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Remedial Investigation for Munitions Response Program Site UXO4

Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

July 2016
Document Control No: KCH-2622-0070-0055

Contract No: N62473-09-D-2622

CTO No: 0070

Prepared for:

Naval Facilities Engineering Command
NAVFAC SOUTHWEST

Prepared by:

KCH

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Naval Facilities Engineering Command Southwest

Prepared by:

CH2M HILL Kleinfelder, A Joint Venture
402 West Broadway, Suite 1450
San Diego, California 92101

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CH2M HILL Kleinfelder, A Joint Venture

Signature: _____ Date: _____
Dan Carroll, PE
Project Quality Assurance Officer

Signature: _____ Date: _____
Gus Thrasher, PE
Task Order Manager

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Executive Summary

CH2M HILL Kleinfelder, A Joint Venture (KCH), prepared this remedial investigation (RI) report to address munitions and explosives of concern (MEC)/material potentially presenting an explosive hazard (MPPEH), and munitions constituents (MC) for Munitions Response Program (MRP) Site Unexploded Ordnance (UXO) 4. The RI activities included biological monitoring, site land survey, vegetation removal, surface MEC clearance, soil sampling, digital geophysical mapping (DGM), reacquisition of DGM anomalies of interest, intrusive investigation of DGM anomalies, trenching investigation, MPPEH management, and preparation of an after-action report.

MRP Site UXO4 is a vacant open space bordered by Terrier Road to the north and Sidewinder Road to the south at Naval Weapons Station (NAVWPNSTA) Seal Beach Detachment Fallbrook (Detachment Fallbrook), Fallbrook, California. This RI was prepared for Naval Facilities Engineering Command (NAVFAC) Southwest under Contract Task Order 0070, Contract Number N62473-09-D-2622.

In February 1942, what was then Naval Ammunition Depot (NAD) Fallbrook was commissioned. The depot's mission was to receive, store, and guard large quantities of explosives and ammunition, and then distribute and deliver them as needed to other installations. This status ended with the onset of the Korean War in 1950. In 1953, the Marine Barracks at the depot became a separate command, which replaced the Marine Guard Detachment from Marine Corps Base (MCB) Camp Pendleton that had provided station security since the original commissioning in 1942. In 1958, NAD Fallbrook was designated an annex of the Naval Ammunition Depot, Seal Beach. In the 1960s, the depot's primary duty was to support the Pacific Marine Forces. On October 1, 1997, following the reorganization of munitions handling installations, the depot's name changed to Detachment Fallbrook, and it reported to the present NAVWPNSTA Seal Beach. Currently, MRP Site UXO4 is not in use and is completely fenced.

MRP Site UXO4 (previously known as the Dunnage Disposal Site 3) was originally identified under the Installation Restoration Program (IRP) and given the designation IRP Site 34c. No IRP investigations were undertaken, and IRP Site 34c is now being addressed under the MRP and identified as MRP Site UXO4.

MRP Site UXO4 is approximately 1.8 acres and was reported to be a burial area for dunnage and munitions. The site was reportedly used between 1942 and 1978. A 1978 memorandum from a former Commanding Officer at Detachment Fallbrook states that numerous cases of inert rifle-propelled grenades were buried in the area. All interviews and documentation relating to the site indicated that only inert ordnance was buried at MRP Site UXO4.

In November 2004, the Explosives Ordnance Disposal Unit from Camp Pendleton, California conducted a site survey of the area, which had not yet been identified as an MRP site. It was noted that the site was an area where practice rifle grenades were placed as landfill material to prevent soil erosion. Numerous inert rifle grenades exposed by erosion were observed at the surface during the survey (United States Marine Corps, 2004).

Information gathered during the preliminary assessment (PA) indicates that inert rifle grenades, one M720 60-millimeter mortar, and other munitions scrap were observed on the ground surface and in the ravine area during the site visits (Malcolm Pirnie, 2006). During the follow-on site inspection (SI), a disposal trench was tentatively identified through a geophysical survey in the central portion of the site. The geophysical survey indicated that the majority of disposal took place in and around a drainage swale located near the central portion of the site. Eleven suspect MEC items (M31 practice grenades) were found. Some of these items were found protruding from the walls of the drainage, and some were lying on the surface of the site, while others were partially buried. All suspect MEC was treated as having an explosive hazard and left in place. As a result, the explosive status of these items remained unconfirmed. Some portions of the site were inaccessible during the SI because of dense vegetation (ChaduxTt, 2010).

In early November 2014, six practice rifle grenades and other munitions debris and scrap metal were observed to be exposed on and protruding from the ground surface along the shallow drainage located west and downgradient of the MRP Site UXO4 boundary. Prior to the May 2014 Tomahawk wildfire at Detachment Fallbrook, this area was covered with coastal scrub vegetation. Much of the vegetation in this area was destroyed by the fire. Following heavy rains in October 2014, which caused significant soil erosion along the shallow drainage area, it is suspected that the suspect MEC items and other munitions debris were exposed. Therefore, this 2.16-acre area along the drainage area is identified as the Additional Work Area.

The purposes of the RI field activities are as follows:

- Determine the nature and extent of MEC/MPPEH and MC at MRP Site UXO4 and whether impacts to surface soil have occurred at the Additional Work Area, located downgradient of the site.
- Provide data for the MEC hazard assessment and the MC baseline human health risk assessment (HHRA) and screening-level ecological risk assessment (ERA).
- Perform the MEC hazard assessment, HHRA, and ERA.
- Complete an RI to generate sufficient investigative information to perform a comparative analysis, and recommend a remedial action alternative for those areas of concern within MRP Site UXO4 that have been determined to present an unacceptable explosives safety hazard or chemical risk to potential receptors.

RI field activities included the following:

- Site preparation
- Anomaly avoidance
- Location surveying
- Utility locating
- Vegetation removal
- Biological avoidance
- Instrument verification
- MPPEH management
- Surface clearance

- Geophysical data collection
- Intrusive investigation of anomalies (including four investigative trenches)
- Soil sampling for MC

Because the inferred depth to groundwater is greater than 100 feet below ground surface (bgs), groundwater is not considered a medium of concern at MRP Site UXO4 and is not addressed by this RI (KCH, 2015a).

Following the completion of DGM, the distribution of total detected metallic anomalies were evaluated using Visual Sample Plan (VSP) (Pacific Northwest National Laboratory/Battelle, 2014). The number of anomalies required from each population to achieve a 95 percent confidence level and within a ±5 percent margin of error for defining nature and extent of potential MEC/MPPEH was then determined using the VSP Estimating a Proportion Method. Hence, only a percentage of subsurface anomalies were investigated as part of the RI field work. The specific anomalies to be intrusively investigated were subsequently determined using a random number generator. The combined subset of DGM anomalies selected for intrusive investigation from the EM61-MK2 surveys and from the G-858 magnetometer survey were then re-acquired and marked in the field by the location surveyor. To assess the nature of the source of the selected DGM anomalies, UXO technicians used hand tools to investigate until the source of the anomaly was discovered. No MEC was recovered during the field operations at MRP Site UXO4 and the Additional Work Area during the RI field activities. MPPEH found at MRP Site UXO4 included the following items:

- M31 practice rifle grenades (approximately 1,000)
- M11 practice rifle grenades (approximately 500)

The practice rifle grenades did not contain an explosive hazard so they were not initially classified as MEC or MDEH, but potentially contained explosives so were considered MPPEH. After further inspection, they were further classified as MDAS. All MPPEH was inspected, certified, and verified as material documented as safe (MDAS). Fourteen drums containing MDAS from MRP Site UXO4 were sent to Bonetti Explosives in Columbus, Texas, for shredding and smelting.

A total of 2,390 pounds of MDAS from MRP Site UXO4 was shredded and smelted on May 26, 2015.

Non-munitions-related metallic debris was inspected, certified, verified, and documented on a United States Department of Defense (DoD) Form 1348-1A, and was placed in a separate storage bin dedicated for non-munitions-related metallic debris. About 400 pounds of non-munitions-related metallic debris from MRP Site UXO4 was transported offsite to Fallbrook Waste and Recycling for recycling on April 15, 2015.

Soil investigations conducted during 2008 for the SI and during 2015 for the RI have resulted in the collection of 11 surface soil samples (0 to 0.5 foot bgs) and 47 subsurface soil samples (0.5 to 8 feet bgs). Perchlorate, explosives, and hexavalent chromium were not detected above United States Environmental Protection Agency (USEPA) regional screening levels (RSLs) in surface and subsurface soil samples. Metals were detected in soil at concentrations above background threshold values (BTVs) or the lower of USEPA RSLs and California Department of Toxic Substances Control (DTSC) screening levels (DTSC-SLs).

Beryllium, cadmium, copper, lead, manganese, mercury, and zinc were detected above their respective BTVs in one or more soil samples; however, none of these concentrations were above their respective residential and industrial RSLs or DTSC-SLs. Arsenic concentrations were above the residential and industrial DTSC-SLs in the 47 samples, but were above the BTV in 25 of the 47 samples. The cobalt concentration in one soil sample was above the BTV and residential RSL.

Although all items recovered as part of the RI field work were classified as MDAS, based on the items reported in the PA and SI, the potential for MEC/MPPEH in the subsurface at MRP Site UXO4 and the Additional Work Area is considered to remain, and therefore the potential explosive hazard remains. Pursuant to an MEC hazard assessment, the overall hazard resulting from MEC/MPPEH potentially remaining at MRP Site UXO4 and the Additional Work Area is judged to be moderate.

Based on the evaluation of primary risk contributors in the HHRA, no constituents are recommended for response action at MRP Site UXO4.

The results of the ERA indicate that concentrations of constituents of potential ecological concern (COPECs) found in MRP Site UXO4 soil during the RI sampling are below levels that might be expected to pose ecological risk (as indicated by the high toxicity reference value (TRV)-based ecological screening values [ESVs])**.** The overall conclusion of the ERA is that the concentrations in soil do not pose unacceptable risk to ecological receptors.

The nature and extent of MC resulting from the presence of MEC and MPPEH, as well as environmental constituents, is limited to concentrations of arsenic in surface and subsurface soil. However, the concentrations of arsenic in soil are consistent with naturally occurring concentrations of arsenic in local soil; therefore, there are no known impacts of MEC, MPPEH, or environmental constituents at MRP Site UXO4 and the Additional Work Area.

Based on the results of the RI field investigation, risk assessments, and explosive hazard assessment, the following are recommendations for future actions at MRP Site UXO4:

- MPPEH are suspected to remain in the subsurface at MRP Site UXO4 and the Additional Work Area, therefore,it is recommended that the site remain under restricted military use for the foreseeable future and remain fenced with warning signs. Also, UXO personnel support is recommended for any intrusive activities to be conducted at MRP Site UXO4. It is recommended these land use controls continue to be implemented at MRP Site UXO4.
- Neither MEC or MPPEH were found in the Additional Work Area during RI activities; however, UXO construction support is recommended for any intrusive activities to be conducted at the Additional Work Area.
- Although no impacts related to MEC, MPPEH, or MC were identified at MRP Site UXO4 and the Additional Work Area, due to the potential presence of MEC/MPPEH in the subsurface, it is recommended to proceed with a a feasibility study for MRP Site UXO4 to develop remedial action objectives and to develop and evaluate remedial alternatives to address the remaining potential of MEC/MPPEH at MRP Site UXO4 and the Additional Work Area.

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Acronyms and Abbreviations

°F	degree(s) Fahrenheit
<	less than
95UCL	95 percent upper confidence limit
Army	United States Department of the Army
BAMP	Biological Avoidance and Minimization Plan
BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
Bonetti	Bonetti Explosives, Inc.
BTV	background threshold value
CAGN	California gnatcatcher
Cal-EPA	California Environmental Protection Agency
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	constituent of potential concern
COPEC	constituent of potential ecological concern
CSEM	conceptual site exposure model
CSM	conceptual site model
CTO	Contract Task Order
DDESB	Department of Defense Explosives Safety Board
Detachment Fallbrook	Naval Weapons Station Seal Beach Detachment Fallbrook
DGM	digital geophysical mapping
DMM	discarded military munitions
DoD	United States Department of Defense
DTSC	California Department of Toxic Substances Control
DTSC-SL	California Department of Toxic Substances Control screening level
EM	electromagnetic
EMP	Explosives Management Plan
EPC	exposure point concentration
ERA	ecological risk assessment
ESO	explosives safety officer
ESS	Explosives Safety Submission
ESV	ecological screening value
EZ	exclusion zone
FS	feasibility study
GPS	global positioning system

HA	hazard assessment
HE	high explosives
HHRA	human health risk assessment
IRP	Installation Restoration Program
IVS	instrument verification strip
KCH	CH2M HILL Kleinfelder, A Joint Venture
Kgt	Tonalite (parent rock type)
MC	munitions constituents
MCB	Marine Corps Base
MDAS	material documented as safe
MEC	munitions and explosives of concern
mg/kg	milligram per kilogram
mm	millimeter
MPPEH	material potentially presenting an explosive hazard
MRP	Munitions Response Program
MRSIMS	Munitions Response Site Information Management System
MS	matrix spike
MSD	matrix spike duplicate
NAD	Naval Ammunition Depot
NAVFAC	Naval Facilities Engineering Command
NAVSEA	Naval Sea Systems Command
Navy	United States Department of the Navy
NOSSA	Naval Ordnance Safety and Security Activity
NAVWPNSTA	Naval Weapons Station
PA	preliminary assessment
PLS	Professional Land Surveyor
QC	quality control
RBC	risk-based concentration
RI	remedial investigation
RSL	regional screening level
RTK	real-time kinematic
SI	site inspection
SKR	Stephen's kangaroo rat
SLERA	Screening-level Ecological Risk Assessment
SUXOS	senior UXO supervisor
SVOC	semivolatile organic compound
TCRA	time-critical removal action
TRV	toxicity reference value

USAE	USA Environmental
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UXO	unexploded ordnance
UXOQCS	unexploded ordnance quality control specialist
VOC	volatile organic compound
VSP	Visual Sample Plan

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1.0 Introduction

CH2M HILL Kleinfelder, A Joint Venture (KCH), prepared this remedial investigation (RI) report to address munitions and explosives of concern (MEC) / material potentially presenting an explosive hazard (MPPEH), and munitions constituents (MC) for Munitions Response Program (MRP) Site Unexploded Ordnance (UXO) 4. Definitions for munitions-related terms are provided in Section 1.3.

MRP Site UXO4 is a 1.8-acre vacant open space bordered by Terrier Road to the north and Sidewinder Road to the south at Naval Weapons Station (NAVWPNSTA) Seal Beach Detachment Fallbrook (Detachment Fallbrook), Fallbrook, California (Figures 1-1, 1-2, and 1-3). A shallow drainage ravine is located west and downgradient of the MRP Site UXO4 boundary; it is a 2.16-acre area identified as the Additional Work Area (Figures 1-2 and 1-3). Information was not available regarding the operational history of the Additional Work Area and whether it also served as a burial area; therefore, the Additional Work Area was identified as a separate work area for this RI.

This RI report is being prepared for Naval Facilities Engineering Command (NAVFAC) Southwest under Contract Task Order (CTO) 0070, Contract Number N62473-09-D-2622.

1.1 Project Objectives and Purpose

The objective for this CTO is to perform an RI under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements to address the presence, nature, and extent of MEC and MC at MRP Site UXO4 and the Additional Work Area.

The purposes of this RI are as follows:

- Determine the nature and extent of MEC/MPPEH and MC at the site and the Additional Work Area.
- Provide data for the MEC hazard assessment and the MC baseline human health risk assessment (HHRA) and ecological risk assessment (ERA).
- Perform the MEC hazard assessment, HHRA, and ERA.
- Collect sufficient data to develop and evaluate potential remedial alternatives as necessary.
- Complete an RI to generate sufficient investigative information to develop, assess, and perform comparative analysis, and recommend remedial alternatives for those areas of concern within the MRP Site UXO4 (and the Additional Work Area) that have been determined to present an unacceptable explosives safety hazard or chemical risk to potential human or ecological receptors.

RI activities included the following:

- Site preparation (including vegetation clearance and utility locating)

- Surface MEC clearance
- Soil sampling
- Location surveys and mapping
- Digital geophysical mapping
- Reacquisition and intrusive investigation of digital geophysical mapping (DGM) anomalies
- Trenching investigations
- MPPEH management
- Preparation of an after-action report
- Preparation of an RI report

Project field and reporting activities were implemented by an integrated team specializing in environmental and MEC investigations. The project team and associated lines of communication were detailed in the organization chart included as Worksheet #5 of the MEC Quality Assurance Project Plan (QAPP) and the Sampling and Analysis Plan (KCH, 2015a).

1.2 Report Organization

This RI report is organized with the following sections:

- Section 1.0 – Introduction
- Section 2.0 – Site Background
- Section 3.0 – Previous Investigations
- Section 4.0 – Remedial Investigation Field Activities
- Section 5.0 – Remedial Investigation Results
- Section 6.0 – Nature and Extent
- Section 7.0 – Explosive Hazards Evaluation
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- Appendix H - Laboratory Analytical Reports
- Appendix I - Data Quality Assessment
- Appendix J - Data Validation Reports
- Appendix K - MEC Hazard Assessments

- Appendix L - Human Health Risk Assessment
- Appendix M - Ecological Risk Assessment

1.3 Munition-related Terms Definitions

Throughout this report, specific munitions response terminology is used, including MEC, MPPEH, material documented as safe (MDAS), discarded military munitions (DMM), UXO, MC, and non-munitions-related metallic debris. Military munitions-related terms used throughout this document are consistent with the April 21, 2005, United States Department of the Army (Army) memorandum *Munitions Response Terminology* (Army, 2005) and are defined as follows:

- **MEC:** Specific categories of military munitions that may pose unique explosives safety risks, including (1) UXO as defined in 10 United States Code 2710(e)(9); (2) DMM, as defined in 10 United States Code 2710(e)(2); or (3) explosive munitions constituents present in high enough concentrations to pose an explosive hazard.
- **MPPEH:** Material owned or controlled by the Department of Defense that, prior to determination of its explosives safety status, potentially contains explosives or munitions (for example, munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal) or potentially contains a high enough concentration of explosives that the material presents an explosive hazard (for example, equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization, or disposal operations). Excluded from MPPEH are military munitions within the Department of Defense's established munitions management system and other hazardous items that may present explosion hazards (such as gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.
- **UXO:** Military munitions that (1) have been primed, fuzed, armed, or otherwise prepared for action; (2) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material; and (3) remain unexploded either by malfunction, design, or any other cause.
- **MDAS:** MPPEH that has been assessed and documented as not presenting an explosive hazard and for which the chain of custody has been established and maintained. This material is no longer considered to be MPPEH.
- **MDEH:** MPPEH that cannot be documented as MDAS, that has been assessed and documented as to the maximum explosive hazards the material is known or suspected to present, and for which the chain of custody has been established and maintained. This material is no longer considered to be MPPEH.
- **DMM:** Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of, consistent with applicable environmental laws and regulations.

- **MC:** Any materials originating from UXO, DMM, or other military munitions, including explosive and non-explosive materials, and emission, degradation or breakdown elements of such ordnance or munitions.
- **Non-munitions related metallic debris:** Debris, other than munitions debris, collected from operational or former ranges or disposal areas (for example, target debris, military munitions packaging, crating material, etc.).

2.0 Site Background

This section summarizes the location, description, and history for MRP Site UXO4. Additional background information is summarized in the *Site Inspection Report for Installation Restoration Program Sites 32, 34b, 34d and 34e and Munitions Response Program Sites UXO1, UXO2, UXO3, UXO4, UXO6 and UXO7* (SI) (ChaduxTt, 2010).

2.1 Site Location and Description

Detachment Fallbrook is located approximately 53 miles north of San Diego in northern San Diego County, California, approximately 9 miles inland from the Pacific Coast (Figure 1-1). Detachment Fallbrook is bordered on the west by Marine Corps Base (MCB) Camp Pendleton and is south of the Santa Margarita River. The base currently occupies 8,852 acres, of which only 274 acres are developed. The remaining acreage is mostly open space that falls within Explosive Safety Quantity Distance arcs required for munitions operations.

MRP Site UXO4 is triangular in shape and occupies approximately 1.8 acres (Figures 1-2 and 1-3). There are no occupied buildings on or adjacent to the site. The closest occupied building is at least 1 mile away. The site is roughly 4,500 feet from Ammunition Road, a well-used commuter route within the base boundary. Detachment Fallbrook leases cattle-grazing rights as part of the fire suppression program. The land surrounding MRP Site UXO4 is within the grazing program. The site is fenced with a four-strand wire fence to exclude the site from grazing activities (ChaduxTt, 2010). The 2.16-acre Additional Work Area is located along a shallow drainage that is west and downgradient of MRP Site UXO4.

2.1.1 Installation Mission and Operational History

In February 1942, what was then Naval Ammunition Depot (NAD) Fallbrook was commissioned. The depot's mission was to receive, store, and guard large quantities of explosives and ammunition, and then distribute and deliver them as needed to other installations. The original facilities included 133 magazines, barracks, and administration and service buildings; 16 miles of railroad; and 115 miles of roads and trails (Malcolm Pirnie, 2006). In 1947, after World War II, NAD Fallbrook was put on caretaker status. This status ended with the onset of the Korean War in 1950. In 1953, the Marine Barracks at the depot became a separate command, which replaced the Marine Guard Detachment from MCB Camp Pendleton that had provided station security since the original commissioning in 1942 (ChaduxTt, 2010).

In 1958, NAD Fallbrook was designated an annex of the NAD, Seal Beach. In the 1960s, the depot's primary duty was to support the Pacific Marine Forces. It also stored, tested, and maintained several types of missiles (Malcolm Pirnie, 2006). On October 1, 1997, following the reorganization of munitions handling installations, the depot's name changed to Detachment Fallbrook, and it reported to the present NAVWPNSTA Seal Beach. The base currently has 190 magazines storing pyrotechnics, high explosives (HE), fuzes, detonators,

and small arms ammunition, among other weapons (Malcolm Pirnie, 2006). There are no active ranges within the base (ChaduxTt, 2010).

Detachment Fallbrook contains the only West Coast air-launched missile production facility, where air-launched missiles such as the Phoenix, Sidewinder, Maverick, and high-speed anti-radiation missiles are inspected, maintained, and recertified. The last remnants of the nation's napalm stockpile were stored at Detachment Fallbrook, and a state-of-the-art facility was built there to help eliminate these weapons. The last full napalm canister was destroyed in March 2001 (ChaduxTt, 2010).

Detachment Fallbrook is unique among naval weapons storage areas because it is located inland. Ammunition is transferred to and from ships by a process known as vertical replenishment, where ammunition is taken by trucks from a magazine on Detachment Fallbrook to a helicopter pad located on the coast inside MCB Camp Pendleton. From there, a helicopter picks up the load and transfers it to the receiving ship waiting several miles offshore. In this manner, large vessels such as aircraft carriers and amphibious assault ships can be loaded without leaving their primary Southern California operating and training areas (ChaduxTt, 2010).

2.1.2 MRP Site UXO4 Background

MRP Site UXO4 was previously named Site 34c and later Dunnage Disposal Site 3. The site was reportedly used from 1942 to 1978 as a burial area for dunnage and munitions within Detachment Fallbrook. A 1978 memorandum from Tom Curtis, a former Commanding Officer at NAVWPNSTA Detachment Fallbrook, states that numerous cases of dummy rifle-propelled grenades were buried in the area.

In November 2004, the Explosives Ordnance Disposal Unit from Camp Pendleton, California conducted a site survey of the area, which had not yet been identified as an MRP site. It was noted that the site was an area where soil containing practice rifle grenades was used as fill to prevent soil erosion. Numerous inert rifle grenades exposed by erosion were reported to be observed at the surface (United States Marine Corps, 2004).

Visual observations within the site during the preliminary assessment (PA) (Malcom Pirnie, 2006), as well as geophysical survey results (using a Geonics EM61-MK2) from the site inspection (SI) (ChaduxTt, 2010), supported the information provided in the memorandum.

MRP Site UXO4 is not suspected to contain chemical warfare materiel-filled munitions or depleted uranium associated munitions.

As a result of the discovery of MPPEH downgradient and outside the site boundary of MRP Site UXO4, an additional area of investigation designated as the Additional Work Area was added to the scope of this RI. In early November 2014, six suspected MEC items and other munitions debris and scrap metal were observed to be exposed on and protruding from the ground surface along the drainage ravine in the Additional Work Area. Prior to the May 2014 Tomahawk wildfire at Detachment Fallbrook, this area was covered with coastal scrub vegetation. Much of the vegetation in this area was subsequently destroyed as a result of the fire. Following heavy rains in October 2014, which caused significant soil erosion along the shallow drainage area, it is suspected that the suspected MEC items and other munitions debris were exposed.

No information is available regarding the history of MEC use at the Additional Work Area. However, based on site observations and its proximity to MRP Site UXO4, the Additional Work Area is not suspected to contain chemical warfare materiel-filled munitions or depleted uranium associated munitions.

Currently, MRP Site UXO4 is not in use and is completely fenced. A single gate is located along the western boundary of the site.

2.2 Environmental Setting

Local vegetation, ecology, geology, hydrogeology, and surface water hydrology are summarized in this section.

2.2.1 Physiography and Topography

Detachment Fallbrook lies between the Santa Margarita and San Onofre mountain ranges. The topography is mostly moderate south- and west-facing slopes, with rough broken ridges. It varies from gently rolling hills in the southern area to steeply rising hills to the north. Elevations range from 200 to 840 feet above mean sea level. The local topography is characterized by low hills and natural ravines (ChaduxTt, 2010).

2.2.2 Vegetation and Biological Setting

Detachment Fallbrook is composed mainly of open space where plant communities, habitats, and federally listed as threatened or endangered species are able to thrive because of the low-intensity land use requirement of the site. Fourteen primary vegetation communities occur on the site and generally correspond to seven wildlife habitat types: coastal sage scrub, mixed chaparral, chamise chaparral, valley foothill riparian, annual grassland, fresh emergent wetlands, and eucalyptus. The vegetation in the area of MRP Site UXO4 is considered to be mostly mixed grassland. Common species in mixed grassland habitat include native, perennial bunch grasses such as *Nassella* spp, mixed with nonnative annual grasses.

However, the site contains coastal sage scrub, which is considered to be critical habitat for special-status bird species. For this reason, vegetation removal and all intrusive field work were coordinated with Detachment Fallbrook's biologist and the United States Fish and Wildlife Service (USFWS). A survey for special-status species was performed prior to fieldwork, and fieldwork was performed outside of the bird breeding season, in conjunction with biological avoidance practices, as necessary. Communication with USFWS was handled through the station biologist. Prior to the May 2014 Tomahawk fire at Detachment Fallbrook, the shallow ravine that traverses the site was covered with thick grassland and coastal scrub vegetation. Much of that vegetation was destroyed during the fire.

Federally listed species that could occur at the site include California gnatcatcher (CAGN) (*Polioptila californica*), Stephens' kangaroo rat (SKR) (*Dipodomys stephensi*), arroyo toad (*Bufo californicus*), and Least Bell's Vireo (*Verio bellii pusillus*). Of these species, only two have been potentially recorded within the project area; the threatened CAGN was positively sighted. Suspected kangaroo rat burrows have been positively sighted at MRP Site UXO4; it is unconfirmed whether the burrows belonged to an SKR or the Dulzura kangaroo rat that is

known to be at Detachment Fallbrook and is not endangered. The site contained suitable habitat for SKR in 2009, when the last phase of fieldwork took place. SKR prefer sparsely vegetated grassy areas. During the SI (ChaduxTt, 2010), MRP Site UXO4 was monitored for CAGN and SKR. Neither of these species were observed at the time. However, the possibility remains that both of these species could be present at the site, and the planning phases and fieldwork phases of the project will take this into account by performing field surveys. Special-status species were not found to occupy the site; therefore, mitigation measures were not required.

Other species that are federally listed as endangered or threatened that could potentially occur at MRP Site UXO4 (based on their presence in similar areas in San Diego County and initial surveys conducted by the USFWS on Detachment Fallbrook in March and April 1990) include the quino checkerspot butterfly (*Euphydryas editha quino*) and thread-leaved brodiaea (*Brodiaea filifolia*). These species have never been documented on Detachment Fallbrook and are considered unlikely to be present at the site.

Several unlisted yet sensitive bird species are also known to occur in Detachment Fallbrook and include the rufus-crowned sparrow (*Aimophila ruficeps*), grasshopper sparrow (*Ammodramus savannarum*), and protected raptors such as the Cooper's hawk (*Accipter cooperii*) and Golden Eagle (*Aquila chrysaetos*). These species are known to occur on Detachment Fallbrook but have not been specifically recorded at MRP Site UXO4. These species were not observed at the site at the time of field activities (ChaduxTt, 2010).

2.2.3 Geology

Detachment Fallbrook is located in the western portion of the Peninsular Ranges geomorphic province. The province is dominated by the igneous, volcanic, and metamorphic rocks of the Peninsular Range batholith. Metasediments now preserved in the central and eastern Peninsular Range region include marbles, slates, schists, quartzites, and gneisses. Nearly flat-lying sedimentary formations unconformably overlie the granitic and metasedimentary bedrock in the coastal portions of the province, which include Detachment Fallbrook. Volcanic rocks are found locally within the central and, to a lesser extent, near the coastal areas of the province, such as the San Onofre Mountains of MCB Camp Pendleton (ChaduxTt, 2010).

MRP Site UXO4 is underlain by granitic bedrock mapped as either older volcanic or tonalite composition. The contact between the volcanic materials and the tonalite is tentatively mapped to extend through the site. Volcanic rocks consist of a variety of rock types including dacites, rhyodacites, and tuffs. The closest outcrop to the site is located approximately 400 feet northwest of the site. The volcanic rocks in this area are aphanitic dacites with feldspar phenocrysts (2 to 3 millimeters [mm]) and weakly foliated, and display blocky fractures. A parent rock type of Tonalite (Kgt) is mapped to underlie the southern half of the site. As observed at other locations within the installation, slightly weathered to unweathered tonalite was medium gray.

Alluvial soils have not been mapped because the drainage that traverses the site is relatively shallow (generally less than 2 feet deep). Debris fill is shown to be present in the suspect disposal trench area (ChaduxTt, 2010). During the SI, the fill was logged to a maximum depth of 4 feet and consisted of a medium to light brown fine- to medium-grained silty sand with

metal debris. Artificial fill that is associated with construction of Sidewinder and Terrier Roads was also mapped in the area (ChaduxTt, 2010). The artificial fill consisted of light brown silty sand and was placed to a maximum depth of approximately 10 feet as observed at the location of the culvert that passed below Sidewinder Road (ChaduxTt, 2010).

2.2.4 Hydrology

The general hydrologic setting for the northern portion of the installation is dominated by the Santa Margarita River channel that defines the northern boundary of Detachment Fallbrook. All surface runoff from the northern portion of the installation flows into the Santa Margarita River, which is considered part of the Santa Margarita–Upper Ysidora Watershed. The Santa Margarita River and associated groundwater is designated as beneficial use by the State of California Water Resource Control Board. The central portion of the installation may be characterized by first- and second-order ephemeral drainages associated with Fallbrook Creek. Fallbrook Creek traverses the community of Fallbrook and enters the installation near the east gate at Ammunition Road. The creek flows west through the installation and exits Detachment Fallbrook along the middle of the west boundary, entering MCB Camp Pendleton. The southern portion of the installation drains southward through first- and second-order ephemeral drainages that include Pilgrim Creek. Pilgrim Creek exits the installation along the southern boundary and continues southward, where it eventually joins the San Luis Rey River Channel (ChaduxTt, 2010).

Prior to the May 2014 Tomahawk fire at Detachment Fallbrook, the shallow ravine that traverses the site was covered with thick grassland and coastal scrub vegetation. Much of that vegetation was destroyed during the fire. If present, surface water flow in the ravine is likely now characterized as a moderate- to high-energy environment, particularly following high-intensity rainstorms. Surface water was not observed within the drainage swale at the time of the RI.

Perched groundwater occurs at Detachment Fallbrook within alluvium, colluvium, or thin near-surface (weathered) bedrock layers in topographically low drainage areas. This seasonal perched water occurs primarily after storms or periods of prolonged precipitation, and may be present at relatively shallow depths, less than 10 feet below ground surface (bgs), for many of the first- or second-order drainages at Detachment Fallbrook. However, specific measurement data are minimal (ChaduxTt, 2010).

Shallow groundwater was measured at approximately 17 to 29 feet bgs during installation of three monitoring wells at IRP Site 27 in 2006 (Marrs, 2007). IRP Site 27 is located in the southeastern part of Detachment Fallbrook within the Fallbrook Creek drainage basin, near Pilgram Creek. Based on the well log, it appeared that groundwater encountered occurred at or near the alluvium-to-bedrock contact. It was interpreted this zone of saturation was likely perched and likely occurs seasonally.

Groundwater was not encountered in the borings completed to a maximum depth of 4 feet bgs during the SI. However, shallow groundwater was encountered above a clay layer, at an approximate depth of 7 to 8 feet bgs during a trench investigation during this RI. Potable groundwater is anticipated to be deeper than 100 feet in this area. Although groundwater beneath Detachment Fallbrook is considered beneficial use by the Regional Water Quality

Control Board, the installation receives all of its potable water from the San Diego County Water Authority (ChaduxTt, 2010).

2.2.5 Climate

The climate at Detachment Fallbrook is typical of the coastal Southern California climate, and is characterized by mild winters, cool summers, and infrequent rainfall. The annual average temperature in the Detachment Fallbrook vicinity is 75.7 degrees Fahrenheit (°F). Summer temperatures range from 66°F at night to 90°F during the day. Precipitation ranges from 13.7 to 17.1 inches per year. January is the wettest month and July is the driest, with a mean of 0.02 inch of precipitation. Summers at Detachment Fallbrook are punctuated by the Santa Ana (offshore) winds (Malcolm Pirnie, 2006; KCH, 2015a).

3.0 Previous Investigations

Previous investigations at MRP Site UXO4 include the following:

- PA (Malcolm Pirnie, 2006)
- SI (ChaduxTt, 2010)
- Biological Monitoring (KCH, 2015a)

These investigations are summarized in the following sections.

3.1 Preliminary Assessment

MRP Site UXO4 was evaluated during the PA that was conducted in 2004 and 2005 (Malcolm Pirnie, 2006). The site was identified as Dunnage Disposal Site No. 3 (IRP Site 34c). The PA included interviews of current and retired personnel from Detachment Fallbrook; a review of reports, files, and drawings in the Detachment Fallbrook environmental office; a review of map and flat files at Detachment Fallbrook Facilities and Engineering offices for historical maps and aerial photos; and a review of archives at the NAVFAC historian's office at Port Hueneme. A 1978 memorandum from Tom Curtis, a former Commanding Officer at Detachment Fallbrook states that numerous cases of inert rifle-propelled grenades were buried in the area (Malcolm Pirnie, 2006).

Two data collection teams were used to conduct visual surveys of MRP Site UXO4 in September 2004 and March 2005. The visual data were collected by walking the perimeter of MRP Site UXO4 and then walking several transects within it. Inert rifle grenades, one M720 60-mm mortar, and other munitions scrap were observed on the ground surface and in the ravine area during the PA site visits. A large quantity of non-munitions-related debris was also noted at the site (Malcolm Pirnie, 2006).

Because of the PA's conclusion that IRP Site 34c was a burial area for possible munitions and munitions-related debris, the site was moved from the IRP to the MRP and was named MRP Site UXO4. This decision was based on the presence of the exposed inert rifle-propelled grenades and a 60-mm mortar at the site (Malcolm Pirnie, 2006).

3.2 Site Inspection

The SI was completed at MRP Site UXO4 by ChaduxTt in 2010. The SI included UXO detector-aided visual surveying, site reconnaissance mapping, and geophysical surveys (EM-61 surveys) to locate buried suspect MEC. Biased and unbiased location samples were submitted to the laboratory for analysis of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs), metals, white phosphorous, perchlorate, and explosive compounds (ChaduxTt, 2010).

During the SI, a disposal trench was tentatively identified through a geophysical survey in the central portion of the site. The geophysical survey indicated that the majority of disposal

took place in and around the ravine in the central portion of the site. Some portions of the site were inaccessible during the SI because of dense vegetation. Eleven suspect MEC items (M31 practice grenades) were found. Some of these items were found protruding from the walls of the drainage and some were lying on the surface of the site, while others were partially buried. All suspect MEC identified during the SI was treated as having an explosive hazard, and was left in place. Therefore, the explosive status of these items remained unconfirmed (ChaduxTt, 2010).

The SI included the following soil sampling tasks:

- Drilling and sampling of six soil borings adjacent to observed suspect MEC or electromagnetic anomalies. Surface (0 to 2 feet bgs) and subsurface (4 to 6 feet bgs) soil samples were collected from the soil borings. A total of 10 discrete surface and subsurface soil samples were collected from the soil borings.
- Collection of two bias-located discrete surface (0 to 2 feet bgs) soil samples from the drainage swale/ravine that traverses the site from southeast to northwest. One soil sample was collected below the Sidewinder Road corrugated metal pipe outfall, and one soil sample was collected at the downgradient boundary of the site.
- Collection of four non-bias-located discrete surface samples (0 to 2 feet bgs) from four randomly selected grid cells within a sampling grid established across the site.

Soil samples collected from the munitions areas, drainage swale areas, and randomly selected grid cells were analyzed for explosives, metals, perchlorate, VOCs, and SVOCs. VOCs and SVOCs were not detected at concentrations above the laboratory reporting limits in the soil samples collected at the site. Although metals concentrations exceeded some human health screening criteria and ecological benchmarks available during the SI, the concentrations of metals detected at the site are relatively low and were considered within the range of normal background concentrations for the region. Perchlorate was detected in one of the 16 samples. The detected concentration for perchlorate did not exceed human health screening criteria (ChaduxTt, 2010).

No concentrations of explosives or propellants, VOCs, or SVOCs were detected in soils during the SI at MRP Site UXO4. Perchlorate was detected at a concentration below the human health screening criteria. Two metals (arsenic and cadmium) exceeded human health screening criteria. At least one sample contained detected concentrations of six metals in soil at MRP Site UXO4 (aluminum, chromium, cobalt, iron, manganese, and vanadium) that exceeded the corresponding ecological benchmarks. Arsenic exceeded both residential and industrial human health screening criteria available at the time of the SI, but this was thought to be attributed to background due to the low concentrations and similar range of concentrations detected over the sampling area (ChaduxTt, 2010). Figures and tables from the SI for MRP Site UXO4 are included in Appendix A.

3.3 Biological Monitoring

The results of previous SKR trapping events and CAGN surveys were detailed in the biological avoidance and minimization plan (BAMP) that was an appendix to the RI work plan (KCH, 2015a). Prior to the May 2014 Tomahawk Fire, the CAGN habitat within MRP Site UXO4 was of low to moderate quality, with sparse, patchy vegetation ranging in size from 1 to 2 feet in height. Currently (post-fire), some scattered stems of various shrubs and herbs remain. However, the overall density of both shrub and herbaceous vegetation cover is severely reduced, and bare ground is abundant throughout. CAGN were not observed or heard during the protocol surveys conducted at MRP Site UXO4 between September 2013 and February 2014. CAGN are considerably less likely to use MRP Site UXO4 now that the site vegetation was burned as a result of the May 2014 Tomahawk Fire.

An initial check of the site for habitat suitable for the endangered SKR, as well as for kangaroo rat signs (i.e., burrows, scat, or tracks), was conducted during December 2013 by SJM Biological Consultants (KCH, 2015a). Open grassland potentially occupied by SKR, as well as occasional signs of kangaroo rat activity, were confirmed in a portion of the eastern part of the site. However, because there is no way to determine the species responsible for such signs, it was necessary to conduct a trapping survey to confirm the species creating the signs. A trapping survey to determine the species of kangaroo rat creating the signs observed at the site was conducted on five nights between December 6 and 12, 2013. The trapping survey confirmed that no SKR were present in the project area, and therefore no impacts to SKR would occur during RI field activities.

A follow-up non-trapping survey was conducted at MRP Site UXO4 on August 18, 2014, to assess the potential for SKR occurrence following the May 2014 Tomahawk Fire. The visual survey was conducted to evaluate whether the more open vegetation conditions caused by the fire resulted in more suitable conditions for SKR than existed prior to the fire. At the time of the RI field activities, MRP Site UXO4 was very open (i.e., exhibited abundant bare ground) compared to before the fire because of the razing of numerous shrubs and sub-trees, and to a lesser degree herbaceous vegetation cover. Rodent burrows were observed to be rare throughout, with no evidence of kangaroo rat activity observed at MRP Site UXO4 or in the immediate vicinity.

Areas surrounding MRP Site UXO4 also burned to varying degrees. The area outside the western entry gate burned, but still exhibited some shrubs that were only partly burned. The hill to the south of MRP Site UXO4 and across Sidewinder Road, which was known to harbor a scattered population of SKR in late 2013, also burned. Thus, bare ground is abundant in both of these areas adjacent and in proximity to MRP Site UXO4.

Based on observations made during the August 18, 2014, survey, there was no evidence that suggested incursion by SKR (i.e., burrows, diggings, or tracks) into MRP Site UXO4 or the immediate vicinity, and there was no reason to suspect that SKR have entered MRP Site UXO4 since the December 2013 trapping survey. Therefore, biological monitoring for SKR was not conducted during field activities at MRP Site UXO4.

3.4 Known or Suspected MEC/MPPEH

In 2004, a PA was conducted at MRP Site UXO4. During the visual survey, items observed included surface scrap metal, inert rifle grenades, and one M720 60-mm mortar (Malcolm Pirnie, 2006).

A 1978 memorandum states that numerous cases of dummy rifle-propelled grenades were buried in the area. M31 practice rifle grenades were observed within the site. Eleven suspect MEC items were found throughout the site during the PA fieldwork. All 11 items were M31 practice grenades. Some of these items were found protruding from the walls of the main ravine that crosses the central portion of the site, some were lying on the surface of the site, and others were partially buried. All suspect MEC was treated as an explosive hazard and was left in place. EM61-MK2 geophysical survey results support the information provided in the memorandum (ChaduxTt, 2010).

Because the SI reported evidence of suspect MEC (practice rifle grenades) and past practices as well as the nature and extent of EM anomalies detected by the EM61-MK2 and magnetic anomalies detected by the handheld magnetometer, the MEC risk and hazard at MRP Site UXO4 is anticipated to be medium to high. Based on suspect MEC observations, the central portion of the site was anticipated to have the highest MEC density. Although only practice munitions were observed, it was deemed possible that other MEC was disposed of at the site. Based on the MEC investigation included as part of the SI, performance of an RI was recommended (ChaduxTt, 2010).

In early November 2014, prior to RI field activities, six practice rifle grenades and other munitions debris and scrap metal were observed by base biologist personnel to be exposed on and protruding from the ground surface along the shallow drainage located west and downgradient of the MRP Site UXO4 boundary. Prior to the May 2014 Tomahawk wildfire at Detachment Fallbrook, this area was covered with coastal scrub vegetation. Much of the vegetation in this area was subsequently destroyed as a result of the fire. Following subsequent heavy rains in October 2014, which caused significant soil erosion along the shallow drainage area, it is suspected that the M31 practice rifle grenades and other munitions debris were exposed by erosion and potentially migrated from the MRP Site UXO4 site during heavy precipitation run off. This 2.16-acre area along the drainage area is identified as the Additional Work Area.

4.0 Remedial Investigation Field Activities

The project tasks for the RI for MRP Site UXO4 are summarized in this section. Field work was performed in accordance with the Accident Prevention Plan/Site Safety and Health Plan (KCH, 2015b).

Shallow groundwater was measured at approximately 17 to 29 feet bgs during installation of three monitoring wells at IRP Site 27 in 2006 (Marrs, 2007). IRP Site 27 is located in the southeastern part of Detachment Fallbrook within the Fallbrook Creek drainage basin, near Pilgram Creek and approximately 3,500 feet southeast of MRP Site UXO4. Based on the well log, it appeared that groundwater encountered occurred at or near the alluvium to-bedrock contact. It was interpreted this zone of saturation was likely perched and likely occurs seasonally. Potable groundwater is expected to be greater than 100 feet bgs (ChaduxTt, 2010). Because of the inferred depth to groundwater (greater than 100 feet), groundwater was not considered a medium of concern at MRP Site UXO4 and was not investigated during this RI. In addition, because of the absence of surface water at MRP Site UXO4, surface water was not investigated during the RI.

The Explosives Safety Submission for the RI at MRP Site UXO4 was distributed to Naval Ordnance Safety and Security Activity (NOSSA) for interim approval in January 2015, as required by Navy policy. To allow the work to begin before the CAGN breeding season began, NOSSA provided authorization to proceed with RI field activities, pending review and response by the Department of Defense Explosives Safety Board (DDESB). Following incorporation of minor edits, the Explosives Safety Submission (ESS) was endorsed by DDESB (KCH, 2015c). Work was performed in accordance with the NOSSA and DDESB-approved ESS.

In addition, an Explosives Management Plan (EMP) was prepared for the management of commercial explosives brought to Detachment Fallbrook for MEC/MPPEH disposal. The draft EMP was provided to the Detachment Fallbrook explosives safety officer (ESO) for review. Comments from the ESO were incorporated, and the final EMP was submitted with the Final RI Work Plan dated February 2015 (KCH, 2015a). A photographic log for RI activities at MRP Site UXO4 and the Additional Work Area is included in Appendix B.

4.1 Site Preparation

KCH and USA Environmental (USAE) (UXO subcontractor) personnel were mobilized to Detachment Fallbrook on February 9 and 10, 2015. Key site preparation activities included the following:

- Base access credentials were obtained by KCH and USA Environmental personnel.
- On February 10, 2015, a UXO hazard briefing was conducted by the KCH Munitions Response Project Quality Assurance Officer on behalf of the Fallbrook ESO.

- Delivery of storage containers, drums, armored excavator, protective observation armor/shielding, mini-excavator, and commercial explosives and detonators was completed.

4.2 Anomaly Avoidance Measures

Anomaly avoidance techniques were implemented by a UXO escort to avoid potential surface or subsurface MEC during vegetation clearance, biological monitoring, site surveying, and RI soil sampling activities. A UXO technician conducted a reconnaissance of the approach route to the site and located a clear path for the vegetation removal, surveying, and sampling teams. A UXO technician cleared a work site for soil samples with a magnetometer, and clearly marked the boundaries. The area was large enough to provide a work area for intrusive activities performed by the surveying and/or sampling team.

4.3 Location Surveys and Mapping

A California-registered and licensed professional land surveyor (PLS) (Coast Surveying, Inc.) established location control (i.e., temporary benchmarks) onsite for use as control points throughout the field activities. UXO personnel provided escort to the PLS using anomaly avoidance measures to prevent unintentional contact with potential MEC or MPPEH during land surveying. The PLS then completed surveying of the grid cell overlay and the Additional Work Area boundary. Layout of DGM areas was performed using global positioning system (GPS) (Trimble GeoXH) and Munitions Response Site Information Management System (MRSIMS) handheld personal digital assistant devices.

Prior to the start of DGM, the PLS, escorted by UXO personnel, placed and documented buried quality control (QC) seed items. Following DGM, the PLS reacquired and flagged geophysical anomalies (including QC seed items) selected for intrusive investigation from the DGM survey, including those selected within the Additional Work Area.

Handheld personal digital assistant devices were used for recording the locations of site features such as piles of debris, fences, and utilities.

4.4 Utility Locating

On February 13, 2015, a utility location subcontractor (Spectrum Geophysics) conducted a check for the locations of underground utilities using the following geophysical technologies:

- Radio Detection 4000 transmitter with matched receiver
- Schonstedt Mac 51b handheld magnetometer
- Fisher TW-6 M-scope shallow focus metal detector
- Dynatel 500A transmitter with matched receiver

Ground-penetrating radar was not used in the investigation because of the thick brush and rugged terrain that characterized a portion of MRP Site UXO4. During the investigation, Spectrum Geophysics detected several utility conduits that were marked on the ground

with spray paint in a color code established by the American Public Works Association. The utility locating report is included in Appendix C.

4.5 Vegetation Removal

Most areas of vegetation on Detachment Fallbrook burned as a result of the Tomahawk Fire in May 2014. Clearance of remaining vegetation was conducted in areas where DGM surveys were planned. Vegetation clearance was also conducted at the four areas where trench investigations were planned. Vegetation was cleared using loppers, man-portable weed-whackers, and chainsaws. Before vegetation removal began, UXO technicians completed a detector-aided visual sweep to ensure that the area was clear of surface MEC/MPPEH. UXO technicians cleared vegetation to a height that provided suitable access for surface clearance, DGM and intrusive investigations.

A skid steer loader was used to haul vegetation away from the work areas so as to not impede data collection or create a safety hazard, and the vegetation was then fed through a chipper. In consultation with the Detachment Fallbrook biologist team, chipped vegetation was used to cover bare soil and erosion areas at MRP Site UXO4. Vegetation clearance of MRP Site UXO4 and the Additional Work Area was completed on February 27, 2015.

4.6 Instrument Verification

Prior to conducting surface clearance and DGM at MRP Site UXO4 and the Additional Work Area, the analog magnetometers were tested and the DGM instrument and positional equipment were validated at an instrument verification strip (IVS). Information regarding installation and instrument testing at the IVS is provided in Appendix D.

4.7 MPPEH Management

A systematic approach was used for collecting, inspecting, and segregating items recovered during the investigation. The management approach was designed so that materials undergo a continual inspection and evaluation process from the time they are acquired until they are removed from the site.

Segregation procedures began when the item was discovered by the UXO technician, who made a preliminary determination as to the item's classification into one of three categories: MPPEH, MDEH, or non-munitions-related metallic debris. The UXO technician confirmed the classification of the item and recorded the location and depth.

For MPPEH inspection and management, KCH's MEC support contractor followed United States Department of Defense (DoD) Instruction 4140.62, Material Potentially Presenting an Explosive Hazard (DoD, 2008) and Naval Sea Systems Command (NAVSEA) Ordnance Pamphlet 5 Volume 1 (Navy, 2015). These procedures ensured that MPPEH and other debris were inspected, reinspected, certified, and documented as free of explosive hazard within the grid and the chain-of-custody maintained. This material was then no longer considered MPPEH and was further managed as material documented as safe (MDAS) outside of MRP Site UXO4.

4.8 Surface Clearance

The surface clearance at MRP Site UXO4 and the Additional Work Area was completed using detector-aided visual approach. The analog instruments included Schonstedt Model GA-52CX and White's Model XLT®.

The Schonstedt GA-52Cx measures the magnetic gradient between two sensors to detect changes in the earth's magnetic field resulting from the presence of a ferrous item. The Schonstedt GA-52Cx was used to assist with reacquisition of anomalies and removal verification QC of DGM anomalies. The White's Model XLT® is a time-domain electromagnetic (EM) all-metals detector that provides an audio and visual response. The instrument applies a pulsing current to a transmitter coil, which then induces a magnetic field. When the magnetic field of the coil moves across a metallic item, the field induces electric currents (called eddy currents) in the item. The eddy currents induce their own magnetic field, generating an opposite current in a receiving coil, which in turn induces a signal indicating the presence of metal. The White's Model XLT® was used to assist in MEC avoidance activities during vegetation removal and land surveying, and to assist the Unexploded Ordnance Quality Control Specialist (UXOQCS) when installing the IVS and burying blind QC seeds.

All handheld instruments were checked in the IVS prior to and following work each day that surface clearance operations took place, and were determined to be functioning as intended. The process of subdividing each grid cell into 5- by 100-foot search lanes marked by polypropylene rope confirmed that the entire grid area was searched. QC checks indicated acceptable effectiveness of these instruments used for the surface sweep.

4.9 Geophysical Data Collection

For MRP Site UXO4 and the Additional Work Area, DGM was performed using both the Geonics EM61-MK2 and the Geonics EM31 terrain conductivity meter. The Geonics EM61-MK2 is a high-resolution time-domain EM instrument designed to detect, with high spatial resolution, shallow ferrous and nonferrous metallic objects. The EM61-MK2 was selected for this project because of its documented success in support of munitions response investigations, its ability to detect ferrous and nonferrous objects, and its documented capabilities to detect relatively small munitions items (e.g., 20-mm projectiles). The Geonics EM31 was presumptively selected for use during DGM because of its well-documented use in delineating the lateral extent of disposal areas containing both metallic and nonferrous materials. The EM31 was used as a reconnaissance tool to identify potential disposal areas and to assist in selection of investigative trench locations during the intrusive investigation. Location control during EM61-MK2 and EM31 data collection was maintained using survey-grade real-time kinematic (RTK) GPS. Both geophysical instruments are considered effective at locating and recording the presence of subsurface metallic items.

While the EM61-MK2 and EM31 are well suited to detecting subsurface anomalies, neither instrument can fully discern whether those anomalies are MEC or munitions debris, non-munitions-related metallic debris, or geologic interference until intrusively investigated. Geophysical anomalies were selected for intrusive investigation using the procedures described in Visual Sample Plan (VSP) (Pacific Northwest National Laboratory/Battelle,

2014). Although the selection criteria resulted in intrusively investigating a small amount of non-munitions-related metallic debris, this information is incorporated into the overall RI results. Additional information regarding equipment and temporary benchmarks used for positioning is provided in the DGM Technical Memorandum (provided in Appendix E).

The results of the DGM surveys include the following:

- The total number of targets for all of MRP Site UXO4 selected for intrusive investigation was 149. The targets selected for intrusive investigation are presented on Figure E1-7 In Appendix E. Dig lists are included in Appendix F. Target locations were imported into MRSIMS for use during the intrusive investigation.
- The results of the DGM survey and statistical sampling of the data met the DGM objectives for the RI Work Plan at MRP Site UXO4 (KCH, 2015a). The measurement quality objectives were achieved, and the EM61-MK2 sensor passed the required QC tests. As a result, there is added confidence in the characterization of the proportion of munitions-related items to non-munitions-related items using the data gathered and targets derived from the DGM survey.

4.10 Geophysical Anomaly Selection and Reacquisition

In accordance with the RI Work Plan (KCH, 2015a), the intrusive investigation of targets identified in the DGM data was performed on a statistically representative subset of targets to characterize the proportion of munitions-related items to non-munitions-related items to a 95 percent confidence level and within a ±5 percent margin of error.

The first step in the derivation of a dig list was to evaluate whether the anomaly locations comprise a single population or whether they represent multiple anomaly populations. The distribution of total anomalies detected during the DGM surveys was evaluated using the VSP (Pacific Northwest National Laboratory/Battelle, 2014) for the presence of potential clustering. For MRP Site UXO4, the distribution of Type 1 targets appeared consistent with the site history as a disposal area. Saturated response areas were not included in the evaluation of anomaly populations. It was decided that because of the site operational history, the distribution of the targets, and the overall low target count (171 Type 1 targets), MRP Site UXO4 would be represented by a single anomaly population. The QC seeds were removed from the statistical evaluation, but were subsequently added to the final dig list to be reacquired, intrusively investigated, and removed as ongoing validation of the data-gathering processes onsite.

From the Estimating a Proportion Method of VSP, 116 randomly selected targets were needed to achieve the desired statistical characterizations for MRP Site UXO4 and the Additional Work Area. This number was rounded up to 120 targets to ease the process of tallying targets during reacquisition and intrusive investigation. The six QC seeds and 23 additional biased dig locations were added to the dig list after determination of the statistical subset. Because 120 randomly selected targets more than met the statistical requirements in the RI Work Plan (KCH, 2015a), the KCH team decided that additional digs were desired in and around the drainage swale in the Additional Work Area to the west of MRP Site UXO4.

A list of targets to be intrusively investigated was developed, including the anomaly unique ID, coordinates (eastings and northings), and geophysical response amplitude. Of the total number of anomalies from the site geophysical data, 149 targets (of the 171 total Type 1 targets) were placed on the dig list (shown on Figure E1-7 of Appendix E). Anomalies were identified using the grid cell ID number and anomaly number. For example, anomaly C-3-0009 represented grid cell C-3, anomaly number 0009.

The DGM anomalies selected for intrusive investigation were reacquired in the field by the PLS using RTK GPS. A flag with the unique anomaly ID was then placed within 12 inches of each contact. A daily QC check of the positional equipment used during reacquisition was performed using the temporary benchmarks or other points previously established by the PLS.

4.11 MEC Intrusive Investigations

Two types of intrusive investigations were completed at MRP Site UXO4. The first type was target anomaly investigation of selected subsurface anomalies identified during the DGM survey. The second type was excavation of four investigative trenches at elevated anomaly density areas to characterize potential MEC/MPPEH and MC contamination.

Prior to the start of intrusive investigation operations, exclusion zones (EZs) were established in accordance with the approved ESS. Nonessential personnel and visitors were not permitted to enter the EZ. The United States Department of the Navy (Navy) quality assurance representative was designated as essential personnel, and was granted site access by the senior UXO supervisor (SUXOS).

4.11.1 Target Anomaly Investigations

To assess the nature of the source of the selected DGM anomalies, UXO technicians used hand tools such as shovels, spades, trowels, and pry bars until the source of the anomaly was discovered. For deep or saturated anomaly areas, a low-input mechanized safety protocol using earthmoving machinery (i.e., a John Deere mini-excavator) was implemented to remove overburden to within 12 inches of the anomaly, but did not directly remove, expose, or disturb the anomaly. Manual excavation was used to complete the excavation until the source of the anomaly was identified. Following investigation and removal of the anomaly, the UXO technician checked the excavation location with the EM61-MK2 to confirm that the source of the anomaly was removed.

Information regarding identification number, date, location, depth, type and nomenclature, fuze status, and disposal status was recorded for the anomalies using MRSIMS.

No MEC was identified from intrusive investigations associated with anomalies selected from the DGM surveys. MPPEH was inspected and segregated into MDAS or non-munitions-related metal debris. Approximately 1,021 pounds (field estimated weight) of MPPEH recovered from these anomalies was segregated, inspected, certified, verified, and documented to be MDAS on Form 1348-1A, and was secured in 55-gallon drums. The items consisted of M31 practice rifle grenades. The practice rifle grenades did not contain an explosive hazard so they were not initially classified as MEC or MDEH, but potentially contained explosives so were considered MPPEH. After further inspection, they were further classified as MDAS. Non-munitions-related metallic debris was segregated,

inspected, certified, verified, and documented on DoD Form 1348-1A, and was placed in a separate storage bin dedicated to non-munitions-related metallic debris. In addition, all six QC seed items were recovered and disposed as non-munitions-related metallic debris.

Appendix F provides a summary of target anomaly intrusive investigations, including anomaly identification, amplitude, date of investigation, location coordinates, items recovered, photos, and QC seed items recovered.

4.11.2 Investigative Trenches at Elevated Anomaly Density Areas

Four investigative trenches positioned in high-density anomaly areas were excavated using low-input mechanized shielded earthmoving equipment (i.e., Komatsu PC 200 LC track hoe). To protect the equipment operator and UXO technician from potential unintentional detonation of MEC, personnel were protected behind 3.23-inch Plexiglas shields. The locations of investigative trenches are shown on Figure 4-1 and summarized in Table 4-3. The investigative trenches were generally 3 feet wide, up to 20 feet long, and up to 10 feet deep. No additional anomalies were detected. The purpose of the investigative trenches was to delineate vertical extent of the disposed debris and to collect soil samples at the interface of debris and soil. The results of geophysical surveys were used to determine lateral extent of subsurface debris.

Excavated soils were laid out to allow the UXO technician to conduct visual and metal detector inspections. Once the MEC clearance was completed, the material was then placed in an area near the excavation, but not interfering with investigation operations. The excavation was considered complete when no additional anomalies were detected.

No MEC was recovered from the investigative trenches. MPPEH recovered from Trenches 1, 2, and 4 was inspected and segregated into MDAS or non-munitions-related metallic debris. Approximately 694 pounds (field estimated weight) of MPPEH was determined to be MDAS. The MDAS consisted of M11 and M31 practice rifle grenades. The practice rifle grenades did not contain an explosive hazard so they were not initially classified as MEC or MDEH, but potentially contained explosives so were considered MPPEH. After further inspection, they were further classified as MDAS. The non-munitions-related metallic debris recovered from Trenches 1, 2, and 4 was segregated and placed in a separate storage bin dedicated to non-munitions-related metallic debris.

The largest amount of MPPEH was excavated from Trench 4. The sidewalls of the trench indicated that the material extends laterally in the subsurface. Although the trench was not expanded to conduct a lateral investigation of this material, several potholes were excavated in the vicinity of the investigative trenches to assess the depth of buried items. Based on examination of potholes, the maximum depth of MPPEH at MRP Site UXO4 was 7 feet bgs. Perched groundwater was encountered at approximately 7 to 8 feet, just above an apparent clay layer, and the MPPEH did not appear to extend deeper than this.

Investigative trenches were backfilled after soil and debris investigation activities were completed, following collection of soil samples and following final inspection by the UXO QC specialist. The backfilled areas were then tamped and graded to prevent erosion, to be generally consistent with surrounding grade.

4.11.3 Disposal of MDAS and Non-munitions-Related Metallic Debris

Fourteen drums (2,390 pounds) of MDAS from MRP Site UXO4 were picked up at Detachment Fallbrook on April 16, 2015, and were transported to Bonetti Explosives, Inc. (Bonetti) located in Columbus, Texas.

The drums arrived at Bonetti on April 21, 2015, for final demilitarization. The drums were inspected and inventoried, and their seals were found to be intact. A DoD Form 1348-1A accompanied each drum during transport, storage, treatment, and recycling. Upon arrival at Bonetti, the onsite KCH UXOQCS checked and verified every drum seal number and checked every DoD Form 1348-1A to confirm that the required information was accurate.

A total of 2,390 pounds of MDAS from MRP Site UXO4 was shredded and smelted on May 26, 2015.

Also, non-munitions-related metallic debris was recovered during intrusive investigations of DGM anomalies, and from the investigative trenches at MRP Site UXO4. The non-munitions-related metallic debris was segregated, inspected, certified, verified, and documented on a DoD Form 1348-1A, and was placed in a separate storage bin dedicated to non-munitions-related metallic debris. About 400 pounds of non-munitions-related metallic debris from MRP Site UXO4 was transported offsite to Fallbrook Waste and Recycling for recycling on April 15, 2015.

Disposal documentation is included in Appendix G.

4.12 MC Investigation

Following MEC anomaly detection, flagging, and intrusive investigation (no soil sampling was performed during MEC investigations), the investigation for MC, consisting of the collection of soil samples, commenced at MRP Site UXO4 to determine the nature and extent of MC in surface and subsurface soil to a maximum depth of at least 8 feet bgs.

A total of 31 soil samples was collected from MRP Site UXO4 between April 2 and April 16, 2015. Three types of soil samples were collected, including bias-located samples beneath MPPEH, investigative trench samples, and non-bias located (random) samples. Nine biased soil samples were collected in the vicinity of investigated MPPEH anomalies (Table 4-2). The depths of these samples ranged from approximately 0.08 to 8 feet bgs. Eight soil samples were collected from the four investigative trenches at two depth intervals ranging from 1 to 3 feet bgs (Table 4-3). A total of 14 non-biased soil samples was collected from seven locations at two depth intervals (0 to 0.5 foot bgs and 0.5 to 1 foot bgs) (Table 4-4). The non-biased soil sample locations were determined using the random point generator geoprocessing tool in Esri ArcMap geographic information system software. Details regarding laboratory analysis of soil samples are included in Section 5.2. Additional details regarding the MC sampling procedures were provided in Appendix B of the RI Work Plan (KCH, 2015a).

Soil waste was not generated during sampling activities. Disposable sampling equipment was used to collect soil samples beneath MPPEH and from trenches, thereby minimizing the amount of decontamination water generated during sampling. A hand auger was used to collect soil samples from non-biased locations, which resulted in the generation of a

minimal amount of decontamination water (less than 2 gallons) that was evaporated onsite. Therefore, no investigation-derived wastes were generated, and sampling was not required.

4.12.1 Quality Control Program

Field QC samples consisted of a source water blank, an equipment rinsate blank, and matrix spike/matrix spike duplicates (MS/MSD). In conformance with the Sampling and Analysis Plan provided as Appendix B to the RI Work Plan (KCH, 2015a), field duplicate samples were not collected to assess sampling precision due to heterogeneity of the site soil. The single equipment rinsate was collected after the hand auger was cleaned by collecting the rinse water from the cleaning process. The source water blank was collected from the source water used for the final rinse of the decontaminated hand auger. MS/MSDs were collected and analyzed at the required minimum frequency of one MS/MSD per 20 samples.

Details regarding the QC program were provided in Worksheets #15 and #17 of the Sampling and Analysis Plan (Appendix B of the RI Work Plan [KCH, 2015a]).

4.12.2 Sample Analyses

Soil sampling was conducted during the RI at MRP Site UXO4 to assess the nature and extent of MC in the soil. Surface and subsurface soil samples were collected in the vicinity of removed MPPEH items that indicated a possible release of MC to the soil and in the investigative trench areas where MPPEH items were discovered. Soil samples collected during the MC investigation were submitted for offsite analysis to EMAX Laboratories in Torrance, California, a DoD Environmental Laboratory Accreditation Program laboratory. Soil samples were submitted for the following analyses:

- Metals (United States Environmental Protection Agency [USEPA] Method 6020A)
- Mercury (USEPA Method 7470A/7471A)
- Hexavalent Chromium (USEPA Method 7199)
- Explosives Residue (USEPA Method 8330A)
- Perchlorate (USEPA Method 6850)

4.13 Site Restoration and Demobilization

Following completion of intrusive investigations of DGM anomalies, trench investigation and backfill activities, MPPEH inspection and management operations, and MC investigation, work areas at MRP Site UXO4 were restored as close to pre-work conditions as possible.

Fourteen 55-gallon drums of inspected, reinspected, and certified MDAS from MRP Site UXO4 were transported offsite on April 16, 2015, for demilitarization and smelting. Containerized non-munitions-related metallic debris from MRP Sites UXO4 was transported to Fallbrook Waste and Recycling on April 15, 2015.

Open detonation disposal of remaining unused commercial donor explosives was not permitted at Detachment Fallbrook and return of the items to the commercial explosives vendor was not allowed. With the permission of the Detachment Fallbrook ESO and Remedial Project Manager, remaining unused commercial donor explosives were transferred to Explosive Ordnance Disposal personnel from MCB Camp Pendleton on April 17, 2015. Field investigation personnel and equipment demobilized on April 17, 2015.

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5.0 Remedial Investigation Results

5.1 MEC Investigation Findings

Although MPPEH items were found during the RI field activities at MRP Site UXO4 and the Additional Work Area, no MEC or MDEH was identified. The practice rifle grenades did not contain an explosive hazard so they were not initially classified as MEC, but potentially contained explosives so were initially considered MPPEH.

MPPEH found at MRP Site UXO4 and the Additional Work Area included the following items:

- M31 practice rifle grenades (approximately 1,000)
- M11 practice rifle grenades (approximately 500)

The items recovered within the disposal areas at MRP Site UXO4 were found at maximum depth of 7 feet bgs. Most of the remaining distributed items were found at a maximum depth of 12 inches bgs.

Of these, 23 M31 practice rifle grenades were found in the shallow subsurface at the Additional Work Area. Seven were found almost 500 feet from the MRP Site UXO4 western boundary, at a maximum depth of 4 inches bgs.

All M31 and M11 practice rifle grenades were inspected, reinspected, certified, and verified to be MDAS. Each day that it was discovered, MDAS was documented on DoD Form 1348-1A and secured in a closed-top 55-gallon drum. Fourteen 55-gallon drums of inspected, certified, and verified MDAS were stored onsite within a fenced and locked staging area pending transfer to the offsite recycling facility. Fourteen DoD Form 1348-1As were completed for MDAS recovered from the investigations at MRP Site UXO4.

5.2 MC Investigation Findings

Between April 2 and 16, 2015, 31 soil samples were collected from beneath MPPEH, investigative trenches, and non-biased locations. Samples were submitted to EMAX Laboratories and were analyzed for the following:

- Metals (USEPA Method 6020A)
- Mercury (USEPA Method 7470A/7471A)
- Hexavalent Chromium (USEPA Method 7199)
- Explosives Residue (USEPA Method 8330A)
- Perchlorate (USEPA Method 6850)

Analytical results are summarized in Tables 5-1 and 5-2 and are compared to background threshold values (BTVs) (SES-TECH, 2012) and risk-based screening levels for human health. Risk-based screening levels are the more conservative levels of USEPA regional screening levels (RSLs) (USEPA, 2015) and California Department of Toxic Substances

Control (DTSC) screening levels (DTSC-SLs) (DTSC, 2016). Soil sample and investigative trench locations are shown on Figure 4-1. Laboratory analytical reports are included in Appendix H. The analytical results were validated, as described in Section 5.2.5.

5.2.1 Analytical Results for Samples Collected Beneath MPPEH

Nine biased soil samples were collected immediately beneath anomalies identified in the field. Sampling beneath MPPEH is summarized in Table 4-2, and sample locations are shown on Figure 4-1. Analytical results are summarized in Tables 5-1 and 5-2.

No explosive residues or perchlorate were reported in these soil samples. Hexavalent chromium was reported in one sample at a concentration of 0.144 mg/kg, which is below the residential RSL of 0.30 mg/kg. Arsenic was detected above both the BTV and risk-based screening levels. A number of metals were reported at concentrations above BTVs, RSLs, or DTSC-SLs. Metals analytical results are summarized as follows:

- Arsenic was detected at concentrations above the residential DTSC-SL of 0.067 mg/kg and industrial DTSC-SL of 0.25 mg/kg in the nine samples, with the highest reported result at 2.57 mg/kg. Arsenic concentrations in two of the nine samples were above the BTV (1.681 mg/kg).
- Cadmium was detected above the BTV of 0.19 mg/kg in three of the nine samples, with the highest reported result at 0.282 J mg/kg. Cadmium concentrations were below the residential (5.2 mg/kg) and industrial (7.3 mg/kg) DTSC-SLs.
- Copper was detected above the BTV of 29.51 mg/kg in two of the nine samples, with the highest reported result at 58.4 mg/kg. Copper concentrations were below the residential (3,100 mg/kg) and industrial (47,000 mg/kg) RSLs.
- Lead was detected above the BTV of 4.597 mg/kg in eight of the nine samples, with the highest reported result at 51.2 J mg/kg. Lead concentrations were below the residential (80 mg/kg) and industrial DTSC-SLs (320 mg/kg).
- Manganese was detected above the BTV of 432.1 mg/kg in one of the nine samples, at a concentration of 451 mg/kg. The manganese concentration was below the residential RSL (1,800 mg/kg) and industrial DTSC-SL (6,900 mg/kg).
- Mercury was detected above the BTV of 0.0203 mg/kg in one of the nine samples, at a concentration of 0.0425 J mg/kg. This concentration was below the residential RSL (23 mg/kg) and industrial DTSC-SL (69 mg/kg).
- Zinc was detected above the BTV of 35.31 mg/kg in six of the nine samples, with the highest reported result at 81.2 J mg/kg. Zinc concentrations were below the residential (23,000 mg/kg) and industrial (350,000 mg/kg) RSLs.

5.2.2 Analytical Results for Samples from Investigative Trenches

Four investigative trenches (approximately 3 feet wide, up to 20 feet long, and up to 10 feet deep) were excavated. Two soil samples were collected from each investigative trench based on visual inspection at depths ranging from 1 to 3 feet bgs. Investigative trench sampling is

summarized in Table 4-3. Analytical results are summarized in Tables 5-1 and 5-2. Investigative trench locations are shown on Figure 4-1.

No explosive residues or perchlorate were reported in the investigative trench soil samples. Hexavalent chromium was detected in one sample at a concentration below the residential and industrial RSLs. Arsenic was detected above both the BTV and risk-based screening levels. A number of metals were reported at concentrations above BTVs, RSLs, or DTSC-SLs. Metals analytical results are summarized as follows:

- Arsenic was detected at concentrations above the residential DTSC-SL of 0.067 mg/kg and industrial DTSC-SL of 0.25 mg/kg in the eight trench samples, with the highest reported result at 2.48 mg/kg. Arsenic concentrations in seven of the eight samples were above the BTV (1.681 mg/kg).
- Cadmium was detected above the BTV of 0.19 mg/kg in six of the eight trench samples, with the highest reported result at 0.278 J mg/kg. Cadmium concentrations were below the residential (5.2 mg/kg) and industrial (7.3 mg/kg) DTSC-SLs.
- Copper was detected above the BTV of 29.51 mg/kg in one of the nine samples, at a concentration of 61.3 mg/kg. Copper concentrations were below the residential (3,100 mg/kg) and industrial (47,000 mg/kg) RSLs.
- Lead was detected above the BTV of 4.597 mg/kg in five of the eight samples, with the highest reported result at 39.9 mg/kg. Lead concentrations were below the residential (80 mg/kg) and industrial (320 mg/kg) DTSC-SLs.
- Mercury was detected above the BTV of 0.0203 mg/kg in five of the eight samples, with the highest reported result at 0.0598 J mg/kg. Mercury concentrations were below the residential RSL (23 mg/kg) and industrial DTSC-SL (69 mg/kg).
- Zinc was detected above the BTV of 35.31 mg/kg in five of the eight samples, with the highest reported result at 91.0 mg/kg. Zinc concentrations were below the residential (23,000 mg/kg) and industrial (350,000 mg/kg) RSLs.

5.2.3 Analytical Results for Samples from Non-Biased Locations

Seven non-biased soil sampling locations were identified at MRP Site UXO4. Soil samples were collected at surface (0 to 0.5 foot bgs) and subsurface (0.5 to 1.0 foot bgs) depths at each location. The random location samples are shown on Figure 4-1 and summarized in Table 4-4. The analytical results are summarized in Tables 5-1 and 5-2.

No explosive residues were reported in these soil samples. Perchlorate was detected at estimated concentrations below the residential and industrial RSLs in the two samples collected at location KCH-UXO4-SB14. Hexavalent chromium was detected at estimated concentrations below the residential and industrial RSLs in the samples collected from 1 foot bgs at locations KCH-UXO4-SB11 and KCH-UXO4-SB13.

Arsenic was detected above both the BTV and risk-based screening levels. A number of metals were reported at concentrations above BTVs, RSLs, or DTSC-SLs. Metals analytical results are summarized as follows:

- Arsenic was detected above the residential DTSC-SL of 0.067 mg/kg and industrial DTSC-SL of 0.25 mg/kg in the 14 samples, with the highest reported result at 3.99 mg/kg. Arsenic concentrations in four of the 14 samples were above the BTV (1.681 mg/kg).
- Beryllium was detected above the BTV of 0.382 mg/kg in one of the 14 samples, at a concentration of 0.388 J mg/kg. Beryllium concentrations were below the residential (15 mg/kg) and industrial (210 mg/kg) DTSC-SLs.
- Cadmium was detected above the BTV of 0.19 mg/kg in six of the 14 samples, with the highest reported result at 0.366 J mg/kg. Cadmium concentrations were below the residential (5.2 mg/kg) and industrial DTSC-SLs (7.3 mg/kg).
- Lead was detected above the BTV of 4.597 mg/kg in three of the 14 samples, with the highest reported result at 5.67 mg/kg. Lead concentrations were below the residential (80 mg/kg) and industrial DTSC-SLs (320 mg/kg).

5.2.4 Quality Control Samples

Data quality indicators for the analytical data generated during this investigation, as evaluated through QC samples, met the requirements of the Sampling and Analysis Plan (Appendix B of the RI Work Plan [KCH, 2015a]). An evaluation of QC sample results is included in the data quality assessment in Appendix I.

5.2.5 Data Validation and Evaluation

Data validation was conducted by MECX in Aurora, Colorado, in accordance with *Environmental Work Instruction No. 1, Data Validation Guidelines for Chemical Analysis of Environmental Samples* (NAVFAC Southwest, 2001) and in accordance with updates from USEPA Contract Laboratory Program *National Functional Guidelines for Inorganic Superfund Data Review* (USEPA, 2010) and USEPA Contract Laboratory Program *National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA, 2008a). Since 100 percent of the data were usable, the data met the completeness project goal of 90 percent for usable data (KCH, 2015a). The data validation report is provided in Appendix J.

6.0 Nature and Extent

This section summarizes the nature and extent of MEC and MPPEH, as well as environmental impacts, at MRP Site UXO4.

6.1 Nature and Extent of MEC and MPPEH

This section summarizes the nature and extent of MEC and MPPEH at MRP Site UXO4 based on the results of investigations conducted to date (presented in Sections 3 and 5).

Although MPPEH was recovered during the surface clearance in grid cell area, no MEC or MDEH was discovered. Metallic debris measuring 2 inches by 2 inches or greater that protruded or was visible from the top of ground (soil) surface was inspected and removed as part of the surface metal removal clearance. MPPEH was inspected and segregated into MDAS or non-munitions-related metal debris. Approximately 12 pounds (field estimated weight) of MDAS was segregated. The MDAS consisted of M11 and M31 practice grenades. Also, non-munitions-related metallic debris was recovered during surface clearance of grid cell areas and placed in a separate container dedicated to nonmunitions-related metallic debris.

Although MPPEH was recovered during intrusive investigations associated with anomalies selected from the DGM surveys, no MEC or MDEH was identified. MPPEH was inspected and segregated into MDAS or non-munitions-related metallic debris. Approximately 1,021 pounds (field estimated weight) of MPPEH recovered from these anomalies was segregated, inspected, certified, verified, and documented to be MDAS on Form 1348-1A, and was secured in 55-gallon drums. The items consisted of M31 practice rifle grenades. The practice rifle grenades did not contain an explosive hazard so they were not initially classified as MEC, but potentially contained explosives so were considered MPPEH. After further inspection, they were further classified as MDAS.

Non-munitions-related metallic debris was segregated, inspected, certified, verified, and documented on DoD Form 1348-1A, and was placed in a separate storage bin dedicated to non-munitions-related metallic debris. In addition, all six QC seed items were recovered and disposed as non-munitions-related metallic debris.

In conformance with the Verification Sampling Program in VSP, Version 6.5 (Pacific Northwest National Laboratory/Battelle, 2014), the results of the total number of anomalies investigated indicate that there is a 95 percent confidence (with plus or minus 5 percent sampling error) that the remaining uninvestigated DGM anomalies at MRP Site UXO4 and the Additional Work Area do not represent MEC. However, these statistical results cannot be applied to material remaining in the disposal areas.

Although MPPEH was recovered during intrusive investigations of the trenches, no MEC or MDEH was identified. MPPEH recovered from Trenches 1, 2, and 4 was inspected and segregated into MDAS or non-munitions-related metallic debris. Approximately 694 pounds (field estimated weight) of MPPEH was determined to be MDAS. The MDAS consisted of

M11 and M31 practice rifle grenades. The practice rifle grenades did not contain an explosive hazard so they were not initially classified as MEC, but potentially contained explosives so were considered MPPEH. After further inspection, they were further classified as MDAS. Non-munitions-related metallic debris recovered from Trenches 1, 2, and 4 was segregated and placed in a separate storage bin dedicated to non-munitions-related metallic debris.

Based on the results of the MEC Hazard Assessment and the lack of a complete subsurface clearance at the site, MEC and MPPEH are suspected to remain in the subsurface at MRP Site UXO4 and the Additional Work Area. It is known that material remains in the subsurface in the vicinity of Trench 4. Although Trench 4 was not expanded to conduct a lateral investigation of this material, several potholes were excavated in the vicinity of the investigative trenches to assess the depth of buried items. Based on examination of potholes, the maximum depth of MPPEH at MRP Site UXO4 was 7 feet bgs.

There is a potential for migration of MEC or MPPEH from MRP Site UXO4 and the Additional Work Area through erosion and surface water transport, particularly in the areas of sloping terrain. Precipitation runoff drains toward the drainage swale within MRP Site UXO4 that channels water to the west. If MEC/MPPEH migration occurs or has occurred from MRP Site UXO4, it would likely be in the direction of the drainage swale, and then transported to the west toward the Additional Work Area. The inferred disposal area and surface water migration pathways are shown on Figure 6-1.

The lowest temperatures occur from December through February, with a mean annual low of 47.5 degrees Fahrenheit. Thus, there is no frost line in Fallbrook, California, and no potential for frost heave to occur at MRP Site UXO4 that could potentially bring buried MEC and/or MPPEH to the surface. Based on the field investigation information, potential MEC/MPPEH at MRP Site UXO4 is unlikely to be deeper than 7 feet bgs, and potential MEC/MPPEH at the Additional Work Area is unlikely to be deeper than 1 foot bgs. However, site activities (e.g., site work and construction) may disturb MEC/MPPEH below the surface and cause MEC/MPPEH to be exposed at the surface.

6.2 Nature and Extent of Environmental Impacts

During the 2008 SI and 2015 RI, 47 soil samples were collected from depths up to 8 feet bgs. To assess the nature and extent of environmental impacts, samples were categorized as surface and/or subsurface samples based on the same criteria used for the HHRA. Samples collected from 0 to 0.5 foot bgs were considered surface soil samples and samples collected from 0 to 10 feet bgs were considered subsurface soil samples. Based on these categories, all surface samples were also considered to be subsurface samples.

SI and RI soil sample locations are shown on Figure 4-1. SI soil samples were analyzed for VOCs, SVOCs, explosives residue, perchlorate, and metals. RI soil samples were analyzed for explosives residue, perchlorate, metals, and hexavalent chromium. Hexavalent chromium analyses were performed to provide information about chromium speciation for the risk assessments. Without these data, chromium detected in soil would be considered the more toxic hexavalent form. The analytical data were compared to BTVs, RSLs, and

DTSC-SLs. Analytes that exceeded RSLs, BTVs, or DTSC-SLs are described in the following sections.

6.2.1 Surface Soil

Perchlorate, explosives, and hexavalent chromium were not detected above RSLs in surface soil samples. Six metals (arsenic, cadmium, copper, lead, manganese, and zinc) were detected in surface soil samples at concentrations above BTVs, RSLs, or DTSC-SLs, and are summarized in Table 6-1. Surface soil samples were not collected during the SI.

- Arsenic concentrations in 11 RI surface soil samples were above the residential DTSC-SL of 0.067 mg/kg and the industrial DTSC-SL of 0.25 mg/kg. Arsenic concentrations in two RI surface soil samples were above the BTV (1.681 mg/kg).
- Cadmium concentrations in four RI surface soil samples were above the BTV of 0.19 mg/kg.
- The copper concentration in one RI surface soil sample was above the BTV of 29.51 mg/kg.
- Lead concentrations in seven RI surface soil samples were above the BTV of 4.597 mg/kg.
- The manganese concentration in one RI surface soil sample was above the BTV of 432.1 mg/kg.
- Zinc concentrations in four RI surface soil samples were above the BTV of 35.31 mg/kg.

6.2.2 Subsurface Soil

Perchlorate, explosives, and hexavalent chromium were not detected above RSLs in subsurface soil samples. Nine metals (arsenic, beryllium, cadmium, cobalt, copper, lead, manganese, mercury, and zinc) were detected in surface soil samples at concentrations above BTVs, RSLs, or DTSC-SLs, and are summarized in Table 6-2.

- Arsenic concentrations in 16 SI subsurface soil samples and 31 RI subsurface soil samples were above the residential DTSC-SL of 0.067 mg/kg and the industrial DTSC-SL of 0.25 mg/kg. Arsenic concentrations in 12 SI subsurface soil samples and 13 RI subsurface soil samples were above the BTV (1.681 mg/kg).
- The beryllium concentration in one RI subsurface soil sample was above the BTV of 0.382 mg/kg.
- Cadmium concentrations in 15 RI subsurface soil samples were above the BTV of 0.19 mg/kg.
- The cobalt concentration in one SI subsurface soil sample was above the BTV of 23.81 mg/kg and residential DTSC-SL of 23 mg/kg.
- Copper concentrations in three RI subsurface soil sample was above the BTV of 29.51 mg/kg.

- Lead concentrations in three SI subsurface soil samples and 16 RI subsurface soil samples were above the BTV of 4.597 mg/kg.
- Manganese concentrations in one SI subsurface soil sample and one RI subsurface soil sample were above the BTV of 432.1 mg/kg.
- Mercury concentrations in one SI subsurface soil sample and six RI subsurface soil samples were above the BTV of 0.0203 mg/kg.
- Zinc concentrations in three SI subsurface soil samples and 11 RI subsurface soil samples were above the BTV of 35.31 mg/kg.

6.2.3 Summary of Surface and Subsurface Soil

Perchlorate, explosives residue, VOCs, SVOCs, and hexavalent chromium were not detected at concentrations above RSLs or DTSC-SLs in soil samples collected during the SI and RI. The following metals were detected in soil at concentrations above BTVs, RSLs, or DTSC-SLs:

- Arsenic was detected above the residential (0.067 mg/kg) and industrial (0.25 mg/kg) DTSC-SLs. Arsenic concentrations were above the BTV (1.681 mg/kg) in 25 of the 47 samples; however, these arsenic concentrations were only slightly above the BTV for the Kgt parent rock and well within the range of naturally occurring concentrations, and arsenic is not associated with munitions or munitions dunnage.
- Beryllium was detected above the BTV (0.382 mg/kg) in one of the 47 samples; however, the beryllium concentration was below the residential (3.0 mg/kg) and industrial (21 mg/kg) DTSC-SLs. This beryllium concentration was only slightly above the BTV for the Kgt parent rock and within the range of naturally occurring concentrations.
- Cadmium was detected above the BTV (0.19 mg/kg) in 15 of the 47 samples; however, the cadmium concentrations were below the residential (5.2 mg/kg) and industrial (7.3 mg/kg) DTSC-SLs. These cadmium concentrations were only slightly above the BTV for the Kgt parent rock and within the range of naturally occurring concentrations.
- Cobalt was detected above the BTV (23.81 mg/kg) and residential RSL (23 mg/kg) in one of the 47 samples; however, the cobalt concentration was below the industrial RSL (350 mg/kg). This cobalt concentration was only slightly above the BTV for the Kgt parent rock and residential RSL, and was within the range of naturally occurring concentrations.
- Copper was detected above the BTV (29.51 mg/kg) in three of the 47 samples; however, copper concentrations were well below the residential (3,100 mg/kg) and industrial RSLs (47,000 mg/kg).
- Lead was detected above the BTV (4.597 mg/kg) in 19 of the 47 samples; however, lead concentrations were below the residential (80 mg/kg) and industrial (320 mg/kg) DTSC-SLs.
- Manganese was detected above the BTV (432.1 mg/kg) in two of the 47 samples; however, manganese concentrations were well below the residential RSL (1,800 mg/kg) and industrial DTSC-SL (6,900 mg/kg).

- Mercury was detected above the BTV (0.0203 mg/kg) in seven of the 47 samples; however, mercury concentrations were below the residential RSL (23 mg/kg) and industrial DTSC-SL (92 mg/kg). These mercury concentrations were only slightly above the BTV for the Kgt parent rock, and were within the range of naturally occurring concentrations.
- Zinc was detected above the BTV (35.31 mg/kg) in 14 of the 47 samples; however, zinc concentrations were below the residential (23,000 mg/kg) and industrial (350,000 mg/kg) RSLs.

Risk associated with metals at MRP Site UXO4 is summarized in Section 8.

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7.0 Explosive Hazards Evaluation

The Interim MEC Hazard Assessment (HA) methodology (USEPA, 2008b) was used to evaluate the potential explosive hazards to receptors based on current conditions at the site (both geophysical and related to discovered ordnance), anticipated land use, and established screening levels for humans. The model uses inputs related to the site, human, and ordnance factors to produce a hazard level that provides a qualitative assessment of potential explosive hazards to humans based on current or anticipated future use. The output will serve as a baseline condition when comparing alternatives in the FS.

The MEC HA evaluates the potential explosive hazard associated with the MRP site given current or reasonably anticipated future conditions, and under various cleanup, land use activities, and land use control alternatives. As specified in the *Munitions and Explosives of Concern Hazard Assessment Methodology* (USEPA, 2008b), the MEC HA process fulfills the National Contingency Plan requirement for site-specific risk assessments.

The purpose of the MEC HA is to (1) support the hazard management decision-making process by analyzing site-specific information to assess land use activity decisions and to evaluate removal or remedial alternatives, and (2) support the communication of MEC hazards by organizing site information in a consistent manner. The MEC HA also evaluates potential explosive safety risk. If future land uses other than what is specified in the MEC HA occur, then explosive safety risks should be reevaluated to incorporate additional information specific to these future land uses.

The MEC HA is primarily designed to be used at two points in the CERCLA process: once at the end of an RI to assess baseline explosive hazards and relative hazard reductions associated with remedial alternatives in a feasibility study (FS), and at the completion of a removal action to assess baseline explosive hazards and relative hazard reductions associated with a particular removal alternative.

Two separate MEC HAs were developed as part of this RI, one for MRP Site UXO4 and the other for the Additional Work Area based on information regarding operational history. MRP Site UXO4 (1.8 acres) is a distinct separate (and fenced) parcel of land from the Additional Work Area (2.16 acres). Previous investigation information indicated that MRP Site UXO4 was used as a disposal area, whereas this information was not available for the Additional Work Area. The two are connected via the shallow drainage swale that traverses both sites. Each MEC HA presents current site configurations and conditions, incorporates the results of surface MEC clearance and RI field investigation activities, and identifies land use activities associated with both sites. It was assumed that land use controls will be implemented at MRP Site UXO4 and that these will be implemented for the Additional Work Area as well. Changes in future land use for MRP Site UXO4 and the Additional Work Area must be approved by the Navy.

The planned future land use activities by potential receptors and corresponding contact hours for MRP Site UXO4 and the Additional Work Area were estimated conservatively and are listed in the following chart.

Activity	Number of People per Year Who Participate in Activity	Number of Hours a Person Would Spend on Activity	Potential Contact Hours per Year
Natural Resource Investigations	5	40	200
Routine Fence Maintenance	5	50	250
Ranching for Cattle Grazing	8	80	640
Total Potential Contact Hours			**1,090**

Note: Planned future land use activities do not include intrusive land uses.

The MEC HA is structured around the following three components of potential explosive hazard incidents:

- **Severity:** the potential consequences of the effect (e.g., death or injury) on a human receptor if an MEC item detonates
- **Accessibility:** the likelihood that a human receptor will come in contact with an MEC item
- **Sensitivity:** the likelihood that a human receptor will interact with an MEC item so that it will detonate

These components were assessed by input factors that have two or more categories. Each category is associated with a numeric score that reflects the relative contribution of the different input factors to the MEC HA. The sum of the scores, although not a quantitative measurement of an explosive hazard, generates the output (or hazard level) that reflects the attributes of the site and its explosive hazard.

The following assumptions, input factors, and output factors were used:

- **Assumptions:** The MEC HA assumed that the 2015 surface MEC clearance actions at DGM survey areas completed during RI field investigation activities satisfy the requirements for surface clearance at MRP Site UXO4 and the Additional Work Area.
- **Input Factors:**
  - Energetic material type was conservatively assumed to be HE, based on the single M720 60-mm mortar found at MRP Site UXO4 during the PA. This energetic material type was also used for the Additional Work Area because it lies directly downslope of the drainage that flows through MRP Site UXO4. However, all MPPEH was determined to be practice rounds, which only contain spotting charges.
  - Future use activities were conservatively estimated as follows:
    - MRP Site UXO4: 1,090 contact hours per year (no intrusive activities) for oversight of cattle grazing, natural resource investigations, and routine maintenance activities.
    - Additional Work Area: 1,090 contact hours per year (no intrusive activities) for oversight of cattle grazing, natural resource investigations, and routine maintenance activities.

For both sites, accessibility for future use was initially noted as "Moderate," defined as some barriers to entry such as installation security access procedures. To evaluate risk reductions taken as a result of a remedial alternative consisting of implementing land use controls, accessibility was considered "Limited," defined as significant barriers to entry, which would include fence, gate, and warning signs. These controls are currently in place at MRP Site UXO4, but may require implementation at the Additional Work Area.

- **Output Factors:**
  - Less than 10,000 receptor contact hours ("very few") annually were assumed for future use conditions, respectively, within MRP Site UXO4 and the Additional Work Area.

The MRP Site UXO4 MEC HA was developed to present and compare the explosive risk under future moderate access (without land use controls) and future limited-access site conditions (with land use controls). MRP Site UXO4 MEC HA scores are summarized in the following chart:

		MRP Site UXO4 Hazard Assessment Score	
Input Factor	**Input Factor Category**	**Future Moderate Access Conditions (Prior to Land Use Controls)**	**Future Limited Access Conditions (with Land Use Controls)**
Energetic Material Type	HE and low explosive filler in fragmenting rounds	100	100
Distance of Additional Potential Receptors to Explosive Hazard Category	Inside of the explosive safety quantity distance	0	0
Site Accessibility		Moderate – 55	Limited – 15
Potential Contact Hours	<10,000 receptor-hours/year[a]	15	15
Amount of MEC	Burial Pit	140	140
Minimum MEC Depth Relative to the Maximum Receptor Intrusive Depth	MEC located subsurface; intrusive depth does not overlap with minimum MEC depth	50	50
Migration Potential	Possible	30	30
MEC Classification	Fuzed DMM Special Case[b]	105	105
MEC Size	Small	40	40
Total Score		**535**	**495**
Hazard Level		**Level 3**	**Level 4**

Notes:
[a] The <10,000 receptor-hours per year is the lowest default input factor category, assigned as "Very Few Hours."
[b] The MEC classification defaults to Fuzed DMM special case because it was a known disposal area.

The Additional Work Area MEC HA was developed to present the explosive risk under future moderate access (without land use controls) and future limited-access site conditions (with land use controls). Additional Work Area MEC HA scores are summarized as follows:

Input Factor	Input Factor Category	Additional Work Area Hazard Assessment Score	
		Future Moderate Access Conditions (Without Land Use Controls)	Future Limited Access Conditions (with Land Use Controls)
Energetic Material Type	HE and low explosive filler in fragmenting rounds	100	100
Distance of Additional Potential Receptors to Explosive Hazard Category	Inside of the explosive safety quantity distance	0	0
Site Accessibility		Moderate - 55	Limited – 15
Potential Contact Hours	<10,000 receptor-hours/year[a]	15	15
Amount of MEC	Safety Buffer Area	30	30
Minimum MEC Depth Relative to the Maximum Receptor Intrusive Depth	MEC located subsurface; intrusive depth does not overlap with minimum MEC depth	50	50
Migration Potential	Possible	30	30
MEC Classification	UXO special case[b]	180	180
MEC Size	Small	40	40
Total Score		**500**	**460**
Hazard Level		**Level 4**	**Level 4**

Notes:

[a] The <10,000 receptor-hours per year is the lowest default input factor category, assigned as "Very Few Hours."

[b] The MEC classification defaults to UXO special case. Because the area is a safety buffer area, it cannot be automatically assumed that the MEC items from this category are DMM. Therefore, the more conservative assumption is that the items in the Additional Work Area are UXO.

Hazard Level 3 identifies sites with moderate potential explosive hazard conditions. This hazard level was determined for site conditions at MRP Site UXO4 prior to implementation of land use controls (fencing and signs). Typical characteristics of a Hazard Level 3 site include those in which a surface clearance was conducted at the site, but subsurface MEC are suspected. However, there are no intrusive uses that would encounter subsurface MEC. Any subsurface uses would change the hazard level.

Hazard Level 4 identifies sites with low potential explosive hazard conditions. This hazard level was determined for future site conditions to include land use controls at MRP Site UXO4 and the Additional Work Area. The presence of potential MEC at a munitions response site means that an explosive hazard may exist. Therefore, MEC in the subsurface at MRP Site UXO4 and the Additional Work Area may still pose a hazard. Typical characteristics of Hazard Level 4 sites include those in which: 1) a surface MEC cleanup was performed or MEC is only located in the subsurface; 2) MEC is below the depth of potential receptor intrusive activities; and 3) accessibility is limited such that contact hours are few (which could be the result of implementing land use controls).

Based on the findings during previous and current field investigation activities, MPPEH are suspected to remain in the subsurface at MRP Site UXO4 and the Additional Work Area. Also, erosion and surface runoff have intensified following the May 2014 Tomahawk fire at Detachment Fallbrook. This could enhance the potential for MEC or MPPEH to migrate offsite from MRP Site UXO4 and the Additional Work Area. Until a permanent remedy is implemented, restricted-access conditions are recommended through the use of land use controls, and any intrusive land use activities should only be authorized with the appropriate level of qualified UXO personnel support. The MEC HA workbooks for MRP Site UXO4 and the Additional Work Area are provided in Appendix K.

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8.0 Risk Assessments for Munitions Constituents

This section presents the results of the HHRA and ERA for MRP Site UXO4 and the Additional Work Area. The primary objective of the risk assessments is to evaluate site-related chemical risks that may pose a threat to human health, the environment, or both.

The HHRA and ERA evaluated MRP Site UXO4 and the Additional Work Area as a single exposure point. That is, these adjacent locations were considered a single location for evaluation of potential risk from exposure to MC. Subsequent discussion in this section to MRP Site UXO4 includes the Additional Work Area.

8.1 Baseline Human Health Risk Assessment

This section provides an overview of the HHRA methods and summarizes the results of the HHRA for MRP Site UXO4. A detailed discussion of the HHRA methods and results is provided in Appendix L.

The specific objectives of the HHRA were to (1) estimate the magnitude of potential risk to human health associated with current and potential future land use scenarios, (2) identify the environmental media and chemicals that pose the primary human health concerns, (3) identify the environmental media and chemicals that pose little or no threat to human health, and (4) provide a foundation for assessing the need for further consideration or response under the MRP.

The HHRA for MRP Site UXO4 consisted of four major steps: development of a conceptual site exposure model (CSEM), data evaluation and identification of constituents of potential concern (COPC), estimation of exposure point concentrations (EPCs), and risk characterization. These steps of the HHRA are described below in Sections 8.1.1 through 8.1.4. Results of the HHRA are summarized in Section 8.1.5.

8.1.1 Human Health Conceptual Site Exposure Model

The first step involved identifying sources of chemicals at the site, affected environmental media, chemical release and transport mechanisms that may occur at the site, human receptor populations that may be exposed to the affected media under current or future site conditions, and potential exposure pathways for each receptor population. This information was summarized in a CSEM. Figure 8-1 presents the CSEM for potential human receptors. As shown in the CSEM, the following receptors were identified for evaluation in the HHRA:

- Future industrial worker
- Future construction worker
- Hypothetical future resident (adult and child)

Health risks from exposure to COPCs were evaluated for each of these receptors. An unrestricted (residential) land use scenario generally represents the greatest potential for exposure to site chemicals. Although the future residential scenario is unlikely for MRP Site UXO4, it was evaluated to provide additional information to support risk management decisions for the site. With the exception of site investigations, MRP Site UXO4 is not currently used, and fencing prevents access. Therefore, no current potential receptors were evaluated in the HHRA.

Potential exposure pathways for each of these receptors are shown in the CSEM; cancer risks and noncancer hazards were quantified in the HHRA for each exposure pathway identified as potentially complete. The soil exposure pathways identified as potentially complete are as follows:

- Incidental ingestion
- Dermal contact
- Inhalation of chemicals adsorbed to windblown soils released to outdoor air

Exposure to surface soil (0 to 0.5 foot bgs) from direct contact was evaluated for the future industrial worker and future resident; surface soil exposures represent a minimal development scenario during future land use (i.e., minimal excavation of site soils). Exposure to subsurface soil (0 to 10 feet bgs) was evaluated for the future industrial worker, future construction worker, and future resident; subsurface soil exposures represent an intrusive development scenario during future land use (i.e., intrusive excavation and mixing of deeper site soils with shallower soils).

In the absence of current receptors at MRP Site UXO4, soil exposure pathways and hence risks from exposure to soil are incomplete for current receptors.

Because of the inferred depth to potable groundwater (greater than 100 feet bgs), groundwater is not considered a medium of concern at MRP Site UXO4 and is not addressed by this RI. Potential exposure to surface water is expected to be negligible and is not evaluated in the HHRA. No permanent water bodies are present within MRP Site UXO4 or the Additional Work Area.

8.1.2 Data Evaluation and Identification of Constituents of Potential Concern

This step of the HHRA consisted of evaluating the analytical data for usability in the HHRA, grouping the analytical data by depth interval (surface and subsurface), and identifying COPCs for data grouping. Detected chemicals except inorganic chemicals considered to be essential human nutrients and metals detected at concentrations below Detachment Fallbrook-specific BTVs for Kgt soils were identified as COPCs for the HHRA. COPCs were identified separately for surface soil (0 to 0.5 foot bgs) and subsurface soil (0 to 10 feet bgs).

8.1.3 Estimating Exposure Point Concentrations

EPCs for each COPC were estimated from measured concentrations for evaluation in the subsequent risk calculations. A 95 percent upper confidence limit (95UCL) was used as the EPC for each COPC for surface soil and subsurface soil, except when the 95UCL exceeded the maximum concentration or when the dataset was not sufficiently large to calculate a 95UCL. In these cases, the maximum concentration was used as the EPC.

8.1.4 Risk Characterization

This HHRA estimates health risks using a streamlined risk-based concentration (RBC) approach, rather than the traditional forward risk calculation approach outlined in the RAGS Part A framework (USEPA, 1989). The RBC approach uses the ratio of EPCs to receptor- and pathway-specific RBCs to estimate health risks. Because the potential receptors and potentially complete exposure pathways identified for evaluation for UXO4 are consistent with those incorporated in the USEPA RSLs (USEPA, 2015) and DTSC-SLs (DTSC, 2016), the resulting health risk estimates are numerically equivalent to the estimates obtained using the forward risk calculation methodology outlined in the USEPA Risk Assessment Guidance For Superfund Part A framework (USEPA, 1989). This RBC approach, also known as the risk-ratio or ratiometric approach, also follows the DTSC guidelines for risk assessments (DTSC, 2015; DTSC, 2016).

USEPA (2015) industrial and residential RSLs for soil were used as RBCs to evaluate future industrial worker and hypothetical future residential exposure to surface and subsurface soil. When available, DTSC-SLs (DTSC, 2016) were used as RBCs in lieu of USEPA RSLs. Soil RBCs for construction worker exposure were derived specifically for this HHRA because neither USEPA nor DTSC has established soil RBCs for construction worker exposure. The soil RBCs used for this HHRA are summarized in Appendix L.

8.1.4.1 Characterization of Cancer Risks

Risks associated with exposure to COPCs classified as carcinogens are estimated as the incremental probability that an individual will develop cancer over a lifetime as a direct result of an exposure. The estimated risk is expressed as a unitless probability.

USEPA guidance on exposure levels considered protective of human health was used to aid in interpreting the results of the risk assessment. In the National Contingency Plan (40 *Code of Federal Regulations* 300.430), USEPA defined general remedial action goals for sites on the National Priorities List. The goals include a range for residual cancer risk, which is "an excess upper-bound lifetime cancer risk to an individual of between 1E-04 [10^{-4}]and 1E-06 [10^{-6}]," or 1 in 10,000 to 1 in 1,000,000. This HHRA compares cumulative cancer risks with the USEPA range of 10^{-4} to 10^{-6} for management of cancer risk, referred to as the risk management range. This HHRA also compares cumulative cancer risks with the lower end of the range, 1×10^{-6}, which is the DTSC point of departure for management of cancer risks. Risks that do not exceed the point of departure (1×10^{-6}) are considered negligible and do not require action. Comparison of cumulative cancer risks to both the DTSC point of departure and the USEPA risk management range is included to provide information for risk management decisions.

8.1.4.2 Characterization of Noncancer Hazards

A noncancer hazard index (HI) is used to evaluate the potential for exposure that would result in adverse health effects other than cancer for COPCs not classified as carcinogens and for those carcinogens known to cause adverse health effects other than cancer. HIs for chemicals are summed to create an overall HI to evaluate the potential for adverse health effects other than cancer to result from simultaneous exposure to multiple chemicals. If the total HI exceeds 1, further evaluation in the form of a segregation of HI based on a target organ analysis may be performed to identify whether the noncancer HIs are a concern.

8.1.4.3 Characterization of Risks from Exposure to Lead

Lead was identified as a COPC in surface soil and subsurface soil. The HHRA evaluated the potential for health effects from exposure to lead in surface and subsurface soil by comparing EPCs with the DTSC-SLs of 80 mg/kg for residential exposure and 320 mg/kg for industrial exposure (DTSC, 2016). These screening concentrations are based on a biomarker (blood lead levels); for this reason, the risks from exposure to lead were characterized separately and were not included in risk or hazard calculations.

8.1.5 Results of the Human Health Risk Assessment

This section summarizes the results of the HHRA and identifies the primary risk contributors for MRP Site UXO4. The HHRA evaluated three scenarios: future industrial worker, future construction worker, and future resident. Risk calculations are provided Appendix L.

This HHRA identifies a COPC as a primary risk contributor when (1) the COPC-specific cancer risk exceeds 1×10^{-6} (the lower end of the risk management range for cancer risks) or (2) the COPC-specific noncancer HI exceeds 1 (the threshold level for noncancer effects). Each of the COPCs identified as primary risk contributors was evaluated further to assess whether detections could be attributed to non-Navy-related conditions. Primary risk contributors that could be attributed to Navy site-use-related conditions are recommended for further consideration or response under the MRP. Primary risk contributors that are not attributed to Navy site-use-related conditions are not recommended for additional evaluation. The evaluation of primary risk contributors is presented in Section 8.1.6.

8.1.5.1 Surface Soil

Future Industrial Worker

The cumulative cancer risk for future industrial worker exposure to surface soil is 7×10^{-6}. The cancer risk exceeds the DTSC point of departure of 1×10^{-6}, but is within the USEPA risk management range of 10^{-4} to 10^{-6}. Arsenic accounts for nearly 100 percent of the cancer risk.

The cumulative noncancer HI for future industrial worker exposure to surface soil is 0.7, which is less than the noncancer threshold of 1.

Future Resident

The cumulative cancer risk for future residential exposure to surface soil is 3×10^{-5}. The cancer risk exceeds the DTSC point of departure of 1×10^{-6}, but is within the USEPA risk management range of 10^{-4} to 10^{-6}. Arsenic accounts for nearly 100 percent of the cancer risk.

The cumulative noncancer HI for future residential exposure to surface soil is 7, which exceeds the noncancer threshold of 1. Arsenic is a primary risk contributor for noncancer effects, and accounts for 75 percent of the cumulative noncancer hazard. The sum of the HIs for other COPCs in surface soil is below 1.

8.1.5.2 Subsurface Soil

Future Industrial Worker

The cumulative cancer risk for future industrial worker exposure to subsurface soil is 8×10^{-6}. The cancer risk exceeds the DTSC point of departure of 1×10^{-6}, but is within the USEPA risk management range of 10^{-4} to 10^{-6}. Arsenic accounts for over 99 percent of the cancer risk.

The cumulative noncancer HI for future industrial worker exposure to subsurface soil is 0.7, which is less than the noncancer threshold of 1.

Future Resident

The cumulative cancer risk for future residential exposure to subsurface soil is 3×10^{-5}. The cancer risk exceeds the DTSC point of departure of 1×10^{-6}, but is within the USEPA risk management range of 10^{-4} to 10^{-6}. Arsenic accounts for over 99 percent of the cancer risk.

The cumulative noncancer HI for future residential exposure to subsurface soil is 8, which exceeds the noncancer threshold of 1. Arsenic accounts for 93 percent of the cumulative noncancer hazard. The sum of the HIs for other COPCs in subsurface soil does not exceed 1.

Future Construction Worker

The cumulative cancer risk for future construction worker exposure to subsurface soil is 1×10^{-6}, which is equal to but does not exceed the DTSC point of departure of 1×10^{-6}.

The cumulative noncancer HI for future construction worker exposure to subsurface soil is 4, which exceeds the noncancer threshold of 1. Segregation of the HI in the form of a target organ evaluation was completed for the construction worker scenario because the cumulative HI exceeded the threshold of 1. This evaluation showed that the highest segregated HI is 3, and is based on effects to the nervous system, and associated with exposure to arsenic and manganese. In addition, a segregated HI of 2 was calculated for the reproductive/development, cardiovascular, respiratory, and dermal systems. The segregated HI of 2 for each of these target organs was based on exposure to arsenic; cobalt also contributes to the segregated HI for the respiratory system. No other HIs segregated by target organ exceed the threshold of 1. Based on these results, arsenic, cobalt, and manganese are identified as primary risk contributors based on noncancer effects.

8.1.5.3 Lead

EPCs for lead in surface and subsurface soil are based on 95UCLs and are less than the residential DTSC-SL of 80 mg/kg and the industrial DTSC-SL of 320 mg/kg. EPCs do not exceed screening criteria for lead. Therefore, further evaluation is not needed for lead.

8.1.6 Evaluation of Primary Risk Contributors

Arsenic, cobalt, and manganese were identified as primary risk contributors for surface and subsurface soil (future industrial, construction worker, and residential scenarios). These chemicals were evaluated further to assess whether detections could be attributed to Navy-related conditions.

8.1.6.1 Arsenic

Arsenic was identified as a primary risk contributor for surface and subsurface soil based on cancer risks that exceed 1×10^{-6} for the future industrial and residential scenarios. In addition, arsenic contributes to a segregated HI of 3 (based on effects to the nervous system) and to multiple segregated HIs of 2 (based on effects to the reproductive/ development, cardiovascular, respiratory, and dermal systems) for the future construction worker scenario.

Detected arsenic concentrations at MRP Site UXO4 (0.932 to 3.99 mg/kg) are well within the range of naturally occurring background arsenic concentrations, and are likely naturally occurring rather than site-related. In addition, arsenic is not associated with munitions or munitions dunnage, and historical uses of the MRP Site UXO4 do not indicate use or disposal of arsenic. For these reasons, arsenic is not recommended for further evaluation.

8.1.6.2 Cobalt

Cobalt was identified as a primary risk contributor for subsurface soil for the future construction worker scenario because it contributes to a segregated HI of 2, based on a target organ analysis. Detected cobalt concentrations at MRP Site UXO4 range from 4.34 to 23.9 mg/kg. Further evaluation of cobalt is provided in Section 8.4.2 of Appendix L. Results of this evaluation indicate that the construction worker HI for cobalt (0.5) is relatively low compared to the respective segregated HI (2), the EPC for cobalt is less than residential and construction worker RBCs for cobalt, and site concentrations for cobalt are comparable to background concentrations for cobalt for Detachment Fallbrook with only one of 47 sample results (the maximum detection) that exceeds the cobalt BTV for Kgt soils (23.81 mg/kg). The single sample result for cobalt that exceeds the BTV (measured at UXO4-SB05) is essentially equivalent to the BTV because the exceedance is by a negligible amount (0.01 mg/kg). In addition, the sample location of the maximum detection is not associated with an investigation trench with geophysical anomalies. Cobalt is not recommended for further evaluation.

8.1.6.3 Manganese

Manganese was identified as a primary risk contributor for subsurface soil for the future construction worker scenario because it contributes to a segregated HI of 3, based on a target organ analysis. Detected manganese concentrations at MRP Site UXO4 range from 89.9 to 627 mg/kg. Father evaluation of manganese is provided in Section 8.4.2 of Appendix L. Results of this evaluation indicate that the construction worker HI for manganese is equal to, but does not exceed the threshold HI of 1, manganese concentrations are well below the residential RBC for manganese (1,800 mg/kg), and site concentrations for manganese are generally comparable to background concentrations for manganese. Results for only two of 47 samples exceed the manganese BTV for Kgt soils (432.1 mg/kg). The two sample results where manganese exceeds the BTV are 451 mg/kg at KCH-UXO-SB04 and 627 mg/kg at UXO4-SB05. Neither of these samples is collocated nor located in an investigation trench with geophysical anomalies. Manganese is not recommended for further evaluation.

8.2 Ecological Risk Assessment

An ERA was conducted as part of the RI for MRP Site UXO4 in accordance with the guidelines published by USEPA and the California Environmental Protection Agency (Cal-EPA). The overall objective of this ERA was to quantitatively and qualitatively evaluate baseline or existing exposure and risks to ecological receptors, and to provide risk managers with information needed to achieve their ecological management goals and help guide remedial decisions, if necessary.

This ERA was conducted in phases as recommended by the Navy policy for conducting ERAs (Navy, 1999 and 2003) and is consistent with USEPA (USEPA, 1997 and 1998) and Cal-EPA DTSC (DTSC, 1996) guidance for conducting ERAs. Each of the following phases is more detailed and focused than the preceding phase, and data from one phase are used to determine whether further studies are needed to meet the objectives of the assessment.

- Tier 1 SLERA
- Tier 2 Baseline ERA (BERA)
- Tier 3 Evaluation of Remedial Alternatives

The tiered approach is designed to focus the evaluation on those receptor types and constituents of potential ecological concern (COPECs) considered of greatest concern. The Tier 1 SLERA used conservative assumptions to determine the chemicals, receptors, and exposure pathways to carry forward to the site-specific Tier 2 assessment, and included the maximum detected concentration and Low ecological screening values (ESVs). Tier 2 included use of refined exposure assumptions (e.g., use of areal average concentrations as represented by the 95UCL and consideration of High toxicity reference value [TRV]-based ESVs) to provide more realistic estimates of exposure and risk. Tier 3 is initiated when the results of the Tier 2 BERA indicate that site-related chemicals of ecological concern pose unacceptable risks to one or more assessment endpoints. The ERA process, results, and uncertainties are discussed in more detail in Appendix M. A CSEM for ecological receptors is shown on Figure 8-2.

Risks were estimated for terrestrial birds and mammals. These estimates were conducted under the hypothetical assumption that soil at MRP Site UXO4 is readily accessible for exposure by these receptors. Potential risks to terrestrial birds and mammals were estimated using the dosage-based food-chain uptake model and Low and High TRVs to derive ESVs.

Low TRV-based ESVs are used to estimate potential risks to special-status species. Prior to conducting the RI sampling, MRP Site UXO4 was monitored for CAGN and SKR, and neither of these species were found to be currently present at the site. Given the lack of documented special-status birds or mammals using the site, the results using the High TRV-based ESVs are considered most appropriate for assessing the potential for adverse effects on receptor populations and communities for nonthreatened and nonendangered species.

The results of this ERA indicate that concentrations of COPECs found in MRP Site UXO4 soil during the RI sampling are below levels that might be expected to pose ecological risk

(as indicated by the High TRV-based ESVs). The overall conclusion of the ERA is that the concentrations in soil do not pose unacceptable risk to ecological receptors.

The ERA also included an assessment of uncertainties inherent in the assumptions used to estimate risks. Uncertainties in risk assessment methods may result in understating or overstating the ecological risks.

9.0 Conceptual Site Model

This updated conceptual site model (CSM) for MRP Site UXO4 and the Additional Work Area integrates RI results with background information, environmental setting, and demographic information to identify sources, release mechanisms, transport pathways, potentially affected media, and receptors for potential contamination at the site. The CSM is summarized in the following chart. Exposure pathway evaluations for MC for potential human receptors and MC for potential ecological receptors are included as Figures 8-1 and 8-2, respectively. An exposure pathway evaluation for MEC for potential human receptors is included as Figure 9-1.

Size	Approximately 1.8 acres for MRP Site UXO4, plus approximately 2.16 acres for the Additional Work Area.
Access	Fenced, accessed from Terrier Road and Sidewinder Road.
Terrain	Low hills and natural ravines.
Vegetation/Biological Setting	Detachment Fallbrook is composed mainly of open space where plant communities, habitats, and federally listed as threatened or endangered species are able to thrive because of the low-intensity land use requirement of the site. Fourteen primary vegetation communities occur on the site and generally correspond to seven wildlife habitat types: coastal sage scrub, mixed chaparral, chamise chaparral, valley foothill riparian, annual grassland, fresh emergent wetlands, and eucalyptus.
Hydrology/Surface Water	Detachment Fallbrook is part of two coastal watersheds: the Santa Margarita River and the San Luis Rey River. The Santa Margarita River, Fallbrook Creek, and Pilgrim Creek make up the three major surface water drainages within the detachment. There are no permanent surface water bodies within MRP Site UXO4 and the Additional Work Area. A drainage swale runs along the northern portion of MRP Site UXO4 and the Additional Work Area flowing to the west.
Geology/Hydrogeology	Detachment Fallbrook is in the Peninsular Ranges geomorphic province, which is characterized by a series of northwest-trending ranges and valleys. The geomorphic province is dominated by the igneous and metamorphic rocks of the Peninsular Range batholith. Four bedrock types have been identified within the boundaries of Detachment Fallbrook: gabbro, granodiorite, Kgt, and metavolcanic/metasedimentary. Potable groundwater is estimated to be deeper than 100 feet at MRP Site UXO4 and the Additional Work Area, and the groundwater gradient is estimated to be to the southwest.
Current Use	MRP Site UXO4 is not in use and is completely fenced. There are no buildings within MRP Site UXO4 boundaries. The Additional Work Area is outside of the MRP Site UXO4 perimeter fence and is currently unused; however, it is within fencing that surrounds Detachment Fallbrook.
Historical Use	MRP Site UXO4 was used as a burial area for dunnage and munitions. The site was used from 1942 until 1978. Sidewinder Road and Terrier Road were constructed in 1945.
Primary Source/Release Mechanisms	Burial area for munitions and munitions-related dunnage. Releases of MC and other COPCs may have occurred to the surface.
Secondary Release or Transport Mechanisms	Intentional or inadvertent burial of discarded munitions or related materials resulting in the potential release of MC as materials deteriorate.

Suspected Contaminants	Releases from debris, MEC, and MPPEH.
Target Munitions	In 2004, a PA was conducted at MRP Site UXO4. During the visual survey, items observed included surface scrap metal, inert rifle grenades, and a single 60-mm mortar (Malcolm Pirnie, 2006). In addition, suspect MEC was observed at the Additional Work Area following heavy rainfall and surface runoff event.
Potential Transport Mechanisms	Erosion/rain events and surface runoff, intrusive human activities, and burrowing animals.
Sensitive Ecological Habitats	Common fauna include mammals (kangaroo rats, voles, deer, mice, ground squirrels, opossum, rabbits, and coyotes), amphibians (tree frogs), reptiles (orange throated whiptails, rattlesnakes, and horned lizards), and birds (burrowing owls, kites, quails, sparrows, kingbirds, and hawks).
Current Human Receptors	Detachment Fallbrook workers, contractors, and visitors. For the purposes of the HHRA, there are no current human receptors because the site is located on an active military installation and access to the site is currently restricted by fencing, locked gates, and signage.
Future Human Receptors	Detachment Fallbrook workers, contractors, and visitors, and future construction workers at the Additional Work Area. For the purposes of the HHRA, the future human receptors were industrial workers, construction workers, and hypothetical residents.
Previous MEC Investigations and Removal Actions	**PA:** The PA included interviews of current and retired personnel from Detachment Fallbrook; a review of reports, files, and drawings in the Detachment Fallbrook environmental office; a review of map and flat files at Detachment Fallbrook Facilities and Engineering offices for historical maps and aerial photos; and a review of archives at the NAVFAC historian's office at Port Hueneme. In addition, visual surveys of MRP Site UXO4 were performed in September 2004 and March 2005 by walking the perimeter of MRP Site UXO4 and then walking several transects within it. Inert rifle grenades, one 60-mm mortar, and other munitions scrap were observed on the ground surface and in the ravine area during the site visits. A large quantity of non-munitions-related trash was also noted at the site (Malcolm Pirnie, 2006). **SI:** The SI included UXO detector-aided visual surveying, site reconnaissance mapping, and geophysical surveys (EM-61 surveys) to locate buried suspect MEC. Biased and unbiased location samples were submitted to the laboratory for analysis of VOCs and SVOCs, metals, white phosphorous, perchlorate, and explosive compounds. A disposal trench was identified in the central portion of the site, and the geophysical survey indicated that the majority of disposal took place in and around the ravine in the central portion of the site. Eleven suspect MEC items (M31 practice grenades) were found. Some of these items were found protruding from the walls of the drainage, and some were lying on the surface of the site, while others were partially buried. All suspect MEC was left in place, and the explosive status of these items remains unconfirmed. No concentrations of explosives or propellants, VOCs, or SVOCs were detected in soils at MRP Site UXO4. Perchlorate was detected at a concentration below the human health screening criteria. Concentrations of two metals (arsenic and cadmium) exceeded human health screening criteria. At least one sample contained detected concentrations of six metals in soil at MRP Site UXO4 (aluminum, chromium, cobalt, iron, manganese, and vanadium) that exceeded the corresponding ecological benchmarks. Arsenic exceeded both residential and industrial human health screening criteria but could be attributed to background because the maximum result was only 3.5 mg/kg (estimated value) (ChaduxTt, 2010). No removal actions were previously performed at MRP Site UXO4.

Current MEC Investigation	The RI consisted of digital geophysical mapping, intrusive investigation of selected anomalies, and excavation of four investigative trenches to assess the nature and extent of MEC and munitions debris in the surface and subsurface at MRP Site UXO4 and the Additional Work Area. A surface clearance of DGM survey areas was conducted by completing analog-instrument-aided visual inspections of each area.
Previous MC Investigations	During the SI, sampling and analytical results included the following: • Ten discrete surface and subsurface soil samples were collected from six soil borings. • Two bias-located discrete surface (0 to 2 feet bgs) soil samples were collected from the drainage swale/ravine that traverses the site from southeast to northwest. One soil sample was collected below the Sidewinder Road corrugated metal pipe outfall, and one soil sample was collected at the downgradient boundary of the site. • Four non-bias-located discrete surface samples (0 to 2 feet bgs) were collected from four randomly selected locations. No concentrations of explosives or propellants, VOCs, or SVOCs were detected in soils at MRP Site UXO4. Perchlorate was detected at a concentration below the human health screening criteria. Two metals (arsenic and cadmium) exceeded human health screening criteria. At least one sample contained detected concentrations of six metals in soil at MRP Site UXO4 (aluminum, chromium, cobalt, iron, manganese, and vanadium) that exceeded the corresponding ecological benchmarks. Arsenic exceeded both residential and industrial human health screening criteria but could be attributed to background because the maximum result was only 3.5 mg/kg (estimated value) (ChaduxTt, 2010).
Current MC Investigation	Eleven surface soil samples (0 to 0.5 foot bgs) and 36 subsurface soil samples (1 to 8 feet bgs) were collected in 2015 for the RI. Soil samples were analyzed for explosives residues, perchlorate, metals, and hexavalent chromium.
MEC Pathways	Potential human exposures to MEC physical hazards are possible at MRP Site UXO4, but not likely. The potential for exposure is attributed to exposure pathways, which are influenced by site accessibility, duration of potential for contact, quantity and type of MEC, depth of MEC versus work undertaken, and the potential for MEC migration. Access to MRP Site UXO4 is currently restricted by both physical barriers and administrative access restrictions. Currently, there are no physical barriers to the Additional Work Area. MRP Site UXO4 and the Additional Work Area are located entirely within the secured Detachment Fallbrook boundary. The site constraints of restricted access and controlled activity type support the position of an incomplete source/receptor pathway. However, because the possibility of direct MEC contact remains, the source/potential receptor pathway is determined to be complete for authorized personnel for both MRP Site UXO4 and the Additional Work Area, and the site users are considered potential receptors.
MC Pathways	**HHRA:** The soil exposure pathways identified as potentially complete are as follows: • Incidental ingestion • Dermal contact • Inhalation of chemicals adsorbed to windblown soils released to outdoor air **ERA:** Direct exposure to soil and indirect exposure through food web exposure via consumption of contaminated prey/forage.
Nature and Extent	**MEC/MPPEH:** No MEC or MDEH was discovered during the surface clearance completed prior to DGM surveys at MRP Site UXO4 and the Additional Work Area. Also, no MEC or MDEH was identified from intrusive investigations of the sources associated with anomalies selected from the DGM surveys, and no MEC or MDEH was recovered from any of the investigative trenches at MRP Site UXO4. MPPEH was inspected

	and segregated into MDAS or non-munitions-related metal debris. All MPPEH was determined to be MDAS, identified as M11 and M31 practice rifle grenades. The practice rifle grenades did not contain an explosive hazard so they were not initially classified as MEC, but potentially contained explosives so were considered MPPEH. After further inspection, they were further classified as MDAS. Non-munitions-related metallic debris recovered during these investigations was segregated and placed in a separate storage bin dedicated to non-munitions-related metallic debris. In conformance with Verification Sampling Program in VSP, Version 6.5 (Pacific Northwest National Laboratory/Battelle, 2014), the results of the total number of anomalies investigated indicate that there is a 95 percent confidence (with plus or minus 5 percent sampling error) that the remaining uninvestigated DGM anomalies at MRP Site UXO4 and the Additional Work Area do not represent MEC. These statistical results cannot be applied to remaining material in the disposal areas. Without a complete subsurface clearance, MEC and MPPEH are suspected in the subsurface at MRP Site UXO4 and the Additional Work Area. It is known that material (possibly related to a disposal area) remains in the subsurface in the vicinity of Trench 4. Although the trench was not expanded to conduct a lateral investigation of this material, several potholes were excavated in the vicinity of the investigative trenches to assess the depth of buried items. Based on examination of potholes, the maximum depth of MPPEH at MRP Site UXO4 was 7 feet bgs. There is a potential for migration of MEC or MPPEH through erosion and surface water transport, particularly in the areas of sloping terrain. Precipitation runoff drains toward a drainage swale within MRP Site UXO4. If MEC/MPPEH migration occurs or has occurred from MRP Site UXO4, it would likely be in the direction of the drainage swale, and then to the west toward the Additional Work Area. The inferred disposal area and surface water migration pathways are shown on Figure 6-1. **MC:** Soil has been characterized through investigations conducted during 2009 and 2015, resulting in the collection of 47 soil samples (0 to 8 feet bgs). No explosives residues or perchlorate were detected at concentrations above RSLs in soil samples collected during the SI and RI. Metals were detected in soil at concentrations above BTVs, RSLs, or DTSC-SLs. Beryllium, cadmium, copper, lead, manganese, mercury, and zinc were detected above their respective BTVs in one or more soil samples; however, none of these concentrations were above their respective residential and industrial RSLs and DTSC-SLs. Detected arsenic concentrations were above the residential and industrial DTSC-SLs and were above the BTV in 25 of 47 samples; however, these were well within the range of naturally occurring background arsenic concentrations in Kgt classified soils. The cobalt concentration in one SI subsurface soils ample was above the BTV and residential DTSC-SL. Detected lead concentrations were above the BTV in 19 of 47 samples; however, lead concentrations were below industrial and residential DTSC-SLs.
Risk Assessment	**MEC/MPPEH:** Based on the explosives hazards evaluation, the explosive hazard for MRP Site UXO4 is low to moderate. Although all items recovered as part of the RI fieldwork were classified as MDAS, based on the items reported in the SI and RI, the potential for MEC/MPPEH in the subsurface at MRP Site UXO4 and the Additional Work Area is considered to remain, indicating that the potential for explosive hazard remains. **MC:** Based on the evaluation of primary risk contributors in the HHRA, there are no constituents at MRP Site UXO4 recommended for further consideration or response under the MRP. The results of the ERA indicate that concentrations of COPECs in soil samples collected during the SI and RI sampling are below levels that might be expected to pose ecological risk (as indicated by the High TRV-based ESVs) to receptor populations and communities for nonthreatened and nonendangered species.

10.0 Conclusions and Recommendations

10.1 Conclusions

The following conclusions are based on findings from the SI and RI investigations:

- No MEC or MDEH was recovered during the field operations at MRP Site UXO4 or the Additional Work Area during the RI field activities. All MPPEH (consisting of M31 and M11 practice grenades) was determined to be MDAS. Fourteen drums containing inspected, reinspected, certified, and verified MDAS from MRP Site UXO4 were sent to Bonetti Explosives in Columbus, Texas, and were shredded and smelted on May 26, 2015. Recovered non-munitions-related metallic debris from MRP Site UXO4 was transported offsite to Fallbrook Waste and Recycling for recycling on April 15, 2015.
- In conformance with the Verification Sampling Program in VSP, Version 6.5 (Pacific Northwest National Laboratory/Battelle, 2014), the results of the total number of anomalies investigated indicate that there is a 95 percent confidence (with plus or minus 5 percent sampling error) that the remaining uninvestigated DGM anomalies at MRP Site UXO4 and the Additional Work Area do not represent MEC. However, these statistical results cannot be applied to material remaining in the disposal areas.
- MPPEH is known to remain in the subsurface at MRP Site UXO4, based on visual observations of material exposed in the sidewalls of Trench 4. The maximum depth of material is estimated to be 7 feet bgs.
- The results of the MEC HA developed for MRP Site UXO4 indicated a Hazard Level 4, which identifies sites with a low potential explosive hazard condition. The current land use controls of fencing and signage provided risk reductions for this hazard level. Any intrusive activities should be conducted using qualified UXO personnel support.
- The results of the MEC HA developed for the Additional Work Area also indicate a Hazard Level 4, which identifies sites with a low potential explosive hazard condition. Risk reductions for the Additional Work Area were included because it is suspected that the area received MPPEH that has migrated from MRP Site UXO4 rather, than the presence of disposal areas at the Additional Work Area. Similar to MRP Site UXO4, any intrusive activities should be conducted using qualified UXO personnel support.
- Based on the findings during previous and current field investigation activities, MPPEH are suspected to remain in the subsurface at MRP Site UXO4 and the Additional Work Area. Also, erosion and surface runoff have intensified following the May 2014 Tomahawk fire at Detachment Fallbrook. This could enhance the potential for MEC or MPPEH to migrate offsite from MRP Site UXO4 and the Additional Work Area. Therefore, restricted-access conditions at the Additional Work Area are recommended through the use of land use controls, and intrusive land use activities should be restricted, only to be conducted with the appropriate level of UXO support.

- No explosives residues or perchlorate were detected at concentrations above RSLs in soil samples collected during the SI and RI. Metals were detected in soil at concentrations above BTVs or RSLs and DTSC-SLs and were evaluated in the HHRA.
- Arsenic and lead were identified in the HHRA as primary risk contributors. Arsenic is not recommended for further evaluation because (1) arsenic concentrations were only slightly above the BTV for Kgt parent rock and well within the range of naturally occurring concentrations, (2) there were no collocated sample locations, and (3) arsenic is not associated with munitions or munitions dunnage.
- Lead is not recommended for response action because no surface or subsurface soil samples containing lead concentrations exceeded industrial or residential screening criteria.
- The results of the ERA for MRP Site UXO4 indicate that concentrations of COPECs found in MRP Site UXO4 soil during the SI and RI sampling are below levels that might be expected to pose ecological risk (as indicated by the High TRV-based ESVs) to receptor populations and communities for nonthreatened and nonendangered species.

The distribution of anomalies detected during DGM and the nature of MPPEH recovered during intrusive investigations are consistent with the MRP Site UXO4 history as a disposal area. Although all items recovered as part of the RI fieldwork were classified as MDAS, the potential for MEC/MPPEH in the subsurface at MRP Site UXO4 and the Additional Work Area is considered to remain, indicating that the potential for explosive hazard remains.

There is a potential for migration of MEC or MPPEH through erosion and surface water transport, particularly in the areas of the drainage swale that traverses MRP Site UXO4 and discharges toward the Additional Work Area. If MEC/MPPEH migration occurs, it will likely be in the direction of the drainage swale. Based on field investigation activities of disposal areas at MRP Site UXO4, MEC/MPPEH is unlikely to be deeper than 7 feet bgs; however, site activities (e.g., site work and construction) could disturb MEC/MPPEH below the surface and cause MEC/MPPEH to be exposed at the surface. Therefore, the current restricted-access conditions and prohibitions against intrusive activities will continue, and intrusive land use activities will only be authorized with the appropriate level of UXO support at both MRP Site UXO4 and the Additional Work Area.

10.2 Recommendations

The following recommendations are made for future actions related to MRP Site UXO4 and the Additional Work Area:

- **MRP Site UXO4:** Future land use at MRP Site UXO4 is expected to remain the same as current use, which is natural habitat area. As a result of the residual waste present, it is recommended the site remain under restricted military use for the foreseeable future and remain fenced with warning signs. Also, UXO personnel support is recommended for any intrusive activities to be conducted at MRP Site UXO4. These land use controls should continue to be implemented at MRP Site UXO4. The anomaly investigations, investigative trenches, and soil sampling are believed to be sufficient for the purpose of determining the nature of the wastes and refining the vertical extent of the wastes.

- **Additional Work Area:** Future land use at the Additional Work Area is also expected to remain the same as current use, which is natural habitat area. As a result of the residual waste present, it is recommended this area remain under restricted military use for the foreseeable future and land use controls continue to be implemented. Also, UXO personnel support is recommended for any intrusive activities to be conducted at the Additional Work Area. The anomaly investigations, investigative trenches, and soil sampling are believed to be sufficient for the purpose of determining the nature of the wastes and refining the vertical extent of the wastes at the Additional Work Area.
- Based on the findings during previous and current field investigation activities, MPPEH are suspected to remain in the subsurface at MRP Site UXO4 and the Additional Work Area. A feasibility study is recommended for MRP Site UXO4 to develop remedial action objectives and to develop and evaluate remedial alternatives to address the remaining potential threat of MEC/MPPEH at MRP Site UXO4 and the Additional Work Area.

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Tables

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TABLE 4-1

Summary of Investigative Trenches

RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

Trench ID	Location Coordinate Easting (center of excavation)	Location Coordinate Northing (center of excavation)	Depth (feet bgs)	MEC/MDEH (number of items)	MDAS (pounds)	NonMunitions-Related Metallic Debris (pounds)	Comments
1	6244264.607	2078050.588	3.5	0	136	10	M11 and M31 practice rifle grenades
2	6244226.559	2078061.981	3	0	180	5	M11 and M31 practice rifle grenades
3	6244207.035	2078041.092	3	0	0	1	
4	6244236.511	2078040.750	7	0	378	20	M11 and M31 practice rifle grenades
			Total:	0	694	36	

Notes:

bgs = below ground surface

ID = identification

MDAS = material documented as safe

MDEH = material documented as an explosive hazard

MEC = munitions and explosives of concern

MRP = Munitions Response Program

NAVWPNSTA = Naval Weapons Station

UXO = unexploded ordnance

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TABLE 4-2

Summary of Soil Samples Collected Beneath MPPEH

RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

Location ID	Sample Date	Depth (feet bgs)	Anomaly ID Location	MPPEH Description
KCH-UXO4-SB01	4/2/2015	1.0	ST049-109	M31 practice rifle grenade
KCH-UXO4-SB02	4/3/2015	0.83	ST048-0050	M11 practice rifle grenade
KCH-UXO4-SB03	4/6/2015	0.08	ST059-0013	M31 practice rifle grenade
KCH-UXO4-SB04	4/3/2015	0.33	ST049-0069	M31 practice rifle grenade
KCH-UXO4-SB05	4/3/2015	0.33	ST049-0108	M31 practice rifle grenade
KCH-UXO4-SB06	4/3/2015	0.42	T006-0008	M31 practice rifle grenade
KCH-UXO4-SB07	4/6/2015	2.0	T011-0004	M11 practice rifle grenade
KCH-UXO4-SB08	4/10/2015	8.0	T019-0007	M31 practice rifle grenade
KCH-UXO4-SB09	4/10/2015	1.0	T031-0006	M31 practice rifle grenade

Notes:

bgs = below ground surface

ID = identification

MPPEH = material potentially presenting an explosive hazard

MRP = Munitions Response Program

NAVWPNSTA = Naval Weapons Station

UXO = unexploded ordnance

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TABLE 4-3

Summary of Soil Samples Collected from Investigative Trenches

RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

Trench ID	Sample Location ID	Sample Date	Depth (feet bgs)
Trench 1	KCH-UXO4-TR01	4/10/2015	1
		4/10/2015	3
Trench 2	KCH-UXO4-TR02	4/13/2015	2
		4/13/2015	3
Trench 3	KCH-UXO4-TR03	4/13/2015	1.5
		4/13/2015	3
Trench 4	KCH-UXO4-TR04	4/14/2015	2
		4/14/2015	3

Notes:

bgs = below ground surface

ID = identification

MRP = Munitions Response Program

NAVWPNSTA = Naval Weapons Station

UXO = unexploded ordnance

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TABLE 4-4
Summary of Non-Biased Soil Samples
RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

Location ID	Sample Date	Depth (feet bgs)
KCH-UXO4-SB10	4/16/2015	0.5
	4/16/2015	1
KCH-UXO4-SB11	4/16/2015	0.5
	4/16/2015	1
KCH-UXO4-SB12	4/16/2015	0.5
	4/16/2015	1
KCH-UXO4-SB13	4/16/2015	0.5
	4/16/2015	1
KCH-UXO4-SB14	4/16/2015	0.5
	4/16/2015	1
KCH-UXO4-SB15	4/16/2015	0.5
	4/16/2015	1
KCH-UXO4-SB16	4/16/2015	0.5
	4/16/2015	1

Notes:
bgs = below ground surface
ID = identification
MRP = Munitions Response Program
NAVWPNSTA = Naval Weapons Station
UXO = unexploded ordnance

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TABLE 5-1
Soil Analytical Results - Perchlorate and Explosives
RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

		Chemical	Perchlorate	1,3,5-Trinitrobenzene	1,3-Dinitrobenzene	2,4,6-Trinitrotoluene	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2-Amino-4,6-dinitrotoluene	2-Nitrotoluene	3-Nitrotoluene	4-Amino-2,6-dinitrotoluene	4-Nitrotoluene	HMX	Nitrobenzene	RDX	Tetryl
Location ID	**Sample Date**	**Depth (feet bgs)**	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q
Samples Collected beneath MPPEH																	
KCH-UXO4-SB01	04/02/2015	1	< 2.21 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-SB02	04/03/2015	0.83	< 2.02 U	U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-SB03	04/03/2015	0.08	< 2.05 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-SB04	04/03/2015	0.33	< 2.04 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 500 U	< 100 U	< 200 U	< 100 U
KCH-UXO4-SB05	04/03/2015	0.33	< 2.1 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-SB06	04/03/2015	0.42	< 2.02 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-SB07	04/06/2015	2	< 2.16 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-SB08	04/08/2015	8	< 2.24 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-SB09	04/10/2015	6.6	< 2.54 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
Samples Collected from Trenches																	
KCH-UXO4-TR01	04/10/2015	1	< 2.15 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
	04/10/2015	3	< 2.19 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-TR02	04/13/2015	2	< 2.14 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
	04/13/2015	3	< 2.17 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-TR03	04/13/2015	1.5	< 2.23 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
	04/13/2015	3	< 2.36 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-TR04	04/14/2015	2	< 2.21 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
	04/14/2015	3	< 2.32 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
Samples Collected from Non-Biased Locations																	
KCH-UXO4-SB10	04/16/2015	0.5	< 2.08 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
	04/16/2015	1	< 2.21 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-SB11	04/16/2015	0.5	< 2.04 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 200 U	< 100 U	< 100 U	< 100 U
	04/16/2015	1	< 2.11 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-SB12	04/16/2015	0.5	< 2.02 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
	04/16/2015	1	< 2.05 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-SB13	04/16/2015	0.5	< 2.02 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 500 U	< 100 U	< 200 U	< 100 U
	04/16/2015	1	< 2.09 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-SB14	04/16/2015	0.5	3.76 J	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
	04/16/2015	1	2.29 J	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-SB15	04/16/2015	0.5	< 2.03 UJ	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
	04/16/2015	1	< 2.06 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
KCH-UXO4-SB16	04/16/2015	0.5	< 2.08 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 200 U	< 100 U	< 100 U	< 100 U
	04/16/2015	1	< 2.14 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 200 U	< 200 U	< 100 U	< 200 U	< 100 U	< 100 U	< 100 U	< 100 U
Residential Screening Criteria[a]			55,000	2,200,000	6,300	21,000	1,700	360	150,000	3,200	6,300	150,000	34,000	3,900,000	5,100	6,100	160,000
Industrial Screening Criteria[a]			820,000	32,000,000	82,000	96,000	7,400	1,500	2,300,000	15,000	82,000	2,300,000	140,000	57,000,000	22,000	28,000	2,300,000

Notes:
Results reported in micrograms per kilogram (µg/kg)
[a] Residential and industrial screening criteria are RSLs (USEPA, 2015).
< = less than
bgs = below ground surface
HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
ID = identification
MRP = Munitions Response Program
NAVWPNSTA = Naval Weapons Station
Q = result qualifier assigned by third-party validation
RDX = 1,3,5-trinitroperhydro-1,3,5-triazine
RSL = regional screening level
U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
USEPA = United States Environmental Protection Agency
UXO = unexploded ordnance

Source:
United States Environmental Protection Agency (USEPA). 2015. Regional Screening Levels for Chemical Contaminants at Superfund Sites. November.

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TABLE 5-2
Soil Analytical Results - Total Metals
RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

Location ID	Sample Date	Chemical Depth (feet bgs)	Aluminum Result Q	Antimony Result Q	Arsenic Result Q	Barium Result Q	Beryllium Result Q	Cadmium Result Q	Calcium Result Q	Chromium Result Q	Chromium VI Result Q	Cobalt Result Q	Copper Result Q	Iron Result Q	Lead Result Q	Magnesium Result Q	Manganese Result Q	Mercury Result Q	Molybdenum Result Q	Nickel Result Q	Potassium Result Q	Selenium Result Q	Silver Result Q	Sodium Result Q	Strontium Result Q	Thallium Result Q	Tin Result Q	Vanadium Result Q	Zinc Result Q
Samples Collected beneath MPPEH																													
KCH-UXO4-SB01	04/02/2015	1	14700	0.134 J	**1.97**	96.1 J	0.265 J	0.151 J	2190	11.6	0.144	5.39	8.13 J	19600	**6.72**	3620	181	0.0171 J	0.321 J	4.48 J	2450	0.0715 J	**< 0.108 U**	159	17.3	0.270 J	< 10.8 U	47.7	34.3
KCH-UXO4-SB02	04/03/2015	0.83	8570	0.178 J	**1.46**	72.4	0.200 J	0.166 J	1000	9.12	< 0.0404 U	5.30	8.34	13500	**10.6**	2570	233	0.0185 J	0.416 J	3.83	2230	0.111 J	**< 0.0991 U**	110	9.14	0.247 J	< 9.91 U	35.2	25.9
KCH-UXO4-SB03	04/03/2015	0.08	8510	0.126 J	**1.53**	67.3	0.172 J	0.152 J	1460	9.78	< 0.0409 U	5.22	24.1	15800	**21.8**	2420	178	< 0.0202 U	0.230 J	3.40	1800	0.0736 J	**< 0.0994 U**	102	11.2	0.181 J	6.98 J	41.2	**47.6**
KCH-UXO4-SB04	04/03/2015	0.33	9880	0.135 J	**1.42**	125	0.208 J	**0.282 J**	3600	9.62	< 0.204 U	7.70	11.6	16600	**6.02**	3430	**451**	**< 0.0204 U**	0.541	4.03	2720	0.122 J	**< 0.101 U**	129	24.7	0.207 J	< 10.1 U	49.5	**44.2**
KCH-UXO4-SB05	04/03/2015	0.33	8790	0.274 J	**1.61**	62.0	0.160 J	0.145 J	1260	10.8	< 0.0419 U	4.80	18.7	20800	**45.7**	2290	159	0.0111 J	0.336 J	3.96	1480	0.0720 J	**< 0.102 U**	94.4 J	9.04	0.154 J	14.3 J	53.6	**44.6**
KCH-UXO4-SB06	04/03/2015	0.42	7360	0.137 J	**1.23**	66.8	0.142 J	0.139 J	1160	9.04	< 0.0404 U	4.76	**58.4**	15900	**18.2**	2240	197	0.0132 J	0.396 J	3.08	2020	0.0615 J	**< 0.0976 U**	71.6 J	8.65	0.161 J	5.87 J	38.9	**36.3**
KCH-UXO4-SB07	04/06/2015	2	11900	0.309 J	**1.56**	110	0.108 J	0.157 J	2400	11.4 J	< 0.0433 U	7.05	**53.0 J**	34400	**51.2 J**	4100	198	**0.0425 J**	0.395 J	4.00	1940	0.0669 J	**< 0.106 U**	183	13.0	0.0965 J	6.86 J	71.4 J	**81.2 J**
KCH-UXO4-SB08	04/08/2015	8	11500	< 0.216 U	**1.51**	95.8	0.195 J	**0.193 J**	1580	11.6	< 0.0448 U	6.40	6.51	19400	2.69	4060	162	**< 0.0224 U**	0.131 J	3.78	2140	0.0674 J	**< 0.108 U**	< 137 U	11.2	0.299 J	< 10.8 U	46.1	26.4
KCH-UXO4-SB09	04/10/2015	6.6	16100	0.283 J	**2.57**	124	0.288 J	**0.246 J**	1900	16.4	< 0.0508 U	7.80	11.1	29300	**27.7**	4890	219	0.0173 J	0.355 J	5.46	2090	0.110 J	**< 0.124 U**	< 156 U	14.3	0.316 J	10.9 J	68.3	**72.0**
Samples Collected from Trenches																													
KCH-UXO4-TR01	04/10/2015	1	14900	< 0.210 U	**1.41**	94.8	0.314 J	**0.197 J**	1440	12.2	< 0.043 U	5.61	5.94	18800	4.18	3350	245	**< 0.0214 U**	0.211 J	4.75	1550	0.0749 J	**< 0.105 U**	< 234 U	12.5	0.277 J	< 10.5 U	43.6	26.6
	04/10/2015	3	14800	0.254 J	**2.48**	116	0.310 J	**0.222 J**	1630	15.3	< 0.0439 U	7.58	11.8	28000	**39.9**	3870	347	**0.0437 J**	0.485 J	6.91	2120	0.0871 J	**< 0.107 U**	< 258 U	13.7	0.318 J	12.6 J	50.4	**91.0**
KCH-UXO4-TR02	04/13/2015	2	17200	0.215 J	**2.07**	85.1	0.249 J	0.173 J	1210	13.2	< 0.0428 U	5.67	11.5	23800	**6.94**	2890	279	**0.0247 J**	0.484 J	6.12	1400	0.0677 J	**< 0.106 U**	< 203 U	10.2	0.231 J	< 10.6 U	42.4	**40.6**
	04/13/2015	3	23500	0.237 J	**1.82**	82.6	0.212 J	**0.214 J**	1070	10.9	< 0.0434 U	5.31	17.7	20400	**9.83**	2670	174	**0.0334 J**	0.389 J	4.83	1420	0.0923 J	0.0552 J	< 193 U	11.2	0.215 J	< 10.5 U	41.0	**54.0**
KCH-UXO4-TR03	04/13/2015	1.5	14200	0.116 J	**1.80**	78.8	0.249 J	**0.209 J**	1230	11.2	< 0.0445 U	6.43	5.54	19400	3.23	3670	210	0.0120 J	0.233 J	3.85	2140	0.0769 J	**< 0.111 U**	< 149 U	11.3	0.308 J	< 11.1 U	51.6	26.0
	04/13/2015	3	16900	0.139 J	**1.96**	99.0	0.345 J	**0.229 J**	1500	14.1	< 0.0472 U	7.23	5.82	23200	3.91	4400	240	**< 0.023 U**	0.265 J	4.76	2470	0.0925 J	**< 0.117 U**	< 240 U	13.7	0.388 J	< 11.7 U	60.1	31.3
KCH-UXO4-TR04	04/14/2015	2	13900	0.201 J	**1.91**	87.3	0.227 J	0.190 J	1190	16.4	< 0.0441 U	6.43	**61.3**	25200	**9.91**	3540	213	**0.0356 J**	0.341 J	4.78	2230	0.0780 J	**< 0.110 U**	< 142 U	10.3	0.284 J	< 11.0 U	66.0	**39.0**
	04/14/2015	3	19300	0.178 J	**1.72 J**	96.8 J	0.368 J	**0.278 J**	2050 J	16.3 J	0.0220 J	8.24 J	14.7 J	28600 J	**18.5 J**	4090 J	190 J	**0.0598 J**	0.249 J	7.27 J	1940 J	0.0909 J	**< 0.113 U**	< 196 U	15.8 J	0.307 J	12.6 J	47.6 J	**42.3**
Samples Collected from Non-Biased Locations																													
KCH-UXO4-SB10	04/16/2015	0.5	17700	0.108 J	**2.78**	175	0.338 J	**0.251 J**	6960	15.7	< 0.0416 U	5.89	5.34	21200	3.60	5090	94.4	**< 0.0204 U**	0.108 J	5.65	1440	0.106 J	**< 0.103 U**	< 474 U	25.8	0.305 J	< 10.3 U	56.0	23.5
	04/16/2015	1	21200	0.123 J	**3.99**	91.3	**0.388 J**	**0.366 J**	2150	17.7	< 0.0442 U	7.98	7.12	24900	3.30	5930	89.9	0.0125 J	< 0.213 U	5.93	1340	0.131 J	**< 0.107 U**	1050	25.0	0.314 J	< 10.7 U	75.6	25.9
KCH-UXO4-SB11	04/16/2015	0.5	9540	0.109 J	**1.50**	82.2	0.196 J	0.144 J	1020	12.0	< 0.0407 U	6.05	5.30	16300	3.54	3030	209	< 0.0201 U	0.359 J	4.54	2620	0.116 J	**< 0.0989 U**	< 94.0 U	9.58	0.275 J	< 9.89 U	45.8	23.8
	04/16/2015	1	15400	0.111 J	**2.09**	106	0.263 J	0.177 J	1410	15.2	0.0221 J	6.62	5.17	22900	3.29	4330	184	**< 0.0211 U**	0.429 J	5.36	2300	0.122 J	**< 0.104 U**	< 159 U	12.3	0.366 J	< 10.4 U	64.5	28.9
KCH-UXO4-SB12	04/16/2015	0.5	7180	0.109 J	**1.12**	73.3	0.166 J	0.131 J	1190	8.38	< 0.0404 U	4.95	6.16	11000	**5.28**	1930	297	< 0.0202 U	0.388 J	3.60	2060	0.114 J	**< 0.0986 U**	< 60.0 U	10.4	0.202 J	< 9.86 U	28.6	20.9
	04/16/2015	1	7860	< 0.200 U	**1.13**	73.8	0.188 J	0.129 J	1050	9.09	< 0.0409 U	5.09	5.99	12100	2.55	2130	266	**< 0.0204 U**	0.278 J	3.63	2050	0.110 J	**< 0.0999 U**	< 65.4 U	9.41	0.227 J	< 9.99 U	31.9	19.0
KCH-UXO4-SB13	04/16/2015	0.5	8820	0.119 J	**1.28**	77.6	0.179 J	0.151 J	1130	9.32	< 0.0405 U	6.74	5.87	12800	**5.67**	2170	335	< 0.0201 U	0.346 J	4.05	2110	0.111 J	**< 0.100 U**	< 83.2 U	9.87	0.220 J	< 10.0 U	32.8	20.8
	04/16/2015	1	11600	< 0.207 U	**1.59**	79.3	0.222 J	0.120 J	1160	12.0	0.0177 J	6.40	5.51	17700	2.97	3120	244	**< 0.0209 U**	0.292 J	4.61	2010	0.106 J	**< 0.103 U**	< 120 U	10.3	0.285 J	< 10.3 U	46.5	23.6
KCH-UXO4-SB14	04/16/2015	0.5	18500	< 0.207 U	**1.84**	117	0.345 J	**0.207 J**	2250	14.4	< 0.0421 U	8.39	5.72	20400	3.66	3760	306	0.0120 J	0.281 J	5.51	1980	0.104 J	**< 0.104 U**	< 580 U	18.0	0.322 J	< 10.4 U	50.7	27.5
	04/16/2015	1	12600	< 0.213 U	**1.52**	91.7	0.304 J	**0.199 J**	1430	12.1	< 0.0433 U	5.63	4.88	17800	2.97	3320	197	**< 0.0216 U**	0.175 J	4.64	1630	0.0962 J	**< 0.107 U**	< 467 U	14.3	0.296 J	< 10.7 U	46.1	21.3
KCH-UXO4-SB15	04/16/2015	0.5	5940 J	0.123 J	**1.01**	59.9 J	0.147 J	0.108 J	856	7.50	< 0.0405 U	4.61	4.72	10500 J	4.33	1880	215	< 0.0202 U	0.291 J	2.85	2130	0.0950 J	**< 0.0984 U**	< 70.5 U	7.62	0.175 J	< 9.84 U	29.0	17.3
	04/16/2015	1	6390	< 0.201 U	**1.13**	78.8	0.185 J	0.126 J	1000	8.30	< 0.0411 U	5.53	6.19	10800	2.76	1920	343	**< 0.0204 U**	0.327 J	3.72	1960	0.132 J	**< 0.101 U**	< 83.0 U	9.69	0.203 J	< 10.1 U	28.8	17.7
KCH-UXO4-SB16	04/16/2015	0.5	9840	0.117 J	**0.932**	153	0.198 J	**0.220 J**	2110	10.8	< 0.0417 U	6.95	11.1	20600	**5.09**	3770	312	**< 0.0207 U**	0.914	4.21	4920	0.189 J	**< 0.102 U**	< 129 U	14.9	0.257 J	< 10.2 U	59.4	32.7
	04/16/2015	1	10600	< 0.212 U	**0.973**	162	0.213 J	**0.221 J**	2040	10.6	< 0.0427 U	7.01	11.1	21400	2.99	3940	301	**< 0.0213 U**	0.771	4.21	4360	0.205 J	**< 0.106 U**	< 148 U	15.4	0.262 J	< 10.6 U	62.0	30.9
Background Threshold Value[a]			32,152	--	1.681	266.1	0.382	0.19	--	97.06	--	23.81	29.51	35,630	4.597	--	432.1	0.0203	--	21.28	--	0.707	0.0876	--	57.73	0.621	--	116.4	35.31
Residential Screening Criteria[b]			77,000	31	0.067	15,000	15	5.2	--	36,000	0.30	23	3,100	55,000	80	--	1,800	23	390	490	--	390	390	--	47,000	0.78	47,000	390	23,000
Industrial Screening Criteria[b]			1,100,000	470	0.25	220,000	210	7.3	--	170,000	6.3	350	47,000	820,000	320	--	6,900	69	5,800	3,100	--	5,800	1,500	--	700,000	12	700,000	1,000	350,000

Notes:
Results reported in milligrams per kilogram (mg/kg)
[a] BTVs are installation-specific upper tolerance limits developed in SES-TECH (2012). BTVs for the Kgt (Tonalite) parent rock type are used, based on the prevalence of this rock type where MRP Site UXO4 is located.
[b] Residential and industrial screening criteria are the lower criteria of RSLs (USEPA, 2015) and DTSC-SLs (DTSC, 2016). DTSC-SLs are indicated by shaded cells. Criteria for mercury based on mercuric chloride and other mercury salts. Criteria for chromium based on trivalent chromium.
Bold indicates the concentration exceeds the BTV and/or RSL/DTSC-SL
< = less than
-- = not applicable or not available
bgs = below ground surface
BTV = background threshold value
DTSC-SL = California Department of Toxic Substances Control screening level
ID = identification
J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
mg/kg = milligram per kilogram
MRP = Munitions Response Program
NAVWPNSTA = Naval Weapons Station
Q = result qualifier assigned by third-party validation
RSL = regional screening level
U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
USEPA = United States Environmental Protection Agency
UXO = unexploded ordnance

Sources:
California Department of Toxic Substances Control (DTSC). 2016. "DTSC-Modified Screening Levels (DTSC SLs)." Human and Ecological Risk Office (HERO). HERO HHRA Note Number 3. January.
SES-TECH. 2012. Final Basewide Metals Background Soil Study Report, Naval Weapons Stations Seal Beach, Detachment Fallbrook, Fallbrook, California. November.
United States Environmental Protection Agency (USEPA). 2015. Regional Screening Levels for Chemical Contaminants at Superfund Sites. November.

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TABLE 6-1

Summary of Exceedances in Surface Soil (0 to 0.5 foot bgs)

RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

Constituent	Detection Frequency	Range of Detected Concentrations (mg/kg)	Screening Criteria[a,b]	Value (mg/kg)	Number of Exceedances
Arsenic	11/11	0.932 - 2.78	BTV	1.681	2
			Residential	0.067	11
			Industrial	0.25	11
Cadmium	11/11	0.108 J - 0.282 J	BTV	0.19	4
			Residential	5.2	0
			Industrial	7.3	0
Copper	11/11	4.72 - 58.4	BTV	29.51	1
			Residential	3,100	0
			Industrial	47,000	0
Lead	11/11	3.54 - 45.7	BTV	4.597	7
			Residential	80	0
			Industrial	320	0
Manganese	11/11	94.4 - 451	BTV	432.1	1
			Residential	1,800	0
			Industrial	6,900	0
Zinc	11/11	17.3 - 47.6	BTV	35.31	4
			Residential	23,000	0
			Industrial	350,000	0

Notes:

Analytes shown are those that had one or more exceedances of BTVs, RSLs, or DTSC-SLs.

[a] BTVs are installation-specific upper tolerance limits developed in SES-TECH (2012). BTVs for the Kgt (Tonalite) parent rock type are used, based on the prevalence of this rock type where MRP Site UXO4 is located.

[b] Residential and industrial screening criteria are the lower criteria of RSLs (USEPA, 2015) and DTSC-SLs (DTSC, 2016). DTSC-SLs are indicated by shaded cells.

DTSC-SL = California Department of Toxic Substances Control screening level

ID = identification

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

mg/kg = milligram per kilogram

MRP = Munitions Response Program

NAVWPNSTA = Naval Weapons Station

RSL = regional screening level

USEPA = United States Environmental Protection Agency

UXO = unexploded ordnance

Sources:

California Department of Toxic Substances Control (DTSC). 2016. “DTSC-Modified Screening Levels (DTSC SLs).” Human and Ecological Risk Office (HERO). HERO HHRA Note Number 3. January.

SES-TECH. 2012. Final Basewide Metals Background Soil Study Report, Naval Weapons Stations Seal Beach, Detachment Fallbrook, Fallbrook, California. November.

United States Environmental Protection Agency (USEPA). 2015. Regional Screening Levels for Chemical Contaminants at Superfund Sites. November.

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TABLE 6-2

Summary of Exceedances in Subsurface Soil (0 to 10 feet bgs)

RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

Constituent	Detection Frequency	Range of Detected Concentrations (mg/kg)	Screening Criteria[a,b]	Value (mg/kg)	Number of Exceedances
Arsenic	47/47	0.932 - 3.99	BTV	1.681	25
			Residential	0.067	47
			Industrial	0.25	47
Beryllium	47/47	0.108 J - 0.388 J	BTV	0.382	1
			Residential	3.0	0
			Industrial	21	0
Cadmium	39/47	0.108 J - 0.366 J	BTV	0.19	15
			Residential	5.2	0
			Industrial	7.3	0
Cobalt	47/47	4.34 - 23.9	BTV	23.81	1
			Residential	23	1
			Industrial	350	0
Copper	47/47	4.65 - 61.3	BTV	29.51	3
			Residential	3,100	0
			Industrial	47,000	0
Lead	47/47	2.55 - 51.2 J	BTV	4.597	19
			Residential	80	0
			Industrial	320	0
Manganese	47/47	89.9 - 627	BTV	432.1	2
			Residential	1,800	0
			Industrial	6,900	0
Mercury	15/47	0.0111 J - 0.0598 J	BTV	0.0203	7
			Residential	23	0
			Industrial	92	0
Zinc	47/47	17.3 - 91	BTV	35.31	14
			Residential	23,000	0
			Industrial	350,000	0

Notes:

Analytes shown are those that had one or more exceedances of BTVs, RSLs, or DTSC-SLs.

[a] BTVs are installation-specific upper tolerance limits developed in SES-TECH (2012). BTVs for the Kgt (Tonalite) parent rock type are used, based on the prevalence of this rock type where MRP Site UXO4 is located.

[b] Residential and industrial screening criteria are the lower criteria of RSLs (USEPA, 2015) and DTSC-SLs (DTSC, 2016). DTSC-SLs are indicated by shaded cells. Criteria for mercury based on mercuric chloride and other mercury salts.

DTSC-SL = California Department of Toxic Substances Control screening level

ID = identification

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

mg/kg = milligram per kilogram

MRP = Munitions Response Program

NAVWPNSTA = Naval Weapons Station

RSL = regional screening level

USEPA = United States Environmental Protection Agency

UXO = unexploded ordnance

Sources:

California Department of Toxic Substances Control (DTSC). 2016. “DTSC-Modified Screening Levels (DTSC SLs).” Human and Ecological Risk Office (HERO). HERO HHRA Note Number 3. January.

SES-TECH. 2012. Final Basewide Metals Background Soil Study Report, Naval Weapons Stations Seal Beach, Detachment Fallbrook, Fallbrook, California. November.

United States Environmental Protection Agency (USEPA). 2015. Regional Screening Levels for Chemical Contaminants at Superfund Sites. November.

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Figures

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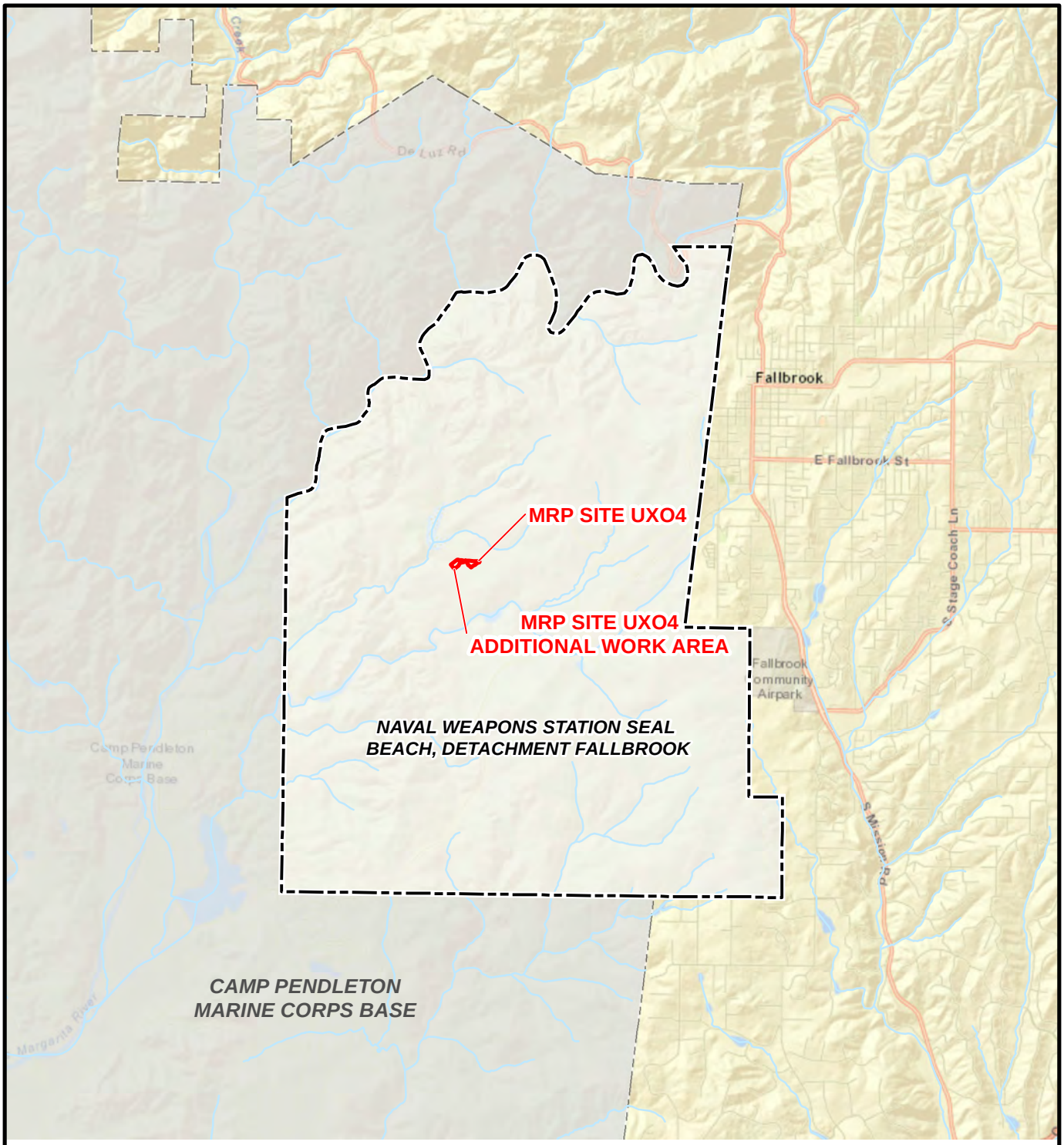

LEGEND

MRP SITE BOUNDARY

FACILITY BOUNDARY

NOTES:
MRP = Munitions Response Program
UXO = Unexploded Ordnance
NAVWPNSTA = Naval Weapons Station

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, Streets

0 0.5 1 2
Miles

Site Location

Remedial Investigation for MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

N

FIGURE

1-1

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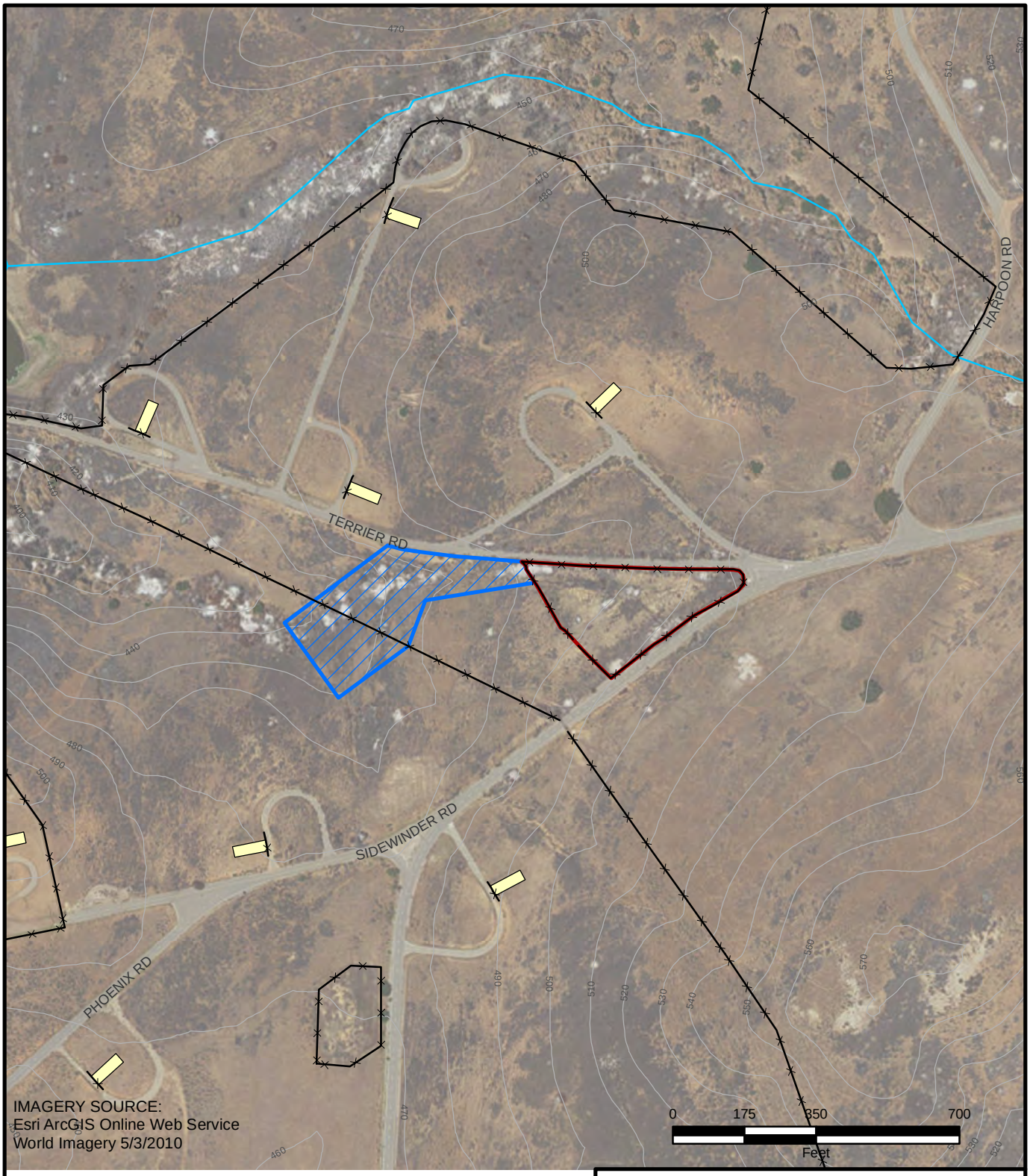

LEGEND

- FENCE
- 10 FOOT GROUND CONTOUR
- WATERCOURSE
- AMMUNITION STORAGE/ OPERATION/HANDLING AREA
- ADDITIONAL WORK AREA (2.16 ACRES)
- MRP SITE BOUNDARY

NOTES:
MRP = Munitions Response Program
UXO = Unexploded Ordnance
NAVWPNSTA = Naval Weapons Station

Site Map

Remedial Investigation for MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

N

FIGURE

1-2

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LEGEND

- FENCE
- 5 FOOT GROUND CONTOUR
- ADDITIONAL WORK AREA (2.16 ACRES)
- MRP SITE BOUNDARY

0 100 200 400
Feet

NOTES:
MRP = Munitions Response Program
UXO = Unexploded Ordnance
NAVWPNSTA = Naval Weapons Station

N

Site Topography

Remedial Investigation for MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

FIGURE
1-3

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LEGEND

- SOIL BORING - RI, 2015
- SOIL SAMPLE LOCATION - SI, 2008
- INVESTIGATIVE TRENCH - RI, 2015
- FENCE
- 5 FOOT GROUND CONTOUR
- ADDITIONAL WORK AREA (2.16 ACRES)
- MRP SITE BOUNDARY

NOTES:
RI = Remedial Investigation
SI = Site Investigation
MRP = Munitions Response Program
UXO = Unexploded Ordnance
NAVWPNSTA = Naval Weapons Station

SOURCE:
ChaduxTt, Site Inspections Report, May 2010

IMAGERY SOURCE:
Esri ArcGIS Online Web Service
World Imagery 5/3/2010

0 50 100 200
Feet

Environmental Sample Locations

Remedial Investigation for MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

N

FIGURE
4-1

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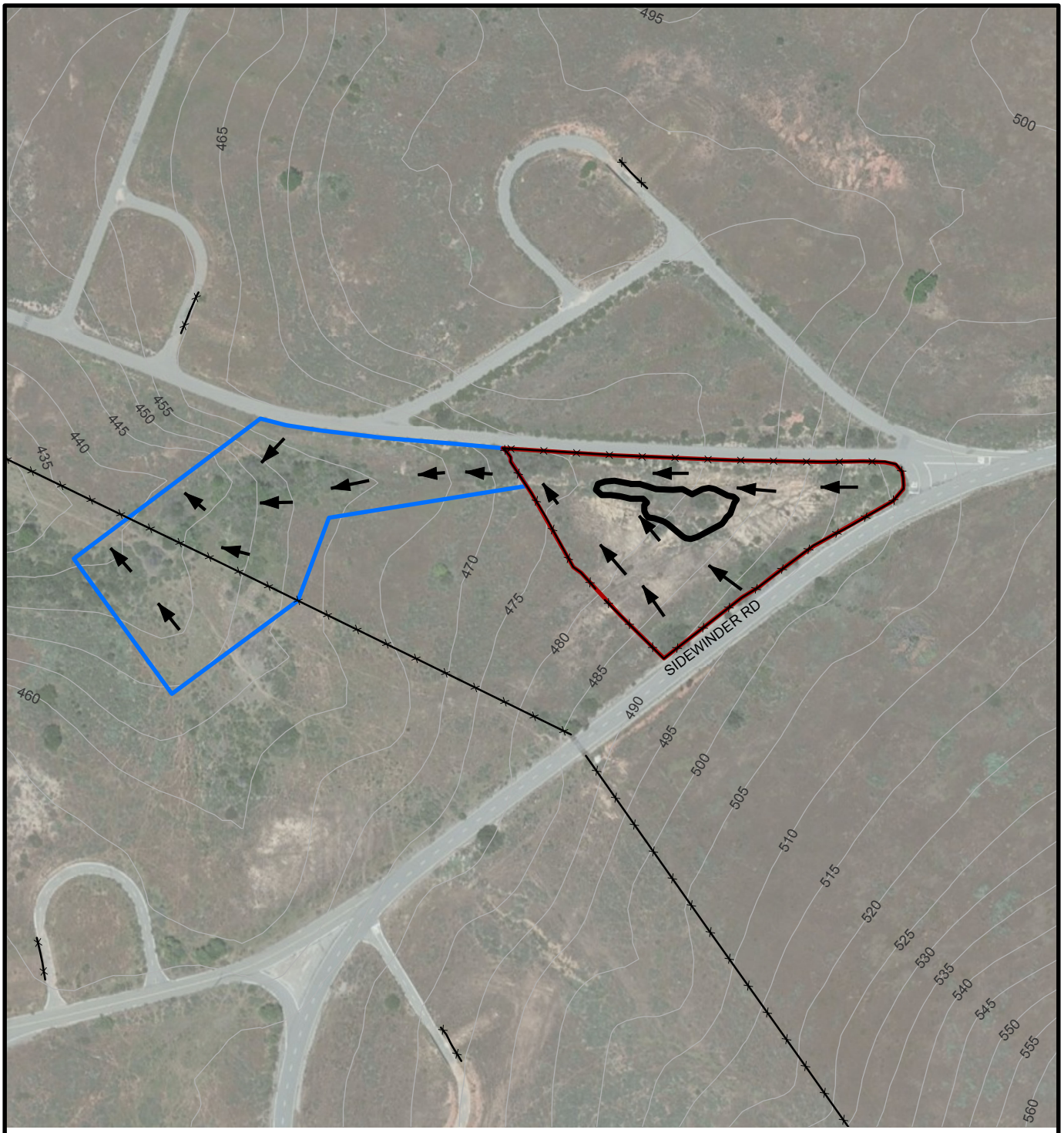

0 100 200 400
Feet

LEGEND

- INFERRED SURFACE WATER FLOW DIRECTION
- FENCE
- SUSPECTED DISPOSAL AREA
- 5 FOOT GROUND CONTOUR
- ADDITIONAL WORK AREA (2.16 ACRES)
- MRP SITE BOUNDARY

IMAGERY SOURCE:
Esri ArcGIS Online Web Service
World Imagery 5/3/2010

NOTES:
MC = Munitions Constituent
MEC = Munitions and Explosives of Concern
MRP = Munitions Response Program
UXO = Unexploded Ordnance
NAVWPNSTA = Naval Weapons Station

Inferred Disposal Area and Surface Water Migration Pathways

Remedial Investigation for MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

N

FIGURE
6-1

Date: 4/29/2016 User: jpatay Path: \\kadc3-ssfs2.kleinfelder.com\drawings_clients\Navy_CLEAN\FALLBROOK\CTO_070\MXD\MRP4_RI_FS\RI_REPORT\070_4486.mxd

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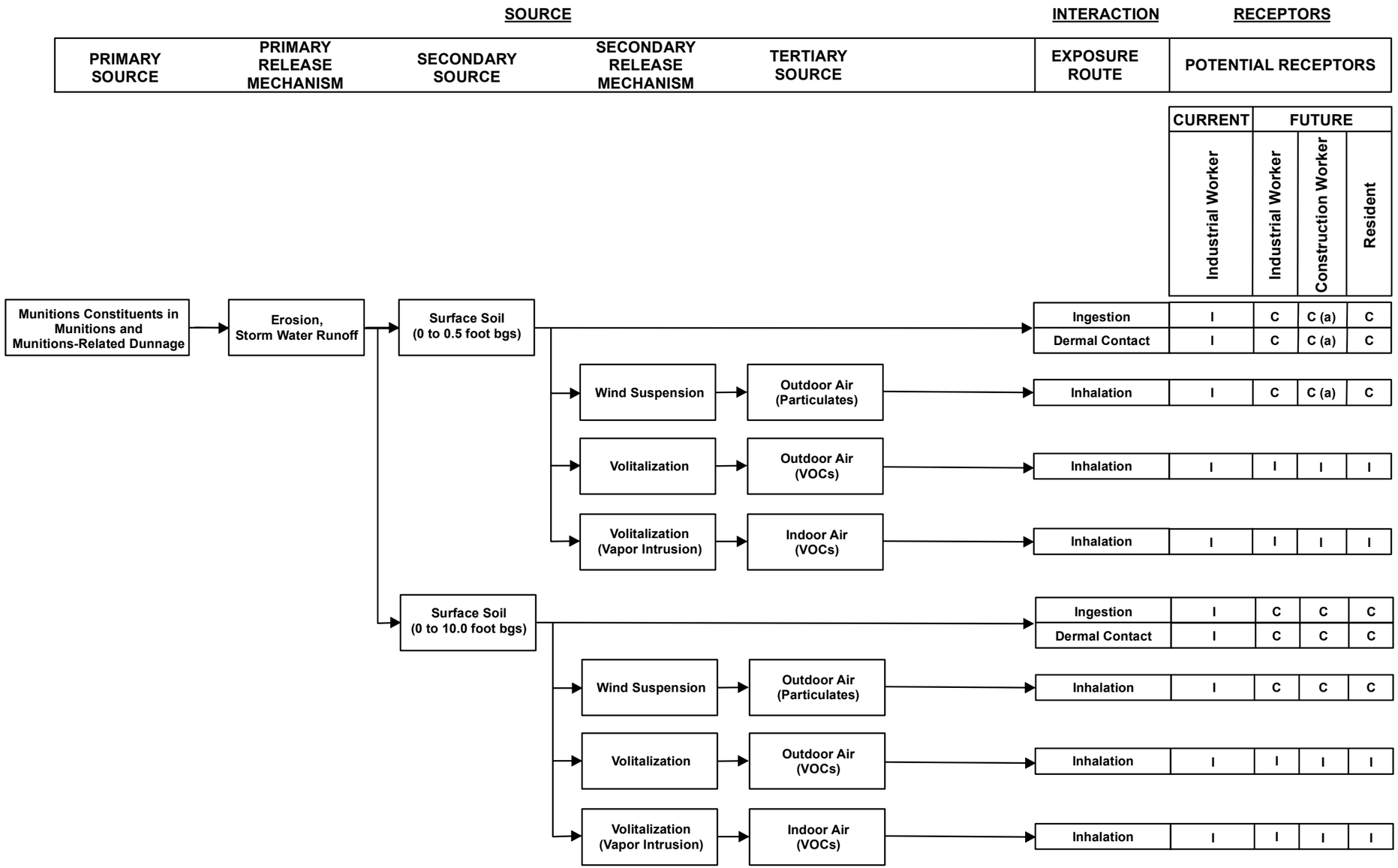

LEGEND

C POTENTIALLY COMPLETE EXPOSURE PATHWAY
I INCOMPLETE OR NEGLIGIBLE EXPOSURE PATHWAY

NOTES:
(a) = Included in the evaluation of subsurface soil exposure pathways (not evaluated separately from subsurface soil).
bgs = below ground surface
HHRA = Human Health Risk Assessment
VOC = Volatile Organic Compound
MC = Munitions Constituents
MRP = Munitions Response Program
UXO = Unexploded Ordnance
NAVWPNSTA = Naval Weapons Station

MC Conceptual Site Exposure Model for Potential Human Receptors

Remedial Investigation for MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

FIGURE
8-1

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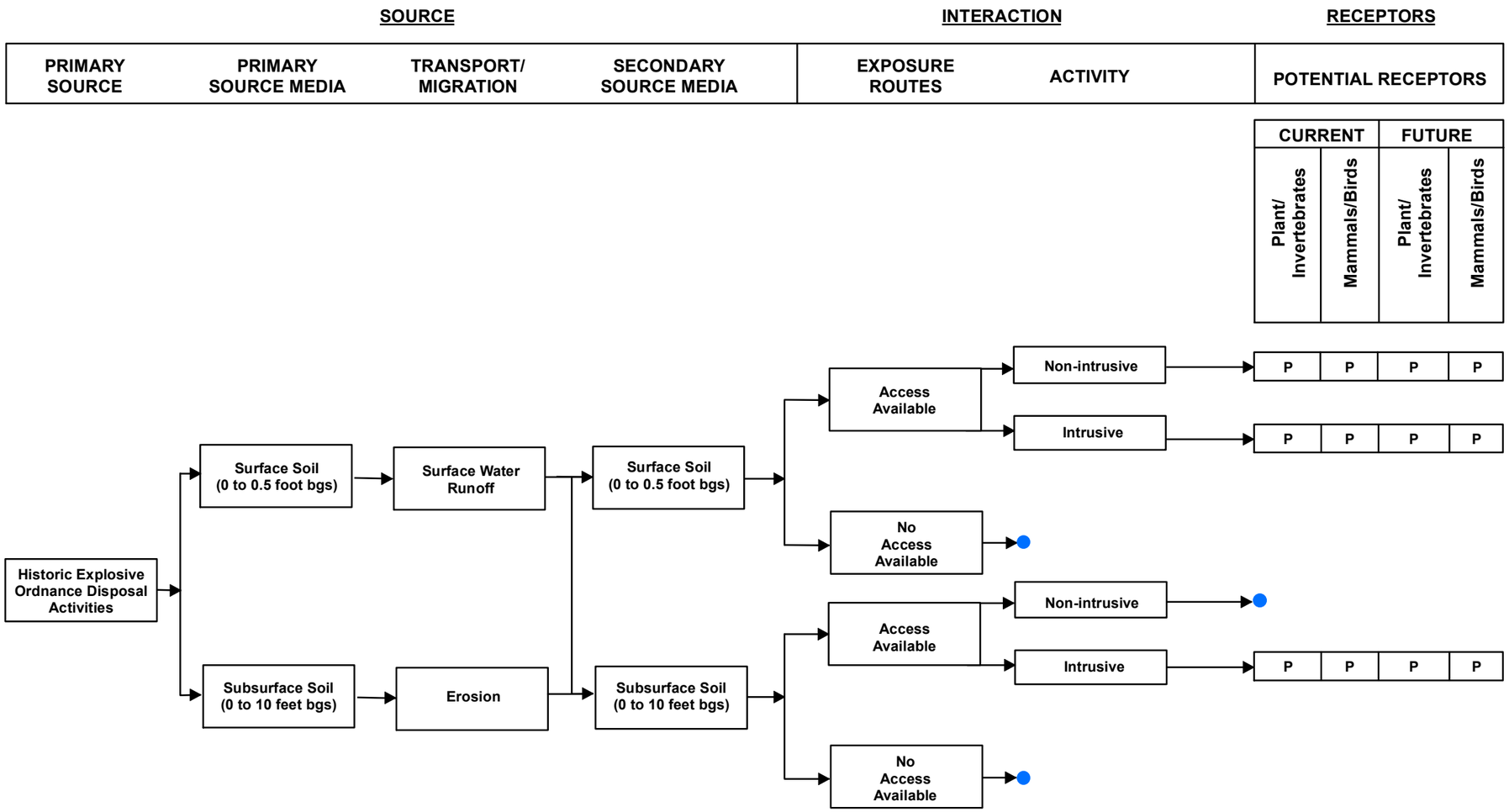

LEGEND

P POTENTIAL RECEPTOR

● INCOMPLETE PATHWAY DUE TO LACK OF ACCESS TO POTENTIALLY CONTAMINATED MEDIA

NOTES:
bgs = below ground surface
MC = Munitions Constituents
MRP = Munitions Response Program
UXO = Unexploded Ordnance
NAVWPNSTA = Naval Weapons Station

MC Conceptual Site Exposure Model for Potential Ecological Receptors

Remedial Investigation for MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

FIGURE
8-2

Date: 10/12/2015 User: lmoussa Path: \\kadc3-ssfs2.kleinfelder.com\drawings_clients\Navy_CLEAN\FALLBROOK\CTO_070\MXD\MRP4_RI_FS\RI_REPORT\070_4083.mxd

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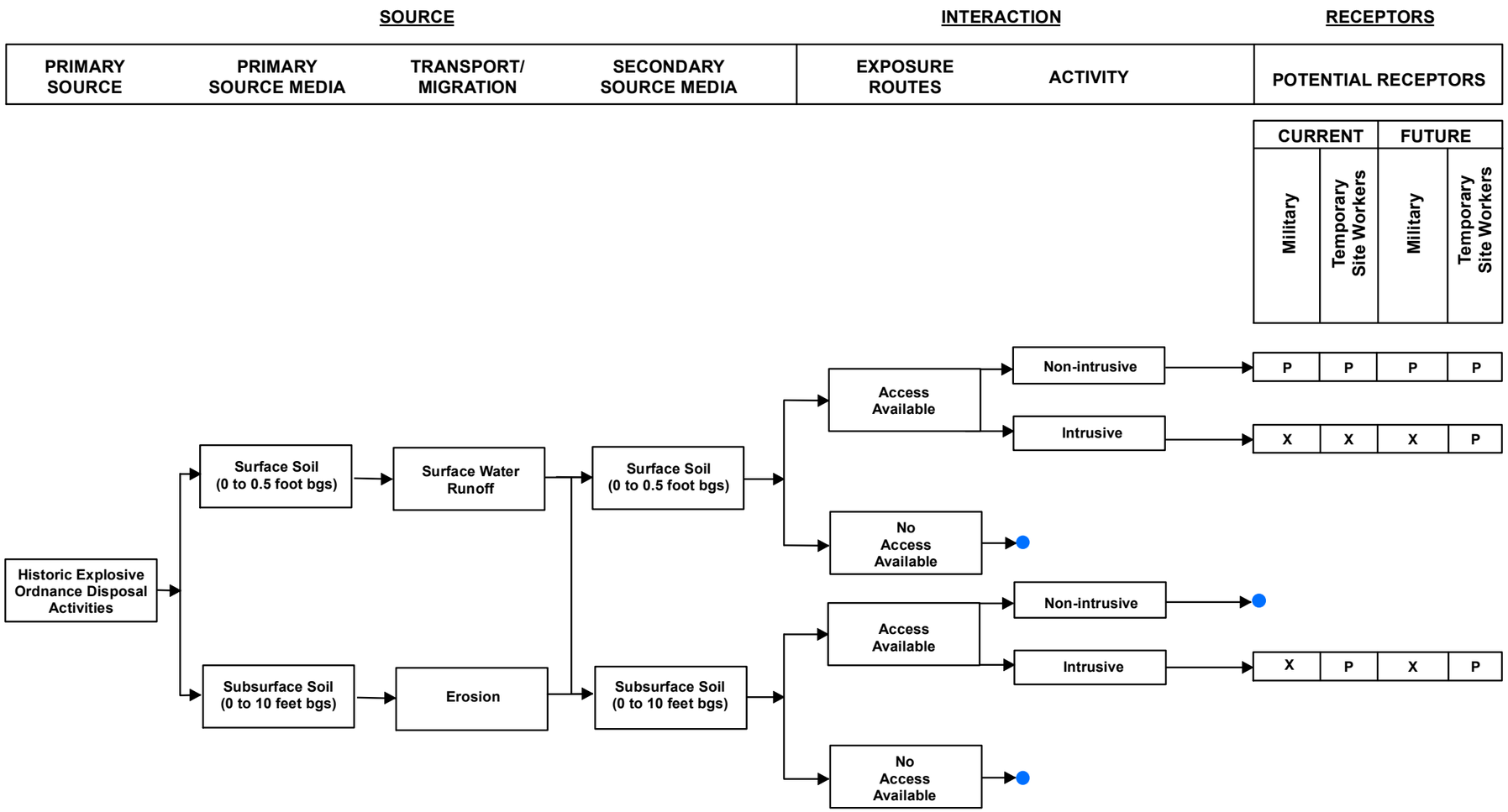

LEGEND

- [P] POTENTIAL RECEPTOR
- [X] INCOMPLETE PATHWAY
- ● INCOMPLETE PATHWAY DUE TO LACK OF ACCESS TO POTENTIALLY CONTAMINATED MEDIA

NOTES:
bgs = below ground surface
MEC = Munitions and Explosives of Concern
MRP = Munitions Response Program
UXO = Unexploded Ordnance
NAVWPNSTA = Naval Weapons Station

- Subsurface MEC is potentially present. Neither current or future military personnel, contractors or visitors are assumed to potentially engage in intrusive activities.

MEC Conceptual Site Exposure Model for Potential Human Receptors

Remedial Investigation for MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

FIGURE
9-1

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Appendix A
Figures and Tables from SI Report

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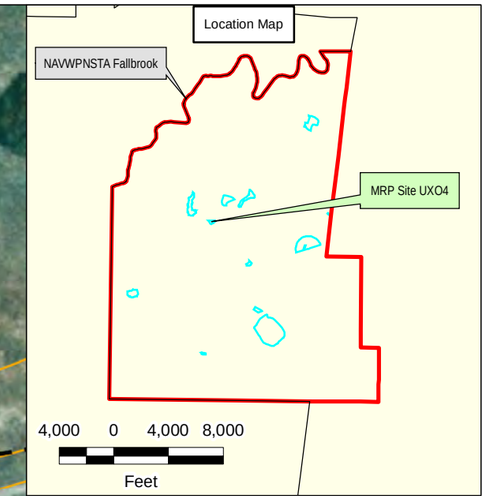


Legend

- MRP Site Boundary
- Road
- Fencing Installed
- Stream
- Elevation Contour (Feet Above Mean Sea Level)
- Disposal Trench
- Surface Soil Sample Location
- Soil Boring Sample Location
- Geologic Contact

Qdf Debris Fill
Qaf Artificial Fill
Qal Alluvium
Kgt Tonalite
Kjm Volcanic

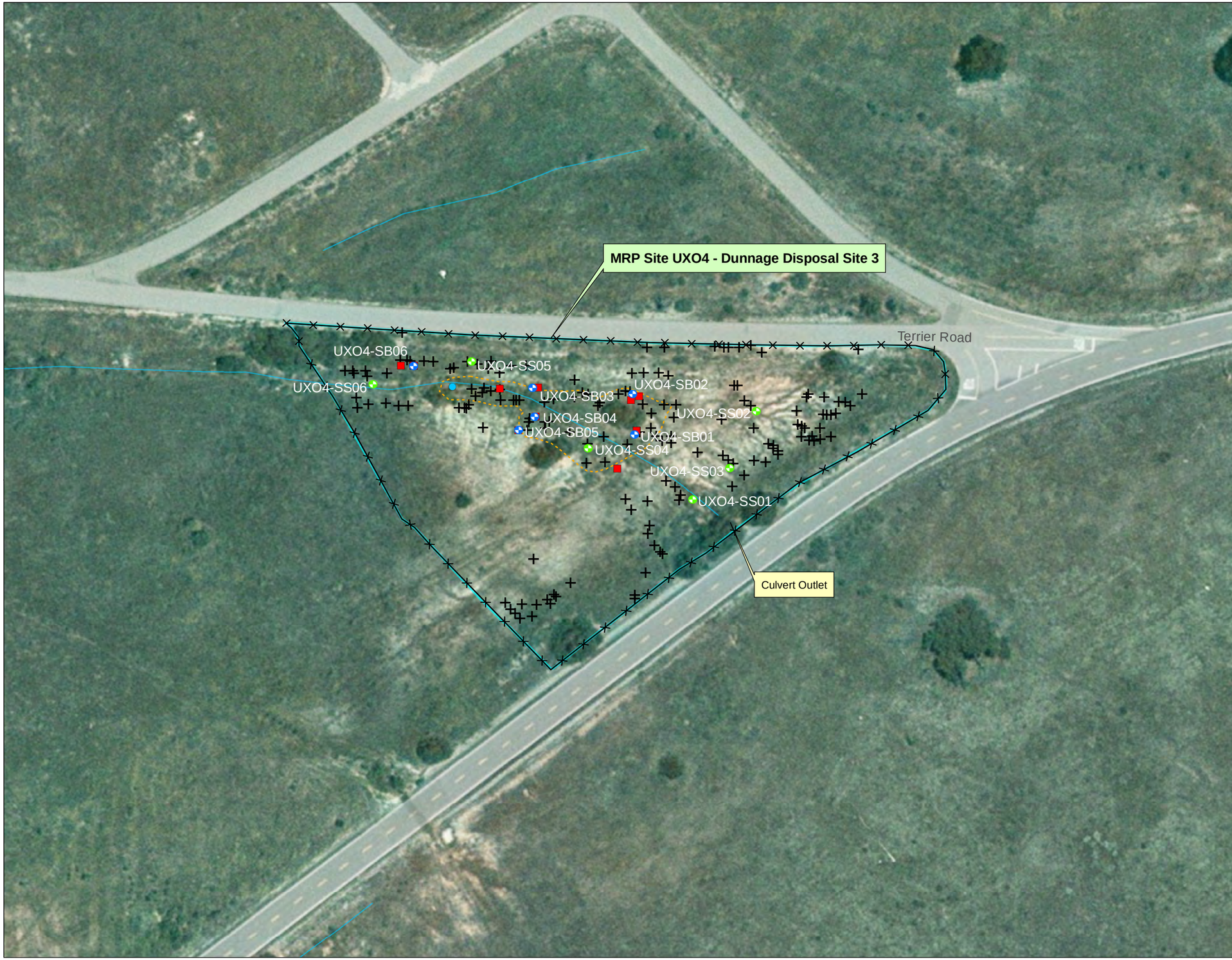
40 0 40 80
Feet

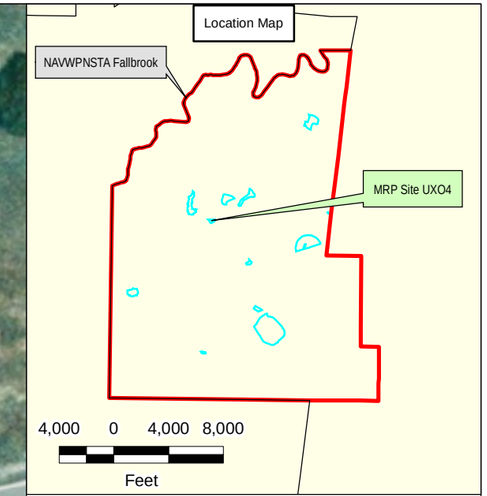
ChaduxTt JV
Consulting Engineers and Scientists

NAVWPNSTA Seal Beach Det Fallbrook
Fallbrook, California

Figure 10-1
MRP Site UXO4
(Dunnage Disposal Site 3)
Sample Location Map

2009-07-06 v:\misc_gis\fallbrook\projects\SI Report\MRP UXO4 Sample Location Map Fig19_FINAL.mxd TtEMI-AL jeff.eddo





Legend

- MRP Site Boundary
- Road
- Fencing Installed
- Stream
- EM Anomaly Pick From EM61 Survey
- Construction Debris (Asphalt)
- Suspect MEC (M31 Practice Rifle Grenade)
- Disposal Trench
- Surface Soil Sample Location
- Soil Boring Sample Location

Note: 100% detector-aided visual survey was conducted by UXO technicians over the entire site. EM61 data was collected along survey lines nominally spaced 5 feet apart over accessible portions of the site.

40 0 40 80
Feet

ChaduxTt JV
Consulting Engineers and Scientists

NAVWPNSTA Seal Beach Det Fallbrook
Fallbrook, California

Figure 10-2
MRP Site UXO4
(Dunnage Disposal Site 3)
Field Survey Map

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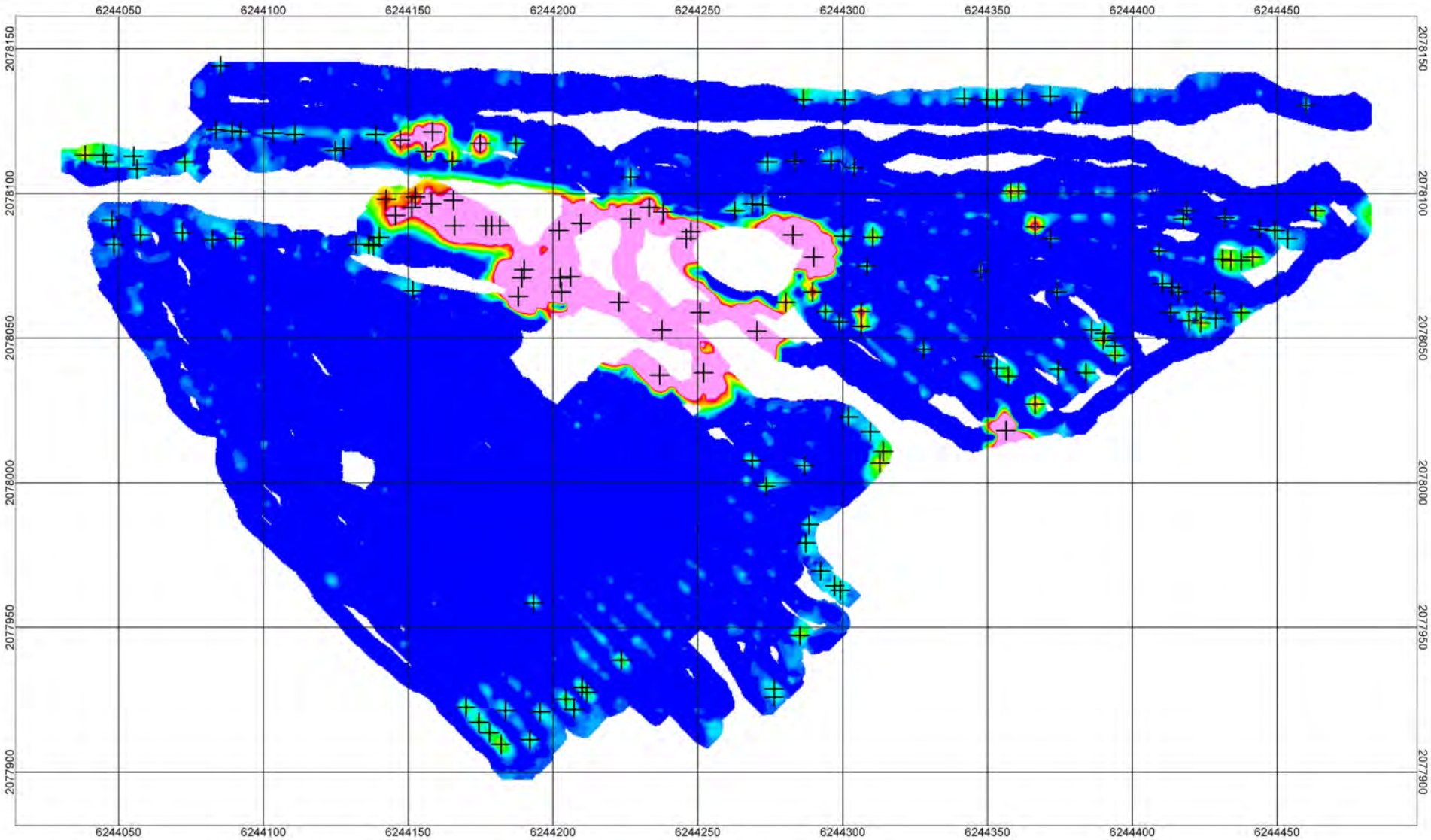

Legend

+ Anomaly/Target Pick

Summation of CH1-CH3 (mV)

2.6 10.3 17.9 25.6 33.3 41.0 48.7 56.4 64.1 71.8 79.5 87.2 94.9

25 0 25 50

(feet)

1 inch = 50 feet

Note:
California State Plane Coordinate System,
NAD83, Zone VI (0406), US Feet

ChaduxTt JV
Consulting Engineers and Scientists

NAVWPNSTA Seal Beach Det Fallbrook
Fallbrook, California

Figure 10-3

MRP Site UXO4
(Dunnage Disposal Site 3)
EM61 Data Map

TABLE 10-1: SUMMARY OF SOIL ANALYTICAL RESULTS COMPARED WITH SCREENING CRITERIA FOR MRP SITE UXO4

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample depth from 0 to 4 feet below ground surface

Analyte	Detection Frequency	Minimum Detected Result	Maximum Detected Result	Location of Maximum Detected Result	Range of Detection Limits	Residential Screening Criteria	Number of Detections Above Residential Screening Criteria	Industrial Screening Criteria	Number of Detections Above Industrial Screening Criteria	Ecological Screening Criteria	Number of Detections Above Ecological Screening Criteria
Volatile Organic Compounds (mg/kg)											
None Detected	0/ 16	ND	ND	-	-	-	-	-	-	-	-
Semivolatile Organic Compounds (mg/kg)											
None Detected	0/ 16	ND	ND	-	-	-	-	-	-	-	-
Metals (mg/kg)											
ALUMINUM	16/16	7,060 J	18,200 J	UXO4-SB06	106 - 121	77,000	0	990,000	0	50.0	**16**
ARSENIC	16/16	1.2 J	3.5 J	UXO4-SB05	5.3 - 6.1	0.062	**16**	0.24	**16**	10.0	0
BARIUM	16/16	51.8	156	UXO4-SB02	5.3 - 6.1	5,200	0	63,000	0	330	0
BERYLLIUM	16/16	0.14 J	0.38 J	UXO4-SB06	0.53 - 0.61	16.0	0	190	0	10.0	0
CADMIUM	8/16	0.13 J	0.17 J	UXO4-SS02	0.53 - 0.61	1.7	0	7.5	0	0.36	0
CALCIUM	16/16	1,110	2,190	UXO4-SB02	106 - 121	NC	-	NC	-	NC	-
CHROMIUM	16/16	7.4	30.3	UXO4-SB02	2.1 - 2.4	280	0	1,400	0	0.40	**16**
COBALT	16/16	4.3	23.9	UXO4-SB05	1.1 - 1.2	23.0	**1**	300	0	20.0	**1**
COPPER	16/16	4.7	10.5	UXO4-SB03	2.1 - 2.4	3,000	0	38,000	0	28.0	0
IRON	16/16	11,200	27,700	UXO4-SB05	106 - 121	55,000	0	720,000	0	200	**16**
LEAD	16/16	2.9	7.0	UXO4-SB03	2.1 - 2.4	80.0	0	320	0	11.0	0
MAGNESIUM	16/16	2,000	5,790	UXO4-SB02	106 - 121	NC	-	NC	-	NC	-
MANGANESE	16/16	142	627	UXO4-SB05	2.7 - 3.0	1,800	0	23,000	0	220	**9**
MERCURY-INORGANIC	1/16	0.060 J	0.060 J	UXO4-SB05	0.12 - 0.12	18.0	0	180	0	0.10	0
MERCURY-ORGANIC	1/16	0.060 J	0.060 J	UXO4-SB05	0.12 - 0.12	7.8	0	100	0	0.10	0
NICKEL	16/16	2.7	10.8	UXO4-SB02	1.1 - 1.2	1,600	0	16,000	0	30.0	0
POTASSIUM	16/16	1,090	2,730	UXO4-SB02	106 - 121	NC	-	NC	-	NC	-
SELENIUM	6/16	0.12 J	0.19 J	UXO4-SS05	0.55 - 0.61	380	0	4,800	0	1.0	0
SODIUM	15/16	123	529	UXO4-SB02	106 - 121	NC	-	NC	-	NC	-
STRONTIUM	16/16	9.7 J	30.4	UXO4-SB02	10.6 - 12.1	47,000	0	610,000	0	NC	-
THALLIUM	16/16	0.15 J	0.42 J	UXO4-SS01	0.53 - 0.61	5.0	0	63.0	0	1.0	0
VANADIUM	16/16	28.8	80.1	UXO4-SB05	1.1 - 1.2	390	0	5,200	0	2.0	**16**
ZINC	16/16	18.8	36.5	UXO4-SB02	10.6 - 12.1	23,000	0	100,000	0	46.0	0

TABLE 10-1: SUMMARY OF SOIL ANALYTICAL RESULTS COMPARED WITH SCREENING CRITERIA FOR MRP SITE UXO4

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample depth from 0 to 4 feet below ground surface

Analyte	Detection Frequency	Minimum Detected Result	Maximum Detected Result	Location of Maximum Detected Result	Range of Detection Limits	Residential Screening Criteria	Number of Detections Above Residential Screening Criteria	Industrial Screening Criteria	Number of Detections Above Industrial Screening Criteria	Ecological Screening Criteria	Number of Detections Above Ecological Screening Criteria
Explosives (mg/kg)											
PERCHLORATE	1/16	0.0011	0.0011	UXO4-SS02	0.0062 - 0.0062	29.0	0	380	0	NC	-

Notes:
1. Data shown includes detected analytes in all soil samples. No QC or duplicate samples were identified.
2. Number of detections exceeding screening criteria is shown in bold.
3. Screening criteria sources are presented in Sections 6.1 (human-health) and 6.2 (ecological).
4. "Total" metals were measured at the Site. Given the uncertainties, total mercury was screened by use of inorganic and organic mercury human health screening criteria.

-	Not applicable
J	Estimated value
mg/kg	Milligrams per kilogram
MRP	Munitions Response Program
NC	No criteria
ND	None detected
UXO	Unexploded ordinance

TABLE 10-2: SOIL ANALYTICAL RESULTS EXCEEDING CRITERIA FOR MRP SITE UXO4

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample depth from 0 to 4 feet below ground surface

Analyte	Detected Concentration	Point ID	Sample ID	Sample Depth (feet)	Sample Collection Date	Laboratory Reporting Limit	Residential Screening Criteria	Industrial Screening Criteria	Ecological Screening Criteria
Metals (mg/kg)									
ALUMINUM	15,500 J	UXO4-SB01	UXO4-SB01(0-2)	0.00 - 2.00	12/16/08	119	77,000	990,000	**50.0**
ALUMINUM	13,600 J	UXO4-SB01	UXO4-SB01(2-3)	2.00 - 3.00	12/16/08	120	77,000	990,000	**50.0**
ALUMINUM	14,700 J	UXO4-SB02	UXO4-SB02(0-2)	0.00 - 2.00	12/16/08	110	77,000	990,000	**50.0**
ALUMINUM	12,100 J	UXO4-SB02	UXO4-SB02(2-2.5)	2.00 - 2.50	12/16/08	106	77,000	990,000	**50.0**
ALUMINUM	8,070 J	UXO4-SB03	UXO4-SB03(0-2)	0.00 - 2.00	12/16/08	119	77,000	990,000	**50.0**
ALUMINUM	7,060 J	UXO4-SB03	UXO4-SB03(3-4)	3.00 - 4.00	12/16/08	115	77,000	990,000	**50.0**
ALUMINUM	13,500 J	UXO4-SB04	UXO4-SB04(0-2)	0.00 - 2.00	12/16/08	108	77,000	990,000	**50.0**
ALUMINUM	16,600 J	UXO4-SB05	UXO4-SB05(0-2)	0.00 - 2.00	12/16/08	121	77,000	990,000	**50.0**
ALUMINUM	7,990 J	UXO4-SB06	UXO4-SB06(0-2)	0.00 - 2.00	12/16/08	112	77,000	990,000	**50.0**
ALUMINUM	18,200 J	UXO4-SB06	UXO4-SB06(2-3)	2.00 - 3.00	12/16/08	109	77,000	990,000	**50.0**
ALUMINUM	12,000 J	UXO4-SS01	UXO4-SS01	0.00 - 2.00	12/16/08	118	77,000	990,000	**50.0**
ALUMINUM	11,300 J	UXO4-SS02	UXO4-SS02	0.00 - 1.00	12/16/08	121	77,000	990,000	**50.0**
ALUMINUM	11,800 J	UXO4-SS03	UXO4-SS03	0.00 - 2.00	12/16/08	113	77,000	990,000	**50.0**
ALUMINUM	12,600 J	UXO4-SS04	UXO4-SS04	0.00 - 2.00	12/16/08	119	77,000	990,000	**50.0**
ALUMINUM	14,800 J	UXO4-SS05	UXO4-SS05	0.00 - 2.00	12/16/08	116	77,000	990,000	**50.0**
ALUMINUM	12,400 J	UXO4-SS06	UXO4-SS06	0.00 - 2.00	12/16/08	114	77,000	990,000	**50.0**
ARSENIC	2.7 J	UXO4-SB01	UXO4-SB01(0-2)	0.00 - 2.00	12/16/08	6.0	**0.062**	**0.24**	10.0
ARSENIC	2.0 J	UXO4-SB01	UXO4-SB01(2-3)	2.00 - 3.00	12/16/08	6.0	**0.062**	**0.24**	10.0
ARSENIC	2.5 J	UXO4-SB02	UXO4-SB02(0-2)	0.00 - 2.00	12/16/08	5.5	**0.062**	**0.24**	10.0
ARSENIC	2.2 J	UXO4-SB02	UXO4-SB02(2-2.5)	2.00 - 2.50	12/16/08	5.3	**0.062**	**0.24**	10.0
ARSENIC	1.3 J	UXO4-SB03	UXO4-SB03(0-2)	0.00 - 2.00	12/16/08	6.0	**0.062**	**0.24**	10.0
ARSENIC	1.2 J	UXO4-SB03	UXO4-SB03(3-4)	3.00 - 4.00	12/16/08	5.8	**0.062**	**0.24**	10.0
ARSENIC	2.0 J	UXO4-SB04	UXO4-SB04(0-2)	0.00 - 2.00	12/16/08	5.4	**0.062**	**0.24**	10.0
ARSENIC	3.5 J	UXO4-SB05	UXO4-SB05(0-2)	0.00 - 2.00	12/16/08	6.1	**0.062**	**0.24**	10.0
ARSENIC	1.3 J	UXO4-SB06	UXO4-SB06(0-2)	0.00 - 2.00	12/16/08	5.6	**0.062**	**0.24**	10.0
ARSENIC	2.3 J	UXO4-SB06	UXO4-SB06(2-3)	2.00 - 3.00	12/16/08	5.5	**0.062**	**0.24**	10.0
ARSENIC	1.9 J	UXO4-SS01	UXO4-SS01	0.00 - 2.00	12/16/08	5.9	**0.062**	**0.24**	10.0
ARSENIC	1.9 J	UXO4-SS02	UXO4-SS02	0.00 - 1.00	12/16/08	6.1	**0.062**	**0.24**	10.0
ARSENIC	2.0 J	UXO4-SS03	UXO4-SS03	0.00 - 2.00	12/16/08	5.6	**0.062**	**0.24**	10.0

TABLE 10-2: SOIL ANALYTICAL RESULTS EXCEEDING CRITERIA FOR MRP SITE UXO4 (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample depth from 0 to 4 feet below ground surface

Analyte	Detected Concentration	Point ID	Sample ID	Sample Depth (feet)	Sample Collection Date	Laboratory Reporting Limit	Residential Screening Criteria	Industrial Screening Criteria	Ecological Screening Criteria
Metals (mg/kg)									
ARSENIC	2.0 J	UXO4-SS04	UXO4-SS04	0.00 - 2.00	12/16/08	5.9	**0.062**	**0.24**	10.0
ARSENIC	2.2 J	UXO4-SS05	UXO4-SS05	0.00 - 2.00	12/16/08	5.8	**0.062**	**0.24**	10.0
ARSENIC	1.6 J	UXO4-SS06	UXO4-SS06	0.00 - 2.00	12/16/08	5.7	**0.062**	**0.24**	10.0
CHROMIUM	14.7	UXO4-SB01	UXO4-SB01(0-2)	0.00 - 2.00	12/16/08	2.4	280	1,400	**0.40**
CHROMIUM	22.7	UXO4-SB01	UXO4-SB01(2-3)	2.00 - 3.00	12/16/08	2.4	280	1,400	**0.40**
CHROMIUM	17.5	UXO4-SB02	UXO4-SB02(0-2)	0.00 - 2.00	12/16/08	2.2	280	1,400	**0.40**
CHROMIUM	30.3	UXO4-SB02	UXO4-SB02(2-2.5)	2.00 - 2.50	12/16/08	2.1	280	1,400	**0.40**
CHROMIUM	8.4	UXO4-SB03	UXO4-SB03(0-2)	0.00 - 2.00	12/16/08	2.4	280	1,400	**0.40**
CHROMIUM	7.4	UXO4-SB03	UXO4-SB03(3-4)	3.00 - 4.00	12/16/08	2.3	280	1,400	**0.40**
CHROMIUM	16.6	UXO4-SB04	UXO4-SB04(0-2)	0.00 - 2.00	12/16/08	2.2	280	1,400	**0.40**
CHROMIUM	13.9	UXO4-SB05	UXO4-SB05(0-2)	0.00 - 2.00	12/16/08	2.4	280	1,400	**0.40**
CHROMIUM	7.8	UXO4-SB06	UXO4-SB06(0-2)	0.00 - 2.00	12/16/08	2.2	280	1,400	**0.40**
CHROMIUM	17.7	UXO4-SB06	UXO4-SB06(2-3)	2.00 - 3.00	12/16/08	2.2	280	1,400	**0.40**
CHROMIUM	11.9	UXO4-SS01	UXO4-SS01	0.00 - 2.00	12/16/08	2.4	280	1,400	**0.40**
CHROMIUM	12.3	UXO4-SS02	UXO4-SS02	0.00 - 1.00	12/16/08	2.4	280	1,400	**0.40**
CHROMIUM	11.9	UXO4-SS03	UXO4-SS03	0.00 - 2.00	12/16/08	2.3	280	1,400	**0.40**
CHROMIUM	11.3	UXO4-SS04	UXO4-SS04	0.00 - 2.00	12/16/08	2.4	280	1,400	**0.40**
CHROMIUM	11.8	UXO4-SS05	UXO4-SS05	0.00 - 2.00	12/16/08	2.3	280	1,400	**0.40**
CHROMIUM	10.1	UXO4-SS06	UXO4-SS06	0.00 - 2.00	12/16/08	2.3	280	1,400	**0.40**
COBALT	23.9	UXO4-SB05	UXO4-SB05(0-2)	0.00 - 2.00	12/16/08	1.2	**23.0**	300	**20.0**
IRON	25,500	UXO4-SB01	UXO4-SB01(0-2)	0.00 - 2.00	12/16/08	119	55,000	720,000	**200**
IRON	20,600	UXO4-SB01	UXO4-SB01(2-3)	2.00 - 3.00	12/16/08	120	55,000	720,000	**200**
IRON	25,600	UXO4-SB02	UXO4-SB02(0-2)	0.00 - 2.00	12/16/08	110	55,000	720,000	**200**
IRON	20,800	UXO4-SB02	UXO4-SB02(2-2.5)	2.00 - 2.50	12/16/08	106	55,000	720,000	**200**
IRON	16,400	UXO4-SB03	UXO4-SB03(0-2)	0.00 - 2.00	12/16/08	119	55,000	720,000	**200**
IRON	11,200	UXO4-SB03	UXO4-SB03(3-4)	3.00 - 4.00	12/16/08	115	55,000	720,000	**200**
IRON	18,600	UXO4-SB04	UXO4-SB04(0-2)	0.00 - 2.00	12/16/08	108	55,000	720,000	**200**
IRON	27,700	UXO4-SB05	UXO4-SB05(0-2)	0.00 - 2.00	12/16/08	121	55,000	720,000	**200**
IRON	11,700	UXO4-SB06	UXO4-SB06(0-2)	0.00 - 2.00	12/16/08	112	55,000	720,000	**200**

TABLE 10-2: SOIL ANALYTICAL RESULTS EXCEEDING CRITERIA FOR MRP SITE UXO4 (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample depth from 0 to 4 feet below ground surface

Analyte	Detected Concentration	Point ID	Sample ID	Sample Depth (feet)	Sample Collection Date	Laboratory Reporting Limit	Residential Screening Criteria	Industrial Screening Criteria	Ecological Screening Criteria
Metals (mg/kg)									
IRON	23,500	UXO4-SB06	UXO4-SB06(2-3)	2.00 - 3.00	12/16/08	109	55,000	720,000	**200**
IRON	16,800	UXO4-SS01	UXO4-SS01	0.00 - 2.00	12/16/08	118	55,000	720,000	**200**
IRON	17,600	UXO4-SS02	UXO4-SS02	0.00 - 1.00	12/16/08	121	55,000	720,000	**200**
IRON	16,400	UXO4-SS03	UXO4-SS03	0.00 - 2.00	12/16/08	113	55,000	720,000	**200**
IRON	18,400	UXO4-SS04	UXO4-SS04	0.00 - 2.00	12/16/08	119	55,000	720,000	**200**
IRON	20,400	UXO4-SS05	UXO4-SS05	0.00 - 2.00	12/16/08	116	55,000	720,000	**200**
IRON	15,400	UXO4-SS06	UXO4-SS06	0.00 - 2.00	12/16/08	114	55,000	720,000	**200**
MANGANESE	280	UXO4-SB01	UXO4-SB01(0-2)	0.00 - 2.00	12/16/08	3.0	1,800	23,000	**220**
MANGANESE	257	UXO4-SB01	UXO4-SB01(2-3)	2.00 - 3.00	12/16/08	3.0	1,800	23,000	**220**
MANGANESE	266	UXO4-SB02	UXO4-SB02(0-2)	0.00 - 2.00	12/16/08	2.8	1,800	23,000	**220**
MANGANESE	243	UXO4-SB02	UXO4-SB02(2-2.5)	2.00 - 2.50	12/16/08	2.7	1,800	23,000	**220**
MANGANESE	627	UXO4-SB05	UXO4-SB05(0-2)	0.00 - 2.00	12/16/08	3.0	1,800	23,000	**220**
MANGANESE	249	UXO4-SB06	UXO4-SB06(0-2)	0.00 - 2.00	12/16/08	2.8	1,800	23,000	**220**
MANGANESE	244	UXO4-SS01	UXO4-SS01	0.00 - 2.00	12/16/08	3.0	1,800	23,000	**220**
MANGANESE	232	UXO4-SS03	UXO4-SS03	0.00 - 2.00	12/16/08	2.8	1,800	23,000	**220**
MANGANESE	252	UXO4-SS06	UXO4-SS06	0.00 - 2.00	12/16/08	2.9	1,800	23,000	**220**
VANADIUM	67.8	UXO4-SB01	UXO4-SB01(0-2)	0.00 - 2.00	12/16/08	1.2	390	5,200	**2.0**
VANADIUM	57.1	UXO4-SB01	UXO4-SB01(2-3)	2.00 - 3.00	12/16/08	1.2	390	5,200	**2.0**
VANADIUM	64.0	UXO4-SB02	UXO4-SB02(0-2)	0.00 - 2.00	12/16/08	1.1	390	5,200	**2.0**
VANADIUM	55.1	UXO4-SB02	UXO4-SB02(2-2.5)	2.00 - 2.50	12/16/08	1.1	390	5,200	**2.0**
VANADIUM	40.4	UXO4-SB03	UXO4-SB03(0-2)	0.00 - 2.00	12/16/08	1.2	390	5,200	**2.0**
VANADIUM	28.8	UXO4-SB03	UXO4-SB03(3-4)	3.00 - 4.00	12/16/08	1.2	390	5,200	**2.0**
VANADIUM	49.7	UXO4-SB04	UXO4-SB04(0-2)	0.00 - 2.00	12/16/08	1.1	390	5,200	**2.0**
VANADIUM	80.1	UXO4-SB05	UXO4-SB05(0-2)	0.00 - 2.00	12/16/08	1.2	390	5,200	**2.0**
VANADIUM	30.8	UXO4-SB06	UXO4-SB06(0-2)	0.00 - 2.00	12/16/08	1.1	390	5,200	**2.0**
VANADIUM	58.9	UXO4-SB06	UXO4-SB06(2-3)	2.00 - 3.00	12/16/08	1.1	390	5,200	**2.0**
VANADIUM	45.5	UXO4-SS01	UXO4-SS01	0.00 - 2.00	12/16/08	1.2	390	5,200	**2.0**
VANADIUM	50.5	UXO4-SS02	UXO4-SS02	0.00 - 1.00	12/16/08	1.2	390	5,200	**2.0**
VANADIUM	45.6	UXO4-SS03	UXO4-SS03	0.00 - 2.00	12/16/08	1.1	390	5,200	**2.0**

TABLE 10-2: SOIL ANALYTICAL RESULTS EXCEEDING CRITERIA FOR MRP SITE UXO4 (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample depth from 0 to 4 feet below ground surface

Analyte	Detected Concentration	Point ID	Sample ID	Sample Depth (feet)	Sample Collection Date	Laboratory Reporting Limit	Residential Screening Criteria	Industrial Screening Criteria	Ecological Screening Criteria
Metals (mg/kg)									
VANADIUM	50.5	UXO4-SS04	UXO4-SS04	0.00 - 2.00	12/16/08	1.2	390	5,200	**2.0**
VANADIUM	55.3	UXO4-SS05	UXO4-SS05	0.00 - 2.00	12/16/08	1.2	390	5,200	**2.0**
VANADIUM	41.6	UXO4-SS06	UXO4-SS06	0.00 - 2.00	12/16/08	1.1	390	5,200	**2.0**

Notes:
1. Exceeded screening criterion is shown in bold.
2. Screening criteria sources are presented in Sections 6.1 (human-health) and 6.2 (ecological).

ID Identification
J Estimated value
mg/kg Milligrams per kilogram
MRP Munitions Response Program
UXO Unexploded ordinance

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO3-SS05	UXO4-SB01	UXO4-SB01	UXO4-SB02	UXO4-SB02	UXO4-SB03	UXO4-SB03
Sample ID	UXO3-SS05	UXO4-SB01(0-2)	UXO4-SB01(2-3)	UXO4-SB02(0-2)	UXO4-SB02(2-2.5)	UXO4-SB03(0-2)	UXO4-SB03(3-4)
Sample Date	12/10/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008
Sample Depth	0.00 - 2.00	0.00 - 2.00	2.00 - 3.00	0.00 - 2.00	2.00 - 2.50	0.00 - 2.00	3.00 - 4.00
Volatile Organic Compounds (mg/kg)							
1,1,1-TRICHLOROETHANE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
1,1,2,2-TETRACHLOROETHANE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 UJ	0.017 UJ
1,1,2-TRICHLOROETHANE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
1,1-DICHLOROETHANE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
1,1-DICHLOROETHENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
1,2,4-TRIMETHYLBENZENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
1,2-DICHLOROETHANE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
1,2-DICHLOROPROPANE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
1,3,5-TRIMETHYLBENZENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
2-BUTANONE	0.019 U	0.02 U	0.028 U	0.046 U	0.017 U	0.013 UJ	0.033 UJ
2-HEXANONE	0.037 U	0.041 UJ	0.055 UJ	0.093 U	0.034 UJ	0.026 UJ	0.067 UJ
4-METHYL-2-PENTANONE	0.037 U	0.041 UJ	0.055 UJ	0.093 U	0.034 UJ	0.026 UJ	0.067 UJ
ACETONE	0.037 U	0.041 U	0.055 U	0.093 U	0.034 U	0.026 U	0.067 U
BENZENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
BROMODICHLOROMETHANE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
BROMOFORM	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
BROMOMETHANE	0.019 UJ	0.02 U	0.028 U	0.046 U	0.017 U	0.013 UJ	0.033 UJ
CARBON DISULFIDE	0.0094 U	0.01 UJ	0.014 UJ	0.023 U	0.0085 UJ	0.0065 U	0.017 U
CARBON TETRACHLORIDE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
CHLOROBENZENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
CHLOROETHANE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 UJ	0.017 UJ
CHLOROFORM	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
CHLOROMETHANE	0.019 U	0.02 UJ	0.028 UJ	0.046 U	0.017 UJ	0.013 UJ	0.033 UJ
CIS-1,2-DICHLOROETHENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
CIS-1,3-DICHLOROPROPENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
DIBROMOCHLOROMETHANE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
ETHYLBENZENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
ISOPROPYLBENZENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
M,P-XYLENE	0.019 U	0.02 U	0.028 U	0.046 U	0.017 U	0.013 U	0.033 U
METHYLENE CHLORIDE	0.019 UJ	0.02 UJ	0.028 UJ	0.046 U	0.017 UJ	0.013 U	0.033 U
N-BUTYLBENZENE	0.0094 U	0.01 UJ	0.014 UJ	0.023 U	0.0085 UJ	0.0065 U	0.017 U
N-PROPYLBENZENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
O-XYLENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO3-SS05	UXO4-SB01	UXO4-SB01	UXO4-SB02	UXO4-SB02	UXO4-SB03	UXO4-SB03
Sample ID	UXO3-SS05	UXO4-SB01(0-2)	UXO4-SB01(2-3)	UXO4-SB02(0-2)	UXO4-SB02(2-2.5)	UXO4-SB03(0-2)	UXO4-SB03(3-4)
Sample Date	12/10/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008
Sample Depth	0.00 - 2.00	0.00 - 2.00	2.00 - 3.00	0.00 - 2.00	2.00 - 2.50	0.00 - 2.00	3.00 - 4.00
Volatile Organic Compounds (mg/kg)							
P-ISOPROPYLTOLUENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
SEC-BUTYLBENZENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
STYRENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
TERT-BUTYLBENZENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
TETRACHLOROETHENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
TOLUENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
TRANS-1,2-DICHLOROETHENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
TRANS-1,3-DICHLOROPROPENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
TRICHLOROETHENE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
VINYL CHLORIDE	0.0094 U	0.01 U	0.014 U	0.023 U	0.0085 U	0.0065 U	0.017 U
Semivolatile Organic Compounds (mg/kg)							
1,2,4,5-TETRACHLOROBENZENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
1,2,4-TRICHLOROBENZENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
1,2-DICHLOROBENZENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
1,3-DICHLOROBENZENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
1,4-DICHLOROBENZENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
2,2'-OXYBIS(1-CHLOROPROPANE)	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
2,4,5-TRICHLOROPHENOL	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
2,4,6-TRICHLOROPHENOL	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
2,4-DICHLOROPHENOL	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
2,4-DIMETHYLPHENOL	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
2,4-DINITROPHENOL	0.73 UJ	0.79 U	0.79 U	0.73 U	0.7 U	0.78 U	0.76 U
2,4-DINITROTOLUENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
2,6-DICHLOROPHENOL	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
2-CHLORONAPHTHALENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
2-CHLOROPHENOL	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
2-METHYLPHENOL	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
2-NITROANILINE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 UJ
2-NITROPHENOL	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
3,3'-DICHLOROBENZIDINE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
3,3'-DIMETHYLBENZIDINE	0.36 UJ	0.39 UJ	0.4 UJ	0.36 UJ	0.35 UJ	0.39 UJ	0.38 UJ
3,4-METHYLPHENOL	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO3-SS05	UXO4-SB01	UXO4-SB01	UXO4-SB02	UXO4-SB02	UXO4-SB03	UXO4-SB03
Sample ID	UXO3-SS05	UXO4-SB01(0-2)	UXO4-SB01(2-3)	UXO4-SB02(0-2)	UXO4-SB02(2-2.5)	UXO4-SB03(0-2)	UXO4-SB03(3-4)
Sample Date	12/10/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008
Sample Depth	0.00 - 2.00	0.00 - 2.00	2.00 - 3.00	0.00 - 2.00	2.00 - 2.50	0.00 - 2.00	3.00 - 4.00
Semivolatile Organic Compounds (mg/kg)							
3-NITROANILINE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
4,6-DINITRO-2-METHYLPHENOL	0.73 UJ	0.79 U	0.79 U	0.73 U	0.7 U	0.78 U	0.76 U
4-BROMOPHENYL-PHENYLETHER	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
4-CHLORO-3-METHYLPHENOL	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
4-CHLOROANILINE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
4-CHLOROPHENYL-PHENYLETHER	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
4-NITROANILINE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
4-NITROPHENOL	0.73 U	0.79 U	0.79 U	0.73 U	0.7 U	0.78 U	0.76 U
5-NITRO-O-TOLUIDINE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
A,A-DIMETHYLPHENETHYLAMINE	0.36 UJ	0.39 UJ	0.4 UJ	0.36 UJ	0.35 UJ	0.39 UJ	0.38 UJ
ACENAPHTHENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
ACENAPHTHYLENE	NA	NA	NA	NA	NA	NA	NA
ACETOPHENONE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
ANILINE	0.73 U	0.79 U	0.79 U	0.73 U	0.7 U	0.78 U	0.76 U
ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
ARAMITE	0.36 UJ	0.39 UJ	0.4 UJ	0.36 UJ	0.35 UJ	0.39 UJ	0.38 UJ
BENZO(A)ANTHRACENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
BENZO(A)PYRENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
BENZO(B)FLUORANTHENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
BENZO(G,H,I)PERYLENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
BENZO(K)FLUORANTHENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
BENZYL ALCOHOL	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
BIS(2-CHLOROETHOXY)METHANE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
BIS(2-CHLOROETHYL)ETHER	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
BIS(2-ETHYLHEXYL)PHTHALATE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
BUTYLBENZYLPHTHALATE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 UJ
CHLOROBENZILATE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
CHRYSENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
DI-N-BUTYLPHTHALATE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
DI-N-OCTYLPHTHALATE	0.36 UJ	0.39 UJ	0.4 UJ	0.36 UJ	0.35 UJ	0.39 UJ	0.38 UJ
DIALLATE	0.36 UJ	0.39 UJ	0.4 UJ	0.36 UJ	0.35 UJ	0.39 UJ	0.38 U
DIBENZ(A,H)ANTHRACENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO3-SS05	UXO4-SB01	UXO4-SB01	UXO4-SB02	UXO4-SB02	UXO4-SB03	UXO4-SB03
Sample ID	UXO3-SS05	UXO4-SB01(0-2)	UXO4-SB01(2-3)	UXO4-SB02(0-2)	UXO4-SB02(2-2.5)	UXO4-SB03(0-2)	UXO4-SB03(3-4)
Sample Date	12/10/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008
Sample Depth	0.00 - 2.00	0.00 - 2.00	2.00 - 3.00	0.00 - 2.00	2.00 - 2.50	0.00 - 2.00	3.00 - 4.00
Semivolatile Organic Compounds (mg/kg)							
DIBENZOFURAN	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
DIETHYLPHTHALATE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
DIMETHYLPHTHALATE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
DIPHENYLAMINE (1)	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
FLUORANTHENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
FLUORENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
HEXACHLOROBENZENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
HEXACHLOROBUTADIENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
HEXACHLOROCYCLOPENTADIENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
HEXACHLOROETHANE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
INDENO(1,2,3-CD)PYRENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
ISOPHORONE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
KEPONE	1.4 UJ	1.6 UJ	1.6 UJ	1.4 UJ	1.4 UJ	1.5 UJ	1.5 UJ
N-NITROSO-DI-N-BUTYLAMINE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
N-NITROSO-DI-N-PROPYLAMINE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
N-NITROSODIMETHYLAMINE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
N-NITROSOMETHYLETHYLAMINE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
N-NITROSOPYRROLIDINE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
NAPHTHALENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
O-TOLUIDINE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
PENTACHLOROBENZENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
PENTACHLOROETHANE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
PENTACHLORONITROBENZENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
PENTACHLOROPHENOL	0.73 U	0.79 U	0.79 U	0.73 U	0.7 U	0.78 U	0.76 U
PHENANTHRENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
PHENOL	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
PRONAMIDE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
PYRENE	0.36 U	0.39 U	0.4 U	0.36 U	0.35 U	0.39 U	0.38 U
PYRIDINE	0.92 U	0.99 U	1 U	0.92 U	0.88 U	0.99 U	0.96 U
Metals (mg/kg)							
ALUMINUM	**11,500**	**15,500 J**	**13,600 J**	**14,700 J**	**12,100 J**	**8,070 J**	**7,060 J**
ANTIMONY	0.553 UJ	0.225 UJ	0.2 UJ	0.214 UJ	0.204 UJ	0.185 UJ	0.142 UJ

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO3-SS05	UXO4-SB01	UXO4-SB01	UXO4-SB02	UXO4-SB02	UXO4-SB03	UXO4-SB03
Sample ID	UXO3-SS05	UXO4-SB01(0-2)	UXO4-SB01(2-3)	UXO4-SB02(0-2)	UXO4-SB02(2-2.5)	UXO4-SB03(0-2)	UXO4-SB03(3-4)
Sample Date	12/10/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008
Sample Depth	0.00 - 2.00	0.00 - 2.00	2.00 - 3.00	0.00 - 2.00	2.00 - 2.50	0.00 - 2.00	3.00 - 4.00
Metals (mg/kg)							
ARSENIC	1.2 J	2.65 J	2.02 J	2.54 J	2.18 J	1.33 J	1.23 J
BARIUM	104	102	78.3	156	100	73.2	51.8
BERYLLIUM	0.198 J	0.308 J	0.252 J	0.25 J	0.201 J	0.136 J	0.157 J
CADMIUM	0.332 J	0.142 J	0.601 U	0.129 J	0.157 J	0.595 U	0.577 U
CALCIUM	1,840	1,810	1,250	2,190	1,420	1,500	1,270
CHROMIUM	14.7	14.7	22.7	17.5	30.3	8.44	7.44
COBALT	7	9.35	7.83	14.7	7.94	5.33	4.34
COPPER	13.1	6.99	6.07	8.57	6.54	10.5	4.65
IRON	16,800	25,500	20,600	25,600	20,800	16,400	11,200
LEAD	18.5	3.64	3.03	3.7	3.03	6.99	3.32
MAGNESIUM	3,680	4,910	3,790	5,790	4,870	2,830	2,000
MANGANESE	303	280	257	266	243	175	142
MERCURY	0.11 U	0.119 U	0.12 U	0.11 U	0.106 U	0.119 U	0.115 U
NICKEL	5.08	4.96	8.31	6.02	10.8	3.66	2.72
POTASSIUM	3,110	2,620	2,160	2,730	2,660	1,670	1,090
SELENIUM	0.149 J	0.597 U	0.601 U	0.115 J	0.529 U	0.595 U	0.577 U
SILVER	0.551 U	0.597 U	0.601 U	0.552 U	0.529 U	0.595 U	0.577 U
SODIUM	184 UJ	205	197	529	469	161	150
STRONTIUM	NA	14.3	9.93 J	30.4	16.3	13.8	10.9 J
THALLIUM	0.266 UJ	0.342 J	0.294 J	0.322 J	0.318 J	0.168 J	0.147 J
TIN	NA	NA	NA	NA	NA	NA	NA
VANADIUM	46.6	67.8	57.1	64	55.1	40.4	28.8
ZINC	59.9	34	25.6	36.5	32.4	35.5	18.8
Dioxin (ng/kg)							
1,2,3,4,6,7,8-HPCDD	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDF	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-HPCDF	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HXCDD	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HXCDF	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HXCDD	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HXCDF	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HXCDD	NA	NA	NA	NA	NA	NA	NA

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO3-SS05	UXO4-SB01	UXO4-SB01	UXO4-SB02	UXO4-SB02	UXO4-SB03	UXO4-SB03
Sample ID	UXO3-SS05	UXO4-SB01(0-2)	UXO4-SB01(2-3)	UXO4-SB02(0-2)	UXO4-SB02(2-2.5)	UXO4-SB03(0-2)	UXO4-SB03(3-4)
Sample Date	12/10/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008
Sample Depth	0.00 - 2.00	0.00 - 2.00	2.00 - 3.00	0.00 - 2.00	2.00 - 2.50	0.00 - 2.00	3.00 - 4.00
Dioxin (ng/kg)							
1,2,3,7,8,9-HXCDF	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PECDD	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PECDF	NA	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-HXCDF	NA	NA	NA	NA	NA	NA	NA
2,3,4,7,8-PECDF	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDD	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDF	NA	NA	NA	NA	NA	NA	NA
OCDD	NA	NA	NA	NA	NA	NA	NA
OCDF	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTA-DIOXINS	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTA-FURANS	NA	NA	NA	NA	NA	NA	NA
TOTAL HEXA-DIOXINS	NA	NA	NA	NA	NA	NA	NA
TOTAL HEXA-FURANS	NA	NA	NA	NA	NA	NA	NA
TOTAL PENTA-DIOXINS	NA	NA	NA	NA	NA	NA	NA
TOTAL PENTA-FURANS	NA	NA	NA	NA	NA	NA	NA
TOTAL TCDF	NA	NA	NA	NA	NA	NA	NA
TOTAL TETRA-DIOXINS	NA	NA	NA	NA	NA	NA	NA
Explosives (mg/kg)							
1,3,5-TRINITROBENZENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
1,3-DINITROBENZENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2,4,6-TRINITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2,4-DINITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2,6-DINITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2-AM-4,6-DNT	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
3-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
4-AM-2,6-DNT	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
4-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
HMX	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
NITROBENZENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
PERCHLORATE	0.0055 U	0.0058 U	0.006 U	0.0061 U	0.0053 U	0.0061 U	0.0058 U
PHOSPHORUS, WHITE	0.0037 U	NA	NA	NA	NA	NA	NA

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO3-SS05	UXO4-SB01	UXO4-SB01	UXO4-SB02	UXO4-SB02	UXO4-SB03	UXO4-SB03
Sample ID	UXO3-SS05	UXO4-SB01(0-2)	UXO4-SB01(2-3)	UXO4-SB02(0-2)	UXO4-SB02(2-2.5)	UXO4-SB03(0-2)	UXO4-SB03(3-4)
Sample Date	12/10/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008
Sample Depth	0.00 - 2.00	0.00 - 2.00	2.00 - 3.00	0.00 - 2.00	2.00 - 2.50	0.00 - 2.00	3.00 - 4.00
Explosives (mg/kg)							
PICRIC ACID	NA	NA	NA	NA	NA	NA	NA
RDX	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
TETRYL	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO4-SB04	UXO4-SB05	UXO4-SB06	UXO4-SB06	UXO4-SS01	UXO4-SS02	UXO4-SS03
Sample ID	UXO4-SB04(0-2)	UXO4-SB05(0-2)	UXO4-SB06(0-2)	UXO4-SB06(2-3)	UXO4-SS01	UXO4-SS02	UXO4-SS03
Sample Date	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008
Sample Depth	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	2.00 - 3.00	0.00 - 2.00	0.00 - 1.00	0.00 - 2.00
Volatile Organic Compounds (mg/kg)							
1,1,1-TRICHLOROETHANE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
1,1,2,2-TETRACHLOROETHANE	0.0065 UJ	0.015 UJ	0.0052 UJ	0.0049 UJ	0.0058 U	0.013 U	0.0068 U
1,1,2-TRICHLOROETHANE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
1,1-DICHLOROETHANE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
1,1-DICHLOROETHENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
1,2,4-TRIMETHYLBENZENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
1,2-DICHLOROETHANE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
1,2-DICHLOROPROPANE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
1,3,5-TRIMETHYLBENZENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
2-BUTANONE	0.013 UJ	0.03 UJ	0.01 UJ	0.0097 UJ	0.012 U	0.025 U	0.014 U
2-HEXANONE	0.026 UJ	0.061 UJ	0.021 UJ	0.019 UJ	0.023 U	0.051 U	0.027 UJ
4-METHYL-2-PENTANONE	0.026 UJ	0.061 UJ	0.021 UJ	0.019 UJ	0.023 U	0.051 U	0.027 UJ
ACETONE	0.026 U	0.061 U	0.021 U	0.019 UJ	0.023 U	0.051 U	0.027 U
BENZENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
BROMODICHLOROMETHANE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
BROMOFORM	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
BROMOMETHANE	0.013 UJ	0.03 UJ	0.01 UJ	0.0097 UJ	0.012 U	0.025 U	0.014 U
CARBON DISULFIDE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
CARBON TETRACHLORIDE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
CHLOROBENZENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
CHLOROETHANE	0.0065 UJ	0.015 UJ	0.0052 UJ	0.0049 UJ	0.0058 U	0.013 U	0.0068 U
CHLOROFORM	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
CHLOROMETHANE	0.013 UJ	0.03 UJ	0.01 UJ	0.0097 UJ	0.012 U	0.025 U	0.014 U
CIS-1,2-DICHLOROETHENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
CIS-1,3-DICHLOROPROPENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
DIBROMOCHLOROMETHANE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
ETHYLBENZENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
ISOPROPYLBENZENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
M,P-XYLENE	0.013 U	0.03 U	0.01 U	0.0097 U	0.012 U	0.025 U	0.014 U
METHYLENE CHLORIDE	0.013 U	0.03 U	0.01 U	0.0097 U	0.012 U	0.025 U	0.014 UJ
N-BUTYLBENZENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 UJ
N-PROPYLBENZENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
O-XYLENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO4-SB04	UXO4-SB05	UXO4-SB06	UXO4-SB06	UXO4-SS01	UXO4-SS02	UXO4-SS03
Sample ID	UXO4-SB04(0-2)	UXO4-SB05(0-2)	UXO4-SB06(0-2)	UXO4-SB06(2-3)	UXO4-SS01	UXO4-SS02	UXO4-SS03
Sample Date	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008
Sample Depth	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	2.00 - 3.00	0.00 - 2.00	0.00 - 1.00	0.00 - 2.00
Volatile Organic Compounds (mg/kg)							
P-ISOPROPYLTOLUENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
SEC-BUTYLBENZENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
STYRENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
TERT-BUTYLBENZENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
TETRACHLOROETHENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
TOLUENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
TRANS-1,2-DICHLOROETHENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
TRANS-1,3-DICHLOROPROPENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
TRICHLOROETHENE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
VINYL CHLORIDE	0.0065 U	0.015 U	0.0052 U	0.0049 U	0.0058 U	0.013 U	0.0068 U
Semivolatile Organic Compounds (mg/kg)							
1,2,4,5-TETRACHLOROBENZENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
1,2,4-TRICHLOROBENZENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
1,2-DICHLOROBENZENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
1,3-DICHLOROBENZENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
1,4-DICHLOROBENZENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
2,2'-OXYBIS(1-CHLOROPROPANE)	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
2,4,5-TRICHLOROPHENOL	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
2,4,6-TRICHLOROPHENOL	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
2,4-DICHLOROPHENOL	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
2,4-DIMETHYLPHENOL	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
2,4-DINITROPHENOL	0.72 U	1.6 U	0.74 U	0.72 U	0.78 U	0.8 U	0.74 U
2,4-DINITROTOLUENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
2,6-DICHLOROPHENOL	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
2-CHLORONAPHTHALENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
2-CHLOROPHENOL	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
2-METHYLPHENOL	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
2-NITROANILINE	0.36 UJ	0.8 UJ	0.37 UJ	0.36 UJ	0.39 U	0.4 U	0.37 U
2-NITROPHENOL	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
3,3'-DICHLOROBENZIDINE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
3,3'-DIMETHYLBENZIDINE	0.36 UJ	0.8 UJ	0.37 UJ	0.36 UJ	0.39 UJ	0.4 UJ	0.37 UJ
3,4-METHYLPHENOL	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO4-SB04	UXO4-SB05	UXO4-SB06	UXO4-SB06	UXO4-SS01	UXO4-SS02	UXO4-SS03
Sample ID	UXO4-SB04(0-2)	UXO4-SB05(0-2)	UXO4-SB06(0-2)	UXO4-SB06(2-3)	UXO4-SS01	UXO4-SS02	UXO4-SS03
Sample Date	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008
Sample Depth	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	2.00 - 3.00	0.00 - 2.00	0.00 - 1.00	0.00 - 2.00
Semivolatile Organic Compounds (mg/kg)							
3-NITROANILINE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
4,6-DINITRO-2-METHYLPHENOL	0.72 U	1.6 U	0.74 U	0.72 U	0.78 U	0.8 U	0.74 U
4-BROMOPHENYL-PHENYLETHER	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
4-CHLORO-3-METHYLPHENOL	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
4-CHLOROANILINE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
4-CHLOROPHENYL-PHENYLETHER	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
4-NITROANILINE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
4-NITROPHENOL	0.72 U	1.6 U	0.74 U	0.72 U	0.78 U	0.8 U	0.74 U
5-NITRO-O-TOLUIDINE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
A,A-DIMETHYLPHENETHYLAMINE	0.36 UJ	0.8 UJ	0.37 UJ	0.36 UJ	0.39 UJ	0.4 UJ	0.37 UJ
ACENAPHTHENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
ACENAPHTHYLENE	NA	NA	NA	NA	NA	NA	NA
ACETOPHENONE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
ANILINE	0.72 U	1.6 U	0.74 U	0.72 U	0.78 U	0.8 U	0.74 U
ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
ARAMITE	0.36 UJ	0.8 UJ	0.37 UJ	0.36 UJ	0.39 UJ	0.4 UJ	0.37 UJ
BENZO(A)ANTHRACENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
BENZO(A)PYRENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
BENZO(B)FLUORANTHENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
BENZO(G,H,I)PERYLENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
BENZO(K)FLUORANTHENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
BENZYL ALCOHOL	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
BIS(2-CHLOROETHOXY)METHANE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
BIS(2-CHLOROETHYL)ETHER	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
BIS(2-ETHYLHEXYL)PHTHALATE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
BUTYLBENZYLPHTHALATE	0.36 UJ	0.8 UJ	0.37 UJ	0.36 UJ	0.39 U	0.4 U	0.37 U
CHLOROBENZILATE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
CHRYSENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
DI-N-BUTYLPHTHALATE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
DI-N-OCTYLPHTHALATE	0.36 UJ	0.8 UJ	0.37 UJ	0.36 UJ	0.39 UJ	0.4 UJ	0.37 UJ
DIALLATE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 UJ	0.4 UJ	0.37 UJ
DIBENZ(A,H)ANTHRACENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO4-SB04	UXO4-SB05	UXO4-SB06	UXO4-SB06	UXO4-SS01	UXO4-SS02	UXO4-SS03
Sample ID	UXO4-SB04(0-2)	UXO4-SB05(0-2)	UXO4-SB06(0-2)	UXO4-SB06(2-3)	UXO4-SS01	UXO4-SS02	UXO4-SS03
Sample Date	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008
Sample Depth	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	2.00 - 3.00	0.00 - 2.00	0.00 - 1.00	0.00 - 2.00
Semivolatile Organic Compounds (mg/kg)							
DIBENZOFURAN	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
DIETHYLPHTHALATE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
DIMETHYLPHTHALATE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
DIPHENYLAMINE (1)	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
FLUORANTHENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
FLUORENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
HEXACHLOROBENZENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
HEXACHLOROBUTADIENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
HEXACHLOROCYCLOPENTADIENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
HEXACHLOROETHANE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
INDENO(1,2,3-CD)PYRENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
ISOPHORONE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
KEPONE	1.4 UJ	3.2 UJ	1.5 UJ	1.4 UJ	1.5 UJ	1.6 UJ	1.5 UJ
N-NITROSO-DI-N-BUTYLAMINE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
N-NITROSO-DI-N-PROPYLAMINE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
N-NITROSODIMETHYLAMINE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
N-NITROSOMETHYLETHYLAMINE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
N-NITROSOPYRROLIDINE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
NAPHTHALENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
O-TOLUIDINE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
PENTACHLOROBENZENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
PENTACHLOROETHANE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
PENTACHLORONITROBENZENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
PENTACHLOROPHENOL	0.72 U	1.6 U	0.74 U	0.72 U	0.78 U	0.8 U	0.74 U
PHENANTHRENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
PHENOL	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
PRONAMIDE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
PYRENE	0.36 U	0.8 U	0.37 U	0.36 U	0.39 U	0.4 U	0.37 U
PYRIDINE	0.9 U	2 U	0.93 U	0.91 U	0.98 U	1 U	0.93 U
Metals (mg/kg)							
ALUMINUM	**13,500 J**	**16,600 J**	**7,990 J**	**18,200 J**	**12,000 J**	**11,300 J**	**11,800 J**
ANTIMONY	0.245 UJ	0.281 UJ	0.187 UJ	0.182 UJ	0.572 UJ	0.29 UJ	0.35 UJ

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO4-SB04	UXO4-SB05	UXO4-SB06	UXO4-SB06	UXO4-SS01	UXO4-SS02	UXO4-SS03
Sample ID	UXO4-SB04(0-2)	UXO4-SB05(0-2)	UXO4-SB06(0-2)	UXO4-SB06(2-3)	UXO4-SS01	UXO4-SS02	UXO4-SS03
Sample Date	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008
Sample Depth	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	2.00 - 3.00	0.00 - 2.00	0.00 - 1.00	0.00 - 2.00
Metals (mg/kg)							
ARSENIC	1.99 J	3.45 J	1.31 J	2.25 J	1.87 J	1.86 J	2.03 J
BARIUM	77.1	134	65.6	119	81.6	78.9	74.9
BERYLLIUM	0.267 J	0.373 J	0.179 J	0.382 J	0.339 J	0.322 J	0.273 J
CADMIUM	0.542 U	0.164 J	0.561 U	0.153 J	0.135 J	0.173 J	0.563 U
CALCIUM	1,440	1,950	1,110	1,490	1,500	1,370	1,400
CHROMIUM	16.6	13.9	7.84	17.7	11.9	12.3	11.9
COBALT	5.82	23.9	5.2	8.48	4.9	6.03	7.81
COPPER	5.88	8.79	5.93	6.07	6.08	6.65	5.02
IRON	18,600	27,700	11,700	23,500	16,800	17,600	16,400
LEAD	2.9	5.71	3.83	4.14	3.29	3.05	3.49
MAGNESIUM	3,810	4,530	2,000	4,910	3,260	3,550	3,220
MANGANESE	164	627	249	178	244	177	232
MERCURY	0.108 U	0.0597 J	0.112 U	0.109 U	0.118 U	0.121 U	0.113 U
NICKEL	6.38	5.97	3.35	6.44	4.72	4.25	4.29
POTASSIUM	2,010	2,430	1,830	2,060	2,000	2,170	1,750
SELENIUM	0.542 U	0.16 J	0.136 J	0.139 J	0.592 U	0.148 J	0.563 U
SILVER	0.542 U	0.607 U	0.561 U	0.547 U	0.592 U	0.606 U	0.563 U
SODIUM	221	187	107 UJ	281	179	255	245
STRONTIUM	13	16.7	9.65 J	15.4	11.9	11.8 J	12.2
THALLIUM	0.29 J	0.376 J	0.209 J	0.341 J	0.421 J	0.408 J	0.305 J
TIN	NA	NA	NA	NA	NA	NA	NA
VANADIUM	49.7	80.1	30.8	58.9	45.5	50.5	45.6
ZINC	27.4	35.4	20.1	29.5	24.5	25.3	22.2
Dioxin (ng/kg)							
1,2,3,4,6,7,8-HPCDD	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDF	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-HPCDF	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HXCDD	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HXCDF	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HXCDD	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HXCDF	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HXCDD	NA	NA	NA	NA	NA	NA	NA

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO4-SB04	UXO4-SB05	UXO4-SB06	UXO4-SB06	UXO4-SS01	UXO4-SS02	UXO4-SS03
Sample ID	UXO4-SB04(0-2)	UXO4-SB05(0-2)	UXO4-SB06(0-2)	UXO4-SB06(2-3)	UXO4-SS01	UXO4-SS02	UXO4-SS03
Sample Date	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008
Sample Depth	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	2.00 - 3.00	0.00 - 2.00	0.00 - 1.00	0.00 - 2.00
Dioxin (ng/kg)							
1,2,3,7,8,9-HXCDF	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PECDD	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PECDF	NA	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-HXCDF	NA	NA	NA	NA	NA	NA	NA
2,3,4,7,8-PECDF	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDD	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDF	NA	NA	NA	NA	NA	NA	NA
OCDD	NA	NA	NA	NA	NA	NA	NA
OCDF	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTA-DIOXINS	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTA-FURANS	NA	NA	NA	NA	NA	NA	NA
TOTAL HEXA-DIOXINS	NA	NA	NA	NA	NA	NA	NA
TOTAL HEXA-FURANS	NA	NA	NA	NA	NA	NA	NA
TOTAL PENTA-DIOXINS	NA	NA	NA	NA	NA	NA	NA
TOTAL PENTA-FURANS	NA	NA	NA	NA	NA	NA	NA
TOTAL TCDF	NA	NA	NA	NA	NA	NA	NA
TOTAL TETRA-DIOXINS	NA	NA	NA	NA	NA	NA	NA
Explosives (mg/kg)							
1,3,5-TRINITROBENZENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
1,3-DINITROBENZENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2,4,6-TRINITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2,4-DINITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2,6-DINITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2-AM-4,6-DNT	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
3-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
4-AM-2,6-DNT	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
4-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
HMX	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
NITROBENZENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
PERCHLORATE	0.0054 U	0.0058 U	0.0056 U	0.0054 U	0.006 U	**0.0011**	0.0057 U
PHOSPHORUS, WHITE	NA	NA	NA	NA	NA	NA	NA

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO4-SB04	UXO4-SB05	UXO4-SB06	UXO4-SB06	UXO4-SS01	UXO4-SS02	UXO4-SS03
Sample ID	UXO4-SB04(0-2)	UXO4-SB05(0-2)	UXO4-SB06(0-2)	UXO4-SB06(2-3)	UXO4-SS01	UXO4-SS02	UXO4-SS03
Sample Date	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008	12/16/2008
Sample Depth	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	2.00 - 3.00	0.00 - 2.00	0.00 - 1.00	0.00 - 2.00
Explosives (mg/kg)							
PICRIC ACID	NA	NA	NA	NA	NA	NA	NA
RDX	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
TETRYL	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO4-SS04	UXO4-SS05	UXO4-SS06	UXO6-SS01	UXO6-SS02	UXO6-SS03	UXO6-SS04
Sample ID	UXO4-SS04	UXO4-SS05	UXO4-SS06	UXO6-SS01	UXO6-SS02	UXO6-SS03	UXO6-SS04
Sample Date	12/16/2008	12/16/2008	12/16/2008	01/06/2009	01/06/2009	01/06/2009	01/06/2009
Sample Depth	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 1.50	0.00 - 2.00
Volatile Organic Compounds (mg/kg)							
1,1,1-TRICHLOROETHANE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
1,1-DICHLOROETHANE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
1,1-DICHLOROETHENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
1,2,4-TRIMETHYLBENZENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
1,2-DICHLOROETHANE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
1,2-DICHLOROPROPANE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
1,3,5-TRIMETHYLBENZENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
2-BUTANONE	0.017 U	0.014 U	0.0095 U	NA	NA	NA	NA
2-HEXANONE	0.033 U	0.028 UJ	0.019 UJ	NA	NA	NA	NA
4-METHYL-2-PENTANONE	0.033 U	0.028 UJ	0.019 UJ	NA	NA	NA	NA
ACETONE	0.033 U	0.028 U	0.019 U	NA	NA	NA	NA
BENZENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
BROMODICHLOROMETHANE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
BROMOFORM	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
BROMOMETHANE	0.017 U	0.014 U	0.0095 U	NA	NA	NA	NA
CARBON DISULFIDE	0.0083 U	0.0069 U	0.0047 UJ	NA	NA	NA	NA
CARBON TETRACHLORIDE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
CHLOROBENZENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
CHLOROETHANE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
CHLOROFORM	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
CHLOROMETHANE	0.017 U	0.014 U	0.0095 UJ	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
CIS-1,3-DICHLOROPROPENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
DIBROMOCHLOROMETHANE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
ETHYLBENZENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
ISOPROPYLBENZENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
M,P-XYLENE	0.017 U	0.014 U	0.0095 U	NA	NA	NA	NA
METHYLENE CHLORIDE	0.017 U	0.014 UJ	0.0095 UJ	NA	NA	NA	NA
N-BUTYLBENZENE	0.0083 U	0.0069 UJ	0.0047 UJ	NA	NA	NA	NA
N-PROPYLBENZENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
O-XYLENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO4-SS04	UXO4-SS05	UXO4-SS06	UXO6-SS01	UXO6-SS02	UXO6-SS03	UXO6-SS04
Sample ID	UXO4-SS04	UXO4-SS05	UXO4-SS06	UXO6-SS01	UXO6-SS02	UXO6-SS03	UXO6-SS04
Sample Date	12/16/2008	12/16/2008	12/16/2008	01/06/2009	01/06/2009	01/06/2009	01/06/2009
Sample Depth	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 1.50	0.00 - 2.00
Volatile Organic Compounds (mg/kg)							
P-ISOPROPYLTOLUENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
SEC-BUTYLBENZENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
STYRENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
TERT-BUTYLBENZENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
TETRACHLOROETHENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
TOLUENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
TRICHLOROETHENE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
VINYL CHLORIDE	0.0083 U	0.0069 U	0.0047 U	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)							
1,2,4,5-TETRACHLOROBENZENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
1,2,4-TRICHLOROBENZENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
1,2-DICHLOROBENZENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
1,3-DICHLOROBENZENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
1,4-DICHLOROBENZENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
2,4-DICHLOROPHENOL	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
2,4-DINITROPHENOL	1.6 U	0.76 U	0.75 U	NA	NA	NA	NA
2,4-DINITROTOLUENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
2,6-DICHLOROPHENOL	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
2-CHLORONAPHTHALENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
2-CHLOROPHENOL	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
2-METHYLPHENOL	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
2-NITROANILINE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
2-NITROPHENOL	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
3,3'-DIMETHYLBENZIDINE	0.78 UJ	0.38 UJ	0.38 UJ	NA	NA	NA	NA
3,4-METHYLPHENOL	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO4-SS04	UXO4-SS05	UXO4-SS06	UXO6-SS01	UXO6-SS02	UXO6-SS03	UXO6-SS04
Sample ID	UXO4-SS04	UXO4-SS05	UXO4-SS06	UXO6-SS01	UXO6-SS02	UXO6-SS03	UXO6-SS04
Sample Date	12/16/2008	12/16/2008	12/16/2008	01/06/2009	01/06/2009	01/06/2009	01/06/2009
Sample Depth	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 1.50	0.00 - 2.00
Semivolatile Organic Compounds (mg/kg)							
3-NITROANILINE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	1.6 U	0.76 U	0.75 U	NA	NA	NA	NA
4-BROMOPHENYL-PHENYLETHER	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
4-CHLOROANILINE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
4-CHLOROPHENYL-PHENYLETHER	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
4-NITROANILINE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
4-NITROPHENOL	1.6 U	0.76 U	0.75 U	NA	NA	NA	NA
5-NITRO-O-TOLUIDINE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
A,A-DIMETHYLPHENETHYLAMINE	0.78 UJ	0.38 UJ	0.38 UJ	NA	NA	NA	NA
ACENAPHTHENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
ACENAPHTHYLENE	NA	NA	NA	NA	NA	NA	NA
ACETOPHENONE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
ANILINE	1.6 U	0.76 U	0.75 U	NA	NA	NA	NA
ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
ARAMITE	0.78 UJ	0.38 UJ	0.38 UJ	NA	NA	NA	NA
BENZO(A)ANTHRACENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
BENZO(A)PYRENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
BENZYL ALCOHOL	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
BUTYLBENZYLPHTHALATE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
CHLOROBENZILATE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
CHRYSENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
DI-N-BUTYLPHTHALATE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
DI-N-OCTYLPHTHALATE	0.78 UJ	0.38 UJ	0.38 UJ	NA	NA	NA	NA
DIALLATE	0.78 UJ	0.38 UJ	0.38 UJ	NA	NA	NA	NA
DIBENZ(A,H)ANTHRACENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO4-SS04	UXO4-SS05	UXO4-SS06	UXO6-SS01	UXO6-SS02	UXO6-SS03	UXO6-SS04
Sample ID	UXO4-SS04	UXO4-SS05	UXO4-SS06	UXO6-SS01	UXO6-SS02	UXO6-SS03	UXO6-SS04
Sample Date	12/16/2008	12/16/2008	12/16/2008	01/06/2009	01/06/2009	01/06/2009	01/06/2009
Sample Depth	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 1.50	0.00 - 2.00
Semivolatile Organic Compounds (mg/kg)							
DIBENZOFURAN	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
DIETHYLPHTHALATE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
DIMETHYLPHTHALATE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
DIPHENYLAMINE (1)	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
FLUORANTHENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
FLUORENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
HEXACHLOROBENZENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
HEXACHLOROBUTADIENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
HEXACHLOROETHANE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
ISOPHORONE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
KEPONE	3.1 UJ	1.5 UJ	1.5 UJ	NA	NA	NA	NA
N-NITROSO-DI-N-BUTYLAMINE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
N-NITROSODIMETHYLAMINE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
N-NITROSOMETHYLETHYLAMINE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
N-NITROSOPYRROLIDINE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
NAPHTHALENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
O-TOLUIDINE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
PENTACHLOROBENZENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
PENTACHLOROETHANE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
PENTACHLORONITROBENZENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
PENTACHLOROPHENOL	1.6 U	0.76 U	0.75 U	NA	NA	NA	NA
PHENANTHRENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
PHENOL	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
PRONAMIDE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
PYRENE	0.78 U	0.38 U	0.38 U	NA	NA	NA	NA
PYRIDINE	2 U	0.96 U	0.95 U	NA	NA	NA	NA
Metals (mg/kg)							
ALUMINUM	**12,600 J**	**14,800 J**	**12,400 J**	**6,320 J**	**7,800 J**	**9,310 J**	**8,390 J**
ANTIMONY	0.325 UJ	0.222 UJ	0.183 UJ	1.18 UJ	1.21 UJ	0.144 UJ	1.25 UJ

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO4-SS04	UXO4-SS05	UXO4-SS06	UXO6-SS01	UXO6-SS02	UXO6-SS03	UXO6-SS04
Sample ID	UXO4-SS04	UXO4-SS05	UXO4-SS06	UXO6-SS01	UXO6-SS02	UXO6-SS03	UXO6-SS04
Sample Date	12/16/2008	12/16/2008	12/16/2008	01/06/2009	01/06/2009	01/06/2009	01/06/2009
Sample Depth	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 1.50	0.00 - 2.00
Metals (mg/kg)							
ARSENIC	**1.95 J**	**2.22 J**	**1.62 J**	**1.18 J**	**1.13 J**	**2.23 J**	**1.71 J**
BARIUM	**86**	**99.4**	**87**	**32.6**	**45.2**	**70**	**55.7**
BERYLLIUM	**0.279 J**	**0.34 J**	**0.319 J**	**0.231 J**	**0.277 J**	**0.272 J**	**0.289 J**
CADMIUM	**0.151 J**	0.578 U	0.57 U	**0.2 J**	**0.263 J**	**0.267 J**	**0.247 J**
CALCIUM	**1,450**	**1,430**	**1,200**	**665**	**754**	**5,870**	**1,770**
CHROMIUM	**11.3**	**11.8**	**10.1**	**1.18 J**	**1.93 J**	**6.96**	**3.2**
COBALT	**5.81**	**6.58**	**5.43**	**1.6**	**2.21**	**4.47**	**3.15**
COPPER	**8.63**	**5.85**	**5.89**	**5.47**	**9.52**	**19.3**	**10.6**
IRON	**18,400**	**20,400**	**15,400**	**12,400**	**14,700**	**16,600**	**16,500**
LEAD	**5.61**	**3.72**	**2.9**	**4.55**	**7**	**11.6**	**6.98**
MAGNESIUM	**3,580**	**3,240**	**3,290**	**1,180 J**	**1,390 J**	**2,760 J**	**1,860 J**
MANGANESE	**212**	**220**	**252**	**124**	**145**	**197**	**187**
MERCURY	0.119 U	0.116 U	0.114 U	0.118 U	0.121 U	0.126 U	0.125 U
NICKEL	**4.53**	**4.51**	**3.78**	**0.548 J**	**0.974 J**	**2.94**	**1.59**
POTASSIUM	**2,690**	**2,070**	**1,940**	**1,790**	**2,260**	**2,930**	**2,860**
SELENIUM	0.593 U	**0.193 J**	0.57 U	0.17 UJ	0.167 UJ	0.211 UJ	0.175 UJ
SILVER	0.593 U	0.578 U	0.57 U	0.591 U	0.605 U	0.628 U	0.624 U
SODIUM	**129**	**123**	**166**	**331**	**386**	**343**	**283**
STRONTIUM	**12**	**11.6**	**11.4 J**	NA	NA	NA	NA
THALLIUM	**0.312 J**	**0.31 J**	**0.268 J**	0.333 UJ	0.317 UJ	0.349 UJ	0.311 UJ
TIN	NA	NA	NA	NA	NA	NA	NA
VANADIUM	**50.5**	**55.3**	**41.6**	**6.28**	**7.84**	**25.1**	**12.8**
ZINC	**34.8**	**25.8**	**25.7**	**33.6**	**106**	**63**	**48.1**
Dioxin (ng/kg)							
1,2,3,4,6,7,8-HPCDD	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDF	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-HPCDF	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HXCDD	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HXCDF	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HXCDD	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HXCDF	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HXCDD	NA	NA	NA	NA	NA	NA	NA

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO4-SS04	UXO4-SS05	UXO4-SS06	UXO6-SS01	UXO6-SS02	UXO6-SS03	UXO6-SS04
Sample ID	UXO4-SS04	UXO4-SS05	UXO4-SS06	UXO6-SS01	UXO6-SS02	UXO6-SS03	UXO6-SS04
Sample Date	12/16/2008	12/16/2008	12/16/2008	01/06/2009	01/06/2009	01/06/2009	01/06/2009
Sample Depth	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 1.50	0.00 - 2.00
Dioxin (ng/kg)							
1,2,3,7,8,9-HXCDF	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PECDD	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PECDF	NA	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-HXCDF	NA	NA	NA	NA	NA	NA	NA
2,3,4,7,8-PECDF	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDD	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDF	NA	NA	NA	NA	NA	NA	NA
OCDD	NA	NA	NA	NA	NA	NA	NA
OCDF	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTA-DIOXINS	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTA-FURANS	NA	NA	NA	NA	NA	NA	NA
TOTAL HEXA-DIOXINS	NA	NA	NA	NA	NA	NA	NA
TOTAL HEXA-FURANS	NA	NA	NA	NA	NA	NA	NA
TOTAL PENTA-DIOXINS	NA	NA	NA	NA	NA	NA	NA
TOTAL PENTA-FURANS	NA	NA	NA	NA	NA	NA	NA
TOTAL TCDF	NA	NA	NA	NA	NA	NA	NA
TOTAL TETRA-DIOXINS	NA	NA	NA	NA	NA	NA	NA
Explosives (mg/kg)							
1,3,5-TRINITROBENZENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
1,3-DINITROBENZENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2,4,6-TRINITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2,4-DINITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2,6-DINITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2-AM-4,6-DNT	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
3-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
4-AM-2,6-DNT	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
4-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
HMX	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
NITROBENZENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
PERCHLORATE	0.0057 U	0.0057 U	0.0057 U	0.0059 U	0.0058 U	0.0059 U	0.0059 U
PHOSPHORUS, WHITE	NA	NA	NA	NA	NA	NA	NA

APPENDIX J-1: SOIL ANALYTICAL RESULTS FOR ALL MRP SITES (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample Location ID	UXO4-SS04	UXO4-SS05	UXO4-SS06	UXO6-SS01	UXO6-SS02	UXO6-SS03	UXO6-SS04
Sample ID	UXO4-SS04	UXO4-SS05	UXO4-SS06	UXO6-SS01	UXO6-SS02	UXO6-SS03	UXO6-SS04
Sample Date	12/16/2008	12/16/2008	12/16/2008	01/06/2009	01/06/2009	01/06/2009	01/06/2009
Sample Depth	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0.00 - 1.50	0.00 - 2.00
Explosives (mg/kg)							
PICRIC ACID	NA	NA	NA	NA	NA	NA	NA
RDX	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
TETRYL	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U

Appendix B
Photographic Log

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Photo 1: MRP Site UXO4, Detachment Fallbrook.

Photo 2: Plexiglas shielding for mechanized equipment.

Photo 3: Plexiglas shielding for observer.

Photo 4: Surface clearance quality control Seed Items QC-01 - QC-06.

Photo 5: Detector-aided surface clearance at MRP Site UXO4.

Photo 6: Installation of IVS at MRP Site UXO5.

Photo 7: Setting up EM61-MK2 base station for DGM surveys.

Photo 8: Testing the EM61-MK2 at the IVS.

Photo 9: IVS Seed IVS-01 (horizontal orientation).

Photo 10: IVS Seed IVS-02 (vertical orientation).

Photo 11: DGM survey at MRP Site UXO4 using EM61-MK2.

Photo 12: DGM survey using EM31.

Photo 13: UXO technicians completing manual intrusive investigation.

Photo 14: UXO subcontractor checking EM61-MK2 in IVS.

Photo 15: MDAS recovered from grid E-10 (M11/M31 practice rifle grenades) .

Photo 16: Confirmation survey of anomaly source area using EM61-MK2.

Photo 17: Excavation and observation of Trench 3 at MRP Site UXO4.

Photo 18: Soil excavation from Trench 3 at MRP Site UXO4.

Photo 19: MPPEH at bottom of Trench 4 at MRP Site UXO4.

Photo 20: Soil and MPPEH excavated from Trench 4.

Photo 21: Residual MPPEH in sidewalls of Trench 4 at MRP Site UXO4.

Photo 22: MDAS (M31 and M11 practice rifle grenades) from Trench 4.

Photo 23: Camp Pendleton EOD unit receiving unused commercial explosives.

Photo 24: Drums of inspected and certified MDAS ready for shipment.

Appendix C
Utility Investigation Report

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March 26, 2015

Gus Thrasher
CH2MHILL
P.O. Box 241329
Denver, CO 80224

RE: Utility Investigation
US Naval Weapons Station
UXO 5 Area
700 Ammunition Road
Fallbrook, CA

Dear Mr. Gus Thrasher

On March 26 2015, Spectrum Geophysics performed two utility investigations at the Naval Weapons Station in Fallbrook, CA. The first area was an approximate 275 by 30 foot strip outside the gate at UXO Area 5. The second area was an approximate 150 by 150 foot area within UXO Area 4. Spectrum also investigated the perimeter of the entire 2 acre site at UXO Area 4. The purpose of the investigation was to locate detectable utilities in advance of proposed ground excavations.

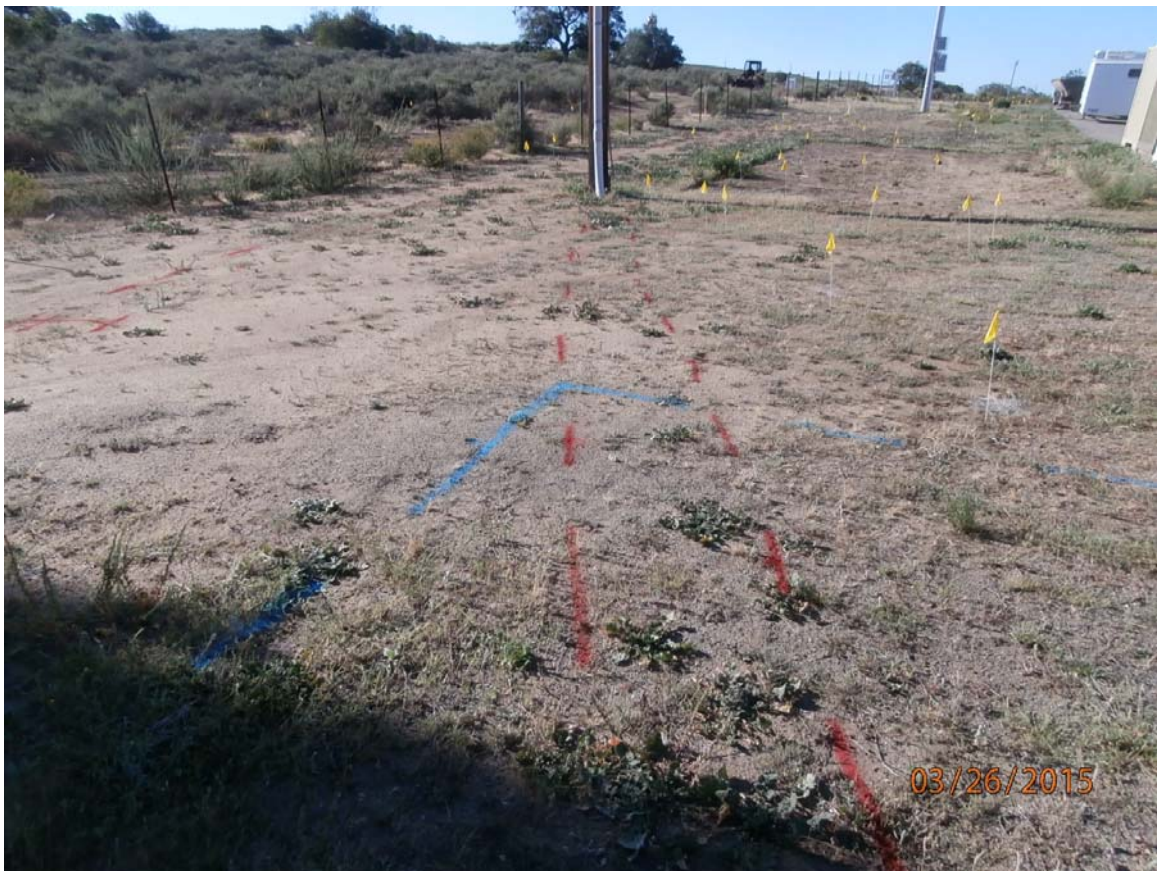
20434 Corisco St.,
Chatsworth, CA 91311

(818) 886-4500
fax (818) 886-4511

The following is a list of equipment used to locate detectable utilities during this survey:

- Radio Detection 4000 transmitter w/ matched receiver
- Schonstedt Mac 51b hand-held magnetometer
- Fisher TW-6 M-scope - shallow focus metal detector
- Sensors and Software ground penetrating radar (GPR) unit
- Dynatel 500A transmitter w/ matched receiver

Ground Penetrating Radar was not used in the investigation at UXO Area 4 due to uneven and rugged terrain.



During the investigation Spectrum detected several utility conduits which were marked on the ground with spray paint in a color code established by the American Public Works Association.

The American Public Works Association color code for utilities is as follows:

Utility	**Color**
Electric	Red
Telephone/Communication	Orange
Storm Drain/Sanitary Sewer	Green
Natural Gas	Yellow
Water	Blue
Unknown Conduit	Pink

Survey Exclusions

- Utilities *excluded* from this scope of work include inaccessible sanitary sewer and storm drain lines.
- Utilities that originate inside inaccessible buildings, vaults or utility closet whose surface trace is only detectable by applying a direct signal or through use of an induction clamp.
- Non-metallic/Non-electrically conductive utilities which are not detectable through standard EM utility-locating methods and/or the use of the additional geophysical methods (i.e, ground penetrating radar).
- Abandoned or inaccessible utilities to which standard locating techniques may not be applied.
- Utilities whose burial depths exceed that of the detection limits of the equipment in a specific setting.
- Utilities whose detectable signal may be distorted or rendered undetectable due to reinforced concrete, steel plates or above ground interferences.
- Utilities whose surface trace cannot be determined due to the utilities' proximity to a greater conductor.
- Utilities whose proximity are so close to buildings or fences EM utility locating methods are distorted and GPR traverses cannot be performed.

- Utilities whose proximity are so close to buildings or fences EM utility locating methods are distorted and GPR traverses cannot be performed.

Thank you for the opportunity to submit this non-exclusive letter report. Please call (818-391-3010) or e-mail if I may answer any questions.

Best Regards,

Colin Embrey, Project Manager

GPR Data Collection

20434 Corisco St.,
Chatsworth, CA 91311

Appendix D
Instrument Verification Strip Report

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Draft

Instrument Verification Strip Report

Remedial Investigation for Munitions Response Program Sites UXO4 and UXO5

Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Orders: 0070 and 0063
Document Control Number: KCH-2622-0070-0055

July 2016

Prepared for

Department of the Navy
Naval Facilities Engineering Command Southwest

Prepared by

CH2M HILL Kleinfelder, A Joint Venture (KCH)
402 West Broadway, Suite 1450
San Diego, California 92101

Gus Thrasher, PE
Task Order Manager

Tamir Klaff, PGp PG
Technical Lead

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Acronyms and Abbreviations

cm	centimeter
CONUS	Continental United States
CTO	Contract Task Order
DGM	digital geophysical mapping
GIWP	geophysical investigation work plan
GNSS	Global Navigation Satellite System
GPS	global positioning system
GSV	geophysical system verification
in.	inch
ISO	industry standard object
IVS	Instrument Verification Strip
KCH	CH2M HILL Kleinfelder, A Joint Venture
m	meter
MPC	measurement performance criteria
MQO	measurement quality objective
MRP	Munitions Response Program
mV	millivolt
NAD83	North American Datum 1983
NAVFAC	Naval Facilities Engineering Command
NAVWPNSTA	Naval Weapons Station
NRL	Naval Research Laboratory
QC	quality control
RI	remedial investigation
RTK	real-time kinematic
UXO	unexploded ordnance

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1.0 Introduction

CH2M HILL Kleinfelder, A Joint Venture (KCH), is implementing the geophysical system verification (GSV) process for the digital geophysical mapping (DGM) survey at Munitions Response Program (MRP) Sites Unexploded Ordnance (UXO) 4 and UXO5, Naval Weapons Station (NAVWPNSTA) Seal Beach Detachment Fallbrook, located in Fallbrook, California. The GSV process compares signal strength and sensor performance to known response curves of industry standard objects (ISOs) to validate DGM systems before and during site surveys. Validation is initially performed along an Instrument Verification Strip (IVS), followed by a blind seeding program. This report presents the results for the IVS surveys conducted on February 19, 2015.

The DGM was performed in support of remedial investigations (RIs) at both sites on behalf of the United States Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC) Southwest. Work was conducted under Contract N62473-09-D-2622, Contract Task Orders (CTOs) 0070 (MRP Site UXO4) and 0063 (MRP Site UXO5).

The DGM was performed in accordance with the *Geophysical System Verification Plan, Remedial Investigation for Munitions Response Program Site UXO5, Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California* (KCH, 2015a). A separate GSV Plan of the same name was prepared for MRP Site UXO4 (KCH, 2015b); collectively these documents are herein referred to as the GSV Plans. The GSV Plans are included as attachments to the geophysical investigation work plans (GIWPs) prepared for each RI. Information on the DGM objectives, personnel, approach, operational procedures, and quality control (QC) methods to be used during DGM are contained in the GIWPs.

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2.0 DGM Equipment and Control Points

KCH performed the DGM using a Geonics, Ltd. EM61-MK2 (EM61-MK2) in person-portable mode, with the coils mounted on its standard wheels. The height of the bottom coil above ground surface measured 16.5 inches (42 centimeters [cm]). The EM61-MK2 data were logged at a rate of 10 readings per second.

Positioning data were recorded at 10 Hertz using a real-time kinematic global positioning system (RTK GPS). The GPS units used for the base station and rover unit mounted to the EM61-MK2 coils were Trimble R8 Global Navigation Satellite System (GNSS) receivers. Serial numbers for the DGM and GPS equipment are provided in Table 2-1.

Temporary benchmark locations for use as control points during the DGM survey were established prior to the start of DGM by Coast Surveying, Inc., a professional land surveyor firm licensed in the State of California. Temporary benchmarks were established at MRP Sites UXO4 and UXO5, although the points at MRP Site UXO5 were used for the initial IVS surveys. The coordinates for the points at MRP Site UXO5 are provided in Table 2-2.

TABLE 2-1
DGM and GPS Equipment Serial Numbers

Instrument	Serial Number
EM61-MK2	021907-3
Trimble R8 GNSS Base Station Receiver	5033444774
Trimble R8 GNSS Rover Receiver	5032443750
Trimble TDL450 External Radio	14332152
Trimble TSC3 Data Collector	RS2BC46352

TABLE 2-2
Temporary Benchmarks at MRP Site UXO5

Point ID	Easting (U.S. Survey Feet)	Northing (U.S. Survey Feet)	Elevation (U.S. Survey Feet)
500	6251257.93	2085287.61	708.98
501	6251161.62	2084900.5	705.55
502	6251504.29	2084709.67	711.17
503	6251214.01	2085600.59	702.08
504	6251277.79	2085263.82	709.52
505	6251184.53	2085630	701.66

Note: Coordinates are California State Plane Zone 6, North American Datum 1983 (NAD83) Continental United States (CONUS).

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3.0 IVS Location and Construction

3.1 Initial Background Survey

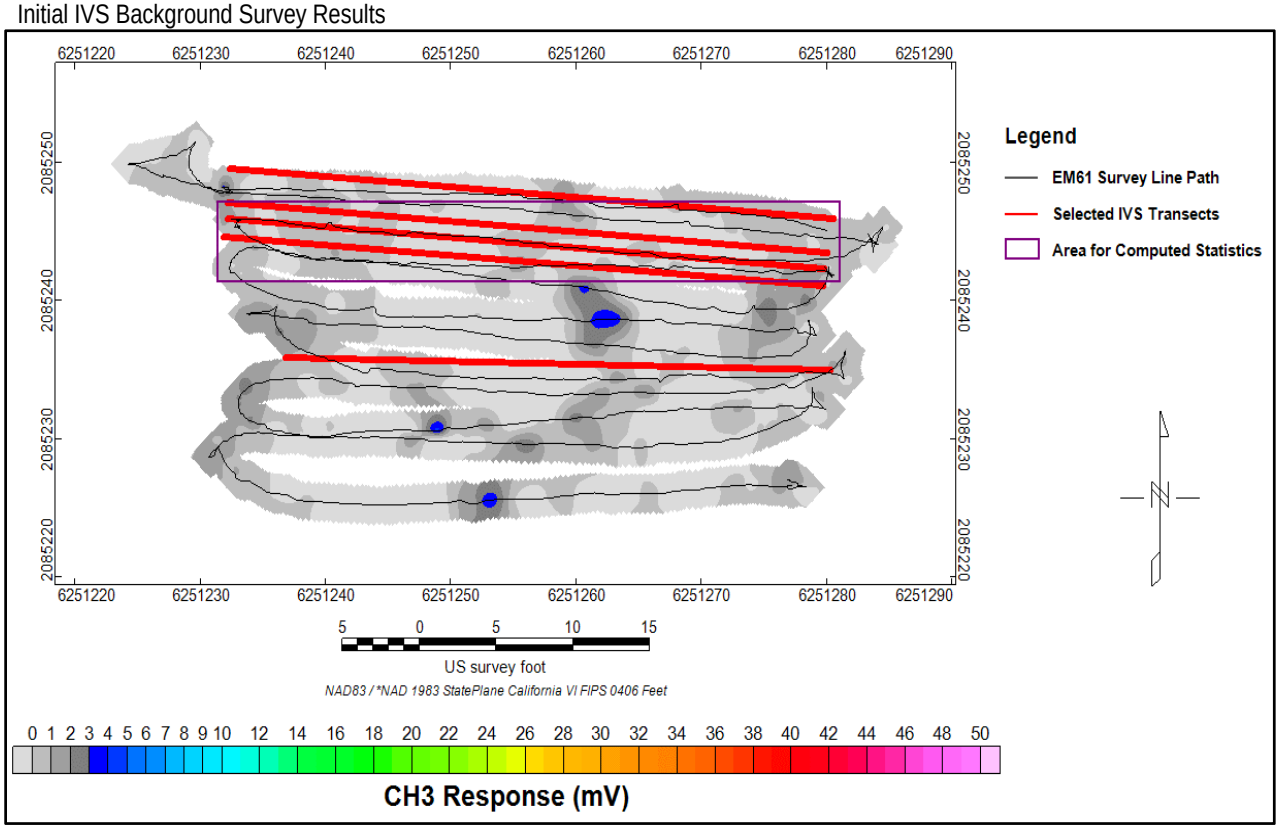
Prior to constructing the IVS, KCH performed an initial background (i.e., pre-seeded) survey of the proposed IVS location in order to assess background conditions, determine the suitability of the location (e.g., few existing anomalies), and to provide a means by which to avoid placing the IVS seed items near existing subsurface metal.

Onsite UXO personnel conducted an analog survey of the proposed IVS location using a handheld White's XLT all metals detector prior to performing vegetation clearance. The background DGM survey was completed with an intended lane spacing of 2.5 feet (0.75 meter [m]) in order to provide full coverage of a sufficiently large area to construct the IVS. RTK GPS was used to record positional data during the background survey. QC tests were conducted in accordance with the GIWPs in order to demonstrate proper EM61-MK2 functionality.

The results of the initial background survey are presented as a false color map on Figure 3-1, where background responses correspond to amplitudes less than 3 millivolts (mV) on Channel 3. Discrete geophysical anomalies with peak amplitudes greater than 3 mV are represented by blue color shading on Figure 3-1. These anomalies were avoided during layout of the IVS transect lines and seed placement.

The red lines on Figure 3-1 represent the idealized IVS transects selected from the background survey results. These transects were positioned in order to avoid discrete anomalies with amplitudes greater than the background range. The purple rectangle indicates the area from which a statistical analysis was performed to demonstrate further the suitability of this area for the IVS and placement of the seed items. The minimum Channel 3 response from within the area selected for statistical analysis (i.e., purple rectangle) was -1.35 mV, the maximum response was 2.35 mV, the mean was 0.038 mV, and the standard deviation was 0.55 mV.

FIGURE 3-1
Initial IVS Background Survey Results



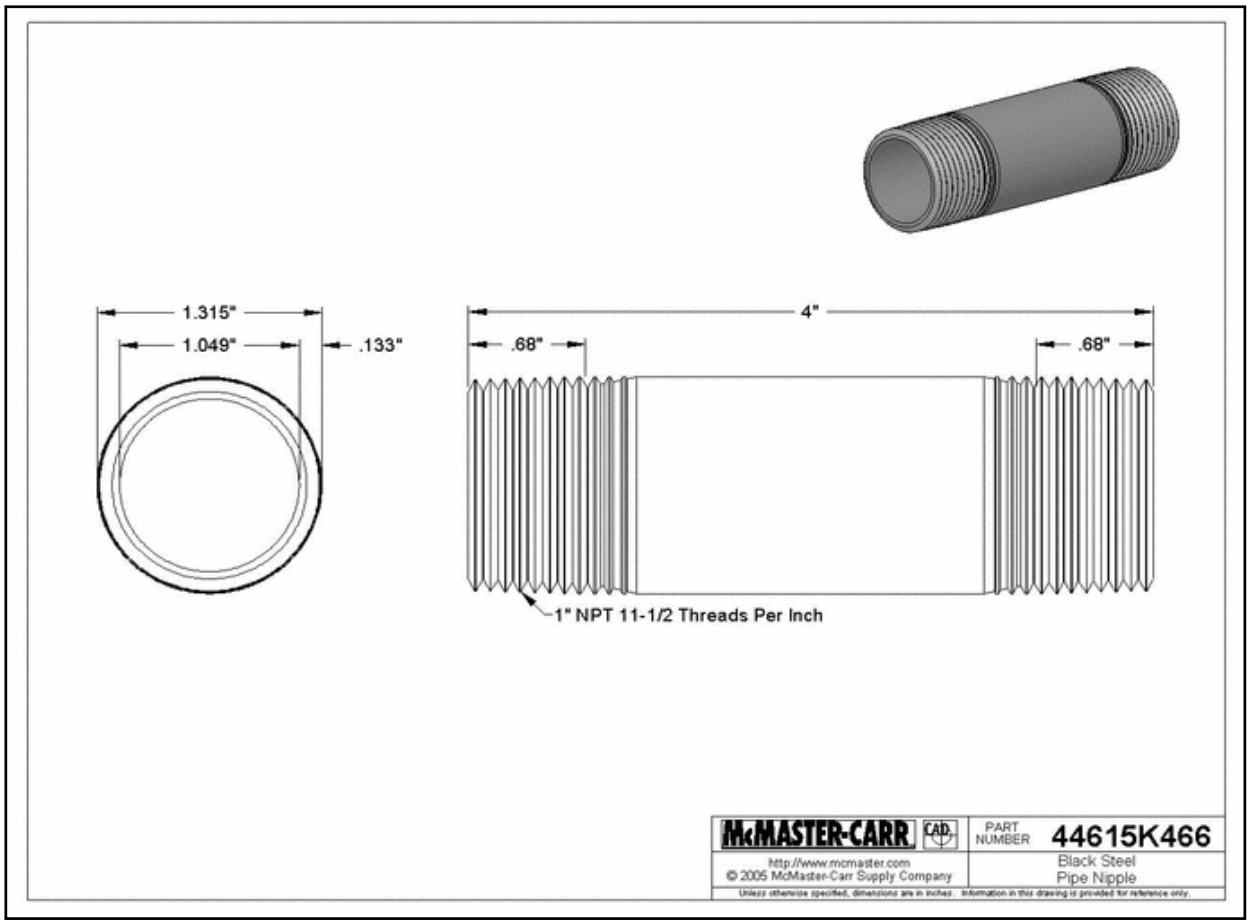
3.2 Industry Standard Objects

The IVS seed items consisted of small Schedule 40 ISOs depicted on Figure 3-2. The ISOs consist of 1- by 4-inch (2.54-cm by 10.16-cm) pipe segments, part number 44615K466 from the McMaster-Carr online catalog (McMaster-Carr, 2013). Additional specifications on the pipe segments are as follows:

- Shape: Straight nipple, threaded both ends
- Pipe Size: 1 inch inner diameter, 1.315 inch outside diameter (2.5 cm inner diameter, 3.34 cm outside diameter)
- Length: 4 inches (10.1 cm)
- Finish: Black welded steel

Instrument response curves for this ISO have been developed by the Naval Research Laboratory (NRL) demonstrating their standard EM61-MK2 response under their best orientation (perpendicular to the EM61-MK2 instrument plane) and worst orientation (parallel to the instrument plane) at multiple distances from the instrument's transmit/receive coil (NRL, 2009).

FIGURE 3-2
Small Schedule 40 ISOs Used as IVS Seed Items



3.3 IVS Construction

Figure 3-3 presents the location of the IVS and the temporary control points at MRP Site UXO5. This map also presents the sitewide grid system established by KCH during project planning stages. Figure 3-4 presents the as-built layout of the IVS. Once the five IVS transects were selected from the background survey data, KCH used RTK GPS to flag the start and end locations of the idealized transects shown on Figure 3-1. RTK GPS was used in order to avoid inadvertently placing seed items near discrete anomalies identified in the background survey area.

A tape measure was extended along the seeded transect to assist with placement of the ISOs. Two small Schedule 40 ISOs were buried at different depths and orientations in accordance with the GIWPs.

The as-flagged coordinates of the IVS transects and the seed items are presented in Table 3-1.

FIGURE 3-3
IVS and Temporary Benchmark Locations at MRP Site UXO5

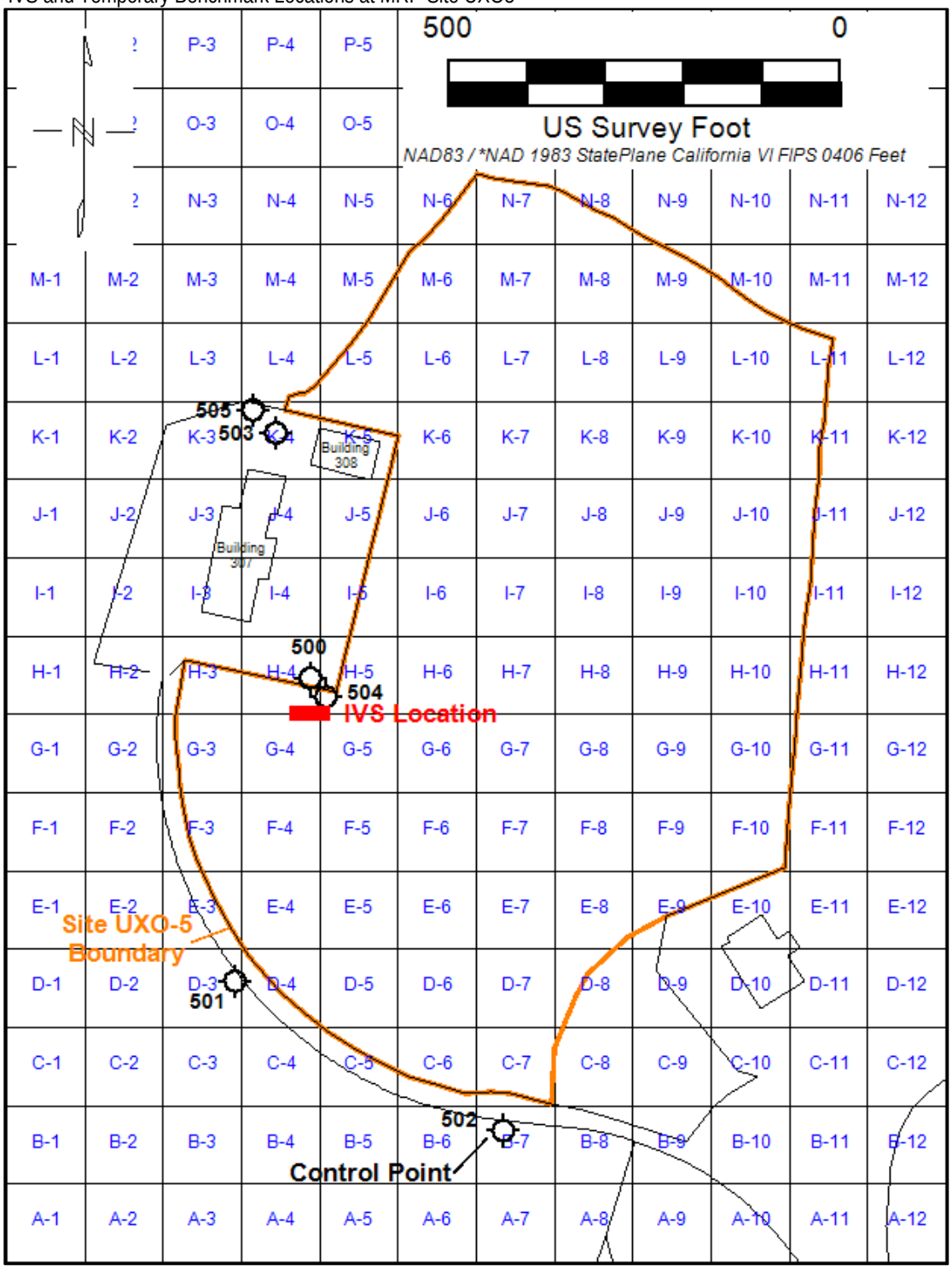


FIGURE 3-4
IVS As-Built Layout

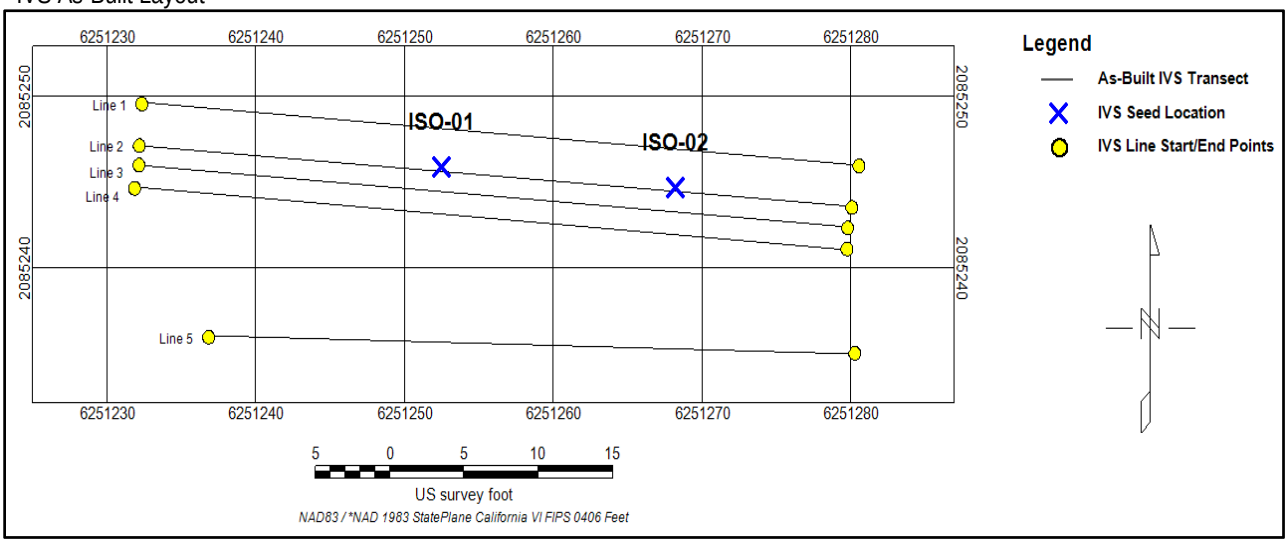


TABLE 3-1
IVS Construction Details

Point	Easting (U.S. Survey Feet)	Northing (U.S. Survey Feet)	Depth (inches) and Orientation
ISO-01	6251252.46	2085245.89	9; Vertical
ISO-02	6251268.19	2085244.70	3; Horizontal (Cross-Track)
Line 1 East	6251280.53	2085245.96	N/A
Line 1 West	6251232.34	2085249.58	N/A
Line 2 East	6251280.05	2085243.53	N/A
Line 2 West	6251232.18	2085247.14	N/A
Line 3 East	6251279.77	2085242.33	N/A
Line 3 West	6251232.16	2085246.01	N/A
Line 4 East	6251279.72	2085241.10	N/A
Line 4 West	6251231.87	2085244.64	N/A
Line 5 East	6251280.25	2085235.00	N/A
Line 5 West	6251236.83	2085235.95	N/A

Notes:
Coordinates are California State Plane Zone 6, NAD83 CONUS.
Depths reflect burial below ground surface to approximate ISO center of mass.

UXO personnel performed subsurface anomaly avoidance using handheld geophysical instruments prior to digging holes for the ISOs. The IVS seed items were affixed with labels identifying them as inert and listing the KCH Project Manager's name and phone number. Also included on the labels were the KCH contract number with NAVFAC Southwest and the CTO number. Figure 3-5 presents photos of the IVS seed items prior to and after emplacement (photos were taken using a camera for which a camera pass had been obtained from NAVWPNSTA Seal Beach Detachment Fallbrook). Once placed in the ground, KCH used RTK GPS to record the locations of the seed items before covering them with soil. Vinyl-stem flags were used to mark their locations after burial.

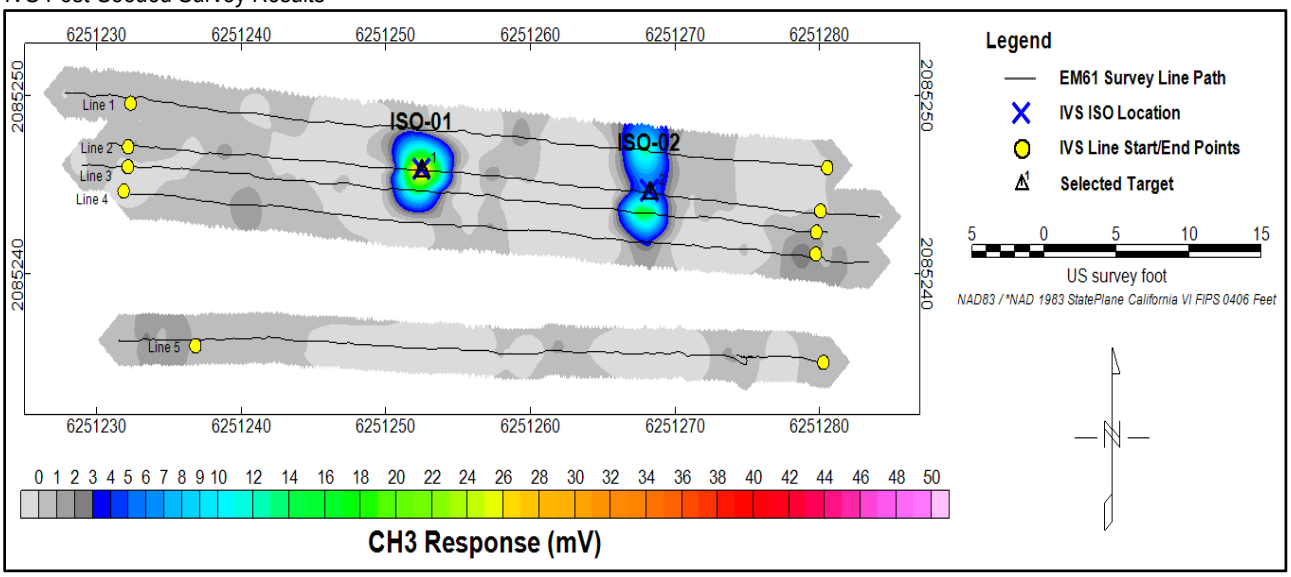
FIGURE 3-5
IVS Seed Item Photos

4.0 IVS Survey Results

4.1 IVS Five-Line Survey

After construction of the IVS, KCH performed the five-line post-seeded IVS survey, the results of which are presented on Figure 4-1.

FIGURE 4-1
IVS Post-Seeded Survey Results



Like the pre-seeded survey results, the post-seeded IVS survey results are depicted as a false-color map with background response representing amplitudes less than 3 mV on Channel 3. The line paths shown on Figure 4-1 represent the GPS track of the center of the EM61-MK2 coils as it was pulled along the IVS transects.

The anomaly response footprint of each ISO is consistent with the expected footprint for vertically and horizontally oriented ISOs in the subsurface. For the horizontal ISO, it is expected that larger amplitudes would be recorded over the two threaded ends of the pipe segment, and that the middle of the pipe segment would yield a small response by comparison. Both ISOs were detected above the background range, and the IVS measurement quality objectives (MQOs) were met for positioning, dynamic response, and data handling. The MQO performance for the positioning and dynamic response is presented in Tables 4-1 and 4-2, respectively. IVS data were provided to the KCH Project Geophysicist within 3 days of data collection, thereby meeting the Data Handling MQO. The MQOs and measurement performance criteria (MPC) for the IVS survey are provided in the GSV Plans.

A statistical analysis of the background transect (Line 5 on Figure 4-1) resulted in a minimum recorded Channel 3 response of -1.01 mV, a maximum response of 2.33 mV, a mean of 0.21 mV, and a standard deviation of 0.64 mV.

TABLE 4-1
DGM System Positioning MQO Performance

Seed ID	Target Easting (U.S. Survey Feet)	Target Northing (U.S. Survey Feet)	Offset from Ground Truth (U.S. Survey Feet)	MQO Met (Yes/No)
ISO-01	6251252.5	2085245.79	0.11	Yes
ISO-02	6251268.28	2085244.57	0.16	Yes

Notes:
Coordinates are California State Plane Zone 6, NAD83 CONUS.
Offsets relative to ground truth presented in Table 3-1.

TABLE 4-2
DGM System Munitions Detection MQO Performance

Seed ID	Target Amplitude (mV)	Predicted Amplitude (mV)	Tolerance ±20% (mV)	MQO Met (Yes/No)
ISO-01	32.8	30.6	24.5 – 36.7	Yes
ISO-02	5.9	6	4.8 – 7.1	Yes

Note:
Predicted amplitudes are from NRL, 2009, with sensor height of 16.5 inches (42 cm).

4.2 Quality Control

The daily QC tests, their frequency, and passing criteria are discussed in the GIWPs. QC tests included a personnel response test, cable shake (i.e., vibration) test, and static background and static spike test. The static tests were conducted prior to conducting the IVS surveys and after completion of the IVS surveys.

The DGM system passed the required QC tests. Figures 4-2 through 4-4 present the QC tests results from February 19, 2015. The static spike test, as discussed in the GIWPs, serves as the primary quantitative assessment of EM61-MK2 operation. A small Schedule 40 ISO was used for this test and was positioned in a fixed location relative to the center of the coils and at a height of 20 inches (51 cm) above the EM61-MK2 lower coil.

FIGURE 4-2
Personnel QC Test Results (2/19/2015)

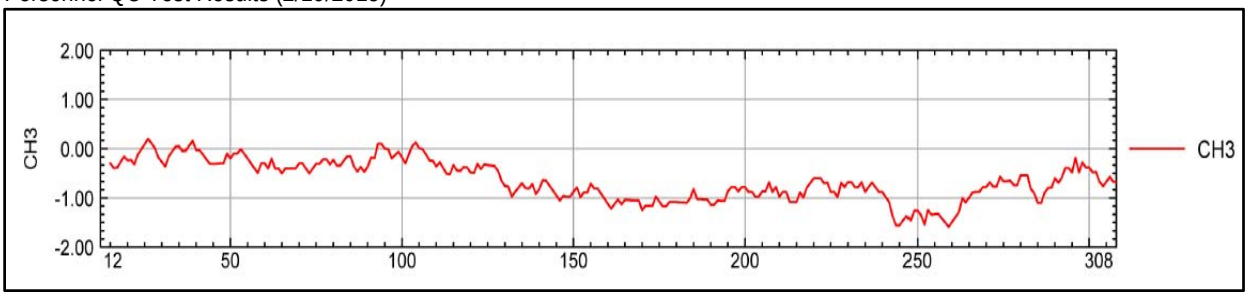


FIGURE 4-3
Cable Shake QC Test Results (2/19/2015)

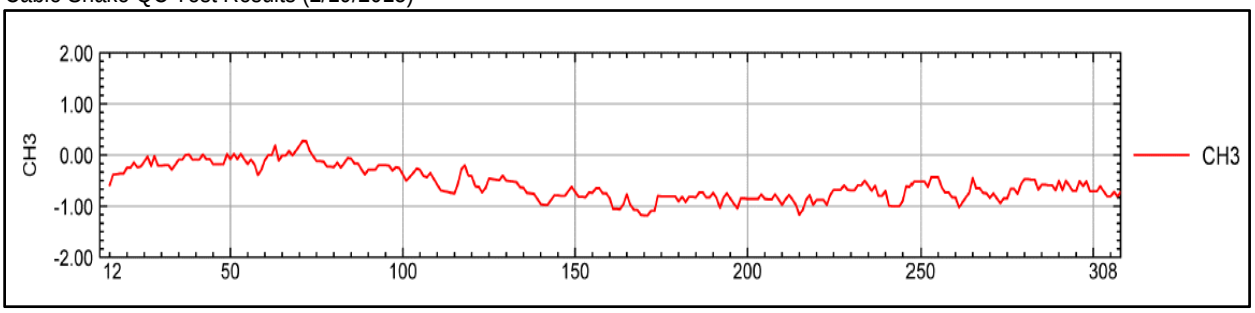
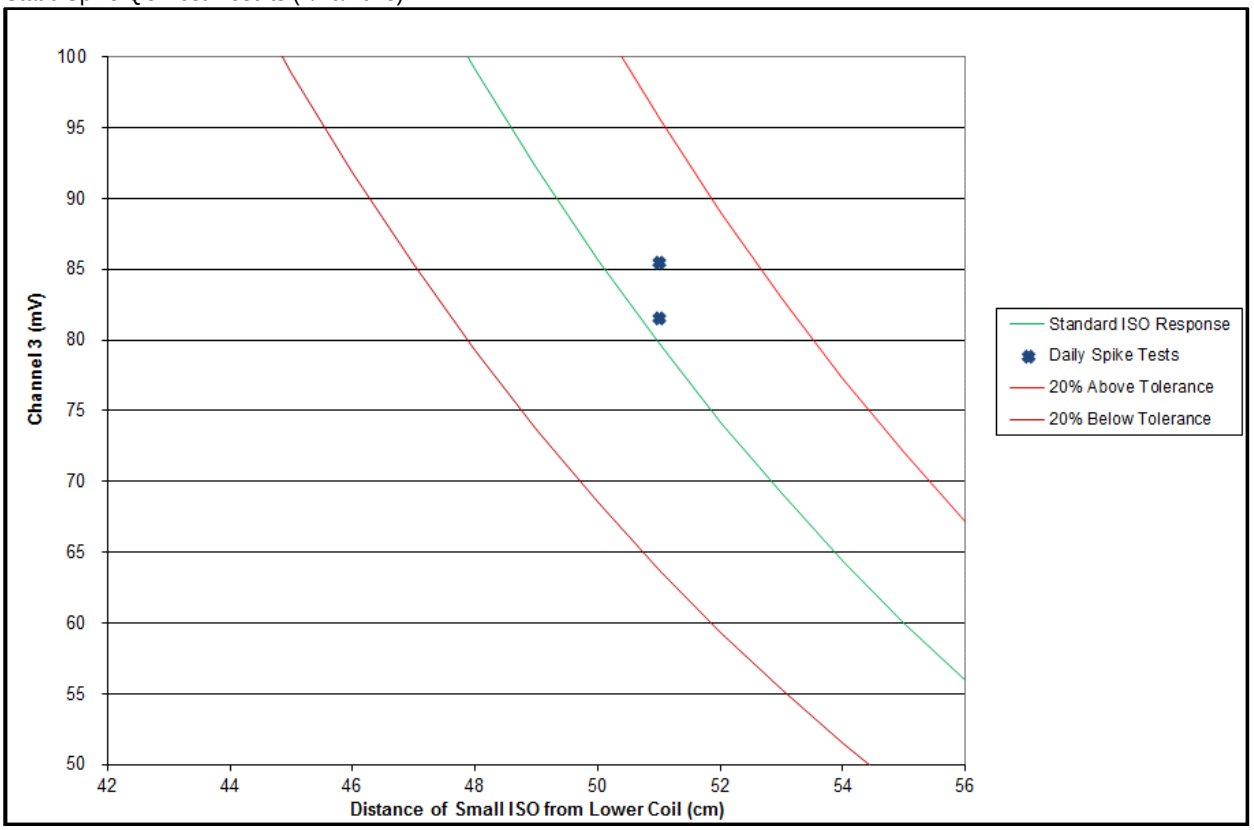


FIGURE 4-4
Static Spike QC Test Results (2/19/2015)



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5.0 Conclusions

IVS surveys were conducted at MRP Site UXO5 on February 19, 2015. The EM61-MK2 passed the required QC tests, and the IVS MQOs were met, thereby validating the EM61-MK2. In addition, the QC tests demonstrated that the sensor was operating properly. Furthermore, the results of the surveys presented in this report demonstrate that the location selected was suitable for an IVS.

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6.0 References

CH2M HILL Kleinfelder, A Joint Venture (KCH). 2015a. *Geophysical System Verification Plan, Remedial Investigation for Munitions Response Program Site UXO5, Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California*. Final. February.

CH2M HILL Kleinfelder, A Joint Venture (KCH). 2015b. *Geophysical System Verification Plan, Remedial Investigation for Munitions Response Program Site UXO4, Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California*. Final. February.

McMaster-Carr. 2015. Online Catalog. http://www.mcmaster.com. Accessed on April 2, 2015.

Naval Research Laboratory (NRL). 2009. *EM61-MK2 Response of Three Surrogates*, NRL/MR/6110-09-9183. March.

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Appendix E
Digital Geophysical Mapping Survey Results Technical Memorandum

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TECHNICAL MEMORANDUM

DGM Survey Results, Remedial Investigation MRP Site UXO4, NAVWPNSTA Seal Beach Detachment Fallbrook, California

PREPARED FOR:	NAVFAC, Southwest
COPY TO:	KCH Project Team
PREPARED BY:	Matthew Barner/CLT
DATE:	September 10, 2015
PROJECT NUMBER:	478890
REVISION NO.:	0
APPROVED BY:	Tamir Klaff/WDC

This technical memorandum summarizes the findings of the digital geophysical mapping (DGM) survey conducted in support of a remedial investigation and feasibility study work plan (RI/FS Work Plan) at Munitions Response Program (MRP) Site Unexploded Ordnance (UXO) 4 (herein referred to as MRP Site UXO4), Naval Weapons Station (NAVWPNSTA) Seal Beach Detachment Fallbrook, located in Fallbrook, California.

The DGM survey was conducted by CH2M HILL Kleinfelder, A Joint Venture (KCH) on behalf of the United States Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC) Southwest. The survey was conducted under the Comprehensive Long-Term Environmental Action Navy program Contract Number N62473-09-D-2622, Contract Task Order 0070.

The DGM was performed in accordance with the *Work Plan, Remedial Investigation and Feasibility Study for Munitions Response Program Site UXO4, Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California* (RI/FS Work Plan) (KCH, 2015a). The following appendices from the RI/FS Work Plan pertain to the execution of the DGM survey:

- Appendix A. Munitions and Explosives of Concern Quality Assurance Project Plan for Remedial Investigation and Feasibility Study for Munitions Response Program Site UXO4, Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California
- Appendix C. Explosives Safety Submission for Munitions Response Program Site UXO4, Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California
- Appendix E. Geophysical Investigation Work Plan, Remedial Investigation and Feasibility Study for Munitions Response Program Site UXO4, Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

This memorandum is submitted as an appendix to the Remedial Investigation Report, Munitions Response Program Site UXO4, Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California (RI Report) (KCH, 2016). This memorandum is intended to specifically address the DGM survey and relevant aspects of the site as they pertain to the

DGM. The RI Report is referenced throughout this memorandum in order to avoid redundancy in presentation of static details regarding MRP Site UXO4. Stand-alone, external figures submitted in support of this memorandum are included in Attachment E1.

DGM Purpose and Objective

The DGM data were gathered to assist in the determination of the nature and extent of munitions and explosives of concern/material potentially presenting an explosive hazard (MEC/MPPEH). The objective of the DGM was to identify metal potentially associated with MEC/MPPEH buried in the subsurface. This objective included mapping the positions of discrete target locations as well as the lateral extent (footprint) of a suspected disposal area onsite.

The DGM results were used to assess the lateral extent of buried metal within the mapped portion of MRP Site UXO4 and the Additional Work Area. A statistically representative subset of discrete target locations was chosen from the DGM results for intrusive investigation in order to assess the vertical extent of buried metal and characterize the nature of the sources of the geophysical anomalies.

Previous Investigations

Previous investigations performed by others at MRP Site UXO4 included a preliminary assessment (PA) (Malcolm Pirnie, 2006) and a site inspection (SI) (Chadux Tt, 2010). The RI Report (KCH, 2016) provides details on the timing and findings of these investigations.

A DGM survey was conducted in 2009 as part of the SI (Chadux Tt, 2010). The DGM survey was completed using a Geonics, Ltd. EM61-MK2 (EM61-MK2) and sub-meter positioning using a Trimble Pro XRS differential global positioning system (DGPS). The results are presented in the following geophysics report appended to the Chadux Tt SI report: *Geophysical Evaluation, Naval Weapons Station, Fallbrook, NAVWPNSTA Seal Beach Detachment Fallbrook, Fallbrook, California* (Southwest Geophysics, 2009). A total of 158 target[1] locations was selected from the EM61-MK2 data using a threshold of 15 millivolts (mV) for the summation of Channel 1 through Channel 3. The DGM survey also identified a suspected disposal feature at MRP Site UXO4. The target locations and disposal feature were not investigated as part of the SI.

In November 2014 during a routine inspection of fence lines by the Navy, six suspected practice rockets and an unspecified amount of non-munitions-related metal debris were observed protruding from the ground or on the surface within the vicinity of a drainage swale outside of MRP Site UXO4. As a result of this discovery, the RI field investigation area was expanded to include an additional 2.2-acre (ac) (0.89-hectare [ha]) parcel located west of MRP Site UXO4, along the drainage swale. This additional parcel is referred to herein as the Additional Work Area.

[1] Note that throughout this document the term *Anomaly* indicates an anomalous geophysical response to a source (discrete metal object) and the term *Target* indicates a 'targeted location' for subsequent investigation.

Site Description

MRP Site UXO4 had been used from 1942 to 1978 as a disposal area for munitions and munitions-related dunnage. It was previously known as Dunnage Disposal Site 3. The RI Report provides details on the location of NAVWPNSTA Seal Beach Detachment Fallbrook and MRP Site UXO4, its operational history, and the physical conditions (e.g., soil types, vegetation, and geology) of MRP Site UXO4.

MRP Site UXO4 is approximately 1.8 ac (0.73 ha), and is located at the southwestern corner of the intersection of Terrier and Sidewinder Roads on NAVWPNSTA Seal Beach Detachment Fallbrook. It is a remote site with no buildings within an approximate 1-mile (mi) (1.6-kilometer [km]) radius. The site is surrounded by wire strand fences and exhibits variable relief, with steeper slopes occurring along the roads. The site lies in a topographic depression, with the adjacent roads at a higher elevation.

The Additional Work Area is approximately 2.2 ac (0.89 ha) and is situated to the west of MRP Site UXO4. A fence bisects the southern portion of this irregularly shaped area, but otherwise the Additional Work Area is not bounded by fences or other distinct features. A surface water drainage swale extends in a general east-westerly direction across MRP Site UXO4 and into the Additional Work Area, and then turns in a general southwesterly direction within the western portion of this area. The DGM coverage maps (i.e., instrument path maps) presented as Figures E1-1 and E1-2 depict the locations of the fences and drainage swale as inaccessible survey coverage gaps. Walking conditions within the drainage swale were generally not safe because of localized steep slopes and dense vegetation. As a result, DGM data collection was performed within or as close to the swale as possible without jeopardizing field personnel safety or data quality.

Munition Items of Interest at MRP Site UXO4

The Explosives Safety Submission (KCH, 2015b) presented a list of munitions items that have been identified or are suspected to be at the site based on the findings of previous investigations at MRP Site UXO4. For purposes of planning and executing the DGM for the RI, the smallest munition item of interest was the 60-millimeter (mm) mortar, because one 60-mm mortar was identified during the PA. The remainder of MPPEH identified onsite included practice rockets and M31 practice rifle grenades.

Site Preparations for DGM

An operational grid was established by KCH during the project planning stages. Each grid measured approximately 100 by 100 feet (33 by 33 meters [m]). This grid system was designed to assist with data management throughout the investigation and to facilitate incorporation of additional data that may be gathered onsite during future site investigations.

Wooden stakes were set at grid corners by KCH's land surveying subcontractor, Coast Surveying, Inc. Additional site preparation steps included establishing temporary benchmarks onsite for use as control points during the DGM survey and recording the locations of quality control (QC) seed items emplaced by KCH. Both of these tasks were performed by Coast Surveying, Inc. Land surveying activities were performed in

accordance with MEC avoidance practices. The temporary control points were established along Terrier and Sidewinder Roads; the details are provided in Table 1.

USA Environmental, Inc. (USAE), the UXO subcontractor, performed vegetation clearance before the DGM. Vegetation clearance efforts were relatively minimal because MRP Site UXO4 had burned during the May 2014 Tomahawk wildfire. Vegetation clearance was performed in accordance with MEC avoidance practices. A surface clearance was performed by USAE after vegetation clearance was completed. No MEC or MPPEH was found during the surface clearance.

TABLE 1
Temporary Benchmark Details

Point ID	Easting (U.S. Feet)	Northing (U.S. Feet)	Elevation (U.S. Feet)
400	6244218.3	2077864.0	492.0
401	6244599.4	2078119.5	508.3
402	6243908.1	2078162.4	473.7
403	6243824.7	2077575.9	477.1

Note:
Coordinates are California State Plane Zone 6, North American Datum 1983 (NAD83) Continental United States (CONUS).
ID = identifier
U.S. = United States

DGM and Positioning Technology

DGM was conducted at MRP Site UXO4 using a combination of surveys using a Geonics EM61-MK2 (EM61-MK2) and Geonics EM31 (EM31). The EM31 was used because it was not known whether other disposal features existed at MRP Site UXO4, and if so, what the nature of the debris would be. During the project scoping stages, KCH elected to not use the 2009 DGM data collected during the SI because of concerns over positioning accuracy. The data were collected using sub-meter global positioning system (GPS) positioning accuracy, and it was determined that it may be more efficient to have greater accuracy in positional data for the purpose of reacquiring and intrusively investigating discrete target locations.

KCH operated the EM61-MK2 system in person-portable mode on its standard wheels (Figure 1). The EM61-MK2 is a high-resolution time-domain electromagnetic (EM) instrument designed to detect, with high spatial resolution, shallow ferrous and nonferrous metallic objects. The standard EM61-MK2 system consists of two air-cored, 3.3-foot by 1.2-foot (1-m by 0.5-m) coils, a digital data recorder, batteries, and processing electronics. The EM61-MK2 transmitter generates a pulsed primary magnetic field, which induces eddy currents in nearby metallic objects. The EM61-MK2 receiver measures the eddy currents at three distinct time intervals in the bottom coil or at four intervals (i.e., four-channel mode) if no top coil measurements are recorded. Earlier time gates provide enhanced detection of smaller metallic objects. Secondary voltages induced in both coils are measured in mV. The arrangement of coils is such that a vertical separation of 16 inches (42 centimeters [cm]) lies between the transmit loop and ground surface. To obtain as much information about the decay of the induced EM signal as possible, the top coil was not used at this site, and data

were recorded on four bottom coil channels. With survey-grade positioning, target resolution of approximately 20 inches (50 cm) can be achieved.

The EM31 was carried by the operator at a height of approximately 3.3 feet (1 m) above the ground surface in vertical dipole orientation (Figure 1). The EM31 measures the electrical conductivity of subsurface materials by inducing a time varying magnetic field and measuring the amplitude and phase shift of an induced secondary magnetic field. Variations in subsurface conductivity may be caused by the presence of buried metal objects, by the presence of nonmetallic debris, or by changes in geologic conditions that alter the conductive signature of subsurface materials.

Quadrature and inphase are the two components of the EM31 induced field. The quadrature phase (measured in units of milliSiemens/meter [mS/m]) component is generally indicative of nonmetallic debris or variations in geology, whereas the inphase component (measured in units of parts per thousand [ppt]) is generally indicative of buried metal objects. By recording both components and comparing the results, it is often possible to evaluate whether a detected change in bulk conductivity is a result of the presence of buried metallic objects or nonmetallic materials, or geologic effect.

GPS satellites orbit the earth transmitting signals that can be detected with a GPS receiver. The GPS receiver uses the known locations of the satellites and the elapsed time of signal transmittal to calculate its position. DGPS increases the accuracy of GPS readings through the use of two receivers: a stationary receiver that acts as a base station and collects data at a known location, and a second roving receiver that makes the position measurements. The base stations can be configured to save the data for correcting positional data during post-processing or to transmit the correction data to the rover system in real-time kinematic (RTK) mode. RTK GPS instruments are ideal for field-mapping applications with adequate satellite visibility conditions because they typically provide accuracy of approximately 1 to 2 cm. The DGM at MRP Site UXO4 was performed using a Trimble R8 Global Navigation Satellite System (GNSS) receiver mounted above and centered over the EM61-MK2 coils. A second R8 GNSS receiver was used at the base station (erected at one of the points in Table 1) and a Trimble TDL450 external radio for broadcasting real-time corrections.

FIGURE 1
EM61-MK2 (Left) and EM31 (Right) Surveys with R8 GNSS Receiver

Geophysical System Verification

KCH followed the geophysical system verification (GSV) process for the EM61-MK2 survey at MRP Site UXO4. This process compares signal strength and sensor performance to known response curves of industry standard objects (ISOs) to validate DGM systems before and during site surveys. The GSV process, the measurement quality objectives (MQOs), and measurement performance criteria (MPC) are discussed in the RI/FS Work Plan (KCH, 2015a).

KCH constructed an Instrument Verification Strip (IVS) at MRP Site UXO5, another site at NAVWPNSTA Seal Beach Detachment where EM61-MK2 surveying was performed in support of separate RI field investigation activities. The DGM for both MRP Sites UXO4 and UXO5 was conducted during the same mobilization and given similar terrain characteristics, and the same IVS was used for both sites. The IVS was constructed on February 19, 2015, after first conducting an initial background survey to verify that the location was suitable (i.e., minimal existing geophysical anomaly locations) for construction of an IVS. The IVS data were submitted to the KCH Data Processor and subsequently reviewed by the KCH QC Geophysicist to evaluate whether the IVS MQOs were met prior to the start of the production survey. The IVS report is included as Appendix D to the RI Report. It presents the IVS location, construction details, and EM61-MK2 validation results for the sensor used during DGM at MRP Site UXO4.

Six blind seed items consisting of small Schedule 40 ISOs (ISO40s) were placed in advance of the DGM at MRP Site UXO4 in accordance with the RI/FS Work Plan. The seed item positions were recorded by Coast Surveying, Inc. at the time of emplacement.

The EM31 was not subjected to the requirements of the GSV process; however, QC tests were performed each day the instrument was scheduled for use to demonstrate proper functionality and to demonstrate that the MQOs for the EM31 survey were met. Because the EM31 measures bulk properties where the response is averaged over the system's effective survey depth, it is better utilized for reconnaissance-level surveys as opposed to identifying discrete subsurface targets. The primary objective of the EM31 survey is to delineate the footprint of suspected buried wastes and not to identify discrete anomalies indicative of potential MEC/MPPEH. Therefore, the EM31 is not subjected to the formal GSV process or a quantitative QC program.

DGM Survey Execution

DGM at MRP Site UXO4 was performed between February 26 and March 12, 2015. For the EM61-MK2 survey, a nominal lane spacing of 2.5 feet (0.75 m) was used. Localized deviations from this lane spacing were associated with vegetation, large rocks, manmade obstructions (e.g., fences), or features that posed a health and safety risk. Data were recorded by the instrument at a rate of 10 readings/second, with RTK GPS positions logged at a frequency of 5 Hertz (Hz).

For the EM31 survey, a nominal lane spacing of 10 feet (3 m) was used. This broader lane spacing was employed because the EM31 survey was conducted with the objective of delineating potential disposal features on a reconnaissance level, rather than identifying discrete targets.

Information Management

DGM data were collected in grid "blocks" where one block was composed of several grids. The block ID was one of the unit (i.e., grid or transect) IDs within that block. QC tests were conducted in between each block, thereby "opening" and "closing" each data collection event. This procedure allowed for effective QC of the DGM data for the following reason: if a problem was identified, it would only negatively affect a subset of data rather than an entire day's worth of data. For presentation of final results in this memorandum, the individual blocks were compiled to generate mosaics of the survey sub-areas previously described.

Field notes (including site conditions, weather conditions, instrument file names, QC test file names) were recorded using KCH's Munitions Response Site Information Management System (MRSIMS). Rugged Toughpad field notebook computers were used by the DGM team to record information using a forms-based interface that allowed for consistent completion of daily forms or data block-specific forms. The forms were submitted via the Internet at the end of each day's data collection and placed in a secure SharePoint library associated with the project SharePoint site. The data processor subsequently imported the form data into the master MRP Site UXO4 MRSIMS project database. This master database was housed on a secure KCH server, accessible to project team members who possessed the required log-in credentials.

Raw sensor data, photos, and other relevant information from the field were posted daily to a secure, password-enabled file transfer protocol (FTP) site.

Quality Control

As a means of maintaining confidence in the sensor performance and quality of the DGM data, daily QC tests were performed on the RTK GPS, EM61-MK2, and EM31 each day the instruments were scheduled for use. Initial start and end-of-day QC tests were conducted at the IVS. Other tests (described in the following sections) were conducted within the production area.

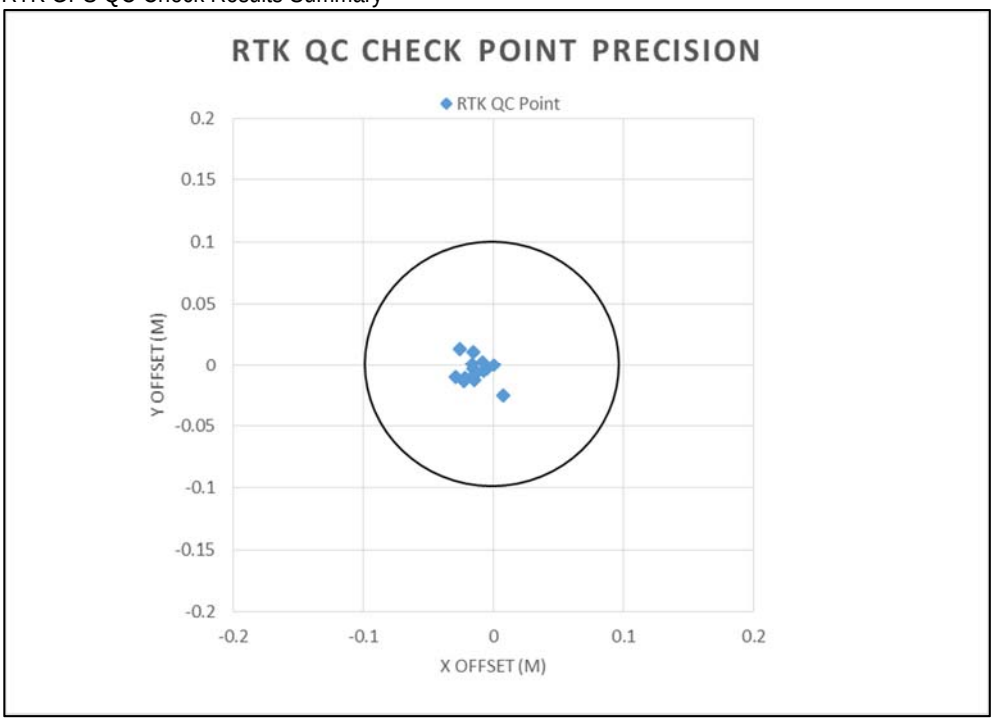
Equipment Warm Up

Result: Pass. The EM61-MK2 and EM31 sensors were allowed to sufficiently warm up for at least 10 to 15 minutes at the start of each day they were scheduled for use. This warm-up period was necessary to allow for minimization of sensor drift associated with stabilization of the sensor electronics.

Record Sensor Positions

Result: Pass. The R8 GNSS receiver used for the DGM survey was tested each day it was scheduled for use by measuring the position of one of the temporary benchmark locations in Table 1. The measured positions were subsequently compared to the positions provided by Coast Surveying, Inc. for compliance with the required tolerance of ±4 inches (10 cm). The RTK GPS QC checks between February 26 and March 12, 2015 are shown graphically on Figure 2.

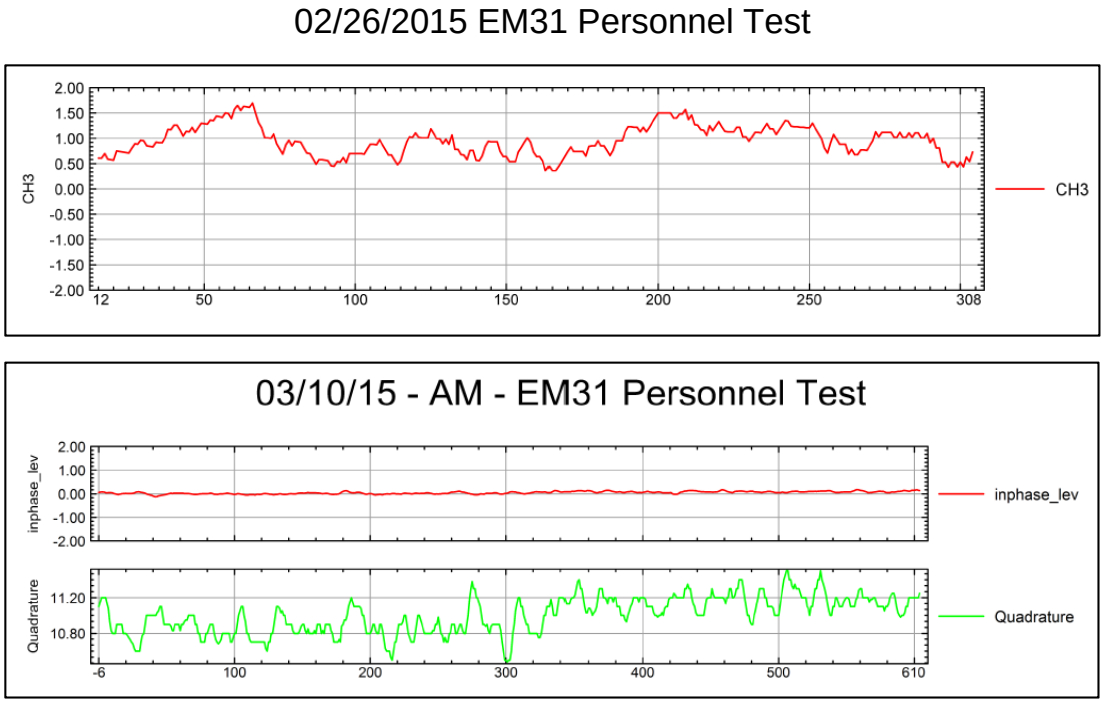
FIGURE 2
RTK GPS QC Check Results Summary



Personnel Test

Result: Pass. A static test was conducted with the EM61-MK2 and the EM31 to evaluate whether a response was present in the data from the DGM operator (e.g., metal items in pockets or personnel too close to the sensor). The tolerance level was set as follows: the effect of the DGM operator would not result in responses outside ±2 mV of the mean response for the target selection channel for the EM61-MK2. Tolerance for the EM31 was no responses outside ±2 mS/m (quadrature) and ±1 ppt (inphase) of the mean response for each component. Representative QC outputs from the personnel test are provided on Figure 3.

FIGURE 3
Representative Personnel Test Results (EM61-MK2 Top; EM31 Bottom)



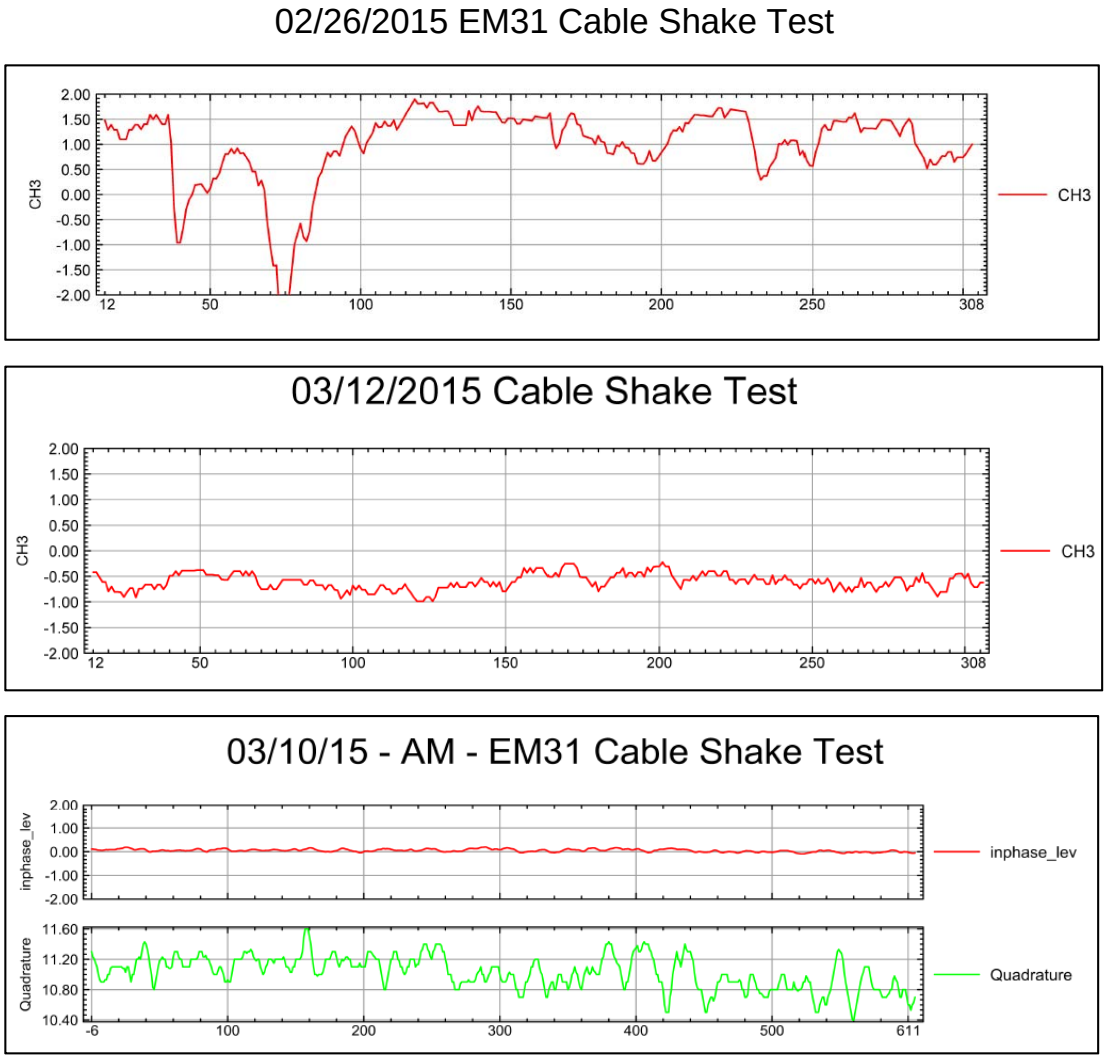
Cable Shake Test

Result: Pass. A static test was conducted with the EM61-MK2 and EM31 to evaluate whether vibration of the sensor cables and connectors (mimicking walking conditions during data collection) elicited a response in the data. The tolerance level in the responses is ±2 mV of the mean response for the target selection channel for the EM61-MK2. Tolerance for the EM31 was no responses outside ±2 mS/m (quadrature) and ±1 ppt (inphase) of the mean response for each component.

One instance of a measurement outside this tolerance level for the EM61-MK2 was recorded on the February 26, 2015 cable shake test (see Figure 4). A root cause analysis (RCA) was conducted by the KCH team for this instance. It was determined that the DGM operator did not follow proper procedures that day for performing the test. The operator vigorously shook the cables and connections when conducting the test, at which point the equipment no longer simulated normal walking conditions. Evaluation of data collected at the IVS and in the production area on this day, in addition to other cable shake tests for the entire DGM survey, indicated no resulting adverse quality impacts or EM61-MK2 system problems. The data from the subject test indicate that the issue was a result of improper field procedures. Additional explanation of the issue is provided in the RCA document provided in Attachment E2 to this memorandum.

Representative QC outputs from the cable shake tests for both sensors are provided on Figure 4.

FIGURE 4
Representative Cable Shake Test Results (EM61-MK2 Top Two Images; EM31 Bottom)



Static Background and Static Spike Test

Result: Pass. A static background response and static spike test were conducted with the EM61-MK2 at the start and end of each day they were scheduled for use, and in between each data block. The intent of this test was to demonstrate the following:

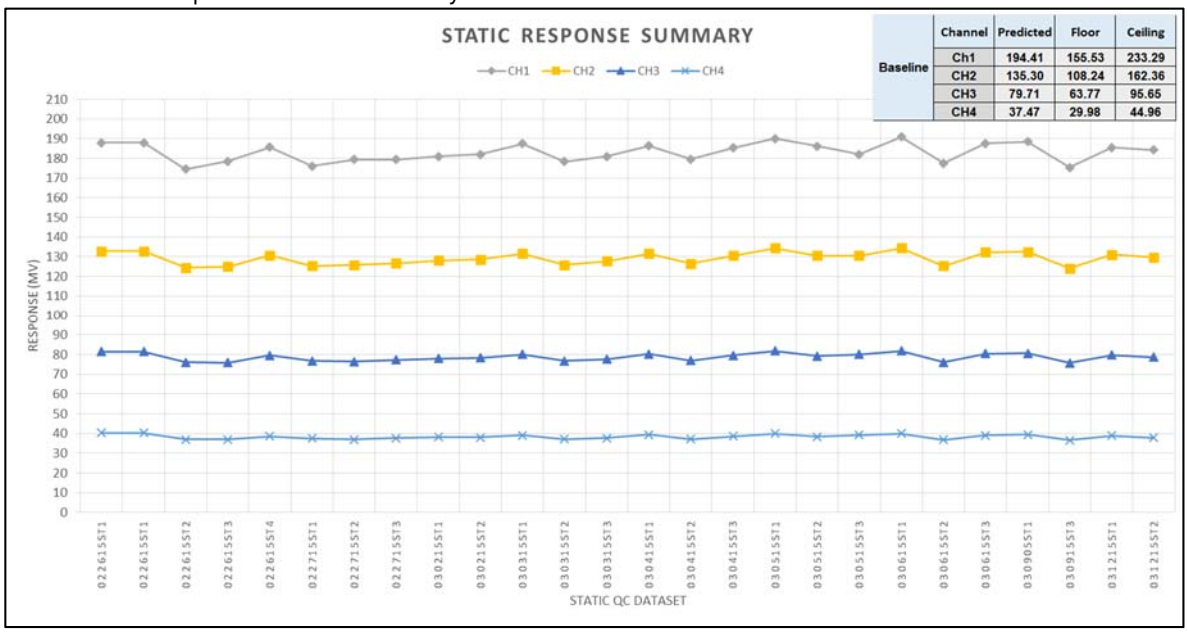
- No unusual, inexplicable change in background response or sensor noise levels occurred during the day
- The EM61-MK2 response, after background removal, to an ISO40 was within ±20 percent of the predicted EM61-MK2 Channel 3 response, as published by the Naval Research Laboratory (NRL) (2009).

This quantitative assessment serves as a sensor function test for the EM61-MK2 to demonstrate that the sensor responds consistently to a known object and within industry-

accepted standards. The results shown on Figure 5 demonstrate that no static responses to the small ISO40 exceeded the ±20 percent tolerance.

A static background test was conducted with the EM31 at the start and end of each day the equipment was scheduled for use. Figure 6 depicts the results of these tests.

FIGURE 5
EM61-MK2 Static Spike Test Results Summary



Baseline	Channel	Predicted	Floor	Ceiling
	Ch1	194.41	155.53	233.29
	CH2	135.30	108.24	162.36
	CH3	79.71	63.77	95.65
	CH4	37.47	29.98	44.96

Repeat Data

Result: Pass. Repeatability of the DGM data was assessed through evaluation of the twice daily (once at the start of the workday and once at the end of the workday) survey of the IVS with the EM61-MK2. The twice daily survey at the IVS including recording data along the seeded transect and background strip. This QC check facilitated quantitative comparison of the derived IVS seed positions from the DGM data versus the ground truth. The QC check also allowed for a qualitative comparison of the response amplitude from the seed items versus the predicted responses (NRL, 2009). IVS construction and seed details are provided in the IVS report in Appendix D.

For data collection on February 26, 2015 (the final day for DGM at MRP Site UXO5 and first day of DGM at MRP Site UXO4), the DGM field team did not conduct an end-of-day survey at the IVS. The RCA process (Attachment **E2**) was undertaken by KCH as a result of this oversight, and it was determined that the DGM field team did not plan adequate time at the end of the workday to allow for this required test. The field team inadvertently got locked behind a secure gate, further delaying their return to the IVS. All data quality assessments and usability assessments from this day were performed by the KCH Data Processor and QC Geophysicist, and no data quality issues were observed as a result of not completing the end-of-day IVS survey.

FIGURE 6
EM31 Static Background Test Results Summary

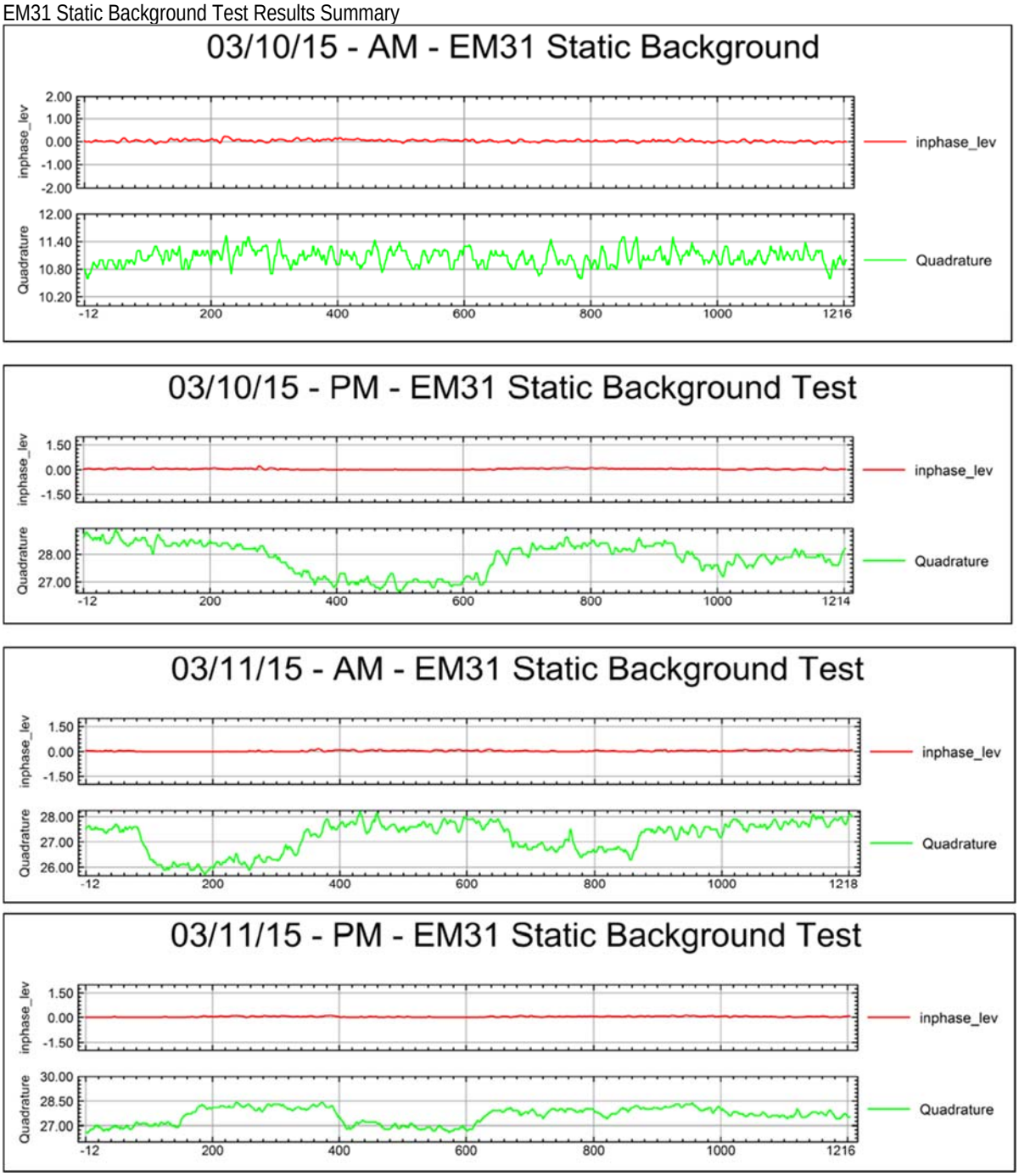
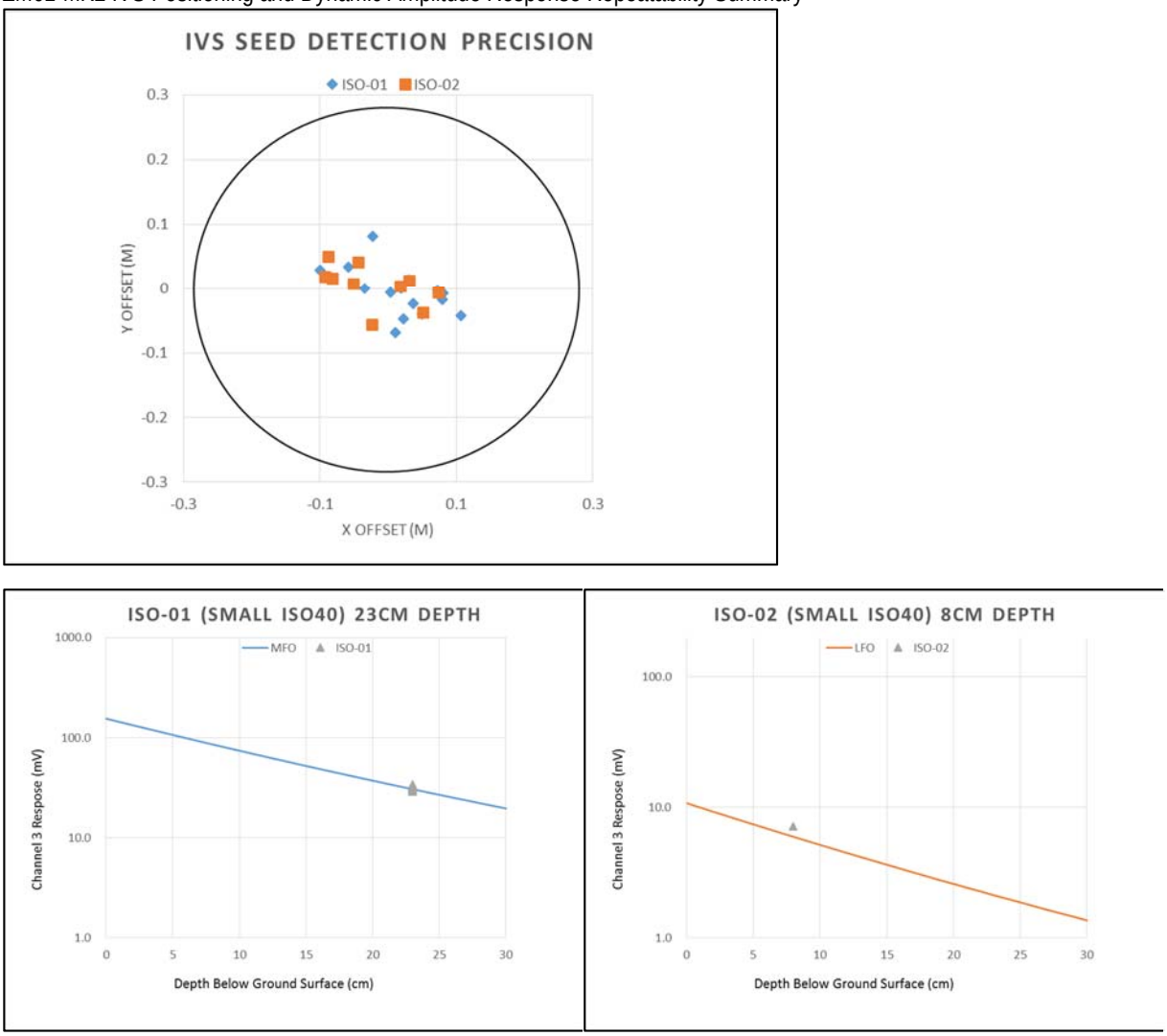


Figure 7 demonstrates the IVS seed positioning precision (tolerance is ±0.82 foot [25 cm]) and the Channel 3 responses from the small ISO40s during the dynamic survey of the IVS.

In addition to using the IVS to assess repeatability, KCH also collected repeat data each day of production surveying (Figures 8 and 9). The intent of this QC test was to demonstrate that the results obtained during the DGM production survey were repeatable in terms of

detected anomalies, positioning, and general amplitude response. Figure 8 presents a representative repeatability assessment for the EM61; Figure 9 presents the same for the EM31.

FIGURE 7
EM61-MK2 IVS Positioning and Dynamic Amplitude Response Repeatability Summary



Notes:
MFO = Most Favorable Orientation (i.e., vertical)
LFO = Least Favorable Orientation (i.e., horizontal)

FIGURE 8
Representative Production Area EM61-MK2 Repeatability Assessment

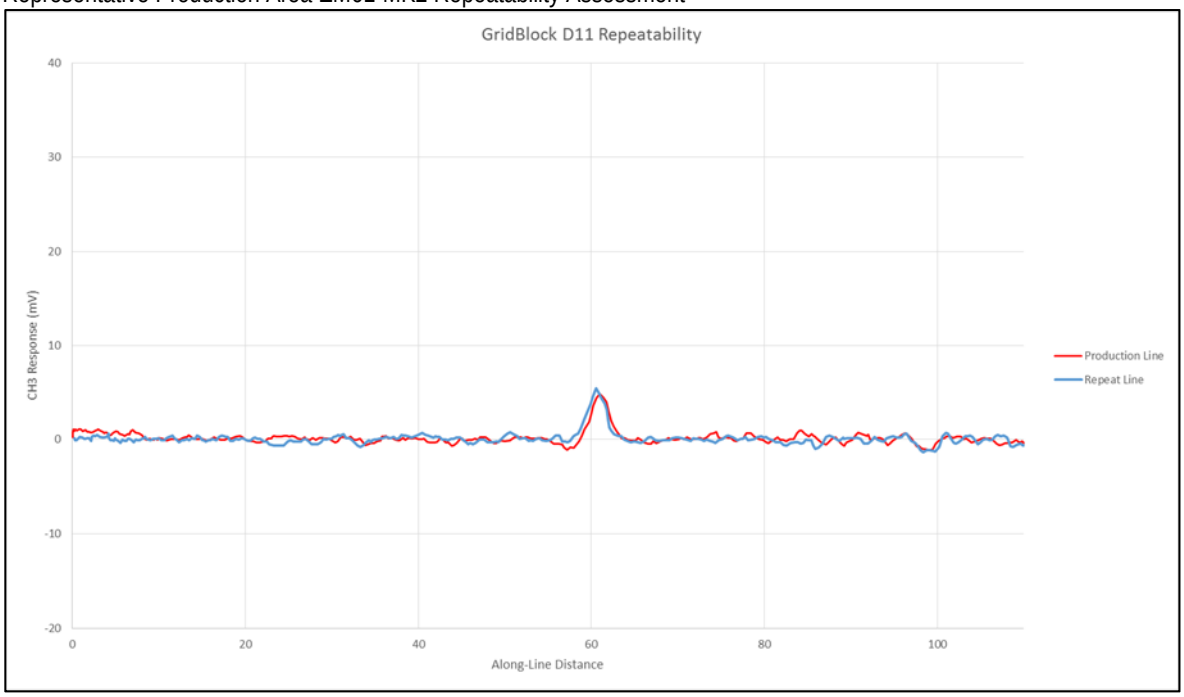
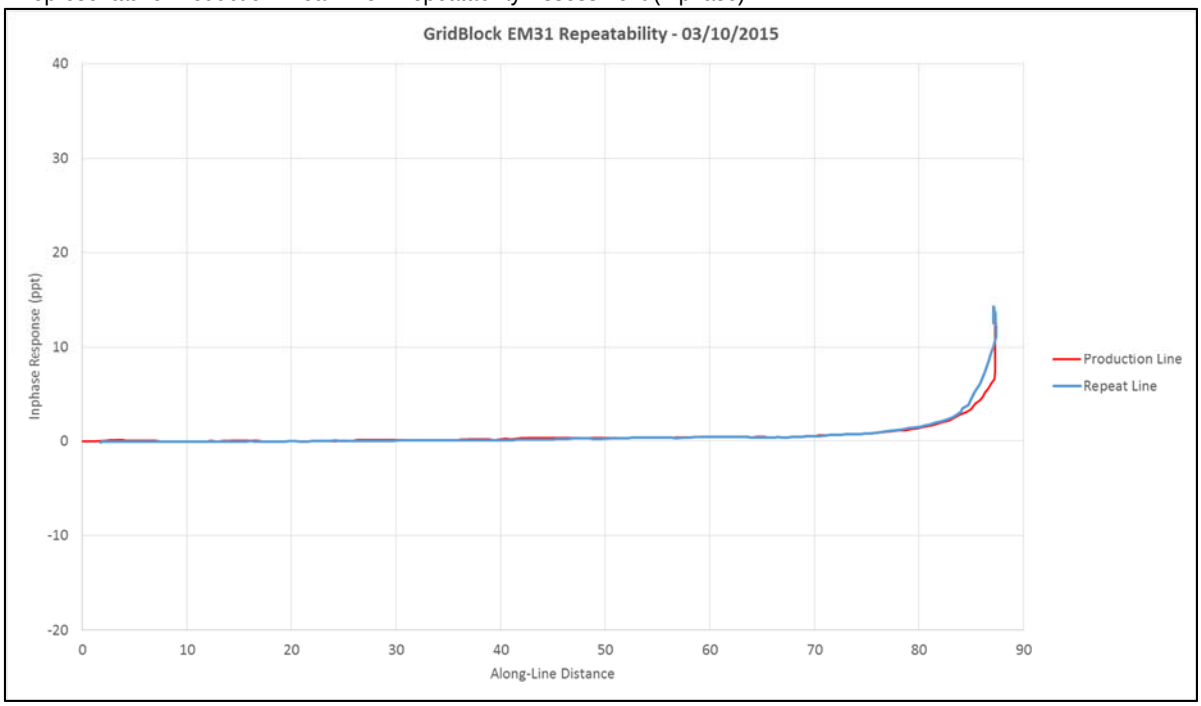


FIGURE 9
Representative Production Area EM31 Repeatability Assessment (Inphase)



For repeatability assessments using dynamic DGM data (whether at the IVS or in the production area), the amplitude response evaluation is qualitative because of inherent variables that cannot be strictly controlled during dynamic surveying. The following variables result in relatively small sources of error; therefore, it becomes impractical to assign a rigid quantitative pass/fail metric to this evaluation:

- Instrument bounce: As the EM61-MK2 is pulled along a survey transect, the instrument will bounce in a manner that cannot be consistently and strictly controlled
- Walking path: While the operator attempts to walk a repeat line as closely as possible to the original survey line, minor variations in the walking speed and instrument path (particularly as it passes over metal objects) will result in minor variations in the instrument response

Although these variables result in small errors, the previously discussed static spike test serves as the primary quantitative test for evaluating sensor functionality for the EM61-MK2 because the static spike test can be strictly controlled in terms of keeping the coils stationary and knowing the precise distance, orientation, and position of the ISO relative to the bottom coil.

Blind Seeds

The six blind seed items placed by KCH within the MRP Site UXO4 production area were successfully detected by the DGM field team and selected as target anomalies by the KCH Data Processor. The ground truth positions were reported by Coast Surveying, Inc. Positioning tolerance according to the RI Work Plan was ±3.3 feet (1 m). The results are presented in Table 2.

TABLE 2
DGM Blind Seed Results

DGM Target ID	Ground Truth Easting (U.S. Feet)	Ground Truth Northing (U.S. Feet)	Target Easting (U.S. Feet)	Target Northing (U.S. Feet)	Positioning Offset (U.S. Feet)
E-4-00005	6243627.91	2078066.76	6243628.00	2078067.75	0.99
C-4-00001	6243611.3	2077892.56	6243610.75	2077892.75	0.58
E-7-00009	6243946.91	2078096.19	6243946.50	2078097.00	0.91
E-9-00001	6244076.09	2078068.15	6244075.50	2078069.00	1.03
D-10-00002	6244197.37	2078030.29	6244197.25	2078030.50	0.24
E-11-00015	6244322.96	2078073.98	6244323.00	2078074.25	0.27

Note:
Coordinates are California State Plane Zone 6, North American Datum 1983 (NAD83) Continental United States (CONUS).

DGM Data Processing

Data processing was completed in the following steps: QC review of DGM field forms, DGM pre-processing, and DGM final processing.

QC of DGM Field Forms

Daily QC of the DGM field forms was completed by the KCH Data Processor. This QC process was intended to check that MRSIMS was updated each day with the required information and that the relevant field information (e.g., survey notes, QC test file names, EM61-MK2 battery levels, and weather conditions) was effectively documented.

DGM Pre-Processing

Raw instrument files were initially pre-processed using TrackMaker61MK2 for the EM61-MK2 data and Trackmaker31MK2 for the EM31 data (Geomar Software, Inc.). This initial step involved formatting the files from their raw instrument format to .XYZ ASCII format for further manipulation in Geosoft Oasis Montaj (Geosoft). Upon export from the instrument-specific software to either Universal Transverse Mercator (UTM) or geographic (latitude/longitude) coordinates, interpolation of the RTK GPS positions is performed for the sensor data recorded at a rate of 10 readings per second, based on the time stamp logged by the GPS and EM61-MK2 or EM31.

Positioned .XYZ files were subsequently imported into Geosoft for further pre-processing. DGM pre-processing steps included the following:

- Evaluation of QC tests (static, cable shake, and personnel) prior to processing DGM survey data
- Conversion of the exported UTM X,Y positons (in meters) to the California State Plane Zone 6 coordinate system (in U.S. Survey Feet)
- Application of auto leveling and instrument drift corrections for EM61-MK2 and EM31 inphase data
- Application of an appropriate lag correction (from daily seeded IVS transect collection for EM61-MK2 and dynamic response test for EM31)
- Preliminary comparison of original versus repeat data
- Identification of data gaps to submit to field team for completion (as needed)
- Evaluation of results against the performance objectives listed in the RI/FS Work Plan
- Generation of formatted ASCII files containing preprocessed data
- Generation of MRSIMS raw data delivery report

Following completion of the above steps, the pre-processed data were reviewed by the KCH QC Geophysicist.

DGM Final Processing

Final DGM processing steps included the following:

- Incorporating gap-fill data gathered by the field team into the processing work flow
- Refinement of data leveling and lag corrections (as needed)
- Gridding of all four EM61-MK2 time gates using the Geosoft minimum curvature algorithm

- EM61-MK2 target selection from gridded data
- Gridding of EM31 quadrature and inphase response data
- Comparison of quadrature and inphase results to identify responses likely indicative of metal
- Generation of formatted ASCII files containing processed data
- Generation of a false-color mosaic of DGM data
- Assigning EM61-MK2 target type categories based on field notes and observations provided by the DGM team
- Preparation of EM61-MK2 target lists
- Generation of MRSIMS Final Data Delivery Report

DGM Target Selection

The target selection threshold is a function of the EM61-MK2 root mean square (RMS) amplitude noise (i.e., sensor noise levels) and site-specific background response. Selection of a target threshold too far into the sensor noise range will lead to a high number of "no contacts" (i.e., false positives) and also a false confidence assuming metal is detected at those signal levels (a true signal can be masked by the noise).

For the EM61-MK2 data, the RMS noise levels for Channel 3 ranged between 0.59 and 1.09 mV for the IVS surveys between February 26 and March 12, 2015. Industry-accepted practice suggests using a target threshold that equates to a peak amplitude response of 5 times (5x) the RMS noise. Channel 3 was selected because it had the highest signal-to-noise ratio (SNR) of the four channels. The corresponding targeting threshold for the reported range of RMS values in the IVS surveys using the 5x value equates to a threshold of 3 mV on Channel 3. Initial production data gathered in the first few days of the survey demonstrated similar RMS values as those of the IVS.

Initial target selections were made using the automatic peak picking module (Blakely Test) in Geosoft's UX-Detect module to identify peak amplitude responses in the gridded Channel 3 data that appeared to be indicative of metal. Data profiles for all four channels were reviewed by the KCH Data Processor to evaluate the validity and position of the auto-selected targets. Targets found to be invalid or incorrectly located were adjusted or removed from the final selection list. This review was performed by evaluating the decay in amplitudes from a peak response as well as the general shapes of the response curves for each channel at the selected anomaly locations. The intent of this evaluation was to identify automatically selected targets that appear to be associated with surface debris, noise spikes, or potentially represented duplicate target selections. This review process also facilitates adding anomalies to the target selection list that may not have been automatically selected by the UX-Detect module but appear to represent metal.

Table 3 presents the target type categories used by KCH and for the DGM at MRP Site UXO4 and an explanation of each one. Target lists were generated for each grid and were provided to the KCH QC Geophysicist along with the processed data for review as part of the DGM data delivery package.

TABLE 3
DGM Target Types

Target Type	Description
1	Target of interest, unknown nature
2	Below target threshold (<3 mV) selection
3	Known or suspected response from observed cultural feature
4	Target associated with EM61-MK2 noise spike (suspected false positive)
5	Boundary target where location of peak response is not precisely known because of inability of EM61-MK2 to fully pass over object (i.e., along the edge of the survey area or at the end of a transect)
6	N/A (not used)
7	N/A (not used)
8	Obstruction feature defined by four vertices; represents data gap area that could not be accessed with EM61-MK2
9	SRA defined by four vertices where precise identification of individual peak amplitudes not possible because of overlapping signatures or saturation of the dynamic recording range of the EM61-MK2

Notes:
N/A = not applicable
SRA = Saturated Response Area

Measurement Quality Objectives

MQOs and their corresponding MPCs are presented in the RI Work Plan. For the DGM survey at MRP Site UXO4, the MQOs were met. Table 4 summarizes these results.

TABLE 4
DGM MQO Achievement Summary

MQO	Result	Achieved (Yes/No)
DGM System Positioning	All RTK GPS positions were within ±4 inch (10 cm) tolerance (see Figure 2).	Yes
DGM System Munitions Detection	Responses to small ISO were within ±20 percent tolerance of predicted value (NRL, 2009) (see Figure 5).	Yes
Repeatability	Derived IVS seed item positions were within ±0.8 foot (25 cm) tolerance of ground truth positions; repeat EM61-MK2 data profiles exhibit good correlation in positioning and amplitude response (see Figures 7 and 8); repeat EM31 data profiles also exhibit good correlation in positioning and amplitude response (see Figure 9).	Yes
Data Density	Mean sample spacing for the EM61-MK2 data was 0.22 foot (0.07 m); EM61-MK2 data were recorded with less than 2 percent exceeding the 0.7 foot (0.21 m) point-to-point spacing requirement. Gaps larger than 2 feet (0.61 m) were associated with obstructions. Mean sample spacing for the EM31 data was 0.5 foot (0.15 m); EM31 data point separation met the 3.3 feet (1 m) point-to-point spacing requirement. Any gaps larger than 3.3 feet (1.5 m) were associated with obstructions.	Yes
Lane Spacing	EM61-MK2 lane spacing was ±3.3 feet (1 m) or less, except in areas with obstructions present. EM31 lane spacing was ±10 feet (3 m) or less, except in areas with obstructions present.	Yes
Data Positioning	All blind seed items were detected within ±3.3 feet (1 m) tolerance.	Yes
Data Handling	Data delivery was on schedule; delays associated with delivery of initial results resulted from the need to perform gap fill surveys and incorporate those data into the results.	Yes

DGM Results

False-color images of the EM31 quadrature and inphase responses are provided on Figures E1-3 and E1-4, respectively. The false color image of the EM61-MK2 Channel 3 responses is provided on Figure E1-5. On Figure E1-5, the grayscale shading represents the background response range (i.e., responses less than 3 mV on Channel 3).

There was relatively good correlation between the EM61-MK2 results and EM31 inphase response with regard to the location of the suspected disposal feature in the eastern portion of the investigation area. This feature is outlined on each results map. The location generally coincides with the suspected location described in the SI (Chadux Tt, 2010). The inphase results (Figure E1-4) also depict responses indicative of metal in the western portion of the investigation area (i.e., the Additional Work Area) similar to the EM61-MK2 survey results, where it appears that metal may be present within the drainage swale. However, the results from both sensors do not suggest the presence of a disposal feature like what appears in MRP Site UXO4. The high-amplitude EM61-MK2 survey responses across the suspected disposal area and the manifestation of this feature more prominently in the EM31 inphase data versus the quadrature data suggest that the disposal feature is buried beneath a relatively thin soil layer and may not extend to significant depths. The EM31 quadrature results (Figure E1-3) appear to reflect localized changes in subsurface conductivity associated with soil characteristics.

The derived discrete targets from the EM61-MK2 survey are presented as Figure E1-6 and are summarized in Table 5.

TABLE 5
EM61-MK2 Target Quantities

Target Type	Quantity
1	171
2	0
3	194
4	132
5	23
6	N/A
7	N/A
8	0
9	5
Total	**525**

For the RI/FS Work Plan, only the Type 1 targets were considered for follow-up investigation. Therefore, Figure E1-6 presents EM61-MK2 Type 1 targets using a different symbol color than the other EM61-MK2 target types. Because SRAs are defined by four vertices, they are presented on Figure E1-6 as polygons. Furthermore, as part of the data tracking and flow in MRSIMS, a polygon (Type 8 or Type 9 target) cannot extend across grid boundaries. Therefore, the five SRAs shown

on Figure E1-6 are, in fact, part of the same elevated response features depicted in the data on Figure E1-5.

Target Population Assessment

In accordance with the RI/FS Work Plan, the intrusive investigation of targets identified in the DGM data was performed on a statistically representative subset of targets in order to characterize the proportion of munitions-related items to non-munitions-related items to a 95 percent confidence level and within a ±5 percent margin of error.

The first step in the derivation of a dig list is to evaluate whether the anomaly locations comprise a single population or if they represent multiple anomaly populations. For many munitions response investigations where a potential impact area, bombing target, firing position, or similar features are suspected, there are often variations in the target density (i.e., lateral extent of anomaly locations indicating the presence of metal) within these features versus the remainder of the site.

For MRP Site UXO4, the distribution of Type 1 targets appeared consistent with the site history as a disposal area. SRAs were not included in the evaluation of anomaly populations. It was decided that because of the site operational history, the distribution of the targets, and the overall low target count (171 Type 1 targets), MRP Site UXO4 would be represented by a single anomaly population.

It should be noted that a statistical evaluation is performed using the specific target locations derived from the geophysical data, and that the characterization pertains to the actual target population itself. The Type 1 targets were used as the basis for deriving the dig list. QC seeds were removed from the statistical evaluation but were subsequently added to the final dig list to be reacquired and intrusively investigated as ongoing validation of the data gathering processes onsite.

Estimating a Proportion

The Estimating a Proportion method was used to calculate the number of randomly selected DGM targets to be intrusively excavated to estimate, with a 95 percent confidence level and ± 5 percent sampling error, the proportion of munitions-related to non-munitions-related items within the target populations identified at MRP Site UXO4.

When a population size is large or unknown, the necessary sample size of DGM anomalies to be intrusively investigated can be estimated using the following statistical sample size formula:

$$n_0 = \frac{Z_\alpha^2 pq}{e^2}$$

Z_α = desired confidence level
p = proportion of DGM anomalies classified as munitions-related
q = proportion of DGM anomalies classified as non-munitions-related (q = 1-p)
e = acceptable margin of error for proportion being estimated
n_0 = statistical sample size for a large population

To conservatively estimate the variance of proportional variables (munitions-related or non-munitions-related), pq (in the equation above), a population proportion of 50 percent (p=0.5) is estimated to maximize the variance, and subsequently maximize the sample size. Using a z-statistic for a 95 percent confidence level (Z_α=1.96) and a margin of error of 5 percent (e=0.05), the solution for n_0 becomes:

$$n_0 = \frac{Z_\alpha^2 pq}{e^2} = \frac{1.96_\alpha^2(0.5)(0.5)}{0.05^2} = 384$$

A maximum of 384 randomly selected DGM anomalies is estimated for classifying, with 95 percent confidence level and ± 5 percent sampling error, the proportion of munitions-related to non-munitions-related DGM anomalies in a large or unknown population.

Following the estimation of the population size above, the following finite population correction can be used to reduce the number of anomalies required to obtain the same confidence level:

$$n_1 = \frac{n_0}{1 + \left(\frac{n_0}{N}\right)}$$

n_1 = adjusted statistical sample size for a finite population
n_0 = statistical sample size for a large population
N = size of the population (number of DGM targets)

The finite population correction equation used a random number selector process and excluded non-Type 1 targets and QC seed items. This means that of the total anomalies for each population were used as "N" in the equation to calculate the finite population correction:

$$n_1 = \frac{n_0}{1+\left(\frac{n_0}{N}\right)} = \frac{384}{1+\frac{384}{165}} = 116$$

Biased Dig Locations

From the Estimating a Proportion Method, a total of 116 randomly-selected targets was needed to achieve the desired statistical characterization. This number was rounded up to 120 targets to ease the process of tallying targets during the reacquisition and intrusive

investigation. The six QC seeds and 23 additional "biased" dig locations were added to the dig list after determination of the statistical subset. Because 120 randomly selected more than met the statistical requirements in the RI/FS Work Plan, the KCH team decided that additional digs were desired in and around the drainage swale in the Additional Work Area to the west of MRP Site UXO4. Therefore, 149 targets (of the 171 total Type 1 targets) were placed on the dig list.

DGM Conclusions

The total number of targets for all of MRP Site UXO4 selected for intrusive investigation was 149. The targets selected for intrusive investigation are presented on Figure E1-7. Dig lists were provided to the KCH project manager and UXO Quality Control Specialist, and target locations were imported into MRSIMS for use during the intrusive investigation.

The results of the DGM survey and statistical sampling of the data met the DGM objectives for the RI/FS Work Plan at MRP Site UXO4. The MQOs were achieved and the EM61-MK2 sensor passed the required QC tests. As a result, there is added confidence in the characterization of the proportion of munitions-related items to non-munitions-related items using the data gathered and targets derived from the DGM survey.

References

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CH2M HILL Kleinfelder, A Joint Venture (KCH). 2015b. Explosive Safety Submission for Munitions Response Program Site UXO4, Correction 1. *Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California.*

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Southwest Geophysics. 2009. *Geophysical Evaluation, Naval Weapons Station, Fallbrook, NAVWPNSTA Seal Beach Detachment Fallbrook, Fallbrook, California.* February.

Attachment E1
Figures **(site maps)**

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LEGEND

- EM31 INSTRUMENT PATH
- FENCE LINE
- A-1 100 FOOT GRID
- ADDITIONAL WORK AREA
- SITE BOUNDARY

NOTES:
DGM = Digital Geophysical Mapping
MRP = Munitions Response Program
UXO = Unexploded Ordnance
NAVWPNSTA = Naval Weapons Station

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service,
World Imagery 6/3/2014

0 50 100 200
Feet

DGM Survey Coverage - EM31

Digital Geophysical Mapping Technical Memorandum
MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

N

FIGURE
E1-1

Date: 10/12/2015 User: lmoussa Path: \\kadc3-ssfs2.kleinfelder.com\drawings_clients\Navy_CLEAN\FALLBROOK\CTO_070\MXD\MRP4_DGM_TM\070_4144.mxd

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LEGEND

- EM61-MK2 INSTRUMENT PATH
- FENCE LINE
- A-1 100 FOOT GRID
- ADDITIONAL WORK AREA
- SITE BOUNDARY

NOTES:
DGM = Digital Geophysical Mapping
MRP = Munitions Response Program
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IMAGERY SOURCE:
ESRI ArcGIS Online Web Service,
World Imagery 6/3/2014

0 50 100 200
Feet

DGM Survey Coverage - EM61-MK2

Digital Geophysical Mapping Technical Memorandum
MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

N

FIGURE
E1-2

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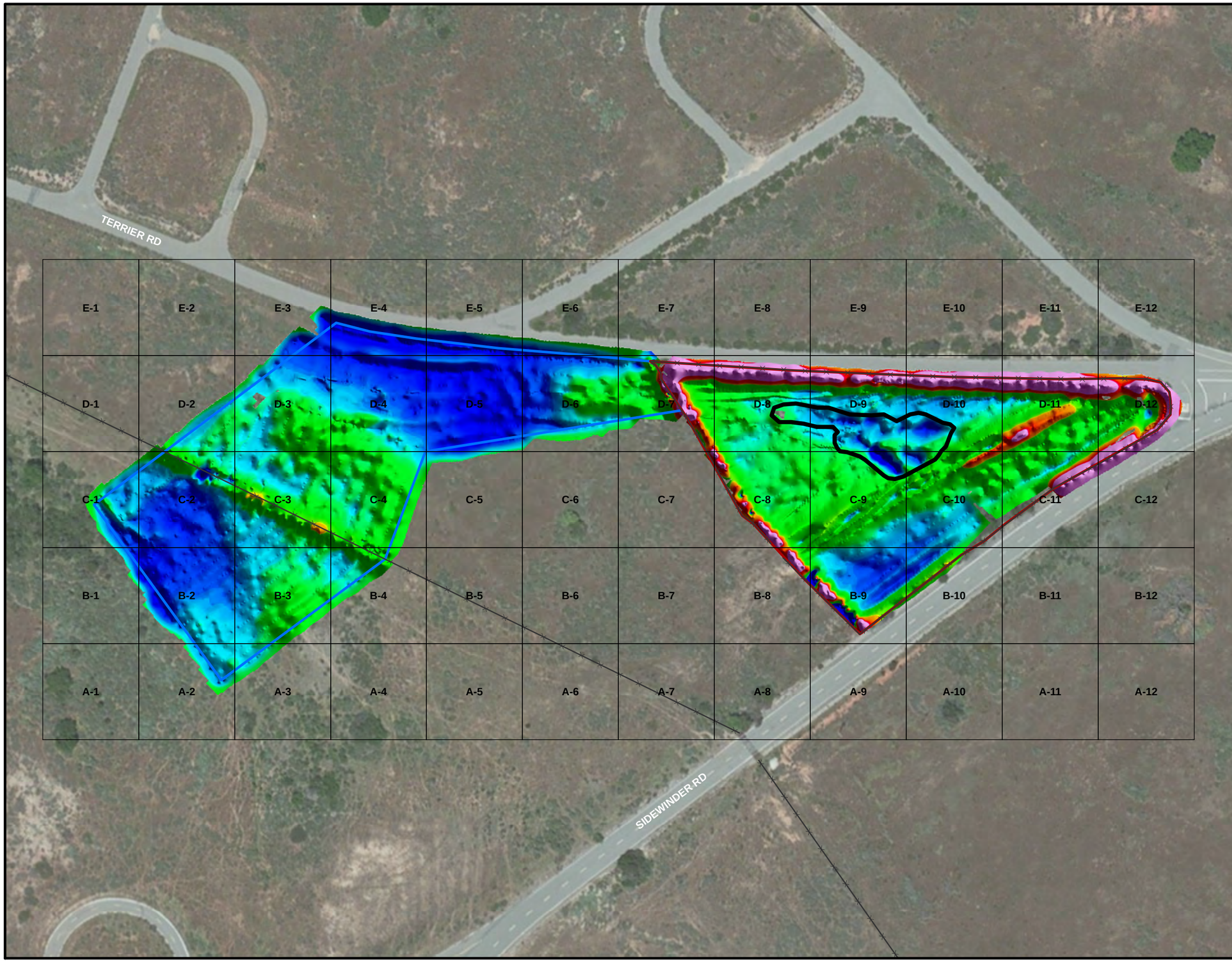
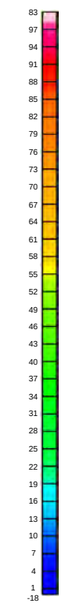


LEGEND

- FENCE LINE
- SUSPECTED DISPOSAL AREA
- A-1 100 FOOT GRID
- ADDITIONAL WORK AREA
- SITE BOUNDARY



NOTES:
mS/m = milliSiemens per meter
MRP = Munitions Response Program
UXO = Unexploded Ordnance
NAVWPNSTA = Naval Weapons Station

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service,
World Imagery 6/3/2014

0 50 100 200
Feet

EM31 Quadrature Response

Digital Geophysical Mapping Technical Memorandum
MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

N

FIGURE
E1-3

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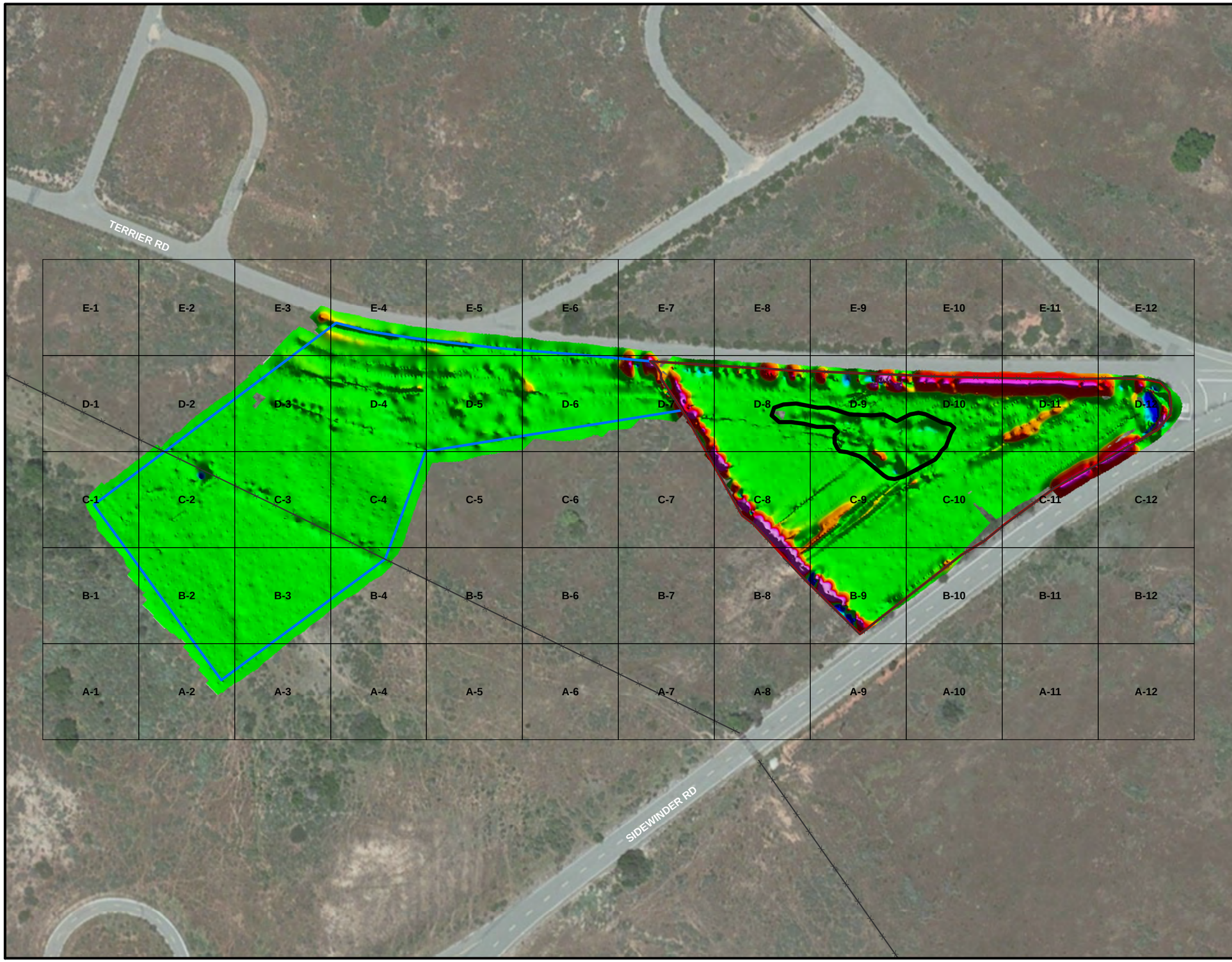

LEGEND

- FENCE LINE
- SUSPECTED DISPOSAL AREA
- A-1 100 FOOT GRID
- ADDITIONAL WORK AREA
- SITE BOUNDARY

19, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0, -1, -2, -3, -4, -5, -6, -7, -8, -9, -22

ppt

NOTES:
ppt = parts per thousand
MRP = Munitions Response Program
UXO = Unexploded Ordnance
NAVWPNSTA = Naval Weapons Station

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service,
World Imagery 6/3/2014

0 50 100 200
Feet

EM31 Inphase Response

Digital Geophysical Mapping Technical Memorandum
MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

N

FIGURE
E1-4

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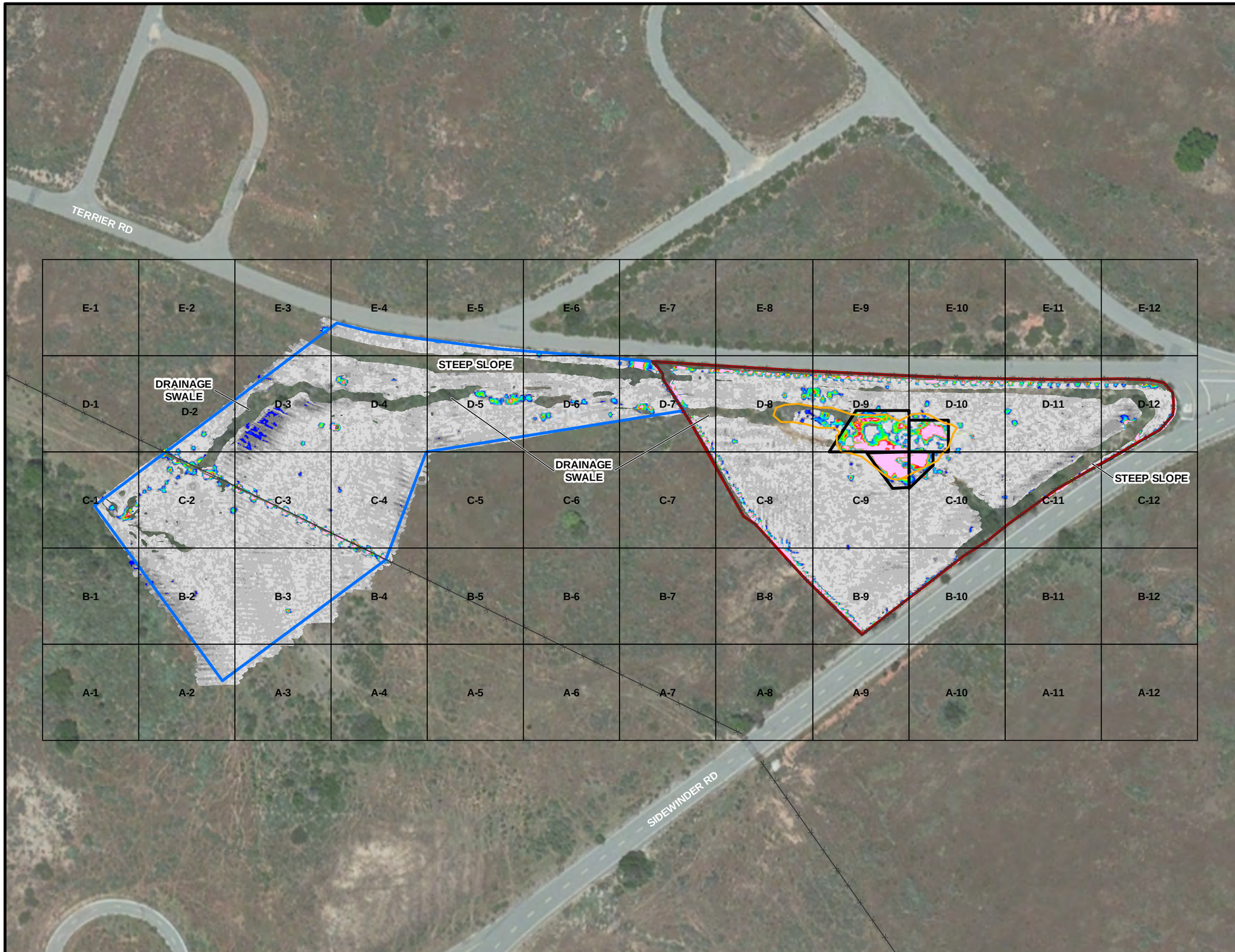
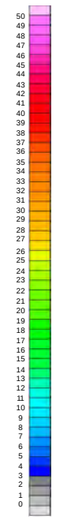


LEGEND

- FENCE LINE
- SATURATED RESPONSE AREA
- SUSPECTED DISPOSAL AREA
- A-1 100 FOOT GRID
- ADDITIONAL WORK AREA
- SITE BOUNDARY



EM61-MK2 Bottom Coil Response
Channel 3
(mV)

NOTES:
mV = milliVolts
MRP = Munitions Response Program
UXO = Unexploded Ordnance
NAVWPNSTA = Naval Weapons Station

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service,
World Imagery 6/3/2014

0 50 100 200
Feet

EM61-MK2 Channel 3 Response

Digital Geophysical Mapping Technical Memorandum
MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

N

KEH

FIGURE
E1-5

Date: 10/12/2015 User: lmoussa Path: \\kadc3-ssfs2.kleinfelder.com\drawings_clients\Navy_CLEAN\FALLBROOK\CTO_070\MXD\MRP4_DGM_TM\070_4148.mxd

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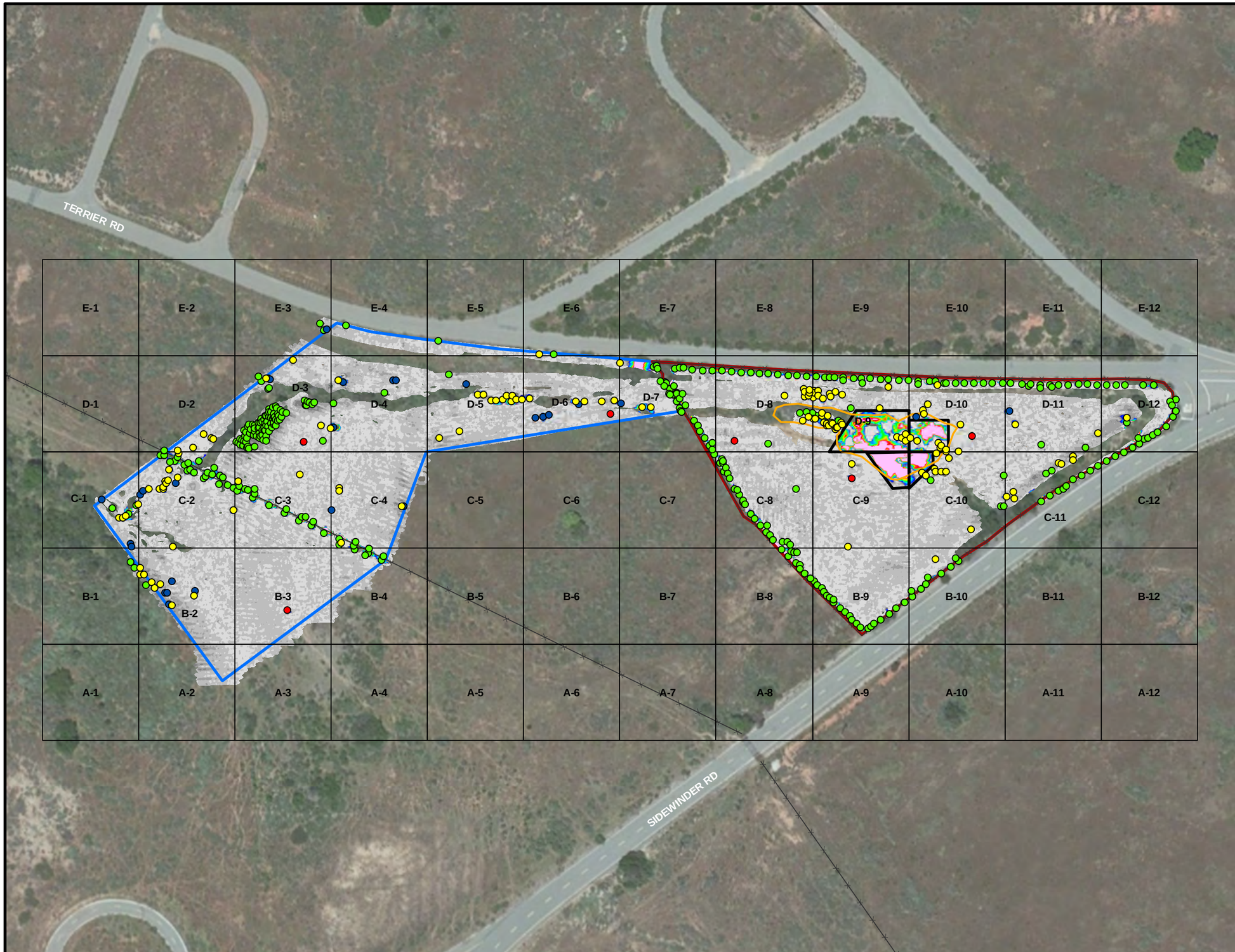
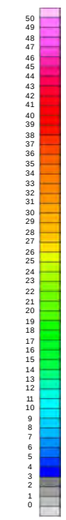


LEGEND

DGM TARGET LOCATIONS

- QC SEED LOCATION
- EM61-MK2 TYPE 1 TARGET
- EM61-MK2 TYPE 1 TARGET (BIASED)
- EM61-MK2 TYPE 3/4/5 TARGET
- FENCE LINE
- SATURATED RESPONSE AREA
- SUSPECTED DISPOSAL AREA
- A-1 100 FOOT GRID
- SITE BOUNDARY
- ADDITIONAL WORK AREA



EM61-MK2 Bottom Coil Response
Channel 3
(mV)

NOTES:
DGM = Digital Geophysical Mapping
MRP = Munitions Response Program
UXO = Unexploded Ordnance
NAVWPNSTA = Naval Weapons Station

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service,
World Imagery 6/3/2014

0 50 100 200
Feet

DGM Target Locations

Digital Geophysical Mapping Technical Memorandum
MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

N

FIGURE
E1-6

Date: 10/12/2015 User: lmoussa Path: \\kadc3-ssfs2.kleinfelder.com\drawings_clients\Navy_CLEAN\FALLBROOK\CTO_070\MXD\MRP4_DGM_TM\070_4149.mxd

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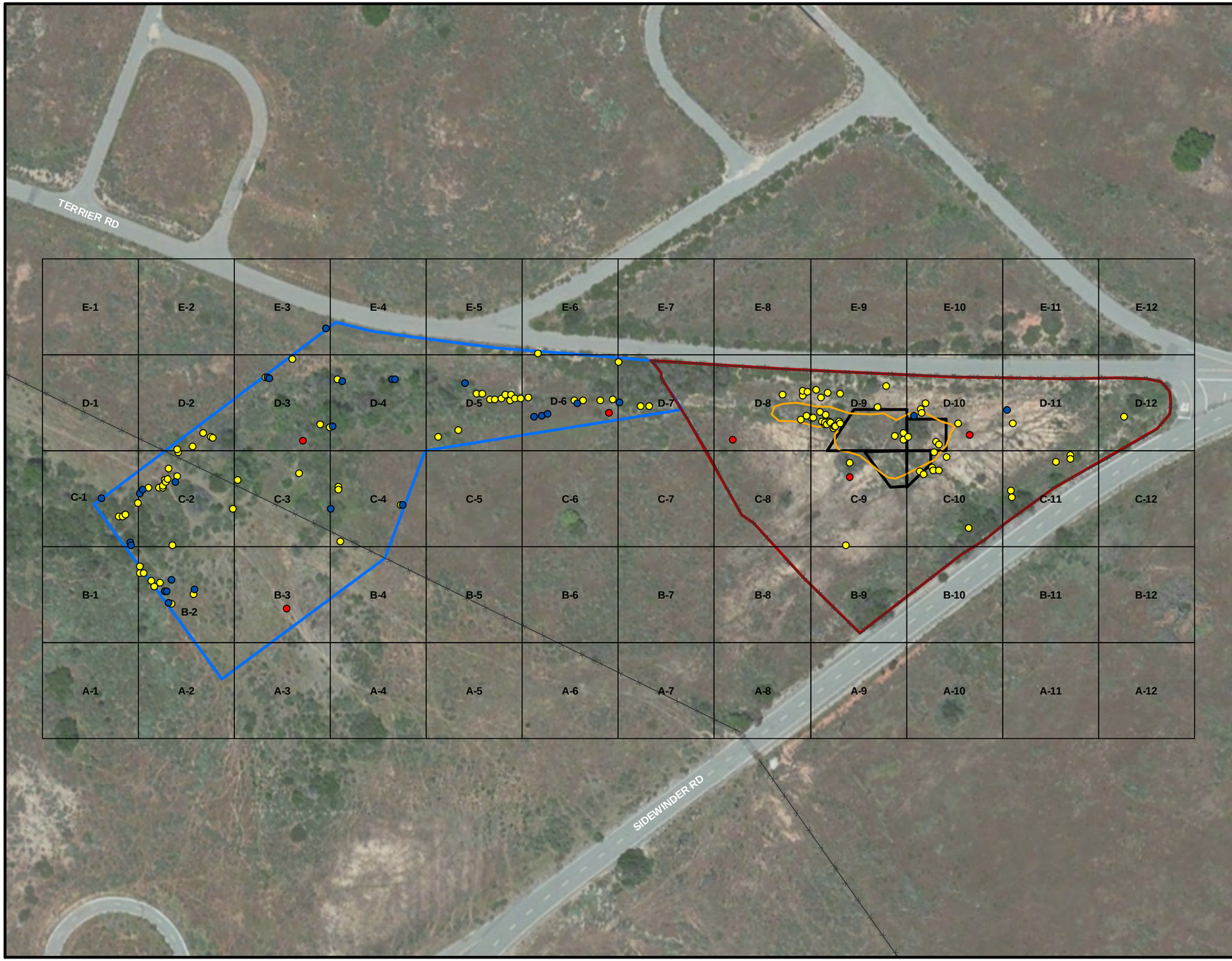

LEGEND

DGM TARGET DIG LOCATIONS

- QC SEED LOCATION
- EM61-MK2 TYPE 1 TARGET
- EM61-MK2 TYPE 1 TARGET (BIASED)
- FENCE LINE
- SATURATED RESPONSE AREA
- SUSPECTED DISPOSAL AREA
- A-1 100 FOOT GRID
- ADDITIONAL WORK AREA
- SITE BOUNDARY

NOTES:
DGM = Digital Geophysical Mapping
MRP = Munitions Response Program
UXO = Unexploded Ordnance
NAVWPNSTA = Naval Weapons Station

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service,
World Imagery 6/3/2014

0 50 100 200
Feet

DGM Target Locations
Selected for Intrusive Investigation
Digital Geophysical Mapping Technical Memorandum
MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

N

FIGURE
E1-7

Date: 10/12/2015 User: lmoussa Path: \\adc3-ssfs2.kleinfelder.com\drawings_clients\Navy_CLEAN\FALLBROOK\CTO_070\MXD\MRP4_DGM_TM\070_4150.mxd

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Attachment E2
DGM Survey Results Technical Memorandum

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Attachment E2
Technical Memorandum, DGM Survey Results, RI MRP Site UXO4, NAVWPNSTA Seal Beach Detachment Fallbrook, California

PREPARED FOR:	NAVFAC Southwest
PREPARED BY:	Matthew Barner/CLT
COPIES:	KCH Project Team
DATE:	September 14, 2015

Background

This document is submitted in conjunction with the digital geophysical mapping (DGM) technical memorandum. The purpose of this document is to address two quality control (QC) issues identified during DGM performed in support of the remedial investigation (RI) at Munitions Response Program (MRP) Site Unexploded Ordnance 4 (MRP Site UXO4), Naval Weapons Station (NAVWPNSTA) Seal Beach Detachment Fallbrook, located in Fallbrook, California. Work at MRP Site UXO4 was conducted during the same mobilization as MRP Site UXO5. The Geonics, Ltd. EM61-MK2 sensor was used for the DGM. In accordance with the Quality Assurance Project Plan for Munitions and Explosives of Concern, Remedial Investigation for MRP Site UXO4 (KCH, 2015), the root cause analysis (RCA) process is undertaken when a QC testing requirement or measurement quality objective does not meet the performance criteria in the MEC QAPP or other relevant work planning documents. A corrective action, as needed, is determined as a follow up to the RCA process for immediate implementation as well as to prevent future occurrences.

Event #1 Description and Date: Cable Shake Test Noise Threshold Exceedance (February 26, 2015)

As part of the daily QC testing requirements, a static test was conducted with the EM61-MK2 to evaluate whether vibration of the sensor cables and connectors, which were conducted to mimic walking conditions during data collection, elicited a response in the data. The performance criterion for this test is that the mean response during the test duration is within a ±2-milliVolt (mV) range. Noise spikes with peak responses outside this range may be indicative of a sensor problem, sensor component (e.g., cable) problem, or loose connection. This test is performed once at the start of each day that the sensor is used for data collection or each time a cable or connection is repaired or replaced to avoid collecting production data with a potential hardware problem or loose connection.

Event #1 Root Cause

The root cause of this event was determined to be complacency during routine field procedures by the DGM field team. It is possible to induce noise spikes in the data if one too

vigorously shakes the cables at the connection points. When this occurs, damage to the cables and connectors is possible because the test no longer simulates data collection conditions during a person-portable survey. It is also possible to induce noise spikes when the DGM operator turns or leans too close to the sensor while wearing the backpack during the test.

The RCA process was undertaken by the CH2M HILL Kleinfelder, A Joint Venture (KCH) QC Geophysicist with support from the KCH DGM Data Processor. It was determined that this event was an outlier and was not indicative of an EM61-MK2 instrument sensor problem. Therefore, there are no adverse implications in the DGM production data collected on February 26, 2015. Figure 1 presents the results of all cable shake tests conducted for the DGM survey at MRP Site UXO5. Note the threshold exceedance on the plot for February 26, 2015. The nature of the response at the exceedance point indicates an external noise source, either from too vigorously shaking the cable or from the operator getting too close to the coils. An EM61-MK2 sensor problem or loose connection would likely be manifested in the data as abrupt, single reading noise spikes or series of single readings with very large (positive or negative) amplitudes.

After the cable shake test was performed, the field team performed the required 2-line test at the Instrument Verification Strip (IVS). The EM61-MK2 root mean square (RMS) noise level for Channel 3 during the IVS was 0.66 mV. This RMS noise level quantifies the amount of sensor noise and would be strongly impacted by a malfunctioning sensor, sensor component, or loose connection. This RMS noise level is within proper sensor operation specifications and is consistent with data gathered in support of the RI at MRP Site UXO5.

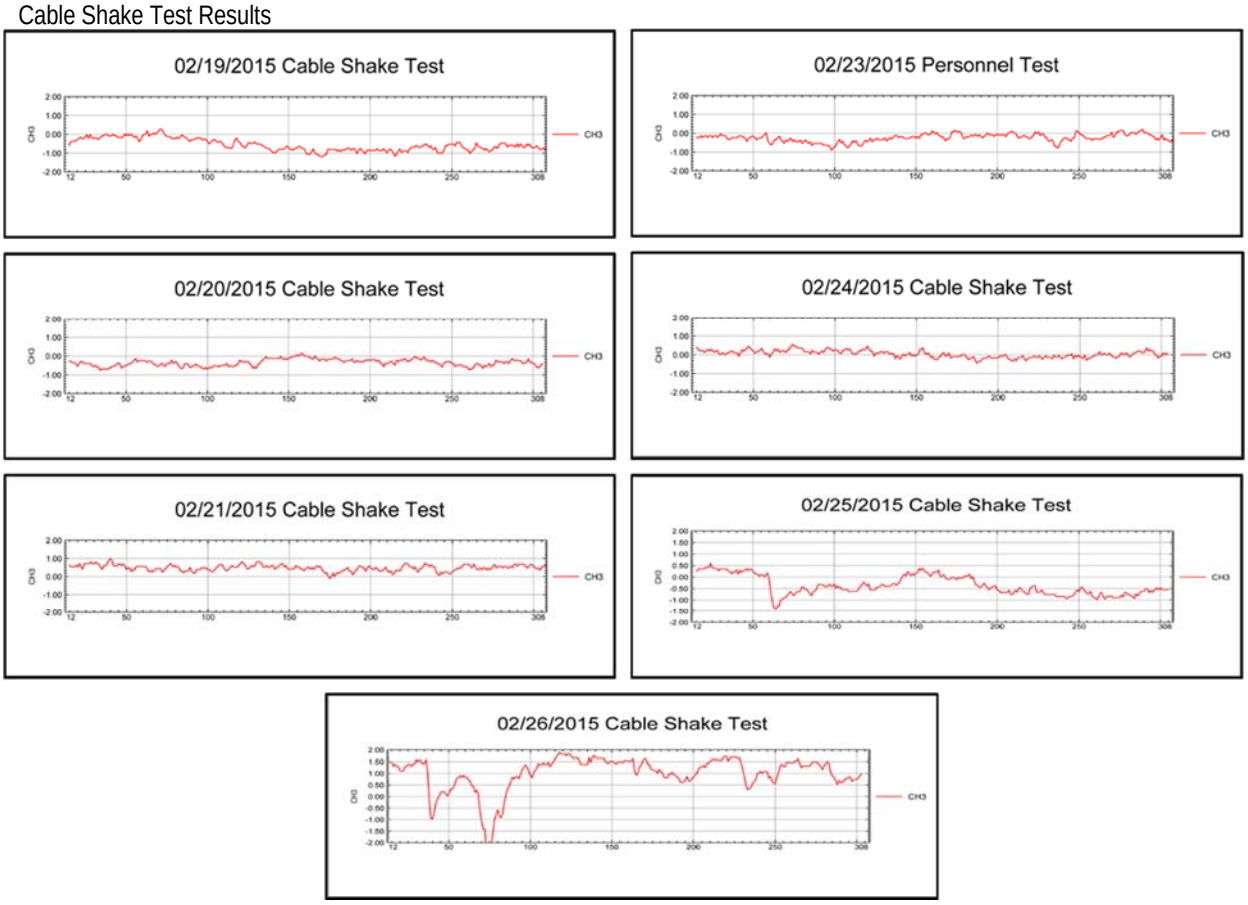
Event #1 Contributing Factors

The primary contributing factor was complacency by the DGM field team during routine tests after collecting data for 1 week. The DGM field team leader is highly experienced, although long field days and repetitive tasks each day can lead to a sense of complacency and loss of focus. In this case, the data were not adequately reviewed in real time during the test, and the mistake went unnoticed until the QC test data had been submitted to the data processor.

Event #1 Immediate Corrective Actions

The KCH QC Geophysicist had a phone conversation the next working day with the DGM field team leader and explained the potential ramifications of the QC test failure. The discussion included a refocus on the importance of each QC test, and not just for the purpose of passing the tests but for identifying potential issues with the sensor that could lead to rejection and recollection of production data. It was agreed by both parties that the QC tests are in place for a reason and that procedures must be followed to avoid significant loss of time associated with rework.

FIGURE 1
Cable Shake Test Results



Event #1 Corrective Actions to Prevent Future Recurrence

During DGM survey chartering sessions or during initial field kickoff events, this specific instance will be used as a quality moment during discussions with the field teams about the importance of following proper field procedures. KCH will also revisit its standard operating procedures for conducting EM61-MK2 surveys to make sure the documents are clear and specific on how to perform the cable shake test properly.

Event #2 Description and Date: End-of-Day 2-line IVS Survey Not Performed (February 26, 2015)

February 26, 2015, was the last day of DGM data collection at MRP Site UXO5 and the first day of data collection at MRP Site UXO4. On this day, the DGM field team was transitioning between the two sites. Start-of-day QC tests and IVS tests were completed at MRP Site UXO5.

During DGM production surveys, ongoing validation of EM61-MK2 sensor responses and data positioning is performed using the IVS. This test is performed once at the beginning and once at the end of each day's operations. However, unforeseen instances may arise where an end-of-day test is not performed (e.g., bad weather). On February 26, 2015, the DGM field team misjudged the amount of time needed to finish daily operations at

MRP Site UXO4 and inadvertently were locked behind a secure facility gate. Once the gate was unlocked and the field team returned to MRP Site UXO5, they ran out of time to complete the test because of the need to download data and store the equipment for the night.

Data from the start-of-day IVS survey as well as production data gathered on this day met all performance criteria.

Event #2 Root Cause

The root cause of this event was poor time management by the DGM field team and general lack of awareness of the time of day with regard to site security procedures (i.e., when gates would be locked).

Event #2 Contributing Factors

Contributing factors included the distance between the two Detachment Fallbrook MRP sites and the time required to safely drive from one site to another and to properly load and unload the EM61-MK2 from the field vehicle.

Event #2 Immediate Corrective Actions

No immediate corrective actions were implemented other than the KCH QC Geophysicist stressing the importance of allowing sufficient time to perform necessary end-of-day QC tests.

Event #2 Corrective Actions to Prevent Future Recurrence

During DGM survey chartering sessions or during initial field kickoff events, this specific event will be used for QC training during discussions with the field teams about the importance of time management and the need to balance production survey levels, time for conducting QC tests, and end-of-day shutdown procedures such as data download and equipment storage. These discussions will stress the importance of the QC tests that are required and the implications for the data if the QC tests are not performed or not performed properly.

Reference

CH2M HILL Kleinfelder, A Joint Venture (KCH). 2015. *Quality Assurance Project Plan for Munitions and Explosives of Concern, Remedial Investigation and Feasibility Study for Munitions Response Program Site UXO4, Naval Weapons Station Seal Beach, Detachment Fallbrook, Fallbrook, California*. February.

Appendix F
Intrusive Anomaly Investigation Results Summary

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Dig Results Report

C-3

C-3-00001 Item: A

Dig Date: 4/3/2015

Amplitude: 3.17749 mV
X Coord: 6243457.5
Y Coord: 2077930.25
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

C-3-00002 Item: A

Dig Date: 4/3/2015

Amplitude: 3.52298 mV
X Coord: 6243457.5
Y Coord: 2077936.75
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

Dig Results Report

C-3-00003 Item: A

Dig Date: 4/3/2015

Amplitude: 3.03204 mV
X Coord: 6243461.75
Y Coord: 2077930
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

C-3-00004 Item: A

Dig Date: 4/3/2015

Amplitude: 3.94849 mV
X Coord: 6243469.5
Y Coord: 2077922.25
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

Dig Results Report

C-3-00005 Item: A

Dig Date: 4/3/2015

Amplitude: 5.43807 mV
X Coord: 6243473
Y Coord: 2077915.75
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

C-3-00006 Item: A

Dig Date: 4/3/2015

Amplitude: 3.12054 mV
X Coord: 6243478.75
Y Coord: 2077920.25
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

Dig Results Report

C-3-00007 Item: A

Dig Date: 4/14/2015

Amplitude: 3.35145 mV
X Coord: 6243484
Y Coord: 2077910.75
Shared With: C-3-00008

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Left in Place
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:
Shared hit >4 feet South of flags. Out of range, left in place.

C-3-00008 Item: A

Dig Date: 4/14/2015

Amplitude: 3.11670 mV
X Coord: 6243486
Y Coord: 2077910.75
Shared With: C-3-00007

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Left in Place
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:
Shared hit >4 feet South of flags. Out of range, left in place.

Dig Results Report

C-3-00009 Item: A

Dig Date: 4/14/2015

Amplitude: 3.13546 mV
X Coord: 6243487.5
Y Coord: 2077898.75
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

C-3-00010 Item: A

Dig Date: 4/3/2015

Amplitude: 3.02579 mV
X Coord: 6243490.5
Y Coord: 2077898.5
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

Dig Results Report

C-3-00011 Item: A

Dig Date: 4/14/2015

Amplitude: 3.74704 mV
X Coord: 6243491
Y Coord: 2077922.75
Shared With: N/A

Item Group: Non-Munitions Scrap
Class: Non-Munitions Scrap
Category: Scrap Metal
Filler Type: Not Applicable
Fuze: Not Applicable

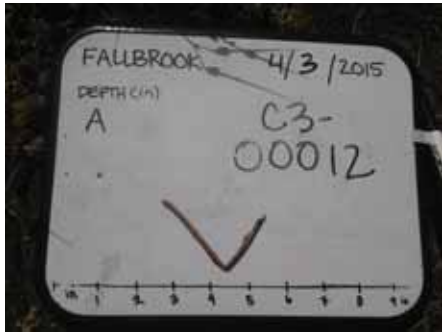
Additional Description:

Action Taken: Scrap Bin
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 2
Depth: 12
Weight: 1

C-3-00012 Item: A

Dig Date: 4/3/2015

Amplitude: 4.01125 mV
X Coord: 6243514.25
Y Coord: 2077908
Shared With: N/A



Item Group: Non-Munitions Scrap
Class: Non-Munitions Scrap
Category: Wire
Filler Type: Not Applicable
Fuze: Not Applicable

Additional Description:
Wire depth 5 inches.

Action Taken: Scrap Bin
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 5
Weight: 0.1

Dig Results Report

C-3-00013 Item: A

Dig Date: 4/14/2015

Amplitude: 4.48997 mV
X Coord: 6243515.25
Y Coord: 2077912.75
Shared With: N/A

Item Group: Non-Munitions Scrap
Class: Non-Munitions Scrap
Category: Bolt
Filler Type: Not Applicable
Fuze: Not Applicable
Additional Description:

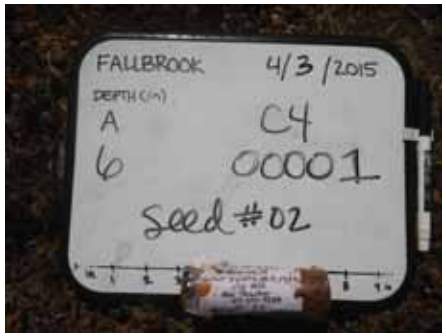
Action Taken: Scrap Bin
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 18
Weight: 2

C-4

C-4-00001 Item: A

Dig Date: 4/3/2015

Amplitude: 69.73 mV
X Coord: 6243610.75
Y Coord: 2077892.75
Shared With: N/A



Item Group: QC Seed
Class: QC Seed
Category: QC Seed
Filler Type: Not Applicable
Fuze: Not Applicable
Additional Description:

Action Taken: Returned To QC
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 6
Weight: 0.5

D-10

Dig Results Report

D-10-00001 Item: A

Dig Date: 4/3/2015

Amplitude: 5.90782 mV
X Coord: 6244194
Y Coord: 2077959.5
Shared With: N/A

Item Group: Non-Munitions Scrap
Class: Non-Munitions Scrap
Category:
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Scrap Bin
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 3
Weight: 0.5

Additional Description:

D-10-00002 Item: A

Dig Date: 4/3/2015

Amplitude: 48.9758 mV
X Coord: 6244197.25
Y Coord: 2078030.5
Shared With: N/A

Item Group: QC Seed
Class: QC Seed
Category: QC Seed
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Returned To QC
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 6
Weight: 0.5

Additional Description:
#05

Dig Results Report

D-10-00003 Item: A

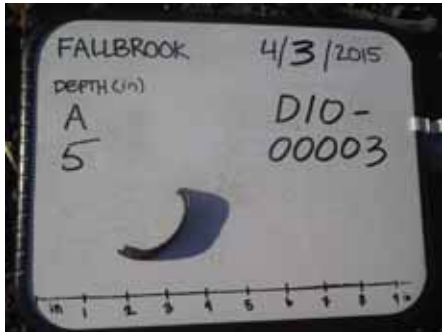
Dig Date: 4/3/2015

Amplitude: 5.13054 mV

X Coord: 6244197.5

Y Coord: 2078044.75

Shared With: N/A



Item Group: Non-Munitions Scrap

Class: Non-Munitions Scrap

Category:

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Scrap Bin

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 5

Weight: 0.1

D-11

D-11-00001 Item: A

Dig Date: 4/2/2015

Amplitude: 3.38734 mV

X Coord: 6244270.75

Y Coord: 2078036.5

Shared With: N/A

Item Group: Other

Class: Other

Category: Not Applicable

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Left in Place

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 0

Weight: 0

Additional Description:

Target hit >6 feet North of flag. Out of range.

Dig Results Report

D-11-00002 Item: A

Dig Date: 4/2/2015

Amplitude: 53.8556 mV
X Coord: 6244274.5
Y Coord: 2078033.5
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 1
Weight: 0.25

Additional Description:
Warhead scrap

D-11-00003 Item: A

Dig Date: 4/2/2015

Amplitude: 13.3296 mV
X Coord: 6244283.75
Y Coord: 2078039.75
Shared With: N/A

Item Group: Non-Munitions Scrap
Class: Non-Munitions Scrap
Category: Nail
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Scrap Bin
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 2
Depth: 8
Weight: 0.5

Additional Description:
Nail, large bolt.

Dig Results Report

D-11-00004 Item: A

Dig Date: 4/2/2015

Amplitude: 12.6973 mV
X Coord: 6244285
Y Coord: 2078036.75
Shared With: N/A

Item Group: Non-Munitions Scrap
Class: Non-Munitions Scrap
Category: Scrap Metal
Filler Type: Not Applicable
Fuze: Not Applicable
Additional Description:

Action Taken: Scrap Bin
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 3
Weight: 0.25

D-11-00005 Item: A

Dig Date: 4/2/2015

Amplitude: 9.49598 mV
X Coord: 6244286
Y Coord: 2078055.75
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable
Additional Description:

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 8
Weight: 0.1

Dig Results Report

D-11-00006 Item: A

Dig Date: 4/2/2015

Amplitude: 17.7797 mV
X Coord: 6244290.5
Y Coord: 2078036.75
Shared With: N/A

Item Group: Other
Class: Other
Category: Buried Utility
Filler Type: Not Applicable
Fuze: Not Applicable
Additional Description:

Action Taken: Left in Place
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 0
Weight: 0

D-11-00008 Item: A

Dig Date: 4/2/2015

Amplitude: 29.1823 mV
X Coord: 6244298.75
Y Coord: 2078050.75
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable
Additional Description:

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 4
Weight: 0.25

Dig Results Report

D-11-00009 Item: A

Dig Date: 4/2/2015

Amplitude: 6.22644 mV

X Coord: 6244321.75

Y Coord: 2077977.5

Shared With: N/A

Item Group: Non-Munitions Scrap

Class: Non-Munitions Scrap

Category: Scrap Metal

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Scrap Bin

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 10

Weight: 0.25

Additional Description:

Scrap metal bar, nail

D-12

D-12-00002 Item: A

Dig Date: 4/2/2015

Amplitude: 3.20425 mV

X Coord: 6244365.25

Y Coord: 2078016.25

Shared With: N/A

Item Group: Non-Munitions Scrap

Class: Non-Munitions Scrap

Category: Scrap Metal

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Scrap Bin

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 2

Weight: 0.1

Additional Description:

Dig Results Report

D-12-00003 Item: A

Dig Date: 4/2/2015

Amplitude: 4.07977 mV

X Coord: 6244366.75

Y Coord: 2078009

Shared With: N/A

Item Group: Non-Munitions Scrap

Class: Non-Munitions Scrap

Category: Other

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Scrap Bin

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 3

Weight: 0.1

Additional Description:

Trailer pin

D-12-00004 Item: A

Dig Date: 4/2/2015

Amplitude: 3.093 mV

X Coord: 6244412.5

Y Coord: 2078045.75

Shared With: N/A

Item Group: No Contact

Class: Not Applicable

Category: Not Applicable

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Not Applicable

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 0

Depth: 0

Weight: 0

Additional Description:

Dig Results Report

D-12-00006 Item: A

Dig Date: 4/2/2015

Amplitude: 3.56118 mV

X Coord: 6244427.5

Y Coord: 2078052.75

Shared With: D-12-00007

Item Group: Non-Munitions Scrap

Class: Non-Munitions Scrap

Category: Scrap Metal

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Scrap Bin

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 1

Weight: 0.1

Additional Description:

Scrap can pieces. ***Shared with D-12-00007

D-12-00007 Item: A

Dig Date: 4/2/2015

Amplitude: 3.12076 mV

X Coord: 6244428

Y Coord: 2078048.75

Shared With: D-12-00006

Item Group: Non-Munitions Scrap

Class: Non-Munitions Scrap

Category: Scrap Metal

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Scrap Bin

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 1

Weight: 0.1

Additional Description:

Scrap can pieces. ***Shared with D-12-00006

D-2

Dig Results Report

D-2-00001 Item: A

Dig Date: 4/14/2015

Amplitude: 13.9258 mV
X Coord: 6243418
Y Coord: 2078008
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable
Additional Description:

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 6
Weight: 1

D-2-00002 Item: A

Dig Date: 4/3/2015

Amplitude: 6.82718 mV
X Coord: 6243435.75
Y Coord: 2077989.25
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable
Additional Description:

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 4
Weight: 0.5

Dig Results Report

D-2-00003 Item: A

Dig Date: 4/3/2015

Amplitude: 67.7421 mV

X Coord: 6243439.5

Y Coord: 2077989.5

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 4

Weight: 1

D-2-00004 Item: A

Dig Date: 4/3/2015

Amplitude: 54.9187 mV

X Coord: 6243443.25

Y Coord: 2077991.5

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 5

Depth: 6

Weight: 2

Dig Results Report

D-2-00005 Item: A

Dig Date: 4/14/2015

Amplitude: 4.18616 mV
X Coord: 6243448.25
Y Coord: 2077961.75
Shared With: D-2-00006

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:
D2_5 shared with D2_6

D-2-00006 Item: A

Dig Date: 4/14/2015

Amplitude: mV
X Coord:
Y Coord:
Shared With: D-2-00005

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:
D2_5 shared with D2_6

Dig Results Report

D-2-00007 Item: A

Dig Date: 4/3/2015

Amplitude: 12.4602 mV

X Coord: 6243456

Y Coord: 2078003

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 24

Weight: 3

D-3

D-3-00001 Item: A

Dig Date: 4/14/2015

Amplitude: 5.85711 mV

X Coord: 6243457.75

Y Coord: 2078013.25

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 4

Weight: 0.25

Dig Results Report

D-3-00002 Item: A

Dig Date: 4/14/2015

Amplitude: 7.97706 mV

X Coord: 6243461.25

Y Coord: 2078017

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 8

Weight: 0.5

D-3-00004 Item: A

Dig Date: 4/3/2015

Amplitude: 7.98522 mV

X Coord: 6243477.75

Y Coord: 2078019

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 10

Weight: 0.5

Dig Results Report

D-3-00005 Item: A

Dig Date: 4/3/2015

Amplitude: 27.2813 mV
X Coord: 6243481.75
Y Coord: 2078018.75
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable
Additional Description:

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 4
Weight: 0.5

D-3-00006 Item: A

Dig Date: 4/3/2015

Amplitude: 7.65426 mV
X Coord: 6243481.75
Y Coord: 2078021.5
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable
Additional Description:

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 8
Weight: 0.5

Dig Results Report

D-3-00007 Item: A

Dig Date: 4/3/2015

Amplitude: 47.0732 mV

X Coord: 6243484

Y Coord: 2078027

Shared With: D-3-00008

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 1

Weight: 0.5

Additional Description:

***Shared with D3 flags 8 & 9.

D-3-00008 Item: A

Dig Date: 4/3/2015

Amplitude: 19.2566 mV

X Coord: 6243485.25

Y Coord: 2078025

Shared With: D-3-00007

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 1

Weight: 0.5

Additional Description:

***Shared with D3 flags 7 & 9.

Dig Results Report

D-3-00009 Item: A

Dig Date: 4/3/2015

Amplitude: 7.72786 mV

X Coord: 6243487.25

Y Coord: 2078028

Shared With: D-3-00007

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 1

Weight: 0.5

Additional Description:

***Shared with D3 flags 8 & 7.

D-3-00010 Item: A

Dig Date: 4/3/2015

Amplitude: 51.2108 mV

X Coord: 6243488.25

Y Coord: 2078039

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 6

Weight: 0.5

Additional Description:

Dig Results Report

D-3-00011 Item: A

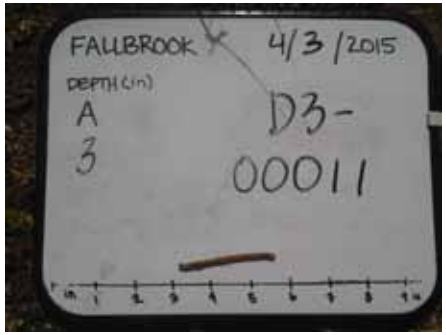
Dig Date: 4/3/2015

Amplitude: 3.13622 mV

X Coord: 6243491.5

Y Coord: 2077959.5

Shared With: N/A



Item Group: Non-Munitions Scrap

Class: Non-Munitions Scrap

Category: Wire

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Scrap Bin

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 3

Weight: 0.1

D-3-00012 Item: A

Dig Date: 4/14/2015

Amplitude: 4.15060 mV

X Coord: 6243495

Y Coord: 2078025.25

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 3

Weight: 0.5

Dig Results Report

D-3-00013 Item: A

Dig Date: 4/3/2015

Amplitude: 8.60237 mV
X Coord: 6243497.25
Y Coord: 2078031.25
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

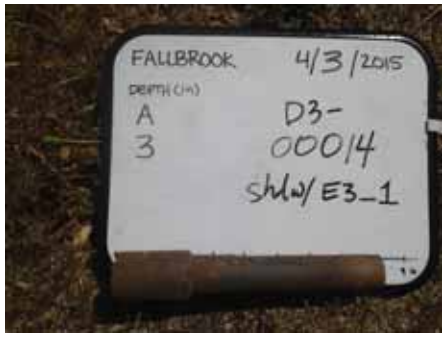
Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

D-3-00014 Item: A

Dig Date: 4/3/2015

Amplitude: 10.1591 mV
X Coord: 6243497.75
Y Coord: 2078056.25
Shared With: N/A



Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 3
Weight: 0.5

Additional Description:

Dig Results Report

D-3-00014 Item: B

Dig Date: 4/3/2015

Amplitude: 10.1591 mV

X Coord: 6243497.75

Y Coord: 2078056.25

Shared With: E-3-00001

Item Group: Non-Munitions Scrap

Class: Non-Munitions Scrap

Category: Scrap Metal

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Scrap Bin

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 3

Weight: 0.1

Additional Description:

Lid ***Shared with E-3-00001.

D-3-00015 Item: A

Dig Date: 4/10/2015

Amplitude: 22.9558 mV

X Coord: 6243554.5

Y Coord: 2077996.75

Shared With: N/A

Item Group: Non-Munitions Scrap

Class: Non-Munitions Scrap

Category: Scrap Metal

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Scrap Bin

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 24

Weight: 30

Additional Description:

D-4

Dig Results Report

D-4-00001 Item: A

Dig Date: 4/3/2015

Amplitude: 4.17532 mV
X Coord: 6243559.5
Y Coord: 2078027.25
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

D-4-00002 Item: A

Dig Date: 4/3/2015

Amplitude: 5.42912 mV
X Coord: 6243623.75
Y Coord: 2078034
Shared With: N/A

Item Group: Non-Munitions Scrap
Class: Non-Munitions Scrap
Category: Scrap Metal
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Scrap Bin
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 5
Weight: 1

Additional Description:

D-5

Dig Results Report

D-5-00001 Item: A

Dig Date: 4/14/2015

Amplitude: 5.77618 mV
X Coord: 6243656.5
Y Coord: 2077997
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

D-5-00002 Item: A

Dig Date: 4/3/2015

Amplitude: 3.71047 mV
X Coord: 6243664.75
Y Coord: 2078020.5
Shared With: D-5-00003

Item Group: Non-Munitions Scrap
Class: Non-Munitions Scrap
Category: Scrap Metal
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Scrap Bin
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 2
Weight: 0.5

Additional Description:
Shared with D5_3

Dig Results Report

D-5-00003 Item: A

Dig Date: 4/3/2015

Amplitude: 10.6142 mV

X Coord: 6243665.25

Y Coord: 2078017.25

Shared With: D-5-00002

Item Group: Non-Munitions Scrap

Class: Non-Munitions Scrap

Category: Scrap Metal

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Scrap Bin

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 2

Weight: 0.5

Additional Description:

Shared with D5_2

D-5-00004 Item: A

Dig Date: 4/3/2015

Amplitude: 40.6641 mV

X Coord: 6243667

Y Coord: 2077962.75

Shared With: N/A

Item Group: Other

Class: Other

Category: Fence

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Left in Place

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 0

Weight: 0

Additional Description:

Barbed wire fence 3' N from flag

Dig Results Report

D-5-00005 Item: A

Dig Date: 4/3/2015

Amplitude: 3.39816 mV
X Coord: 6243729.5
Y Coord: 2078001.5
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

D-5-00006 Item: A

Dig Date: 4/14/2015

Amplitude: 3.00034 mV
X Coord: 6243731.5
Y Coord: 2078000.75
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

Dig Results Report

E-10-00002 Item: A

Dig Date: 4/10/2015

Amplitude: 8.61846 mV
X Coord: 6244158
Y Coord: 2078092
Shared With: E-10-00005

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Consolidation Point
☐ Demo Required?
☑ Pit? ☐ Frag?
Quantity: 16
Depth: 36
Weight: 35

Additional Description:
Excavator dig. Shared with E10_5.

E-10-00005 Item: A

Dig Date: 4/10/2015

Amplitude: 7.89371 mV
X Coord: 6244159.75
Y Coord: 2078092
Shared With: E-10-00009

Item Group: Shared
Class: Shared
Category: Shared
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☑ Pit? ☐ Frag?
Quantity: 0
Depth: 36
Weight: 0

Additional Description:
Excavator dig. Shared with E10_2.

Dig Results Report

E-10-00006 Item: A

Dig Date: 4/3/2015

Amplitude: 18.7927 mV
X Coord: 6244162.5
Y Coord: 2078121.5
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 6
Weight: 2

Additional Description:

E-10-00009 Item: A

Dig Date: 4/6/2015

Amplitude: 49.7782 mV
X Coord: 6244167
Y Coord: 2078097.75
Shared With: E-10-00026

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Consolidation Point
☐ Demo Required?
☑ Pit? ☐ Frag?
Quantity: 30
Depth: 60
Weight: 200

Additional Description:
Parts of M31, M11, hinges from shipping crates. All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

Dig Results Report

E-10-00009 Item: B

Dig Date: 4/6/2015

Amplitude: 49.7782 mV

X Coord: 6244167

Y Coord: 2078097.75

Shared With: E-10-00026

Item Group: Non-Munitions Scrap

Class: Non-Munitions Scrap

Category: Other

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Scrap Bin

☐ Demo Required?

☑ Pit? ☐ Frag?

Quantity: 30

Depth: 36

Weight: 10

Additional Description:

Shipping crate hinges. Excavator dig. All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

E-10-00009 Item: C

Dig Date: 4/6/2015

Amplitude: 49.7782 mV

X Coord: 6244167

Y Coord: 2078097.75

Shared With: E-10-00026

Item Group: MDAS

Class: Grenade

Category: Other (see comments)

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☑ Pit? ☐ Frag?

Quantity: 30

Depth: 60

Weight: 200

Additional Description:

M11 practice. Excavator dig. All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

Dig Results Report

E-10-00009 Item: D

Dig Date: 4/6/2015

Amplitude: 49.7782 mV

X Coord: 6244167

Y Coord: 2078097.75

Shared With: E-10-00026

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☑ Pit? ☐ Frag?

Quantity: 30

Depth: 60

Weight: 200

Additional Description:

All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

E-10-00009 Item: E

Dig Date: 4/7/2015

Amplitude: 49.7782 mV

X Coord: 6244167

Y Coord: 2078097.75

Shared With: E-10-00026

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☑ Pit? ☐ Frag?

Quantity: 30

Depth: 90

Weight: 200

Additional Description:

Excavator dig. All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26. Final depth: 8 feet Final MDAS weight: 957lbs

Dig Results Report

E-10-00010 Item: A

Dig Date: 4/3/2015

Amplitude: 41.1021 mV

X Coord: 6244167.5

Y Coord: 2078113

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 4

Weight: 1

E-10-00011 Item: A

Dig Date: 4/10/2015

Amplitude: 32.1832 mV

X Coord: 6244168.25

Y Coord: 2078087.75

Shared With: E-10-00009

Item Group: Shared

Class: Shared

Category: Shared

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Not Applicable

☐ Demo Required?

☑ Pit? ☐ Frag?

Quantity: 0

Depth: 0

Weight: 0

Additional Description:

All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

Dig Results Report

E-10-00012 Item: A

Dig Date: 4/10/2015

Amplitude: 34.2751 mV

X Coord: 6244171.5

Y Coord: 2078085

Shared With: E-10-00009

Item Group: Shared

Class: Shared

Category: Shared

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Not Applicable

☐ Demo Required?

☑ Pit? ☐ Frag?

Quantity: 0

Depth: 0

Weight: 0

Additional Description:

All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

E-10-00013 Item: A

Dig Date: 4/10/2015

Amplitude: 15.2826 mV

X Coord: 6244171.75

Y Coord: 2078087.25

Shared With: E-10-00009

Item Group: Shared

Class: Shared

Category: Shared

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Not Applicable

☐ Demo Required?

☑ Pit? ☐ Frag?

Quantity: 0

Depth: 0

Weight: 0

Additional Description:

All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

Dig Results Report

E-10-00014 Item: A

Dig Date: 4/10/2015

Amplitude: 45.5452 mV

X Coord: 6244172.75

Y Coord: 2078095

Shared With: E-10-00009

Item Group: Shared

Class: Shared

Category: Shared

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Not Applicable

☐ Demo Required?

☑ Pit? ☐ Frag?

Quantity: 0

Depth: 0

Weight: 0

Additional Description:

All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

E-10-00015 Item: A

Dig Date: 4/10/2015

Amplitude: 25.7266 mV

X Coord: 6244173.75

Y Coord: 2078085.5

Shared With: E-10-00009

Item Group: Shared

Class: Shared

Category: Shared

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Not Applicable

☐ Demo Required?

☑ Pit? ☐ Frag?

Quantity: 0

Depth: 0

Weight: 0

Additional Description:

All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

Dig Results Report

E-10-00016 Item: A

Dig Date: 4/3/2015

Amplitude: 32.3828 mV
X Coord: 6244175
Y Coord: 2078117.75
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 2
Depth: 4
Weight: 0.5

Additional Description:

E-10-00018 Item: A

Dig Date: 4/10/2015

Amplitude: 4.38394 mV
X Coord: 6244176.5
Y Coord: 2078088.5
Shared With: E-10-00009

Item Group: Shared
Class: Shared
Category: Shared
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☑ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:
All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

Dig Results Report

E-10-00019 Item: A

Dig Date: 4/10/2015

Amplitude: 16.4407 mV

X Coord: 6244177.5

Y Coord: 2078087

Shared With: E-10-00009

Item Group: Shared

Class: Shared

Category: Shared

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Not Applicable

☐ Demo Required?

☑ Pit? ☐ Frag?

Quantity: 0

Depth: 0

Weight: 0

Additional Description:

All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

E-10-00020 Item: A

Dig Date: 4/10/2015

Amplitude: 4.60725 mV

X Coord: 6244180.5

Y Coord: 2078080.75

Shared With: E-10-00009

Item Group: Shared

Class: Shared

Category: Shared

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Not Applicable

☐ Demo Required?

☑ Pit? ☐ Frag?

Quantity: 0

Depth: 0

Weight: 0

Additional Description:

All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

Dig Results Report

E-10-00022 Item: A

Dig Date: 4/10/2015

Amplitude: 3.61664 mV

X Coord: 6244181.25

Y Coord: 2078083.25

Shared With: E-10-00009

Item Group: Shared

Class: Shared

Category: Shared

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Not Applicable

☐ Demo Required?

☑ Pit? ☐ Frag?

Quantity: 0

Depth: 0

Weight: 0

Additional Description:

All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

E-10-00023 Item: A

Dig Date: 4/10/2015

Amplitude: 4.35334 mV

X Coord: 6244183

Y Coord: 2078083.5

Shared With: E-10-00009

Item Group: Shared

Class: Shared

Category: Shared

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Not Applicable

☐ Demo Required?

☑ Pit? ☐ Frag?

Quantity: 0

Depth: 0

Weight: 0

Additional Description:

All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

Dig Results Report

E-10-00024 Item: A

Dig Date: 4/10/2015

Amplitude: 26.6849 mV

X Coord: 6244186.25

Y Coord: 2078087.75

Shared With: E-10-00009

Item Group: Shared

Class: Shared

Category: Shared

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Not Applicable

☐ Demo Required?

☑ Pit? ☐ Frag?

Quantity: 0

Depth: 0

Weight: 0

Additional Description:

All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

E-10-00025 Item: A

Dig Date: 4/3/2015

Amplitude: 9.41451 mV

X Coord: 6244187.5

Y Coord: 2078116.75

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 2

Weight: 0.5

Additional Description:

Tail fin assembly m31 practice

Dig Results Report

E-10-00026 Item: A

Dig Date: 4/10/2015

Amplitude: 21.0205 mV

X Coord: 6244187.75

Y Coord: 2078085.75

Shared With: E-10-00009

Item Group: Shared

Class: Shared

Category: Shared

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Not Applicable

☐ Demo Required?

☑ Pit? ☐ Frag?

Quantity: 0

Depth: 0

Weight: 0

Additional Description:

All flags shared and dug as pit with excavator. E10_00009, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 26.

E-10-00027 Item: A

Dig Date: 4/3/2015

Amplitude: 17.3676 mV

X Coord: 6244226.25

Y Coord: 2078103

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 6

Weight: 0.5

Additional Description:

Dig Results Report

E-10-00028 Item: A

Dig Date: 4/3/2015

Amplitude: 11.4063 mV

X Coord: 6244235.5

Y Coord: 2078125

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Other (see comments)

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 10

Weight: 0.5

Additional Description:

M11 Practice rifle grenade

E-10-00029 Item: A

Dig Date: 4/2/2015

Amplitude: 20.5199 mV

X Coord: 6244245

Y Coord: 2078072.75

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 16

Weight: 2

Additional Description:

M31 scrap and a hit >10 feet N. Out of range.

Dig Results Report

E-10-00031 Item: A

Dig Date: 4/2/2015

Amplitude: 12.6350 mV

X Coord: 6244253.5

Y Coord: 2078076

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 2

Depth: 12

Weight: 2

Additional Description:

2 M31 practice, and hit >6 feet N out of range

E-10-00032 Item: A

Dig Date: 4/2/2015

Amplitude: 8.69132 mV

X Coord: 6244253.9495878

Y Coord: 2078069.0747256

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 10

Weight: 0.5

Additional Description:

M31 scrap

E-11

Dig Results Report

E-11-00001 Item: A

Dig Date: 4/2/2015

Amplitude: 5.26651 mV

X Coord: 6244258.5

Y Coord: 2078072.25

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 14

Weight: 1

Additional Description:

2nd hit >6 feet E out of range

E-11-00002 Item: A

Dig Date: 4/3/2015

Amplitude: 35.1351 mV

X Coord: 6244264.75

Y Coord: 2078094

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 3

Weight: 0.5

Additional Description:

Dig Results Report

E-11-00004 Item: A

Dig Date: 4/3/2015

Amplitude: 4.95451 mV

X Coord: 6244271.25

Y Coord: 2078101

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 6

Weight: 0.5

E-11-00005 Item: A

Dig Date: 4/3/2015

Amplitude: 9.74685 mV

X Coord: 6244272.75

Y Coord: 2078096.75

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 6

Weight: 0.5

Dig Results Report

E-11-00006 Item: A

Dig Date: 4/3/2015

Amplitude: 17.2932 mV

X Coord: 6244276.25

Y Coord: 2078106.75

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 8

Weight: 0.5

E-11-00008 Item: A

Dig Date: 4/2/2015

Amplitude: 7.93865 mV

X Coord: 6244287.5

Y Coord: 2078067.5

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 5

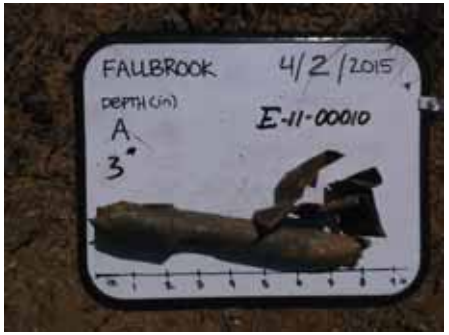
Weight: 0.25

Dig Results Report

E-11-00010 Item: A

Dig Date: 4/2/2015

Amplitude: 29.1302 mV
X Coord: 6244291
Y Coord: 2078064.5
Shared With: N/A



Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 3
Weight: 0.25

Additional Description:
M31 tail boom

E-11-00014 Item: A

Dig Date: 4/2/2015

Amplitude: 29.4329 mV
X Coord: 6244310.5
Y Coord: 2078086.5
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 10
Weight: 1

Additional Description:
2 tail booms, 1 warhead scrap

Dig Results Report

E-11-00015 **Item: A** **Dig Date:** 4/2/2015

Amplitude: 55.412 mV
X Coord: 6244323
Y Coord: 2078074.25
Shared With: N/A

Item Group: QC Seed
Class: QC Seed
Category: QC Seed
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Returned To QC
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 6
Weight: 0.5

Additional Description:
No. 06

E-12

E-12-00001 **Item: A** **Dig Date:** 4/2/2015

Amplitude: 24.5621 mV
X Coord: 6244361.75
Y Coord: 2078100.5
Shared With: N/A

Item Group: Non-Munitions Scrap
Class: Non-Munitions Scrap
Category: Other
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Scrap Bin
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 4
Weight: 1

Additional Description:
Scrap handle

Dig Results Report

E-12-00002 **Item: A** **Dig Date:** 4/2/2015

Amplitude: 22.8864 mV
X Coord: 6244367.75
Y Coord: 2078086.5
Shared With: N/A

Item Group: Non-Munitions Scrap
Class: Non-Munitions Scrap
Category: Other
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 6
Weight: 1

Additional Description:
Scrap handle

E-13

E-13-00001 **Item: A** **Dig Date:** 4/2/2015

Amplitude: 8.36487 mV
X Coord: 6244483.25
Y Coord: 2078093.25
Shared With: N/A

Item Group: Other
Class: Other
Category: Buried Utility
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Left in Place
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 0
Weight: 0

Additional Description:

E-3

Dig Results Report

E-3-00001 Item: A

Dig Date: 4/3/2015

Amplitude: 18.8412 mV

X Coord: 6243496.5

Y Coord: 2078058.75

Shared With: D-3-00014

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 3

Weight: 0.5

Additional Description:

Shared with D3_14

E-3-00001 Item: B

Dig Date: 4/3/2015

Amplitude: 18.8412 mV

X Coord: 6243496.5

Y Coord: 2078058.75

Shared With: N/A

Item Group: Non-Munitions Scrap

Class: Non-Munitions Scrap

Category: Scrap Metal

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Scrap Bin

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 3

Weight: 0.1

Additional Description:

Lid

Dig Results Report

E-3-00002 Item: A

Dig Date: 4/3/2015

Amplitude: 17.9336 mV

X Coord: 6243512.75

Y Coord: 2078062

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 4

Weight: 0.5

E-3-00003 Item: A

Dig Date: 4/3/2015

Amplitude: 33.3084 mV

X Coord: 6243523.75

Y Coord: 2078075.75

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 2

Weight: 0.5

Dig Results Report

E-3-00004 Item: A

Dig Date: 4/3/2015

Amplitude: 132.911 mV
X Coord: 6243532.25
Y Coord: 2078071.75
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 1
Weight: 0.25

Additional Description:
Fin assembly

E-3-00005 Item: A

Dig Date: 4/3/2015

Amplitude: 4.02322 mV
X Coord: 6243534.25
Y Coord: 2078071.25
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 1
Weight: 0.25

Additional Description:
Fin assembly

E-4

Dig Results Report

E-4-00001 Item: A

Dig Date: 4/3/2015

Amplitude: 3.16696 mV
X Coord: 6243588.75
Y Coord: 2078134
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

E-4-00002 Item: A

Dig Date: 4/14/2015

Amplitude: 3.3362 mV
X Coord: 6243590.75
Y Coord: 2078133.75
Shared With: E-4-00003

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:
Shared, no contacts on E4_2 with E4_3.

Dig Results Report

E-4-00003 Item: A

Dig Date: 4/14/2015

Amplitude: 3.13328 mV
X Coord: 6243592.75
Y Coord: 2078133.5
Shared With: E-4-00002

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:
Shared, no contacts on E4_2 with E4_3.

E-4-00004 Item: A

Dig Date: 4/3/2015

Amplitude: 3.56002 mV
X Coord: 6243617
Y Coord: 2078153
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

Dig Results Report

E-4-00005 Item: A

Dig Date: 4/3/2015

Amplitude: 28.3242 mV

X Coord: 6243628

Y Coord: 2078067.75

Shared With: N/A

Item Group: QC Seed

Class: QC Seed

Category: QC Seed

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Returned To QC

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 6

Weight: 0.5

Additional Description:

Seed #01

E-4-00006 Item: A

Dig Date: 4/3/2015

Amplitude: 21.5602 mV

X Coord: 6243645.9669977

Y Coord: 2078085.4405322

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 4

Weight: 0.5

Additional Description:

Dig Results Report

E-4-00007 Item: A

Dig Date: 4/3/2015

Amplitude: 7.62493 mV

X Coord: 6243655.5

Y Coord: 2078081.75

Shared With: E-5-00001

Item Group: Non-Munitions Scrap

Class: Non-Munitions Scrap

Category: Scrap Metal

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Scrap Bin

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 12

Weight: 30

Additional Description:

Target hit on E5_00001, flag E4_00007 shared.

E-5

E-5-00001 Item: A

Dig Date: 4/3/2015

Amplitude: 341.121 mV

X Coord: 6243658.5

Y Coord: 2078083

Shared With: E-4-00007

Item Group: Non-Munitions Scrap

Class: Non-Munitions Scrap

Category: Scrap Metal

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Scrap Bin

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 12

Weight: 30

Additional Description:

Target hit on E5_00001, flag E4_00007 shared.

Dig Results Report

E-5-00002 Item: A

Dig Date: 4/3/2015

Amplitude: 32.4046 mV

X Coord: 6243664.25

Y Coord: 2078132

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 4

Weight: 1

E-5-00003 Item: A

Dig Date: 4/3/2015

Amplitude: 52.3689 mV

X Coord: 6243669.1423464

Y Coord: 2078129.7501245

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 2

Depth: 6

Weight: 2

Dig Results Report

E-5-00004 Item: A

Dig Date: 4/14/2015

Amplitude: 7.59563 mV

X Coord: 6243721

Y Coord: 2078132.5

Shared With: E-5-00005

Item Group: Non-Munitions Scrap

Class: Non-Munitions Scrap

Category: Scrap Metal

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Scrap Bin

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 4

Weight: 0.5

Additional Description:

Shared hit with E-5-00005

E-5-00005 Item: A

Dig Date: 4/14/2015

Amplitude: 6.23139 mV

X Coord: 6243723.5

Y Coord: 2078132.25

Shared With: E-5-00004

Item Group: Shared

Class: Shared

Category: Shared

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Not Applicable

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 0

Depth: 4

Weight: 0

Additional Description:

Shared hit with E-5-00004. See E-5-00004 for item info.

E-6

Dig Results Report

E-6-00001 Item: A

Dig Date: 4/3/2015

Amplitude: 3.10552 mV
X Coord: 6243768.5
Y Coord: 2078071.75
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

E-6-00002 Item: A

Dig Date: 4/3/2015

Amplitude: 3.26305 mV
X Coord: 6243789.25
Y Coord: 2078079.25
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

Dig Results Report

E-6-00003 Item: A

Dig Date: 4/14/2015

Amplitude: 3.50147 mV
X Coord: 6243796.25
Y Coord: 2078127.75
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

E-6-00004 Item: A

Dig Date: 4/6/2015

Amplitude: 25.3404 mV
X Coord: 6243808.75
Y Coord: 2078117.5
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 12
Weight: 2

Additional Description:
M31 parts. Excavator dig.

Dig Results Report

E-6-00005 Item: A

Dig Date: 4/6/2015

Amplitude: 36.2352 mV

X Coord: 6243814.5

Y Coord: 2078117.25

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 7

Depth: 18

Weight: 4

Additional Description:

M31 parts. Excavator dig.

E-6-00006 Item: A

Dig Date: 4/3/2015

Amplitude: 39.6867 mV

X Coord: 6243823

Y Coord: 2078111.5

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 3

Depth: 10

Weight: 1

Additional Description:

Dig Results Report

E-6-00007 Item: A

Dig Date: 4/6/2015

Amplitude: 27.0933 mV

X Coord: 6243828

Y Coord: 2078110.75

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 24

Weight: 3

Additional Description:

M31 parts. Excavator dig.

E-6-00008 Item: A

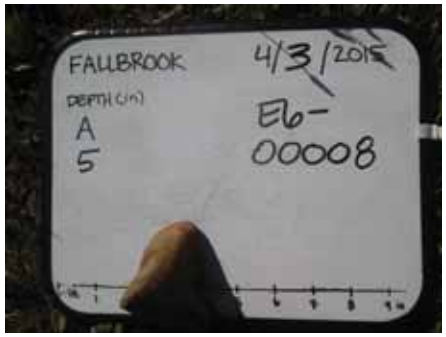
Dig Date: 4/3/2015

Amplitude: 12.6244 mV

X Coord: 6243834.5

Y Coord: 2078111.75

Shared With: N/A



Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 5

Weight: 0.5

Additional Description:

Copper cone

Dig Results Report

E-6-00009 Item: A

Dig Date: 4/3/2015

Amplitude: 15.3512 mV

X Coord: 6243838.25

Y Coord: 2078115.75

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 6

Weight: 0.5

E-6-00010 Item: A

Dig Date: 4/6/2015

Amplitude: 79.9078 mV

X Coord: 6243843.25

Y Coord: 2078110.5

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

M31 parts. Excavator dig.

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 10

Depth: 18

Weight: 5

Dig Results Report

E-6-00011 Item: A

Dig Date: 4/3/2015

Amplitude: 19.3258 mV
X Coord: 6243845
Y Coord: 2078116
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 6
Weight: 0.5

Additional Description:
Tailboom

E-6-00012 Item: A

Dig Date: 4/6/2015

Amplitude: 35.4519 mV
X Coord: 6243848.75
Y Coord: 2078111.75
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 6
Depth: 18
Weight: 4

Additional Description:
M31 parts. Excavator dig.

Dig Results Report

E-6-00013 **Item: A** **Dig Date:** 4/3/2015

Amplitude: 19.6390 mV
X Coord: 6243854.5
Y Coord: 2078112.5
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable
Additional Description:

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 7
Weight: 0.5

E-7

E-7-00001 **Item: A** **Dig Date:** 4/3/2015

Amplitude: 22.1596 mV
X Coord: 6243862.25
Y Coord: 2078113
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable
Additional Description:

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 6
Weight: 0.5

Dig Results Report

E-7-00002 Item: A

Dig Date: 4/14/2015

Amplitude: 8.69531 mV

X Coord: 6243868.5

Y Coord: 2078092.75

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 5

Weight: 0.5

E-7-00003 Item: A

Dig Date: 4/3/2015

Amplitude: 43.6985 mV

X Coord: 6243877

Y Coord: 2078094

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 2

Depth: 1

Weight: 0.5

Dig Results Report

E-7-00004 Item: A

Dig Date: 4/14/2015

Amplitude: 22.1239 mV

X Coord: 6243882.25

Y Coord: 2078096.5

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 6

Weight: 0.5

E-7-00005 Item: A

Dig Date: 4/3/2015

Amplitude: 17.2507 mV

X Coord: 6243910.25

Y Coord: 2078110

Shared With: N/A

Item Group: No Contact

Class: Not Applicable

Category: Not Applicable

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Not Applicable

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 0

Depth: 0

Weight: 0

Dig Results Report

E-7-00006 Item: A

Dig Date: 4/14/2015

Amplitude: 4.20720 mV

X Coord: 6243913.5

Y Coord: 2078107.5

Shared With: E-7-00005

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 6

Weight: 0.5

Additional Description:

Shared with E7_00005

E-7-00007 Item: A

Dig Date: 4/3/2015

Amplitude: 15.1282 mV

X Coord: 6243919.5

Y Coord: 2078110.5

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 4

Weight: 0.5

Additional Description:

Dig Results Report

E-7-00008 Item: A

Dig Date: 4/3/2015

Amplitude: 4.27664 mV
X Coord: 6243937.75
Y Coord: 2078110
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

E-7-00009 Item: A

Dig Date: 4/3/2015

Amplitude: 30.6209 mV
X Coord: 6243946.5
Y Coord: 2078097
Shared With: N/A

Item Group: QC Seed
Class: QC Seed
Category: QC Seed
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Returned To QC
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 6
Weight: 0.5

Additional Description:
Seed #03

Dig Results Report

E-7-00010 Item: A

Dig Date: 4/3/2015

Amplitude: 10.3397 mV
X Coord: 6243951
Y Coord: 2078111.25
Shared With: N/A

Item Group: No Contact
Class: Not Applicable
Category: Not Applicable
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Not Applicable
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 0
Depth: 0
Weight: 0

Additional Description:

E-8

E-8-00001 Item: A

Dig Date: 4/3/2015

Amplitude: 9.19031 mV
X Coord: 6243956.75
Y Coord: 2078150
Shared With: N/A

Item Group: Other
Class: Other
Category: Other
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Left in Place
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 6
Weight: 0

Additional Description:
Survey marker

Dig Results Report

E-8-00002 Item: A

Dig Date: 4/14/2015

Amplitude: 5.36288 mV

X Coord: 6243958

Y Coord: 2078108

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 2

Depth: 24

Weight: 2

Additional Description:

Excavator dig

E-8-00003 Item: A

Dig Date: 4/3/2015

Amplitude: 79.1527 mV

X Coord: 6243979.75

Y Coord: 2078104.25

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 20

Weight: 5

Additional Description:

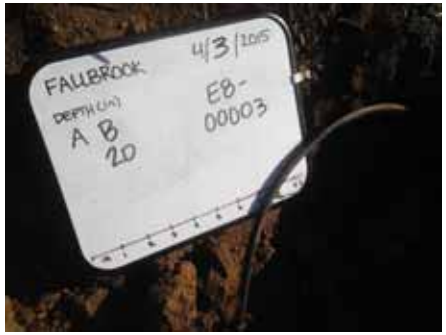
Characterized with utility below m31s

Dig Results Report

E-8-00003 Item: B

Dig Date: 4/3/2015

Amplitude: 79.1527 mV
X Coord: 6243979.75
Y Coord: 2078104.25
Shared With: N/A



Item Group: Other
Class: Other
Category: Buried Utility
Filler Type: Not Applicable
Fuze: Not Applicable
Additional Description:

Action Taken: Left in Place
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 20
Weight: 0

E-8-00004 Item: A

Dig Date: 4/3/2015

Amplitude: 76.9340 mV
X Coord: 6243988.25
Y Coord: 2078104.25
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable
Additional Description:

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 3
Depth: 6
Weight: 2

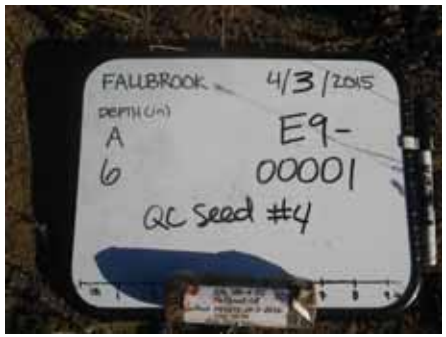
E-9

Dig Results Report

E-9-00001 Item: A

Dig Date: 4/3/2015

Amplitude: 30.5311 mV
X Coord: 6244075.5
Y Coord: 2078069
Shared With: N/A



Item Group: QC Seed
Class: QC Seed
Category: QC Seed
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Returned To QC
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 6
Weight: 0.5

Additional Description:
Seed #04

E-9-00002 Item: A

Dig Date: 4/3/2015

Amplitude: 43.9162 mV
X Coord: 6244128
Y Coord: 2078116.25
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 3
Weight: 0.5

Additional Description:

Dig Results Report

E-9-00003 Item: A

Dig Date: 4/6/2015

Amplitude: 6.49149 mV

X Coord: 6244146.5

Y Coord: 2078089.75

Shared With: E-9-00007

Item Group: Shared

Class: Shared

Category: Shared

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Not Applicable

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 0

Depth: 30

Weight: 0

Additional Description:

Shared with E-9-00007B

E-9-00005 Item: A

Dig Date: 4/3/2015

Amplitude: 44.9957 mV

X Coord: 6244148.5

Y Coord: 2078115

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 5

Weight: 1

Additional Description:

Dig Results Report

E-9-00006 Item: A

Dig Date: 4/3/2015

Amplitude: 10.6468 mV
X Coord: 6244148.75
Y Coord: 2078119.75
Shared With: N/A

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Additional Description:

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 1
Depth: 4
Weight: 0.5

E-9-00007 Item: B

Dig Date: 4/6/2015

Amplitude: 5.11188 mV
X Coord: 6244152.25
Y Coord: 2078094.5
Shared With: E-9-00003

Item Group: MDAS
Class: Grenade
Category: Rifle, Practice, M31
Filler Type: Not Applicable
Fuze: Not Applicable

Additional Description:
Excavator dig. Lower depth hit shared with E9_00003.

Action Taken: Consolidation Point
☐ Demo Required?
☐ Pit? ☐ Frag?
Quantity: 15
Depth: 30
Weight: 20

Dig Results Report

E-9-00007 Item: A

Dig Date: 4/10/2015

Amplitude: 5.11188 mV

X Coord: 6244152.25

Y Coord: 2078094.5

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 12

Weight: 0.5

Additional Description:

Practice tailboom

E-9-00009 Item: A

Dig Date: 4/3/2015

Amplitude: 20.4298 mV

X Coord: 6244153.25

Y Coord: 2078119.5

Shared With: N/A

Item Group: MDAS

Class: Grenade

Category: Rifle, Practice, M31

Filler Type: Not Applicable

Fuze: Not Applicable

Action Taken: Consolidation Point

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 10

Weight: 2

Additional Description:

F-7

Dig Results Report

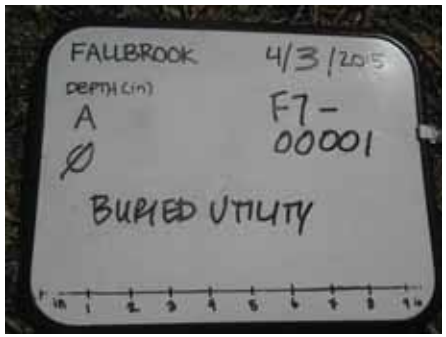
F-7-00001 **Item: A** **Dig Date:** 4/3/2015

Amplitude: 15.8475 mV

X Coord: 6243872.5

Y Coord: 2078159.25

Shared With: N/A



Item Group: Other

Class: Other

Category: Buried Utility

Filler Type: Not Applicable

Fuze: Not Applicable

Additional Description:

Action Taken: Left in Place

☐ Demo Required?

☐ Pit? ☐ Frag?

Quantity: 1

Depth: 0

Weight: 0

Appendix G
Disposal Documentation

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Bonetti Explosives, LLC

May 12, 2015

Invoice # 3129

Mr. George Mackanin
American EOD Services, Inc.
P.O. Box 1237
Spearfish, South Dakota 57783-1237

Re: MDAS sent from Fallbrook, CA by USAE / CH2MHILL

Mr. Mackanin,

This letter is to verify that Bonetti Explosives, LLC has received fifteen (15) 55 gallon drums weighing 3,680 lbs of assumed MDAS sent by USAE/CH2MHILL from Fallbrook, CA. The material was not removed from the drums and could not be verified. However, the weight of the MDAS was calculated using standard drum and pallet weights and was found to be 2,800 lbs. The material arrived on April 21, 2015 in good condition. Security seal numbers and notations are as follows:

Drum#	Security seal #s
1.	629984
2.	629505
3.	235717
4.	235704
5.	629987
6.	629989
7.	235702
8.	235709
9.	235707
10.	235701
11.	629985
12.	629988
13.	629986
14.	725922
15.	629983

This shipment of MDAS has not been opened; therefore release of liability cannot be issued at this time. These drums will not be opened until a representative from the client is present as per client's request. This material is being stored in A-1 processing area until it is opened, verified with accompanying 1348, and smelted in the presence of a witness from the client. After that time, a final disposition letter will be issued.

Thank you for your Business,

Gina Barnett

Gina Barnett

303 Washington St, Columbus TX, 78934
www.Bonettiexplosives.com

(979) 739-5597
Bonetti4@yahoo.com

Bonetti Explosives, LLC

May 29, 2015

Invoice # 3129

Mr. George Mackanin
American EOD Services, Inc.
P.O. Box 1237
Spearfish, South Dakota 57783-1237

Re: MDAS sent from Fallbrook, CA by CH2MHILL

Mr. Mackanin,

This letter is to verify that Bonetti Explosives, LLC has smelted and prepared for recycling, in the presence of a CH2MHILL representative, fifteen (15) drums weighing 2,800 lbs of MDAS which was received on April 21, 2015. The contents of the container was not sold, traded or otherwise given to another party until the contents were properly prepared for recycle and only identifiable by their basic content. On May 26, 2015, the material was dispositioned into civilian recycling in accordance with EM 200-1-15, NAVSEA OP 5, DOD 4160.28 AND DOD 4160.62; this is your final letter regarding this matter.

Thank you for your Business,

Matt Barnett

(979) 739-5597

P.O. Box 116, Columbus TX, 78934
www.Bonettiexplosives.com

(979) 739-5597
Bonetti4@yahoo.com

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1 2 3	4 5 6 7	23 24	25 26 27 28 29	45 46 47 48 49 50	51	52 53	54 55 56	57 58 59	60 61	62 63	64 65	66 67	68	69 70	71 72	73 74 75 76 77 78 79 80
DOCIDENT	RI FROM M&S	UNIT ISS	QUANTITY	SER SUPPLEMENTARY ADDRESS	SIG	FUND	DISTRIBUTION	PROJECT	PRI	REQD DELL DATE	ADV		RI	O/P	COND MGT	UNIT PRICE DOLLARS CTS

1. TOTAL PRICE		2. SHIP FROM	3. SHIP TO
DOLLARS	CTS	USAE Environmental POC Dan Paul (989)351-8633	Daley Iron POC Matt Barnett (979)739-5597
		4. MARK FOR	

5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS
4/1/2015			55 Gallon Drum	

10. QTY. REC'D	11. UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE
Material Documented as Safe (MDAS)

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE
		220lbs	

22. RECEIVED BY	23. DATE RECEIVED

PREVIOUS EDITION MAY BE USED

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4/5
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

smelted on 5/26/15
witnessed by

25. NATIONAL STOCK NO. & ADD (8-22)

Barrel# 1

Seal # 629984

26. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-58) UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Daly Iron
1618 Smith Rau Road
Columbus, TX

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

Adobe Designer 7.0

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1 2 3	4 5 6	7	23 24	25 26 27 28 29	45 46 47	48 49 50	51 52	53 54 55	56 57 58	59 60	61 62	63 64	65 66	67 68	69 70	71	72 73	74 75	76 77	78 79 80
DOC	IDENT	RI FROM	M&S	UNIT	ISS	QUANTITY	SER	SUPPLE-MENTARY ADDRESS	SIG	FUND	DIS-TRI-BU-TION	PRO-JECT	PRI	REQD	DEL	DATE	ADV	RI	O/P	COND	MGT

1. TOTAL PRICE			2. SHIP FROM	3. SHIP TO
UNIT PRICE	DOLLARS	CTS	USAE Environmental POC Dan Paul (989)351-8633	Daley Iron POC Matt Barnett (979)739-5597
DOLLARS / CTS			4. MARK FOR	

PREVIOUS EDITION MAY BE USED

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4/5
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

Smetell on 5/24/15
Witnessed by

25. NATIONAL STOCK NO. & ADD (8-22)

Barrel# 2

Seal # 629505

FINAL

26. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-56) UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Daly Iron
1618 Smith Rau Road
Columbus, TX

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS
4/6/15			55 Gallon Drum	

10. QTY. REC'D	11.UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE
Material Documented as Safe (MDAS)

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE
		276 LBS	

22. RECEIVED BY	23. DATE RECEIVED

Adobe Designer 7.0

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1 2 3 4 5 6 7	23 24 25 26 27 28 29	45 46 47 48 49 50	51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80				
DOC IDENT	RI FROM M&S	UNIT ISS QUANTITY	SER SUPPLEMENTARY ADDRESS SIG FUND DISTRIBUTION PROJECT PRI REQD DELL DATE ADV RI O/P COND MGT	UNIT PRICE DOLLARS CTS	1. TOTAL PRICE DOLLARS CTS	2. SHIP FROM USAE Environmental POC Dan Paul (989)351-8633	3. SHIP TO Daley Iron POC Matt Barnett (979)739-5597
						4. MARK FOR	

5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS
4/7/15			55 Gallon Drum	

10. QTY. REC'D	11. UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE
Material Documented as Safe (MDAS)

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE
		165 LBS	

22. RECEIVED BY	23. DATE RECEIVED

PREVIOUS EDITION MAY BE USED

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4/5
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

smelted on 5/26/15
witnessed by

25. NATIONAL STOCK NO. & ADD (8-22)

Barrel# 3

Seal # 235717

FINAL

26. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-56) UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Daly Iron
1618 Smith Rau Road
Columbus, TX

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

Adobe Designer 7.0

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1 2 3	4 5 6	7	23 24	25 26 27 28 29	45 46	47 48 49 50	51	52 53	54 55	56 57 58	59 60	61 62	63 64	65 66	67 68	69 70	71 72	73 74 75	76 77	78 79 80
DOCIDENT	RI FROM	M&S	UNIT	ISS QUANTITY	SER	SUPPLEMENTARY ADDRESS	SIG	FUND	DISTRIBUTION	PROJECT	PRI	REQD	DELDATE	ADV	RI	O/P	COND	MGT	UNIT PRICE DOLLARS	UNIT PRICE CTS

1. TOTAL PRICE DOLLARS	CTS	2. SHIP FROM	3. SHIP TO
		USAE Environmental POC Dan Paul (989)351-8633	Daley Iron POC Matt Barnett (979)739-5597
		4. MARK FOR	

5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS
4/7/15			55 Gallon Drum	

10. QTY. REC'D	11. UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE
Material Documented as Safe (MDAS)

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE
		129 LBS	

22. RECEIVED BY	23. DATE RECEIVED

PREVIOUS EDITION MAY BE USED

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4/5
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

Smelted on 5/26/15
Witnessed by

25. NATIONAL STOCK NO. & ADD (8-22)

Barrel# 4

Seal # 235704

FINAL

26. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-56) UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Daly Iron
1618 Smith Rau Road
Columbus, TX

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

Adobe Designer 7.0

FORM 1348-1A JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1-2 DOCT	3-4 IDENT	5-6 RI FROM	7 M&S	23 UNIT	24-25 ISS	26-29 QUANTITY	45 SER	46-49 SUPPLEMENTARY ADDRESS	50 SIG	51-52 FUND	53-54 DISTRIBUTION	55-56 PROJECT	57 PRI	58-59 REQD	60-61 DELL	62-63 DATE	64 ADV	65-66 RI	67 O/P	68 COND	69 MGT	70-73 UNIT PRICE DOLLARS	74-80 UNIT PRICE CTS

1. TOTAL PRICE DOLLARS	CTS	2. SHIP FROM	3. SHIP TO
		USAE Environmental POC Dan Paul (989)351-8633	Daley Iron POC Matt Barnett (979)739-5597

4. MARK FOR

5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS
			55 Gallon Drum	

10. QTY. REC'D	11. UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL
4/7/15					

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE

Material Documented as Safe (MDAS)

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE
		130 LBS	

22. RECEIVED BY

23. DATE RECEIVED

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4[redacted]
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

Smelted on 5/26/15
witnessed by

25. NATIONAL STOCK NO. & ADD (8-22)

Barrel# 5

Seal # 629987

FINAL

26. RIC (4-6)
UI (23-24)
QTY (25-29)
CON CODE (71)
DIST (55-56)
UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Daly Iron
1618 Smith Rau Road
Columbus, TX

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

PREVIOUS EDITION MAY BE USED

Adobe Designer 7.0

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1	2	3	4	5	6	7	23	24	25	26	27	28	29	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
DOC	IDENT		RI FROM			M&S	UNIT	ISS	QUANTITY					SER	SUPPLEMENTARY ADDRESS					SIG	FUND		DISTRIBUTION			PROJECT			PRI	REQD	DEL	DATE		ADV			RI			O/P	COND	MGT							

1. TOTAL PRICE			2. SHIP FROM	3. SHIP TO
UNIT PRICE	DOLLARS	CTS	USAE Environmental POC Dan Paul (989)351-8633	Daley Iron POC Matt Barnett (979)739-5597
DOLLARS / CTS			4. MARK FOR	

5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS
4/8/15			55 Gallon Drum	

10. QTY. REC'D	11. UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE
Material Documented as Safe (MDAS)

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE
		135 LBS	

22. RECEIVED BY	23. DATE RECEIVED

PREVIOUS EDITION MAY BE USED

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4/5
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

Smelted on 5/26/15
Witnessed by

25. NATIONAL STOCK NO. & ADD (8-22)

Barrel# 6

Seal # 629989

FINAL

26. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-56) UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Daly Iron
1618 Smith Rau Road
Columbus, TX

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

Adobe Designer 7.0

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

DOC	IDENT	RI FROM	M&S	UNIT	ISS	QUANTITY	SER	SUPPLEMENTARY ADDRESS	SIG	FUND	DISTRIBUTION	PROJECT	PRI	REQD	DEL	DATE	ADV	RI	O/P	COND	MGT

UNIT PRICE DOLLARS	CTS	DOLLARS	CTS

1. TOTAL PRICE

2. SHIP FROM: USAE Environmental, POC Dan Paul, (989)351-8633

3. SHIP TO: Daley Iron, POC Matt Barnett, (979)739-5597

4. MARK FOR

5. DOC DATE: 4/8/15

6. NMFC

7. FRT RATE

8. TYPE CARGO: 55 Gallon Drum

9. PS

10. QTY. REC'D

11. UP

12. UNIT WEIGHT

13. UNIT CUBE

14. UFC

15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE: Material Documented as Safe (MDAS)

18. TY CONT

19. NO CONT

20. TOTAL WEIGHT: 127 LBS

21. TOTAL CUBE

22. RECEIVED BY

23. DATE RECEIVED

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4/5
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

SMcFadden 5/26/15
Witnessed by

25. NATIONAL STOCK NO. & ADD (8-22)

Barrel# 7

Seal # 235702

FINAL

26. RIC (4-6) UI (23-24) QTY (26-29) CON CODE (71) DIST (55-58) UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Daly Iron
1618 Smith Rau Road
Columbus, TX

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

PREVIOUS EDITION MAY BE USED

Adobe Designer 7.0

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1	2	3	4	5	6	7	23	24	25	26	27	28	29	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
DOC	IDENT		RI FROM			M&S	UNIT	ISS	QUANTITY					SER	SUPPLEMENTARY ADDRESS				SIG	FUND	DISTRIBUTION		PROJECT		PRI	REQD	DEL	DATE	ADV		RI			O/P	COND	MGT											

1. TOTAL PRICE		
DOLLARS	CTS	

UNIT PRICE	
DOLLARS	CTS

2. SHIP FROM	3. SHIP TO
USAE Environmental POC Dan Paul (989)351-8633	Daley Iron POC Matt Barnett (979)739-5597

4. MARK FOR

5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS
4/9/15			55 Gallon Drum	

10. QTY. REC'D	11. UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE
Material Documented as Safe (MDAS)

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE
		140 LBS	

22. RECEIVED BY	23. DATE RECEIVED

PREVIOUS EDITION MAY BE USED

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4/5
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

Smelted on 5/26/15
Witnessed by

25. NATIONAL STOCK NO. & ADD (8-22)

Barrel# 8

Seal # E35709

FINAL

26. RIC (4-8) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-56) UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Daly Iron
1618 Smith Rau Road
Columbus, TX

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

Adobe Designer 7.0

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1 DOC	2 IDENT	3 4 5 6 RI FROM	7 M&S	23 UNIT	24 25 ISS	26 27 28 29 QUANTITY	45 SER	46 47 48 49 50 SUPPLEMENTARY ADDRESS	51 SIG	52 53 FUND	54 55 DISTRIBUTION	56 57 58 PROJECT	59 PRI	60 61 REQD	62 63 DELL	64 DATE	65 66 ADV	67 68 69 RI	70 O/P	71 COND	72 73 MGT

1. TOTAL PRICE			2. SHIP FROM	3. SHIP TO
UNIT PRICE	DOLLARS	CTS	USAE Environmental POC Dan Paul (989)351-8633	Daley Iron POC Matt Barnett (979)739-5597
DOLLARS / CTS			4. MARK FOR	

5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS
4/9/15			55 Gallon Drum	

10. QTY. REC'D	11. UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE
Material Documented as Safe (MDAS)

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE
		131 LBS	

22. RECEIVED BY	23. DATE RECEIVED

PREVIOUS EDITION MAY BE USED

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4/5
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

Sanctioned on 5/26/15
Witnessed by

25. NATIONAL STOCK NO. & ADD (8-22)

Barrel# 9

Seal # 235707

FINAL

26. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-56) UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Daly Iron
1618 Smith Rau Road
Columbus, TX

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

Adobe Designer 7.0

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1	2	3	4	5	6	7	23	24	25	26	27	28	29	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
DOCUMENT			RI FROM			M&S	UNIT	ISS	QUANTITY					SER	SUPPLEMENTARY ADDRESS					SIG	FUND		DISTRIBUTION			PROJECT			PRI	REQD	DELDATE			ADV			RI		O/P	COND	MGT							

1. TOTAL PRICE

UNIT PRICE: DOLLARS / CTS

DOLLARS / CTS

2. SHIP FROM: USAE Environmental, POC Dan Paul, (989)351-8633

3. SHIP TO: Daley Iron, POC Matt Barnett, (979)739-5597

4. MARK FOR

5. DOC DATE: 4/10/15

6. NMFC

7. FRT RATE

8. TYPE CARGO: 55 Gallon Drum

9. PS

10. QTY. REC'D | 11. UP | 12. UNIT WEIGHT | 13. UNIT CUBE | 14. UFC | 15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE: Material Documented as Safe (MDAS)

18. TY CONT | 19. NO CONT | 20. TOTAL WEIGHT: 130 LBS | 21. TOTAL CUBE

22. RECEIVED BY

23. DATE RECEIVED

PREVIOUS EDITION MAY BE USED

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4/5
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

Smelted on 5/26/15
Witnessed by

25. NATIONAL STOCK NO. & ADD (8-22)

Barrel# 10

Seal # 235701

26. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-56) UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Daly Iron
1618 Smith Rau Road
Columbus, TX

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

Adobe Designer 7.0

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

DOCUMENT	RI FROM	M&S	UNIT	ISS	QUANTITY	SER	SUPPLEMENTARY ADDRESS	SIG	FUND	DISTRIBUTION	PROJECT	PRI	REQD	DELDATE	ADV	RI	O/P	COND	MGT

1. TOTAL PRICE		2. SHIP FROM	3. SHIP TO
UNIT PRICE DOLLARS	CTS	USAE Environmental POC Dan Paul (989)351-8633	Daley Iron POC Matt Barnett (979)739-5597
DOLLARS	CTS	4. MARK FOR	

5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS
4/10/15			55 Gallon Drum	

10. QTY. REC'D	11. UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE
Material Documented as Safe (MDAS)

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE
		133 LBS	

22. RECEIVED BY	23. DATE RECEIVED

PREVIOUS EDITION MAY BE USED

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4/5
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

Sealed on 5/26/15
Witnessed by

25. NATIONAL STOCK NO. & ADD (8-22)

Barrel# 11

Seal # 629985

26. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-56) UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Daly Iron
1618 Smith Rau Road
Columbus, TX

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

Adobe Designer 7.0

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1 2 3	4 5 6	7	23 24	25 26 27 28 29	45 46	47 48 49 50	51	52 53	54 55 56	57 58 59	60 61	62 63	64 65	66 67 68	69	70 71	72 73	74 75 76 77 78 79 80
DOCIDENT	RI FROM	M&S	UNIT	ISS QUANTITY	SER	SUPPLEMENTARY ADDRESS	SIG	FUND	DISTRIBUTION	PROJECT	PRI	REQD	DELDATE	ADV	RI	O/P	COND	MGT

1. TOTAL PRICE			2. SHIP FROM	3. SHIP TO
UNIT PRICE DOLLARS	CTS	DOLLARS	CTS	USAE Environmental POC Dan Paul (989)351-8633	Daley Iron POC Matt Barnett (979)739-5597
			4. MARK FOR	

5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS
4/13/15			55 Gallon Drum	

10. QTY. REC'D	11. UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE

Material Documented as Safe (MDAS)

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE
		155 LBS	

22. RECEIVED BY	23. DATE RECEIVED

PREVIOUS EDITION MAY BE USED

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4/5
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

Smelted on 5/26/15
Witnessed by

25. NATIONAL STOCK NO. & ADD (8-22)

Barrel# 12

Seal # 629988

FINAL

26. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-66) UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Daly Iron
1618 Smith Rau Road
Columbus, TX

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

Adobe Designer 7.0

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1 2 3	4 5 6	7	23 24	25 26 27 28 29	45 46 47 48 49 50	51	52 53 54	55 56 57 58	59 60	61 62 63	64 65	66 67 68	69 70	71 72	73 74 75 76 77 78 79 80
DOCUMENT	RI FROM	M&S	UNIT	ISS QUANTITY	SER SUPPLEMENTARY ADDRESS	SIG	FUND	DISTRIBUTION	PROJECT	PRI	REQD DELL DATE	ADV	RI	O/P	COND MGT

UNIT PRICE DOLLARS	UNIT PRICE CTS	1. TOTAL PRICE DOLLARS	CTS

2. SHIP FROM: USAE Environmental, POC Dan Paul, (989)351-8633

3. SHIP TO: Daley Iron, POC Matt Barnett, (979)739-5597

4. MARK FOR

5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS
4/13/15			55 Gallon Drum	

10. QTY. REC'D	11. UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE: Material Documented as Safe (MDAS)

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE
		148 LBS	

22. RECEIVED BY

23. DATE RECEIVED

PREVIOUS EDITION MAY BE USED

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4/5
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

Smelted on 5/24/15
Witnessed by

25. NATIONAL STOCK NO. & ADD (8-22)

Barrel# 13

Seal # 629986

FINAL

26. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-56) UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Daly Iron
1618 Smith Rau Road
Columbus, TX

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

Adobe Designer 7.0

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

DOC IDENT	RI FROM	M&S	UNIT ISS	QUANTITY	SER	SUPPLEMENTARY ADDRESS	SIG	FUND	DISTRIBUTION	PROJECT	PRI	REQD	DELL DATE	ADV	RI	O/P	COND	MGT	UNIT PRICE DOLLARS	UNIT PRICE CTS	1. TOTAL PRICE DOLLARS	CTS

2. SHIP FROM: USAE Environmental, POC Dan Paul, (989)351-8633

3. SHIP TO: Daley Iron, POC Matt Barnett, (979)739-5597

4. MARK FOR

5. DOC DATE: 4/14/15

6. NMFC

7. FRT RATE

8. TYPE CARGO: 55 Gallon Drum

9. PS

10. QTY. REC'D | 11. UP | 12. UNIT WEIGHT | 13. UNIT CUBE | 14. UFC | 15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE: Material Documented as Safe (MDAS)

18. TY CONT | 19. NO CONT | 20. TOTAL WEIGHT: 98 LBS | 21. TOTAL CUBE

22. RECEIVED BY | 23. DATE RECEIVED

PREVIOUS EDITION MAY BE USED

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4/5
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

Smelted on 5/26/15
witnessed by

25. NATIONAL STOCK NO. & ADD (8-22)

Barrel# 14

Seal # 725922

FINAL

26. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-56) UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Daly Iron
1618 Smith Rau Road
Columbus, TX

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

Adobe Designer 7.0

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1 2 3	4 5 6	7	23 24 25	26 27 28 29	45 46 47	48 49 50	51 52 53	54 55 56	57 58 59	60 61	62 63	64 65	66 67 68	69 70	71 72	73 74 75	76 77 78	79 80
DOC DENT	RI FROM	M&S	UNIT	ISS QUANTITY	SER	SUPPLEMENTARY ADDRESS	SIG	FUND	DISTRIBUTION	PROJECT	PRI	REQD DELT	DATE ADV	RI	O/P	COND MGT	UNIT PRICE DOLLARS	CTS

1. TOTAL PRICE DOLLARS	CTS	2. SHIP FROM	3. SHIP TO
		USAE Environmental POC Dan Paul (989)351-8633	Daley Iron POC Matt Barnett (979)739-5597
		4. MARK FOR	

5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS
4/14/15			55 Gallon Drum	

10. QTY. REC'D	11. UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE
Material Documented as Safe (MDAS)

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE
		175 LBS	

22. RECEIVED BY	23. DATE RECEIVED

PREVIOUS EDITION MAY BE USED

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4/5
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

Smelted on 5/26/15
Witnessed by

25. NATIONAL STOCK NO. & ADD (8-22)

Barrel# 15

Seal # 629983

FINAL

26. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (71) DIST (55-56) UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Daly Iron
1618 Smith Rau Road
Columbus, TX

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

Adobe Designer 7.0

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

PREVIOUS EDITION MAY BE USED

DOC IDEN	RI FROM	M&S	UNIT	ISS	QUANTITY	SER	SUPPLEMENTARY ADDRESS	SIG	FUND	DISTRIBUTION	PROJECT	PRI	REQD	DELIV DATE	ADV		TP	COND	MGT	UNIT PRICE		DOLLARS	CTS

1. TOTAL PRICE

2. SHIP FROM
USAE Environmental
POC Dan Paul
(989)351-8633

3. SHIP TO
Fallbrook Waste and Recycling
(760)728-6114

4. MARK FOR

24. DOCUMENT NUMBER & SUFFIX (30-44)

Munitions Response Program Site UXO4/5
Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070

5. COC DATE: 4/15/2015
6. NMFC
7. FRT RATE
8. TYPE CARGO: In Pickup Truck
9. PS
10. QTY. RECD: 2
11. UP
12. UNIT WEIGHT
13. UNIT CUBE
14. UFC
15. SL
16. FREIGHT CLASSIFICATION NOMENCLATURE
17. ITEM NOMENCLATURE: Scrap Metal
18. TY CONT
19. NO CONT
20. TOTAL WEIGHT: 2090lbs
21. TOTAL CUBE
22. RECEIVED BY
23. DATE RECEIVED

25. NATIONAL STOCK NO. & ADD (8-23)

26. RIC (4-6) UI (23-24) QTY (25-29) CON CODE (77) DIST (55-56) UP (74-80)

"The material listed on this form has been inspected or processed by DDESB approved means, as required by Department of Defense policy, and to the best of my knowledge and belief does not pose an explosive hazard."

Shipped to: Fallbrook Waste and Recycling
550 West Aviation
Fallbrook, CA 92028

27. ADDITIONAL DATA

Verified By

Dan Paul
USAE Environmental
Senior UXO Specialist
(989)351-8633

Certified By

Dave McDonald
CH2M Hill/Munitions Response Group
Quality Control Specialist
(949)285-0746

Adobe Designer 7.0

tomer: 0000 Ticket: 30201 In: 14:13 Truck: 0000
Date: 04/15/15 Out: 14:35 Container:
Route: 05610
Origin: 056 P

C. CASH DRIVE UP

modity	Units	Rate			
RESIDENTIAL REFUSE	.52	68.00 per TON			
oss(In): 3.65 tons Scl#1	Tare 3.13 tons Scl#1	Net: .52 to			

Net Amount

PAID CREDIT CARD

ALICIA Driver

LBROOK WASTE & RECYCLING
WEST AVIATION
LBROOK, CA 92028
0) 728-6114

IN

comer: 0000 Ticket: 30202 In: 14:14 Truck: 0000
Date: 04/15/15 Out: 14:37 Container:
Route: 05610
Origin: 056 P

C. CASH DRIVE UP

odity	Units	Rate			
RESIDENTIAL REFUSE	.57	68.00 per TON			
ss(In): 3.42 tons Scl#1	Tare 2.85 tons Scl#1	Net: .57 ton			

Net Amount

PAID CREDIT CARD

ALICIA Driver

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Appendix H
Laboratory Analytical Reports

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TABLE OF CONTENTS

CLIENT: **KLEINFELDER**

PROJECT: **CTO 070, UXO4, FALLBROOK**

SDG: **15D027**

SECTION		PAGE
Cover Letter, COC/Sample Receipt Form		1000 – 1003
GC/MS-VOA	**	2000 –
GC/MS-SVOA	**	3000 –
GC-VOA	**	4000 –
GC-SVOA	**	5000 –
HPLC	METHOD SW8330A	6000 – 6041
METALS	METHOD SW6020A METHOD SW7471A	7000 – 7060 7061 – 7073
WET	METHOD 6850 METHOD 7199	8000 – 8047 8048 – 8096
OTHERS	**	9000 –

** - Not Requested

EMAX
LABORATORIES, INC.
1835 W. 205th Street
Torrance, CA 90501
Tel: (310) 618-8889
Fax: (310) 618-0818

Date: 04-30-2015
EMAX Batch No.: 15D027

Attn: Scott Fleming

Kleinfelder
1320 Columbia St, Suite 310
San Diego, CA 92101

Subject: Laboratory Report
Project: CTO 070, UX04, FALLBROOK

Enclosed is the Laboratory report for samples received on 04/03/15.
The data reported relate only to samples listed below :

Sample ID	Control #	Col Date	Matrix	Analysis
UX04-SB01-1.0	D027-01	04/02/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850

The results are summarized on the following pages.

Please feel free to call if you have any questions concerning
these results.

Sincerely yours,

Caspar J. Pang
Laboratory Director

This report is confidential and intended solely for the use of the individual or entity to whom it is addressed. This report shall not be reproduced except in full or without the written approval of EMAX.

EMAX certifies that results included in this report meets all NELAC & DOD requirements unless noted in the Case Narrative.

NELAC Accredited Certificate Number 02116CA
L-A-B Accredited DoD ELAP and ISO/IEC 17025 Certificate Number L2278 Testing

Chain of Custody Form

COC# 0070- 01
Page 1 of 1

CTO-070, UXO4, Fallbrook, CA

Project Manager: Gus Thrasher

Contact: sfleming@kleinfelder.com (865-924-6911)

Sampler: G. THRASHER / J. WILLIAMS

Sampler Phone: 858-717-5545

Signature:

Date: 4/2/15

150027

Analytical Laboratory
EMAX Laboratory
1835 W. 205th Street
Torrance CA 90501
Phone (310) 618-8889

Attn Ye Myint

Lab TAT
28-day LIV package &
EQuIS LOD/LOQ EFWEDD

Deliver data to
sfleming@kleinfelder.com &
gkellar@kleinfelder.com

General Comments:
P=Preserved; U=Unpreserved
FP=Filtered and Preserved

Sample ID	Location ID	Sample Matrix	Sample Date	Sample Time	# Containers	Explosives Method 8330A	Metals including Strontium Method 6020	Perchlorate Method 6850	Hexavalent Chromium Method 7199	Mercury Method 7470/7471A								Sample Comments
4 UXO4- SB01-1.0	E11-00001	SOIL	4/2/15	1300	2	U	U	U	U	U								
UXO4-																		
UXO4-																		
UXO4-																		
UXO4-																		
UXO4-																		
UXO4-																		
UXO4-																		

Sample Transport:
Lab Courier
Shipping Company:

Sample Disposal
Disposal by Lab - 60 day retention

Tracking #

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
	4/3/15	1135	Keith Stout	4-3-15	11:35
Keith Stout	4-3-15	1429		4/3/15	14:29

Temp - 1.0°

1001

SAMPLE RECEIPT FORM 1

Reference Number: SM02.7.3

Type of Delivery	Airbill / Tracking Number	ECN 15D027
☐ Fedex ☐ UPS ☐ GSO ☐ Others		Recipient I Lafez
☐ EMAX Courier ☐ Client Delivery		Date 4/3/15 Time 1424

COC INSPECTION

☑ Client Name	☑ Client PM/FC	☑ Sampler Name	☑ Sampling Date/Time	☑ Sample ID	☑ Matrix
☑ Address	☑ Tel # / Fax #	☐ Courier Signature	☑ Analysis Required	☐ Preservative (if any)	☑ TAT
Safety Issues (if any)	☐ High concentrations expected	☐ From Superfund Site	☐ Rad screening required		

Note:

PACKAGING INSPECTION

Container	☑ Cooler	☐ Box	☐ Other		
Condition	☑ Custody Seal	☑ Intact	☐ Damaged		
Packaging	☑ Bubble Pack	☐ Styrofoam	☐ Popcorn	☑ Sufficient	☐ _____
Temperatures (Cool, ≤6 °C but not frozen)	☑ Cooler 1 1.0 °C	☐ Cooler 2 _____ °C	☐ Cooler 3 _____ °C	☐ Cooler 4 _____ °C	☐ Cooler 5 _____ °C
	☐ Cooler 6 _____ °C	☐ Cooler 7 _____ °C	☐ Cooler 8 _____ °C	☐ Cooler 9 _____ °C	☐ Cooler 10 _____ °C
Thermometer:	*A - S/N* _____	FM 1/20/15 *B - S/N* 140252070	*C - S/N* 140252067	*D - S/N* _____	

Comments: ☐ **Temperature is out of range. PM was informed IMMEDIATELY.**

Note:

DISCREPANCIES

LabSampleID	LabSampleContainerID	Code	ClientSample Label ID / Information	Corrective Action
			4/3/15	

☐ pH holding time requirement for water samples is 15 mins. Water samples for pH analysis are received beyond 15 minutes from sampling time.

NOTES/OBSERVATIONS:

LEGEND:

☐ **Continue to next page.**

Code	Description- Sample Management	Code	Description-Sample Management	Code	Description-Sample Management
D1	Analysis is not indicated in _____	D13	Out of Holding Time	R1	Proceed as indicated in ☐ COC ☐ Label
D2	Analysis mismatch COC vs label	D14	Bubble is >6mm	R2	Refer to attached instruction
D3	Sample ID mismatch COC vs label	D15	No trip blank in cooler	R3	Cancel the analysis
D4	Sample ID is not indicated in _____	D16	Preservation not indicated in _____	R4	Use vial with smallest bubble first
D5	Container -[improper] [leaking] [broken]	D17	Preservation mismatch COC vs label	R5	Log-in with latest sampling date and time+1 min
D6	Date/Time is not indicated in _____	D18	Insufficient chemical preservative	R6	Adjust pH as necessary
D7	Date/Time mismatch COC vs label	D19	Insufficient Sample	R7	Filter and preserved as necessary
D8	Sample listed in COC is not received	D20	No filtration info for dissolved analysis	R8	_____
D9	Sample received is not listed in COC	D21	No sample for moisture determination	R9	_____
D10	No initial/date on corrections in COC/label	D22	_____	R10	_____
D11	Container count mismatch COC vs received	D23	_____	R11	_____
D12	Container size mismatch COC vs received	D24	_____	R12	_____

REVIEWS:

Sample Labeling _____ Date 4/3/15 4/3/15

SRF _____ Date 4/3/15

PM LP for [illegible] Date 4/3/15

REPORTING CONVENTIONS

DATA QUALIFIERS:

Lab Qualifier	AFCEE Qualifier	Description
J	F	Indicates that the analyte is positively identified and the result is less than RL but greater than MDL.
N		Indicates presumptive evidence of a compound.
B	B	Indicates that the analyte is found in the associated method blank as well as in the sample at above QC level.
E	J	Indicates that the result is above the maximum calibration range or estimated value.
*	*	Out of QC limit.

Note: The above qualifiers are used to flag the results unless the project requires a different set of qualification criteria.

ACRONYMS AND ABBREVIATIONS:

CRDL	Contract Required Detection Limit
RL	Reporting Limit
MRL	Method Reporting Limit
PQL	Practical Quantitation Limit
MDL	Method Detection Limit
DO	Diluted out

DATES

The date and time information for leaching and preparation reflect the beginning date and time of the procedure unless the method, protocol, or project specifically requires otherwise.

LABORATORY REPORT FOR

KLEINFELDER

CTO 070, UXO4, FALLBROOK

METHOD SW8330A
EXPLOSIVES

SDG#: 15D027

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D027

METHOD SW8330A
EXPLOSIVES

One (1) soil sample was received on 04/03/15 to be analyzed for Explosives in accordance with Method SW8330A and project specific requirements.

Holding Time
The sample was analyzed within the prescribed holding time.

Calibration
Multi-calibration points were generated to establish initial calibration (ICAL). ICAL was verified using a secondary source (ICV). Continuing calibration (CCV) verifications were carried on a frequency specified by the project. All calibration requirements were within acceptance criteria. Refer to calibration summary forms of ICAL, ICV and CCV for details.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, one (1) method blank was analyzed. EXD003SB - result was compliant to project requirement. Refer to sample result summary form for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, one (1) set of LCS/LCD was analyzed. EXD003SL/EXD003SC - all analytes were within LCS QC limits. Refer to LCS summary form for details.

Matrix QC Sample
No matrix QC sample was designated on this SDG.

Surrogate
Surrogate was added on QC and field samples. All surrogate recoveries were within QC limits. Refer to sample result summary forms for details.

Sample Analysis
All positive results above LOQ were confirmed by Biphenyl column. Confirmation was presumptive because it was based on retention time window. All project requirements were met otherwise anomalies were discussed within the associated QC parameter.
Soil samples were air dried, hence no moisture correction applied to RL and MDL.

LAB CHRONICLE
EXPLOSIVES

Client : KLEINFELDER
Project : CTO 070, UX04, FALLBROOK

SDG NO. : 15D027
Instrument ID : T081

SOIL

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1S	EXD003SB	1	NA	04/09/1516:40	04/08/1515:53	XD09007A	XD09002A	EXD003S	Method Blank
LCS1S	EXD003SL	1	NA	04/09/1517:15	04/08/1515:53	XD09008A	XD09002A	EXD003S	Lab Control Sample (LCS)
LCD1S	EXD003SC	1	NA	04/09/1517:50	04/08/1515:53	XD09009A	XD09002A	EXD003S	LCS Duplicate
UX04-SB01-1.0	D027-01	1	NA	04/09/1523:06	04/08/1515:53	XD09018A	XD09013A	EXD003S	Field Sample

FN - Filename
% Moist - Percent Moisture

SAMPLE RESULTS

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/02/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/03/15
Batch No.	: 15D027	Date Extracted:	04/08/15 15:53
Sample ID:	UX04-SB01-1.0	Date Analyzed:	04/09/15 23:06
Lab Samp ID:	D027-01	Dilution Factor:	1
Lab File ID:	XD09018A	Matrix :	SOIL
Ext Btch ID:	EXD003S	% Moisture :	NA
Calib. Ref.:	XD09013A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1950	2000	97.3	70-130

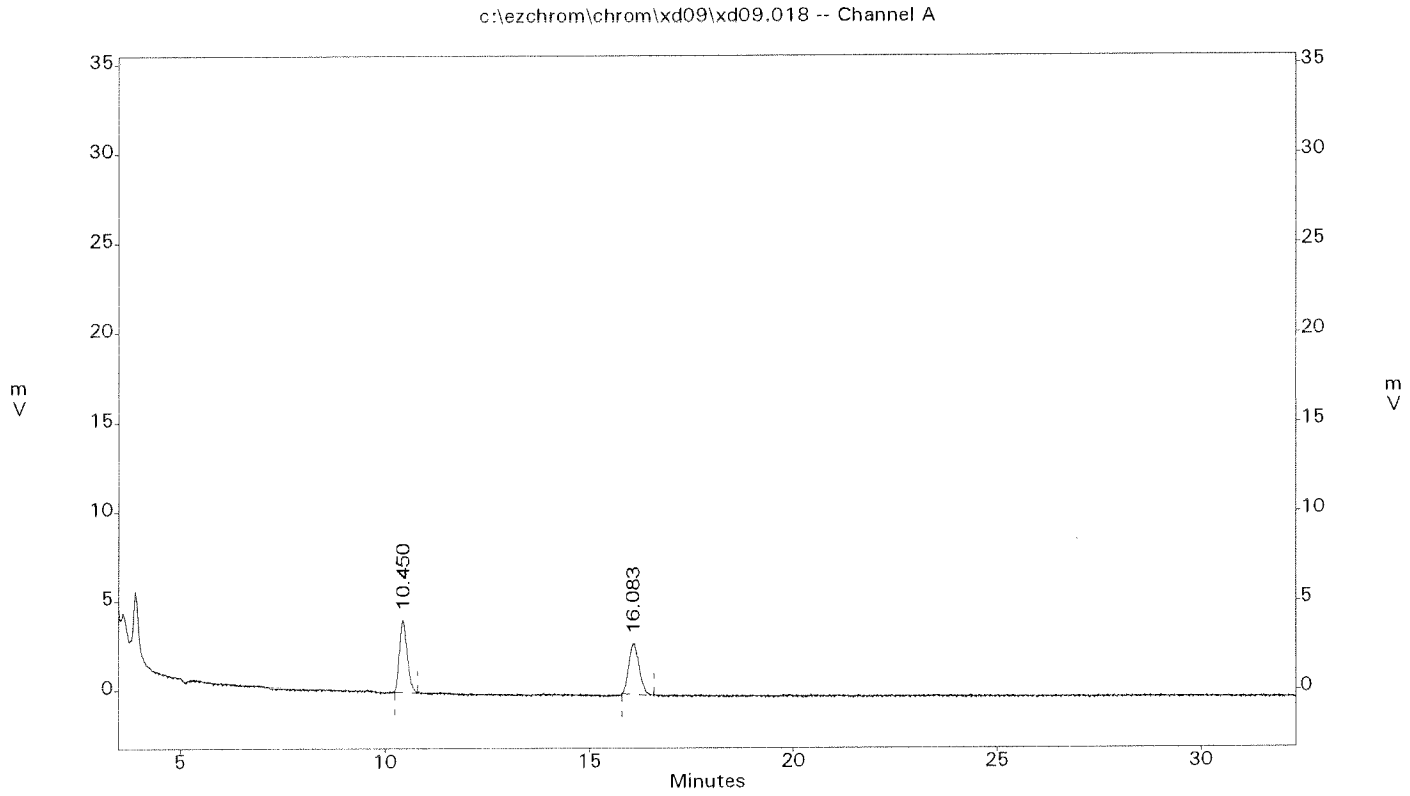
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd09\xd09.018
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D027-01
Acquired : Apr 09, 2015 23:06:21
Printed : Apr 10, 2015 14:47:17
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.650	0	0.0	0.0
--	RDX	7.167	0	0.0	0.0
--	1,3,5-TNB	9.733	0	0.0	0.0
1	1,2-Dinitrobenzene	10.450	53359	289.8	184.1
--	1,3-DNB	12.225	0	0.0	0.0
--	Tetryl	13.233	0	0.0	0.0
--	Nitrobenzene	14.408	0	0.0	0.0
--	2,4,6-TNT	15.900	0	0.0	0.0
2	3,4-DNT	16.083	51876	266.7	194.5
--	4-Am-2,6-DNT	16.942	0	0.0	0.0
--	2-Am-4,6-DNT	17.542	0	0.0	0.0
--	2,6-DNT	19.125	0	0.0	0.0
--	2,4-DNT	19.817	0	0.0	0.0
--	2-Nitrotoluene	24.075	0	0.0	0.0
--	4-Nitrotoluene	26.083	0	0.0	0.0
--	3-Nitrotoluene	27.942	0	0.0	0.0



QC SUMMARIES

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	NA
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/08/15
Batch No.	: 15D027	Date Extracted:	04/08/15 15:53
Sample ID:	MBLK1S	Date Analyzed:	04/09/15 16:40
Lab Samp ID:	EXD003SB	Dilution Factor:	1
Lab File ID:	XD09007A	Matrix :	SOIL
Ext Btch ID:	EXD003S	% Moisture :	NA
Calib. Ref.:	XD09002A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1980	2000	99.1	70-130

Note: All positive results are confirmed by Biphenyl column

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UXO4, FALLBROOK
BATCH NO.: 15D027
METHOD: SW8330A

MATRIX:	SOIL			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK1S				
LAB SAMP ID:	EXD003SB	EXD003SL	EXD003SC		
LAB FILE ID:	XD09007A	XD09008A	XD09009A		
DATE EXTRACTED:	04/08/1515:53	04/08/1515:53	04/08/1515:53	DATE COLLECTED:	NA
DATE ANALYZED:	04/09/1516:40	04/09/1517:15	04/09/1517:50	DATE RECEIVED:	04/08/15
PREP. BATCH:	EXD003S	EXD003S	EXD003S		
CALIB. REF:	XD09002A	XD09002A	XD09002A		

ACCESSION:

PARAMETER	BLNK RSLT (ug/kg)	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	SPIKE AMT (ug/kg)	BSD RSLT (ug/kg)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
HMX	ND	2000	2300	115	2000	2070	103	10	75-125	30
RDX	ND	2000	2130	107	2000	2120	106	0	70-135	30
1,3,5-TNB	ND	2000	2160	108	2000	2180	109	1	75-125	30
1,3-DNB	ND	2000	2180	109	2000	2170	108	1	80-125	30
Tetryl	ND	2000	2160	108	2000	2120	106	2	10-150	30
Nitrobenzene	ND	2000	2030	101	2000	2090	104	3	75-125	30
2,4,6-TNT	ND	2000	2080	104	2000	2020	101	3	55-140	30
4-AM-2,6-DNT	ND	2000	2010	101	2000	1940	97	4	80-125	30
2-AM-4,6-DNT	ND	2000	2120	106	2000	2090	105	1	80-125	30
2,6-DNT	ND	2000	1970	98	2000	2070	104	5	80-120	30
2,4-DNT	ND	2000	2090	105	2000	2120	106	1	80-125	30
2-Nitrotoluene	ND	2000	1910	95	2000	1890	94	1	80-125	30
3-Nitrotoluene	ND	2000	1920	96	2000	1940	97	1	75-120	30
4-Nitrotoluene	ND	2000	2050	103	2000	1710	86	18	75-125	30

SURROGATE PARAMETER	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	SPIKE AMT (ug/kg)	BSD RSLT (ug/kg)	BSD % REC	QC LIMIT (%)
3,4-Dinitrotoluene	2000	2120	106	2000	2110	105	70-130

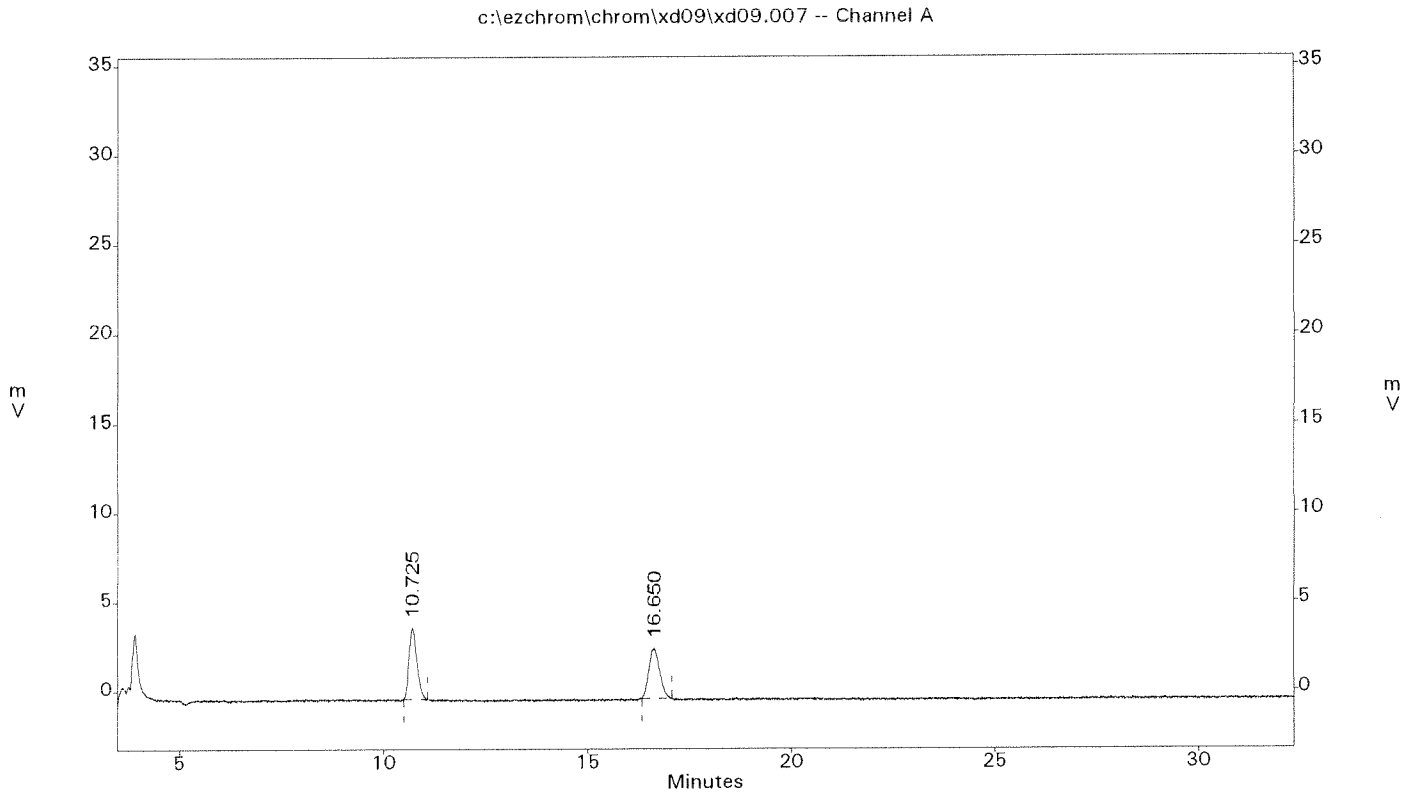
QC DATA

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd09\xd09.007
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD003SB
Acquired : Apr 09, 2015 16:40:31
Printed : Apr 10, 2015 14:30:52
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.700	0	0.0	0.0
--	RDX	7.308	0	0.0	0.0
--	1,3,5-TNB	9.900	0	0.0	0.0
1	1,2-Dinitrobenzene	10.725	54946	289.8	189.6
--	1,3-DNB	12.508	0	0.0	0.0
--	Tetryl	13.592	0	0.0	0.0
--	Nitrobenzene	14.733	0	0.0	0.0
--	2,4,6-TNT	16.300	0	0.0	0.0
2	3,4-DNT	16.650	52850	266.7	198.2
--	4-Am-2,6-DNT	17.542	0	0.0	0.0
--	2-Am-4,6-DNT	18.175	0	0.0	0.0
--	2,6-DNT	19.692	0	0.0	0.0
--	2,4-DNT	20.408	0	0.0	0.0
--	2-Nitrotoluene	24.733	0	0.0	0.0
--	4-Nitrotoluene	26.875	0	0.0	0.0
--	3-Nitrotoluene	28.808	0	0.0	0.0

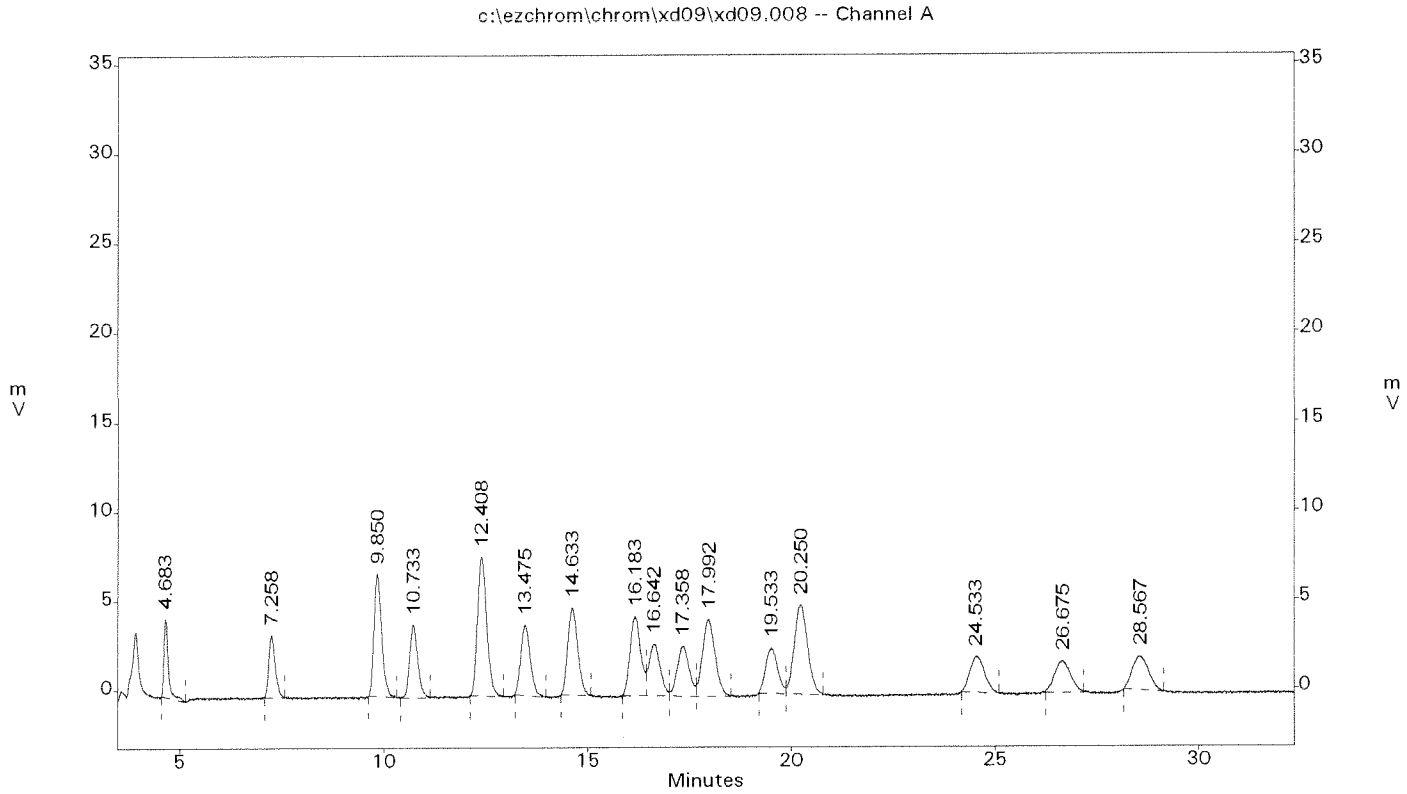


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd09\xd09.008
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD003SL
Acquired : Apr 09, 2015 17:15:35
Printed : Apr 10, 2015 14:31:04
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.683	32627	142.1	229.6
2	RDX	7.258	37850	177.4	213.3
3	1,3,5-TNB	9.850	90504	418.4	216.3
4	1,2-Dinitrobenzene	10.733	58019	289.8	200.2
5	1,3-DNB	12.408	124714	571.5	218.2
6	Tetryl	13.475	65590	303.8	215.9
7	Nitrobenzene	14.633	85258	420.8	202.6
8	2,4,6-TNT	16.183	82182	395.8	207.6
9	3,4-DNT	16.642	56454	266.7	211.7
10	4-Am-2,6-DNT	17.358	57886	287.5	201.4
11	2-Am-4,6-DNT	17.992	93070	439.2	211.9
12	2,6-DNT	19.533	52960	269.2	196.7
13	2,4-DNT	20.250	114913	548.5	209.5
14	2-Nitrotoluene	24.533	51423	269.4	190.9
15	4-Nitrotoluene	26.675	47945	233.7	205.1
16	3-Nitrotoluene	28.567	53344	277.1	192.5

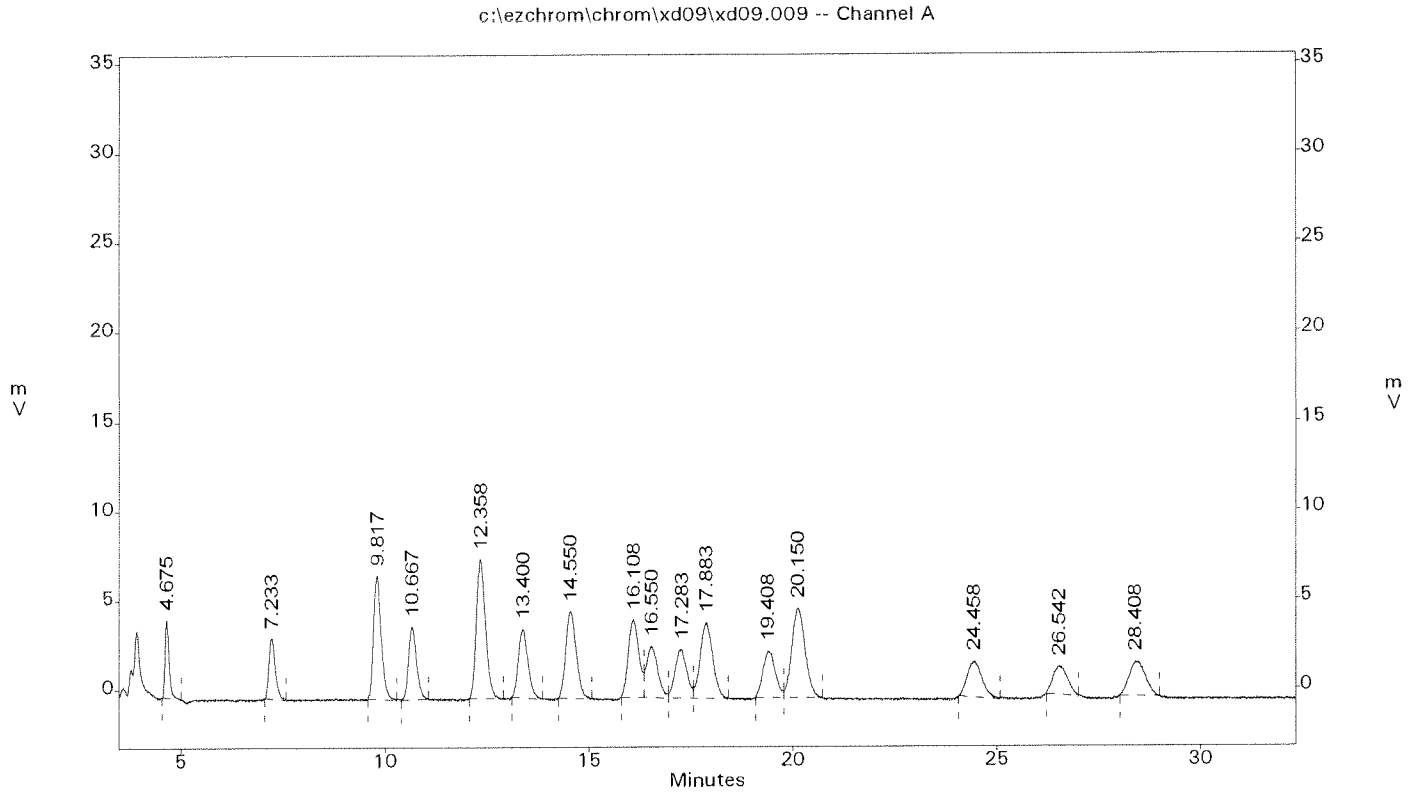


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd09\xd09.009
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD003SC
Acquired : Apr 09, 2015 17:50:44
Printed : Apr 10, 2015 14:32:20
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.675	29401	142.1	206.9
2	RDX	7.233	37679	177.4	212.4
3	1,3,5-TNB	9.817	91383	418.4	218.4
4	1,2-Dinitrobenzene	10.667	57652	289.8	198.9
5	1,3-DNB	12.358	124013	571.5	217.0
6	Tetryl	13.400	64263	303.8	211.5
7	Nitrobenzene	14.550	87877	420.8	208.8
8	2,4,6-TNT	16.108	80048	395.8	202.2
9	3,4-DNT	16.550	56184	266.7	210.7
10	4-Am-2,6-DNT	17.283	55706	287.5	193.8
11	2-Am-4,6-DNT	17.883	92001	439.2	209.5
12	2,6-DNT	19.408	55761	269.2	207.1
13	2,4-DNT	20.150	116342	548.5	212.1
14	2-Nitrotoluene	24.458	50887	269.4	188.9
15	4-Nitrotoluene	26.542	40064	233.7	171.4
16	3-Nitrotoluene	28.408	53659	277.1	193.6



INITIAL CALIBRATIONS

INITIAL CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Columm : VARIAN C18
Column size ID : 15CMX4.6MM
LFID & Datetime: XA29002A 01/29/15 18:02
LFID & Datetime: XA29003A 01/29/15 18:36
LFID & Datetime: XA29004A 01/29/15 19:10
LFID & Datetime: XA29005A 01/29/15 19:45
LFID & Datetime: XA29006A 01/29/15 20:19
LFID & Datetime: XA29007A 01/29/15 20:53
LFID & Datetime: XA29008A 01/29/15 21:27
LFID & Datetime: XA29009A 01/29/15 22:01
CONC UNIT: ppb

COMPOUND	CONC X	CALIBRATION FACTORS (AREA)/UNIT 0.50X	1.00X	2.50X	5.00X	10.00X	15.00X	20.00X	40.00X	MEAN	%RSD
HMX	20.00	167	131	141	137	139	141	142	140	142.1	7.6
RDX	20.00	185	158	179	173	179	182	181	183	177.4	5.0
1,3,5-TNB	20.00	504	364	421	393	411	418	417	420	418.4	9.5
1,3-DNB	20.00	537	555	587	567	571	581	585	590	571.5	3.2
Tetryl	20.00	330	262	306	292	300	310	315	315	303.8	6.6
Nitrobenzene	20.00	439	424	426	408	412	415	419	423	420.8	2.3
2,4,6-TNT	20.00	400	380	390	369	403	403	411	411	395.8	3.8
4-AM-2,6-DNT	20.00	354	290	261	261	283	284	282	285	287.5	10.0
2-AM-4,6-DNT	20.00	552	375	451	407	437	426	433	432	439.2	11.6
2,6-DNT	20.00	310	235	289	244	277	261	263	275	269.2	9.0
2,4-DNT	20.00	562	458	589	554	550	552	560	565	548.5	7.0
2-Nitrotoluene	20.00	280	334	292	231	247	250	256	265	269.4	12.1
4-Nitrotoluene	20.00	239	276	233	205	227	224	230	237	233.7	8.6
3-Nitrotoluene	20.00	250	285	288	258	282	281	281	294	277.1	5.4
SURROGATE	**X**	**0.50X**	**1.00X**	**2.50X**	**5.00X**	**10.00X**	**15.00X**	**20.00X**	**40.00X**	**MEAN**	**%RSD**
1,2-Dinitrobenzene	20.00	308	300	304	279	276	287	281	283	289.8	4.3
3,4-DNT	20.00	318	290	258	244	249	256	254	263	266.7	9.4

EX81A29.met

NA 02/03/15

INITIAL CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Columm : VARIAN C18
Column size ID : 15CMX4.6MM
LFID & Datetime: XA29002A 01/29/15 18:02
LFID & Datetime: XA29003A 01/29/15 18:36
LFID & Datetime: XA29004A 01/29/15 19:10
LFID & Datetime: XA29005A 01/29/15 19:45
LFID & Datetime: XA29006A 01/29/15 20:19
LFID & Datetime: XA29007A 01/29/15 20:53
LFID & Datetime: XA29008A 01/29/15 21:27
LFID & Datetime: XA29009A 01/29/15 22:01

COMPOUND	RT OF STANDARDS (MIN) 0.5X	1.0X	2.5X	5.0X	10.0X	15.0X	20.0X	40.0X	MEAN RT	RT WINDOW FROM	TO	RTWINDOW WIDTH
HMX	4.658	4.675	4.667	4.650	4.658	4.650	4.650	4.658	4.658	4.592	4.724	0.066
RDX	7.192	7.208	7.208	7.167	7.158	7.142	7.158	7.167	7.175	7.004	7.346	0.171
1,3,5-TNB	9.817	9.850	9.800	9.783	9.775	9.750	9.758	9.792	9.791	9.593	9.989	0.198
1,3-DNB	12.392	12.383	12.317	12.250	12.258	12.242	12.250	12.300	12.299	12.011	12.587	0.288
Tetryl	13.333	13.367	13.325	13.217	13.242	13.208	13.208	13.292	13.274	12.886	13.662	0.388
Nitrobenzene	14.558	14.608	14.542	14.458	14.467	14.450	14.442	14.517	14.505	14.175	14.835	0.330
2,4,6-TNT	16.075	16.117	16.050	15.983	15.983	15.967	15.967	16.058	16.025	15.623	16.427	0.402
4-AM-2,6-DNT	17.100	17.225	17.058	16.933	16.950	16.933	16.908	17.067	17.022	16.379	17.665	0.643
2-AM-4,6-DNT	17.725	17.792	17.717	17.508	17.533	17.517	17.508	17.650	17.619	16.938	18.300	0.681
2,6-DNT	19.417	19.375	19.325	19.183	19.167	19.208	19.158	19.300	19.267	18.710	19.824	0.557
2,4-DNT	20.058	20.067	20.058	19.875	19.892	19.917	19.883	20.017	19.971	19.442	20.500	0.529
2-Nitrotoluene	24.317	24.442	24.425	24.100	24.150	24.208	24.125	24.283	24.256	23.581	24.931	0.675
4-Nitrotoluene	26.500	26.467	26.442	26.142	26.200	26.300	26.200	26.367	26.327	25.533	27.121	0.794
3-Nitrotoluene	28.375	28.433	28.375	28.042	28.092	28.192	28.067	28.225	28.225	27.427	29.023	0.798

SURROGATE	0.5X	1.0X	2.5X	5.0X	10.0X	15.0X	20.0X	40.0X	RT	FROM	TO	WIDTH
1,2-Dinitrobenzene	10.642	10.700	10.642	10.567	10.575	10.550	10.558	10.617	10.606	10.468	10.744	0.138
3,4-DNT	16.475	16.533	16.467	16.325	16.325	16.325	16.317	16.425	16.399	15.912	16.886	0.487

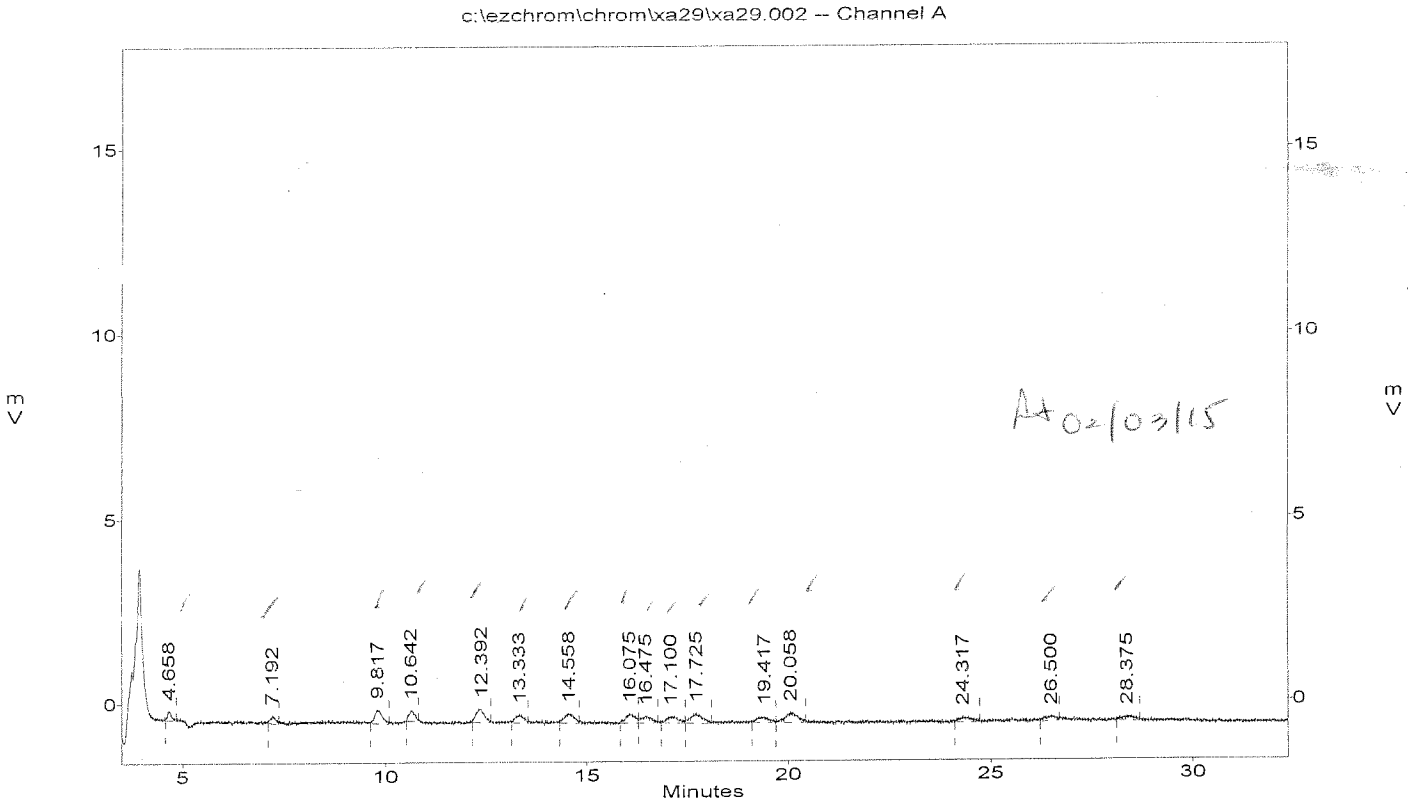
EX81A29.met

AA
02/03/15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.002
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2901 10 ppb
Acquired : Jan 29, 2015 18:02:27
Printed : Jan 30, 2015 16:02:51
User : LErmol
Channel A Results

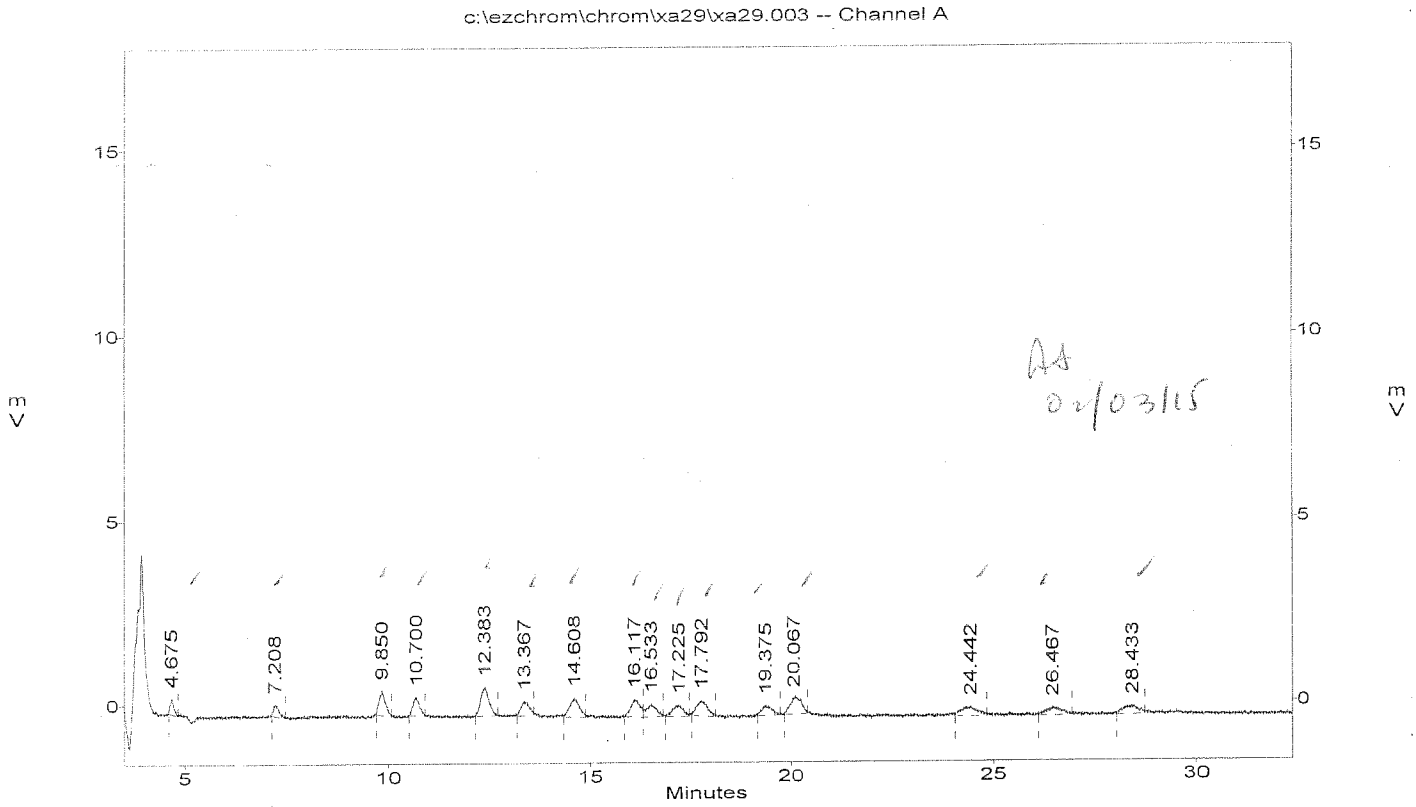
#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	1672	142.1	10.0
2	RDX	7.192	1849	177.4	10.0
3	1,3,5-TNB	9.817	5038	418.4	10.0
4	1,2-Dinitrobenzene	10.642	3084	289.8	10.0
5	1,3-DNB	12.392	5368	571.5	10.0
6	Tetryl	13.333	3296	303.8	10.0
7	Nitrobenzene	14.558	4389	420.8	10.0
8	2,4,6-TNT	16.075	3997	395.8	10.0
9	3,4-DNT	16.475	3184	266.7	10.0
10	4-Am-2,6-DNT	17.100	3536	287.5	10.0
11	2-Am-4,6-DNT	17.725	5520	439.2	10.0
12	2,6-DNT	19.417	3099	269.2	10.0
13	2,4-DNT	20.058	5616	548.5	10.0
14	2-Nitrotoluene	24.317	2801	269.4	10.0
15	4-Nitrotoluene	26.500	2388	233.7	10.0
16	3-Nitrotoluene	28.375	2502	277.1	10.0



EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.003
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2902 20 ppb
Acquired : Jan 29, 2015 18:36:39
Printed : Jan 30, 2015 16:03:22
User : LErmol
Channel A Results

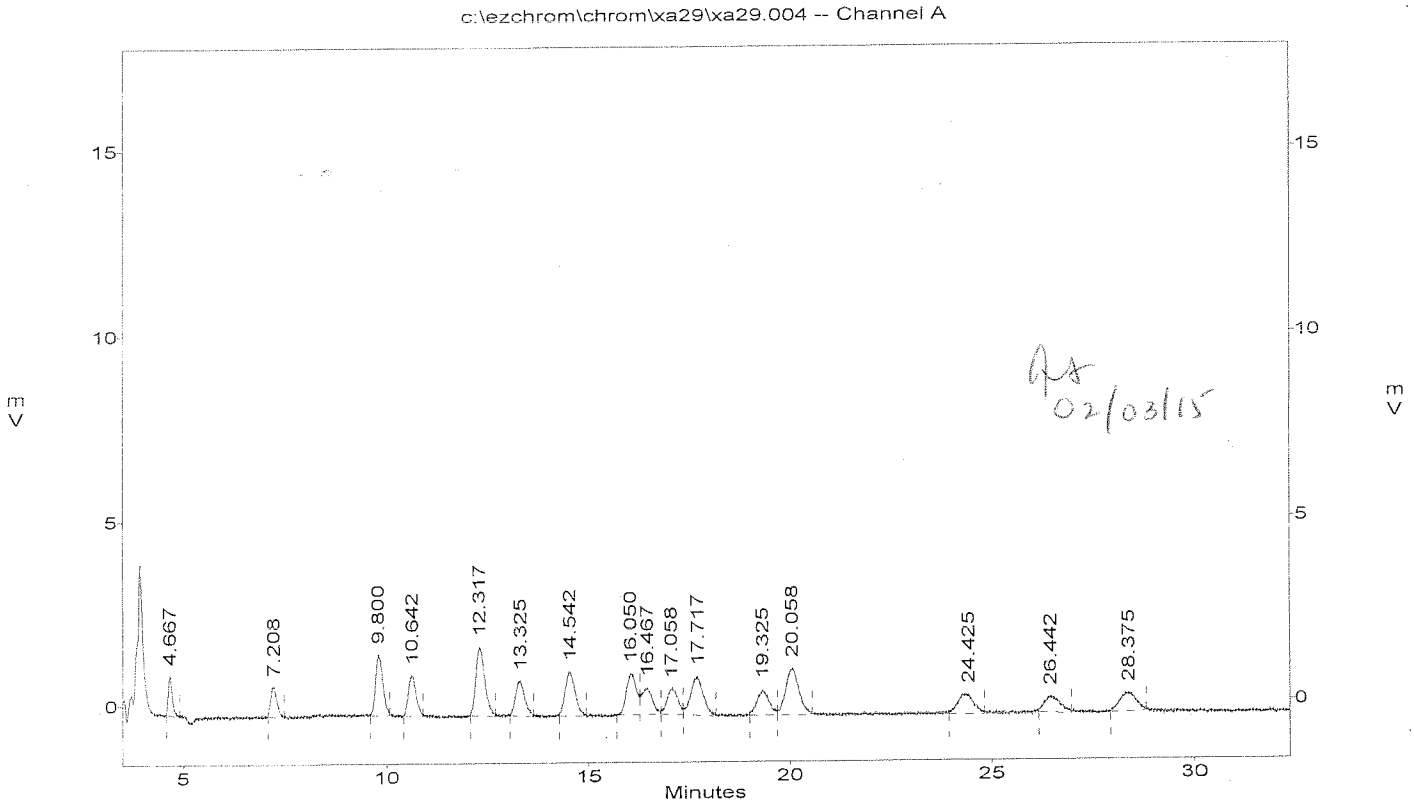
#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.675	2614	142.1	20.0
2	RDX	7.208	3154	177.4	20.0
3	1,3,5-TNB	9.850	7276	418.4	20.0
4	1,2-Dinitrobenzene	10.700	6002	289.8	20.0
5	1,3-DNB	12.383	11096	571.5	20.0
6	Tetryl	13.367	5243	303.8	20.0
7	Nitrobenzene	14.608	8479	420.8	20.0
8	2,4,6-TNT	16.117	7609	395.8	20.0
9	3,4-DNT	16.533	5808	266.7	20.0
10	4-Am-2,6-DNT	17.225	5808	287.5	20.0
11	2-Am-4,6-DNT	17.792	7504	439.2	20.0
12	2,6-DNT	19.375	4707	269.2	20.0
13	2,4-DNT	20.067	9166	548.5	20.0
14	2-Nitrotoluene	24.442	6687	269.4	20.0
15	4-Nitrotoluene	26.467	5518	233.7	20.0
16	3-Nitrotoluene	28.433	5693	277.1	20.0



EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.004
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2903 50 ppb
Acquired : Jan 29, 2015 19:10:52
Printed : Jan 30, 2015 16:03:32
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.667	7031	142.1	50.0
2	RDX	7.208	8935	177.4	50.0
3	1,3,5-TNB	9.800	21036	418.4	50.0
4	1,2-Dinitrobenzene	10.642	15221	289.8	50.0
5	1,3-DNB	12.317	29337	571.5	50.0
6	Tetryl	13.325	15301	303.8	50.0
7	Nitrobenzene	14.542	21303	420.8	50.0
8	2,4,6-TNT	16.050	19491	395.8	50.0
9	3,4-DNT	16.467	12912	266.7	50.0
10	4-Am-2,6-DNT	17.058	13066	287.5	50.0
11	2-Am-4,6-DNT	17.717	22556	439.2	50.0
12	2,6-DNT	19.325	14473	269.2	50.0
13	2,4-DNT	20.058	29431	548.5	50.0
14	2-Nitrotoluene	24.425	14609	269.4	50.0
15	4-Nitrotoluene	26.442	11628	233.7	50.0
16	3-Nitrotoluene	28.375	14376	277.1	50.0

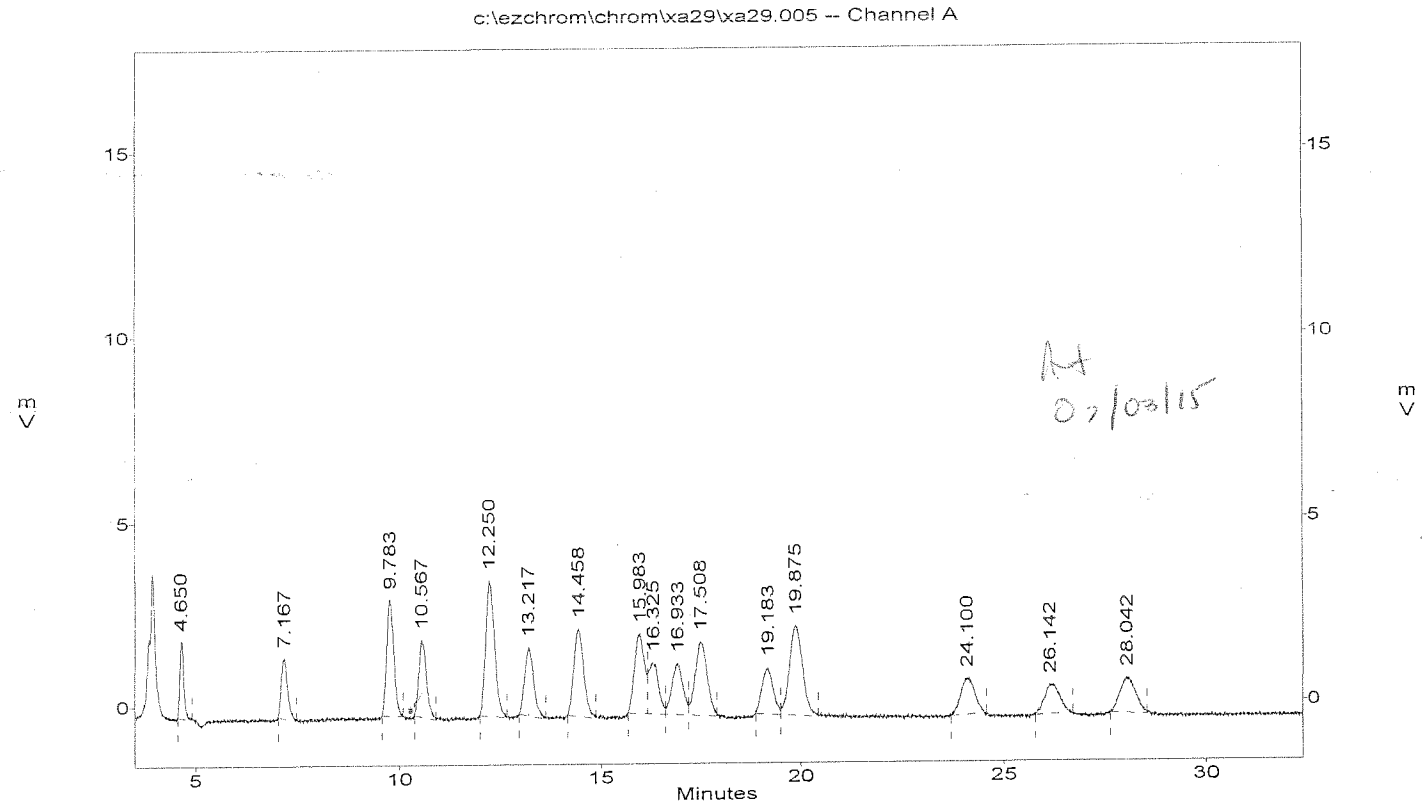


6018

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.005
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2904 100 ppb
Acquired : Jan 29, 2015 19:45:05
Printed : Jan 30, 2015 16:03:43
User : LErmol
Channel A Results

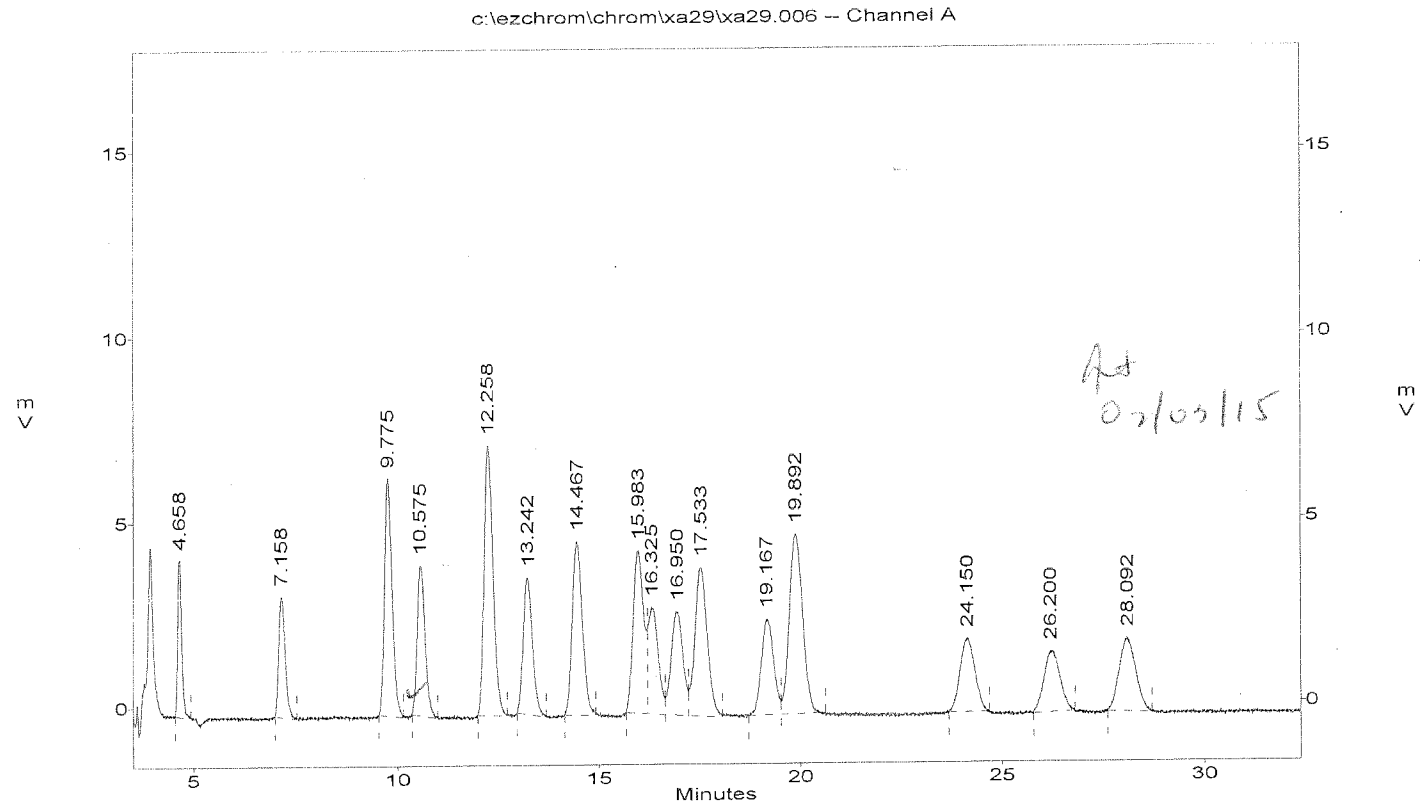
#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.650	13682	142.1	100.0
2	RDX	7.167	17266	177.4	100.0
3	1,3,5-TNB	9.783	39294	418.4	100.0
4	1,2-Dinitrobenzene	10.567	27901	289.8	100.0
5	1,3-DNB	12.250	56684	571.5	100.0
6	Tetryl	13.217	29235	303.8	100.0
7	Nitrobenzene	14.458	40838	420.8	100.0
8	2,4,6-TNT	15.983	36868	395.8	100.0
9	3,4-DNT	16.325	24446	266.7	100.0
10	4-Am-2,6-DNT	16.933	26121	287.5	100.0
11	2-Am-4,6-DNT	17.508	40711	439.2	100.0
12	2,6-DNT	19.183	24357	269.2	100.0
13	2,4-DNT	19.875	55350	548.5	100.0
14	2-Nitrotoluene	24.100	23138	269.4	100.0
15	4-Nitrotoluene	26.142	20464	233.7	100.0
16	3-Nitrotoluene	28.042	25774	277.1	100.0



EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.006
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2905 200 ppb
Acquired : Jan 29, 2015 20:19:17
Printed : Jan 30, 2015 16:04:17
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	27710	142.1	200.0
2	RDX	7.158	35812	177.4	200.0
3	1,3,5-TNB	9.775	82212	418.4	200.0
4	1,2-Dinitrobenzene	10.575	55299	289.8	200.0
5	1,3-DNB	12.258	114254	571.5	200.0
6	Tetryl	13.242	60077	303.8	200.0
7	Nitrobenzene	14.467	82410	420.8	200.0
8	2,4,6-TNT	15.983	80603	395.8	200.0
9	3,4-DNT	16.325	49848	266.7	200.0
10	4-Am-2,6-DNT	16.950	56555	287.5	200.0
11	2-Am-4,6-DNT	17.533	87358	439.2	200.0
12	2,6-DNT	19.167	55431	269.2	200.0
13	2,4-DNT	19.892	109963	548.5	200.0
14	2-Nitrotoluene	24.150	49350	269.4	200.0
15	4-Nitrotoluene	26.200	45365	233.7	200.0
16	3-Nitrotoluene	28.092	56370	277.1	200.0

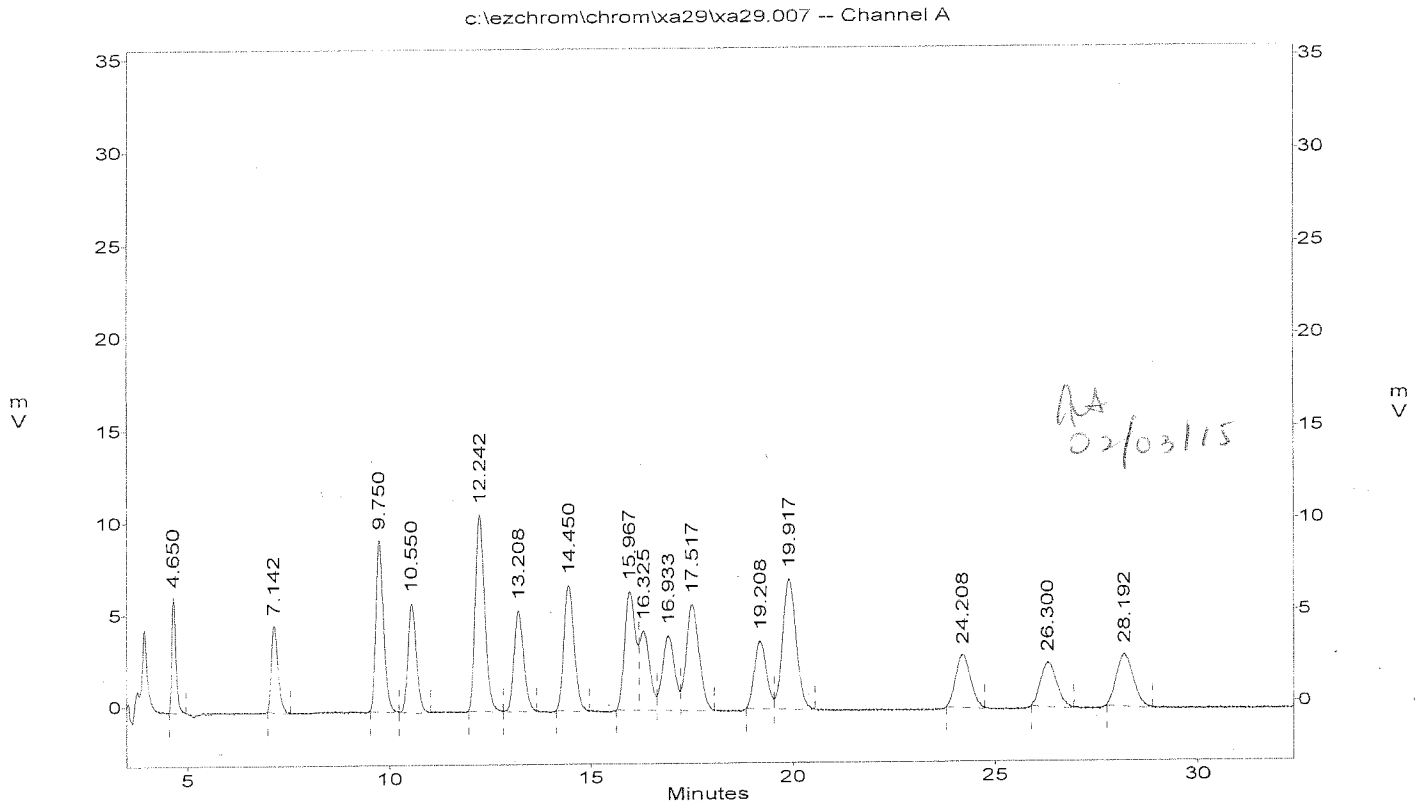


6020

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.007
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2906 300 ppb
Acquired : Jan 29, 2015 20:53:30
Printed : Jan 30, 2015 16:04:49
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.650	42305	142.1	300.0
2	RDX	7.142	54521	177.4	300.0
3	1,3,5-TNB	9.750	125471	418.4	300.0
4	1,2-Dinitrobenzene	10.550	85951	289.8	300.0
5	1,3-DNB	12.242	174209	571.5	300.0
6	Tetryl	13.208	93099	303.8	300.0
7	Nitrobenzene	14.450	124632	420.8	300.0
8	2,4,6-TNT	15.967	120888	395.8	300.0
9	3,4-DNT	16.325	76751	266.7	300.0
10	4-Am-2,6-DNT	16.933	85199	287.5	300.0
11	2-Am-4,6-DNT	17.517	127848	439.2	300.0
12	2,6-DNT	19.208	78177	269.2	300.0
13	2,4-DNT	19.917	165495	548.5	300.0
14	2-Nitrotoluene	24.208	74959	269.4	300.0
15	4-Nitrotoluene	26.300	67252	233.7	300.0
16	3-Nitrotoluene	28.192	84221	277.1	300.0

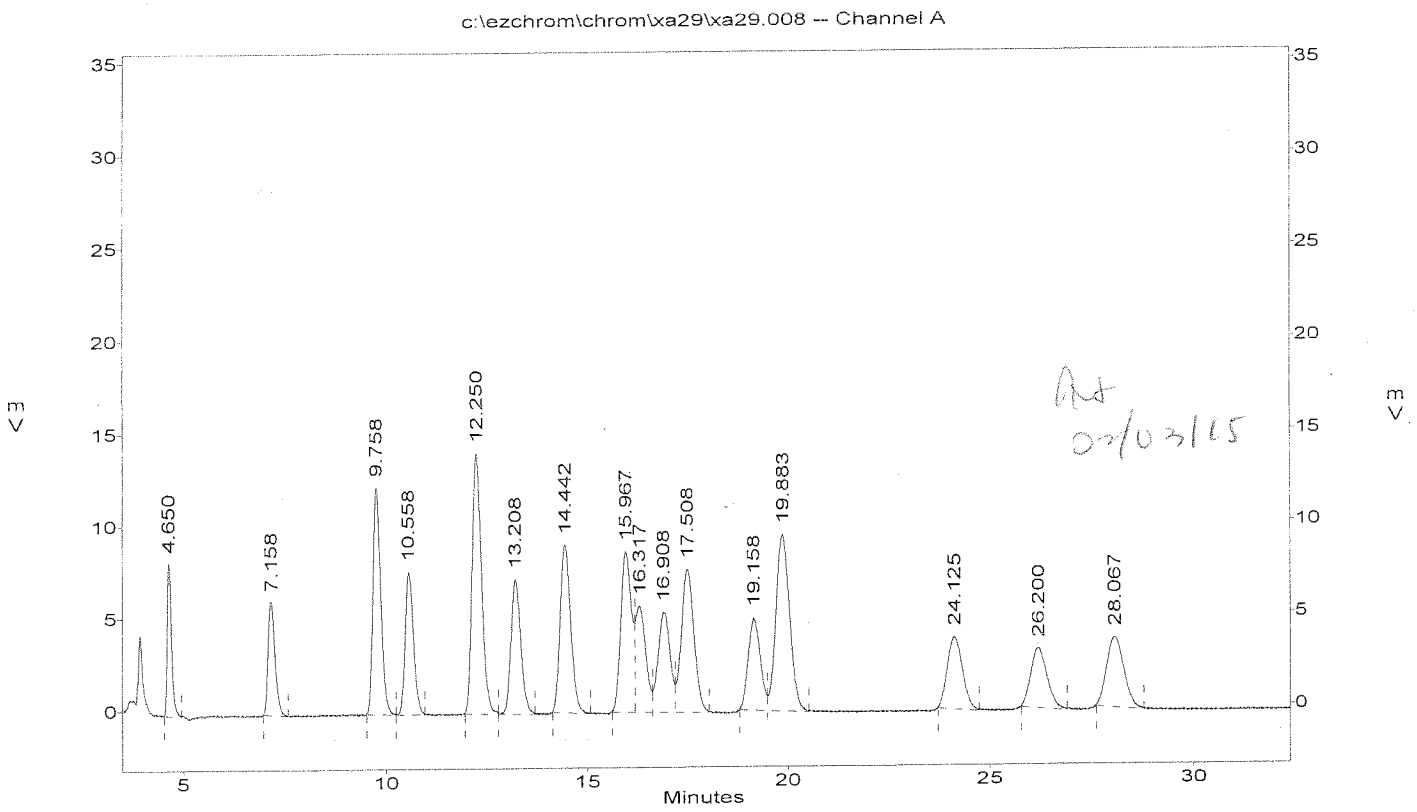


6021

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.008
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2907 400 ppb
Acquired : Jan 29, 2015 21:27:43
Printed : Jan 30, 2015 16:05:13
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.650	56819	142.1	400.0
2	RDX	7.158	72429	177.4	400.0
3	1,3,5-TNB	9.758	166817	418.4	400.0
4	1,2-Dinitrobenzene	10.558	112258	289.8	400.0
5	1,3-DNB	12.250	234157	571.5	400.0
6	Tetryl	13.208	125939	303.8	400.0
7	Nitrobenzene	14.442	167502	420.8	400.0
8	2,4,6-TNT	15.967	164527	395.8	400.0
9	3,4-DNT	16.317	101436	266.7	400.0
10	4-Am-2,6-DNT	16.908	112639	287.5	400.0
11	2-Am-4,6-DNT	17.508	173220	439.2	400.0
12	2,6-DNT	19.158	105032	269.2	400.0
13	2,4-DNT	19.883	224055	548.5	400.0
14	2-Nitrotoluene	24.125	102525	269.4	400.0
15	4-Nitrotoluene	26.200	91929	233.7	400.0
16	3-Nitrotoluene	28.067	112241	277.1	400.0

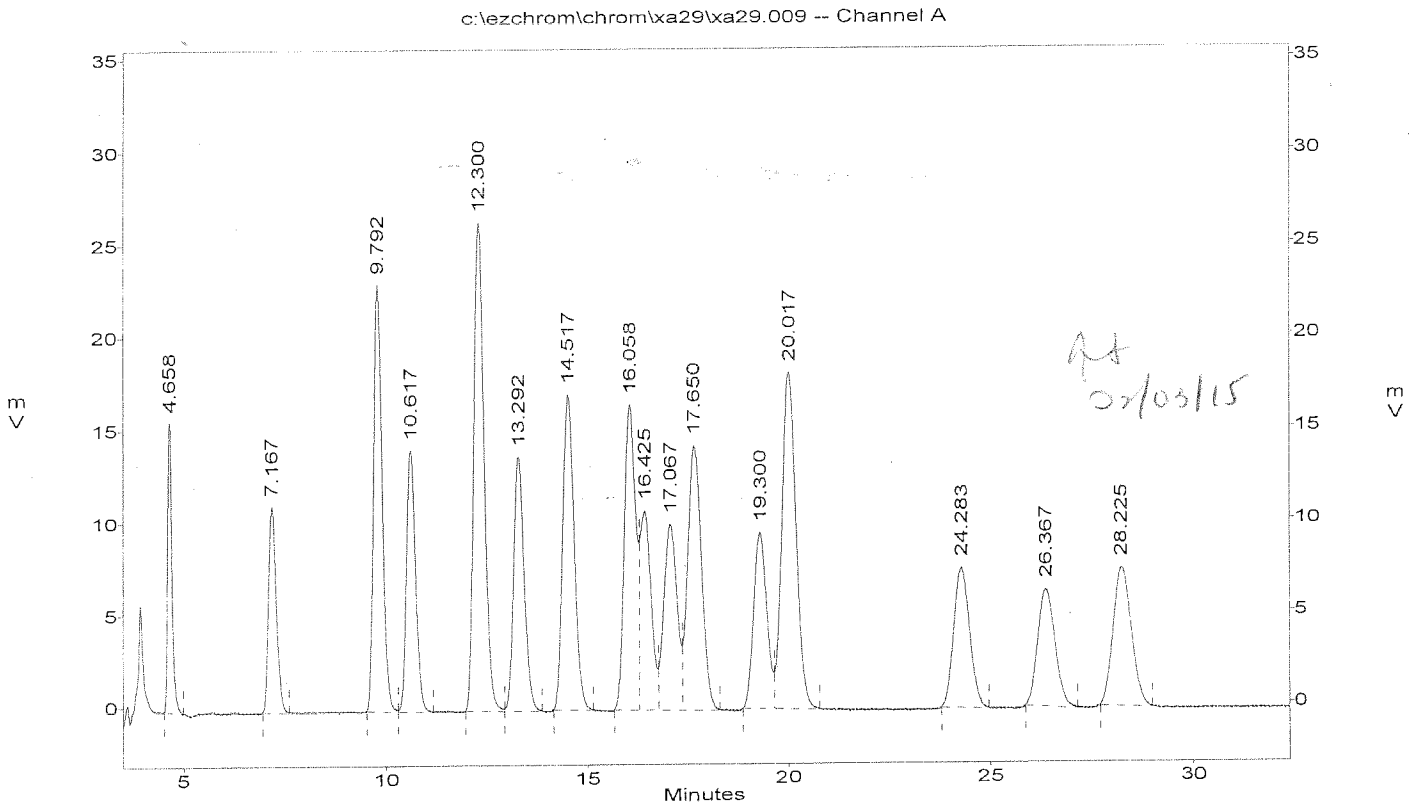


6022

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.009
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2908 800 ppb
Acquired : Jan 29, 2015 22:01:56
Printed : Jan 30, 2015 16:05:29
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	111980	142.1	800.0
2	RDX	7.167	146777	177.4	800.0
3	1,3,5-TNB	9.792	335703	418.4	800.0
4	1,2-Dinitrobenzene	10.617	226419	289.8	800.0
5	1,3-DNB	12.300	471816	571.5	800.0
6	Tetryl	13.292	251959	303.8	800.0
7	Nitrobenzene	14.517	338135	420.8	800.0
8	2,4,6-TNT	16.058	328661	395.8	800.0
9	3,4-DNT	16.425	210578	266.7	800.0
10	4-Am-2,6-DNT	17.067	227837	287.5	800.0
11	2-Am-4,6-DNT	17.650	345951	439.2	800.0
12	2,6-DNT	19.300	220261	269.2	800.0
13	2,4-DNT	20.017	451765	548.5	800.0
14	2-Nitrotoluene	24.283	211611	269.4	800.0
15	4-Nitrotoluene	26.367	189654	233.7	800.0
16	3-Nitrotoluene	28.225	234893	277.1	800.0



6023

SECOND SOURCE VERIFICATION

INITIAL CALIBRATION VERIFICATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XA29010A 01/29/2015 22:36
CONC UNIT : ppb

COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.658	4.592	4.724	400.0	142.100	57155	402.17	1		15
RDX	7.142	6.971	7.313	400.0	177.400	74241	418.46	5		15
1,3,5-TNB	9.758	9.560	9.956	400.0	418.400	168447	402.60	1		15
1,3-DNB	12.242	11.954	12.530	400.0	571.500	237334	415.26	4		15
Tetryl	13.200	12.812	13.588	400.0	303.800	126985	417.95	4		15
Nitrobenzene	14.433	14.103	14.763	400.0	420.800	169842	403.64	1		15
2,4,6-TNT	15.950	15.548	16.352	400.0	395.800	164351	415.19	4		15
4-AM-2,6-DNT	16.908	16.265	17.551	400.0	287.500	115382	401.38	0		15
2-AM-4,6-DNT	17.500	16.819	18.181	400.0	439.200	174113	396.40	-1		15
2,6-DNT	19.150	18.593	19.707	400.0	269.200	110261	409.52	2		15
2,4-DNT	19.867	19.338	20.396	400.0	548.500	229472	418.33	5		15
2-Nitrotoluene	24.108	23.433	24.783	400.0	269.400	102522	380.51	-5		15
4-Nitrotoluene	26.200	25.406	26.994	400.0	233.700	93448	399.82	-0		15
3-Nitrotoluene	28.042	27.244	28.840	400.0	277.100	115242	415.86	4		15

SURROGATE	MINUTES	FROM	TO	TRUECON	CF	AREA	CONC	%D	QL	LIMITS
1,2-Dinitrobenzene	10.558	10.420	10.696	400.0	289.800	114476	394.98	-1		15
3,4-DNT	16.308	15.821	16.795	400.0	266.700	104671	392.51	-2		15

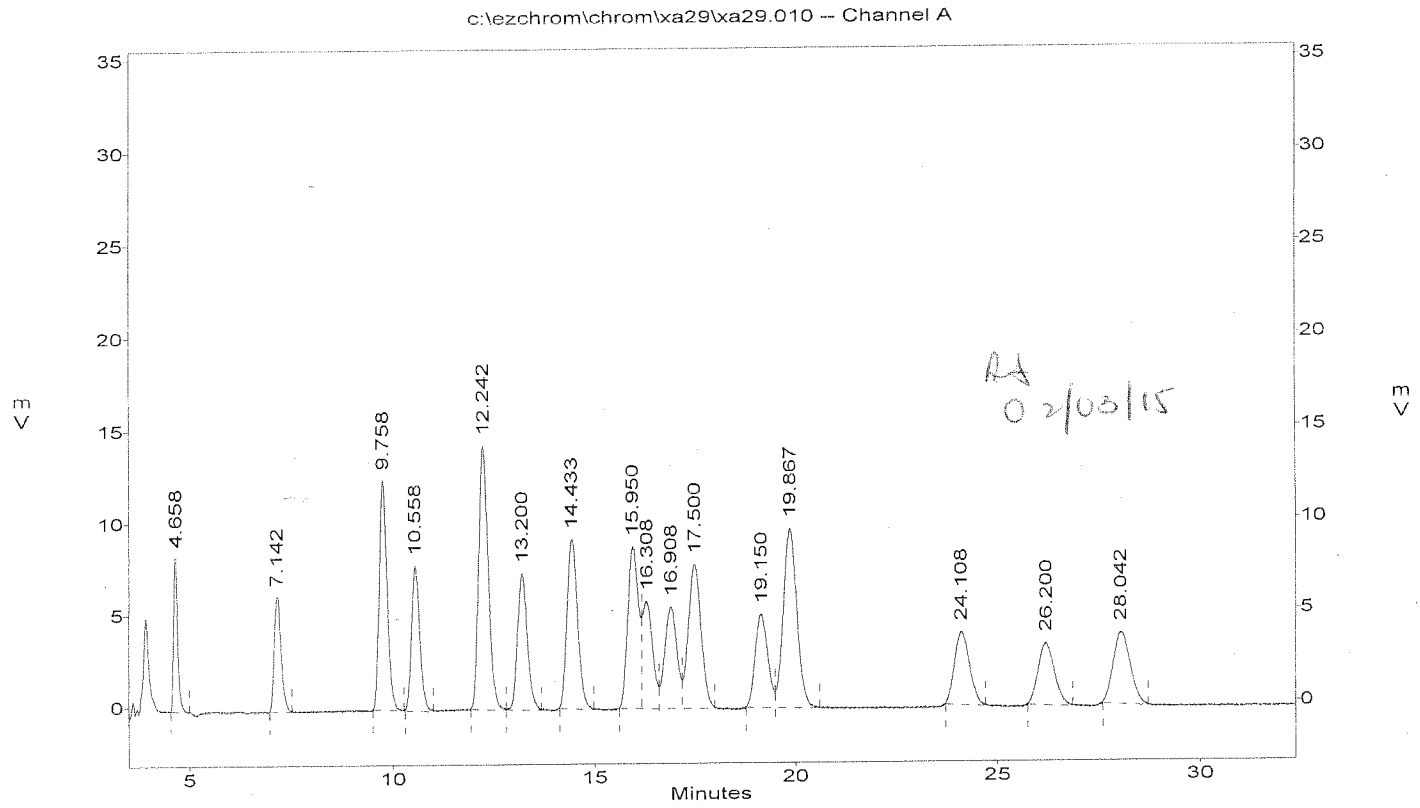
EX81A29.met

AA
02/03/15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.010
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : IEX81A2901
Acquired : Jan 29, 2015 22:36:08
Printed : Jan 30, 2015 16:07:39
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	57155	142.1	402.2
2	RDX	7.142	74241	177.4	418.5
3	1,3,5-TNB	9.758	168447	418.4	402.6
4	1,2-Dinitrobenzene	10.558	114476	289.8	395.0
5	1,3-DNB	12.242	237334	571.5	415.3
6	Tetryl	13.200	126985	303.8	417.9
7	Nitrobenzene	14.433	169842	420.8	403.6
8	2,4,6-TNT	15.950	164351	395.8	415.2
9	3,4-DNT	16.308	104671	266.7	392.5
10	4-Am-2,6-DNT	16.908	115382	287.5	401.4
11	2-Am-4,6-DNT	17.500	174113	439.2	396.4
12	2,6-DNT	19.150	110261	269.2	409.5
13	2,4-DNT	19.867	229472	548.5	418.3
14	2-Nitrotoluene	24.108	102522	269.4	380.5
15	4-Nitrotoluene	26.200	93448	233.7	399.8
16	3-Nitrotoluene	28.042	115242	277.1	415.9



6026

DAILY CALIBRATIONS

CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD09002A 04/09/2015 13:45
CONC UNIT : ppb

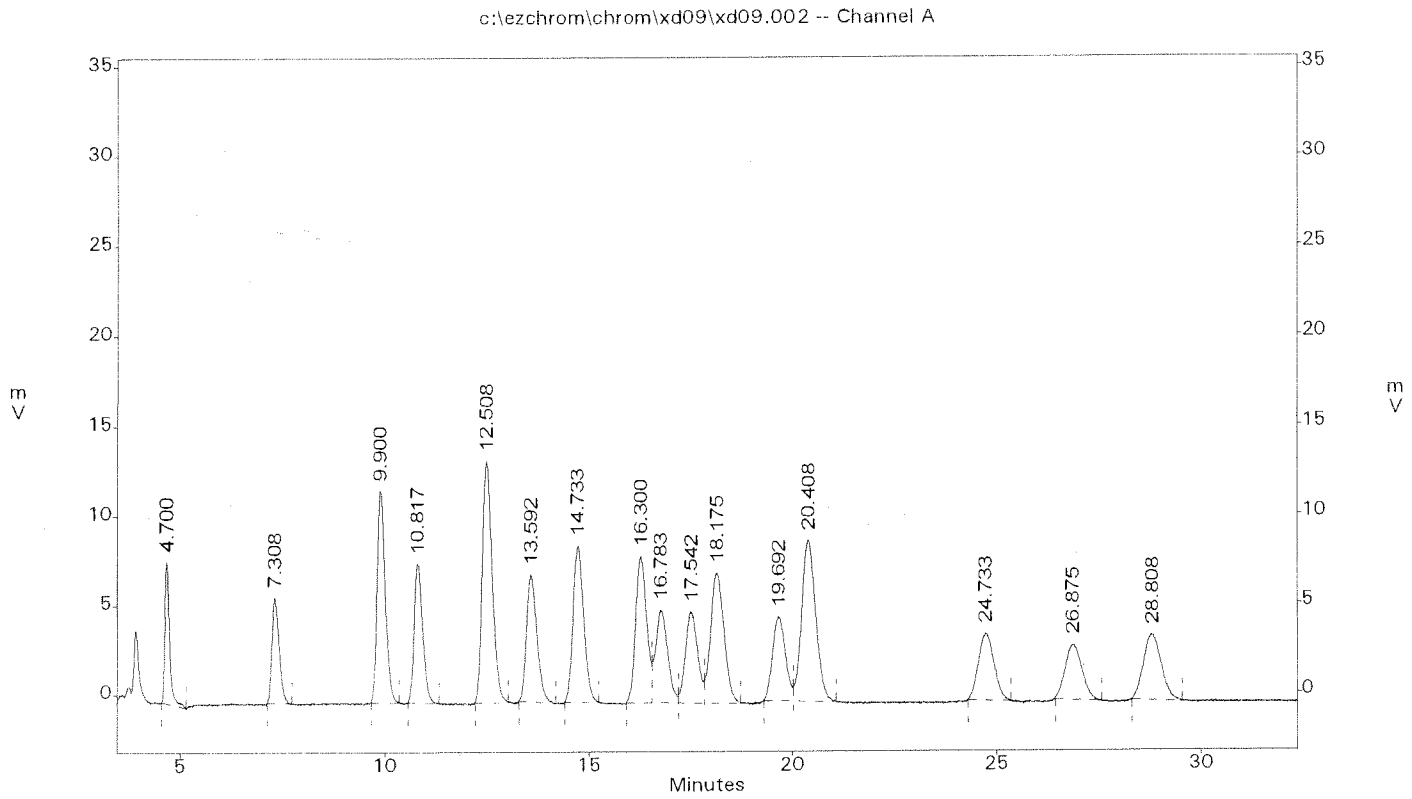
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.700	4.634	4.766	400.0	142.100	58743	413.35	3		15
RDX	7.308	7.137	7.479	400.0	177.400	70866	399.44	-0		15
1,3,5-TNB	9.900	9.702	10.098	400.0	418.400	163154	389.94	-3		15
1,3-DNB	12.508	12.220	12.796	400.0	571.500	227478	398.01	-0		15
Tetryl	13.592	13.204	13.980	400.0	303.800	126290	415.66	4		15
Nitrobenzene	14.733	14.403	15.063	400.0	420.800	163554	388.70	-3		15
2,4,6-TNT	16.300	15.898	16.702	400.0	395.800	157360	397.53	-1		15
4-AM-2,6-DNT	17.542	16.899	18.185	400.0	287.500	110372	383.95	-4		15
2-AM-4,6-DNT	18.175	17.494	18.856	400.0	439.200	168599	383.85	-4		15
2,6-DNT	19.692	19.135	20.249	400.0	269.200	104701	388.87	-3		15
2,4-DNT	20.408	19.879	20.937	400.0	548.500	217188	395.94	-1		15
2-Nitrotoluene	24.733	24.058	25.408	400.0	269.400	99713	370.09	-7		15
4-Nitrotoluene	26.875	26.081	27.669	400.0	233.700	88148	377.15	-6		15
3-Nitrotoluene	28.808	28.010	29.606	400.0	277.100	114318	412.53	3		15
SURROGATE	**MINUTES**	**FROM**	**TO**	**TRUECON**	**CF**	**AREA**	**CONC**	**%D**	**QL**	**LIMITS**
1,2-Dinitrobenzene	10.817	10.679	10.955	400.0	289.800	115128	397.23	-1		15
3,4-DNT	16.783	16.296	17.270	400.0	266.700	108395	406.47	2		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd09\xd09.002
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29062
Acquired : Apr 09, 2015 13:45:11
Printed : Apr 10, 2015 11:05:10
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.700	58743	142.1	413.3
2	RDX	7.308	70866	177.4	399.4
3	1,3,5-TNB	9.900	163154	418.4	389.9
4	1,2-Dinitrobenzene	10.817	115128	289.8	397.2
5	1,3-DNB	12.508	227478	571.5	398.0
6	Tetryl	13.592	126290	303.8	415.7
7	Nitrobenzene	14.733	163554	420.8	388.7
8	2,4,6-TNT	16.300	157360	395.8	397.5
9	3,4-DNT	16.783	108395	266.7	406.5
10	4-Am-2,6-DNT	17.542	110372	287.5	384.0
11	2-Am-4,6-DNT	18.175	168599	439.2	383.8
12	2,6-DNT	19.692	104701	269.2	388.9
13	2,4-DNT	20.408	217188	548.5	395.9
14	2-Nitrotoluene	24.733	99713	269.4	370.1
15	4-Nitrotoluene	26.875	88148	233.7	377.1
16	3-Nitrotoluene	28.808	114318	277.1	412.5



CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD09013A 04/09/2015 20:11
CONC UNIT : ppb

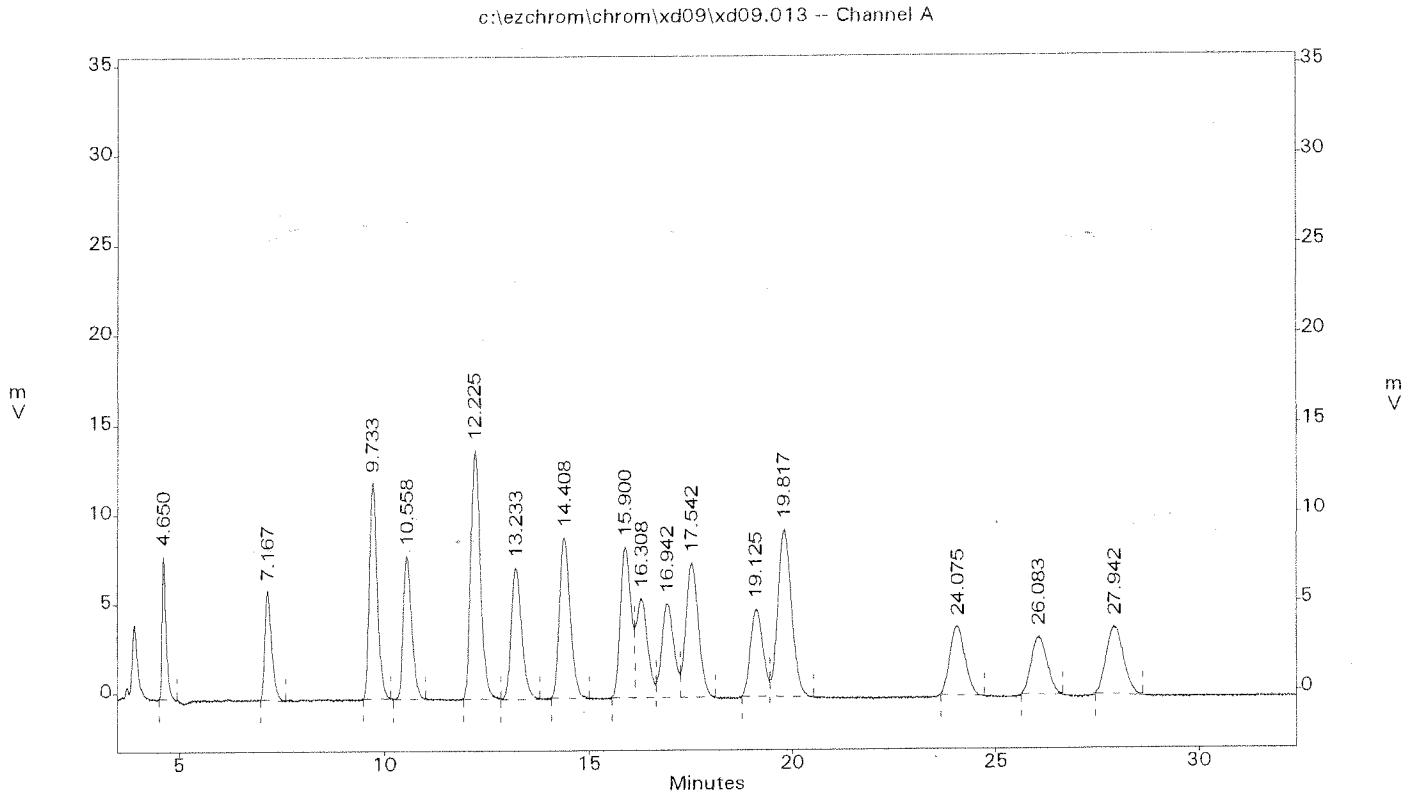
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.650	4.584	4.716	400.0	142.100	54085	380.57	-5		15
RDX	7.167	6.996	7.338	400.0	177.400	72141	406.63	2		15
1,3,5-TNB	9.733	9.535	9.931	400.0	418.400	162544	388.49	-3		15
1,3-DNB	12.225	11.937	12.513	400.0	571.500	229713	401.92	0		15
Tetryl	13.233	12.845	13.621	400.0	303.800	129773	427.13	7		15
Nitrobenzene	14.408	14.078	14.738	400.0	420.800	166873	396.58	-1		15
2,4,6-TNT	15.900	15.498	16.302	400.0	395.800	154182	389.50	-3		15
4-AM-2,6-DNT	16.942	16.299	17.585	400.0	287.500	109923	382.39	-4		15
2-AM-4,6-DNT	17.542	16.861	18.223	400.0	439.200	166236	378.47	-5		15
2,6-DNT	19.125	18.568	19.682	400.0	269.200	104584	388.44	-3		15
2,4-DNT	19.817	19.288	20.346	400.0	548.500	219821	400.74	0		15
2-Nitrotoluene	24.075	23.400	24.750	400.0	269.400	100689	373.71	-7		15
4-Nitrotoluene	26.083	25.289	26.877	400.0	233.700	88942	380.54	-5		15
3-Nitrotoluene	27.942	27.144	28.740	400.0	277.100	112020	404.24	1		15
SURROGATE	MINUTES	FROM	TO	TRUECON	CF	AREA	CONC	%D	QL	LIMITS
1,2-Dinitrobenzene	10.558	10.420	10.696	400.0	289.800	116985	403.64	1		15
3,4-DNT	16.308	15.821	16.795	400.0	266.700	109031	408.86	2		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd09\xd09.013
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29063
Acquired : Apr 09, 2015 20:11:01
Printed : Apr 10, 2015 14:43:41
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.650	54085	142.1	380.6
2	RDX	7.167	72141	177.4	406.6
3	1,3,5-TNB	9.733	162544	418.4	388.5
4	1,2-Dinitrobenzene	10.558	116985	289.8	403.6
5	1,3-DNB	12.225	229713	571.5	401.9
6	Tetryl	13.233	129773	303.8	427.1
7	Nitrobenzene	14.408	166873	420.8	396.6
8	2,4,6-TNT	15.900	154182	395.8	389.5
9	3,4-DNT	16.308	109031	266.7	408.9
10	4-Am-2,6-DNT	16.942	109923	287.5	382.4
11	2-Am-4,6-DNT	17.542	166236	439.2	378.5
12	2,6-DNT	19.125	104584	269.2	388.4
13	2,4-DNT	19.817	219821	548.5	400.7
14	2-Nitrotoluene	24.075	100689	269.4	373.7
15	4-Nitrotoluene	26.083	88942	233.7	380.5
16	3-Nitrotoluene	27.942	112020	277.1	404.2



CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Columm : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD09026A 04/10/2015 03:46
CONC UNIT : ppb

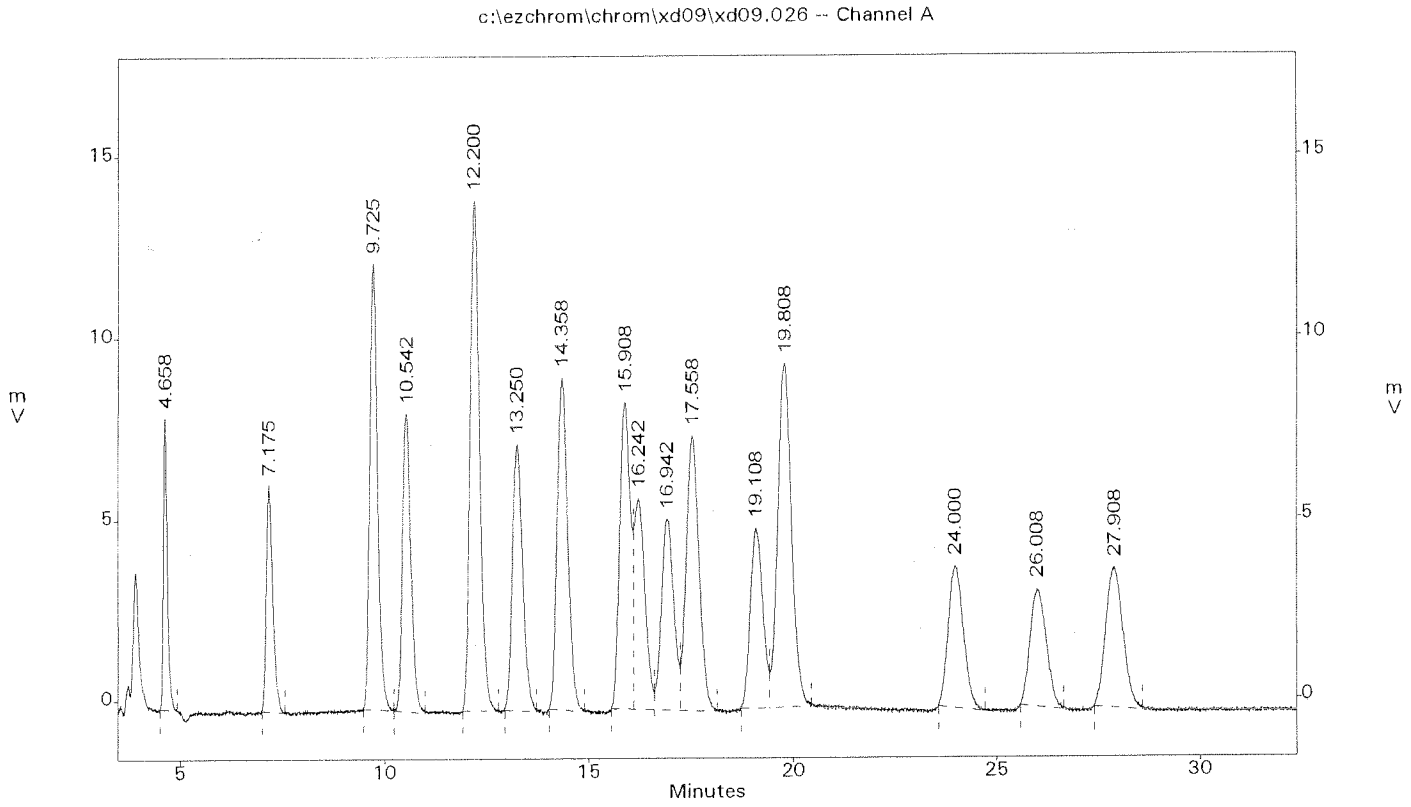
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.658	4.592	4.724	400.0	142.100	54028	380.17	-5		15
RDX	7.175	7.004	7.346	400.0	177.400	71139	400.98	0		15
1,3,5-TNB	9.725	9.527	9.923	400.0	418.400	165497	395.54	-1		15
1,3-DNB	12.200	11.912	12.488	400.0	571.500	229609	401.74	0		15
Tetryl	13.250	12.862	13.638	400.0	303.800	127113	418.37	5		15
Nitrobenzene	14.358	14.028	14.688	400.0	420.800	166911	396.67	-1		15
2,4,6-TNT	15.908	15.506	16.310	400.0	395.800	159004	401.68	0		15
4-AM-2,6-DNT	16.942	16.299	17.585	400.0	287.500	110809	385.47	-4		15
2-AM-4,6-DNT	17.558	16.877	18.239	400.0	439.200	169527	385.96	-4		15
2,6-DNT	19.108	18.551	19.665	400.0	269.200	107162	398.02	-0		15
2,4-DNT	19.808	19.279	20.337	400.0	548.500	223610	407.64	2		15
2-Nitrotoluene	24.000	23.325	24.675	400.0	269.400	102493	380.40	-5		15
4-Nitrotoluene	26.008	25.214	26.802	400.0	233.700	89694	383.76	-4		15
3-Nitrotoluene	27.908	27.110	28.706	400.0	277.100	115487	416.75	4		15
SURROGATE	MINUTES	FROM	TO	TRUECON	CF	AREA	CONC	%D	QL	LIMITS
1,2-Dinitrobenzene	10.542	10.404	10.680	400.0	289.800	119065	410.82	3		15
3,4-DNT	16.242	15.755	16.729	400.0	266.700	103675	388.77	-3		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd09\xd09.026
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29064
Acquired : Apr 10, 2015 03:46:55
Printed : Apr 10, 2015 15:20:04
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	54028	142.1	380.2
2	RDX	7.175	71139	177.4	401.0
3	1,3,5-TNB	9.725	165497	418.4	395.5
4	1,2-Dinitrobenzene	10.542	119065	289.8	410.8
5	1,3-DNB	12.200	229609	571.5	401.7
6	Tetryl	13.250	127113	303.8	418.4
7	Nitrobenzene	14.358	166911	420.8	396.7
8	2,4,6-TNT	15.908	159004	395.8	401.7
9	3,4-DNT	16.242	103675	266.7	388.8
10	4-Am-2,6-DNT	16.942	110809	287.5	385.5
11	2-Am-4,6-DNT	17.558	169527	439.2	386.0
12	2,6-DNT	19.108	107162	269.2	398.0
13	2,4-DNT	19.808	223610	548.5	407.6
14	2-Nitrotoluene	24.000	102493	269.4	380.4
15	4-Nitrotoluene	26.008	89694	233.7	383.8
16	3-Nitrotoluene	27.908	115487	277.1	416.7



6033

ANALYTICAL LOGS

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HPLC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

8330 ICAL
49% MeOH & 51% H2O
flow: 0.8 mL/min
press: 3500 psi
λ = 254 nm
inj: 50 µl
Col.: C18 (R008620005)
time: 33 min
Syringes: MSF01-02-07 (500µl)
↓ 06 (50µl)

EXA008W: LOQ & LOD
EXA011W: 15A111
EXA014W: 15A111
EXA013S: 15A107
↓ 15A122

Book #:	A81-020
Instrument No.:	81
Analytical Sequence:	xa29
Method File:	ex81a29
Analytical Batch:	cex81a29001

SOP #	Rev. #
☑ EMAX-8330	7
☐ EMAX-8332	2
☐ EMAX-	

	STANDARDS ID	Conc. (µg/L)
ICAL	SHIC-07-71-02	10-800
ICV	↓ 71-03	400
DCC	↓ 65-03	400
DCC	—	—
IB	SHIC-07-67-03	n/a

SOLVENT	ID
Acetonitrile	—
Methanol	SW1A-005-09-21
Water	↓ 25

Data File	
ELECTRONIC DATA ARCHIVAL	
Location	Date
☑ EZC_5_HPLC	2/2/15
☐	

Analyzed By: LC

Date: 01/29/15

Method: Ex81a2... 2.015 - [Batc...

File Edit Method Batch Options Analysis Window Help

Method | Data | Batch | Integ. | Peaks | Batch | Custom | Review | Reproc | Recalib | Analyze | Reports

Run	Run Type	Sample ID	Method	Filename	Level	Sample Amt.	ISTD Amt.	Mult.
1	Unknown	IB81A2901	ex81a29.met	XA29.001	0	1	0	1
2	Begin Calibration	EX81A2901 10 ppb	ex81a29.met	XA29.002	0	1	0	1
3	Calibration	EX81A2902 20 ppb	ex81a29.met	XA29.003	0	1	0	1
4	Calibration	EX81A2903 50 ppb	ex81a29.met	XA29.004	0	1	0	1
5	Calibration	EX81A2904 100 ppb	ex81a29.met	XA29.005	0	1	0	1
6	Calibration	EX81A2905 200 ppb	ex81a29.met	XA29.006	0	1	0	1
7	Calibration	EX81A2906 300 ppb	ex81a29.met	XA29.007	0	1	0	1
8	Calibration	EX81A2907 400 ppb	ex81a29.met	XA29.008	0	1	0	1
9	End Calibration	EX81A2908 800 ppb	ex81a29.met	XA29.009	0	1	0	1
10	Unknown	IEX81A2901	ex81a29.met	XA29.010	0	1	0	1
11	Unknown	CEX81A29001	ex81a29.met	XA29.011	0	1	0	1
12	Unknown	EXA008WB	ex81a29.met	XA29.012	0	1	0	1
13	Unknown	EXA008WL	ex81a29.met	XA29.013	0	1	0	1
14	Unknown	EXA008WC	ex81a29.met	XA29.014	0	1	0	1
15	Unknown	EXA008WX	ex81a29.met	XA29.015	0	1	0	1
16	Unknown	EXA008WY	ex81a29.met	XA29.016	0	1	0	1
17	Unknown	LOQ-14	ex81a29.met	XA29.017	0	1	0	1
18	Unknown	LOD-14	ex81a29.met	XA29.018	0	1	0	1
19	Unknown	EXA011WB	ex81a29.met	XA29.019	0	1	0	1
20	Unknown	EXA011WL	ex81a29.met	XA29.020	0	1	0	1
21	Unknown	EXA011WC	ex81a29.met	XA29.021	0	1	0	1
22	Unknown	15A111-33	ex81a29.met	XA29.022	0	1	0	1
23	Unknown	CEX81A29002	ex81a29.met	XA29.023	0	1	0	1
24	Unknown	Spike Check	ex81a29.met	XA29.024	0	1	0	1
25	Unknown	EXA014WB	ex81a29.met	XA29.025	0	1	0	1
26	Unknown	EXA014WL	ex81a29.met	XA29.026	0	1	0	1
27	Unknown	EXA014WC	ex81a29.met	XA29.027	0	1	0	1
28	Unknown	15A111-33	ex81a29.met	XA29.028	0	1	0	1
29	Unknown	EXA013SB	ex81a29.met	XA29.029	0	1	0	1
30	Unknown	EXA013SL	ex81a29.met	XA29.030	0	1	0	1
31	Unknown	EXA013SC	ex81a29.met	XA29.031	0	1	0	1
32	Unknown	15A107-01	ex81a29.met	XA29.032	0	1	0	1
33	Unknown	15A107-03	ex81a29.met	XA29.033	0	1	0	1
34	Unknown	CEX81A29003	ex81a29.met	XA29.034	0	1	0	1

FINAL

Method Development

Start | EZChrom Chromat... | Method: Ex17a20c... | Exploring - Export | Calculator | Method: Ex81a29... | Method: Ex81a... | Document - WordP... | 11:34 AM

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HPLC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:
15A048-01 (QC H2O)
EXA004W: LOQ & LOD
EXA003S: LOQ & LOD
↓ 15A026
15A027
EXA006W: LOQ & LOD
↓ 15A0240
LC 4/14/15

Book #: A81-020
Instrument No.: 81
Analytical Sequence: Vol 09
Method File: EX81A29
Analytical Batch: CEX81A29062

SOP #	Rev. #
☑ EMAX-8330	7
☐ EMAX-8332	2
☐ EMAX-	

	STANDARDS ID	Conc. (µg/L)
ICAL	—	—
ICV	—	—
DCC	—	—
DCC	SHIC-07-78-01	400
IB	↓ 74-01	n/a

SOLVENT	ID
Acetonitrile	—
Methanol	SWIA-005-11-18
Water	↓ 10-25

Data File	
ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ EZC_5_HPLC	
☐	

Analyzed By: LC
Date: 4/9/15

Method: Ex81a29.met Batch: Xd09.seq Data: Xd09.025 - [Batch: xd09.seq]

File Edit Method Batch Options Analysis Window Help

Run	Run Type	Sample ID	Method	Filename	Level	Sample Amt.	ISTD Amt.	Mult.
1	Unknown	IB81D0901	ex81a29.met	XD09.001	0	1	0	1
2	Unknown	CEX81A29062	ex81a29.met	XD09.002	0	1	0	1
3	Unknown	15D048-01 QC Water	ex81a29.met	XD09.003	0	1	0	1
4	Unknown	EXD004WB	ex81a29.met	XD09.004	0	1	0	1
5	Unknown	LOQ-06	ex81a29.met	XD09.005	0	1	0	1
6	Unknown	LOD-06	ex81a29.met	XD09.006	0	1	0	1
7	Unknown	EXD003SB	ex81a29.met	XD09.007	0	1	0	1
8	Unknown	EXD003SL	ex81a29.met	XD09.008	0	1	0	1
9	Unknown	EXD003SC	ex81a29.met	XD09.009	0	1	0	1
10	Unknown	LOQ-01	ex81a29.met	XD09.010	0	1	0	1
11	Unknown	LOD-01	ex81a29.met	XD09.011	0	1	0	1
12	Unknown	15D026-01	ex81a29.met	XD09.012	0	1	0	1
13	Unknown	CEX81A29063	ex81a29.met	XD09.013	0	1	0	1
14	Unknown	15D026-01M	ex81a29.met	XD09.014	0	1	0	1
15	Unknown	15D026-01S	ex81a29.met	XD09.015	0	1	0	1
16	Unknown	15D026-02	ex81a29.met	XD09.016	0	1	0	1
17	Unknown	15D026-03	ex81a29.met	XD09.017	0	1	0	1
18	Unknown	15D027-01	ex81a29.met	XD09.018	0	1	0	1
19	Unknown	EXD006WB	ex81a29.met	XD09.019	0	1	0	1
20	Unknown	EXD006WL	ex81a29.met	XD09.020	0	1	0	1
21	Unknown	EXD006WC	ex81a29.met	XD09.021	0	1	0	1
22	Unknown	LOQ-07	ex81a29.met	XD09.022	0	1	0	1
23	Unknown	LOD-07	ex81a29.met	XD09.023	0	1	0	1
24	Unknown	15D040-21	ex81a29.met	XD09.024	0	1	0	1
25	Unknown	15D040-22	ex81a29.met	XD09.025	0	1	0	1
26	Unknown	CEX81A29064	ex81a29.met	XD09.026	0	1	0	1
27	Unknown	x	ex81a29.met	XD09.027	0	1	0	1
28	Unknown	x	ex81a29.met	XD09.028	0	1	0	1
29	Unknown	x	ex81a29.met	XD09.029	0	1	0	1
30	Unknown	x	ex81a29.met	XD09.030	0	1	0	1
31	Unknown	x	ex81a29.met	XD09.031	0	1	0	1
32	Unknown	x	ex81a29.met	XD09.032	0	1	0	1
33	Unknown	x	ex81a29.met	XD09.033	0	1	0	1
34	Unknown	x	ex81a29.met	XD09.034	0	1	0	1

FINAL

LB 4/14/15

Method Development

Tuesday, April 14, 2015

Start | EZChrom Chromatography | Method: Ex81a29.met - B | Method: Ng17a30.met - B | Method: Ex81a29.met... | untitled - Paint | 9:45 AM

EXTRACTION LOGS

EMAX LABORATORIES, INC.

EXTRACTION LOG *for* EXPLOSIVES

Note: For samples and relevant QCs/Standards extracted, refer to attached extraction sequence.

SOP	Rev. #
☑ EMAX-8330	7
☑ EMAX-8332	1
☐ EMAX-	

Lab Sample ID	
EXD003-SP	
-SL	
-SC	
D026-01	✓
-01m	✓
-01S	✓
-02	✓
-03	✓
D027-01	✓
LOQ-01	✓
LOD-01	✓
LOQ-02	✓
LOD-02	✓
LOQ-03	✓
LOD-03	✓
LOQ-04	✓
LOD-04	✓
LOQ-05	✓
LOD-05	✓

Book #.: EEX-026

Preparation Batch: EXD003S

Matrix: Soil

Micropipette ID: PE00-04 (1000-ul)

Micropipette ID: PE99C-03 (100-ul)

Comments:

Standards	ID	Amount Added (ml)
Surrogate (REG)	SH1B-06-64-03	0.4
LCS/MS (8330)	SH1B-06-65-01	0.4
LCS/MS (8332)	SH1B-06-64-02	LOQs & LODs
LCS/MS (2,4/2,6 DNT)	SH1B-06-60-01	SEE
LCS/MS (picric acid)	SH1B-06-45-03	ATTACHED
(3,5 DNA)	SH1B-06-56-02	COPY...

Reagent	Lot # / ID
Acetonitrile	54330
NaCl	-
$CaCl_2$	SP1B-08-03-03
Silica Sand	SW1B-002-43-21
Reagent Water	54247
SPE Disk	-
Methanol	-
Acetone	-

Prepared By: Jville Witnessed By: mu

Standard Added By: Jville Checked By: JM

Extract Received By: LC 4/9/15 Location: SE04#04

Disposed By: Disposed On:

6040

FileID: EXD003S

EMAX LABORATORIES, INC.

EXTRACTION LOG FOR EXPLOSIVES

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Ve(ml)	ExpAmt	ExpVe(ml)	PrepFctr	Comments
15EXD003S01	EXD003SB	2	g	4/8/15 11:56	20	2	20	1	
15EXD003S02	EXD003SL	2	g	4/8/15 11:56	20	2	20	1	
15EXD003S03	EXD003SC	2	g	4/8/15 11:56	20	2	20	1	
15EXD003S04	D026-01	2	g	4/8/15 11:58	20	2	20	1	
15EXD003S05	D026-01M	2	g	4/8/15 11:59	20	2	20	1	
15EXD003S06	D026-01S	2	g	4/8/15 12:00	20	2	20	1	
15EXD003S07	D026-02	2	g	4/8/15 12:01	20	2	20	1	
15EXD003S08	D026-03	2.02	g	4/8/15 12:02	20	2	20	0.99	
15EXD003S09	D027-01	2	g	4/8/15 12:03	20	2	20	1	
15EXD003S10	LOQ-01	2	g	4/8/15 12:05	20	2	20	1	(8330) Spike & Surr.amt. 20ppb (0.04ml)
15EXD003S11	LOD-01	2	g	4/8/15 12:05	20	2	20	1	(8330) Spike & Surr.amt. 10ppb (0.02ml)
15EXD003S12	LOQ-02	2	g	4/8/15 12:05	20	2	20	1	(8332) Spike & Surr.amt. 50ppb (0.04ml)
15EXD003S13	LOD-02	2	g	4/8/15 12:08	20	2	20	1	(8332) Spike & Surr.amt. 25ppb (0.02ml)
15EXD003S14	LOQ-03	2	g	4/8/15 12:08	20	2	20	1	(2,4/2,6 Addt'l) Spike amt. 40ppb (0.08ml)
15EXD003S15	LOD-03	2	g	4/8/15 12:08	20	2	20	1	(2,4/2,6 Addt'l) Spike amt. 20ppb (0.04ml)
15EXD003S16	LOQ-04	2	g	4/8/15 12:10	20	2	20	1	(Picric Acid) Spike amt. 20ppb (0.04ml)
15EXD003S17	LOD-04	2	g	4/8/15 12:10	20	2	20	1	(Picric Acid) Spike amt. 10ppb (0.02ml)
15EXD003S18	LOQ-05	2	g	4/8/15 12:11	20	2	20	1	(3,5 DNA) Spike amt. 20ppb (0.04ml)
15EXD003S19	LOD-05	2	g	4/8/15 12:11	20	2	20	1	(3,5 DNA) Spike amt. 10ppb (0.02ml)
									Air Dry Batch: ADD002

Balance ID: 10203192. Calibration check was verified prior to use.

Ve=extract volume

PreptFctr=(ExpAmt/Aliquot)(Ve/ExpVe)

☑ Extraction Started @ 4/8/15 15:53

Prepared By: JVille

☑ Extraction Ended @ 4/9/15 9:53

Checked By: JM

Comments:

Date 4/9/15

SOP EMAX-8330 Rev. 7

LABORATORY REPORT FOR

KLEINFELDER

CTO 070, UXO4, FALLBROOK

METALS / MERCURY

SDG#: 15D027

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D027

METHOD SW6020A
METALS BY ICP-MS

One (1) soil sample was received on 04/03/15 to be analyzed for Metals by ICP-MS in accordance with Method SW6020A and project specific requirements.

Holding Time
The sample was digested and analyzed within the prescribed holding time.

Calibration
Initial Calibration was established as prescribed by the method and was verified using a secondary source (ICV). Interference checks were performed and results were within required limits. Continuing calibration verifications and continuing calibration blanks were carried out at the frequency specified by the project. All calibration requirements were within acceptance criteria. MRL was analyzed as required by the project.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, one (1) method blank was analyzed. IMD010SB - result was compliant to project requirement. Refer to sample result summary form for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, one (1) set of LCS/LCD was analyzed. IMD010SL/IMD010SC - all analytes were within LCS QC limits. Refer to LCS summary form for details.

Matrix QC Sample
Matrix spike sample was prepared and analyzed at a frequency required by the project. For this SDG, one (1) set of MS/MSD was analyzed and the following were noted: D027-01M/D027-01S - Percent recoveries for Aluminum (5X), Antimony, Iron (7X) and Manganese (7X) were not within MS/MSD QC limits. Percent recovery for Barium (3X) was not within MSD QC limits. The enclosed value (#X) is the ratio of parent sample result and spike amount. Presence of matrix interference was suspected. The rest of the analytes were in control. Analytical spike and serial dilution were analyzed and evaluated as appropriate. Results were within expected values. Refer to Matrix QC summary form for details.

Sample Analysis
The sample was analyzed according to prescribed analytical procedures. Results were evaluated in accordance to project requirements. For this SDG, all quality control requirements were met with the exception of those that were discussed within the associated QC parameter.

LAB CHRONICLE
METALS BY ICP-MS

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK

SDG NO. : 15D027
Instrument ID : T-I98

SOIL

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1S	IMD010SB	0.966	NA	04/10/1516:19	04/07/1514:25	98D03041	98D03039	IMD010S	Method Blank
LCS1S	IMD010SL	0.966	NA	04/10/1516:24	04/07/1514:25	98D03042	98D03039	IMD010S	Lab Control Sample (LCS)
LCD1S	IMD010SC	0.957	NA	04/10/1516:28	04/07/1514:25	98D03043	98D03039	IMD010S	LCS Duplicate
UXO4-SB01-1.0MS	D027-01M	0.966	9.5	04/10/1517:08	04/07/1514:25	98D03052	98D03050	IMD010S	Matrix Spike Sample (MS)
UXO4-SB01-1.0MSD	D027-01S	0.976	9.5	04/10/1517:12	04/07/1514:25	98D03053	98D03050	IMD010S	MS Duplicate (MSD)
UXO4-SB01-1.0AS	D027-01A	0.980	9.5	04/10/1517:17	04/07/1514:25	98D03054	98D03050	IMD010S	Analytical Spike Sample
UXO4-SB01-1.0	D027-01	0.980	9.5	04/10/1517:21	04/07/1514:25	98D03055	98D03050	IMD010S	Field Sample
UXO4-SB01-1.0DL	D027-01J	4.90	9.5	04/10/1517:25	04/07/1514:25	98D03056	98D03050	IMD010S	Diluted Sample

FN - Filename
% Moist - Percent Moisture

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/02/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/03/15
SDG NO.	: 15D027	Date Extracted:	04/07/15 14:25
Sample ID:	UX04-SB01-1.0	Date Analyzed:	04/10/15 17:21
Lab Samp ID:	D027-01	Dilution Factor:	0.980
Lab File ID:	98D03055	Matrix :	SOIL
Ext Btch ID:	IMD010S	% Moisture :	9.5
Calib. Ref.:	98D03050	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	14700	108	10.8	21.7
Antimony	0.134J	0.541	0.108	0.217
Arsenic	1.97	0.541	0.0541	0.108
Barium	96.1	0.541	0.0780	0.108
Beryllium	0.265J	0.541	0.0541	0.108
Cadmium	0.151J	0.541	0.0617	0.108
Calcium	2190	108	18.4	21.7
Chromium	11.6	0.541	0.0541	0.108
Cobalt	5.39	0.541	0.0541	0.108
Copper	8.13	0.541	0.108	0.217
Iron	19600	108	5.41	10.8
Lead	6.72	0.541	0.0541	0.108
Magnesium	3620	108	10.8	21.7
Manganese	181	0.541	0.166	0.217
Molybdenum	0.321J	0.541	0.108	0.217
Nickel	4.48	0.541	0.0682	0.108
Potassium	2450	108	10.8	21.7
Selenium	0.0715J	0.541	0.0541	0.108
Silver	ND	0.541	0.0541	0.108
Sodium	159	108	10.8	21.7
Strontium	17.3	0.541	0.0541	0.108
Thallium	0.270J	0.541	0.0541	0.108
Tin	ND	21.7	5.41	10.8
Vanadium	47.7	0.541	0.206	0.271
Zinc	34.3	2.17	0.740	1.08

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	NA
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/07/15
SDG NO.	: 15D027	Date Extracted:	04/07/15 14:25
Sample ID:	MBLK1S	Date Analyzed:	04/10/15 16:19
Lab Samp ID:	IMD010SB	Dilution Factor:	0.966
Lab File ID:	98D03041	Matrix :	SOIL
Ext Btch ID:	IMD010S	% Moisture :	NA
Calib. Ref.:	98D03039	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	ND	96.6	9.66	19.3
Antimony	ND	0.483	0.0966	0.193
Arsenic	ND	0.483	0.0483	0.0966
Barium	ND	0.483	0.0696	0.0966
Beryllium	ND	0.483	0.0483	0.0966
Cadmium	ND	0.483	0.0551	0.0966
Calcium	ND	96.6	16.4	19.3
Chromium	ND	0.483	0.0483	0.0966
Cobalt	ND	0.483	0.0483	0.0966
Copper	ND	0.483	0.0966	0.193
Iron	ND	96.6	4.83	9.66
Lead	ND	0.483	0.0483	0.0966
Magnesium	ND	96.6	9.66	19.3
Manganese	ND	0.483	0.148	0.193
Molybdenum	ND	0.483	0.0966	0.193
Nickel	ND	0.483	0.0609	0.0966
Potassium	ND	96.6	9.66	19.3
Selenium	ND	0.483	0.0483	0.0966
Silver	ND	0.483	0.0483	0.0966
Sodium	ND	96.6	9.66	19.3
Strontium	ND	0.483	0.0483	0.0966
Thallium	ND	0.483	0.0483	0.0966
Tin	ND	19.3	4.83	9.66
Vanadium	ND	0.483	0.184	0.242
Zinc	ND	1.93	0.660	0.966

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
SDG NO.: 15D027
METHOD: SW6020A

MATRIX:	SOIL			% MOISTURE:	NA
DILTN FACTR:	0.966	0.966	0.957		
SAMPLE ID:	MBLK1S				
CONTROL NO.:	IMD010SB	IMD010SL	IMD010SC		
LAB FILE ID:	98D03041	98D03042	98D03043		
DATIME EXTRCTD:	04/07/1514:25	04/07/1514:25	04/07/1514:25	DATE COLLECTED:	NA
DATIME ANALYZD:	04/10/1516:19	04/10/1516:24	04/10/1516:28	DATE RECEIVED:	04/07/15
PREP. BATCH:	IMD010S	IMD010S	IMD010S		
CALIB. REF:	98D03039	98D03039	98D03039		

ACCESSION:

PARAMETER	BLNK RSLT mg/kg	SPIKE AMT mg/kg	BS RSLT mg/kg	BS % REC	SPIKE AMT mg/kg	BSD RSLT mg/kg	BSD % REC	RPD %	QC LIMIT %	MAX RPD %
Aluminum	ND	2500	2450	98	2500	2420	97	1	80-120	20
Antimony	ND	25.0	23.7	95	25.0	23.7	95	0	80-120	20
Arsenic	ND	25.0	24.5	98	25.0	23.9	96	3	80-120	20
Barium	ND	25.0	23.9	96	25.0	23.7	95	1	80-120	20
Beryllium	ND	25.0	24.1	97	25.0	23.6	94	2	80-120	20
Cadmium	ND	25.0	24.3	97	25.0	23.8	95	2	80-120	20
Calcium	ND	2500	2520	101	2500	2520	101	0	80-120	20
Chromium	ND	25.0	23.4	93	25.0	22.9	92	2	80-120	20
Cobalt	ND	25.0	24.2	97	25.0	24.0	96	1	80-120	20
Copper	ND	25.0	23.4	94	25.0	23.0	92	2	80-120	20
Iron	ND	2500	2440	98	2500	2450	98	0	80-120	20
Lead	ND	25.0	24.8	99	25.0	24.2	97	3	80-120	20
Magnesium	ND	2500	2510	100	2500	2480	99	1	80-120	20
Manganese	ND	25.0	24.2	97	25.0	24.0	96	1	80-120	20
Molybdenum	ND	25.0	24.9	99	25.0	24.5	98	1	80-120	20
Nickel	ND	25.0	23.9	95	25.0	23.4	94	2	80-120	20
Potassium	ND	2500	2510	101	2500	2470	99	2	80-120	20
Selenium	ND	25.0	24.1	96	25.0	23.6	94	2	80-120	20
Silver	ND	25.0	24.5	98	25.0	23.8	95	3	75-120	20
Sodium	ND	2500	2480	99	2500	2490	100	1	80-120	20
Strontium	ND	25.0	24.1	97	25.0	23.9	96	1	80-120	20
Thallium	ND	25.0	24.4	98	25.0	23.9	96	2	80-120	20
Tin	ND	25.0	26.7	107	25.0	26.4	106	1	80-120	20
Vanadium	ND	25.0	24.2	97	25.0	23.7	95	2	80-120	20
Zinc	ND	50.0	46.9	94	50.0	46.0	92	2	80-120	20

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
SDG NO.: 15D027
METHOD: SW6020A

MATRIX:	SOIL			% MOISTURE:	9.5
DILTN FACTR:	0.980	0.966	0.976		
SAMPLE ID:	UX04-SB01-1.0				
CONTROL NO.:	D027-01	D027-01M	D027-01S		
LAB FILE ID:	98D03055	98D03052	98D03053		
DATIME EXTRCTD:	04/07/1514:25	04/07/1514:25	04/07/1514:25	DATE COLLECTED:	04/02/15
DATIME ANALYZD:	04/10/1517:21	04/10/1517:08	04/10/1517:12	DATE RECEIVED:	04/03/15
PREP. BATCH:	IMD010S	IMD010S	IMD010S		
CALIB. REF:	98D03050	98D03050	98D03050		

ACCESSION:

PARAMETER	SMPL RSLT mg/kg	SPIKE AMT mg/kg	MS RSLT mg/kg	MS % REC	SPIKE AMT mg/kg	MSD RSLT mg/kg	MSD % REC	RPD %	QC LIMIT %	MAX RPD %
Aluminum	14700	2760	18700	142*	2760	19600	175*	5	80-120	20
Antimony	0.134J	27.6	19.3	69*	27.6	20.0	72*	4	80-120	20
Arsenic	1.97	27.6	27.8	94	27.6	27.7	93	0	80-120	20
Barium	96.1	27.6	121	89	27.6	117	74*	3	80-120	20
Beryllium	0.265J	27.6	26.5	95	27.6	26.1	94	1	80-120	20
Cadmium	0.151J	27.6	26.8	96	27.6	26.3	95	2	80-120	20
Calcium	2190	2760	4510	84	2760	4580	87	2	80-120	20
Chromium	11.6	27.6	35.0	84	27.6	34.9	84	0	80-120	20
Cobalt	5.39	27.6	28.9	85	27.6	29.0	85	0	80-120	20
Copper	8.13	27.6	30.7	82	27.6	31.2	84	2	80-120	20
Iron	19600	2760	21400	69*	2760	21600	75*	1	80-120	20
Lead	6.72	27.6	35.2	103	27.6	32.7	94	8	80-120	20
Magnesium	3620	2760	6000	86	2760	5950	84	1	80-120	20
Manganese	181	27.6	200	70*	27.6	197	57*	2	80-120	20
Molybdenum	0.321J	27.6	26.4	94	27.6	26.8	96	2	80-120	20
Nickel	4.48	27.6	27.5	83	27.6	27.6	84	0	80-120	20
Potassium	2450	2760	4860	87	2760	4740	83	2	80-120	20
Selenium	0.0715J	27.6	25.6	92	27.6	25.6	93	0	80-120	20
Silver	ND	27.6	26.8	97	27.6	26.1	95	3	75-120	20
Sodium	159	2760	2550	87	2760	2600	88	2	80-120	20
Strontium	17.3	27.6	41.7	88	27.6	41.7	88	0	80-120	20
Thallium	0.270J	27.6	27.0	97	27.6	26.4	95	2	80-120	20
Tin	ND	27.6	29.9	108	27.6	30.3	110	1	80-120	20
Vanadium	47.7	27.6	70.8	83	27.6	71.4	86	1	80-120	20
Zinc	34.3	55.2	87.7	97	55.2	85.1	92	3	80-120	20

EMAX QUALITY CONTROL DATA
SERIAL DILUTION ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
BATCH NO.: 15D027
METHOD: SW6020A

MATRIX:	SOIL		% MOISTURE:	9.5
DILUTION FACTOR:	0.980	4.90		
SAMPLE ID:	UX04-SB01-1.0	UX04-SB01-1.0DL		
EMAX SAMP ID:	D027-01	D027-01J		
LAB FILE ID:	98D03055	98D03056		
DATE EXTRACTED:	04/07/1514:25	04/07/1514:25	DATE COLLECTED:	04/02/15
DATE ANALYZED:	04/10/1517:21	04/10/1517:25	DATE RECEIVED:	04/03/15
PREP. BATCH:	IMD010S	IMD010S		
CALIB. REF:	98D03050	98D03050		

ACCESSION:

PARAMETER	SMPL RSLT (mg/kg)	SERIAL DIL RSLT (mg/kg)	DIF RSLT %	QC LIMIT (%)
Aluminum	14700	15600	6	10
Antimony	0.134J	ND	NA	10
Arsenic	1.97	2.01J	NA	10
Barium	96.1	94.6	2	10
Beryllium	.265J	0.285J	NA	10
Cadmium	.151J	ND	NA	10
Calcium	2190	2330	7	10
Chromium	11.6	12.5	8	10
Cobalt	5.39	5.93	10	10
Copper	8.13	9.13	12*	10
Iron	19600	21000	8	10
Lead	6.72	6.71	0	10
Magnesium	3620	3870	7	10
Manganese	181	196	9	10
Molybdenum	.321J	ND	NA	10
Nickel	4.48	4.98	11*	10
Potassium	2450	2580	5	10
Selenium	0.0715J	ND	NA	10
Silver	ND	ND	0	10
Sodium	159	153J	4	10
Strontium	17.3	16.7	4	10
Thallium	.27J	ND	NA	10
Tin	ND	ND	0	10
Vanadium	47.7	51	7	10
Zinc	34.3	34.8	1	10

EMAX QUALITY CONTROL DATA
ANALYTICAL SPIKE ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
SDG NO.: 15D027
METHOD: SW6020A

MATRIX:	SOIL		% MOISTURE:	9.5
DILTN FACTR:	0.980	0.980		
SAMPLE ID:	UX04-SB01-1.0			
CONTROL NO.:	D027-01	D027-01A		
LAB FILE ID:	98D03055	98D03054		
DATIME EXTRCTD:	04/07/1514:25	04/07/1514:25	DATE COLLECTED:	04/02/15
DATIME ANALYZD:	04/10/1517:21	04/10/1517:17	DATE RECEIVED:	04/03/15
PREP. BATCH:	IMD010S	IMD010S		
CALIB. REF:	98D03050	98D03050		

ACCESSION:

PARAMETER	SMPL RSLT (mg/kg)	SPIKE AMT (mg/kg)	AS RSLT (mg/kg)	AS % REC	QC LIMIT (%)
Aluminum	14700	2710	17300	92	75-125
Antimony	0.134J	27.1	26.8	99	75-125
Arsenic	1.97	27.1	28.6	99	75-125
Barium	96.1	27.1	127	113	75-125
Beryllium	0.265J	27.1	25.7	94	75-125
Cadmium	0.151J	27.1	26.7	98	75-125
Calcium	2190	2710	4810	97	75-125
Chromium	11.6	27.1	34.9	86	75-125
Cobalt	5.39	27.1	29.3	88	75-125
Copper	8.13	27.1	30.9	84	75-125
Iron	19600	2710	22200	96	75-125
Lead	6.72	27.1	33.0	97	75-125
Magnesium	3620	2710	6320	100	75-125
Manganese	181	27.1	203	83	75-125
Molybdenum	0.321J	27.1	28.3	103	75-125
Nickel	4.48	27.1	27.8	86	75-125
Potassium	2450	2710	5090	97	75-125
Selenium	0.0715J	27.1	26.6	98	75-125
Silver	ND	27.1	26.1	96	75-125
Sodium	159	2710	2750	96	75-125
Strontium	17.3	27.1	43.1	95	75-125
Thallium	0.270J	27.1	26.8	98	75-125
Tin	ND	27.1	30.1	111	75-125
Vanadium	47.7	27.1	74.2	98	75-125
Zinc	34.3	54.1	85.7	95	75-125

ICP-MS QC CHECK TABLE

QC	CCV HIGH	ICV	CCV	ICSAB	ICSA
Limit%	95-105	90-110	90-110	80-120	80-120
Comp	ug/L	ug/L	ug/L	ug/L	ug/L
Al	5000	3000	2500	100000	100000
Sb	50	30	25	20	0
As	50	30	25	20	0
Ba	50	30	25	20	0
Be	50	30	25	20	0
B	50	30	25	20	0
Cd	50	30	25	20	0
Ca	5000	3000	2500	100000	100000
Cr	50	30	25	20	0
Co	50	30	25	20	0
Cu	50	30	25	20	0
Fe	5000	30	2500	100000	100000
Pb	50	30	25	20	0
Mg	5000	3000	2500	100000	100000
Mn	50	30	25	20	0
Mo	50	30	25	2000	2000
Ni	50	30	25	20	0
P	500	300	250	100000	100000
K	5000	3000	2500	100000	100000
Se	50	30	25	20	0
Si	5000	3000	2500	200	0
Ag	50	30	25	20	0
Na	2500	1500	1250	100000	100000
Sr	50	30	25	20	0
Tl	50	30	25	20	0
Sn	50	30	25	20	0
Ti	50	30	25	2000	2000
Th	50	30	25	20	0
W	50	30	25	20	0
V	50	30	25	20	0
U	50	30	25	20	0
Zn	100	60	50	20	0
Zr	30	20	15	20	0

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
ICP-MS

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Start Date: 4/10/15 13:22

End Date: 4/10/15 18:29

Comments:

All soil/solid samples are diluted at 10x dilution prior to analysis.

QC Re

Book #: A98-038

Instrument No.: 98

Analytical Batch: T98D03

Analytical Sequence: 98D03

Method File: EMX6020

Micropipette ID: ☑ 1462781004

Micropipette ID: ☑ ICP-06

Micropipette ID: ☑ 339362028

Micropipette ID: ☑ GFAA-07

Micropipette ID: ☐

SOP #	Rev. #
☑ EMAX-6020	8
☑ EMAX-200.8	5
☐ EMAX-	

STANDARDS ID		STANDARDS ID	
S0	SM6B059.05.07	MRL1 (1)	SM6B059.05.01
S1	.05.08	MRL2 (0.5)	.05.02
S2	.06.01	MRL3 (0.2)	.05.04
S3	.06.02	MRL4	LA
S4	.06.03	MRL5	
S5	LA	MRL6	
S6		Internal Standard	SM6B058.04.07
S7		Post-Spike 1	SMGA-057.02.10
ICV	SM6B059.07.01	Post-Spike 2	02.11
CCV	.07.02	Post-Spike 3	LA
ICSA	.07.03	Post-Spike 4	
ICSAB	.07.04		
6020 TUNE SOLN.	.02.04		
200.8 TUNE SOLN.	.02.05		

Analyzed By: CRC

Date: 4/10/15

7010

SEQUENCE FILE : I98D03

4-18	19-33	34-43	44-53	54-63
LFID	LSID	TIME	DATE	DF
98D03003	BLNK	13:22	04/10/15	1.00
98D03004	S0	13:26	04/10/15	1.00
98D03005	S1 0.5	13:31	04/10/15	1.00
98D03006	S2 5	13:36	04/10/15	1.00
98D03007	S3 25	13:40	04/10/15	1.00
98D03008	S4 50	13:44	04/10/15	1.00
98D03009	ICV	13:49	04/10/15	1.00
98D03010	ICB	13:53	04/10/15	1.00
98D03011	MRLD1001	13:58	04/10/15	1.00
98D03012	MRLD1002	14:02	04/10/15	1.00
98D03013	ICSA	14:07	04/10/15	1.00
98D03014	ICSAB	14:11	04/10/15	1.00
98D03015	MRLD1003	14:16	04/10/15	1.00
98D03016	CCV1	14:20	04/10/15	1.00
98D03017	CCB1	14:25	04/10/15	1.00
98D03018	D049-01	14:29	04/10/15	1.00
98D03019	IMD006SB	14:34	04/10/15	1.00
98D03020	IMD006SL	14:38	04/10/15	1.00
98D03021	IMD006SC	14:43	04/10/15	1.00
98D03022	D005-01M	14:47	04/10/15	1.00
98D03023	D005-01S	14:51	04/10/15	1.00
98D03024	D005-01A	14:56	04/10/15	1.00
98D03025	D005-01	15:00	04/10/15	1.00
98D03026	D005-01J	15:04	04/10/15	5.00
98D03027	BLANK	15:09	04/10/15	1.00
98D03028	CCV2	15:13	04/10/15	1.00
98D03029	CCB2	15:18	04/10/15	1.00
98D03030	D005-02	15:22	04/10/15	1.00
98D03031	D005-03	15:27	04/10/15	1.00
98D03032	D005-04	15:31	04/10/15	1.00
98D03033	D005-05	15:36	04/10/15	1.00
98D03034	D005-06	15:40	04/10/15	1.00
98D03035	D005-07	15:44	04/10/15	1.00
98D03036	D005-08	15:49	04/10/15	1.00
98D03037	D005-09	15:53	04/10/15	1.00
98D03038	BLANK	16:06	04/10/15	1.00
98D03039	CCV3	16:11	04/10/15	1.00
98D03040	CCB3	16:15	04/10/15	1.00
98D03041	IMD010SB	16:19	04/10/15	1.00
98D03042	IMD010SL	16:24	04/10/15	1.00
98D03043	IMD010SC	16:28	04/10/15	1.00
98D03044	D005-10	16:33	04/10/15	1.00
98D03045	D005-11	16:37	04/10/15	1.00
98D03046	D026-01	16:41	04/10/15	1.00
98D03047	D026-02	16:46	04/10/15	1.00
98D03048	D026-03	16:50	04/10/15	1.00
98D03049	BLANK	16:55	04/10/15	1.00
98D03050	CCV4	16:59	04/10/15	1.00
98D03051	CCB4	17:04	04/10/15	1.00
98D03052	D027-01M	17:08	04/10/15	1.00
98D03053	D027-01S	17:12	04/10/15	1.00

98D03054	D027-01A	17:17	04/10/15	1.00
98D03055	D027-01	17:21	04/10/15	1.00
98D03056	D027-01J	17:25	04/10/15	5.00
98D03057	BLANK	17:30	04/10/15	1.00
98D03058	CCV5	17:34	04/10/15	1.00
98D03059	CCB5	17:39	04/10/15	1.00
98D03060	IDL-01	17:43	04/10/15	1.00
98D03061	IDL-02	17:48	04/10/15	1.00
98D03062	IDL-03	17:52	04/10/15	1.00
98D03063	IDL-04	17:57	04/10/15	1.00
98D03064	IDL-05	18:02	04/10/15	1.00
98D03065	IDL-06	18:06	04/10/15	1.00
98D03066	IDL-07	18:11	04/10/15	1.00
98D03067	MRLD1004	18:15	04/10/15	1.00
98D03068	MRLD1005	18:20	04/10/15	1.00
98D03069	CCV6	18:24	04/10/15	1.00
98D03070	CCB6	18:29	04/10/15	1.00

SDG : 15D027 UNIT : % ICPMS CHECK : I98D03 DATE : 04/10/15 INST : EMAXTI98

ANALYTE	Li	Be	B	Na	Mg	Al	Si	P	K	Ca	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	As	Se	Sr	Zr	Mo	Ag	Cd	Sn	Sb	Ba	W	Tl	Pb	U
BLNK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S1 0.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S2 5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S3 25	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S4 50	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICV	97	99	109	104	99	99	99	97	101	101	98	98	95	99	99	96	98	97	96	98	100	98	108	97	94	97	98	92	95	97	99	99	98
ICB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1001	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1002	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICSA	----	----	----	97	96	94	----	104	96	98	104	----	----	----	94	----	----	----	----	----	----	----	----	106	----	----	----	----	----	----	----	----	----
ICSAB	100	99	85	97	98	95	98	104	96	98	106	97	100	97	95	92	93	93	104	106	111	100	120	109	91	100	100	101	100	102	95	97	100
MRLD1003	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV1	96	96	94	101	101	102	102	100	100	101	99	96	96	98	98	98	99	98	96	100	100	98	105	101	95	99	98	96	97	100	102	99	99
CCB1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D049-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD006SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD006SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD006SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-01M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-01S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-01A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-01J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV2	95	95	90	102	101	101	103	102	102	101	101	96	95	98	98	96	98	97	97	100	100	100	105	100	95	98	99	96	97	100	100	98	98
CCB2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-08	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-09	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV3	95	95	92	101	101	101	104	102	101	101	101	96	95	98	98	97	98	97	97	100	100	100	104	101	96	99	98	97	99	99	101	98	99
CCB3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD010SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD010SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD010SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-11	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D026-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D026-02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D026-03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV4	94	95	83*	102	101	101	105	103	102	101	101	95	94	97	98	99	96	95	95	100	99	97	103	101	97	99	99	97	98	99	101	98	97
CCB4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D027-01M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D027-01S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

D027-01A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D027-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D027-01J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV5	94	93	77*	100	100	101	104	102	102	101	100	96	93	98	97	97	96	95	97	101	99	100	107	99	95	97	97	95	96	100	99	98	97
CCB5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1004	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1005	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV6	94	97	87*	102	99	100	101	101	102	100	102	95	94	101	98	98	96	94	98	100	101	101	109	100	96	99	98	97	98	100	99	99	99
CCB6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

QC limit of each parameter are listed in a table attached next to all the ICP check forms

* : Out of QC Limit

SDG : 15D027 UNIT : UG/L SUMMARY of CALIBRATION BLANKS : I98D03 (SOIL) DATE : 04/10/15 INST : EMAXTI98

ANALYTE	Li	Be	B	Na	Mg	Al	Si	P	K	Ca	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	As	Se	Sr	Zr	Mo	Ag	Cd	Sn	Sb	Ba	W	Tl	Pb	U
BLNK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S1 0.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S2 5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S3 25	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S4 50	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICV	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICB	.054	.012	1.19	2.41	-.185	-.584	-13.2	-.639	-.326	.178	-.053	.046	.004	-.002	.040	.001	-.009	-.005	.057	.011	.011	.002	.021	.025	.000	.003	.001	.047	.001	.066	.003	.000	.003
MRLD1001	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1002	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICSA	.408	.013	.055	----	----	----	5.62	----	----	----	----	.013	1.23	.403	----	.141	.108	.497	2.08	.069	.024	.620	1.49	----	.017	.173	.007	.032	.079	.202	-.004	.176	-.009
ICSAB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1003	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB1	-.177	.004	-1.93	4.83	.625	-.205	-26.8	.410	2.11	1.16	-.053	.071	.005	-.000	.524	-.000	.002	.020	.098	.018	.008	.001	.011	.108	-.000	.000	.000	.036	.001	.059	.000	.000	.000
D049-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD006SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD006SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD006SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-01M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-01S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-01A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-01J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB2	-.001	.006	-3.38	2.66	.090	-.462	-15.2	1.80	3.50	1.01	-.022	.035	.004	.007	.145	.000	.007	.002	.105	.015	.006	.001	.008	.014	.000	.002	.003	.031	.003	.035	.001	-.001	.000
D005-02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-08	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-09	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB3	-.082	.002	-2.53	3.13	.163	-.166	6.57	2.53	4.54	1.30	.035	.014	.001	.016	1.32	.000	.004	-.000	.106	.016	.003	.002	.006	.013	-.000	.002	.002	.026	.006	.031	-.000	-.000	-.000
IMD010SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD010SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD010SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D005-11	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D026-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D026-02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D026-03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB4	-.147	.005	-5.77	.113	-.007	-.498	-14.6	2.29	4.43	.860	-.002	.017	.000	.015	.481	.000	.010	-.000	.122	.009	.008	.003	.010	.009	-.001	.001	.003	.028	.003	.041	.000	.000	.002
D027-01M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D027-01S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

D027-01A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D027-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D027-01J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB5	-.124	.010	-4.79	-.794	.171	.013	-27.7	2.25	4.78	.894	.017	.023	.000	.015	.285	.001	-.004	-.005	.117	.015	.003	.002	.013	.012	-.000	.000	.002	.028	.010	.040	.002	-.000	.000
IDL-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1004	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1005	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB6	.051	.007	-3.10	1.05	-.236	-.657	-24.5	1.44	6.46	.929	-.052	.028	-.001	.007	.138	-.000	-.003	-.005	.110	.006	.011	.000	.016	.008	-.000	.001	.001	.029	.004	.090	.000	-.002	.002

QC limit of each parameter are listed in a table attached next to all the ICP check forms

* : Out of QC Limit

	Method	Type	Vial	Data File	Sample	Comment	Dil/Lvl	Final WT or Vol	Sample WT or Vol	Dil Multiplier	ISTD Conc	Action on Failure	Skip	Result
1		Keyword		TUNBEG	Start of TUNE									
2	C:\ICPCHEM\1\METHODS\TN6020_C.M	Tun6	1301	98D03001	6020tunchk		1.000							
3	C:\ICPCHEM\1\METHODS\TN200_8C.M	Tun2	1302	98D03002	2008tunchk		1.000							
4		Keyword		TUNEND	End of TUNE									
5		Keyword		CALBEG	Start of CALIB									
6	C:\ICPCHEM\1\METHODS\EMX6020.M	CalBlk	1101	98D03003	BLNK		Level 1							
7	C:\ICPCHEM\1\METHODS\EMX6020.M	CalBlk	1102	98D03004	S0		Level 1							
8	C:\ICPCHEM\1\METHODS\EMX6020.M	CalStd	1104	98D03005	S1 0.5		Level 2							
9	C:\ICPCHEM\1\METHODS\EMX6020.M	CalStd	1105	98D03006	S2 5		Level 3							
10	C:\ICPCHEM\1\METHODS\EMX6020.M	CalStd	1106	98D03007	S3 25		Level 4							
11	C:\ICPCHEM\1\METHODS\EMX6020.M	CalStd	1107	98D03008	S4 50		Level 5							
12	C:\ICPCHEM\1\METHODS\EMX6020.M	ICV1	1204	98D03009	ICV		1.000							
13	C:\ICPCHEM\1\METHODS\EMX6020.M	ICB	1102	98D03010	ICB		1.000							
14	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1305	98D03011	MRLD1001	1/100/10 ppb	1.000							
15	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1306	98D03012	MRLD1002	0.5/50/4 ppb	1.000							
16	C:\ICPCHEM\1\METHODS\EMX6020.M	ICS-A	1303	98D03013	ICSA		1.000							
17	C:\ICPCHEM\1\METHODS\EMX6020.M	ICS-AB	1304	98D03014	ICSAB		1.000							
18	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1207	98D03015	MRLD1003	500 ppb CAT	1.000							
19	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	98D03016	CCV1		1.000							
20	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	98D03017	CCB1		1.000							
21		Keyword		CALEND	End of CALIB									
22		Keyword		SMPLBEG	Start of SMPL									
23	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2101	98D03018	D049-01		1.000							
24	C:\ICPCHEM\1\METHODS\EMX6020.M	MBS	2102	98D03019	IMD006SB		1.000							
25	C:\ICPCHEM\1\METHODS\EMX6020.M	LCSS	2103	98D03020	IMD006SL		1.000							
26	C:\ICPCHEM\1\METHODS\EMX6020.M	LCSS	2104	98D03021	IMD006SC		1.000							
27	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2105	98D03022	D005-01M		1.000							
28	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2106	98D03023	D005-01S		1.000							
29	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2107	98D03024	D005-01A		1.000							
30	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2108	98D03025	D005-01		1.000							
31	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2109	98D03026	D005-01J		5.000							
32	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	98D03027	BLANK		1.000							
33	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	98D03028	CCV2		1.000							
34	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	98D03029	CCB2		1.000							
35	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2110	98D03030	D005-02		1.000							
36	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2111	98D03031	D005-03		1.000							
37	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2112	98D03032	D005-04		1.000							
38	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2201	98D03033	D005-05		1.000							
39	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2202	98D03034	D005-06		1.000							
40	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2203	98D03035	D005-07		1.000							
41	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2204	98D03036	D005-08		1.000							
42	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2205	98D03037	D005-09		1.000							
43	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	98D03038	BLANK		1.000							
44	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	98D03039	CCV3		1.000							
45	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	98D03040	CCB3		1.000							
46	C:\ICPCHEM\1\METHODS\EMX6020.M	MBS	2207	98D03041	IMD010SB		1.000							
47	C:\ICPCHEM\1\METHODS\EMX6020.M	LCSS	2208	98D03042	IMD010SL		1.000							
48	C:\ICPCHEM\1\METHODS\EMX6020.M	LCSS	2209	98D03043	IMD010SC		1.000							
49	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2206	98D03044	D005-10		1.000							
50	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2210	98D03045	D005-11		1.000							
51	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2211	98D03046	D026-01		1.000							

	Method	Type	Vial	Data File	Sample	Comment	Dil/Lvl	Final WT or Vol	Sample WT or Vol	Dil Multiplier	ISTD Conc	Action on Failure	Skip	Result
52	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2212	98D03047	D026-02		1.000							
53	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2301	98D03048	D026-03		1.000							
54	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	98D03049	BLANK		1.000							
55	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	98D03050	CCV4		1.000							
56	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	98D03051	CCB4		1.000							
57	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2302	98D03052	D027-01M		1.000							
58	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2303	98D03053	D027-01S		1.000							
59	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2304	98D03054	D027-01A		1.000							
60	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2305	98D03055	D027-01		1.000							
61	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2306	98D03056	D027-01J		5.000							
62	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	98D03057	BLANK		1.000							
63	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	98D03058	CCV5		1.000							
64	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	98D03059	CCB5		1.000							
65	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1201	98D03060	IDL-01		1.000							
66	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1201	98D03061	IDL-02		1.000							
67	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1201	98D03062	IDL-03		1.000							
68	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1201	98D03063	IDL-04		1.000							
69	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1201	98D03064	IDL-05		1.000							
70	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1201	98D03065	IDL-06		1.000							
71	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1201	98D03066	IDL-07		1.000							
72	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1305	98D03067	MRLD1004		1.000							
73	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1306	98D03068	MRLD1005		1.000							
74	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	98D03069	CCV6		1.000							
75	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	98D03070	CCB6		1.000							
76		Keyword		StandBy										
77		Keyword		SMPLEND	End of SMPL									
78		Keyword		End	End of Sequence									
79		Keyword		CCVBEG	Start of CCV									
80		Keyword		CCVEND	End of CCV									
81		Keyword		BLKBEG	Start of BLANK									
82		Keyword		BLKEND	End of BLANK									
83		Keyword		ERRBEG	Start of ERRTERM									
84		Keyword		ERREND	End of ERRTERM									

7018

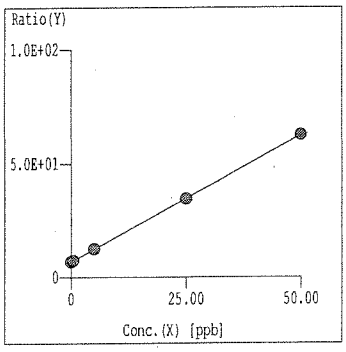
Last Calib: Apr 10, 2015 01:47 pm
Calibration Type: External Calibration Method
Calibration Title:
Weighting Method: 1/(SD*SD)
Mass Interpolation Fit for VIS: Point to Point
Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Multi Tune: #1 h2.u
#2 he.u
#3 norm.u

=== Standard Files ===
<Data Correction>
Bkg File: ---
Rejected Masses: ---
Interference Correction: ON

	Data File	Sample Name	Date Acquired
1	d:\data\i982015\d\i98d03.b\98d03004.d\98d03004.d#	S0	Apr 10 2015 01:26 pm
2	d:\data\i982015\d\i98d03.b\98d03005.d\98d03005.d#	S1 0.5	Apr 10 2015 01:31 pm
3	d:\data\i982015\d\i98d03.b\98d03006.d\98d03006.d#	S2 5	Apr 10 2015 01:36 pm
4	d:\data\i982015\d\i98d03.b\98d03007.d\98d03007.d#	S3 25	Apr 10 2015 01:40 pm
5	d:\data\i982015\d\i98d03.b\98d03008.d\98d03008.d#	S4 50	Apr 10 2015 01:44 pm
6	---		
7	---		
8	---		
9	---		
10	---		
11	---		
12	---		
13	---		
14	---		
15	---		
16	---		
17	---		
18	---		
19	---		
20	---		

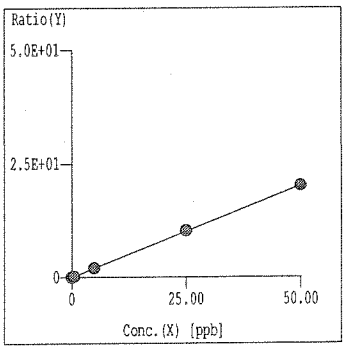
=== Graph Detail ===

Step Mass Element	ISTD	Unit
(3) 7 Li	6	ppb



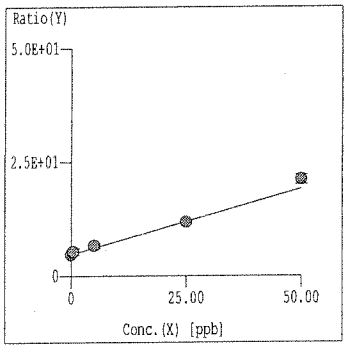
Curve Fit: Y=aX+b
r = 1.0000
Y = 1.115E+000*X +6.881E+000
X = 8.970E-001*Y -6.172E+000
DL = 2.021E-01 ppb
BEC = 6.172 ppb

Step Mass Element	ISTD	Unit
(3) 9 Be	6	ppb



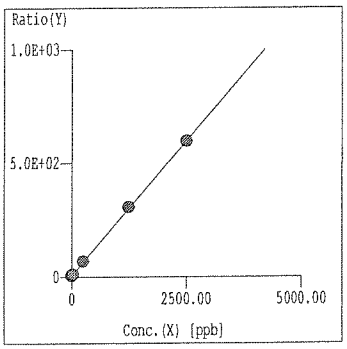
Curve Fit: Y=aX+b
r = 1.0000
Y = 4.039E-001*X +5.893E-003
X = 2.476E+000*Y -1.459E-002
DL = 9.772E-03 ppb
BEC = 1.459E-02 ppb

Step Mass Element	ISTD	Unit
(3) 11 B	6	ppb



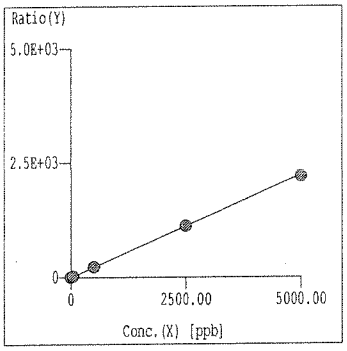
Curve Fit: Y=aX+b
r = 0.9967
Y = 2.883E-001*X +4.755E+000
X = 3.468E+000*Y -1.649E+001
DL = 3.679 ppb
BEC = 16.49 ppb

Step Mass Element	ISTD	Unit
(1) 23 Na	45	ppb



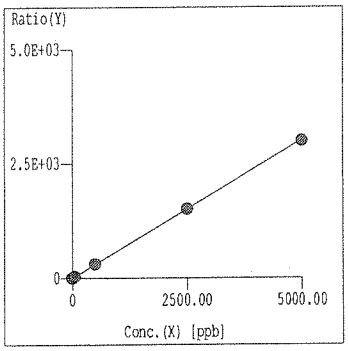
Curve Fit: Y=aX+b
r = 0.9999
Y = 2.365E-001*X +6.108E+000
X = 4.228E+000*Y -2.583E+001
DL = 1.306 ppb
BEC = 25.83 ppb

Step Mass Element	ISTD	Unit
(3) 24 Mg	45	ppb



Curve Fit: Y=aX+b
r = 1.0000
Y = 4.476E-001*X +1.014E+000
X = 2.234E+000*Y -2.267E+000
DL = 5.731E-01 ppb
BEC = 2.267 ppb

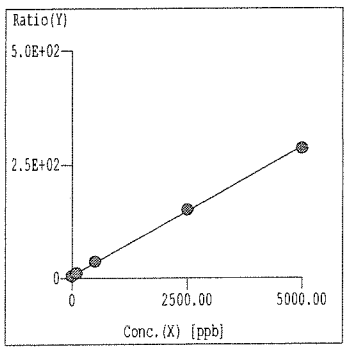
Step Mass Element	ISTD	Unit
(3) 27 Al	45	ppb



Curve Fit: Y=aX+b
r = 1.0000
Y = 6.038E-001*X +1.456E+000
X = 1.656E+000*Y -2.411E+000
DL = 8.249E-01 ppb
BEC = 2.411 ppb

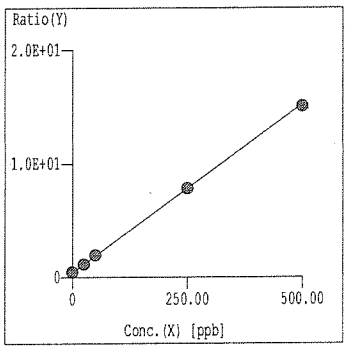
=== Graph Detail ===

Step Mass Element ISTD Unit
(1) 28 Si 45 ppb



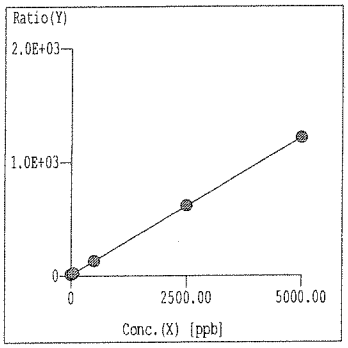
Curve Fit: Y=aX+b
r = 0.9998
Y = 5.656E-002*X +6.243E+000
X = 1.768E+001*Y -1.104E+002
DL = 12.41 ppb
BEC = 110.4 ppb

Step Mass Element ISTD Unit
(3) 31 P 45 ppb



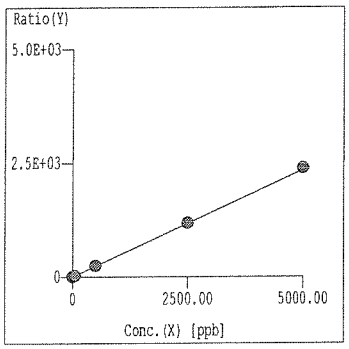
Curve Fit: Y=aX+b
r = 1.0000
Y = 2.964E-002*X +4.357E-001
X = 3.374E+001*Y -1.470E+001
DL = 1.653 ppb
BEC = 14.70 ppb

Step Mass Element ISTD Unit
(2) 39 K 45 ppb



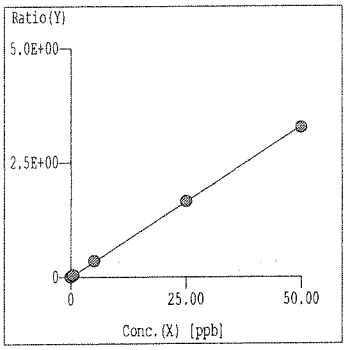
Curve Fit: Y=aX+b
r = 1.0000
Y = 2.407E-001*X +1.210E+001
X = 4.155E+000*Y -5.029E+001
DL = 3.635 ppb
BEC = 50.29 ppb

Step Mass Element ISTD Unit
(1) 40 Ca 45 ppb



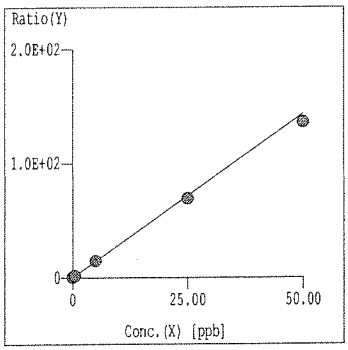
Curve Fit: Y=aX+b
r = 1.0000
Y = 4.691E-001*X +3.700E+000
X = 2.132E+000*Y -7.886E+000
DL = 2.174E-01 ppb
BEC = 7.886 ppb

Step Mass Element ISTD Unit
(3) 47 Ti 45 ppb



Curve Fit: Y=aX+b
r = 1.0000
Y = 6.555E-002*X +9.078E-003
X = 1.525E+001*Y -1.385E-001
DL = 9.992E-02 ppb
BEC = 1.385E-01 ppb

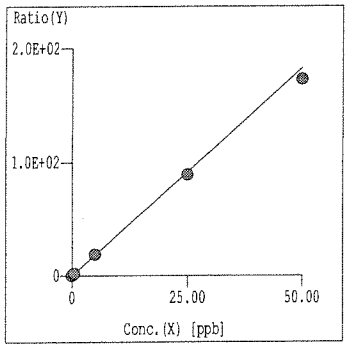
Step Mass Element ISTD Unit
(2) 51 V 45 ppb



Curve Fit: Y=aX+b
r = 1.0000
Y = 2.858E+000*X +4.392E-001
X = 3.499E-001*Y -1.537E-001
DL = 1.042E-02 ppb
BEC = 1.537E-01 ppb

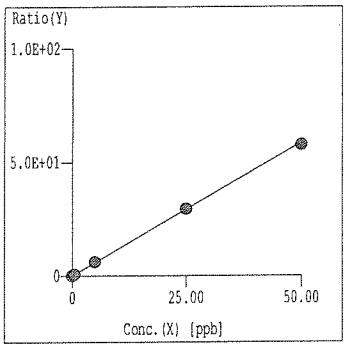
=== Graph Detail ===

Step Mass Element (2) 52 Cr — ISTD 45 — Unit ppb



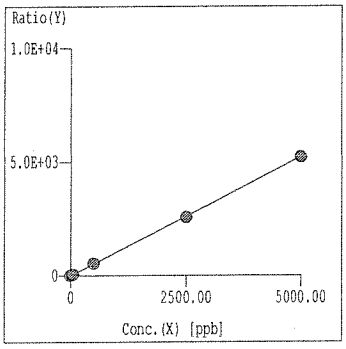
Curve Fit: Y=aX+b
r = 0.9999
Y = 3.653E+000*X +1.747E-001
X = 2.737E-001*Y -4.783E-002
DL = 8.371E-03 ppb
BEC = 4.783E-02 ppb

Step Mass Element (3) 55 Mn — ISTD 45 — Unit ppb



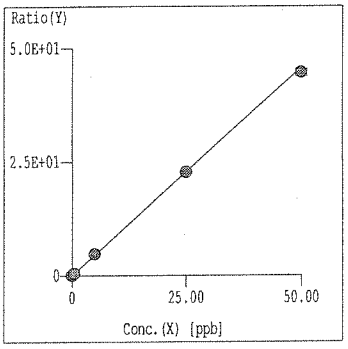
Curve Fit: Y=aX+b
r = 0.9999
Y = 1.173E+000*X +8.093E-002
X = 8.524E-001*Y -6.899E-002
DL = 4.444E-03 ppb
BEC = 6.899E-02 ppb

Step Mass Element (1) 56 Fe — ISTD 45 — Unit ppb



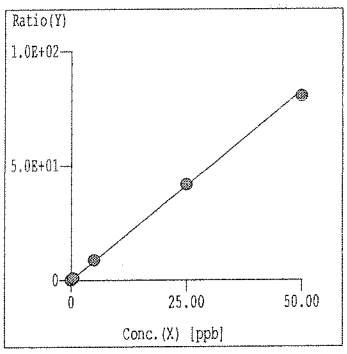
Curve Fit: Y=aX+b
r = 1.0000
Y = 1.045E+000*X +2.567E+000
X = 9.569E-001*Y -2.457E+000
DL = 2.889E-01 ppb
BEC = 2.457 ppb

Step Mass Element (3) 59 Co — ISTD 45 — Unit ppb



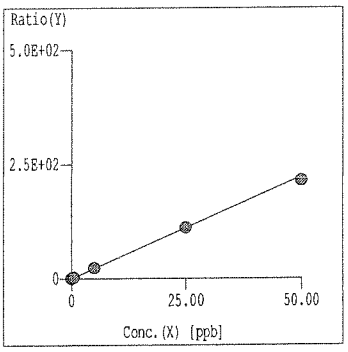
Curve Fit: Y=aX+b
r = 0.9999
Y = 9.135E-001*X +1.002E-002
X = 1.095E+000*Y -1.097E-002
DL = 1.446E-03 ppb
BEC = 1.097E-02 ppb

Step Mass Element (2) 60 Ni — ISTD 45 — Unit ppb



Curve Fit: Y=aX+b
r = 0.9998
Y = 1.652E+000*X +9.831E-002
X = 6.052E-001*Y -5.950E-002
DL = 1.209E-02 ppb
BEC = 5.950E-02 ppb

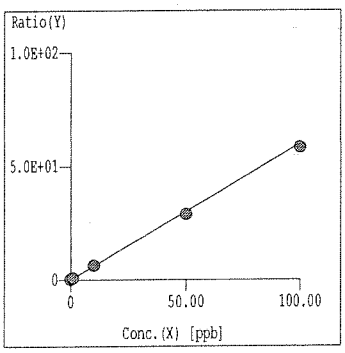
Step Mass Element (2) 63 Cu — ISTD 45 — Unit ppb



Curve Fit: Y=aX+b
r = 0.9998
Y = 4.454E+000*X +3.130E-001
X = 2.245E-001*Y -7.026E-002
DL = 6.464E-03 ppb
BEC = 7.026E-02 ppb

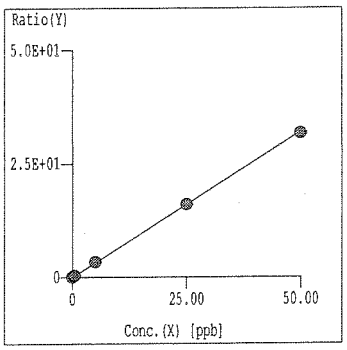
=== Graph Detail ===

Step Mass Element	ISTD	Unit
(3) 66 Zn	72	ppb



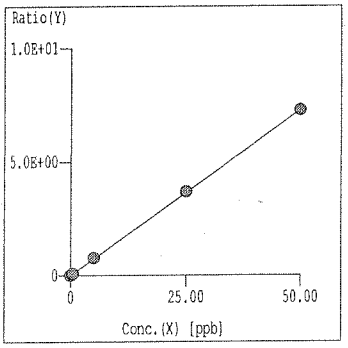
Curve Fit: Y=aX+b
r = 0.9999
Y = 5.980E-001*X +1.547E-001
X = 1.672E+000*Y -2.586E-001
DL = 5.106E-02 ppb
BEC = 2.586E-01 ppb

Step Mass Element	ISTD	Unit
(2) 75 As	72	ppb



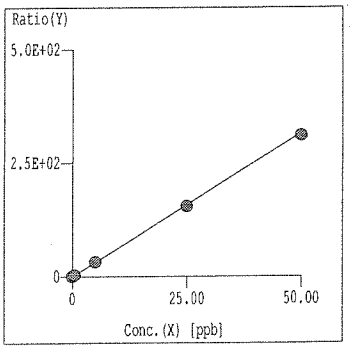
Curve Fit: Y=aX+b
r = 1.0000
Y = 6.391E-001*X +2.324E-002
X = 1.565E+000*Y -3.636E-002
DL = 1.051E-02 ppb
BEC = 3.636E-02 ppb

Step Mass Element	ISTD	Unit
(1) 78 Se	72	ppb



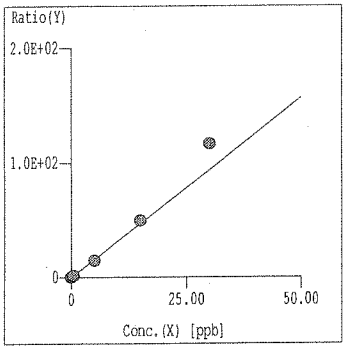
Curve Fit: Y=aX+b
r = 1.0000
Y = 1.458E-001*X +2.736E-003
X = 6.858E+000*Y -1.876E-002
DL = 2.016E-02 ppb
BEC = 1.876E-02 ppb

Step Mass Element	ISTD	Unit
(3) 88 Sr	72	ppb



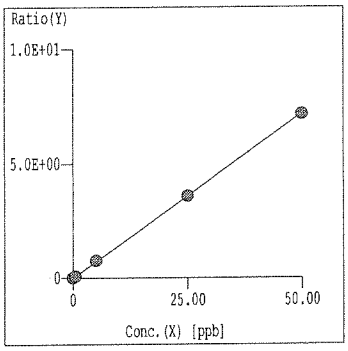
Curve Fit: Y=aX+b
r = 1.0000
Y = 6.315E+000*X +1.058E-001
X = 1.584E-001*Y -1.676E-002
DL = 3.561E-03 ppb
BEC = 1.676E-02 ppb

Step Mass Element	ISTD	Unit
(3) 90 Zr	72	ppb



Curve Fit: Y=aX+b
r = 0.9969
Y = 3.132E+000*X +4.041E-002
X = 3.193E-001*Y -1.291E-002
DL = 1.656E-03 ppb
BEC = 1.291E-02 ppb

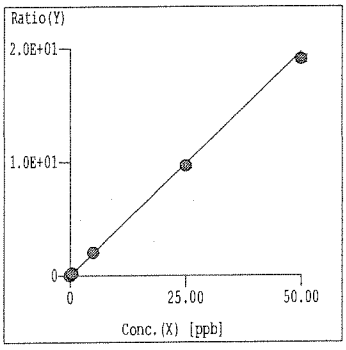
Step Mass Element	ISTD	Unit
(3) 95 Mo	115	ppb



Curve Fit: Y=aX+b
r = 1.0000
Y = 1.438E-001*X +3.194E-003
X = 6.955E+000*Y -2.221E-002
DL = 2.118E-02 ppb
BEC = 2.221E-02 ppb

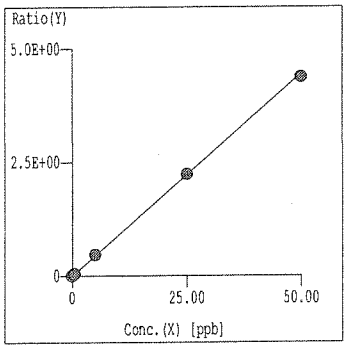
=== Graph Detail ===

Step Mass Element	ISTD	Unit
(3) 107 Ag	115	ppb



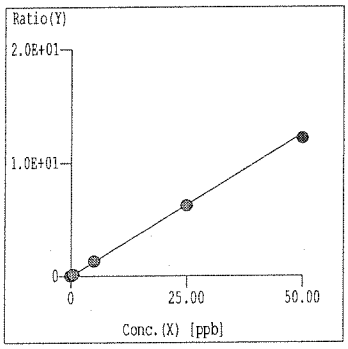
Curve Fit: Y=aX+b
r = 1.0000
Y = 3.948E-001*X +2.569E-003
X = 2.533E+000*Y -6.506E-003
DL = 2.545E-03 ppb
BEC = 6.506E-03 ppb

Step Mass Element	ISTD	Unit
(3) 111 Cd	115	ppb



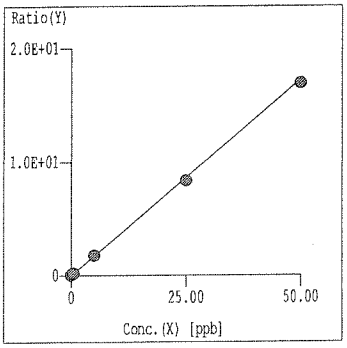
Curve Fit: Y=aX+b
r = 0.9999
Y = 8.896E-002*X +9.438E-004
X = 1.124E+001*Y -1.061E-002
DL = 4.372E-03 ppb
BEC = 1.061E-02 ppb

Step Mass Element	ISTD	Unit
(3) 118 Sn	115	ppb



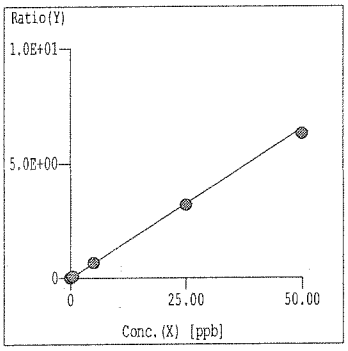
Curve Fit: Y=aX+b
r = 0.9999
Y = 2.514E-001*X +6.842E-003
X = 3.977E+000*Y -2.721E-002
DL = 6.088E-03 ppb
BEC = 2.721E-02 ppb

Step Mass Element	ISTD	Unit
(3) 121 Sb	115	ppb



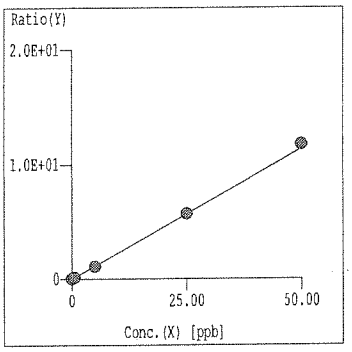
Curve Fit: Y=aX+b
r = 1.0000
Y = 3.447E-001*X +1.304E-002
X = 2.901E+000*Y -3.784E-002
DL = 5.189E-03 ppb
BEC = 3.784E-02 ppb

Step Mass Element	ISTD	Unit
(3) 137 Ba	115	ppb



Curve Fit: Y=aX+b
r = 1.0000
Y = 1.305E-001*X +3.182E-003
X = 7.661E+000*Y -2.438E-002
DL = 1.957E-03 ppb
BEC = 2.438E-02 ppb

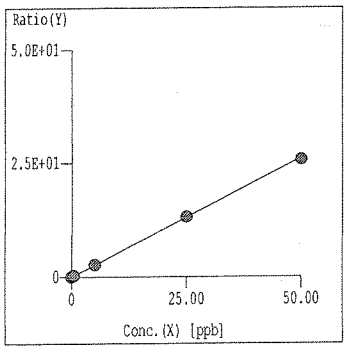
Step Mass Element	ISTD	Unit
(3) 182 W	159	ppb



Curve Fit: Y=aX+b
r = 0.9999
Y = 2.269E-001*X +1.818E-002
X = 4.406E+000*Y -8.009E-002
DL = 9.395E-03 ppb
BEC = 8.009E-02 ppb

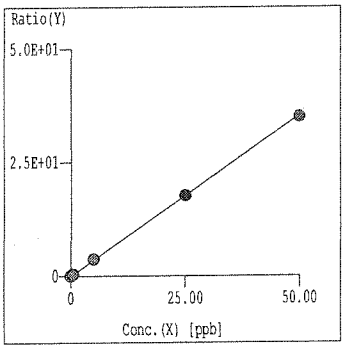
=== Graph Detail ===

Step Mass Element	ISTD	Unit
(3) 205 Tl	159	ppb



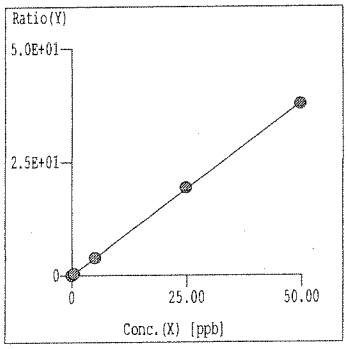
Curve Fit: Y=aX+b
r = 0.9999
Y = 5.224E-001*X +5.087E-003
X = 1.914E+000*Y -9.738E-003
DL = 1.985E-03 ppb
BEC = 9.738E-03 ppb

Step Mass Element	ISTD	Unit
(3) 208 Pb	159	ppb



Curve Fit: Y=aX+b
r = 1.0000
Y = 7.065E-001*X +1.203E-002
X = 1.415E+000*Y -1.703E-002
DL = 3.259E-03 ppb
BEC = 1.703E-02 ppb

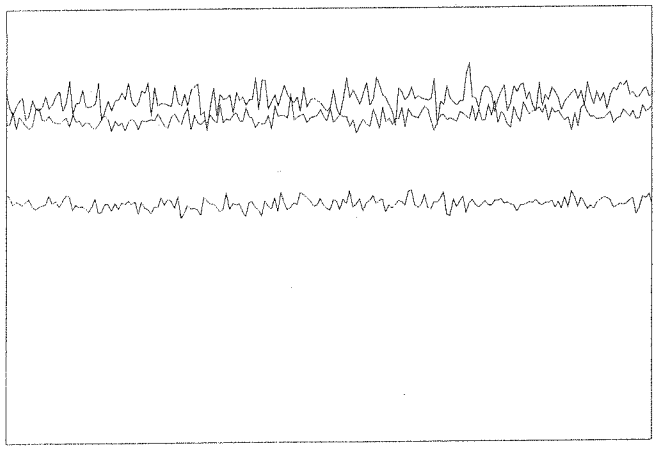
Step Mass Element	ISTD	Unit
(3) 238 U	159	ppb



Curve Fit: Y=aX+b
r = 0.9999
Y = 7.648E-001*X +9.160E-003
X = 1.308E+000*Y -1.198E-002
DL = 7.638E-04 ppb
BEC = 1.198E-02 ppb

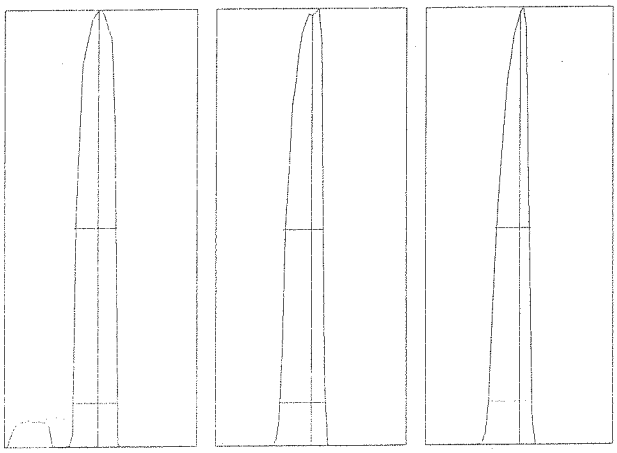
Tune Report

Tune File : NORM.U
Comment : I98D03



Integration Time:	0.1000 sec	
Sampling Period:	0.6200 sec	
n:	200	
Oxide:	156/140	1.501%
Doubly Charged:	70/140	0.700%

m/z	Range	Count	Mean	RSD%	Background
7	20,000	15941.0	15876.4	2.94	3.50
89	100,000	77236.0	74905.2	1.99	4.70
205	100,000	54337.0	55038.0	2.32	8.00
156/140	5	1.486%	1.524%	4.74	
70/140	2	0.643%	0.702%	5.74	



m/z:	7	89	205
Height:	15,833	73,925	56,000
Axis:	7.00	89.05	205.05
W-50%:	0.70	0.65	0.60
W-10%:	0.700	0.7500	0.700

Integration Time: 0.1000 sec
Acquisition Time: 22.7600 sec

Y axis : Linear

Generated : Apr 10, 2015 10:37:54
Printed : Apr 10, 2015 10:37:56

7025

Tune Report

Tune File : NORM.U
Comment : I98D03

Tuning Parameters

===Plasma Condition===			===Ion Lenses===			===Q-Pole Parameters===		
RF Power	:	1500 W	Extract 1	:	0 V	AMU Gain	:	132
RF Matching	:	1.78 V	Extract 2	:	-110 V	AMU Offset	:	128
Smpl Depth	:	8 mm	Omega Bias-ce	:	-30 V	Axis Gain	:	1.0006
Torch-H	:	0 mm	Omega Lens-ce	:	0.6 V	Axis Offset	:	-0.01
Torch-V	:	-0.2 mm	Cell Entrance	:	-26 V	QP Bias	:	-3 V
Carrier Gas	:	0.9 L/min	QP Focus	:	1 V			
Makeup Gas	:	0.12 L/min	Cell Exit	:	-30 V	===Detector Parameters===		
Optional Gas	:	--- %				Discriminator	:	8 mV
Nebulizer Pump	:	0.1 rps	===Octopole Parameters===			Analog HV	:	2330 V
Sample Pump	:	--- rps	OctP RF	:	170 V	Pulse HV	:	1760 V
S/C Temp	:	2 degC	OctP Bias	:	-6 V			

===Reaction Cell===								
Reaction Mode	:	OFF						
H2 Gas	:	0 mL/min	He Gas	:	0 mL/min	Optional Gas	:	--- %

Generated : Apr 10, 2015 10:37:54
Printed : Apr 10, 2015 10:37:59

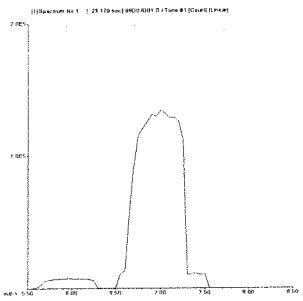
7027

6020 QC Tune Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03001.D
Date Acquired:	Apr 10 2015 11:07 am
Acq. Method:	TN6020_C.M
Operator:	CCapul
Sample Name:	6020tunchk
Misc Info:	
Vial Number:	1301
Current Method:	C:\ICPCHEM\1\METHODS\TN6020_C.M

RSD (%)

Element	Actual	Required	Flag
7 Li	2.12	5.00	
59 Co	3.87	5.00	
115 In	4.10	5.00	
205 Tl	3.95	5.00	



7 Li

Mass Calib.

Actual: 7.00

Required: 6.90 - 7.10

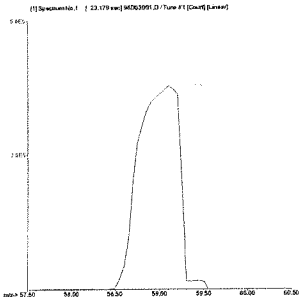
Flag:

Peak Width-10%

Actual: 0.60

Limit 0.90

Flag:



59 Co

Mass Calib.

Actual: 59.10

Required: 58.90 - 59.10

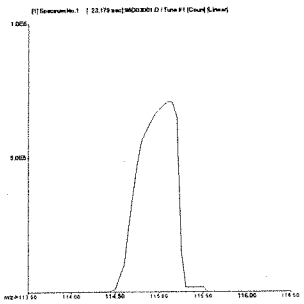
Flag:

Peak Width-10%

Actual: 0.60

Limit 0.90

Flag:



115 In

Mass Calib.

Actual: 115.05

Required: 114.90 - 115.10

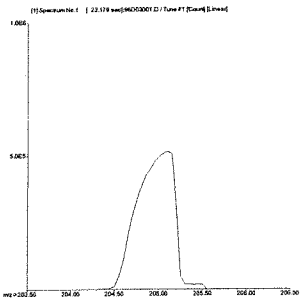
Flag:

Peak Width-10%

Actual: 0.60

Limit 0.90

Flag:



205 Tl

Mass Calib.

Actual: 205.05

Required: 204.90 - 205.10

Flag:

Peak Width-10%

Actual: 0.60

Limit 0.90

Flag:

Calibration Blank QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03003.D\98D03003.D#
Date Acquired:	Apr 10 2015 01:22 pm
Operator:	CCapul
Sample Name:	BLNK
Misc Info:	
Vial Number:	1101
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal Update:	Apr 10 2015 11:41 am
Sample Type:	CalBlk
Total Dil Factor:	1.00

QC&ISTD Elements

Element		CPS Mean		SD	CPS RSD(%)
6	Li	1286383.00	A	7958.00	0.62
7	Li	88691.14	P	542.40	0.61
9	Be	67.78	P	16.78	24.76
11	B	74958.47	P	7515.00	10.03
23	Na	118896.10	P	10080.00	8.48
24	Mg	47454.87	P	5303.00	11.18
27	Al	58122.56	P	10640.00	18.31
28	Si	112154.50	P	11720.00	10.45
31	P	22235.75	P	816.20	3.67
39	K	22938.80	P	974.10	4.25
40	Ca	42316.89	P	1815.00	4.29
45	Sc	1952996.00	A	95030.00	4.87
45	Sc	191625.09	P	6653.00	3.47
45	Sc	4612485.00	A	110700.00	2.40
47	Ti	615.63	P	163.00	26.48
51	V	734.25	P	41.53	5.66
52	Cr	325.56	P	22.33	6.86
55	Mn	3948.62	P	333.50	8.45
56	Fe	43185.00	P	2287.00	5.30
59	Co	330.02	P	74.24	22.50
60	Ni	194.00	P	24.94	12.86
63	Cu	483.79	P	34.49	7.13
66	Zn	1509.05	P	104.20	6.91
72	Ge	523245.59	P	20300.00	3.88
72	Ge	129163.70	P	3908.00	3.03
72	Ge	1037897.00	A	22190.00	2.14
75	As	26.22	P	3.67	14.00
78	Se	7.78	P	2.78	35.69
88	Sr	1150.11	P	95.99	8.35
90	Zr	440.04	P	15.29	3.47
95	Mo	320.02	P	49.78	15.56
107	Ag	187.79	P	20.09	10.70
111	Cd	51.03	P	23.69	46.42
115	In	7999962.00	A	149100.00	1.86
118	Sn	444.47	P	53.89	12.13
121	Sb	1006.75	P	52.92	5.26
137	Ba	337.80	P	58.72	17.38
159	Tb	11175880.00	A	73190.00	0.65
182	W	982.31	P	21.43	2.18
205	Tl	375.58	P	95.71	25.48
208	Pb	1086.74	P	86.67	7.98
209	Bi	6759419.00	A	63540.00	0.94
235	U	8.89	P	3.85	43.30
238	U	410.03	P	21.86	5.33

Calibration Blank QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#
Date Acquired:	Apr 10 2015 01:26 pm
Operator:	CCapul
Sample Name:	S0
Misc Info:	
Vial Number:	1102
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal Update:	Apr 10 2015 01:25 pm
Sample Type:	CalBlk
Total Dil Factor:	1.00

QC&ISTD Elements

Element		CPS Mean		SD	CPS RSD(%)
6	Li	1278750.00	A	5756.00	0.45
7	Li	87941.18	P	761.40	0.87
9	Be	97.78	P	16.44	16.81
11	B	59999.50	P	4731.00	7.89
23	Na	117585.70	P	1027.00	0.87
24	Mg	45954.14	P	4318.00	9.40
27	Al	55545.05	P	8095.00	14.57
28	Si	92676.32	P	3159.00	3.41
31	P	20737.79	P	818.40	3.95
39	K	26001.33	P	422.10	1.62
40	Ca	67790.62	P	620.20	0.91
45	Sc	1810592.00	A	22660.00	1.25
45	Sc	214309.00	P	7631.00	3.56
45	Sc	4614279.00	A	39980.00	0.87
47	Ti	318.91	P	103.00	32.30
51	V	937.60	P	11.93	1.27
52	Cr	378.01	P	25.01	6.62
55	Mn	3754.04	P	48.42	1.29
56	Fe	46445.03	P	2110.00	4.54
59	Co	461.14	P	24.12	5.23
60	Ni	210.89	P	7.37	3.50
63	Cu	660.02	P	42.53	6.44
66	Zn	1855.77	P	119.50	6.44
72	Ge	482116.31	P	7344.00	1.52
72	Ge	142906.20	P	3527.00	2.47
72	Ge	1047853.00	A	11230.00	1.07
75	As	33.11	P	3.67	11.09
78	Se	14.89	P	4.54	30.48
88	Sr	1146.77	P	80.01	6.98
90	Zr	430.02	P	14.53	3.38
95	Mo	320.02	P	82.13	25.66
107	Ag	200.01	P	28.48	14.24
111	Cd	73.99	P	9.97	13.48
115	In	7894589.00	A	83820.00	1.06
118	Sn	523.37	P	40.55	7.75
121	Sb	1034.53	P	40.74	3.94
137	Ba	250.01	P	8.82	3.53
159	Tb	11252720.00	A	73860.00	0.66
182	W	2136.96	P	67.44	3.16
205	Tl	570.04	P	35.28	6.19
208	Pb	1336.76	P	92.44	6.92
209	Bi	6800234.00	A	20750.00	0.31
235	U	22.22	P	5.09	22.91
238	U	1032.32	P	28.35	2.75

Calibration Standard QC Report

Data File: D:\DATA\I982015\D\I98D03.B\98D03005.D\98D03005.D#
Date Acquired: Apr 10 2015 01:31 pm
Operator: CCapul
Sample Name: S1 0.5
Misc Info:
Vial Number: 1104
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal Update: Apr 10 2015 01:29 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	CPS RSD(%)
6 Li	1253051.00	A	11790.00	0.94
7 Li	92959.18	P	1077.00	1.16
9 Be	2495.89	P	57.49	2.30
11 B	66906.70	P	8857.00	13.24
23 Na	216779.00	P	2056.00	0.95
24 Mg	1084202.00	A	35120.00	3.24
27 Al	1469243.00	A	34750.00	2.37
28 Si	211211.59	P	1455.00	0.69
31 P	51956.56	P	903.30	1.74
39 K	51230.85	P	335.70	0.66
40 Ca	462958.91	P	6577.00	1.42
45 Sc	1833740.00	A	28220.00	1.54
45 Sc	212243.41	P	2496.00	1.18
45 Sc	4517741.00	A	72690.00	1.61
47 Ti	1998.03	P	269.10	13.47
51 V	3810.81	P	128.70	3.38
52 Cr	4154.48	P	87.77	2.11
55 Mn	29592.79	P	734.70	2.48
56 Fe	998728.88	A	1525.00	0.15
59 Co	21176.10	P	348.40	1.65
60 Ni	1954.16	P	14.44	0.74
63 Cu	5533.68	P	152.10	2.75
66 Zn	7512.52	P	132.50	1.76
72 Ge	484730.00	P	2764.00	0.57
72 Ge	141689.09	P	2908.00	2.05
72 Ge	1023303.00	A	8877.00	0.87
75 As	475.79	P	20.19	4.24
78 Se	358.23	P	7.49	2.09
88 Sr	32587.71	P	612.00	1.88
90 Zr	14483.33	P	394.10	2.72
95 Mo	5838.28	P	141.90	2.43
107 Ag	15934.05	P	178.60	1.12
111 Cd	3560.89	P	101.40	2.85
115 In	7835976.00	A	189600.00	2.42
118 Sn	10292.45	P	140.10	1.36
121 Sb	14166.39	P	97.96	0.69
137 Ba	5426.99	P	90.24	1.66
159 Tb	11049960.00	A	67380.00	0.61
182 W	13404.76	P	466.60	3.48
205 Tl	29521.45	P	227.70	0.77
208 Pb	41673.61	P	613.50	1.47
209 Bi	6720324.00	A	12170.00	0.18
235 U	324.46	P	39.49	12.17
238 U	42391.27	P	379.50	0.90

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1253050.60	0.94	1278749.60	98.0	60 - 125	
45 Sc	1833740.00	1.54	1810592.50	101.3	60 - 125	
45 Sc	212243.38	1.18	214309.00	99.0	60 - 125	
45 Sc	4517741.00	1.61	4614279.00	97.9	60 - 125	
72 Ge	484730.03	0.57	482116.34	100.5	60 - 125	
72 Ge	141689.11	2.05	142906.22	99.1	60 - 125	
72 Ge	1023303.30	0.87	1047852.70	97.7	60 - 125	
115 In	7835975.50	2.42	7894589.00	99.3	60 - 125	
159 Tb	11049961.00	0.61	11252717.00	98.2	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

--- :Element Failures
0 :ISTD Failures

--- :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Calibration Standard QC Report

Data File: D:\DATA\I982015\D\I98D03.B\98D03006.D\98D03006.D#
Date Acquired: Apr 10 2015 01:36 pm
Operator: CCapul
Sample Name: S2 5
Misc Info:
Vial Number: 1105
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal Update: Apr 10 2015 01:34 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	CPS RSD(%)
6 Li	1253361.00	A	11170.00	0.89
7 Li	156999.41	P	1122.00	0.71
9 Be	25675.84	P	59.22	0.23
11 B	84015.68	P	7586.00	9.03
23 Na	1255096.00	A	32680.00	2.60
24 Mg	10509530.00	A	177600.00	1.69
27 Al	14174740.00	A	163100.00	1.15
28 Si	673038.38	P	7386.00	1.10
31 P	90024.03	P	1496.00	1.66
39 K	282729.81	P	8902.00	3.15
40 Ca	4442281.00	A	92200.00	2.08
45 Sc	1810420.00	A	19160.00	1.06
45 Sc	215599.00	P	4067.00	1.89
45 Sc	4599845.00	A	106000.00	2.30
47 Ti	16423.30	P	195.90	1.19
51 V	31955.42	P	522.80	1.64
52 Cr	40412.39	P	702.40	1.74
55 Mn	282126.91	P	2947.00	1.04
56 Fe	9719430.00	A	66610.00	0.69
59 Co	218991.50	P	280.70	0.13
60 Ni	19044.81	P	182.60	0.96
63 Cu	51069.71	P	631.60	1.24
66 Zn	65080.65	P	1123.00	1.73
72 Ge	479832.41	P	3541.00	0.74
72 Ge	143882.20	P	4181.00	2.91
72 Ge	1033133.00	A	15670.00	1.52
75 As	4817.83	P	112.90	2.34
78 Se	3703.46	P	103.10	2.78
88 Sr	331739.81	P	6173.00	1.86
90 Zr	151869.20	P	1044.00	0.69
95 Mo	60176.29	P	543.40	0.90
107 Ag	159957.00	P	1994.00	1.25
111 Cd	36879.61	P	495.20	1.34
115 In	7950529.00	A	35580.00	0.45
118 Sn	103666.90	P	800.10	0.77
121 Sb	140488.41	P	278.40	0.20
137 Ba	53044.78	P	850.10	1.60
159 Tb	11518390.00	A	144800.00	1.26
182 W	125995.70	P	1384.00	1.10
205 Tl	306691.31	P	4303.00	1.40
208 Pb	426976.81	P	3037.00	0.71
209 Bi	6807673.00	A	74440.00	1.09
235 U	3211.69	P	23.66	0.74
238 U	444227.00	P	3978.00	0.90

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1253360.80	0.89	1278749.60	98.0	60 - 125	
45 Sc	1810420.10	1.06	1810592.50	100.0	60 - 125	
45 Sc	215599.00	1.89	214309.00	100.6	60 - 125	
45 Sc	4599845.50	2.30	4614279.00	99.7	60 - 125	
72 Ge	479832.38	0.74	482116.34	99.5	60 - 125	
72 Ge	143882.17	2.91	142906.22	100.7	60 - 125	
72 Ge	1033132.60	1.52	1047852.70	98.6	60 - 125	
115 In	7950529.00	0.45	7894589.00	100.7	60 - 125	
159 Tb	11518391.00	1.26	11252717.00	102.4	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

--- :Element Failures
0 :ISTD Failures

--- :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Calibration Standard QC Report

Data File: D:\DATA\I982015\D\I98D03.B\98D03007.D\98D03007.D#
Date Acquired: Apr 10 2015 01:40 pm
Operator: CCapul
Sample Name: S3 25
Misc Info:
Vial Number: 1106
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal Update: Apr 10 2015 01:38 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	CPS RSD(%)
6 Li	1183317.00	A	14770.00	1.25
7 Li	409049.31	P	2563.00	0.63
9 Be	121406.10	P	2333.00	1.92
11 B	140596.80	P	3348.00	2.38
23 Na	5684529.00	A	99120.00	1.74
24 Mg	50961120.00	A	1047000.00	2.05
27 Al	68711616.00	A	897300.00	1.31
28 Si	2780426.00	A	47250.00	1.70
31 P	356361.19	P	5121.00	1.44
39 K	1333425.00	A	31250.00	2.34
40 Ca	21852830.00	A	309600.00	1.42
45 Sc	1844060.00	A	16930.00	0.92
45 Sc	216484.70	P	6469.00	2.99
45 Sc	4553446.00	A	44090.00	0.97
47 Ti	75406.84	P	1768.00	2.34
51 V	149950.59	P	3083.00	2.06
52 Cr	192591.70	P	4454.00	2.31
55 Mn	1344085.00	A	14080.00	1.05
56 Fe	47332340.00	A	424700.00	0.90
59 Co	1035911.00	A	19730.00	1.90
60 Ni	90471.83	P	1597.00	1.77
63 Cu	241982.00	P	2878.00	1.19
66 Zn	299567.09	P	2087.00	0.70
72 Ge	489836.59	P	5634.00	1.15
72 Ge	144577.09	P	3599.00	2.49
72 Ge	1042225.00	A	25510.00	2.45
75 As	23096.91	P	359.70	1.56
78 Se	18072.92	P	350.30	1.94
88 Sr	1607531.00	A	18800.00	1.17
90 Zr	516339.69	P	970.60	0.19
95 Mo	279305.41	P	1378.00	0.49
107 Ag	750253.31	P	5214.00	0.69
111 Cd	173668.00	P	863.90	0.50
115 In	7773750.00	A	96040.00	1.24
118 Sn	483371.50	P	4594.00	0.95
121 Sb	649177.50	P	2889.00	0.45
137 Ba	248518.20	P	815.10	0.33
159 Tb	11126890.00	A	84210.00	0.76
182 W	635717.81	P	3582.00	0.56
205 Tl	1460571.00	A	24980.00	1.71
208 Pb	1963251.00	M	24140.00	1.23
209 Bi	6549291.00	A	23070.00	0.35
235 U	15231.77	P	455.50	2.99
238 U	2145772.00	A	10980.00	0.51

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1183316.60	1.25	1278749.60	92.5	60 - 125	
45 Sc	1844059.50	0.92	1810592.50	101.8	60 - 125	
45 Sc	216484.70	2.99	214309.00	101.0	60 - 125	
45 Sc	4553446.50	0.97	4614279.00	98.7	60 - 125	
72 Ge	489836.59	1.15	482116.34	101.6	60 - 125	
72 Ge	144577.14	2.49	142906.22	101.2	60 - 125	
72 Ge	1042224.80	2.45	1047852.70	99.5	60 - 125	
115 In	7773750.00	1.24	7894589.00	98.5	60 - 125	
159 Tb	11126888.00	0.76	11252717.00	98.9	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

--- :Element Failures
0 :ISTD Failures

--- :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Calibration Standard QC Report

Data File: D:\DATA\I982015\D\I98D03.B\98D03008.D\98D03008.D#
Date Acquired: Apr 10 2015 01:44 pm
Operator: CCapul
Sample Name: S4 50
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal Update: Apr 10 2015 01:43 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	CPS RSD(%)
6 Li	1182527.00	A	23940.00	2.02
7 Li	739803.13	A	5824.00	0.79
9 Be	238710.50	P	2190.00	0.92
11 B	250760.59	P	8918.00	3.56
23 Na	11240600.00	A	147000.00	1.31
24 Mg	100995400.00	A	1037000.00	1.03
27 Al	137499010.00	A	830400.00	0.60
28 Si	5363605.00	A	43250.00	0.81
31 P	690804.81	P	10270.00	1.49
39 K	2636650.00	A	82350.00	3.12
40 Ca	44978728.00	A	246800.00	0.55
45 Sc	1882863.00	A	19420.00	1.03
45 Sc	217393.91	P	4912.00	2.26
45 Sc	4590621.00	A	7645.00	0.17
47 Ti	149591.80	P	1314.00	0.88
51 V	295255.91	P	4482.00	1.52
52 Cr	375327.00	P	6529.00	1.74
55 Mn	2650177.00	A	32830.00	1.24
56 Fe	97991560.00	A	473300.00	0.48
59 Co	2048092.00	A	34540.00	1.69
60 Ni	174589.20	P	2691.00	1.54
63 Cu	466631.59	P	7099.00	1.52
66 Zn	599014.50	P	3855.00	0.64
72 Ge	491397.81	P	4077.00	0.83
72 Ge	143069.20	P	1482.00	1.04
72 Ge	1028656.00	A	15210.00	1.48
75 As	45270.07	P	697.80	1.54
78 Se	35770.21	P	207.40	0.58
88 Sr	3189789.00	A	42720.00	1.34
90 Zr	1199316.00	A	29480.00	2.46
95 Mo	561540.31	P	6008.00	1.07
107 Ag	1494740.00	A	7074.00	0.47
111 Cd	342744.31	P	1752.00	0.51
115 In	7835697.00	A	99470.00	1.27
118 Sn	951757.19	M	6426.00	0.68
121 Sb	1325269.00	A	7358.00	0.56
137 Ba	493038.81	P	3709.00	0.75
159 Tb	11188610.00	A	117300.00	1.05
182 W	1315430.00	A	5912.00	0.45
205 Tl	2876536.00	A	50650.00	1.76
208 Pb	3910940.00	A	22760.00	0.58
209 Bi	6630384.00	A	33320.00	0.50
235 U	30348.51	P	415.30	1.37
238 U	4231286.00	A	23130.00	0.55

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1182526.90	2.02	1278749.60	92.5	60 - 125	
45 Sc	1882863.10	1.03	1810592.50	104.0	60 - 125	
45 Sc	217393.94	2.26	214309.00	101.4	60 - 125	
45 Sc	4590621.00	0.17	4614279.00	99.5	60 - 125	
72 Ge	491397.84	0.83	482116.34	101.9	60 - 125	
72 Ge	143069.19	1.04	142906.22	100.1	60 - 125	
72 Ge	1028655.80	1.48	1047852.70	98.2	60 - 125	
115 In	7835697.50	1.27	7894589.00	99.3	60 - 125	
159 Tb	11188608.00	1.05	11252717.00	99.4	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

--- :Element Failures
0 :ISTD Failures

--- :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

ICV QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03009.D\98D03009.D#
Date Acquired:	Apr 10 2015 01:49 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	ICV
Misc Info:	
Vial Number:	1204
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	ICV1
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc. RSD(%)	Expected	QC Range(%)	Flag
7 Li	29.03	ppb	472933.2	1.07	30.00	90 - 110	
9 Be	29.67	ppb	144470.2	0.30	30.00	90 - 110	
11 B	32.62	ppb	170568.1	9.29	30.00	90 - 110	
23 Na	1555.00	ppb	7141539.0	0.27	1500.00	90 - 110	
24 Mg	2961.00	ppb	60859792.0	2.41	3000.00	90 - 110	
27 Al	2980.00	ppb	82632048.0	1.57	3000.00	90 - 110	
28 Si	2984.00	ppb	3342231.0	0.93	3000.00	90 - 110	
31 P	290.90	ppb	415507.7	1.46	300.00	90 - 110	
39 K	3036.00	ppb	1631633.0	0.99	3000.00	90 - 110	
40 Ca	3032.00	ppb	27233130.0	1.51	3000.00	90 - 110	
47 Ti	29.48	ppb	89098.5	0.58	30.00	90 - 110	
51 V	29.46	ppb	185829.3	0.74	30.00	90 - 110	
52 Cr	28.53	ppb	229265.4	0.70	30.00	90 - 110	
55 Mn	29.55	ppb	1594208.0	0.54	30.00	90 - 110	
56 Fe	2966.00	ppb	59241780.0	0.97	3000.00	90 - 110	
59 Co	28.90	ppb	1211609.0	0.37	30.00	90 - 110	
60 Ni	29.44	ppb	107040.7	0.98	30.00	90 - 110	
63 Cu	29.20	ppb	286302.8	0.97	30.00	90 - 110	
66 Zn	57.77	ppb	358159.0	1.10	60.00	90 - 110	
75 As	29.32	ppb	27414.1	0.94	30.00	90 - 110	
78 Se	30.00	ppb	22317.8	0.14	30.00	90 - 110	
88 Sr	29.28	ppb	1909611.0	1.26	30.00	90 - 110	
90 Zr	21.55	ppb	697038.0	1.80	20.00	90 - 110	
95 Mo	29.14	ppb	333513.8	0.80	30.00	90 - 110	
107 Ag	28.22	ppb	886259.2	0.76	30.00	90 - 110	
111 Cd	29.02	ppb	205402.4	0.71	30.00	90 - 110	
118 Sn	29.28	ppb	586150.7	1.16	30.00	90 - 110	
121 Sb	27.65	ppb	759001.5	0.79	30.00	90 - 110	
137 Ba	28.59	ppb	297074.7	0.93	30.00	90 - 110	
182 W	29.17	ppb	745912.2	0.89	30.00	90 - 110	
205 Tl	29.82	ppb	1750369.0	1.66	30.00	90 - 110	
208 Pb	29.58	ppb	2349594.0	0.41	30.00	90 - 110	
235 U	0.21	ppb	18162.7	1.14	0.22	90 - 110	
238 U	29.45	ppb	2531926.0	1.09	30.00	90 - 110	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1205012.6	1.05	1278749.60	94.2	60 - 125	
45 Sc	1909675.0	1.28	1810592.50	105.5	60 - 125	
45 Sc	219640.0	2.10	214309.00	102.5	60 - 125	
45 Sc	4588268.5	0.96	4614279.00	99.4	60 - 125	
72 Ge	509912.4	1.04	482116.34	105.8	60 - 125	
72 Ge	146117.1	0.93	142906.22	102.2	60 - 125	
72 Ge	1032135.9	0.48	1047852.70	98.5	60 - 125	
115 In	7953990.0	1.10	7894589.00	100.8	60 - 125	
159 Tb	11236081.0	0.97	11252717.00	99.9	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

0 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

ICB QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03010.D\98D03010.D#
Date Acquired:	Apr 10 2015 01:53 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	ICB
Misc Info:	
Vial Number:	1102
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	ICB
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc RSD(%)	High Limit	Flag
7 Li	0.0543	ppb	85947.5	180.47	0.20	
9 Be	0.0123	ppb	134.5	13.12	0.10	
11 B	1.1880	ppb	63048.0	240.99	5.00	
23 Na	2.4130	ppb	128436.4	20.19	40.00	
24 Mg	-0.1846	ppb	43210.6	20.78	10.00	
27 Al	-0.5835	ppb	51156.7	12.40	20.00	
28 Si	-13.2400	ppb	105633.1	16.92	20.00	
31 P	-0.6389	ppb	19328.1	46.36	10.00	
39 K	-0.3261	ppb	26699.4	393.74	20.00	
40 Ca	0.1781	ppb	72752.5	61.37	25.00	
47 Ti	-0.0533	ppb	258.9	15.24	0.50	
51 V	0.0464	ppb	1269.0	12.84	0.50	
52 Cr	0.0044	ppb	424.0	9.75	0.20	
55 Mn	-0.0024	ppb	3621.8	153.72	0.20	
56 Fe	0.0405	ppb	50198.2	196.19	10.00	
59 Co	0.0012	ppb	515.6	50.63	0.20	
60 Ni	-0.0086	ppb	186.7	19.75	0.20	
63 Cu	-0.0046	ppb	649.4	99.56	0.40	
66 Zn	0.0566	ppb	1986.9	18.88	2.00	
75 As	0.0113	ppb	45.1	22.37	0.20	
78 Se	0.0115	ppb	22.4	19.21	0.20	
88 Sr	0.0023	ppb	1270.1	62.06	0.20	
90 Zr	0.0212	ppb	1127.9	19.86	2.00	
95 Mo	0.0252	ppb	557.8	12.34	0.40	
107 Ag	0.0009	ppb	240.0	128.50	0.20	
111 Cd	0.0031	ppb	100.0	121.36	0.20	
118 Sn	0.0011	ppb	583.4	117.76	0.20	
121 Sb	0.0468	ppb	2387.0	0.45	0.40	
137 Ba	0.0014	ppb	275.6	152.09	0.20	
182 W	0.0657	ppb	3794.1	5.66	1.00	
205 Tl	0.0027	ppb	742.3	24.53	0.20	
208 Pb	0.0007	ppb	1435.7	151.71	0.10	
235 U	-0.0001	ppb	15.6	47.16	1.00	
238 U	0.0032	ppb	1331.2	21.96	0.10	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1238268.9	1.22	1278749.60	96.8	60 - 125	
45 Sc	1923222.0	1.36	1810592.50	106.2	60 - 125	
45 Sc	222063.4	2.33	214309.00	103.6	60 - 125	
45 Sc	4637147.5	0.55	4614279.00	100.5	60 - 125	
72 Ge	508725.3	1.41	482116.34	105.5	60 - 125	
72 Ge	148079.6	2.58	142906.22	103.6	60 - 125	
72 Ge	1054292.1	1.44	1047852.70	100.6	60 - 125	
115 In	8181052.5	1.64	7894589.00	103.6	60 - 125	
159 Tb	11469079.0	0.69	11252717.00	101.9	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

0 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Nnumber of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Sample QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03011.D\98D03011.D#
Date Acquired:	Apr 10 2015 01:58 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	MRLD1001
Misc Info:	1/100/10 ppb
Vial Number:	1305
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	97262.3	0.0000	0.9925	ppb	11.81	225.00	
9 Be	# 3	6	4880.0	0.0000	0.9780	ppb	3.93	225.00	
11 B	# 3	6	98737.8	0.0000	11.6800	ppb	24.51	225.00	
23 Na	# 1	45	578029.9	0.0000	103.8000	ppb	1.41	269999.99	
24 Mg	# 3	45	2106607.0	0.0000	101.1000	ppb	1.15	180000.00	
27 Al	# 3	45	2756169.0	0.0000	97.8800	ppb	3.00	180000.00	
28 Si	# 1	45	111878.5	0.0000	-5.4200	ppb	79.72	18000.00	
31 P	# 3	45	87671.1	0.0000	50.2900	ppb	2.83	359999.99	
39 K	# 2	45	77892.8	0.0000	95.7000	ppb	0.66	269999.99	
40 Ca	# 1	45	955052.9	0.0000	100.1000	ppb	1.17	269999.99	
47 Ti	# 3	45	3333.9	0.0000	0.9788	ppb	2.79	2700.00	
51 V	# 2	45	7402.8	0.0000	1.0150	ppb	0.81	2700.00	
52 Cr	# 2	45	8245.3	0.0000	0.9705	ppb	0.84	2700.00	
55 Mn	# 3	45	57011.0	0.0000	0.9987	ppb	0.65	2700.00	
56 Fe	# 1	45	2013405.0	0.0000	99.7400	ppb	2.20	90000.00	
59 Co	# 3	45	42111.4	0.0000	1.0020	ppb	1.97	2700.00	
60 Ni	# 2	45	3911.3	0.0000	1.0080	ppb	0.37	2700.00	
63 Cu	# 2	45	10491.5	0.0000	0.9925	ppb	1.15	2700.00	
66 Zn	# 3	72	63743.1	0.0000	9.9380	ppb	0.63	2700.00	
75 As	# 2	72	983.8	0.0000	1.0090	ppb	1.23	2700.00	
78 Se	# 1	72	768.3	0.0000	1.0240	ppb	3.26	2700.00	
88 Sr	# 3	72	131883.7	0.0000	1.9810	ppb	1.79	2700.00	
90 Zr	# 3	72	138216.8	0.0000	4.2100	ppb	3.13	1800.00	
95 Mo	# 3	115	11525.8	0.0000	0.9715	ppb	0.41	2700.00	
107 Ag	# 3	115	31085.6	0.0000	0.9698	ppb	3.59	225.00	
111 Cd	# 3	115	7479.3	0.0000	1.0320	ppb	3.58	2700.00	
118 Sn	# 3	115	20112.6	0.0000	0.9645	ppb	0.53	2700.00	
121 Sb	# 3	115	27880.0	0.0000	0.9649	ppb	0.89	2700.00	
137 Ba	# 3	115	10366.0	0.0000	0.9603	ppb	2.95	2700.00	
182 W	# 3	159	5179763.0	0.0000	197.6000	ppb	0.55	900.00	
205 Tl	# 3	159	60593.8	0.0000	0.9953	ppb	1.20	2700.00	
208 Pb	# 3	159	84435.1	0.0000	1.0180	ppb	2.38	2700.00	
235 U	# 3	159	622.3	0.0000	0.0066	ppb	3.95	2700.00	
238 U	# 3	159	87665.6	0.0000	0.9810	ppb	0.60	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1218128.10	3.29	1278749.60	95.3	60 - 125	
45 Sc # 1	1885741.60	2.06	1810592.50	104.2	60 - 125	
45 Sc # 2	221670.31	2.00	214309.00	103.4	60 - 125	
45 Sc # 3	4551770.50	0.54	4614279.00	98.6	60 - 125	
72 Ge # 1	505200.78	1.26	482116.34	104.8	60 - 125	
72 Ge # 2	147258.64	2.43	142906.22	103.0	60 - 125	
72 Ge # 3	1045337.80	1.21	1047852.70	99.8	60 - 125	
115 In # 3	8066723.00	1.48	7894589.00	102.2	60 - 125	
159 Tb # 3	11543108.00	1.09	11252717.00	102.6	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7038

Sample QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03012.D\98D03012.D#
Date Acquired:	Apr 10 2015 02:02 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	MRLD1002
Misc Info:	0.5/50/4 ppb
Vial Number:	1306
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	89687.3	0.0000	0.4899	ppb	13.02	225.00	
9 Be	# 3	6	2548.1	0.0000	0.5077	ppb	2.80	225.00	
11 B	# 3	6	70530.7	0.0000	3.7820	ppb	86.01	225.00	
23 Na	# 1	45	340934.2	0.0000	52.7100	ppb	2.36	269999.99	
24 Mg	# 3	45	1049112.0	0.0000	49.3600	ppb	1.37	180000.00	
27 Al	# 3	45	1368679.0	0.0000	47.5100	ppb	2.25	180000.00	
28 Si	# 1	45	140321.7	0.0000	24.8200	ppb	15.21	18000.00	
31 P	# 3	45	18324.4	0.0000	-1.0880	ppb	58.86	359999.99	
39 K	# 2	45	51842.1	0.0000	47.2900	ppb	2.33	269999.99	
40 Ca	# 1	45	463770.5	0.0000	45.9700	ppb	1.89	269999.99	
47 Ti	# 3	45	1791.3	0.0000	0.4635	ppb	6.80	2700.00	
51 V	# 2	45	4283.6	0.0000	0.5255	ppb	2.12	2700.00	
52 Cr	# 2	45	4248.1	0.0000	0.4791	ppb	1.87	2700.00	
55 Mn	# 3	45	29548.3	0.0000	0.4857	ppb	1.37	2700.00	
56 Fe	# 1	45	995262.3	0.0000	49.4300	ppb	1.98	90000.00	
59 Co	# 3	45	21237.3	0.0000	0.5009	ppb	1.04	2700.00	
60 Ni	# 2	45	1986.2	0.0000	0.4849	ppb	1.10	2700.00	
63 Cu	# 2	45	5404.7	0.0000	0.4793	ppb	1.39	2700.00	
66 Zn	# 3	72	27779.9	0.0000	4.1590	ppb	1.05	2700.00	
75 As	# 2	72	504.7	0.0000	0.5029	ppb	1.15	2700.00	
78 Se	# 1	72	359.1	0.0000	0.4847	ppb	2.41	2700.00	
88 Sr	# 3	72	33169.2	0.0000	0.4828	ppb	1.20	2700.00	
90 Zr	# 3	72	2480.3	0.0000	0.0624	ppb	2.35	1800.00	
95 Mo	# 3	115	6090.6	0.0000	0.4966	ppb	1.39	2700.00	
107 Ag	# 3	115	15322.2	0.0000	0.4688	ppb	2.88	225.00	
111 Cd	# 3	115	3697.5	0.0000	0.4987	ppb	3.09	2700.00	
118 Sn	# 3	115	10361.4	0.0000	0.4777	ppb	1.61	2700.00	
121 Sb	# 3	115	14650.3	0.0000	0.4829	ppb	2.18	2700.00	
137 Ba	# 3	115	5324.7	0.0000	0.4753	ppb	1.06	2700.00	
182 W	# 3	159	9339.6	0.0000	0.2753	ppb	1.96	900.00	
205 Tl	# 3	159	30828.1	0.0000	0.5000	ppb	0.14	2700.00	
208 Pb	# 3	159	43002.7	0.0000	0.5087	ppb	1.36	2700.00	
235 U	# 3	159	294.5	0.0000	0.0030	ppb	16.79	2700.00	
238 U	# 3	159	44114.5	0.0000	0.4862	ppb	1.17	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1207660.10	1.31	1278749.60	94.4	60 - 125	
45 Sc # 1	1836056.00	2.68	1810592.50	101.4	60 - 125	
45 Sc # 2	220763.61	2.99	214309.00	103.0	60 - 125	
45 Sc # 3	4541183.50	1.97	4614279.00	98.4	60 - 125	
72 Ge # 1	489069.31	0.75	482116.34	101.4	60 - 125	
72 Ge # 2	146446.75	2.05	142906.22	102.5	60 - 125	
72 Ge # 3	1051599.80	1.68	1047852.70	100.4	60 - 125	
115 In # 3	8163485.50	1.44	7894589.00	103.4	60 - 125	
159 Tb # 3	11578871.00	1.73	11252717.00	102.9	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7039

ICS-A QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03013.D\98D03013.D#
Date Acquired:	Apr 10 2015 02:07 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	ICSA
Misc Info:	
Vial Number:	1303
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	ICS-A
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc RSD(%)	High Limit	Flag
7 Li	0.41	ppb	82580.6	32.86	---	
9 Be	0.01	ppb	126.7	22.93	---	
11 B	0.06	ppb	53485.9	5283.20	---	
23 Na	97180.00	ppb	404383010.0	0.17	120000.00	
24 Mg	96320.00	ppb	1799035000.0	0.90	120000.00	
27 Al	94390.00	ppb	2378776100.0	0.90	120000.00	
28 Si	5.63	ppb	115337.5	122.24	---	
31 P	104000.00	ppb	128709900.0	0.24	120000.00	
39 K	95770.00	ppb	46774160.0	0.57	120000.00	
40 Ca	97790.00	ppb	807151490.0	1.17	120000.00	
47 Ti	2089.00	ppb	5716036.0	0.51	2400.00	
51 V	0.01	ppb	968.0	21.74	---	
52 Cr	1.23	ppb	9468.6	0.45	---	
55 Mn	0.40	ppb	23098.2	2.69	---	
56 Fe	94470.00	ppb	1736622000.0	0.38	120000.00	
59 Co	0.14	ppb	5778.2	2.92	---	
60 Ni	0.11	ppb	560.2	10.12	---	
63 Cu	0.50	ppb	5126.6	1.99	---	
66 Zn	2.08	ppb	12763.6	1.70	---	
75 As	0.07	ppb	88.7	12.67	---	
78 Se	0.02	ppb	28.0	10.98	---	
88 Sr	0.62	ppb	36683.4	1.85	---	
90 Zr	1.49	ppb	42896.5	4.41	---	
95 Mo	2111.00	ppb	20169430.0	0.80	2400.00	
107 Ag	0.02	ppb	625.6	4.72	---	
111 Cd	0.17	ppb	1081.9	31.95	---	
118 Sn	0.01	ppb	574.5	54.66	---	
121 Sb	0.03	ppb	1597.9	8.25	---	
137 Ba	0.08	ppb	896.7	6.77	---	
182 W	0.20	ppb	6148.5	6.02	---	
205 Tl	0.00	ppb	280.0	6.99	---	
208 Pb	0.18	ppb	13143.4	1.87	---	
235 U	0.00	ppb	10.0	47.13	---	
238 U	-0.01	ppb	191.1	3.12	---	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1126418.1	4.00	1278749.60	88.1	60 - 125	
45 Sc	1759023.9	1.58	1810592.50	97.2	60 - 125	
45 Sc	202788.5	1.84	214309.00	94.6	60 - 125	
45 Sc	4173269.5	1.43	4614279.00	90.4	60 - 125	
72 Ge	446272.6	1.46	482116.34	92.6	60 - 125	
72 Ge	132082.4	3.20	142906.22	92.4	60 - 125	
72 Ge	912678.4	2.65	1047852.70	87.1	60 - 125	
115 In	6644454.0	1.09	7894589.00	84.2	60 - 125	
159 Tb	9611129.0	0.81	11252717.00	85.4	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

0 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

ICS-AB QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03014.D\98D03014.D#
Date Acquired:	Apr 10 2015 02:11 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	ICSAB
Misc Info:	
Vial Number:	1304
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	ICS-AB
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc RSD(%)	Expected	QC Range(%)	Flag
7 Li	19.94	ppb	331433.9	1.16	20.00	80 - 120	
9 Be	19.86	ppb	91369.8	1.64	20.00	80 - 120	
11 B	17.00	ppb	109879.4	14.70	20.00	80 - 120	
23 Na	96510.00	ppb	395650820.0	0.84	100000.00	80 - 120	
24 Mg	97570.00	ppb	1839930000.0	1.15	100000.00	80 - 120	
27 Al	95470.00	ppb	2428844000.0	0.74	100000.00	80 - 120	
28 Si	195.80	ppb	299967.5	4.34	200.00	80 - 120	
31 P	103900.00	ppb	129726400.0	0.98	100000.00	80 - 120	
39 K	95560.00	ppb	45352328.0	0.36	100000.00	80 - 120	
40 Ca	97820.00	ppb	795225980.0	0.16	100000.00	80 - 120	
47 Ti	2126.00	ppb	5871126.0	0.31	2000.00	80 - 120	
51 V	19.40	ppb	110106.6	0.72	20.00	80 - 120	
52 Cr	19.99	ppb	144239.1	0.98	20.00	80 - 120	
55 Mn	19.45	ppb	964822.2	1.15	20.00	80 - 120	
56 Fe	95010.00	ppb	1720386000.0	0.47	100000.00	80 - 120	
59 Co	18.48	ppb	711749.1	0.37	20.00	80 - 120	
60 Ni	18.67	ppb	60966.3	1.24	20.00	80 - 120	
63 Cu	18.62	ppb	163979.2	1.51	20.00	80 - 120	
66 Zn	20.83	ppb	114101.8	1.64	20.00	80 - 120	
75 As	21.11	ppb	17263.7	1.04	20.00	80 - 120	
78 Se	22.16	ppb	14205.1	1.31	20.00	80 - 120	
88 Sr	20.04	ppb	1146066.0	0.34	20.00	80 - 120	
90 Zr	23.92	ppb	677818.4	1.22	20.00	80 - 120	
95 Mo	2177.00	ppb	20447110.0	0.62	2000.00	80 - 120	
107 Ag	18.28	ppb	471526.4	1.31	20.00	80 - 120	
111 Cd	19.93	ppb	115907.9	0.97	20.00	80 - 120	
118 Sn	19.93	ppb	327797.8	0.67	20.00	80 - 120	
121 Sb	20.14	ppb	454375.3	0.62	20.00	80 - 120	
137 Ba	19.91	ppb	169957.9	1.35	20.00	80 - 120	
182 W	20.42	ppb	441858.3	0.49	20.00	80 - 120	
205 Tl	18.94	ppb	940136.9	0.74	20.00	80 - 120	
208 Pb	19.30	ppb	1296052.0	0.88	20.00	80 - 120	
235 U	0.14	ppb	10262.7	0.40	0.14	80 - 120	
238 U	20.03	ppb	1455802.0	0.88	19.86	80 - 120	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1138512.8	1.61	1278749.60	89.0	60 - 125	
45 Sc	1732734.6	1.24	1810592.50	95.7	60 - 125	
45 Sc	197069.4	3.09	214309.00	92.0	60 - 125	
45 Sc	4212956.0	0.83	4614279.00	91.3	60 - 125	
72 Ge	439355.3	1.93	482116.34	91.1	60 - 125	
72 Ge	127745.9	1.48	142906.22	89.4	60 - 125	
72 Ge	904653.1	1.56	1047852.70	86.3	60 - 125	
115 In	6532436.0	1.14	7894589.00	82.7	60 - 125	
159 Tb	9495361.0	0.58	###########	84.4	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

0 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Sample QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03015.D\98D03015.D#
Date Acquired:	Apr 10 2015 02:16 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	MRLD1003
Misc Info:	500 ppb CAT
Vial Number:	1207
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	94569.6	0.0000	-0.0599	ppb	177.46	225.00	
9 Be	# 3	6	64.4	0.0000	-0.0031	ppb	125.77	225.00	
11 B	# 3	6	50654.5	0.0000	-3.8280	ppb	38.66	225.00	
23 Na	# 1	45	2463225.0	0.0000	530.5000	ppb	0.70	269999.99	
24 Mg	# 3	45	11317050.0	0.0000	520.5000	ppb	1.41	180000.00	
27 Al	# 3	45	14812690.0	0.0000	504.7000	ppb	1.60	180000.00	
28 Si	# 1	45	105178.1	0.0000	-10.9800	ppb	42.39	18000.00	
31 P	# 3	45	28324.0	0.0000	5.0540	ppb	9.27	359999.99	
39 K	# 2	45	286569.6	0.0000	493.0000	ppb	0.72	269999.99	
40 Ca	# 1	45	4618608.0	0.0000	518.1000	ppb	0.37	269999.99	
47 Ti	# 3	45	686.7	0.0000	0.0781	ppb	19.37	2700.00	
51 V	# 2	45	915.8	0.0000	-0.0075	ppb	41.38	2700.00	
52 Cr	# 2	45	337.6	0.0000	-0.0056	ppb	23.34	2700.00	
55 Mn	# 3	45	4315.3	0.0000	0.0071	ppb	25.10	2700.00	
56 Fe	# 1	45	10169480.0	0.0000	517.4000	ppb	0.91	90000.00	
59 Co	# 3	45	353.4	0.0000	-0.0030	ppb	39.37	2700.00	
60 Ni	# 2	45	209.8	0.0000	-0.0016	ppb	116.70	2700.00	
63 Cu	# 2	45	1159.4	0.0000	0.0486	ppb	14.23	2700.00	
66 Zn	# 3	72	1503.5	0.0000	-0.0230	ppb	33.34	2700.00	
75 As	# 2	72	35.8	0.0000	0.0017	ppb	160.04	2700.00	
78 Se	# 1	72	13.6	0.0000	-0.0004	ppb	541.52	2700.00	
88 Sr	# 3	72	1303.5	0.0000	0.0026	ppb	33.19	2700.00	
90 Zr	# 3	72	1336.8	0.0000	0.0271	ppb	3.17	1800.00	
95 Mo	# 3	115	8537.7	0.0000	0.6961	ppb	3.03	2700.00	
107 Ag	# 3	115	236.7	0.0000	0.0007	ppb	115.85	225.00	
111 Cd	# 3	115	51.7	0.0000	-0.0036	ppb	89.44	2700.00	
118 Sn	# 3	115	393.4	0.0000	-0.0083	ppb	20.78	2700.00	
121 Sb	# 3	115	974.5	0.0000	-0.0036	ppb	11.07	2700.00	
137 Ba	# 3	115	195.6	0.0000	-0.0063	ppb	29.87	2700.00	
182 W	# 3	159	2284.8	0.0000	0.0063	ppb	16.81	900.00	
205 Tl	# 3	159	417.8	0.0000	-0.0029	ppb	16.02	2700.00	
208 Pb	# 3	159	1031.2	0.0000	-0.0045	ppb	13.56	2700.00	
235 U	# 3	159	7.8	0.0000	-0.0002	ppb	20.42	2700.00	
238 U	# 3	159	431.1	0.0000	-0.0071	ppb	6.57	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1387910.40	0.44	1278749.60	108.5	60 - 125	
45 Sc # 1	1871847.30	1.63	1810592.50	103.4	60 - 125	
45 Sc # 2	219176.30	2.51	214309.00	102.3	60 - 125	
45 Sc # 3	4837229.50	0.22	4614279.00	104.8	60 - 125	
72 Ge # 1	506942.44	1.37	482116.34	105.1	60 - 125	
72 Ge # 2	146979.63	2.53	142906.22	102.9	60 - 125	
72 Ge # 3	1066981.40	1.85	1047852.70	101.8	60 - 125	
115 In # 3	8266543.00	0.95	7894589.00	104.7	60 - 125	
159 Tb # 3	11654796.00	1.43	11252717.00	103.6	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7042

CCV QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03016.D\98D03016.D#
Date Acquired:	Apr 10 2015 02:20 pm
Operator:	CCapul
Sample Name:	CCV1
Misc Info:	
Vial Number:	1206
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal Update:	Apr 10 2015 01:47 pm
Sample Type:	CCV
Total Dil Factor:	1.00

QC Elements

Element	Conc.	CPS	Conc RSD(%)	Expected	QC Range(%)	Flag
7 Li	24.03 ppb	435586.41	2.92	25.00	90 - 110	
9 Be	24.07 ppb	125860.20	0.76	25.00	90 - 110	
11 B	23.45 ppb	149068.50	7.23	25.00	90 - 110	
23 Na	1262.00 ppb	5790391.00	0.74	1250.00	90 - 110	
24 Mg	2536.00 ppb	53042340.00	0.64	2500.00	90 - 110	
27 Al	2542.00 ppb	71733872.00	0.77	2500.00	90 - 110	
28 Si	2554.00 ppb	2864631.00	1.05	2500.00	90 - 110	
31 P	249.60 ppb	365709.41	0.73	250.00	90 - 110	
39 K	2504.00 ppb	1333414.00	0.93	2500.00	90 - 110	
40 Ca	2514.00 ppb	22489680.00	0.59	2500.00	90 - 110	
47 Ti	24.85 ppb	76476.04	0.90	25.00	90 - 110	
51 V	24.05 ppb	150025.50	0.53	25.00	90 - 110	
52 Cr	23.90 ppb	189697.80	0.45	25.00	90 - 110	
55 Mn	24.49 ppb	1345090.00	2.76	25.00	90 - 110	
56 Fe	2450.00 ppb	48733000.00	0.37	2500.00	90 - 110	
59 Co	24.57 ppb	1048213.00	1.23	25.00	90 - 110	
60 Ni	24.67 ppb	88625.67	1.09	25.00	90 - 110	
63 Cu	24.47 ppb	237013.59	0.74	25.00	90 - 110	
66 Zn	48.16 ppb	302577.59	2.64	50.00	90 - 110	
75 As	25.09 ppb	23105.34	1.14	25.00	90 - 110	
78 Se	25.01 ppb	18541.79	0.68	25.00	90 - 110	
88 Sr	24.42 ppb	1612923.00	2.19	25.00	90 - 110	
90 Zr	15.73 ppb	515329.91	1.86	15.00	90 - 110	
95 Mo	25.18 ppb	285587.50	0.46	25.00	90 - 110	
107 Ag	23.85 ppb	742268.13	1.07	25.00	90 - 110	
111 Cd	24.74 ppb	173483.09	1.04	25.00	90 - 110	
118 Sn	24.56 ppb	487166.41	0.41	25.00	90 - 110	
121 Sb	24.07 ppb	654852.00	0.41	25.00	90 - 110	
137 Ba	24.14 ppb	248584.59	1.03	25.00	90 - 110	
182 W	25.08 ppb	641531.63	1.72	25.00	90 - 110	
205 Tl	25.61 ppb	1503436.00	2.18	25.00	90 - 110	
208 Pb	24.76 ppb	1966235.00	3.19	25.00	90 - 110	
235 U	0.17 ppb	15182.75	2.51	0.18	90 - 110	
238 U	24.82 ppb	2133028.00	2.48	25.00	90 - 110	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1294026.50	1.41	1278749.60	101.2	60 - 125	
45 Sc	1901139.40	0.66	1810592.50	105.0	60 - 125	
45 Sc	216874.97	1.96	214309.00	101.2	60 - 125	
45 Sc	4668535.50	0.58	4614279.00	101.2	60 - 125	
72 Ge	508006.97	0.66	482116.34	105.4	60 - 125	
72 Ge	143903.02	2.78	142906.22	100.7	60 - 125	
72 Ge	1045528.80	2.75	1047852.70	99.8	60 - 125	
115 In	7879744.00	0.55	7894589.00	99.8	60 - 125	
159 Tb	11238154.00	2.82	11252717.00	99.9	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

0 :Element Failures — 0 :Max. Number of Failures Allowed

0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass

ISTD: Pass

CCB QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03017.D\98D03017.D#
Date Acquired:	Apr 10 2015 02:25 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	CCB1
Misc Info:	
Vial Number:	1102
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	CCB
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc RSD(%)	High Limit	Flag
7 Li	-0.1768	ppb	87962.6	78.05	0.20	
9 Be	0.0036	ppb	96.7	92.86	0.10	
11 B	-1.9300	ppb	55298.2	90.88	5.00	
23 Na	4.8320	ppb	140808.3	10.58	40.00	
24 Mg	0.6250	ppb	58627.0	18.93	10.00	
27 Al	-0.2053	ppb	60348.3	89.63	20.00	
28 Si	-26.8400	ppb	91713.2	13.30	20.00	Fail
31 P	0.4096	ppb	20291.4	58.47	10.00	
39 K	2.1140	ppb	27099.2	55.68	20.00	
40 Ca	1.1590	ppb	82432.9	15.15	25.00	
47 Ti	-0.0528	ppb	254.5	14.47	0.50	
51 V	0.0712	ppb	1381.0	8.17	0.50	
52 Cr	0.0047	ppb	412.5	35.84	0.20	
55 Mn	-0.0010	ppb	3615.1	74.91	0.20	
56 Fe	0.5235	ppb	60565.6	54.98	10.00	
59 Co	-0.0008	ppb	420.0	29.35	0.20	
60 Ni	0.0023	ppb	219.3	101.18	0.20	
63 Cu	0.0201	ppb	864.5	6.45	0.40	
66 Zn	0.0985	ppb	2169.2	18.91	2.00	
75 As	0.0185	ppb	50.7	17.93	0.20	
78 Se	0.0077	ppb	20.0	72.36	0.20	
88 Sr	0.0012	ppb	1152.3	181.49	0.20	
90 Zr	0.0113	ppb	771.2	6.54	2.00	
95 Mo	0.1079	ppb	1471.3	16.00	0.40	
107 Ag	-0.0001	ppb	200.0	1359.60	0.20	
111 Cd	0.0003	ppb	76.1	402.43	0.20	
118 Sn	0.0008	ppb	553.4	342.75	0.20	
121 Sb	0.0361	ppb	2003.6	12.57	0.40	
137 Ba	0.0011	ppb	261.1	218.05	0.20	
182 W	0.0593	ppb	3536.2	6.48	1.00	
205 Tl	0.0001	ppb	573.4	1530.10	0.20	
208 Pb	0.0002	ppb	1362.3	728.44	0.10	
235 U	-0.0001	ppb	14.4	60.58	1.00	
238 U	0.0010	ppb	1106.8	93.29	0.10	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1316207.8	0.95	1278749.60	102.9	60 - 125	
45 Sc	1942258.8	2.06	1810592.50	107.3	60 - 125	
45 Sc	214896.0	1.97	214309.00	100.3	60 - 125	
45 Sc	4530765.5	0.97	4614279.00	98.2	60 - 125	
72 Ge	517320.7	0.91	482116.34	107.3	60 - 125	
72 Ge	144697.3	2.65	142906.22	101.3	60 - 125	
72 Ge	1015893.9	0.62	1047852.70	97.0	60 - 125	
115 In	7860548.0	1.14	7894589.00	99.6	60 - 125	
159 Tb	11177786.0	1.15	11252717.00	99.3	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

1 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Nnumber of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

CCV QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03039.D\98D03039.D#
Date Acquired:	Apr 10 2015 04:11 pm
Operator:	CCapul
Sample Name:	CCV3
Misc Info:	
Vial Number:	1206
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal Update:	Apr 10 2015 01:47 pm
Sample Type:	CCV
Total Dil Factor:	1.00

QC Elements

Element	Conc.	CPS	Conc RSD(%)	Expected	QC Range(%)	Flag
7 Li	23.85 ppb	433947.81	2.84	25.00	90 - 110	
9 Be	23.81 ppb	124730.70	2.53	25.00	90 - 110	
11 B	22.98 ppb	147602.00	8.77	25.00	90 - 110	
23 Na	1265.00 ppb	5524203.00	1.41	1250.00	90 - 110	
24 Mg	2532.00 ppb	51911592.00	0.45	2500.00	90 - 110	
27 Al	2533.00 ppb	70061368.00	0.10	2500.00	90 - 110	
28 Si	2592.00 ppb	2766207.00	1.24	2500.00	90 - 110	
31 P	255.20 ppb	366029.31	0.33	250.00	90 - 110	
39 K	2529.00 ppb	1309128.00	0.64	2500.00	90 - 110	
40 Ca	2515.00 ppb	21424270.00	1.66	2500.00	90 - 110	
47 Ti	25.29 ppb	76286.56	0.26	25.00	90 - 110	
51 V	24.11 ppb	146231.30	0.86	25.00	90 - 110	
52 Cr	23.71 ppb	183050.41	1.22	25.00	90 - 110	
55 Mn	24.56 ppb	1322259.00	1.34	25.00	90 - 110	
56 Fe	2452.00 ppb	46421560.00	1.45	2500.00	90 - 110	
59 Co	24.37 ppb	1019292.00	0.91	25.00	90 - 110	
60 Ni	24.60 ppb	85933.93	0.60	25.00	90 - 110	
63 Cu	24.26 ppb	228557.80	0.62	25.00	90 - 110	
66 Zn	48.37 ppb	296416.50	2.19	50.00	90 - 110	
75 As	25.00 ppb	22488.48	0.96	25.00	90 - 110	
78 Se	25.04 ppb	17790.93	0.88	25.00	90 - 110	
88 Sr	24.90 ppb	1604435.00	1.24	25.00	90 - 110	
90 Zr	15.63 ppb	499044.50	3.55	15.00	90 - 110	
95 Mo	25.16 ppb	279649.59	2.40	25.00	90 - 110	
107 Ag	24.05 ppb	733704.13	1.43	25.00	90 - 110	
111 Cd	24.76 ppb	170221.20	1.39	25.00	90 - 110	
118 Sn	24.61 ppb	478619.91	1.57	25.00	90 - 110	
121 Sb	24.32 ppb	648732.19	1.39	25.00	90 - 110	
137 Ba	24.79 ppb	250178.30	2.78	25.00	90 - 110	
182 W	24.71 ppb	624607.38	1.99	25.00	90 - 110	
205 Tl	25.18 ppb	1461148.00	1.37	25.00	90 - 110	
208 Pb	24.61 ppb	1931729.00	0.85	25.00	90 - 110	
235 U	0.17 ppb	14613.18	2.34	0.18	90 - 110	
238 U	24.78 ppb	2105110.00	0.75	25.00	90 - 110	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1296896.50	2.39	1278749.60	101.4	60 - 125	
45 Sc	1810087.30	1.76	1810592.50	100.0	60 - 125	
45 Sc	210893.70	1.24	214309.00	98.4	60 - 125	
45 Sc	4575794.00	0.21	4614279.00	99.2	60 - 125	
72 Ge	486785.81	0.23	482116.34	101.0	60 - 125	
72 Ge	140530.73	1.91	142906.22	98.3	60 - 125	
72 Ge	1019734.90	2.96	1047852.70	97.3	60 - 125	
115 In	7726612.50	2.04	7894589.00	97.9	60 - 125	
159 Tb	11102606.00	0.94	11252717.00	98.7	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

0 :Element Failures — 0 :Max. Number of Failures Allowed

0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass

ISTD: Pass

CCB QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03040.D\98D03040.D#
Date Acquired:	Apr 10 2015 04:15 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	CCB3
Misc Info:	
Vial Number:	1102
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	CCB
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc RSD(%)	High Limit	Flag
7 Li	-0.0818	ppb	88030.1	54.39	0.20	
9 Be	0.0024	ppb	88.9	103.43	0.10	
11 B	-2.5270	ppb	52200.9	79.38	5.00	
23 Na	3.1350	ppb	124922.7	12.45	40.00	
24 Mg	0.1631	ppb	49884.6	156.77	10.00	
27 Al	-0.1662	ppb	62200.3	279.24	20.00	
28 Si	6.5730	ppb	120593.8	80.97	20.00	
31 P	2.5320	ppb	23421.9	7.63	10.00	
39 K	4.5400	ppb	28662.5	39.10	20.00	
40 Ca	1.2960	ppb	78578.1	10.75	25.00	
47 Ti	0.0353	ppb	523.4	177.82	0.50	
51 V	0.0138	ppb	1039.2	67.12	0.50	
52 Cr	0.0012	ppb	389.1	184.16	0.20	
55 Mn	0.0161	ppb	4576.7	28.51	0.20	
56 Fe	1.3210	ppb	72239.7	115.90	10.00	
59 Co	0.0002	ppb	466.7	886.30	0.20	
60 Ni	0.0041	ppb	228.4	26.29	0.20	
63 Cu	-0.0008	ppb	672.5	175.25	0.40	
66 Zn	0.1059	ppb	2231.4	4.66	2.00	
75 As	0.0164	ppb	49.1	22.14	0.20	
78 Se	0.0026	ppb	15.3	56.99	0.20	
88 Sr	0.0017	ppb	1192.3	23.21	0.20	
90 Zr	0.0061	ppb	608.9	4.46	2.00	
95 Mo	0.0132	ppb	401.1	42.67	0.40	
107 Ag	-0.0007	ppb	180.0	54.10	0.20	
111 Cd	0.0017	ppb	86.5	79.03	0.20	
118 Sn	0.0023	ppb	582.3	213.40	0.20	
121 Sb	0.0256	ppb	1719.1	12.54	0.40	
137 Ba	0.0057	ppb	308.9	67.28	0.20	
182 W	0.0307	ppb	2786.0	2.22	1.00	
205 Tl	-0.0001	ppb	557.8	1198.80	0.20	
208 Pb	-0.0002	ppb	1319.0	486.75	0.10	
235 U	-0.0001	ppb	15.6	20.51	1.00	
238 U	-0.0002	ppb	1001.2	528.76	0.10	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1296511.0	0.79	1278749.60	101.4	60 - 125	
45 Sc	1823989.8	1.71	1810592.50	100.7	60 - 125	
45 Sc	217256.4	2.43	214309.00	101.4	60 - 125	
45 Sc	4585821.5	1.14	4614279.00	99.4	60 - 125	
72 Ge	492622.4	0.95	482116.34	102.2	60 - 125	
72 Ge	145782.2	2.08	142906.22	102.0	60 - 125	
72 Ge	1023614.8	0.35	1047852.70	97.7	60 - 125	
115 In	7867661.5	1.40	7894589.00	99.7	60 - 125	
159 Tb	11078906.0	0.84	11252717.00	98.5	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

0 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Nnumber of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

CCB QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03041.D\98D03041.D#
Date Acquired:	Apr 10 2015 04:19 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	IMD010SB
Misc Info:	
Vial Number:	2207
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	MBS
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc RSD(%)	High Limit	Flag
7 Li	0.0212	ppb	92354.5	267.89	0.50	
9 Be	-0.0060	ppb	46.7	33.45	0.50	
11 B	-4.7520	ppb	45294.9	23.11	10.00	
23 Na	-2.6130	ppb	108107.5	30.64	100.00	
24 Mg	-0.1861	ppb	44675.1	147.56	100.00	
27 Al	0.4343	ppb	82407.4	104.42	100.00	
28 Si	-23.9300	ppb	96198.9	36.78	50.00	
31 P	10.5800	ppb	35984.6	5.99	10.00	Fail
39 K	5.2700	ppb	30791.7	30.76	100.00	
40 Ca	12.5900	ppb	189206.7	1.81	100.00	
47 Ti	0.0540	ppb	604.5	119.26	0.50	
51 V	-0.0545	ppb	652.7	7.23	0.50	
52 Cr	0.0179	ppb	552.7	23.84	0.50	
55 Mn	0.0264	ppb	5371.4	19.66	0.50	
56 Fe	-0.1052	ppb	48549.3	691.73	100.00	
59 Co	-0.0048	ppb	270.0	13.58	0.50	
60 Ni	0.0166	ppb	289.6	8.34	0.50	
63 Cu	0.0362	ppb	1092.5	8.67	0.50	
66 Zn	0.4967	ppb	4848.9	1.44	2.00	
75 As	-0.0143	ppb	21.8	26.43	0.50	
78 Se	-0.0089	ppb	7.6	42.88	0.50	
88 Sr	0.0058	ppb	1530.2	20.86	0.50	
90 Zr	0.0213	ppb	1151.2	7.02	5.00	
95 Mo	-0.0025	ppb	233.3	111.15	0.50	
107 Ag	-0.0022	ppb	141.1	56.59	0.50	
111 Cd	-0.0052	ppb	39.3	16.80	0.50	
118 Sn	3.4760	ppb	72428.1	1.07	20.00	
121 Sb	-0.0060	ppb	901.2	14.78	0.50	
137 Ba	0.0130	ppb	401.1	60.72	0.50	
182 W	-0.0425	ppb	987.9	9.02	2.00	
205 Tl	-0.0062	ppb	212.2	8.29	0.50	
208 Pb	-0.0023	ppb	1209.0	30.24	0.50	
235 U	-0.0002	ppb	12.2	53.97	---	
238 U	-0.0100	ppb	171.1	1.31	0.50	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1337671.5	1.49	1278749.60	104.6	60 - 125	
45 Sc	1969803.9	1.68	1810592.50	108.8	60 - 125	
45 Sc	230362.2	2.59	214309.00	107.5	60 - 125	
45 Sc	4801467.0	0.89	4614279.00	104.1	60 - 125	
72 Ge	526270.1	1.84	482116.34	109.2	60 - 125	
72 Ge	153986.2	1.75	142906.22	107.8	60 - 125	
72 Ge	1073566.5	0.78	1047852.70	102.5	60 - 125	
115 In	8223397.5	1.45	7894589.00	104.2	60 - 125	
159 Tb	11577926.0	1.04	11252717.00	102.9	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

1 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Nnumber of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

LCS QC Report

Data File: D:\DATA\I982015\D\I98D03.B\98D03042.D\98D03042.D#
Date Acquired: Apr 10 2015 04:24 pm
Operator: CCapul
Sample Name: IMD010SL
Misc Info:
Vial Number: 2208
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update: Apr 10 2015 01:47 pm
Sample Type: LCSS
Final Dil Factor: 1.00

Analyte Elements

Element	CPS Mean	Conc.		RSD(%)	Expected	QC Range(%)	Flag
7 Li	862840.38	51.96	ppb	2.67	50.00	80 - 120.0	
9 Be	268731.41	49.96	ppb	2.30	50.00	80 - 120.0	
11 B	245376.70	47.43	ppb	4.78	50.00	80 - 120.0	
23 Na	23129790.00	5128.00	ppb	1.70	5000.00	80 - 120.0	
24 Mg	109690000.00	5189.00	ppb	1.22	5000.00	80 - 120.0	
27 Al	144688610.00	5073.00	ppb	0.90	5000.00	80 - 120.0	
28 Si	118114.50	-0.32	ppb	639.03	5000.00	80 - 120.0	Fail
31 P	796340.81	554.40	ppb	1.30	500.00	80 - 120.0	
39 K	2853648.00	5206.00	ppb	0.43	5000.00	80 - 120.0	
40 Ca	46549360.00	5221.00	ppb	0.54	5000.00	80 - 120.0	
47 Ti	158513.20	51.09	ppb	2.16	50.00	80 - 120.0	
51 V	323371.50	50.01	ppb	0.70	50.00	80 - 120.0	
52 Cr	399021.00	48.38	ppb	0.54	50.00	80 - 120.0	
55 Mn	2773431.00	50.02	ppb	3.36	50.00	80 - 120.0	
56 Fe	100263500.00	5054.00	ppb	1.07	5000.00	80 - 120.0	
59 Co	2159810.00	50.08	ppb	2.42	50.00	80 - 120.0	
60 Ni	184406.00	49.42	ppb	1.24	50.00	80 - 120.0	
63 Cu	487865.19	48.49	ppb	0.54	50.00	80 - 120.0	
66 Zn	613777.81	97.04	ppb	0.64	100.00	80 - 120.0	
75 As	48395.64	50.81	ppb	0.60	50.00	80 - 120.0	
78 Se	36629.65	49.84	ppb	0.25	50.00	80 - 120.0	
88 Sr	3330114.00	49.98	ppb	2.22	50.00	80 - 120.0	
90 Zr	1158104.00	35.05	ppb	2.48	30.00	80 - 120.0	
95 Mo	584966.63	51.49	ppb	1.79	50.00	80 - 120.0	
107 Ag	1580137.00	50.67	ppb	2.92	50.00	80 - 120.0	
111 Cd	353708.91	50.33	ppb	1.27	50.00	80 - 120.0	
118 Sn	1097559.00	55.24	ppb	1.40	50.00	80 - 120.0	
121 Sb	1339476.00	49.16	ppb	1.43	50.00	80 - 120.0	
137 Ba	510415.59	49.48	ppb	1.08	50.00	80 - 120.0	
182 W	1206513.00	48.09	ppb	1.72	50.00	80 - 120.0	
205 Tl	2916858.00	50.59	ppb	0.72	50.00	80 - 120.0	
208 Pb	4004939.00	51.36	ppb	0.57	50.00	80 - 120.0	
235 U	30404.31	0.35	ppb	2.22	0.35	80 - 120.0	
238 U	4239368.00	50.22	ppb	0.84	49.65	80 - 120.0	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1331332.90	0.35	1278749.60	104.1	60 - 125	
45 Sc	1897461.40	0.12	1810592.50	104.8	60 - 125	
45 Sc	225562.00	2.04	214309.00	105.3	60 - 125	
45 Sc	4720856.50	1.35	4614279.00	102.3	60 - 125	
72 Ge	503830.78	1.05	482116.34	104.5	60 - 125	
72 Ge	148926.39	2.17	142906.22	104.2	60 - 125	
72 Ge	1054873.40	1.28	1047852.70	100.7	60 - 125	
115 In	7899400.50	1.57	7894589.00	100.1	60 - 125	
159 Tb	11034281.00	0.93	11252717.00	98.1	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

1 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

7048

LCS QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03043.D\98D03043.D#
Date Acquired:	Apr 10 2015 04:28 pm
Operator:	CCapul
Sample Name:	IMD010SC
Misc Info:	
Vial Number:	2209
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	LCSS
Final Dil Factor:	1.00

Analyte Elements

Element	CPS Mean	Conc.		RSD(%)	Expected	QC Range(%)	Flag
7 Li	868118.38	51.43	ppb	1.84	50.00	80 - 120.0	
9 Be	269150.50	49.35	ppb	3.71	50.00	80 - 120.0	
11 B	248355.50	47.42	ppb	12.47	50.00	80 - 120.0	
23 Na	23399370.00	5211.00	ppb	0.51	5000.00	80 - 120.0	
24 Mg	110847900.00	5183.00	ppb	4.89	5000.00	80 - 120.0	
27 Al	145954400.00	5058.00	ppb	3.97	5000.00	80 - 120.0	
28 Si	126771.30	8.36	ppb	109.82	5000.00	80 - 120.0	Fail
31 P	810679.31	557.90	ppb	2.53	500.00	80 - 120.0	
39 K	2869748.00	5169.00	ppb	0.67	5000.00	80 - 120.0	
40 Ca	46719568.00	5263.00	ppb	1.08	5000.00	80 - 120.0	
47 Ti	160536.20	51.12	ppb	3.29	50.00	80 - 120.0	
51 V	324888.09	49.62	ppb	1.35	50.00	80 - 120.0	
52 Cr	399440.19	47.82	ppb	0.59	50.00	80 - 120.0	
55 Mn	2816980.00	50.19	ppb	3.39	50.00	80 - 120.0	
56 Fe	101105900.00	5118.00	ppb	1.14	5000.00	80 - 120.0	
59 Co	2185705.00	50.07	ppb	1.81	50.00	80 - 120.0	
60 Ni	184745.00	48.88	ppb	0.54	50.00	80 - 120.0	
63 Cu	489744.41	48.07	ppb	1.22	50.00	80 - 120.0	
66 Zn	613822.63	96.08	ppb	2.55	100.00	80 - 120.0	
75 As	48621.80	49.97	ppb	0.60	50.00	80 - 120.0	
78 Se	36548.81	49.23	ppb	0.45	50.00	80 - 120.0	
88 Sr	3362883.00	49.95	ppb	0.71	50.00	80 - 120.0	
90 Zr	1172509.00	35.13	ppb	1.13	30.00	80 - 120.0	
95 Mo	586803.19	51.23	ppb	4.78	50.00	80 - 120.0	
107 Ag	1560914.00	49.68	ppb	7.81	50.00	80 - 120.0	
111 Cd	352145.19	49.67	ppb	1.81	50.00	80 - 120.0	
118 Sn	1106260.00	55.16	ppb	0.93	50.00	80 - 120.0	
121 Sb	1360998.00	49.52	ppb	2.26	50.00	80 - 120.0	
137 Ba	515987.69	49.62	ppb	4.98	50.00	80 - 120.0	
182 W	1221360.00	48.19	ppb	0.82	50.00	80 - 120.0	
205 Tl	2914673.00	50.04	ppb	0.23	50.00	80 - 120.0	
208 Pb	3977763.00	50.52	ppb	3.96	50.00	80 - 120.0	
235 U	30578.00	0.35	ppb	2.86	0.35	80 - 120.0	
238 U	4253213.00	49.87	ppb	0.05	49.65	80 - 120.0	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1351295.90	4.64	1278749.60	105.7	60 - 125	
45 Sc	1889255.80	1.67	1810592.50	104.3	60 - 125	
45 Sc	228435.98	1.97	214309.00	106.6	60 - 125	
45 Sc	4777292.50	1.35	4614279.00	103.5	60 - 125	
72 Ge	509015.00	2.57	482116.34	105.6	60 - 125	
72 Ge	152138.42	1.21	142906.22	106.5	60 - 125	
72 Ge	1065753.50	2.35	1047852.70	101.7	60 - 125	
115 In	7971806.50	3.67	7894589.00	101.0	60 - 125	
159 Tb	11148446.00	2.79	11252717.00	99.1	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

1 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

CCV QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03050.D\98D03050.D#
Date Acquired:	Apr 10 2015 04:59 pm
Operator:	CCapul
Sample Name:	CCV4
Misc Info:	
Vial Number:	1206
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal Update:	Apr 10 2015 01:47 pm
Sample Type:	CCV
Total Dil Factor:	1.00

QC Elements

Element	Conc.	CPS	Conc RSD(%)	Expected	QC Range(%)	Flag
7 Li	23.57 ppb	448075.50	1.28	25.00	90 - 110	
9 Be	23.64 ppb	129099.00	0.41	25.00	90 - 110	
11 B	20.80 ppb	145325.30	8.85	25.00	90 - 110	Fail
23 Na	1271.00 ppb	5636299.00	0.77	1250.00	90 - 110	
24 Mg	2527.00 ppb	53921648.00	0.94	2500.00	90 - 110	
27 Al	2530.00 ppb	72855832.00	0.89	2500.00	90 - 110	
28 Si	2626.00 ppb	2844784.00	1.28	2500.00	90 - 110	
31 P	256.80 ppb	383275.81	0.67	250.00	90 - 110	
39 K	2555.00 ppb	1410485.00	0.67	2500.00	90 - 110	
40 Ca	2532.00 ppb	21907890.00	1.38	2500.00	90 - 110	
47 Ti	25.25 ppb	79278.51	0.44	25.00	90 - 110	
51 V	23.73 ppb	153487.09	0.18	25.00	90 - 110	
52 Cr	23.40 ppb	192601.70	0.76	25.00	90 - 110	
55 Mn	24.25 ppb	1359227.00	2.79	25.00	90 - 110	
56 Fe	2458.00 ppb	47258420.00	0.19	2500.00	90 - 110	
59 Co	24.70 ppb	1075482.00	4.72	25.00	90 - 110	
60 Ni	24.12 ppb	89864.29	0.84	25.00	90 - 110	
63 Cu	23.78 ppb	238944.20	0.73	25.00	90 - 110	
66 Zn	47.58 ppb	305318.81	5.24	50.00	90 - 110	
75 As	25.11 ppb	23919.28	0.95	25.00	90 - 110	
78 Se	24.78 ppb	17925.36	1.25	25.00	90 - 110	
88 Sr	24.34 ppb	1641765.00	4.52	25.00	90 - 110	
90 Zr	15.49 ppb	518331.50	3.89	15.00	90 - 110	
95 Mo	25.25 ppb	283372.31	1.18	25.00	90 - 110	
107 Ag	24.22 ppb	745985.13	0.50	25.00	90 - 110	
111 Cd	24.74 ppb	171765.30	1.14	25.00	90 - 110	
118 Sn	24.75 ppb	485923.09	1.17	25.00	90 - 110	
121 Sb	24.30 ppb	654377.00	0.46	25.00	90 - 110	
137 Ba	24.58 ppb	250569.00	1.06	25.00	90 - 110	
182 W	24.75 ppb	627652.63	0.78	25.00	90 - 110	
205 Tl	25.26 ppb	1470716.00	3.43	25.00	90 - 110	
208 Pb	24.52 ppb	1930615.00	0.98	25.00	90 - 110	
235 U	0.17 ppb	14774.44	4.29	0.18	90 - 110	
238 U	24.35 ppb	2075780.00	0.24	25.00	90 - 110	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1351445.00	0.34	1278749.60	105.7	60 - 125	
45 Sc	1838245.40	1.60	1810592.50	101.5	60 - 125	
45 Sc	224912.73	2.19	214309.00	104.9	60 - 125	
45 Sc	4763793.50	1.06	4614279.00	103.2	60 - 125	
72 Ge	495658.28	0.83	482116.34	102.8	60 - 125	
72 Ge	148872.38	2.27	142906.22	104.2	60 - 125	
72 Ge	1068977.80	4.85	1047852.70	102.0	60 - 125	
115 In	7799830.50	0.55	7894589.00	98.8	60 - 125	
159 Tb	11138691.00	1.25	11252717.00	99.0	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

1 :Element Failures — 0 :Max. Number of Failures Allowed

0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail

ISTD: Pass

7050

CCB QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03051.D\98D03051.D#
Date Acquired:	Apr 10 2015 05:04 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	CCB4
Misc Info:	
Vial Number:	1102
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	CCB
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc RSD(%)	High Limit	Flag
7 Li	-0.1466	ppb	92875.5	73.60	0.20	
9 Be	0.0051	ppb	110.0	34.63	0.10	
11 B	-5.7730	ppb	42778.0	31.65	5.00	Fail
23 Na	0.1132	ppb	117877.3	175.97	40.00	
24 Mg	-0.0073	ppb	47189.5	950.65	10.00	
27 Al	-0.4979	ppb	53891.3	20.83	20.00	
28 Si	-14.6000	ppb	104066.0	9.25	20.00	
31 P	2.2940	ppb	23508.1	5.26	10.00	
39 K	4.4300	ppb	29847.4	7.93	20.00	
40 Ca	0.8604	ppb	78833.6	12.01	25.00	
47 Ti	-0.0015	ppb	418.9	777.19	0.50	
51 V	0.0169	ppb	1105.2	39.78	0.50	
52 Cr	0.0003	ppb	398.2	469.46	0.20	
55 Mn	0.0148	ppb	4585.4	23.34	0.20	
56 Fe	0.4808	ppb	58975.4	13.47	10.00	
59 Co	0.0001	ppb	472.3	957.93	0.20	
60 Ni	0.0096	ppb	258.7	39.75	0.20	
63 Cu	-0.0005	ppb	704.2	631.22	0.40	
66 Zn	0.1218	ppb	2365.9	9.94	2.00	
75 As	0.0092	ppb	43.8	58.09	0.20	
78 Se	0.0076	ppb	19.6	117.67	0.20	
88 Sr	0.0029	ppb	1289.0	29.16	0.20	
90 Zr	0.0102	ppb	751.2	11.51	2.00	
95 Mo	0.0095	ppb	360.0	19.77	0.40	
107 Ag	-0.0014	ppb	160.0	48.64	0.20	
111 Cd	0.0012	ppb	82.7	179.05	0.20	
118 Sn	0.0031	ppb	602.3	102.49	0.20	
121 Sb	0.0278	ppb	1788.0	25.70	0.40	
137 Ba	0.0027	ppb	278.9	117.76	0.20	
182 W	0.0413	ppb	3058.3	11.86	1.00	
205 Tl	0.0003	ppb	582.3	134.10	0.20	
208 Pb	0.0002	ppb	1354.5	54.52	0.10	
235 U	-0.0002	ppb	12.2	37.55	1.00	
238 U	0.0016	ppb	1149.0	25.98	0.10	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1382810.9	1.86	1278749.60	108.1	60 - 125	
45 Sc	1921377.6	0.79	1810592.50	106.1	60 - 125	
45 Sc	226618.6	0.91	214309.00	105.7	60 - 125	
45 Sc	4666985.5	0.51	4614279.00	101.1	60 - 125	
72 Ge	508744.1	1.44	482116.34	105.5	60 - 125	
72 Ge	150444.6	1.82	142906.22	105.3	60 - 125	
72 Ge	1039625.7	1.25	1047852.70	99.2	60 - 125	
115 In	7903396.5	0.92	7894589.00	100.1	60 - 125	
159 Tb	11100172.0	1.64	11252717.00	98.6	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

1 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Nnumber of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Sample QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03052.D\98D03052.D#
Date Acquired:	Apr 10 2015 05:08 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D027-01M
Misc Info:	
Vial Number:	2302
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	1166206.0	0.0000	69.3500	ppb	3.35	225.00	
9 Be	# 3	6	277802.3	0.0000	49.6800	ppb	3.92	225.00	
11 B	# 3	6	272340.7	0.0000	51.9100	ppb	13.81	225.00	
23 Na	# 1	45	24120250.0	0.0000	4777.0000	ppb	1.08	269999.99	
24 Mg	# 3	45	265877410.0	0.0000	11250.0000	ppb	4.70	180000.00	
27 Al	# 3	45	1115854000.0	0.0000	35000.0000	ppb	5.08	180000.00	
28 Si	# 1	45	2439144.0	0.0000	1921.0000	ppb	0.48	18000.00	
31 P	# 3	45	1024756.0	0.0000	639.8000	ppb	1.27	359999.99	
39 K	# 2	45	5428345.0	0.0000	9102.0000	ppb	0.49	269999.99	
40 Ca	# 1	45	84217584.0	0.0000	8446.0000	ppb	0.65	269999.99	
47 Ti	# 3	45	7638354.0	0.0000	2205.0000	ppb	1.19	2700.00	
51 V	# 2	45	934887.7	0.0000	132.6000	ppb	1.06	2700.00	
52 Cr	# 2	45	589955.1	0.0000	65.4900	ppb	0.62	2700.00	
55 Mn	# 3	45	23265130.0	0.0000	375.4000	ppb	2.18	2700.00	
56 Fe	# 1	45	891540290.0	0.0000	40180.0000	ppb	0.85	90000.00	
59 Co	# 3	45	2611470.0	0.0000	54.1300	ppb	4.58	2700.00	
60 Ni	# 2	45	210393.6	0.0000	51.6100	ppb	0.44	2700.00	
63 Cu	# 2	45	632280.5	0.0000	57.5400	ppb	0.38	2700.00	
66 Zn	# 3	72	1026104.0	0.0000	164.4000	ppb	0.22	2700.00	
75 As	# 2	72	49356.6	0.0000	52.1100	ppb	0.33	2700.00	
78 Se	# 1	72	35360.8	0.0000	47.9800	ppb	0.79	2700.00	
88 Sr	# 3	72	5139007.0	0.0000	78.0900	ppb	0.95	2700.00	
90 Zr	# 3	72	1047815.0	0.0000	32.1100	ppb	2.46	1800.00	
95 Mo	# 3	115	541248.2	0.0000	49.4100	ppb	3.96	2700.00	
107 Ag	# 3	115	1510083.0	0.0000	50.2400	ppb	5.45	225.00	
111 Cd	# 3	115	339979.9	0.0000	50.1600	ppb	1.81	2700.00	
118 Sn	# 3	115	1073777.0	0.0000	56.0200	ppb	2.47	2700.00	
121 Sb	# 3	115	949875.7	0.0000	36.1400	ppb	2.65	2700.00	
137 Ba	# 3	115	2247992.0	0.0000	226.1000	ppb	3.05	2700.00	
182 W	# 3	159	610685.4	0.0000	24.7900	ppb	1.39	900.00	
205 Tl	# 3	159	2854627.0	0.0000	50.5100	ppb	2.64	2700.00	
208 Pb	# 3	159	5047039.0	0.0000	66.0300	ppb	2.15	2700.00	
235 U	# 3	159	29675.6	0.0000	0.3521	ppb	3.23	2700.00	
238 U	# 3	159	4135346.0	0.0000	49.9800	ppb	3.15	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1385928.90	5.27	1278749.60	108.4	60 - 125	
45 Sc # 1	2123539.00	1.95	1810592.50	117.3	60 - 125	
45 Sc # 2	246411.33	1.14	214309.00	115.0	60 - 125	
45 Sc # 3	5283958.50	2.87	4614279.00	114.5	60 - 125	
72 Ge # 1	505139.53	0.97	482116.34	104.8	60 - 125	
72 Ge # 2	148088.05	1.18	142906.22	103.6	60 - 125	
72 Ge # 3	1041881.00	1.39	1047852.70	99.4	60 - 125	
115 In # 3	7618875.00	2.59	7894589.00	96.5	60 - 125	
159 Tb # 3	10818856.00	2.01	11252717.00	96.1	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7052

Sample QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03053.D\98D03053.D#
Date Acquired:	Apr 10 2015 05:12 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D027-01S
Misc Info:	
Vial Number:	2303
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	1163423.0	0.0000	69.5200	ppb	1.54	225.00	
9 Be	# 3	6	270133.2	0.0000	48.4900	ppb	0.30	225.00	
11 B	# 3	6	261031.4	0.0000	49.1700	ppb	2.67	225.00	
23 Na	# 1	45	23780400.0	0.0000	4825.0000	ppb	1.10	269999.99	
24 Mg	# 3	45	257696900.0	0.0000	11030.0000	ppb	0.44	180000.00	
27 Al	# 3	45	1144807000.0	0.0000	36320.0000	ppb	1.29	180000.00	
28 Si	# 1	45	2620897.0	0.0000	2125.0000	ppb	0.99	18000.00	
31 P	# 3	45	1043819.0	0.0000	660.0000	ppb	1.11	359999.99	
39 K	# 2	45	5207478.0	0.0000	8795.0000	ppb	0.64	269999.99	
40 Ca	# 1	45	82748552.0	0.0000	8502.0000	ppb	0.76	269999.99	
47 Ti	# 3	45	7457159.0	0.0000	2179.0000	ppb	0.56	2700.00	
51 V	# 2	45	926957.1	0.0000	132.5000	ppb	0.09	2700.00	
52 Cr	# 2	45	578444.3	0.0000	64.7000	ppb	0.87	2700.00	
55 Mn	# 3	45	22324170.0	0.0000	364.5000	ppb	0.41	2700.00	
56 Fe	# 1	45	868419070.0	0.0000	40090.0000	ppb	0.66	90000.00	
59 Co	# 3	45	2564323.0	0.0000	53.7700	ppb	0.54	2700.00	
60 Ni	# 2	45	207391.2	0.0000	51.2600	ppb	0.83	2700.00	
63 Cu	# 2	45	631701.5	0.0000	57.9300	ppb	1.29	2700.00	
66 Zn	# 3	72	999473.3	0.0000	157.8000	ppb	0.81	2700.00	
75 As	# 2	72	48758.5	0.0000	51.4500	ppb	0.71	2700.00	
78 Se	# 1	72	34923.1	0.0000	47.5300	ppb	1.32	2700.00	
88 Sr	# 3	72	5163711.0	0.0000	77.3200	ppb	1.08	2700.00	
90 Zr	# 3	72	1099736.0	0.0000	33.2000	ppb	0.13	1800.00	
95 Mo	# 3	115	548308.6	0.0000	49.7100	ppb	1.63	2700.00	
107 Ag	# 3	115	1466033.0	0.0000	48.4200	ppb	2.81	225.00	
111 Cd	# 3	115	333148.1	0.0000	48.8300	ppb	0.98	2700.00	
118 Sn	# 3	115	1084342.0	0.0000	56.2200	ppb	1.06	2700.00	
121 Sb	# 3	115	983287.1	0.0000	37.1700	ppb	0.90	2700.00	
137 Ba	# 3	115	2162820.0	0.0000	216.1000	ppb	0.63	2700.00	
182 W	# 3	159	581472.0	0.0000	23.3800	ppb	0.62	900.00	
205 Tl	# 3	159	2798290.0	0.0000	49.0500	ppb	1.23	2700.00	
208 Pb	# 3	159	4676534.0	0.0000	60.6000	ppb	1.07	2700.00	
235 U	# 3	159	30086.8	0.0000	0.3536	ppb	0.55	2700.00	
238 U	# 3	159	4210268.0	0.0000	50.4100	ppb	1.89	2700.00	

ISTD Elements

Element		CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	# 3	1378806.00	0.28	1278749.60	107.8	60 - 125	
45 Sc	# 1	2072993.80	1.85	1810592.50	114.5	60 - 125	
45 Sc	# 2	244593.30	2.35	214309.00	114.1	60 - 125	
45 Sc	# 3	5219619.50	0.78	4614279.00	113.1	60 - 125	
72 Ge	# 1	503649.09	0.57	482116.34	104.5	60 - 125	
72 Ge	# 2	148163.55	1.37	142906.22	103.7	60 - 125	
72 Ge	# 3	1057338.90	0.79	1047852.70	100.9	60 - 125	
115 In	# 3	7667990.50	1.07	7894589.00	97.1	60 - 125	
159 Tb	# 3	10919459.00	0.62	11252717.00	97.0	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7053

Sample QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03054.D\98D03054.D#
Date Acquired:	Apr 10 2015 05:17 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D027-01A
Misc Info:	
Vial Number:	2304
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	1138072.0	0.0000	65.4700	ppb	1.31	225.00	
9 Be	# 3	6	273794.7	0.0000	47.5500	ppb	1.18	225.00	
11 B	# 3	6	267512.6	0.0000	48.6200	ppb	2.80	225.00	
23 Na	# 1	45	25141410.0	0.0000	5076.0000	ppb	0.44	269999.99	
24 Mg	# 3	45	270483300.0	0.0000	11680.0000	ppb	0.95	180000.00	
27 Al	# 3	45	995084030.0	0.0000	31860.0000	ppb	0.54	180000.00	
28 Si	# 1	45	1825734.0	0.0000	1439.0000	ppb	0.66	18000.00	
31 P	# 3	45	278687.5	0.0000	167.1000	ppb	0.58	359999.99	
39 K	# 2	45	5547988.0	0.0000	9398.0000	ppb	0.70	269999.99	
40 Ca	# 1	45	86893320.0	0.0000	8882.0000	ppb	0.67	269999.99	
47 Ti	# 3	45	7419463.0	0.0000	2188.0000	ppb	0.85	2700.00	
51 V	# 2	45	956327.1	0.0000	137.0000	ppb	0.93	2700.00	
52 Cr	# 2	45	575365.4	0.0000	64.5300	ppb	1.36	2700.00	
55 Mn	# 3	45	22791760.0	0.0000	375.6000	ppb	0.42	2700.00	
56 Fe	# 1	45	890917700.0	0.0000	40910.0000	ppb	0.82	90000.00	
59 Co	# 3	45	2556702.0	0.0000	54.1000	ppb	1.23	2700.00	
60 Ni	# 2	45	207014.1	0.0000	51.3100	ppb	1.65	2700.00	
63 Cu	# 2	45	620632.5	0.0000	57.0600	ppb	1.35	2700.00	
66 Zn	# 3	72	997579.0	0.0000	158.2000	ppb	1.08	2700.00	
75 As	# 2	72	50292.9	0.0000	52.9000	ppb	0.84	2700.00	
78 Se	# 1	72	36344.8	0.0000	49.0600	ppb	0.51	2700.00	
88 Sr	# 3	72	5295808.0	0.0000	79.6300	ppb	0.32	2700.00	
90 Zr	# 3	72	104509.1	0.0000	3.1570	ppb	1.73	1800.00	
95 Mo	# 3	115	570867.6	0.0000	52.2700	ppb	0.86	2700.00	
107 Ag	# 3	115	1443637.0	0.0000	48.1600	ppb	1.15	225.00	
111 Cd	# 3	115	333226.6	0.0000	49.3300	ppb	0.55	2700.00	
118 Sn	# 3	115	1060979.0	0.0000	55.5500	ppb	2.36	2700.00	
121 Sb	# 3	115	1298737.0	0.0000	49.5900	ppb	0.93	2700.00	
137 Ba	# 3	115	2317632.0	0.0000	233.8000	ppb	0.85	2700.00	
182 W	# 3	159	4880.1	0.0000	0.1183	ppb	5.98	900.00	
205 Tl	# 3	159	2803501.0	0.0000	49.5300	ppb	0.87	2700.00	
208 Pb	# 3	159	4662004.0	0.0000	60.8900	ppb	1.07	2700.00	
235 U	# 3	159	30154.6	0.0000	0.3572	ppb	1.75	2700.00	
238 U	# 3	159	4191696.0	0.0000	50.5700	ppb	1.09	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1425046.80	0.95	1278749.60	111.4	60 - 125	
45 Sc # 1	2083526.60	2.04	1810592.50	115.1	60 - 125	
45 Sc # 2	243934.63	2.10	214309.00	113.8	60 - 125	
45 Sc # 3	5172210.00	1.02	4614279.00	112.1	60 - 125	
72 Ge # 1	507848.53	1.54	482116.34	105.3	60 - 125	
72 Ge # 2	148668.61	0.86	142906.22	104.0	60 - 125	
72 Ge # 3	1052949.80	1.19	1047852.70	100.5	60 - 125	
115 In # 3	7592220.50	1.14	7894589.00	96.2	60 - 125	
159 Tb # 3	10835444.00	1.20	11252717.00	96.3	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7054

Sample QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03055.D\98D03055.D#
Date Acquired:	Apr 10 2015 05:21 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D027-01
Misc Info:	
Vial Number:	2305
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	343746.9	0.0000	14.4900	ppb	5.63	225.00	
9 Be	# 3	6	3027.1	0.0000	0.4890	ppb	9.92	225.00	
11 B	# 3	6	71651.1	0.0000	0.2904	ppb	1242.80	225.00	
23 Na	# 1	45	1574760.0	0.0000	294.1000	ppb	2.45	269999.99	
24 Mg	# 3	45	155952400.0	0.0000	6682.0000	ppb	1.35	180000.00	
27 Al	# 3	45	857207680.0	0.0000	27240.0000	ppb	3.81	180000.00	
28 Si	# 1	45	1841183.0	0.0000	1454.0000	ppb	1.36	18000.00	
31 P	# 3	45	282174.7	0.0000	168.0000	ppb	2.75	359999.99	
39 K	# 2	45	2737543.0	0.0000	4530.0000	ppb	0.62	269999.99	
40 Ca	# 1	45	39491840.0	0.0000	4037.0000	ppb	1.87	269999.99	
47 Ti	# 3	45	7328020.0	0.0000	2144.0000	ppb	0.72	2700.00	
51 V	# 2	45	626868.3	0.0000	88.1900	ppb	1.01	2700.00	
52 Cr	# 2	45	195465.6	0.0000	21.5000	ppb	1.31	2700.00	
55 Mn	# 3	45	20440080.0	0.0000	334.1000	ppb	1.16	2700.00	
56 Fe	# 1	45	785333310.0	0.0000	36110.0000	ppb	0.89	90000.00	
59 Co	# 3	45	474375.4	0.0000	9.9530	ppb	2.23	2700.00	
60 Ni	# 2	45	34203.5	0.0000	8.2770	ppb	1.45	2700.00	
63 Cu	# 2	45	166754.6	0.0000	15.0100	ppb	1.80	2700.00	
66 Zn	# 3	72	408386.6	0.0000	63.4400	ppb	2.46	2700.00	
75 As	# 2	72	3539.6	0.0000	3.6360	ppb	0.50	2700.00	
78 Se	# 1	72	112.4	0.0000	0.1320	ppb	8.89	2700.00	
88 Sr	# 3	72	2164326.0	0.0000	31.9300	ppb	0.96	2700.00	
90 Zr	# 3	72	96126.5	0.0000	2.8520	ppb	4.85	1800.00	
95 Mo	# 3	115	6993.4	0.0000	0.5931	ppb	2.85	2700.00	
107 Ag	# 3	115	1634.6	0.0000	0.0459	ppb	9.97	225.00	
111 Cd	# 3	115	2034.4	0.0000	0.2786	ppb	1.16	2700.00	
118 Sn	# 3	115	106558.4	0.0000	5.3340	ppb	2.34	2700.00	
121 Sb	# 3	115	7752.7	0.0000	0.2467	ppb	6.47	2700.00	
137 Ba	# 3	115	1830031.0	0.0000	177.4000	ppb	4.38	2700.00	
182 W	# 3	159	2554.8	0.0000	0.0219	ppb	9.46	900.00	
205 Tl	# 3	159	29330.8	0.0000	0.4992	ppb	6.74	2700.00	
208 Pb	# 3	159	969850.6	0.0000	12.4200	ppb	3.13	2700.00	
235 U	# 3	159	1176.8	0.0000	0.0134	ppb	7.26	2700.00	
238 U	# 3	159	159974.4	0.0000	1.8830	ppb	3.00	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1494135.40	6.21	1278749.60	116.8	60 - 125	
45 Sc # 1	2081362.90	1.56	1810592.50	115.0	60 - 125	
45 Sc # 2	248340.23	2.30	214309.00	115.9	60 - 125	
45 Sc # 3	5213151.00	2.13	4614279.00	113.0	60 - 125	
72 Ge # 1	511241.44	2.29	482116.34	106.0	60 - 125	
72 Ge # 2	150826.22	1.08	142906.22	105.5	60 - 125	
72 Ge # 3	1072774.00	4.47	1047852.70	102.4	60 - 125	
115 In # 3	7908083.00	2.27	7894589.00	100.2	60 - 125	
159 Tb # 3	11038477.00	1.99	11252717.00	98.1	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7055

Sample QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03056.D\98D03056.D#
Date Acquired:	Apr 10 2015 05:25 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D027-01J
Misc Info:	
Vial Number:	2306
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	Sample
Dilution Factor:	5.00
Autodil Factor:	Undiluted
Final Dil Factor:	5.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	149341.5	0.0000	2.7080	ppb	1.25	225.00	
9 Be	# 3	6	728.9	0.0000	0.1051	ppb	4.26	225.00	
11 B	# 3	6	59726.9	0.0000	-2.7310	ppb	82.90	225.00	
23 Na	# 1	45	374080.8	0.0000	56.5900	ppb	0.57	269999.99	
24 Mg	# 3	45	32064820.0	0.0000	1431.0000	ppb	2.46	180000.00	
27 Al	# 3	45	174059810.0	0.0000	5764.0000	ppb	2.15	180000.00	
28 Si	# 1	45	462002.2	0.0000	315.3000	ppb	2.78	18000.00	
31 P	# 3	45	79178.0	0.0000	38.7400	ppb	2.64	359999.99	
39 K	# 2	45	562492.5	0.0000	952.3000	ppb	1.32	269999.99	
40 Ca	# 1	45	7830318.0	0.0000	861.8000	ppb	0.97	269999.99	
47 Ti	# 3	45	1530886.0	0.0000	467.1000	ppb	0.90	2700.00	
51 V	# 2	45	126436.1	0.0000	18.8300	ppb	1.25	2700.00	
52 Cr	# 2	45	39863.0	0.0000	4.6330	ppb	1.18	2700.00	
55 Mn	# 3	45	4257058.0	0.0000	72.5300	ppb	1.33	2700.00	
56 Fe	# 1	45	155825600.0	0.0000	7767.0000	ppb	0.62	90000.00	
59 Co	# 3	45	100511.2	0.0000	2.1900	ppb	1.27	2700.00	
60 Ni	# 2	45	7320.4	0.0000	1.8410	ppb	0.62	2700.00	
63 Cu	# 2	45	35744.1	0.0000	3.3720	ppb	1.12	2700.00	
66 Zn	# 3	72	86150.7	0.0000	12.8600	ppb	0.51	2700.00	
75 As	# 2	72	757.6	0.0000	0.7441	ppb	5.95	2700.00	
78 Se	# 1	72	22.4	0.0000	0.0119	ppb	42.98	2700.00	
88 Sr	# 3	72	427695.8	0.0000	6.1520	ppb	0.60	2700.00	
90 Zr	# 3	72	19233.1	0.0000	0.5465	ppb	3.74	1800.00	
95 Mo	# 3	115	1527.9	0.0000	0.1089	ppb	4.04	2700.00	
107 Ag	# 3	115	438.9	0.0000	0.0072	ppb	10.53	225.00	
111 Cd	# 3	115	456.6	0.0000	0.0527	ppb	2.37	2700.00	
118 Sn	# 3	115	22128.4	0.0000	1.0590	ppb	1.27	2700.00	
121 Sb	# 3	115	2211.4	0.0000	0.0414	ppb	11.84	2700.00	
137 Ba	# 3	115	369769.2	0.0000	34.9400	ppb	1.80	2700.00	
182 W	# 3	159	1194.6	0.0000	-0.0344	ppb	7.80	900.00	
205 Tl	# 3	159	6253.1	0.0000	0.0942	ppb	2.85	2700.00	
208 Pb	# 3	159	203300.2	0.0000	2.4800	ppb	1.45	2700.00	
235 U	# 3	159	248.9	0.0000	0.0025	ppb	17.03	2700.00	
238 U	# 3	159	32614.9	0.0000	0.3581	ppb	1.56	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1508690.10	2.24	1278749.60	118.0	60 - 125	
45 Sc # 1	1919118.80	1.02	1810592.50	106.0	60 - 125	
45 Sc # 2	233127.83	2.58	214309.00	108.8	60 - 125	
45 Sc # 3	4998554.50	0.99	4614279.00	108.3	60 - 125	
72 Ge # 1	501082.84	0.93	482116.34	103.9	60 - 125	
72 Ge # 2	151838.36	2.25	142906.22	106.3	60 - 125	
72 Ge # 3	1097981.00	0.68	1047852.70	104.8	60 - 125	
115 In # 3	8102345.50	0.62	7894589.00	102.6	60 - 125	
159 Tb # 3	11523490.00	0.86	11252717.00	102.4	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7056

CCV QC Report

Data File: D:\DATA\I982015\D\I98D03.B\98D03058.D\98D03058.D#
Date Acquired: Apr 10 2015 05:34 pm
Operator: CCapul
Sample Name: CCV5
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal Update: Apr 10 2015 01:47 pm
Sample Type: CCV
Total Dil Factor: 1.00

QC Elements

Element	Conc.	CPS	Conc RSD(%)	Expected	QC Range(%)	Flag
7 Li	23.56 ppb	457336.19	1.14	25.00	90 - 110	
9 Be	23.33 ppb	130087.70	2.30	25.00	90 - 110	
11 B	19.32 ppb	142356.09	12.13	25.00	90 - 110	Fail
23 Na	1254.00 ppb	5751655.00	1.00	1250.00	90 - 110	
24 Mg	2504.00 ppb	53902272.00	1.75	2500.00	90 - 110	
27 Al	2516.00 ppb	73060672.00	0.93	2500.00	90 - 110	
28 Si	2603.00 ppb	2915277.00	0.99	2500.00	90 - 110	
31 P	255.00 ppb	384039.59	0.75	250.00	90 - 110	
39 K	2561.00 ppb	1413160.00	0.85	2500.00	90 - 110	
40 Ca	2531.00 ppb	22623750.00	0.85	2500.00	90 - 110	
47 Ti	24.91 ppb	78904.86	1.46	25.00	90 - 110	
51 V	23.91 ppb	154576.20	0.43	25.00	90 - 110	
52 Cr	23.37 ppb	192300.00	0.80	25.00	90 - 110	
55 Mn	24.42 ppb	1380412.00	1.24	25.00	90 - 110	
56 Fe	2429.00 ppb	48261912.00	0.36	2500.00	90 - 110	
59 Co	24.13 ppb	1059387.00	2.05	25.00	90 - 110	
60 Ni	24.04 ppb	89519.22	0.81	25.00	90 - 110	
63 Cu	23.84 ppb	239384.30	0.56	25.00	90 - 110	
66 Zn	48.70 ppb	304172.81	1.49	50.00	90 - 110	
75 As	25.24 ppb	23988.52	0.38	25.00	90 - 110	
78 Se	24.83 ppb	18322.82	1.06	25.00	90 - 110	
88 Sr	24.98 ppb	1640181.00	1.04	25.00	90 - 110	
90 Zr	16.09 ppb	524014.19	2.35	15.00	90 - 110	
95 Mo	24.83 ppb	287419.19	2.62	25.00	90 - 110	
107 Ag	23.63 ppb	750608.00	1.48	25.00	90 - 110	
111 Cd	24.37 ppb	174510.00	0.85	25.00	90 - 110	
118 Sn	24.32 ppb	492542.09	1.41	25.00	90 - 110	
121 Sb	23.66 ppb	657158.50	2.08	25.00	90 - 110	
137 Ba	23.90 ppb	251274.09	1.39	25.00	90 - 110	
182 W	24.97 ppb	634492.31	0.41	25.00	90 - 110	
205 Tl	24.87 ppb	1450018.00	1.00	25.00	90 - 110	
208 Pb	24.54 ppb	1936176.00	1.27	25.00	90 - 110	
235 U	0.17 ppb	14872.39	2.28	0.18	90 - 110	
238 U	24.20 ppb	2066503.00	1.72	25.00	90 - 110	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1380001.40	2.30	1278749.60	107.9	60 - 125	
45 Sc	1899723.50	0.90	1810592.50	104.9	60 - 125	
45 Sc	224811.64	2.00	214309.00	104.9	60 - 125	
45 Sc	4804794.50	0.87	4614279.00	104.1	60 - 125	
72 Ge	505723.84	0.80	482116.34	104.9	60 - 125	
72 Ge	148473.05	1.40	142906.22	103.9	60 - 125	
72 Ge	1039218.40	2.27	1047852.70	99.2	60 - 125	
115 In	8045686.50	1.99	7894589.00	101.9	60 - 125	
159 Tb	11158914.00	0.73	11252717.00	99.2	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

1 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

CCB QC Report

Data File:	D:\DATA\I982015\D\I98D03.B\98D03059.D\98D03059.D#
Date Acquired:	Apr 10 2015 05:39 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	CCB5
Misc Info:	
Vial Number:	1102
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	d:\DATA\I982015\A\I98A01.B\EMX6020.C
Last Cal. Update:	Apr 10 2015 01:47 pm
Sample Type:	CCB
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc RSD(%)	High Limit	Flag
7 Li	-0.1238	ppb	93668.0	21.49	0.20	
9 Be	0.0100	ppb	137.8	24.90	0.10	
11 B	-4.7890	ppb	46862.2	40.89	5.00	
23 Na	-0.7942	ppb	112230.7	86.38	40.00	
24 Mg	0.1710	ppb	51118.8	95.73	10.00	
27 Al	0.0132	ppb	68530.1	3096.60	20.00	
28 Si	-27.6700	ppb	88600.7	29.53	20.00	Fail
31 P	2.2520	ppb	23548.4	26.46	10.00	
39 K	4.7780	ppb	30030.0	11.18	20.00	
40 Ca	0.8942	ppb	78092.3	14.17	25.00	
47 Ti	0.0165	ppb	475.6	214.46	0.50	
51 V	0.0226	ppb	1140.9	40.60	0.50	
52 Cr	0.0002	ppb	397.6	260.48	0.20	
55 Mn	0.0152	ppb	4626.7	32.28	0.20	
56 Fe	0.2853	ppb	54330.1	8.63	10.00	
59 Co	0.0012	ppb	520.0	131.03	0.20	
60 Ni	-0.0037	ppb	208.9	45.45	0.20	
63 Cu	-0.0045	ppb	663.4	80.34	0.40	
66 Zn	0.1166	ppb	2303.6	2.47	2.00	
75 As	0.0148	ppb	48.9	11.56	0.20	
78 Se	0.0035	ppb	16.7	116.66	0.20	
88 Sr	0.0020	ppb	1215.7	79.65	0.20	
90 Zr	0.0126	ppb	821.2	10.67	2.00	
95 Mo	0.0122	ppb	391.1	23.58	0.40	
107 Ag	0.0000	ppb	202.2	3422.90	0.20	
111 Cd	0.0008	ppb	79.9	508.91	0.20	
118 Sn	0.0024	ppb	588.9	64.92	0.20	
121 Sb	0.0283	ppb	1800.2	20.05	0.40	
137 Ba	0.0097	ppb	351.1	20.39	0.20	
182 W	0.0396	ppb	3040.5	5.32	1.00	
205 Tl	0.0020	ppb	685.6	33.35	0.20	
208 Pb	-0.0002	ppb	1329.0	988.19	0.10	
235 U	-0.0001	ppb	13.3	28.00	1.00	
238 U	0.0004	ppb	1061.2	151.97	0.10	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1389142.6	0.13	1278749.60	108.6	60 - 125	
45 Sc	1896207.5	1.76	1810592.50	104.7	60 - 125	
45 Sc	226563.1	1.27	214309.00	105.7	60 - 125	
45 Sc	4687338.5	1.02	4614279.00	101.6	60 - 125	
72 Ge	513730.3	1.07	482116.34	106.6	60 - 125	
72 Ge	149635.1	2.12	142906.22	104.7	60 - 125	
72 Ge	1026614.6	0.52	1047852.70	98.0	60 - 125	
115 In	7904569.0	1.17	7894589.00	100.1	60 - 125	
159 Tb	11196527.0	1.27	11252717.00	99.5	60 - 125	

ISTD Ref File : D:\DATA\I982015\D\I98D03.B\98D03004.D\98D03004.D#

1 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Nnumber of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

EMAX LABORATORIES, INC.

DIGESTION LOG
for
ICP-MS

Note: For samples, relevant QCs/Standards digested, refer to attached digestion sequence.

Comments:

Digestion Vessel Lot # 19414007

LCS-3 : P : SM6A-007-01-20 0.5 mL
LCS-4 : Zr : SM6A-007-01-21 0.3 mL
LCS-5 : W : SM6A-~~007~~ 04-68 0.5 mL
SK 4/7/15

Book #: EIM-053
Batch: IMD010S
Matrix: SOIL
Digestor ID: D

SOP #	Rev. #
☐ EMAX-200.8	5
☑ EMAX-6020	8
☐ EMAX-	

Start	Temp	End	Temp
	95.9 °c		96.4 °c

Standards	ID	Amount Added (ml/g)
LCS-1	SM6A-007-02-13	5.0
LCS-2	SM6A-007-02-14	5.0
MS	SAME SPIKE VOL & SOLN AS LCS1,2,3,4,5	
Blank Soil (Bead)	SM5A-03-01-23	
Reagent	**Lot# / ID**	**Amount Added (ml)**
HNO_3	SWIA-005-11-08	10
HCl	SWIA-005-08-04	5+5
H_2O_2	SWIA-005-08-15	10
HNO_3(1:1)	SM5B-03-53-04	10
pH Strip (0-14)	NA	

Digestate Location	metals
Extract Location	
☑ Reagent Water ID:	SM5A-03-01-24
☑ Thermometer ID:	140553509 / D18
☑ Pipette ID:	142780035
☑ Pipette ID:	239360318
☐ Pipette ID:	
☐ HNO_3 dispenser checked @ 5.0 ml with Class A volumetric flask	
☐ HCl dispenser checked @ 5.0 ml with Class A volumetric flask	

Prepared By: SK

Standard Added By: SK Witnessed By: [illegible]

Extract Rcvd By: [illegible] Checked By: [illegible]

EMAX LABORATORIES INC

DIGESTION LOG FOR METALS

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Vd(ml)	ExpAmt	ExpVd(ml)	PrepFctr	Comments
15IMD010S01	IMD010SB	2.07	g	4/7/15 11:48	100	2	100	0.966	✓
15IMD010S02	IMD010SL	2.07	g	4/7/15 11:48	100	2	100	0.966	✓
15IMD010S03	IMD010SC	2.09	g	4/7/15 11:49	100	2	100	0.957	✓
15IMD010S04	D026-01	2.02	g	4/7/15 11:50	100	2	100	0.99	
15IMD010S05	D026-02	2.05	g	4/7/15 11:51	100	2	100	0.976	
15IMD010S06	D026-03	2.01	g	4/7/15 11:52	100	2	100	0.995	
15IMD010S07	D027-01	2.04	g	4/7/15 11:52	100	2	100	0.98	
15IMD010S08	D027-01M	2.07	g	4/7/15 11:53	100	2	100	0.966	✓
15IMD010S09	D027-01S	2.05	g	4/7/15 11:53	100	2	100	0.976	✓
15IMD010S10	LOQV	2	g	4/7/15 11:53	100	2	100	1	
15IMD010S11	LODV	2	g	4/7/15 11:53	100	2	100	1	
15IMD010S12	LODV-D	2	g	4/7/15 11:53	100	2	100	1	
15IMD010S13	MDLV-1	2	g	4/7/15 11:53	100	2	100	1	
15IMD010S14	MDLV-2	2	g	4/7/15 11:53	100	2	100	1	

SK 4/7/15

Vd=digestate volume

PrepFctr=(ExpAmt/Aliquot)*(Vd/ExpVd)

☑ Digestion Started @ 4/7/15 14:25

☑ Digestion Ended @ 4/7/15 16:05

Prepared By: SKusum

Checked By: [illegible]

Date 4/7/15

Comments:

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D027

METHOD SW7471A
MERCURY

One (1) soil sample was received on 04/03/15 to be analyzed for Mercury in accordance with Method SW7471A and project specific requirements.

Holding Time
The sample was analyzed within the prescribed holding time.

Calibration
Multi-calibration points were generated to establish initial calibration (ICAL). ICAL was verified using a secondary source (ICV). Continuing calibration (CCV) verifications were carried on a frequency specified by the project. All calibration requirements were within acceptance criteria.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, one (1) method blank was analyzed. Mercury was not detected in HGD005SB. Refer to sample result summary form for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, one (1) set of LCS/LCD was analyzed. Mercury was within LCS QC limits in HGD005SL/HGD005SC. Refer to LCS summary form for details.

Matrix QC Sample
No matrix QC sample was designated on this SDG.

Sample Analysis
The sample was analyzed according to prescribed analytical procedures. Results were evaluated in accordance to project requirements. For this SDG, all quality control requirements were met.

LAB CHRONICLE
MERCURY

Client : KLEINFELDER
Project : CTO 070, UX04, FALLBROOK

SDG NO. : 15D027
Instrument ID : TI047

SOIL

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1S	HGD005SB	1	NA	04/06/1517:15	04/06/1512:00	M47D005037	M47D005	HGD005S	Method Blank
LCS1S	HGD005SL	1	NA	04/06/1516:20	04/06/1512:00	M47D005012	M47D005	HGD005S	Lab Control Sample (LCS)
LCD1S	HGD005SC	1	NA	04/06/1516:22	04/06/1512:00	M47D005013	M47D005	HGD005S	LCS Duplicate
UX04-SB01-1.0	D027-01	1	9.5	04/06/1517:12	04/06/1512:00	M47D005036	M47D005	HGD005S	Field Sample

FN - Filename
% Moist - Percent Moisture

METHOD SW7471A
MERCURY

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK
Batch No. : 15D027

Matrix : SOIL
InstrumentID : 47

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (mg/Kg)	DIL'N FACTOR	MOIST (%)	LOQ (mg/Kg)	DL (mg/Kg)	LOD (mg/Kg)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1S	HGD005SB	ND	1	NA	0.1	0.01	0.02	04/06/1517:15	04/06/1512:00	M47D005037	M47D005	HGD005S	NA	NA
LCS1S	HGD005SL	0.474	1	NA	0.0998	0.00998	0.02	04/06/1516:20	04/06/1512:00	M47D005012	M47D005	HGD005S	NA	NA
LCD1S	HGD005SC	0.482	1	NA	0.1	0.01	0.02	04/06/1516:22	04/06/1512:00	M47D005013	M47D005	HGD005S	NA	NA
UXO4-SB01-1.0	D027-01	0.0171J	1	9.5	0.11	0.011	0.022	04/06/1517:12	04/06/1512:00	M47D005036	M47D005	HGD005S	04/02/1513:00	04/03/15

EMAX QUALITY CONTROL DATA
LAB CONTROL SAMPLE ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UXO4, FALLBROOK
BATCH NO. : 15D027
METHOD : SW7471A

MATRIX	SOIL		% MOISTURE: N/A
DILUTION FACTOR	1	1	1
SAMPLE ID	MBLK1S	LCS1S	LCD1S
LAB SAMPLE ID	HGD005SB	HGD005SL	HGD005SC
LAB FILE ID	M47D005037	M47D005012	M47D005013
DATE PREPARED	04/06/1512:00	04/06/1512:00	04/06/1512:00
DATE ANALYZED	04/06/1517:15	04/06/1516:20	04/06/1516:22
PREP BATCH	HGD005S	HGD005S	HGD005S
CALIBRATION REF	M47D005	M47D005	M47D005

ACCESSION:

PARAMETER	MB RESULT (mg/Kg)	SPIKE AMT (mg/Kg)	BS RESULT (mg/Kg)	BS REC (%)	SPIKE AMT (mg/Kg)	BSD RESULT (mg/Kg)	BSD REC (%)	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Mercury	ND	0.416	0.474	114	0.417	0.482	116	2	80-120	20

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
MERCURY

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Start Date: 4/6/15 **Start Time:** 15:49

End Date: 4/6/15 **End Time:** 17:20

Comments:

QC OK

Book #:	A47-096
Instrument No.:	47
Analytical Sequence/Batch:	M47D005
Method File:	HG1
Micropipette ID:	☐ ICP DOE-1
Micropipette ID:	☑ HG-03
Micropipette ID:	☑ HG-04
Micropipette ID:	☐

SOP #	Rev. #
☐ EMAX-7470	7
☑ EMAX-7471	7
☐ EMAX-245.1	3
☐ EMAX-	

STANDARDS ID	
S1	BLANK
S2	SM3B-11-97-02
S3	↓
S4	↓
S5	↓
S6	↓
CCV	↓
ICV	SM3B-11-97-03
LCS	↓
Analytical Spike	
	SM3B-11-97-04 TV 3ug/L

Analyzed By: HT

Date: 4/6/15

"M47D005"

EMAXlfid	EMAXlsid	conc	Raw_resp	rsd/rf	adatetime	DF
M47D005001	STD01REP1	0	4688		04/06/1515:49	1
M47D005002	STD02REP1	.2	29315		04/06/1515:51	1
M47D005003	STD03REP1	.5	67187		04/06/1515:53	1
M47D005004	STD04REP1	1	126105		04/06/1515:55	1
M47D005005	STD05REP1	2	247563		04/06/1515:57	1
M47D005006	STD06REP1	5	603116		04/06/1515:59	1
M47D005007	ICV	1.95	239058	0	04/06/1516:01	1
M47D005008	ICB	-.012	4881	0	04/06/1516:09	1
M47D005009	CCV1	1.99	244678	0	04/06/1516:14	1
M47D005010	CCB1	-.05	305	0	04/06/1516:16	1
M47D005011	HGD005SB	-.213	-19116	0	04/06/1516:18	1
M47D005012	HGD005SL	2.85	347234	0	04/06/1516:20	1
M47D005013	HGD005SC	2.89	352319	0	04/06/1516:22	1
M47D005014	D005-01A	3.47	421715	0	04/06/1516:24	1
M47D005015	D005-01	-.046	784	0	04/06/1516:26	1
M47D005016	D005-01J	-.094	-4936	0	04/06/1516:29	5
M47D005017	D005-01M	2.92	355703	0	04/06/1516:31	1
M47D005018	D005-01S	2.89	352263	0	04/06/1516:34	1
M47D005019	D005-02	-.047	641	0	04/06/1516:36	1
M47D005020	D005-03	.043	11484	0	04/06/1516:38	1
M47D005021	CCV2	2.35	287421	0	04/06/1516:40	1
M47D005022	CCB2	-.03	2719	0	04/06/1516:42	1
M47D005023	D005-04	.089	16928	0	04/06/1516:44	1
M47D005024	D005-05	.034	10384	0	04/06/1516:46	1
M47D005025	D005-06	.012	7671	0	04/06/1516:48	1
M47D005026	D005-07	-.02	3894	0	04/06/1516:51	1
M47D005027	D005-08	.011	7624	0	04/06/1516:53	1
M47D005028	D005-09	.047	11855	0	04/06/1516:55	1
M47D005029	D005-10	.111	19564	0	04/06/1516:57	1
M47D005030	D005-11	.069	14541	0	04/06/1516:59	1
M47D005031	D026-01	.076	15323	0	04/06/1517:02	1
M47D005032	D026-02	.036	10573	0	04/06/1517:04	1
M47D005033	CCV3	2.15	263429	0	04/06/1517:06	1
M47D005034	CCB3	-.037	1884	0	04/06/1517:08	1
M47D005035	D026-03	.002	6573	0	04/06/1517:10	1
M47D005036	D027-01	.093	17380	0	04/06/1517:12	1
M47D005037	HGD005SB	-.04	1559	0	04/06/1517:15	1
M47D005038	CCV4	2.06	252243	0	04/06/1517:17	1
M47D005039	CCB4	-.062	-1140	0	04/06/1517:20	1
**********	**********	**********	**********	**********	**********	***
EMAXlfid	EMAXlsid	Xint	Yint	rrf	adatetime	DF
M47D005001	BLANK	-5.270866E-02	6301.794	.9999797	04/06/1517:20	1

M47D005

cup	sample ID	extended ID	weight	volume	? A D F P S U SC UI US C1..7
1	ICV		1.0000	1.0000	
2	ICB		1.0000	1.0000	
3	CCV1		1.0000	1.0000	
4	CCB1		1.0000	1.0000	
5	HGD005SB		1.0000	1.0000	
6	HGD005SL		1.0000	1.0000	
7	HGD005SC		1.0000	1.0000	
8	D005-01A		1.0000	1.0000	
9	D005-01		1.0000	1.0000	
10	D005-01J		1.0000	1.0000	
11	D005-01M		1.0000	1.0000	
12	D005-01S		1.0000	1.0000	
13	D005-02		1.0000	1.0000	
14	D005-03		1.0000	1.0000	
15	CCV2		1.0000	1.0000	
16	CCB2		1.0000	1.0000	
17	D005-04		1.0000	1.0000	
18	D005-05		1.0000	1.0000	
19	D005-06		1.0000	1.0000	
20	D005-07		1.0000	1.0000	
21	D005-08		1.0000	1.0000	
22	D005-09		1.0000	1.0000	
23	D005-10		1.0000	1.0000	
24	D005-11		1.0000	1.0000	
25	D026-01		1.0000	1.0000	
26	D026-02		1.0000	1.0000	
27	CCV3		1.0000	1.0000	
28	CCB3		1.0000	1.0000	
29	D026-03		1.0000	1.0000	
30	D027-01		1.0000	1.0000	
31	HGD005SB		1.0000	1.0000	
32	CCV4		1.0000	1.0000	
33	CCB4		1.0000	1.0000	
34			1.0000	1.0000	
35			1.0000	1.0000	
36			1.0000	1.0000	
37			1.0000	1.0000	
38			1.0000	1.0000	
39			1.0000	1.0000	
40			1.0000	1.0000	
41			1.0000	1.0000	
42			1.0000	1.0000	
43			1.0000	1.0000	
44			1.0000	1.0000	

NT 4/6/15

WinHg Database 1.3

File Utility Help

RN⇩ RN⇧ ?

Protocol HG1 Dataset/Proto M47D005 /HG1

Protocol | Line info | Cal Curve | Report | Ctrl Chart | Viewer

Reset

Calib Coeffs

New Cal

Update Coeffs

Spike Coeffs

A

B 8.36373e-6

C -5.26477e-2

Rho .999980

Type Linear

☑ Calibrated

☑ Accepted

Accept

Rel. Abs.
603116

Accepted

New

Include S1 Rep 1 ☑ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Conc. 5.00

S	Conc.	Calc.	Dev.	Mean	SD or %RSD	Rep 1	Rep 2	Rep 3
01	.00000	-.013	-.013	4688	1	4688		
02	.20000	.193	-.007	29316	0%	29315		
03	.50000	.509	.009	67187	0%	67187		
04	1.0000	1.00	.002	126105	0%	126105		
05	2.0000	2.02	.018	247563	0%	247563		
06	5.0000	4.99	-.008	603116	0%	603116		

Ready CAP NUM

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Standard: 1 Rep: 1				Seq: 1	15:49:02 06 Apr 15	HG		
Hg	.000	ug/l	4688					
*** Standard: 2 Rep: 1				Seq: 2	15:51:02 06 Apr 15	HG		
Hg	.200	ug/l	29315					
*** Standard: 3 Rep: 1				Seq: 3	15:53:03 06 Apr 15	HG		
Hg	.500	ug/l	67187					
*** Standard: 4 Rep: 1				Seq: 4	15:55:26 06 Apr 15	HG		
Hg	1.00	ug/l	126105					
*** Standard: 5 Rep: 1				Seq: 5	15:57:25 06 Apr 15	HG		
Hg	2.00	ug/l	247563					
*** Standard: 6 Rep: 1				Seq: 6	15:59:26 06 Apr 15	HG		
Hg	5.00	ug/l	603116					
*** Sample ID: ICV				Seq: 7	16:01:45 06 Apr 15	HG		
Hg	1.95	ug/l	239058					
*** Sample ID: ICB				Seq: 8	16:09:16 06 Apr 15	HG		
Hg	-.012	ug/l	4881					
*** Sample ID: CCV1				Seq: 9	16:14:16 06 Apr 15	HG		
Hg	1.99	ug/l	244678					
*** Sample ID: CCB1				Seq: 10	16:16:14 06 Apr 15	HG		
Hg	-.050	ug/l	305					
*** Sample ID: HGD005SB				Seq: 11	16:18:26 06 Apr 15	HG		
Hg	-.213	ug/l	-19116					
*** Sample ID: HGD005SL				Seq: 12	16:20:46 06 Apr 15	HG		
Hg	2.85	ug/l	347234					
*** Sample ID: HGD005SC				Seq: 13	16:22:45 06 Apr 15	HG		
Hg	2.89	ug/l	352319					
*** Sample ID: D005-01A				Seq: 14	16:24:44 06 Apr 15	HG		
Hg	3.47	ug/l	421715					
*** Sample ID: D005-01				Seq: 15	16:26:54 06 Apr 15	HG		
Hg	-.046	ug/l	784					

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: D005-01J				Seq:	16	16:29:17 06 Apr 15		HG
Hg	-.094	ug/l	-4936					
*** Sample ID: D005-01M				Seq:	17	16:31:47 06 Apr 15		HG
Hg	2.92	ug/l	355703					
*** Sample ID: D005-01S				Seq:	18	16:34:01 06 Apr 15		HG
Hg	2.89	ug/l	352263					
*** Sample ID: D005-02				Seq:	19	16:36:24 06 Apr 15		HG
Hg	-.047	ug/l	641					
*** Sample ID: D005-03				Seq:	20	16:38:45 06 Apr 15		HG
Hg	.043	ug/l	11484					
*** Sample ID: CCV2				Seq:	21	16:40:45 06 Apr 15		HG
Hg	2.35	ug/l	287421					
*** Sample ID: CCB2				Seq:	22	16:42:44 06 Apr 15		HG
Hg	-.030	ug/l	2719					
*** Sample ID: D005-04				Seq:	23	16:44:58 06 Apr 15		HG
Hg	.089	ug/l	16928					
*** Sample ID: D005-05				Seq:	24	16:46:57 06 Apr 15		HG
Hg	.034	ug/l	10384					
*** Sample ID: D005-06				Seq:	25	16:48:57 06 Apr 15		HG
Hg	.012	ug/l	7671					
*** Sample ID: D005-07				Seq:	26	16:51:03 06 Apr 15		HG
Hg	-.020	ug/l	3894					
*** Sample ID: D005-08				Seq:	27	16:53:01 06 Apr 15		HG
Hg	.011	ug/l	7624					
*** Sample ID: D005-09				Seq:	28	16:55:10 06 Apr 15		HG
Hg	.047	ug/l	11855					
*** Sample ID: D005-10				Seq:	29	16:57:20 06 Apr 15		HG
Hg	.111	ug/l	19564					
*** Sample ID: D005-11				Seq:	30	16:59:33 06 Apr 15		HG
Hg	.069	ug/l	14541					

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: D026-01				Seq:	31	17:02:22 06 Apr 15		HG
Hg	.076	ug/l	15323					
*** Sample ID: D026-02				Seq:	32	17:04:23 06 Apr 15		HG
Hg	.036	ug/l	10573					
*** Sample ID: CCV3				Seq:	33	17:06:23 06 Apr 15		HG
Hg	2.15	ug/l	263429					
*** Sample ID: CCB3				Seq:	34	17:08:24 06 Apr 15		HG
Hg	-.037	ug/l	1884					
*** Sample ID: D026-03				Seq:	35	17:10:28 06 Apr 15		HG
Hg	.002	ug/l	6573					
*** Sample ID: D027-01				Seq:	36	17:12:33 06 Apr 15		HG
Hg	.093	ug/l	17380					
*** Sample ID: HGD005SB				Seq:	37	17:15:53 06 Apr 15		HG
Hg	-.040	ug/l	1559					
*** Sample ID: CCV4				Seq:	38	17:17:59 06 Apr 15		HG
Hg	2.06	ug/l	252243					
*** Sample ID: CCB4				Seq:	39	17:20:11 06 Apr 15		HG
Hg	-.062	ug/l	-1140					

EMAX LABORATORIES, INC.

DIGESTION LOG *for* MERCURY

Note: For samples, relevant QCs/Standards digested, refer to attached digestion sequence.

Comments:

Digestion Vessel Lot #: 19414007

Book #: E47-097

Batch No.: HGD0055

Matrix: Soil

SOP #	Rev. #
☐ EMAX-7470	7
☑ EMAX-7471	7
☐ EMAX-245.1	3
☐ EMAX-	

Standards	ID	Conc. (µg/L)	Amount Added (ml)
ICAL	SM3B-11-97-02	100	0.2, 0.5, 1, 2, 5
CCV	↓	↓	2
ICV	SM3B-11-97-03	↓	2
LCS/MS	↓	↓	2.5

Reagent	ID / Lot #
HNO_3 / aqua regia	SW1A-005-08-14
HCl	SW1A-005-08-04
H_2SO_4	N/A
$KMnO_4$	SM5B-03-54-01
$K_2S_2O_8$	N/A
$NH_2OH \cdot HCl$	SM5B-03-53-02
$SnCl_2$	SM5B-03-52-04
Silica Sand	SW1B-002-43-08
Reagent Water	SM5A-03-01-24
pH strip 0-14	N/A

Digestor ID/ Temp (°C): A / 94.7

Thermometer ID/LOC: 11124112J / A8

Thermometer ID/LOC: N/A

Pipette ID: ICP DOE-1, HG-03, HG-04

☐ H_2SO_4 dispenser checked @ 2.5 ml with Class A graduated cylinder

☑ HCl dispenser checked @ 30 ml with Class A graduated cylinder

☑ HNO_3 dispenser checked @ 10 ml with Class A graduated cylinder

Prepared By: NT

Standard Added By: NT Witnessed By: CW

7072

EMAX LABORATORIES INC

DIGESTION LOG FOR MERCURY

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Vd(ml)	ExpAmt	ExpVd(ml)	PrepFctr	Comments
15HGD005S01	HGD005SB	0.6	g	4/6/15 10:59	100	0.6	100	1	
15HGD005S02	HGD005SL	0.601	g	4/6/15 11:01	100	0.6	100	0.998	
15HGD005S03	HGD005SC	0.6	g	4/6/15 11:01	100	0.6	100	1	
15HGD005S04	D005-01	0.607	g	4/6/15 11:02	100	0.6	100	0.988	
15HGD005S05	D005-01M	0.602	g	4/6/15 11:02	100	0.6	100	0.997	
15HGD005S06	D005-01S	0.6	g	4/6/15 11:02	100	0.6	100	1	
15HGD005S07	D005-02	0.609	g	4/6/15 11:03	100	0.6	100	0.985	
15HGD005S08	D005-03	0.606	g	4/6/15 11:04	100	0.6	100	0.99	
15HGD005S09	D005-04	0.601	g	4/6/15 11:04	100	0.6	100	0.998	
15HGD005S10	D005-05	0.602	g	4/6/15 11:05	100	0.6	100	0.997	
15HGD005S11	D005-06	0.608	g	4/6/15 11:06	100	0.6	100	0.987	
15HGD005S12	D005-07	0.602	g	4/6/15 11:06	100	0.6	100	0.997	
15HGD005S13	D005-08	0.608	g	4/6/15 11:07	100	0.6	100	0.987	
15HGD005S14	D005-09	0.601	g	4/6/15 11:08	100	0.6	100	0.998	
15HGD005S15	D005-10	0.608	g	4/6/15 11:08	100	0.6	100	0.987	
15HGD005S16	D005-11	0.601	g	4/6/15 11:09	100	0.6	100	0.998	
15HGD005S17	D026-01	0.604	g	4/6/15 11:09	100	0.6	100	0.993	
15HGD005S18	D026-02	0.604	g	4/6/15 11:10	100	0.6	100	0.993	
15HGD005S19	D026-03	0.601	g	4/6/15 11:11	100	0.6	100	0.998	
15HGD005S20	D027-01	0.602	g	4/6/15 11:12	100	0.6	100	0.997	
15HGD005S21	S-0/CCB/ICB	0.6	g	4/6/15 11:13	100	0.6	100	1	
15HGD005S22	S-0.2	0.6	g	4/6/15 11:13	100	0.6	100	1	
15HGD005S23	S-0.5	0.6	g	4/6/15 11:13	100	0.6	100	1	
15HGD005S24	S-1	0.6	g	4/6/15 11:13	100	0.6	100	1	
15HGD005S25	S-2/CCV	0.6	g	4/6/15 11:13	100	0.6	100	1	
15HGD005S26	S-5	0.6	g	4/6/15 11:13	100	0.6	100	1	
15HGD005S27	ICV	0.6	g	4/6/15 11:13	100	0.6	100	1	
15HGD005S28	PS SOIL	0.6	g	4/6/15 11:13	100	0.6	100	1	

NT
4/6/15

Balance ID: 10601202. Calibration check was verified prior to use.

Vd=digestate volume

PrepFctr=(ExpAmt/Aliquot)*(Vd/ExpVd)

☑ Digestion Started @ 4/6/15 12:00

Prepared By: NTan

☑ Digestion Ended @ 4/6/15 13:00

Checked By: NT

Comments:

Date 4/6/15

SOP EMAX-7471 Rev. 7

LABORATORY REPORT FOR

KLEINFELDER

CTO 070, UXO4, FALLBROOK

WET CHEMICAL ANALYSES

SDG#: 15D027

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D027

METHOD 6850
PERCHLORATE

One (1) soil sample was received on 04/03/15 to be analyzed for Perchlorate in accordance with Method 6850 and project specific requirements.

Holding Time
The sample was analyzed within the prescribed holding time.

Calibration
Calibration was performed as prescribed by the method and was verified using a secondary source (ICV). All calibration requirements were within acceptance criteria.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, one (1) method blank was analyzed. Perchlorate was not detected in PLD003SB. Refer to sample result summary form for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, one (1) set of LCS/LCD was analyzed. Perchlorate was within LCS QC limits in PLD003SL/PLD003SC. Refer to LCS summary form for details.

Matrix QC Sample
No matrix QC sample was designated on this SDG.

Sample Analysis
The sample was analyzed according to prescribed analytical procedures. Results were evaluated in accordance to project requirements. For this SDG, all quality control requirements were met.

SAMPLE RESULTS

METHOD 6850
PERCHLORATE

Client : KLEINFELDER
Project : CTO 070, UX04, FALLBROOK
Batch No. : 15D027

Matrix : SOIL
InstrumentID : G0

Client SAMPLE ID	EMAX SAMPLE ID	RESULT (ug/kg)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1S	PLD003SB	ND	1	NA	4	0.5	2	04/08/1512:30	04/07/1511:09	15MD08007	MD08006	15PLD003S	NA	NA
LCS1S	PLD003SL	3.92J	1	NA	4	0.5	2	04/08/1512:45	04/07/1511:09	15MD08008	MD08006	15PLD003S	NA	NA
LCD1S	PLD003SC	3.98J	1	NA	4	0.5	2	04/08/1512:59	04/07/1511:09	15MD08009	MD08006	15PLD003S	NA	NA
UX04-SB01-1.0	D027-01	ND	1	9.5	4.42	0.552	2.21	04/08/1514:45	04/07/1511:09	15MD08016	MD08014	15PLD003S	04/02/1513:00	04/03/15

Method 6850
EMAX Laboratories
Instrument # G0

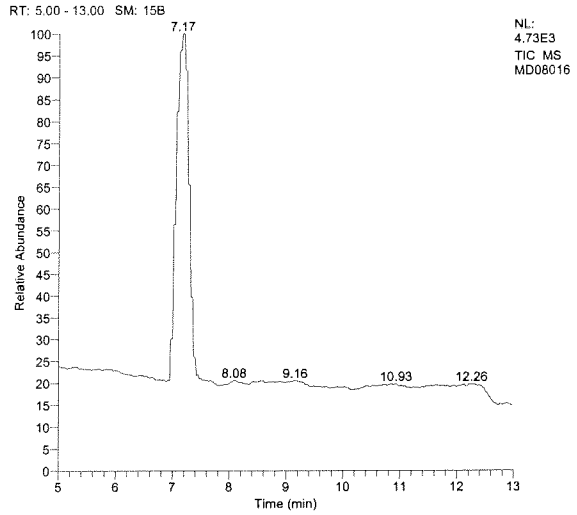
Sample Summary

EMAX Lab ID:	D027-01
Lab File ID:	MD08016
Acquisition Date:	04/08/15 02:45:46 PM
Data Path:	C:\XCALIBUR\DATA\MD08
Instrument Method:	C:\Xcalibur\methods\PLG0D01.meth
Operator:	CDam

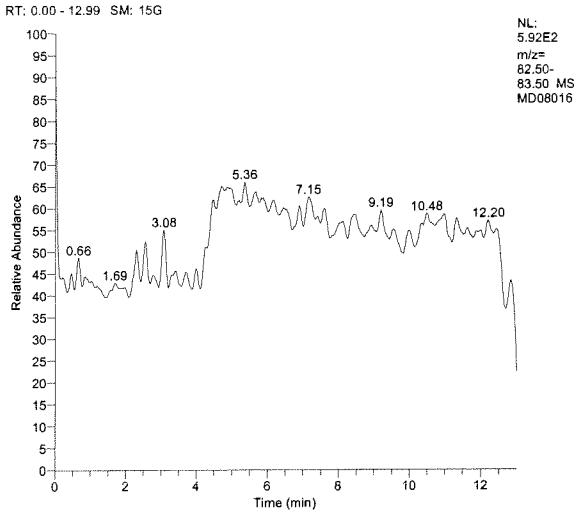
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB7
Injection Volume(ul):	20.00
Run Time(min):	12.99

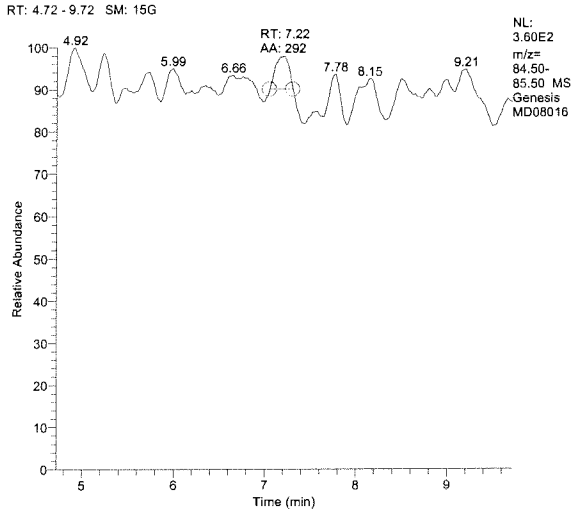
TIC



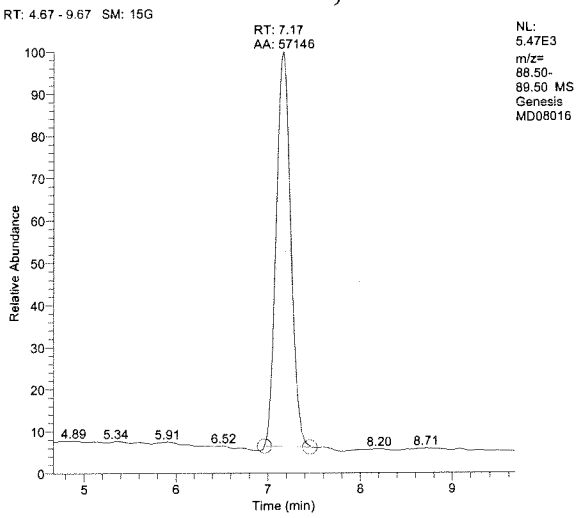
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	7.22	292	0.000	0.024	ppb	4.15
Perchlorate_89_ISTD	7.17	57146	2.000	N/A	ppb	295.84

83/85 Ratio: N/a
(Control Limit: +/-30%)

QC SUMMARIES

EMAX QUALITY CONTROL DATA
LAB CONTROL SAMPLE ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UXO4, FALLBROOK
BATCH NO. : 15D027
METHOD : 6850

MATRIX : SOIL % MOISTURE: NA

DILUTION FACTOR:	1	1	1
SAMPLE ID :	MBLK1S	LCS1S	LCD1S
LAB SAMPLE ID :	PLD003SB	PLD003SL	PLD003SC
LAB FILE ID :	15MD08007	15MD08008	15MD08009
DATE PREPARED :	04/07/1511:09	04/07/1511:09	04/07/1511:09
DATE ANALYZED :	04/08/1512:30	04/08/1512:45	04/08/1512:59
PREP BATCH :	15PLD003S	15PLD003S	15PLD003S
CALIBRATION REF:	MD08006	MD08006	MD08006

ACCESSION:

PARAMETER	MB RESULT (ug/kg)	SPIKE AMT (ug/kg)	BS RESULT (ug/kg)	BS REC (%)	SPIKE AMT (ug/kg)	BSD RESULT (ug/kg)	BSD REC (%)	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Perchlorate	ND	4	3.92	98	4	3.98	100	2	80-120	15

QC DATA

Method 6850
EMAX Laboratories
Instrument # G0

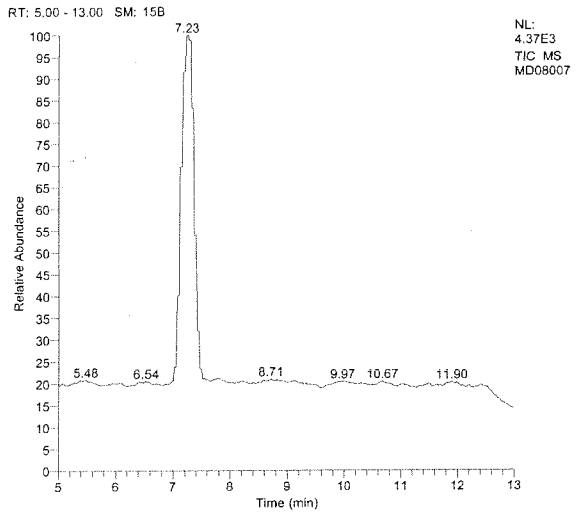
Sample Summary

EMAX Lab ID:	PLD003SB
Lab File ID:	MD08007
Acquisition Date:	04/08/15 12:30:32 PM
Data Path:	C:\XCALIBUR\DATA\MD08
Instrument Method:	C:\Xcalibur\methods\PLG0D01.meth
Operator:	CDam

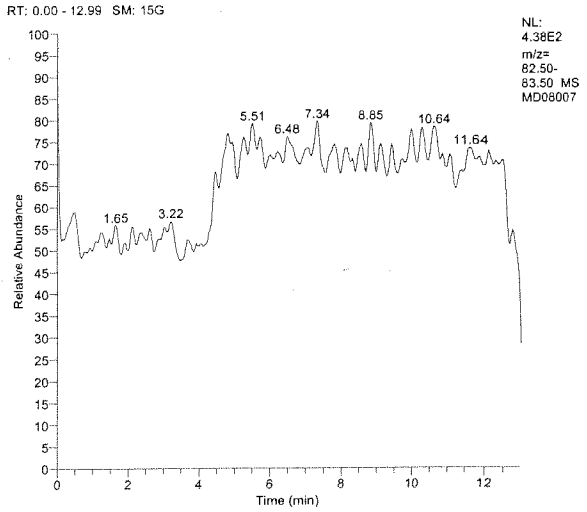
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA7
Injection Volume(ul):	20.00
Run Time(min):	12.99

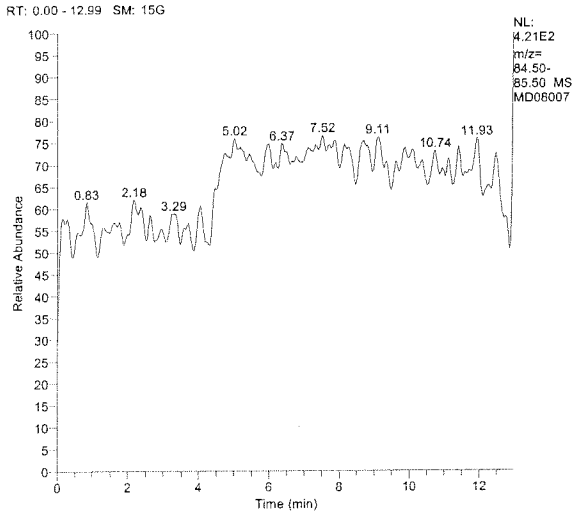
TIC



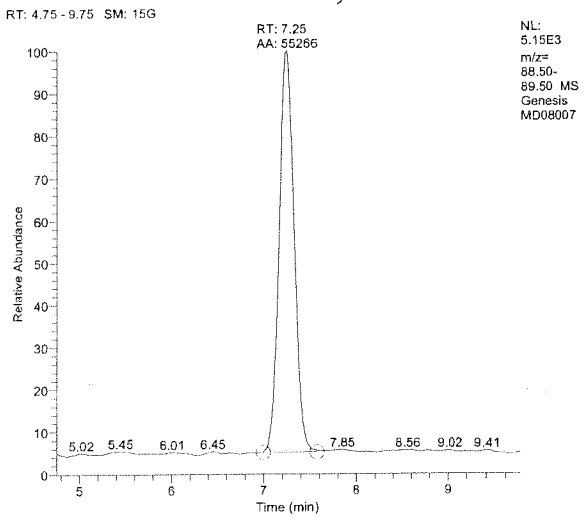
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_89_ISTD	7.25	55266	2.000	N/A	ppb	682.23

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

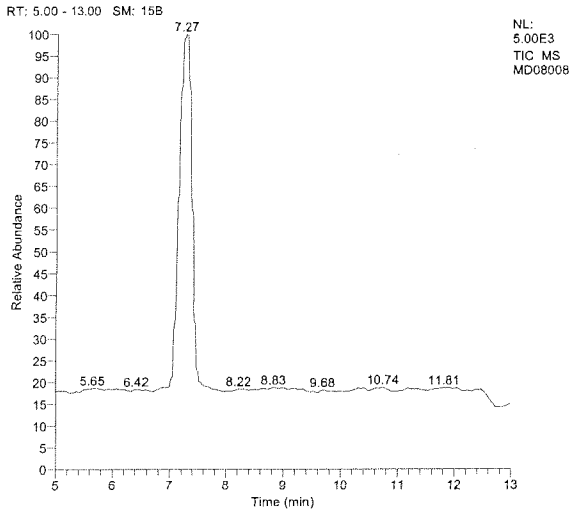
Sample Summary

EMAX Lab ID:	PLD003SL
Lab File ID:	MD08008
Acquisition Date:	04/08/15 12:45:04 PM
Data Path:	C:\XCALIBUR\DATA\MD08
Instrument Method:	C:\Xcalibur\methods\PLG0D01.meth
Operator:	CDam

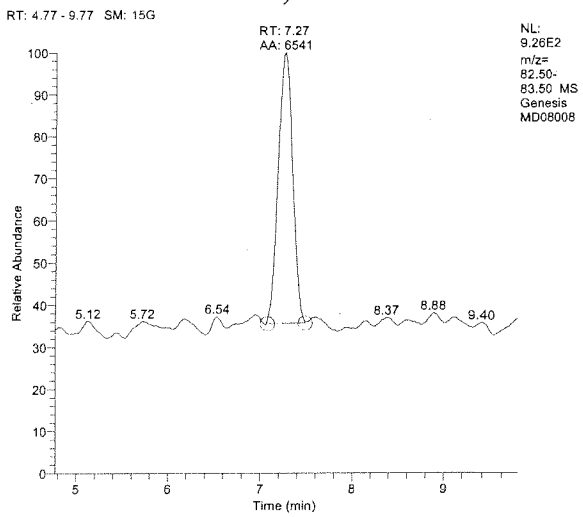
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA8
Injection Volume(ul):	20.00
Run Time(min):	12.99

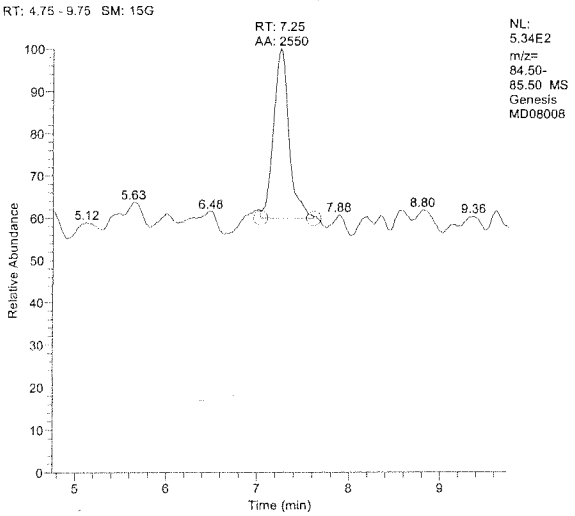
TIC



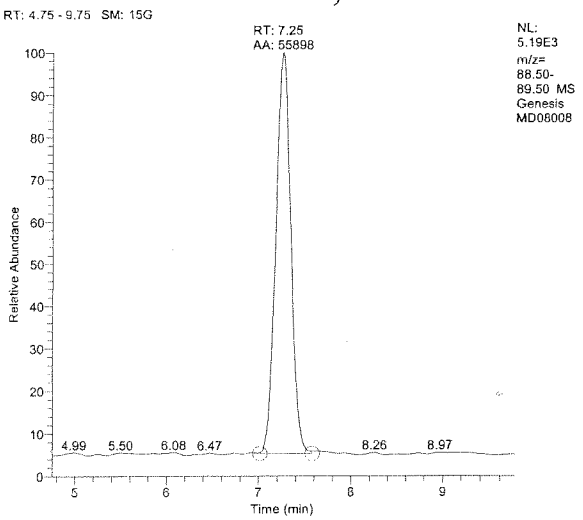
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.27	6541	0.000	0.196	ppb	61.95
Perchlorate_85	7.25	2550	0.000	0.213	ppb	25.75
Perchlorate_89_ISTD	7.25	55898	2.000	N/A	ppb	621.46

83/85 Ratio: 2.56

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

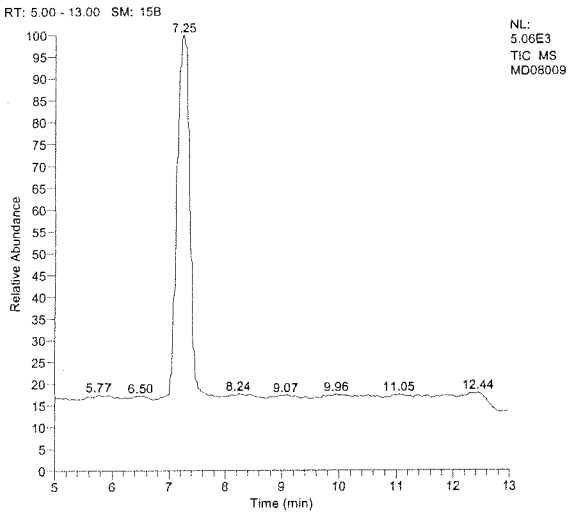
Sample Summary

EMAX Lab ID:	PLD003SC
Lab File ID:	MD08009
Acquisition Date:	04/08/15 12:59:36 PM
Data Path:	C:\XCALIBUR\DATA\MD08
Instrument Method:	C:\Xcalibur\methods\PLG0D01.meth
Operator:	CDam

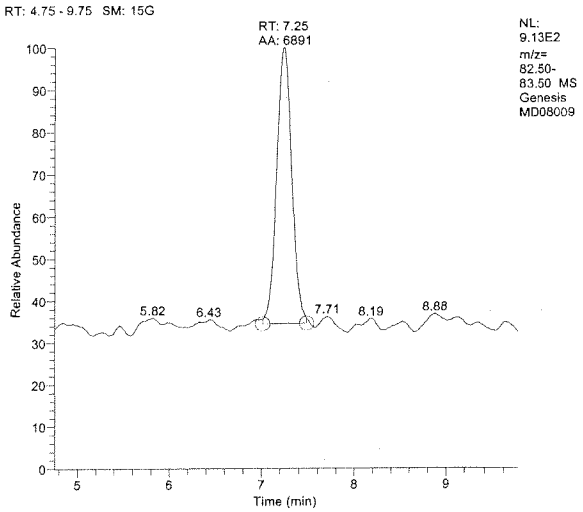
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB1
Injection Volume(ul):	20.00
Run Time(min):	12.99

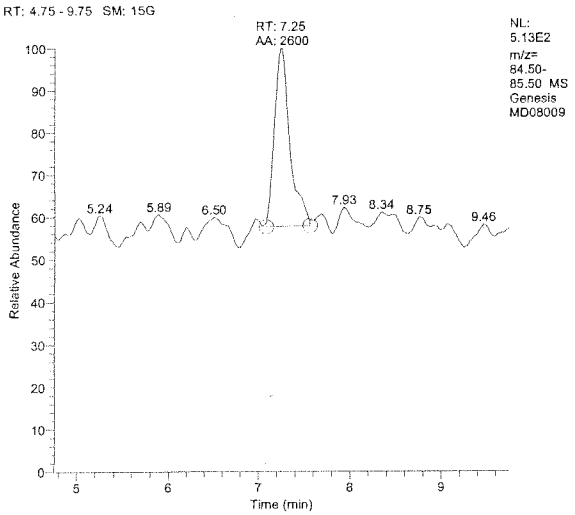
TIC



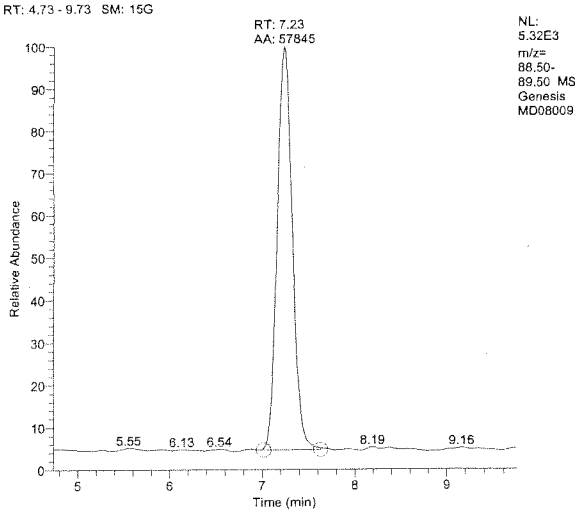
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.25	6891	0.000	0.199	ppb	60.23
Perchlorate_85	7.25	2600	0.000	0.210	ppb	21.97
Perchlorate_89_ISTD	7.23	57845	2.000	N/A	ppb	470.32

83/85 Ratio: 2.65

(Control Limit: +/-30%)

INITIAL CALIBRATION(S)

Component : Perchlorate_83
Method/CalSet : PLG0D01/MD01(2015)

LFID	LSID	S	Dilf	RT	Area	SpkAmt	Con	Units	ISTDArea	83/85	Cntrl Lim	Anl DateTime	%Rec
MD01001	IBG0D011	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.34-3.90	04/01/15 19:37	
MD01002	BLANK(IS)	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.34-3.90	04/01/15 19:52	
MD01003	PLG0D01001	P	1.000	7.10	2117	0.100	0.107	ppb	36926	2.6	2.34-3.90	04/01/15 20:07	107
MD01004	PLG0D01002	P	1.000	7.10	4630	0.200	0.207	ppb	37277	2.8	2.34-3.90	04/01/15 20:21	103
MD01005	PLG0D01003	P	1.000	7.13	11638	0.500	0.476	ppb	38172	3.0	2.34-3.90	04/01/15 20:36	95
MD01006	PLG0D01004	P	1.000	7.13	23705	1.000	0.926	ppb	39105	2.9	2.34-3.90	04/01/15 20:50	93
MD01007	PLG0D01005	P	1.000	7.11	52439	2.000	2.040	ppb	38765	3.1	2.34-3.90	04/01/15 21:05	102
MD01008	PLG0D01006	P	1.000	7.13	125076	5.000	4.926	ppb	38069	3.1	2.34-3.90	04/01/15 21:19	99
MD01009	PLG0D01007	*	1.000	7.13	181132	7.500	7.618	ppb	35590	3.2	2.34-3.90	04/01/15 21:34	102
MD01010	IPLG0D01001	P	1.000	7.13	49040	0.000	1.900	ppb	38971	3.1	2.34-3.90	04/01/15 21:49	
MD01011	LOQ-01	P	1.000	7.11	4415	0.000	0.188	ppb	39531	2.6	2.34-3.90	04/01/15 22:03	
MD01012	IPCS	P	1.000	6.89	5236	0.000	0.233	ppb	36935	3.1	2.34-3.90	04/01/15 22:18	

83/85 Ratio +/-25%

LFID	LSID	S	Dilf	RT	Area	SpkAmt	Con	Units	ISTDArea	83/85	Cntrl Lim	Anl DateTime	%Rec
MD01001	IBG0D011	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.18-4.06	04/01/15 19:37	
MD01002	BLANK(IS)	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.18-4.06	04/01/15 19:52	
MD01003	PLG0D01001	P	1.000	7.10	2117	0.100	0.107	ppb	36926	2.6	2.18-4.06	04/01/15 20:07	107
MD01004	PLG0D01002	P	1.000	7.10	4630	0.200	0.207	ppb	37277	2.8	2.18-4.06	04/01/15 20:21	103
MD01005	PLG0D01003	P	1.000	7.13	11638	0.500	0.476	ppb	38172	3.0	2.18-4.06	04/01/15 20:36	95
MD01006	PLG0D01004	P	1.000	7.13	23705	1.000	0.926	ppb	39105	2.9	2.18-4.06	04/01/15 20:50	93
MD01007	PLG0D01005	P	1.000	7.11	52439	2.000	2.040	ppb	38765	3.1	2.18-4.06	04/01/15 21:05	102
MD01008	PLG0D01006	P	1.000	7.13	125076	5.000	4.926	ppb	38069	3.1	2.18-4.06	04/01/15 21:19	99
MD01009	PLG0D01007	*	1.000	7.13	181132	7.500	7.618	ppb	35590	3.2	2.18-4.06	04/01/15 21:34	102
MD01010	IPLG0D01001	P	1.000	7.13	49040	0.000	1.900	ppb	38971	3.1	2.18-4.06	04/01/15 21:49	
MD01011	LOQ-01	P	1.000	7.11	4415	0.000	0.188	ppb	39531	2.6	2.18-4.06	04/01/15 22:03	
MD01012	IPCS	P	1.000	6.89	5236	0.000	0.233	ppb	36935	3.1	2.18-4.06	04/01/15 22:18	

83/85 Ratio +/-30%
IS(ICV) +/-50% (19485-58456)

AS 04/03/15

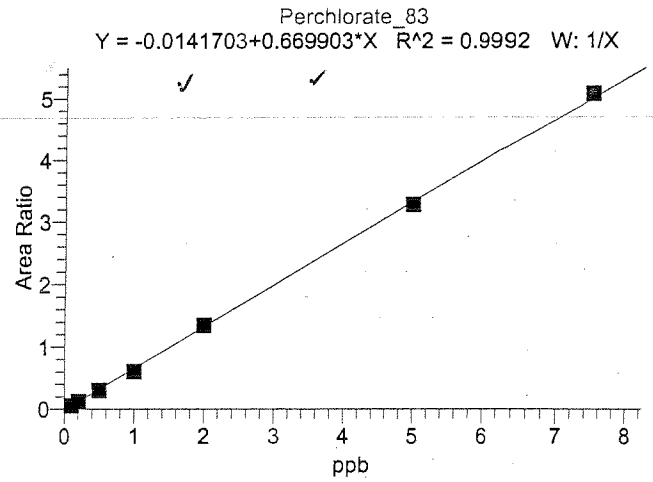
Calibration Summary

Identification

Component Name:	Perchlorate_83
Detector Type:	MS
Operator:	None
Expected RT (min):	6.70
Window (sec):	60.00000

Genesis Peak Integration

Smoothing Points:	15
S/N Threshold:	1.00
Valley Detection:	Enabled
Expected Peak Width (sec):	5.00000
Constrain Peak Width:	No
Peak Height (%):	N/A
Tailing Factor:	N/A
Identify By:	Highest Peak
Minimum Peak Height (S/N):	3.00
Ion Ratio Confirmation:	Yes
Window %:	Absolute
Qualifier Ion Coelution (min):	0.100



QC Level	Amount
2 PPB	2.000

Cal Level	Amount
0.1 ppb	0.100
0.2 ppb	0.200
0.5 ppb	0.500
1 ppb	1.000
2 ppb	2.000
5 ppb	5.000
7.5 ppb	7.500

Sample ID	Data File Name	Area	ISTD Area	Area Ratio	Calculated Amount	% Diff	% RSD	Calibration Flags
PLG0D01001	MD01003	2117 ✓	36926 ✓	0.057	0.107	6.75	0.000	N/A
PLG0D01002	MD01004	4630 ✓	37277 ✓	0.124	0.207	3.28	0.000	N/A
PLG0D01003	MD01005	11638 ✓	38172 ✓	0.305	0.476	-4.74	0.000	N/A
PLG0D01004	MD01006	23705 ✓	39105 ✓	0.606	0.926	-7.40	0.000	N/A
PLG0D01005	MD01007	52439 ✓	38765 ✓	1.353	2.040	2.02	0.000	N/A
PLG0D01006	MD01008	125076 ✓	38069 ✓	3.285	4.926	-1.49	0.000	N/A
PLG0D01007	MD01009	181132 ✓	35590 ✓	5.089	7.618	1.58	0.000	N/A
IPLG0D01001	MD01010	49040 ✓	38971 ✓	1.258	1.900	N/A	N/A	N/A

AS
04/03/15

There is no signature data to report.

8013

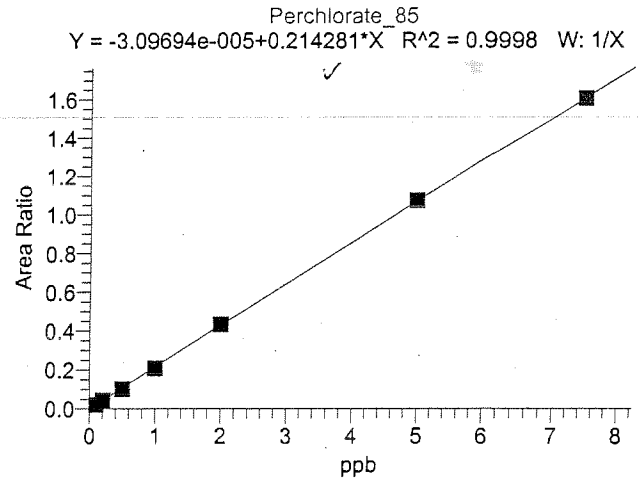
Calibration Summary

Identification

Component Name:	Perchlorate_85
Detector Type:	MS
Operator:	None
Expected RT (min):	6.70
Window (sec):	60.00000

Genesis Peak Integration

Smoothing Points:	15
S/N Threshold:	0.50
Valley Detection:	Enabled
Expected Peak Width (sec):	5.00000
Constrain Peak Width:	No
Peak Height (%):	N/A
Tailing Factor:	N/A
Identify By:	Highest Peak
Minimum Peak Height (S/N):	1.00
Ion Ratio Confirmation:	No
Window %:	N/A
Qualifier Ion Coelution (min):	N/A



QC Level	Amount
2 PPB	2.000

Cal Level	Amount
0.1 ppb	0.100
0.2 ppb	0.200
0.5 ppb	0.500
1 ppb	1.000
2 ppb	2.000
5 ppb	5.000
7.5 ppb	7.500

Sample ID	Data File Name	Area	ISTD Area	Area Ratio	Calculated Amount	% Diff	% RSD	Calibration Flags
PLG0D01001	MD01003	808	36926	0.022	0.102	2.23	0.000	N/A
PLG0D01002	MD01004	1652	37277	0.044	0.207	3.48	0.000	N/A
PLG0D01003	MD01005	3900	38172	0.102	0.477	-4.61	0.000	N/A
PLG0D01004	MD01006	8156	39105	0.209	0.973	-2.65	0.000	N/A
PLG0D01005	MD01007	16814	38765	0.434	2.024	1.21	0.000	N/A
PLG0D01006	MD01008	40940	38069	1.075	5.019	0.38	0.000	N/A
PLG0D01007	MD01009	57176	35590	1.606	7.497	-0.04	0.000	N/A
IPLG0D01001	MD01010	15945	38971	0.409	1.910	N/A	N/A	N/A

DA
04/03/15

There is no signature data to report.

8014

Method 6850
EMAX Laboratories
Instrument # G0

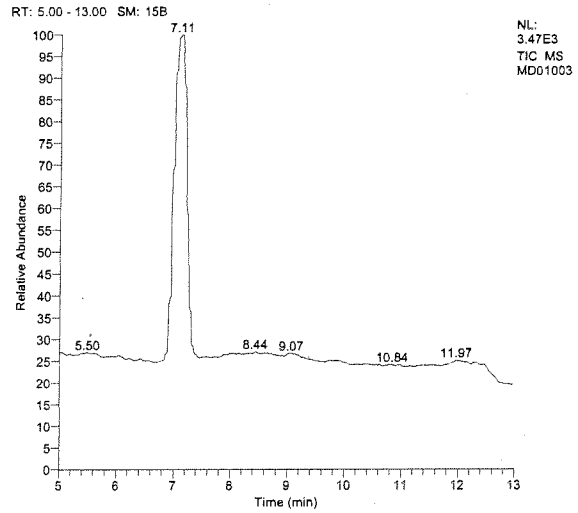
Sample Summary

EMAX Lab ID:	PLG0D01001
Lab File ID:	MD01003
Acquisition Date:	04/01/15 08:07:11 PM
Data Path:	C:\XCALIBUR\DATA\MD01
Instrument Method:	C:\Xcalibur\methods\PLG0D01
Operator:	CDam

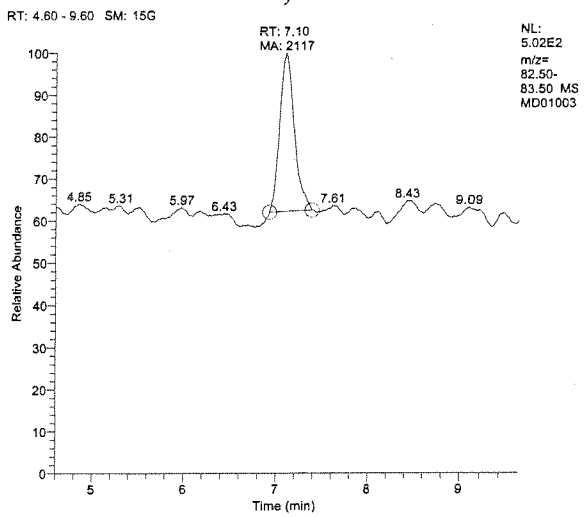
Run Parameters

Sample Type:	Std Clear
Calibration Level:	0.1 ppb
Vial:	RA3
Injection Volume(ul):	20.00
Run Time(min):	12.99

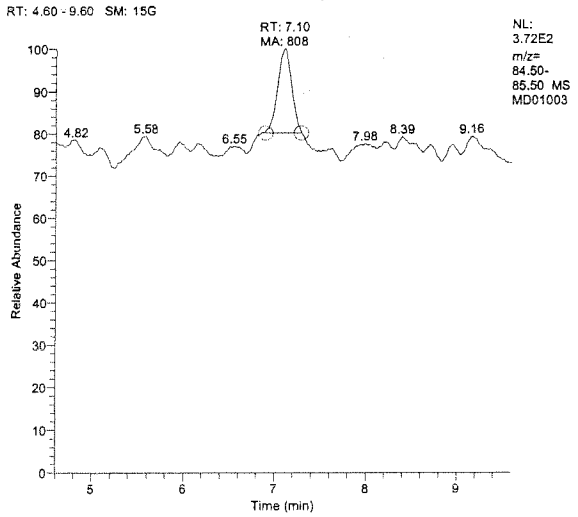
TIC



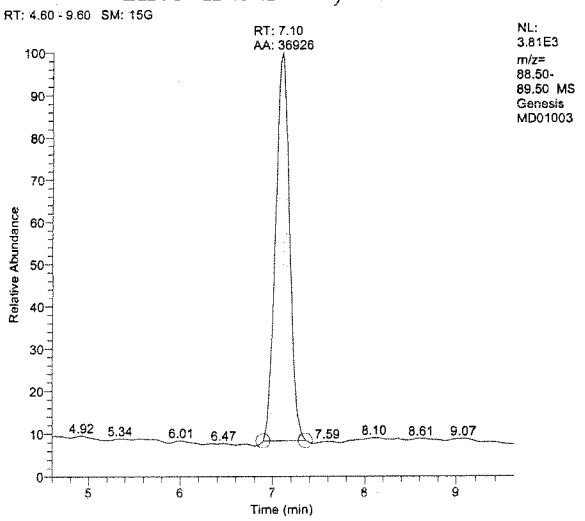
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AA 04/03/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.10	2117 ✓	0.100	0.107 ✓	ppb	28.90
Perchlorate_85	7.10	808	0.100	0.102 ✓	ppb	23.28
Perchlorate_89_ISTD	7.10	36926 ✓	2.000	N/A	ppb	203.10

83/85 Ratio: 2.62 ✓
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

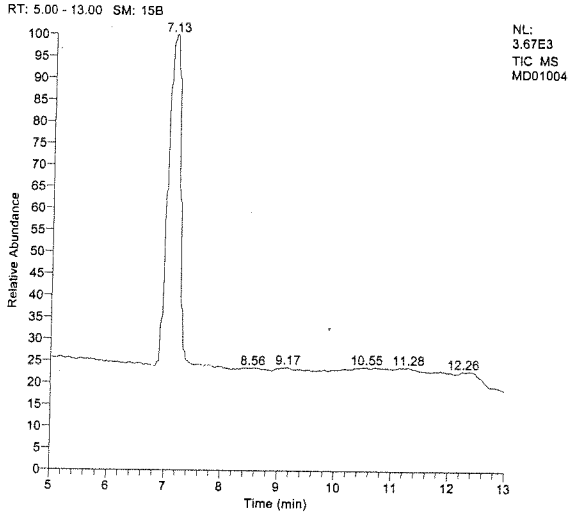
Sample Summary

EMAX Lab ID:	PLG0D01002
Lab File ID:	MD01004
Acquisition Date:	04/01/15 08:21:49 PM
Data Path:	C:\XCALIBUR\DATA\MD01
Instrument Method:	C:\Xcalibur\methods\PLG0D01
Operator:	CDam

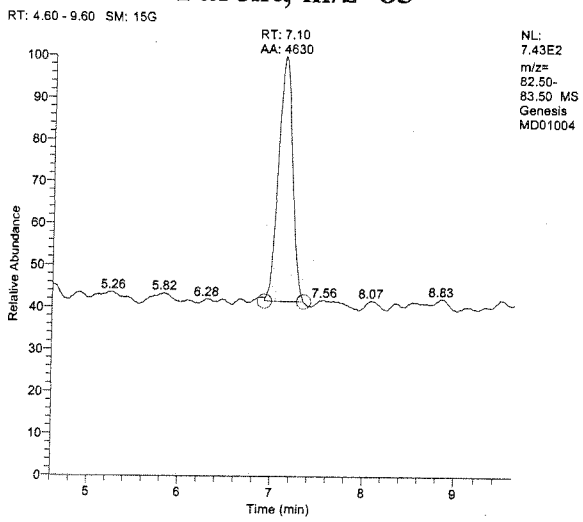
Run Parameters

Sample Type:	Std Update
Calibration Level:	0.2 ppb
Vial:	RA4
Injection Volume(ul):	20.00
Run Time(min):	12.99

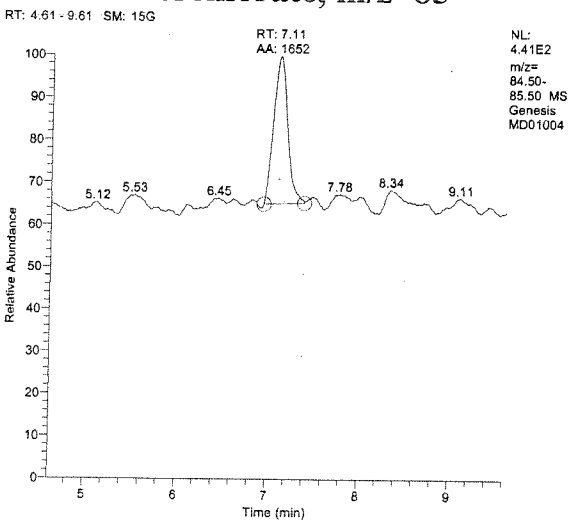
TIC



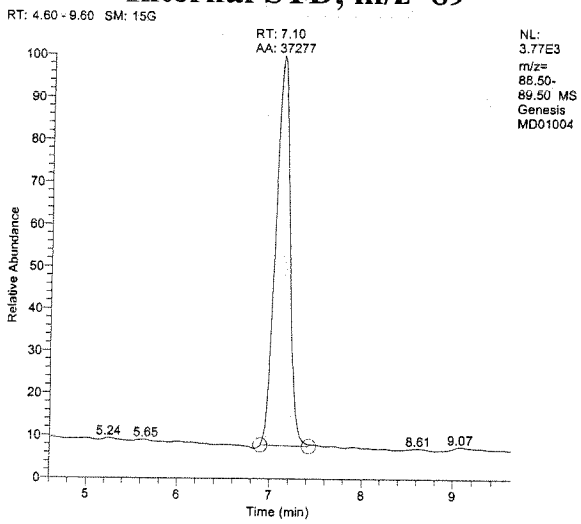
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AS 04/03/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.10	4630 ✓	0.200	0.207 ✓	ppb	92.86
Perchlorate_85	7.11	1652 ✓	0.200	0.207 ✓	ppb	25.81
Perchlorate_89_ISTD	7.10	37277 ✓	2.000	N/A	ppb	591.46

83/85 Ratio: 2.80 ✓

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

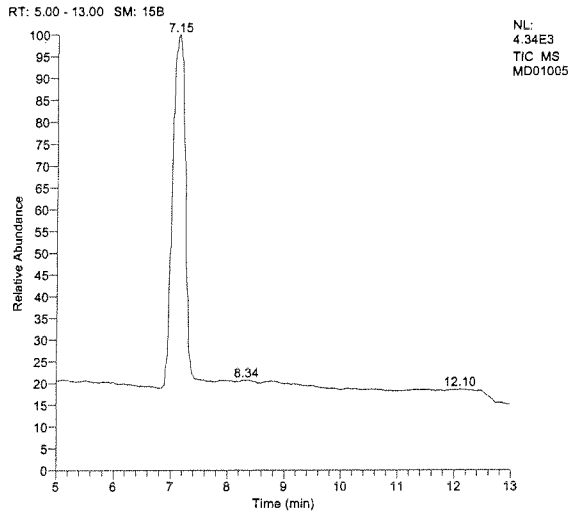
Sample Summary

EMAX Lab ID:	PLG0D01003
Lab File ID:	MD01005
Acquisition Date:	04/01/15 08:36:21 PM
Data Path:	C:\XCALIBUR\DATA\MD01
Instrument Method:	C:\Xcalibur\methods\PLG0D01
Operator:	CDam

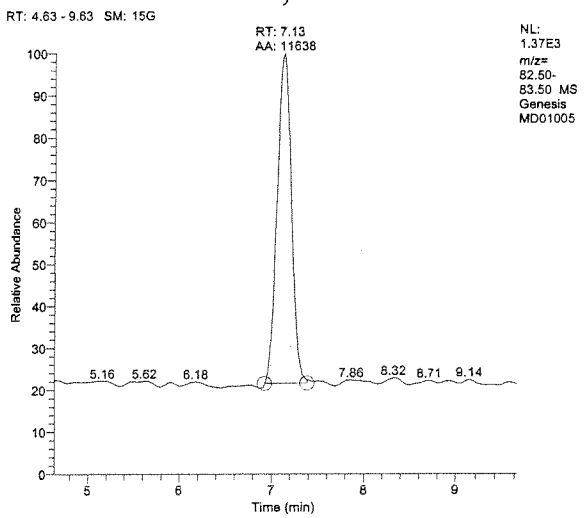
Run Parameters

Sample Type:	Std Update
Calibration Level:	0.5 ppb
Vial:	RA5
Injection Volume(ul):	20.00
Run Time(min):	12.99

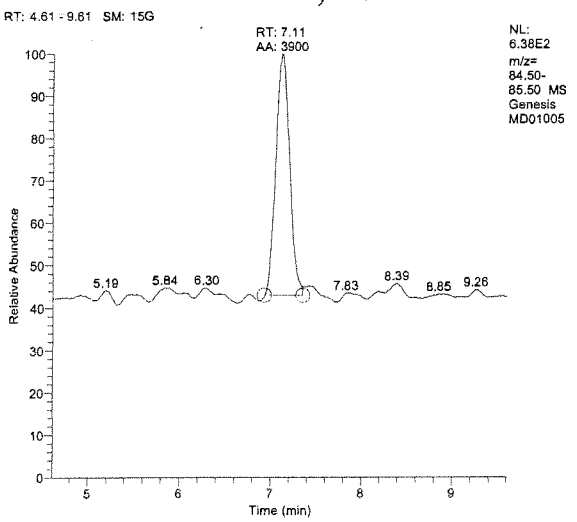
TIC



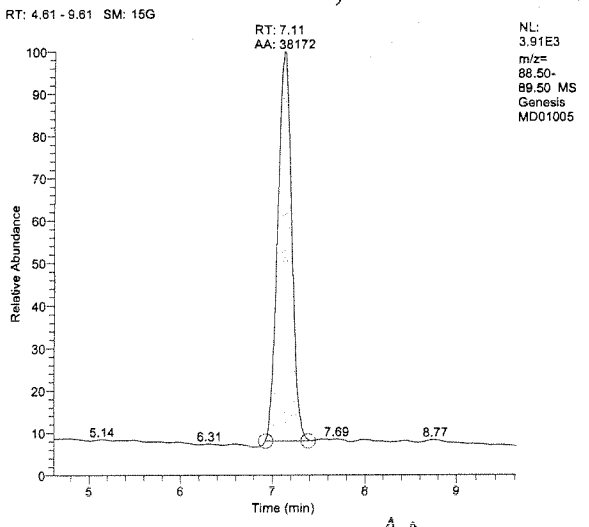
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AJ 04/03/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.13	11638	0.500	0.476	ppb	157.21
Perchlorate_85	7.11	3900	0.500	0.477	ppb	79.40
Perchlorate_89_ISTD	7.11	38172	2.000	N/A	ppb	249.61

83/85 Ratio: 2.98

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

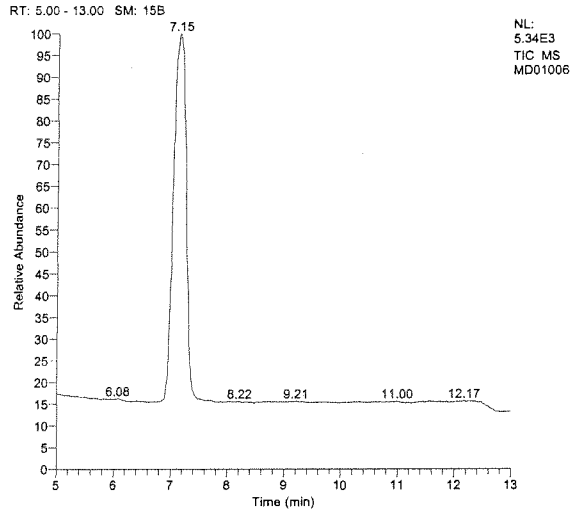
Sample Summary

EMAX Lab ID:	PLG0D01004
Lab File ID:	MD01006
Acquisition Date:	04/01/15 08:50:53 PM
Data Path:	C:\XCALIBUR\DATA\MD01
Instrument Method:	C:\Xcalibur\methods\PLG0D01
Operator:	CDam

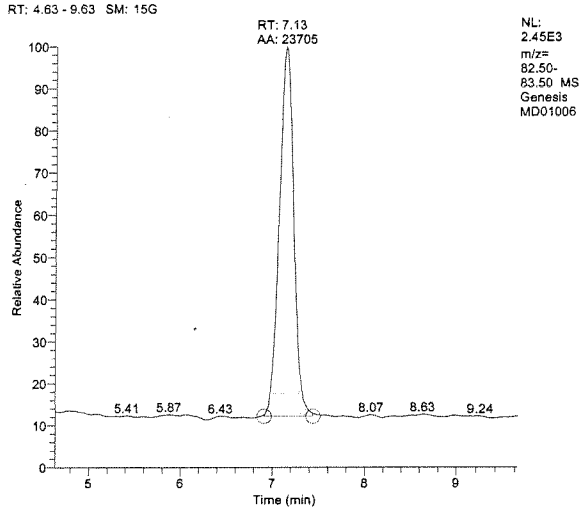
Run Parameters

Sample Type:	Std Update
Calibration Level:	1 ppb
Vial:	RA6
Injection Volume(ul):	20.00
Run Time(min):	12.99

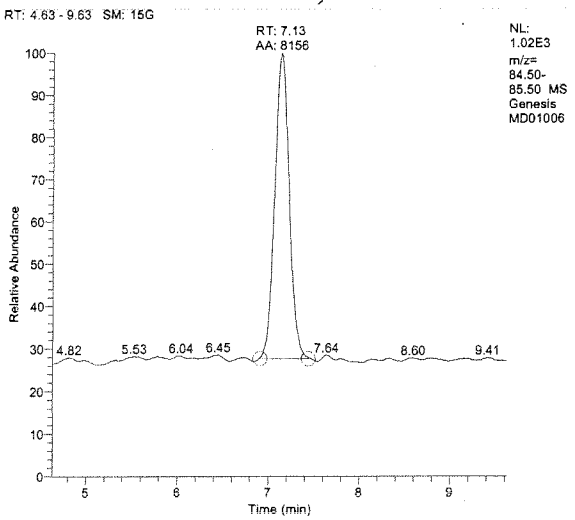
TIC



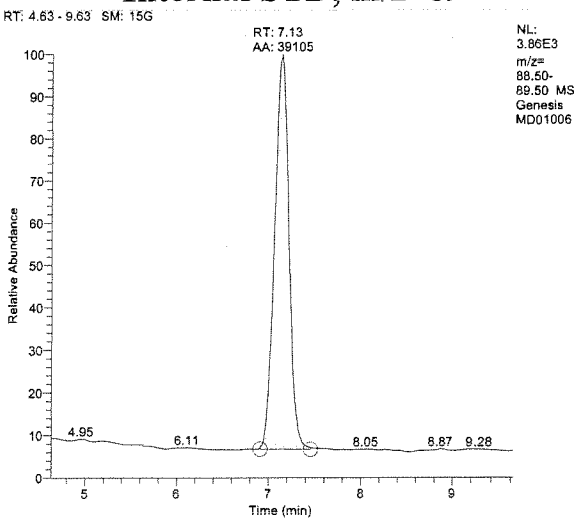
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AS 04/03/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.13	23705	1.000	0.926	ppb	395.11
Perchlorate_85	7.13	8156	1.000	0.973	ppb	217.90
Perchlorate_89_ISTD	7.13	39105	2.000	N/A	ppb	391.19

83/85 Ratio: 2.91 ✓
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

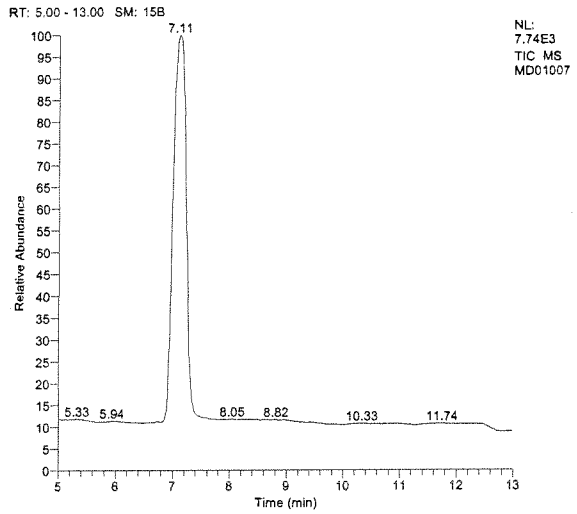
Sample Summary

EMAX Lab ID:	PLG0D01005
Lab File ID:	MD01007
Acquisition Date:	04/01/15 09:05:25 PM
Data Path:	C:\XCALIBUR\DATA\MD01
Instrument Method:	C:\Xcalibur\methods\PLG0D01
Operator:	CDam

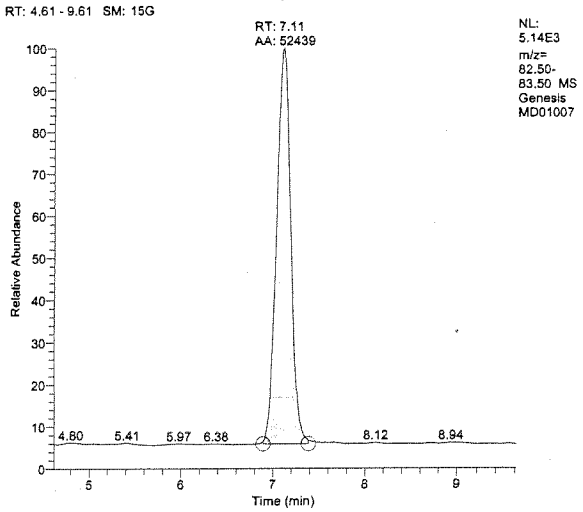
Run Parameters

Sample Type:	Std Update
Calibration Level:	2 ppb
Vial:	RA7
Injection Volume(ul):	20.00
Run Time(min):	12.99

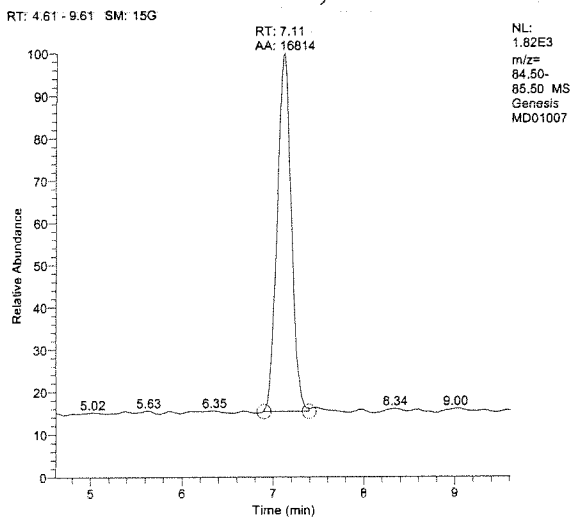
TIC



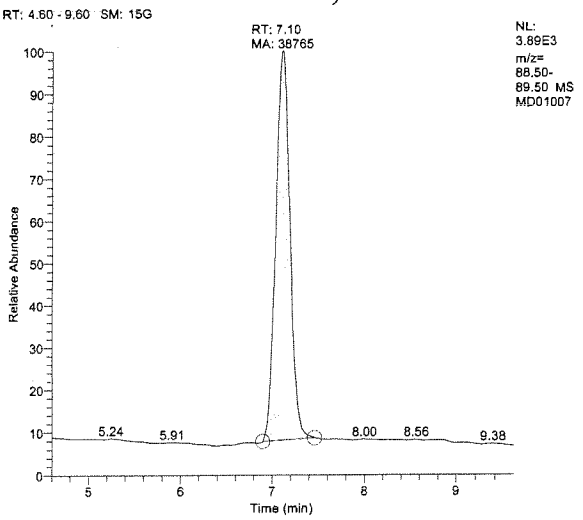
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



RS 04/03/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.11	52439 ✓	2.000	2.040 ✓	ppb	1049.05
Perchlorate_85	7.11	16814 ✓	2.000	2.024 ✓	ppb	397.25
Perchlorate_89_ISTD	7.10	38765 ✓	2.000	N/A	ppb	222.46

83/85 Ratio: 3.12 ✓

(Control Limit: +/-30%)

±25%: (2.34 – 3.90)

±30%: (2.18 – 4.06)

Method 6850
EMAX Laboratories
Instrument # G0

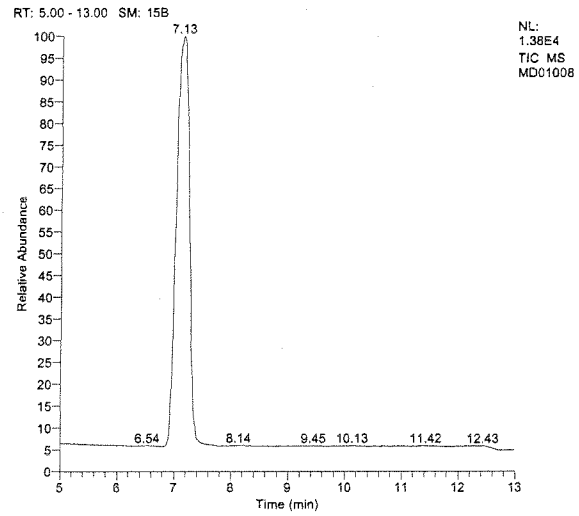
Sample Summary

EMAX Lab ID:	PLG0D01006
Lab File ID:	MD01008
Acquisition Date:	04/01/15 09:19:57 PM
Data Path:	C:\XCALIBUR\DATA\MD01
Instrument Method:	C:\Xcalibur\methods\PLG0D01
Operator:	CDam

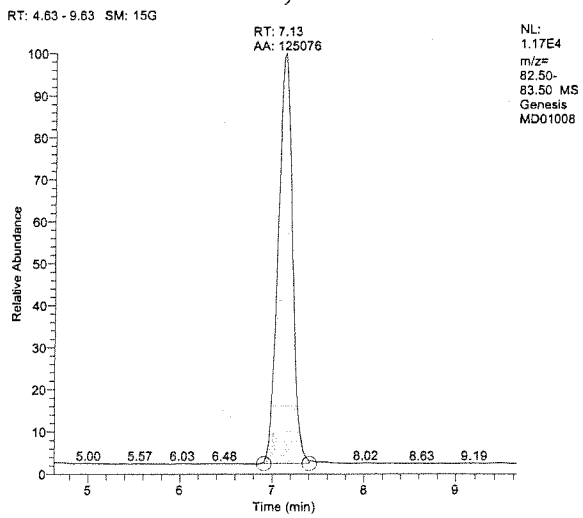
Run Parameters

Sample Type:	Std Update
Calibration Level:	5 ppb
Vial:	RA8
Injection Volume(ul):	20.00
Run Time(min):	12.99

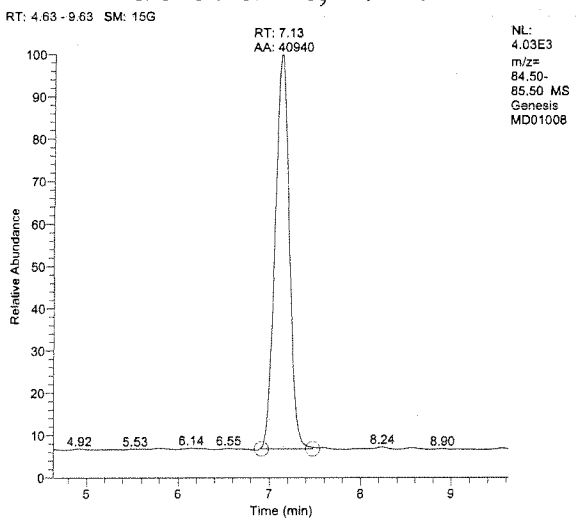
TIC



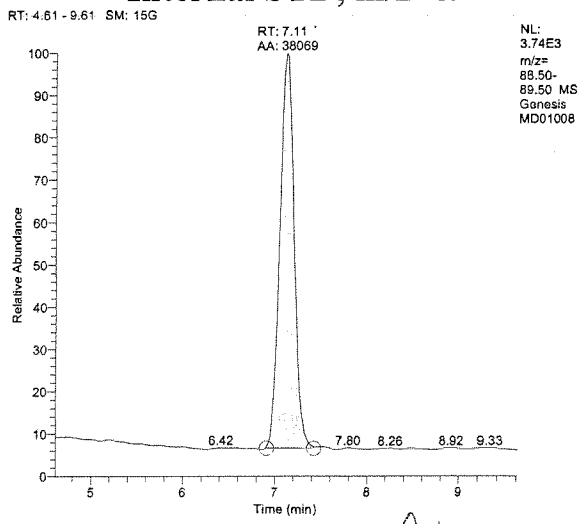
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AS 04/03/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.13	125076 ✓	5.000	4.926 ✓	ppb	2953.60
Perchlorate_85	7.13	40940 ✓	5.000	5.019 ✓	ppb	1012.58
Perchlorate_89_ISTD	7.11	38069 ✓	2.000	N/A	ppb	500.76

83/85 Ratio: 3.05 ✓
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

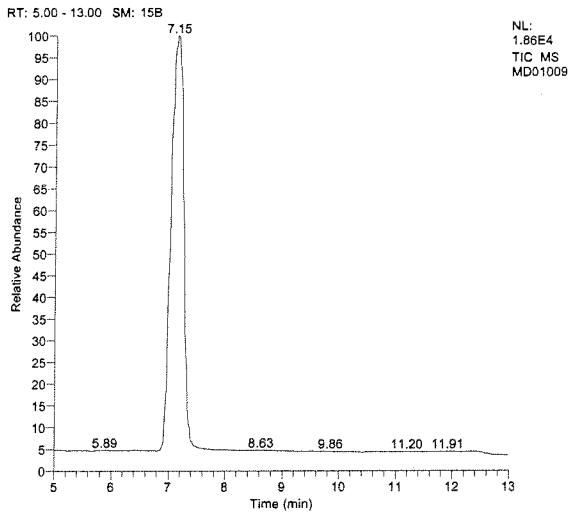
Sample Summary

EMAX Lab ID:	PLG0D01007
Lab File ID:	MD01009
Acquisition Date:	04/01/15 09:34:29 PM
Data Path:	C:\XCALIBUR\DATA\MD01
Instrument Method:	C:\Xcalibur\methods\PLG0D01
Operator:	CDam

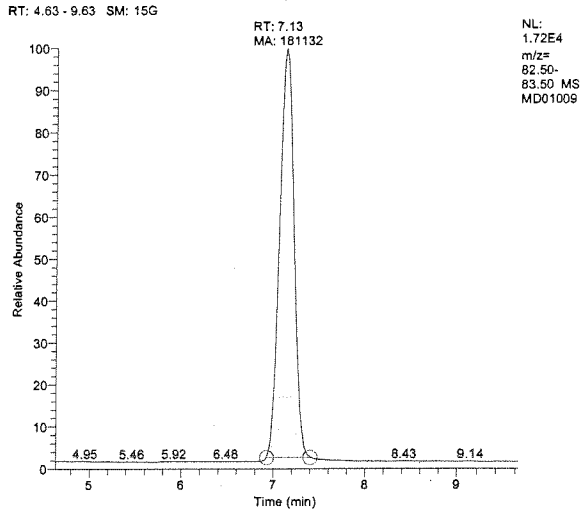
Run Parameters

Sample Type:	Std Update
Calibration Level:	7.5 ppb
Vial:	RB1
Injection Volume(ul):	20.00
Run Time(min):	12.99

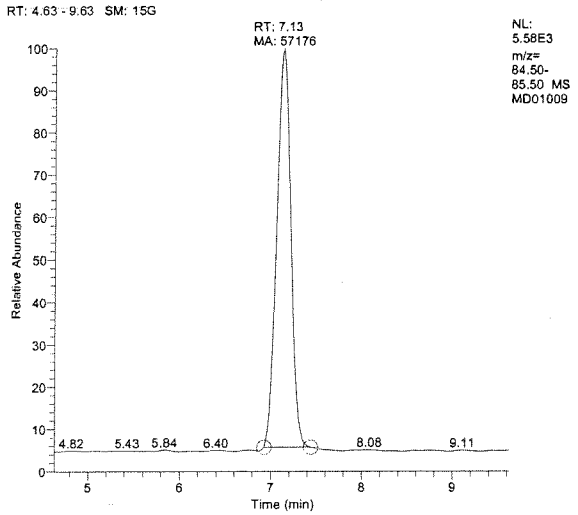
TIC



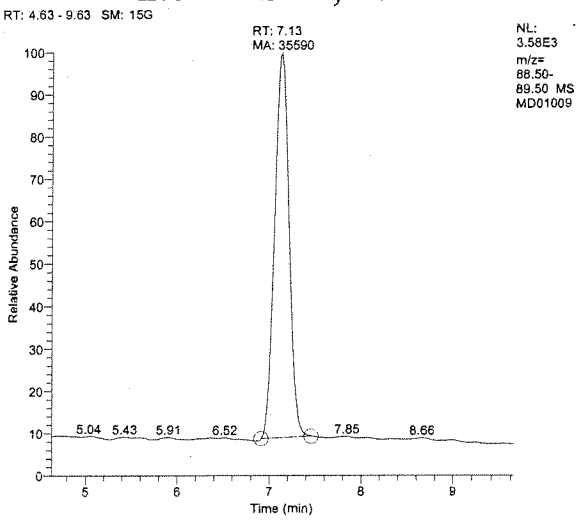
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AJ 04/03/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.13	181132 ✓	7.500	7.618 ✓	ppb	3654.03
Perchlorate_85	7.13	57176 ✓	7.500	7.497 ✓	ppb	941.49
Perchlorate_89_ISTD	7.13	35590 ✓	2.000	N/A	ppb	384.15

83/85 Ratio: 3.17 ✓
(Control Limit: +/-30%)

SECOND SOURCE VERIFICATION

Method 6850
EMAX Laboratories
Instrument # G0

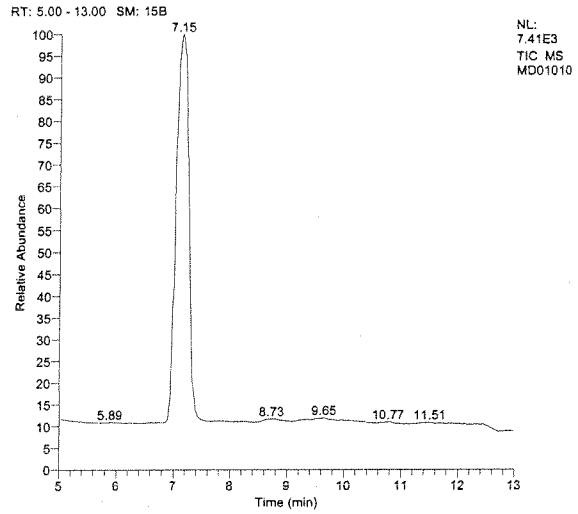
Sample Summary

EMAX Lab ID:	IPLG0D01001
Lab File ID:	MD01010
Acquisition Date:	04/01/15 09:49:01 PM
Data Path:	C:\XCALIBUR\DATA\MD01
Instrument Method:	C:\Xcalibur\methods\PLG0D01
Operator:	CDam

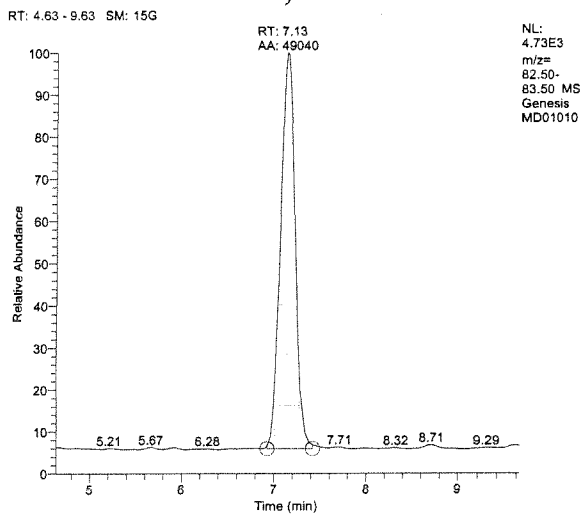
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB2
Injection Volume(ul):	20.00
Run Time(min):	12.99

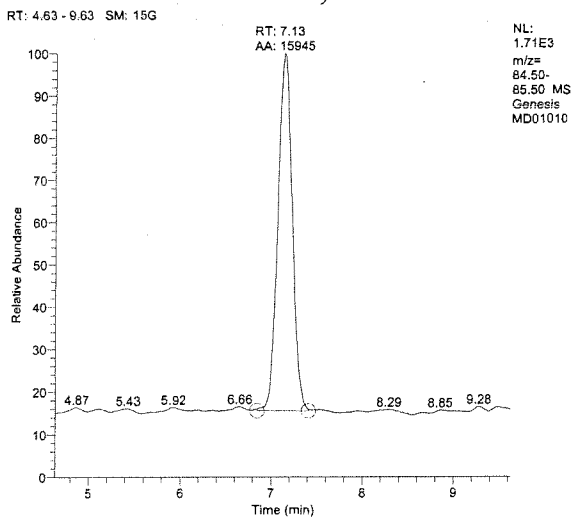
TIC



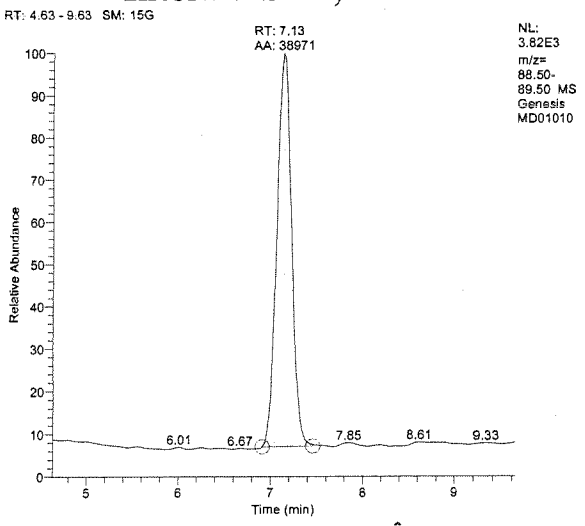
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AA 04/03/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.13	49040 ✓	0.000	1.900 ✓	ppb	1455.74
Perchlorate_85	7.13	15945 ✓	0.000	1.910 ✓	ppb	356.01
Perchlorate_89_ISTD	7.13	38971 ✓	2.000	N/A	ppb	282.67

83/85 Ratio: 3.08 ✓
(Control Limit: +/-30%)

IS (ICV) ±50%: (19,485 - 58,456)

Method 6850
EMAX Laboratories
Instrument # G0

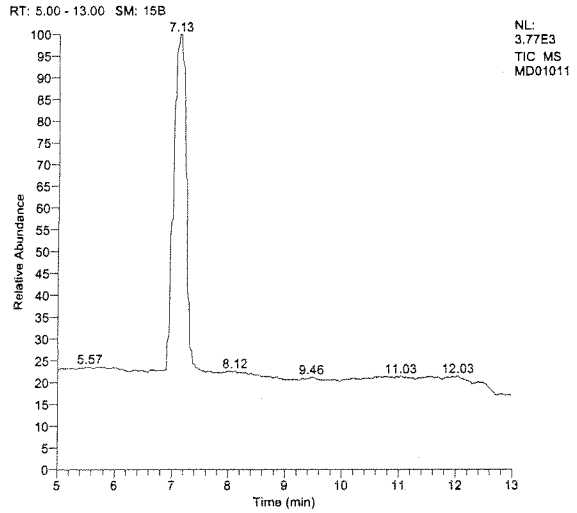
Sample Summary

EMAX Lab ID:	LOQ-01 0.2PPB
Lab File ID:	MD01011
Acquisition Date:	04/01/15 10:03:33 PM
Data Path:	C:\XCALIBUR\DATA\MD01
Instrument Method:	C:\Xcalibur\methods\PLG0D01
Operator:	CDam

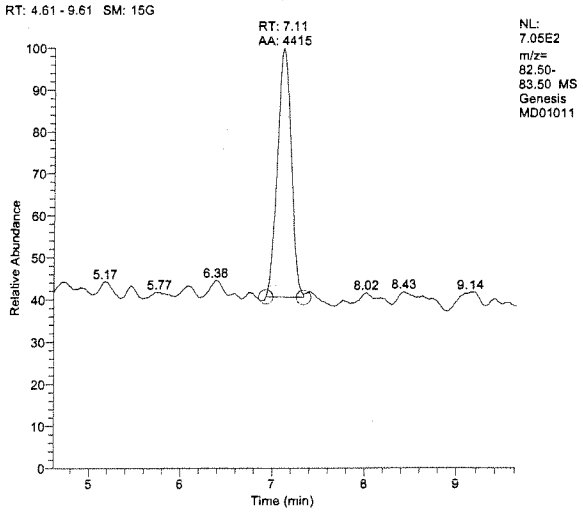
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB3
Injection Volume(ul):	20.00
Run Time(min):	12.99

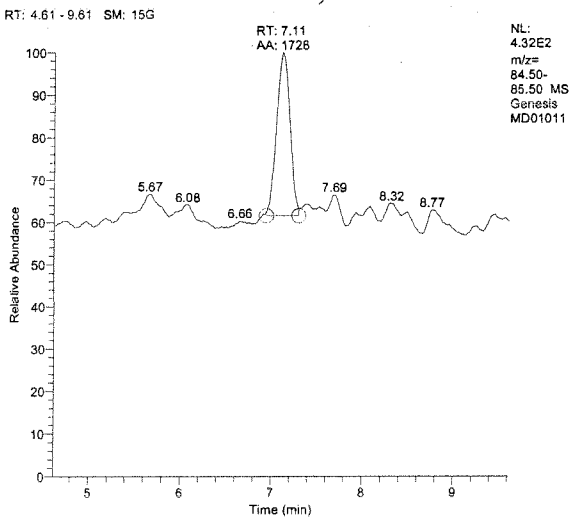
TIC



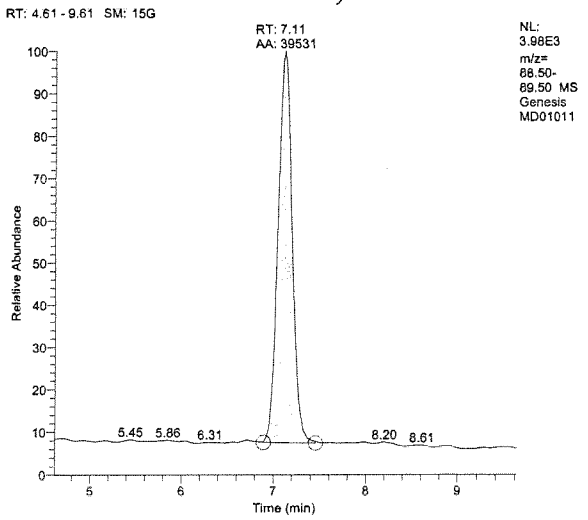
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



RA 04/03/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.11	4415 ✓	0.000	0.188 ✓	ppb	59.91
Perchlorate_85	7.11	1728 ✓	0.000	0.204 ✓	ppb	21.37
Perchlorate_89_ISTD	7.11	39531 ✓	2.000	N/A	ppb	369.02

83/85 Ratio: 2.55 ✓
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

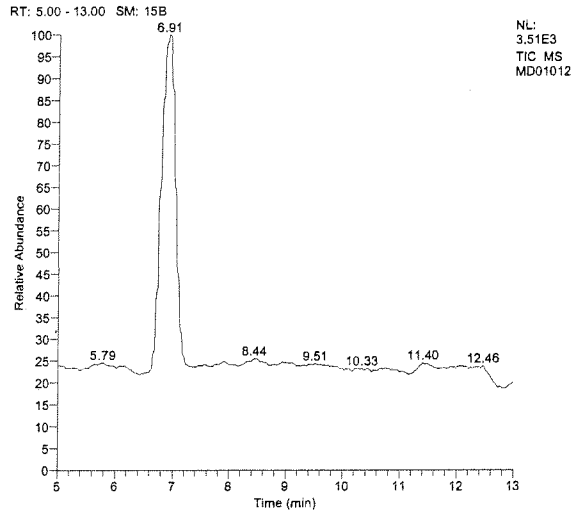
Sample Summary

EMAX Lab ID:	IPCS 0.2PPB/400PPM
Lab File ID:	MD01012
Acquisition Date:	04/01/15 10:18:05 PM
Data Path:	C:\XCALIBUR\DATA\MD01
Instrument Method:	C:\Xcalibur\methods\PLG0D01
Operator:	CDam

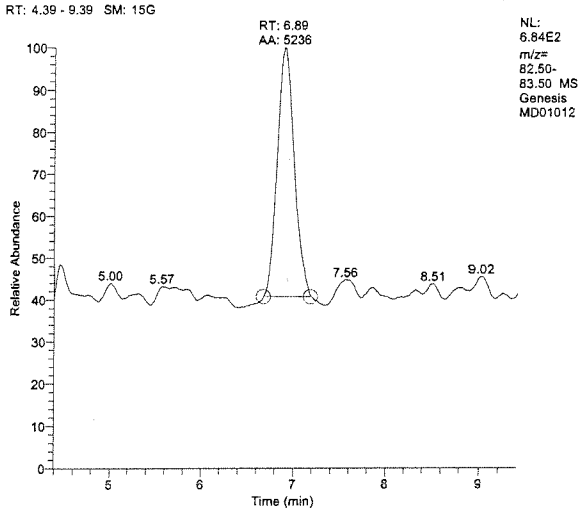
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB4
Injection Volume(ul):	20.00
Run Time(min):	12.99

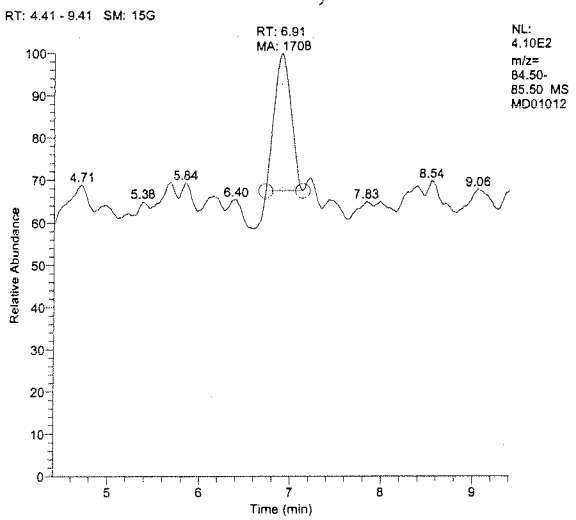
TIC



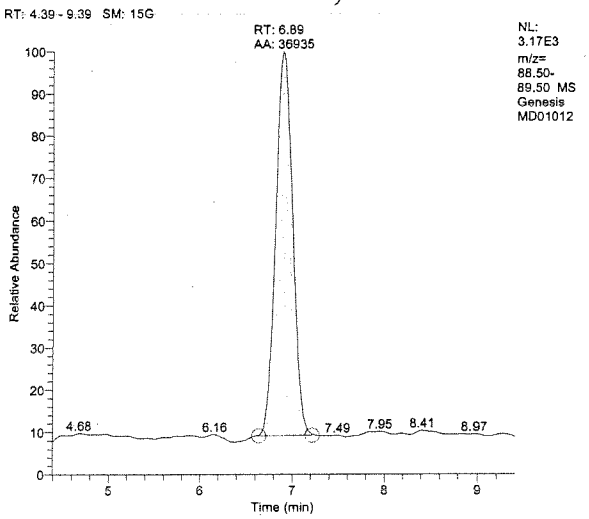
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AS 04/03/15

Sample Summary Table

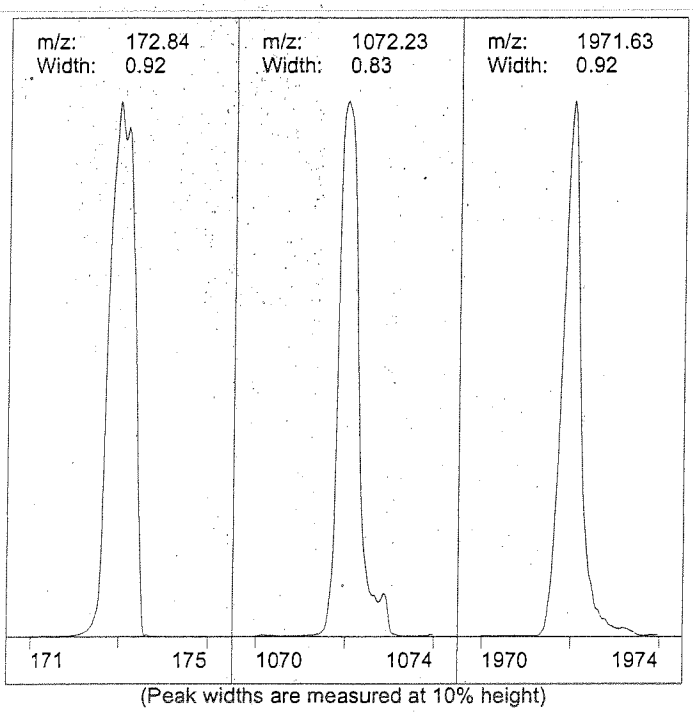
Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.89	5236	0.000	0.233	ppb	40.60
Perchlorate_85	6.91	1708	0.000	0.216	ppb	17.34
Perchlorate_89_ISTD	6.89	36935	2.000	N/A	ppb	300.35

83/85 Ratio: 3.01 ✓
(Control Limit: +/-30%)

AutoTune Report

Laboratory:
Instrument ID: MSQ Plus
Serial Number: MSQ20789

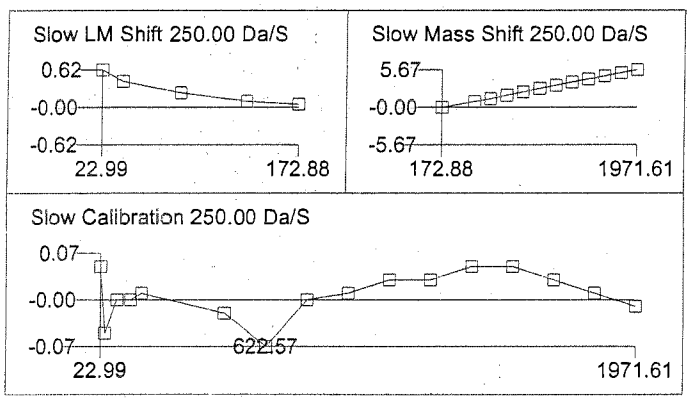
Filename: Calibration_150401122226.msqreport
Tune Date: 4/1/2015 12:22:26 PM
Report Date: 4/1/2015 12:22:42 PM
User Name: dionex xcaliber
Computer Name: XCALIBER



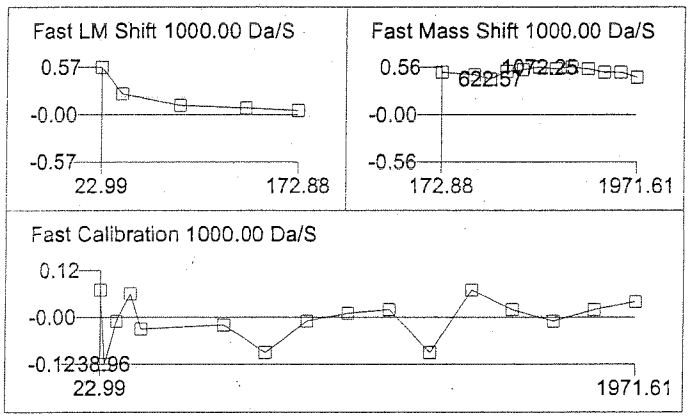
(Peak widths are measured at 10% height)

Tune Parameters	Set Point	Actual
Probe Temperature (°C)	349	345
Needle Voltage (kV)	3.0	3.0
Detector Voltage (V)	1800	1808
RF Lens Bias (V)	0.5	0.6
Ion Energy (V)	0.5	n/a
Ion Energy Ramp (mV/amu)	0.3	n/a
Low Mass Resolution	12.7	n/a
High Mass Resolution	12.5	n/a
Cone(V)	75	74
RF Frequency	235364,112	n/a
Linearity Adjust	-0.04	n/a
Low Mass Res Mid Point	56	n/a
High Mass Res Mid Point	13751	n/a

Mass Calibration Results	Fast	Slow
Calibration Type	Autotune	Autotune
Missed Ref Peaks	0	0
Standard Deviation[max 0.2]	0.0549	0.0334
R.M.S Error	0.0551	0.0344
Max Residual Error(m/z)[max 0.3]	0.1230	0.0722
Calibrated Range Min(m/z)	22.9898	22.9898
Calibrated Range Max(m/z)	1971.6149	1971.6149



Ref-Peak	Search-	From-To	Real-Peak	Mass-Shift
22.99	18.99	26.99	23.04	0.05
38.96	37.01	41.01	38.91	-0.05
83.05	81.00	85.00	83.05	0.00
132.91	130.91	134.91	132.91	0.00
172.88	170.89	174.89	172.89	0.01
472.67	470.68	474.68	472.65	-0.02
622.57	620.55	624.55	622.49	-0.07
772.46	770.39	774.39	772.46	-0.00
922.36	920.35	924.35	922.36	0.01
1072.25	1070.26	1074.26	1072.28	0.03
1222.14	1220.18	1224.18	1222.17	0.03
1372.04	1370.07	1374.07	1372.09	0.05
1521.93	1519.98	1523.98	1521.98	0.05
1671.83	1669.88	1673.88	1671.85	0.03
1821.72	1819.75	1823.75	1821.73	0.01
1971.61	1969.63	1973.63	1971.61	-0.01



Ref-Peak	Search-	From-To	Real-Peak	Mass-Shift
22.99	18.99	26.99	23.06	0.07
38.96	37.03	41.03	38.84	-0.12
83.05	80.92	84.92	83.03	-0.01
132.91	130.89	134.89	132.96	0.06
172.88	170.94	174.94	172.86	-0.03
472.67	470.64	474.64	472.66	-0.02
622.57	620.55	624.55	622.48	-0.09
772.46	770.37	774.37	772.45	-0.01
922.36	920.35	924.35	922.36	0.01
1072.25	1070.26	1074.26	1072.27	0.02
1222.14	1220.16	1224.16	1222.05	-0.09
1372.04	1369.95	1373.95	1372.11	0.07
1521.93	1520.00	1524.00	1521.95	0.02
1671.83	1669.84	1673.84	1671.81	-0.01
1821.72	1819.71	1823.71	1821.74	0.02
1971.61	1969.64	1973.64	1971.66	0.04

Diagnostic Messages

No messages.

AutoTune Status: Pass

Reviewed By: _____ Date: 04/01/15

8026

DAILY CALIBRATION(S)

Continuing Calibration Summary Form

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK
SDG : 15D027
Method : 6850
InstrumentID : G0
Parameter : Perchlorate

LFID	LSID	DF	Expected	Result	Unit	83/85	%Rec	AnalysisDateTime
15MD08003	IPCS	1	0.2	0.200	ug/L	2.9	100	04/08/1511:32
15MD08004	LOD-01	1	0.1	0.109	ug/L	2.6	109	04/08/1511:46
15MD08005	LOQ-01	1	0.2	0.203	ug/L	2.8	102	04/08/1512:01
15MD08006	CPLG0D01011	1	2.000	2.058	ug/L	3.1	103	04/08/1512:15
15MD08014	CPLG0D01012	1	2.000	2.082	ug/L	3.2	104	04/08/1514:16
15MD08017	CPLG0D01013	1	2.000	2.058	ug/L	3.1	103	04/08/1515:00
15MD08019	LOQ-02	1	0.2	0.187	ug/L	2.5	93	04/08/1515:59
15MD08020	LOD-02	1	0.1	0.110	ug/L	2.6	110	04/08/1516:14

83/85 Ratio Acceptance Criteria: ✓25% __30%
LOD/LOQ Acceptance Criteria: __20% ✓25%
CCV Acceptance Criteria: 85-115%

Component : Perchlorate_83
Method/CalSet : PLG0D01/MD01(2015)

LFID	LSID	S	Dilf	RT	Area	SpkAmt	Con	Units	ISTDArea	83/85	Cntrl Lim	Anl DateTime	%Rec
MD08001	IBG0D081	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.34-3.90	04/08/15 11:02	
MD08002	BLANK(IS)	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.34-3.90	04/08/15 11:17	
MD08003	IPCS	P	1.000	7.01	6929	0.000	0.200	ppb	57931	2.9	2.34-3.90	04/08/15 11:32	
MD08004	LOD-01	P	1.000	7.27	3404	0.000	0.109	ppb	58136	2.6	2.34-3.90	04/08/15 11:46	
MD08005	LOQ-01	P	1.000	7.23	7130	0.000	0.203	ppb	58415	2.8	2.34-3.90	04/08/15 12:01	
MD08006	CPLG0D01011	P	1.000	7.23	76768	2.000	2.058	ppb	56263	3.1	2.34-3.90	04/08/15 12:15	103
MD08007	PLD003SB	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.34-3.90	04/08/15 12:30	
MD08008	PLD003SL	P	1.000	7.27	6541	0.000	0.196	ppb	55898	2.6	2.34-3.90	04/08/15 12:45	
MD08009	PLD003SC	P	1.000	7.25	6891	0.000	0.199	ppb	57845	2.7	2.34-3.90	04/08/15 12:59	
MD08010	D026-01	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.34-3.90	04/08/15 13:14	
MD08011	D026-02	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.34-3.90	04/08/15 13:28	
MD08012	D026-02M	P	1.000	7.25	6979	0.000	0.201	ppb	57817	3.0	2.34-3.90	04/08/15 13:43	
MD08013	D026-02S	P	1.000	7.25	7780	0.000	0.227	ppb	56346	2.8	2.34-3.90	04/08/15 13:57	
MD08014	CPLG0D01012	P	1.000	7.25	78107	2.000	2.082	ppb	56580	3.2	2.34-3.90	04/08/15 14:16	104
MD08015	D026-03	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.34-3.90	04/08/15 14:31	
MD08016	D027-01	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.34-3.90	04/08/15 14:45	
MD08017	CPLG0D01013	P	1.000	7.25	75807	2.000	2.058	ppb	55555	3.1	2.34-3.90	04/08/15 15:00	103
MD08018	LOD-02	*	1.000	7.23	3448	0.000	0.112	ppb	56522	3.1	2.34-3.90	04/08/15 15:14	
MD08019	LOQ-02	P	1.000	7.27	6406	0.000	0.187	ppb	57621	2.5	2.34-3.90	04/08/15 15:59	
MD08020	LOD-02	P	1.000	7.27	3471	0.000	0.110	ppb	58391	2.6	2.34-3.90	04/08/15 16:14	
MD08021	BLANK(IS)	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.34-3.90	04/08/15 17:03	

83/85 Ratio +/-25%

Method 6850
EMAX Laboratories
Instrument # G0

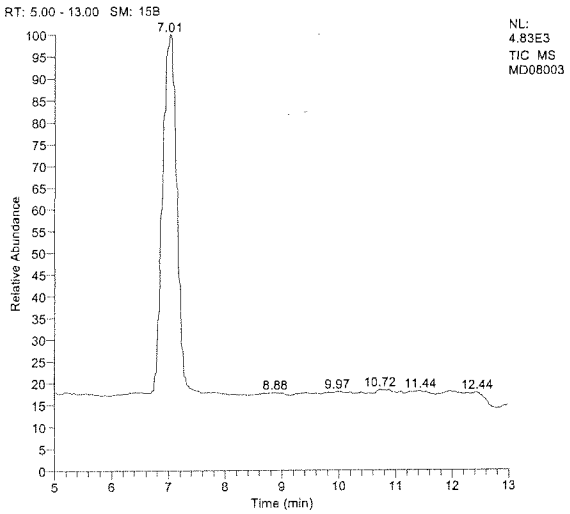
Sample Summary

EMAX Lab ID:	IPCS 0.2PPB/400PPM
Lab File ID:	MD08003
Acquisition Date:	04/08/15 11:32:24 AM
Data Path:	C:\XCALIBUR\DATA\MD08
Instrument Method:	C:\Xcalibur\methods\PLG0D01.meth
Operator:	CDam

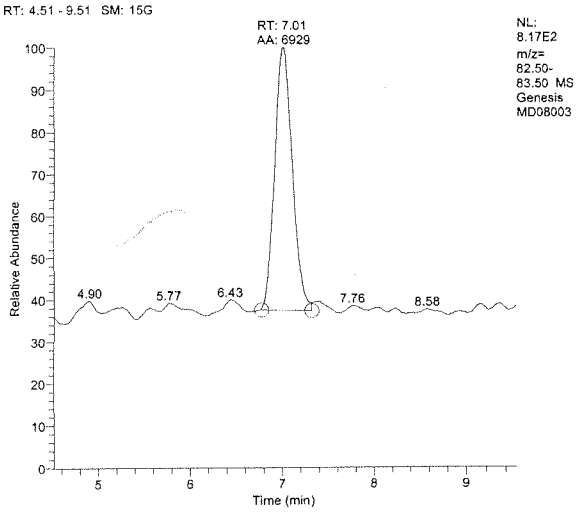
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA3
Injection Volume(ul):	20.00
Run Time(min):	12.99

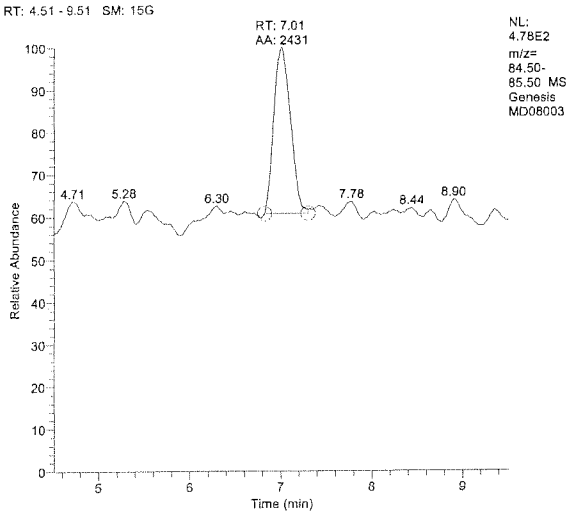
TIC



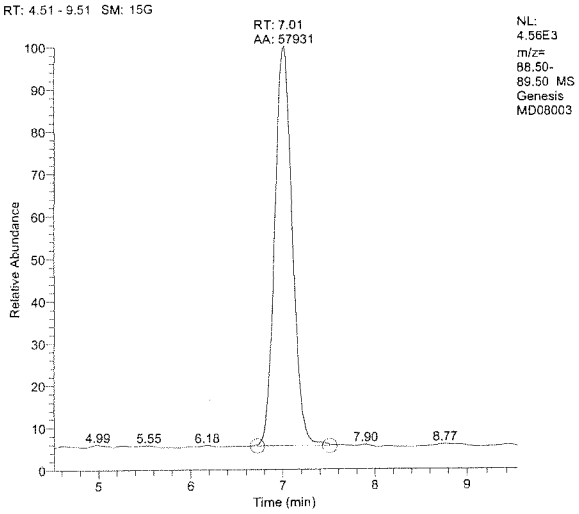
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.01	6929	0.000	0.200	ppb	150.37
Perchlorate_85	7.01	2431	0.000	0.196	ppb	42.88
Perchlorate_89_ISTD	7.01	57931	2.000	N/A	ppb	552.08

83/85 Ratio: 2.85

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

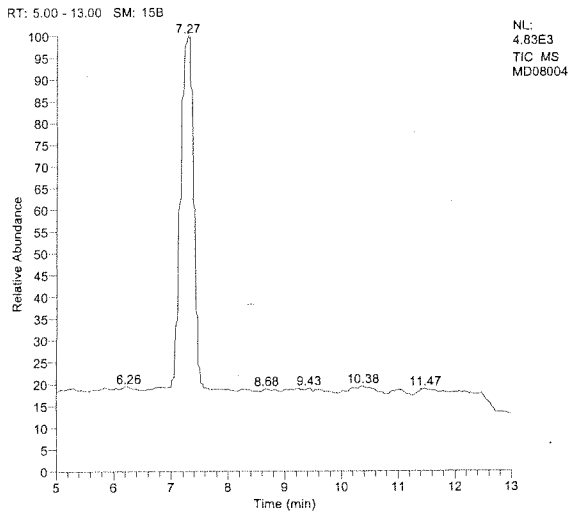
Sample Summary

EMAX Lab ID:	LOD-01 0.1PPB
Lab File ID:	MD08004
Acquisition Date:	04/08/15 11:46:54 AM
Data Path:	C:\XCALIBUR\DATA\MD08
Instrument Method:	C:\Xcalibur\methods\PLG0D01
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA4
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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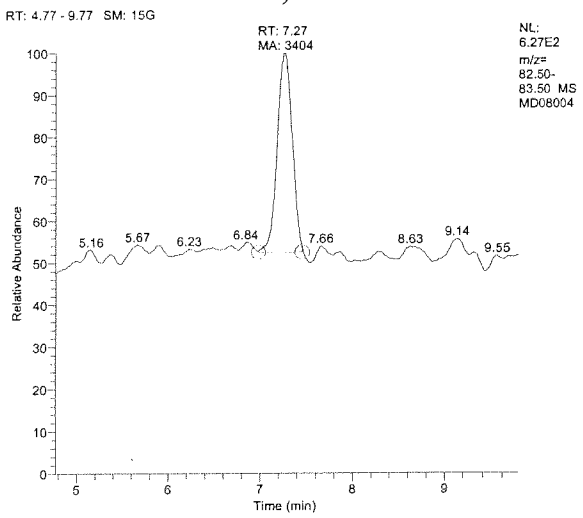
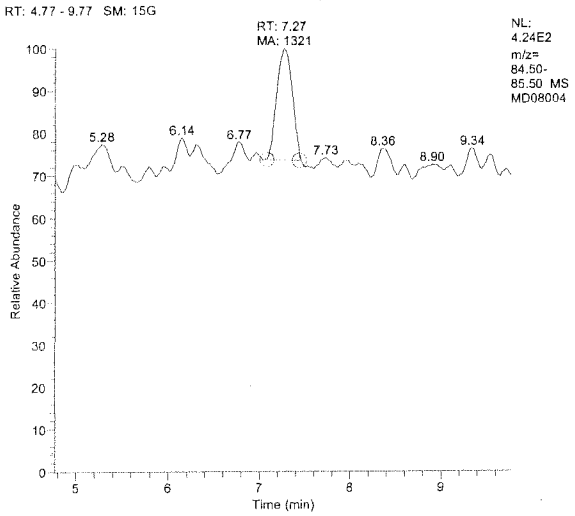


Perchlorate, m/z=85



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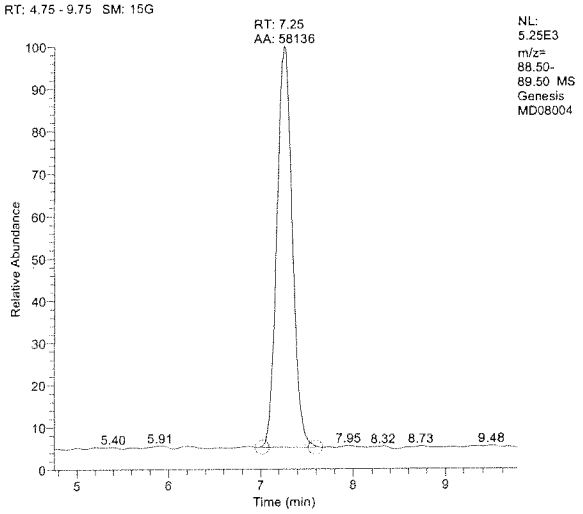


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.27	3404	0.000	0.109	ppb	41.37
Perchlorate_85	7.27	1321	0.000	0.106	ppb	18.99
Perchlorate_89_ISTD	7.25	58136	2.000	N/A	ppb	587.64

83/85 Ratio: 2.58
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

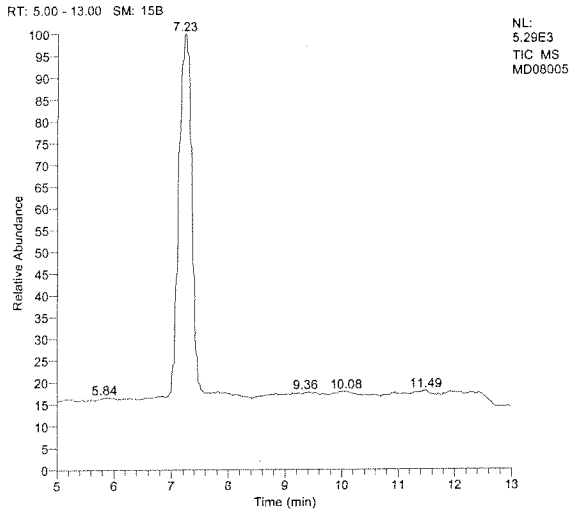
Sample Summary

EMAX Lab ID:	LOQ-01 0.1PPB
Lab File ID:	MD08005
Acquisition Date:	04/08/15 12:01:28 PM
Data Path:	C:\XCALIBUR\DATA\MD08
Instrument Method:	C:\Xcalibur\methods\PLG0D01
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA5
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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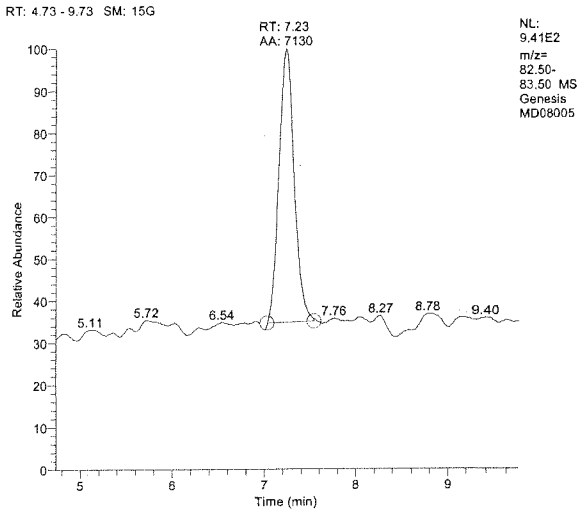
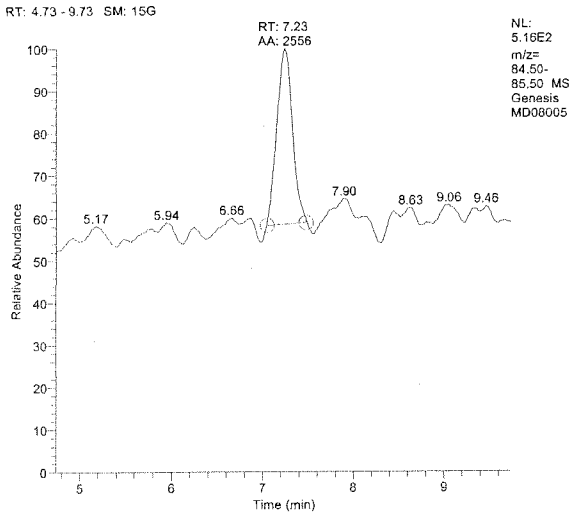


Perchlorate, m/z=85



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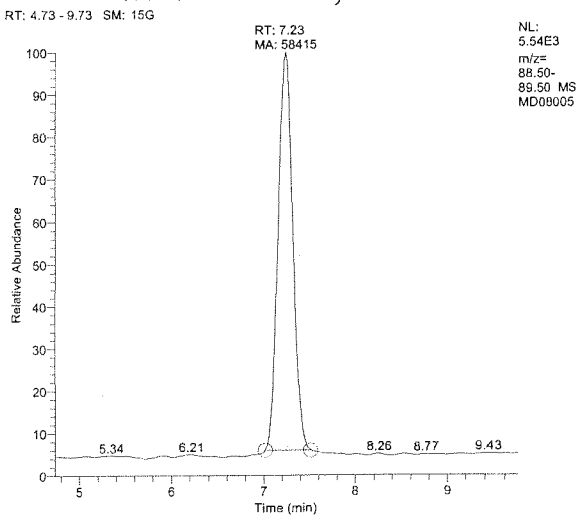


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.23	7130	0.000	0.203	ppb	122.53
Perchlorate_85	7.23	2556	0.000	0.204	ppb	26.29
Perchlorate_89_ISTD	7.23	58415	2.000	N/A	ppb	559.85

83/85 Ratio: 2.79

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

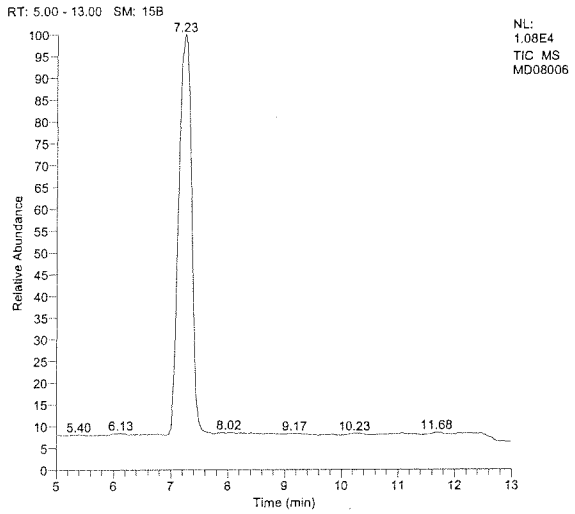
Sample Summary

EMAX Lab ID:	CPLG0D01011
Lab File ID:	MD08006
Acquisition Date:	04/08/15 12:15:58 PM
Data Path:	C:\XCALIBUR\DATA\MD08
Instrument Method:	C:\Xcalibur\methods\PLG0D01.meth
Operator:	CDam

Run Parameters

Sample Type:	QC
Calibration Level:	2 PPB
Vial:	RA6
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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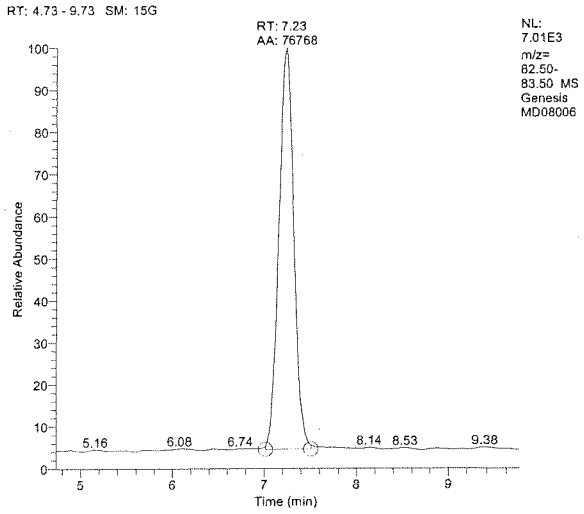

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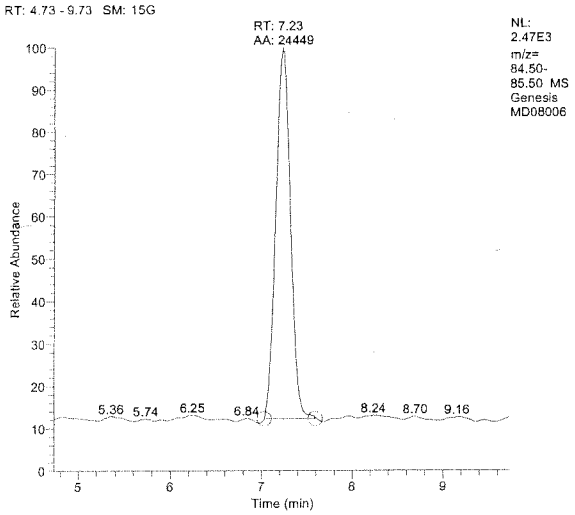

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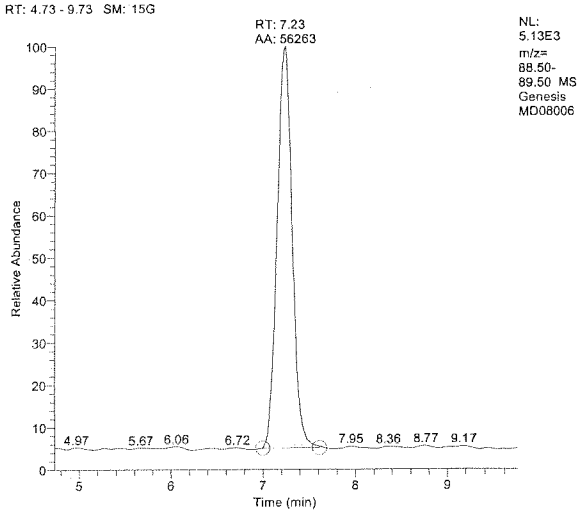


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.23	76768	2.000	2.058	ppb	605.29
Perchlorate_85	7.23	24449	2.000	2.028	ppb	230.08
Perchlorate_89_ISTD	7.23	56263	2.000	N/A	ppb	598.88

83/85 Ratio: 3.14
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

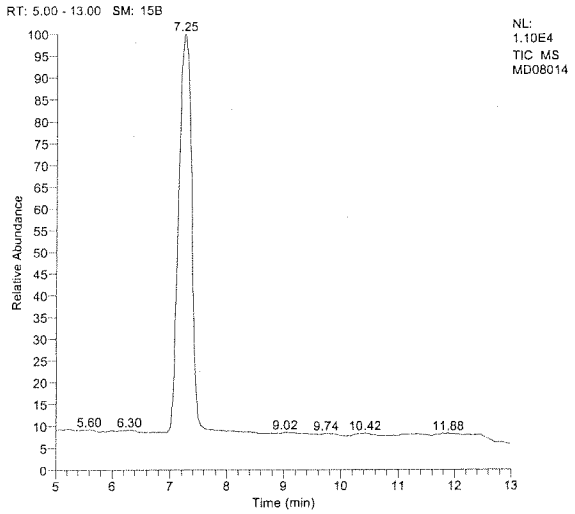
Sample Summary

EMAX Lab ID:	CPLG0D01012
Lab File ID:	MD08014
Acquisition Date:	04/08/15 02:16:26 PM
Data Path:	C:\XCALIBUR\DATA\MD08
Instrument Method:	C:\Xcalibur\methods\PLG0D01.meth
Operator:	CDam

Run Parameters

Sample Type:	QC
Calibration Level:	2 PPB
Vial:	RA6
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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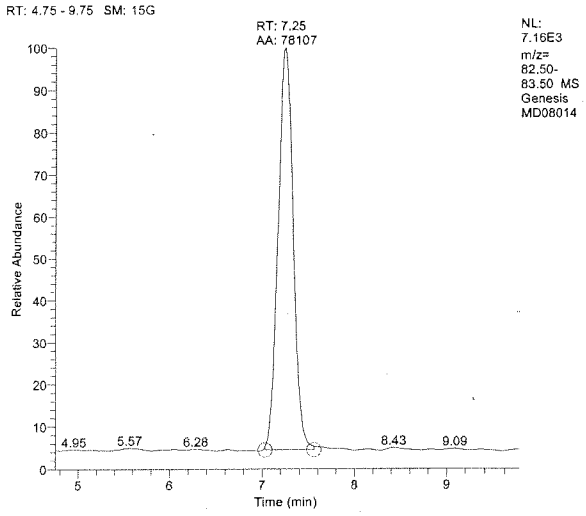

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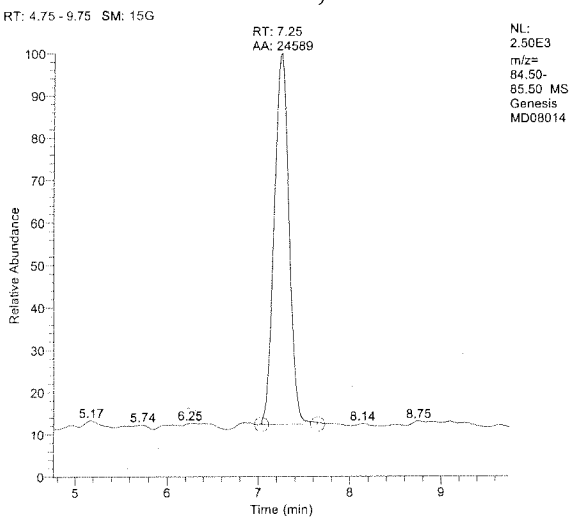

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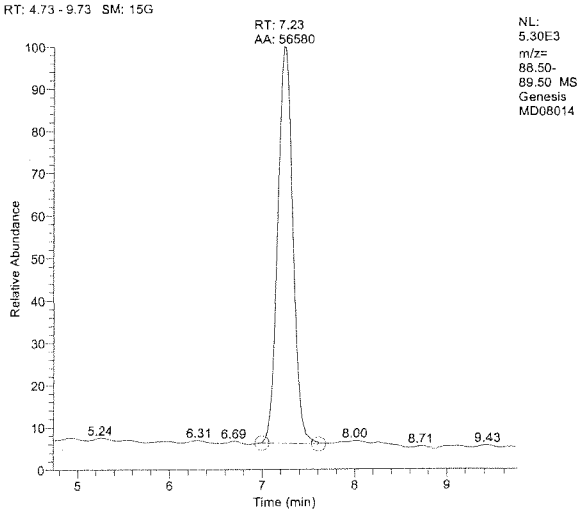


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.25	78107	2.000	2.082	ppb	684.37
Perchlorate_85	7.25	24589	2.000	2.028	ppb	265.99
Perchlorate_89_ISTD	7.23	56580	2.000	N/A	ppb	473.05

83/85 Ratio: 3.18
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

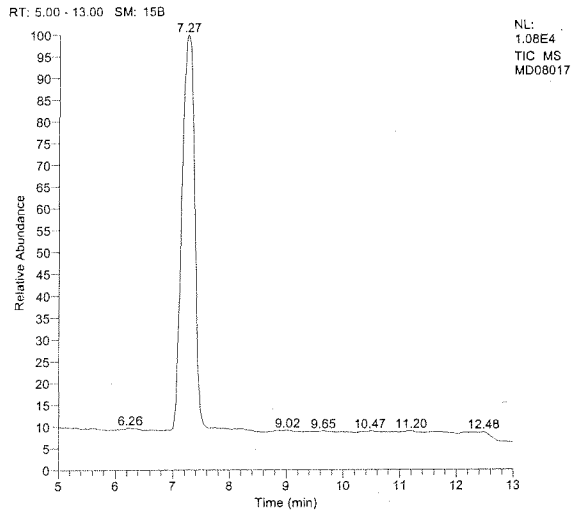
Sample Summary

EMAX Lab ID:	CPLG0D01013
Lab File ID:	MD08017
Acquisition Date:	04/08/15 03:00:18 PM
Data Path:	C:\XCALIBUR\DATA\MD08
Instrument Method:	C:\Xcalibur\methods\PLG0D01.meth
Operator:	CDam

Run Parameters

Sample Type:	QC
Calibration Level:	2 PPB
Vial:	RA6
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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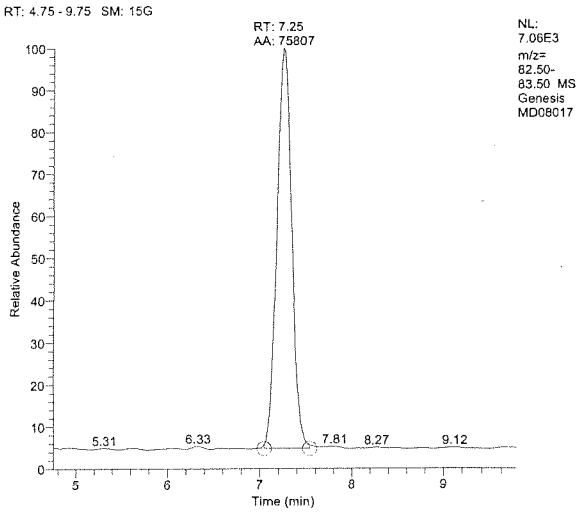
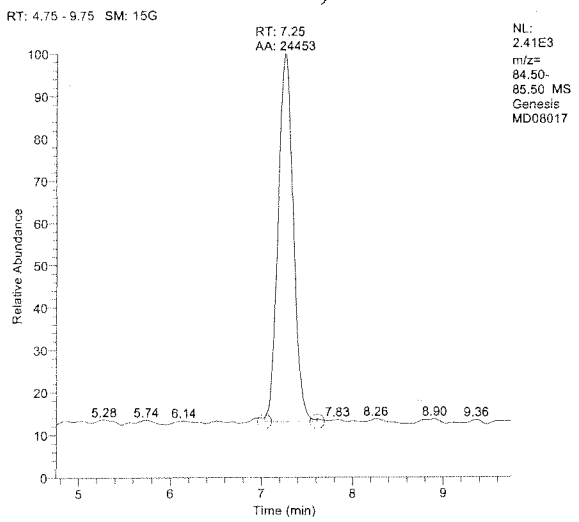
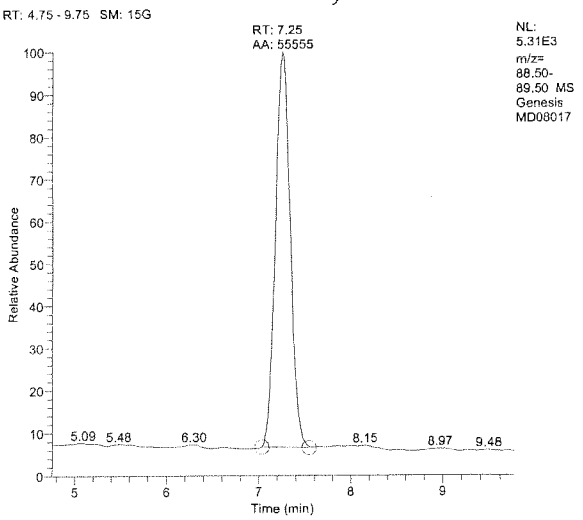


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.25	75807	2.000	2.058	ppb	934.97
Perchlorate_85	7.25	24453	2.000	2.054	ppb	276.67
Perchlorate_89_ISTD	7.25	55555	2.000	N/A	ppb	309.02

83/85 Ratio: 3.10
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

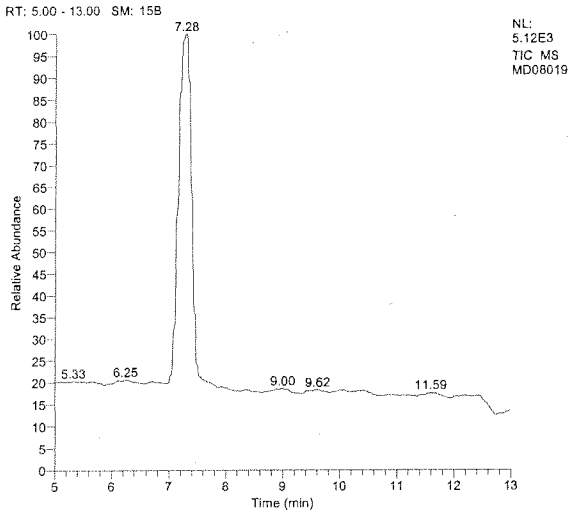
Sample Summary

EMAX Lab ID:	LOQ-02 0.1PPB
Lab File ID:	MD08019
Acquisition Date:	04/08/15 03:59:42 PM
Data Path:	C:\XCALIBUR\DATA\MD08
Instrument Method:	C:\Xcalibur\methods\PLG0D01.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA5
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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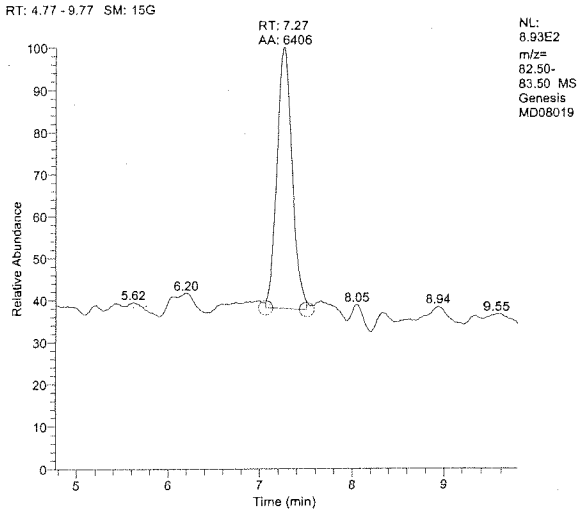

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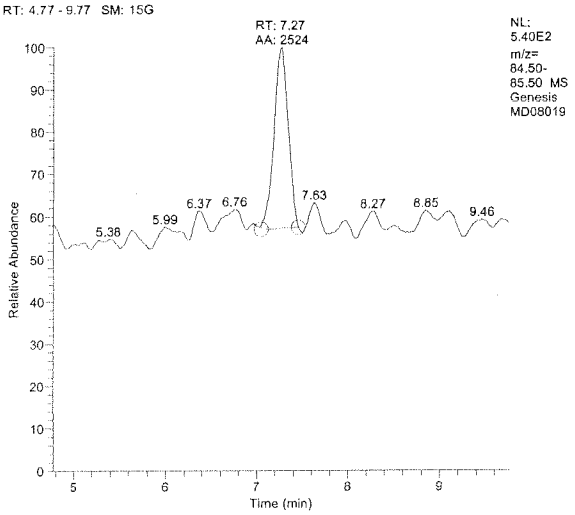

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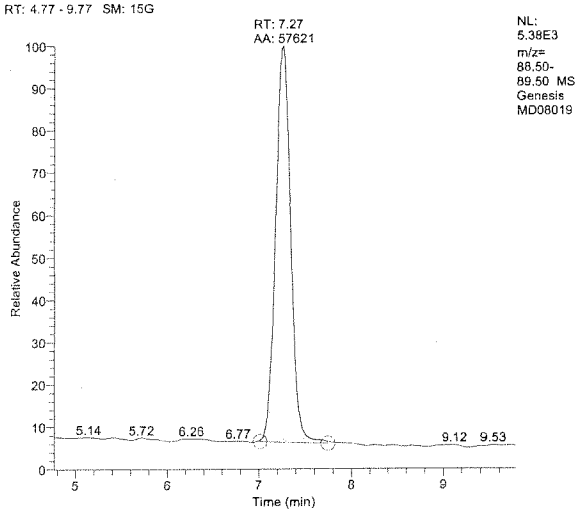


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.27	6406	0.000	0.187	ppb	43.86
Perchlorate_85	7.27	2524	0.000	0.205	ppb	24.72
Perchlorate_89_ISTD	7.27	57621	2.000	N/A	ppb	484.08

83/85 Ratio: 2.54

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

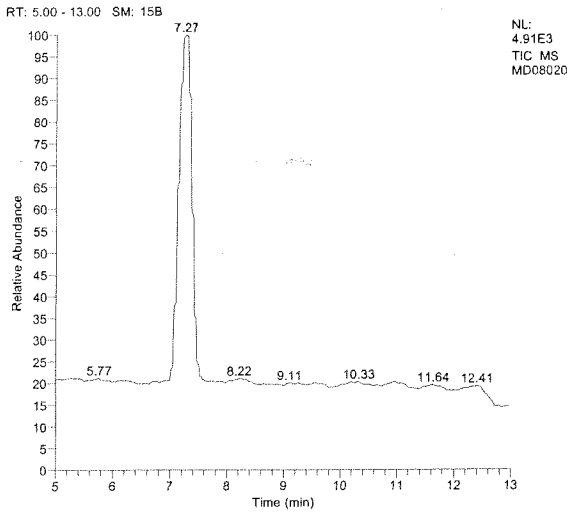
Sample Summary

EMAX Lab ID:	LOD-02 0.1PPB
Lab File ID:	MD08020
Acquisition Date:	04/08/15 04:14:28 PM
Data Path:	C:\XCALIBUR\DATA\MD08
Instrument Method:	C:\Xcalibur\methods\PLG0D01
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA4
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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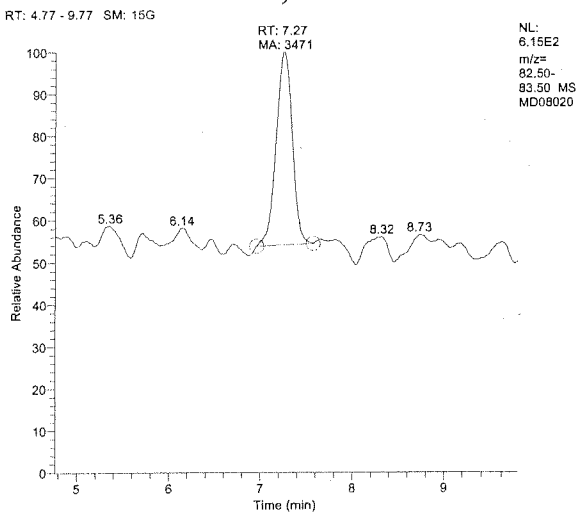
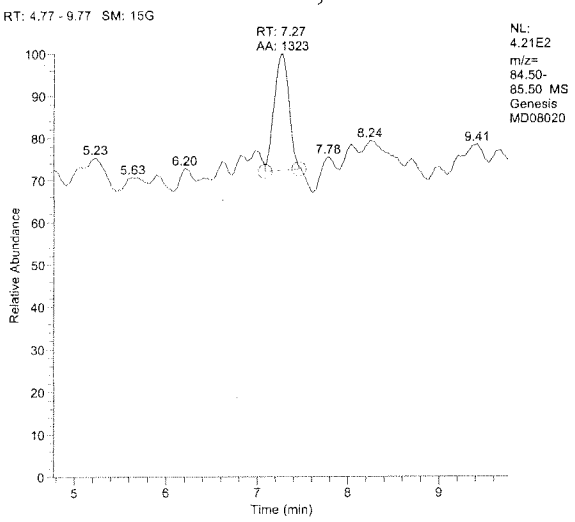
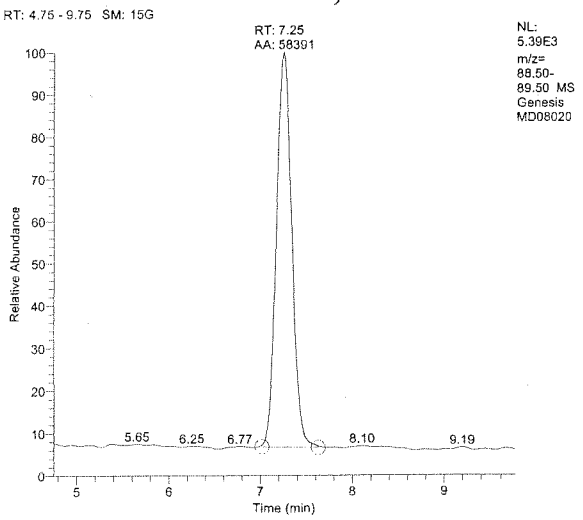


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.27	3471	0.000	0.110	ppb	32.36
Perchlorate_85	7.27	1323	0.000	0.106	ppb	13.83
Perchlorate_89_ISTD	7.25	58391	2.000	N/A	ppb	453.72

83/85 Ratio: 2.62

(Control Limit: +/-30%)

Wednesday, April 15, 2015, 12:48:13

ANALYTICAL LOG(S)

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
PERCHLORATE BY HPLC/MS

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

ICAL: PLG0D01

* 4µL Internal Standard added to each 1mL sample vial prior to analysis.

** LOQ-01 (0.2 ppb)
2µL Standard → 1000µL H2O

Book #:	AG0-005
Instrument No.:	G0
Analytical Sequence:	MD01
Method File:	PLG0D01
Analytical Batch:	—

SOP #	Rev. #
☑ EMAX-6850	1
☐ EMAX-	

STANDARDS ID		Conc. (µg/L)
ICAL	SHIC-10-04-01	(0.1-7.5ppb) 2ppb
ICV	↓ 04-02	2ppb 2ppb
DCC1	—	—
DCC2	—	—
LCS	—	—
MS	—	—
IS *	SHIB-07-06-02	500 ppb
IPC	SHIC-10-03-03	0.2ppb 400 ppm
LODV **	SHIB-07-07-03	100 ppmb cd 04/01/15

SOLVENT	ID
Acetonitrile	SWIA-005-09-24
Methanol	—
Water	SWIA-005-10-25
Acetic Acid	SPIA-07-01-01

FILTER	ID
0.20 µm PTFE Membrane	21831377
0.45 µm PTFE Membrane	—

Data File	

SYRINGES
☑ 1 mL - MSF-01-01-01
☐ 100 µL - MSF-01-01-02
☐ 25 µL - MSF-01-01-03
☑ 10 µL - MSF-01-01-04
☐
☐

ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ XCALIBURG0	
☐	

Analyzed By: cd

Date: 04/01/15

Thermo Xcalibur Sequence Setup - MD01.sld

File Edit Change Actions View GoTo Help

	Position	Sample ID	File Name	Inj Vol	Dil Factor	Sample Type	Level	Path	Inst Meth	Proc Meth	Cal File
1	RA1	IBG0D011	MD01001	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
2	RA2	BLANK(IS)	MD01002	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
3	RA3	PLG0D01001	MD01003	20.000	1.000	Std Clear	0.1 ppb	C:\XCALIBUR\DATA\MD01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
4	RA4	PLG0D01002	MD01004	20.000	1.000	Std Update	0.2 ppb	C:\XCALIBUR\DATA\MD01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
5	RA5	PLG0D01003	MD01005	20.000	1.000	Std Update	0.5 ppb	C:\XCALIBUR\DATA\MD01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
6	RA6	PLG0D01004	MD01006	20.000	1.000	Std Update	1 ppb	C:\XCALIBUR\DATA\MD01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
7	RA7	PLG0D01005	MD01007	20.000	1.000	Std Update	2 ppb	C:\XCALIBUR\DATA\MD01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
8	RA8	PLG0D01006	MD01008	20.000	1.000	Std Update	5 ppb	C:\XCALIBUR\DATA\MD01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
9	RB1	PLG0D01007	MD01009	20.000	1.000	Std Update	7.5 ppb	C:\XCALIBUR\DATA\MD01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
10	RB2	IPLG0D01001	MD01010	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
11	RB3	LOQ-01 0.2PPB	MD01011	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
12	RB4	IPCS 0.2PPB/400PPM	MD01012	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
				0.001	0.000						

RA 04/03/15

FINAL ae 04/02/15

For Help, press F1

CAP NUM 4/2/2015

Thursday, April 02, 2015

Start | Chromeleon Xpress | C:\Xcalibur\methods\... | Thermo Xcalibur Sequ... | DCMSLink Event Log | 4:22 PM

LFID	EFID	Dil Factor
MD01001	IBG0D011	1.000
MD01002	BLANK(IS)	1.000
MD01003	PLG0D01001	1.000
MD01004	PLG0D01002	1.000
MD01005	PLG0D01003	1.000
MD01006	PLG0D01004	1.000
MD01007	PLG0D01005	1.000
MD01008	PLG0D01006	1.000
MD01009	PLG0D01007	1.000
MD01010	IPLG0D01001	1.000
MD01011	LOQ-01 0.2PPB	1.000
MD01012	IPCS 0.2PPB/400PPM	1.000

FINAL ae 04/02/15

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
PERCHLORATE BY HPLC/MS

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

* 4µL Internal Standard added to each 1mL sample vial prior to analysis.

** LOD - 01, 02 (0.1 ppb)
1µL Standard → 1000µL H2O

** LOQ - 01, 02 (0.2 ppb)
2µL Standard → 1000µL H2O

PLD0035: D026, D027 : 500µL aliquot of each sample were volumed to 1000µL H2O to be calculated as prep. factor of 2X prior to analysis.

MD08.018 : Not evaluated ; record only.

Book #:	AG0-005
Instrument No.:	G0
Analytical Sequence:	MD08
Method File:	PLØGOD01 04/15/15
Analytical Batch:	PLD0035

SOP #	Rev. #
☑ EMAX-6850	1
☐ EMAX-	

STANDARDS ID		Conc. (µg/L)
ICAL	—	—
ICV	—	—
DCC1	SHIC - 10 - 05 - 02	2ppb / 2ppb
DCC2	—	—
LCS	—	—
MS	—	—
IS *	SHIB - 07 - 08 - 02	500ppb
IPC	SHIC - 10 - 05 - 01	0.2ppb / 400 ppm
LODV **	SHIB - 07 - 07 - 03	100 ppb

SOLVENT	ID
Acetonitrile	SWIA - 005 - 009 - 24
Methanol	—
Water	SWIA - 005 - 10 - 25
Acetic Acid	SPIA - 07 - 10 - 01

FILTER	ID
0.20 µm PTFE Membrane	21837317
0.45 µm PTFE Membrane	—

Data File	

SYRINGES
☑ 1 mL - MSF-01-01-01
☐ 100 µL - MSF-01-01-02
☐ 25 µL - MSF-01-01-03
☑ 10 µL - MSF-01-01-04
☐
☐

ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ XCALIBURG0	
☐	

Analyzed By: ed

Date: 04/08/15

Thermo Xcalibur Sequence Setup - MD08.sld

File Edit Change Actions View GoTo Help

	Position	Sample ID	File Name	Inj Vol	Dil Factor	Sample Type	Level	Path	Inst Meth	Proc Meth	Cal File
1	RA1	IBG0D081	MD08001	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
2	RA2	BLANK(IS)	MD08002	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
3	RA3	IPCS 0.2PPB/400PPM	MD08003	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
4	RA4	LOD-01 0.1PPB	MD08004	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
5	RA5	LOQ-01 0.1PPB	MD08005	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
6	RA6	CPLG0D01011	MD08006	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
7	RA7	PLD003SB	MD08007	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
8	RA8	PLD003SL	MD08008	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
9	RB1	PLD003SC	MD08009	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
10	RB2	D026-01	MD08010	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
11	RB3	D026-02	MD08011	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
12	RB4	D026-02M	MD08012	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
13	RB5	D026-02S	MD08013	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
14	RA6	CPLG0D01012	MD08014	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
15	RB6	D026-03	MD08015	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
16	RB7	D027-01	MD08016	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
17	RA6	CPLG0D01013	MD08017	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
18	RA4	LOD-02 0.1PPB Not Evaluated.	MD08018	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
19	RA5	LOQ-02 0.1PPB	MD08019	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
20	RA4	LOD-02 0.1PPB	MD08020	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
21	RA2	BLANK(IS)	MD08021	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD08	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01	C:\Xcalibur\methods\PLG0D01
				0.001	0.000						

FINAL ad 04/15/15

For Help, press F1 NUM 4/15/201 Wednesday, April 15, 2015

Start Thermo Xcalibur Sequ...

LFID	EFID	Dil Factor
MD08001	IBG0D081	1.000
MD08002	BLANK(IS)	1.000
MD08003	IPCS 0.2PPB/400PPM	1.000
MD08004	LOD-01 0.1PPB	1.000
MD08005	LOQ-01 0.1PPB	1.000
MD08006	CPLG0D01011	1.000
MD08007	PLD003SB	1.000
MD08008	PLD003SL	1.000
MD08009	PLD003SC	1.000
MD08010	D026-01	1.000
MD08011	D026-02	1.000
MD08012	D026-02M	1.000
MD08013	D026-02S	1.000
MD08014	CPLG0D01012	1.000
MD08015	D026-03	1.000
MD08016	D027-01	1.000
MD08017	CPLG0D01013	1.000
MD08018	LOD-02 0.1PPB	1.000
MD08019	LOQ-02 0.1PPB	1.000
MD08020	LOD-02 0.1PPB	1.000
MD08021	BLANK(IS)	1.000

FINAL ae 04/15/15

EXTRACTION LOGS

EMAX LABORATORIES, INC.

EXTRACTION LOG
for
PERCHLORATE BY HPLC/MS

Note: For samples, relevant QCs/Standards extracted, refer to attached extraction sequence.

Comments:

@ 4µL Internal Standard added to each 1mL sample vial prior to analysis.

PLD0035: D026 & D027

Book #.: EPC-004

Preparation Batch: PLD0035

Matrix Soil

SOP	Rev. #
☑ EMAX-6850	0
☐ EMAX-	

Standards	ID	Amount Added (ml)
LCS/MS	(1000 ppb) SH1B-07-08-01	16µL
Internal Standard	(50 ppb) SH1B-07-06-02	@ 4µL

Reagent	Lot # / ID
H_2O	SW1A-005-10-25
Sand	124605 / SW1B-002-41-19

SDG#	Extract Location

Prepared By: CL

Standard Added By: CL

8046

EMAX LABORATORIES, INC.

FileID: PLD003S

SAMPLE PREPARATION LOG FOR PERCHLORATE

PrepBatchID	LabSampleID	Aliquot	DateTime	Unit	Ve(ml)	ExpAmt	ExpVe(ml)	AliquotFctr	Comments
15PLD003S01	PLD003SB	4	4/7/15 10:37	g	40	4	40	1	
15PLD003S02	PLD003SL	4	4/7/15 10:39	g	40	4	40	1	
15PLD003S03	PLD003SC	4	4/7/15 10:40	g	40	4	40	1	
15PLD003S04	D026-01	4	4/7/15 10:42	g	40	4	40	1	
15PLD003S05	D026-02	4	4/7/15 10:43	g	40	4	40	1	
15PLD003S06	D026-02M	4	4/7/15 10:44	g	40	4	40	1	
15PLD003S07	D026-02S	4	4/7/15 10:45	g	40	4	40	1	
15PLD003S08	D026-03	4	4/7/15 10:46	g	40	4	40	1	
15PLD003S09	D027-01	4	4/7/15 10:47	g	40	4	40	1	

FINAL

Balance ID: 10304418. Calibration check was verified prior to use.

Ve=extract volume

AliquotFctr=ExpAmt/Aliquot

☑ Extraction Started @ 4/7/15 11:09

☑ Extraction Ended @ 4/7/15 14:15

Prepared By: JChun

Checked By: RS

Date 04/07/15

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D027

METHOD 7199
HEXAVALENT CHROMIUM

One (1) soil sample was received on 04/03/15 to be analyzed for Hexavalent Chromium in accordance with Method 7199 and project specific requirements.

Holding Time
The sample was analyzed within the prescribed holding time.

Calibration
Calibration was performed as prescribed by the method and was verified using a secondary source (ICV). All calibration requirements were within acceptance criteria.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, one (1) method blank was analyzed. Hexavalent Chromium was not detected in HCD006SB. Refer to sample result summary form for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, one (1) soluble LCS was analyzed. Hexavalent Chromium was within LCS QC limits in CSD006SL. One (1) insoluble LCS was also analyzed and Hexavalent Chromium was within LCS QC limits. Refer to LCS summary form for details.

Matrix QC Sample
No matrix QC sample was designated on this SDG.

Sample Analysis
The sample was analyzed according to prescribed analytical procedures. Results were evaluated in accordance to project requirements. For this SDG, all quality control requirements were met.

SAMPLE RESULTS

METHOD 7199
HEXAVALENT CHROMIUM

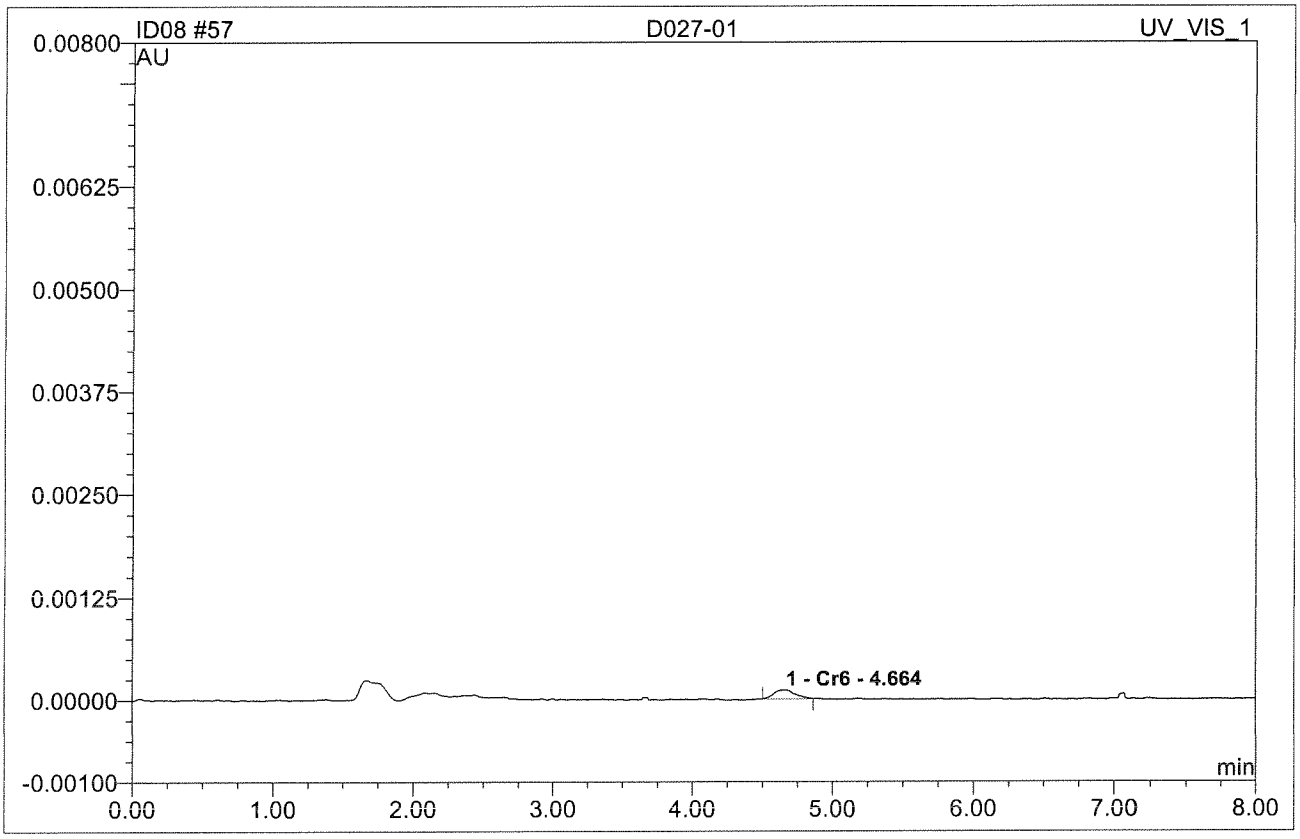
Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK
Batch No. : 15D027

Matrix : SOIL
InstrumentID : 59

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/kg)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1S	HCD006SB	ND	1	NA	100	13	40	04/08/1514:10	04/07/1514:43	ID08022	ID08018	HCD006S	NA	NA
LCS1S	CSD006SL	941	1	NA	100	13	40	04/08/1514:31	04/07/1514:43	ID08024	ID08018	HCD006S	NA	NA
UXO4-SB01-1.0	D027-01	144	1	9.5	110	14.4	44.2	04/08/1518:20	04/07/1514:43	ID08046	ID08042	HCD006S	04/02/1513:00	04/03/15

ID08 046 D027-01

Sample Name:	**D027-01**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/8/2015 18:20**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.66	Cr6	0.0001090	0.0000187	100.00	0.261	BMB
Total:			0.000	0.000	100.00	0.261	

QC SUMMARIES

EMAX QUALITY CONTROL DATA
LCS ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UXO4, FALLBROOK
BATCH NO. : 15D027
METHOD : 7199

MATRIX : SOIL
DILUTION FACTOR: 1 1
SAMPLE ID : MBLK1S LCS1S
LAB SAMPLE ID : HCD006SB CSD006SL
LAB FILE ID : ID08022 ID08024
DATE PREPARED : 04/07/1514:43 04/07/1514:43
DATE ANALYZED : 04/08/1514:10 04/08/1514:31
PREP BATCH : HCD006S HCD006S
CALIBRATION REF: ID08018 ID08018

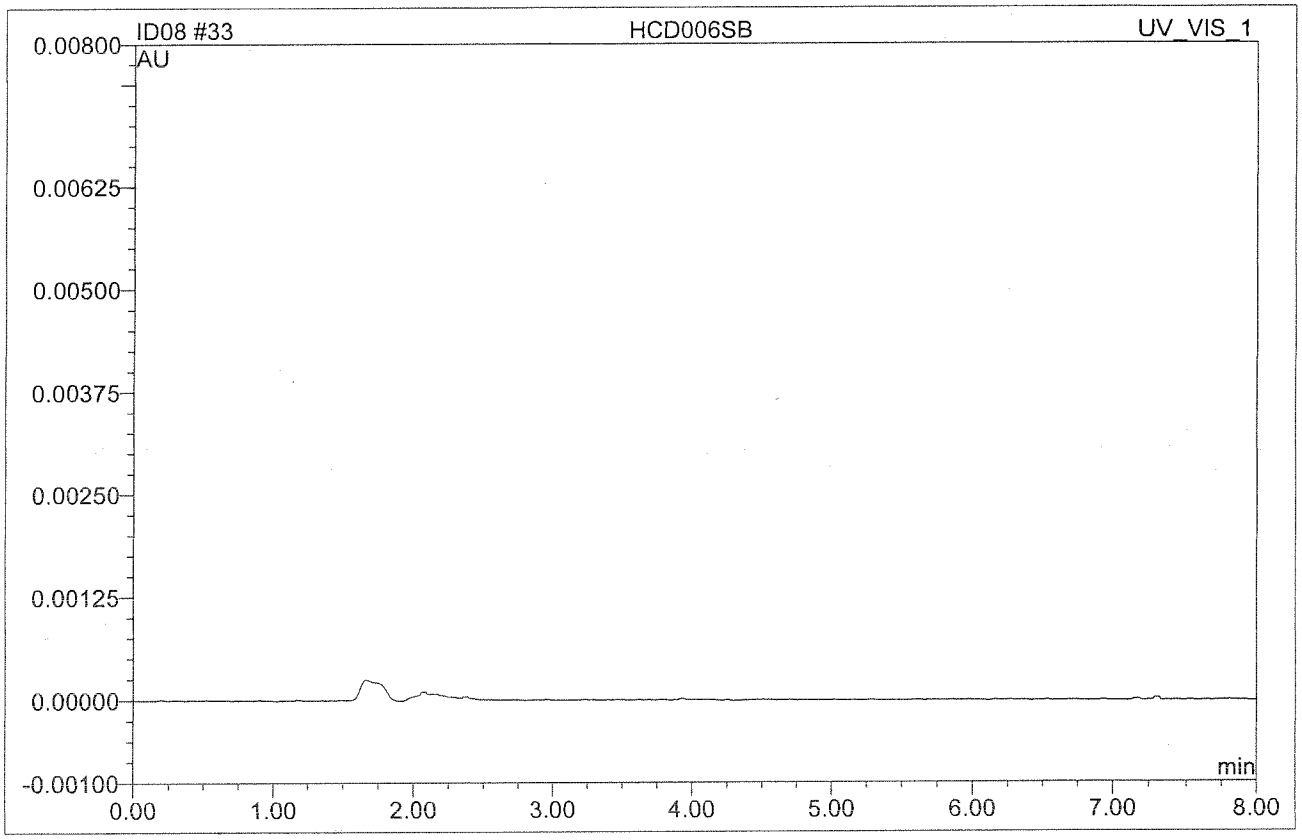
ACCESSION:

PARAMETER	MB RESULT (ug/kg)	SPIKE AMT (ug/kg)	BS RESULT (ug/kg)	BS REC (%)	QC LIMIT (%)
Hexavalent Chromium	ND	1000	941	94	80-120

QC DATA

ID08 022 HCD006SB

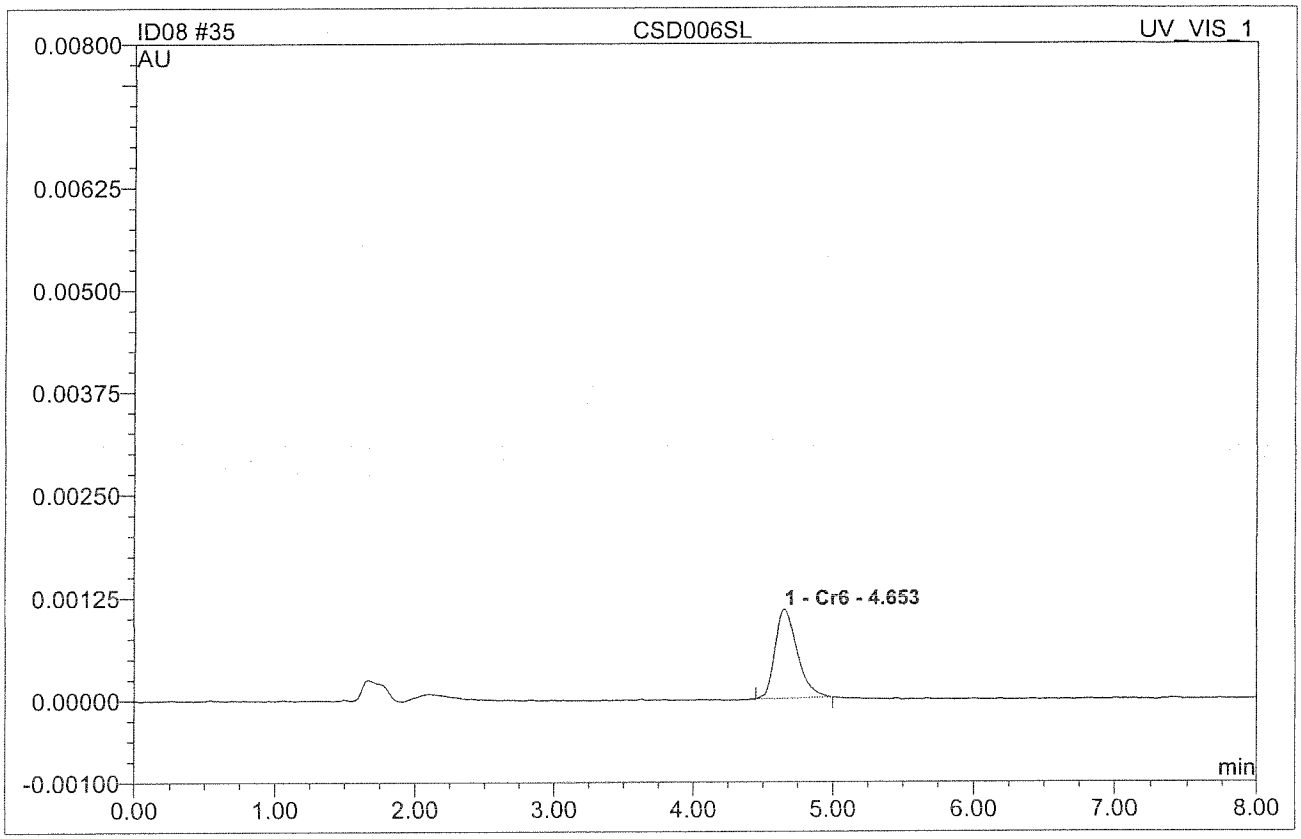
Sample Name:	**HCD006SB**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/8/2015 14:10**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID08 024 CSD006SL

Sample Name:	**CSD006SL**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/8/2015 14:31**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**

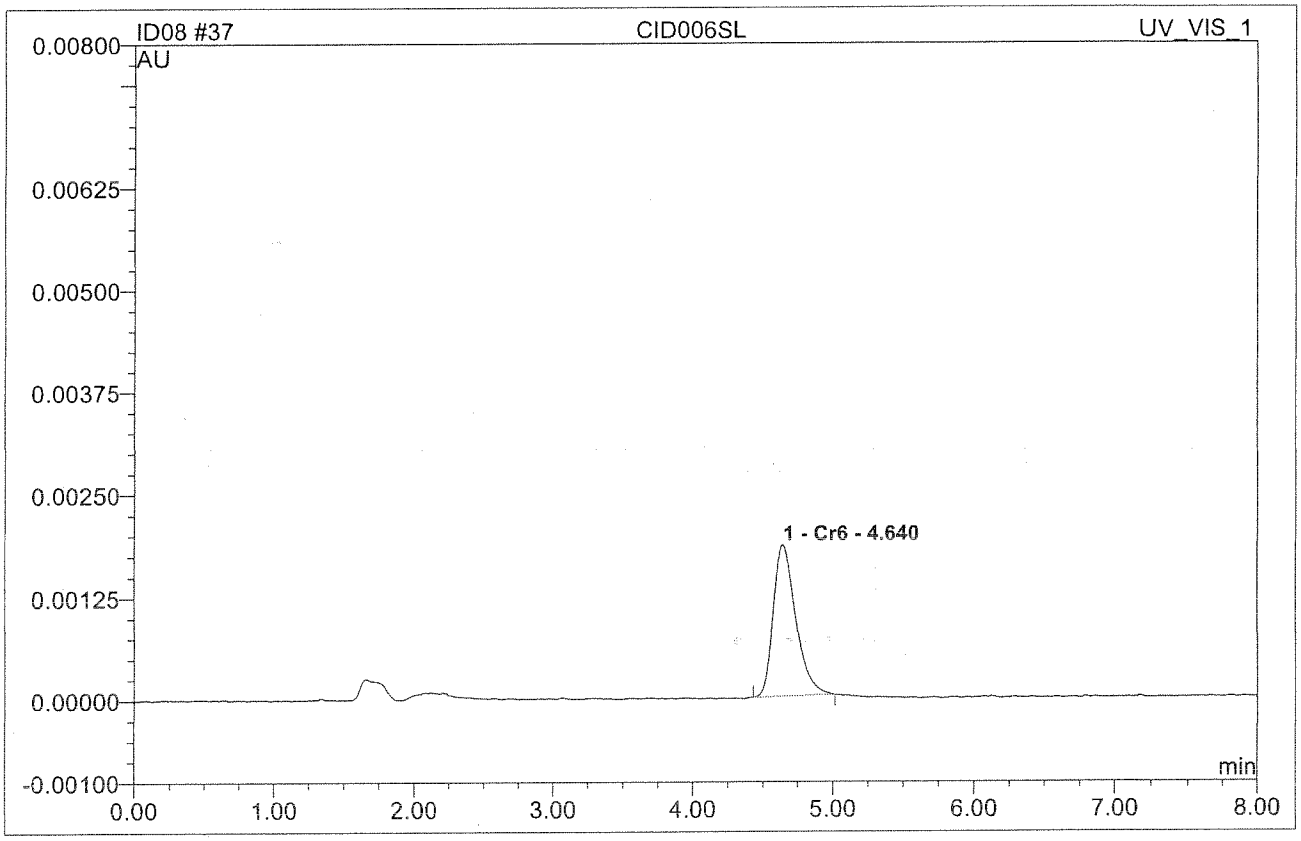


No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.65	Cr6	0.0010860	0.0001998	100.00	1.882	BMB
Total:			0.001	0.000	100.00	1.882	

ID08 026 CID006SL

DF=200

Sample Name:	**CID006SL**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**200**
Recording Time:	**4/8/2015 14:52**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.64	Cr6	0.0018370	0.0003436	100.00	633.638	BMB
Total:			0.002	0.000	100.00	633.638	

28.2 mg = 725.986
= 87.3%

INITIAL CALIBRATIONS

IC RESULT FORM CalVersion : CR6.A26/IA26 (2015)

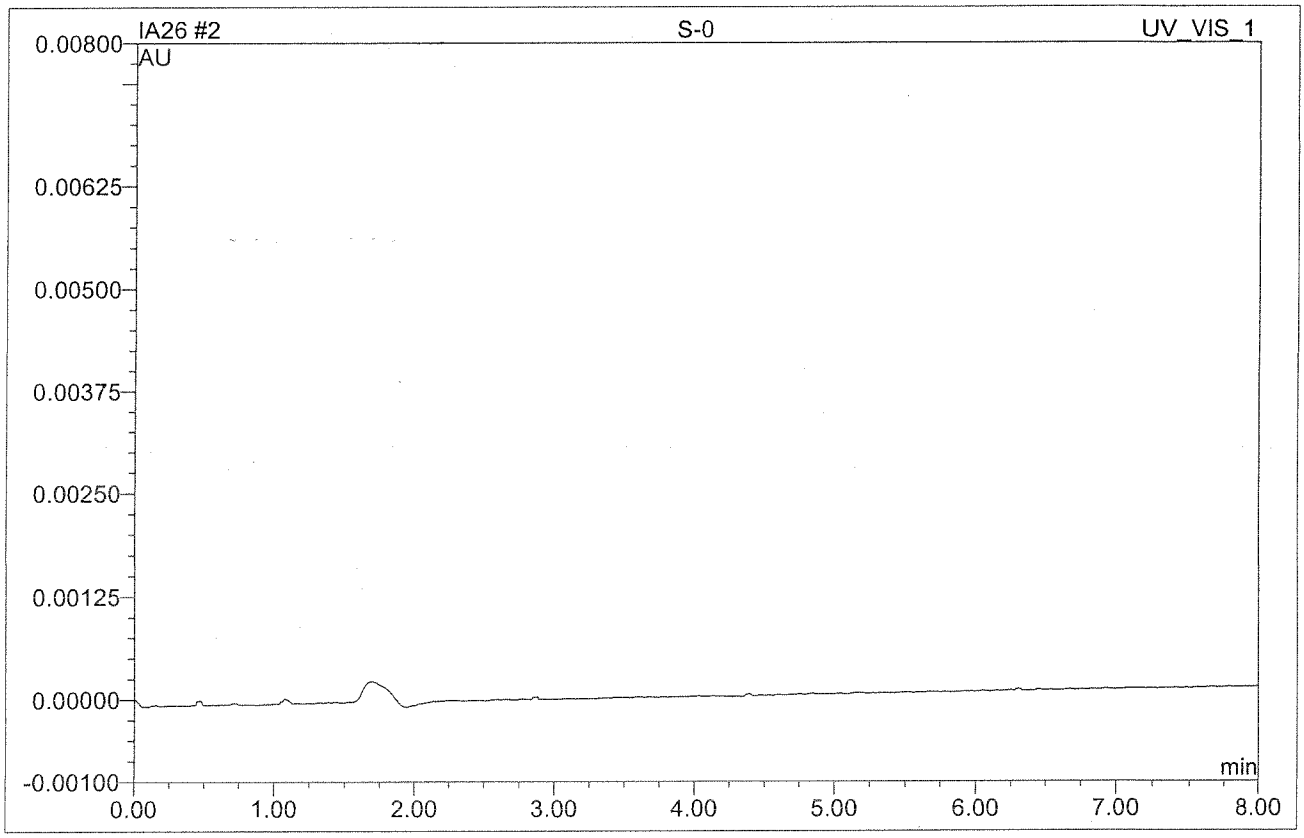
LFID	LSID	SelCmp	Cr6	DateTime	DF
IA26001	IB	C	ND	01/26/1514:29	1
IA26002	S-0	C	ND	01/26/1514:39	1
IA26003	S-1	C	0.185	01/26/1514:55	1
IA26004	S-2	C	0.513	01/26/1515:05	1
IA26005	S-3	C	0.868	01/26/1515:16	1
IA26006	S-4	C	1.998	01/26/1515:26	1
IA26007	S-5	C	4.985	01/26/1515:36	1
IA26008	S-6	C	7.644	01/26/1515:47	1
IA26009	S-7	C	9.913	01/26/1515:57	1
IA26010	ICV	C	96%	01/26/1516:10	1
IA26011	ICB	C	ND	01/26/1516:21	1

METHOD: IC59A26
SOLVENT: pH NANOPURE (SW4-02-49-03)

AA
01/27/15

IA26 002 S-0

Sample Name:	**S-0**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 14:39**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



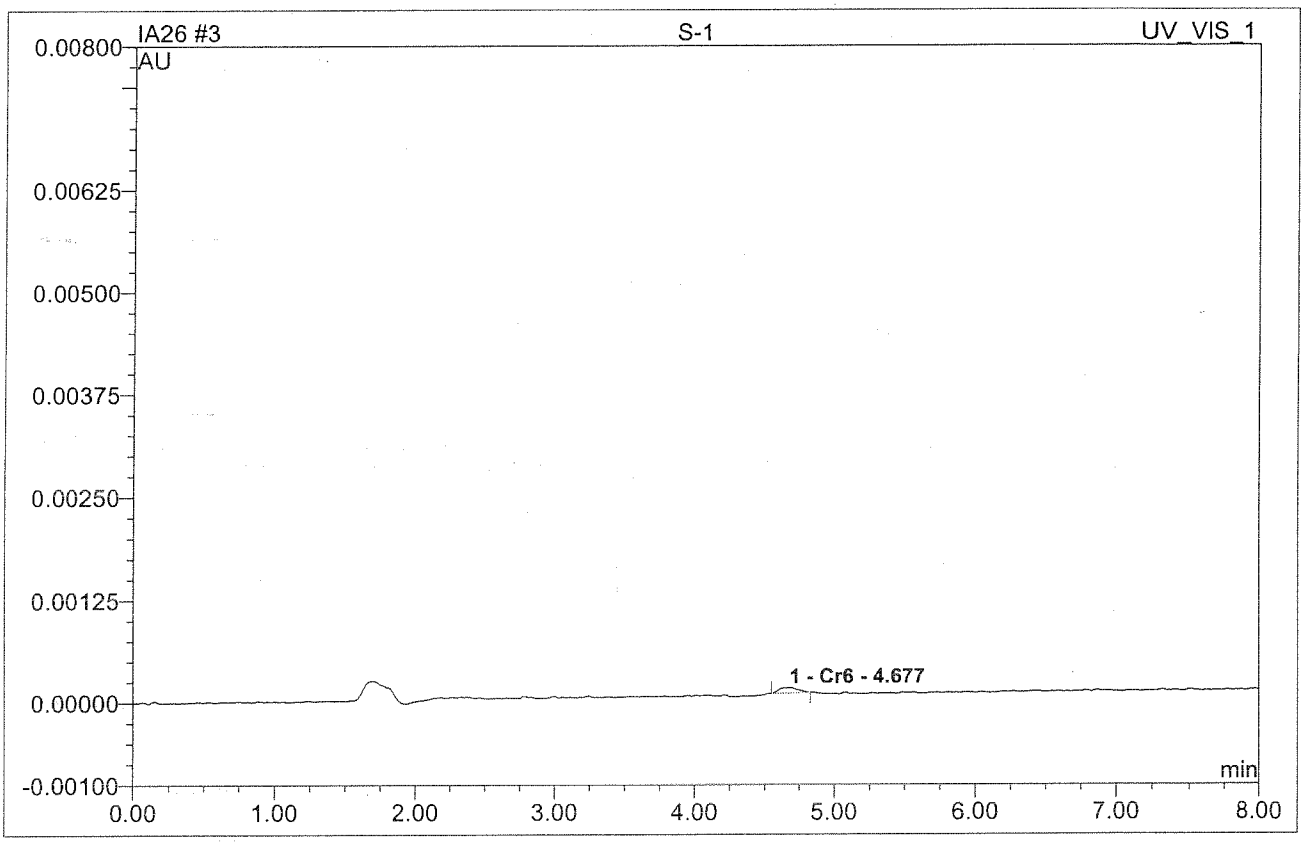
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

AA
01/27/15

IA26 003 S-1

0.2 PPB

Sample Name:	**S-1**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 14:55**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



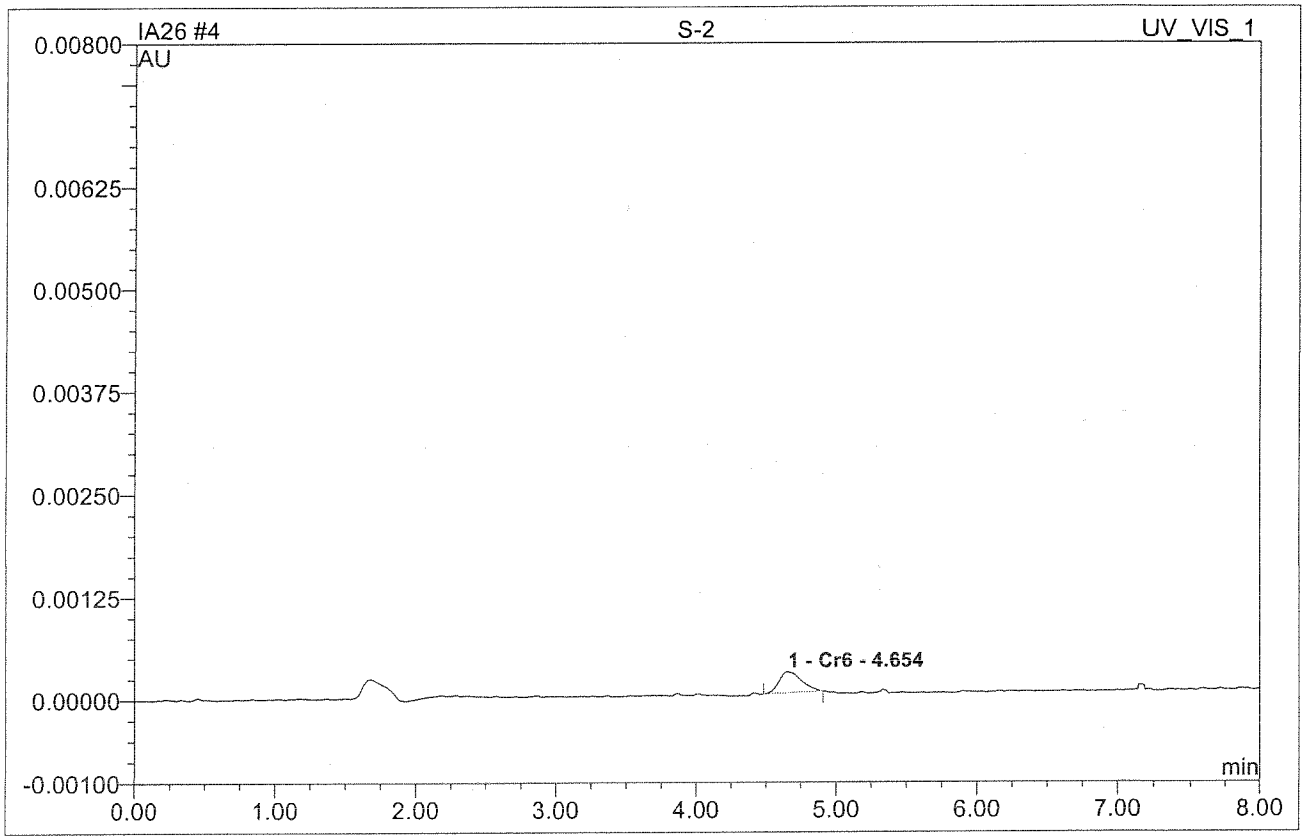
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.68	Cr6	0.0000670	0.0000102 ✓	100.00	0.185 ✓	BMB
Total:			0.000	0.000	100.00	0.185	

RA
01/27/15

IA26 004 S-2

0.5 PPB

Sample Name:	**S-2**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:05**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



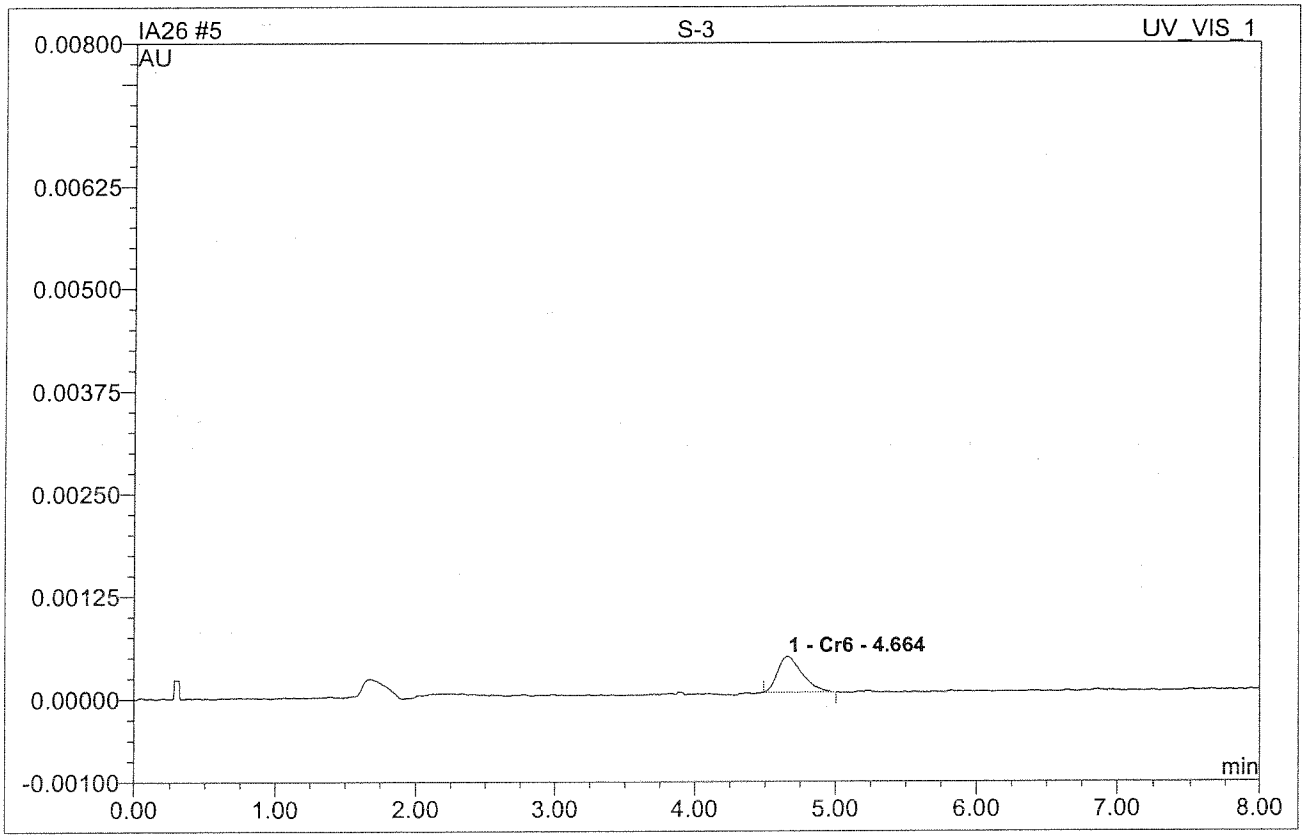
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.65	Cr6	0.0002560	0.0000469	100.00	0.513	BMB
Total:			0.000	0.000	100.00	0.513	

RA
01/27/15

IA26 005 S-3

1.0 PPB

Sample Name:	**S-3**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:16**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



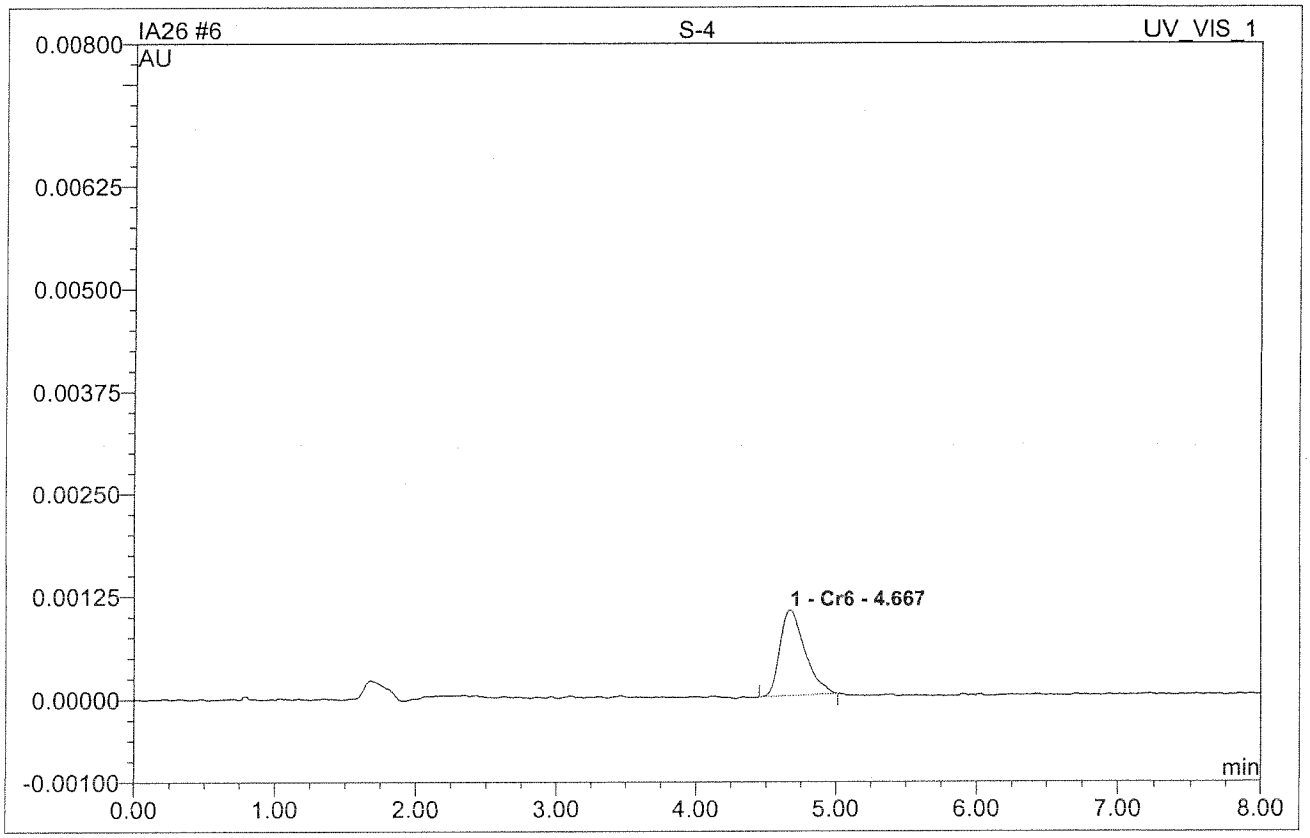
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.66	Cr6	0.0004350	0.0000865	100.00	0.868	BMB
Total:			0.000	0.000	100.00	0.868	

AS 01/27/15

IA26 006 S-4

2.0 PPB

Sample Name:	**S-4**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:26**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



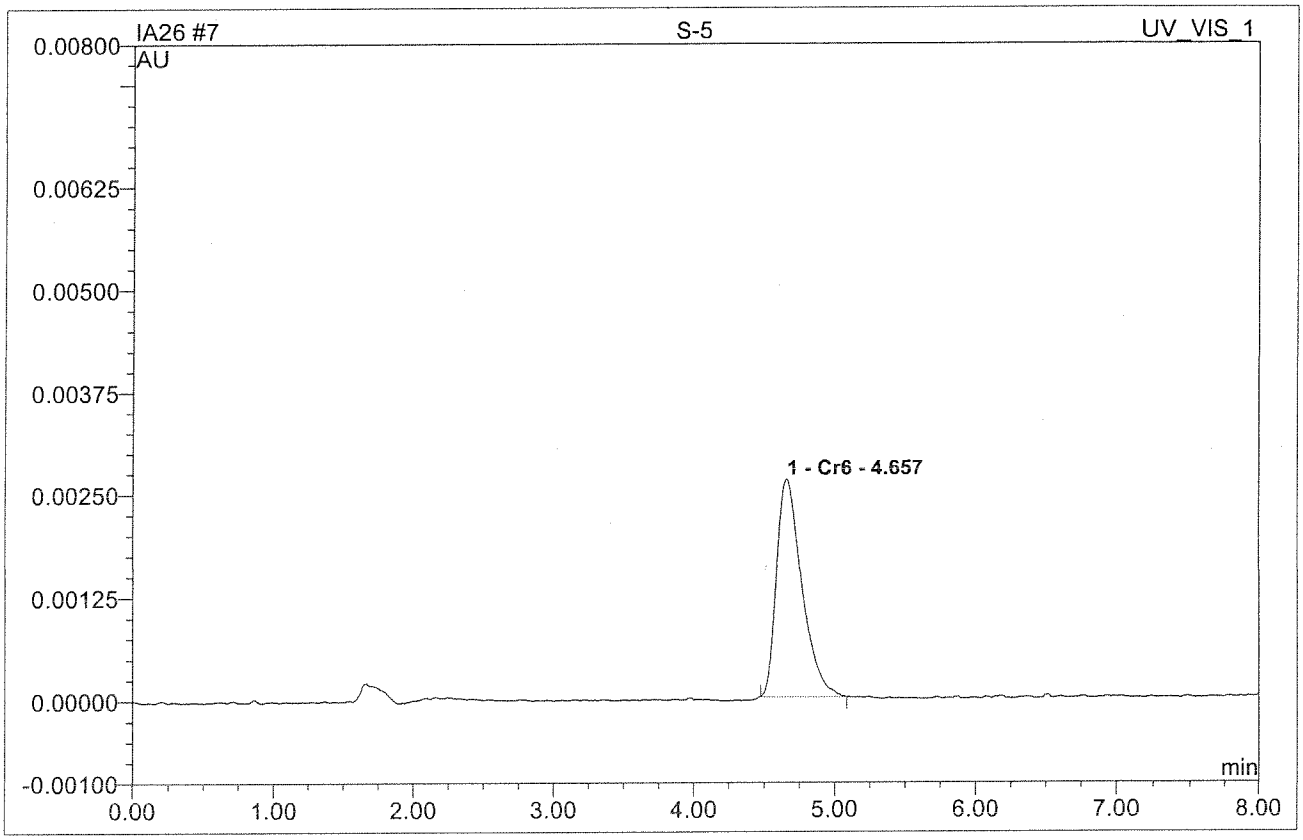
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.67	Cr6	0.0010350	0.0002128	100.00	1.998	BMB
Total:			0.001	0.000	100.00	1.998	

RA
01/27/15

IA26 007 S-5

5.0 PPB

Sample Name:	**S-5**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:36**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



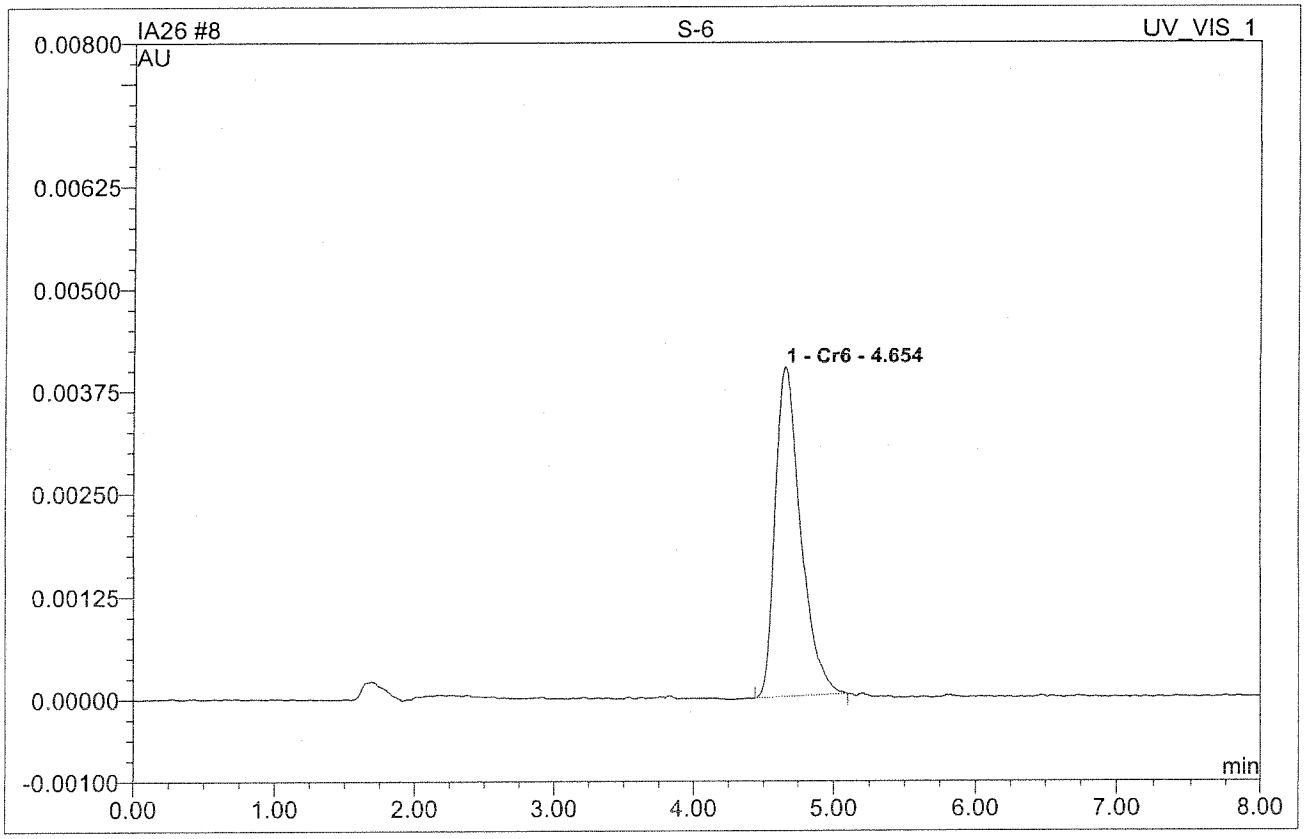
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.66	Cr6	0.0026400	0.0005466	100.00	4.985	BMB
Total:			0.003	0.001	100.00	4.985	

AA
01/27/15

IA26 008 S-6

7.5 PPB

Sample Name:	**S-6**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:47**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



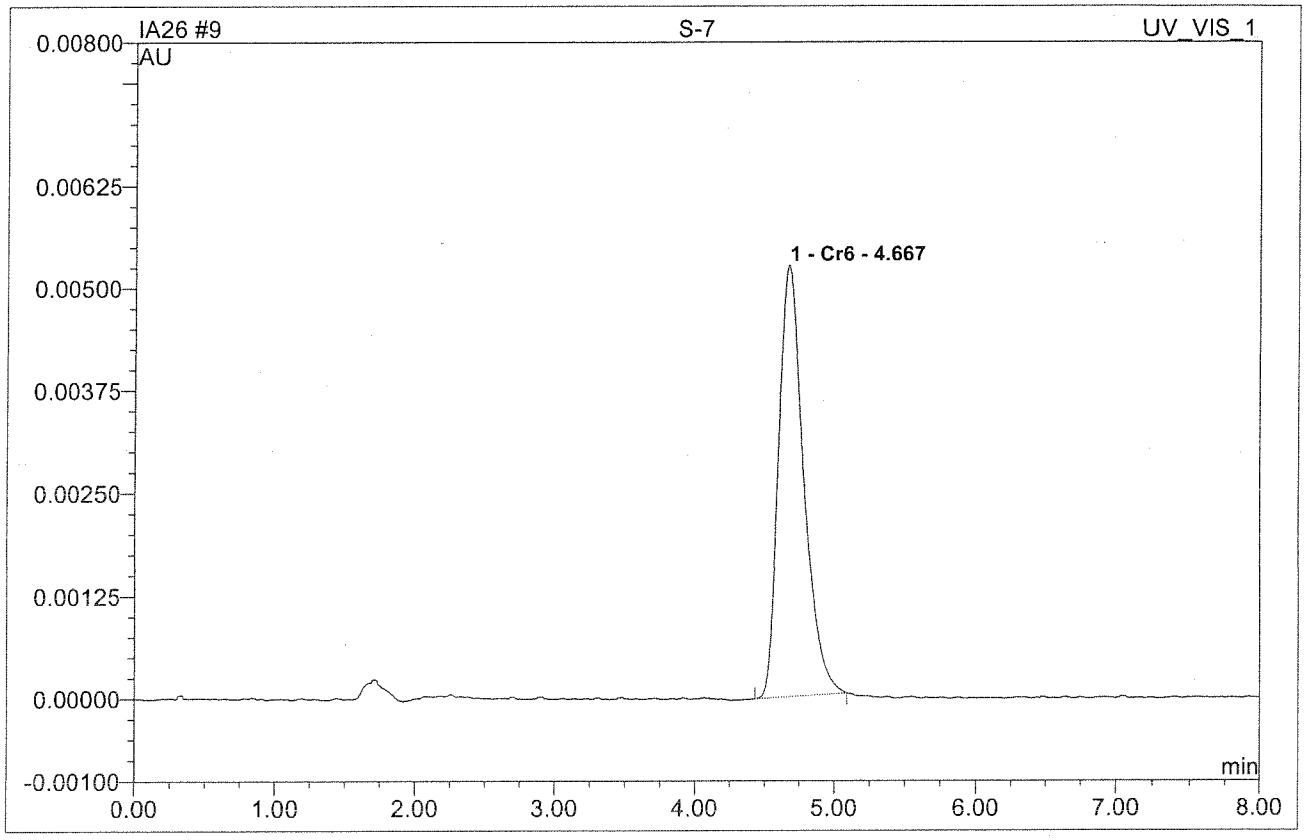
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.65	Cr6	0.0040100	0.0008438	100.00	7.644	BMB
Total:			0.004	0.001	100.00	7.644	

At
01/27/15

IA26 009 S-7

10 PPB

Sample Name:	**S-7**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:57**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



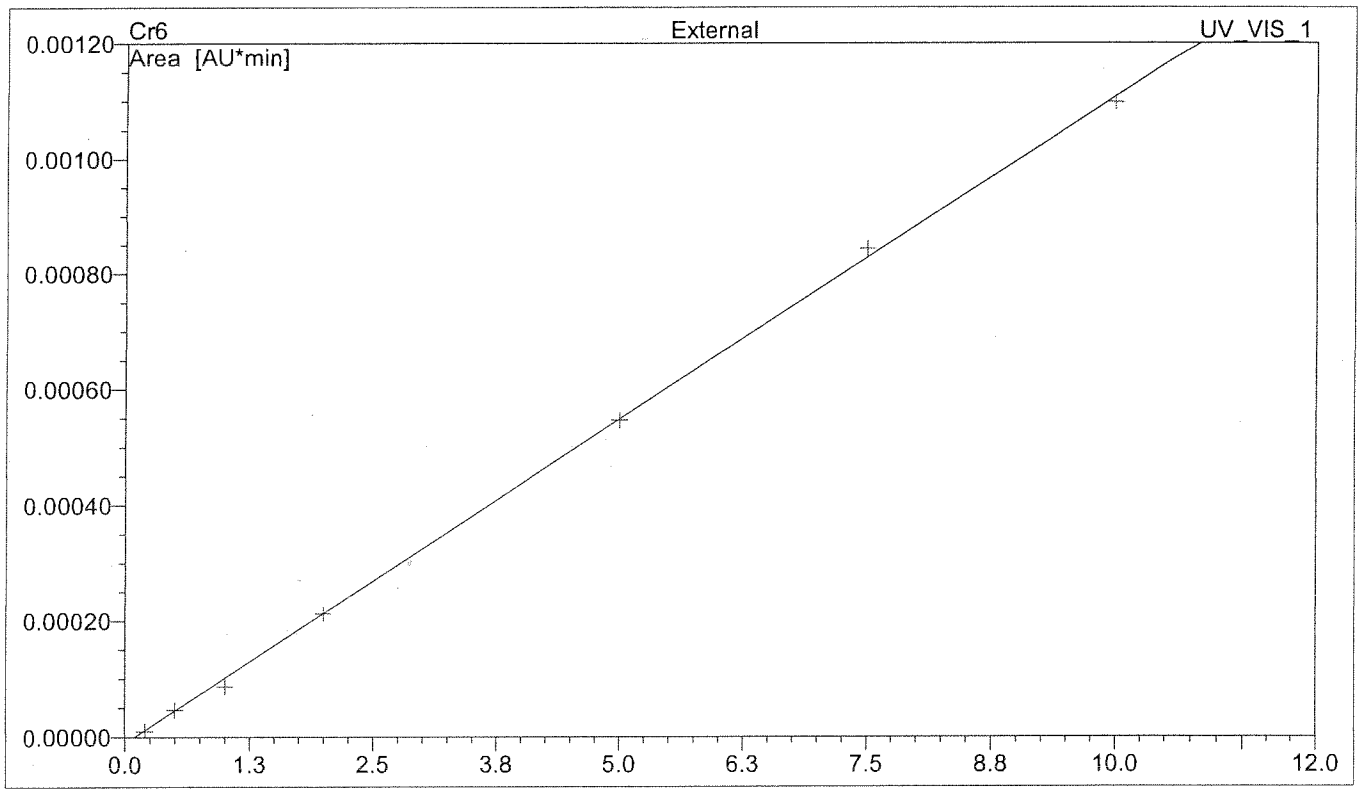
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.67	Cr6	0.0052610	0.0010973	100.00	9.913	BMB
Total:			0.005	0.001	100.00	9.913	

01/27/15

9 S-7

10 PPB

Sample Name:	**S-7**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1.0000**
Recording Time:	**1/26/2015 15:57**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Cal.Type	Points	R-Square	Offset	Slope	Curve
1	4.67	Cr6	0LOff	7	0.9995	-0.0000105	0.0001118	0.0000
Average:					0.9995	0.0000	0.0001	0.0000

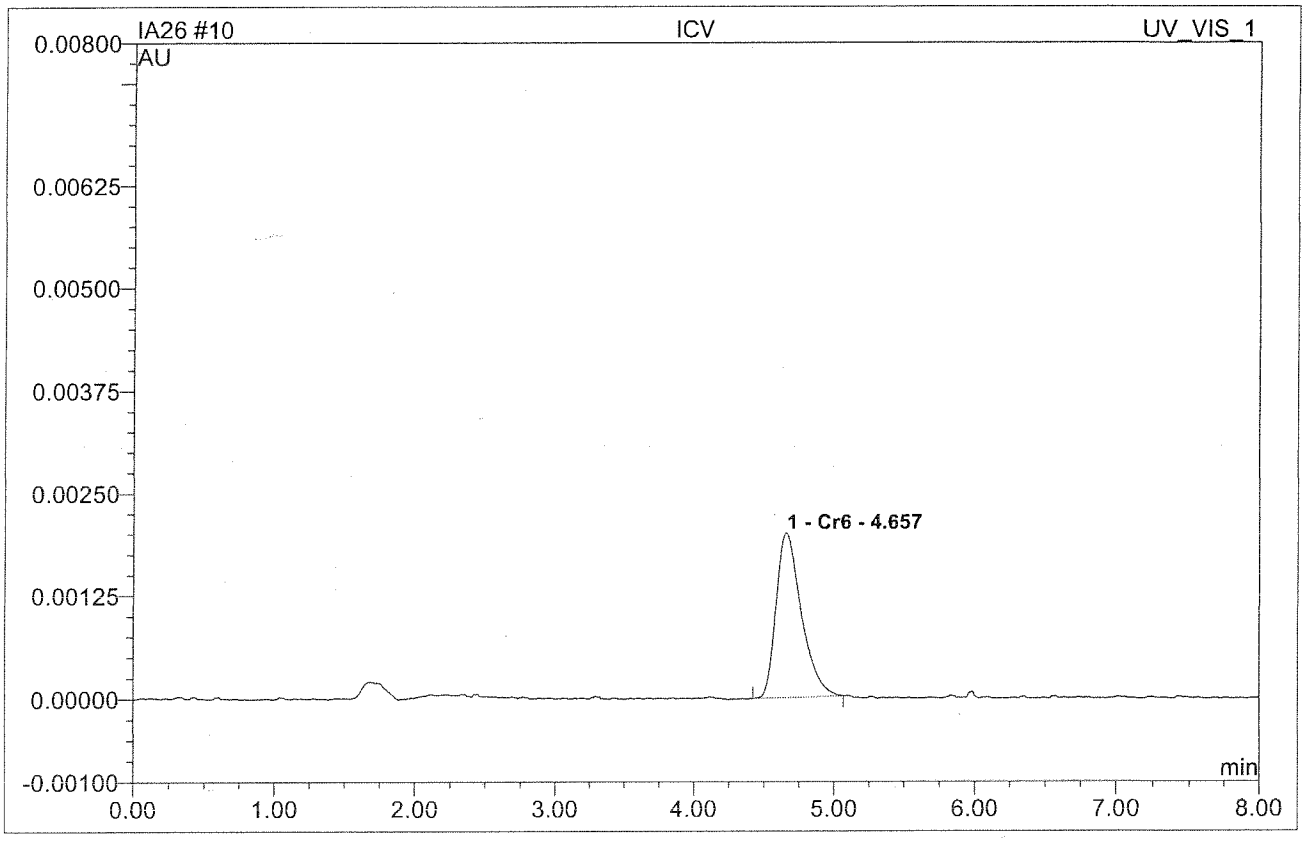
AA 01/27/15

SECOND SOURCE VERIFICATION

IA26 010 ICV

4.0 PPB

Sample Name:	**ICV**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 16:10**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**

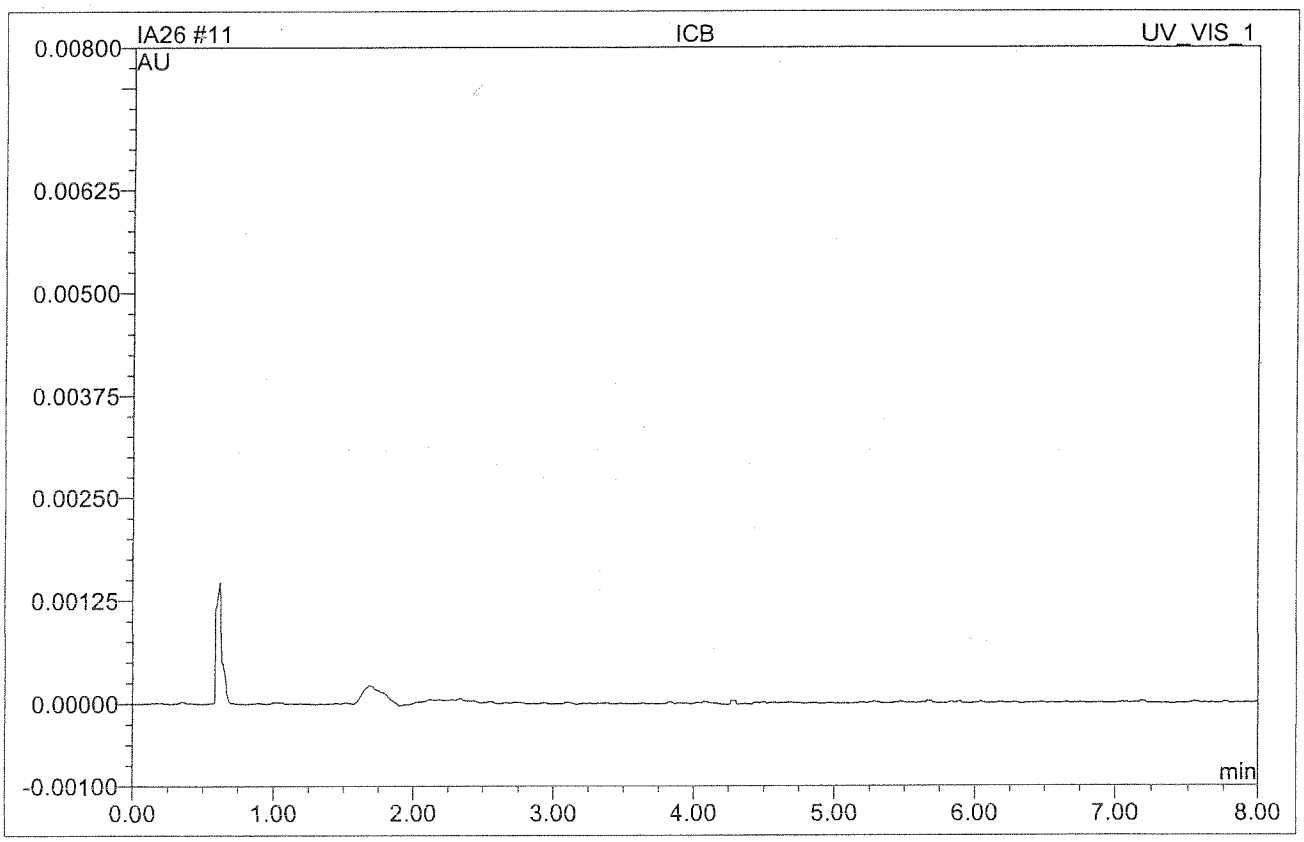


No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.66	Cr6	0.0019990	0.0004173	100.00	3.827	BMB
Total:			0.002	0.000	100.00	3.827	

AS
01/27/15

IA26 011 ICB

Sample Name:	**ICB**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 16:21**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

AA
01/27/15

DAILY CALIBRATIONS

Continuing Calibration Summary Form

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK
SDG : 15D027
Method : 7199
QuantMethod : IC59A26
InstrumentID: 59
Parameter : Hexavalent Chromium

LFID	LSID	DF	Expected	Result	Unit	%Rec	AnalysisDateTime
ID08018	CCV179	1	2	1.971	ug/L	99	04/08/1513:29
ID08030	CCV181	1	2	1.916	ug/L	96	04/08/1515:33
ID08042	CCV183	1	2	1.987	ug/L	99	04/08/1517:38
ID08054	CCV185	1	2	2.026	ug/L	101	04/08/1519:54

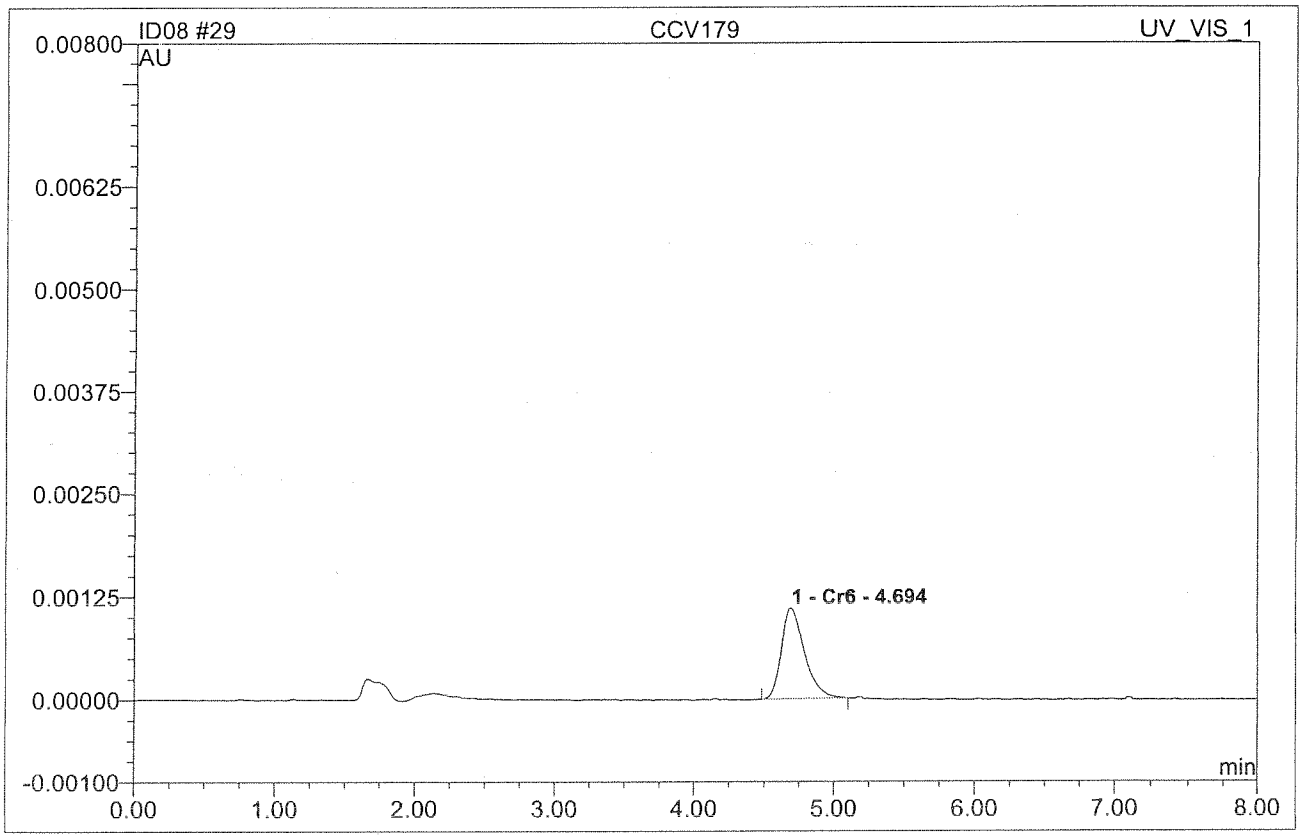
CCV Acceptance Criteria: 90-110%

IC RESULT FORM CalVersion : CR6.A26

LFID	LSID	SelCmp	Cr6	DateTime	DF
ID08001	CCV175	C	101%	04/08/1510:05	1
ID08002	CCB175	C	ND	04/08/1510:26	1
ID08003	WATER QC	C	ND	04/08/1510:36	1
ID08004	HCD003WB	C	ND	04/08/1510:47	1
ID08005	HCD003WQ	C	ND	04/08/1510:57	1
ID08006	HCD003WL	C	1.973	04/08/1511:08	1
ID08007	HCD003WX	C	2.035	04/08/1511:18	1
ID08008	HCD003WC	C	1.973	04/08/1511:28	1
ID08009	HCD003WY	C	1.916	04/08/1511:39	1
ID08010	CCV177	C	100%	04/08/1512:05	1
ID08011	CCB177	C	ND	04/08/1512:16	1
ID08012	D040-21	C	ND	04/08/1512:26	1
ID08013	D040-21N	C	ND	04/08/1512:37	1
ID08014	D040-21A	C	1.036	04/08/1512:47	1
ID08015	D040-22	C	ND	04/08/1512:57	1
ID08016	D040-22N	C	ND	04/08/1513:08	1
ID08017	D040-22A	C	1.018	04/08/1513:18	1
ID08018	CCV179	C	99%	04/08/1513:29	1
ID08019	CCB179	C	ND	04/08/1513:39	1
ID08020	HCD002SB	C	ND	04/08/1513:49	1
ID08021	REAGENT QC	C	ND	04/08/1514:00	1
ID08022	HCD006SB	C	ND	04/08/1514:10	1
ID08023	HCD006SQ	C	ND	04/08/1514:21	1
ID08024	CSD006SL	C	1.882	04/08/1514:31	1
ID08025	CSD006SX	C	1.900	04/08/1514:41	1
ID08026	CID006SL	C	633.638	04/08/1514:52	200
ID08027	CID006SX	C	639.440	04/08/1515:02	200
ID08028	D026-01	C	ND	04/08/1515:13	1
ID08029	D026-01N	C	ND	04/08/1515:23	1
ID08030	CCV181	C	96%	04/08/1515:33	1
ID08031	CCB181	C	ND	04/08/1515:44	1
ID08032	D026-01M	C	445.189	04/08/1515:54	200
ID08033	D026-01NM	C	456.583	04/08/1516:05	200
ID08034	D026-01S	C	441.359	04/08/1516:15	200
ID08035	D026-01NS	C	434.559	04/08/1516:25	200
ID08036	D026-01M	C	3.281	04/08/1516:36	1
ID08037	D026-01NM	C	3.289	04/08/1516:46	1
ID08038	D026-01S	C	3.238	04/08/1516:57	1
ID08039	D026-01NS	C	3.226	04/08/1517:07	1
ID08040	D026-02	C	ND	04/08/1517:17	1
ID08041	D026-02N	C	ND	04/08/1517:28	1
ID08042	CCV183	C	99%	04/08/1517:38	1
ID08043	CCB183	C	ND	04/08/1517:49	1
ID08044	D026-03	C	ND	04/08/1517:59	1
ID08045	D026-03N	C	ND	04/08/1518:10	1
ID08046	D027-01	C	0.261	04/08/1518:20	1
ID08047	D027-01N	C	0.256	04/08/1518:30	1
ID08048	HCD003SB	C	ND	04/08/1518:41	1
ID08049	HCD003SQ	C	ND	04/08/1518:51	1
ID08050	LOD-02	C	0.156	04/08/1519:02	1
ID08051	LOD-02N	C	0.159	04/08/1519:12	1
ID08052	LOQ-02	C	0.226	04/08/1519:22	1
ID08053	LOQ-02N	C	0.235	04/08/1519:33	1
ID08054	CCV185	C	101%	04/08/1519:54	1
ID08055	CCB185	C	ND	04/08/1520:04	1
ID08056	HCD004SB	C	ND	04/08/1521:17	1
ID08057	HCD004SQ	C	ND	04/08/1521:27	1
ID08058	LOD-03	C	0.151	04/08/1521:38	1
ID08059	LOD-03N	C	0.151	04/08/1521:48	1
ID08060	LOQ-03	C	0.225	04/08/1522:30	1
ID08061	LOQ-03N	C	0.235	04/08/1522:40	1
ID08062	CCV187	C	99%	04/08/1522:50	1
ID08063	CCB187	C	ND	04/08/1523:11	1

ID08 018 CCV179

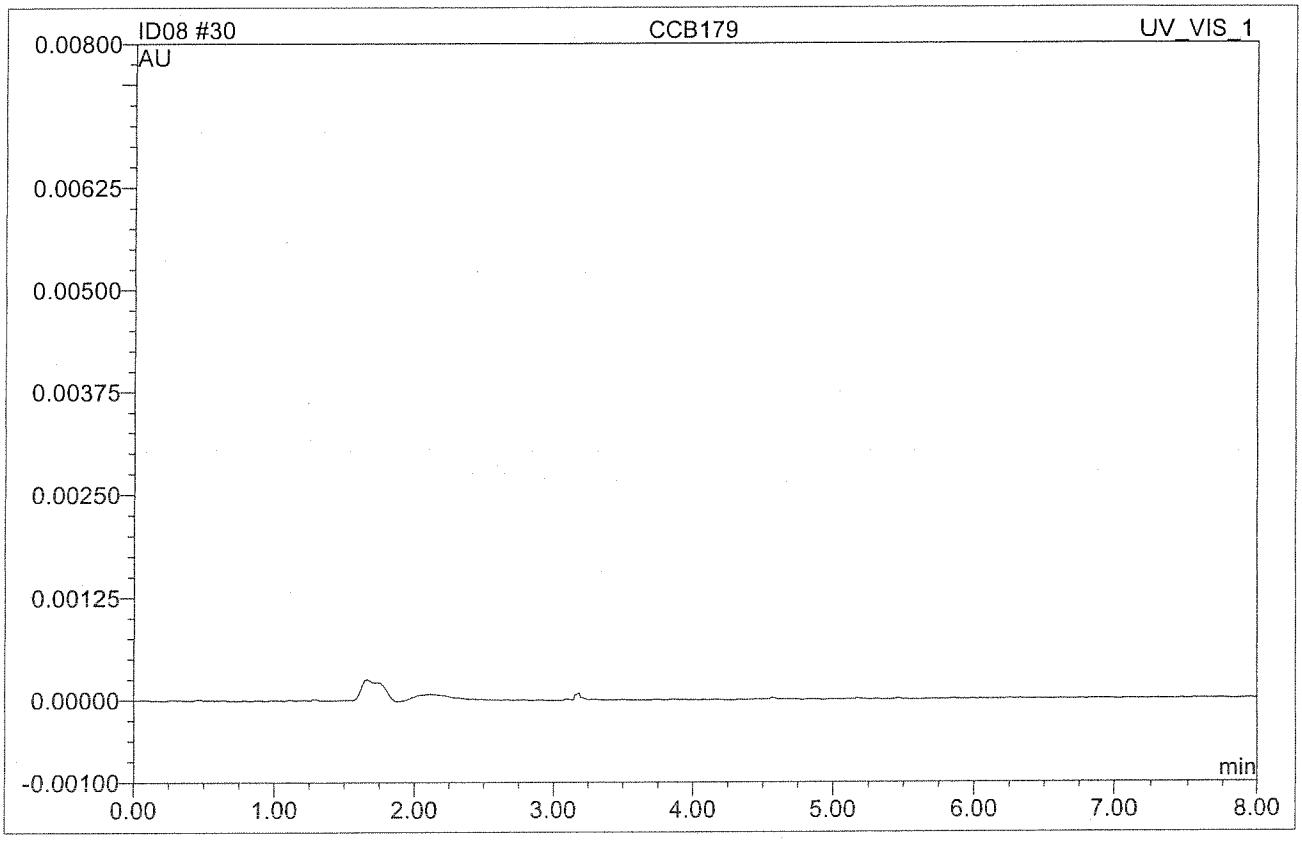
Sample Name:	**CCV179**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/8/2015 13:29**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.69	Cr6	0.0011010	0.0002098	100.00	1.971	BMB
Total:			0.001	0.000	100.00	1.971	

ID08 019 CCB179

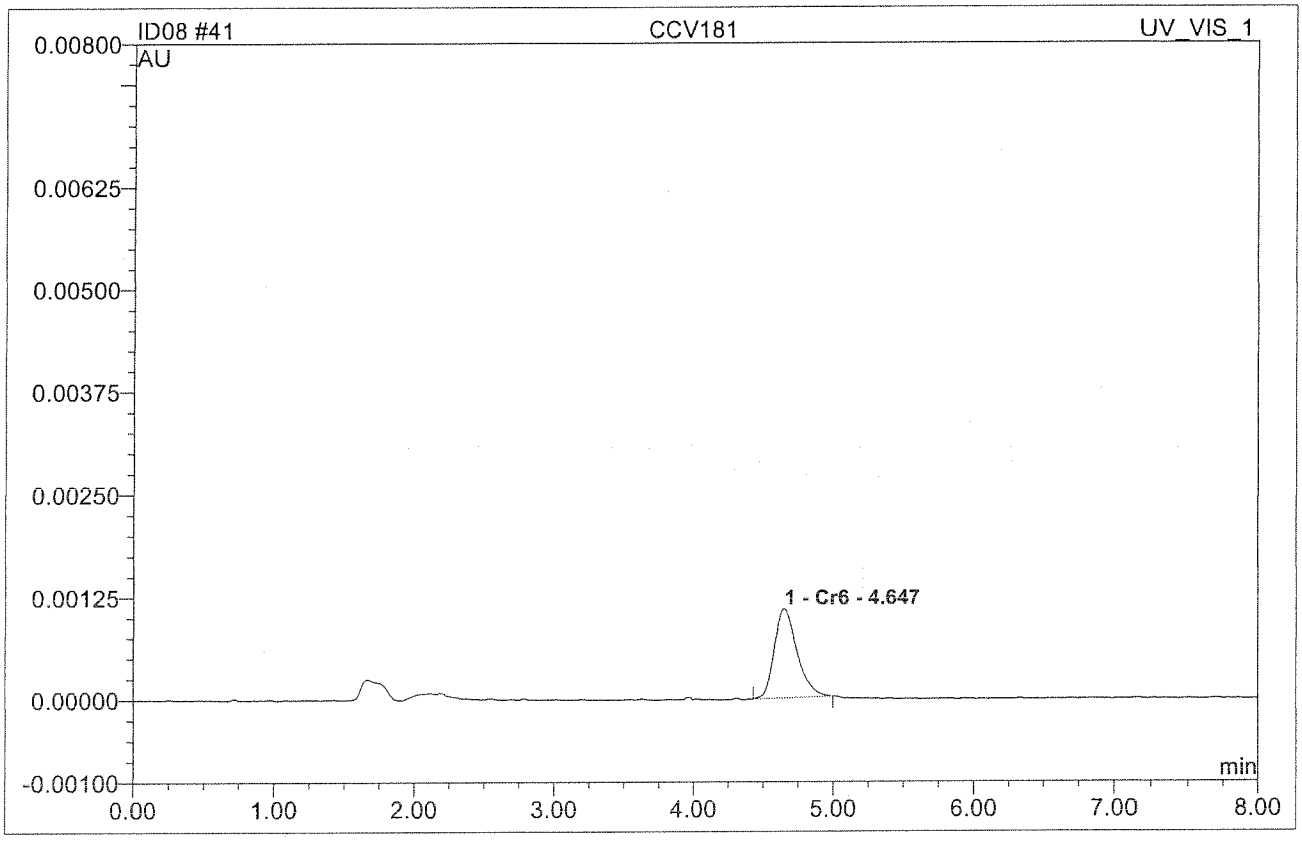
Sample Name:	**CCB179**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/8/2015 13:39**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID08 030 CCV181

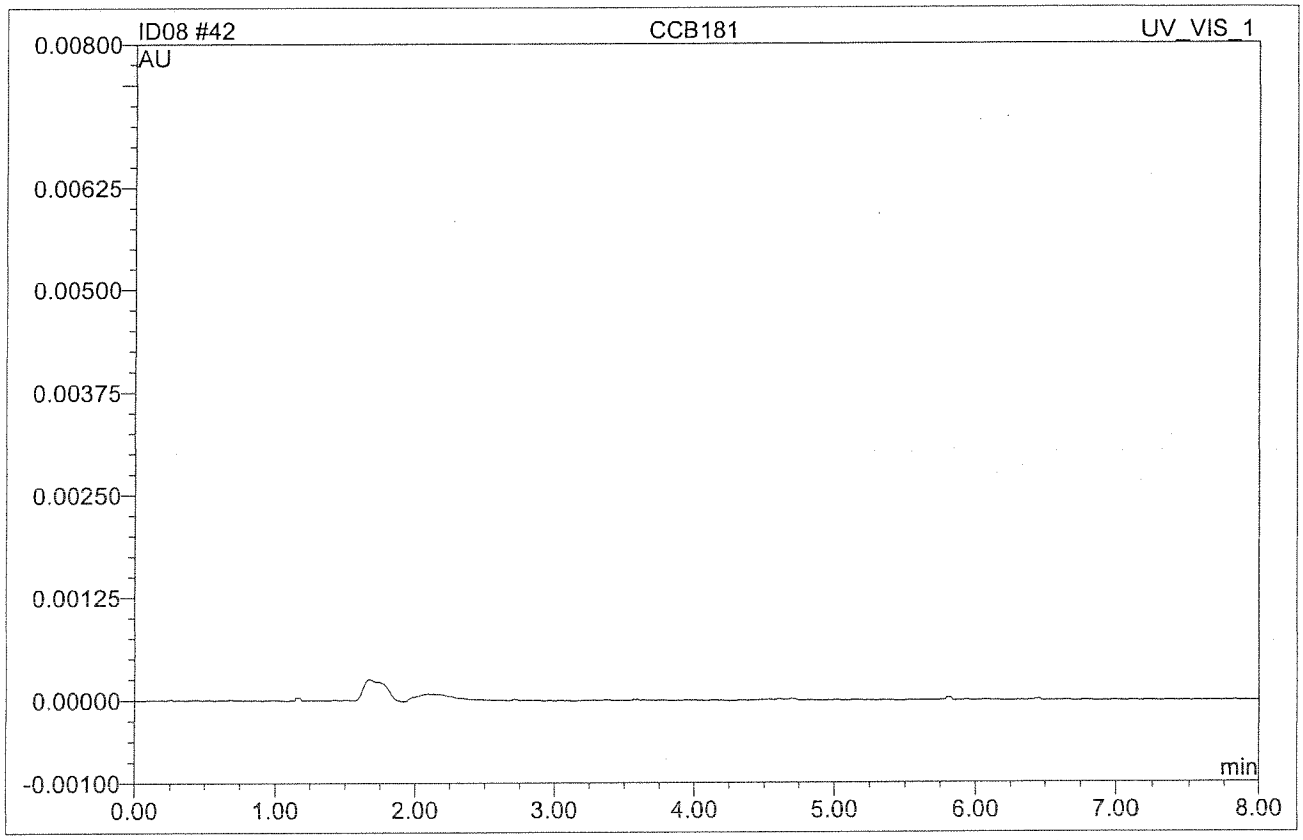
Sample Name:	**CCV181**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/8/2015 15:33**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.65	Cr6	0.0010890	0.0002036	100.00	1.916	BMB
Total:			0.001	0.000	100.00	1.916	

ID08 031 CCB181

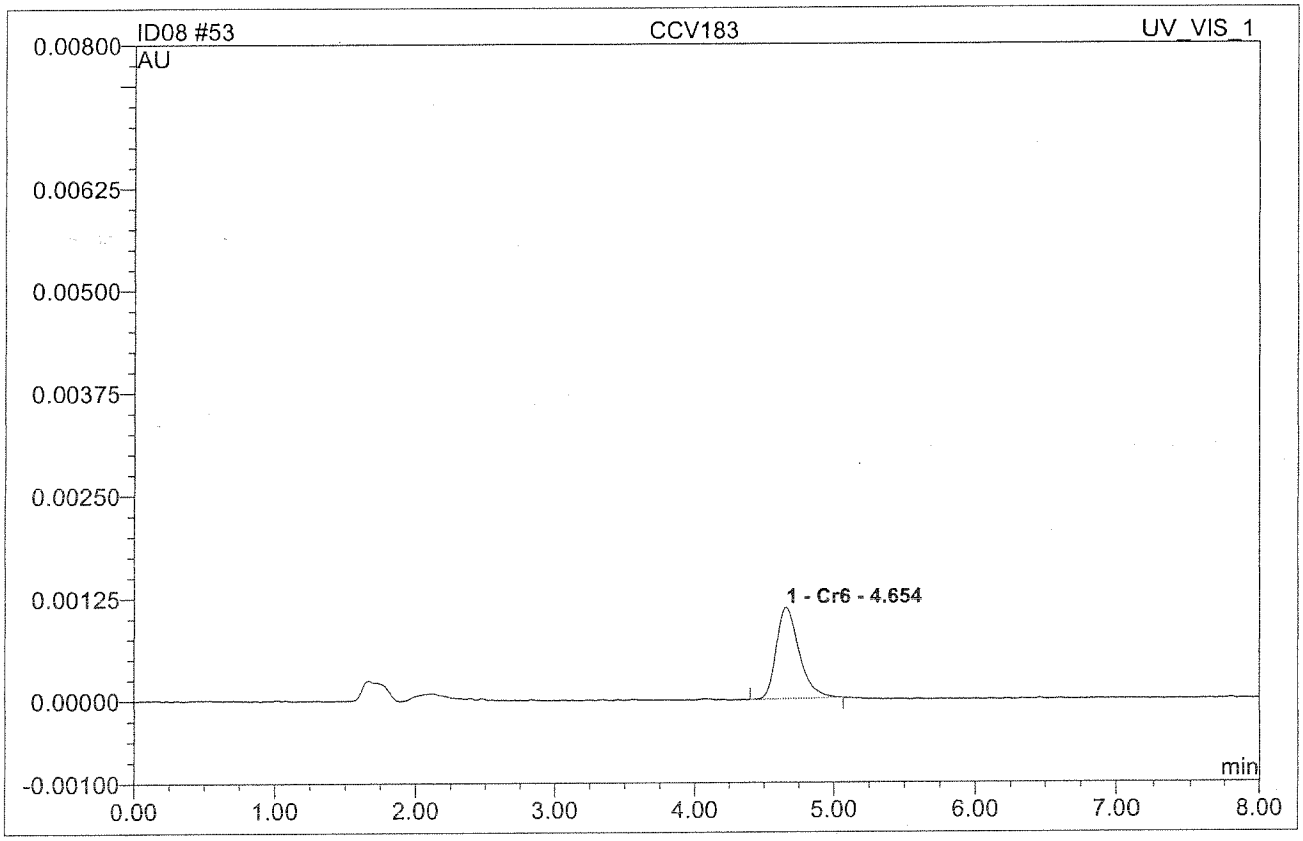
Sample Name:	**CCB181**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/8/2015 15:44**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID08 042 CCV183

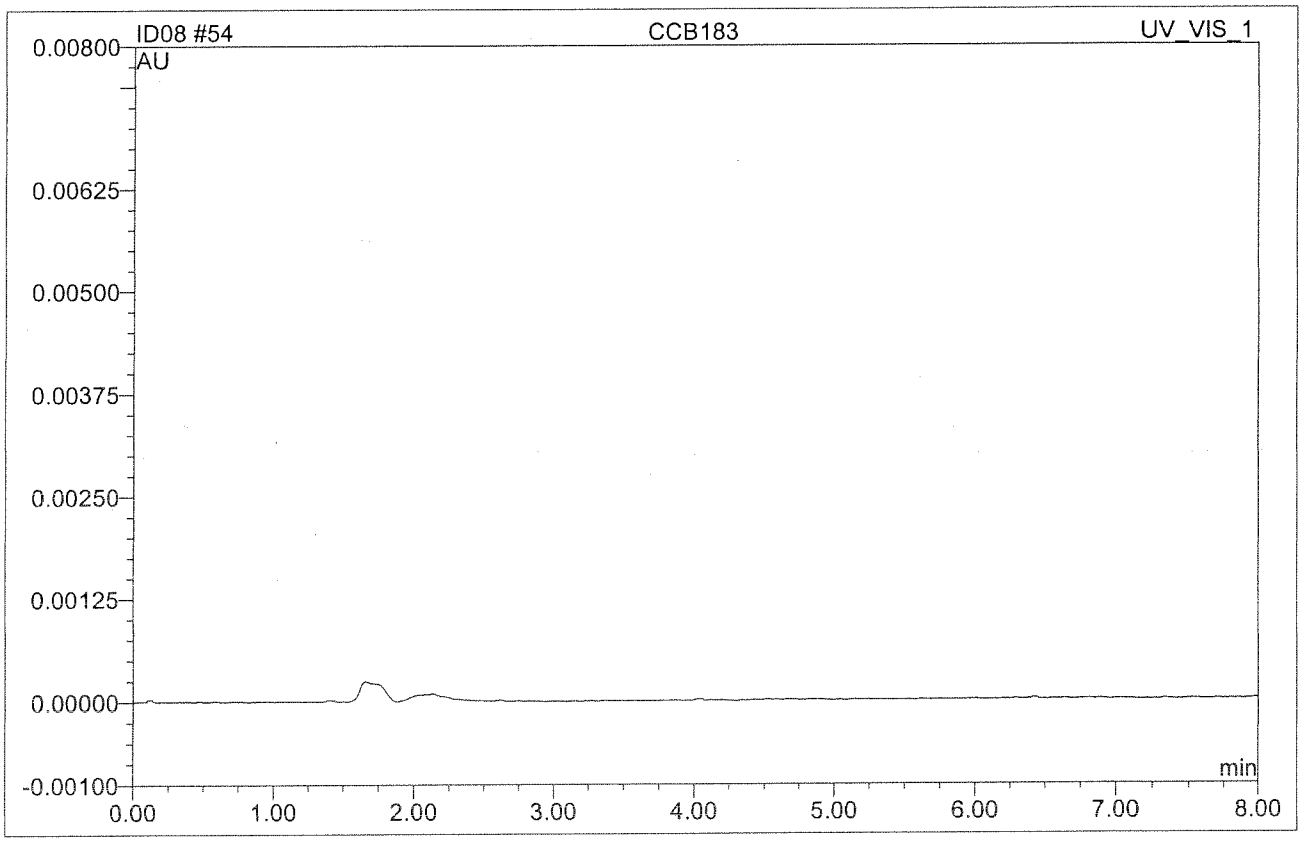
Sample Name:	**CCV183**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/8/2015 17:38**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.65	Cr6	0.0011160	0.0002116	100.00	1.987	BMB
Total:			0.001	0.000	100.00	1.987	

ID08 043 CCB183

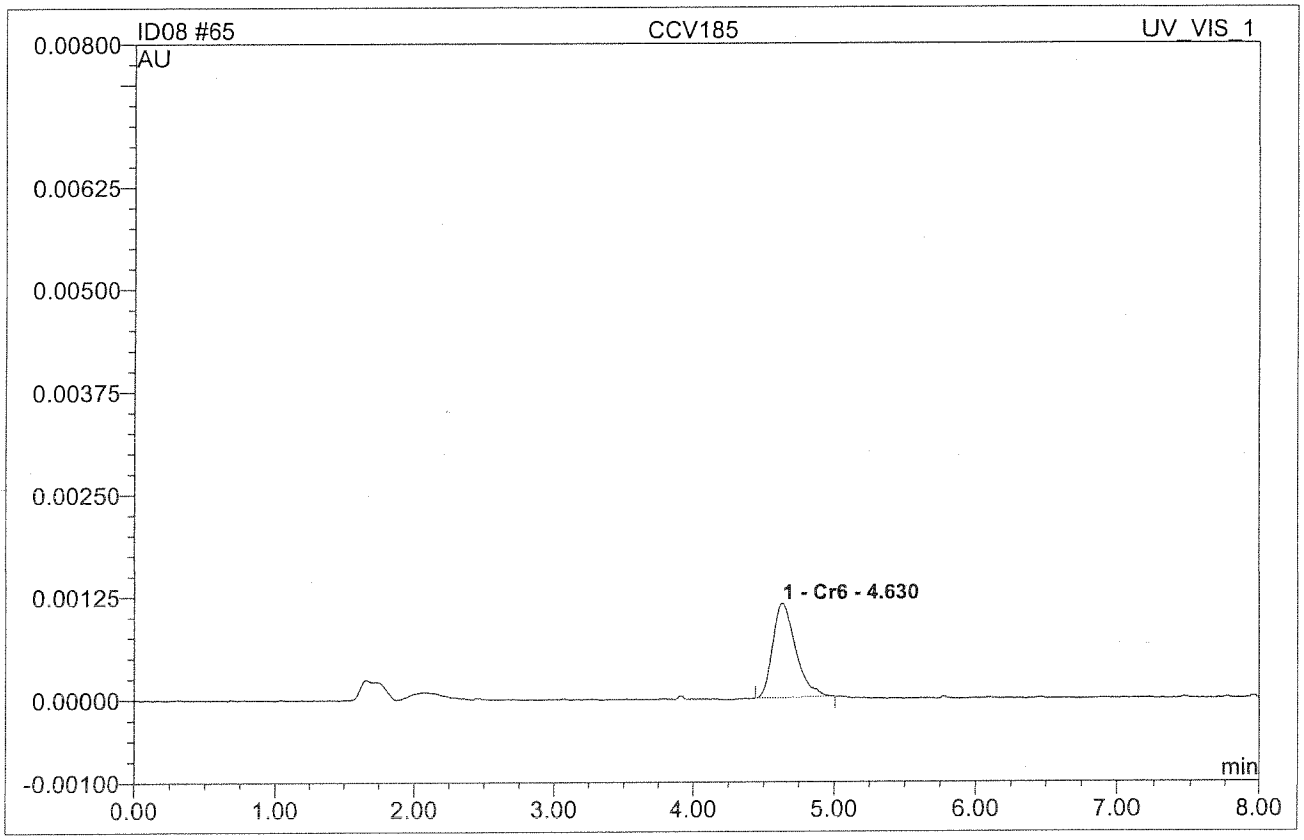
Sample Name:	**CCB183**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/8/2015 17:49**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID08 054 CCV185

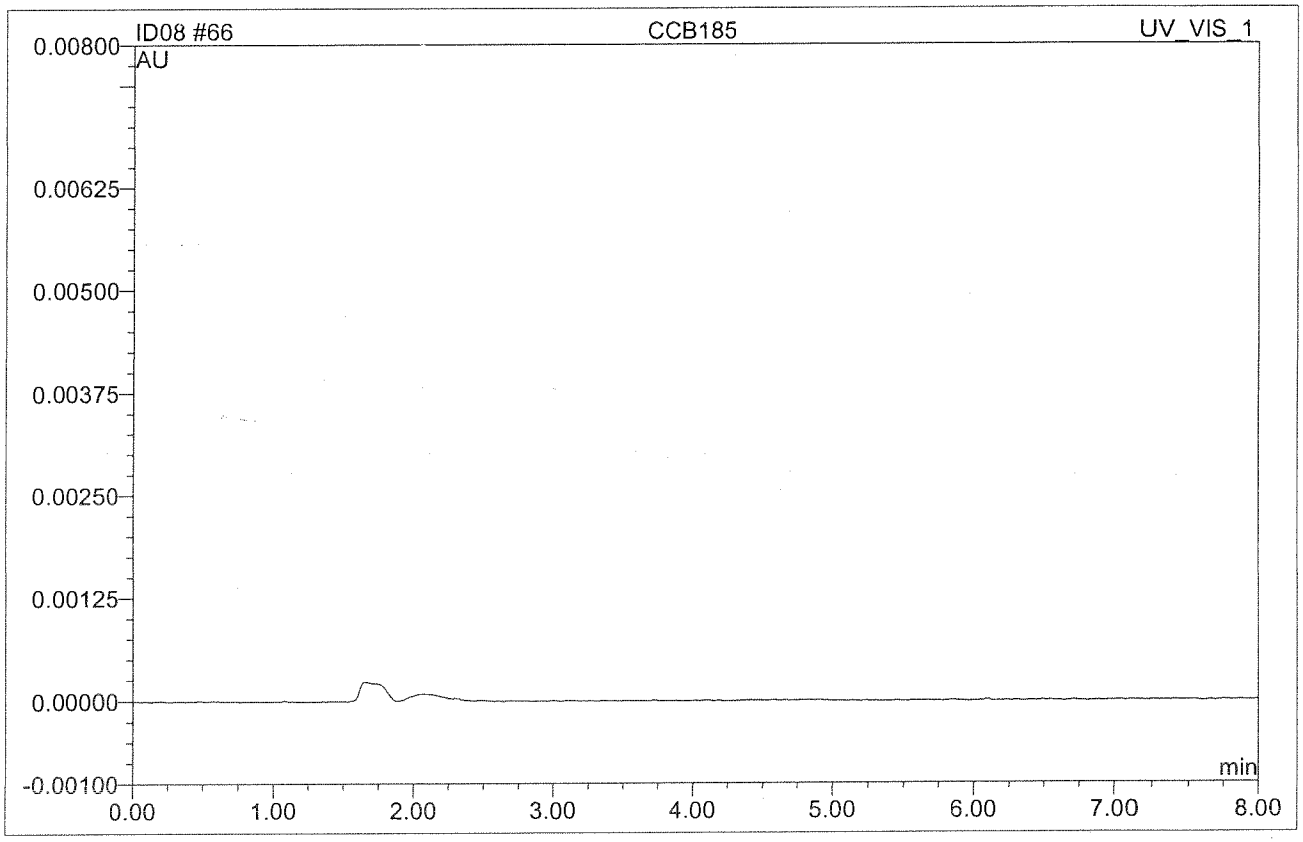
Sample Name:	**CCV185**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/8/2015 19:54**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.63	Cr6	0.0011470	0.0002159	100.00	2.026	BMB
Total:			0.001	0.000	100.00	2.026	

ID08 055 CCB185

Sample Name:	**CCB185**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/8/2015 20:04**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ANALYTICAL LOGS

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HEXAVALENT CHROMIUM IC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

1,5 Diphenylcarbohydrozide : 0.5 g	SW9B-04-023
MeOH : 100 ml	SW1A-005-08-12 } 1L ✓
H_2SO_4 : 28 ml	↓ 06-12
$(NH_4)2SO_4$: 66 g	SW9A-04-027 } 2L ✓
NH_4OH : 13 ml	↓ 023
pH Adjusted Water ID #: (range 9.3-9.5)	1/26/15 ~~R~~ SW4-02-49-03
Reagent Water ID #:	RW1-13-002

Linear Range (ppb):	S0	—	0
	S1	—	0.2
	S2	—	0.5
	S3	—	1.0
	S4	—	2.0
	S5	—	5.0
	S6	—	7.5
	S7	—	10
	ICV	—	4.0

Column : IonPac AS7 (4x255 mm) Serial # 015163 ✓

Guard Column : IonPac NG1 (4x35 mm) Serial # 024132 ✓

Flow : 1.00 mL/min ✓

Wavelength : 530nm ✓

Inj Vol: 250 µL ✓

5 mL vial kit Lot #:	038141	Snapseal
0.45 µm filter lot #:	21855728	402 # 19414007
0.2 µm filter lot #:	21852703	1.502 # 20814007

Book #:	A59-034
Instrument No.:	59
Pipette ID:	SW9A-04-017
	SW9A-04-025
	SW8A-02-21
Balance ID:	10601202
Analytical Sequence:	IA26
Method File:	IC59A26
Analytical Batch:	—

SOP #	Rev. #
☑ EMAX-218.6	5
☑ EMAX-7199	3
☐ EMAX-	

STANDARDS ID	
ICAL	SW9B-05-61-03
ICV	↓ -61-04
CCV	— ~~61~~ 1/26/15
LCS	—
MS	—

ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ CHROMELEON	
☐	

Analyzed By: M

Date: 1/26/15

8084

Sequence: IA26
Operator: EMAXLABS

Printed: 1/27/2015 11:28:56 AM

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 11

Created: 1/26/2015 2:07:16 PM by EMAXLABS
Last Update: 1/27/2015 9:42:56 AM by EMAXLABS

No.	Sequence	Sample ID	Name	Type	Inj. Vol.	Program	Method	Status	Inj. Date/Time	Dil. Factor	Comment
1	IA26	001	IB	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:29:17 PM	1.0000	
2	IA26	002	S-0	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:39:41 PM	1.0000	
3	IA26	003	S-1	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:55:21 PM	1.0000	0.2 PPB
4	IA26	004	S-2	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:05:45 PM	1.0000	0.5 PPB
5	IA26	005	S-3	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:16:09 PM	1.0000	1.0 PPB
6	IA26	006	S-4	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:26:33 PM	1.0000	2.0 PPB
7	IA26	007	S-5	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:36:58 PM	1.0000	5.0 PPB
8	IA26	008	S-6	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:47:22 PM	1.0000	7.5 PPB
9	IA26	009	S-7	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:57:46 PM	1.0000	10 PPB
10	IA26	010	ICV	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 4:10:56 PM	1.0000	4.0 PPB
11	IA26	011	ICB	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 4:21:21 PM	1.0000	

1/27/15 AA

FINAL

VL 1/27/15

5985

Chromeleon © Dionex Corporation, Version 6.70 SP2a Build 1871

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HEXAVALENT CHROMIUM IC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

1,5 Diphenylcarbohydrozide : 0.5 g	SW9B-04-35
MeOH : 100 ml	SW1A-005-08-12 } 1L
H_2SO_4 : 28 ml	↓ -06-12
$(NH_4)2SO_4$: 66 g	SW9A-04-034 } 2L
NH_4OH : 13 ml	↓ 023
pH Adjusted Water ID #: (range 9.3-9.5)	SW4-03-02-02
Reagent Water ID #:	SM5A-03-01-24

ID08.003 QC for SM5A-~~0301~~ 03-01-04 N 4/8/15

HCD003W: D040

HCD023*: QC for SW4-03-03-01

HCD006S*: D026, D027

*: 1.6mL aliquot of digestate was volumed to 100mL to be calculated as preparation factor of 62.5x

HCD003S**: Low Level LOD, LOQ

**: 4.0mL aliquot of digestate was volumed to 100mL to be calculated as preparation factor of 25x

HCD004S [*]: Regular Level LOD, LOQ

[*]: 0.16mL aliquot of digestate was volumed to 100mL to be calculated as preparation factor of 625x

5 mL vial kit Lot #: 038141 Snap-Seal Container

0.45 µm filter lot #: 21855728 4 oz: 19414007

0.2 µm filter lot #: 21852703 1.5 oz: 20814007

Book #:	A59-035
Instrument No.:	59
Pipette ID:	SW9A-04-017
	SW9A-04-025
	SW8A-02-21
Balance ID:	10601202
Analytical Sequence:	ID08
Method File:	IC59A26
Analytical Batch:	HCD003W/2S/6S/3S/4S

SOP #	Rev. #
☐ EMAX-218.6	5
☑ EMAX-7199	3
☐ EMAX-	

STANDARDS ID	
ICAL	–
ICV	–
CCV	SW9B-05-64-12
LCS	↓ 13
MS	↓ 07

ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ CHROMELEON	
☐	

Analyzed By: N

Date: 4/8/15

8086

Sequence: ID08
Operator: EMAXLABS

Printed: 4/10/2015 4:02:51 PM

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 74

Created: 4/10/2015 2:39:51 PM by EMAXLABS
Last Update: 4/10/2015 4:02:33 PM by EMAXLABS

No.	Sequence	Sample ID	Name	Type	Inj. Vol.	Program	Method	Status	Inj. Date/Time	Dil. Factor
1	ID08		IB	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:29:17 PM	1.0000
2	ID08		S-0	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:39:41 PM	1.0000
3	ID08		S-1	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:55:21 PM	1.0000
4	ID08		S-2	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:05:45 PM	1.0000
5	ID08		S-3	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:16:09 PM	1.0000
6	ID08		S-4	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:26:33 PM	1.0000
7	ID08		S-5	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:36:58 PM	1.0000
8	ID08		S-6	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:47:22 PM	1.0000
9	ID08		S-7	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:57:46 PM	1.0000
10	ID08		ICV	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 4:10:56 PM	1.0000
11	ID08		ICB	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 4:21:21 PM	1.0000
12	ID08	001	CCV175	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 10:05:42 AM	1.0000
13	ID08	002	CCB175	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 10:26:31 AM	1.0000
14	ID08	003	WATER QC	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 10:36:55 AM	1.0000
15	ID08	004	HCD003WB	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 10:47:19 AM	1.0000
16	ID08	005	HCD003WQ	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 10:57:43 AM	1.0000
17	ID08	006	HCD003WL	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 11:08:07 AM	1.0000
18	ID08	007	HCD003WX	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 11:18:32 AM	1.0000
19	ID08	008	HCD003WC	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 11:28:56 AM	1.0000
20	ID08	009	HCD003WY	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 11:39:20 AM	1.0000
21	ID08	010	CCV177	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 12:05:54 PM	1.0000
22	ID08	011	CCB177	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 12:16:18 PM	1.0000
23	ID08	012	D040-21	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 12:26:42 PM	1.0000
24	ID08	013	D040-21N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 12:37:06 PM	1.0000
25	ID08	014	D040-21A	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 12:47:30 PM	1.0000
26	ID08	015	D040-22	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 12:57:55 PM	1.0000
27	ID08	016	D040-22N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 1:08:19 PM	1.0000

8687

FINAL
K 4/10/15

Sequence: ID08
Operator: EMAXLABS

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 74

Created: 4/10/2015 2:39:51 PM by EMAXLABS
Last Update: 4/10/2015 4:02:33 PM by EMAXLABS

No.	Sequence	Comment
1	ID08	
2	ID08	
3	ID08	0.2 PPB
4	ID08	0.5 PPB
5	ID08	1.0 PPB
6	ID08	2.0 PPB
7	ID08	5.0 PPB
8	ID08	7.5 PPB
9	ID08	10 PPB
10	ID08	4.0 PPB
11	ID08	
12	ID08	
13	ID08	
14	ID08	QC FOR SM5A-03-01-24
15	ID08	
16	ID08	
17	ID08	
18	ID08	
19	ID08	
20	ID08	
21	ID08	
22	ID08	
23	ID08	
24	ID08	
25	ID08	POST-SPIKE AT 1 PPB
26	ID08	
27	ID08	

3088

FINAL
n 4/10/15

Sequence: ID08
Operator: EMAXLABS

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 74

Created: 4/10/2015 2:39:51 PM by EMAXLABS
Last Update: 4/10/2015 4:02:33 PM by EMAXLABS

No.	Sequence	Sample ID	Name	Type	Inj. Vol.	Program	Method	Status	Inj. Date/Time	Dil. Factor
28	ID08	017	D040-22A	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 1:18:44 PM	1.0000
29	ID08	018	CCV179	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 1:29:08 PM	1.0000
30	ID08	019	CCB179	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 1:39:32 PM	1.0000
31	ID08	020	HCD002SB	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 1:49:56 PM	1.0000
32	ID08	021	REAGENT QC	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 2:00:20 PM	1.0000
33	ID08	022	HCD006SB	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 2:10:44 PM	1.0000
34	ID08	023	HCD006SQ	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 2:21:09 PM	1.0000
35	ID08	024	CSD006SL	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 2:31:33 PM	1.0000
36	ID08	025	CSD006SX	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 2:41:57 PM	1.0000
37	ID08	026	CID006SL	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 2:52:22 PM	200.0000
38	ID08	027	CID006SX	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 3:02:46 PM	200.0000
39	ID08	028	D026-01	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 3:13:10 PM	1.0000
40	ID08	029	D026-01N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 3:23:34 PM	1.0000
41	ID08	030	CCV181	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 3:33:58 PM	1.0000
42	ID08	031	CCB181	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 3:44:22 PM	1.0000
43	ID08	032	D026-01M	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 3:54:46 PM	200.0000
44	ID08	033	D026-01NM	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 4:05:10 PM	200.0000
45	ID08	034	D026-01S	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 4:15:35 PM	200.0000
46	ID08	035	D026-01NS	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 4:25:58 PM	200.0000
47	ID08	036	D026-01M	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 4:36:23 PM	1.0000
48	ID08	037	D026-01NM	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 4:46:47 PM	1.0000
49	ID08	038	D026-01S	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 4:57:11 PM	1.0000
50	ID08	039	D026-01NS	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 5:07:35 PM	1.0000
51	ID08	040	D026-02	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 5:17:59 PM	1.0000
52	ID08	041	D026-02N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 5:28:23 PM	1.0000
53	ID08	042	CCV183	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 5:38:48 PM	1.0000
54	ID08	043	CCB183	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 5:49:12 PM	1.0000

8888

FINAL
4/10/15

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 74

Created: 4/10/2015 2:39:51 PM by EMAXLABS
Last Update: 4/10/2015 4:02:33 PM by EMAXLABS

No.	Sequence	Comment
28	ID08	POST-SPIKE AT 1 PPB
29	ID08	
30	ID08	
31	ID08	
32	ID08	QC FOR SW4-03-03-01
33	ID08	
34	ID08	
35	ID08	
36	ID08	
37	ID08	DF=200
38	ID08	DF=200
39	ID08	
40	ID08	
41	ID08	
42	ID08	
43	ID08	DF=200
44	ID08	DF=200
45	ID08	DF=200
46	ID08	DF=200
47	ID08	
48	ID08	
49	ID08	
50	ID08	
51	ID08	
52	ID08	
53	ID08	
54	ID08	

FINAL
KL 4/10/15

Sequence: ID08
Operator: EMAXLABS

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 74

Created: 4/10/2015 2:39:51 PM by EMAXLABS
Last Update: 4/10/2015 4:02:33 PM by EMAXLABS

No.	Sequence	Sample ID	Name	Type	Inj. Vol.	Program	Method	Status	Inj. Date/Time	Dil. Factor
55	ID08	044	D026-03	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 5:59:36 PM	1.0000
56	ID08	045	D026-03N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 6:10:00 PM	1.0000
57	ID08	046	D027-01	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 6:20:24 PM	1.0000
58	ID08	047	D027-01N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 6:30:48 PM	1.0000
59	ID08	048	HCD003SB	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 6:41:12 PM	1.0000
60	ID08	049	HCD003SQ	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 6:51:37 PM	1.0000
61	ID08	050	LOD-02	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 7:02:01 PM	1.0000
62	ID08	051	LOD-02N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 7:12:25 PM	1.0000
63	ID08	052	LOQ-02	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 7:22:49 PM	1.0000
64	ID08	053	LOQ-02N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 7:33:13 PM	1.0000
65	ID08	054	CCV185	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 7:54:01 PM	1.0000
66	ID08	055	CCB185	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 8:04:25 PM	1.0000
67	ID08	056	HCD004SB	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 9:17:14 PM	1.0000
68	ID08	057	HCD004SQ	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 9:27:38 PM	1.0000
69	ID08	058	LOD-03	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 9:38:02 PM	1.0000
70	ID08	059	LOD-03N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 9:48:26 PM	1.0000
71	ID08	060	LOQ-03	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 10:30:03 PM	1.0000
72	ID08	061	LOQ-03N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 10:40:27 PM	1.0000
73	ID08	062	CCV187	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 10:50:51 PM	1.0000
74	ID08	063	CCB187	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/8/2015 11:11:39 PM	1.0000

8091

FINAL
K 4/10/15

Sequence: ID08
Operator: EMAXLABS
Printed: 4/10/2015 4:02:51 PM

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 74

Created: 4/10/2015 2:39:51 PM by EMAXLABS
Last Update: 4/10/2015 4:02:33 PM by EMAXLABS

No.	Sequence	Comment
55	ID08	
56	ID08	
57	ID08	
58	ID08	
59	ID08	LOW LEVEL
60	ID08	
61	ID08	
62	ID08	
63	ID08	
64	ID08	
65	ID08	
66	ID08	
67	ID08	REGULAR LEVEL
68	ID08	
69	ID08	
70	ID08	
71	ID08	
72	ID08	
73	ID08	
74	ID08	

8692

FINAL
4/10/15

EXTRACTION LOGS

FileID: HCD006S

EMAX LABORATORIES, INC.

IC HEXAVALENT CHROMIUM SOIL SAMPLE PREPARATION LOG

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	pHAdj	FinalVol(ml)	Notes
15HCD006S01	HCD006SB	12.501	g	4/7/15 12:59	9.34	100	
15HCD006S02	CSD006SL	12.509	g	4/7/15 13:00	9.35	100	**1.25mL
15HCD006S03	CID006SL	12.498	g	4/7/15 13:01	9.39	100	*28.2mg
15HCD006S04	D026-01	12.516	g	4/7/15 13:02	9.37	100	
15HCD006S05	D026-01M	12.493	g	4/7/15 13:02	9.39	100	SOL; **2.5mL
15HCD006S06	D026-01S	12.495	g	4/7/15 13:04	9.38	100	SOL; **2.5mL
15HCD006S07	D026-01M	12.506	g	4/7/15 13:05	9.34	100	INSOL; *21.0mg
15HCD006S08	D026-01S	12.505	g	4/7/15 13:06	9.36	100	INSOL; *21.0mg
15HCD006S09	D026-02	12.496	g	4/7/15 13:07	9.34	100	
15HCD006S10	D026-03	12.498	g	4/7/15 13:08	9.38	100	
15HCD006S11	D027-01	12.504	g	4/7/15 13:09	9.36	100	

Calibration of pH Meter — InstrumentID: F7

BufferID	Value	Reading	DateTime
SW1-01-644	4	4	4/8/15 9:50
SW1-01-667	7	7	4/8/15 9:50
SW1-01-627	10	10.01	4/8/15 9:50
SW1-01-656	CalVer 8	8.01	4/8/15 9:50

Standards	Desc	Amt. Added	Exp.Date
SW9B-05-61-15	Cr VI (soluble) 10 ppm	**SEE NOTES	8/5/2015
SW9A-03-002	Cr VI (insoluble) Lead Chromate	*SEE NOTES	4/3/2016
	Cr VI (insoluble)		
	Cr VI (insoluble)		

Reagents ID	Desc	Amt. Added	Exp.Date
SW4-02-39-02	Phosphate Buffer	0.5mL	5/20/2015
SWR1-01-502	$MgCl_2$	0.4g	2/1/2021
SW1A-005-08-14	HNO_3	~1mL	2/6/2016
SW4-03-03-01	Alkali Digestion Solution pH 11.9	50mL	5/7/2015
SW1B-002-20-23	Silica Sand	12.5g	9/21/2021
LOT # 9592070	Filter	NA	NA

Balance ID: 10601202. Calibration check was verified prior to use.

Digestor #: B — Temp. / Thermometer ID: 95C; 111859904

Micropipette ID: SW9A-04-025; SW9A-04-017

☑ EMAX-3060 Rev.0

☐ EMAX-7199 Rev.3

Prepared By: VLe

Checked By: [illegible]

Date 4/8/15

☑ DateTimeStarted 4/7/2015 14:43 ☑ DateTimeEnded 4/7/2015 15:56 Comment: DateTimeStarted and DateTimeEnded is the start and end time for alkali digestion.

FINAL

[illegible] 4/8/15

8091

RETENTION TIME WINDOW

RETENTION TIME WINDOW

METHOD 218.6/7199

Lab Name:	EMAX	**METHOD:**	EMAX-218.6/7199
Instrument ID:	DX500IC59	**IC COLUMN:**	AS7/AG7 / AS7/NG1
		COLUMN SIZE:	4x250mm

Compound	Ical Mean RT	from	to	Retention Time Window
CHROMIUM VI	**4.66**	4.57	4.76	**0.095**

IC59A26

AS
01/27/15

TABLE OF CONTENTS

CLIENT: **KLEINFELDER**

PROJECT: **CTO 070, UXO4, FALLBROOK**

SDG: **15D041**

SECTION		PAGE
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GC/MS-VOA	**	2000 –
GC/MS-SVOA	**	3000 –
GC-VOA	**	4000 –
GC-SVOA	**	5000 –
HPLC	METHOD SW8330A	6000 – 6055
METALS	METHOD SW6020A METHOD SW7471A	7000 – 7075 7076 – 7088
WET	METHOD 6850 METHOD 7199	8000 – 8055 8056 – 8114
OTHERS	**	9000 –

** - Not Requested

EMAX
LABORATORIES, INC.
1835 W. 205th Street
Torrance, CA 90501
Tel: (310) 618-8889
Fax: (310) 618-0818

Date: 05-06-2015
EMAX Batch No.: 15D041

Attn: Scott Fleming

Kleinfelder
1320 Columbia St, Suite 310
San Diego, CA 92101

Subject: Laboratory Report
Project: CTO 070, UX04, FALLBROOK

Enclosed is the Laboratory report for samples received on 04/08/15.
The data reported relate only to samples listed below :

Sample ID	Control #	Col Date	Matrix	Analysis
UX04-SB02-0.83	D041-01	04/03/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC PERCHLORATE BY 6850
UX04-SB03-0.08	D041-02	04/03/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC PERCHLORATE BY 6850
UX04-SB04-0.33	D041-03	04/03/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC PERCHLORATE BY 6850
UX04-SB05-0.33	D041-04	04/03/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC

Sample ID	Control #	Col Date	Matrix	Analysis
				PERCHLORATE BY 6850
UX04-SB06-0.42	D041-05	04/03/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850
UX04-SB07-2.0	D041-06	04/06/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850

The results are summarized on the following pages.

Please feel free to call if you have any questions concerning these results.

Sincerely yours,

Caspar J. Pang
Laboratory Director

This report is confidential and intended solely for the use of the individual or entity to whom it is addressed. This report shall not be reproduced except in full or without the written approval of EMAX.

EMAX certifies that results included in this report meets all NELAC & DOD requirements unless noted in the Case Narrative.

NELAC Accredited Certificate Number 02116CA
L-A-B Accredited DoD ELAP and ISO/IEC 17025 Certificate Number L2278 Testing

15D041

Chain of Custody Form

COC# 0070- 02
Page 1 of 1

CTO-070, UXO4, Fallbrook, CA

Project Manager: Gus Thrasher

Contact: sfleming@kleinfelder.com (865-924-6911)

Sampler: G. Thrasher

Sampler Phone: 858-717-5545

Signature:

Date: 4/7/15

Analytical Laboratory
EMAX Laboratory
1835 W. 205th Street
Torrance CA 90501
Phone (310) 618-8889

Attn Ye Myint

Lab TAT
28-day LIV package &
EQuIS LOD/LOQ EFWEDD

Deliver data to
sfleming@kleinfelder.com &
gkellar@kleinfelder.com

General Comments:
P=Preserved; U=Unpreserved;
FP=Filtered and Preserved

	Sample ID	Location ID	Sample Matrix	Sample Date	Sample Time	# Containers	Explosives Method 8330A	Metals including Strontium Method 6020	Perchlorate Method 6850	Hexavalent Chromium Method 7199	Mercury Method 7470/7471A	Sample Comments
1	UXO4- SB02-0.83	SB02	Soil	4/3/15	15:07	2	✓	✓	✓	✓	✓	
2	UXO4- SB03-0.08	SB03	↓	↓	15:10	2	↓	↓	↓	↓	↓	
3	UXO4- SB04-0.33	SB04			15:20	2						
4	UXO4- SB05-0.33	SB05			15:30	2						
5	UXO4- SB06-0.42	SB06			15:40	2						
6	UXO4- SB07-2.0	SB07	↓	4/6/15	13:30	2	↓	↓	↓	↓	↓	
	UXO4-											
	UXO4-											

Sample Transport:
Lab Courier [X]
Shipping Company: [ ]

Sample Disposal
Disposal by Lab - 60 day retention

Tracking #

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
	4/8/15	0700		4/8/15	1010
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

#1 cooler temp = 3.4°C
no custody seal

1992

SAMPLE RECEIPT FORM 1

Reference Number: SM02.7.3

Type of Delivery	Airbill / Tracking Number	ECN 15D041
☐ Fedex ☐ UPS ☐ GSO ☑ Others	Direct Delivery	Recipient BAISON
☐ EMAX Courier ☐ Client Delivery		Date 4/8/15 Time 1010

COC INSPECTION

☑ Client Name	☑ Client PM/FC	☐ Sampler Name	☑ Sampling Date/Time	☑ Sample ID	☑ Matrix
☐ Address	☑ Tel # / Fax #	☐ Courier Signature	☑ Analysis Required	☐ Preservative (if any)	☐ TAT
Safety Issues (if any)	☐ High concentrations expected	☐ From Superfund Site	☐ Rad screening required		

Note: Original C.O.C was not received.

PACKAGING INSPECTION

Container	☑ Cooler	☐ Box	☐ Other		
Condition	☐ Custody Seal	☑ Intact	☐ Damaged		
Packaging	☐ Bubble Pack	☐ Styrofoam	☐ Popcorn	☑ Sufficient	☐ _____
Temperatures (Cool, ≤6 °C but not frozen)	☑ Cooler 1 3.4 °C	☐ Cooler 2_____ °C	☐ Cooler 3_____ °C	☐ Cooler 4_____ °C	☐ Cooler 5_____ °C
	☐ Cooler 6_____ °C	☐ Cooler 7_____ °C	☐ Cooler 8_____ °C	☐ Cooler 9_____ °C	☐ Cooler 10_____ °C

Thermometer: *A - S/N* _____ FM 1/20/15 *B - S/N* 140252070 *C - S/N* 140252067 *D - S/N* _____

Comments: ☐ **Temperature is out of range. PM was informed IMMEDIATELY.**

Note: _____

DISCREPANCIES

LabSampleID	LabSampleContainerID	Code	ClientSample Label ID / Information	Corrective Action

4/8/15

☐ pH holding time requirement for water samples is 15 mins. Water samples for pH analysis are received beyond 15 minutes from sampling time. LP 4/8/15

NOTES/OBSERVATIONS:

LEGEND:

☐ **Continue to next page.**

Code	Description- Sample Management	Code	Description-Sample Management	Code	Description-Sample Management
D1	Analysis is not indicated in _____	D13	Out of Holding Time	R1	Proceed as indicated in ☐ COC ☐ Label
D2	Analysis mismatch COC vs label	D14	Bubble is >6mm	R2	Refer to attached instruction
D3	Sample ID mismatch COC vs label	D15	No trip blank in cooler	R3	Cancel the analysis
D4	Sample ID is not indicated in _____	D16	Preservation not indicated in _____	R4	Use vial with smallest bubble first
D5	Container -[improper] [leaking] [broken]	D17	Preservation mismatch COC vs label	R5	Log-in with latest sampling date and time+1 min
D6	Date/Time is not indicated in _____	D18	Insufficient chemical preservative	R6	Adjust pH as necessary
D7	Date/Time mismatch COC vs label	D19	Insufficient Sample	R7	Filter and preserved as necessary
D8	Sample listed in COC is not received	D20	No filtration info for dissolved analysis	R8	_____
D9	Sample received is not listed in COC	D21	No sample for moisture determination	R9	_____
D10	No initial/date on corrections in COC/label	D22	_____	R10	_____
D11	Container count mismatch COC vs received	D23	_____	R11	_____
D12	Container size mismatch COC vs received	D24	_____	R12	_____

REVIEWS:

Sample Labeling [signature] **Date** 04/8/15 4/8/15

SRF [signature] **Date** 4/8/15

PM [signature] **Date** 4/8/15

Ye Myint

From: Gus.Thrasher@CH2M.com
Sent: Wednesday, April 08, 2015 12:45 PM
To: Ye Myint; Cecilia Chavez; SFleming@kleinfelder.com
Cc: Linh Pham
Subject: RE: UXO5 and UXO4 sampling
Attachments: UXO4_COC02_04082015.jpg

Please see attached missing COC for samples collected from UXO4 and submitted this morning via lab courier.

Please let me know if you have any questions...

Thanks,
Gus

From: Ye Myint [mailto:YMyint@emaxlabs.com]
Sent: Wednesday, April 08, 2015 11:54 AM
To: Thrasher, Gus/SDO; Cecilia Chavez; SFleming@kleinfelder.com
Cc: Linh Pham
Subject: RE: UXO5 and UXO4 sampling

The samples received today, without COC are:

CTO 70

UX04-SB02-0.83, collected 04/03 15:07
UX04-SB03-0.08, collected 04/03 15:10
UX04-SB04-0.33, collected 04/03 15:20
UX04-SB05-0.33, collected 04/03 15:30
UX04-SB06-0.42, collected 04/03 15:40

UX04-SB07-2.0, collected 04/06 13:30

Thanks

Ye
310-618-8889 x121

From: Gus.Thrasher@CH2M.com [mailto:Gus.Thrasher@CH2M.com]
Sent: Wednesday, April 08, 2015 11:28 AM
To: Ye Myint; Cecilia Chavez; SFleming@kleinfelder.com
Cc: Linh Pham
Subject: RE: UXO5 and UXO4 sampling

Thank you for the clarification – the missing COC is associated with the UXO4 samples were wrapped/packaged in the morning yesterday and must not have made it in the latest cooler that was packed up late last night. This should be samples UXO4-SB02-x.x through UXO4-SB06-x.x. Will you please send me the date/times listed on the containers? I will complete the COC and send you a scan. Apologies for the confusion.

Gus

From: Ye Myint [mailto:YMyint@emaxlabs.com]
Sent: Wednesday, April 08, 2015 11:22 AM
To: Thrasher, Gus/SDO; Cecilia Chavez; SFleming@kleinfelder.com
Cc: Linh Pham
Subject: RE: UXO5 and UXO4 sampling

We did receive all 3 COCs this morning for samples collected on 04/07.

In addition, we also received 5 soil collected on 04/03 and 1 soil collected on 04/06 this morning. However, there are no corresponding COCs received for these 6 samples. Our SM will provide us the sample IDs that need COCs.

No issues with the samples we received last Friday via EMAX courier.

Ye
310-618-8889 x121

From: Gus.Thrasher@CH2M.com [mailto:Gus.Thrasher@CH2M.com]
Sent: Wednesday, April 08, 2015 11:05 AM
To: Cecilia Chavez; SFleming@kleinfelder.com; Ye Myint
Cc: Linh Pham
Subject: RE: UXO5 and UXO4 sampling

What sample group is this? The samples that just went in this morning had a 3 page COC – all from CTO 063.

The samples sent Friday morning had two COCs, one from CTO 063 and one from CTO 070 (one sample). Both COCs were inside a ziploc bag taped to the outside of the cooler and signed by courier Keith upon pick up!

From: Cecilia Chavez [mailto:CChavez@emaxlabs.com]
Sent: Wednesday, April 08, 2015 11:02 AM
To: 'Scott Fleming'; Ye Myint
Cc: Thrasher, Gus/SDO; Linh Pham
Subject: RE: UXO5 and UXO4 sampling

Ye

We received samples from CTO 63, with COC and CTO 70 without COC. We will separate this CTOs with different SDGs. Please provide copy of the missing COC.

Thanks

From: Scott Fleming [mailto:SFleming@kleinfelder.com]
Sent: Tuesday, April 07, 2015 12:53 PM
To: Ye Myint; Cecilia Chavez
Cc: Gus.Thrasher@CH2M.com; Linh Pham
Subject: RE: UXO5 and UXO4 sampling

Ye,
7am 4/8/15 is perfect!
Thanks
Scott

From: Ye Myint [mailto:YMyint@emaxlabs.com]
Sent: Tuesday, April 07, 2015 2:51 PM
To: Scott Fleming; Cecilia Chavez
Cc: Gus.Thrasher@CH2M.com; Linh Pham
Subject: RE: UXO5 and UXO4 sampling

Scott,

Can you please have the samples ready by 7 a.m tomorrow? The driver will be there at 7 and will bring the samples straight back to EMAX. Please let us know if there are any issues with the scheduled pick-up time. Thanks.

Ye
310-618-8889 x121

REPORTING CONVENTIONS

DATA QUALIFIERS:

Lab Qualifier	AFCEE Qualifier	Description
J	F	Indicates that the analyte is positively identified and the result is less than LOQ/RL but greater than LOD/MDL/DL.
N		Indicates presumptive evidence of a compound.
B	B	Indicates that the analyte is found in the associated method blank as well as in the sample at above QC level.
E	J	Indicates that the result is above the maximum calibration range or estimated value.
*	*	Out of QC limit.

Note: The above qualifiers are used to flag the results unless the project requires a different set of qualification criteria.

ACRONYMS AND ABBREVIATIONS:

CRDL	Contract Required Detection Limit
RL	Reporting Limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
DL	Detection Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DO	Diluted out

DATES

The date and time information for leaching and preparation reflect the beginning date and time of the procedure unless the method, protocol, or project specifically requires otherwise.

LABORATORY REPORT FOR

KLEINFELDER

CTO 070, UXO4, FALLBROOK

METHOD SW8330A
EXPLOSIVES

SDG#: 15D041

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D041

METHOD SW8330A
EXPLOSIVES

A total of six (6) soil samples were received on 04/08/15 to be analyzed for Explosives in accordance with Method SW8330A and project specific requirements.

Holding Time
Samples were analyzed within the prescribed holding time.

Calibration
Multi-calibration points were generated to establish initial calibration (ICAL). ICAL was verified using a secondary source (ICV). Continuing calibration (CCV) verifications were carried on a frequency specified by the project. All calibration requirements were within acceptance criteria. Refer to calibration summary forms of ICAL, ICV and CCV for details.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, one (1) method blank was analyzed. EXD010SB - result was compliant to project requirement. Refer to sample result summary form for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, one (1) set of LCS/LCD was analyzed. EXD010SL/EXD010SC - all analytes were within LCS QC limits. Refer to LCS summary form for details.

Matrix QC Sample
Matrix spike sample was prepared and analyzed at a frequency required by the project. For this SDG, one (1) set of MS/MSD was analyzed. D041-01M/D041-01S - all analytes were within MS QC limits. Refer to Matrix QC summary form for details.

Surrogate
Surrogate was added on QC and field samples. All surrogate recoveries were within QC limits. Refer to sample result summary forms for details.

Sample Analysis
All positive results above LOQ were confirmed by Biphenyl column. Confirmation was presumptive because it was based on retention time window. All project requirements were met otherwise anomalies were discussed within the associated QC parameter.
Soil samples were air dried, hence no moisture correction applied to RL and MDL.

LAB CHRONICLE
EXPLOSIVES

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK

SDG NO. : 15D041
Instrument ID : T081

SOIL

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1S	EXD010SB	1	NA	04/14/1520:23	04/13/1515:50	XD14014A	XD14013A	EXD010S	Method Blank
LCS1S	EXD010SL	1	NA	04/14/1520:58	04/13/1515:50	XD14015A	XD14013A	EXD010S	Lab Control Sample (LCS)
LCD1S	EXD010SC	1	NA	04/14/1521:33	04/13/1515:50	XD14016A	XD14013A	EXD010S	LCS Duplicate
UXO4-SB02-0.83	D041-01	1	NA	04/14/1523:19	04/13/1515:50	XD14019A	XD14013A	EXD010S	Field Sample
UXO4-SB02-0.83MS	D041-01M	1	NA	04/14/1523:54	04/13/1515:50	XD14020A	XD14013A	EXD010S	Matrix Spike Sample (MS)
UXO4-SB02-0.83MSD	D041-01S	1	NA	04/15/1500:29	04/13/1515:50	XD14021A	XD14013A	EXD010S	MS Duplicate (MSD)
UXO4-SB03-0.08	D041-02	1	NA	04/15/1501:04	04/13/1515:50	XD14022A	XD14013A	EXD010S	Field Sample
UXO4-SB04-0.33	D041-03	1	NA	04/15/1501:39	04/13/1515:50	XD14023A	XD14013A	EXD010S	Field Sample
UXO4-SB05-0.33	D041-04	1	NA	04/15/1502:49	04/13/1515:50	XD14025A	XD14024A	EXD010S	Field Sample
UXO4-SB06-0.42	D041-05	1	NA	04/15/1503:24	04/13/1515:50	XD14026A	XD14024A	EXD010S	Field Sample
UXO4-SB07-2.0	D041-06	1	NA	04/15/1503:59	04/13/1515:50	XD14027A	XD14024A	EXD010S	Field Sample

FN - Filename
% Moist - Percent Moisture

SAMPLE RESULTS

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/03/15
Project	: CTO 070, UXO4, FALLBROOK	Date Received:	04/08/15
Batch No.	: 15D041	Date Extracted:	04/13/15 15:50
Sample ID:	UXO4-SB02-0.83	Date Analyzed:	04/14/15 23:19
Lab Samp ID:	D041-01	Dilution Factor:	1
Lab File ID:	XD14019A	Matrix :	SOIL
Ext Btch ID:	EXD010S	% Moisture :	NA
Calib. Ref.:	XD14013A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1960	2000	97.9	70-130

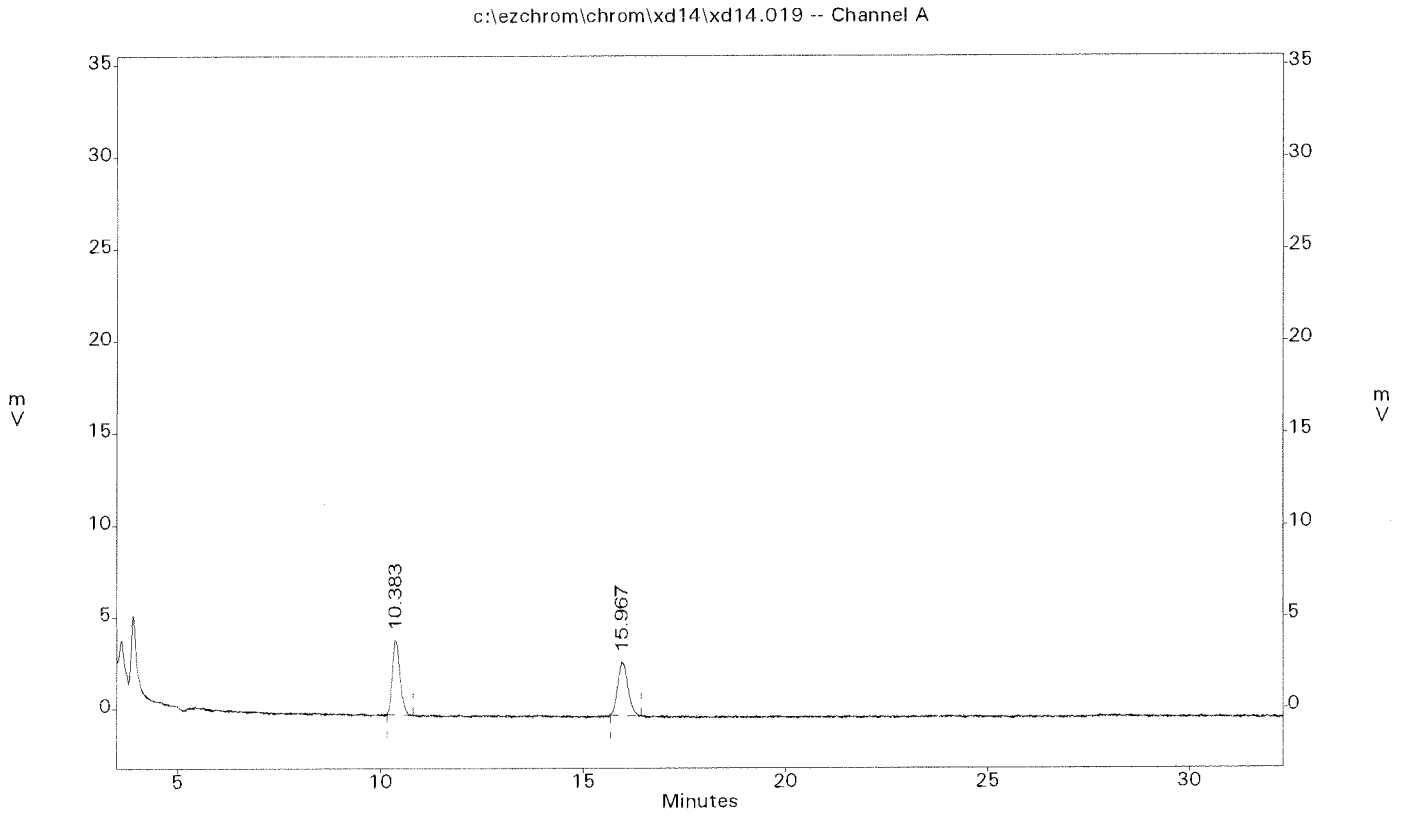
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd14\xd14.019
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D041-01
Acquired : Apr 14, 2015 23:19:00
Printed : Apr 15, 2015 12:24:17
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.633	0	0.0	0.0
--	RDX	7.108	0	0.0	0.0
--	1,3,5-TNB	9.650	0	0.0	0.0
1	1,2-Dinitrobenzene	10.383	54118	289.8	186.7
--	1,3-DNB	12.075	0	0.0	0.0
--	Tetryl	13.050	0	0.0	0.0
--	Nitrobenzene	14.208	0	0.0	0.0
--	2,4,6-TNT	15.700	0	0.0	0.0
2	3,4-DNT	15.967	52241	266.7	195.9
--	4-Am-2,6-DNT	16.642	0	0.0	0.0
--	2-Am-4,6-DNT	17.242	0	0.0	0.0
--	2,6-DNT	18.833	0	0.0	0.0
--	2,4-DNT	19.500	0	0.0	0.0
--	2-Nitrotoluene	23.642	0	0.0	0.0
--	4-Nitrotoluene	25.600	0	0.0	0.0
--	3-Nitrotoluene	27.458	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/03/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/08/15
Batch No.	: 15D041	Date Extracted:	04/13/15 15:50
Sample ID:	UX04-SB03-0.08	Date Analyzed:	04/15/15 01:04
Lab Samp ID:	D041-02	Dilution Factor:	1
Lab File ID:	XD14022A	Matrix :	SOIL
Ext Btch ID:	EXD010S	% Moisture :	NA
Calib. Ref.:	XD14013A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1930	2000	96.7	70-130

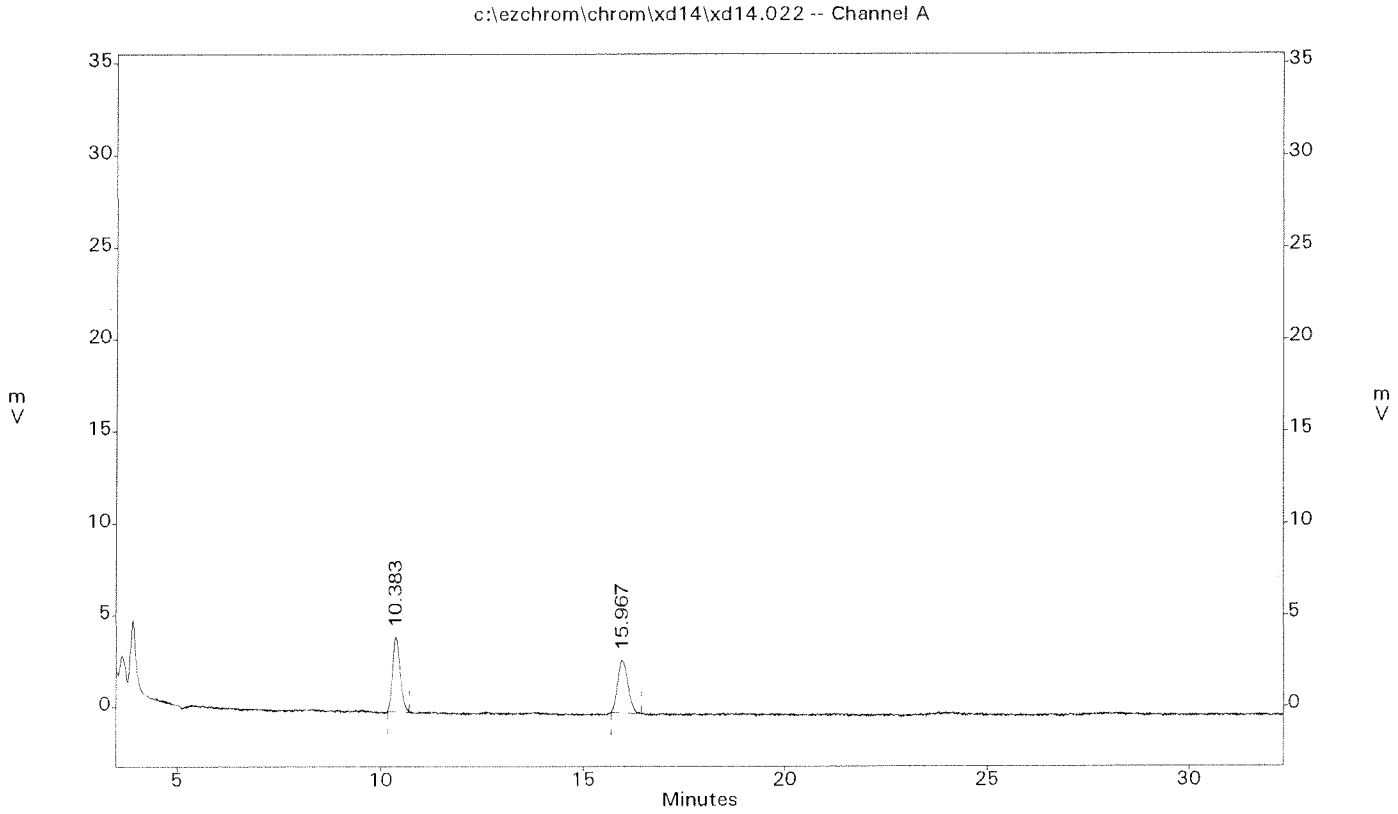
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd14\xd14.022
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D041-02
Acquired : Apr 15, 2015 01:04:07
Printed : Apr 15, 2015 12:25:00
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.633	0	0.0	0.0
--	RDX	7.108	0	0.0	0.0
--	1,3,5-TNB	9.650	0	0.0	0.0
1	1,2-Dinitrobenzene	10.383	53551	289.8	184.8
--	1,3-DNB	12.075	0	0.0	0.0
--	Tetryl	13.050	0	0.0	0.0
--	Nitrobenzene	14.208	0	0.0	0.0
--	2,4,6-TNT	15.700	0	0.0	0.0
2	3,4-DNT	15.967	51572	266.7	193.4
--	4-Am-2,6-DNT	16.642	0	0.0	0.0
--	2-Am-4,6-DNT	17.242	0	0.0	0.0
--	2,6-DNT	18.833	0	0.0	0.0
--	2,4-DNT	19.500	0	0.0	0.0
--	2-Nitrotoluene	23.642	0	0.0	0.0
--	4-Nitrotoluene	25.600	0	0.0	0.0
--	3-Nitrotoluene	27.458	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/03/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/08/15
Batch No.	: 15D041	Date Extracted:	04/13/15 15:50
Sample ID:	UX04-SB04-0.33	Date Analyzed:	04/15/15 01:39
Lab Samp ID:	D041-03	Dilution Factor:	1
Lab File ID:	XD14023A	Matrix :	SOIL
Ext Btch ID:	EXD010S	% Moisture :	NA
Calib. Ref.:	XD14013A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2000	2000	99.9	70-130

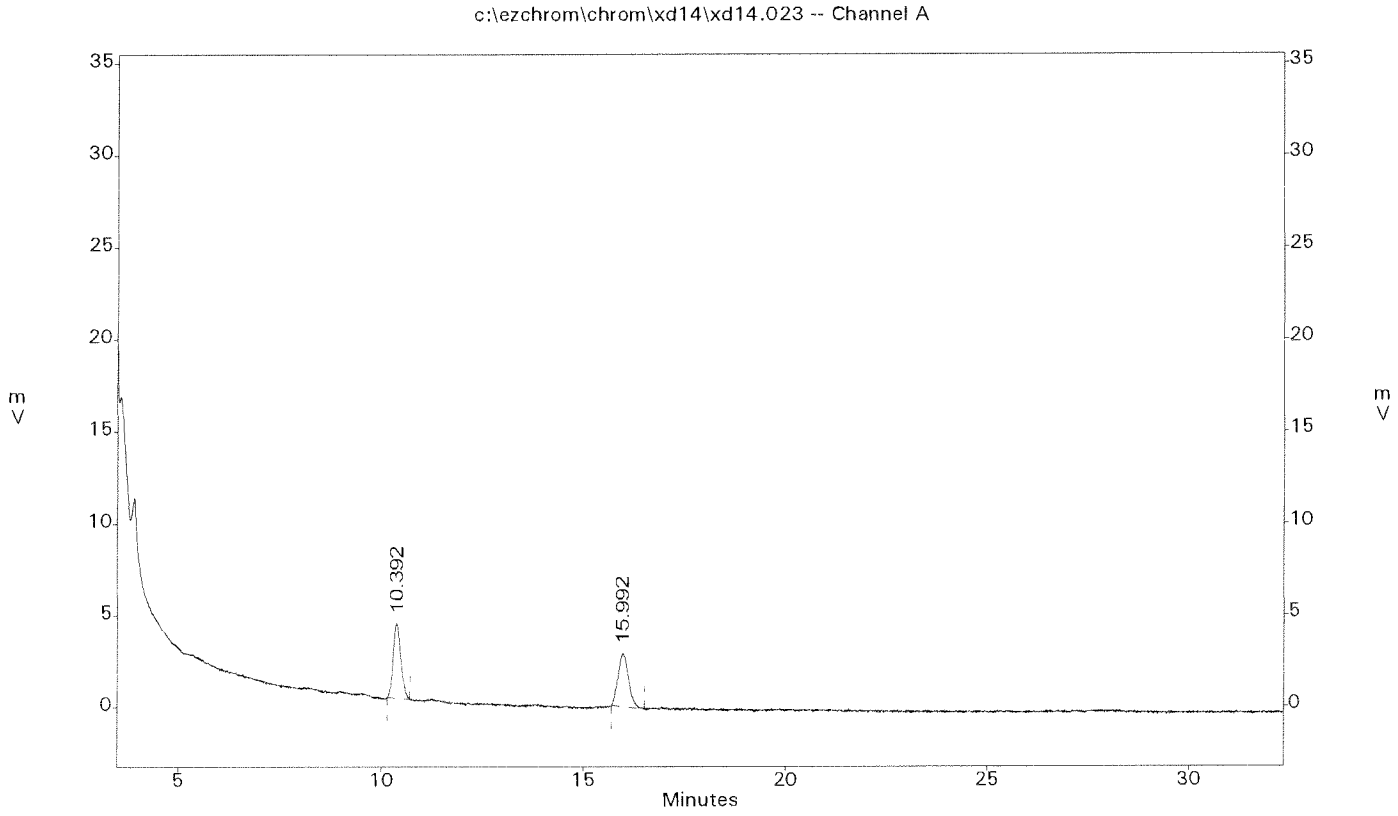
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd14\xd14.023
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D041-03
Acquired : Apr 15, 2015 01:39:10
Printed : Apr 15, 2015 12:25:10
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.633	0	0.0	0.0
--	RDX	7.108	0	0.0	0.0
--	1,3,5-TNB	9.650	0	0.0	0.0
1	1,2-Dinitrobenzene	10.392	53744	289.8	185.4
--	1,3-DNB	12.075	0	0.0	0.0
--	Tetryl	13.050	0	0.0	0.0
--	Nitrobenzene	14.208	0	0.0	0.0
--	2,4,6-TNT	15.700	0	0.0	0.0
2	3,4-DNT	15.992	53270	266.7	199.8
--	4-Am-2,6-DNT	16.642	0	0.0	0.0
--	2-Am-4,6-DNT	17.242	0	0.0	0.0
--	2,6-DNT	18.833	0	0.0	0.0
--	2,4-DNT	19.500	0	0.0	0.0
--	2-Nitrotoluene	23.642	0	0.0	0.0
--	4-Nitrotoluene	25.600	0	0.0	0.0
--	3-Nitrotoluene	27.458	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/03/15
Project	: CTO 070, UXO4, FALLBROOK	Date Received:	04/08/15
Batch No.	: 15D041	Date Extracted:	04/13/15 15:50
Sample ID:	UXO4-SB05-0.33	Date Analyzed:	04/15/15 02:49
Lab Samp ID:	D041-04	Dilution Factor:	1
Lab File ID:	XD14025A	Matrix :	SOIL
Ext Btch ID:	EXD010S	% Moisture :	NA
Calib. Ref.:	XD14024A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1940	2000	97.0	70-130

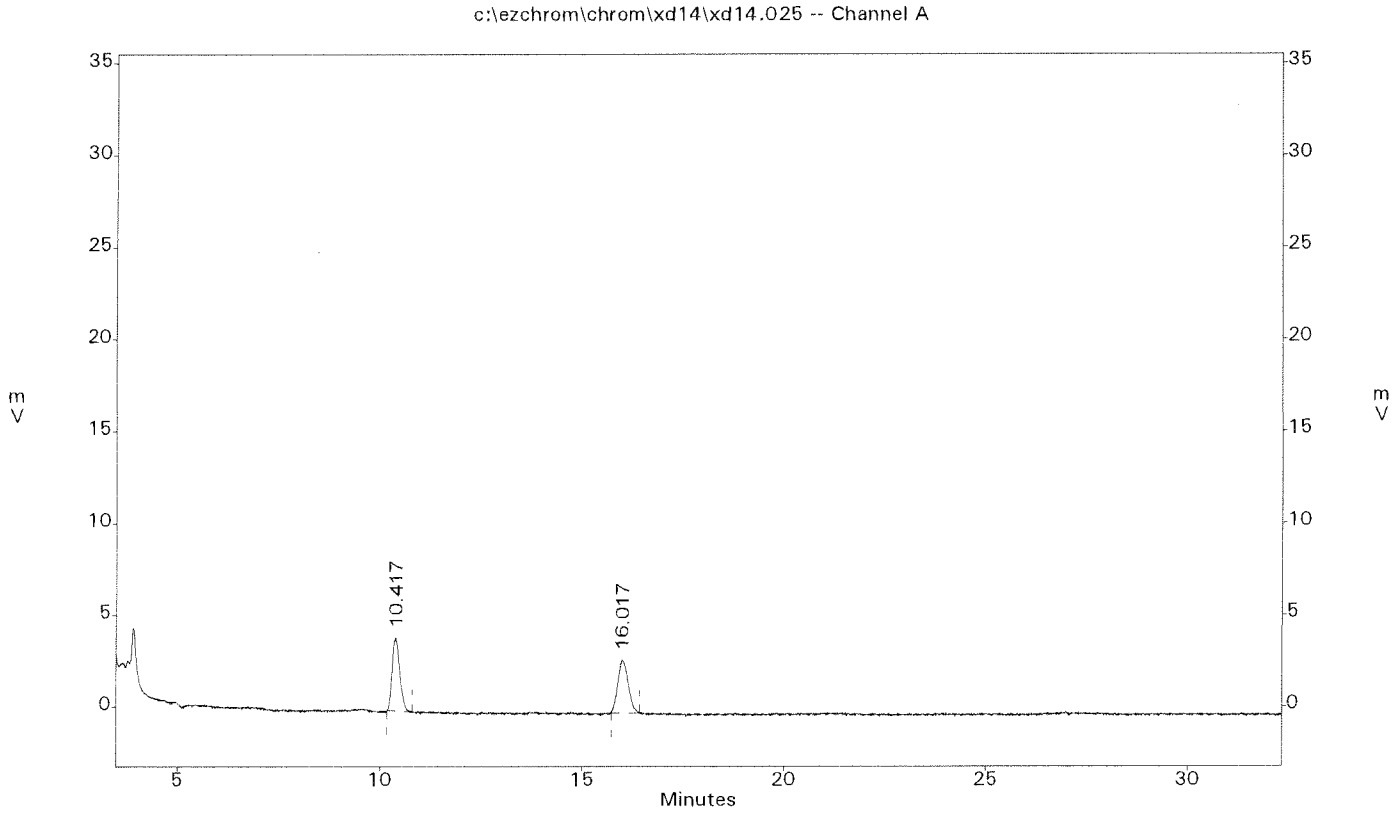
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd14\xd14.025
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D041-04
Acquired : Apr 15, 2015 02:49:19
Printed : Apr 15, 2015 12:26:32
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.625	0	0.0	0.0
--	RDX	7.083	0	0.0	0.0
--	1,3,5-TNB	9.608	0	0.0	0.0
1	1,2-Dinitrobenzene	10.417	53352	289.8	184.1
--	1,3-DNB	12.033	0	0.0	0.0
--	Tetryl	12.975	0	0.0	0.0
--	Nitrobenzene	14.175	0	0.0	0.0
--	2,4,6-TNT	15.658	0	0.0	0.0
2	3,4-DNT	16.017	51721	266.7	193.9
--	4-Am-2,6-DNT	16.567	0	0.0	0.0
--	2-Am-4,6-DNT	17.150	0	0.0	0.0
--	2,6-DNT	18.783	0	0.0	0.0
--	2,4-DNT	19.458	0	0.0	0.0
--	2-Nitrotoluene	23.658	0	0.0	0.0
--	4-Nitrotoluene	25.617	0	0.0	0.0
--	3-Nitrotoluene	27.467	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/03/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/08/15
Batch No.	: 15D041	Date Extracted:	04/13/15 15:50
Sample ID:	UX04-SB06-0.42	Date Analyzed:	04/15/15 03:24
Lab Samp ID:	D041-05	Dilution Factor:	1
Lab File ID:	XD14026A	Matrix :	SOIL
Ext Btch ID:	EXD010S	% Moisture :	NA
Calib. Ref.:	XD14024A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1940	2000	96.9	70-130

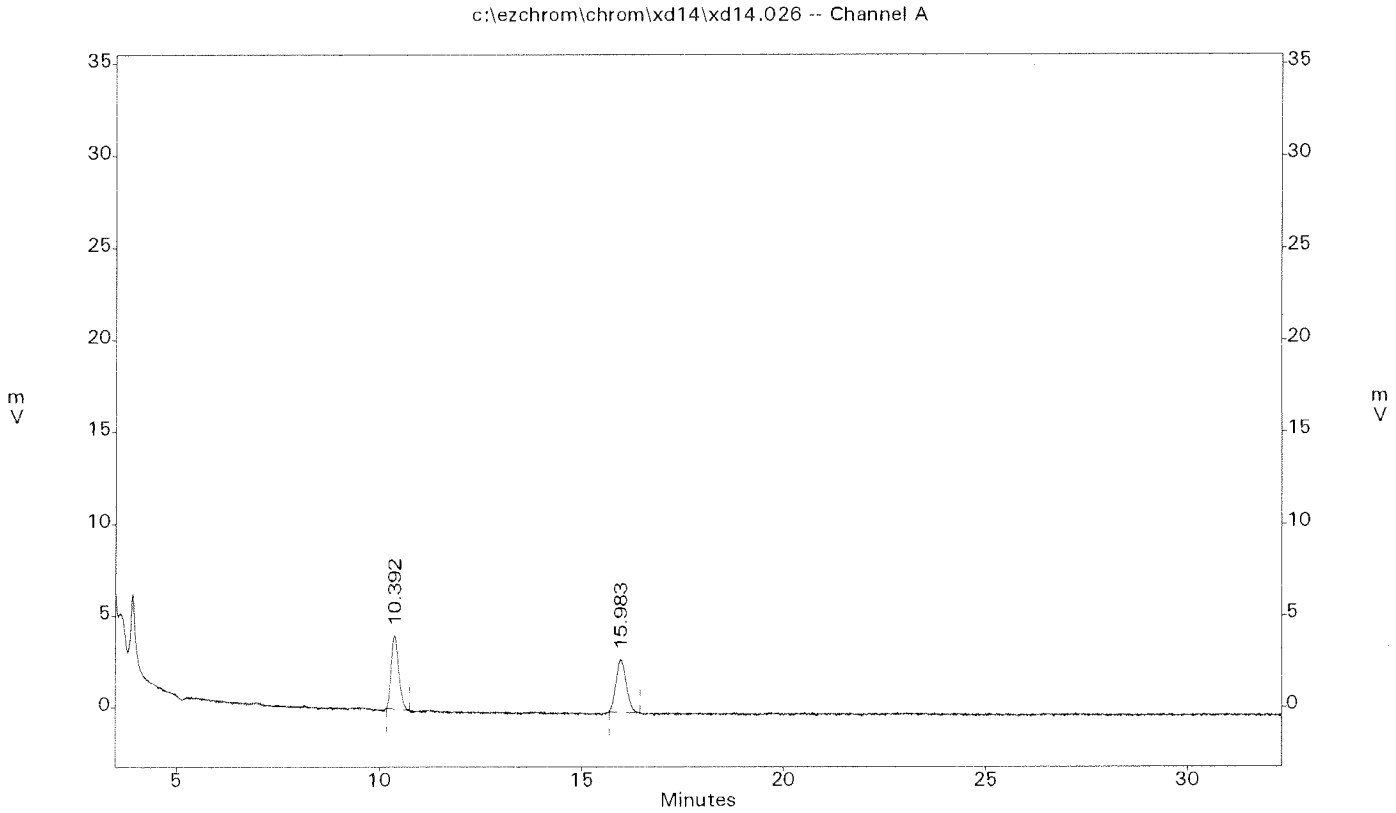
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd14\xd14.026
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D041-05
Acquired : Apr 15, 2015 03:24:21
Printed : Apr 15, 2015 12:26:41
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.625	0	0.0	0.0
--	RDX	7.083	0	0.0	0.0
--	1,3,5-TNB	9.608	0	0.0	0.0
1	1,2-Dinitrobenzene	10.392	52908	289.8	182.6
--	1,3-DNB	12.033	0	0.0	0.0
--	Tetryl	12.975	0	0.0	0.0
--	Nitrobenzene	14.175	0	0.0	0.0
--	2,4,6-TNT	15.658	0	0.0	0.0
2	3,4-DNT	15.983	51674	266.7	193.8
--	4-Am-2,6-DNT	16.567	0	0.0	0.0
--	2-Am-4,6-DNT	17.150	0	0.0	0.0
--	2,6-DNT	18.783	0	0.0	0.0
--	2,4-DNT	19.458	0	0.0	0.0
--	2-Nitrotoluene	23.658	0	0.0	0.0
--	4-Nitrotoluene	25.617	0	0.0	0.0
--	3-Nitrotoluene	27.467	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/06/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/08/15
Batch No.	: 15D041	Date Extracted:	04/13/15 15:50
Sample ID:	UX04-SB07-2.0	Date Analyzed:	04/15/15 03:59
Lab Samp ID:	D041-06	Dilution Factor:	1
Lab File ID:	XD14027A	Matrix :	SOIL
Ext Btch ID:	EXD010S	% Moisture :	NA
Calib. Ref.:	XD14024A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1980	2000	99.0	70-130

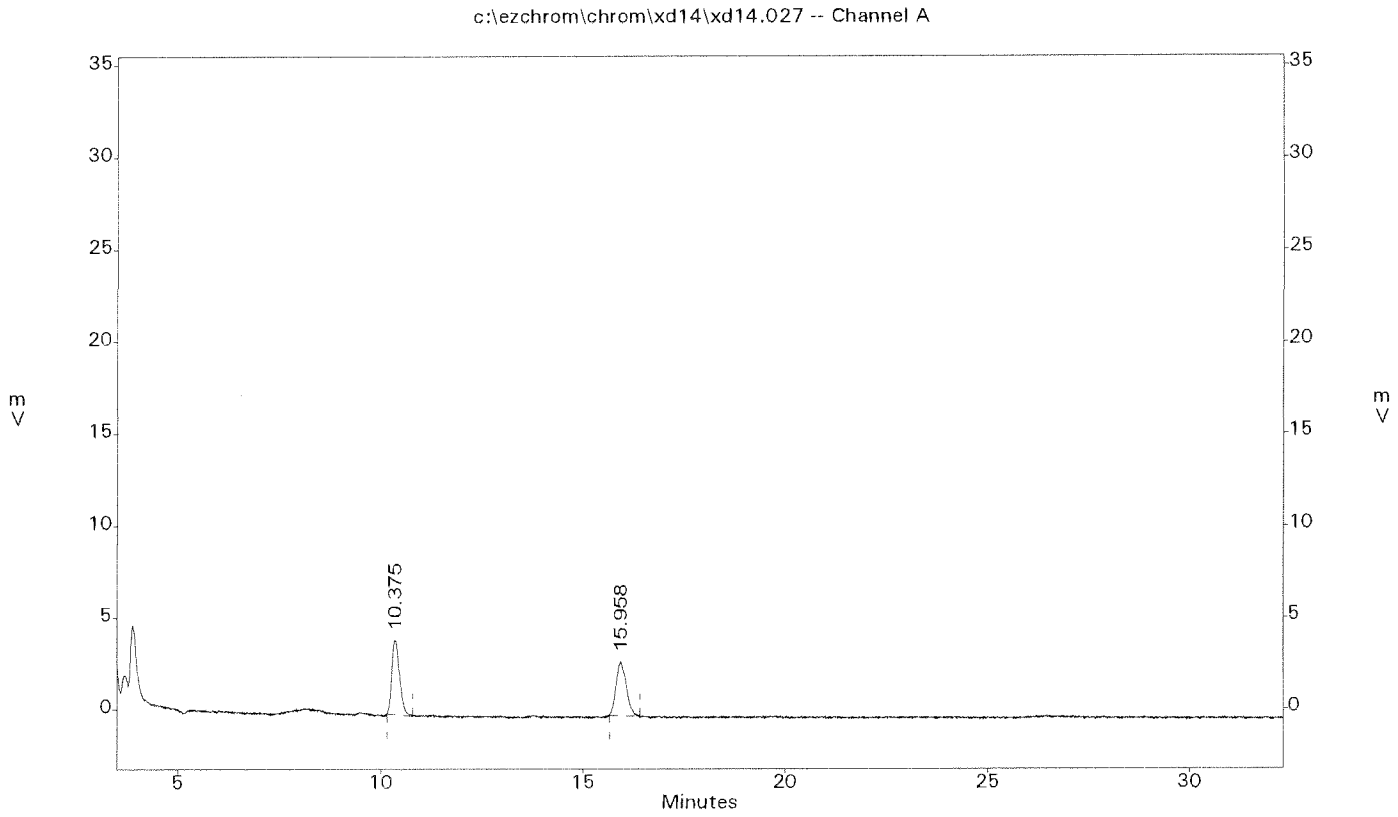
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd14\xd14.027
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D041-06
Acquired : Apr 15, 2015 03:59:24
Printed : Apr 15, 2015 12:26:53
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.625	0	0.0	0.0
--	RDX	7.083	0	0.0	0.0
--	1,3,5-TNB	9.608	0	0.0	0.0
1	1,2-Dinitrobenzene	10.375	55247	289.8	190.6
--	1,3-DNB	12.033	0	0.0	0.0
--	Tetryl	12.975	0	0.0	0.0
--	Nitrobenzene	14.175	0	0.0	0.0
--	2,4,6-TNT	15.658	0	0.0	0.0
2	3,4-DNT	15.958	52778	266.7	197.9
--	4-Am-2,6-DNT	16.567	0	0.0	0.0
--	2-Am-4,6-DNT	17.150	0	0.0	0.0
--	2,6-DNT	18.783	0	0.0	0.0
--	2,4-DNT	19.458	0	0.0	0.0
--	2-Nitrotoluene	23.658	0	0.0	0.0
--	4-Nitrotoluene	25.617	0	0.0	0.0
--	3-Nitrotoluene	27.467	0	0.0	0.0



6015

QC SUMMARIES

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	NA
Project	: CTO 070, UXO4, FALLBROOK	Date Received:	04/13/15
Batch No.	: 15D041	Date Extracted:	04/13/15 15:50
Sample ID:	MBLK1S	Date Analyzed:	04/14/15 20:23
Lab Samp ID:	EXD010SB	Dilution Factor:	1
Lab File ID:	XD14014A	Matrix :	SOIL
Ext Btch ID:	EXD010S	% Moisture :	NA
Calib. Ref.:	XD14013A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1990	2000	99.7	70-130

Note: All positive results are confirmed by Biphenyl column

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UXO4, FALLBROOK
BATCH NO.: 15D041
METHOD: SW8330A

MATRIX:	SOIL			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK1S				
LAB SAMP ID:	EXD010SB	EXD010SL	EXD010SC		
LAB FILE ID:	XD14014A	XD14015A	XD14016A		
DATE EXTRACTED:	04/13/1515:50	04/13/1515:50	04/13/1515:50	DATE COLLECTED:	NA
DATE ANALYZED:	04/14/1520:23	04/14/1520:58	04/14/1521:33	DATE RECEIVED:	04/13/15
PREP. BATCH:	EXD010S	EXD010S	EXD010S		
CALIB. REF:	XD14013A	XD14013A	XD14013A		

ACCESSION:

PARAMETER	BLNK RSLT (ug/kg)	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	SPIKE AMT (ug/kg)	BSD RSLT (ug/kg)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
HMX	ND	2000	2030	102	2000	2050	102	1	75-125	30
RDX	ND	2000	2090	105	2000	2100	105	1	70-135	30
1,3,5-TNB	ND	2000	2090	105	2000	2120	106	1	75-125	30
1,3-DNB	ND	2000	2120	106	2000	2150	107	1	80-125	30
Tetryl	ND	2000	2060	103	2000	1990	99	3	10-150	30
Nitrobenzene	ND	2000	2030	102	2000	2030	101	0	75-125	30
2,4,6-TNT	ND	2000	1930	96	2000	2020	101	5	55-140	30
4-AM-2,6-DNT	ND	2000	1900	95	2000	1970	98	3	80-125	30
2-AM-4,6-DNT	ND	2000	2030	101	2000	2080	104	2	80-125	30
2,6-DNT	ND	2000	2030	101	2000	2030	102	0	80-120	30
2,4-DNT	ND	2000	2120	106	2000	2100	105	1	80-125	30
2-Nitrotoluene	ND	2000	1930	96	2000	1830	92	5	80-125	30
3-Nitrotoluene	ND	2000	2040	102	2000	2000	100	2	75-120	30
4-Nitrotoluene	ND	2000	2030	102	2000	1980	99	3	75-125	30

SURROGATE PARAMETER	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	SPIKE AMT (ug/kg)	BSD RSLT (ug/kg)	BSD % REC	QC LIMIT (%)
3,4-Dinitrotoluene	2000	2160	108	2000	2130	107	70-130

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
BATCH NO.: 15D041
METHOD: SW8330A

MATRIX:	SOIL			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	UX04-SB02-0.83				
LAB SAMP ID:	D041-01	D041-01M	D041-01S		
LAB FILE ID:	XD14019A	XD14020A	XD14021A		
DATE EXTRACTED:	04/13/1515:50	04/13/1515:50	04/13/1515:50	DATE COLLECTED:	04/03/15
DATE ANALYZED:	04/14/1523:19	04/14/1523:54	04/15/1500:29	DATE RECEIVED:	04/08/15
PREP. BATCH:	EXD010S	EXD010S	EXD010S		
CALIB. REF:	XD14013A	XD14013A	XD14013A		

ACCESSION:

PARAMETER	SMPL RSLT (ug/kg)	SPIKE AMT (ug/kg)	MS RSLT (ug/kg)	MS % REC	SPIKE AMT (ug/kg)	MSD RSLT (ug/kg)	MSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
HMX	ND	2000	2020	101	2000	2000	100	1	75-125	30
RDX	ND	2000	2020	101	2000	2020	101	0	70-135	30
1,3,5-TNB	ND	2000	2110	106	2000	2090	105	1	75-125	30
1,3-DNB	ND	2000	2130	107	2000	2160	108	1	80-125	30
Tetryl	ND	2000	2050	103	2000	2130	106	4	10-150	30
Nitrobenzene	ND	2000	2010	101	2000	2040	102	1	75-125	30
2,4,6-TNT	ND	2000	1980	99	2000	1980	99	0	55-140	30
4-AM-2,6-DNT	ND	2000	1760	88	2000	1880	94	7	80-125	30
2-AM-4,6-DNT	ND	2000	1980	99	2000	2070	103	4	80-125	30
2,6-DNT	ND	2000	2000	100	2000	1960	98	2	80-120	30
2,4-DNT	ND	2000	2050	103	2000	2100	105	2	80-125	30
2-Nitrotoluene	ND	2000	1910	96	2000	1920	96	0	80-125	30
3-Nitrotoluene	ND	2000	1980	99	2000	1940	97	2	75-120	30
4-Nitrotoluene	ND	2000	1910	96	2000	1960	98	3	75-125	30

SURROGATE PARAMETER	SPIKE AMT (ug/kg)	MS RSLT (ug/kg)	MS % REC	SPIKE AMT (ug/kg)	MSD RSLT (ug/kg)	MSD % REC	QC LIMIT (%)
3,4-Dinitrotoluene	2000	2180	109	2000	2080	104	70-130

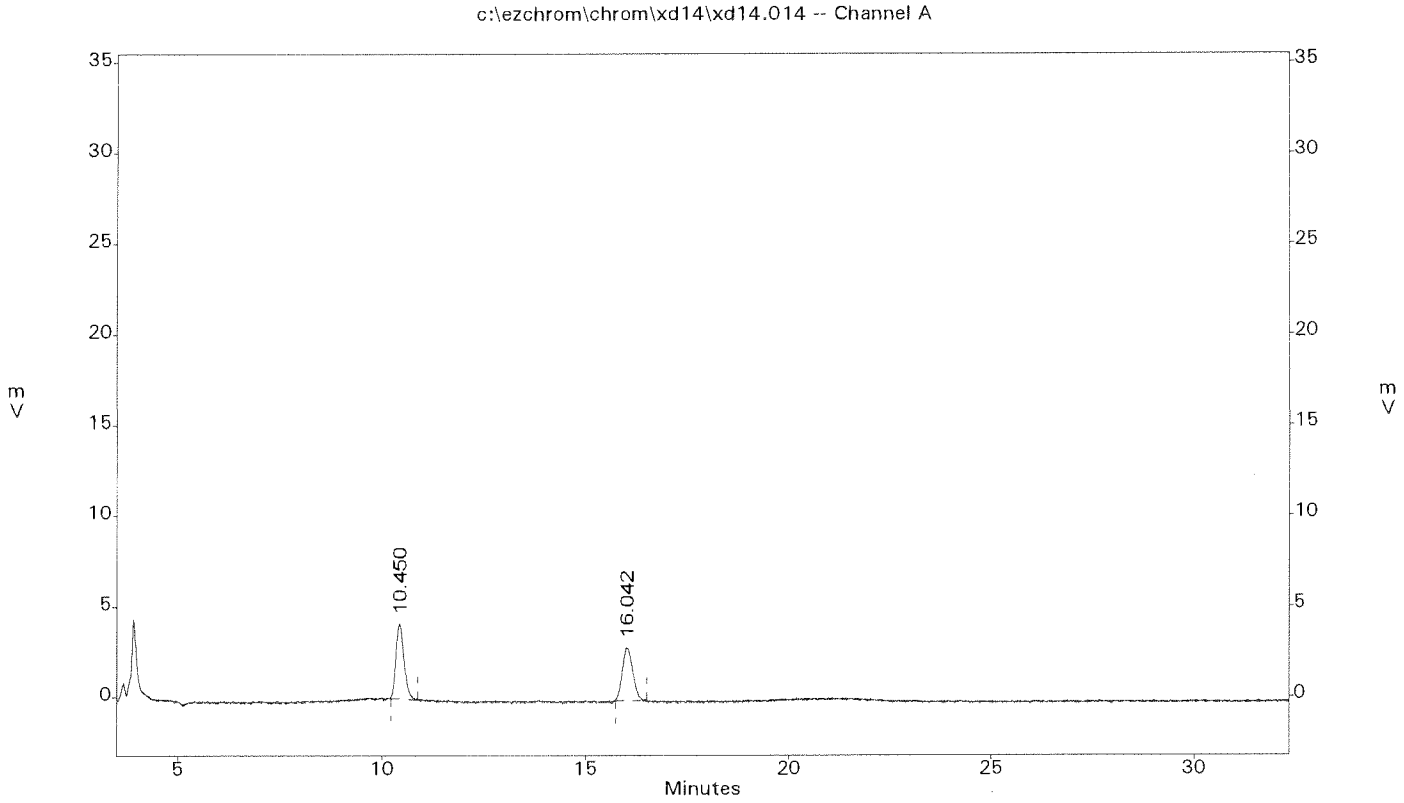
QC DATA

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd14\xd14.014
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD010SB
Acquired : Apr 14, 2015 20:23:49
Printed : Apr 15, 2015 12:10:28
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.667	0	0.0	0.0
--	RDX	7.200	0	0.0	0.0
--	1,3,5-TNB	9.742	0	0.0	0.0
1	1,2-Dinitrobenzene	10.450	56308	289.8	194.3
--	1,3-DNB	12.233	0	0.0	0.0
--	Tetryl	13.267	0	0.0	0.0
--	Nitrobenzene	14.358	0	0.0	0.0
--	2,4,6-TNT	15.892	0	0.0	0.0
2	3,4-DNT	16.042	53190	266.7	199.5
--	4-Am-2,6-DNT	16.958	0	0.0	0.0
--	2-Am-4,6-DNT	17.583	0	0.0	0.0
--	2,6-DNT	19.092	0	0.0	0.0
--	2,4-DNT	19.775	0	0.0	0.0
--	2-Nitrotoluene	23.925	0	0.0	0.0
--	4-Nitrotoluene	25.908	0	0.0	0.0
--	3-Nitrotoluene	27.775	0	0.0	0.0

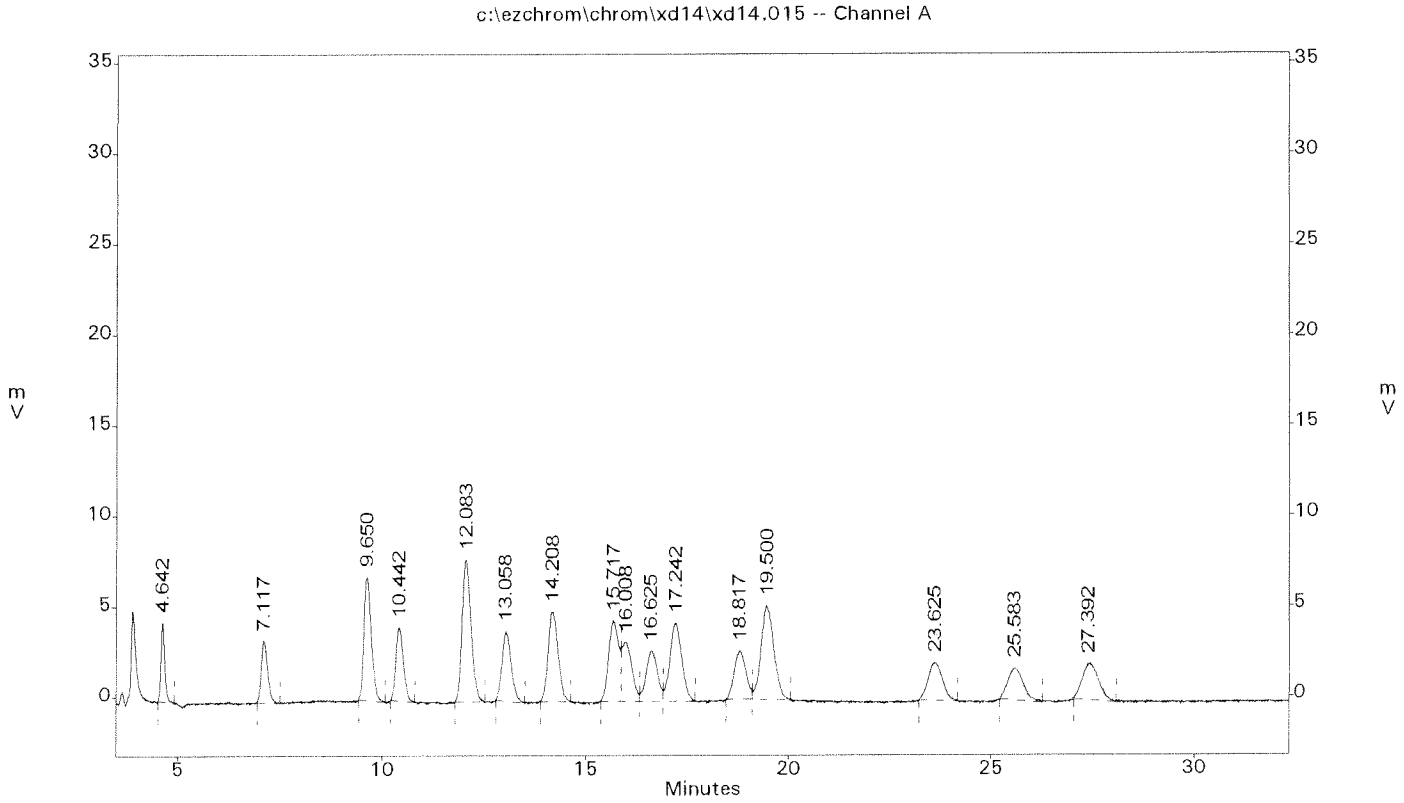


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd14\xd14.015
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD010SL
Acquired : Apr 14, 2015 20:58:52
Printed : Apr 15, 2015 12:11:19
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.642	28871	142.1	203.2
2	RDX	7.117	37113	177.4	209.2
3	1,3,5-TNB	9.650	87632	418.4	209.4
4	1,2-Dinitrobenzene	10.442	53954	289.8	186.2
5	1,3-DNB	12.083	121075	571.5	211.8
6	Tetryl	13.058	62472	303.8	205.6
7	Nitrobenzene	14.208	85599	420.8	203.4
8	2,4,6-TNT	15.717	76238	395.8	192.6
9	3,4-DNT	16.008	57489	266.7	215.6
10	4-Am-2,6-DNT	16.625	54721	287.5	190.4
11	2-Am-4,6-DNT	17.242	89123	439.2	202.9
12	2,6-DNT	18.817	54639	269.2	202.9
13	2,4-DNT	19.500	116549	548.5	212.5
14	2-Nitrotoluene	23.625	51900	269.4	192.6
15	4-Nitrotoluene	25.583	47560	233.7	203.5
16	3-Nitrotoluene	27.392	56488	277.1	203.8

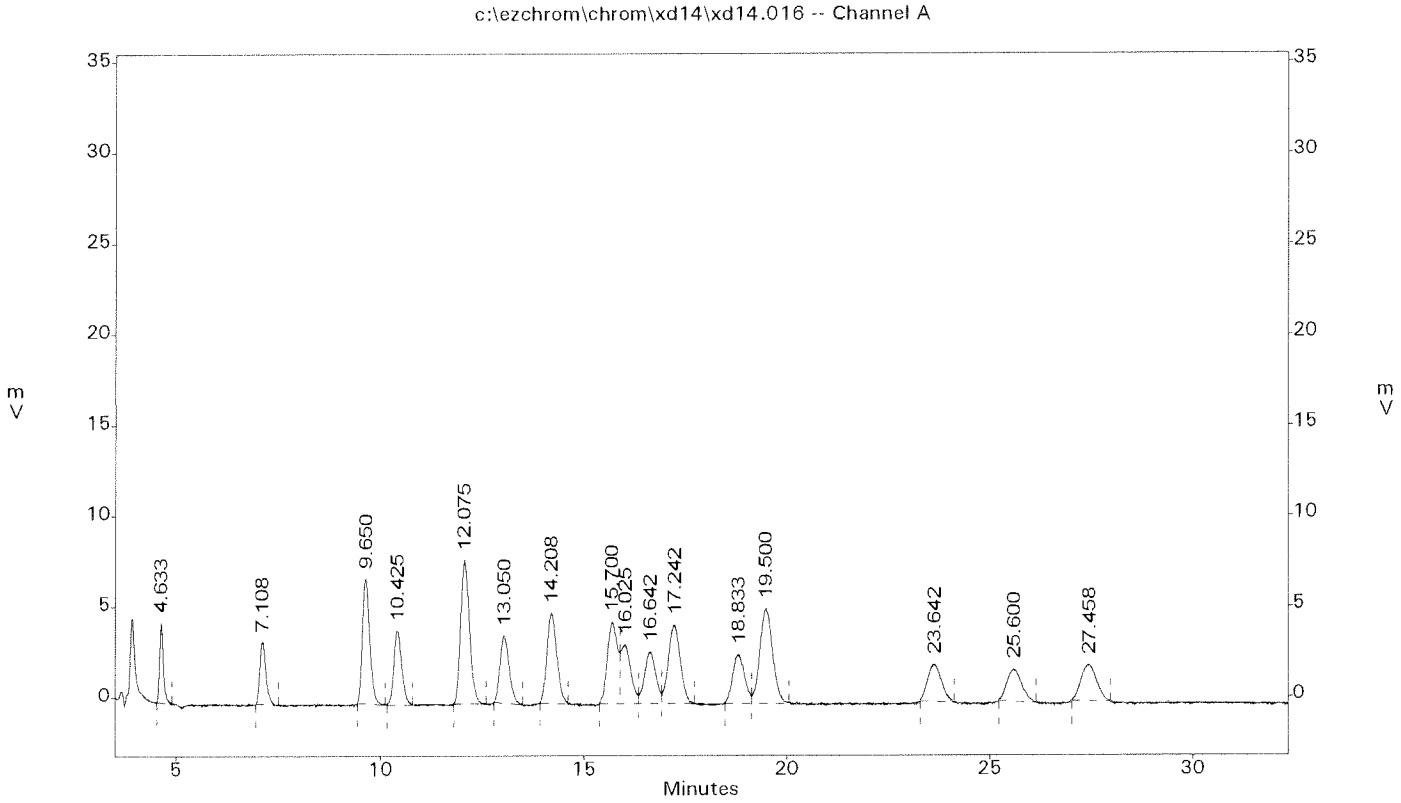


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd14\xd14.016
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD010SC
Acquired : Apr 14, 2015 21:33:54
Printed : Apr 15, 2015 12:11:31
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.633	29068	142.1	204.5
2	RDX	7.108	37303	177.4	210.3
3	1,3,5-TNB	9.650	88696	418.4	212.0
4	1,2-Dinitrobenzene	10.425	55998	289.8	193.2
5	1,3-DNB	12.075	122706	571.5	214.7
6	Tetryl	13.050	60370	303.8	198.7
7	Nitrobenzene	14.208	85210	420.8	202.5
8	2,4,6-TNT	15.700	79840	395.8	201.7
9	3,4-DNT	16.025	56885	266.7	213.3
10	4-Am-2,6-DNT	16.642	56592	287.5	196.9
11	2-Am-4,6-DNT	17.242	91321	439.2	207.9
12	2,6-DNT	18.833	54672	269.2	203.1
13	2,4-DNT	19.500	115031	548.5	209.7
14	2-Nitrotoluene	23.642	49425	269.4	183.4
15	4-Nitrotoluene	25.600	46331	233.7	198.2
16	3-Nitrotoluene	27.458	55411	277.1	200.0

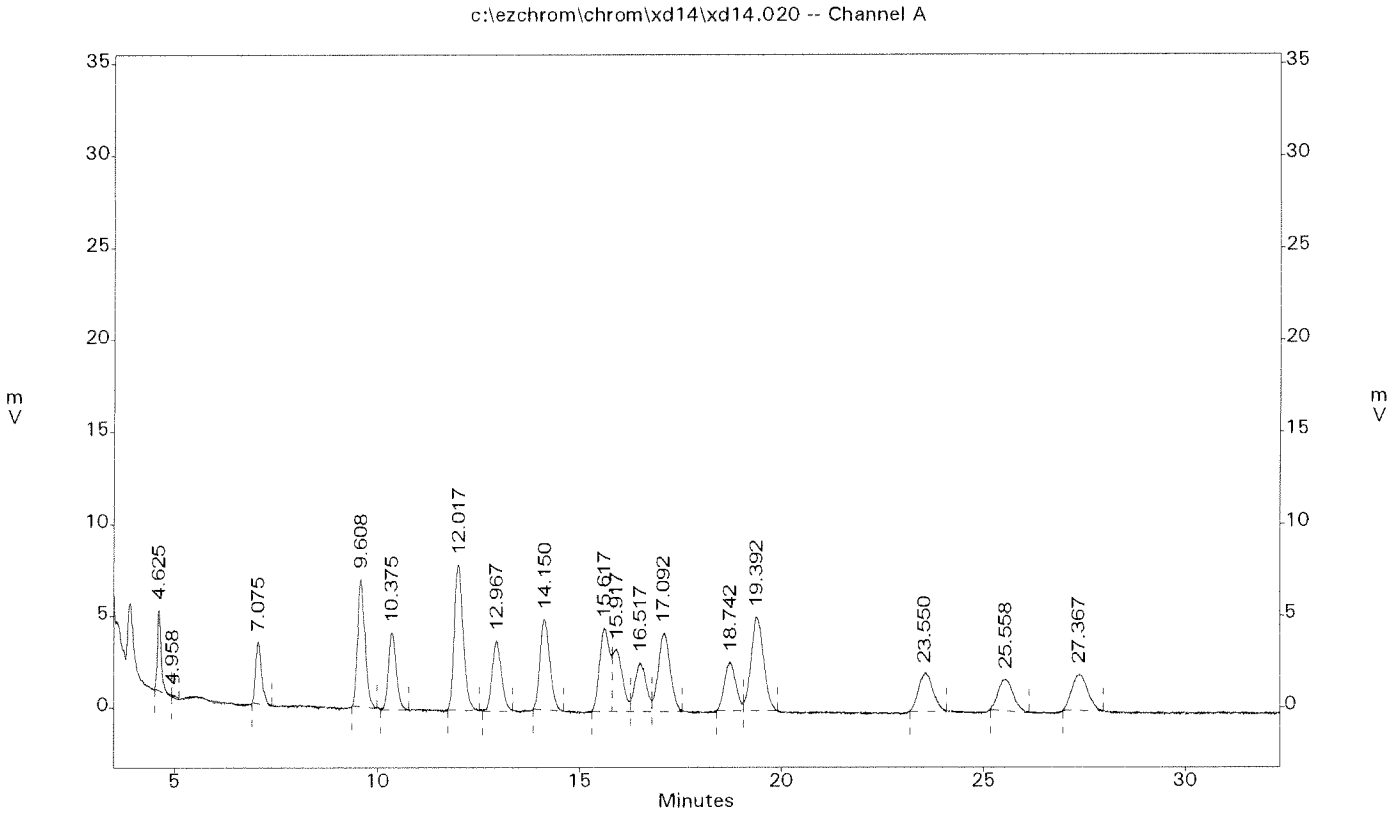


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd14\xd14.020
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D041-01M
Acquired : Apr 14, 2015 23:54:03
Printed : Apr 15, 2015 12:24:36
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.625	28754	142.1	202.3
3	RDX	7.075	35770	177.4	201.6
4	1,3,5-TNB	9.608	88369	418.4	211.2
5	1,2-Dinitrobenzene	10.375	57337	289.8	197.8
6	1,3-DNB	12.017	121748	571.5	213.0
7	Tetryl	12.967	62306	303.8	205.1
8	Nitrobenzene	14.150	84670	420.8	201.2
9	2,4,6-TNT	15.617	78501	395.8	198.3
10	3,4-DNT	15.917	58208	266.7	218.3
11	4-Am-2,6-DNT	16.517	50611	287.5	176.1
12	2-Am-4,6-DNT	17.092	87058	439.2	198.2
13	2,6-DNT	18.742	53862	269.2	200.1
14	2,4-DNT	19.392	112671	548.5	205.4
15	2-Nitrotoluene	23.550	51541	269.4	191.3
16	4-Nitrotoluene	25.558	44664	233.7	191.1
17	3-Nitrotoluene	27.367	54911	277.1	198.2

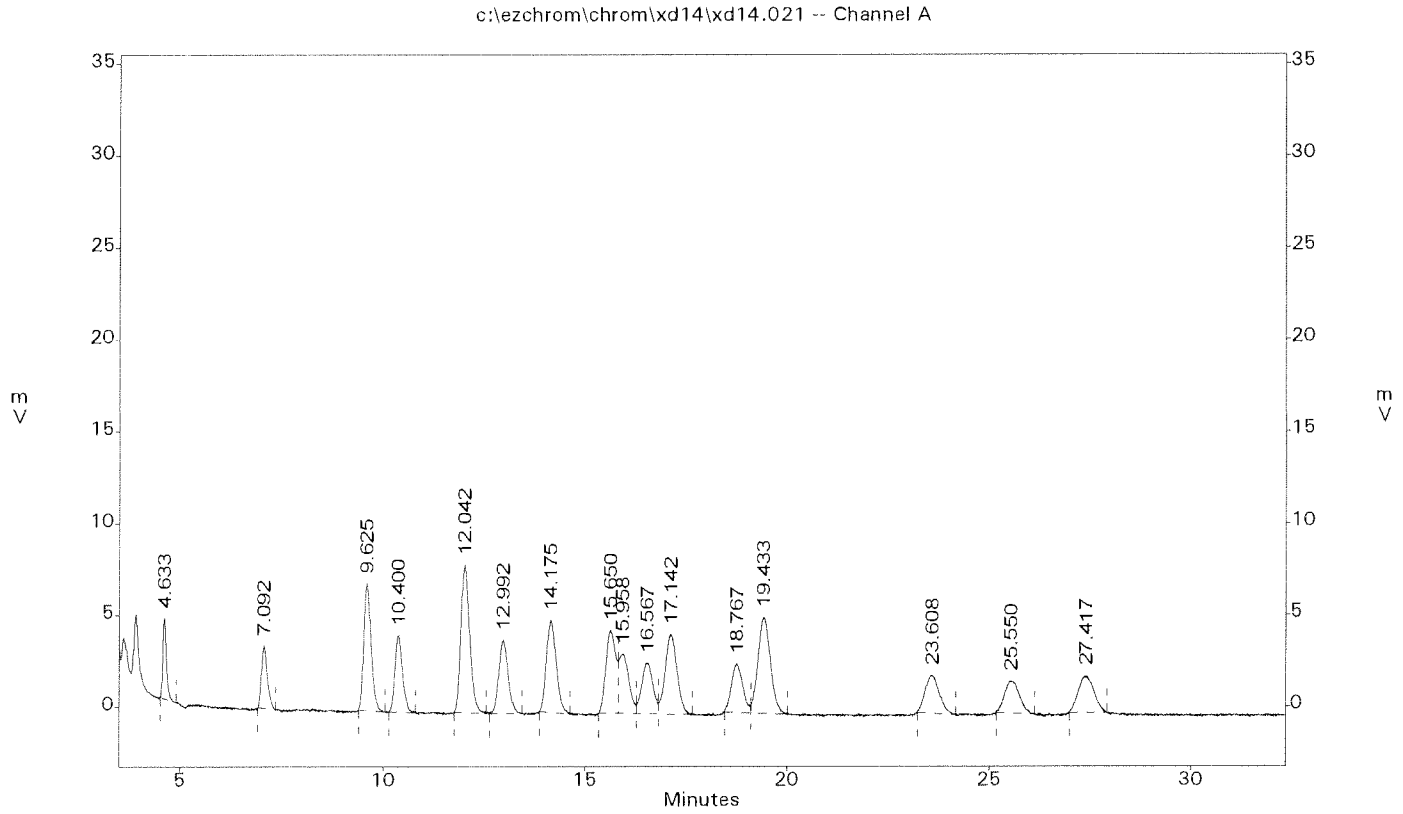


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd14\xd14.021
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D041-01S
Acquired : Apr 15, 2015 00:29:05
Printed : Apr 15, 2015 12:24:48
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.633	28450	142.1	200.2
2	RDX	7.092	35788	177.4	201.7
3	1,3,5-TNB	9.625	87594	418.4	209.4
4	1,2-Dinitrobenzene	10.400	56065	289.8	193.4
5	1,3-DNB	12.042	123500	571.5	216.1
6	Tetryl	12.992	64573	303.8	212.5
7	Nitrobenzene	14.175	85860	420.8	204.1
8	2,4,6-TNT	15.650	78440	395.8	198.2
9	3,4-DNT	15.958	55583	266.7	208.4
10	4-Am-2,6-DNT	16.567	54122	287.5	188.3
11	2-Am-4,6-DNT	17.142	90702	439.2	206.5
12	2,6-DNT	18.767	52792	269.2	196.1
13	2,4-DNT	19.433	114986	548.5	209.6
14	2-Nitrotoluene	23.608	51680	269.4	191.8
15	4-Nitrotoluene	25.550	45917	233.7	196.5
16	3-Nitrotoluene	27.417	53709	277.1	193.8



INITIAL CALIBRATIONS

INITIAL CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
LFID & Datetime: XA29002A 01/29/15 18:02
LFID & Datetime: XA29003A 01/29/15 18:36
LFID & Datetime: XA29004A 01/29/15 19:10
LFID & Datetime: XA29005A 01/29/15 19:45
LFID & Datetime: XA29006A 01/29/15 20:19
LFID & Datetime: XA29007A 01/29/15 20:53
LFID & Datetime: XA29008A 01/29/15 21:27
LFID & Datetime: XA29009A 01/29/15 22:01
CONC UNIT: ppb

COMPOUND	CONC X	CALIBRATION FACTORS (AREA)/UNIT 0.50X	1.00X	2.50X	5.00X	10.00X	15.00X	20.00X	40.00X	MEAN	%RSD
HMX	20.00	167	131	141	137	139	141	142	140	142.1	7.6
RDX	20.00	185	158	179	173	179	182	181	183	177.4	5.0
1,3,5-TNB	20.00	504	364	421	393	411	418	417	420	418.4	9.5
1,3-DNB	20.00	537	555	587	567	571	581	585	590	571.5	3.2
Tetryl	20.00	330	262	306	292	300	310	315	315	303.8	6.6
Nitrobenzene	20.00	439	424	426	408	412	415	419	423	420.8	2.3
2,4,6-TNT	20.00	400	380	390	369	403	403	411	411	395.8	3.8
4-AM-2,6-DNT	20.00	354	290	261	261	283	284	282	285	287.5	10.0
2-AM-4,6-DNT	20.00	552	375	451	407	437	426	433	432	439.2	11.6
2,6-DNT	20.00	310	235	289	244	277	261	263	275	269.2	9.0
2,4-DNT	20.00	562	458	589	554	550	552	560	565	548.5	7.0
2-Nitrotoluene	20.00	280	334	292	231	247	250	256	265	269.4	12.1
4-Nitrotoluene	20.00	239	276	233	205	227	224	230	237	233.7	8.6
3-Nitrotoluene	20.00	250	285	288	258	282	281	281	294	277.1	5.4
SURROGATE	**X**	**0.50X**	**1.00X**	**2.50X**	**5.00X**	**10.00X**	**15.00X**	**20.00X**	**40.00X**	**MEAN**	**%RSD**
1,2-Dinitrobenzene	20.00	308	300	304	279	276	287	281	283	289.8	4.3
3,4-DNT	20.00	318	290	258	244	249	256	254	263	266.7	9.4

EX81A29.met

RA
02/03/15

INITIAL CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
LFID & Datetime: XA29002A 01/29/15 18:02
LFID & Datetime: XA29003A 01/29/15 18:36
LFID & Datetime: XA29004A 01/29/15 19:10
LFID & Datetime: XA29005A 01/29/15 19:45
LFID & Datetime: XA29006A 01/29/15 20:19
LFID & Datetime: XA29007A 01/29/15 20:53
LFID & Datetime: XA29008A 01/29/15 21:27
LFID & Datetime: XA29009A 01/29/15 22:01

COMPOUND	RT OF STANDARDS (MIN) 0.5X	1.0X	2.5X	5.0X	10.0X	15.0X	20.0X	40.0X	MEAN RT	RT WINDOW FROM	TO	RTWINDOW WIDTH
HMX	4.658	4.675	4.667	4.650	4.658	4.650	4.650	4.658	4.658	4.592	4.724	0.066
RDX	7.192	7.208	7.208	7.167	7.158	7.142	7.158	7.167	7.175	7.004	7.346	0.171
1,3,5-TNB	9.817	9.850	9.800	9.783	9.775	9.750	9.758	9.792	9.791	9.593	9.989	0.198
1,3-DNB	12.392	12.383	12.317	12.250	12.258	12.242	12.250	12.300	12.299	12.011	12.587	0.288
Tetryl	13.333	13.367	13.325	13.217	13.242	13.208	13.208	13.292	13.274	12.886	13.662	0.388
Nitrobenzene	14.558	14.608	14.542	14.458	14.467	14.450	14.442	14.517	14.505	14.175	14.835	0.330
2,4,6-TNT	16.075	16.117	16.050	15.983	15.983	15.967	15.967	16.058	16.025	15.623	16.427	0.402
4-AM-2,6-DNT	17.100	17.225	17.058	16.933	16.950	16.933	16.908	17.067	17.022	16.379	17.665	0.643
2-AM-4,6-DNT	17.725	17.792	17.717	17.508	17.533	17.517	17.508	17.650	17.619	16.938	18.300	0.681
2,6-DNT	19.417	19.375	19.325	19.183	19.167	19.208	19.158	19.300	19.267	18.710	19.824	0.557
2,4-DNT	20.058	20.067	20.058	19.875	19.892	19.917	19.883	20.017	19.971	19.442	20.500	0.529
2-Nitrotoluene	24.317	24.442	24.425	24.100	24.150	24.208	24.125	24.283	24.256	23.581	24.931	0.675
4-Nitrotoluene	26.500	26.467	26.442	26.142	26.200	26.300	26.200	26.367	26.327	25.533	27.121	0.794
3-Nitrotoluene	28.375	28.433	28.375	28.042	28.092	28.192	28.067	28.225	28.225	27.427	29.023	0.798

SURROGATE	0.5X	1.0X	2.5X	5.0X	10.0X	15.0X	20.0X	40.0X	RT	FROM	TO	WIDTH
1,2-Dinitrobenzene	10.642	10.700	10.642	10.567	10.575	10.550	10.558	10.617	10.606	10.468	10.744	0.138
3,4-DNT	16.475	16.533	16.467	16.325	16.325	16.325	16.317	16.425	16.399	15.912	16.886	0.487

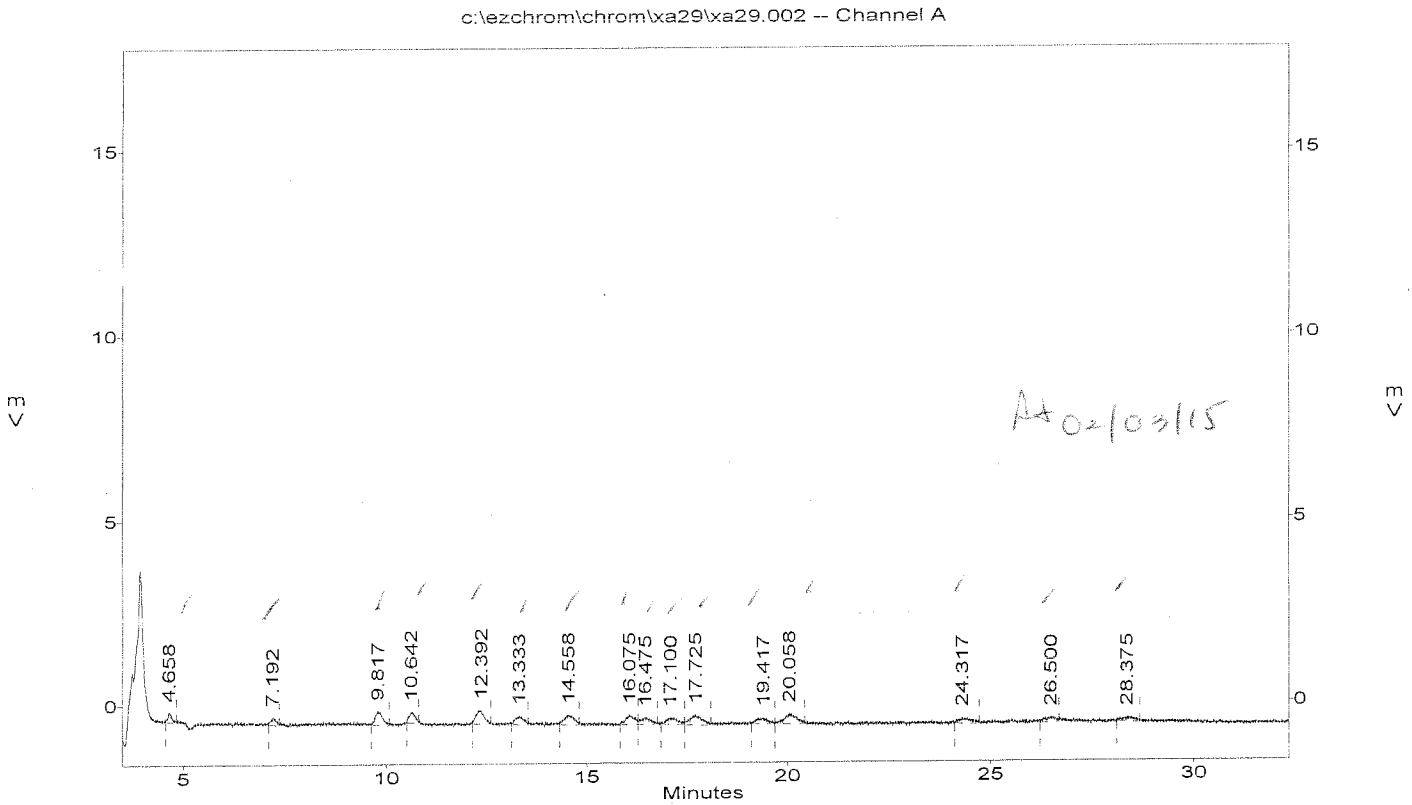
EX81A29.met

AA
02/03/15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.002
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2901 10 ppb
Acquired : Jan 29, 2015 18:02:27
Printed : Jan 30, 2015 16:02:51
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	1672	142.1	10.0
2	RDX	7.192	1849	177.4	10.0
3	1,3,5-TNB	9.817	5038	418.4	10.0
4	1,2-Dinitrobenzene	10.642	3084	289.8	10.0
5	1,3-DNB	12.392	5368	571.5	10.0
6	Tetryl	13.333	3296	303.8	10.0
7	Nitrobenzene	14.558	4389	420.8	10.0
8	2,4,6-TNT	16.075	3997	395.8	10.0
9	3,4-DNT	16.475	3184	266.7	10.0
10	4-Am-2,6-DNT	17.100	3536	287.5	10.0
11	2-Am-4,6-DNT	17.725	5520	439.2	10.0
12	2,6-DNT	19.417	3099	269.2	10.0
13	2,4-DNT	20.058	5616	548.5	10.0
14	2-Nitrotoluene	24.317	2801	269.4	10.0
15	4-Nitrotoluene	26.500	2388	233.7	10.0
16	3-Nitrotoluene	28.375	2502	277.1	10.0

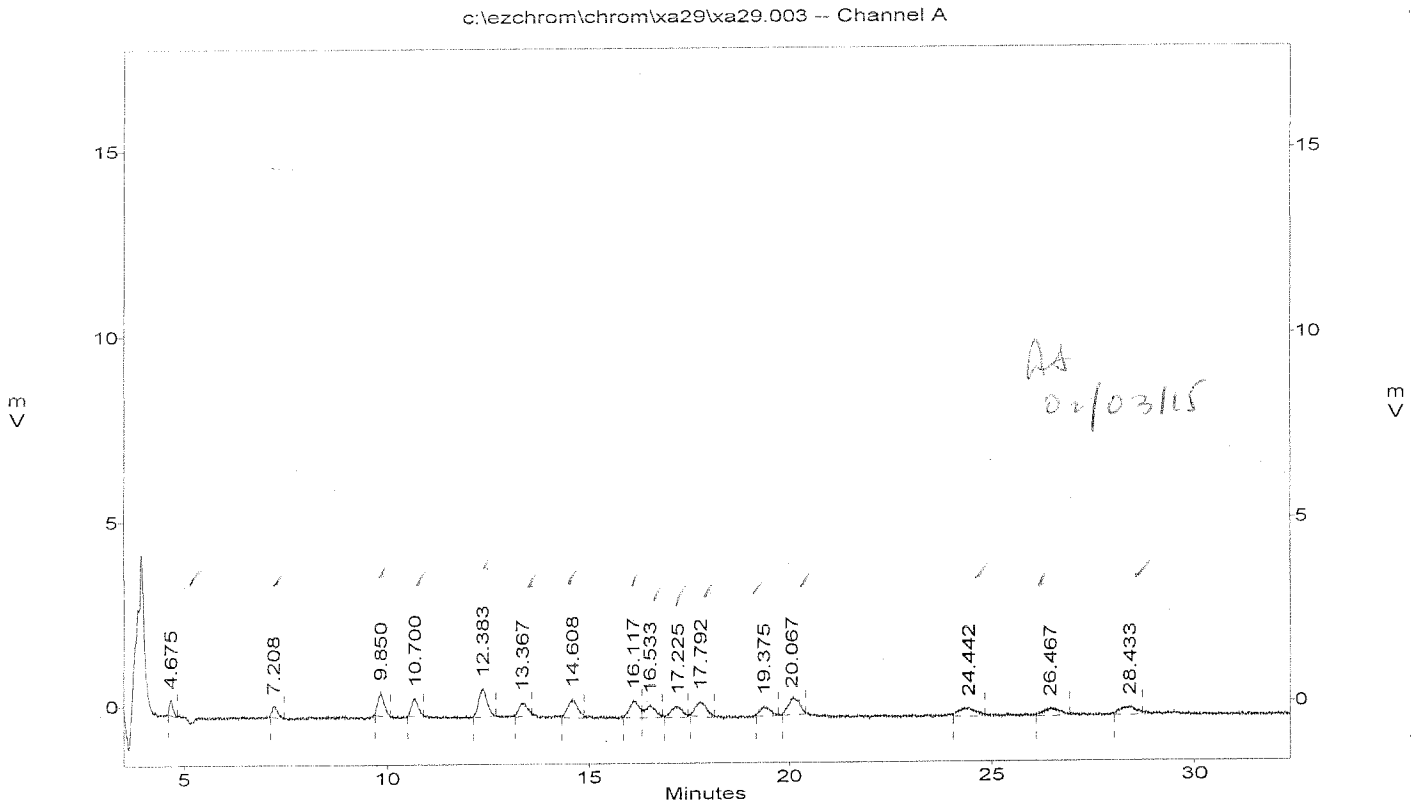


6029

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.003
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2902 20 ppb
Acquired : Jan 29, 2015 18:36:39
Printed : Jan 30, 2015 16:03:22
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.675	2614	142.1	20.0
2	RDX	7.208	3154	177.4	20.0
3	1,3,5-TNB	9.850	7276	418.4	20.0
4	1,2-Dinitrobenzene	10.700	6002	289.8	20.0
5	1,3-DNB	12.383	11096	571.5	20.0
6	Tetryl	13.367	5243	303.8	20.0
7	Nitrobenzene	14.608	8479	420.8	20.0
8	2,4,6-TNT	16.117	7609	395.8	20.0
9	3,4-DNT	16.533	5808	266.7	20.0
10	4-Am-2,6-DNT	17.225	5808	287.5	20.0
11	2-Am-4,6-DNT	17.792	7504	439.2	20.0
12	2,6-DNT	19.375	4707	269.2	20.0
13	2,4-DNT	20.067	9166	548.5	20.0
14	2-Nitrotoluene	24.442	6687	269.4	20.0
15	4-Nitrotoluene	26.467	5518	233.7	20.0
16	3-Nitrotoluene	28.433	5693	277.1	20.0

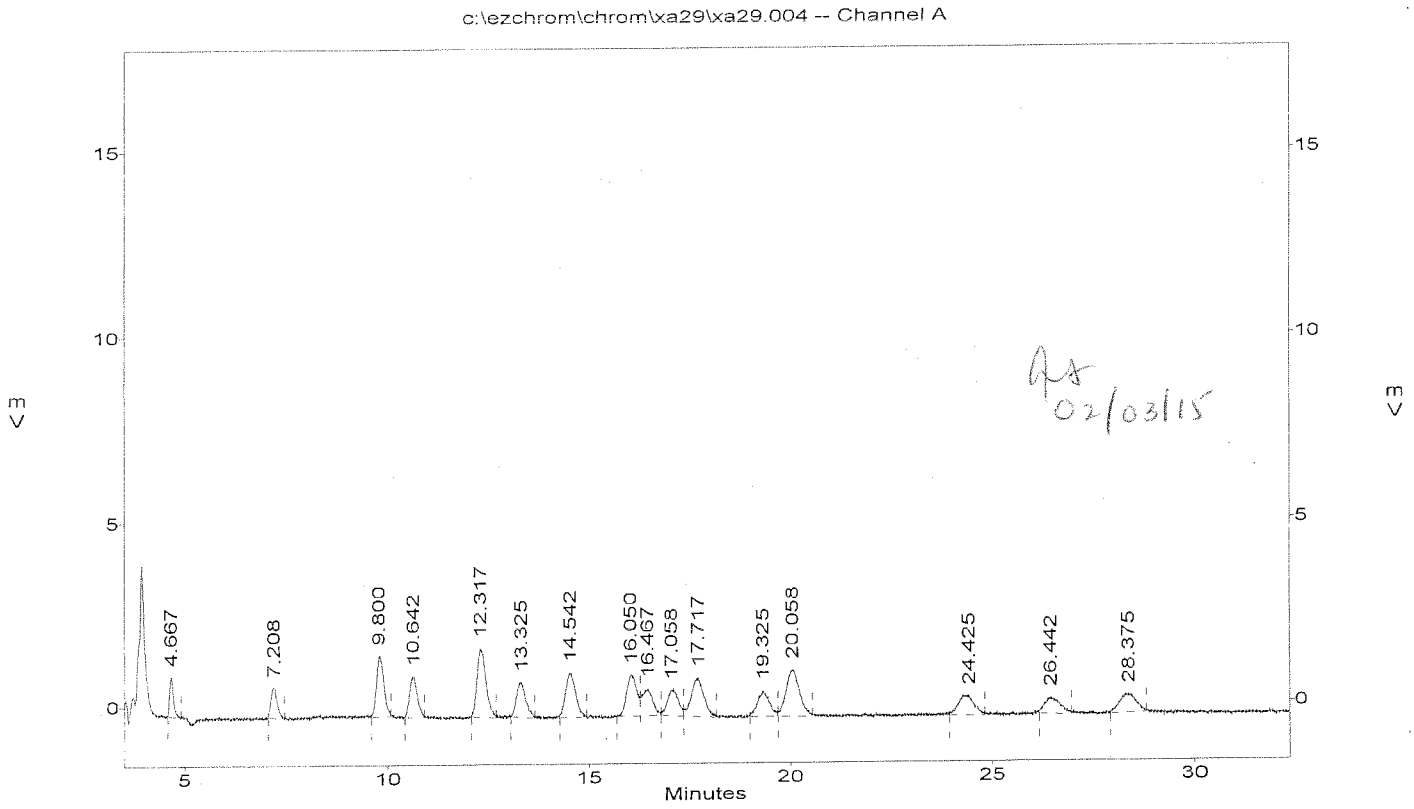


6030

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.004
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2903 50 ppb
Acquired : Jan 29, 2015 19:10:52
Printed : Jan 30, 2015 16:03:32
User : LErmol
Channel A Results

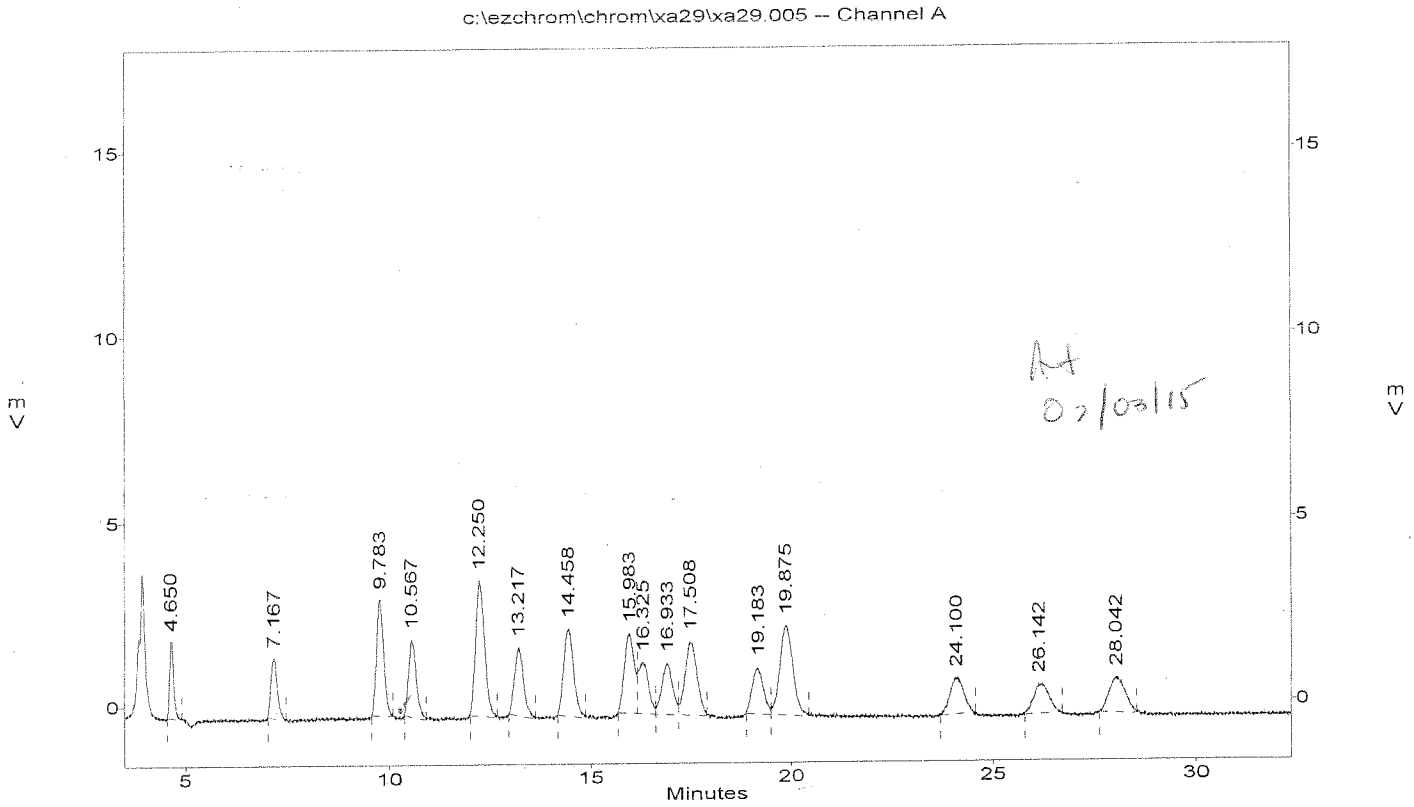
#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.667	7031	142.1	50.0
2	RDX	7.208	8935	177.4	50.0
3	1,3,5-TNB	9.800	21036	418.4	50.0
4	1,2-Dinitrobenzene	10.642	15221	289.8	50.0
5	1,3-DNB	12.317	29337	571.5	50.0
6	Tetryl	13.325	15301	303.8	50.0
7	Nitrobenzene	14.542	21303	420.8	50.0
8	2,4,6-TNT	16.050	19491	395.8	50.0
9	3,4-DNT	16.467	12912	266.7	50.0
10	4-Am-2,6-DNT	17.058	13066	287.5	50.0
11	2-Am-4,6-DNT	17.717	22556	439.2	50.0
12	2,6-DNT	19.325	14473	269.2	50.0
13	2,4-DNT	20.058	29431	548.5	50.0
14	2-Nitrotoluene	24.425	14609	269.4	50.0
15	4-Nitrotoluene	26.442	11628	233.7	50.0
16	3-Nitrotoluene	28.375	14376	277.1	50.0



EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.005
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2904 100 ppb
Acquired : Jan 29, 2015 19:45:05
Printed : Jan 30, 2015 16:03:43
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.650	13682	142.1	100.0
2	RDX	7.167	17266	177.4	100.0
3	1,3,5-TNB	9.783	39294	418.4	100.0
4	1,2-Dinitrobenzene	10.567	27901	289.8	100.0
5	1,3-DNB	12.250	56684	571.5	100.0
6	Tetryl	13.217	29235	303.8	100.0
7	Nitrobenzene	14.458	40838	420.8	100.0
8	2,4,6-TNT	15.983	36868	395.8	100.0
9	3,4-DNT	16.325	24446	266.7	100.0
10	4-Am-2,6-DNT	16.933	26121	287.5	100.0
11	2-Am-4,6-DNT	17.508	40711	439.2	100.0
12	2,6-DNT	19.183	24357	269.2	100.0
13	2,4-DNT	19.875	55350	548.5	100.0
14	2-Nitrotoluene	24.100	23138	269.4	100.0
15	4-Nitrotoluene	26.142	20464	233.7	100.0
16	3-Nitrotoluene	28.042	25774	277.1	100.0

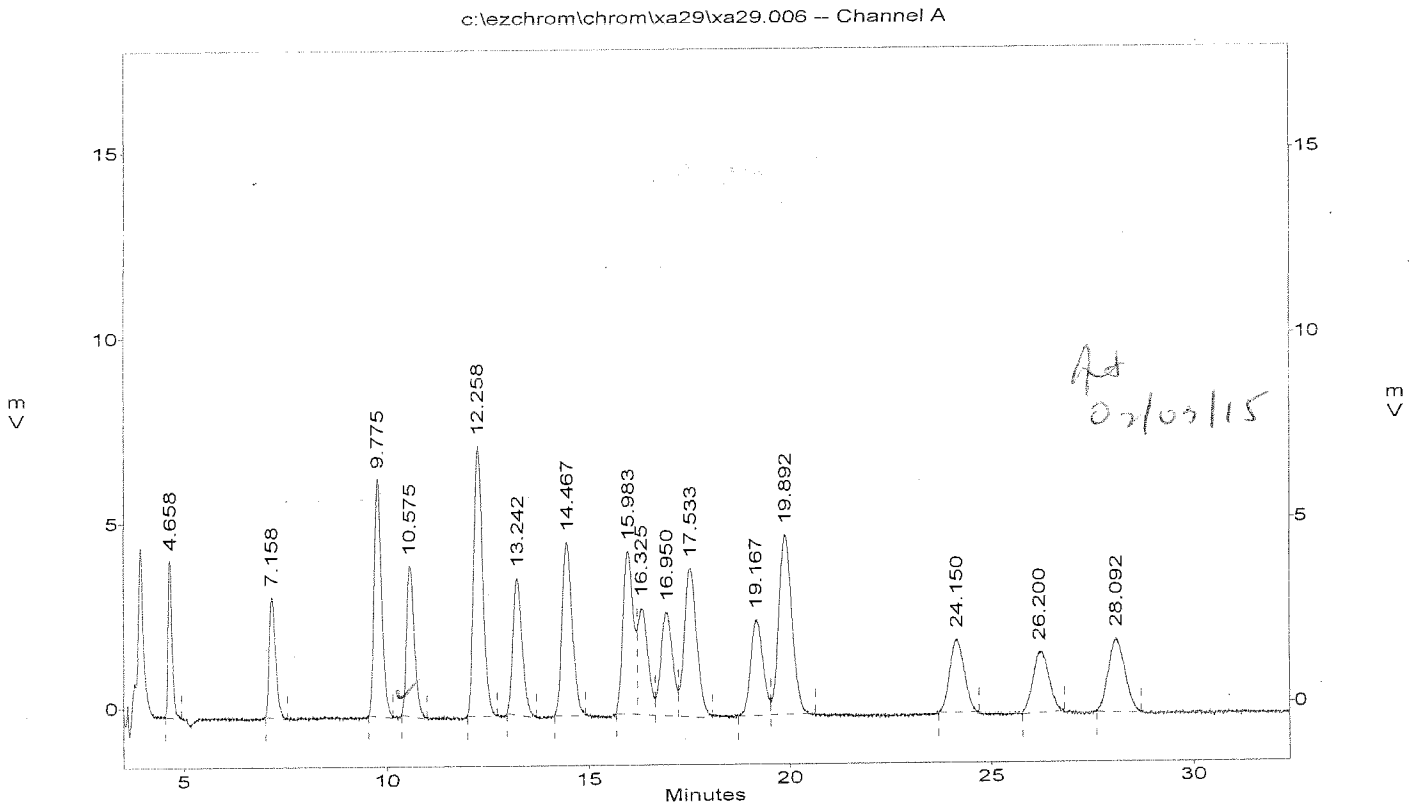


6032

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.006
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2905 200 ppb
Acquired : Jan 29, 2015 20:19:17
Printed : Jan 30, 2015 16:04:17
User : LErmol
Channel A Results

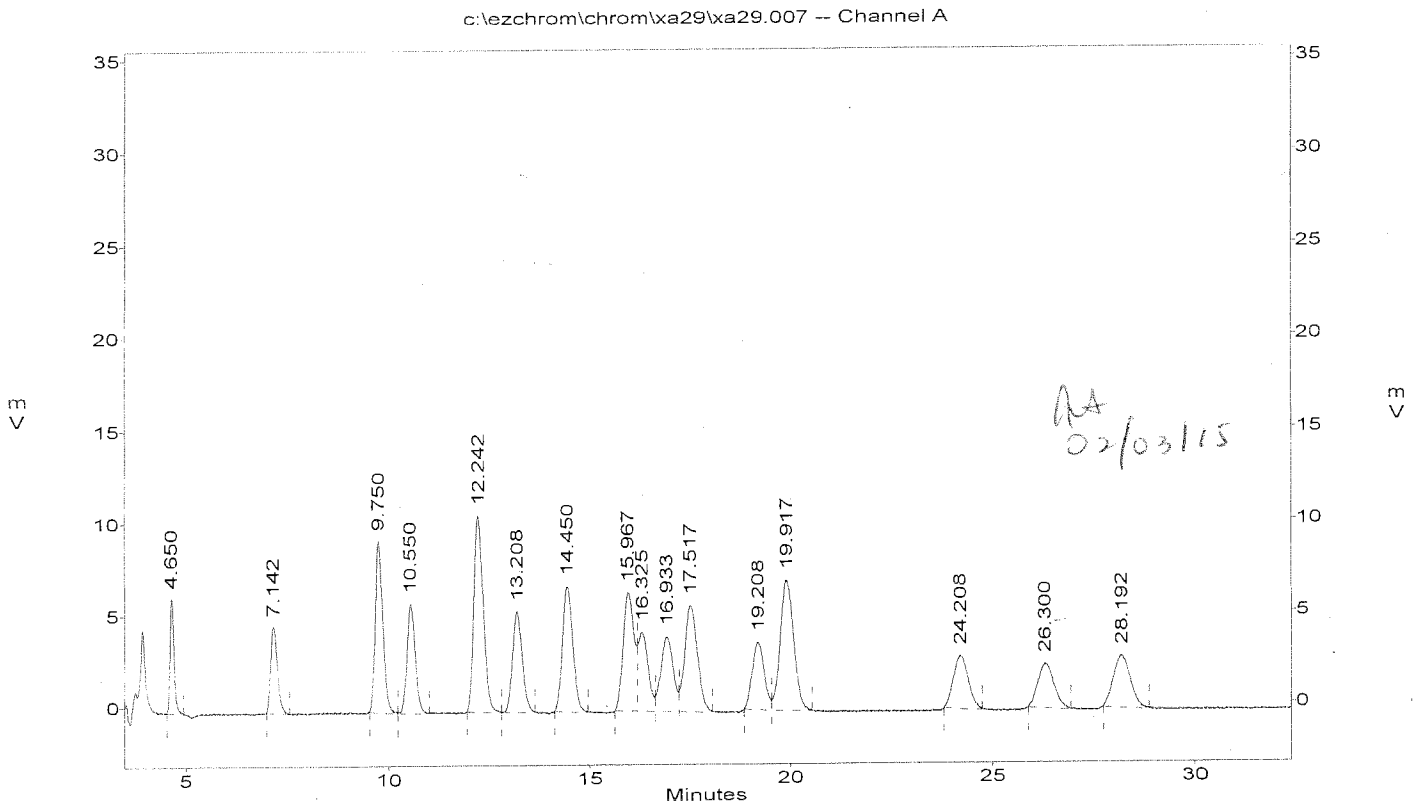
#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	27710	142.1	200.0
2	RDX	7.158	35812	177.4	200.0
3	1,3,5-TNB	9.775	82212	418.4	200.0
4	1,2-Dinitrobenzene	10.575	55299	289.8	200.0
5	1,3-DNB	12.258	114254	571.5	200.0
6	Tetryl	13.242	60077	303.8	200.0
7	Nitrobenzene	14.467	82410	420.8	200.0
8	2,4,6-TNT	15.983	80603	395.8	200.0
9	3,4-DNT	16.325	49848	266.7	200.0
10	4-Am-2,6-DNT	16.950	56555	287.5	200.0
11	2-Am-4,6-DNT	17.533	87358	439.2	200.0
12	2,6-DNT	19.167	55431	269.2	200.0
13	2,4-DNT	19.892	109963	548.5	200.0
14	2-Nitrotoluene	24.150	49350	269.4	200.0
15	4-Nitrotoluene	26.200	45365	233.7	200.0
16	3-Nitrotoluene	28.092	56370	277.1	200.0



EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.007
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2906 300 ppb
Acquired : Jan 29, 2015 20:53:30
Printed : Jan 30, 2015 16:04:49
User : LErmol
Channel A Results

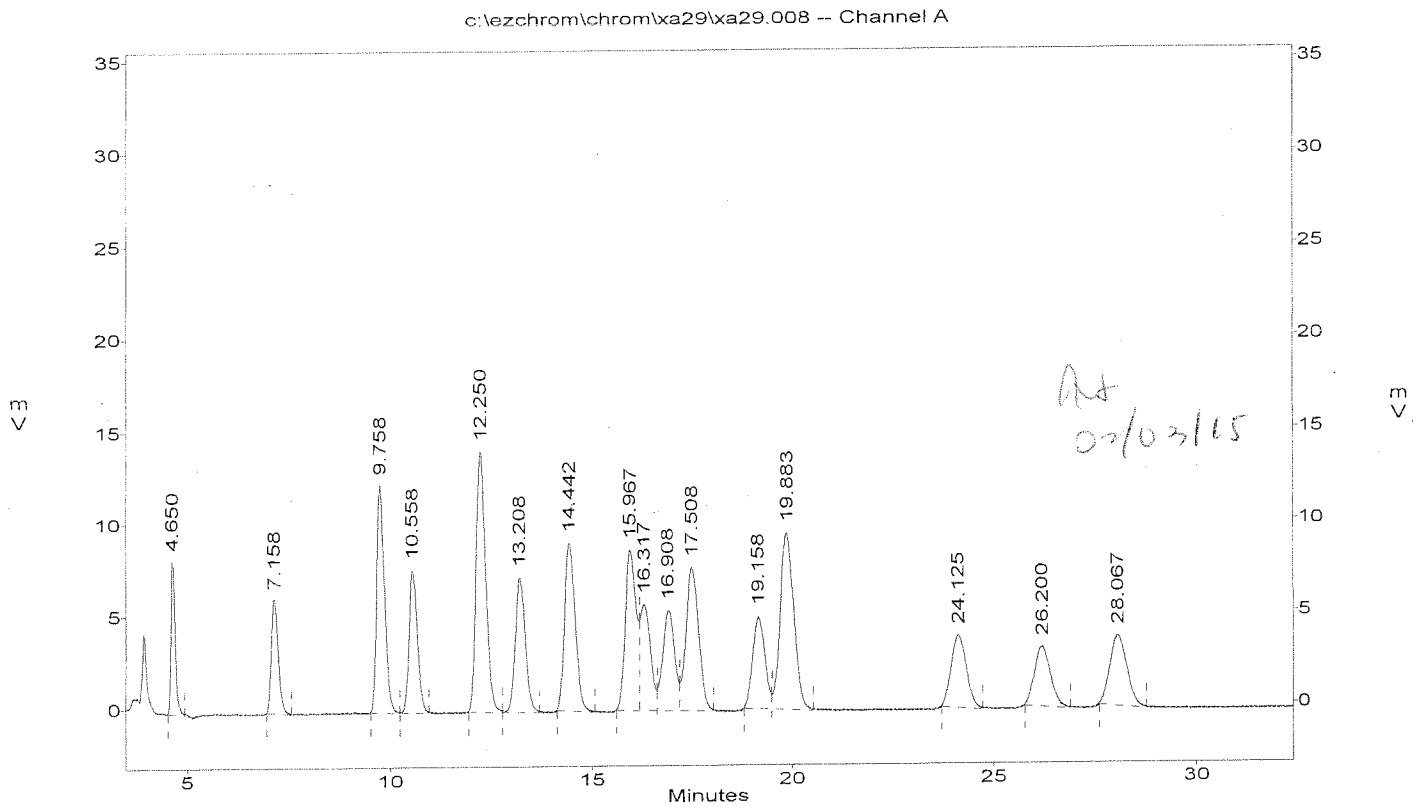
#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.650	42305	142.1	300.0
2	RDX	7.142	54521	177.4	300.0
3	1,3,5-TNB	9.750	125471	418.4	300.0
4	1,2-Dinitrobenzene	10.550	85951	289.8	300.0
5	1,3-DNB	12.242	174209	571.5	300.0
6	Tetryl	13.208	93099	303.8	300.0
7	Nitrobenzene	14.450	124632	420.8	300.0
8	2,4,6-TNT	15.967	120888	395.8	300.0
9	3,4-DNT	16.325	76751	266.7	300.0
10	4-Am-2,6-DNT	16.933	85199	287.5	300.0
11	2-Am-4,6-DNT	17.517	127848	439.2	300.0
12	2,6-DNT	19.208	78177	269.2	300.0
13	2,4-DNT	19.917	165495	548.5	300.0
14	2-Nitrotoluene	24.208	74959	269.4	300.0
15	4-Nitrotoluene	26.300	67252	233.7	300.0
16	3-Nitrotoluene	28.192	84221	277.1	300.0



EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.008
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2907 400 ppb
Acquired : Jan 29, 2015 21:27:43
Printed : Jan 30, 2015 16:05:13
User : LErmol
Channel A Results

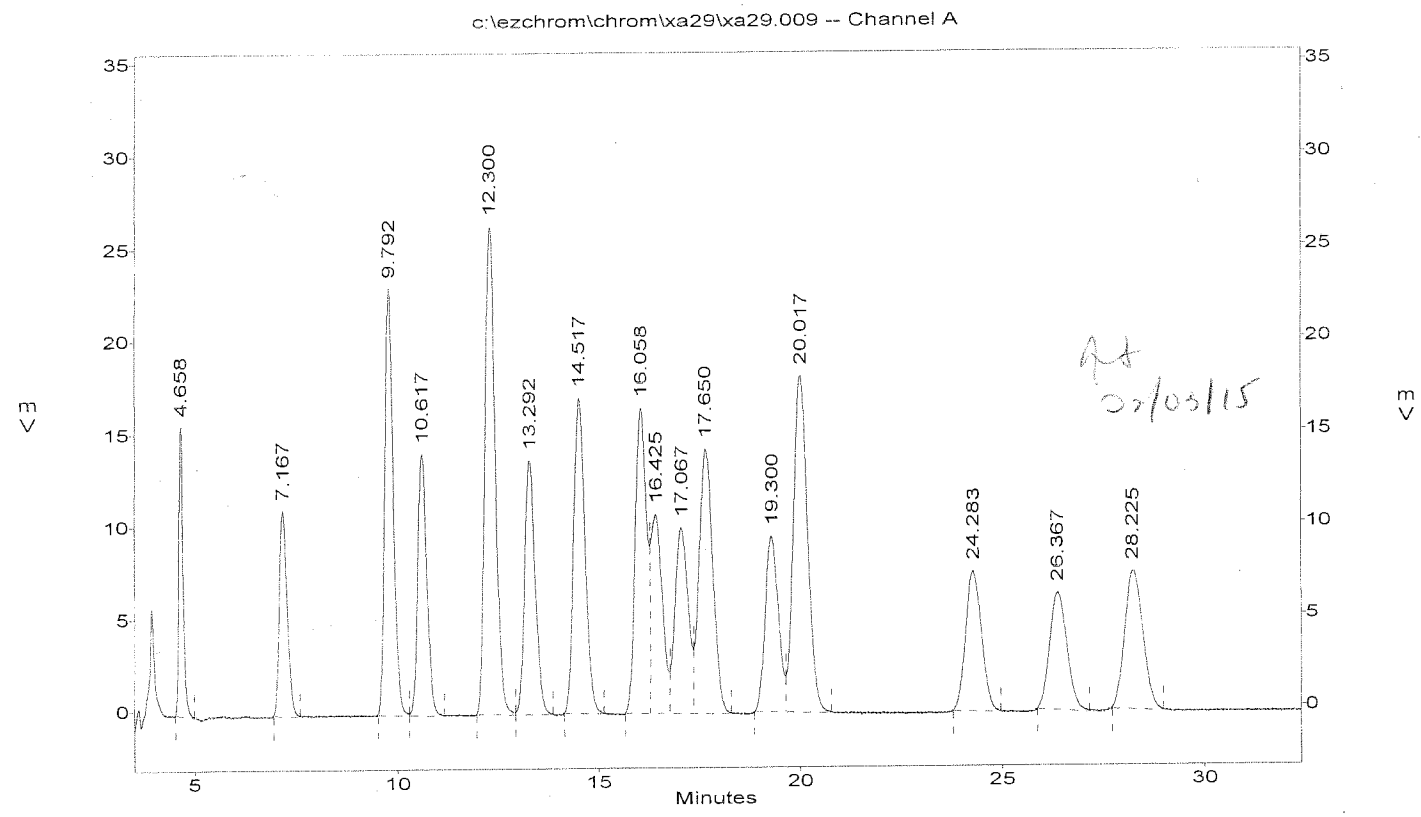
#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.650	56819	142.1	400.0
2	RDX	7.158	72429	177.4	400.0
3	1,3,5-TNB	9.758	166817	418.4	400.0
4	1,2-Dinitrobenzene	10.558	112258	289.8	400.0
5	1,3-DNB	12.250	234157	571.5	400.0
6	Tetryl	13.208	125939	303.8	400.0
7	Nitrobenzene	14.442	167502	420.8	400.0
8	2,4,6-TNT	15.967	164527	395.8	400.0
9	3,4-DNT	16.317	101436	266.7	400.0
10	4-Am-2,6-DNT	16.908	112639	287.5	400.0
11	2-Am-4,6-DNT	17.508	173220	439.2	400.0
12	2,6-DNT	19.158	105032	269.2	400.0
13	2,4-DNT	19.883	224055	548.5	400.0
14	2-Nitrotoluene	24.125	102525	269.4	400.0
15	4-Nitrotoluene	26.200	91929	233.7	400.0
16	3-Nitrotoluene	28.067	112241	277.1	400.0



EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.009
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2908 800 ppb
Acquired : Jan 29, 2015 22:01:56
Printed : Jan 30, 2015 16:05:29
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	111980	142.1	800.0
2	RDX	7.167	146777	177.4	800.0
3	1,3,5-TNB	9.792	335703	418.4	800.0
4	1,2-Dinitrobenzene	10.617	226419	289.8	800.0
5	1,3-DNB	12.300	471816	571.5	800.0
6	Tetryl	13.292	251959	303.8	800.0
7	Nitrobenzene	14.517	338135	420.8	800.0
8	2,4,6-TNT	16.058	328661	395.8	800.0
9	3,4-DNT	16.425	210578	266.7	800.0
10	4-Am-2,6-DNT	17.067	227837	287.5	800.0
11	2-Am-4,6-DNT	17.650	345951	439.2	800.0
12	2,6-DNT	19.300	220261	269.2	800.0
13	2,4-DNT	20.017	451765	548.5	800.0
14	2-Nitrotoluene	24.283	211611	269.4	800.0
15	4-Nitrotoluene	26.367	189654	233.7	800.0
16	3-Nitrotoluene	28.225	234893	277.1	800.0



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SECOND SOURCE VERIFICATION

INITIAL CALIBRATION VERIFICATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XA29010A 01/29/2015 22:36
CONC UNIT : ppb

COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.658	4.592	4.724	400.0	142.100	57155	402.17	1		15
RDX	7.142	6.971	7.313	400.0	177.400	74241	418.46	5		15
1,3,5-TNB	9.758	9.560	9.956	400.0	418.400	168447	402.60	1		15
1,3-DNB	12.242	11.954	12.530	400.0	571.500	237334	415.26	4		15
Tetryl	13.200	12.812	13.588	400.0	303.800	126985	417.95	4		15
Nitrobenzene	14.433	14.103	14.763	400.0	420.800	169842	403.64	1		15
2,4,6-TNT	15.950	15.548	16.352	400.0	395.800	164351	415.19	4		15
4-AM-2,6-DNT	16.908	16.265	17.551	400.0	287.500	115382	401.38	0		15
2-AM-4,6-DNT	17.500	16.819	18.181	400.0	439.200	174113	396.40	-1		15
2,6-DNT	19.150	18.593	19.707	400.0	269.200	110261	409.52	2		15
2,4-DNT	19.867	19.338	20.396	400.0	548.500	229472	418.33	5		15
2-Nitrotoluene	24.108	23.433	24.783	400.0	269.400	102522	380.51	-5		15
4-Nitrotoluene	26.200	25.406	26.994	400.0	233.700	93448	399.82	-0		15
3-Nitrotoluene	28.042	27.244	28.840	400.0	277.100	115242	415.86	4		15
SURROGATE	MINUTES	FROM	TO	TRUECON	CF	AREA	CONC	%D	QL	LIMITS
1,2-Dinitrobenzene	10.558	10.420	10.696	400.0	289.800	114476	394.98	-1		15
3,4-DNT	16.308	15.821	16.795	400.0	266.700	104671	392.51	-2		15

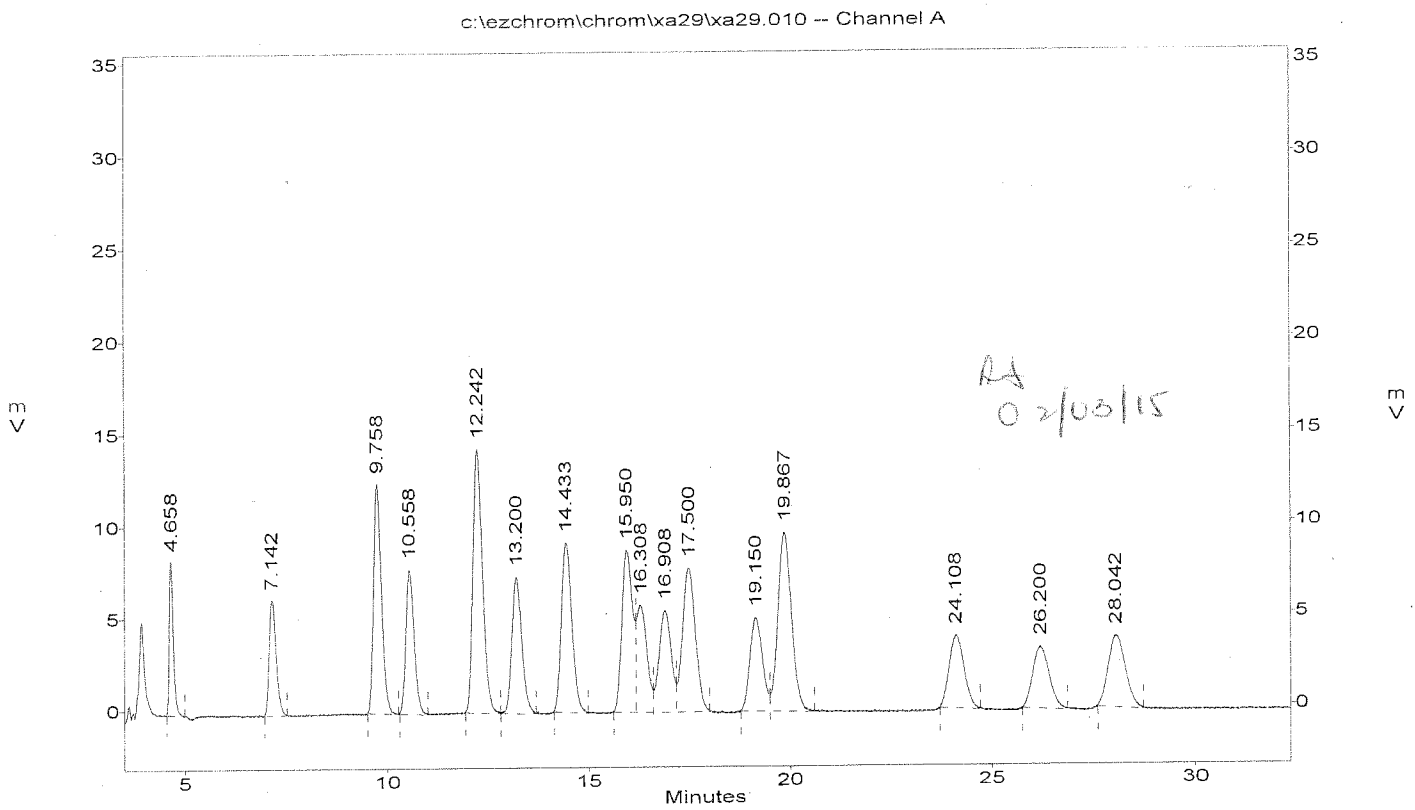
EX81A29.met

AA
02/03/15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.010
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : IEX81A2901
Acquired : Jan 29, 2015 22:36:08
Printed : Jan 30, 2015 16:07:39
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	57155	142.1	402.2
2	RDX	7.142	74241	177.4	418.5
3	1,3,5-TNB	9.758	168447	418.4	402.6
4	1,2-Dinitrobenzene	10.558	114476	289.8	395.0
5	1,3-DNB	12.242	237334	571.5	415.3
6	Tetryl	13.200	126985	303.8	417.9
7	Nitrobenzene	14.433	169842	420.8	403.6
8	2,4,6-TNT	15.950	164351	395.8	415.2
9	3,4-DNT	16.308	104671	266.7	392.5
10	4-Am-2,6-DNT	16.908	115382	287.5	401.4
11	2-Am-4,6-DNT	17.500	174113	439.2	396.4
12	2,6-DNT	19.150	110261	269.2	409.5
13	2,4-DNT	19.867	229472	548.5	418.3
14	2-Nitrotoluene	24.108	102522	269.4	380.5
15	4-Nitrotoluene	26.200	93448	233.7	399.8
16	3-Nitrotoluene	28.042	115242	277.1	415.9



DAILY CALIBRATIONS

CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD14013A 04/14/2015 19:48
CONC UNIT : ppb

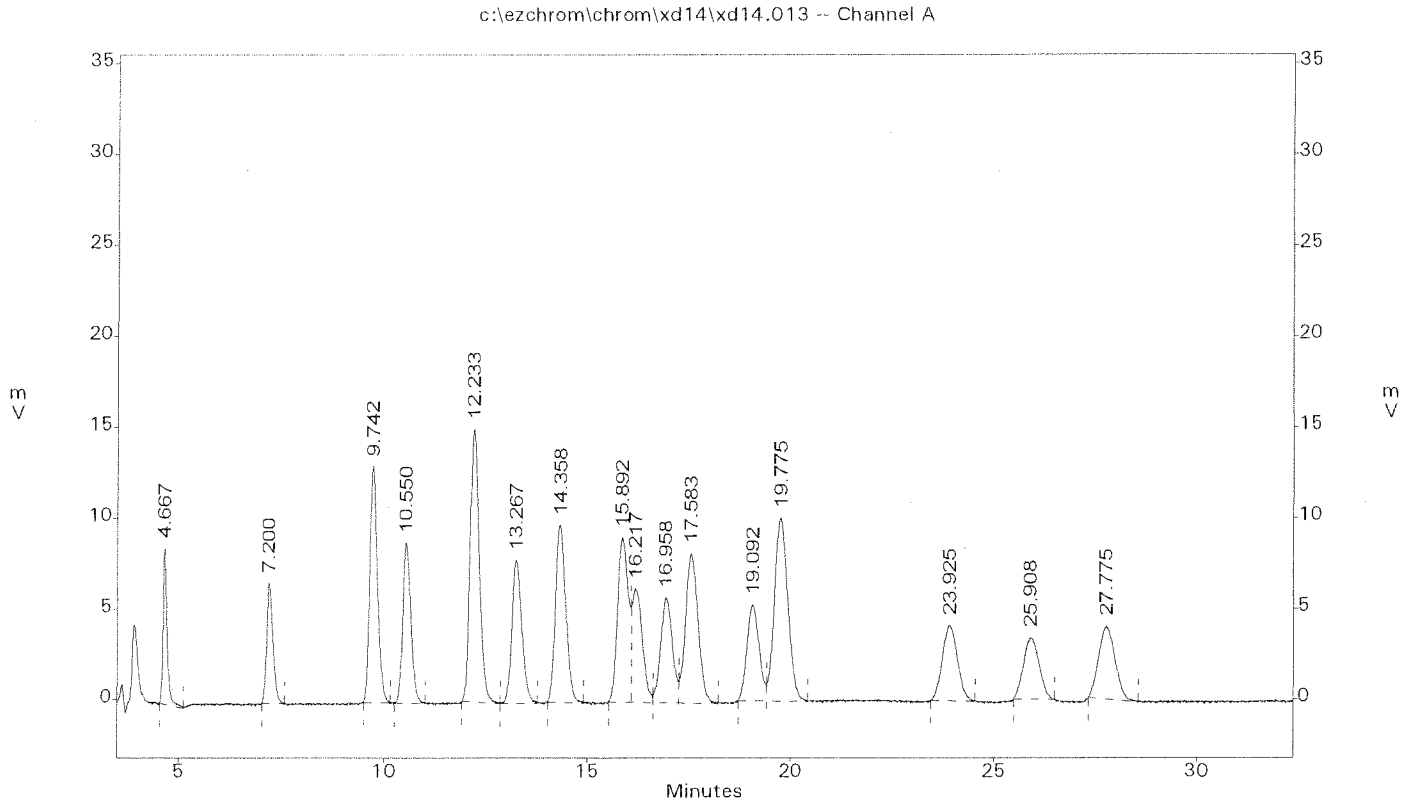
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.667	4.601	4.733	400.0	142.100	60782	427.69	7		15
RDX	7.200	7.029	7.371	400.0	177.400	75006	422.78	6		15
1,3,5-TNB	9.742	9.544	9.940	400.0	418.400	172567	412.44	3		15
1,3-DNB	12.233	11.945	12.521	400.0	571.500	241589	422.70	6		15
Tetryl	13.267	12.879	13.655	400.0	303.800	136199	448.27	12		15
Nitrobenzene	14.358	14.028	14.688	400.0	420.800	173773	412.98	3		15
2,4,6-TNT	15.892	15.490	16.294	400.0	395.800	165140	417.18	4		15
4-AM-2,6-DNT	16.958	16.315	17.601	400.0	287.500	117628	409.20	2		15
2-AM-4,6-DNT	17.583	16.902	18.264	400.0	439.200	180190	410.24	3		15
2,6-DNT	19.092	18.535	19.649	400.0	269.200	111098	412.63	3		15
2,4-DNT	19.775	19.246	20.304	400.0	548.500	232521	423.89	6		15
2-Nitrotoluene	23.925	23.250	24.600	400.0	269.400	107752	399.92	-0		15
4-Nitrotoluene	25.908	25.114	26.702	400.0	233.700	91128	389.90	-3		15
3-Nitrotoluene	27.775	26.977	28.573	400.0	277.100	116092	418.93	5		15
SURROGATE	MINUTES	FROM	TO	TRUECON	CF	AREA	CONC	%D	QL	LIMITS
1,2-Dinitrobenzene	10.550	10.412	10.688	400.0	289.800	124157	428.39	7		15
3,4-DNT	16.217	15.730	16.704	400.0	266.700	113888	427.07	7		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd14\xd14.013
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29073
Acquired : Apr 14, 2015 19:48:46
Printed : Apr 15, 2015 12:09:53
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.667	60782	142.1	427.7
2	RDX	7.200	75006	177.4	422.8
3	1,3,5-TNB	9.742	172567	418.4	412.4
4	1,2-Dinitrobenzene	10.550	124157	289.8	428.4
5	1,3-DNB	12.233	241589	571.5	422.7
6	Tetryl	13.267	136199	303.8	448.3
7	Nitrobenzene	14.358	173773	420.8	413.0
8	2,4,6-TNT	15.892	165140	395.8	417.2
9	3,4-DNT	16.217	113888	266.7	427.1
10	4-Am-2,6-DNT	16.958	117628	287.5	409.2
11	2-Am-4,6-DNT	17.583	180190	439.2	410.2
12	2,6-DNT	19.092	111098	269.2	412.6
13	2,4-DNT	19.775	232521	548.5	423.9
14	2-Nitrotoluene	23.925	107752	269.4	399.9
15	4-Nitrotoluene	25.908	91128	233.7	389.9
16	3-Nitrotoluene	27.775	116092	277.1	418.9



6042

CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD14024A 04/15/2015 02:14
CONC UNIT : ppb

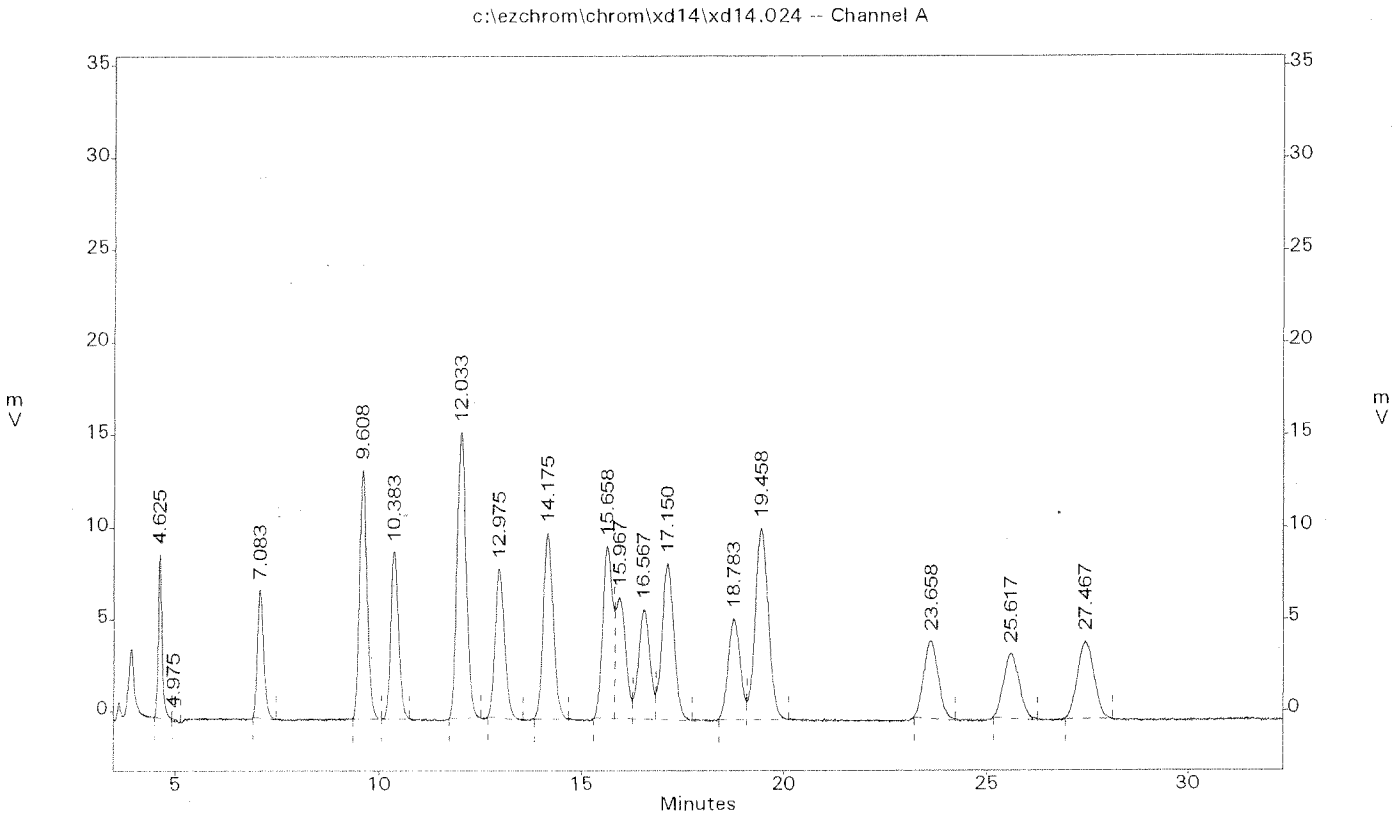
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.625	4.559	4.691	400.0	142.100	59746	420.40	5		15
RDX	7.083	6.912	7.254	400.0	177.400	75746	426.95	7		15
1,3,5-TNB	9.608	9.410	9.806	400.0	418.400	174680	417.49	4		15
1,3-DNB	12.033	11.745	12.321	400.0	571.500	241316	422.22	6		15
Tetryl	12.975	12.587	13.363	400.0	303.800	134058	441.23	10		15
Nitrobenzene	14.175	13.845	14.505	400.0	420.800	177798	422.55	6		15
2,4,6-TNT	15.658	15.256	16.060	400.0	395.800	164760	416.22	4		15
4-AM-2,6-DNT	16.567	15.924	17.210	400.0	287.500	119695	416.39	4		15
2-AM-4,6-DNT	17.150	16.469	17.831	400.0	439.200	179261	408.12	2		15
2,6-DNT	18.783	18.226	19.340	400.0	269.200	113931	423.16	6		15
2,4-DNT	19.458	18.929	19.987	400.0	548.500	235753	429.78	7		15
2-Nitrotoluene	23.658	22.983	24.333	400.0	269.400	106957	396.97	-1		15
4-Nitrotoluene	25.617	24.823	26.411	400.0	233.700	97229	416.00	4		15
3-Nitrotoluene	27.467	26.669	28.265	400.0	277.100	121133	437.12	9		15
SURROGATE	**MINUTES**	**FROM**	**TO**	**TRUECON**	**CF**	**AREA**	**CONC**	**%D**	**QL**	**LIMITS**
1,2-Dinitrobenzene	10.383	10.245	10.521	400.0	289.800	123985	427.79	7		15
3,4-DNT	15.967	15.480	16.454	400.0	266.700	112379	421.41	5		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd14\xd14.024
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29074
Acquired : Apr 15, 2015 02:14:14
Printed : Apr 15, 2015 12:25:27
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.625	59746	142.1	420.4
3	RDX	7.083	75746	177.4	426.9
4	1,3,5-TNB	9.608	174680	418.4	417.5
5	1,2-Dinitrobenzene	10.383	123985	289.8	427.8
6	1,3-DNB	12.033	241316	571.5	422.2
7	Tetryl	12.975	134058	303.8	441.2
8	Nitrobenzene	14.175	177798	420.8	422.5
9	2,4,6-TNT	15.658	164760	395.8	416.2
10	3,4-DNT	15.967	112379	266.7	421.4
11	4-Am-2,6-DNT	16.567	119695	287.5	416.4
12	2-Am-4,6-DNT	17.150	179261	439.2	408.1
13	2,6-DNT	18.783	113931	269.2	423.2
14	2,4-DNT	19.458	235753	548.5	429.8
15	2-Nitrotoluene	23.658	106957	269.4	397.0
16	4-Nitrotoluene	25.617	97229	233.7	416.0
17	3-Nitrotoluene	27.467	121133	277.1	437.1



6044

CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD14036A 04/15/2015 09:14
CONC UNIT : ppb

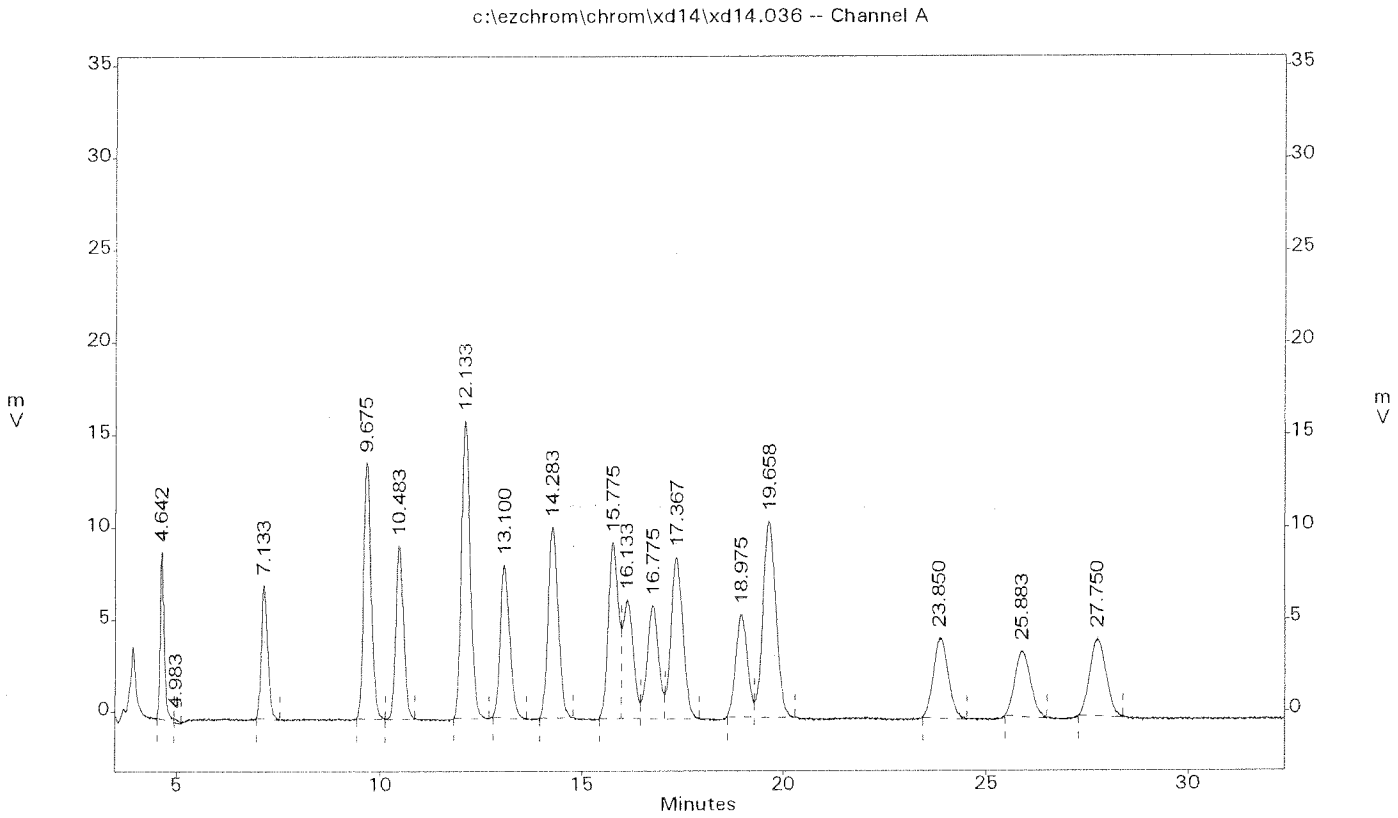
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.642	4.576	4.708	400.0	142.100	61601	433.45	8		15
RDX	7.133	6.962	7.304	400.0	177.400	78558	442.80	11		15
1,3,5-TNB	9.675	9.477	9.873	400.0	418.400	179573	429.19	7		15
1,3-DNB	12.133	11.845	12.421	400.0	571.500	249444	436.44	9		15
Tetryl	13.100	12.712	13.488	400.0	303.800	136702	449.93	12		15
Nitrobenzene	14.283	13.953	14.613	400.0	420.800	180239	428.35	7		15
2,4,6-TNT	15.775	15.373	16.177	400.0	395.800	167919	424.20	6		15
4-AM-2,6-DNT	16.775	16.132	17.418	400.0	287.500	124191	432.03	8		15
2-AM-4,6-DNT	17.367	16.686	18.048	400.0	439.200	184362	419.74	5		15
2,6-DNT	18.975	18.418	19.532	400.0	269.200	113711	422.34	6		15
2,4-DNT	19.658	19.129	20.187	400.0	548.500	238874	435.47	9		15
2-Nitrotoluene	23.850	23.175	24.525	400.0	269.400	113458	421.10	5		15
4-Nitrotoluene	25.883	25.089	26.677	400.0	233.700	97379	416.64	4		15
3-Nitrotoluene	27.750	26.952	28.548	400.0	277.100	120621	435.27	9		15
SURROGATE	MINUTES	FROM	TO	TRUECON	CF	AREA	CONC	%D	QL	LIMITS
1,2-Dinitrobenzene	10.483	10.345	10.621	400.0	289.800	127817	441.02	10		15
3,4-DNT	16.133	15.646	16.620	400.0	266.700	119845	449.41	12		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd14\xd14.036
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29075
Acquired : Apr 15, 2015 09:14:48
Printed : Apr 15, 2015 12:30:37
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.642	61601	142.1	433.5
3	RDX	7.133	78558	177.4	442.8
4	1,3,5-TNB	9.675	179573	418.4	429.2
5	1,2-Dinitrobenzene	10.483	127817	289.8	441.0
6	1,3-DNB	12.133	249444	571.5	436.4
7	Tetryl	13.100	136702	303.8	449.9
8	Nitrobenzene	14.283	180239	420.8	428.3
9	2,4,6-TNT	15.775	167919	395.8	424.2
10	3,4-DNT	16.133	119845	266.7	449.4
11	4-Am-2,6-DNT	16.775	124191	287.5	432.0
12	2-Am-4,6-DNT	17.367	184362	439.2	419.7
13	2,6-DNT	18.975	113711	269.2	422.3
14	2,4-DNT	19.658	238874	548.5	435.5
15	2-Nitrotoluene	23.850	113458	269.4	421.1
16	4-Nitrotoluene	25.883	97379	233.7	416.6
17	3-Nitrotoluene	27.750	120621	277.1	435.3



6046

ANALYTICAL LOGS

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HPLC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

8330 ICAL
49% MeOH & 51% H2O
flow: 0.8 mL/min
press: 3500 psi
λ = 254 nm
inj: 50 µl
Col.: C18 (R008620005)
time: 33 min
Syringes: MSF01-02-07 (500µl)
↓ 06 (50µl)

EXA008W: LOQ & LOD
EXA011W: 15A111
EXA014W: 15A111
EXA013S: 15A107
↓ 15A122

Book #: A81-020
Instrument No.: 81
Analytical Sequence: XA29
Method File: EX81A29
Analytical Batch: CEX81A29001

SOP #	Rev. #
☑ EMAX-8330	7
☐ EMAX-8332	2
☐ EMAX-	

	STANDARDS ID	Conc. (µg/L)
ICAL	SHIC-07-71-02	10-800
ICV	↓ 71-03	400
DCC	↓ 65-03	400
DCC	—	—
IB	SHIC-07 - 67-03	n/a

SOLVENT	ID
Acetonitrile	—
Methanol	SW1A-005-09-21
Water	↓ 25

Data File	
ELECTRONIC DATA ARCHIVAL	
Location	Date
☑ EZC_5_HPLC	2/2/15
☐	

Analyzed By: LL
Date: 01/29/15

6048

Method: Ex81a2... 2.015 - [Batc...

File Edit Method Batch Options Analysis Window Help

Method | Data | Batch | Integ. | Peaks | Batch | Custom | Review | Reproc | Reslib | Analyze | Reports

Run	Run Type	Sample ID	Method	Filename	Level	Sample Amt.	ISTD Amt.	Mult.
1	Unknown	IB81A2901	ex81a29.met	XA29.001	0	1	0	1
2	Begin Calibration	EX81A2901 10 ppb	ex81a29.met	XA29.002	0	1	0	1
3	Calibration	EX81A2902 20 ppb	ex81a29.met	XA29.003	0	1	0	1
4	Calibration	EX81A2903 50 ppb	ex81a29.met	XA29.004	0	1	0	1
5	Calibration	EX81A2904 100 ppb	ex81a29.met	XA29.005	0	1	0	1
6	Calibration	EX81A2905 200 ppb	ex81a29.met	XA29.006	0	1	0	1
7	Calibration	EX81A2906 300 ppb	ex81a29.met	XA29.007	0	1	0	1
8	Calibration	EX81A2907 400 ppb	ex81a29.met	XA29.008	0	1	0	1
9	End Calibration	EX81A2908 800 ppb	ex81a29.met	XA29.009	0	1	0	1
10	Unknown	IEX81A2901	ex81a29.met	XA29.010	0	1	0	1
11	Unknown	CEX81A29001	ex81a29.met	XA29.011	0	1	0	1
12	Unknown	EXA008WB	ex81a29.met	XA29.012	0	1	0	1
13	Unknown	EXA008WL	ex81a29.met	XA29.013	0	1	0	1
14	Unknown	EXA008WC	ex81a29.met	XA29.014	0	1	0	1
15	Unknown	EXA008WX	ex81a29.met	XA29.015	0	1	0	1
16	Unknown	EXA008WY	ex81a29.met	XA29.016	0	1	0	1
17	Unknown	LOQ-14	ex81a29.met	XA29.017	0	1	0	1
18	Unknown	LOD-14	ex81a29.met	XA29.018	0	1	0	1
19	Unknown	EXA011WB	ex81a29.met	XA29.019	0	1	0	1
20	Unknown	EXA011WL	ex81a29.met	XA29.020	0	1	0	1
21	Unknown	EXA011WC	ex81a29.met	XA29.021	0	1	0	1
22	Unknown	15A111-33	ex81a29.met	XA29.022	0	1	0	1
23	Unknown	CEX81A29002	ex81a29.met	XA29.023	0	1	0	1
24	Unknown	Spike Check	ex81a29.met	XA29.024	0	1	0	1
25	Unknown	EXA014WB	ex81a29.met	XA29.025	0	1	0	1
26	Unknown	EXA014WL	ex81a29.met	XA29.026	0	1	0	1
27	Unknown	EXA014WC	ex81a29.met	XA29.027	0	1	0	1
28	Unknown	15A111-33	ex81a29.met	XA29.028	0	1	0	1
29	Unknown	EXA013SB	ex81a29.met	XA29.029	0	1	0	1
30	Unknown	EXA013SL	ex81a29.met	XA29.030	0	1	0	1
31	Unknown	EXA013SC	ex81a29.met	XA29.031	0	1	0	1
32	Unknown	15A107-01	ex81a29.met	XA29.032	0	1	0	1
33	Unknown	15A107-03	ex81a29.met	XA29.033	0	1	0	1
34	Unknown	CEX81A29003	ex81a29.met	XA29.034	0	1	0	1

FINAL

Method Development

Start | EZChrom Chromat... | Method: Ex17a20c... | Exploring - Export | Calculator | Method: Ex81a29... | Method: Ex81a... | Document - WordP... | 11:34 AM

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HPLC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

EX20114W: 1520065
EX20105: LOQ & LOD
↓ 1520041
EX20095: 1520040

Book #: A81-020
Instrument No.: 81
Analytical Sequence: xd 14
Method File: ex81a29
Analytical Batch: cex81a29072

SOP #	Rev. #
☑ EMAX-8330	7
☐ EMAX-8332	2
☐ EMAX-	

	STANDARDS ID	Conc. (µg/L)
ICAL	—	—
ICV	—	—
DCC	—	—
DCC	SHIC-07- 78-01	400
IB	74-01	n/a

SOLVENT	ID
Acetonitrile	—
Methanol	SWIA-005 - 09-21
Water	↓ 12-06

Data File	
ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ EZC_5_HPLC	
☐	

Analyzed By: LC
Date: 4/14/15

6050

Method: Ex81a29.met Batch: Xd14.seq Data: Xd14.009 - [Batch: xd14.seq]

File Edit Method Batch Options Analysis Control Window Help

Run	Run Type	Sample ID	Method	Filename	Level	Sample Amt.	ISTD Amt.	Mult.
1	Unknown	IB81D1401	ex81a29.met	XD14.001	0	1	0	
2	Unknown	CEX81A29072	ex81a29.met	XD14.002	0	1	0	
3	Unknown	EXD011WB	ex81a29.met	XD14.003	0	1	0	
4	Unknown	EXD011WL	ex81a29.met	XD14.004	0	1	0	
5	Unknown	EXD011WC	ex81a29.met	XD14.005	0	1	0	
6	Unknown	15D065-01	ex81a29.met	XD14.006	0	1	0	
7	Unknown	15D065-02	ex81a29.met	XD14.007	0	1	0	
8	Unknown	15D065-06	ex81a29.met	XD14.008	0	1	0	
9	Unknown	15D065-07	ex81a29.met	XD14.009	0	1	0	
10	Unknown	15D065-08	ex81a29.met	XD14.010	0	1	0	
11	Unknown	15D065-09	ex81a29.met	XD14.011	0	1	0	
12	Unknown	15D065-20	ex81a29.met	XD14.012	0	1	0	
13	Unknown	CEX81A29073	ex81a29.met	XD14.013	0	1	0	
14	Unknown	EXD010SB	ex81a29.met	XD14.014	0	1	0	
15	Unknown	EXD010SL	ex81a29.met	XD14.015	0	1	0	
16	Unknown	EXD010SC	ex81a29.met	XD14.016	0	1	0	
17	Unknown	LOQ-13	ex81a29.met	XD14.017	0	1	0	
18	Unknown	LOD-13	ex81a29.met	XD14.018	0	1	0	
19	Unknown	15D041-01	ex81a29.met	XD14.019	0	1	0	
20	Unknown	15D041-01M	ex81a29.met	XD14.020	0	1	0	
21	Unknown	15D041-01S	ex81a29.met	XD14.021	0	1	0	
22	Unknown	15D041-02	ex81a29.met	XD14.022	0	1	0	
23	Unknown	15D041-03	ex81a29.met	XD14.023	0	1	0	
24	Unknown	CEX81A29074	ex81a29.met	XD14.024	0	1	0	
25	Unknown	15D041-04	ex81a29.met	XD14.025	0	1	0	
26	Unknown	15D041-05	ex81a29.met	XD14.026	0	1	0	
27	Unknown	15D041-06	ex81a29.met	XD14.027	0	1	0	
28	Unknown	EXD009SB	ex81a29.met	XD14.028	0	1	0	
29	Unknown	EXD009SL	ex81a29.met	XD14.029	0	1	0	
30	Unknown	EXD009SC	ex81a29.met	XD14.030	0	1	0	
31	Unknown	15D040-01	ex81a29.met	XD14.031	0	1	0	
32	Unknown	15D040-02	ex81a29.met	XD14.032	0	1	0	
33	Unknown	15D040-03	ex81a29.met	XD14.033	0	1	0	
34	Unknown	15D040-04	ex81a29.met	XD14.034	0	1	0	

Start | EZChrom Chromatograp... | Method: Ex81a29... | Method: Ng17a13c.met | Method: Ex81a29.met | untitled - Paint | Exploring - Export | Tuesday, April 14, 2015 5:30 PM

Method: Ex81a29.met Batch: Xd14.seq Data: Xd14.009 - [Batch: xd14.seq]

File Edit Method Batch Options Analysis Control Window Help

Run	Run Type	Sample ID	Method	Filename	Level	Sample Amt.	ISTD Amt.	Mult.
35	Unknown	IB81D1402	ex81a29.met	XD14.035	0	1	0	
36	Unknown	CEX81A29075	ex81a29.met	XD14.036	0	1	0	
37	Unknown	15D040-05	ex81a29.met	XD14.037	0	1	0	
38	Unknown	15D040-06	ex81a29.met	XD14.038	0	1	0	
39	Unknown	15D040-07	ex81a29.met	XD14.039	0	1	0	
40	Unknown	15D040-08	ex81a29.met	XD14.040	0	1	0	
41	Unknown	15D040-09	ex81a29.met	XD14.041	0	1	0	
42	Unknown	15D040-10	ex81a29.met	XD14.042	0	1	0	
43	Unknown	15D040-10M	ex81a29.met	XD14.043	0	1	0	
44	Unknown	15D040-10S	ex81a29.met	XD14.044	0	1	0	
45	Unknown	15D040-11	ex81a29.met	XD14.045	0	1	0	
46	Unknown	15D040-12	ex81a29.met	XD14.046	0	1	0	
47	Unknown	CEX81A29076	ex81a29.met	XD14.047	0	1	0	
48	Unknown	15D040-13	ex81a29.met	XD14.048	0	1	0	
49	Unknown	15D040-14	ex81a29.met	XD14.049	0	1	0	
50	Unknown	15D040-15	ex81a29.met	XD14.050	0	1	0	
51	Unknown	15D040-15M	ex81a29.met	XD14.051	0	1	0	
52	Unknown	15D040-15S	ex81a29.met	XD14.052	0	1	0	
53	Unknown	15D040-16	ex81a29.met	XD14.053	0	1	0	
54	Unknown	15D040-17	ex81a29.met	XD14.054	0	1	0	
55	Unknown	15D040-18	ex81a29.met	XD14.055	0	1	0	
56	Unknown	15D040-19	ex81a29.met	XD14.056	0	1	0	
57	Unknown	15D040-20	ex81a29.met	XD14.057	0	1	0	
58	Unknown	CEX81A29077	ex81a29.met	XD14.058	0	1	0	
59	Unknown	X	ex81a29.met	XD14.059	0	1	0	
60	Unknown	X	ex81a29.met	XD14.060	0	1	0	
61	Unknown	X	ex81a29.met	XD14.061	0	1	0	
62	Unknown	X	ex81a29.met	XD14.062	0	1	0	
63	Unknown	X	ex81a29.met	XD14.063	0	1	0	
64	Unknown	X	ex81a29.met	XD14.064	0	1	0	
65	Unknown	X	ex81a29.met	XD14.065	0	1	0	
66	Unknown	X	ex81a29.met	XD14.066	0	1	0	
67	Unknown	X	ex81a29.met	XD14.067	0	1	0	
68	Unknown	X	ex81a29.met	XD14.068	0	1	0	

FINAL

LB 4/14/15

2689

Start | EZChrom Chromatograp... | Method: Ex81a29... | Method: Ng17a13c.met | Method: Ex81a29.met | untitled - Paint | Exploring - Export | 5:31 PM

Tuesday, April 14, 2015

EXTRACTION LOGS

EMAX LABORATORIES, INC.

EXTRACTION LOG
for
EXPLOSIVES

Note: For samples and relevant QCs/Standards extracted, refer to attached extraction sequence.

SOP	Rev. #
☑ EMAX-8330	7
☐ EMAX-8332	1
☐ EMAX-	

Lab Sample ID	
EXD012 -SB	
-SL	
-SC	
D041 -01	✓
-01M	✓
-01S	✓
-02	✓
-03	✓
-04	✓
-05	✓
-06	✓
LOQ -13	✓
LOD -13	✓

Book #.: EEX-026

Preparation Batch: EXD012 ~~S~~ 10S my 4/13/15

Matrix SOIL

Micropipette ID: PE00-04 (1000 µl)

Micropipette ID: PE97C-03 (100 µl)

Comments:

Air Dry Batch: ADD004

LOQ 13: spike & Surrogate Amt: 20 ppb (0.04mL)

LOD 13: Spike & Surrogate Amt: 10 ppb (0.02mL)

Standards	ID	Amount Added (ml)
Surrogate	SHIB-06-64-03	0.4
LCS/MS	SHIB-06-65-01	0.4
LCS/MS		
LCS/MS		
LCS/MS		

Reagent	Lot # / ID
Acetonitrile	54330
NaCl	–
$CaCl_2$	GPIB-08-06-01
Silica Sand	SWIB-002-43-21
Reagent Water	–
SPE Disk	–
Methanol	–
Acetone	–

Prepared By: my Witnessed By: Jville

Standard Added By: my Checked By: JZ

Extract Received By: LCO 4/14/15 Location: SE04-8330-6A

Disposed By: Disposed On:

6054

FileID: EXD010S

EMAX LABORATORIES, INC.

EXTRACTION LOG FOR EXPLOSIVES

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Ve(ml)	ExpAmt	ExpVe(ml)	PrepFctr	Comments
15EXD010S01	EXD010SB	2	g	4/13/15 12:25	20	2	20	1	
15EXD010S02	EXD010SL	2	g	4/13/15 12:26	20	2	20	1	
15EXD010S03	EXD010SC	2	g	4/13/15 12:26	20	2	20	1	
15EXD010S04	D041-01	2	g	4/13/15 12:27	20	2	20	1	
15EXD010S05	D041-01M	2	g	4/13/15 12:28	20	2	20	1	
15EXD010S06	D041-01S	2	g	4/13/15 12:28	20	2	20	1	
15EXD010S07	D041-02	2	g	4/13/15 12:29	20	2	20	1	
15EXD010S08	D041-03	2.01	g	4/13/15 12:30	20	2	20	1	
15EXD010S09	D041-04	2	g	4/13/15 12:31	20	2	20	1	
15EXD010S10	D041-05	2	g	4/13/15 12:31	20	2	20	1	
15EXD010S11	D041-06	2.01	g	4/13/15 12:32	20	2	20	1	
15EXD010S12	LOQ-13	2	g	4/13/15 12:33	20	2	20	1	(8330) Spike & Surr. Amt: 20ppb (0.04mL)
15EXD010S13	LOD-13	2	g	4/13/15 12:34	20	2	20	1	(8330) Spike & Surr. Amt: 10ppb (0.02mL)
									Air Dry Batch: ADD004

Balance ID: 10203192. Calibration check was verified prior to use.

Ve=extract volume

PreptFctr=(ExpAmt/Aliquot)(Ve/ExpVe)

☑ Extraction Started @ 4/13/15 15:50

Prepared By: MYokoo

☑ Extraction Ended @ 4/14/15 9:50

Checked By: JR

Date 4/14/15

Comments:

SOP EMAX-8330 Rev. 7

6055

LABORATORY REPORT FOR

KLEINFELDER

CTO 070, UXO4, FALLBROOK

METALS / MERCURY

SDG#: 15D041

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D041

METHOD SW6020A
METALS BY ICP-MS

A total of six (6) soil samples were received on 04/08/15 to be analyzed for Metals by ICP-MS in accordance with Method SW6020A and project specific requirements.

Holding Time
Samples were digested and analyzed within the prescribed holding time.

Calibration
Initial Calibration was established as prescribed by the method and was verified using a secondary source (ICV). Interference checks were performed and results were within required limits. Continuing calibration verifications and continuing calibration blanks were carried out at the frequency specified by the project. All calibration requirements were within acceptance criteria. MRL was analyzed as required by the project.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, one (1) method blank was analyzed. IMD016SB - result was compliant to project requirement. Refer to sample result summary form for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, one (1) set of LCS/LCD was analyzed. IMD016SL/IMD016SC - all analytes were within LCS QC limits. Refer to LCS summary form for details.

Matrix QC Sample
Matrix spike sample was prepared and analyzed at a frequency required by the project. For this SDG, one (1) set of MS/MSD was analyzed and the following were noted: D041-06M/D041-06S - Percent recoveries and RPDs for Copper (2X) and Vanadium (3X) were not within MS/MSD QC limits. Percent recoveries for Iron (13X) and Manganese (7X) were not within MS/MSD QC limits. Percent recovery for Zinc (2X) was not within MS QC limits. Percent recoveries for Barium (4X), Chromium and Lead (2X) were not within MSD QC limits. Percent recovery and RPD for Antimony was not within MSD QC limit. The enclosed value (#X) is the ratio of parent sample result and spike amount. Presence of matrix interference was suspected. The rest of the analytes were in control. Analytical spike and serial dilution were analyzed and evaluated as appropriate. Results were within expected values. Refer to Matrix QC summary form for details.

Sample Analysis
Samples were analyzed according to prescribed analytical procedures. Results were evaluated in accordance to project requirements. For this SDG, all quality control requirements were met with the exception of those that were discussed within the associated QC parameter.

LAB CHRONICLE
METALS BY ICP-MS

Client : KLEINFELDER
Project : CTO 070, UX04, FALLBROOK

SDG NO. : 15D041
Instrument ID : T-IF6

SOIL

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1S	IMD016SB	0.985	NA	04/13/1517:38	04/10/1511:55	F6D07035	F6D07033	IMD016S	Method Blank
LCS1S	IMD016SL	0.985	NA	04/13/1517:43	04/10/1511:55	F6D07036	F6D07033	IMD016S	Lab Control Sample (LCS)
LCD1S	IMD016SC	0.990	NA	04/13/1517:47	04/10/1511:55	F6D07037	F6D07033	IMD016S	LCS Duplicate
UX04-SB02-0.83	D041-01	0.980	1.1	04/13/1517:51	04/10/1511:55	F6D07038	F6D07033	IMD016S	Field Sample
UX04-SB03-0.08	D041-02	0.971	2.3	04/13/1517:55	04/10/1511:55	F6D07039	F6D07033	IMD016S	Field Sample
UX04-SB04-0.33	D041-03	0.990	2.1	04/13/151B:00	04/10/1511:55	F6D07040	F6D07033	IMD016S	Field Sample
UX04-SB05-0.33	D041-04	0.971	4.6	04/13/151B:04	04/10/1511:55	F6D07041	F6D07033	IMD016S	Field Sample
UX04-SB06-0.42	D041-05	0.966	1.0	04/13/1518:08	04/10/1511:55	F6D07042	F6D07033	IMD016S	Field Sample
UX04-SB07-2.0MS	D041-06M	0.990	7.6	04/13/1518:25	04/10/1511:55	F6D07046	F6D07044	IMD016S	Matrix Spike Sample (MS)
UX04-SB07-2.0MSD	D041-06S	0.990	7.6	04/13/1518:29	04/10/1511:55	F6D07047	F6D07044	IMD016S	MS Duplicate (MSD)
UX04-SB07-2.0AS	D041-06A	0.980	7.6	04/13/1518:33	04/10/1511:55	F6D07048	F6D07044	IMD016S	Analytical Spike Sample
UX04-SB07-2.0	D041-06	0.980	7.6	04/13/1518:38	04/10/1511:55	F6D07049	F6D07044	IMD016S	Field Sample
UX04-SB07-2.0DL	D041-06J	4.90	7.6	04/13/1518:42	04/10/1511:55	F6D07050	F6D07044	IMD016S	Diluted Sample

FN - Filename
% Moist - Percent Moisture

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/03/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/08/15
SDG NO.	: 15D041	Date Extracted:	04/10/15 11:55
Sample ID:	UX04-SB02-0.83	Date Analyzed:	04/13/15 17:51
Lab Samp ID:	D041-01	Dilution Factor:	0.980
Lab File ID:	F6D07038	Matrix :	SOIL
Ext Btch ID:	IMD016S	% Moisture :	1.1
Calib. Ref.:	F6D07033	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	8570	99.1	9.91	19.8
Antimony	0.178J	0.495	0.0991	0.198
Arsenic	1.46	0.495	0.0495	0.0991
Barium	72.4	0.495	0.0713	0.0991
Beryllium	0.200J	0.495	0.0495	0.0991
Cadmium	0.166J	0.495	0.0565	0.0991
Calcium	1000	99.1	16.8	19.8
Chromium	9.12	0.495	0.0495	0.0991
Cobalt	5.30	0.495	0.0495	0.0991
Copper	8.34	0.495	0.0991	0.198
Iron	13500	99.1	4.95	9.91
Lead	10.6	0.495	0.0495	0.0991
Magnesium	2570	99.1	9.91	19.8
Manganese	233	0.495	0.152	0.198
Molybdenum	0.416J	0.495	0.0991	0.198
Nickel	3.83	0.495	0.0624	0.0991
Potassium	2230	99.1	9.91	19.8
Selenium	0.111J	0.495	0.0495	0.0991
Silver	ND	0.495	0.0495	0.0991
Sodium	110	99.1	9.91	19.8
Strontium	9.14	0.495	0.0495	0.0991
Thallium	0.247J	0.495	0.0495	0.0991
Tin	ND	19.8	4.95	9.91
Vanadium	35.2	0.495	0.188	0.248
Zinc	25.9	1.98	0.677	0.991

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/03/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/08/15
SDG NO.	: 15D041	Date Extracted:	04/10/15 11:55
Sample ID:	UX04-SB03-0.08	Date Analyzed:	04/13/15 17:55
Lab Samp ID:	D041-02	Dilution Factor:	0.971
Lab File ID:	F6D07039	Matrix :	SOIL
Ext Btch ID:	IMD016S	% Moisture :	2.3
Calib. Ref.:	F6D07033	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	8510	99.4	9.94	19.9
Antimony	0.126J	0.497	0.0994	0.199
Arsenic	1.53	0.497	0.0497	0.0994
Barium	67.3	0.497	0.0716	0.0994
Beryllium	0.172J	0.497	0.0497	0.0994
Cadmium	0.152J	0.497	0.0566	0.0994
Calcium	1460	99.4	16.9	19.9
Chromium	9.78	0.497	0.0497	0.0994
Cobalt	5.22	0.497	0.0497	0.0994
Copper	24.1	0.497	0.0994	0.199
Iron	15800	99.4	4.97	9.94
Lead	21.8	0.497	0.0497	0.0994
Magnesium	2420	99.4	9.94	19.9
Manganese	178	0.497	0.152	0.199
Molybdenum	0.230J	0.497	0.0994	0.199
Nickel	3.40	0.497	0.0626	0.0994
Potassium	1800	99.4	9.94	19.9
Selenium	0.0736J	0.497	0.0497	0.0994
Silver	ND	0.497	0.0497	0.0994
Sodium	102	99.4	9.94	19.9
Strontium	11.2	0.497	0.0497	0.0994
Thallium	0.181J	0.497	0.0497	0.0994
Tin	6.98J	19.9	4.97	9.94
Vanadium	41.2	0.497	0.189	0.248
Zinc	47.6	1.99	0.679	0.994

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/03/15
Project	: CTO 070, UXO4, FALLBROOK	Date Received:	04/08/15
SDG NO.	: 15D041	Date Extracted:	04/10/15 11:55
Sample ID:	UXO4-SB04-0.33	Date Analyzed:	04/13/15 18:00
Lab Samp ID:	D041-03	Dilution Factor:	0.990
Lab File ID:	F6D07040	Matrix :	SOIL
Ext Btch ID:	IMD016S	% Moisture :	2.1
Calib. Ref.:	F6D07033	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	9880	101	10.1	20.2
Antimony	0.135J	0.506	0.101	0.202
Arsenic	1.42	0.506	0.0506	0.101
Barium	125	0.506	0.0728	0.101
Beryllium	0.208J	0.506	0.0506	0.101
Cadmium	0.282J	0.506	0.0576	0.101
Calcium	3600	101	17.2	20.2
Chromium	9.62	0.506	0.0506	0.101
Cobalt	7.70	0.506	0.0506	0.101
Copper	11.6	0.506	0.101	0.202
Iron	16600	101	5.06	10.1
Lead	6.02	0.506	0.0506	0.101
Magnesium	3430	101	10.1	20.2
Manganese	451	0.506	0.155	0.202
Molybdenum	0.541	0.506	0.101	0.202
Nickel	4.03	0.506	0.0637	0.101
Potassium	2720	101	10.1	20.2
Selenium	0.122J	0.506	0.0506	0.101
Silver	ND	0.506	0.0506	0.101
Sodium	129	101	10.1	20.2
Strontium	24.7	0.506	0.0506	0.101
Thallium	0.207J	0.506	0.0506	0.101
Tin	ND	20.2	5.06	10.1
Vanadium	49.5	0.506	0.192	0.253
Zinc	44.2	2.02	0.691	1.01

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/03/15
Project	: CTO 070, UXO4, FALLBROOK	Date Received:	04/08/15
SDG NO.	: 15D041	Date Extracted:	04/10/15 11:55
Sample ID:	UXO4-SB05-0.33	Date Analyzed:	04/13/15 18:04
Lab Samp ID:	D041-04	Dilution Factor:	0.971
Lab File ID:	F6D07041	Matrix :	SOIL
Ext Btch ID:	IMD016S	% Moisture :	4.6
Calib. Ref.:	F6D07033	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	8790	102	10.2	20.4
Antimony	0.274J	0.509	0.102	0.204
Arsenic	1.61	0.509	0.0509	0.102
Barium	62.0	0.509	0.0733	0.102
Beryllium	0.160J	0.509	0.0509	0.102
Cadmium	0.145J	0.509	0.0580	0.102
Calcium	1260	102	17.3	20.4
Chromium	10.8	0.509	0.0509	0.102
Cobalt	4.80	0.509	0.0509	0.102
Copper	18.7	0.509	0.102	0.204
Iron	20800	102	5.09	10.2
Lead	45.7	0.509	0.0509	0.102
Magnesium	2290	102	10.2	20.4
Manganese	159	0.509	0.156	0.204
Molybdenum	0.336J	0.509	0.102	0.204
Nickel	3.96	0.509	0.0641	0.102
Potassium	1480	102	10.2	20.4
Selenium	0.0720J	0.509	0.0509	0.102
Silver	ND	0.509	0.0509	0.102
Sodium	94.4J	102	10.2	20.4
Strontium	9.04	0.509	0.0509	0.102
Thallium	0.154J	0.509	0.0509	0.102
Tin	14.3J	20.4	5.09	10.2
Vanadium	53.6	0.509	0.193	0.254
Zinc	44.6	2.04	0.695	1.02

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/03/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/08/15
SDG NO.	: 15D041	Date Extracted:	04/10/15 11:55
Sample ID:	UX04-SB06-0.42	Date Analyzed:	04/13/15 18:08
Lab Samp ID:	D041-05	Dilution Factor:	0.966
Lab File ID:	F6D07042	Matrix :	SOIL
Ext Btch ID:	IMD016S	% Moisture :	1.0
Calib. Ref.:	F6D07033	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	7360	97.6	9.76	19.5
Antimony	0.137J	0.488	0.0976	0.195
Arsenic	1.23	0.488	0.0488	0.0976
Barium	66.8	0.488	0.0703	0.0976
Beryllium	0.142J	0.488	0.0488	0.0976
Cadmium	0.139J	0.488	0.0556	0.0976
Calcium	1160	97.6	16.6	19.5
Chromium	9.04	0.488	0.0488	0.0976
Cobalt	4.76	0.488	0.0488	0.0976
Copper	58.4	0.488	0.0976	0.195
Iron	15900	97.6	4.88	9.76
Lead	18.2	0.488	0.0488	0.0976
Magnesium	2240	97.6	9.76	19.5
Manganese	197	0.488	0.149	0.195
Molybdenum	0.396J	0.488	0.0976	0.195
Nickel	3.08	0.488	0.0615	0.0976
Potassium	2020	97.6	9.76	19.5
Selenium	0.0615J	0.488	0.0488	0.0976
Silver	ND	0.488	0.0488	0.0976
Sodium	71.6J	97.6	9.76	19.5
Strontium	8.65	0.488	0.0488	0.0976
Thallium	0.161J	0.488	0.0488	0.0976
Tin	5.87J	19.5	4.88	9.76
Vanadium	38.9	0.488	0.185	0.244
Zinc	36.3	1.95	0.666	0.976

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/06/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/08/15
SDG NO.	: 15D041	Date Extracted:	04/10/15 11:55
Sample ID:	UX04-SB07-2.0	Date Analyzed:	04/13/15 18:38
Lab Samp ID:	D041-06	Dilution Factor:	0.980
Lab File ID:	F6D07049	Matrix :	SOIL
Ext Btch ID:	IMD016S	% Moisture :	7.6
Calib. Ref.:	F6D07044	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	11900	106	10.6	21.2
Antimony	0.309J	0.530	0.106	0.212
Arsenic	1.56	0.530	0.0530	0.106
Barium	110	0.530	0.0764	0.106
Beryllium	0.108J	0.530	0.0530	0.106
Cadmium	0.157J	0.530	0.0605	0.106
Calcium	2400	106	18.0	21.2
Chromium	11.4	0.530	0.0530	0.106
Cobalt	7.05	0.530	0.0530	0.106
Copper	53.0	0.530	0.106	0.212
Iron	34400	106	5.30	10.6
Lead	51.2	0.530	0.0530	0.106
Magnesium	4100	106	10.6	21.2
Manganese	198	0.530	0.162	0.212
Molybdenum	0.395J	0.530	0.106	0.212
Nickel	4.00	0.530	0.0668	0.106
Potassium	1940	106	10.6	21.2
Selenium	0.0669J	0.530	0.0530	0.106
Silver	ND	0.530	0.0530	0.106
Sodium	183	106	10.6	21.2
Strontium	13.0	0.530	0.0530	0.106
Thallium	0.0965J	0.530	0.0530	0.106
Tin	6.86J	21.2	5.30	10.6
Vanadium	71.4	0.530	0.202	0.265
Zinc	81.2	2.12	0.724	1.06

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	NA
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/10/15
SDG NO.	: 15D041	Date Extracted:	04/10/15 11:55
Sample ID:	MBLK1S	Date Analyzed:	04/13/15 17:38
Lab Samp ID:	IMD016SB	Dilution Factor:	0.985
Lab File ID:	F6D07035	Matrix :	SOIL
Ext Btch ID:	IMD016S	% Moisture :	NA
Calib. Ref.:	F6D07033	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	ND	98.5	9.85	19.7
Antimony	ND	0.493	0.0985	0.197
Arsenic	ND	0.493	0.0493	0.0985
Barium	ND	0.493	0.0709	0.0985
Beryllium	ND	0.493	0.0493	0.0985
Cadmium	ND	0.493	0.0561	0.0985
Calcium	ND	98.5	16.7	19.7
Chromium	ND	0.493	0.0493	0.0985
Cobalt	ND	0.493	0.0493	0.0985
Copper	ND	0.493	0.0985	0.197
Iron	ND	98.5	4.93	9.85
Lead	ND	0.493	0.0493	0.0985
Magnesium	ND	98.5	9.85	19.7
Manganese	ND	0.493	0.151	0.197
Molybdenum	ND	0.493	0.0985	0.197
Nickel	ND	0.493	0.0621	0.0985
Potassium	ND	98.5	9.85	19.7
Selenium	ND	0.493	0.0493	0.0985
Silver	ND	0.493	0.0493	0.0985
Sodium	ND	98.5	9.85	19.7
Strontium	ND	0.493	0.0493	0.0985
Thallium	ND	0.493	0.0493	0.0985
Tin	ND	19.7	4.93	9.85
Vanadium	ND	0.493	0.187	0.246
Zinc	ND	1.97	0.673	0.985

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UXO4, FALLBROOK
SDG NO.: 15D041
METHOD: SW6020A

MATRIX:	SOIL			% MOISTURE:	NA
DILTN FACTR:	0.985	0.985	0.990		
SAMPLE ID:	MBLK1S				
CONTROL NO.:	IMD016SB	IMD016SL	IMD016SC		
LAB FILE ID:	F6D07035	F6D07036	F6D07037		
DATIME EXTRCTD:	04/10/1511:55	04/10/1511:55	04/10/1511:55	DATE COLLECTED:	NA
DATIME ANALYZD:	04/13/1517:38	04/13/1517:43	04/13/1517:47	DATE RECEIVED:	04/10/15
PREP. BATCH:	IMD016S	IMD016S	IMD016S		
CALIB. REF:	F6D07033	F6D07033	F6D07033		

ACCESSION:

PARAMETER	BLNK RSLT mg/kg	SPIKE AMT mg/kg	BS RSLT mg/kg	BS % REC	SPIKE AMT mg/kg	BSD RSLT mg/kg	BSD % REC	RPD %	QC LIMIT %	MAX RPD %
Aluminum	ND	2500	2470	99	2500	2510	100	1	80-120	20
Antimony	ND	25.0	25.2	101	25.0	25.5	102	1	80-120	20
Arsenic	ND	25.0	25.2	101	25.0	24.9	100	1	80-120	20
Barium	ND	25.0	25.4	102	25.0	25.6	102	1	80-120	20
Beryllium	ND	25.0	25.0	100	25.0	24.9	100	0	80-120	20
Cadmium	ND	25.0	23.6	94	25.0	23.7	95	0	80-120	20
Calcium	ND	2500	2490	100	2500	2520	101	1	80-120	20
Chromium	ND	25.0	24.6	99	25.0	24.8	99	1	80-120	20
Cobalt	ND	25.0	25.0	100	25.0	25.0	100	0	80-120	20
Copper	ND	25.0	25.1	100	25.0	25.1	100	0	80-120	20
Iron	ND	2500	2460	99	2500	2480	99	1	80-120	20
Lead	ND	25.0	24.1	96	25.0	24.2	97	0	80-120	20
Magnesium	ND	2500	2500	100	2500	2510	101	1	80-120	20
Manganese	ND	25.0	25.2	101	25.0	25.0	100	1	80-120	20
Molybdenum	ND	25.0	25.0	100	25.0	25.2	101	1	80-120	20
Nickel	ND	25.0	24.8	99	25.0	24.9	100	0	80-120	20
Potassium	ND	2500	2420	97	2500	2450	98	1	80-120	20
Selenium	ND	25.0	23.7	95	25.0	23.7	95	0	80-120	20
Silver	ND	25.0	24.2	97	25.0	24.7	99	2	75-120	20
Sodium	ND	2500	2430	97	2500	2410	96	1	80-120	20
Strontium	ND	25.0	24.9	100	25.0	24.8	99	0	80-120	20
Thallium	ND	25.0	23.6	94	25.0	23.7	95	0	80-120	20
Tin	ND	25.0	26.2	105	25.0	26.3	105	0	80-120	20
Vanadium	ND	25.0	25.3	101	25.0	25.4	102	1	80-120	20
Zinc	ND	50.0	48.2	96	50.0	48.7	97	1	80-120	20

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
SDG NO.: 15D041
METHOD: SW6020A

MATRIX:	SOIL			% MOISTURE:	7.6
DILTN FACTR:	0.980	0.990	0.990		
SAMPLE ID:	UX04-SB07-2.0				
CONTROL NO.:	D041-06	D041-06M	D041-06S		
LAB FILE ID:	F6D07049	F6D07046	F6D07047		
DATIME EXTRCTD:	04/10/1511:55	04/10/1511:55	04/10/1511:55	DATE COLLECTED:	04/06/15
DATIME ANALYZD:	04/13/1518:38	04/13/1518:25	04/13/1518:29	DATE RECEIVED:	04/08/15
PREP. BATCH:	IMD016S	IMD016S	IMD016S		
CALIB. REF:	F6D07044	F6D07044	F6D07044		

ACCESSION:

PARAMETER	SMPL RSLT mg/kg	SPIKE AMT mg/kg	MS RSLT mg/kg	MS % REC	SPIKE AMT mg/kg	MSD RSLT mg/kg	MSD % REC	RPD %	QC LIMIT %	MAX RPD %
Aluminum	11900	2710	14500	97	2710	14800	109	2	80-120	20
Antimony	0.309J	27.1	22.5	82	27.1	11.1	40*	68*	80-120	20
Arsenic	1.56	27.1	27.2	95	27.1	27.2	95	0	80-120	20
Barium	110	27.1	134	87	27.1	147	137*	10	80-120	20
Beryllium	0.108J	27.1	24.8	91	27.1	24.9	92	0	80-120	20
Cadmium	0.157J	27.1	25.8	95	27.1	25.7	94	0	80-120	20
Calcium	2400	2710	4990	96	2710	4890	92	2	80-120	20
Chromium	11.4	27.1	34.7	86	27.1	32.8	79*	6	80-120	20
Cobalt	7.05	27.1	30.5	87	27.1	31.3	89	2	80-120	20
Copper	53.0	27.1	59.4	24*	27.1	73.0	74*	21*	80-120	20
Iron	34400	2710	35500	41*	2710	32500	-70*	9	80-120	20
Lead	51.2	27.1	78.3	100	27.1	91.4	149*	15	80-120	20
Magnesium	4100	2710	6620	93	2710	6910	104	4	80-120	20
Manganese	198	27.1	192	-24*	27.1	219	77*	13	80-120	20
Molybdenum	0.395J	27.1	26.4	96	27.1	25.6	93	3	80-120	20
Nickel	4.00	27.1	27.9	88	27.1	28.5	90	2	80-120	20
Potassium	1940	2710	4440	93	2710	4560	97	3	80-120	20
Selenium	0.0669J	27.1	25.1	93	27.1	24.5	90	3	80-120	20
Silver	ND	27.1	25.7	95	27.1	25.4	94	1	75-120	20
Sodium	183	2710	2680	92	2710	2620	90	2	80-120	20
Strontium	13.0	27.1	38.7	95	27.1	40.8	103	5	80-120	20
Thallium	0.0965J	27.1	25.5	94	27.1	25.2	93	1	80-120	20
Tin	6.86J	27.1	36.7	110	27.1	31.7	92	15	80-120	20
Vanadium	71.4	27.1	91.1	73*	27.1	74.0	10*	21*	80-120	20
Zinc	81.2	54.1	119	71*	54.1	133	97	11	80-120	20

EMAX QUALITY CONTROL DATA
SERIAL DILUTION ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
BATCH NO.: 15D041
METHOD: SW6020A

MATRIX:	SOIL		% MOISTURE:	7.6
DILUTION FACTOR:	0.980	4.90		
SAMPLE ID:	UX04-SB07-2.0	UX04-SB07-2.0DL		
EMAX SAMP ID:	D041-06	D041-06J		
LAB FILE ID:	F6D07049	F6D07050		
DATE EXTRACTED:	04/10/1511:55	04/10/1511:55	DATE COLLECTED:	04/06/15
DATE ANALYZED:	04/13/1518:38	04/13/1518:42	DATE RECEIVED:	04/08/15
PREP. BATCH:	IMD016S	IMD016S		
CALIB. REF:	F6D07044	F6D07044		

ACCESSION:

PARAMETER	SMPL RSLT (mg/kg)	SERIAL DIL RSLT (mg/kg)	DIF RSLT %	QC LIMIT (%)
Aluminum	11900	12800	8	10
Antimony	.309J	ND	NA	10
Arsenic	1.56	1.65J	NA	10
Barium	110	110	1	10
Beryllium	.108J	ND	NA	10
Cadmium	.157J	ND	NA	10
Calcium	2400	2610	9	10
Chromium	11.4	12	6	10
Cobalt	7.05	7.5	6	10
Copper	53	58.2	10	10
Iron	34400	36700	7	10
Lead	51.2	54	6	10
Magnesium	4100	4440	8	10
Manganese	198	214	8	10
Molybdenum	.395J	ND	NA	10
Nickel	4	4.34	8	10
Potassium	1940	2060	6	10
Selenium	0.0669J	ND	NA	10
Silver	ND	ND	0	10
Sodium	183	191J	NA	10
Strontium	13	13.4	4	10
Thallium	0.0965J	ND	NA	10
Tin	6.86J	ND	NA	10
Vanadium	71.4	74.7	5	10
Zinc	81.2	87.6	8	10

EMAX QUALITY CONTROL DATA
ANALYTICAL SPIKE ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
SDG NO.: 15D041
METHOD: SW6020A

MATRIX:	SOIL		% MOISTURE:	7.6
DILTN FACTR:	0.980	0.980		
SAMPLE ID:	UX04-SB07-2.0			
CONTROL NO.:	D041-06	D041-06A		
LAB FILE ID:	F6D07049	F6D07048		
DATIME EXTRCTD:	04/10/1511:55	04/10/1511:55	DATE COLLECTED:	04/06/15
DATIME ANALYZD:	04/13/1518:38	04/13/1518:33	DATE RECEIVED:	04/08/15
PREP. BATCH:	IMD016S	IMD016S		
CALIB. REF:	F6D07044	F6D07044		

ACCESSION:

PARAMETER	SMPL RSLT (mg/kg)	SPIKE AMT (mg/kg)	AS RSLT (mg/kg)	AS % REC	QC LIMIT (%)
Aluminum	11900	2650	14500	100	75-125
Antimony	0.309J	26.5	26.3	98	75-125
Arsenic	1.56	26.5	27.2	97	75-125
Barium	110	26.5	135	95	75-125
Beryllium	0.108J	26.5	24.5	92	75-125
Cadmium	0.157J	26.5	25.1	94	75-125
Calcium	2400	2650	5040	100	75-125
Chromium	11.4	26.5	35.6	91	75-125
Cobalt	7.05	26.5	30.5	89	75-125
Copper	53.0	26.5	75.8	86	75-125
Iron	34400	2650	36300	73*	75-125
Lead	51.2	26.5	75.3	91	75-125
Magnesium	4100	2650	6750	100	75-125
Manganese	198	26.5	219	77	75-125
Molybdenum	0.395J	26.5	26.8	99	75-125
Nickel	4.00	26.5	28.0	91	75-125
Potassium	1940	2650	4520	97	75-125
Selenium	0.0669J	26.5	25.0	94	75-125
Silver	ND	26.5	24.4	92	75-120
Sodium	183	2650	2750	97	75-125
Strontium	13.0	26.5	38.1	95	75-125
Thallium	0.0965J	26.5	25.1	94	75-125
Tin	6.86J	26.5	32.6	97	75-125
Vanadium	71.4	26.5	97.5	99	75-125
Zinc	81.2	53.0	128	88	75-125

ICP-MS QC CHECK TABLE

QC	CCV HIGH	ICV	CCV	ICSAB	ICSA
Limit%	95-105	90-110	90-110	80-120	80-120
Comp	ug/L	ug/L	ug/L	ug/L	ug/L
Al	5000	3000	2500	100000	100000
Sb	50	30	25	20	0
As	50	30	25	20	0
Ba	50	30	25	20	0
Be	50	30	25	20	0
B	50	30	25	20	0
Cd	50	30	25	20	0
Ca	5000	3000	2500	100000	100000
Cr	50	30	25	20	0
Co	50	30	25	20	0
Cu	50	30	25	20	0
Fe	5000	30	2500	100000	100000
Pb	50	30	25	20	0
Mg	5000	3000	2500	100000	100000
Mn	50	30	25	20	0
Mo	50	30	25	2000	2000
Ni	50	30	25	20	0
P	500	300	250	100000	100000
K	5000	3000	2500	100000	100000
Se	50	30	25	20	0
Si	5000	3000	2500	200	0
Ag	50	30	25	20	0
Na	2500	1500	1250	100000	100000
Sr	50	30	25	20	0
Tl	50	30	25	20	0
Sn	50	30	25	20	0
Ti	50	30	25	2000	2000
Th	50	30	25	20	0
W	50	30	25	20	0
V	50	30	25	20	0
U	50	30	25	20	0
Zn	100	60	50	20	0
Zr	30	20	15	20	0

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
ICP-MS

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Start Date: 4/13/15 15:21

End Date: 4/13/15 22:53

Comments:

All soil/solid samples are diluted at 10x dilution prior to analysis.

Filter Lot #:

D090-10A, -10J, -15A, -15J

Mn failed

Book #:	AF6-013
Instrument No.:	F6
Analytical Batch:	TF6007
Analytical Sequence:	F6007
Method File:	FMX6020
Micropipette ID:	☑ 142781004
Micropipette ID:	☑ ICP-06
Micropipette ID:	☑ 339362028
Micropipette ID:	☑ GFAA-07
Micropipette ID:	☐

SOP #	Rev. #
☑ EMAX-6020	8
☑ EMAX-200.8	5
☐ EMAX-	

STANDARDS ID		STANDARDS ID	
S0	SMG3009-05-07	MRL1 (1)	SMG3009-08-01
S1	- 05-08	MRL2 (0.5)	- 08-02
S2	- 02-01	MRL3 (0.4)	- 08-03
S3	- 02-02	MRL4 (0.1)	- 08-04
S4	- 02-03	MRL5	NA
S5	NA	MRL6	↓
S6	↓	Internal Standard	SMG3008-94-07
S7	↓	Post-Spike 1	SMA-007-02-10
ICV	SMG3009-07-01	Post-Spike 2	↓ 02-11
CCV	- 07-02	Post-Spike 3	NA
ICSA	- 07-03	Post-Spike 4	↓
ICSAB	- 07-04		
6020 TUNE SOLN.	- 02-04		
200.8 TUNE SOLN.	↓ - 02-05		

Analyzed By: CW

Date: 4/13/15

SEQUENCE FILE : IF6D07

4-18	19-33	34-43	44-53	54-63
LFID	LSID	TIME	DATE	DF
F6D07003	BLNK	15:21	04/13/15	1.00
F6D07004	S0	15:25	04/13/15	1.00
F6D07005	S1 0.5	15:30	04/13/15	1.00
F6D07006	S2 5	15:34	04/13/15	1.00
F6D07007	S3 25	15:38	04/13/15	1.00
F6D07008	S4 50	15:42	04/13/15	1.00
F6D07009	ICV	15:47	04/13/15	1.00
F6D07010	ICB	15:51	04/13/15	1.00
F6D07011	MRLD1301	15:55	04/13/15	1.00
F6D07012	MRLD1302	15:59	04/13/15	1.00
F6D07013	MRLD1303	16:04	04/13/15	1.00
F6D07014	ICSA	16:08	04/13/15	1.00
F6D07015	ICSAB	16:13	04/13/15	1.00
F6D07016	MRLD1304	16:17	04/13/15	1.00
F6D07017	CCV1	16:21	04/13/15	1.00
F6D07018	CCB1	16:25	04/13/15	1.00
F6D07019	IMD018WB	16:30	04/13/15	1.00
F6D07020	IMD018WL	16:34	04/13/15	1.00
F6D07021	IMD018WC	16:38	04/13/15	1.00
F6D07022	D061-09	16:43	04/13/15	1.00
F6D07023	CCV2	16:47	04/13/15	1.00
F6D07024	CC82	16:51	04/13/15	1.00
F6D07025	IMD015WB	16:56	04/13/15	1.00
F6D07026	IMD015WL	17:00	04/13/15	1.00
F6D07027	IMD015WC	17:04	04/13/15	1.00
F6D07028	D040-21	17:08	04/13/15	1.00
F6D07029	D040-22	17:13	04/13/15	1.00
F6D07030	D044-16	17:17	04/13/15	1.00
F6D07031	MRLD1305	17:21	04/13/15	1.00
F6D07032	MRLD1306	17:26	04/13/15	1.00
F6D07033	CCV3	17:30	04/13/15	1.00
F6D07034	CCB3	17:34	04/13/15	1.00
F6D07035	IMD016SB	17:38	04/13/15	1.00
F6D07036	IMD016SL	17:43	04/13/15	1.00
F6D07037	IMD016SC	17:47	04/13/15	1.00
F6D07038	D041-01	17:51	04/13/15	1.00
F6D07039	D041-02	17:55	04/13/15	1.00
F6D07040	D041-03	18:00	04/13/15	1.00
F6D07041	D041-04	18:04	04/13/15	1.00
F6D07042	D041-05	18:08	04/13/15	1.00
F6D07043	BLANK	18:12	04/13/15	1.00
F6D07044	CCV4	18:17	04/13/15	1.00
F6D07045	CCB4	18:21	04/13/15	1.00
F6D07046	D041-06M	18:25	04/13/15	1.00
F6D07047	D041-06S	18:29	04/13/15	1.00
F6D07048	D041-06A	18:33	04/13/15	1.00
F6D07049	D041-06	18:38	04/13/15	1.00
F6D07050	D041-06J	18:42	04/13/15	5.00
F6D07051	D044-06	18:46	04/13/15	1.00
F6D07052	D044-07	18:50	04/13/15	1.00
F6D07053	MRLD1307	18:55	04/13/15	1.00

F6D07054	MRLD1308	18:59	04/13/15	1.00
F6D07055	MRLD1309	19:03	04/13/15	1.00
F6D07056	CCV5	19:08	04/13/15	1.00
F6D07057	CCB5	19:12	04/13/15	1.00
F6D07058	IMD017SB	19:16	04/13/15	1.00
F6D07059	IMD017SL	19:20	04/13/15	1.00
F6D07060	IMD017SC	19:25	04/13/15	1.00
F6D07061	D040-01	19:29	04/13/15	1.00
F6D07062	D040-02	19:33	04/13/15	1.00
F6D07063	D040-03	19:37	04/13/15	1.00
F6D07064	D040-04	19:42	04/13/15	1.00
F6D07065	D040-05	19:46	04/13/15	1.00
F6D07066	D040-06	19:50	04/13/15	1.00
F6D07067	BLANK	19:54	04/13/15	1.00
F6D07068	CCV6	19:59	04/13/15	1.00
F6D07069	CCB6	20:03	04/13/15	1.00
F6D07070	D040-07	20:07	04/13/15	1.00
F6D07071	D040-08	20:12	04/13/15	1.00
F6D07072	D040-09	20:16	04/13/15	1.00
F6D07073	D040-10M	20:20	04/13/15	1.00
F6D07074	D040-10S	20:24	04/13/15	1.00
F6D07075	D040-10A	20:28	04/13/15	1.00
F6D07076	D040-10	20:32	04/13/15	1.00
F6D07077	D040-10J	20:37	04/13/15	5.00
F6D07078	D040-11	20:41	04/13/15	1.00
F6D07079	BLANK	20:45	04/13/15	1.00
F6D07080	CCV7	20:49	04/13/15	1.00
F6D07081	CCB7	20:54	04/13/15	1.00
F6D07082	D040-12	20:58	04/13/15	1.00
F6D07083	D040-13	21:02	04/13/15	1.00
F6D07084	D040-14	21:07	04/13/15	1.00
F6D07085	D040-15M	21:11	04/13/15	1.00
F6D07086	D040-15S	21:15	04/13/15	1.00
F6D07087	D040-15A	21:19	04/13/15	1.00
F6D07088	D040-15	21:23	04/13/15	1.00
F6D07089	D040-15J	21:27	04/13/15	5.00
F6D07090	D040-16	21:32	04/13/15	1.00
F6D07091	BLANK	21:36	04/13/15	1.00
F6D07092	CCV8	21:40	04/13/15	1.00
F6D07093	CCB8	21:45	04/13/15	1.00
F6D07094	D040-17	21:49	04/13/15	1.00
F6D07095	D040-18	21:53	04/13/15	1.00
F6D07096	D040-19	21:57	04/13/15	1.00
F6D07097	D040-20	22:02	04/13/15	1.00
F6D07098	BLANK	22:06	04/13/15	1.00
F6D07099	CCV9	22:10	04/13/15	1.00
F6D07100	CCB9	22:14	04/13/15	1.00
F6D07101	IDL-01	22:19	04/13/15	1.00
F6D07102	IDL-02	22:23	04/13/15	1.00
F6D07103	IDL-03	22:27	04/13/15	1.00
F6D07104	IDL-04	22:32	04/13/15	1.00
F6D07105	IDL-05	22:36	04/13/15	1.00
F6D07106	IDL-06	22:40	04/13/15	1.00
F6D07107	IDL-07	22:45	04/13/15	1.00

F6D07108	CCV10	22:49	04/13/15	1.00
F6D07109	CCB10	22:53	04/13/15	1.00

SDG : 15D041 UNIT : % ICPMS CHECK : IF6D07 DATE : 04/13/15 INST : EMAXTIF6

ANALYTE	Li	Be	B	Na	Mg	Al	Si	P	K	Ca	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	As	Se	Sr	Zr	Mo	Ag	Cd	Sn	Sb	Ba	W	Tl	Pb	U
BLNK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S1 0.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S2 5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S3 25	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S4 50	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICV	99	98	99	99	101	103	93	101	99	99	97	100	97	97	98	97	99	100	99	99	96	97	98	97	96	96	97	99	101	97	96	98	98
ICB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1301	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1302	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1303	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICSA	----	----	----	94	94	96	----	103	94	94	99	----	----	----	90	----	----	----	----	----	----	----	----	99	----	----	----	----	----	----	----	----	----
ICSAB	101	94	85	93	93	95	96	103	95	95	101	99	103	99	91	96	92	92	104	104	105	99	61*	101	88	96	97	106	105	101	90	94	100
MRLD1304	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV1	100	96	95	96	100	102	90	100	99	97	97	98	99	99	96	99	100	102	100	101	97	99	110	99	95	97	95	101	102	99	96	99	100
CCB1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD018WB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD018WL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD018WC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D061-09	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV2	100	99	97	97	100	101	92	101	99	97	97	99	100	99	97	100	100	101	100	100	98	99	104	98	95	97	95	102	101	100	97	100	102
CCB2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD015WB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD015WL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD015WC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-21	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-22	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D044-16	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1305	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1306	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV3	99	99	97	97	100	101	93	101	100	98	97	99	100	98	96	99	101	101	100	100	98	99	107	99	96	97	95	101	101	99	97	99	101
CCB3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD016SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD016SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD016SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV4	100	98	95	98	99	100	93	100	99	99	97	98	99	99	98	98	100	101	99	101	97	100	103	98	95	96	96	102	100	101	98	101	103
CCB4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-06M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-06S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-06A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-06J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D044-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D044-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1307	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

MRLD1308	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1309	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV5	101	98	94	98	99	100	93	101	100	99	97	98	99	99	98	98	99	100	100	99	99	101	117*	97	96	97	95	102	101	99	96	99	101
CCB5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD017SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD017SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD017SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV6	102	97	95	96	100	102	90	101	100	98	97	97	99	100	96	98	98	99	99	100	99	99	108	97	95	97	95	101	101	99	96	99	102
CCB6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-08	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-09	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-10M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-10S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-10A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-10J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-11	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV7	101	96	93	96	100	101	89*	101	99	99	97	97	98	100	96	97	98	100	98	99	100	100	108	96	94	96	94	101	101	98	96	99	101
CCB7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-12	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-13	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-14	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-15M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-15S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-15A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-15	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-15J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-16	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV8	102	95	92	96	100	101	89*	100	100	98	96	97	99	100	97	97	98	100	95	98	99	98	115*	96	93	97	94	101	100	99	97	101	103
CCB8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-17	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-18	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-19	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-20	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV9	102	94	91	97	100	101	89*	100	99	99	95	97	99	100	99	97	99	100	95	98	98	96	108	97	93	96	94	101	100	99	97	100	104
CCB9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

CCV10	99	95	91	96	99	101	88*	100	98	99	94	97	99	100	98	97	99	100	96	99	98	98	104	97	94	97	94	101	101	99	97	100	102
CCB10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

QC limit of each parameter are listed in a table attached next to all the ICP check forms

* : Out of QC Limit

SDG : KD041 UNIT : UG/L SUMMARY of CALIBRATION BLANKS : IF6D07 (SOIL) DATE : 04/13/15 INST : EMAXTIF6

ANALYTE	Li	Be	B	Na	Mg	Al	Si	P	K	Ca	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	As	Se	Sr	Zr	Mo	Ag	Cd	Sn	Sb	Ba	W	Tl	Pb	U
BLNK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S1 0.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S2 5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S3 25	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S4 50	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICV	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICB	.037	.004	-.426	-.490	.103	.103	.855	-2.80	-.095	.117	-.014	.005	-.005	-.009	.939	.005	.003	-.001	-.009	.002	-.000	-.007	.047	.030	.004	-.000	.010	.115	-.002	.018	.008	.004	.007
MRLD1301	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1302	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1303	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICSA	.415	.011	-.296	----	----	----	3.83	----	----	----	----	.054	1.25	.391	----	.265	.174	.528	2.75	.252	.029	.581	.808	----	.024	.304	.029	.140	.099	.153	.005	.187	.001
ICSAB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1304	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB1	-.062	.002	-.790	1.65	.459	.215	1.59	-5.22	.042	.428	.009	.003	-.005	-.013	1.36	.000	-.007	-.000	-.027	.000	-.006	-.011	.042	.164	.005	.001	.001	.027	.000	.013	.009	.006	.004
IMD018WB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD018WL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD018WC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D061-09	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB2	-.053	.003	-.852	-1.05	.182	.128	.426	-4.63	-.531	.224	-.004	.004	-.007	-.008	.915	.001	-.005	-.005	-.017	.010	.002	-.011	.045	.042	.002	-.002	.007	.092	.000	.009	.011	.006	.005
IMD015WB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD015WL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD015WC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-21	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-22	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D044-16	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1305	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1306	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB3	-.042	.000	-.980	-1.45	.188	.171	.617	-4.24	1.01	.375	.002	.007	-.008	-.008	1.01	.003	.011	-.006	-.024	.010	.005	-.013	.046	.024	.004	-.002	.004	.058	-.000	.029	.010	.005	.005
IMD016SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD016SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD016SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB4	-.107	.003	-1.14	-2.07	.178	.282	.116	-5.18	-2.27	6.71	.008	-.004	-.009	.010	1.21	.002	.021	-.006	.110	-.003	-.003	-.016	.046	.021	.004	-.002	.009	.035	.008	.008	.006	.024	.006
D041-06M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-06S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-06A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D041-06J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D044-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D044-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1307	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

MRLD1308	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD1309	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB5	-.057	.002	-1.11	-2.03	.242	.331	.653	-3.15	-.483	7.00	-.007	-.008	-.003	.016	1.49	.002	.021	-.006	.119	-.003	-.003	-.018	.044	.015	.005	-.000	.012	.020	.009	.029	.007	.036	.005
IMD017S8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD017SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD017SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB6	-.075	.000	-1.13	-2.70	.227	.321	.476	-2.97	-.487	6.68	.006	-.016	-.005	.030	1.71	.001	.008	-.004	.152	-.001	-.004	-.020	.044	.017	.006	-.000	.010	.009	.008	.006	.006	.027	.005
D040-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-08	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-09	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-10M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-10S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-10A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-10J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-11	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB7	-.028	.006	-1.12	-2.80	.291	.397	.809	-.897	-.887	6.81	.013	-.011	-.004	.044	2.59	.002	-.001	-.009	.129	-.007	.000	-.021	.049	.017	.006	-.000	.010	.006	.009	.008	.008	.035	.006
D040-12	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-13	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-14	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-15M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-15S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-15A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-15	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-15J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-16	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB8	-.096	.003	-1.14	-3.08	.339	.532	.563	.132	-2.31	6.77	.029	-.007	-.003	.059	4.45	.002	-.007	-.017	.138	-.008	.000	-.022	.048	.014	.006	.002	.012	.003	.012	.008	.006	.032	.006
D040-17	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-18	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-19	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D040-20	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB9	-.033	.004	-1.16	-3.18	.366	.580	.718	-.962	-2.33	6.82	.025	-.013	-.005	.065	5.08	.003	-.012	-.015	.127	-.006	.000	-.020	.047	.015	.006	.006	.015	.005	.006	.004	.006	.042	.006
IDL-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IDL-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

CCV10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB10	-.094	.004	-1.14	-3.38	.303	.397	.547	-1.91	-2.11	6.72	-.006	-.001	-.010	.038	3.47	.004	-.011	-.014	.118	-.009	-.003	-.022	.048	.016	.004	.002	.008	-.000	.010	.008	.006	.019	.005

QC limit of each parameter are listed in a table attached next to all the ICP check forms

* : Out of QC Limit

	Method	Type	Vial	Data File	Sample	Comment	Dil/Lvl	ISTD Conc	Action on Failure	Skip	Result
1		Keyword		TUNBEG	Start of TUNE						
2	C:\ICPCHEM\1\METHODS\TN6020_C.M	Tun6	1301	F6D07001	6020tunchk		1.000				
3	C:\ICPCHEM\1\METHODS\TN200_8C.M	Tun2	1302	F6D07002	200.8tunchk		1.000				
4		Keyword		TUNEND	End of TUNE						
5		Keyword		CALBEG	Start of CALIB						
6	C:\ICPCHEM\1\METHODS\EMX6020.M	CalBlk	1101	F6D07003	BLNK		Level 1				
7	C:\ICPCHEM\1\METHODS\EMX6020.M	CalBlk	1102	F6D07004	S0		Level 1				
8	C:\ICPCHEM\1\METHODS\EMX6020.M	CalStd	1104	F6D07005	S1 0.5		Level 2				
9	C:\ICPCHEM\1\METHODS\EMX6020.M	CalStd	1105	F6D07006	S2 5		Level 3				
10	C:\ICPCHEM\1\METHODS\EMX6020.M	CalStd	1106	F6D07007	S3 25		Level 4				
11	C:\ICPCHEM\1\METHODS\EMX6020.M	CalStd	1107	F6D07008	S4 50		Level 5				
12	C:\ICPCHEM\1\METHODS\EMX6020.M	ICV1	1204	F6D07009	ICV		1.000				
13	C:\ICPCHEM\1\METHODS\EMX6020.M	ICB	1102	F6D07010	ICB		1.000				
14	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1305	F6D07011	MRLD1301	1/100/10 ppb	1.000				
15	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1306	F6D07012	MRLD1302	0.5/50/4 ppb	1.000				
16	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1307	F6D07013	MRLD1303	0.4/40 ppb	1.000				
17	C:\ICPCHEM\1\METHODS\EMX6020.M	ICS-A	1303	F6D07014	ICSA		1.000				
18	C:\ICPCHEM\1\METHODS\EMX6020.M	ICS-AB	1304	F6D07015	ICSAB		1.000				
19	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1207	F6D07016	MRLD1304	500 ppb CAT	1.000				
20	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D07017	CCV1		1.000				
21	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D07018	CCB1		1.000				
22		Keyword		CALEND	End of CALIB						
23		Keyword		SMPLBEG	Start of SMPL						
24	C:\ICPCHEM\1\METHODS\EMX6020.M	MBW	2210	F6D07019	IMD018WB		1.000				
25	C:\ICPCHEM\1\METHODS\EMX6020.M	LCS	2211	F6D07020	IMD018WL		1.000				
26	C:\ICPCHEM\1\METHODS\EMX6020.M	LCS	2212	F6D07021	IMD018WC		1.000				
27	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2301	F6D07022	D061-09		1.000				
28	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D07023	CCV2		1.000				
29	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D07024	CCB2		1.000				
30	C:\ICPCHEM\1\METHODS\EMX6020.M	MBW	2101	F6D07025	IMD015WB		1.000				
31	C:\ICPCHEM\1\METHODS\EMX6020.M	LCS	2102	F6D07026	IMD015WL		1.000				
32	C:\ICPCHEM\1\METHODS\EMX6020.M	LCS	2103	F6D07027	IMD015WC		1.000				
33	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2104	F6D07028	D040-21		1.000				
34	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2105	F6D07029	D040-22		1.000				
35	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2106	F6D07030	D044-16		1.000				
36	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1305	F6D07031	MRLD1305	1/100/10 ppb	1.000				
37	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1306	F6D07032	MRLD1306	0.5/50/4 ppb	1.000				
38	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D07033	CCV3		1.000				
39	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D07034	CCB3		1.000				
40	C:\ICPCHEM\1\METHODS\EMX6020.M	MBS	2107	F6D07035	IMD016SB		1.000				
41	C:\ICPCHEM\1\METHODS\EMX6020.M	LCSS	2108	F6D07036	IMD016SL		1.000				
42	C:\ICPCHEM\1\METHODS\EMX6020.M	LCSS	2109	F6D07037	IMD016SC		1.000				

	Method	Type	Vial	Data File	Sample	Comment	Dil/Lvl	ISTD Conc	Action on Failure	Skip	Result
43	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2110	F6D07038	D041-01		1.000				
44	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2111	F6D07039	D041-02		1.000				
45	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2112	F6D07040	D041-03		1.000				
46	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2201	F6D07041	D041-04		1.000				
47	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2202	F6D07042	D041-05		1.000				
48	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	F6D07043	BLANK		1.000				
49	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D07044	CCV4		1.000				
50	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D07045	CCB4		1.000				
51	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2203	F6D07046	D041-06M		1.000				
52	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2204	F6D07047	D041-06S		1.000				
53	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2205	F6D07048	D041-06A		1.000				
54	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2206	F6D07049	D041-06		1.000				
55	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2207	F6D07050	D041-06J		5.000				
56	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2208	F6D07051	D044-06		1.000				
57	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2209	F6D07052	D044-07		1.000				
58	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1306	F6D07053	MRLD1307	0.5/50/4 ppb	1.000				
59	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1305	F6D07054	MRLD1308	1/100/10 ppb	1.000				
60	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1307	F6D07055	MRLD1309	0.4/40 ppb	1.000				
61	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D07056	CCV5		1.000				
62	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D07057	CCB5		1.000				
63	C:\ICPCHEM\1\METHODS\EMX6020.M	MBS	2302	F6D07058	IMD017SB		1.000				
64	C:\ICPCHEM\1\METHODS\EMX6020.M	LCSS	2303	F6D07059	IMD017SL		1.000				
65	C:\ICPCHEM\1\METHODS\EMX6020.M	LCSS	2304	F6D07060	IMD017SC		1.000				
66	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2305	F6D07061	D040-01		1.000				
67	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2306	F6D07062	D040-02		1.000				
68	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2307	F6D07063	D040-03		1.000				
69	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2308	F6D07064	D040-04		1.000				
70	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2309	F6D07065	D040-05		1.000				
71	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2310	F6D07066	D040-06		1.000				
72	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	F6D07067	BLANK		1.000				
73	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D07068	CCV6		1.000				
74	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D07069	CCB6		1.000				
75	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2311	F6D07070	D040-07		1.000				
76	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2312	F6D07071	D040-08		1.000				
77	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2401	F6D07072	D040-09		1.000				
78	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2402	F6D07073	D040-10M		1.000				
79	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2403	F6D07074	D040-10S		1.000				
80	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2404	F6D07075	D040-10A	My fail &	1.000				
81	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2405	F6D07076	D040-10		1.000				
82	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2406	F6D07077	D040-10J		5.000				
83	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2407	F6D07078	D040-11		1.000				
84	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	F6D07079	BLANK		1.000				

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	Method	Type	Vial	Data File	Sample	Comment	Dil/Lvl	ISTD Conc	Action on Failure	Skip	Result
85	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D07080	CCV7		1.000				
86	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D07081	CCB7		1.000				
87	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2408	F6D07082	D040-12		1.000				
88	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2409	F6D07083	D040-13		1.000				
89	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2410	F6D07084	D040-14		1.000				
90	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2411	F6D07085	D040-15M		1.000				
91	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2412	F6D07086	D040-15S		1.000				
92	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2501	F6D07087	D040-15A	Unfiltered	1.000				
93	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2502	F6D07088	D040-15		1.000				
94	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2503	F6D07089	D040-15J		5.000				
95	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2504	F6D07090	D040-16		1.000				
96	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	F6D07091	BLANK		1.000				
97	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D07092	CCV8		1.000				
98	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D07093	CCB8		1.000				
99	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2505	F6D07094	D040-17		1.000				
100	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2506	F6D07095	D040-18		1.000				
101	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2507	F6D07096	D040-19		1.000				
102	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2508	F6D07097	D040-20		1.000				
103	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	F6D07098	BLANK		1.000				
104	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D07099	CCV9		1.000				
105	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D07100	CCB9		1.000				
106	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1201	F6D07101	IDL-01		1.000				
107	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1201	F6D07102	IDL-02		1.000				
108	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1201	F6D07103	IDL-03		1.000				
109	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1201	F6D07104	IDL-04		1.000				
110	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1201	F6D07105	IDL-05		1.000				
111	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1201	F6D07106	IDL-06		1.000				
112	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1201	F6D07107	IDL-07		1.000				
113	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D07108	CCV10		1.000				
114	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D07109	CCB10		1.000				
115		Keyword		StandBy							
116		Keyword		SMPLEND	End of SMPL						
117		Keyword		End	End of Sequence						
118		Keyword		CCVBEG	Start of CCV						
119		Keyword		CCVEND	End of CCV						
120		Keyword		BLKBEG	Start of BLANK						
121		Keyword		BLKEND	End of BLANK						
122		Keyword		ERRBEG	Start of ERRTERM						
123		Keyword		ERREND	End of ERRTERM						

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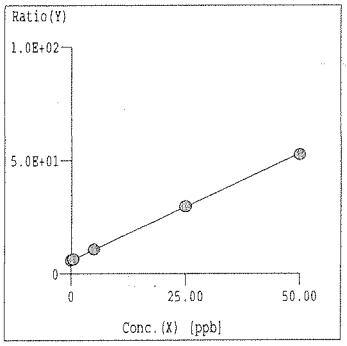
Last Calib: Apr 13, 2015 03:45 pm
Calibration Type: External Calibration Method
Calibration Title:
Weighting Method: 1/(SD*SD)
Mass Interpolation Fit for VIS: Point to Point
Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Multi Tune: #1 h2.u
#2 he.u
#3 norm.u

=== Standard Files ===
<Data Correction>
Bkg File: ---
Rejected Masses: ---
Interference Correction: ON

	Data File	Sample Name	Date Acquired
1	c:\data\if62015\d\if6d07.b\f6d07004.d\f6d07004.d#	S0	Apr 13 2015 03:25 pm
2	c:\data\if62015\d\if6d07.b\f6d07005.d\f6d07005.d#	S1 0.5	Apr 13 2015 03:30 pm
3	c:\data\if62015\d\if6d07.b\f6d07006.d\f6d07006.d#	S2 5	Apr 13 2015 03:34 pm
4	c:\data\if62015\d\if6d07.b\f6d07007.d\f6d07007.d#	S3 25	Apr 13 2015 03:38 pm
5	c:\data\if62015\d\if6d07.b\f6d07008.d\f6d07008.d#	S4 50	Apr 13 2015 03:42 pm
6	---		
7	---		
8	---		
9	---		
10	---		
11	---		
12	---		
13	---		
14	---		
15	---		
16	---		
17	---		
18	---		
19	---		
20	---		

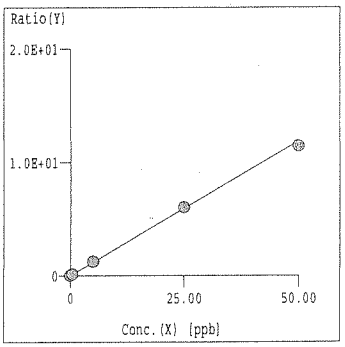
=== Graph Detail ===

Step	Mass	Element	ISTD	Unit
(3)	7	Li	6	ppb



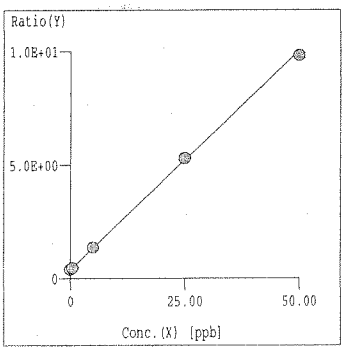
Curve Fit: Y=aX+b
r = 1.0000
Y = 9.412E-001*X +5.909E+000
X = 1.063E+000*Y -6.278E+000
DL = 1.317E-01 ppb
BEC = 6.278 ppb

Step	Mass	Element	ISTD	Unit
(3)	9	Be	45	ppb



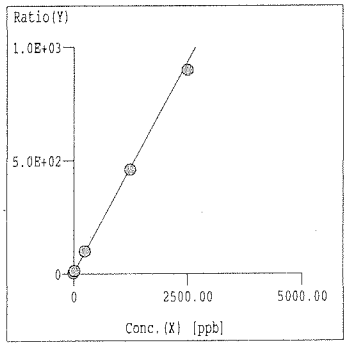
Curve Fit: Y=aX+b
r = 0.9997
Y = 2.372E-001*X +6.168E-004
X = 4.216E+000*Y -2.601E-003
DL = 4.877E-03 ppb
BEC = 2.601E-03 ppb

Step	Mass	Element	ISTD	Unit
(3)	11	B	45	ppb



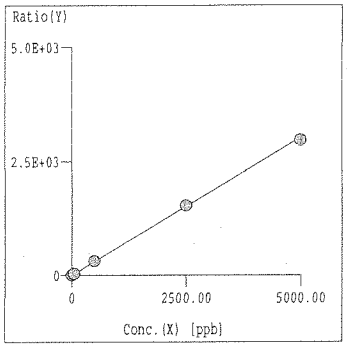
Curve Fit: Y=aX+b
r = 0.9998
Y = 1.934E-001*X +3.829E-001
X = 5.170E+000*Y -1.980E+000
DL = 2.213E-01 ppb
BEC = 1.980 ppb

Step	Mass	Element	ISTD	Unit
(1)	23	Na	45	ppb



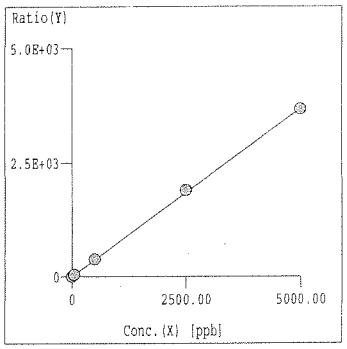
Curve Fit: Y=aX+b
r = 0.9999
Y = 3.737E-001*X +3.374E+000
X = 2.676E+000*Y -9.027E+000
DL = 3.334E-01 ppb
BEC = 9.027 ppb

Step	Mass	Element	ISTD	Unit
(3)	24	Mg	45	ppb



Curve Fit: Y=aX+b
r = 0.9999
Y = 6.048E-001*X +1.322E-001
X = 1.653E+000*Y -2.186E-001
DL = 4.318E-02 ppb
BEC = 2.186E-01 ppb

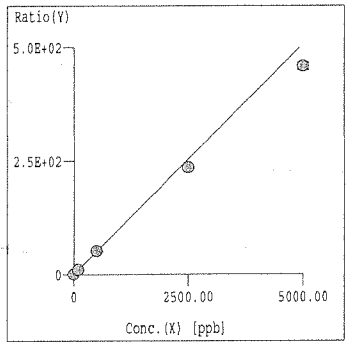
Step	Mass	Element	ISTD	Unit
(3)	27	Al	45	ppb



Curve Fit: Y=aX+b
r = 0.9999
Y = 7.365E-001*X +1.073E-001
X = 1.358E+000*Y -1.457E-001
DL = 1.727E-02 ppb
BEC = 1.457E-01 ppb

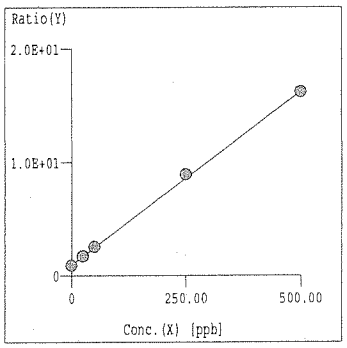
=== Graph Detail ===

Step Mass Element	ISTD	Unit
(1) 28 Si	45	ppb



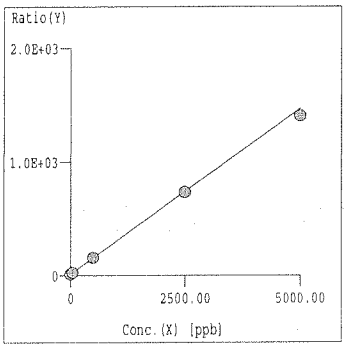
Curve Fit: Y=aX+b
r = 0.9999
Y = 1.015E-001*X +1.794E-001
X = 9.849E+000*Y -1.767E+000
DL = 2.146E-01 ppb
BEC = 1.767 ppb

Step Mass Element	ISTD	Unit
(3) 31 P	45	ppb



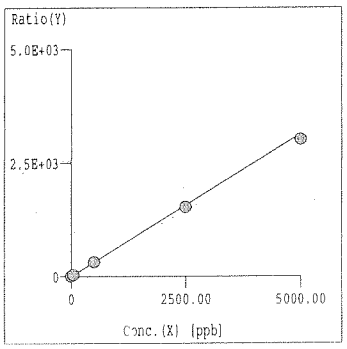
Curve Fit: Y=aX+b
r = 0.9997
Y = 3.054E-002*X +9.493E-001
X = 3.274E+001*Y -3.108E+001
DL = 2.650 ppb
BEC = 31.08 ppb

Step Mass Element	ISTD	Unit
(2) 39 K	45	ppb



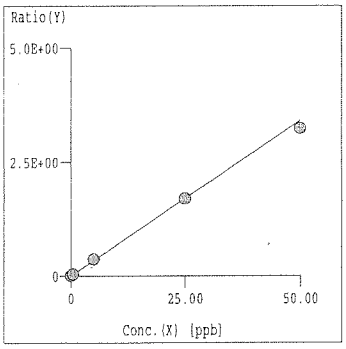
Curve Fit: Y=aX+b
r = 0.9998
Y = 2.917E-001*X +1.117E+001
X = 3.428E+000*Y -3.828E+001
DL = 1.769 ppb
BEC = 38.28 ppb

Step Mass Element	ISTD	Unit
(1) 40 Ca	45	ppb



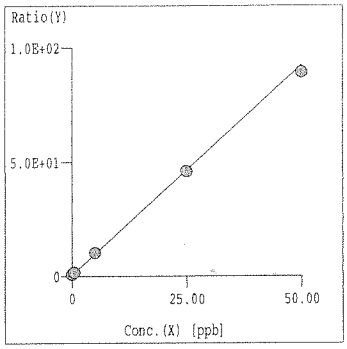
Curve Fit: Y=aX+b
r = 1.0000
Y = 6.273E-001*X +1.452E+000
X = 1.594E+000*Y -2.315E+000
DL = 2.027E-01 ppb
BEC = 2.315 ppb

Step Mass Element	ISTD	Unit
(3) 47 Ti	45	ppb



Curve Fit: Y=aX+b
r = 0.9997
Y = 6.804E-002*X +4.119E-003
X = 1.470E+001*Y -6.055E-002
DL = 2.642E-02 ppb
BEC = 6.055E-02 ppb

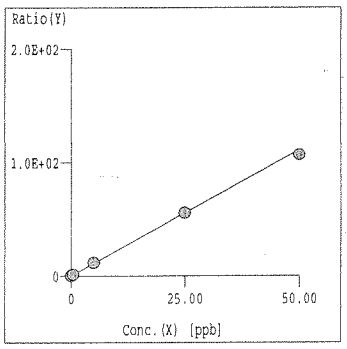
Step Mass Element	ISTD	Unit
(2) 51 V	45	ppb



Curve Fit: Y=aX+b
r = 0.9999
Y = 1.834E+000*X +6.754E-001
X = 5.453E-001*Y -3.683E-001
DL = 3.844E-02 ppb
BEC = 3.683E-01 ppb

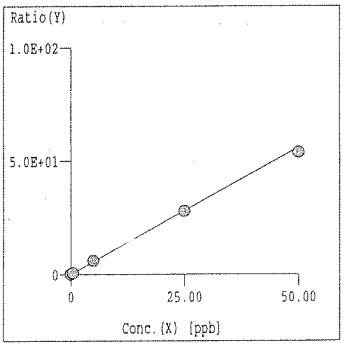
=== Graph Detail ===

Step Mass Element	ISTD	Unit
(2) 52 Cr	45	ppb



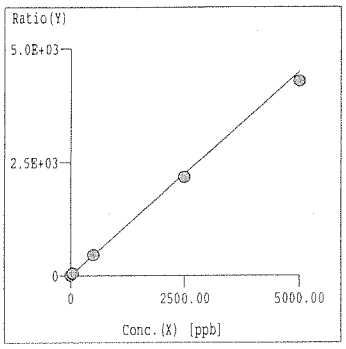
Curve Fit: Y=aX+b
r = 0.9998
Y = 2.217E+000*X +1.470E-001
X = 4.510E-001*Y -6.629E-002
DL = 1.117E-02 ppb
BEC = 6.629E-02 ppb

Step Mass Element	ISTD	Unit
(3) 55 Mn	45	ppb



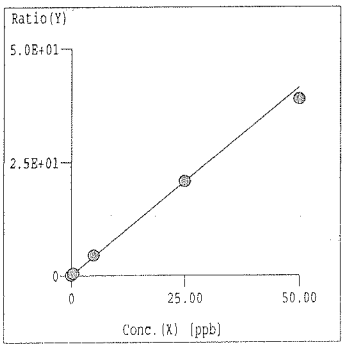
Curve Fit: Y=aX+b
r = 0.9998
Y = 1.120E+000*X +6.167E-002
X = 8.932E-001*Y -5.508E-002
DL = 1.038E-02 ppb
BEC = 5.508E-02 ppb

Step Mass Element	ISTD	Unit
(1) 56 Fe	45	ppb



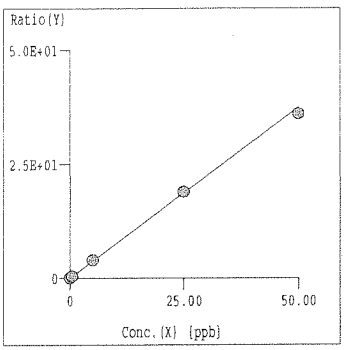
Curve Fit: Y=aX+b
r = 1.0000
Y = 8.983E-001*X +3.621E-001
X = 1.113E+000*Y -4.031E-001
DL = 1.184E-02 ppb
BEC = 4.031E-01 ppb

Step Mass Element	ISTD	Unit
(3) 59 Co	45	ppb



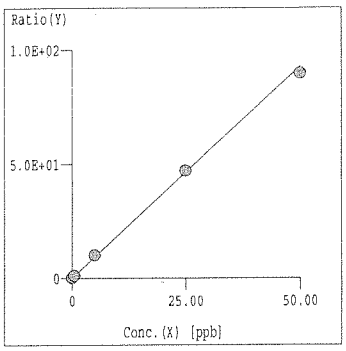
Curve Fit: Y=aX+b
r = 0.9994
Y = 8.291E-001*X +5.143E-003
X = 1.206E+000*Y -6.203E-003
DL = 1.609E-03 ppb
BEC = 6.203E-03 ppb

Step Mass Element	ISTD	Unit
(2) 60 Ni	45	ppb



Curve Fit: Y=aX+b
r = 0.9997
Y = 7.493E-001*X +2.591E-002
X = 1.335E+000*Y -3.459E-002
DL = 7.555E-03 ppb
BEC = 3.459E-02 ppb

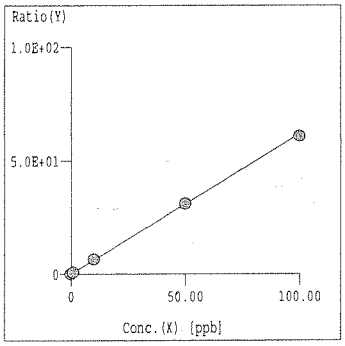
Step Mass Element	ISTD	Unit
(2) 63 Cu	45	ppb



Curve Fit: Y=aX+b
r = 0.9997
Y = 1.850E+000*X +1.181E-001
X = 5.405E-001*Y -6.386E-002
DL = 5.512E-03 ppb
BEC = 6.386E-02 ppb

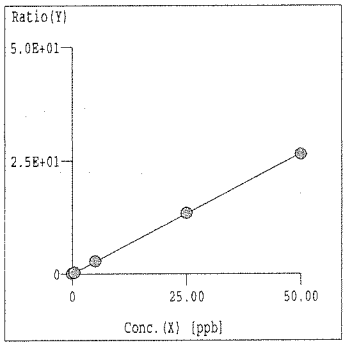
=== Graph Detail ===

Step Mass Element	ISTD	Unit
(3) 66 Zn	72	ppb



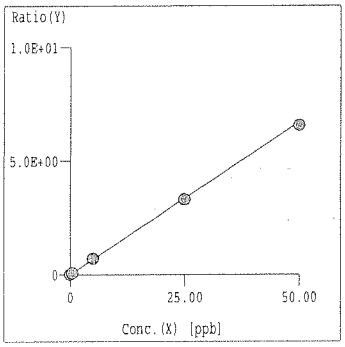
Curve Fit: Y=aX+b
r = 0.9999
Y = 6.187E-001*X +7.109E-002
X = 1.616E+000*Y -1.149E-001
DL = 1.625E-02 ppb
BEC = 1.149E-01 ppb

Step Mass Element	ISTD	Unit
(2) 75 As	72	ppb



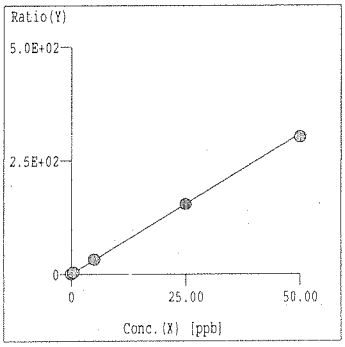
Curve Fit: Y=aX+b
r = 1.0000
Y = 5.321E-001*X +3.871E-002
X = 1.879E+000*Y -7.274E-002
DL = 8.259E-03 ppb
BEC = 7.274E-02 ppb

Step Mass Element	ISTD	Unit
(1) 78 Se	72	ppb



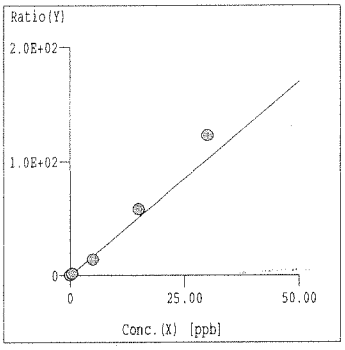
Curve Fit: Y=aX+b
r = 1.0000
Y = 1.342E-001*X +2.061E-003
X = 7.450E+000*Y -1.535E-002
DL = 1.372E-02 ppb
BEC = 1.535E-02 ppb

Step Mass Element	ISTD	Unit
(3) 88 Sr	72	ppb



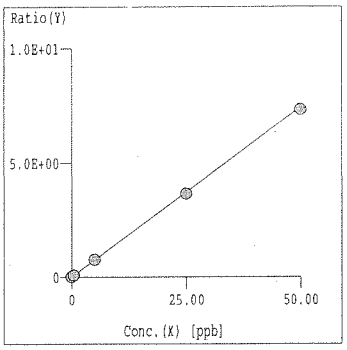
Curve Fit: Y=aX+b
r = 0.9999
Y = 6.165E+000*X +2.091E-001
X = 1.622E-001*Y -3.391E-002
DL = 1.340E-02 ppb
BEC = 3.391E-02 ppb

Step Mass Element	ISTD	Unit
(3) 90 Zr	72	ppb



Curve Fit: Y=aX+b
r = 0.9986
Y = 3.397E+000*X -8.804E-002
X = 2.944E-001*Y +2.592E-002
DL = 6.531E-03 ppb
BEC = -2.592E-02 ppb

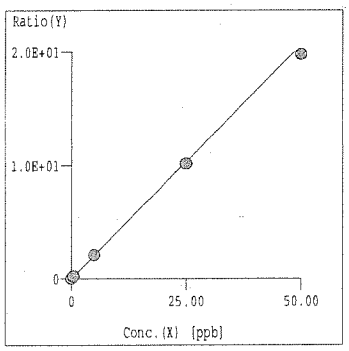
Step Mass Element	ISTD	Unit
(3) 95 Mo	115	ppb



Curve Fit: Y=aX+b
r = 1.0000
Y = 1.488E-001*X +7.685E-004
X = 6.719E+000*Y -5.163E-003
DL = 1.099E-02 ppb
BEC = 5.163E-03 ppb

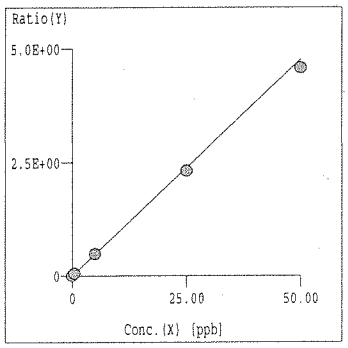
=== Graph Detail ===

Step Mass Element	ISTD	Unit
(3) 107 Ag	115	ppb



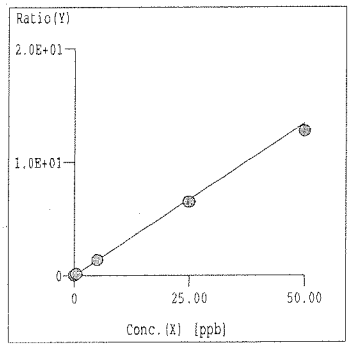
Curve Fit: Y=aX+b
r = 0.9999
Y = 4.133E-001*X +2.770E-003
X = 2.419E+000*Y -6.701E-003
DL = 3.438E-03 ppb
BEC = 6.701E-03 ppb

Step Mass Element	ISTD	Unit
(3) 111 Cd	115	ppb



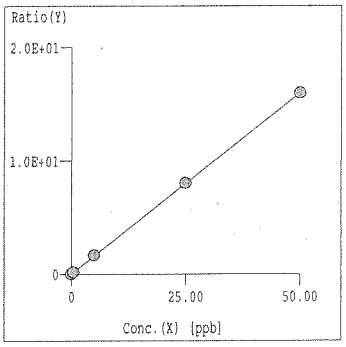
Curve Fit: Y=aX+b
r = 1.0000
Y = 9.549E-002*X +2.320E-004
X = 1.047E+001*Y -2.429E-003
DL = 1.393E-03 ppb
BEC = 2.429E-03 ppb

Step Mass Element	ISTD	Unit
(3) 118 Sn	115	ppb



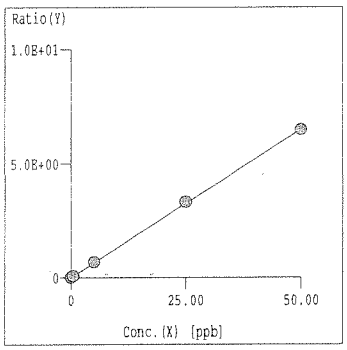
Curve Fit: Y=aX+b
r = 0.9999
Y = 2.683E-001*X +6.517E-003
X = 3.726E+000*Y -2.428E-002
DL = 7.685E-03 ppb
BEC = 2.428E-02 ppb

Step Mass Element	ISTD	Unit
(3) 121 Sb	115	ppb



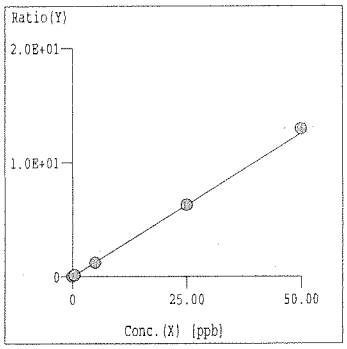
Curve Fit: Y=aX+b
r = 1.0000
Y = 3.187E-001*X +1.553E-002
X = 3.138E+000*Y -4.873E-002
DL = 6.006E-03 ppb
BEC = 4.873E-02 ppb

Step Mass Element	ISTD	Unit
(3) 137 Ba	115	ppb



Curve Fit: Y=aX+b
r = 0.9999
Y = 1.298E-001*X +1.567E-003
X = 7.705E+000*Y -1.207E-002
DL = 5.074E-03 ppb
BEC = 1.207E-02 ppb

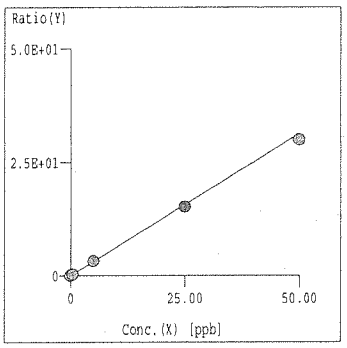
Step Mass Element	ISTD	Unit
(3) 182 W	159	ppb



Curve Fit: Y=aX+b
r = 0.9999
Y = 2.503E-001*X +4.392E-003
X = 3.996E+000*Y -1.755E-002
DL = 2.870E-03 ppb
BEC = 1.755E-02 ppb

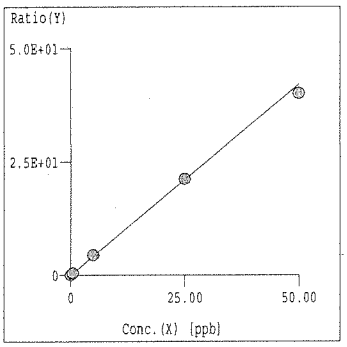
=== Graph Detail ===

Step Mass Element	ISTD	Unit
(3) 205 Tl	159	ppb



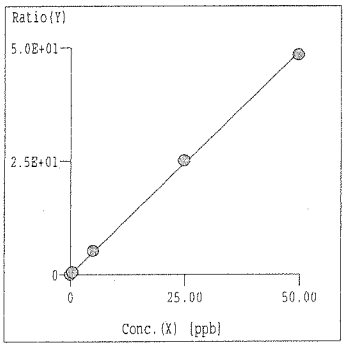
Curve Fit: Y=aX+b
r = 1.0000
Y = 6.254E-001*X +1.134E-003
X = 1.599E+000*Y -1.813E-003
DL = 1.473E-03 ppb
BEC = 1.813E-03 ppb

Step Mass Element	ISTD	Unit
(3) 208 Pb	159	ppb



Curve Fit: Y=aX+b
r = 0.9996
Y = 8.414E-001*X +5.674E-003
X = 1.188E+000*Y -6.743E-003
DL = 2.605E-03 ppb
BEC = 6.743E-03 ppb

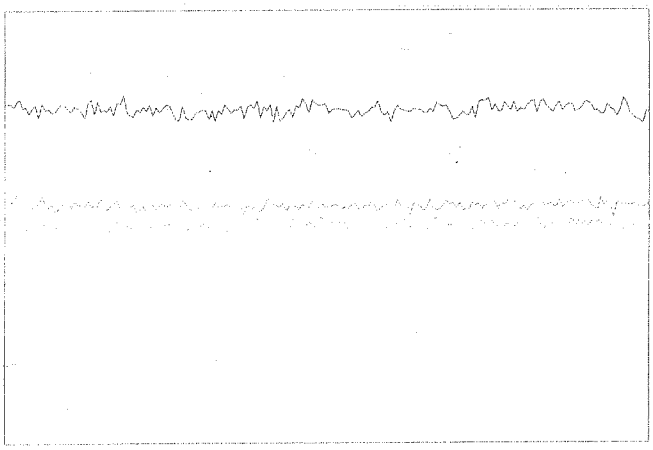
Step Mass Element	ISTD	Unit
(3) 238 U	159	ppb



Curve Fit: Y=aX+b
r = 0.9998
Y = 9.836E-001*X +1.281E-003
X = 1.017E+000*Y -1.302E-003
DL = 3.855E-04 ppb
BEC = 1.302E-03 ppb

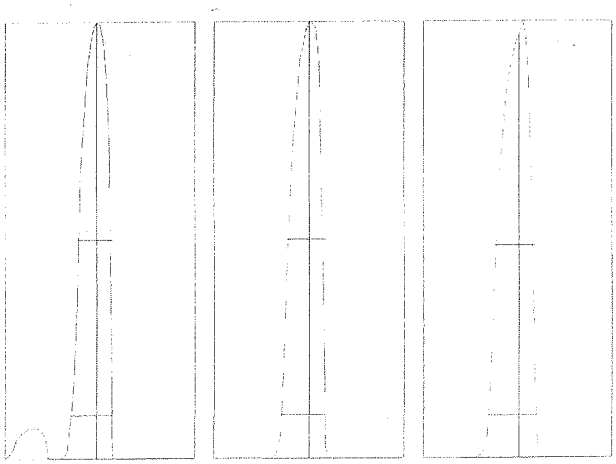
Tune Report

Tune File : NORM.U
Comment : IF6D07



Integration Time:	0.1000 sec	
Sampling Period:	0.6200 sec	
n:	200	
Oxide:	156/140	1.774%
Doubly Charged:	70/140	1.703%

m/z	Range	Count	Mean	RSD%	Background
7	50,000	38288.0	38541.7	1.70	3.30
89	100,000	55201.0	54872.0	1.54	1.10
205	100,000	49997.0	50263.3	1.72	2.70
156/140	5	1.929%	1.838%	4.77	
70/140	2	1.306%	1.341%	4.78	



m/z:	7	89	205
Height:	38,093	56,001	51,387
Axis:	7.00	89.05	205.05
W-50%:	0.55	0.60	0.65
W-10%:	0.6500	0.700	0.800

Integration Time: 0.1000 sec
Acquisition Time: 22.7600 sec

Y axis : Linear

Generated : Apr 13, 2015 13:23:45
Printed : Apr 13, 2015 13:23:47

Tune Report

Tune File : NORM.U
Comment : IF6D07

Tuning Parameters

===Plasma Condition===			===Ion Lenses===			===Q-Pole Parameters===		
RF Power	: 1500	W	Extract 1	: 0	V	AMU Gain	: 128	
RF Matching	: 1.72	V	Extract 2	: -120	V	AMU Offset	: 127	
Smpl Depth	: 8	mm	Omega Bias-ce	: -22	V	Axis Gain	: 1	
Torch-H	: -0.4	mm	Omega Lens-ce	: 1.2	V	Axis Offset	: -0.06	
Torch-V	: -0.2	mm	Cell Entrance	: -26	V	QP Bias	: -3	V
Carrier Gas	: 0.9	L/min	QP Focus	: 1	V			
Makeup Gas	: 0.15	L/min	Cell Exit	: -30	V	===Detector Parameters===		
Optional Gas	: ---	%				Discriminator	: 9	mV
Nebulizer Pump	: 0.1	rps	===Octopole Parameters===			Analog HV	: 2020	V
Sample Pump	: ---	rps	OctP RF	: 169	V	Pulse HV	: 1410	V
S/C Temp	: 2	degC	OctP Bias	: -6	V			

===Reaction Cell===

Reaction Mode	: OFF							
H2 Gas	: 0	mL/min	He Gas	: 0	mL/min	Optional Gas	: ---	%

Generated : Apr 13, 2015 13:23:45
Printed : Apr 13, 2015 13:23:50

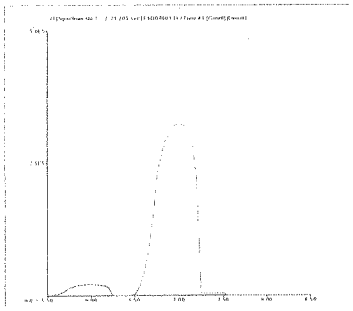
7036

6020 QC Tune Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07001.D
Date Acquired:	Apr 13 2015 02:13 pm
Acq. Method:	TN6020_C.M
Operator:	CCapul
Sample Name:	6020tunchk
Misc Info:	
Vial Number:	1301
Current Method:	C:\ICPCHEM\1\METHODS\TN6020_C.M

RSD (%)

Element	Actual	Required	Flag
7 Li	2.35	5.00	
59 Co	2.67	5.00	
115 In	2.35	5.00	
205 Tl	2.47	5.00	



7 Li

Mass Calib.

Actual: 7.00

Required: 6.90 - 7.10

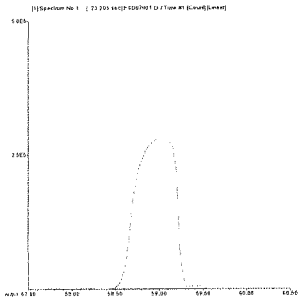
Flag:

Peak Width-10%

Actual: 0.60

Limit 0.90

Flag:



59 Co

Mass Calib.

Actual: 59.00

Required: 58.90 - 59.10

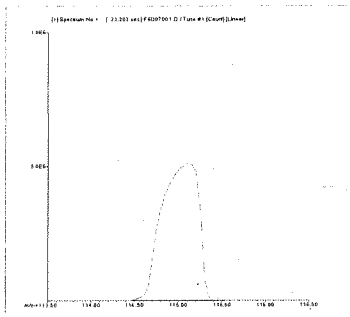
Flag:

Peak Width-10%

Actual: 0.60

Limit 0.90

Flag:



115 In

Mass Calib.

Actual: 115.10

Required: 114.90 - 115.10

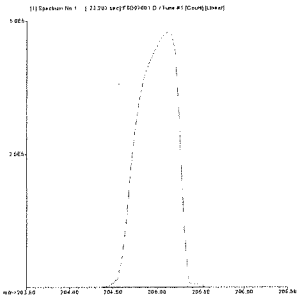
Flag:

Peak Width-10%

Actual: 0.60

Limit 0.90

Flag:



205 Tl

Mass Calib.

Actual: 205.10

Required: 204.90 - 205.10

Flag:

Peak Width-10%

Actual: 0.70

Limit 0.90

Flag:

Calibration Blank QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07003
Date Acquired:	Apr 13 2015 03:21 pm
Operator:	CCapul
Sample Name:	BLNK
Misc Info:	
Vial Number:	1101
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.
Last Cal Update:	Apr 13 2015 02:46 pm
Sample Type:	CalBlk
Total Dil Factor:	1.00

QC&ISTD Elements

Element		CPS Mean		SD	RSD(%)
6	Li	3757461.00	A	77780.00	2.07
7	Li	224071.91	P	3124.00	1.39
9	Be	56.67	P	6.67	11.77
11	B	26454.08	P	510.40	1.93
23	Na	70327.43	P	459.30	0.65
24	Mg	29582.23	P	216.90	0.73
27	Al	38858.76	P	1028.00	2.65
28	Si	6860.73	P	134.10	1.95
31	P	30538.42	P	560.60	1.84
39	K	30090.49	P	481.10	1.60
40	Ca	66077.52	P	702.90	1.06
45	Sc	1333553.00	A	15220.00	1.14
45	Sc	294551.09	P	1280.00	0.43
45	Sc	3563644.00	A	38020.00	1.07
47	Ti	204.45	P	53.58	26.21
51	V	1925.48	P	28.15	1.46
52	Cr	436.46	P	24.13	5.53
55	Mn	2709.24	P	72.47	2.67
56	Fe	25883.66	P	46.64	0.18
59	Co	296.68	P	12.02	4.05
60	Ni	101.56	P	2.14	2.11
63	Cu	505.12	P	17.76	3.52
66	Zn	2530.31	P	81.46	3.22
72	Ge	321754.31	P	1716.00	0.53
72	Ge	145277.20	P	610.80	0.42
72	Ge	717629.13	P	1960.00	0.27
75	As	58.89	P	3.29	5.59
78	Se	6.44	P	0.77	11.95
88	Sr	1850.19	P	37.13	2.01
90	Zr	540.03	P	24.04	4.45
95	Mo	115.56	P	22.20	19.21
107	Ag	177.79	P	16.44	9.25
111	Cd	19.15	P	4.03	21.06
115	In	5175856.00	A	53180.00	1.03
118	Sn	598.92	P	60.13	10.04
121	Sb	967.85	P	73.14	7.56
137	Ba	278.90	P	30.97	11.10
159	Tb	8190181.00	A	68750.00	0.84
182	W	1333.45	P	82.13	6.16
205	Tl	270.01	P	31.80	11.78
208	Pb	1062.28	P	74.56	7.02
209	Bi	5559948.00	A	74220.00	1.33
235	U	15.56	P	3.85	24.74
238	U	624.48	P	45.51	7.29

Calibration Blank QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07004
Date Acquired:	Apr 13 2015 03:25 pm
Operator:	CCapul
Sample Name:	S0
Misc Info:	
Vial Number:	1102
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.
Last Cal Update:	Apr 13 2015 03:24 pm
Sample Type:	CalBlk
Total Dil Factor:	1.00

QC&ISTD Elements

Element		CPS Mean		SD	RSD(%)
6	Li	3436000.00	A	23560.00	0.69
7	Li	202600.20	P	896.60	0.44
9	Be	18.89	P	12.62	66.81
11	B	12834.84	P	331.90	2.59
23	Na	40117.15	P	206.50	0.51
24	Mg	4281.86	P	213.00	4.97
27	Al	3489.43	P	80.75	2.31
28	Si	2173.57	P	73.34	3.37
31	P	29297.24	P	534.00	1.82
39	K	29081.83	P	134.00	0.46
40	Ca	17532.10	P	320.40	1.83
45	Sc	1219080.00	A	13690.00	1.12
45	Sc	261322.59	P	4340.00	1.66
45	Sc	3259125.00	A	58200.00	1.79
47	Ti	110.01	P	17.64	16.04
51	V	1753.23	P	32.64	1.86
52	Cr	362.90	P	22.21	6.12
55	Mn	1573.48	P	130.80	8.31
56	Fe	4413.04	P	73.84	1.67
59	Co	160.01	P	13.33	8.33
60	Ni	66.22	P	4.68	7.07
63	Cu	304.45	P	4.02	1.32
66	Zn	438.91	P	22.20	5.06
72	Ge	287393.81	P	64.99	0.02
72	Ge	131286.20	P	413.20	0.31
72	Ge	650322.63	P	4688.00	0.72
75	As	50.67	P	1.76	3.48
78	Se	3.33	P	1.76	52.92
88	Sr	1137.87	P	178.10	15.65
90	Zr	385.58	P	51.03	13.24
95	Mo	57.78	P	25.02	43.30
107	Ag	124.45	P	22.69	18.23
111	Cd	10.65	P	2.12	19.93
115	In	4722231.00	A	47000.00	1.00
118	Sn	304.46	P	34.05	11.18
121	Sb	725.60	P	37.17	5.12
137	Ba	68.89	P	9.62	13.97
159	Tb	7403281.00	A	78290.00	1.06
182	W	327.79	P	15.40	4.70
205	Tl	83.34	P	23.09	27.71
208	Pb	411.13	P	52.74	12.83
209	Bi	5050772.00	A	55130.00	1.09
235	U	6.67	P	6.67	100.00
238	U	94.45	P	10.18	10.78

Calibration Standard QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07005.D\F6D07005.D#
Date Acquired: Apr 13 2015 03:30 pm
Operator: CCapul
Sample Name: S1 0.5
Misc Info:
Vial Number: 1104
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 13 2015 03:28 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	3437240.00	A	51900.00	1.51
7 Li	219485.59	P	2794.00	1.27
9 Be	4017.33	P	175.80	4.38
11 B	15081.45	P	491.40	3.26
23 Na	160663.00	P	2344.00	1.46
24 Mg	1055217.00	A	21560.00	2.04
27 Al	1303606.00	A	25010.00	1.92
28 Si	125986.30	P	1041.00	0.83
31 P	55427.40	P	1135.00	2.05
39 K	68702.82	P	112.40	0.16
40 Ca	426012.09	P	1801.00	0.42
45 Sc	1221298.00	A	22900.00	1.88
45 Sc	267685.41	P	3783.00	1.41
45 Sc	3249586.00	A	39960.00	1.23
47 Ti	1252.32	P	32.02	2.56
51 V	4227.97	P	17.32	0.41
52 Cr	3459.10	P	27.06	0.78
55 Mn	21401.87	P	39.11	0.18
56 Fe	602633.19	P	3035.00	0.50
59 Co	14470.99	P	23.12	0.16
60 Ni	1111.16	P	34.49	3.10
63 Cu	2948.10	P	54.76	1.86
66 Zn	4844.32	P	141.00	2.91
72 Ge	291310.00	P	4109.00	1.41
72 Ge	134040.80	P	1226.00	0.91
72 Ge	652393.50	P	9009.00	1.38
75 As	400.67	P	15.10	3.77
78 Se	194.00	P	3.06	1.57
88 Sr	21582.56	P	334.80	1.55
90 Zr	9593.56	P	138.50	1.44
95 Mo	3505.00	P	80.59	2.30
107 Ag	10407.54	P	314.90	3.03
111 Cd	2401.06	P	79.16	3.30
115 In	4781476.00	A	58160.00	1.22
118 Sn	6600.69	P	176.10	2.67
121 Sb	8390.61	P	171.70	2.05
137 Ba	3224.95	P	127.30	3.95
159 Tb	7505552.00	A	181700.00	2.42
182 W	9620.47	P	102.70	1.07
205 Tl	23219.96	P	411.70	1.77
208 Pb	33039.77	P	122.30	0.37
209 Bi	5106935.00	A	60320.00	1.18
235 U	294.46	P	22.20	7.54
238 U	38921.44	P	528.70	1.36

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3437240.30	1.51	3436000.30	100.0	60 - 125	
45 Sc	1221298.30	1.88	1219080.40	100.2	60 - 125	
45 Sc	267685.41	1.41	261322.58	102.4	60 - 125	
45 Sc	3249586.50	1.23	3259125.00	99.7	60 - 125	
72 Ge	291310.03	1.41	287393.84	101.4	60 - 125	
72 Ge	134040.81	0.91	131286.22	102.1	60 - 125	
72 Ge	652393.56	1.38	650322.63	100.3	60 - 125	
115 In	4781476.00	1.22	4722231.00	101.3	60 - 125	
159 Tb	7505552.50	2.42	7403280.50	101.4	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Calibration Standard QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07006.D\F6D07006.D#
Date Acquired: Apr 13 2015 03:34 pm
Operator: CCapul
Sample Name: S2 5
Misc Info:
Vial Number: 1105
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 13 2015 03:33 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	3432832.00	A	48330.00	1.41
7 Li	367774.41	P	2356.00	0.64
9 Be	40907.50	P	246.30	0.60
11 B	44542.74	P	720.90	1.62
23 Na	1215399.00	A	17800.00	1.46
24 Mg	10172850.00	A	32020.00	0.31
27 Al	12476270.00	A	233900.00	1.87
28 Si	632804.19	P	1601.00	0.25
31 P	82941.56	P	798.50	0.96
39 K	418193.50	P	4503.00	1.08
40 Ca	3861632.00	A	24250.00	0.63
45 Sc	1225263.00	A	6945.00	0.57
45 Sc	265501.19	P	2303.00	0.87
45 Sc	3271398.00	A	51860.00	1.59
47 Ti	12001.98	P	243.90	2.03
51 V	26958.07	P	56.11	0.21
52 Cr	30914.27	P	194.10	0.63
55 Mn	198055.80	P	2107.00	1.06
56 Fe	5518179.00	A	20800.00	0.38
59 Co	145645.80	P	984.90	0.68
60 Ni	10498.48	P	99.95	0.95
63 Cu	26851.41	P	220.00	0.82
66 Zn	42205.81	P	483.60	1.15
72 Ge	287800.50	P	614.10	0.21
72 Ge	132382.41	P	1314.00	0.99
72 Ge	648864.38	P	4221.00	0.65
75 As	3723.83	P	84.33	2.26
78 Se	2022.38	P	11.04	0.55
88 Sr	208254.20	P	2295.00	1.10
90 Zr	90206.40	P	1139.00	1.26
95 Mo	35916.36	P	270.40	0.75
107 Ag	99058.98	P	559.10	0.56
111 Cd	22834.91	P	140.80	0.62
115 In	4749597.00	A	15540.00	0.33
118 Sn	64208.01	P	300.20	0.47
121 Sb	79486.99	P	424.30	0.53
137 Ba	32294.15	P	162.40	0.50
159 Tb	7456353.00	A	86240.00	1.16
182 W	89852.83	P	1682.00	1.87
205 Tl	240023.09	P	2458.00	1.02
208 Pb	330048.09	P	2570.00	0.78
209 Bi	5037958.00	A	57060.00	1.13
235 U	2824.86	P	30.98	1.10
238 U	387301.50	P	4702.00	1.21

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3432832.00	1.41	3436000.30	99.9	60 - 125	
45 Sc	1225263.30	0.57	1219080.40	100.5	60 - 125	
45 Sc	265501.19	0.87	261322.58	101.6	60 - 125	
45 Sc	3271398.00	1.59	3259125.00	100.4	60 - 125	
72 Ge	287800.50	0.21	287393.84	100.1	60 - 125	
72 Ge	132382.45	0.99	131286.22	100.8	60 - 125	
72 Ge	648864.38	0.65	650322.63	99.8	60 - 125	
115 In	4749597.50	0.33	4722231.00	100.6	60 - 125	
159 Tb	7456353.00	1.16	7403280.50	100.7	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Calibration Standard QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07007.D\F6D07007.D#
Date Acquired: Apr 13 2015 03:38 pm
Operator: CCapul
Sample Name: S3 25
Misc Info:
Vial Number: 1106
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 13 2015 03:37 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	3389279.00	A	29710.00	0.88
7 Li	1002094.00	A	19180.00	1.91
9 Be	197195.50	P	2939.00	1.49
11 B	173527.20	P	673.70	0.39
23 Na	5645364.00	A	50540.00	0.90
24 Mg	50142528.00	A	309700.00	0.62
27 Al	62151860.00	A	68660.00	0.11
28 Si	2894211.00	A	29100.00	1.01
31 P	292457.59	P	1586.00	0.54
39 K	1924614.00	A	30650.00	1.59
40 Ca	18762520.00	A	266600.00	1.42
45 Sc	1230422.00	A	489.90	0.04
45 Sc	263149.41	P	403.80	0.15
45 Sc	3282837.00	A	32670.00	1.00
47 Ti	55493.51	P	665.10	1.20
51 V	120643.80	P	1255.00	1.04
52 Cr	146041.50	P	1012.00	0.69
55 Mn	914043.31	A	6767.00	0.74
56 Fe	26659280.00	A	350700.00	1.32
59 Co	681817.00	P	4574.00	0.67
60 Ni	49801.88	P	435.50	0.87
63 Cu	123706.10	P	1261.00	1.02
66 Zn	196559.59	P	228.10	0.12
72 Ge	277887.19	P	3470.00	1.25
72 Ge	129144.80	P	937.10	0.73
72 Ge	633724.63	P	786.70	0.12
75 As	17347.77	P	129.00	0.74
78 Se	9152.28	P	68.19	0.75
88 Sr	972990.38	M	3397.00	0.35
90 Zr	367345.19	P	1519.00	0.41
95 Mo	168005.30	P	1520.00	0.90
107 Ag	467565.59	P	1071.00	0.23
111 Cd	106844.80	P	1108.00	1.04
115 In	4618223.00	A	40030.00	0.87
118 Sn	299062.59	P	1573.00	0.53
121 Sb	370239.69	P	2511.00	0.68
137 Ba	152725.70	P	254.40	0.17
159 Tb	7272548.00	A	56060.00	0.77
182 W	455431.81	P	2264.00	0.50
205 Tl	1101149.00	M	22850.00	2.08
208 Pb	1536909.00	P	7983.00	0.52
209 Bi	4874856.00	A	59920.00	1.23
235 U	13452.99	P	169.70	1.26
238 U	1821331.00	A	9911.00	0.54

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3389279.00	0.88	3436000.30	98.6	60 - 125	
45 Sc	1230422.00	0.04	1219080.40	100.9	60 - 125	
45 Sc	263149.41	0.15	261322.58	100.7	60 - 125	
45 Sc	3282837.30	1.00	3259125.00	100.7	60 - 125	
72 Ge	277887.19	1.25	287393.84	96.7	60 - 125	
72 Ge	129144.84	0.73	131286.22	98.4	60 - 125	
72 Ge	633724.56	0.12	650322.63	97.4	60 - 125	
115 In	4618223.00	0.87	4722231.00	97.8	60 - 125	
159 Tb	7272548.00	0.77	7403280.50	98.2	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Calibration Standard QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07008.D\F6D07008.D#
Date Acquired: Apr 13 2015 03:42 pm
Operator: CCapul
Sample Name: S4 50
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 13 2015 03:41 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	3433902.00	A	68890.00	2.01
7 Li	1799755.00	A	11260.00	0.63
9 Be	390694.09	P	2713.00	0.69
11 B	335637.00	P	5487.00	1.63
23 Na	11472740.00	A	122000.00	1.06
24 Mg	101272200.00	A	835900.00	0.83
27 Al	125485800.00	A	1318000.00	1.05
28 Si	5854619.00	A	28400.00	0.49
31 P	554034.00	P	7539.00	1.36
39 K	3781925.00	A	66000.00	1.75
40 Ca	38456872.00	A	175600.00	0.46
45 Sc	1277601.00	A	28210.00	2.21
45 Sc	270040.09	P	2991.00	1.11
45 Sc	3419339.00	A	42410.00	1.24
47 Ti	110284.10	P	173.90	0.16
51 V	240492.50	P	1634.00	0.68
52 Cr	287527.81	P	1007.00	0.35
55 Mn	1835852.00	A	5439.00	0.30
56 Fe	54659232.00	A	422000.00	0.77
59 Co	1327756.00	A	5111.00	0.38
60 Ni	97124.49	P	746.50	0.77
63 Cu	241903.00	P	1400.00	0.58
66 Zn	389591.41	P	3910.00	1.00
72 Ge	288319.09	P	1060.00	0.37
72 Ge	130408.30	P	704.20	0.54
72 Ge	641678.63	P	3344.00	0.52
75 As	34474.73	P	102.20	0.30
78 Se	18878.84	P	45.97	0.24
88 Sr	1932367.00	A	15410.00	0.80
90 Zr	785965.50	P	7703.00	0.98
95 Mo	338899.19	P	3710.00	1.09
107 Ag	914553.13	P	4666.00	0.51
111 Cd	211951.30	P	1497.00	0.71
115 In	4629326.00	A	39450.00	0.85
118 Sn	588232.38	P	6323.00	1.07
121 Sb	737364.50	P	5624.00	0.76
137 Ba	299824.41	P	2297.00	0.77
159 Tb	7374265.00	A	72230.00	0.98
182 W	952607.69	P	4747.00	0.50
205 Tl	2206461.00	A	9210.00	0.42
208 Pb	2949923.00	A	9464.00	0.32
209 Bi	4898864.00	A	16350.00	0.33
235 U	26040.21	P	137.30	0.53
238 U	3564465.00	A	30450.00	0.85

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3433902.30	2.01	3436000.30	99.9	60 - 125	
45 Sc	1277601.10	2.21	1219080.40	104.8	60 - 125	
45 Sc	270040.06	1.11	261322.58	103.3	60 - 125	
45 Sc	3419339.00	1.24	3259125.00	104.9	60 - 125	
72 Ge	288319.13	0.37	287393.84	100.3	60 - 125	
72 Ge	130408.28	0.54	131286.22	99.3	60 - 125	
72 Ge	641678.63	0.52	650322.63	98.7	60 - 125	
115 In	4629326.00	0.85	4722231.00	98.0	60 - 125	
159 Tb	7374265.00	0.98	7403280.50	99.6	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

ICV QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07009.D\F6D07009.D#
Date Acquired: Apr 13 2015 03:47 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: ICV
Misc Info:
Vial Number: 1204
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 13 2015 03:45 pm
Sample Type: ICV1
Dilution Factor: 1.00

QC Elements

Element	Conc.		CPS	Conc. RSD(%)	Expected	QC Range(%)	Flag
7 Li	29.63	ppb	1172713.0	1.48	30.00	90 - 110	
9 Be	29.53	ppb	234819.8	0.61	30.00	90 - 110	
11 B	29.84	ppb	206294.7	0.41	30.00	90 - 110	
23 Na	1483.00	ppb	6844752.0	2.30	1500.00	90 - 110	
24 Mg	3040.00	ppb	61628500.0	1.07	3000.00	90 - 110	
27 Al	3086.00	ppb	76191888.0	0.87	3000.00	90 - 110	
28 Si	2801.00	ppb	3492138.0	3.05	3000.00	90 - 110	
31 P	302.00	ppb	340977.2	0.83	300.00	90 - 110	
39 K	2974.00	ppb	2344275.0	1.61	3000.00	90 - 110	
40 Ca	2980.00	ppb	22960800.0	2.95	3000.00	90 - 110	
47 Ti	29.10	ppb	66501.5	1.01	30.00	90 - 110	
51 V	30.08	ppb	148952.4	0.58	30.00	90 - 110	
52 Cr	29.11	ppb	172596.4	0.39	30.00	90 - 110	
55 Mn	29.01	ppb	1090678.0	0.54	30.00	90 - 110	
56 Fe	2943.00	ppb	32452530.0	2.45	3000.00	90 - 110	
59 Co	29.17	ppb	810699.6	0.67	30.00	90 - 110	
60 Ni	29.70	ppb	59428.7	0.94	30.00	90 - 110	
63 Cu	29.87	ppb	147754.8	0.36	30.00	90 - 110	
66 Zn	59.33	ppb	238233.8	0.77	60.00	90 - 110	
75 As	29.59	ppb	20310.7	0.58	30.00	90 - 110	
78 Se	28.94	ppb	11005.8	0.33	30.00	90 - 110	
88 Sr	29.14	ppb	1165148.0	1.73	30.00	90 - 110	
90 Zr	19.52	ppb	428922.8	1.03	20.00	90 - 110	
95 Mo	29.15	ppb	202067.8	0.49	30.00	90 - 110	
107 Ag	28.72	ppb	552826.5	0.31	30.00	90 - 110	
111 Cd	28.88	ppb	128424.8	1.19	30.00	90 - 110	
118 Sn	29.05	ppb	363278.9	0.22	30.00	90 - 110	
121 Sb	29.67	ppb	441091.9	0.66	30.00	90 - 110	
137 Ba	30.43	ppb	184005.7	0.18	30.00	90 - 110	
182 W	28.99	ppb	537461.2	1.54	30.00	90 - 110	
205 Tl	28.87	ppb	1336873.0	1.37	30.00	90 - 110	
208 Pb	29.45	ppb	1835366.0	1.06	30.00	90 - 110	
235 U	0.20	ppb	15725.6	1.65	0.21	90 - 110	
238 U	29.51	ppb	2149189.0	1.75	29.79	90 - 110	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3469768.5	0.82	3436000.30	101.0	60 - 125	
45 Sc	1227686.0	1.86	1219080.40	100.7	60 - 125	
45 Sc	266759.5	0.54	261322.58	102.1	60 - 125	
45 Sc	3351879.8	0.18	3259125.00	102.8	60 - 125	
72 Ge	283190.4	0.10	287393.84	98.5	60 - 125	
72 Ge	128677.1	1.73	131286.22	98.0	60 - 125	
72 Ge	647808.5	0.78	650322.63	99.6	60 - 125	
115 In	4656133.5	1.07	4722231.00	98.6	60 - 125	
159 Tb	7405820.0	2.02	7403280.50	100.0	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7045

ICB QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07010.D\F6D07010.D#
Date Acquired:	Apr 13 2015 03:51 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	ICB
Misc Info:	
Vial Number:	1102
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 13 2015 03:45 pm
Sample Type:	ICB
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc RSD(%)	High Limit	Flag
7 Li	0.0371	ppb	202852.6	132.95	0.20	
9 Be	0.0039	ppb	50.0	48.43	0.10	
11 B	-0.4262	ppb	9725.7	10.96	5.00	
23 Na	-0.4904	ppb	38149.6	23.19	40.00	
24 Mg	0.1028	ppb	6294.9	6.03	10.00	
27 Al	0.1034	ppb	5940.3	3.14	20.00	
28 Si	0.8553	ppb	3183.8	12.05	20.00	
31 P	-2.7990	ppb	27965.4	11.69	10.00	
39 K	-0.0946	ppb	29156.3	458.91	20.00	
40 Ca	0.1167	ppb	18240.8	59.27	25.00	
47 Ti	-0.0136	ppb	103.3	54.95	0.50	
51 V	0.0051	ppb	1792.6	102.51	0.50	
52 Cr	-0.0055	ppb	353.1	7.96	0.20	
55 Mn	-0.0093	ppb	1659.0	20.54	0.20	
56 Fe	0.9386	ppb	14407.6	10.41	10.00	
59 Co	0.0053	ppb	310.0	18.21	0.20	
60 Ni	0.0035	ppb	74.7	128.22	0.20	
63 Cu	-0.0015	ppb	302.2	154.66	0.40	
66 Zn	-0.0087	ppb	423.4	144.45	2.00	
75 As	0.0016	ppb	51.3	960.25	0.20	
78 Se	-0.0008	ppb	5.6	716.52	0.20	
90 Zr	0.0473	ppb	467.8	5.65	2.00	
95 Mo	0.0299	ppb	244.5	4.69	0.40	
107 Ag	0.0041	ppb	210.0	22.09	0.20	
111 Cd	-0.0006	ppb	8.4	84.18	0.20	
118 Sn	0.0097	ppb	427.8	36.43	0.20	
121 Sb	0.1146	ppb	2439.2	3.33	0.40	
137 Ba	-0.0022	ppb	60.0	99.18	0.20	
182 W	0.0179	ppb	653.4	20.88	1.00	
205 Tl	0.0082	ppb	460.0	17.67	0.20	
208 Pb	0.0041	ppb	673.4	14.61	0.10	
235 U	-0.0001	ppb	12.2	61.68	1.00	
238 U	0.0069	ppb	592.3	3.46	0.10	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3413119.0	0.58	3436000.30	99.3	60 - 125	
45 Sc	1195924.3	1.52	1219080.40	98.1	60 - 125	
45 Sc	261772.9	0.67	261322.58	100.2	60 - 125	
45 Sc	3237679.5	0.49	3259125.00	99.3	60 - 125	
72 Ge	283954.4	1.25	287393.84	98.8	60 - 125	
72 Ge	129838.9	0.61	131286.22	98.9	60 - 125	
72 Ge	644369.3	0.48	650322.63	99.1	60 - 125	
115 In	4685747.5	0.07	4722231.00	99.2	60 - 125	
159 Tb	7361712.5	1.23	7403280.50	99.4	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Nnumber of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7046

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07011.D\F6D07011.D#
Date Acquired:	Apr 13 2015 03:55 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	MRLD1301
Misc Info:	1/100/10 ppb
Vial Number:	1305
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 13 2015 03:45 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	238207.9	0.0000	0.9299	ppb	4.79	225.00	
9 Be	# 3	45	8160.2	0.0000	1.0330	ppb	2.75	225.00	
11 B	# 3	45	74545.2	0.0000	9.6270	ppb	2.69	225.00	
23 Na	# 1	45	523395.6	0.0000	103.6000	ppb	1.36	269999.99	
24 Mg	# 3	45	2085653.0	0.0000	103.6000	ppb	0.98	269999.99	
27 Al	# 3	45	2472135.0	0.0000	100.9000	ppb	0.11	90000.00	
28 Si	# 1	45	2872.6	0.0000	0.5092	ppb	19.95	18000.00	
31 P	# 3	45	83468.7	0.0000	51.2200	ppb	2.89	359999.99	
39 K	# 2	45	107709.8	0.0000	99.6200	ppb	1.11	269999.99	
40 Ca	# 1	45	858135.1	0.0000	107.7000	ppb	1.39	269999.99	
47 Ti	# 3	45	2414.7	0.0000	1.0090	ppb	8.87	2700.00	
51 V	# 2	45	6834.7	0.0000	1.0230	ppb	2.17	2700.00	
52 Cr	# 2	45	6389.0	0.0000	1.0100	ppb	1.20	2700.00	
55 Mn	# 3	45	40427.9	0.0000	1.0320	ppb	0.56	2700.00	
56 Fe	# 1	45	1157969.0	0.0000	103.3000	ppb	1.27	90000.00	
59 Co	# 3	45	28738.1	0.0000	1.0380	ppb	2.29	2700.00	
60 Ni	# 2	45	2211.5	0.0000	1.0670	ppb	0.32	2700.00	
63 Cu	# 2	45	5573.5	0.0000	1.0610	ppb	0.52	2700.00	
66 Zn	# 3	72	42663.6	0.0000	10.3200	ppb	1.37	2700.00	
75 As	# 2	72	787.8	0.0000	1.0370	ppb	1.85	2700.00	
78 Se	# 1	72	407.8	0.0000	1.0150	ppb	5.18	2700.00	
88 Sr	# 3	72	83280.1	0.0000	2.0100	ppb	0.29	2700.00	
90 Zr	# 3	72	65219.0	0.0000	2.9310	ppb	0.44	1800.00	
95 Mo	# 3	115	7000.8	0.0000	0.9804	ppb	2.04	2700.00	
107 Ag	# 3	115	19110.2	0.0000	0.9621	ppb	1.15	225.00	
111 Cd	# 3	115	4691.8	0.0000	1.0270	ppb	2.42	2700.00	
118 Sn	# 3	115	12859.7	0.0000	0.9799	ppb	2.51	2700.00	
121 Sb	# 3	115	17221.2	0.0000	1.0830	ppb	1.29	2700.00	
137 Ba	# 3	115	6349.5	0.0000	1.0130	ppb	1.51	2700.00	
182 W	# 3	159	3664115.0	0.0000	196.4000	ppb	0.58	900.00	
205 Tl	# 3	159	45238.2	0.0000	0.9687	ppb	0.90	2700.00	
208 Pb	# 3	159	64598.6	0.0000	1.0230	ppb	1.79	2700.00	
235 U	# 3	159	537.8	0.0000	0.0065	ppb	8.36	27.00	
238 U	# 3	159	76185.5	0.0000	1.0380	ppb	0.72	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	3511552.50	0.59	3436000.30	102.2	60 - 125	
45 Sc # 1	1243513.90	1.86	1219080.40	102.0	60 - 125	
45 Sc # 2	267783.81	0.61	261322.58	102.5	60 - 125	
45 Sc # 3	3321150.80	1.38	3259125.00	101.9	60 - 125	
72 Ge # 1	294835.25	0.90	287393.84	102.6	60 - 125	
72 Ge # 2	133431.08	0.25	131286.22	101.6	60 - 125	
72 Ge # 3	660770.63	0.40	650322.63	101.6	60 - 125	
115 In # 3	4772389.50	0.36	4722231.00	101.1	60 - 125	
159 Tb # 3	7453159.00	1.01	7403280.50	100.7	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7047

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07012.D\F6D07012.D#
Date Acquired: Apr 13 2015 03:59 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: MRLD1302
Misc Info: 0.5/50/4 ppb
Vial Number: 1306
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 13 2015 03:45 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	221407.2	0.0000	0.5271	ppb	12.58	225.00	
9 Be	# 3	45	4058.5	0.0000	0.5315	ppb	6.15	225.00	
11 B	# 3	45	12547.9	0.0000	0.0462	ppb	156.76	225.00	
23 Na	# 1	45	270268.3	0.0000	50.8800	ppb	1.16	269999.99	
24 Mg	# 3	45	1045425.0	0.0000	53.7500	ppb	0.75	269999.99	
27 Al	# 3	45	1260888.0	0.0000	53.3000	ppb	1.29	90000.00	
28 Si	# 1	45	3181.6	0.0000	0.8290	ppb	23.86	18000.00	
31 P	# 3	45	26515.2	0.0000	-3.9740	ppb	12.05	359999.99	
39 K	# 2	45	68190.3	0.0000	50.5300	ppb	0.33	269999.99	
40 Ca	# 1	45	500764.5	0.0000	63.8200	ppb	0.88	269999.99	
47 Ti	# 3	45	1169.0	0.0000	0.4759	ppb	3.92	2700.00	
51 V	# 2	45	4242.6	0.0000	0.5106	ppb	0.25	2700.00	
52 Cr	# 2	45	3439.8	0.0000	0.5231	ppb	1.26	2700.00	
55 Mn	# 3	45	22064.0	0.0000	0.5602	ppb	2.18	2700.00	
56 Fe	# 1	45	595642.5	0.0000	54.5300	ppb	1.41	90000.00	
59 Co	# 3	45	14536.7	0.0000	0.5412	ppb	0.70	2700.00	
60 Ni	# 2	45	1145.2	0.0000	0.5460	ppb	1.27	2700.00	
63 Cu	# 2	45	2896.5	0.0000	0.5309	ppb	0.10	2700.00	
66 Zn	# 3	72	18870.6	0.0000	4.5920	ppb	1.26	2700.00	
75 As	# 2	72	409.6	0.0000	0.5173	ppb	2.94	2700.00	
78 Se	# 1	72	194.2	0.0000	0.4940	ppb	5.33	2700.00	
88 Sr	# 3	72	21573.5	0.0000	0.5062	ppb	1.65	2700.00	
90 Zr	# 3	72	2452.5	0.0000	0.1373	ppb	0.43	1800.00	
95 Mo	# 3	115	3698.4	0.0000	0.5201	ppb	1.70	2700.00	
107 Ag	# 3	115	9761.5	0.0000	0.4926	ppb	1.16	225.00	
111 Cd	# 3	115	2200.7	0.0000	0.4849	ppb	4.28	2700.00	
118 Sn	# 3	115	6654.0	0.0000	0.5000	ppb	0.52	2700.00	
121 Sb	# 3	115	9166.7	0.0000	0.5593	ppb	0.63	2700.00	
137 Ba	# 3	115	3313.9	0.0000	0.5279	ppb	5.38	2700.00	
182 W	# 3	159	3411.7	0.0000	0.1678	ppb	10.04	900.00	
205 Tl	# 3	159	22543.3	0.0000	0.4880	ppb	1.25	2700.00	
208 Pb	# 3	159	32933.9	0.0000	0.5251	ppb	1.05	2700.00	
235 U	# 3	159	296.7	0.0000	0.0035	ppb	6.32	27.00	
238 U	# 3	159	37924.2	0.0000	0.5226	ppb	1.28	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	3457115.30	1.62	3436000.30	100.6	60 - 125	
45 Sc # 1	1207135.60	1.45	1219080.40	99.0	60 - 125	
45 Sc # 2	263227.44	0.59	261322.58	100.7	60 - 125	
45 Sc # 3	3203004.80	0.52	3259125.00	98.3	60 - 125	
72 Ge # 1	283962.97	1.31	287393.84	98.8	60 - 125	
72 Ge # 2	130474.67	1.69	131286.22	99.4	60 - 125	
72 Ge # 3	647962.00	0.73	650322.63	99.6	60 - 125	
115 In # 3	4729850.50	0.78	4722231.00	100.2	60 - 125	
159 Tb # 3	7359872.50	0.81	7403280.50	99.4	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7048

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07013.D\F6D07013.D#
Date Acquired:	Apr 13 2015 04:04 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	MRLD1303
Misc Info:	0.4/40 ppb
Vial Number:	1307
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 13 2015 03:45 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	215073.5	0.0000	0.4162	ppb	8.20	225.00	
9 Be	# 3	45	3209.3	0.0000	0.4200	ppb	2.25	225.00	
11 B	# 3	45	11556.0	0.0000	-0.1133	ppb	19.15	225.00	
23 Na	# 1	45	220783.3	0.0000	41.0700	ppb	1.04	269999.99	
24 Mg	# 3	45	832674.5	0.0000	42.7800	ppb	1.16	269999.99	
27 Al	# 3	45	1004243.0	0.0000	42.4500	ppb	1.37	90000.00	
28 Si	# 1	45	3596.1	0.0000	1.2370	ppb	12.37	18000.00	
31 P	# 3	45	27218.7	0.0000	-3.2410	ppb	29.18	359999.99	
39 K	# 2	45	60719.1	0.0000	41.3300	ppb	0.46	269999.99	
40 Ca	# 1	45	340843.9	0.0000	43.7600	ppb	0.32	269999.99	
47 Ti	# 3	45	990.1	0.0000	0.3940	ppb	3.49	2700.00	
51 V	# 2	45	3702.0	0.0000	0.4038	ppb	1.57	2700.00	
52 Cr	# 2	45	2757.4	0.0000	0.4094	ppb	0.79	2700.00	
55 Mn	# 3	45	17149.5	0.0000	0.4233	ppb	0.92	2700.00	
56 Fe	# 1	45	476004.0	0.0000	44.5400	ppb	1.28	90000.00	
59 Co	# 3	45	11792.9	0.0000	0.4381	ppb	1.51	2700.00	
60 Ni	# 2	45	948.9	0.0000	0.4497	ppb	2.13	2700.00	
63 Cu	# 2	45	2356.9	0.0000	0.4234	ppb	0.59	2700.00	
66 Zn	# 3	72	2273.6	0.0000	0.4566	ppb	4.38	2700.00	
75 As	# 2	72	337.3	0.0000	0.4122	ppb	0.52	2700.00	
78 Se	# 1	72	145.3	0.0000	0.3709	ppb	7.68	2700.00	
88 Sr	# 3	72	16998.4	0.0000	0.3948	ppb	1.24	2700.00	
90 Zr	# 3	72	1131.2	0.0000	0.0777	ppb	4.45	1800.00	
95 Mo	# 3	115	2788.2	0.0000	0.3910	ppb	2.90	2700.00	
107 Ag	# 3	115	7736.9	0.0000	0.3892	ppb	2.14	225.00	
111 Cd	# 3	115	1747.4	0.0000	0.3845	ppb	1.70	2700.00	
118 Sn	# 3	115	5339.0	0.0000	0.3965	ppb	1.93	2700.00	
121 Sb	# 3	115	7376.6	0.0000	0.4408	ppb	3.65	2700.00	
137 Ba	# 3	115	2707.0	0.0000	0.4289	ppb	3.60	2700.00	
182 W	# 3	159	1265.7	0.0000	0.0515	ppb	9.54	900.00	
205 Tl	# 3	159	18335.5	0.0000	0.3981	ppb	2.16	2700.00	
208 Pb	# 3	159	26234.7	0.0000	0.4185	ppb	0.42	2700.00	
235 U	# 3	159	231.1	0.0000	0.0027	ppb	12.81	27.00	
238 U	# 3	159	30461.1	0.0000	0.4211	ppb	0.35	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	3413713.00	0.98	3436000.30	99.4	60 - 125	
45 Sc # 1	1179112.60	1.06	1219080.40	96.7	60 - 125	
45 Sc # 2	261457.73	1.04	261322.58	100.1	60 - 125	
45 Sc # 3	3201719.00	0.84	3259125.00	98.2	60 - 125	
72 Ge # 1	280273.38	0.52	287393.84	97.5	60 - 125	
72 Ge # 2	130741.39	0.94	131286.22	99.6	60 - 125	
72 Ge # 3	643135.38	0.66	650322.63	98.9	60 - 125	
115 In # 3	4729031.50	1.74	4722231.00	100.1	60 - 125	
159 Tb # 3	7332085.00	1.26	7403280.50	99.0	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes:	Pass
ISTD:	Pass

ICS-A QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07014.D\F6D07014.D#
Date Acquired:	Apr 13 2015 04:08 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	ICSA
Misc Info:	
Vial Number:	1303
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 13 2015 03:45 pm
Sample Type:	ICS-A
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc RSD(%)	High Limit	Flag
7 Li	0.42	ppb	186250.0	9.94	---	
9 Be	0.01	ppb	93.3	10.36	---	
11 B	-0.30	ppb	9686.8	3.27	---	
23 Na	94010.00	ppb	408025600.0	0.84	120000.00	
24 Mg	94320.00	ppb	1697479000.0	0.43	120000.00	
27 Al	95660.00	ppb	2096580000.0	0.28	120000.00	
28 Si	3.83	ppb	6598.4	3.76	---	
31 P	103300.00	ppb	93904816.0	0.32	---	
39 K	93660.00	ppb	68018808.0	0.46	120000.00	
40 Ca	94060.00	ppb	685144380.0	1.35	120000.00	
47 Ti	1989.00	ppb	4026978.0	0.28	2400.00	
51 V	0.05	ppb	1929.3	12.20	---	
52 Cr	1.25	ppb	7288.5	0.60	---	
55 Mn	0.39	ppb	14868.0	1.77	---	
56 Fe	90480.00	ppb	943744700.0	1.72	120000.00	
59 Co	0.27	ppb	6696.2	0.66	---	
60 Ni	0.17	ppb	388.5	5.20	---	
63 Cu	0.53	ppb	2726.1	2.51	---	
66 Zn	2.75	ppb	10714.4	2.15	---	
75 As	0.25	ppb	204.7	2.38	---	
78 Se	0.03	ppb	15.1	11.69	---	
88 Sr	0.58	ppb	22942.5	0.81	---	
90 Zr	0.81	ppb	16083.0	9.39	---	
95 Mo	1980.00	ppb	11743160.0	0.54	2400.00	
107 Ag	0.02	ppb	506.7	3.11	---	
111 Cd	0.30	ppb	1166.5	46.83	---	
118 Sn	0.03	ppb	574.5	8.27	---	
121 Sb	0.14	ppb	2395.8	2.22	---	
137 Ba	0.10	ppb	575.6	13.71	---	
182 W	0.15	ppb	2793.7	3.28	---	
205 Tl	0.01	ppb	294.5	10.38	---	
208 Pb	0.19	ppb	10667.7	1.40	---	
235 U	0.00	ppb	14.4	112.60	---	
238 U	0.00	ppb	177.8	7.38	---	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2956810.0	0.35	3436000.30	86.1	60 - 125	
45 Sc	1161382.3	2.43	1219080.40	95.3	60 - 125	
45 Sc	248865.8	0.71	261322.58	95.2	60 - 125	
45 Sc	2975756.3	1.30	3259125.00	91.3	60 - 125	
72 Ge	251862.7	1.22	287393.84	87.6	60 - 125	
72 Ge	118627.1	1.00	131286.22	90.4	60 - 125	
72 Ge	605051.0	0.93	650322.63	93.0	60 - 125	
115 In	3983885.8	0.66	4722231.00	84.4	60 - 125	
159 Tb	6535426.5	0.77	7403280.50	88.3	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Nnumber of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7050

ICS-AB QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07015.D\F6D07015.D#
Date Acquired:	Apr 13 2015 04:13 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	ICSAB
Misc Info:	
Vial Number:	1304
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 13 2015 03:45 pm
Sample Type:	ICS-AB
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc RSD(%)	Expected	QC Range(%)	Flag
7 Li	20.24	ppb	709206.6	1.37	20.00	80 - 120	
9 Be	18.81	ppb	131064.9	0.64	20.00	80 - 120	
11 B	17.05	ppb	108094.9	0.23	20.00	80 - 120	
23 Na	92630.00	ppb	395223300.0	2.48	100000.00	80 - 120	
24 Mg	93480.00	ppb	1660740000.0	0.51	100000.00	80 - 120	
27 Al	95130.00	ppb	2058026000.0	0.16	100000.00	80 - 120	
28 Si	191.00	ppb	223476.5	1.09	200.00	80 - 120	
31 P	103400.00	ppb	92777568.0	0.34	100000.00	80 - 120	
39 K	95320.00	ppb	66226648.0	1.16	100000.00	80 - 120	
40 Ca	95030.00	ppb	680622400.0	0.82	100000.00	80 - 120	
47 Ti	2018.00	ppb	4033210.0	0.22	2000.00	80 - 120	
51 V	19.85	ppb	88288.1	1.15	20.00	80 - 120	
52 Cr	20.51	ppb	108624.7	0.88	20.00	80 - 120	
55 Mn	19.72	ppb	650419.3	1.09	20.00	80 - 120	
56 Fe	91180.00	ppb	935113470.0	0.78	100000.00	80 - 120	
59 Co	19.29	ppb	469851.1	0.23	20.00	80 - 120	
60 Ni	18.45	ppb	32985.4	1.36	20.00	80 - 120	
63 Cu	18.35	ppb	81123.4	1.35	20.00	80 - 120	
66 Zn	20.80	ppb	75432.6	0.85	20.00	80 - 120	
75 As	20.77	ppb	12722.8	1.59	20.00	80 - 120	
78 Se	20.95	ppb	6902.4	1.25	20.00	80 - 120	
88 Sr	19.85	ppb	714544.4	0.53	20.00	80 - 120	
90 Zr	12.19	ppb	240874.2	2.04	20.00	80 - 120	Fail
95 Mo	2018.00	ppb	11725710.0	1.00	2000.00	80 - 120	
107 Ag	17.63	ppb	284565.7	0.47	20.00	80 - 120	
111 Cd	19.26	ppb	71791.9	0.51	20.00	80 - 120	
118 Sn	19.35	ppb	202995.7	0.57	20.00	80 - 120	
121 Sb	21.23	ppb	264722.1	0.43	20.00	80 - 120	
137 Ba	20.91	ppb	105988.8	0.06	20.00	80 - 120	
182 W	20.23	ppb	324896.4	0.78	20.00	80 - 120	
205 Tl	18.00	ppb	722155.0	0.99	20.00	80 - 120	
208 Pb	18.80	ppb	1014977.0	1.06	20.00	80 - 120	
235 U	0.14	ppb	9347.0	2.23	0.14	80 - 120	
238 U	19.93	ppb	1257362.0	0.31	19.86	80 - 120	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2841567.5	0.92	3436000.30	82.7	60 - 125	
45 Sc	1141641.5	1.35	1219080.40	93.6	60 - 125	
45 Sc	238101.1	1.13	261322.58	91.1	60 - 125	
45 Sc	2937535.3	0.42	3259125.00	90.1	60 - 125	
72 Ge	245291.6	1.27	287393.84	85.4	60 - 125	
72 Ge	114700.0	0.46	131286.22	87.4	60 - 125	
72 Ge	582976.9	0.51	650322.63	89.6	60 - 125	
115 In	3903566.3	0.20	4722231.00	82.7	60 - 125	
159 Tb	6413608.0	1.13	7403280.50	86.6	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

1 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

7051

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07016.D\F6D07016.D#
Date Acquired: Apr 13 2015 04:17 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: MRLD1304
Misc Info: 500 ppb CAT
Vial Number: 1207
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 13 2015 03:45 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	195287.6	0.0000	-0.1258	ppb	54.57	225.00	
9 Be	# 3	45	55.6	0.0000	0.0045	ppb	49.05	225.00	
11 B	# 3	45	9047.5	0.0000	-0.5583	ppb	9.52	225.00	
23 Na	# 1	45	2378188.0	0.0000	514.9000	ppb	0.74	269999.99	
24 Mg	# 3	45	10443100.0	0.0000	524.2000	ppb	0.53	269999.99	
27 Al	# 3	45	12525350.0	0.0000	516.4000	ppb	1.04	90000.00	
28 Si	# 1	45	2877.0	0.0000	0.5672	ppb	23.64	18000.00	
31 P	# 3	45	31500.1	0.0000	0.2450	ppb	277.47	359999.99	
39 K	# 2	45	425536.1	0.0000	516.0000	ppb	0.68	269999.99	
40 Ca	# 1	45	4029452.0	0.0000	526.6000	ppb	1.74	269999.99	
47 Ti	# 3	45	565.6	0.0000	0.1919	ppb	5.30	2700.00	
51 V	# 2	45	1665.2	0.0000	-0.0233	ppb	11.04	2700.00	
52 Cr	# 2	45	356.0	0.0000	-0.0053	ppb	88.60	2700.00	
55 Mn	# 3	45	2717.0	0.0000	0.0186	ppb	17.45	2700.00	
56 Fe	# 1	45	5798269.0	0.0000	531.0000	ppb	0.82	90000.00	
59 Co	# 3	45	265.6	0.0000	0.0035	ppb	32.79	2700.00	
60 Ni	# 2	45	82.4	0.0000	0.0072	ppb	85.65	2700.00	
63 Cu	# 2	45	410.0	0.0000	0.0204	ppb	23.36	2700.00	
66 Zn	# 3	72	1102.3	0.0000	0.1538	ppb	2.07	2700.00	
75 As	# 2	72	42.2	0.0000	-0.0127	ppb	15.10	2700.00	
78 Se	# 1	72	5.6	0.0000	-0.0010	ppb	93.87	2700.00	
88 Sr	# 3	72	1301.2	0.0000	-0.0021	ppb	96.41	2700.00	
90 Zr	# 3	72	442.2	0.0000	0.0456	ppb	1.86	1800.00	
95 Mo	# 3	115	12302.5	0.0000	1.7160	ppb	12.14	2700.00	
107 Ag	# 3	115	216.7	0.0000	0.0042	ppb	22.07	225.00	
111 Cd	# 3	115	16.6	0.0000	0.0012	ppb	59.57	2700.00	
118 Sn	# 3	115	397.8	0.0000	0.0066	ppb	18.21	2700.00	
121 Sb	# 3	115	1112.3	0.0000	0.0239	ppb	26.57	2700.00	
137 Ba	# 3	115	92.2	0.0000	0.0027	ppb	99.26	2700.00	
182 W	# 3	159	793.4	0.0000	0.0245	ppb	14.29	900.00	
205 Tl	# 3	159	773.4	0.0000	0.0146	ppb	1.60	2700.00	
208 Pb	# 3	159	718.9	0.0000	0.0046	ppb	20.43	2700.00	
235 U	# 3	159	11.1	0.0000	-0.0002	ppb	53.68	27.00	
238 U	# 3	159	484.5	0.0000	0.0052	ppb	13.42	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	3372715.80	1.34	3436000.30	98.2	60 - 125	
45 Sc # 1	1214588.00	1.43	1219080.40	99.6	60 - 125	
45 Sc # 2	263164.22	0.53	261322.58	100.7	60 - 125	
45 Sc # 3	3292838.50	1.62	3259125.00	101.0	60 - 125	
72 Ge # 1	287412.41	0.71	287393.84	100.0	60 - 125	
72 Ge # 2	132164.17	0.82	131286.22	100.7	60 - 125	
72 Ge # 3	663118.88	0.89	650322.63	102.0	60 - 125	
115 In # 3	4806040.50	0.97	4722231.00	101.8	60 - 125	
159 Tb # 3	7550346.50	1.04	7403280.50	102.0	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7052

CCV QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07017.D\F6D07017.D#
Date Acquired: Apr 13 2015 04:21 pm
Operator: CCapul
Sample Name: CCV1
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 13 2015 03:45 pm
Sample Type: CCV
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	Expected	QC Range(%)	Flag
7 Li	24.98 ppb	1.30	25.00	90 - 110	
9 Be	24.03 ppb	0.61	25.00	90 - 110	
11 B	23.73 ppb	0.82	25.00	90 - 110	
23 Na	1194.00 ppb	0.73	1250.00	90 - 110	
24 Mg	2493.00 ppb	0.29	2500.00	90 - 110	
27 Al	2548.00 ppb	0.63	2500.00	90 - 110	
28 Si	2258.00 ppb	0.10	2500.00	90 - 110	
31 P	250.90 ppb	0.37	250.00	90 - 110	
39 K	2473.00 ppb	1.46	2500.00	90 - 110	
40 Ca	2422.00 ppb	0.53	2500.00	90 - 110	
47 Ti	24.19 ppb	0.89	25.00	90 - 110	
51 V	24.52 ppb	0.36	25.00	90 - 110	
52 Cr	24.80 ppb	0.97	25.00	90 - 110	
55 Mn	24.75 ppb	0.54	25.00	90 - 110	
56 Fe	2404.00 ppb	0.73	2500.00	90 - 110	
59 Co	24.87 ppb	0.44	25.00	90 - 110	
60 Ni	25.09 ppb	0.68	25.00	90 - 110	
63 Cu	25.43 ppb	0.46	25.00	90 - 110	
66 Zn	49.95 ppb	0.23	50.00	90 - 110	
75 As	25.25 ppb	1.39	25.00	90 - 110	
78 Se	24.33 ppb	0.34	25.00	90 - 110	
88 Sr	24.83 ppb	0.73	25.00	90 - 110	
90 Zr	16.46 ppb	1.03	15.00	90 - 110	
95 Mo	24.85 ppb	0.56	25.00	90 - 110	
107 Ag	23.80 ppb	0.34	25.00	90 - 110	
111 Cd	24.16 ppb	0.76	25.00	90 - 110	
118 Sn	23.67 ppb	0.68	25.00	90 - 110	
121 Sb	25.28 ppb	0.63	25.00	90 - 110	
137 Ba	25.46 ppb	0.40	25.00	90 - 110	
182 W	24.86 ppb	0.55	25.00	90 - 110	
205 Tl	23.93 ppb	1.08	25.00	90 - 110	
208 Pb	24.86 ppb	0.98	25.00	90 - 110	
235 U	0.17 ppb	3.68	0.18	90 - 110	
238 U	25.10 ppb	0.63	24.82	90 - 110	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3324886.00	0.41	3436000.30	96.8	60 - 125	
45 Sc	1270566.50	1.12	1219080.40	104.2	60 - 125	
45 Sc	266302.31	0.22	261322.58	101.9	60 - 125	
45 Sc	3378964.30	0.42	3259125.00	103.7	60 - 125	
72 Ge	287682.59	1.10	287393.84	100.1	60 - 125	
72 Ge	130243.99	1.13	131286.22	99.2	60 - 125	
72 Ge	648080.38	0.54	650322.63	99.7	60 - 125	
115 In	4760783.50	0.92	4722231.00	100.8	60 - 125	
159 Tb	7476785.50	0.96	7403280.50	101.0	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7053

CCB QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07018.D\F6D07018.D#
Date Acquired: Apr 13 2015 04:25 pm
Operator: CCapul
Sample Name: CCB1
Misc Info:
Vial Number: 1102
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 13 2015 03:45 pm
Sample Type: CCB
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	High Limit	Flag
7 Li	-0.06 ppb	56.36	0.20	
9 Be	0.00 ppb	75.45	0.10	
11 B	-0.79 ppb	6.46	5.00	
23 Na	1.65 ppb	9.98	40.00	
24 Mg	0.46 ppb	8.22	10.00	
27 Al	0.22 ppb	10.68	20.00	
28 Si	1.59 ppb	97.05	20.00	
31 P	-5.22 ppb	5.45	10.00	
39 K	0.04 ppb	3219.30	20.00	
40 Ca	0.43 ppb	7.42	25.00	
47 Ti	0.01 ppb	187.39	0.50	
51 V	0.00 ppb	391.99	0.50	
52 Cr	-0.01 ppb	41.26	0.20	
55 Mn	-0.01 ppb	18.63	0.20	
56 Fe	1.36 ppb	6.93	10.00	
59 Co	0.00 ppb	1040.10	0.20	
60 Ni	-0.01 ppb	67.19	0.20	
63 Cu	0.00 ppb	2857.70	0.40	
66 Zn	-0.03 ppb	86.47	2.00	
75 As	0.00 ppb	36.75	0.20	
78 Se	-0.01 ppb	68.79	0.20	
88 Sr	-0.01 ppb	13.90	0.20	
90 Zr	0.04 ppb	0.63	2.00	
95 Mo	0.16 ppb	11.54	0.40	
107 Ag	0.01 ppb	62.12	0.20	
111 Cd	0.00 ppb	201.08	0.20	
118 Sn	0.00 ppb	84.78	0.20	
121 Sb	0.03 ppb	31.65	0.40	
137 Ba	0.00 ppb	410.64	0.20	
182 W	0.01 ppb	7.64	1.00	
205 Tl	0.01 ppb	3.36	0.20	
208 Pb	0.01 ppb	16.57	0.10	
235 U	0.00 ppb	16.92	1.00	
238 U	0.00 ppb	7.21	0.10	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3319281.00	0.93	3436000.30	96.6	60 - 125	
45 Sc	1191765.10	1.89	1219080.40	97.8	60 - 125	
45 Sc	260154.14	1.54	261322.58	99.6	60 - 125	
45 Sc	3216109.00	1.66	3259125.00	98.7	60 - 125	
72 Ge	284108.53	0.85	287393.84	98.9	60 - 125	
72 Ge	130345.55	1.26	131286.22	99.3	60 - 125	
72 Ge	642198.00	0.33	650322.63	98.8	60 - 125	
115 In	4723341.00	0.41	4722231.00	100.0	60 - 125	
159 Tb	7272303.00	0.25	7403280.50	98.2	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7054

CCV QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07033.D\F6D07033.D#
Date Acquired: Apr 13 2015 05:30 pm
Operator: CCapul
Sample Name: CCV3
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 13 2015 03:45 pm
Sample Type: CCV
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	Expected	QC Range(%)	Flag
7 Li	24.82 ppb	1.69	25.00	90 - 110	
9 Be	24.78 ppb	0.70	25.00	90 - 110	
11 B	24.29 ppb	2.29	25.00	90 - 110	
23 Na	1216.00 ppb	2.14	1250.00	90 - 110	
24 Mg	2495.00 ppb	1.28	2500.00	90 - 110	
27 Al	2529.00 ppb	0.57	2500.00	90 - 110	
28 Si	2321.00 ppb	2.46	2500.00	90 - 110	
31 P	251.90 ppb	0.42	250.00	90 - 110	
39 K	2501.00 ppb	1.73	2500.00	90 - 110	
40 Ca	2450.00 ppb	1.93	2500.00	90 - 110	
47 Ti	24.35 ppb	0.83	25.00	90 - 110	
51 V	24.66 ppb	0.70	25.00	90 - 110	
52 Cr	24.92 ppb	0.73	25.00	90 - 110	
55 Mn	24.55 ppb	1.00	25.00	90 - 110	
56 Fe	2409.00 ppb	2.76	2500.00	90 - 110	
59 Co	24.85 ppb	0.99	25.00	90 - 110	
60 Ni	25.24 ppb	0.59	25.00	90 - 110	
63 Cu	25.32 ppb	0.21	25.00	90 - 110	
66 Zn	50.03 ppb	0.35	50.00	90 - 110	
75 As	24.98 ppb	0.94	25.00	90 - 110	
78 Se	24.53 ppb	0.90	25.00	90 - 110	
88 Sr	24.63 ppb	0.83	25.00	90 - 110	
90 Zr	16.08 ppb	0.26	15.00	90 - 110	
95 Mo	24.67 ppb	0.36	25.00	90 - 110	
107 Ag	24.08 ppb	1.10	25.00	90 - 110	
111 Cd	24.35 ppb	1.16	25.00	90 - 110	
118 Sn	23.71 ppb	0.69	25.00	90 - 110	
121 Sb	25.26 ppb	0.64	25.00	90 - 110	
137 Ba	25.34 ppb	1.28	25.00	90 - 110	
182 W	24.86 ppb	0.91	25.00	90 - 110	
205 Tl	24.13 ppb	1.10	25.00	90 - 110	
208 Pb	24.85 ppb	0.25	25.00	90 - 110	
235 U	0.17 ppb	1.26	0.18	90 - 110	
238 U	25.13 ppb	1.14	24.82	90 - 110	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3415467.80	1.73	3436000.30	99.4	60 - 125	
45 Sc	1210271.50	2.81	1219080.40	99.3	60 - 125	
45 Sc	264509.75	0.67	261322.58	101.2	60 - 125	
45 Sc	3341948.00	1.00	3259125.00	102.5	60 - 125	
72 Ge	273487.34	1.46	287393.84	95.2	60 - 125	
72 Ge	130456.84	1.15	131286.22	99.4	60 - 125	
72 Ge	640507.56	0.38	650322.63	98.5	60 - 125	
115 In	4678556.00	1.01	4722231.00	99.1	60 - 125	
159 Tb	7333592.50	0.69	7403280.50	99.1	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7055

CCB QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07034.D\F6D07034.D#
Date Acquired:	Apr 13 2015 05:34 pm
Operator:	CCapul
Sample Name:	CCB3
Misc Info:	
Vial Number:	1102
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update:	Apr 13 2015 03:45 pm
Sample Type:	CCB
Total Dil Factor:	1.00

QC Elements

Element	Conc.	RSD(%)	High Limit	Flag
7 Li	-0.04 ppb	72.46	0.20	
9 Be	0.00 ppb	202.81	0.10	
11 B	-0.98 ppb	6.53	5.00	
23 Na	-1.45 ppb	2.83	40.00	
24 Mg	0.19 ppb	12.94	10.00	
27 Al	0.17 ppb	15.71	20.00	
28 Si	0.62 ppb	16.37	20.00	
31 P	-4.24 ppb	16.66	10.00	
39 K	1.01 ppb	36.26	20.00	
40 Ca	0.37 ppb	1.95	25.00	
47 Ti	0.00 ppb	425.13	0.50	
51 V	0.01 ppb	39.24	0.50	
52 Cr	-0.01 ppb	33.11	0.20	
55 Mn	-0.01 ppb	36.13	0.20	
56 Fe	1.01 ppb	7.60	10.00	
59 Co	0.00 ppb	26.84	0.20	
60 Ni	0.01 ppb	72.13	0.20	
63 Cu	-0.01 ppb	50.75	0.40	
66 Zn	-0.02 ppb	34.09	2.00	
75 As	0.01 ppb	21.18	0.20	
78 Se	0.01 ppb	139.18	0.20	
88 Sr	-0.01 ppb	6.93	0.20	
90 Zr	0.05 ppb	5.34	2.00	
95 Mo	0.02 ppb	26.51	0.40	
107 Ag	0.00 ppb	42.96	0.20	
111 Cd	0.00 ppb	31.34	0.20	
118 Sn	0.00 ppb	177.36	0.20	
121 Sb	0.06 ppb	7.90	0.40	
137 Ba	0.00 ppb	280.96	0.20	
182 W	0.03 ppb	12.15	1.00	
205 Tl	0.01 ppb	1.89	0.20	
208 Pb	0.00 ppb	9.41	0.10	
235 U	0.00 ppb	21.03	1.00	
238 U	0.01 ppb	12.49	0.10	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3291291.50	1.42	3436000.30	95.8	60 - 125	
45 Sc	1173742.80	0.51	1219080.40	96.3	60 - 125	
45 Sc	257584.66	0.40	261322.58	98.6	60 - 125	
45 Sc	3159889.30	0.98	3259125.00	97.0	60 - 125	
72 Ge	279257.41	1.41	287393.84	97.2	60 - 125	
72 Ge	128219.96	1.29	131286.22	97.7	60 - 125	
72 Ge	629920.63	0.91	650322.63	96.9	60 - 125	
115 In	4592578.50	0.95	4722231.00	97.3	60 - 125	
159 Tb	7133605.50	0.12	7403280.50	96.4	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: **Pass**
ISTD: **Pass**

7056

CCB QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07035.D\F6D07035.D#
Date Acquired: Apr 13 2015 05:38 pm
Operator: CCapul
Sample Name: IMD016SB
Misc Info:
Vial Number: 2107
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 13 2015 03:45 pm
Sample Type: MBS
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	High Limit	Flag
7 Li	-0.02 ppb	354.29	0.50	
9 Be	0.00 ppb	180.44	0.50	
11 B	-1.09 ppb	3.87	10.00	
23 Na	0.34 ppb	39.12	100.00	
24 Mg	0.73 ppb	1.97	100.00	
27 Al	1.57 ppb	2.08	100.00	
28 Si	1.18 ppb	6.91	50.00	
31 P	5.04 ppb	14.90	10.00	
39 K	-1.44 ppb	32.46	100.00	
40 Ca	9.95 ppb	1.19	100.00	
47 Ti	0.03 ppb	36.53	0.50	
51 V	-0.14 ppb	3.52	0.50	
52 Cr	0.01 ppb	28.41	0.50	
55 Mn	0.02 ppb	24.12	0.50	
56 Fe	0.94 ppb	0.81	100.00	
59 Co	0.00 ppb	103.31	0.50	
60 Ni	0.04 ppb	2.46	0.50	
63 Cu	0.05 ppb	7.64	0.50	
66 Zn	0.51 ppb	3.35	2.00	
75 As	-0.02 ppb	13.75	0.50	
78 Se	0.00 ppb	225.30	0.50	
88 Sr	-0.01 ppb	13.37	0.50	
90 Zr	0.05 ppb	5.34	5.00	
95 Mo	0.01 ppb	19.87	0.50	
107 Ag	0.00 ppb	1560.50	0.50	
111 Cd	0.00 ppb	60.38	0.50	
118 Sn	3.41 ppb	0.68	20.00	
121 Sb	0.00 ppb	656.27	0.50	
137 Ba	0.02 ppb	13.02	0.50	
182 W	0.01 ppb	7.71	2.00	
205 Tl	0.00 ppb	31.76	0.50	
208 Pb	0.01 ppb	6.40	0.50	
235 U	0.00 ppb	16.51	#VALUE!	
238 U	0.00 ppb	27.60	0.50	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3438726.00	0.16	3436000.30	100.1	60 - 125	
45 Sc	1222382.00	1.58	1219080.40	100.3	60 - 125	
45 Sc	268447.34	0.71	261322.58	102.7	60 - 125	
45 Sc	3303587.80	1.15	3259125.00	101.4	60 - 125	
72 Ge	285251.91	0.72	287393.84	99.3	60 - 125	
72 Ge	134255.22	1.55	131286.22	102.3	60 - 125	
72 Ge	660318.38	0.61	650322.63	101.5	60 - 125	
115 In	4757741.00	1.01	4722231.00	100.8	60 - 125	
159 Tb	7397486.50	0.90	7403280.50	99.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

LCS QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07036.D\F6D07036.D#
Date Acquired:	Apr 13 2015 05:43 pm
Operator:	CCapul
Sample Name:	IMD016SL
Misc Info:	
Vial Number:	2108
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 13 2015 03:45 pm
Sample Type:	LCSS
Final Dil Factor:	1.00

Analyte Elements

Element	CPS Mean	Conc.		RSD(%)	Expected	QC Range(%)	Flag
7 Li	1829458.00	51.28	ppb	1.42	50.00	80 - 120	
9 Be	394972.31	50.70	ppb	1.01	50.00	80 - 120	
11 B	323806.19	48.99	ppb	0.89	50.00	80 - 120	
23 Na	22371160.00	4934.00	ppb	2.08	5000.00	80 - 120	
24 Mg	100780400.00	5073.00	ppb	0.87	5000.00	80 - 120	
27 Al	121539100.00	5024.00	ppb	1.05	5000.00	80 - 120	
28 Si	3558.33	1.13	ppb	13.19	5000.00	80 - 120	Fail
31 P	35691.90	4.50	ppb	16.41	500.00	80 - 120	Fail
39 K	3873493.00	4918.00	ppb	1.01	5000.00	80 - 120	
40 Ca	38498328.00	5065.00	ppb	1.05	5000.00	80 - 120	
47 Ti	108189.00	48.35	ppb	1.15	50.00	80 - 120	
51 V	253909.70	51.31	ppb	1.17	50.00	80 - 120	
52 Cr	297486.19	50.01	ppb	0.88	50.00	80 - 120	
55 Mn	1884243.00	51.18	ppb	0.06	50.00	80 - 120	
56 Fe	54436040.00	5003.00	ppb	1.09	5000.00	80 - 120	
59 Co	1382145.00	50.75	ppb	0.46	50.00	80 - 120	
60 Ni	101245.10	50.40	ppb	1.11	50.00	80 - 120	
63 Cu	253135.70	51.01	ppb	1.05	50.00	80 - 120	
66 Zn	388684.81	97.95	ppb	0.59	100.00	80 - 120	
75 As	35255.69	51.25	ppb	0.56	50.00	80 - 120	
78 Se	17885.58	48.19	ppb	1.46	50.00	80 - 120	
88 Sr	1997957.00	50.55	ppb	1.04	50.00	80 - 120	
90 Zr	6059.28	0.30	ppb	1.37	30.00	80 - 120	Fail
95 Mo	351240.69	50.76	ppb	0.45	50.00	80 - 120	
107 Ag	943833.31	49.12	ppb	1.11	50.00	80 - 120	
111 Cd	212762.91	47.93	ppb	0.46	50.00	80 - 120	
118 Sn	664232.81	53.22	ppb	0.69	50.00	80 - 120	
121 Sb	758778.88	51.17	ppb	0.68	50.00	80 - 120	
137 Ba	311568.31	51.63	ppb	0.51	50.00	80 - 120	
182 W	1194.55	0.05	ppb	3.22	50.00	80 - 120	Fail
205 Tl	2190349.00	47.83	ppb	1.37	50.00	80 - 120	
208 Pb	3017831.00	48.98	ppb	1.37	50.00	80 - 120	
235 U	26616.93	0.34	ppb	1.16	0.35	80 - 120	
238 U	3627177.00	50.37	ppb	0.57	49.65	80 - 120	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3377161.50	1.38	3436000.30	98.3	60 - 125	
45 Sc	1211307.60	2.45	1219080.40	99.4	60 - 125	
45 Sc	267938.59	1.86	261322.58	102.5	60 - 125	
45 Sc	3284658.50	0.96	3259125.00	100.8	60 - 125	
72 Ge	276476.44	1.25	287393.84	96.2	60 - 125	
72 Ge	129085.18	0.13	131286.22	98.3	60 - 125	
72 Ge	640681.69	0.81	650322.63	98.5	60 - 125	
115 In	4648519.50	0.09	4722231.00	98.4	60 - 125	
159 Tb	7321297.50	0.43	7403280.50	98.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

4 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

7058

LCS QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07037.D\F6D07037.D#
Date Acquired:	Apr 13 2015 05:47 pm
Operator:	CCapul
Sample Name:	IMD016SC
Misc Info:	
Vial Number:	2109
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 13 2015 03:45 pm
Sample Type:	LCSS
Final Dil Factor:	1.00

Analyte Elements

Element	CPS Mean	Conc.		RSD(%)	Expected	QC Range(%)	Flag
7 Li	1816460.00	51.12	ppb	1.51	50.00	80 - 120	
9 Be	393043.50	50.38	ppb	0.69	50.00	80 - 120	
11 B	319830.59	48.30	ppb	1.31	50.00	80 - 120	
23 Na	22016820.00	4867.00	ppb	1.34	5000.00	80 - 120	
24 Mg	101033400.00	5079.00	ppb	0.80	5000.00	80 - 120	
27 Al	122658900.00	5064.00	ppb	1.01	5000.00	80 - 120	
28 Si	3857.31	1.38	ppb	8.64	5000.00	80 - 120	Fail
31 P	35866.68	4.63	ppb	8.73	500.00	80 - 120	Fail
39 K	3847210.00	4948.00	ppb	0.40	5000.00	80 - 120	
40 Ca	38568672.00	5087.00	ppb	1.85	5000.00	80 - 120	
47 Ti	108491.90	48.42	ppb	1.43	50.00	80 - 120	
51 V	251135.00	51.41	ppb	0.97	50.00	80 - 120	
52 Cr	293998.69	50.07	ppb	0.94	50.00	80 - 120	
55 Mn	1862620.00	50.53	ppb	1.59	50.00	80 - 120	
56 Fe	54477780.00	5019.00	ppb	1.36	5000.00	80 - 120	
59 Co	1376718.00	50.48	ppb	1.75	50.00	80 - 120	
60 Ni	99791.48	50.32	ppb	1.52	50.00	80 - 120	
63 Cu	248185.59	50.66	ppb	1.51	50.00	80 - 120	
66 Zn	385923.59	98.48	ppb	0.21	100.00	80 - 120	
75 As	34448.64	50.35	ppb	0.64	50.00	80 - 120	
78 Se	17707.59	47.96	ppb	1.91	50.00	80 - 120	
88 Sr	1958430.00	50.18	ppb	1.14	50.00	80 - 120	
90 Zr	5446.80	0.28	ppb	3.27	30.00	80 - 120	Fail
95 Mo	343877.00	50.83	ppb	0.70	50.00	80 - 120	
107 Ag	939481.81	50.00	ppb	0.30	50.00	80 - 120	
111 Cd	207751.80	47.87	ppb	0.24	50.00	80 - 120	
118 Sn	648892.31	53.18	ppb	0.61	50.00	80 - 120	
121 Sb	747260.38	51.54	ppb	0.78	50.00	80 - 120	
137 Ba	304830.19	51.66	ppb	0.94	50.00	80 - 120	
182 W	1084.53	0.04	ppb	7.41	50.00	80 - 120	Fail
205 Tl	2167352.00	47.80	ppb	0.56	50.00	80 - 120	
208 Pb	2976478.00	48.79	ppb	0.67	50.00	80 - 120	
235 U	26405.36	0.34	ppb	0.94	0.35	80 - 120	
238 U	3559443.00	49.92	ppb	1.36	49.65	80 - 120	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3362399.30	0.89	3436000.30	97.9	60 - 125	
45 Sc	1208203.90	1.38	1219080.40	99.1	60 - 125	
45 Sc	264507.72	1.81	261322.58	101.2	60 - 125	
45 Sc	3288828.00	0.66	3259125.00	100.9	60 - 125	
72 Ge	274989.03	0.88	287393.84	95.7	60 - 125	
72 Ge	128401.48	1.51	131286.22	97.8	60 - 125	
72 Ge	632660.94	1.00	650322.63	97.3	60 - 125	
115 In	4545116.00	0.50	4722231.00	96.2	60 - 125	
159 Tb	7249754.00	1.15	7403280.50	97.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

4 :Element Failures — 0 :Max. Number of Failures Allowed

0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail

ISTD: Pass

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07038.D\F6D07038.D#
Date Acquired: Apr 13 2015 05:51 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D041-01
Misc Info:
Vial Number: 2110
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 13 2015 03:45 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	507206.3	0.0000	9.6180	ppb	1.24	225.00	
9 Be	# 3	45	3363.8	0.0000	0.4042	ppb	3.00	225.00	
11 B	# 3	45	25976.6	0.0000	1.8730	ppb	6.26	225.00	
23 Na	# 1	45	1116482.0	0.0000	221.7000	ppb	1.18	269999.99	
24 Mg	# 3	45	109462800.0	0.0000	5191.0000	ppb	1.10	269999.99	
27 Al	# 3	45	443942690.0	0.0000	17290.0000	ppb	0.37	90000.00	
28 Si	# 1	45	1389480.0	0.0000	1055.0000	ppb	1.37	18000.00	
31 P	# 3	45	277603.5	0.0000	229.6000	ppb	1.21	359999.99	
39 K	# 2	45	3780536.0	0.0000	4498.0000	ppb	0.95	269999.99	
40 Ca	# 1	45	16485280.0	0.0000	2027.0000	ppb	0.21	269999.99	
47 Ti	# 3	45	4077647.0	0.0000	1719.0000	ppb	0.18	2700.00	
51 V	# 2	45	374359.5	0.0000	71.0700	ppb	0.82	2700.00	
52 Cr	# 2	45	116966.9	0.0000	18.4000	ppb	0.36	2700.00	
55 Mn	# 3	45	18400150.0	0.0000	471.2000	ppb	0.76	2700.00	
56 Fe	# 1	45	317049600.0	0.0000	27250.0000	ppb	0.99	90000.00	
59 Co	# 3	45	309358.8	0.0000	10.6900	ppb	0.25	2700.00	
60 Ni	# 2	45	16617.1	0.0000	7.7270	ppb	0.82	2700.00	
63 Cu	# 2	45	89335.9	0.0000	16.8400	ppb	1.02	2700.00	
66 Zn	# 3	72	209966.1	0.0000	52.3000	ppb	0.67	2700.00	
75 As	# 2	72	2100.4	0.0000	2.9530	ppb	1.07	2700.00	
78 Se	# 1	72	89.6	0.0000	0.2237	ppb	4.96	2700.00	
88 Sr	# 3	72	737594.6	0.0000	18.4400	ppb	0.06	2700.00	
90 Zr	# 3	72	32262.9	0.0000	1.4930	ppb	1.92	1800.00	
95 Mo	# 3	115	5729.1	0.0000	0.8402	ppb	0.47	2700.00	
107 Ag	# 3	115	974.5	0.0000	0.0451	ppb	7.66	225.00	
111 Cd	# 3	115	1470.6	0.0000	0.3358	ppb	2.37	2700.00	
118 Sn	# 3	115	68457.0	0.0000	5.5790	ppb	0.94	2700.00	
121 Sb	# 3	115	5913.7	0.0000	0.3587	ppb	3.11	2700.00	
137 Ba	# 3	115	863819.1	0.0000	146.2000	ppb	0.32	2700.00	
182 W	# 3	159	1433.5	0.0000	0.0616	ppb	15.19	900.00	
205 Tl	# 3	159	22642.3	0.0000	0.4978	ppb	0.82	2700.00	
208 Pb	# 3	159	1305538.0	0.0000	21.4100	ppb	0.43	2700.00	
235 U	# 3	159	929.0	0.0000	0.0118	ppb	4.23	27.00	
238 U	# 3	159	123388.4	0.0000	1.7300	ppb	0.21	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	3390338.80	0.54	3436000.30	98.7	60 - 125	
45 Sc # 1	1295013.60	0.69	1219080.40	106.2	60 - 125	
45 Sc # 2	285723.03	0.08	261322.58	109.3	60 - 125	
45 Sc # 3	3487021.50	1.19	3259125.00	107.0	60 - 125	
72 Ge # 1	279123.34	0.71	287393.84	97.1	60 - 125	
72 Ge # 2	130448.15	0.61	131286.22	99.4	60 - 125	
72 Ge # 3	647464.69	0.66	650322.63	99.6	60 - 125	
115 In # 3	4553219.50	0.84	4722231.00	96.4	60 - 125	
159 Tb # 3	7246097.50	1.18	7403280.50	97.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7060

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07039.D\F6D07039.D#
Date Acquired: Apr 13 2015 05:55 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D041-02
Misc Info:
Vial Number: 2111
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 13 2015 03:45 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	504752.2	0.0000	9.3760	ppb	0.91	225.00	
9 Be	# 3	45	2899.3	0.0000	0.3471	ppb	3.41	225.00	
11 B	# 3	45	30242.4	0.0000	2.4940	ppb	2.66	225.00	
23 Na	# 1	45	1009552.0	0.0000	204.3000	ppb	0.85	269999.99	
24 Mg	# 3	45	103140900.0	0.0000	4878.0000	ppb	0.36	269999.99	
27 Al	# 3	45	440663620.0	0.0000	17120.0000	ppb	0.80	90000.00	
28 Si	# 1	45	2077171.0	0.0000	1614.0000	ppb	1.86	18000.00	
31 P	# 3	45	229254.9	0.0000	183.7000	ppb	0.82	359999.99	
39 K	# 2	45	2997347.0	0.0000	3626.0000	ppb	1.15	269999.99	
40 Ca	# 1	45	23296730.0	0.0000	2931.0000	ppb	1.27	269999.99	
47 Ti	# 3	45	3582232.0	0.0000	1506.0000	ppb	0.69	2700.00	
51 V	# 2	45	428578.0	0.0000	82.9600	ppb	1.43	2700.00	
52 Cr	# 2	45	122828.7	0.0000	19.6900	ppb	1.28	2700.00	
55 Mn	# 3	45	14050640.0	0.0000	359.0000	ppb	0.45	2700.00	
56 Fe	# 1	45	361674910.0	0.0000	31800.0000	ppb	1.02	90000.00	
59 Co	# 3	45	304510.5	0.0000	10.5000	ppb	0.45	2700.00	
60 Ni	# 2	45	14442.5	0.0000	6.8370	ppb	0.57	2700.00	
63 Cu	# 2	45	252077.7	0.0000	48.5200	ppb	1.53	2700.00	
66 Zn	# 3	72	384952.0	0.0000	95.8200	ppb	0.14	2700.00	
75 As	# 2	72	2173.5	0.0000	3.0790	ppb	1.43	2700.00	
78 Se	# 1	72	59.8	0.0000	0.1481	ppb	14.92	2700.00	
88 Sr	# 3	72	905293.6	0.0000	22.6100	ppb	0.83	2700.00	
90 Zr	# 3	72	35539.6	0.0000	1.6390	ppb	0.29	1800.00	
95 Mo	# 3	115	3194.9	0.0000	0.4636	ppb	1.06	2700.00	
107 Ag	# 3	115	922.3	0.0000	0.0420	ppb	1.22	225.00	
111 Cd	# 3	115	1350.9	0.0000	0.3065	ppb	6.69	2700.00	
118 Sn	# 3	115	172796.4	0.0000	14.0400	ppb	0.41	2700.00	
121 Sb	# 3	115	4418.6	0.0000	0.2540	ppb	3.13	2700.00	
137 Ba	# 3	115	805532.7	0.0000	135.5000	ppb	1.44	2700.00	
182 W	# 3	159	1110.1	0.0000	0.0432	ppb	5.78	900.00	
205 Tl	# 3	159	16745.7	0.0000	0.3650	ppb	0.48	2700.00	
208 Pb	# 3	159	2694124.0	0.0000	43.8500	ppb	0.67	2700.00	
235 U	# 3	159	747.8	0.0000	0.0094	ppb	4.63	27.00	
238 U	# 3	159	103679.2	0.0000	1.4430	ppb	0.35	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	3425826.50	1.22	3436000.30	99.7	60 - 125	
45 Sc # 1	1266057.90	0.55	1219080.40	103.9	60 - 125	
45 Sc # 2	280491.38	2.19	261322.58	107.3	60 - 125	
45 Sc # 3	3495519.00	0.75	3259125.00	107.3	60 - 125	
72 Ge # 1	272562.53	1.10	287393.84	94.8	60 - 125	
72 Ge # 2	129582.39	0.65	131286.22	98.7	60 - 125	
72 Ge # 3	648608.50	0.61	650322.63	99.7	60 - 125	
115 In # 3	4579206.00	0.42	4722231.00	97.0	60 - 125	
159 Tb # 3	7300244.00	0.74	7403280.50	98.6	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7061

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07040.D\F6D07040.D#
Date Acquired:	Apr 13 2015 06:00 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D041-03
Misc Info:	
Vial Number:	2112
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 13 2015 03:45 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	625210.3	0.0000	13.1700	ppb	0.71	225.00	
9 Be	# 3	45	3520.5	0.0000	0.4109	ppb	2.60	225.00	
11 B	# 3	45	56059.0	0.0000	6.0940	ppb	1.56	225.00	
23 Na	# 1	45	1385407.0	0.0000	256.1000	ppb	0.46	269999.99	
24 Mg	# 3	45	147441900.0	0.0000	6790.0000	ppb	1.30	269999.99	
27 Al	# 3	45	516860510.0	0.0000	19550.0000	ppb	0.62	90000.00	
28 Si	# 1	45	2758534.0	0.0000	1941.0000	ppb	1.12	18000.00	
31 P	# 3	45	633798.3	0.0000	546.9000	ppb	0.08	359999.99	
39 K	# 2	45	4625912.0	0.0000	5385.0000	ppb	0.59	269999.99	
40 Ca	# 1	45	62481120.0	0.0000	7120.0000	ppb	0.50	269999.99	
47 Ti	# 3	45	4683652.0	0.0000	1917.0000	ppb	0.37	2700.00	
51 V	# 2	45	527419.6	0.0000	97.9900	ppb	0.84	2700.00	
52 Cr	# 2	45	123783.9	0.0000	19.0300	ppb	0.96	2700.00	
55 Mn	# 3	45	35871088.0	0.0000	892.3000	ppb	1.22	2700.00	
56 Fe	# 1	45	413580510.0	0.0000	32920.0000	ppb	1.03	90000.00	
59 Co	# 3	45	453422.3	0.0000	15.2300	ppb	0.66	2700.00	
60 Ni	# 2	45	17558.2	0.0000	7.9790	ppb	0.67	2700.00	
63 Cu	# 2	45	124731.4	0.0000	22.9900	ppb	0.49	2700.00	
66 Zn	# 3	72	350323.4	0.0000	87.4500	ppb	0.83	2700.00	
75 As	# 2	72	2018.6	0.0000	2.8010	ppb	1.76	2700.00	
78 Se	# 1	72	98.9	0.0000	0.2405	ppb	5.29	2700.00	
88 Sr	# 3	72	1949798.0	0.0000	48.8700	ppb	0.13	2700.00	
90 Zr	# 3	72	48260.5	0.0000	2.2230	ppb	0.56	1800.00	
95 Mo	# 3	115	7302.1	0.0000	1.0690	ppb	8.98	2700.00	
107 Ag	# 3	115	1466.8	0.0000	0.0710	ppb	3.13	225.00	
111 Cd	# 3	115	2442.6	0.0000	0.5576	ppb	2.61	2700.00	
118 Sn	# 3	115	57511.3	0.0000	4.6690	ppb	1.98	2700.00	
121 Sb	# 3	115	4605.4	0.0000	0.2677	ppb	2.17	2700.00	
137 Ba	# 3	115	1464132.0	0.0000	247.0000	ppb	1.01	2700.00	
182 W	# 3	159	1436.8	0.0000	0.0611	ppb	4.05	900.00	
205 Tl	# 3	159	18781.7	0.0000	0.4095	ppb	1.59	2700.00	
208 Pb	# 3	159	732224.2	0.0000	11.9100	ppb	1.11	2700.00	
235 U	# 3	159	1027.9	0.0000	0.0130	ppb	2.97	27.00	
238 U	# 3	159	138680.6	0.0000	1.9300	ppb	1.00	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	3415890.30	0.76	3436000.30	99.4	60 - 125	
45 Sc # 1	1398318.40	0.53	1219080.40	114.7	60 - 125	
45 Sc # 2	292402.47	0.93	261322.58	111.9	60 - 125	
45 Sc # 3	3590376.30	0.72	3259125.00	110.2	60 - 125	
72 Ge # 1	287856.56	0.73	287393.84	100.2	60 - 125	
72 Ge # 2	132019.33	0.84	131286.22	100.6	60 - 125	
72 Ge # 3	646726.31	0.76	650322.63	99.4	60 - 125	
115 In # 3	4566701.50	0.90	4722231.00	96.7	60 - 125	
159 Tb # 3	7301015.50	1.09	7403280.50	98.6	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes:	Pass
ISTD:	Pass

7062

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07041.D\F6D07041.D#
Date Acquired:	Apr 13 2015 06:04 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D041-04
Misc Info:	
Vial Number:	2201
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 13 2015 03:45 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	498548.4	0.0000	9.6000	ppb	2.10	225.00	
9 Be	# 3	45	2579.2	0.0000	0.3138	ppb	5.33	225.00	
11 B	# 3	45	25305.4	0.0000	1.8290	ppb	4.16	225.00	
23 Na	# 1	45	971685.7	0.0000	185.5000	ppb	0.95	269999.99	
24 Mg	# 3	45	93660176.0	0.0000	4507.0000	ppb	0.45	269999.99	
27 Al	# 3	45	437091810.0	0.0000	17270.0000	ppb	0.74	90000.00	
28 Si	# 1	45	1816278.0	0.0000	1337.0000	ppb	0.79	18000.00	
31 P	# 3	45	233717.9	0.0000	191.6000	ppb	1.47	359999.99	
39 K	# 2	45	2438381.0	0.0000	2910.0000	ppb	0.51	269999.99	
40 Ca	# 1	45	20796930.0	0.0000	2478.0000	ppb	0.71	269999.99	
47 Ti	# 3	45	3081911.0	0.0000	1318.0000	ppb	0.31	2700.00	
51 V	# 2	45	550170.3	0.0000	105.4000	ppb	0.58	2700.00	
52 Cr	# 2	45	133329.5	0.0000	21.1400	ppb	0.06	2700.00	
55 Mn	# 3	45	12018980.0	0.0000	312.3000	ppb	0.60	2700.00	
56 Fe	# 1	45	490836100.0	0.0000	40870.0000	ppb	0.36	90000.00	
59 Co	# 3	45	268892.4	0.0000	9.4330	ppb	1.18	2700.00	
60 Ni	# 2	45	16616.8	0.0000	7.7870	ppb	0.65	2700.00	
63 Cu	# 2	45	192732.7	0.0000	36.6800	ppb	0.57	2700.00	
66 Zn	# 3	72	351664.2	0.0000	87.6200	ppb	0.84	2700.00	
75 As	# 2	72	2268.4	0.0000	3.1610	ppb	1.70	2700.00	
78 Se	# 1	72	60.4	0.0000	0.1415	ppb	8.52	2700.00	
88 Sr	# 3	72	711319.6	0.0000	17.7700	ppb	0.40	2700.00	
90 Zr	# 3	72	30557.9	0.0000	1.4140	ppb	0.78	1800.00	
95 Mo	# 3	115	4520.9	0.0000	0.6610	ppb	1.82	2700.00	
107 Ag	# 3	115	1059.0	0.0000	0.0495	ppb	3.57	225.00	
111 Cd	# 3	115	1252.0	0.0000	0.2851	ppb	7.58	2700.00	
118 Sn	# 3	115	344214.6	0.0000	28.1100	ppb	0.34	2700.00	
121 Sb	# 3	115	8541.8	0.0000	0.5391	ppb	3.74	2700.00	
137 Ba	# 3	115	721101.0	0.0000	121.8000	ppb	1.37	2700.00	
182 W	# 3	159	1084.5	0.0000	0.0419	ppb	4.94	900.00	
205 Tl	# 3	159	13908.9	0.0000	0.3031	ppb	1.14	2700.00	
208 Pb	# 3	159	5510086.0	0.0000	89.7800	ppb	0.91	2700.00	
235 U	# 3	159	726.7	0.0000	0.0091	ppb	8.95	27.00	
238 U	# 3	159	96851.8	0.0000	1.3490	ppb	1.13	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	3336216.50	0.37	3436000.30	97.1	60 - 125	
45 Sc # 1	1336696.10	0.81	1219080.40	109.6	60 - 125	
45 Sc # 2	283531.91	0.41	261322.58	108.5	60 - 125	
45 Sc # 3	3436282.80	1.05	3259125.00	105.4	60 - 125	
72 Ge # 1	287230.47	0.87	287393.84	99.9	60 - 125	
72 Ge # 2	131813.05	0.48	131286.22	100.4	60 - 125	
72 Ge # 3	647890.81	0.71	650322.63	99.6	60 - 125	
115 In # 3	4559378.50	0.15	4722231.00	96.6	60 - 125	
159 Tb # 3	7293180.50	0.76	7403280.50	98.5	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7063

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07042.D\F6D07042.D#
Date Acquired: Apr 13 2015 06:08 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D041-05
Misc Info:
Vial Number: 2202
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 13 2015 03:45 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	501637.6	0.0000	9.5550	ppb	2.07	225.00	
9 Be	# 3	45	2381.4	0.0000	0.2911	ppb	5.23	225.00	
11 B	# 3	45	22587.6	0.0000	1.4370	ppb	2.60	225.00	
23 Na	# 1	45	736838.8	0.0000	146.7000	ppb	1.45	269999.99	
24 Mg	# 3	45	94973360.0	0.0000	4593.0000	ppb	0.55	269999.99	
27 Al	# 3	45	379974590.0	0.0000	15090.0000	ppb	1.05	90000.00	
28 Si	# 1	45	1576055.0	0.0000	1225.0000	ppb	1.62	18000.00	
31 P	# 3	45	366111.6	0.0000	319.6000	ppb	0.40	359999.99	
39 K	# 2	45	3342432.0	0.0000	4140.0000	ppb	0.74	269999.99	
40 Ca	# 1	45	18906420.0	0.0000	2379.0000	ppb	0.88	269999.99	
47 Ti	# 3	45	3456221.0	0.0000	1486.0000	ppb	0.45	2700.00	
51 V	# 2	45	403001.5	0.0000	79.7600	ppb	0.60	2700.00	
52 Cr	# 2	45	113101.2	0.0000	18.5300	ppb	0.26	2700.00	
55 Mn	# 3	45	15460680.0	0.0000	403.9000	ppb	0.96	2700.00	
56 Fe	# 1	45	369878110.0	0.0000	32530.0000	ppb	0.61	90000.00	
59 Co	# 3	45	276841.5	0.0000	9.7620	ppb	1.74	2700.00	
60 Ni	# 2	45	13027.9	0.0000	6.3060	ppb	1.20	2700.00	
63 Cu	# 2	45	607869.0	0.0000	119.7000	ppb	0.43	2700.00	
66 Zn	# 3	72	294487.2	0.0000	74.4900	ppb	0.38	2700.00	
75 As	# 2	72	1766.3	0.0000	2.5170	ppb	3.44	2700.00	
78 Se	# 1	72	51.3	0.0000	0.1260	ppb	14.04	2700.00	
88 Sr	# 3	72	699043.1	0.0000	17.7400	ppb	0.47	2700.00	
90 Zr	# 3	72	26889.4	0.0000	1.2670	ppb	0.61	1800.00	
95 Mo	# 3	115	5505.7	0.0000	0.8120	ppb	4.12	2700.00	
107 Ag	# 3	115	920.1	0.0000	0.0425	ppb	5.10	225.00	
111 Cd	# 3	115	1238.4	0.0000	0.2841	ppb	5.63	2700.00	
118 Sn	# 3	115	146534.9	0.0000	12.0400	ppb	0.44	2700.00	
121 Sb	# 3	115	4757.7	0.0000	0.2811	ppb	1.51	2700.00	
137 Ba	# 3	115	805080.0	0.0000	137.0000	ppb	0.26	2700.00	
182 W	# 3	159	1334.6	0.0000	0.0562	ppb	9.80	900.00	
205 Tl	# 3	159	15013.5	0.0000	0.3299	ppb	0.76	2700.00	
208 Pb	# 3	159	2274190.0	0.0000	37.3400	ppb	0.75	2700.00	
235 U	# 3	159	782.3	0.0000	0.0099	ppb	10.45	27.00	
238 U	# 3	159	103689.5	0.0000	1.4560	ppb	0.48	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	3366628.80	1.41	3436000.30	98.0	60 - 125	
45 Sc # 1	1265677.90	0.55	1219080.40	103.8	60 - 125	
45 Sc # 2	274242.41	0.95	261322.58	104.9	60 - 125	
45 Sc # 3	3418559.30	0.57	3259125.00	104.9	60 - 125	
72 Ge # 1	270296.31	1.16	287393.84	94.1	60 - 125	
72 Ge # 2	128163.24	0.49	131286.22	97.6	60 - 125	
72 Ge # 3	638027.88	0.41	650322.63	98.1	60 - 125	
115 In # 3	4526398.50	0.34	4722231.00	95.9	60 - 125	
159 Tb # 3	7236086.50	0.63	7403280.50	97.7	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7064

CCV QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07044.D\F6D07044.D#
Date Acquired: Apr 13 2015 06:17 pm
Operator: CCapul
Sample Name: CCV4
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 13 2015 03:45 pm
Sample Type: CCV
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	Expected	QC Range(%)	Flag
7 Li	25.10 ppb	2.33	25.00	90 - 110	
9 Be	24.50 ppb	0.52	25.00	90 - 110	
11 B	23.65 ppb	0.23	25.00	90 - 110	
23 Na	1222.00 ppb	2.09	1250.00	90 - 110	
24 Mg	2466.00 ppb	0.97	2500.00	90 - 110	
27 Al	2512.00 ppb	0.39	2500.00	90 - 110	
28 Si	2315.00 ppb	2.62	2500.00	90 - 110	
31 P	249.90 ppb	1.05	250.00	90 - 110	
39 K	2484.00 ppb	1.30	2500.00	90 - 110	
40 Ca	2487.00 ppb	1.68	2500.00	90 - 110	
47 Ti	24.29 ppb	1.42	25.00	90 - 110	
51 V	24.48 ppb	0.53	25.00	90 - 110	
52 Cr	24.74 ppb	0.31	25.00	90 - 110	
55 Mn	24.79 ppb	1.24	25.00	90 - 110	
56 Fe	2449.00 ppb	2.47	2500.00	90 - 110	
59 Co	24.40 ppb	0.61	25.00	90 - 110	
60 Ni	24.96 ppb	0.49	25.00	90 - 110	
63 Cu	25.18 ppb	0.70	25.00	90 - 110	
66 Zn	49.55 ppb	0.11	50.00	90 - 110	
75 As	25.13 ppb	1.22	25.00	90 - 110	
78 Se	24.33 ppb	0.12	25.00	90 - 110	
88 Sr	24.97 ppb	0.31	25.00	90 - 110	
90 Zr	15.40 ppb	0.89	15.00	90 - 110	
95 Mo	24.56 ppb	0.89	25.00	90 - 110	
107 Ag	23.77 ppb	1.69	25.00	90 - 110	
111 Cd	23.94 ppb	0.76	25.00	90 - 110	
118 Sn	23.88 ppb	0.45	25.00	90 - 110	
121 Sb	25.39 ppb	1.17	25.00	90 - 110	
137 Ba	25.09 ppb	1.11	25.00	90 - 110	
182 W	25.13 ppb	1.23	25.00	90 - 110	
205 Tl	24.43 ppb	1.22	25.00	90 - 110	
208 Pb	25.15 ppb	0.77	25.00	90 - 110	
235 U	0.17 ppb	2.17	0.18	90 - 110	
238 U	25.63 ppb	1.43	24.82	90 - 110	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3383374.00	1.46	3436000.30	98.5	60 - 125	
45 Sc	1239579.90	2.27	1219080.40	101.7	60 - 125	
45 Sc	267173.03	0.84	261322.58	102.2	60 - 125	
45 Sc	3338245.30	0.73	3259125.00	102.4	60 - 125	
72 Ge	284492.41	0.70	287393.84	99.0	60 - 125	
72 Ge	130727.04	0.62	131286.22	99.6	60 - 125	
72 Ge	635180.75	0.60	650322.63	97.7	60 - 125	
115 In	4651196.00	0.62	4722231.00	98.5	60 - 125	
159 Tb	7251740.00	0.32	7403280.50	98.0	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

CCB QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07045.D\F6D07045.D#
Date Acquired: Apr 13 2015 06:21 pm
Operator: CCapul
Sample Name: CCB4
Misc Info:
Vial Number: 1102
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 13 2015 03:45 pm
Sample Type: CCB
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	High Limit	Flag
7 Li	-0.11 ppb	44.71	0.20	
9 Be	0.00 ppb	42.86	0.10	
11 B	-1.14 ppb	3.46	5.00	
23 Na	-2.07 ppb	6.37	40.00	
24 Mg	0.18 ppb	5.75	10.00	
27 Al	0.28 ppb	6.39	20.00	
28 Si	0.12 ppb	65.10	20.00	
31 P	-5.18 ppb	9.05	10.00	
39 K	-2.27 ppb	11.44	20.00	
40 Ca	6.71 ppb	1.82	25.00	
47 Ti	0.01 ppb	72.78	0.50	
51 V	0.00 ppb	91.47	0.50	
52 Cr	-0.01 ppb	63.27	0.20	
55 Mn	0.01 ppb	26.83	0.20	
56 Fe	1.21 ppb	7.70	10.00	
59 Co	0.00 ppb	61.15	0.20	
60 Ni	0.02 ppb	31.84	0.20	
63 Cu	-0.01 ppb	51.54	0.40	
66 Zn	0.11 ppb	10.00	2.00	
75 As	0.00 ppb	163.47	0.20	
78 Se	0.00 ppb	127.80	0.20	
88 Sr	-0.02 ppb	8.87	0.20	
90 Zr	0.05 ppb	7.22	2.00	
95 Mo	0.02 ppb	15.17	0.40	
107 Ag	0.00 ppb	19.93	0.20	
111 Cd	0.00 ppb	221.65	0.20	
118 Sn	0.01 ppb	21.80	0.20	
121 Sb	0.04 ppb	16.14	0.40	
137 Ba	0.01 ppb	68.88	0.20	
182 W	0.01 ppb	22.25	1.00	
205 Tl	0.01 ppb	7.54	0.20	
208 Pb	0.02 ppb	10.33	0.10	
235 U	0.00 ppb	96.40	1.00	
238 U	0.01 ppb	4.84	0.10	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3357025.30	2.18	3436000.30	97.7	60 - 125	
45 Sc	1228160.90	1.14	1219080.40	100.7	60 - 125	
45 Sc	266731.69	0.81	261322.58	102.1	60 - 125	
45 Sc	3185455.00	0.82	3259125.00	97.7	60 - 125	
72 Ge	292624.63	0.84	287393.84	101.8	60 - 125	
72 Ge	132002.28	0.40	131286.22	100.5	60 - 125	
72 Ge	635019.50	0.45	650322.63	97.6	60 - 125	
115 In	4630395.00	0.25	4722231.00	98.1	60 - 125	
159 Tb	7216275.00	0.34	7403280.50	97.5	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07046.D\F6D07046.D#
Date Acquired:	Apr 13 2015 06:25 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D041-06M
Misc Info:	
Vial Number:	2203
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 13 2015 03:45 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	2067087.0	0.0000	61.0200	ppb	1.66	225.00	
9 Be	# 3	45	381484.9	0.0000	46.3800	ppb	0.10	225.00	
11 B	# 3	45	312269.0	0.0000	44.5800	ppb	0.52	225.00	
23 Na	# 1	45	25079280.0	0.0000	4997.0000	ppb	0.37	269999.99	
24 Mg	# 3	45	259313100.0	0.0000	12360.0000	ppb	1.19	269999.99	
27 Al	# 3	45	690478270.0	0.0000	27040.0000	ppb	0.63	90000.00	
28 Si	# 1	45	3530900.0	0.0000	2593.0000	ppb	1.12	18000.00	
31 P	# 3	45	576099.6	0.0000	512.9000	ppb	0.69	359999.99	
39 K	# 2	45	6870719.0	0.0000	8293.0000	ppb	0.81	269999.99	
40 Ca	# 1	45	78304320.0	0.0000	9310.0000	ppb	1.05	269999.99	
47 Ti	# 3	45	4297016.0	0.0000	1821.0000	ppb	0.61	2700.00	
51 V	# 2	45	883219.4	0.0000	170.0000	ppb	0.25	2700.00	
52 Cr	# 2	45	406468.6	0.0000	64.7700	ppb	0.43	2700.00	
55 Mn	# 3	45	13910450.0	0.0000	358.2000	ppb	0.16	2700.00	
56 Fe	# 1	45	798560190.0	0.0000	66320.0000	ppb	1.05	90000.00	
59 Co	# 3	45	1636321.0	0.0000	56.9100	ppb	0.55	2700.00	
60 Ni	# 2	45	110481.6	0.0000	52.1200	ppb	0.64	2700.00	
63 Cu	# 2	45	579833.4	0.0000	110.8000	ppb	0.55	2700.00	
66 Zn	# 3	72	895725.8	0.0000	223.0000	ppb	0.52	2700.00	
75 As	# 2	72	35206.4	0.0000	50.7300	ppb	1.40	2700.00	
78 Se	# 1	72	18096.1	0.0000	46.9300	ppb	0.76	2700.00	
88 Sr	# 3	72	2889798.0	0.0000	72.1900	ppb	0.61	2700.00	
90 Zr	# 3	72	31765.4	0.0000	1.4670	ppb	0.98	1800.00	
95 Mo	# 3	115	327557.8	0.0000	49.3600	ppb	0.69	2700.00	
107 Ag	# 3	115	884217.6	0.0000	47.9800	ppb	0.05	225.00	
111 Cd	# 3	115	205219.0	0.0000	48.2100	ppb	1.47	2700.00	
118 Sn	# 3	115	820087.6	0.0000	68.5300	ppb	0.92	2700.00	
121 Sb	# 3	115	598048.2	0.0000	42.0500	ppb	1.26	2700.00	
137 Ba	# 3	115	1446225.0	0.0000	249.9000	ppb	1.03	2700.00	
182 W	# 3	159	1722.4	0.0000	0.0788	ppb	2.87	900.00	
205 Tl	# 3	159	2122944.0	0.0000	47.5100	ppb	0.75	2700.00	
208 Pb	# 3	159	8782344.0	0.0000	146.1000	ppb	0.41	2700.00	
235 U	# 3	159	26765.1	0.0000	0.3528	ppb	0.68	27.00	
238 U	# 3	159	3629118.0	0.0000	51.6400	ppb	0.87	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	3264299.80	1.95	3436000.30	95.0	60 - 125	
45 Sc # 1	1340381.00	0.97	1219080.40	110.0	60 - 125	
45 Sc # 2	282724.00	0.57	261322.58	108.2	60 - 125	
45 Sc # 3	3467526.50	0.49	3259125.00	106.4	60 - 125	
72 Ge # 1	287164.66	0.35	287393.84	99.9	60 - 125	
72 Ge # 2	130251.34	1.36	131286.22	99.2	60 - 125	
72 Ge # 3	649009.13	0.81	650322.63	99.8	60 - 125	
115 In # 3	4458003.50	1.16	4722231.00	94.4	60 - 125	
159 Tb # 3	7144730.50	0.67	7403280.50	96.5	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7067

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07047.D\F6D07047.D#
Date Acquired: Apr 13 2015 06:29 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D041-06S
Misc Info:
Vial Number: 2204
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 13 2015 03:45 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	2064880.0	0.0000	61.1400	ppb	1.02	225.00	
9 Be	# 3	45	374258.1	0.0000	46.4600	ppb	1.10	225.00	
11 B	# 3	45	302293.5	0.0000	44.0500	ppb	1.38	225.00	
23 Na	# 1	45	23485250.0	0.0000	4883.0000	ppb	1.42	269999.99	
24 Mg	# 3	45	264839100.0	0.0000	12890.0000	ppb	1.01	269999.99	
27 Al	# 3	45	691473090.0	0.0000	27650.0000	ppb	0.28	90000.00	
28 Si	# 1	45	3646952.0	0.0000	2795.0000	ppb	2.45	18000.00	
31 P	# 3	45	583964.3	0.0000	532.0000	ppb	0.96	359999.99	
39 K	# 2	45	6695537.0	0.0000	8509.0000	ppb	0.63	269999.99	
40 Ca	# 1	45	73581184.0	0.0000	9130.0000	ppb	1.74	269999.99	
47 Ti	# 3	45	4355975.0	0.0000	1885.0000	ppb	0.27	2700.00	
51 V	# 2	45	682363.5	0.0000	138.2000	ppb	1.46	2700.00	
52 Cr	# 2	45	364440.8	0.0000	61.1500	ppb	1.58	2700.00	
55 Mn	# 3	45	15556580.0	0.0000	409.1000	ppb	0.48	2700.00	
56 Fe	# 1	45	700531070.0	0.0000	60710.0000	ppb	1.63	90000.00	
59 Co	# 3	45	1642656.0	0.0000	58.3400	ppb	1.15	2700.00	
60 Ni	# 2	45	106941.3	0.0000	53.1200	ppb	1.20	2700.00	
63 Cu	# 2	45	676814.3	0.0000	136.2000	ppb	1.56	2700.00	
66 Zn	# 3	72	987227.5	0.0000	249.2000	ppb	0.35	2700.00	
75 As	# 2	72	33972.0	0.0000	50.7100	ppb	0.60	2700.00	
78 Se	# 1	72	16459.0	0.0000	45.7500	ppb	0.39	2700.00	
88 Sr	# 3	72	3009311.0	0.0000	76.2200	ppb	0.35	2700.00	
90 Zr	# 3	72	36776.2	0.0000	1.7170	ppb	0.43	1800.00	
95 Mo	# 3	115	314096.6	0.0000	47.8400	ppb	0.35	2700.00	
107 Ag	# 3	115	865178.7	0.0000	47.4500	ppb	0.33	225.00	
111 Cd	# 3	115	202055.9	0.0000	47.9700	ppb	0.56	2700.00	
118 Sn	# 3	115	700075.2	0.0000	59.1200	ppb	0.12	2700.00	
121 Sb	# 3	115	290862.2	0.0000	20.6400	ppb	0.50	2700.00	
137 Ba	# 3	115	1574371.0	0.0000	275.0000	ppb	1.23	2700.00	
182 W	# 3	159	1635.7	0.0000	0.0749	ppb	5.65	900.00	
205 Tl	# 3	159	2081888.0	0.0000	47.0900	ppb	0.92	2700.00	
208 Pb	# 3	159	10145950.0	0.0000	170.6000	ppb	1.05	2700.00	
235 U	# 3	159	25928.8	0.0000	0.3454	ppb	2.04	27.00	
238 U	# 3	159	3532188.0	0.0000	50.8000	ppb	1.06	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	3254190.00	0.59	3436000.30	94.7	60 - 125	
45 Sc # 1	1284599.90	1.67	1219080.40	105.4	60 - 125	
45 Sc # 2	268554.41	2.12	261322.58	102.8	60 - 125	
45 Sc # 3	3395983.50	1.18	3259125.00	104.2	60 - 125	
72 Ge # 1	267931.53	0.98	287393.84	93.2	60 - 125	
72 Ge # 2	125716.59	1.16	131286.22	95.8	60 - 125	
72 Ge # 3	640116.38	0.34	650322.63	98.4	60 - 125	
115 In # 3	4411073.00	0.57	4722231.00	93.4	60 - 125	
159 Tb # 3	7069325.00	0.74	7403280.50	95.5	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07048.D\F6D07048.D#
Date Acquired:	Apr 13 2015 06:33 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D041-06A
Misc Info:	
Vial Number:	2205
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 13 2015 03:45 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	2024060.0	0.0000	60.2700	ppb	1.10	225.00	
9 Be	# 3	45	373069.6	0.0000	46.2500	ppb	0.85	225.00	
11 B	# 3	45	310996.1	0.0000	45.3000	ppb	0.77	225.00	
23 Na	# 1	45	24456170.0	0.0000	5193.0000	ppb	1.13	269999.99	
24 Mg	# 3	45	261685300.0	0.0000	12720.0000	ppb	0.39	269999.99	
27 Al	# 3	45	684886270.0	0.0000	27350.0000	ppb	1.11	90000.00	
28 Si	# 1	45	2016542.0	0.0000	1577.0000	ppb	1.72	18000.00	
31 P	# 3	45	609948.5	0.0000	556.2000	ppb	0.29	359999.99	
39 K	# 2	45	6779794.0	0.0000	8516.0000	ppb	1.24	269999.99	
40 Ca	# 1	45	75050280.0	0.0000	9508.0000	ppb	1.10	269999.99	
47 Ti	# 3	45	4155783.0	0.0000	1796.0000	ppb	0.97	2700.00	
51 V	# 2	45	917997.0	0.0000	183.9000	ppb	0.97	2700.00	
52 Cr	# 2	45	405195.4	0.0000	67.1900	ppb	0.55	2700.00	
55 Mn	# 3	45	15716050.0	0.0000	412.7000	ppb	0.31	2700.00	
56 Fe	# 1	45	774610620.0	0.0000	68530.0000	ppb	0.50	90000.00	
59 Co	# 3	45	1624063.0	0.0000	57.5900	ppb	0.41	2700.00	
60 Ni	# 2	45	107573.0	0.0000	52.8000	ppb	0.59	2700.00	
63 Cu	# 2	45	718723.9	0.0000	142.9000	ppb	0.51	2700.00	
66 Zn	# 3	72	973211.4	0.0000	241.4000	ppb	0.46	2700.00	
75 As	# 2	72	34629.9	0.0000	51.2900	ppb	0.56	2700.00	
78 Se	# 1	72	17005.4	0.0000	47.0800	ppb	1.22	2700.00	
88 Sr	# 3	72	2884606.0	0.0000	71.8000	ppb	0.38	2700.00	
90 Zr	# 3	72	25846.5	0.0000	1.1940	ppb	1.02	1800.00	
95 Mo	# 3	115	333578.3	0.0000	50.4600	ppb	0.24	2700.00	
107 Ag	# 3	115	845357.8	0.0000	46.0500	ppb	0.49	225.00	
111 Cd	# 3	115	200682.1	0.0000	47.3200	ppb	0.75	2700.00	
118 Sn	# 3	115	731767.5	0.0000	61.3800	ppb	0.34	2700.00	
121 Sb	# 3	115	702733.3	0.0000	49.6000	ppb	0.21	2700.00	
137 Ba	# 3	115	1472770.0	0.0000	255.5000	ppb	0.33	2700.00	
182 W	# 3	159	1928.0	0.0000	0.0913	ppb	5.32	900.00	
205 Tl	# 3	159	2097917.0	0.0000	47.3700	ppb	1.38	2700.00	
208 Pb	# 3	159	8461720.0	0.0000	142.0000	ppb	1.13	2700.00	
235 U	# 3	159	25653.9	0.0000	0.3412	ppb	1.82	27.00	
238 U	# 3	159	3507251.0	0.0000	50.3500	ppb	0.83	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	3231742.00	0.99	3436000.30	94.1	60 - 125	
45 Sc # 1	1258082.30	1.87	1219080.40	103.2	60 - 125	
45 Sc # 2	271714.03	0.74	261322.58	104.0	60 - 125	
45 Sc # 3	3400855.30	1.17	3259125.00	104.3	60 - 125	
72 Ge # 1	268974.56	0.98	287393.84	93.6	60 - 125	
72 Ge # 2	126696.88	0.65	131286.22	96.5	60 - 125	
72 Ge # 3	651305.13	0.71	650322.63	100.2	60 - 125	
115 In # 3	4441158.50	0.95	4722231.00	94.0	60 - 125	
159 Tb # 3	7081426.50	0.99	7403280.50	95.7	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7069

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07049.D\F6D07049.D#
Date Acquired:	Apr 13 2015 06:38 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D041-06
Misc Info:	
Vial Number:	2206
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 13 2015 03:45 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	468047.7	0.0000	9.0020	ppb	1.90	225.00	
9 Be	# 3	45	1636.8	0.0000	0.2032	ppb	1.26	225.00	
11 B	# 3	45	17477.4	0.0000	0.7165	ppb	13.81	225.00	
23 Na	# 1	45	1645001.0	0.0000	345.7000	ppb	0.22	269999.99	
24 Mg	# 3	45	156746500.0	0.0000	7730.0000	ppb	0.04	269999.99	
27 Al	# 3	45	551916290.0	0.0000	22350.0000	ppb	0.74	90000.00	
28 Si	# 1	45	2072027.0	0.0000	1643.0000	ppb	2.12	18000.00	
31 P	# 3	45	605464.9	0.0000	560.3000	ppb	0.96	359999.99	
39 K	# 2	45	2911477.0	0.0000	3658.0000	ppb	0.84	269999.99	
40 Ca	# 1	45	35286408.0	0.0000	4531.0000	ppb	1.24	269999.99	
47 Ti	# 3	45	4009555.0	0.0000	1758.0000	ppb	1.05	2700.00	
51 V	# 2	45	668646.2	0.0000	134.6000	ppb	0.75	2700.00	
52 Cr	# 2	45	128869.6	0.0000	21.4600	ppb	0.31	2700.00	
55 Mn	# 3	45	14039520.0	0.0000	374.0000	ppb	0.58	2700.00	
56 Fe	# 1	45	723247680.0	0.0000	64890.0000	ppb	0.74	90000.00	
59 Co	# 3	45	369923.9	0.0000	13.3000	ppb	0.80	2700.00	
60 Ni	# 2	45	15341.9	0.0000	7.5480	ppb	0.53	2700.00	
63 Cu	# 2	45	499576.7	0.0000	99.9400	ppb	0.79	2700.00	
66 Zn	# 3	72	611168.1	0.0000	153.2000	ppb	1.11	2700.00	
75 As	# 2	72	2043.3	0.0000	2.9430	ppb	0.94	2700.00	
78 Se	# 1	72	50.7	0.0000	0.1262	ppb	9.37	2700.00	
88 Sr	# 3	72	973312.2	0.0000	24.4600	ppb	0.28	2700.00	
90 Zr	# 3	72	25281.4	0.0000	1.1810	ppb	1.70	1800.00	
95 Mo	# 3	115	4923.2	0.0000	0.7441	ppb	2.82	2700.00	
107 Ag	# 3	115	1287.9	0.0000	0.0639	ppb	6.01	225.00	
111 Cd	# 3	115	1257.4	0.0000	0.2959	ppb	6.56	2700.00	
118 Sn	# 3	115	153521.2	0.0000	12.9300	ppb	0.41	2700.00	
121 Sb	# 3	115	8873.1	0.0000	0.5819	ppb	2.45	2700.00	
137 Ba	# 3	115	1192331.0	0.0000	208.0000	ppb	1.49	2700.00	
182 W	# 3	159	1053.4	0.0000	0.0418	ppb	1.00	900.00	
205 Tl	# 3	159	8155.0	0.0000	0.1819	ppb	2.24	2700.00	
208 Pb	# 3	159	5763765.0	0.0000	96.5200	ppb	0.41	2700.00	
235 U	# 3	159	568.9	0.0000	0.0073	ppb	7.18	27.00	
238 U	# 3	159	76151.8	0.0000	1.0900	ppb	0.47	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	3254686.50	0.25	3436000.30	94.7	60 - 125	
45 Sc # 1	1240697.80	1.51	1219080.40	101.8	60 - 125	
45 Sc # 2	270022.25	0.61	261322.58	103.3	60 - 125	
45 Sc # 3	3352462.30	0.88	3259125.00	102.9	60 - 125	
72 Ge # 1	266881.22	1.73	287393.84	92.9	60 - 125	
72 Ge # 2	127332.25	0.53	131286.22	97.0	60 - 125	
72 Ge # 3	644495.94	0.57	650322.63	99.1	60 - 125	
115 In # 3	4415401.00	1.02	4722231.00	93.5	60 - 125	
159 Tb # 3	7096839.00	0.69	7403280.50	95.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7070

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D07.B\F6D07050.D\F6D07050.D#
Date Acquired:	Apr 13 2015 06:42 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D041-06J
Misc Info:	
Vial Number:	2207
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 13 2015 03:45 pm
Sample Type:	Sample
Dilution Factor:	5.00
Autodil Factor:	Undiluted
Final Dil Factor:	5.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	251003.1	0.0000	1.8390	ppb	8.02	225.00	
9 Be	# 3	45	378.9	0.0000	0.0471	ppb	9.42	225.00	
11 B	# 3	45	7652.2	0.0000	-0.7485	ppb	5.44	225.00	
23 Na	# 1	45	358510.6	0.0000	72.0500	ppb	1.80	269999.99	
24 Mg	# 3	45	32595890.0	0.0000	1676.0000	ppb	0.89	269999.99	
27 Al	# 3	45	113892400.0	0.0000	4810.0000	ppb	0.80	90000.00	
28 Si	# 1	45	410436.4	0.0000	339.9000	ppb	1.40	18000.00	
31 P	# 3	45	146179.7	0.0000	117.8000	ppb	1.88	359999.99	
39 K	# 2	45	620031.3	0.0000	775.1000	ppb	1.07	269999.99	
40 Ca	# 1	45	7328249.0	0.0000	985.1000	ppb	1.89	269999.99	
47 Ti	# 3	45	810637.7	0.0000	370.6000	ppb	1.64	2700.00	
51 V	# 2	45	136701.1	0.0000	28.1600	ppb	1.16	2700.00	
52 Cr	# 2	45	26669.6	0.0000	4.5360	ppb	1.01	2700.00	
55 Mn	# 3	45	2901845.0	0.0000	80.5600	ppb	2.14	2700.00	
56 Fe	# 1	45	146997700.0	0.0000	13830.0000	ppb	1.96	90000.00	
59 Co	# 3	45	75543.3	0.0000	2.8280	ppb	1.10	2700.00	
60 Ni	# 2	45	3268.8	0.0000	1.6350	ppb	2.05	2700.00	
63 Cu	# 2	45	106387.4	0.0000	21.9400	ppb	0.94	2700.00	
66 Zn	# 3	72	130142.1	0.0000	33.0200	ppb	0.86	2700.00	
75 As	# 2	72	470.2	0.0000	0.6238	ppb	3.01	2700.00	
78 Se	# 1	72	14.9	0.0000	0.0258	ppb	52.07	2700.00	
88 Sr	# 3	72	199753.4	0.0000	5.0700	ppb	0.50	2700.00	
90 Zr	# 3	72	4964.4	0.0000	0.2561	ppb	1.41	1800.00	
95 Mo	# 3	115	986.7	0.0000	0.1401	ppb	3.79	2700.00	
107 Ag	# 3	115	506.7	0.0000	0.0202	ppb	10.87	225.00	
111 Cd	# 3	115	288.2	0.0000	0.0638	ppb	8.45	2700.00	
118 Sn	# 3	115	31775.9	0.0000	2.5720	ppb	1.52	2700.00	
121 Sb	# 3	115	2909.3	0.0000	0.1514	ppb	4.74	2700.00	
137 Ba	# 3	115	245069.4	0.0000	41.3800	ppb	0.98	2700.00	
182 W	# 3	159	390.0	0.0000	0.0039	ppb	76.12	900.00	
205 Tl	# 3	159	2086.9	0.0000	0.0442	ppb	5.28	2700.00	
208 Pb	# 3	159	1243604.0	0.0000	20.3700	ppb	1.71	2700.00	
235 U	# 3	159	125.6	0.0000	0.0013	ppb	29.58	27.00	
238 U	# 3	159	15731.2	0.0000	0.2192	ppb	2.05	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	3286154.80	2.14	3436000.30	95.6	60 - 125	
45 Sc # 1	1183411.90	2.55	1219080.40	97.1	60 - 125	
45 Sc # 2	261330.55	1.11	261322.58	100.0	60 - 125	
45 Sc # 3	3215073.50	1.45	3259125.00	98.6	60 - 125	
72 Ge # 1	269521.41	1.52	287393.84	93.8	60 - 125	
72 Ge # 2	126888.29	0.89	131286.22	96.7	60 - 125	
72 Ge # 3	634855.00	0.13	650322.63	97.6	60 - 125	
115 In # 3	4561688.50	1.70	4722231.00	96.6	60 - 125	
159 Tb # 3	7254729.00	0.75	7403280.50	98.0	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7071

CCV QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07056.D\F6D07056.D#
Date Acquired: Apr 13 2015 07:08 pm
Operator: CCapul
Sample Name: CCV5
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 13 2015 03:45 pm
Sample Type: CCV
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	Expected	QC Range(%)	Flag
7 Li	25.32 ppb	2.61	25.00	90 - 110	
9 Be	24.55 ppb	0.91	25.00	90 - 110	
11 B	23.55 ppb	1.54	25.00	90 - 110	
23 Na	1231.00 ppb	1.48	1250.00	90 - 110	
24 Mg	2482.00 ppb	0.52	2500.00	90 - 110	
27 Al	2510.00 ppb	0.51	2500.00	90 - 110	
28 Si	2332.00 ppb	1.90	2500.00	90 - 110	
31 P	252.90 ppb	0.11	250.00	90 - 110	
39 K	2488.00 ppb	1.02	2500.00	90 - 110	
40 Ca	2472.00 ppb	1.48	2500.00	90 - 110	
47 Ti	24.19 ppb	0.96	25.00	90 - 110	
51 V	24.43 ppb	1.48	25.00	90 - 110	
52 Cr	24.71 ppb	1.52	25.00	90 - 110	
55 Mn	24.72 ppb	0.77	25.00	90 - 110	
56 Fe	2443.00 ppb	0.81	2500.00	90 - 110	
59 Co	24.44 ppb	0.87	25.00	90 - 110	
60 Ni	24.84 ppb	1.09	25.00	90 - 110	
63 Cu	25.08 ppb	1.23	25.00	90 - 110	
66 Zn	49.83 ppb	0.08	50.00	90 - 110	
75 As	24.86 ppb	1.45	25.00	90 - 110	
78 Se	24.71 ppb	1.20	25.00	90 - 110	
88 Sr	25.15 ppb	1.54	25.00	90 - 110	
90 Zr	17.61 ppb	1.89	15.00	90 - 110	Fail
95 Mo	24.35 ppb	0.39	25.00	90 - 110	
107 Ag	23.94 ppb	0.65	25.00	90 - 110	
111 Cd	24.29 ppb	0.40	25.00	90 - 110	
118 Sn	23.69 ppb	0.78	25.00	90 - 110	
121 Sb	25.42 ppb	0.16	25.00	90 - 110	
137 Ba	25.26 ppb	0.12	25.00	90 - 110	
182 W	24.73 ppb	0.73	25.00	90 - 110	
205 Tl	23.92 ppb	1.45	25.00	90 - 110	
208 Pb	24.80 ppb	0.35	25.00	90 - 110	
235 U	0.17 ppb	4.12	0.18	90 - 110	
238 U	25.18 ppb	0.58	24.82	90 - 110	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3300501.80	1.82	3436000.30	96.1	60 - 125	
45 Sc	1196461.40	1.82	1219080.40	98.1	60 - 125	
45 Sc	259361.88	0.59	261322.58	99.2	60 - 125	
45 Sc	3274411.50	0.55	3259125.00	100.5	60 - 125	
72 Ge	272397.72	0.50	287393.84	94.8	60 - 125	
72 Ge	127145.27	1.26	131286.22	96.8	60 - 125	
72 Ge	622931.63	1.11	650322.63	95.8	60 - 125	
115 In	4569906.00	0.90	4722231.00	96.8	60 - 125	
159 Tb	7187380.00	1.06	7403280.50	97.1	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

7072

CCB QC Report

Data File: C:\DATA\IF62015\D\IF6D07.B\F6D07057.D\F6D07057.D#
Date Acquired: Apr 13 2015 07:12 pm
Operator: CCapul
Sample Name: CCB5
Misc Info:
Vial Number: 1102
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 13 2015 03:45 pm
Sample Type: CCB
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	High Limit	Flag
7 Li	-0.06 ppb	61.15	0.20	
9 Be	0.00 ppb	62.13	0.10	
11 B	-1.11 ppb	5.06	5.00	
23 Na	-2.03 ppb	5.08	40.00	
24 Mg	0.24 ppb	7.20	10.00	
27 Al	0.33 ppb	6.19	20.00	
28 Si	0.65 ppb	19.49	20.00	
31 P	-3.15 ppb	20.52	10.00	
39 K	-0.48 ppb	112.74	20.00	
40 Ca	7.00 ppb	1.01	25.00	
47 Ti	-0.01 ppb	58.35	0.50	
51 V	-0.01 ppb	56.73	0.50	
52 Cr	0.00 ppb	262.05	0.20	
55 Mn	0.02 ppb	5.16	0.20	
56 Fe	1.49 ppb	7.05	10.00	
59 Co	0.00 ppb	52.05	0.20	
60 Ni	0.02 ppb	9.87	0.20	
63 Cu	-0.01 ppb	10.60	0.40	
66 Zn	0.12 ppb	1.14	2.00	
75 As	0.00 ppb	476.62	0.20	
78 Se	0.00 ppb	88.27	0.20	
88 Sr	-0.02 ppb	6.87	0.20	
90 Zr	0.04 ppb	3.04	2.00	
95 Mo	0.01 ppb	22.97	0.40	
107 Ag	0.00 ppb	37.10	0.20	
111 Cd	0.00 ppb	454.31	0.20	
118 Sn	0.01 ppb	45.70	0.20	
121 Sb	0.02 ppb	27.84	0.40	
137 Ba	0.01 ppb	5.31	0.20	
182 W	0.03 ppb	22.35	1.00	
205 Tl	0.01 ppb	9.70	0.20	
208 Pb	0.04 ppb	8.66	0.10	
235 U	0.00 ppb	21.38	1.00	
238 U	0.01 ppb	20.39	0.10	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3276185.80	1.73	3436000.30	95.3	60 - 125	
45 Sc	1147623.50	1.75	1219080.40	94.1	60 - 125	
45 Sc	254121.22	0.91	261322.58	97.2	60 - 125	
45 Sc	3152760.50	1.91	3259125.00	96.7	60 - 125	
72 Ge	269809.41	0.72	287393.84	93.9	60 - 125	
72 Ge	126703.05	0.77	131286.22	96.5	60 - 125	
72 Ge	629372.56	1.10	650322.63	96.8	60 - 125	
115 In	4589602.00	1.40	4722231.00	97.2	60 - 125	
159 Tb	7124767.50	0.97	7403280.50	96.2	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D07.B\F6D07004.D\F6D07004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

EMAX LABORATORIES, INC.

DIGESTION LOG
for
ICP-MS

Note: For samples, relevant QCs/Standards digested, refer to attached digestion sequence.

Comments:

Digestion Vessel Lot # 19414007

Book #: EIM-053
Batch: IMD016S
Matrix: SOIL
Digestor ID: D

SOP #	Rev. #
☐ EMAX-200.8	5
☑ EMAX-6020	8
☐ EMAX-	

Start	Temp	End	Temp
	96.2 °C		95.7 °C

Standards	ID	Amount Added (ml/g)
LCS-1	SM6A-007-02-13	~~0.15~~ 5.0
LCS-2	SM6A-007-02-14	5.0
MS	SAME SPIKE VOL & SOLN AS LCS1,2	
Blank Soil (Bead)	SM5A-03-01-23	
Reagent	**Lot# / ID**	**Amount Added (ml)**
HNO_3	SW1A-005-11-08	10
HCl	SW1A-005-08-04	5 +5
H_2O_2	SW1A-005-08-15	10
HNO_3(1:1)	SM5B-13-54-02	10
pH Strip (0-14)	NA	
Digestate Location	metals	
Extract Location		
☑ Reagent Water ID:	SM5A-03-01-24	
☑ Thermometer ID:	140553509 / D5	
☑ Pipette ID:	142780035	
☐ Pipette ID:		
☐ Pipette ID:		
☐ HNO_3 dispenser checked @ 5.0 ml with Class A volumetric flask		
☐ HCl dispenser checked @ 5.0 ml with Class A volumetric flask		

SK 4/11

Prepared By: SK

Standard Added By: SK Witnessed By: [illegible]

Extract Rcvd By: [illegible] Checked By: [illegible]

EMAX LABORATORIES, INC.

DIGESTION LOG FOR METALS

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Vd(ml)	ExpAmt	ExpVd(ml)	PrepFctr	Comments
15IMD016S01	IMD016SB	2.03	g	4/10/15 11:11	100	2	100	0.985	✓
15IMD016S02	IMD016SL	2.03	g	4/10/15 11:11	100	2	100	0.985	✓
15IMD016S03	IMD016SC	2.02	g	4/10/15 11:12	100	2	100	0.99	✓
15IMD016S04	D041-01	2.04	g	4/10/15 11:13	100	2	100	0.98	✓
15IMD016S05	D041-02	2.06	g	4/10/15 11:13	100	2	100	0.971	✓
15IMD016S06	D041-03	2.02	g	4/10/15 11:14	100	2	100	0.99	✓
15IMD016S07	D041-04	2.06	g	4/10/15 11:15	100	2	100	0.971	✓
15IMD016S08	D041-05	2.07	g	4/10/15 11:16	100	2	100	0.966	✓
15IMD016S09	D041-06	2.04	g	4/10/15 11:16	100	2	100	0.98	✓
15IMD016S10	D041-06M	2.02	g	4/10/15 11:17	100	2	100	0.99	✓
15IMD016S11	D041-06S	2.02	g	4/10/15 11:17	100	2	100	0.99	✓
15IMD016S12	D044-06	2.01	g	4/10/15 11:18	100	2	100	0.995	
15IMD016S13	D044-07	2.02	g	4/10/15 11:18	100	2	100	0.99	

SK 4/10/15

Balance ID: 10304418. Calibration check was verified prior to use.

Vd=digestate volume

PrepFctr=(ExpAmt/Aliquot)*(Vd/ExpVd)

☑ Digestion Started @ 4/10/15 11:55

Prepared By: SKusum

☑ Digestion Ended @ 4/10/15 13:35

Checked By: CW

Comments:

Date 4/10/15

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D041

METHOD SW7471A
MERCURY

A total of six (6) soil samples were received on 04/08/15 to be analyzed for Mercury in accordance with Method SW7471A and project specific requirements.

Holding Time
Samples were analyzed within the prescribed holding time.

Calibration
Multi-calibration points were generated to establish initial calibration (ICAL). ICAL was verified using a secondary source (ICV). Continuing calibration (CCV) verifications were carried on a frequency specified by the project. All calibration requirements were within acceptance criteria.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, one (1) method blank was analyzed. Mercury was not detected in HGD007SB. Refer to sample result summary form for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, one (1) set of LCS/LCD was analyzed. Mercury was within LCS QC limits in HGD007SL/HGD007SC. Refer to LCS summary form for details.

Matrix QC Sample
No matrix QC sample was designated on this SDG.

Sample Analysis
Samples were analyzed according to prescribed analytical procedures. Results were evaluated in accordance to project requirements. For this SDG, all quality control requirements were met.

LAB CHRONICLE
MERCURY

Client : KLEINFELDER
Project : CTO 070, UX04, FALLBROOK

SDG NO. : 15D041
Instrument ID : TI047

SOIL

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1S	HGD007SB	1	NA	04/09/1515:42	04/09/1513:00	M47D007011	M47D007	HGD007S	Method Blank
LCS1S	HGD007SL	1	NA	04/09/1515:45	04/09/1513:00	M47D007012	M47D007	HGD007S	Lab Control Sample (LCS)
LCD1S	HGD007SC	1	NA	04/09/1515:47	04/09/1513:00	M47D007013	M47D007	HGD007S	LCS Duplicate
UX04-SB02-0.83	D041-01	1	1.1	04/09/1516:25	04/09/1513:00	M47D007029	M47D007	HGD007S	Field Sample
UX04-SB03-0.08	D041-02	1	2.3	04/09/1516:27	04/09/1513:00	M47D007030	M47D007	HGD007S	Field Sample
UX04-SB04-0.33	D041-03	1	2.1	04/09/1516:30	04/09/1513:00	M47D007031	M47D007	HGD007S	Field Sample
UX04-SB05-0.33	D041-04	1	4.6	04/09/1516:32	04/09/1513:00	M47D007032	M47D007	HGD007S	Field Sample
UX04-SB06-0.42	D041-05	1	1.0	04/09/1516:40	04/09/1513:00	M47D007035	M47D007	HGD007S	Field Sample
UX04-SB07-2.0	D041-06	1	7.6	04/09/1516:42	04/09/1513:00	M47D007036	M47D007	HGD007S	Field Sample

FN - Filename
% Moist - Percent Moisture

METHOD SW7471A
MERCURY

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK
Batch No. : 15D041

Matrix : SOIL
InstrumentID : 47

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (mg/Kg)	DIL'N FACTOR	MOIST (%)	LOQ (mg/Kg)	DL (mg/Kg)	LOD (mg/Kg)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1S	HGD007SB	ND	1	NA	0.0998	0.00998	0.02	04/09/1515:42	04/09/1513:00	M47D007011	M47D007	HGD007S	NA	NA
LCS1S	HGD007SL	0.410	1	NA	0.0997	0.00997	0.0199	04/09/1515:45	04/09/1513:00	M47D007012	M47D007	HGD007S	NA	NA
LCD1S	HGD007SC	0.405	1	NA	0.1	0.01	0.02	04/09/1515:47	04/09/1513:00	M47D007013	M47D007	HGD007S	NA	NA
UXO4-SB02-0.83	D041-01	0.0185J	1	1.1	0.101	0.0101	0.0202	04/09/1516:25	04/09/1513:00	M47D007029	M47D007	HGD007S	04/03/1515:07	04/08/15
UXO4-SB03-0.08	D041-02	ND	1	2.3	0.101	0.0101	0.0202	04/09/1516:27	04/09/1513:00	M47D007030	M47D007	HGD007S	04/03/1515:10	04/08/15
UXO4-SB04-0.33	D041-03	ND	1	2.1	0.102	0.0102	0.0204	04/09/1516:30	04/09/1513:00	M47D007031	M47D007	HGD007S	04/03/1515:20	04/08/15
UXO4-SB05-0.33	D041-04	0.0111J	1	4.6	0.104	0.0104	0.0208	04/09/1516:32	04/09/1513:00	M47D007032	M47D007	HGD007S	04/03/1515:30	04/08/15
UXO4-SB06-0.42	D041-05	0.0132J	1	1.0	0.1	0.01	0.0201	04/09/1516:40	04/09/1513:00	M47D007035	M47D007	HGD007S	04/03/1515:40	04/08/15
UXO4-SB07-2.0	D041-06	0.0425J	1	7.6	0.108	0.0108	0.0215	04/09/1516:42	04/09/1513:00	M47D007036	M47D007	HGD007S	04/06/1513:30	04/08/15

EMAX QUALITY CONTROL DATA
LAB CONTROL SAMPLE ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UX04, FALLBROOK
BATCH NO. : 15D041
METHOD : SW7471A

MATRIX	SOIL		% MOISTURE: N/A
DILUTION FACTOR	1	1	1
SAMPLE ID	MBLK1S	LCS1S	LCD1S
LAB SAMPLE ID	HGD007SB	HGD007SL	HGD007SC
LAB FILE ID	M47D007011	M47D007012	M47D007013
DATE PREPARED	04/09/1513:00	04/09/1513:00	04/09/1513:00
DATE ANALYZED	04/09/1515:42	04/09/1515:45	04/09/1515:47
PREP BATCH	HGD007S	HGD007S	HGD007S
CALIBRATION REF	M47D007	M47D007	M47D007

ACCESSION:

PARAMETER	MB RESULT (mg/Kg)	SPIKE AMT (mg/Kg)	BS RESULT (mg/Kg)	BS REC (%)	SPIKE AMT (mg/Kg)	BSD RESULT (mg/Kg)	BSD REC (%)	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Mercury	ND	0.416	0.410	99	0.417	0.405	97	1	80-120	20

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
MERCURY

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Start Date: 4/9/15 Start Time: 15:19

End Date: 4/9/15 End Time: 16:46

Comments:

QC OK

Book #:	A47-096
Instrument No.:	47
Analytical Sequence/Batch:	M47D007
Method File:	HG1
Micropipette ID:	☐ ICP DOE-1
Micropipette ID:	☑ HG-03
Micropipette ID:	☑ HG-04
Micropipette ID:	☐

SOP #	Rev. #
☐ EMAX-7470	7
☑ EMAX-7471	7
☐ EMAX-245.1	3
☐ EMAX-	

STANDARDS ID	
S1	BLANK
S2	SM3B-11-97-08
S3	↓
S4	↓
S5	↓
S6	↓
CCV	↓
ICV	SM3B-11-97-09
LCS	↓
Analytical Spike	
	SM3B-11-97-10

Analyzed By: NT

Date: 4/9/15

"M47D007"

EMAX1fid	EMAX1sid	conc	Raw_resp	rsd/rf	adatetime	DF
M47D007001	STD01REP1	0	3486		04/09/1515:19	1
M47D007002	STD02REP1	.2	28662		04/09/1515:21	1
M47D007003	STD03REP1	.5	63008		04/09/1515:24	1
M47D007004	STD04REP1	1	122531		04/09/1515:26	1
M47D007005	STD05REP1	2	242021		04/09/1515:28	1
M47D007006	STD06REP1	5	599353		04/09/1515:30	1
M47D007007	ICV	1.94	234560	0	04/09/1515:34	1
M47D007008	ICB	-.037	-617	0	04/09/1515:36	1
M47D007009	CCV1	1.94	234812	0	04/09/1515:38	1
M47D007010	CCB1	-.035	-381	0	04/09/1515:40	1
M47D007011	HGD007SB	-.02	1504	0	04/09/1515:42	1
M47D007012	HGD007SL	2.47	298398	0	04/09/1515:45	1
M47D007013	HGD007SC	2.43	293644	0	04/09/1515:47	1
M47D007014	D044-06A	2.94	353389	0	04/09/1515:50	1
M47D007015	D044-06	.019	6135	0	04/09/1515:52	1
M47D007016	D044-06J	-.011	2518	0	04/09/1515:55	5
M47D007017	D044-06M	2.58	311435	0	04/09/1515:57	1
M47D007018	D044-06S	2.55	307096	0	04/09/1515:59	1
M47D007019	D044-07	.013	5322	0	04/09/1516:02	1
M47D007020	D044-08	.019	6047	0	04/09/1516:04	1
M47D007021	CCV2	1.97	238337	0	04/09/1516:06	1
M47D007022	CCB2	-.029	343	0	04/09/1516:08	1
M47D007023	D037-01	.03	7363	0	04/09/1516:10	1
M47D007024	D037-02	.101	15823	0	04/09/1516:12	1
M47D007025	D037-03	1.79	216937	0	04/09/1516:16	1
M47D007026	D037-04	.107	16521	0	04/09/1516:19	1
M47D007027	D037-05	.014	5493	0	04/09/1516:21	1
M47D007028	D037-06	.072	12420	0	04/09/1516:23	1
M47D007029	D041-01	.11	16887	0	04/09/1516:25	1
M47D007030	D041-02	.047	9391	0	04/09/1516:27	1
M47D007031	D041-03	.047	9382	0	04/09/1516:30	1
M47D007032	D041-04	.064	11402	0	04/09/1516:32	1
M47D007033	CCV3	2.06	249128	0	04/09/1516:34	1
M47D007034	CCB3	-.041	-1061	0	04/09/1516:37	1
M47D007035	D041-05	.079	13290	0	04/09/1516:40	1
M47D007036	D041-06	.237	32105	0	04/09/1516:42	1
M47D007037	CCV4	2.05	248484	0	04/09/1516:44	1
M47D007038	CCB4	-.035	-335	0	04/09/1516:46	1
**********	**********	**********	**********	**********	**********	***

EMAX1fid	EMAX1sid	Xint	Yint	rrf	adatetime	DF
M47D007001	BLANK	-3.214346E-02	3828.001	.9999971	04/09/1516:46	1

M47D007

cup	sample ID	extended ID	weight	volume	? A D F P S U SC UI US C1..7
1	ICV		1.0000	1.0000	
2	ICB		1.0000	1.0000	
3	CCV1		1.0000	1.0000	
4	CCB1		1.0000	1.0000	
5	HGD007SB		1.0000	1.0000	
6	HGD007SL		1.0000	1.0000	
7	HGD007SC		1.0000	1.0000	
8	D044-06A		1.0000	1.0000	
9	D044-06		1.0000	1.0000	
10	D044-06J		1.0000	1.0000	
11	D044-06M		1.0000	1.0000	
12	D044-06S		1.0000	1.0000	
13	D044-07		1.0000	1.0000	
14	D044-08		1.0000	1.0000	
15	CCV2		1.0000	1.0000	
16	CCB2		1.0000	1.0000	
17	D037-01		1.0000	1.0000	
18	D037-02		1.0000	1.0000	
19	D037-03		1.0000	1.0000	
20	D037-04		1.0000	1.0000	
21	D037-05		1.0000	1.0000	
22	D037-06		1.0000	1.0000	
23	D041-01		1.0000	1.0000	
24	D041-02		1.0000	1.0000	
25	D041-03		1.0000	1.0000	
26	D041-04		1.0000	1.0000	
27	CCV3		1.0000	1.0000	
28	CCB3		1.0000	1.0000	
29	D041-05		1.0000	1.0000	
30	D041-06		1.0000	1.0000	
31	CCV4		1.0000	1.0000	
32	CCB4		1.0000	1.0000	
33			1.0000	1.0000	
34			1.0000	1.0000	
35			1.0000	1.0000	
36			1.0000	1.0000	
37			1.0000	1.0000	
38			1.0000	1.0000	
39			1.0000	1.0000	
40			1.0000	1.0000	
41			1.0000	1.0000	
42			1.0000	1.0000	
43			1.0000	1.0000	
44			1.0000	1.0000	

KT 4/9/15

WinHg Database 1.3

File Utility Help

RN⇩ RN⇧

Protocol HG1 Dataset/Proto M47D007 /HG1

Protocol | Line info | Cal Curve | Report | Ctrl Chart | Viewer

Reset

Calib Coeffs

New Cal

Update Coeffs

Spike Coeffs

A

B 8.39688e-6

C -3.21350e-2

Rho .999997

Type Linear

☑ Calibrated

☑ Accepted

Accept

Rel. Abs.
599353

Accepted

New

Include S1 Rep 1 ☑ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Conc. 5.00

S	Conc.	Calc.	Dev.	Mean	SD or %RSD	Rep 1	Rep 2	Rep 3
01	.00000	-.003	-.003	3487	1	3486		
02	.20000	.209	.009	28663	0%	28662		
03	.50000	.497	-.003	63008	0%	63008		
04	1.0000	.997	-.003	122531	0%	122531		
05	2.0000	2.00	.000	242021	0%	242021		
06	5.0000	5.00	.001	599354	0%	599353		

Ready CAP NUM

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Standard: 1 Rep: 1				Seq: 1	15:19:54 09 Apr 15	HG		
Hg	.000	ug/l	3486					
*** Standard: 2 Rep: 1				Seq: 2	15:21:53 09 Apr 15	HG		
Hg	.200	ug/l	28662					
*** Standard: 3 Rep: 1				Seq: 3	15:24:02 09 Apr 15	HG		
Hg	.500	ug/l	63008					
*** Standard: 4 Rep: 1				Seq: 4	15:26:13 09 Apr 15	HG		
Hg	1.00	ug/l	122531					
*** Standard: 5 Rep: 1				Seq: 5	15:28:13 09 Apr 15	HG		
Hg	2.00	ug/l	242021					
*** Standard: 6 Rep: 1				Seq: 6	15:30:12 09 Apr 15	HG		
Hg	5.00	ug/l	599353					
*** Sample ID: ICV				Seq: 7	15:34:42 09 Apr 15	HG		
Hg	1.94	ug/l	234560					
*** Sample ID: ICB				Seq: 8	15:36:46 09 Apr 15	HG		
Hg	-.037	ug/l	-617					
*** Sample ID: CCV1				Seq: 9	15:38:46 09 Apr 15	HG		
Hg	1.94	ug/l	234812					
*** Sample ID: CCB1				Seq: 10	15:40:56 09 Apr 15	HG		
Hg	-.035	ug/l	-381					
*** Sample ID: HGD007SB				Seq: 11	15:42:54 09 Apr 15	HG		
Hg	-.020	ug/l	1504					
*** Sample ID: HGD007SL				Seq: 12	15:45:03 09 Apr 15	HG		
Hg	2.47	ug/l	298398					
*** Sample ID: HGD007SC				Seq: 13	15:47:32 09 Apr 15	HG		
Hg	2.43	ug/l	293644					
*** Sample ID: D044-06A				Seq: 14	15:50:23 09 Apr 15	HG		
Hg	2.94	ug/l	353389					
*** Sample ID: D044-06				Seq: 15	15:52:42 09 Apr 15	HG		
Hg	.019	ug/l	6135					

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: D044-06J				Seq:	16	15:55:16 09 Apr 15		HG
Hg	-.011	ug/l	2518					
*** Sample ID: D044-06M				Seq:	17	15:57:36 09 Apr 15		HG
Hg	2.58	ug/l	311435					
*** Sample ID: D044-06S				Seq:	18	15:59:55 09 Apr 15		HG
Hg	2.55	ug/l	307096					
*** Sample ID: D044-07				Seq:	19	16:02:04 09 Apr 15		HG
Hg	.013	ug/l	5322					
*** Sample ID: D044-08				Seq:	20	16:04:15 09 Apr 15		HG
Hg	.019	ug/l	6047					
*** Sample ID: CCV2				Seq:	21	16:06:25 09 Apr 15		HG
Hg	1.97	ug/l	238337					
*** Sample ID: CCB2				Seq:	22	16:08:28 09 Apr 15		HG
Hg	-.029	ug/l	343					
*** Sample ID: D037-01				Seq:	23	16:10:29 09 Apr 15		HG
Hg	.030	ug/l	7363					
*** Sample ID: D037-02				Seq:	24	16:12:32 09 Apr 15		HG
Hg	.101	ug/l	15823					
*** Sample ID: D037-03				Seq:	25	16:16:13 09 Apr 15		HG
Hg	1.79	ug/l	216937					
*** Sample ID: D037-04				Seq:	26	16:19:01 09 Apr 15		HG
Hg	.107	ug/l	16521					
*** Sample ID: D037-05				Seq:	27	16:21:17 09 Apr 15		HG
Hg	.014	ug/l	5493					
*** Sample ID: D037-06				Seq:	28	16:23:17 09 Apr 15		HG
Hg	.072	ug/l	12420					
*** Sample ID: D041-01				Seq:	29	16:25:19 09 Apr 15		HG
Hg	.110	ug/l	16887					
*** Sample ID: D041-02				Seq:	30	16:27:59 09 Apr 15		HG
Hg	.047	ug/l	9391					

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: D041-03				Seq:	31	16:30:12 09 Apr 15		HG
Hg	.047	ug/l	9382					
*** Sample ID: D041-04				Seq:	32	16:32:15 09 Apr 15		HG
Hg	.064	ug/l	11402					
*** Sample ID: CCV3				Seq:	33	16:34:17 09 Apr 15		HG
Hg	2.06	ug/l	249128					
*** Sample ID: CCB3				Seq:	34	16:37:19 09 Apr 15		HG
Hg	-.041	ug/l	-1061					
*** Sample ID: D041-05				Seq:	35	16:40:00 09 Apr 15		HG
Hg	.079	ug/l	13290					
*** Sample ID: D041-06				Seq:	36	16:42:00 09 Apr 15		HG
Hg	.237	ug/l	32105					
*** Sample ID: CCV4				Seq:	37	16:44:21 09 Apr 15		HG
Hg	2.05	ug/l	248484					
*** Sample ID: CCB4				Seq:	38	16:46:25 09 Apr 15		HG
Hg	-.035	ug/l	-335					

EMAX LABORATORIES, INC.

DIGESTION LOG
for
MERCURY

Note: For samples, relevant QCs/Standards digested, refer to attached digestion sequence.

Comments:

Digestion Vessel Lot #: 19414007

Book #: E47-097
Batch No.: HGD0075
Matrix: Soil

SOP #	Rev. #
☐ EMAX-7470	7
☑ EMAX-7471	7
☐ EMAX-245.1	3
☐ EMAX-	

Standards	ID	Conc. (µg/L)	Amount Added (ml)
ICAL	SM3B-11-97-08	100	0.2, 0.5, 1, 2, 5
CCV	↓	↓	2
ICV	SM3B-11-97-09	↓	2
LCS/MS	↓	↓	2.5

Reagent	ID / Lot #
HNO_3 / Aqua	SW1A-005-08-14
HCl / Regia	SW1A-005-08-04
H_2SO_4	N/A
$KMnO_4$	SM5B-03-54-01
$K_2S_2O_8$	N/A
$NH_2OH \cdot HCl$	SM5B-03-53-02
$SnCl_2$	SM5B-03-52-04
Silica Sand	SW1B-002-43-08
Reagent Water	SM5A-03-01-24
pH strip 0-14	N/A
Digestor ID/ Temp (°C)	A / 95.2
Thermometer ID/LOC:	11124 1125 / A10
Thermometer ID/LOC:	N/A
Pipette ID:	ICP DEE-1, HG-03, HG-04
☐ H_2SO_4 dispenser checked @ 2.5 ml with Class A graduated cylinder	
☑ HCl dispenser checked @ 30 ml with Class A graduated cylinder	
☑ HNO_3 dispenser checked @ 10 ml with Class A graduated cylinder	

Prepared By: NT

Standard Added By: NT Witnessed By: CJL

EMAX LABORATORIES, INC.

DIGESTION LOG FOR MERCURY

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Vd(ml)	ExpAmt	ExpVd(ml)	PrepFctr	Comments
15HGD007S01	HGD007SB	0.601	g	4/9/15 11:37	100	0.6	100	0.998	
15HGD007S02	HGD007SL	0.602	g	4/9/15 11:38	100	0.6	100	0.997	
15HGD007S03	HGD007SC	0.6	g	4/9/15 11:39	100	0.6	100	1	
15HGD007S04	D037-01	0.602	g	4/9/15 11:39	100	0.6	100	0.997	
15HGD007S05	D037-02	0.613	g	4/9/15 11:39	100	0.6	100	0.979	
15HGD007S06	D037-03	0.601	g	4/9/15 11:40	100	0.6	100	0.998	
15HGD007S07	D037-04	0.603	g	4/9/15 11:41	100	0.6	100	0.995	
15HGD007S08	D037-05	0.602	g	4/9/15 11:42	100	0.6	100	0.997	
15HGD007S09	D037-06	0.608	g	4/9/15 11:43	100	0.6	100	0.987	
15HGD007S10	D041-01	0.602	g	4/9/15 11:44	100	0.6	100	0.997	
15HGD007S11	D041-02	0.609	g	4/9/15 11:44	100	0.6	100	0.985	
15HGD007S12	D041-03	0.601	g	4/9/15 11:45	100	0.6	100	0.998	
15HGD007S13	D041-04	0.605	g	4/9/15 11:46	100	0.6	100	0.992	
15HGD007S14	D041-05	0.604	g	4/9/15 11:46	100	0.6	100	0.993	
15HGD007S15	D041-06	0.603	g	4/9/15 11:47	100	0.6	100	0.995	
15HGD007S16	D044-06	0.602	g	4/9/15 11:48	100	0.6	100	0.997	
15HGD007S17	D044-06M	0.61	g	4/9/15 11:49	100	0.6	100	0.984	
15HGD007S18	D044-06S	0.604	g	4/9/15 11:49	100	0.6	100	0.993	
15HGD007S19	D044-07	0.61	g	4/9/15 11:49	100	0.6	100	0.984	
15HGD007S20	D044-08	0.604	g	4/9/15 11:50	100	0.6	100	0.993	
15HGD007S21	S-0/CCB/ICB	0.6	g	4/9/15 11:50	100	0.6	100	1	
15HGD007S22	S-0.2/LOD2	0.6	g	4/9/15 11:50	100	0.6	100	1	
15HGD007S23	S-0.5/LOQ	0.6	g	4/9/15 11:50	100	0.6	100	1	
15HGD007S24	S-1	0.6	g	4/9/15 11:50	100	0.6	100	1	
15HGD007S25	S-2/CCV	0.6	g	4/9/15 11:50	100	0.6	100	1	
15HGD007S26	S-5	0.6	g	4/9/15 11:50	100	0.6	100	1	
15HGD007S27	ICV	0.6	g	4/9/15 11:50	100	0.6	100	1	
15HGD007S28	PS SOIL	0.6	g	4/9/15 11:50	100	0.6	100	1	
15HGD007S29	LOD1	0.6	g	4/9/15 11:50	100	0.6	100	1	0.1

NT
4/9/15

Balance ID: 10601202. Calibration check was verified prior to use.

Vd=digestate volume

PrepFctr=(ExpAmt/Aliquot)*(Vd/ExpVd)

☑ Digestion Started @ 4/9/15 13:00

Prepared By: NTan

☑ Digestion Ended @ 4/9/15 14:00

Checked By: NT

Comments:

Date 4/9/15

SOP EMAX-7471 Rev. 7

LABORATORY REPORT FOR

KLEINFELDER

CTO 070, UXO4, FALLBROOK

WET CHEMICAL ANALYSES

SDG#: 15D041

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D041

METHOD 6850
PERCHLORATE

A total of six (6) soil samples were received on 04/08/15 to be analyzed for Perchlorate in accordance with Method 6850 and project specific requirements.

Holding Time
Samples were analyzed within the prescribed holding time.

Calibration
Calibration was performed as prescribed by the method and was verified using a secondary source (ICV). All calibration requirements were within acceptance criteria.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, one (1) method blank was analyzed. Perchlorate was not detected in PLD005SB. Refer to sample result summary form for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, one (1) set of LCS/LCD was analyzed. Perchlorate was within LCS QC limits in PLD005SL/PLD005SC. Refer to LCS summary form for details.

Matrix QC Sample
No matrix QC sample was designated on this SDG.

Sample Analysis
Samples were analyzed according to prescribed analytical procedures. Results were evaluated in accordance to project requirements. For this SDG, all quality control requirements were met.

SAMPLE RESULTS

METHOD 6850
PERCHLORATE

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK
Batch No. : 15D041

Matrix : SOIL
InstrumentID : GO

Client SAMPLE ID	EMAX SAMPLE ID	RESULT (ug/kg)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1S	PLD005SB	ND	1	NA	4	0.5	2	04/15/1520:04	04/09/1514:05	15MD15038	MD15032	15PLD005S	NA	NA
LCS1S	PLD005SL	3.24J	1	NA	4	0.5	2	04/15/1520:19	04/09/1514:05	15MD15039	MD15032	15PLD005S	NA	NA
LCD1S	PLD005SC	3.26J	1	NA	4	0.5	2	04/15/1520:33	04/09/1514:05	15MD15040	MD15032	15PLD005S	NA	NA
UXO4-SB02-0.83	D041-01	ND	1	1.1	4.04	0.506	2.02	04/16/1512:12	04/09/1514:05	15MD15055	MD15054	15PLD005S	04/03/1515:07	04/08/15
UXO4-SB03-0.08	D041-02	ND	1	2.3	4.09	0.512	2.05	04/16/1512:26	04/09/1514:05	15MD15056	MD15054	15PLD005S	04/03/1515:10	04/08/15
UXO4-SB04-0.33	D041-03	ND	1	2.1	4.09	0.511	2.04	04/16/1512:41	04/09/1514:05	15MD15057	MD15054	15PLD005S	04/03/1515:20	04/08/15
UXO4-SB05-0.33	D041-04	ND	1	4.6	4.19	0.524	2.1	04/16/1512:55	04/09/1514:05	15MD15058	MD15054	15PLD005S	04/03/1515:30	04/08/15
UXO4-SB06-0.42	D041-05	ND	1	1.0	4.04	0.505	2.02	04/16/1501:10	04/09/1514:05	15MD15059	MD15054	15PLD005S	04/03/1515:40	04/08/15
UXO4-SB07-2.0	D041-06	ND	1	7.6	4.33	0.541	2.16	04/16/1501:24	04/09/1514:05	15MD15060	MD15054	15PLD005S	04/06/1513:30	04/08/15

Method 6850
EMAX Laboratories
Instrument # G0

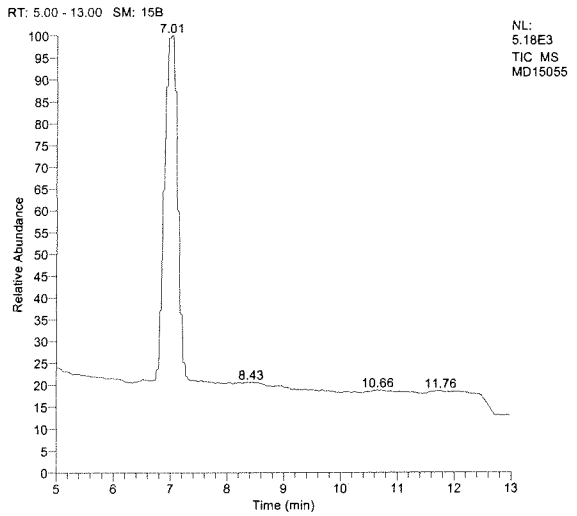
Sample Summary

EMAX Lab ID:	D041-01
Lab File ID:	MD15055
Acquisition Date:	04/16/15 12:12:02 AM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

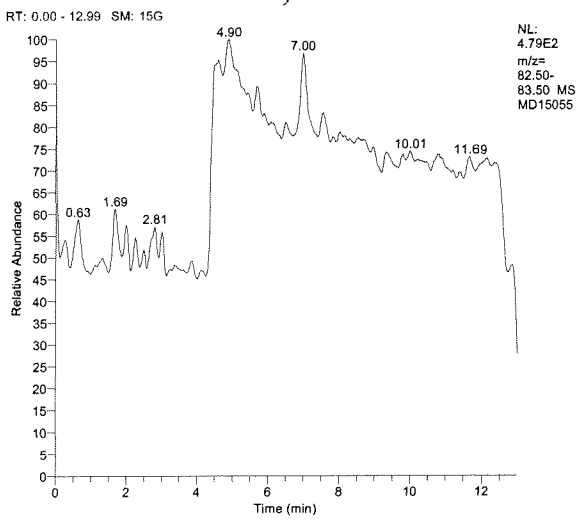
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	GA7
Injection Volume(ul):	20.00
Run Time(min):	12.99

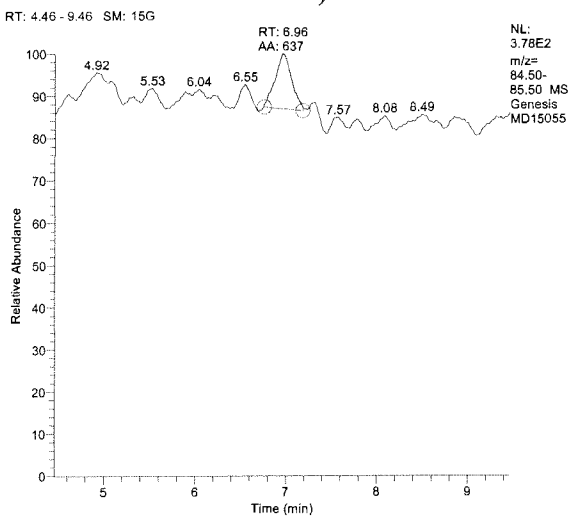
TIC



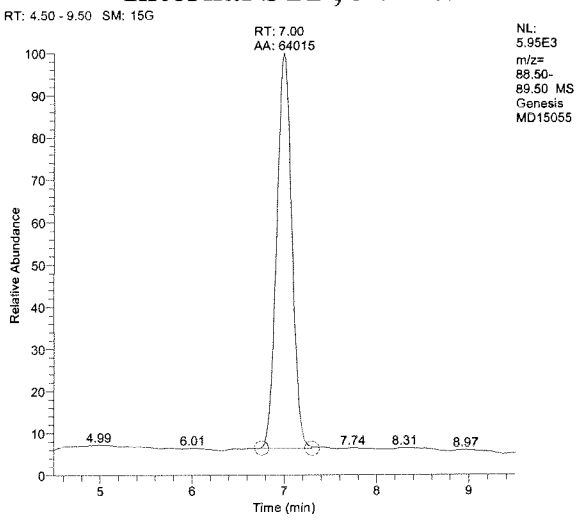
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.96	637	0.000	0.037	ppb	8.62
Perchlorate_89_ISTD	7.00	64015	2.000	N/A	ppb	470.50

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

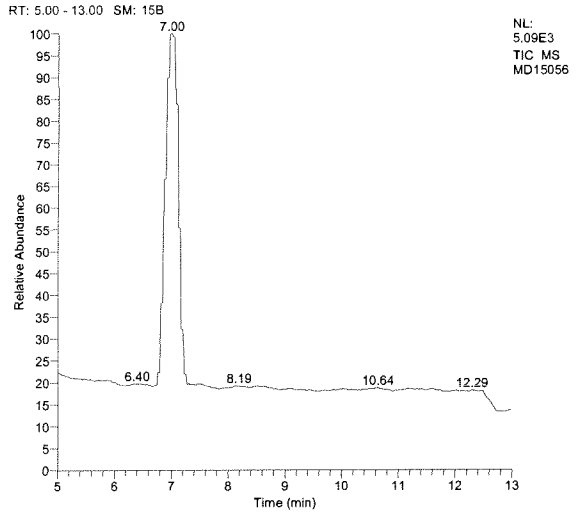
Sample Summary

EMAX Lab ID:	D041-02
Lab File ID:	MD15056
Acquisition Date:	04/16/15 12:26:36 AM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

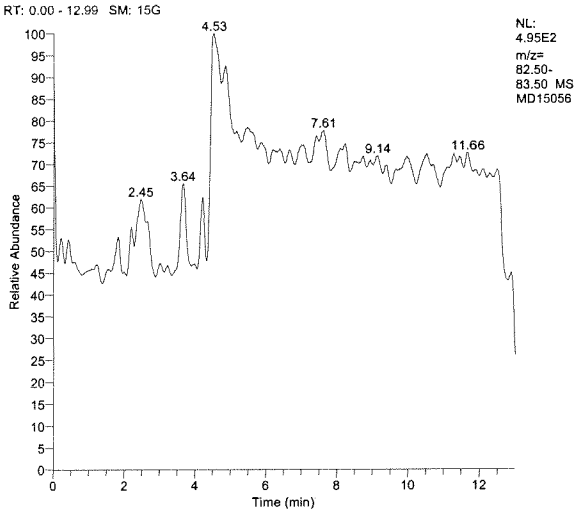
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	GA8
Injection Volume(ul):	20.00
Run Time(min):	12.99

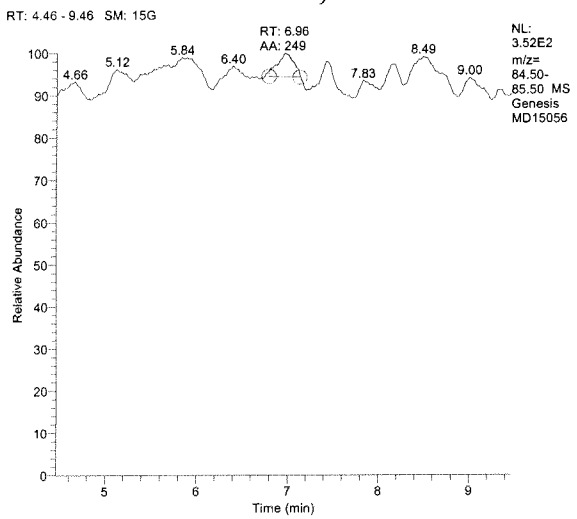
TIC



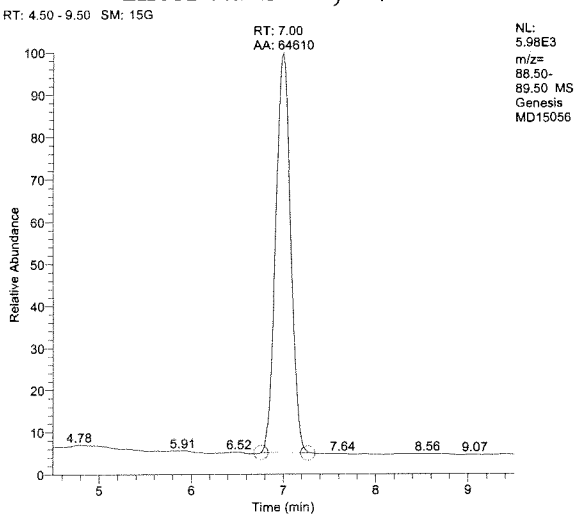
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.96	249	0.000	0.011	ppb	2.53
Perchlorate_89_ISTD	7.00	64610	2.000	N/A	ppb	699.66

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

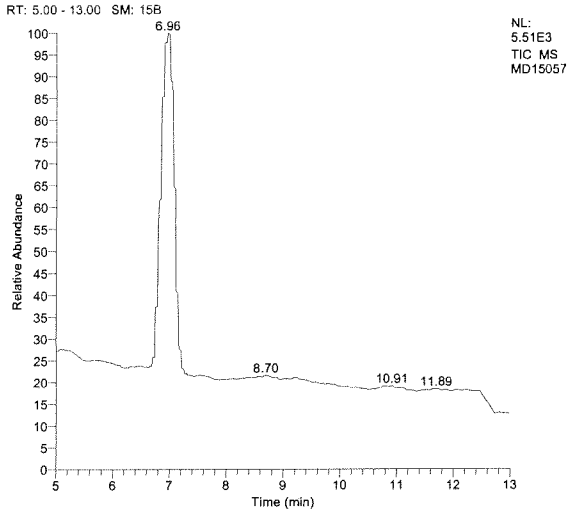
Sample Summary

EMAX Lab ID:	D041-03
Lab File ID:	MD15057
Acquisition Date:	04/16/15 12:41:14 AM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	GB1
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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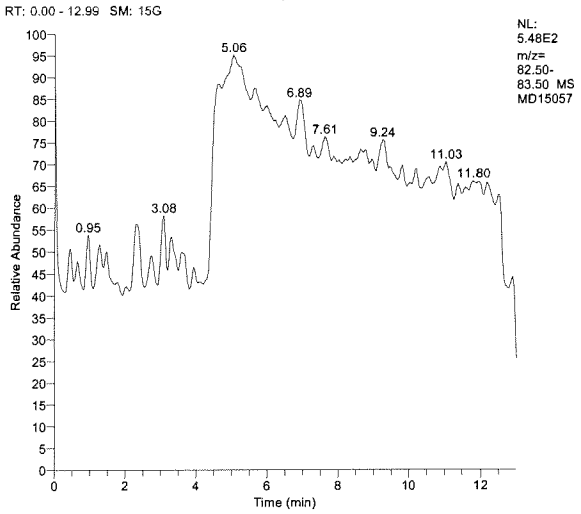
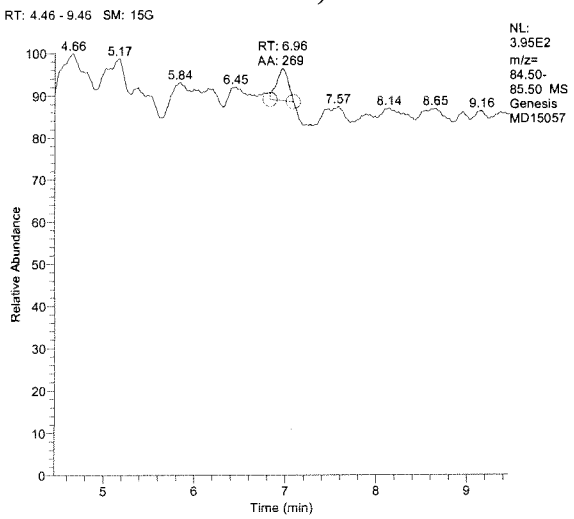
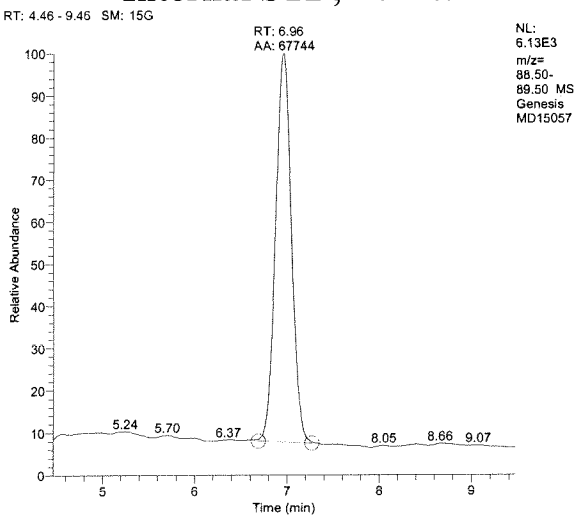


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.96	269	0.000	0.011	ppb	5.79
Perchlorate_89_ISTD	6.96	67744	2.000	N/A	ppb	212.18

83/85 Ratio: N/a
(Control Limit: +/-30%)

Thursday, April 16, 2015, 00:55:53

Method 6850
EMAX Laboratories
Instrument # G0

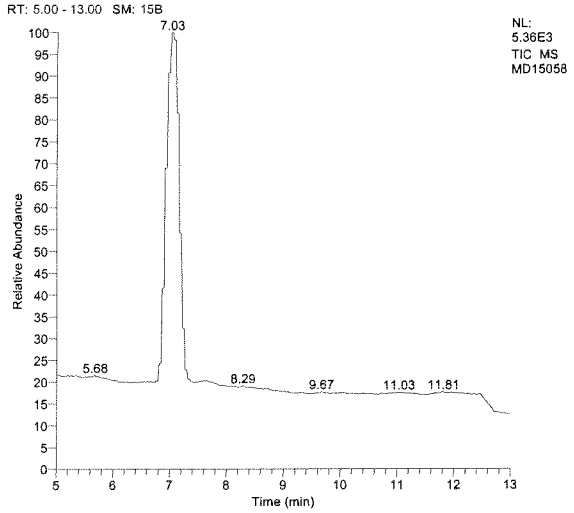
Sample Summary

EMAX Lab ID:	D041-04
Lab File ID:	MD15058
Acquisition Date:	04/16/15 12:55:47 AM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

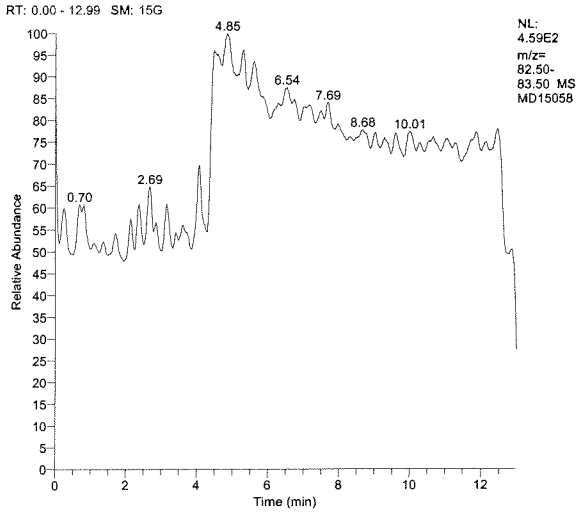
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	GB2
Injection Volume(ul):	20.00
Run Time(min):	12.99

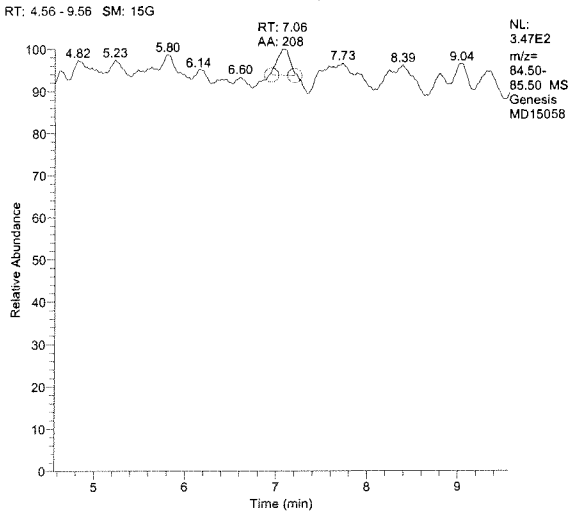
TIC



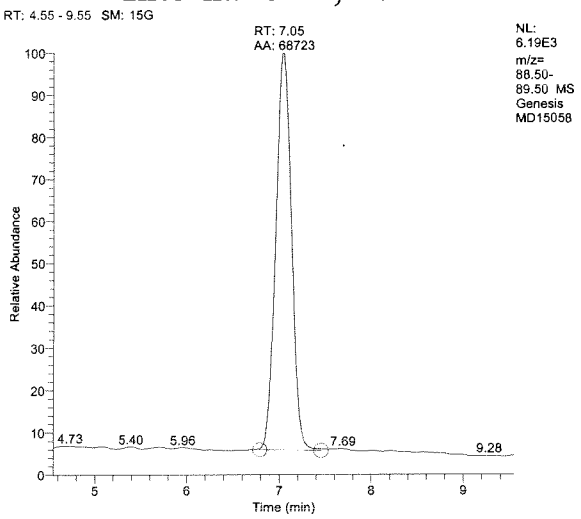
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	7.06	208	0.000	0.007	ppb	3.89
Perchlorate_89_ISTD	7.05	68723	2.000	N/A	ppb	584.31

83/85 Ratio: N/a
(Control Limit: +/-30%)

Thursday, April 16, 2015, 01:10:23

Method 6850
EMAX Laboratories
Instrument # G0

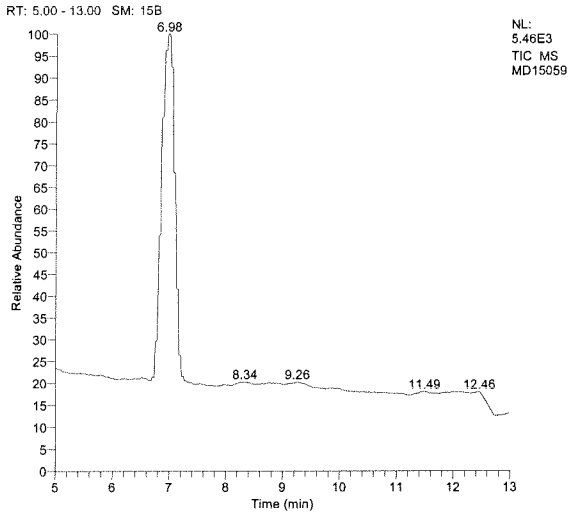
Sample Summary

EMAX Lab ID:	D041-05
Lab File ID:	MD15059
Acquisition Date:	04/16/15 01:10:19 AM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

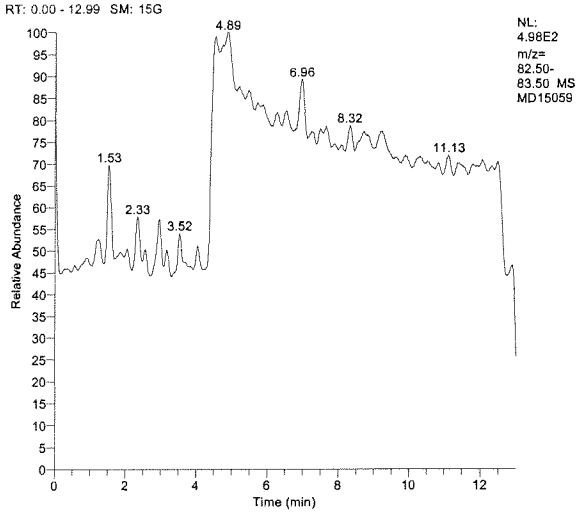
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	GB3
Injection Volume(ul):	20.00
Run Time(min):	12.99

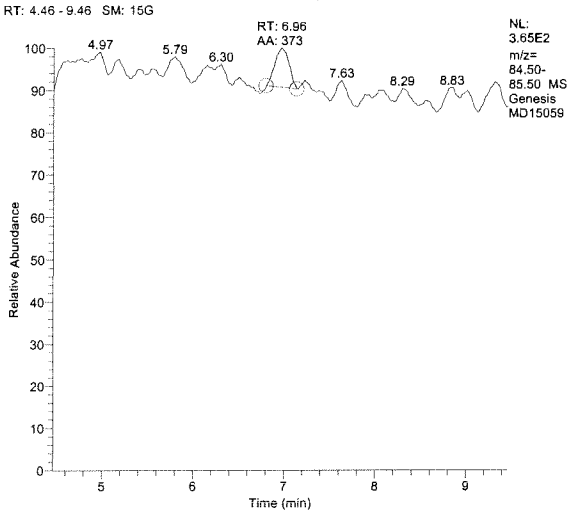
TIC



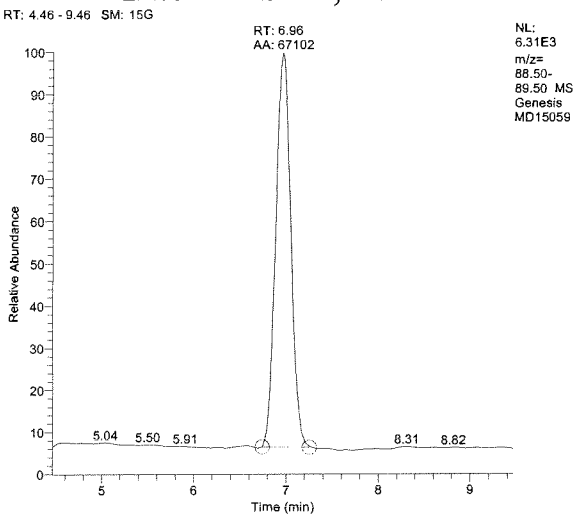
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.96	373	0.000	0.018	ppb	6.37
Perchlorate_89_ISTD	6.96	67102	2.000	N/A	ppb	348.22

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

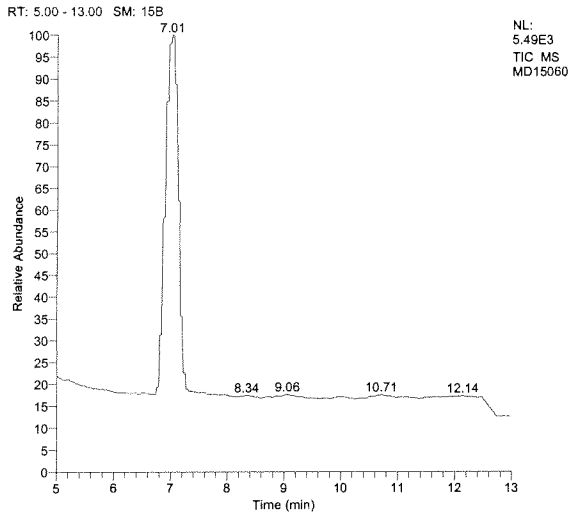
Sample Summary

EMAX Lab ID:	D041-06
Lab File ID:	MD15060
Acquisition Date:	04/16/15 01:24:51 AM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

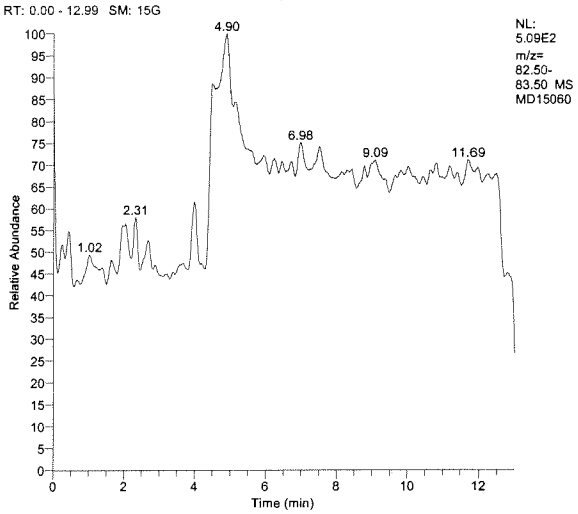
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	GB4
Injection Volume(ul):	20.00
Run Time(min):	12.99

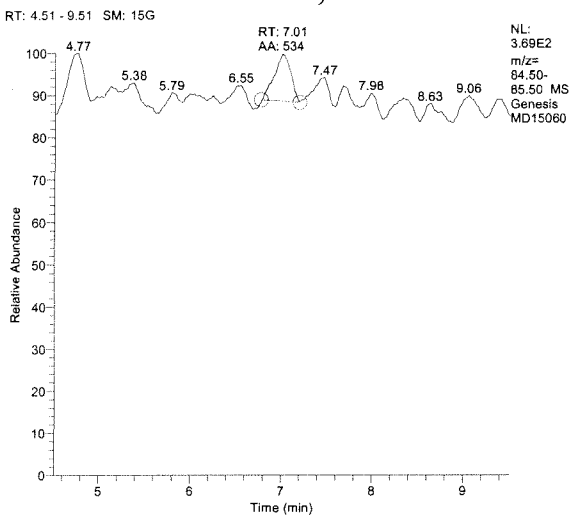
TIC



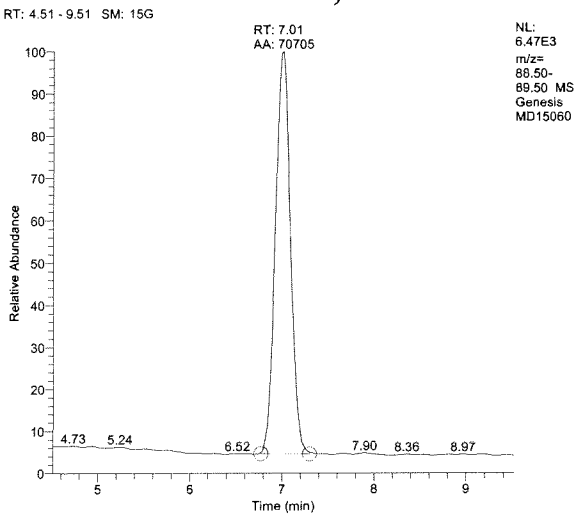
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	7.01	534	0.000	0.027	ppb	6.98
Perchlorate_89_ISTD	7.01	70705	2.000	N/A	ppb	343.89

83/85 Ratio: N/a
(Control Limit: +/-30%)

Thursday, April 16, 2015, 10:56:21

QC SUMMARIES

EMAX QUALITY CONTROL DATA
LAB CONTROL SAMPLE ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UXO4, FALLBROOK
BATCH NO. : 15D041
METHOD : 6850

MATRIX : SOIL % MOISTURE: NA

DILUTION FACTOR:	1	1	1
SAMPLE ID :	MBLK1S	LCS1S	LCD1S
LAB SAMPLE ID :	PLD005SB	PLD005SL	PLD005SC
LAB FILE ID :	15MD15038	15MD15039	15MD15040
DATE PREPARED :	04/09/1514:05	04/09/1514:05	04/09/1514:05
DATE ANALYZED :	04/15/1520:04	04/15/1520:19	04/15/1520:33
PREP BATCH :	15PLD005S	15PLD005S	15PLD005S
CALIBRATION REF:	MD15032	MD15032	MD15032

ACCESSION:

PARAMETER	MB RESULT (ug/kg)	SPIKE AMT (ug/kg)	BS RESULT (ug/kg)	BS REC (%)	SPIKE AMT (ug/kg)	BSD RESULT (ug/kg)	BSD REC (%)	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Perchlorate	ND	4	3.24J	81	4	3.26J	81	1	80-120	15

QC DATA

Method 6850
EMAX Laboratories
Instrument # G0

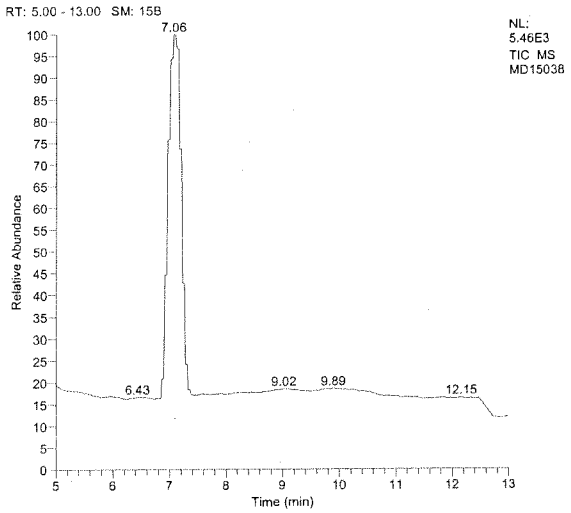
Sample Summary

EMAX Lab ID:	PLD005SB
Lab File ID:	MD15038
Acquisition Date:	04/15/15 08:04:38 PM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

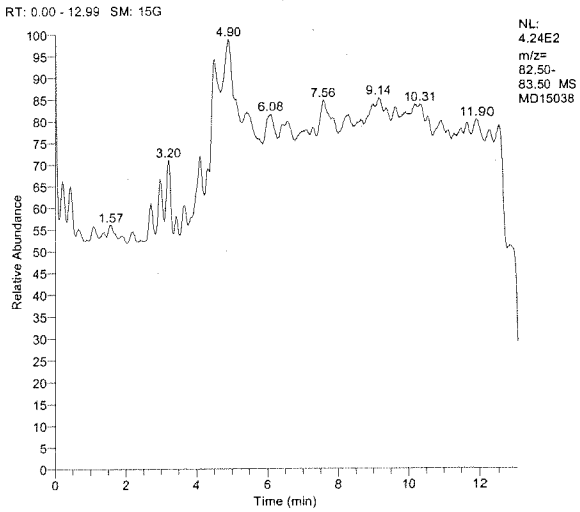
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RD8
Injection Volume(ul):	20.00
Run Time(min):	12.99

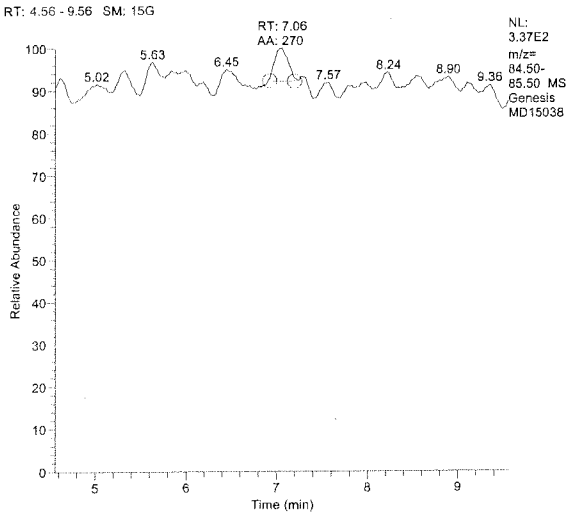
TIC



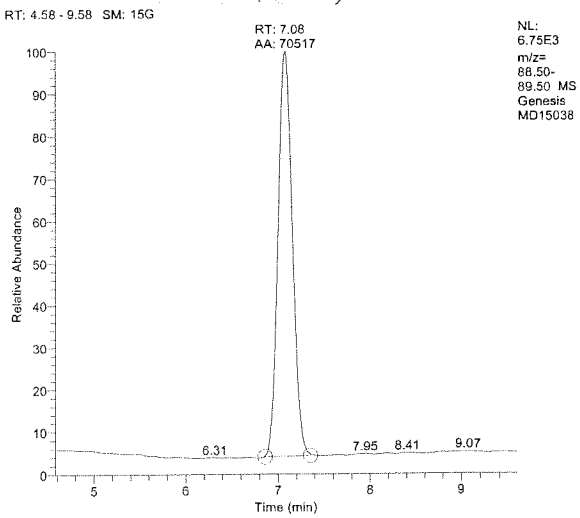
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	7.06	270	0.000	0.011	ppb	4.81
Perchlorate_89_ISTD	7.08	70517	2.000	N/A	ppb	1147.65

83/85 Ratio: N/a

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

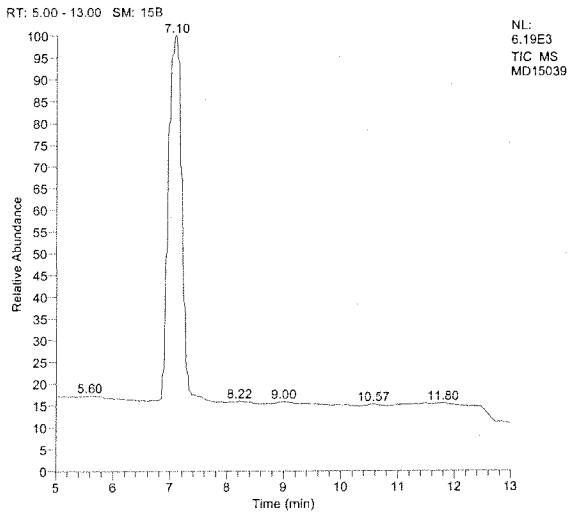
Sample Summary

EMAX Lab ID:	PLD005SL
Lab File ID:	MD15039
Acquisition Date:	04/15/15 08:19:10 PM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

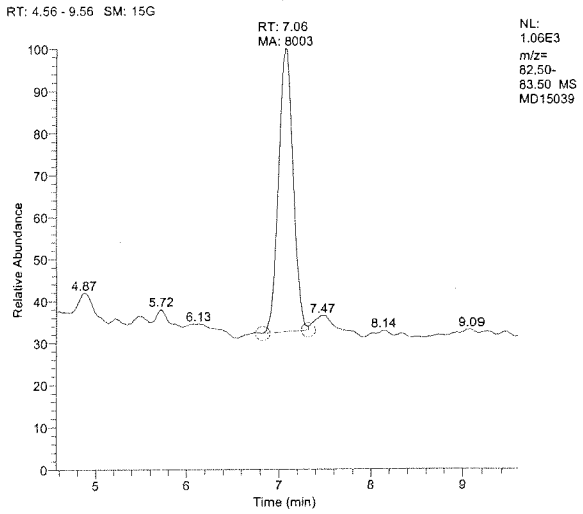
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RE1
Injection Volume(ul):	20.00
Run Time(min):	12.99

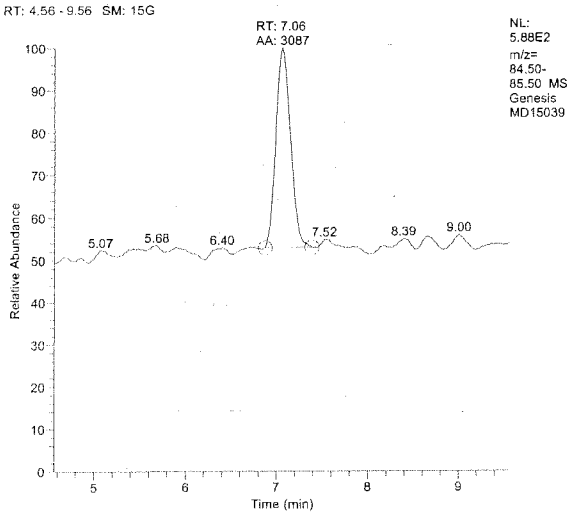
TIC



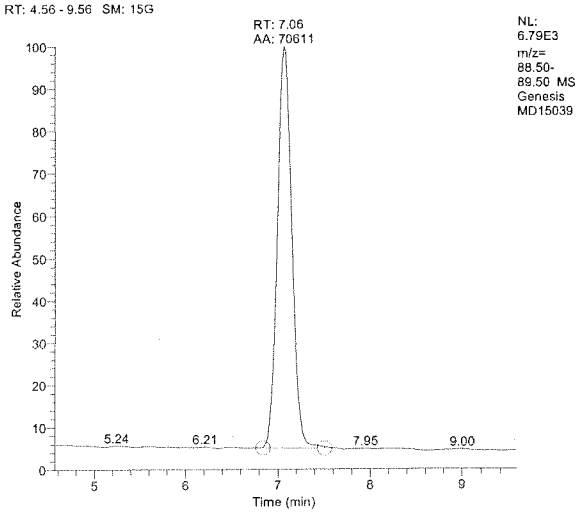
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.06	8003	0.000	0.162	ppb	115.03
Perchlorate_85	7.06	3087	0.000	0.182	ppb	69.55
Perchlorate_89_ISTD	7.06	70611	2.000	N/A	ppb	963.32

83/85 Ratio: 2.59
(Control Limit: +/-30%)

Thursday, April 16, 2015, 11:10:19

Method 6850
EMAX Laboratories
Instrument # G0

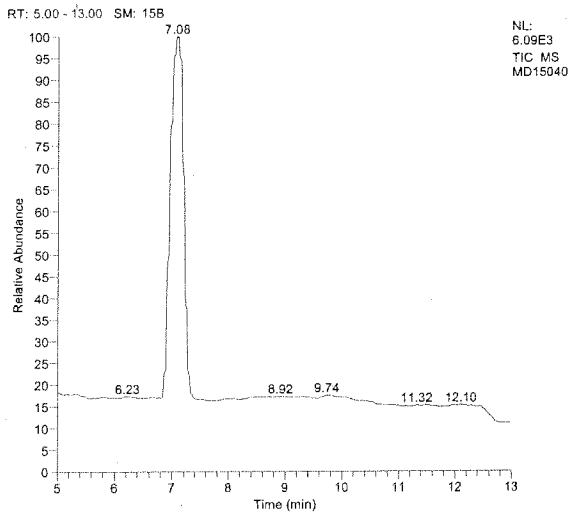
Sample Summary

EMAX Lab ID:	PLD005SC
Lab File ID:	MD15040
Acquisition Date:	04/15/15 08:33:42 PM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

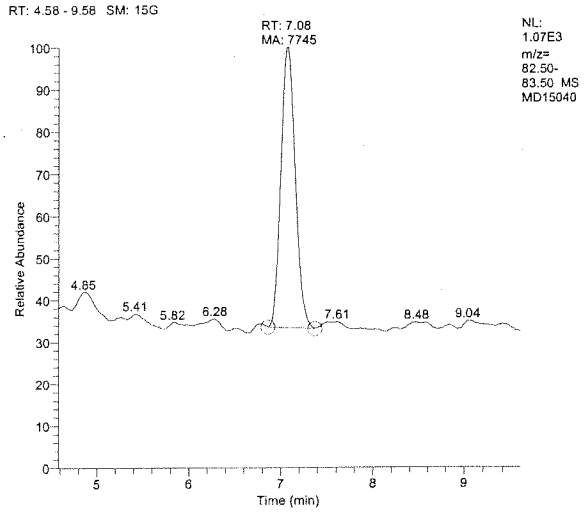
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RE2
Injection Volume(ul):	20.00
Run Time(min):	12.99

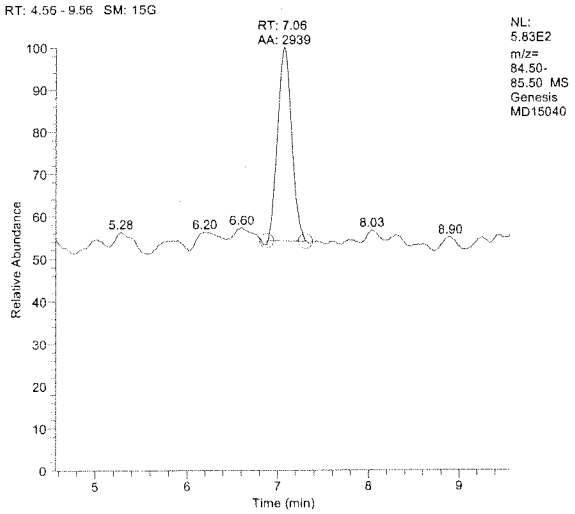
TIC



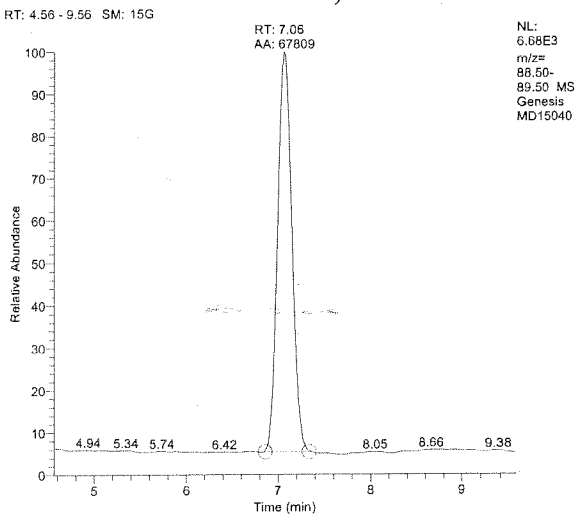
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.08	7745	0.000	0.163	ppb	89.55
Perchlorate_85	7.06	2939	0.000	0.181	ppb	41.97
Perchlorate_89_ISTD	7.06	67809	2.000	N/A	ppb	434.25

83/85 Ratio: 2.63

(Control Limit: +/-30%)

INITIAL CALIBRATION(S)

Component : Perchlorate_83
Method/CalSet : PLGOD14/MD14(2015)

LFID	LSID	S	Dilf	RT	Area	SpkAmt	Con	Units	ISTDArea	83/85	Cntrl Lim	Anl DateTime	%Rec
MD14001	IBGOD141	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/14/15 13:51	
MD14002	QC	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/14/15 14:06	
MD14003	BLANK(IS)	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/14/15 14:20	
MD14004	PLGOD14001	P	1.000	7.06	5341	0.100	0.109	ppb	70673	3.0	2.29-3.81	04/14/15 14:35	109
MD14005	PLGOD14002	P	1.000	7.05	9182	0.200	0.190	ppb	68799	2.8	2.29-3.81	04/14/15 14:49	95
MD14006	PLGOD14003	P	1.000	7.03	22790	0.500	0.493	ppb	65361	3.0	2.29-3.81	04/14/15 15:04	99
MD14007	PLGOD14004	P	1.000	7.03	46244	1.000	0.992	ppb	65765	3.1	2.29-3.81	04/14/15 15:18	99
MD14008	PLGOD14005	P	1.000	7.01	92020	2.000	1.921	ppb	67513	3.0	2.29-3.81	04/14/15 15:33	96
MD14009	PLGOD14006	P	1.000	7.03	231564	5.000	5.165	ppb	63156	3.0	2.29-3.81	04/14/15 15:47	103
MD14010	PLGOD14007	P	1.000	7.01	341260	7.500	7.429	ppb	64697	3.1	2.29-3.81	04/14/15 16:02	99
MD14011	IPLGOD14001	P	1.000	7.01	81841	0.000	1.752	ppb	65848	3.1	2.29-3.81	04/14/15 16:16	
MD14012	LOQ-01	P	1.000	7.00	8110	0.000	0.164	ppb	70425	2.9	2.29-3.81	04/14/15 16:31	
MD14013	IPCS	P	1.000	6.81	7553	0.000	0.160	ppb	67212	2.8	2.29-3.81	04/14/15 16:46	

83/85 Ratio: +/-25%

LFID	LSID	S	Dilf	RT	Area	SpkAmt	Con	Units	ISTDArea	83/85	Cntrl Lim	Anl DateTime	%Rec
MD14001	IBGOD141	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.13-3.96	04/14/15 13:51	
MD14002	QC	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.13-3.96	04/14/15 14:06	
MD14003	BLANK(IS)	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.13-3.96	04/14/15 14:20	
MD14004	PLGOD14001	P	1.000	7.06	5341	0.100	0.109	ppb	70673	3.0	2.13-3.96	04/14/15 14:35	109
MD14005	PLGOD14002	P	1.000	7.05	9182	0.200	0.190	ppb	68799	2.8	2.13-3.96	04/14/15 14:49	95
MD14006	PLGOD14003	P	1.000	7.03	22790	0.500	0.493	ppb	65361	3.0	2.13-3.96	04/14/15 15:04	99
MD14007	PLGOD14004	P	1.000	7.03	46244	1.000	0.992	ppb	65765	3.1	2.13-3.96	04/14/15 15:18	99
MD14008	PLGOD14005	P	1.000	7.01	92020	2.000	1.921	ppb	67513	3.0	2.13-3.96	04/14/15 15:33	96
MD14009	PLGOD14006	P	1.000	7.03	231564	5.000	5.165	ppb	63156	3.0	2.13-3.96	04/14/15 15:47	103
MD14010	PLGOD14007	P	1.000	7.01	341260	7.500	7.429	ppb	64697	3.1	2.13-3.96	04/14/15 16:02	99
MD14011	IPLGOD14001	P	1.000	7.01	81841	0.000	1.752	ppb	65848	3.1	2.13-3.96	04/14/15 16:16	
MD14012	LOQ-01	P	1.000	7.00	8110	0.000	0.164	ppb	70425	2.9	2.13-3.96	04/14/15 16:31	
MD14013	IPCS	P	1.000	6.81	7553	0.000	0.160	ppb	67212	2.8	2.13-3.96	04/14/15 16:46	

83/85 Ratio: +/-30%
ICV (IS) +/-50%: (32924-98772)

QA
04/15/15

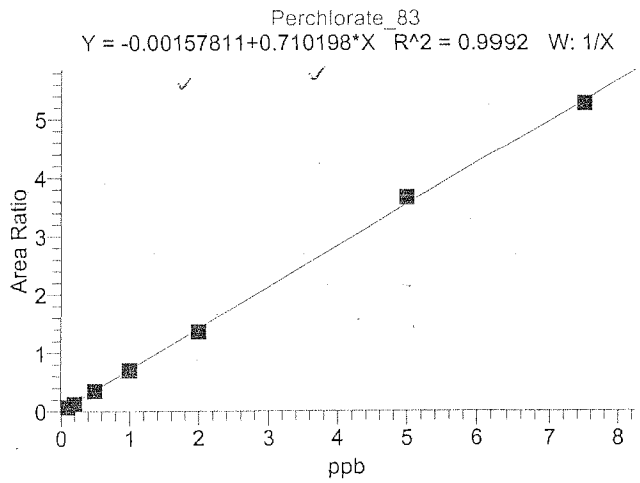
Calibration Summary

Identification

Component Name:	Perchlorate_83
Detector Type:	MS
Operator:	None
Expected RT (min):	7.00
Window (sec):	60.00000

Genesis Peak Integration

Smoothing Points:	15
S/N Threshold:	1.00
Valley Detection:	Enabled
Expected Peak Width (sec):	5.00000
Constrain Peak Width:	No
Peak Height (%):	N/A
Tailing Factor:	N/A
Identify By:	Highest Peak
Minimum Peak Height (S/N):	3.00
Ion Ratio Confirmation:	Yes
Window %:	Absolute
Qualifier Ion Coelution (min):	0.100



QC Level	Amount
2 PPB	2.000

Cal Level	Amount
0.1 ppb	0.100
0.2 ppb	0.200
0.5 ppb	0.500
1 ppb	1.000
2 ppb	2.000
5 ppb	5.000
7.5 ppb	7.500

Sample ID	Data File Name	Area	ISTD Area	Area Ratio	Calculated Amount	% Diff	% RSD	Calibration Flags
PLG0D14001	MD14004	5341	70673	0.076	0.109	8.63	0.000	N/A
PLG0D14002	MD14005	9182	68799	0.133	0.190	-4.93	0.000	N/A
PLG0D14003	MD14006	22790	65361	0.349	0.493	-1.37	0.000	N/A
PLG0D14004	MD14007	46244	65765	0.703	0.992	-0.77	0.000	N/A
PLG0D14005	MD14008	92020	67513	1.363	1.921	-3.93	0.000	N/A
PLG0D14006	MD14009	231564	63156	3.667	5.165	3.30	0.000	N/A
PLG0D14007	MD14010	341260	64697	5.275	7.429	-0.94	0.000	N/A
IPLG0D14001	MD14011	81841	65848	1.243	1.752	N/A	N/A	N/A

AS
04/15/15

There is no signature data to report.

8018

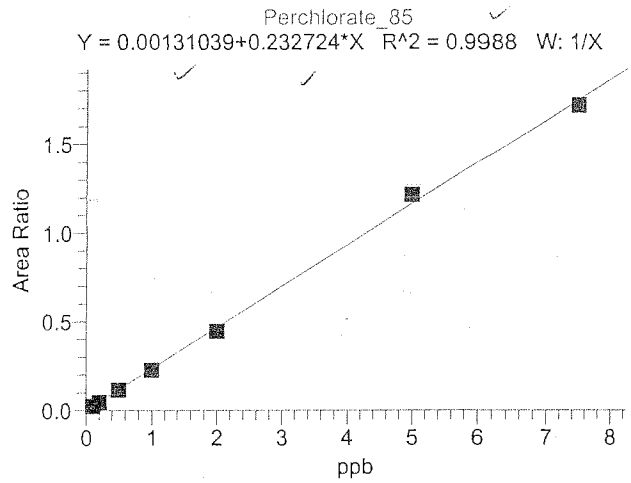
Calibration Summary

Identification

Component Name:	Perchlorate_85
Detector Type:	MS
Operator:	None
Expected RT (min):	7.00
Window (sec):	60.00000

Genesis Peak Integration

Smoothing Points:	15
S/N Threshold:	0.50
Valley Detection:	Enabled
Expected Peak Width (sec):	5.00000
Constrain Peak Width:	No
Peak Height (%):	N/A
Tailing Factor:	N/A
Identify By:	Highest Peak
Minimum Peak Height (S/N):	1.00
Ion Ratio Confirmation:	No
Window %:	N/A
Qualifier Ion Coelution (min):	N/A



QC Level	Amount
2 PPB	2.000

Cal Level	Amount
0.1 ppb	0.100
0.2 ppb	0.200
0.5 ppb	0.500
1 ppb	1.000
2 ppb	2.000
5 ppb	5.000
7.5 ppb	7.500

Sample ID	Data File Name	Area	ISTD Area	Area Ratio	Calculated Amount	% Diff	% RSD	Calibration Flags
PLG0D14001	MD14004	1799	70673	0.025	0.104	3.77	0.000	N/A
PLG0D14002	MD14005	3298	68799	0.048	0.200	0.16	0.000	N/A
PLG0D14003	MD14006	7645	65361	0.117	0.497	-0.60	0.000	N/A
PLG0D14004	MD14007	15081	65765	0.229	0.980	-2.02	0.000	N/A
PLG0D14005	MD14008	30196	67513	0.447	1.916	-4.19	0.000	N/A
PLG0D14006	MD14009	76891	63156	1.217	5.226	4.52	0.000	N/A
PLG0D14007	MD14010	111158	64697	1.718	7.377	-1.64	0.000	N/A
IPLG0D14001	MD14011	26426	65848	0.401	1.719	N/A	N/A	N/A

AA
04/15/15

There is no signature data to report.

8019

Method 6850
EMAX Laboratories
Instrument # G0

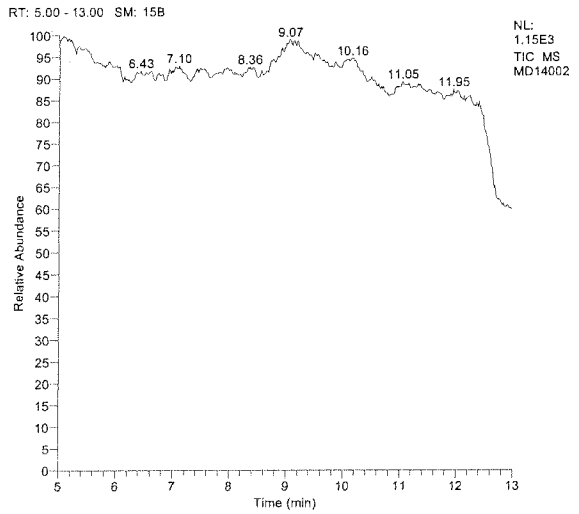
Sample Summary

EMAX Lab ID:	QC H20 LOT#:55007
Lab File ID:	MD14002
Acquisition Date:	04/14/15 02:06:09 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

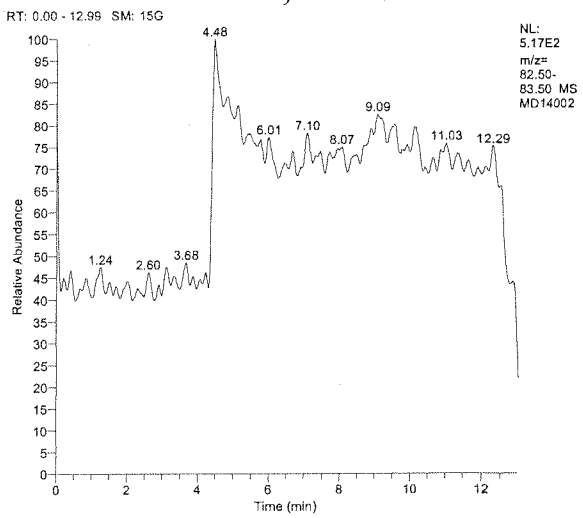
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA2
Injection Volume(ul):	20.00
Run Time(min):	12.99

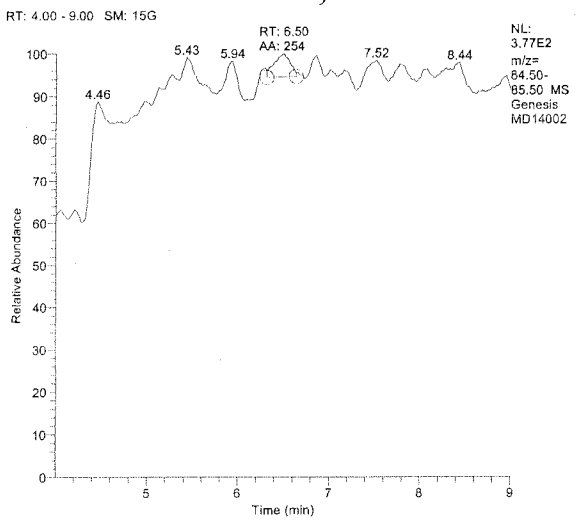
TIC



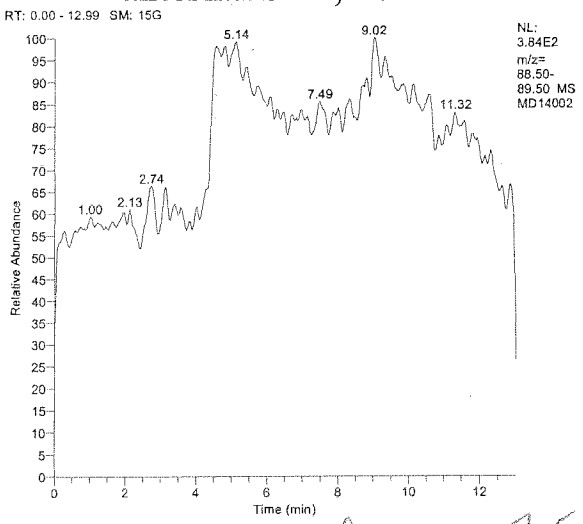
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Qt 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.50	254	0.000	0.000	ppb	2.12
Perchlorate_89_ISTD	N/A	N/A	2.000	N/A	ppb	N/A

83/85 Ratio: N/a
(Control Limit: +/-30%)

Tuesday, April 14, 2015, 14:20:45

Method 6850
EMAX Laboratories
Instrument # G0

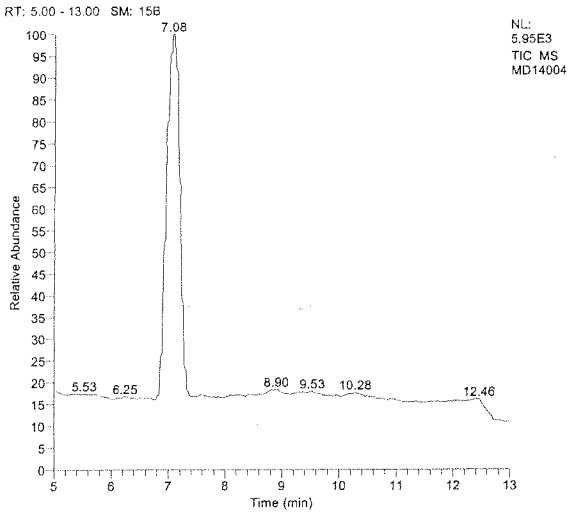
Sample Summary

EMAX Lab ID:	PLG0D14001
Lab File ID:	MD14004
Acquisition Date:	04/14/15 02:35:13 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

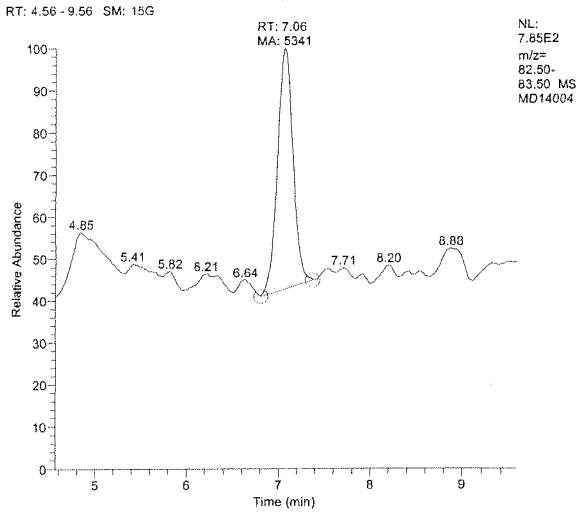
Run Parameters

Sample Type:	Std Clear
Calibration Level:	0.1 ppb
Vial:	RA4
Injection Volume(ul):	20.00
Run Time(min):	12.99

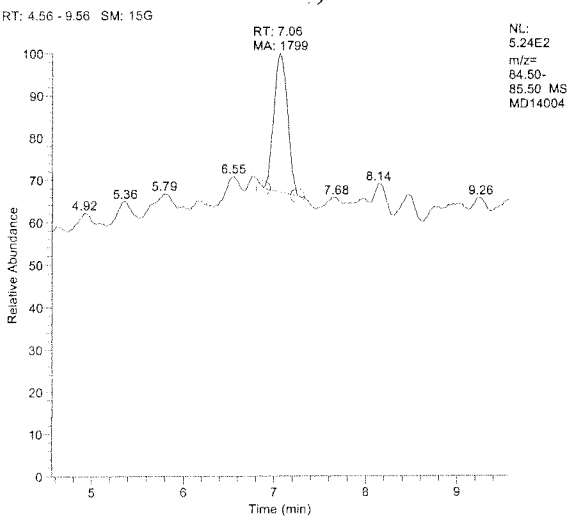
TIC



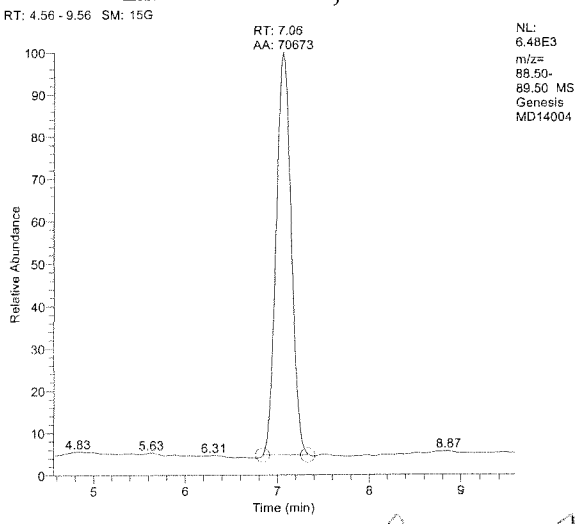
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



RA 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.06	5341	0.100	0.109	ppb	50.58
Perchlorate_85	7.06	1799	0.100	0.104	ppb	31.77
Perchlorate_89_ISTD	7.06	70673	2.000	N/A	ppb	261.94

83/85 Ratio: 2.97

(Control Limit: +/-30%)

Wednesday, April 15, 2015, 11:05:07

Method 6850
EMAX Laboratories
Instrument # G0

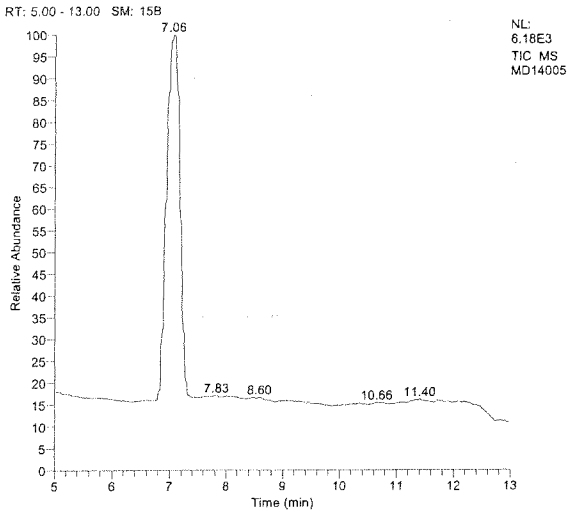
Sample Summary

EMAX Lab ID:	PLG0D14002
Lab File ID:	MD14005
Acquisition Date:	04/14/15 02:49:45 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

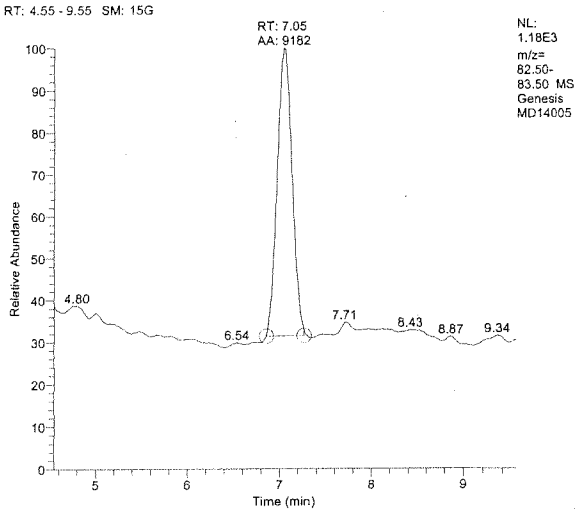
Run Parameters

Sample Type:	Std Update
Calibration Level:	0.2 ppb
Vial:	RA5
Injection Volume(ul):	20.00
Run Time(min):	12.99

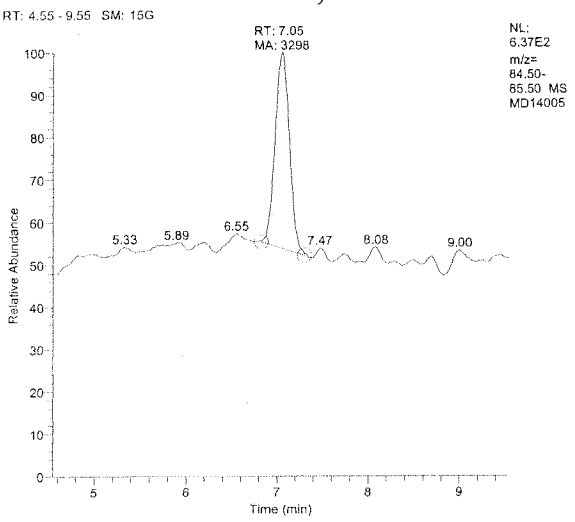
TIC



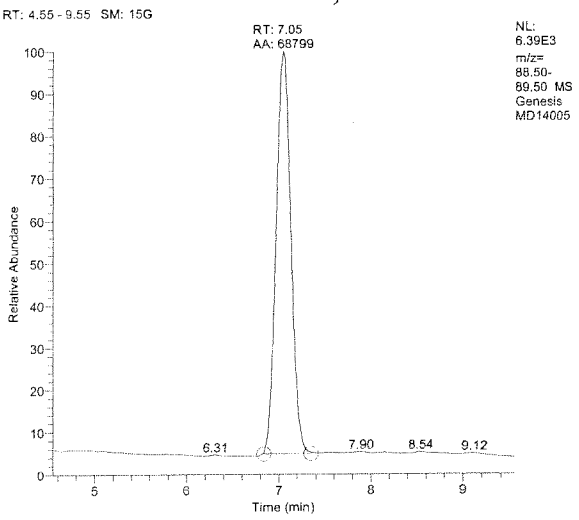
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AA 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.05	9182	0.200	0.190	ppb	55.02
Perchlorate_85	7.05	3298	0.200	0.200	ppb	36.18
Perchlorate_89_ISTD	7.05	68799	2.000	N/A	ppb	335.43

83/85 Ratio: 2.78

(Control Limit: +/-30%)

Wednesday, April 15, 2015, 11:05:08

Method 6850
EMAX Laboratories
Instrument # G0

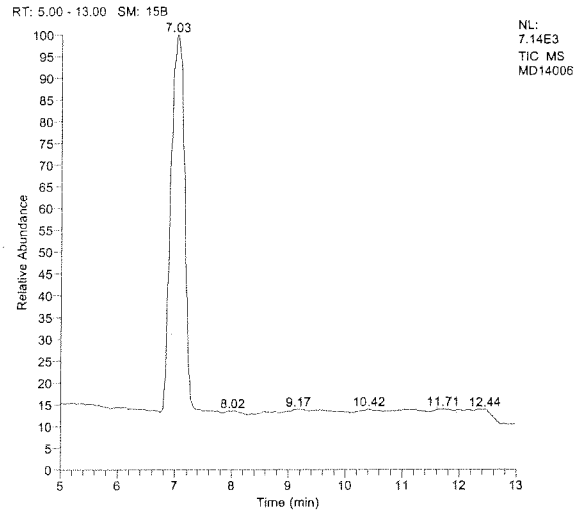
Sample Summary

EMAX Lab ID:	PLG0D14003
Lab File ID:	MD14006
Acquisition Date:	04/14/15 03:04:17 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

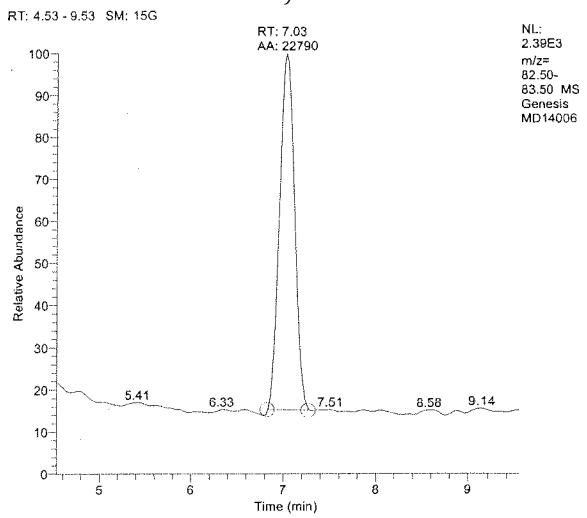
Run Parameters

Sample Type:	Std Update
Calibration Level:	0.5 ppb
Vial:	RA6
Injection Volume(ul):	20.00
Run Time(min):	12.99

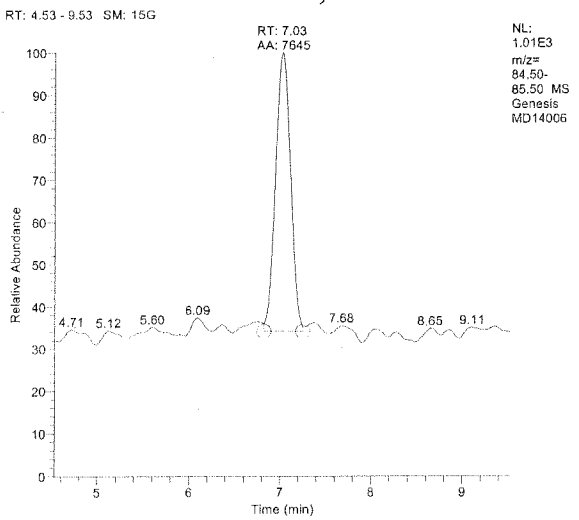
TIC



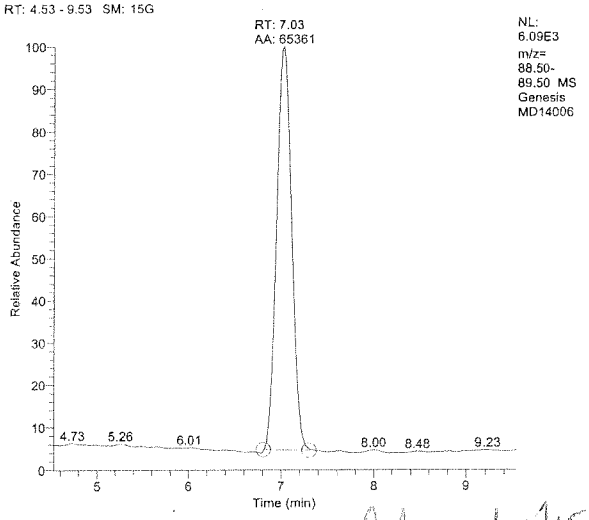
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AA 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.03	22790	0.500	0.493	ppb	180.86
Perchlorate_85	7.03	7645	0.500	0.497	ppb	71.17
Perchlorate_89_ISTD	7.03	65361	2.000	N/A	ppb	401.07

83/85 Ratio: 2.98 ✓
(Control Limit: +/-30%)

Wednesday, April 15, 2015, 11:05:09

Method 6850
EMAX Laboratories
Instrument # G0

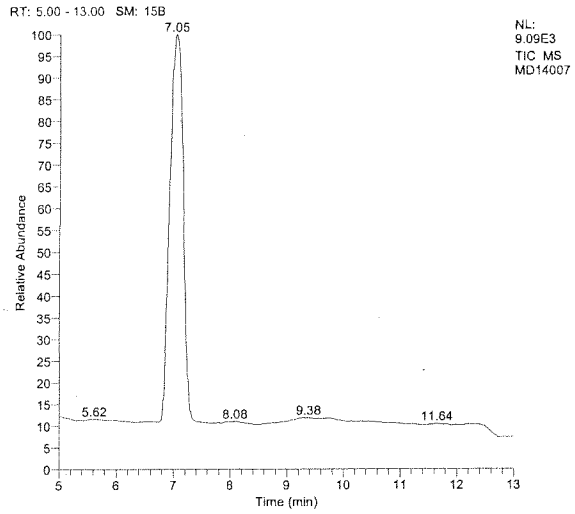
Sample Summary

EMAX Lab ID:	PLG0D14004
Lab File ID:	MD14007
Acquisition Date:	04/14/15 03:18:51 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

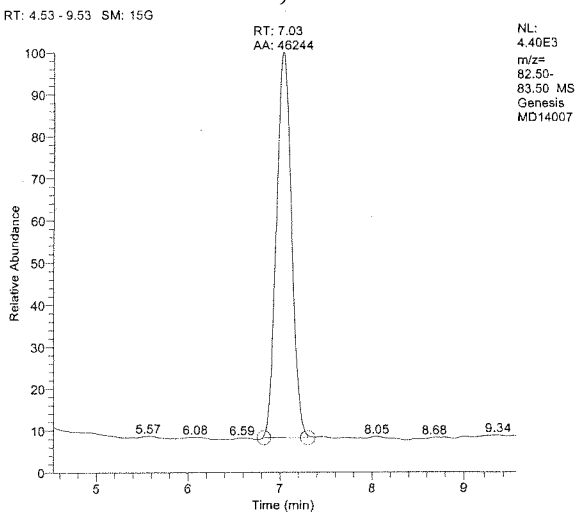
Run Parameters

Sample Type:	Std Update
Calibration Level:	1 ppb
Vial:	RA7
Injection Volume(ul):	20.00
Run Time(min):	12.99

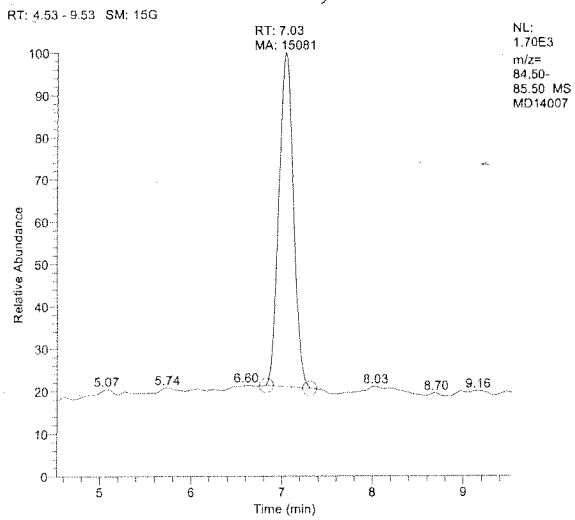
TIC



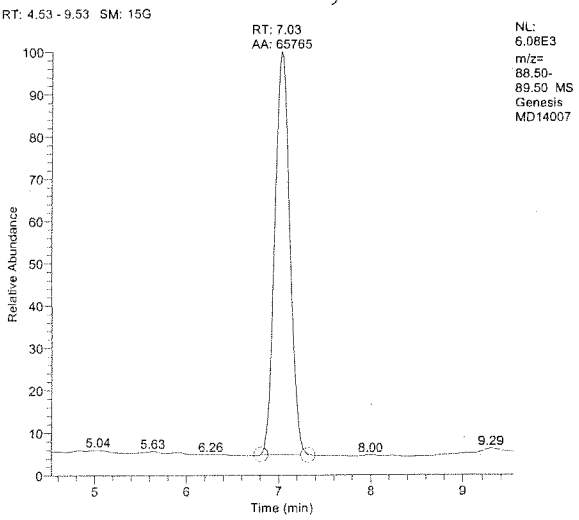
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AA 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.03	46244	1.000	0.992	ppb	451.51
Perchlorate_85	7.03	15081	1.000	0.980	ppb	120.19
Perchlorate_89_ISTD	7.03	65765	2.000	N/A	ppb	659.86

83/85 Ratio: 3.07

(Control Limit: +/-30%)

Wednesday, April 15, 2015, 11:05:11

Method 6850
EMAX Laboratories
Instrument # G0

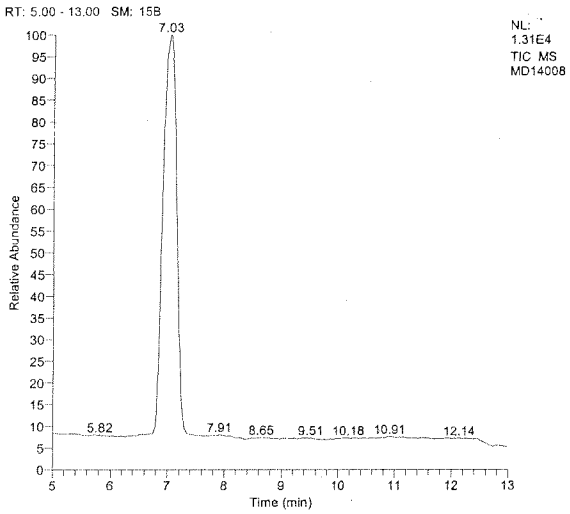
Sample Summary

EMAX Lab ID:	PLG0D14005
Lab File ID:	MD14008
Acquisition Date:	04/14/15 03:33:21 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

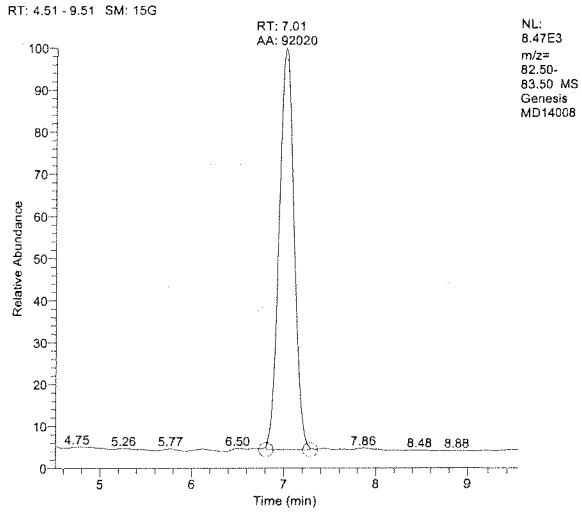
Run Parameters

Sample Type:	Std Update
Calibration Level:	2 ppb
Vial:	RA8
Injection Volume(ul):	20.00
Run Time(min):	12.99

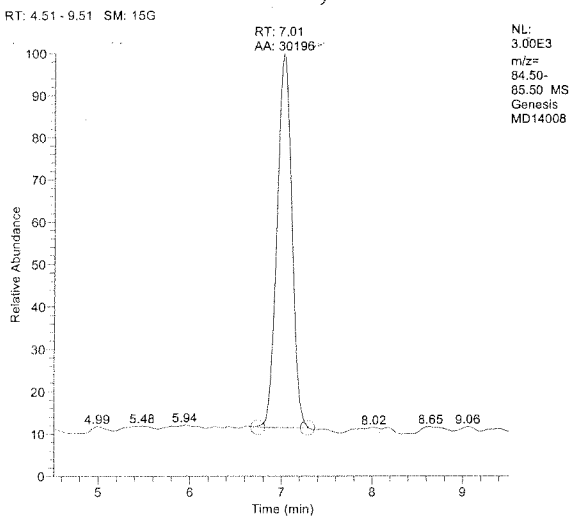
TIC



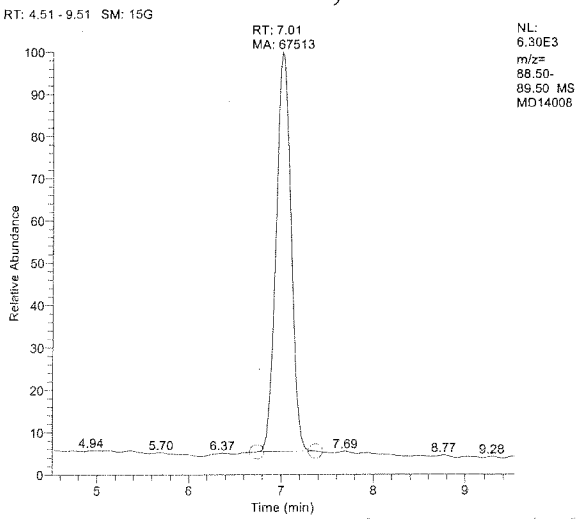
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AS 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.01	92020	2.000	1.921	ppb	550.88
Perchlorate_85	7.01	30196	2.000	1.916	ppb	197.12
Perchlorate_89_ISTD	7.01	67513	2.000	N/A	ppb	327.71

83/85 Ratio: 3.05

(Control Limit: +/-30%)

±25: (2.29 - 3.81)

±30: (2.13 - 3.96)

Wednesday, April 15, 2015, 11:05:12

Method 6850
EMAX Laboratories
Instrument # G0

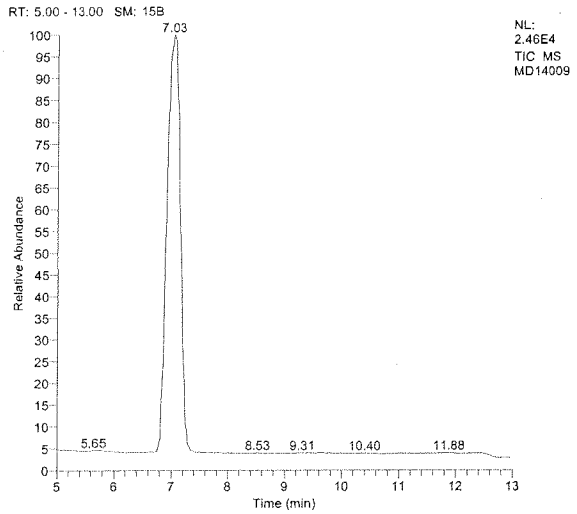
Sample Summary

EMAX Lab ID:	PLG0D14006
Lab File ID:	MD14009
Acquisition Date:	04/14/15 03:47:55 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

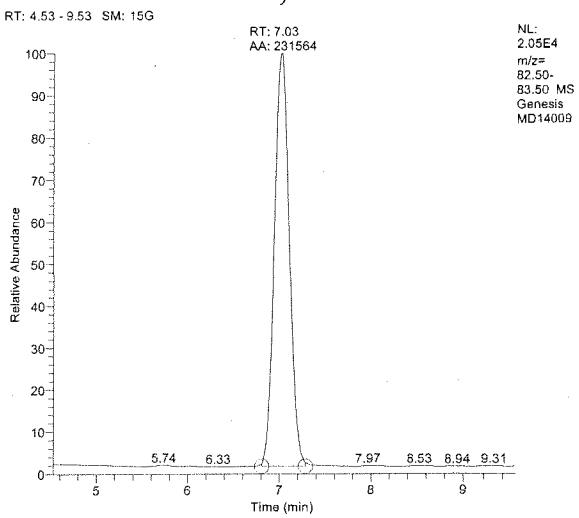
Run Parameters

Sample Type:	Std Update
Calibration Level:	5 ppb
Vial:	RB1
Injection Volume(ul):	20.00
Run Time(min):	12.99

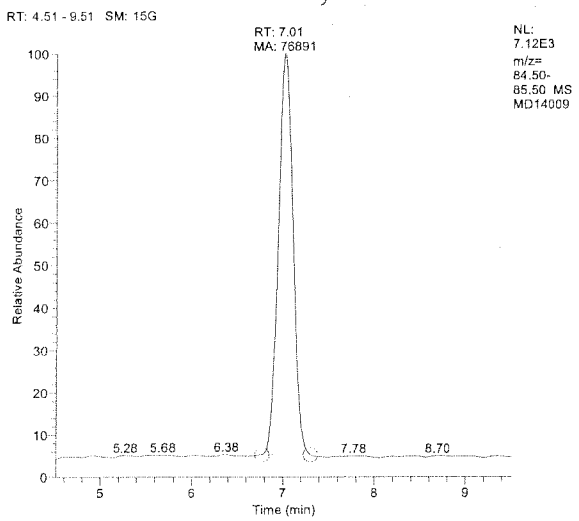
TIC



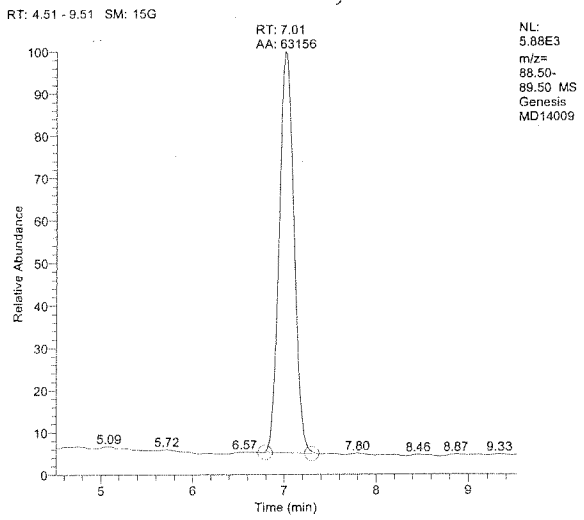
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



DA 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.03	231564	5.000	5.165	ppb	1439.34
Perchlorate_85	7.01	76891	5.000	5.226	ppb	798.90
Perchlorate_89_ISTD	7.01	63156	2.000	N/A	ppb	446.53

83/85 Ratio: 3.01
(Control Limit: +/-30%)

Wednesday, April 15, 2015, 11:05:13

Method 6850
EMAX Laboratories
Instrument # G0

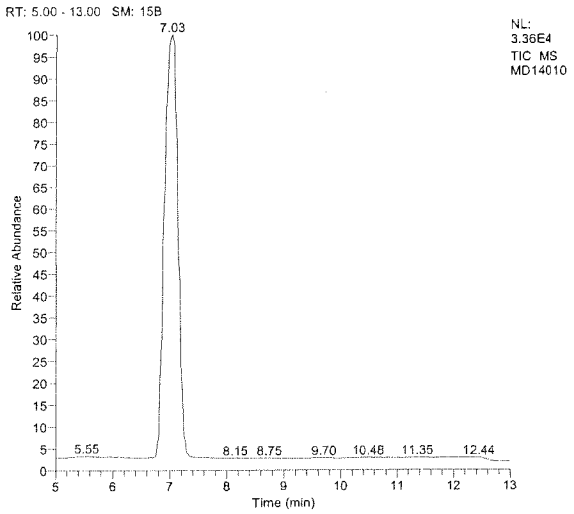
Sample Summary

EMAX Lab ID:	PLG0D14007
Lab File ID:	MD14010
Acquisition Date:	04/14/15 04:02:25 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

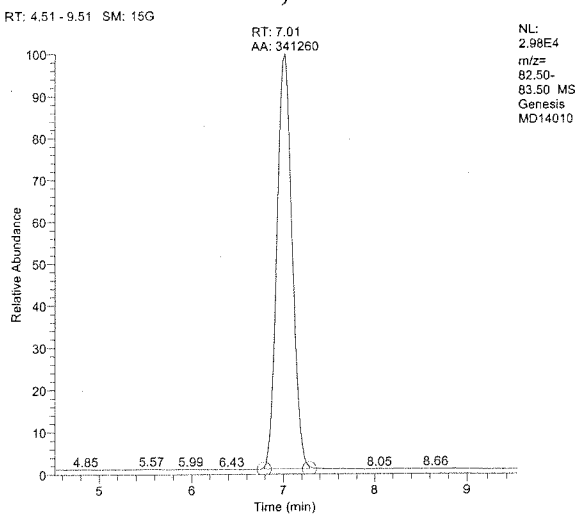
Run Parameters

Sample Type:	Std Update
Calibration Level:	7.5 ppb
Vial:	RB2
Injection Volume(ul):	20.00
Run Time(min):	12.99

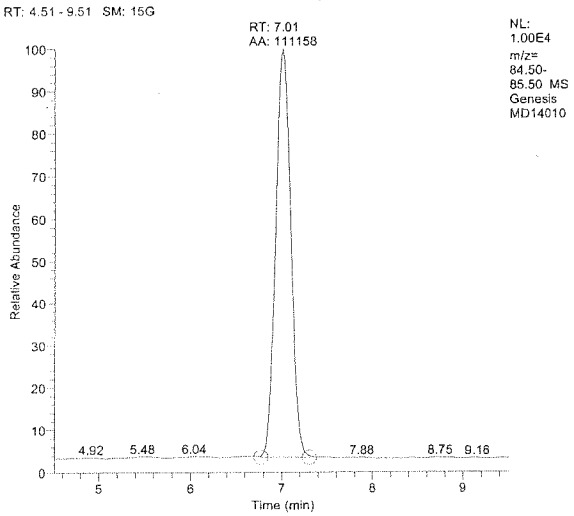
TIC



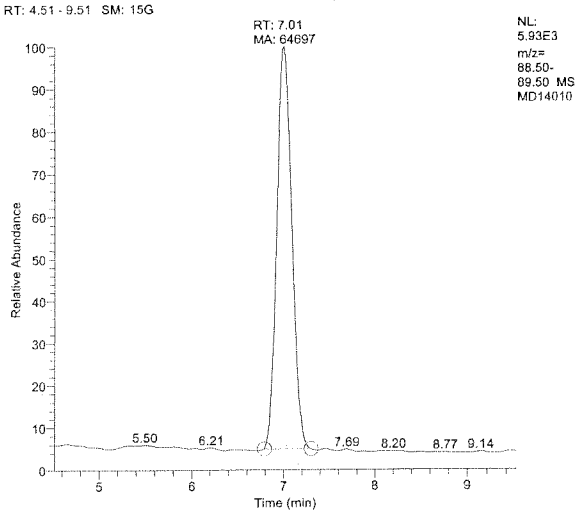
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AS 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.01	341260	7.500	7.429	ppb	2357.40
Perchlorate_85	7.01	111158	7.500	7.377	ppb	1010.27
Perchlorate_89_ISTD	7.01	64697	2.000	N/A	ppb	549.46

83/85 Ratio: 3.01
(Control Limit: +/-30%)

Wednesday, April 15, 2015, 11:05:14

SECOND SOURCE VERIFICATION

Method 6850
EMAX Laboratories
Instrument # G0

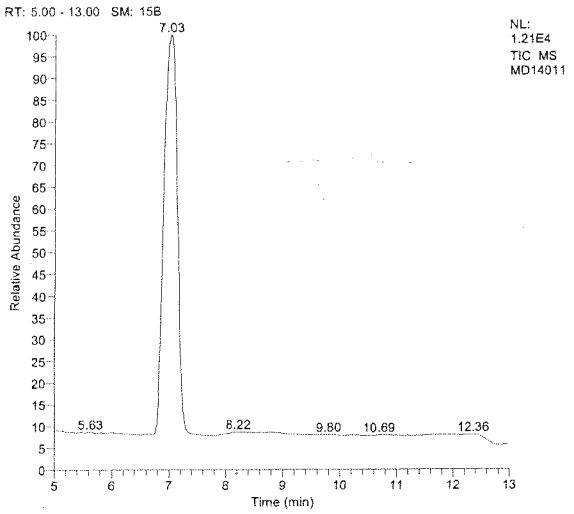
Sample Summary

EMAX Lab ID:	IPLG0D14001
Lab File ID:	MD14011
Acquisition Date:	04/14/15 04:16:57 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

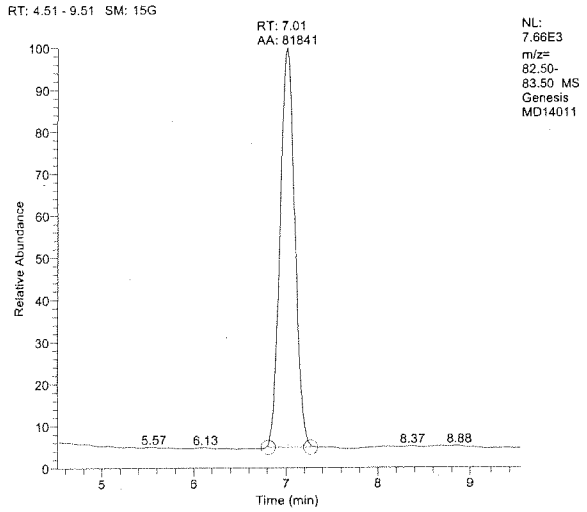
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB3
Injection Volume(ul):	20.00
Run Time(min):	12.99

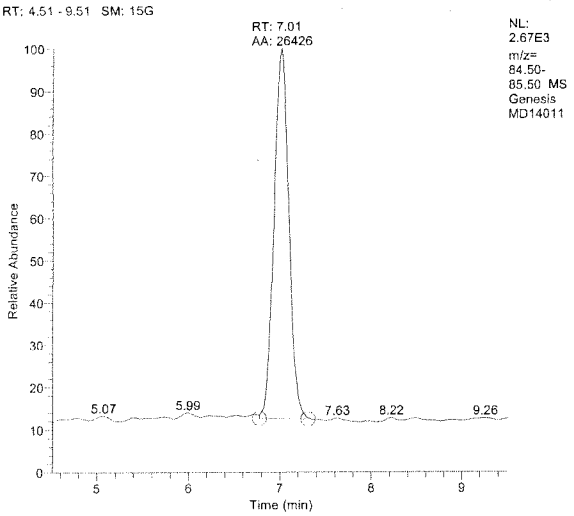
TIC



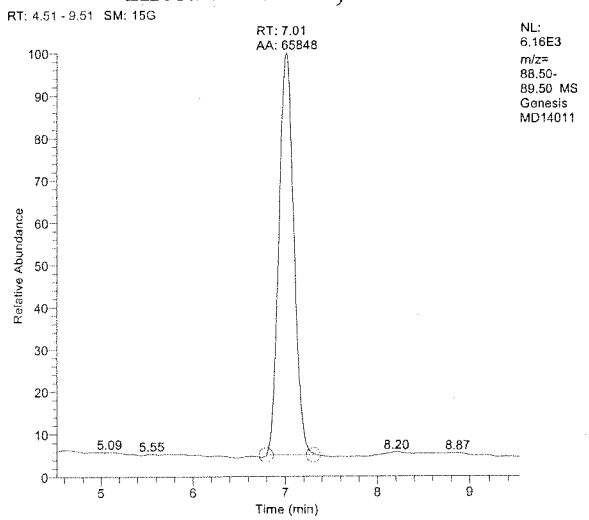
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AS 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.01	81841	0.000	1.752	ppb	491.72
Perchlorate_85	7.01	26426	0.000	1.719	ppb	294.08
Perchlorate_89_ISTD	7.01	65848	2.000	N/A	ppb	273.55

83/85 Ratio: 3.10
(Control Limit: +/-30%)

IW (IS) ± 50: (32,924 - 98,772)

Wednesday, April 15, 2015, 11:05:16

Method 6850
EMAX Laboratories
Instrument # G0

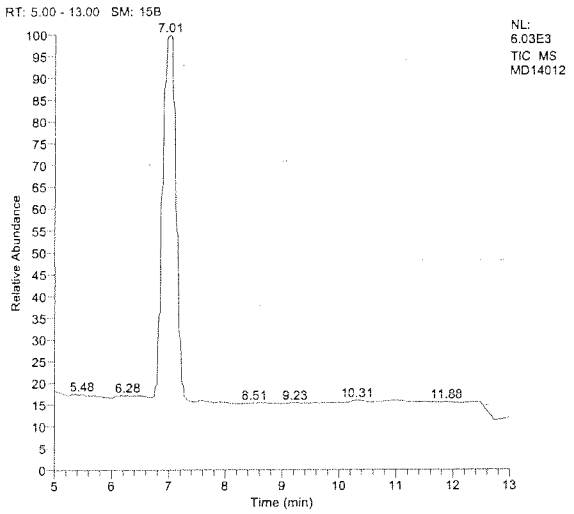
Sample Summary

EMAX Lab ID:	LOQ-01 0.2PPB
Lab File ID:	MD14012
Acquisition Date:	04/14/15 04:31:31 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

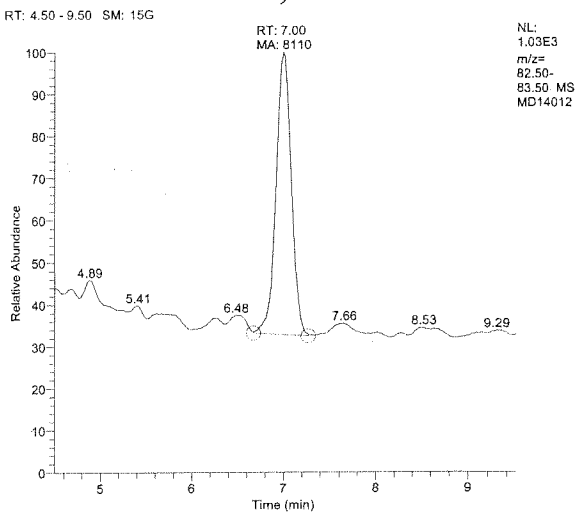
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB4
Injection Volume(ul):	20.00
Run Time(min):	12.99

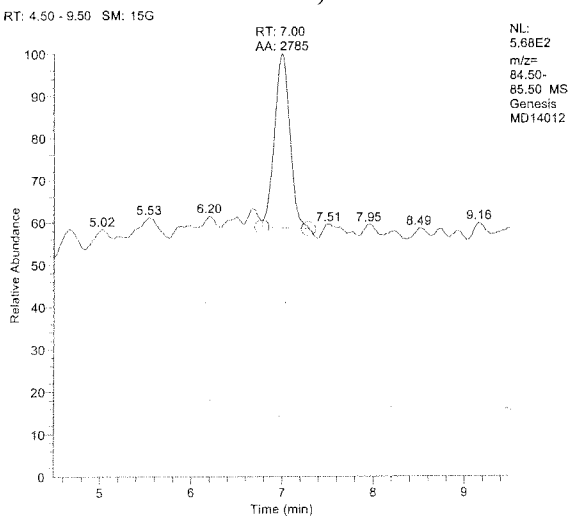
TIC



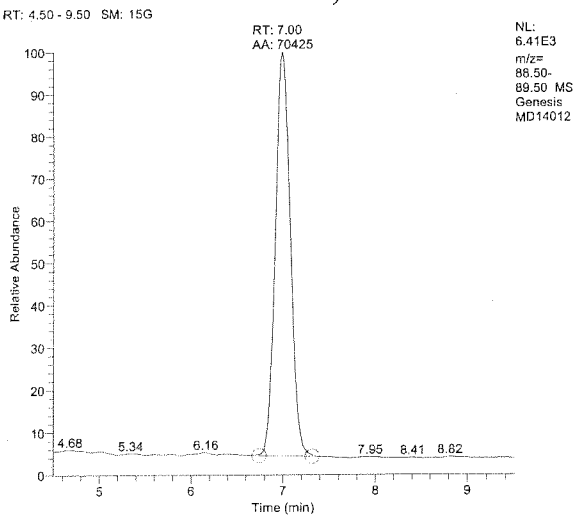
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



RS 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.00	8110	0.000	0.164	ppb	62.82
Perchlorate_85	7.00	2785	0.000	0.164	ppb	31.88
Perchlorate_89_ISTD	7.00	70425	2.000	N/A	ppb	1104.30

83/85 Ratio: 2.91

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

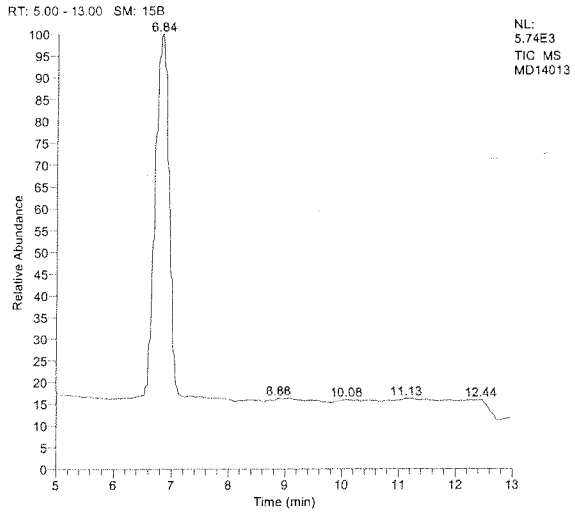
Sample Summary

EMAX Lab ID:	IPCS 0.2PPB/400PPM
Lab File ID:	MD14013
Acquisition Date:	04/14/15 04:46:01 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

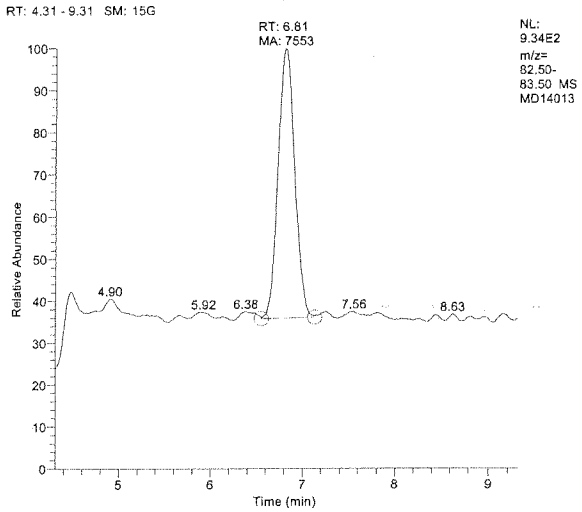
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB5
Injection Volume(ul):	20.00
Run Time(min):	12.99

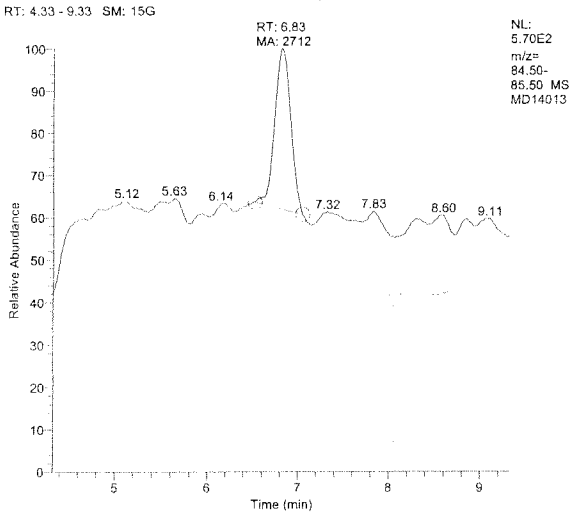
TIC



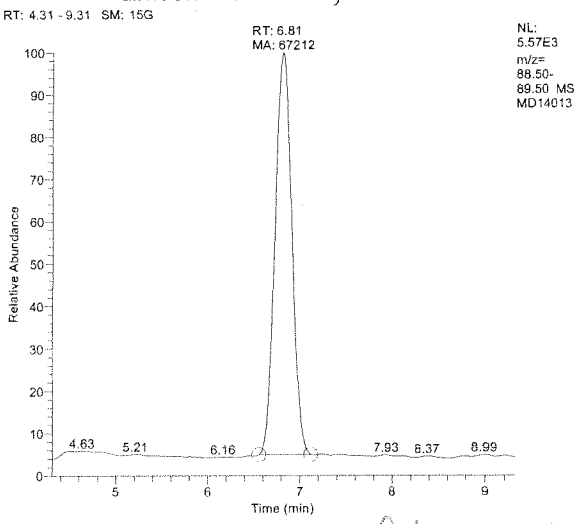
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AJ 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.81	7553	0.000	0.160	ppb	104.50
Perchlorate_85	6.83	2712	0.000	0.168	ppb	35.26
Perchlorate_89_ISTD	6.81	67212	2.000	N/A	ppb	397.88

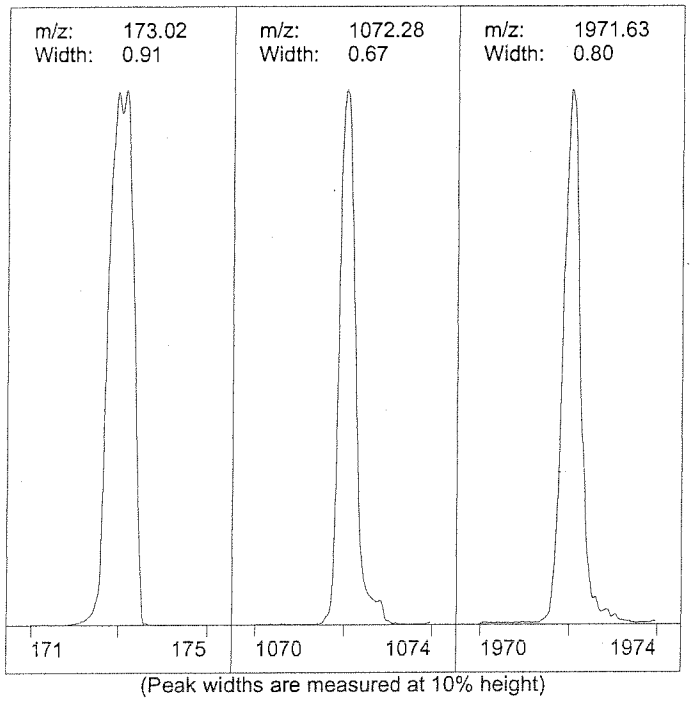
83/85 Ratio: 2.78

(Control Limit: +/-30%)

AutoTune Report

Laboratory:
Instrument ID: MSQ Plus
Serial Number: MSQ20789

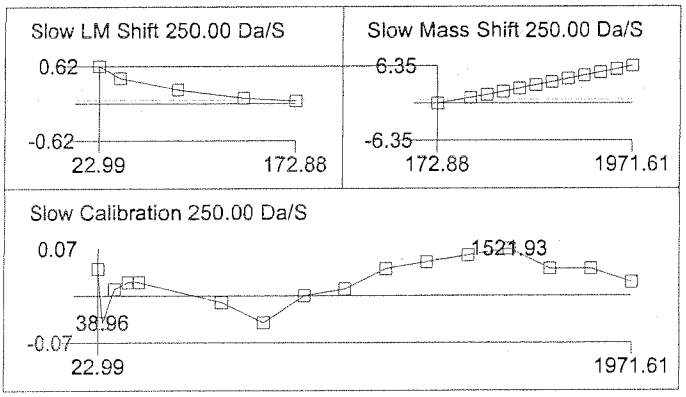
Filename: Calibration_150414120744.msqreport
Tune Date: 4/14/2015 12:07:44 PM
Report Date: 4/14/2015 12:09:35 PM
User Name: dionex xcaliber
Computer Name: XCALIBER



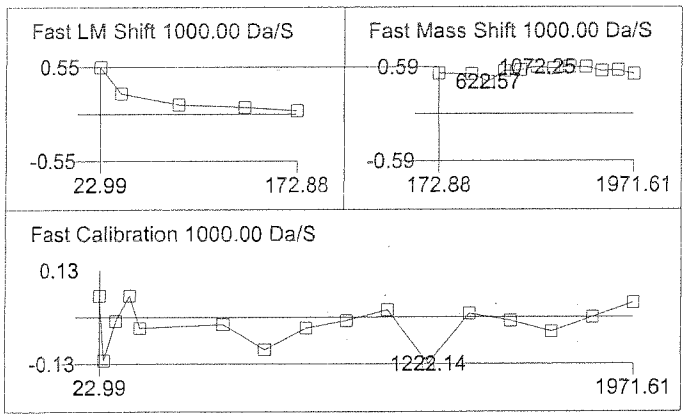
(Peak widths are measured at 10% height)

Tune Parameters	Set Point	Actual
Probe Temperature (°C)	349	344
Needle Voltage (kV)	3.0	3.0
Detector Voltage (V)	1800	1808
RF Lens Bias (V)	0.5	0.6
Ion Energy (V)	0.5	n/a
Ion Energy Ramp (mV/amu)	0.3	n/a
Low Mass Resolution	12.7	n/a
High Mass Resolution	12.5	n/a
Cone(V)	75	74
RF Frequency	235322272	n/a
Linearity Adjust	-0.03	n/a
Low Mass Res Mid Point	56	n/a
High Mass Res Mid Point	13745	n/a

Mass Calibration Results	Fast	Slow
Calibration Type	Autotune	Autotune
Missed Ref Peaks	0	0
Standard Deviation[max 0.2]	✓ 0.0540	0.0311
R.M.S Error	0.0575	0.0373
Max Residual Error(m/z)[max 0.3]	0.1255	0.0665
Calibrated Range Min(m/z)	22.9898	22.9898
Calibrated Range Max(m/z)	1971.6149	1971.6149



Ref-Peak	Search-	From-To	Real-Peak	Mass-Shift
22.99	18.99	26.99	23.03	0.04
38.96	37.01	41.01	38.92	-0.04
83.05	81.00	85.00	83.06	0.01 ✓
132.91	130.92	134.92	132.93	0.02
172.88	170.91	174.91	172.90	0.02
472.67	470.69	474.69	472.66	-0.01
622.57	620.56	624.56	622.53	-0.04
772.46	770.42	774.42	772.46	-0.00
922.36	920.35	924.35	922.37	0.01
1072.25	1070.26	1074.26	1072.29	0.04
1222.14	1220.19	1224.19	1222.19	0.05
1372.04	1370.09	1374.09	1372.10	0.06
1521.93	1520.00	1524.00	1522.00	0.07
1671.83	1669.89	1673.89	1671.86	0.04
1821.72	1819.76	1823.76	1821.76	0.04
1971.61	1969.65	1973.65	1971.64	0.02



Ref-Peak	Search-	From-To	Real-Peak	Mass-Shift
22.99	18.99	26.99	23.05	0.06
38.96	37.03	41.03	38.84	-0.12
83.05	80.92	84.92	83.04	-0.01
132.91	130.89	134.89	132.96	0.06
172.88	170.94	174.94	172.85	-0.03
472.67	470.64	474.64	472.65	-0.02
622.57	620.55	624.55	622.48	-0.09
772.46	770.37	774.37	772.43	-0.03
922.36	920.32	924.32	922.34	-0.01
1072.25	1070.24	1074.24	1072.27	0.02
1222.14	1220.17	1224.17	1222.02	-0.13
1372.04	1369.91	1373.91	1372.05	0.01
1521.93	1519.94	1523.94	1521.92	-0.01
1671.83	1669.81	1673.81	1671.79	-0.04
1821.72	1819.68	1823.68	1821.72	-0.00
1971.61	1969.61	1973.61	1971.65	0.04

Diagnostic Messages

No messages.

AutoTune Status: Pass

Reviewed By: _____ Date: 04/14/15

8032

DAILY CALIBRATION(S)

Continuing Calibration Summary Form

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK
SDG : 15D041
Method : 6850
InstrumentID : G0
Parameter : Perchlorate

LFID	LSID	DF	Expected	Result	Unit	83/85	%Rec	AnalysisDateTime
15MD15003	IPCS	1	0.2	0.150	ug/L	2.9	75	04/15/1510:38
15MD15004	LOD-01	1	0.1	0.091	ug/L	3.3	91	04/15/1510:53
15MD15005	LOQ-01	1	0.2	0.161	ug/L	2.7	80	04/15/1511:08
15MD15006	CPLG0D14001	1	2.000	2.092	ug/L	3.1	105	04/15/1511:22
15MD15018	CPLG0D14002	1	2.000	2.125	ug/L	3.0	106	04/15/1514:26
15MD15019	IPCS	1	0.2	0.152	ug/L	2.4	76	04/15/1515:25
15MD15020	LOD-02	1	0.1	0.083	ug/L	2.4	83	04/15/1515:42
15MD15032	CPLG0D14003	1	2.000	2.076	ug/L	3.1	104	04/15/1518:37
15MD15043	CPLG0D14004	1	2.000	2.081	ug/L	3.0	104	04/15/1521:17
15MD15054	CPLG0D14005	1	2.000	2.125	ug/L	3.0	106	04/15/1523:57
15MD15061	CPLG0D14006	1	2.000	2.121	ug/L	3.0	106	04/16/1501:39
15MD15062	LOD-03	1	0.1	0.091	ug/L	2.5	91	04/16/1501:53
15MD15064	IPCS	1	0.2	0.157	ug/L	2.8	78	04/16/1502:23
15MD15075	CPLG0D14007	1	2.000	2.114	ug/L	3.0	106	04/16/1505:03

83/85 Ratio Acceptance Criteria: ✓25% __30%
LOD/LOQ Acceptance Criteria: __20% ✓25%
CCV Acceptance Criteria: 85-115%

Component : Perchlorate_83
Method/CalSet : PLGOD14/MD14(2015)

LFID	LSID	S	Dilf	RT	Area	SpkAmt	Con	Units	ISTDArea	83/85	Cntrl Lim	Anl DateTime	%Rec
MD15001	IBGOD151	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 10:01	
MD15002	BLANK(IS)	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 10:19	
MD15003	IPCS	P	1.000	6.86	8168	0.000	0.150	ppb	77815	2.9	2.29-3.81	04/15/15 10:38	
MD15004	LOD-01	P	1.000	7.08	4672	0.000	0.091	ppb	73956	3.3	2.29-3.81	04/15/15 10:53	
MD15005	LOQ-01	P	1.000	7.08	8355	0.000	0.161	ppb	74117	2.7	2.29-3.81	04/15/15 11:08	
MD15006	CPLGOD14001	P	1.000	7.08	101662	2.000	2.092	ppb	68489	3.1	2.29-3.81	04/15/15 11:22	105
MD15007	PLD003WB	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 11:37	
MD15008	PLD003WL	P	1.000	7.08	8338	0.000	0.167	ppb	71263	2.9	2.29-3.81	04/15/15 11:51	
MD15009	PLD003WC	P	1.000	7.08	8539	0.000	0.166	ppb	73473	2.7	2.29-3.81	04/15/15 12:09	
MD15010	D072-01	P	1.000	6.93	7351	0.000	0.150	ppb	70220	2.6	2.29-3.81	04/15/15 12:24	
MD15011	D036-01	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 12:39	
MD15012	D036-02	P	1.000	6.84	5763	0.000	0.119	ppb	69541	2.4	2.29-3.81	04/15/15 12:58	
MD15013	D036-03	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 13:13	
MD15014	D036-05	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 13:28	
MD15015	D036-06	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 13:42	
MD15016	D036-06M	P	1.000	6.84	9861	0.000	0.197	ppb	71136	2.9	2.29-3.81	04/15/15 13:57	
MD15017	D036-06S	P	1.000	6.84	10079	0.000	0.210	ppb	68300	2.9	2.29-3.81	04/15/15 14:11	
MD15018	CPLGOD14002	P	1.000	7.08	95398	2.000	2.125	ppb	63264	3.0	2.29-3.81	04/15/15 14:26	106
MD15019	IPCS	P	1.000	6.88	7279	0.000	0.152	ppb	68615	2.4	2.29-3.81	04/15/15 15:25	
MD15020	LOD-02	P	1.000	7.10	4122	0.000	0.083	ppb	71970	2.4	2.29-3.81	04/15/15 15:42	
MD15021	BLANK(IS)	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 15:57	
MD15022	PLD004SB	*	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 16:11	
MD15023	PLD004SL	*	1.000	7.08	7708	0.000	0.166	ppb	66272	2.7	2.29-3.81	04/15/15 16:26	
MD15024	PLD004SC	*	1.000	7.10	7848	0.000	0.173	ppb	64683	2.6	2.29-3.81	04/15/15 16:40	
MD15025	D040-01	*	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 16:55	
MD15026	D040-02	*	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 17:10	
MD15027	D040-03	*	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 17:24	
MD15028	D040-04	*	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 17:39	
MD15029	D040-05	*	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 17:53	
MD15030	D040-06	*	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 18:08	
MD15031	D040-07	*	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 18:22	
MD15032	CPLGOD14003	P	1.000	7.06	94948	2.000	2.076	ppb	64482	3.1	2.29-3.81	04/15/15 18:37	104
MD15033	D040-08	*	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 18:51	
MD15034	D040-09	*	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 19:06	
MD15035	D040-10	*	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 19:21	
MD15036	D040-10M	*	1.000	7.06	8191	0.000	0.173	ppb	67422	3.0	2.29-3.81	04/15/15 19:35	
MD15037	D040-10S	*	1.000	7.05	8572	0.000	0.173	ppb	70680	2.7	2.29-3.81	04/15/15 19:50	
MD15038	PLD005SB	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 20:04	
MD15039	PLD005SL	P	1.000	7.06	8003	0.000	0.162	ppb	70611	2.6	2.29-3.81	04/15/15 20:19	
MD15040	PLD005SC	P	1.000	7.08	7745	0.000	0.163	ppb	67809	2.6	2.29-3.81	04/15/15 20:33	
MD15041	D040-11	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 20:48	
MD15042	D040-12	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 21:02	
MD15043	CPLGOD14004	P	1.000	7.08	94865	2.000	2.081	ppb	64243	3.0	2.29-3.81	04/15/15 21:17	104
MD15044	D040-13	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 21:32	
MD15045	D040-14	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 21:46	
MD15046	D040-15	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 22:01	
MD15047	D040-15M	P	1.000	7.03	7732	0.000	0.165	ppb	66789	2.9	2.29-3.81	04/15/15 22:15	
MD15048	D040-15S	P	1.000	7.03	8262	0.000	0.172	ppb	68601	2.8	2.29-3.81	04/15/15 22:30	
MD15049	D040-16	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 22:44	
MD15050	D040-17	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 22:59	
MD15051	D040-18	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 23:13	
MD15052	D040-19	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 23:28	
MD15053	D040-20	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/15/15 23:42	
MD15054	CPLGOD14005	P	1.000	7.05	96631	2.000	2.125	ppb	64096	3.0	2.29-3.81	04/15/15 23:57	106
MD15055	D041-01	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 12:12	
MD15056	D041-02	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 12:26	
MD15057	D041-03	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 12:41	
MD15058	D041-04	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 12:55	
MD15059	D041-05	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 01:10	
MD15060	D041-06	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 01:24	
MD15061	CPLGOD14006	P	1.000	7.05	95108	2.000	2.121	ppb	63206	3.0	2.29-3.81	04/16/15 01:39	106
MD15062	LOD-03	P	1.000	7.05	4431	0.000	0.091	ppb	70409	2.5	2.29-3.81	04/16/15 01:53	
MD15063	BLANK(IS)	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 02:08	
MD15064	IPCS	P	1.000	6.89	7683	0.000	0.157	ppb	69780	2.8	2.29-3.81	04/16/15 02:23	
MD15065	PLD004WB	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 02:37	
MD15066	PLD004WL	P	1.000	7.06	7674	0.000	0.164	ppb	66935	2.7	2.29-3.81	04/16/15 02:52	
MD15067	PLD004WC	P	1.000	7.08	7902	0.000	0.167	ppb	67647	2.5	2.29-3.81	04/16/15 03:06	
MD15068	D040-21	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 03:21	
MD15069	D040-22	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 03:35	
MD15070	D046-01	P	1.000	6.89	2409	0.000	0.052	ppb	68603	2.4	2.29-3.81	04/16/15 03:50	
MD15071	D046-02	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 04:04	

MD15072	D046-03	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 04:19	
MD15073	D046-09	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 04:33	
MD15074	D046-10	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 04:48	
MD15075	CPLGOD14007	P	1.000	7.10	94972	2.000	2.114	ppb	63334	3.0	2.29-3.81	04/16/15 05:03	106
MD15076	D046-11	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 05:17	
MD15077	D065-01	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 05:32	
MD15078	D065-02	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 05:46	
MD15079	D065-09	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 06:01	
MD15080	D065-20	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 06:15	
MD15081	D070-14	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 06:30	
MD15082	D070-15	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/16/15 06:44	

83/85 Ratio: +/-25%

Method 6850
EMAX Laboratories
Instrument # G0

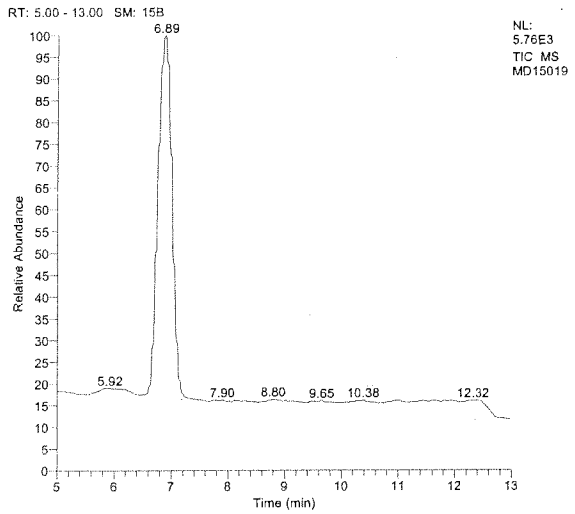
Sample Summary

EMAX Lab ID:	IPCS 0.2PPB/400PPM
Lab File ID:	MD15019
Acquisition Date:	04/15/15 03:25:46 PM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB5
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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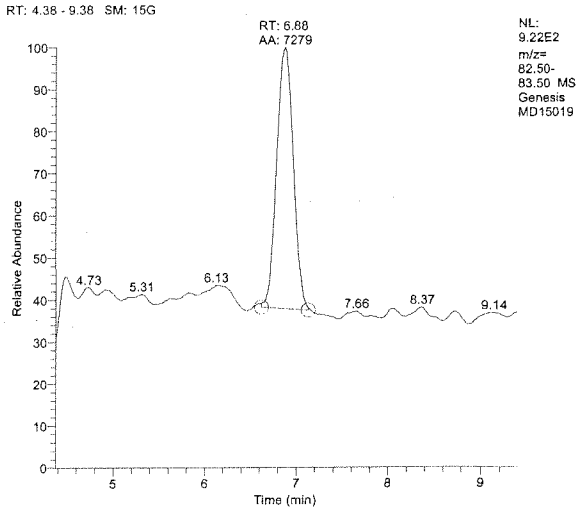
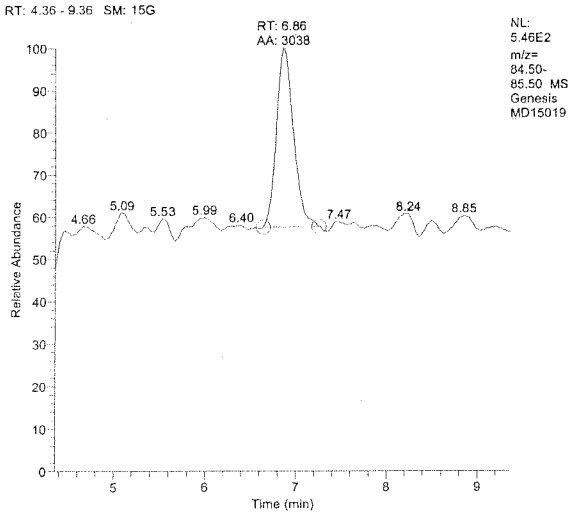


Perchlorate, m/z=85



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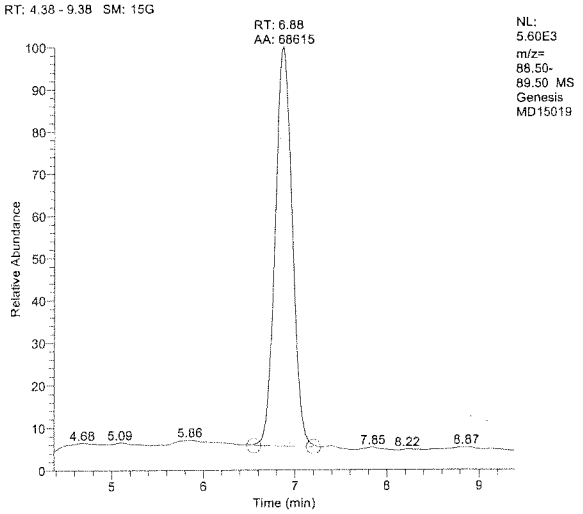


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.88	7279	0.000	0.152	ppb	62.68
Perchlorate_85	6.86	3038	0.000	0.185	ppb	49.29
Perchlorate_89_ISTD	6.88	68615	2.000	N/A	ppb	275.98

83/85 Ratio: 2.40
(Control Limit: +/-30%)

Wednesday, April 15, 2015, 15:42:48

Method 6850
EMAX Laboratories
Instrument # G0

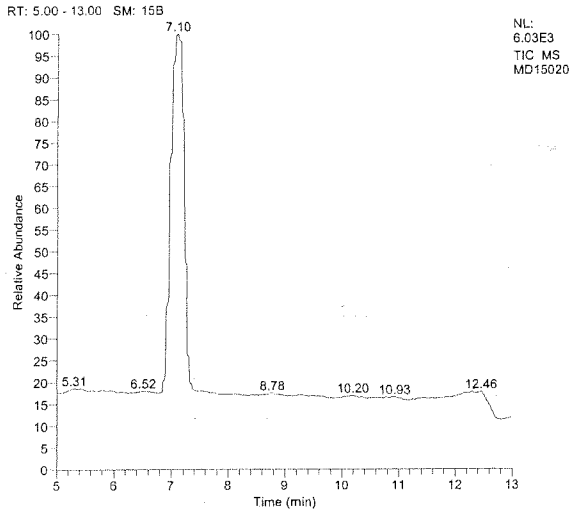
Sample Summary

EMAX Lab ID:	LOD-02 0.1PPB
Lab File ID:	MD15020
Acquisition Date:	04/15/15 03:42:44 PM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB6
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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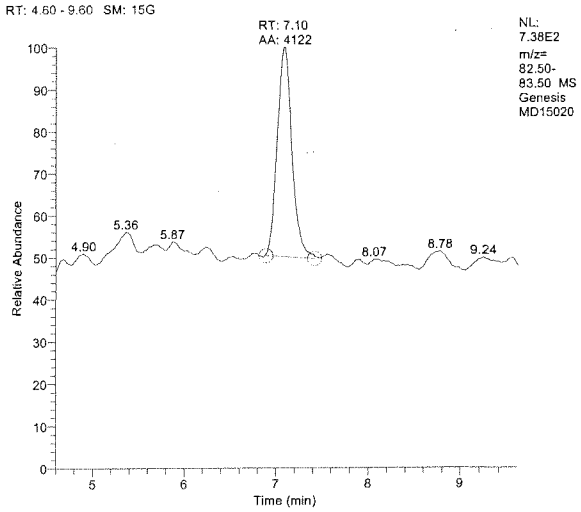
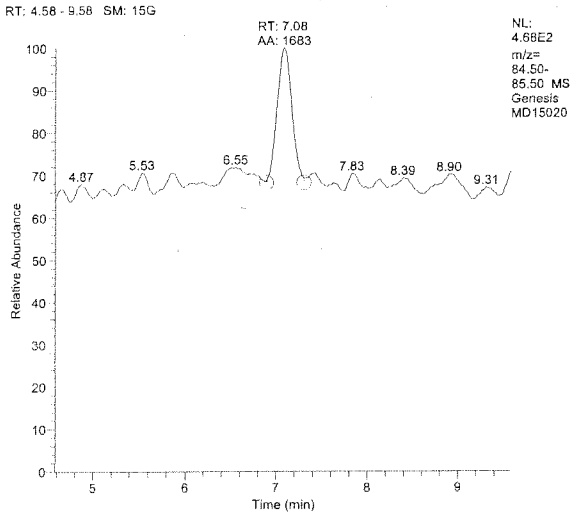


Perchlorate, m/z=85



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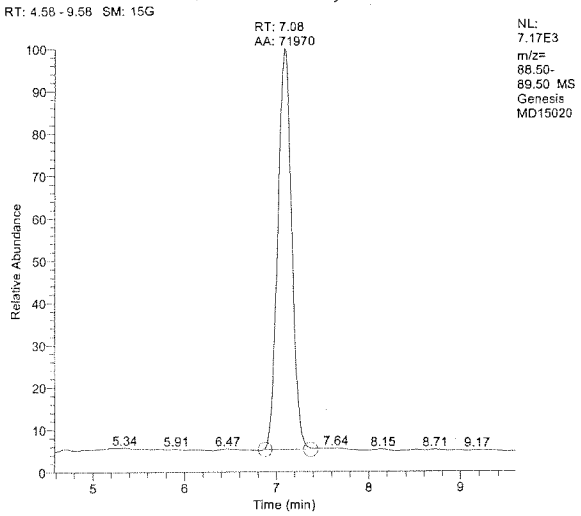


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.10	4122	0.000	0.083	ppb	72.31
Perchlorate_85	7.08	1683	0.000	0.095	ppb	23.43
Perchlorate_89_ISTD	7.08	71970	2.000	N/A	ppb	794.76

83/85 Ratio: 2.45

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

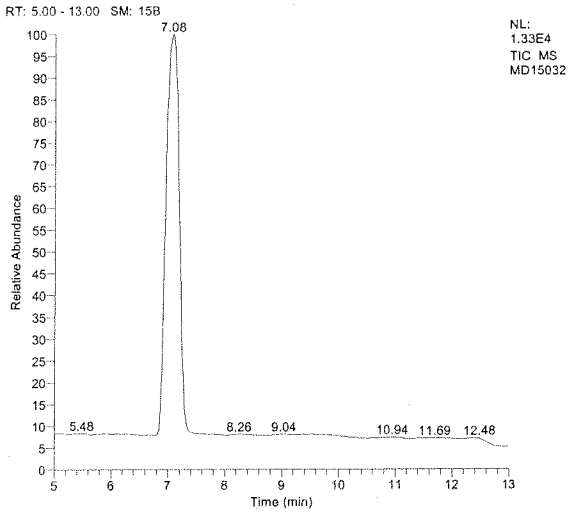
Sample Summary

EMAX Lab ID:	CPLG0D14003
Lab File ID:	MD15032
Acquisition Date:	04/15/15 06:37:16 PM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	QC
Calibration Level:	2 PPB
Vial:	RB7
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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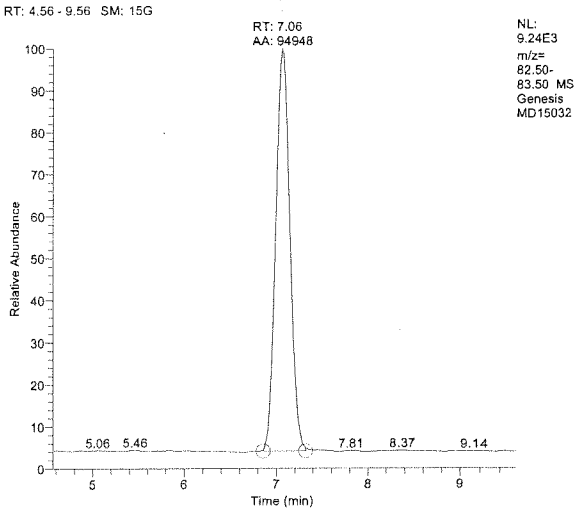

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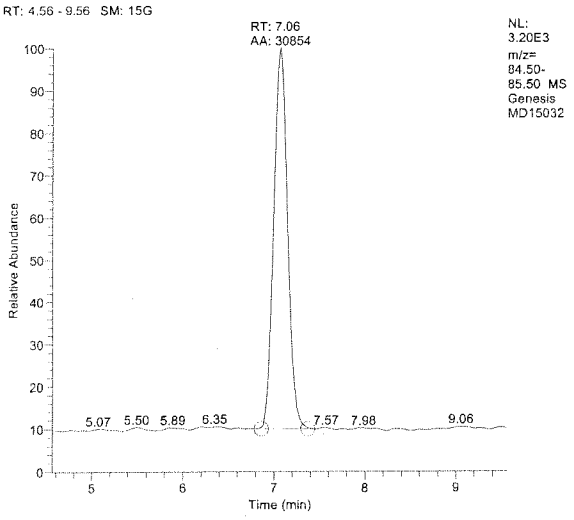
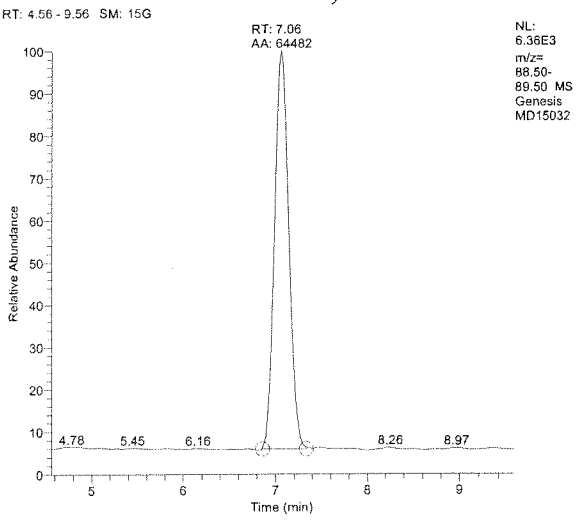


Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.06	94948	2.000	2.076	ppb	1250.51
Perchlorate_85	7.06	30854	2.000	2.050	ppb	375.60
Perchlorate_89_ISTD	7.06	64482	2.000	N/A	ppb	884.51

83/85 Ratio: 3.09

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

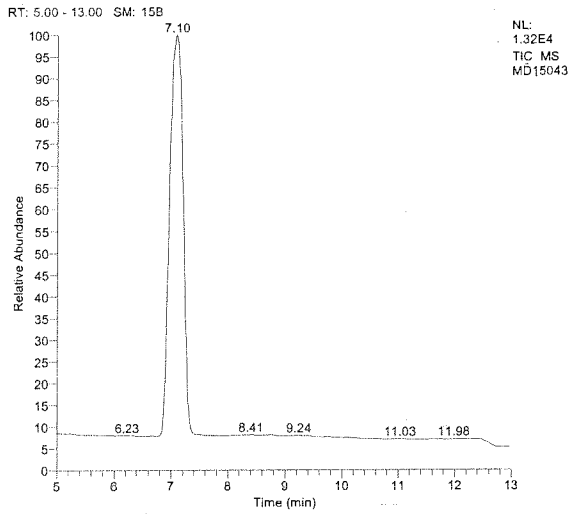
Sample Summary

EMAX Lab ID:	CPLG0D14004
Lab File ID:	MD15043
Acquisition Date:	04/15/15 09:17:28 PM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	QC
Calibration Level:	2 PPB
Vial:	RB7
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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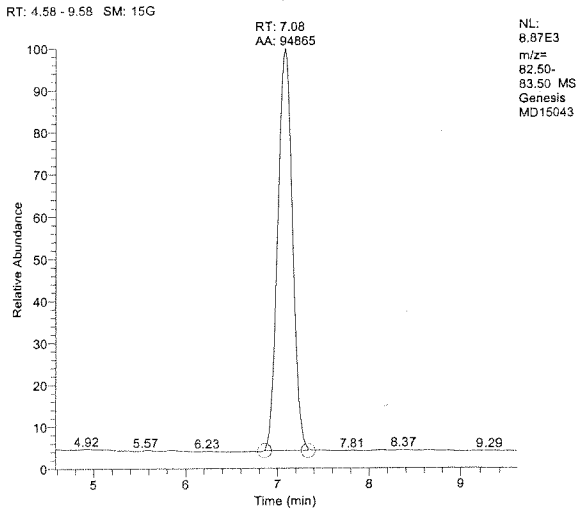

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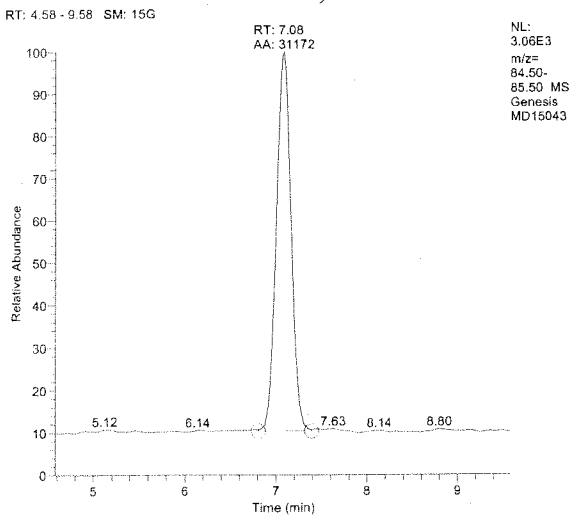

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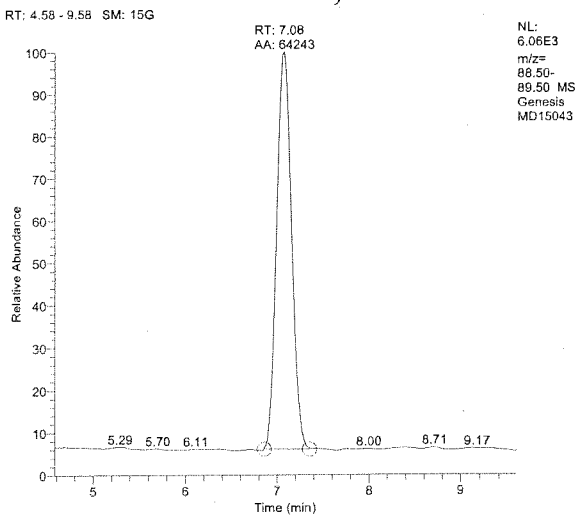


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.08	94865	2.000	2.081	ppb	817.53
Perchlorate_85	7.08	31172	2.000	2.079	ppb	563.62
Perchlorate_89_ISTD	7.08	64243	2.000	N/A	ppb	877.18

83/85 Ratio: 3.04

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

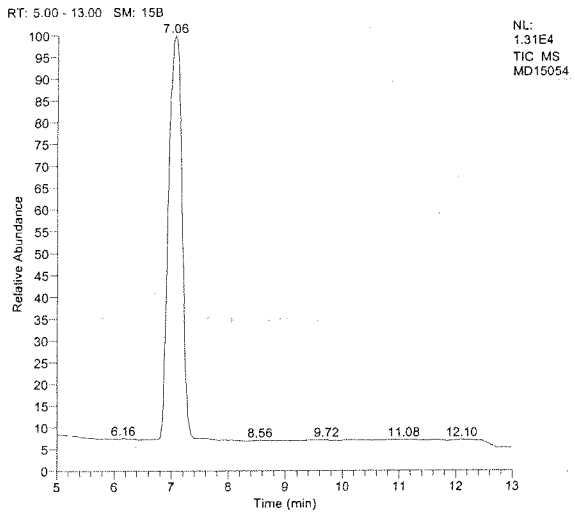
Sample Summary

EMAX Lab ID:	CPLG0D14005
Lab File ID:	MD15054
Acquisition Date:	04/15/15 11:57:30 PM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	QC
Calibration Level:	2 PPB
Vial:	RB8
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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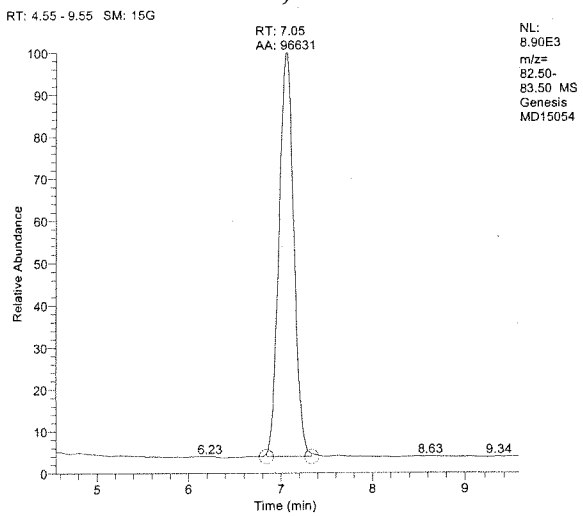

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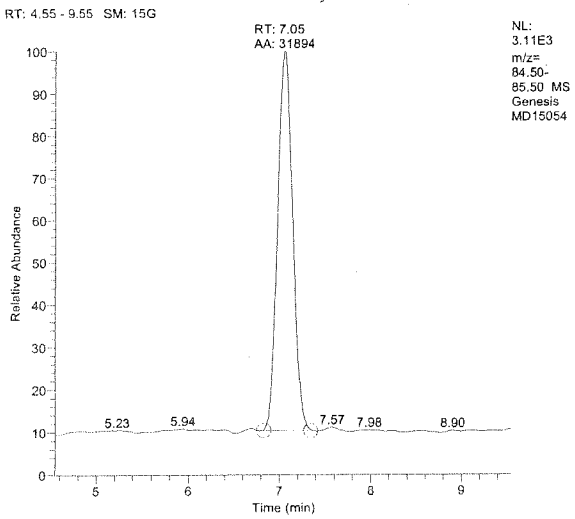

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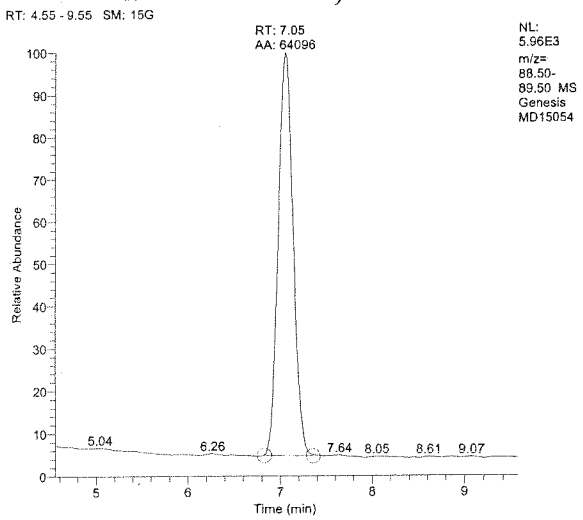


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.05	96631	2.000	2.125	ppb	2304.55
Perchlorate_85	7.05	31894	2.000	2.132	ppb	459.43
Perchlorate_89_ISTD	7.05	64096	2.000	N/A	ppb	736.57

83/85 Ratio: 3.03
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

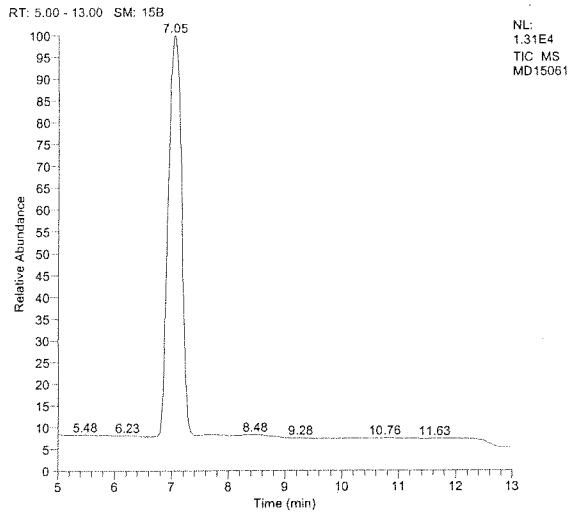
Sample Summary

EMAX Lab ID:	CPLG0D14006
Lab File ID:	MD15061
Acquisition Date:	04/16/15 01:39:25 AM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

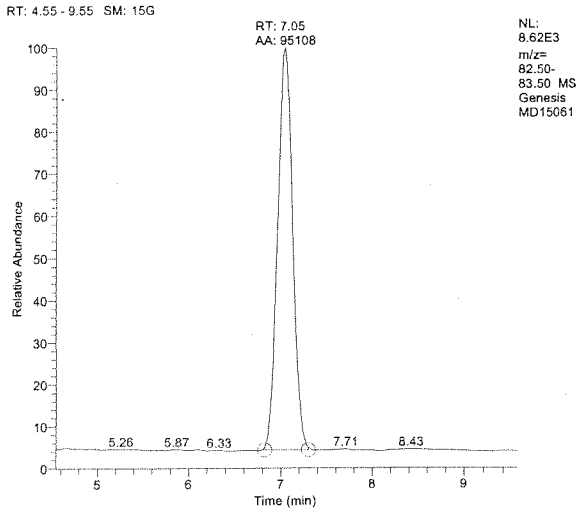
Run Parameters

Sample Type:	QC
Calibration Level:	2 PPB
Vial:	RB8
Injection Volume(ul):	20.00
Run Time(min):	12.99

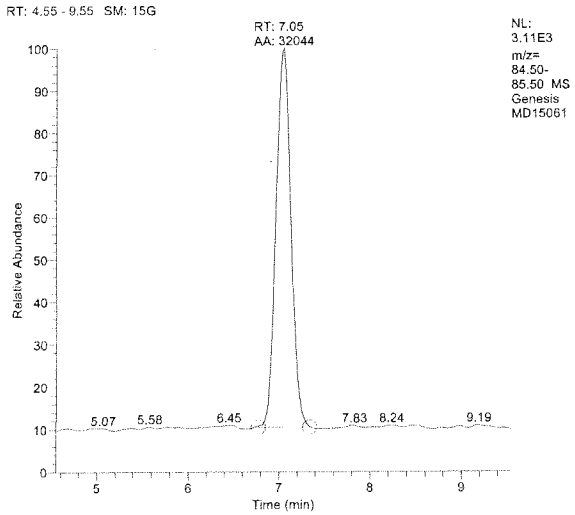
TIC



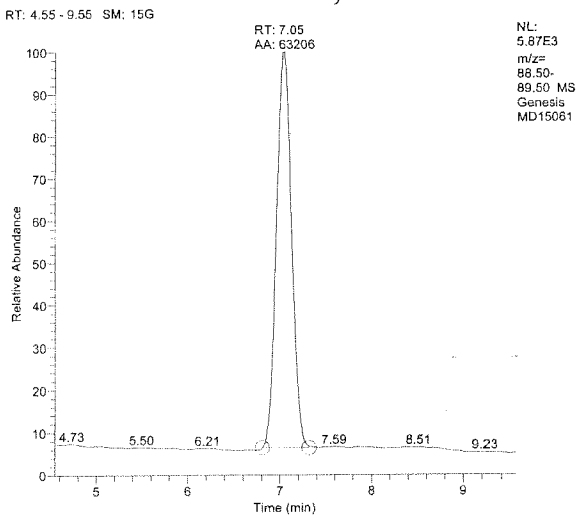
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.05	95108	2.000	2.121	ppb	877.52
Perchlorate_85	7.05	32044	2.000	2.173	ppb	361.15
Perchlorate_89_ISTD	7.05	63206	2.000	N/A	ppb	884.51

83/85 Ratio: 2.97

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

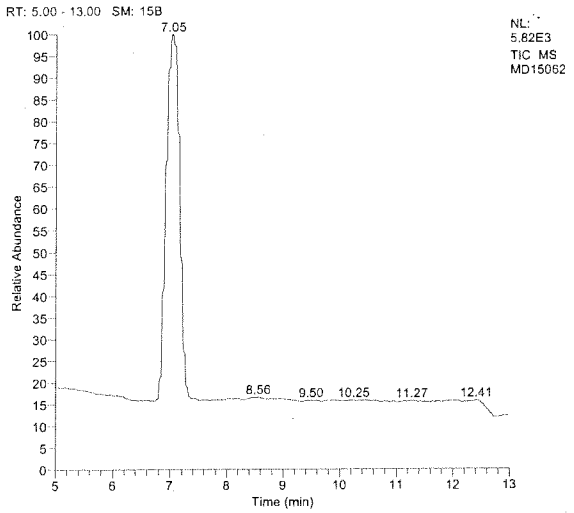
Sample Summary

EMAX Lab ID:	LOD-03 0.1PPB
Lab File ID:	MD15062
Acquisition Date:	04/16/15 01:53:57 AM
Data Path:	C:\XCALIBUR\DATA\MD15
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

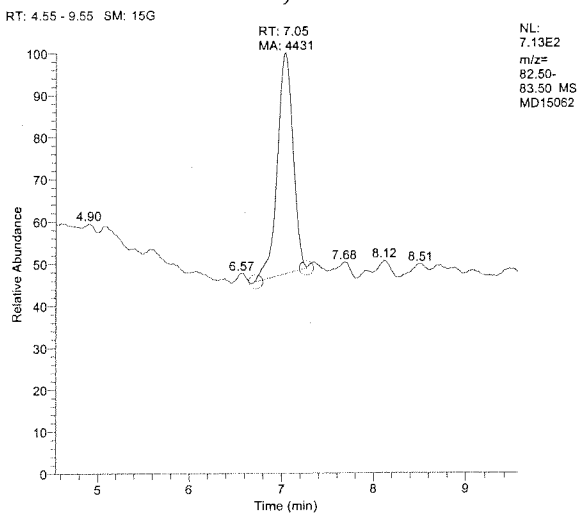
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB6
Injection Volume(ul):	20.00
Run Time(min):	12.99

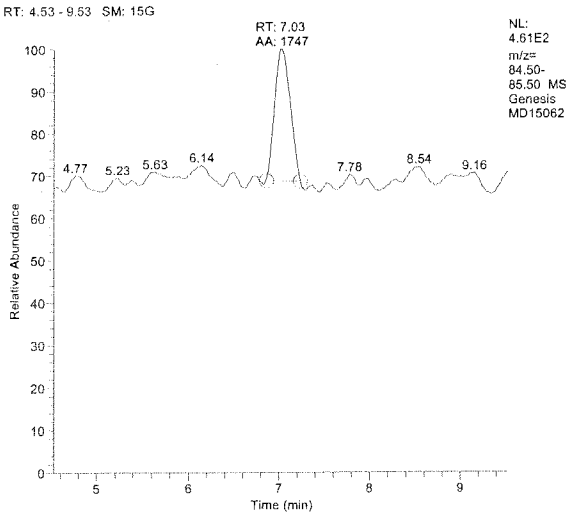
TIC



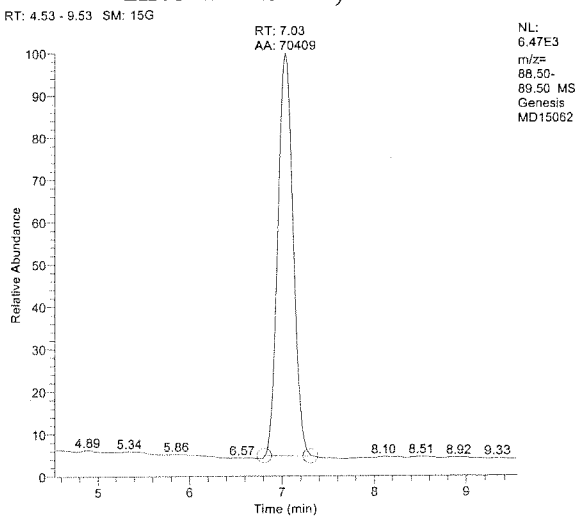
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.05	4431	0.000	0.091	ppb	25.75
Perchlorate_85	7.03	1747	0.000	0.101	ppb	26.63
Perchlorate_89_ISTD	7.03	70409	2.000	N/A	ppb	276.50

83/85 Ratio: 2.54

(Control Limit: +/-30%)

ANALYTICAL LOG(S)

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
PERCHLORATE BY HPLC/MS

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

ICAL: PLG0D14

* 4µL Internal Standard added to each 1mL sample vial prior to analysis.

** LOQ - 01 (0.2 ppb)
2µL Standard → 1000µL H2O

MD14002: QC for H2O, Lot#: 55007; ID: SW1A-005-12-06

Book #:	AG0-005
Instrument No.:	G0
Analytical Sequence:	MD14
Method File:	PLG0D14
Analytical Batch:	—

SOP #	Rev. #
☑ EMAX-6850	1
☐ EMAX-	

STANDARDS ID		Conc. (µg/L)
ICAL	SH1C-10-05-03	(6.1-7.5) ppb / 2 ppb
ICV	06-01	2 ppb / 2 ppb
DCC1	05-02	2 ppb / 2 ppb
DCC2	—	—
LCS	—	—
MS	—	—
IS *	SH1B-07-08-02	500 ppb
IPC	SH1C-10-05-01	0.2 ppb / 480 ppm
LODV **	SH1B-07-07-08	100 ppb

SOLVENT	ID
Acetonitrile	SW1A-005-04A-24
Methanol	—
Water	SW1A-005-10-29
Acetic Acid	SP1A-07-10-01

FILTER	ID
0.20 µm PTFE Membrane	21331577
0.45 µm PTFE Membrane	—

Data File	

SYRINGES
☑ 1 mL - MSF-01-01-01
☐ 100 µL - MSF-01-01-02
☐ 25 µL - MSF-01-01-03
☑ 10 µL - MSF-01-01-04
☐
☐

ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ XCALIBURG0	
☐	

Analyzed By: [illegible]

Date: 04/14/15

Thermo Xcalibur Sequence Setup - MD14.sld

File Edit Change Actions View GoTo Help

	Position	Sample ID	File Name	Inj Vol	Dil Factor	Sample Type	Level	Path	Inst Meth	Proc Meth	Cal File
1	RA1	IBG0D141	MD14001	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
2	RA2	QC H20 LOT#:55007	MD14002	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
3	RA3	BLANK(IS)	MD14003	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
4	RA4	PLG0D14001	MD14004	20.000	1.000	Std Clear	0.1 ppb	C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
5	RA5	PLG0D14002	MD14005	20.000	1.000	Std Update	0.2 ppb	C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
6	RA6	PLG0D14003	MD14006	20.000	1.000	Std Update	0.5 ppb	C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
7	RA7	PLG0D14004	MD14007	20.000	1.000	Std Update	1 ppb	C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
8	RA8	PLG0D14005	MD14008	20.000	1.000	Std Update	2 ppb	C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
9	RB1	PLG0D14006	MD14009	20.000	1.000	Std Update	5 ppb	C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
10	RB2	PLG0D14007	MD14010	20.000	1.000	Std Update	7.5 ppb	C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
11	RB3	IPLG0D14001	MD14011	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
12	RB4	LOQ-01 0.2PPB	MD14012	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
13	RB5	IPCS 0.2PPB/400PPM	MD14013	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
				0.001	0.000						

FINAL GA 04/15/15

04/15/15

For Help, press F1 CAP NUM 4/15/2015 Wednesday, April 15, 2015

Thermo Xcalibur Sequ...

8816

LFID	EFID	Dil Factor
MD14001	IBG0D141	1.000
MD14002	QC H20 LOT#:55007	1.000
MD14003	BLANK(IS)	1.000
MD14004	PLG0D14001	1.000
MD14005	PLG0D14002	1.000
MD14006	PLG0D14003	1.000
MD14007	PLG0D14004	1.000
MD14008	PLG0D14005	1.000
MD14009	PLG0D14006	1.000
MD14010	PLG0D14007	1.000
MD14011	IPLG0D14001	1.000
MD14012	LOQ-01 0.2PPB	1.000
MD14013	IPCS 0.2PPB/400PPM	1.000

FINAL ca 04/15/15

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
PERCHLORATE BY HPLC/MS

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

* 4µL Internal Standard added to each 1mL sample vial prior to analysis.

** LOD - 01, 02, 03, 04 (0.1ppb)
1µL Standard → 1000µL H2O
** LOQ - 01 (0.2 ppb)
2µL Standard → 1000µL H2O

PLD003W: D072, D036: 400µL aliquot of each sample were volumed to 1000µL H2O to be calculated as prep. factor of 2.5X prior to analysis.

PLD003WL/WC (0.2 ppb)
(*) 2µL Standard → 1000µL H2O
D036-06M/06S (0.2 ppb)
(*) 2µL Standard → 1000µL Sample

PLD004S: D040 (1-10)
PLD005S: D040 (11-20), D041
} 500µL aliquot of each sample were volumed to 1000µL H2O to be calculated as prep. factor of 2X prior to analysis.

PLD004W: D040, D046, D065, D070: 400µL aliquot of each sample were volumed to 1000µL H2O to be calculated as prep. factor of 2.5X prior to analysis

PLD004WL/WC (0.2 ppb) (*) 2µL Standard → 1000µL H2O
D070-16M/16S (0.2 ppb) (*) 2µL Standard → 1000µL H2O

SYRINGES
☑ 1 mL - MSF-01-01-01
☐ 100 µL - MSF-01-01-02
☐ 25 µL - MSF-01-01-03
☑ 10 µL - MSF-01-01-04
☐
☐

Book #:	AG0-005
Instrument No.:	G0
Analytical Sequence:	MD15
Method File:	PLG0D14
Analytical Batch:	PLD003W, PLD004S, PLD005S, PLD004W

SOP #	Rev. #
☑ EMAX-6850	1
☐ EMAX-	

STANDARDS ID		Conc. (µg/L)
ICAL	—	—
ICV	—	—
DCC1	SHIC - 10 - 05 - 02	2 ppb / 2 ppb
DCC2	—	—
LCS (*)	SHIB - 07 - 07 - 03	100 ppb
MS (*)	↓	↓
IS *	SHIB - 07 - 05 - 02	500 ppb
IPC	SHIBC - 10 - 05 - 01	0.2 ppb / 400 ppb
LODV **	SHIB - 07 - 07 - 03	100 ppb

SOLVENT	ID
Acetonitrile	SWIA - 005 - 009 - 24
Methanol	—
Water	SWIA - 005 - 12 - 06
Acetic Acid	SPIA - 07 - 10 - 01

FILTER	ID
0.20 µm PTFE Membrane	21837377
0.45 µm PTFE Membrane	—

Data File	

ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ XCALIBURG0	
☐	

Analyzed By: [illegible]
Date: 04/15/15

8048

Thermo Xcalibur Sequence Setup - MD15.sld

File Edit Change Actions View GoTo Help

	Position	Sample ID	File Name	Inj Vol	Dil Factor	Sample Type	Level	Path	Inst Meth	Proc Meth	Cal File
1	RA1	IBG0D151	MD15001	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
2	RA3	BLANK(IS)	MD15002	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
3	RB5	IPCS 0.2PPB/400PPM	MD15003	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
4	RB6	LOD-01 0.1PPB	MD15004	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
5	RB4	LOQ-01 0.2PPB	MD15005	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
6	RB7	CPLG0D14001	MD15006	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
7	GB5	PLD003WB	MD15007	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
8	GB6	PLD003WL	MD15008	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
9	GB7	PLD003WC	MD15009	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
10	GB8	D072-01	MD15010	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
11	GC1	D036-01	MD15011	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
12	GC2	D036-02	MD15012	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
13	GC3	D036-03	MD15013	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
14	GC4	D036-05	MD15014	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
15	GC5	D036-06	MD15015	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
16	GC6	D036-06M	MD15016	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
17	GC7	D036-06S	MD15017	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
18	RB7	CPLG0D14002	MD15018	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
19	RB5	IPCS 0.2PPB/400PPM	MD15019	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
20	RB6	LOD-02 0.1PPB	MD15020	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
21	RA3	BLANK(IS)	MD15021	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
22	RC1	PLD004SB	MD15022	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
23	RC2	PLD004SL	MD15023	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
24	RC3	PLD004SC	MD15024	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
25	RC4	D040-01	MD15025	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
26	RC5	D040-02	MD15026	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
27	RC6	D040-03	MD15027	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
28	RC7	D040-04	MD15028	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
29	RC8	D040-05	MD15029	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
30	RD1	D040-06	MD15030	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
31	RD2	D040-07	MD15031	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
32	RB7	CPLG0D14003	MD15032	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
33	RD3	D040-08	MD15033	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
34	RD4	D040-09	MD15034	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
35	RD5	D040-10	MD15035	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
36	RD6	D040-10M	MD15036	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
37	RD7	D040-10S	MD15037	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
38	RD8	PLD005SB	MD15038	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
39	RE1	PLD005SL	MD15039	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
40	RE2	PLD005SC	MD15040	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
41	RE3	D040-11	MD15041	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
42	RE4	D040-12	MD15042	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
43	RB7	CPLG0D14004	MD15043	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
44	RE5	D040-13	MD15044	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
45	RE6	D040-14	MD15045	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
46	RE7	D040-15	MD15046	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
47	RE8	D040-15M	MD15047	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
48	GA1	D040-15S	MD15048	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
49	GA2	D040-16	MD15049	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
50	GA3	D040-17	MD15050	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14

For Help, press F1 CAP NUM 4/16/2015 Thursday, April 16, 2015

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Thermo Xcalibur Sequence Setup - MD15.sld

File Edit Change Actions View GoTo Help

	Position	Sample ID	File Name	Inj Vol	Dil Factor	Sample Type	Level	Path	Inst Meth	Proc Meth	Cal File
47	RE8	D040-15M	MD15047	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
48	GA1	D040-15S	MD15048	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
49	GA2	D040-16	MD15049	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
50	GA3	D040-17	MD15050	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
51	GA4	D040-18	MD15051	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
52	GA5	D040-19	MD15052	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
53	GA6	D040-20	MD15053	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
54	RB8	CPLG0D14005	MD15054	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
55	GA7	D041-01	MD15055	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
56	GA8	D041-02	MD15056	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
57	GB1	D041-03	MD15057	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
58	GB2	D041-04	MD15058	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
59	GB3	D041-05	MD15059	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
60	GB4	D041-06	MD15060	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
61	RB8	CPLG0D14006	MD15061	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
62	RB6	LOD-03 0.1PPB	MD15062	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
63	RA3	BLANK(IS)	MD15063	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
64	RB5	IPCS 0.2PPB/400PPM	MD15064	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
65	GE3	PLD004WB	MD15065	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
66	GE4	PLD004WL	MD15066	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
67	GE5	PLD004WC	MD15067	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
68	GC8	D040-21	MD15068	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
69	GD1	D040-22	MD15069	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
70	GD2	D046-01	MD15070	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
71	GD3	D046-02	MD15071	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
72	GD4	D046-03	MD15072	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
73	GD5	D046-09	MD15073	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
74	GD6	D046-10	MD15074	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
75	RB8	CPLG0D14007	MD15075	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
76	GD7	D046-11	MD15076	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
77	GD8	D065-01	MD15077	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
78	GE1	D065-02	MD15078	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
79	GE6	D065-09	MD15079	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
80	BA1	D065-20	MD15080	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
81	BA2	D070-14	MD15081	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
82	BA3	D070-15	MD15082	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
83	BA4	D070-16	MD15083	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
84	BA5	D070-16M	MD15084	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
85	BA6	D070-16S	MD15085	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
86	RB8	CPLG0D14008	MD15086	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
87	BA7	D082-01	MD15087	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
88	BA8	D082-07	MD15088	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
89	BB1	D082-09	MD15089	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
90	BB2	D082-10	MD15090	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
91	BB3	D082-11	MD15091	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
92	RB8	CPLG0D14009	MD15092	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
93	RB6	LOD-04 0.1PPB	MD15093	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
94	RA3	BLANK(IS)	MD15094	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD15	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
*				0.001	0.000						

FINAL CR 04/16/15

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CAP NUM 4/16/2015

Thursday, April 16, 2015

Start | Thermo Xcalibur Sequ... | Chrome Browser | C:\Xcalibur\methods | Thermo Xcalibur Qu... | Untitled - Pa...

9056

LFID	EFID	Dil Factor
MD15001	IBG0D151	1.000
MD15002	BLANK(IS)	1.000
MD15003	IPCS 0.2PPB/400PPM	1.000
MD15004	LOD-01 0.1PPB	1.000
MD15005	LOQ-01 0.2PPB	1.000
MD15006	CPLG0D14001	1.000
MD15007	PLD003WB	1.000
MD15008	PLD003WL	1.000
MD15009	PLD003WC	1.000
MD15010	D072-01	1.000
MD15011	D036-01	1.000
MD15012	D036-02	1.000
MD15013	D036-03	1.000
MD15014	D036-05	1.000
MD15015	D036-06	1.000
MD15016	D036-06M	1.000
MD15017	D036-06S	1.000
MD15018	CPLG0D14002	1.000
MD15019	IPCS 0.2PPB/400PPM	1.000
MD15020	LOD-02 0.1PPB	1.000
MD15021	BLANK(IS)	1.000
MD15022	PLD004SB	1.000
MD15023	PLD004SL	1.000
MD15024	PLD004SC	1.000
MD15025	D040-01	1.000
MD15026	D040-02	1.000
MD15027	D040-03	1.000
MD15028	D040-04	1.000
MD15029	D040-05	1.000
MD15030	D040-06	1.000
MD15031	D040-07	1.000
MD15032	CPLG0D14003	1.000
MD15033	D040-08	1.000
MD15034	D040-09	1.000
MD15035	D040-10	1.000
MD15036	D040-10M	1.000
MD15037	D040-10S	1.000
MD15038	PLD005SB	1.000
MD15039	PLD005SL	1.000
MD15040	PLD005SC	1.000
MD15041	D040-11	1.000
MD15042	D040-12	1.000
MD15043	CPLG0D14004	1.000
MD15044	D040-13	1.000
MD15045	D040-14	1.000
MD15046	D040-15	1.000
MD15047	D040-15M	1.000
MD15048	D040-15S	1.000
MD15049	D040-16	1.000
MD15050	D040-17	1.000
MD15051	D040-18	1.000
MD15052	D040-19	1.000
MD15053	D040-20	1.000
MD15054	CPLG0D14005	1.000
MD15055	D041-01	1.000
MD15056	D041-02	1.000
MD15057	D041-03	1.000
MD15058	D041-04	1.000
MD15059	D041-05	1.000
MD15060	D041-06	1.000
MD15061	CPLG0D14006	1.000
MD15062	LOD-03 0.1PPB	1.000
MD15063	BLANK(IS)	1.000
MD15064	IPCS 0.2PPB/400PPM	1.000
MD15065	PLD004WB	1.000
MD15066	PLD004WL	1.000
MD15067	PLD004WC	1.000
MD15068	D040-21	1.000

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LFID	EFID	Dil Factor
MD15069	D040-22	1.000
MD15070	D046-01	1.000
MD15071	D046-02	1.000
MD15072	D046-03	1.000
MD15073	D046-09	1.000
MD15074	D046-10	1.000
MD15075	CPLG0D14007	1.000
MD15076	D046-11	1.000
MD15077	D065-01	1.000
MD15078	D065-02	1.000
MD15079	D065-09	1.000
MD15080	D065-20	1.000
MD15081	D070-14	1.000
MD15082	D070-15	1.000
MD15083	D070-16	1.000
MD15084	D070-16M	1.000
MD15085	D070-16S	1.000
MD15086	CPLG0D14008	1.000
MD15087	D082-01	1.000
MD15088	D082-07	1.000
MD15089	D082-09	1.000
MD15090	D082-10	1.000
MD15091	D082-11	1.000
MD15092	CPLG0D14009	1.000
MD15093	LOD-04 0.1PPB	1.000
MD15094	BLANK(IS)	1.000

FINAL cl 04/16/15

EXTRACTION LOGS

EMAX LABORATORIES, INC.

EXTRACTION LOG
for
PERCHLORATE BY HPLC/MS

Note: For samples, relevant QCs/Standards extracted, refer to attached extraction sequence.

Comments:

PLD005S → D040-11 to 20
D041-01 to -06

① 4µl of IS added to each 1000µl sample prior to analysis.

Syringes:
☑ 100µL – MSF-01-01-02
☑ 10µL – MSF-01-01-04

Book #.: EPC-004

Preparation Batch: PLD005S

Matrix: Soil

SOP	Rev. #
☑ EMAX-6850	0
☐ EMAX-	

Standards	ID	Amount Added (ml)
LCS/MS	SH1B-07-08-01 (1000 ppb)	16µL
① Internal Standard	SH1B-07-08-02 (500 ppb)	4µl.

Reagent	Lot # / ID
H_2O	SW1A-005-10-25
Sand	124605 / SW1B-002-41-19

SDG#	Extract Location

Prepared By: JC / [illegible]

Standard Added By: [illegible]

EMAX LABORATORIES, INC.

FileID: PLD005S

SAMPLE PREPARATION LOG FOR PERCHLORATE

PrepBatchID	LabSampleID	Aliquot	DateTime	Unit	Ve(ml)	ExpAmt	ExpVe(ml)	AliquotFctr	Comments
15PLD005S01	PLD005SB	4.01	4/9/15 12:25	g	40	4	40	1	
15PLD005S02	PLD005SL	4	4/9/15 12:26	g	40	4	40	1	
15PLD005S03	PLD005SC	4	4/9/15 12:27	g	40	4	40	1	
15PLD005S04	D040-11	4	4/9/15 12:33	g	40	4	40	1	
15PLD005S05	D040-12	4.01	4/9/15 12:34	g	40	4	40	1	
15PLD005S06	D040-13	4	4/9/15 12:34	g	40	4	40	1	
15PLD005S07	D040-14	4	4/9/15 12:35	g	40	4	40	1	
15PLD005S08	D040-15	4	4/9/15 12:36	g	40	4	40	1	
15PLD005S09	D040-15M	4	4/9/15 12:37	g	40	4	40	1	
15PLD005S10	D040-15S	4	4/9/15 12:37	g	40	4	40	1	
15PLD005S11	D040-16	4	4/9/15 12:38	g	40	4	40	1	
15PLD005S12	D040-17	4	4/9/15 12:39	g	40	4	40	1	
15PLD005S13	D040-18	4	4/9/15 12:39	g	40	4	40	1	
15PLD005S14	D040-19	4	4/9/15 12:40	g	40	4	40	1	
15PLD005S15	D040-20	4.01	4/9/15 12:41	g	40	4	40	1	
15PLD005S16	D041-01	4	4/9/15 12:44	g	40	4	40	1	
15PLD005S17	D041-02	4	4/9/15 12:45	g	40	4	40	1	
15PLD005S18	D041-03	4	4/9/15 12:46	g	40	4	40	1	
15PLD005S19	D041-04	4.01	4/9/15 12:47	g	40	4	40	1	
15PLD005S20	D041-05	4	4/9/15 12:47	g	40	4	40	1	
15PLD005S21	D041-06	4	4/9/15 12:48	g	40	4	40	1	

FINAL

Balance ID: 10304418. Calibration check was verified prior to use.

Ve=extract volume

AliquotFctr=ExpAmt/Aliquot

☑ Extraction Started @ 4/9/15 14:05

Prepared By: JChun

☑ Extraction Ended @ 04/09/15 17:20 04/09/15

Checked By:

Date 04/09/15

8055

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D041

METHOD 7199
HEXAVALENT CHROMIUM

A total of six (6) soil samples were received on 04/08/15 to be analyzed for Hexavalent Chromium in accordance with Method 7199 and project specific requirements.

Holding Time
Samples were analyzed within the prescribed holding time.

Calibration
Calibration was performed as prescribed by the method and was verified using a secondary source (ICV). All calibration requirements were within acceptance criteria.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, one (1) method blank was analyzed. Hexavalent Chromium was not detected in HCD008SB. Refer to sample result summary form for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, one (1) soluble LCS was analyzed. Hexavalent Chromium was within LCS QC limits in CSD008SL. One (1) insoluble LCS was also analyzed and Hexavalent Chromium was within LCS QC limits. Refer to LCS summary form for details.

Matrix QC Sample
No matrix QC sample was designated on this SDG.

Sample Analysis
Samples were analyzed according to prescribed analytical procedures. Results were evaluated in accordance to project requirements. For this SDG, all quality control requirements were met.
Sample D041-03 was initially diluted and analyzed at DF=5 due to dark brown color-matrix.

SAMPLE RESULTS

METHOD 7199
HEXAVALENT CHROMIUM

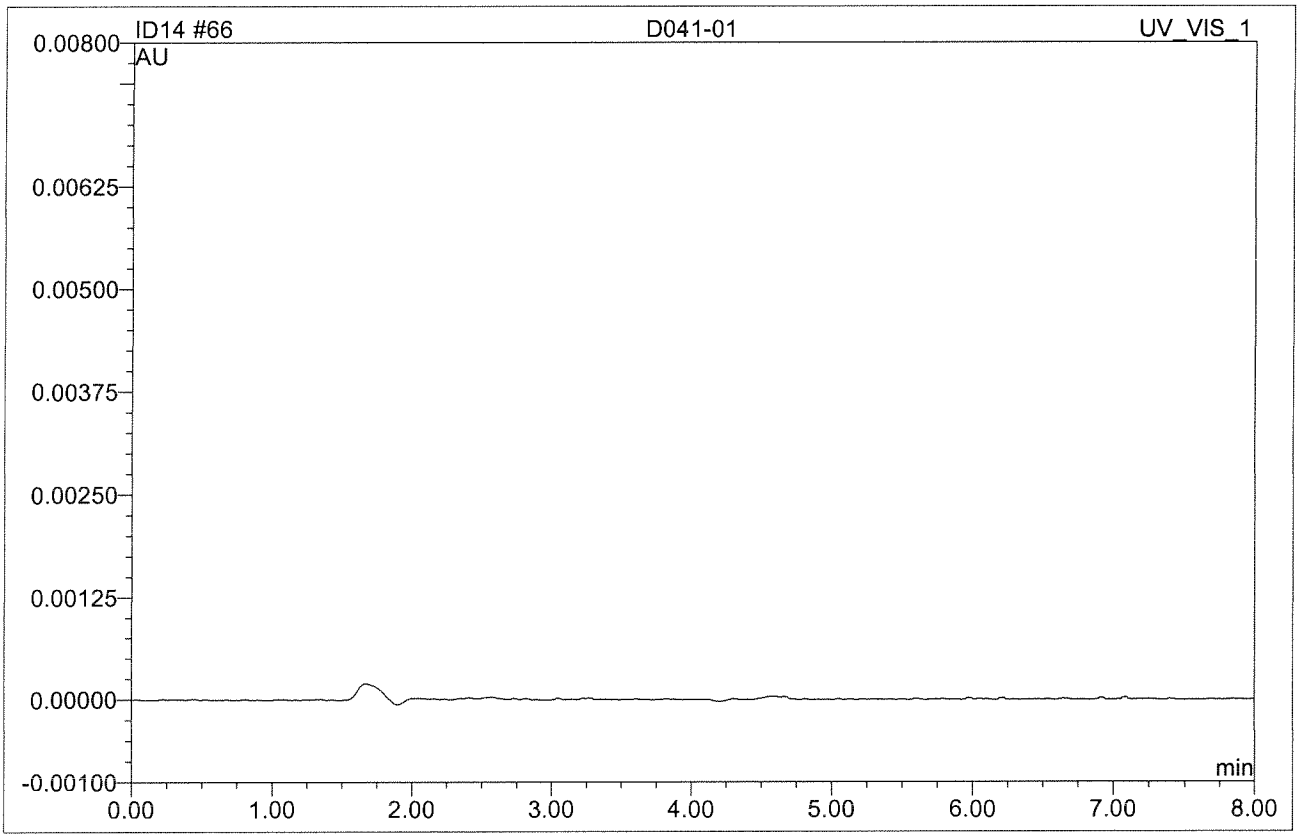
Client : KLEINFELDER
Project : CTO 070, UX04, FALLBROOK
Batch No. : 15D041

Matrix : SOIL
InstrumentID : 59

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/kg)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1S	HCD008SB	ND	1	NA	100	13	40	04/14/1519:14	04/13/1515:12	ID14025	ID14023	HCD008S	NA	NA
LCS1S	CSD008SL	965	1	NA	100	13	40	04/14/1519:35	04/13/1515:12	ID14027	ID14023	HCD008S	NA	NA
UX04-SB02-0.83	D041-01	ND	1	1.1	101	13.1	40.4	04/15/1500:47	04/13/1515:12	ID14055	ID14047	HCD008S	04/03/1515:07	04/08/15
UX04-SB03-0.08	D041-02	ND	1	2.3	102	13.3	40.9	04/15/1501:08	04/13/1515:12	ID14057	ID14047	HCD008S	04/03/1515:10	04/08/15
UX04-SB05-0.33	D041-04	ND	1	4.6	105	13.6	41.9	04/15/1502:00	04/13/1515:12	ID14061	ID14059	HCD008S	04/03/1515:30	04/08/15
UX04-SB06-0.42	D041-05	ND	1	1.0	101	13.1	40.4	04/15/1502:21	04/13/1515:12	ID14063	ID14059	HCD008S	04/03/1515:40	04/08/15
UX04-SB07-2.0	D041-06	ND	1	7.6	108	14.1	43.3	04/15/1502:42	04/13/1515:12	ID14065	ID14059	HCD008S	04/06/1513:30	04/08/15
UX04-SB04-0.33	D041-03I	ND	5	2.1	511	66.4	204	04/15/1503:03	04/13/1515:12	ID14067	ID14059	HCD008S	04/03/1515:20	04/08/15

ID14 055 D041-01

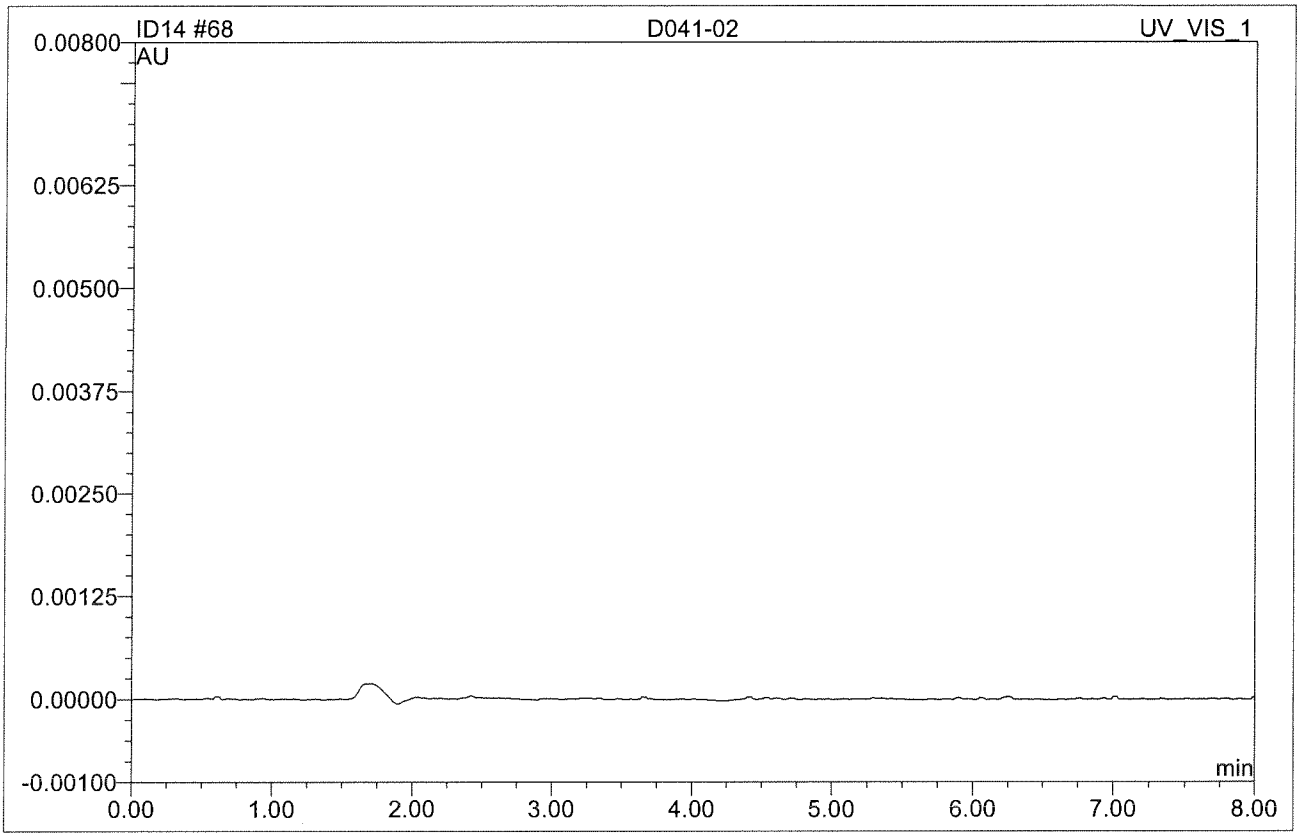
Sample Name:	**D041-01**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/15/2015 0:47**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID14 057 D041-02

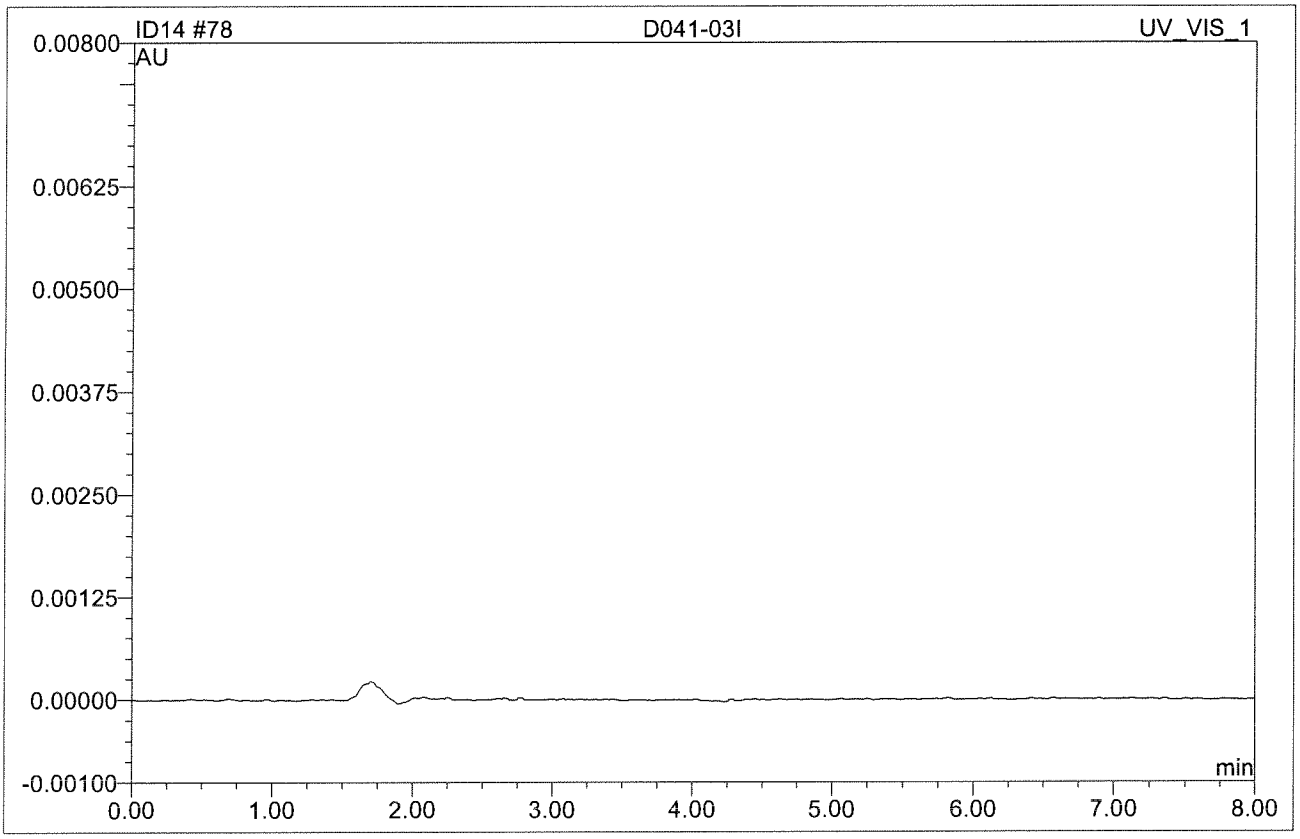
Sample Name:	**D041-02**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/15/2015 1:08**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID14 067 D041-03I

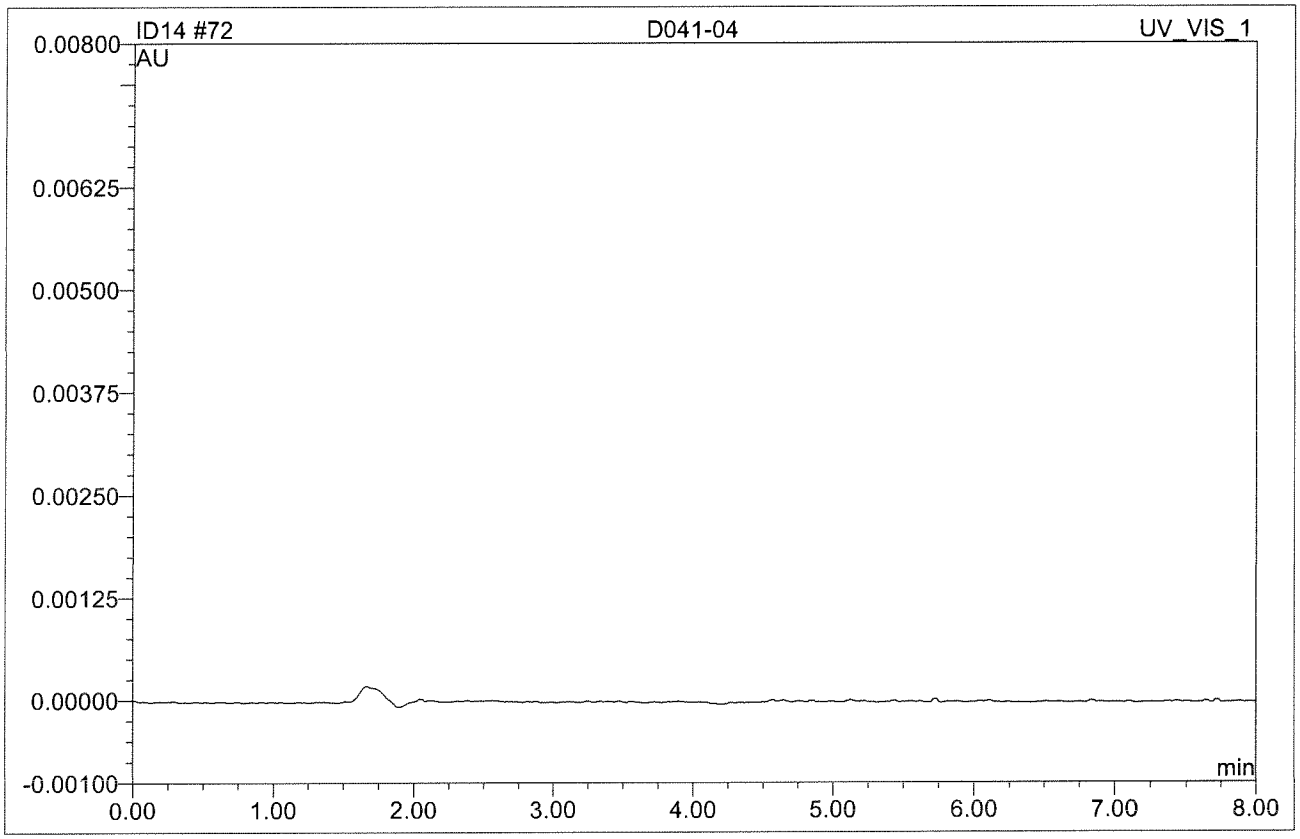
Sample Name:	**D041-03I**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**5**
Recording Time:	**4/15/2015 3:03**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID14 061 D041-04

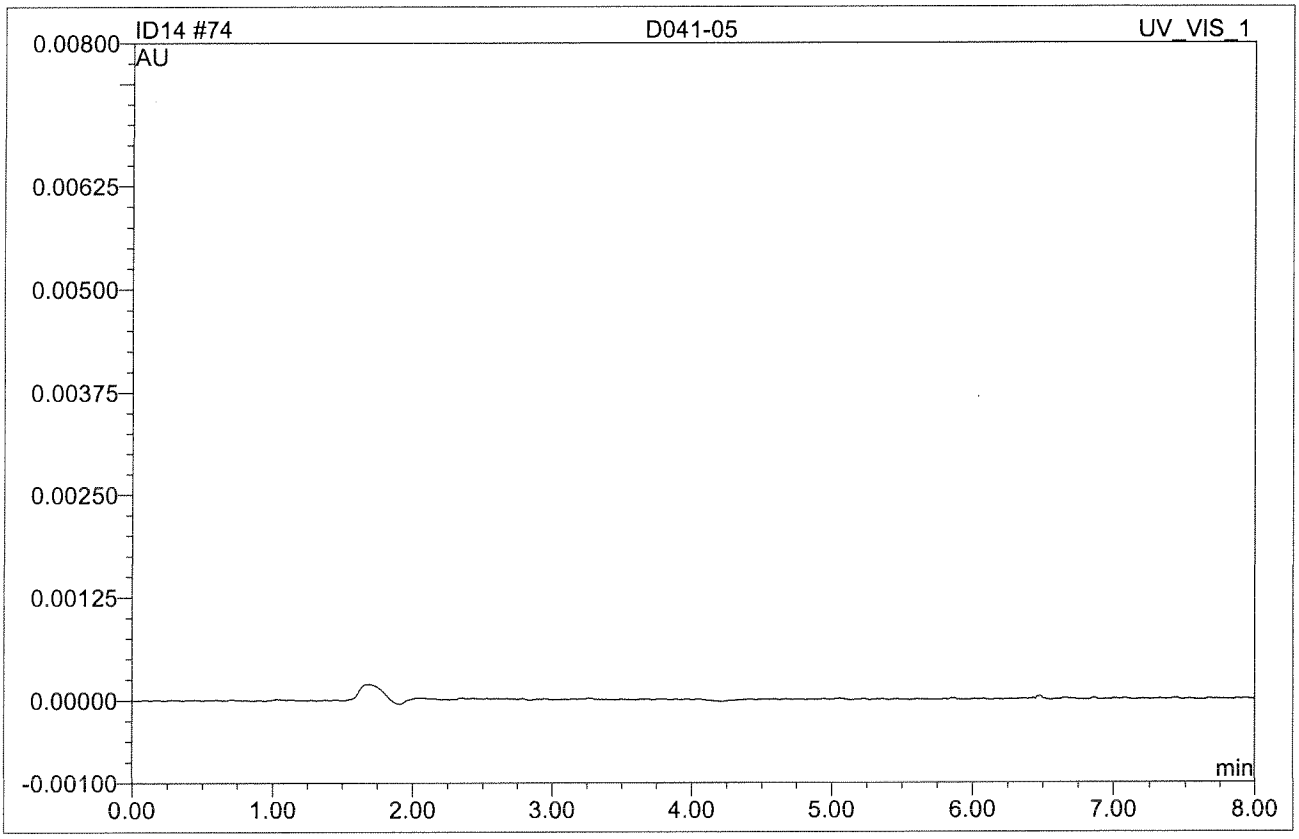
Sample Name:	**D041-04**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/15/2015 2:00**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID14 063 D041-05

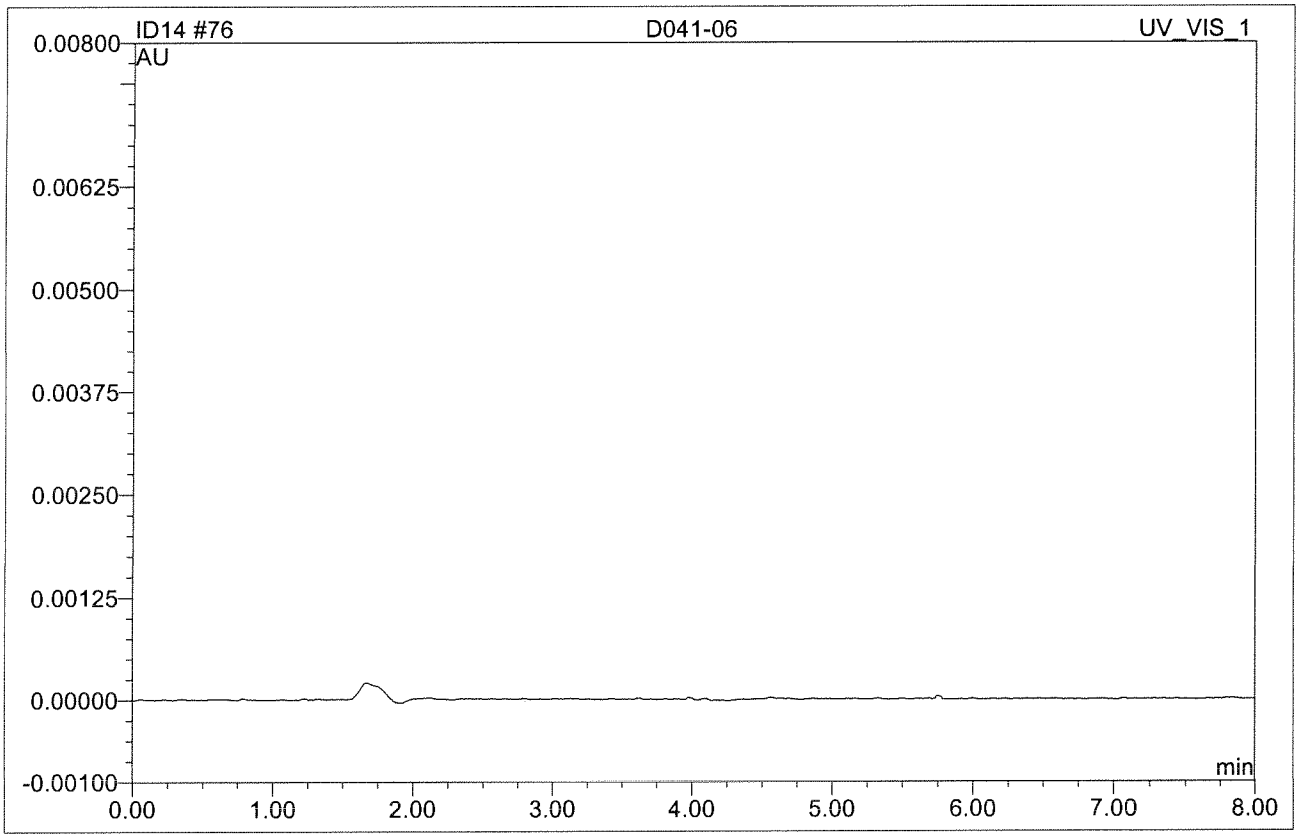
Sample Name:	**D041-05**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/15/2015 2:21**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID14 065 D041-06

Sample Name:	**D041-06**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/15/2015 2:42**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

QC SUMMARIES

EMAX QUALITY CONTROL DATA
LCS ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UXO4, FALLBROOK
BATCH NO. : 15D041
METHOD : 7199

MATRIX : SOIL
DILUTION FACTOR: 1 1
SAMPLE ID : MBLK1S LCS1S
LAB SAMPLE ID : HCD008SB CSD008SL
LAB FILE ID : ID14025 ID14027
DATE PREPARED : 04/13/1515:12 04/13/1515:12
DATE ANALYZED : 04/14/1519:14 04/14/1519:35
PREP BATCH : HCD008S HCD008S
CALIBRATION REF: ID14023 ID14023

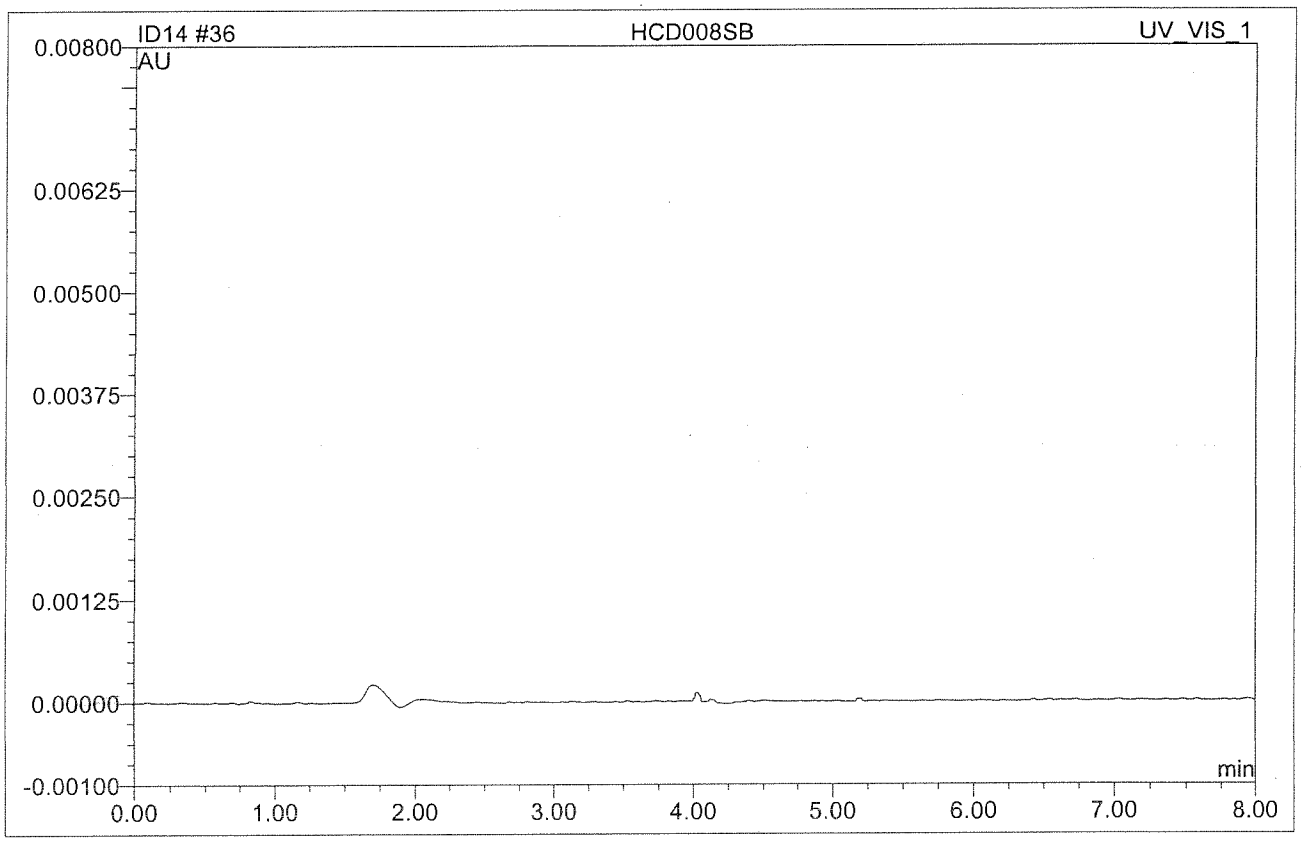
ACCESSION:

PARAMETER	MB RESULT (ug/kg)	SPIKE AMT (ug/kg)	BS RESULT (ug/kg)	BS REC (%)	QC LIMIT (%)
Hexavalent Chromium	ND	1000	965	96	80-120

QC DATA

ID14 025 HCD008SB

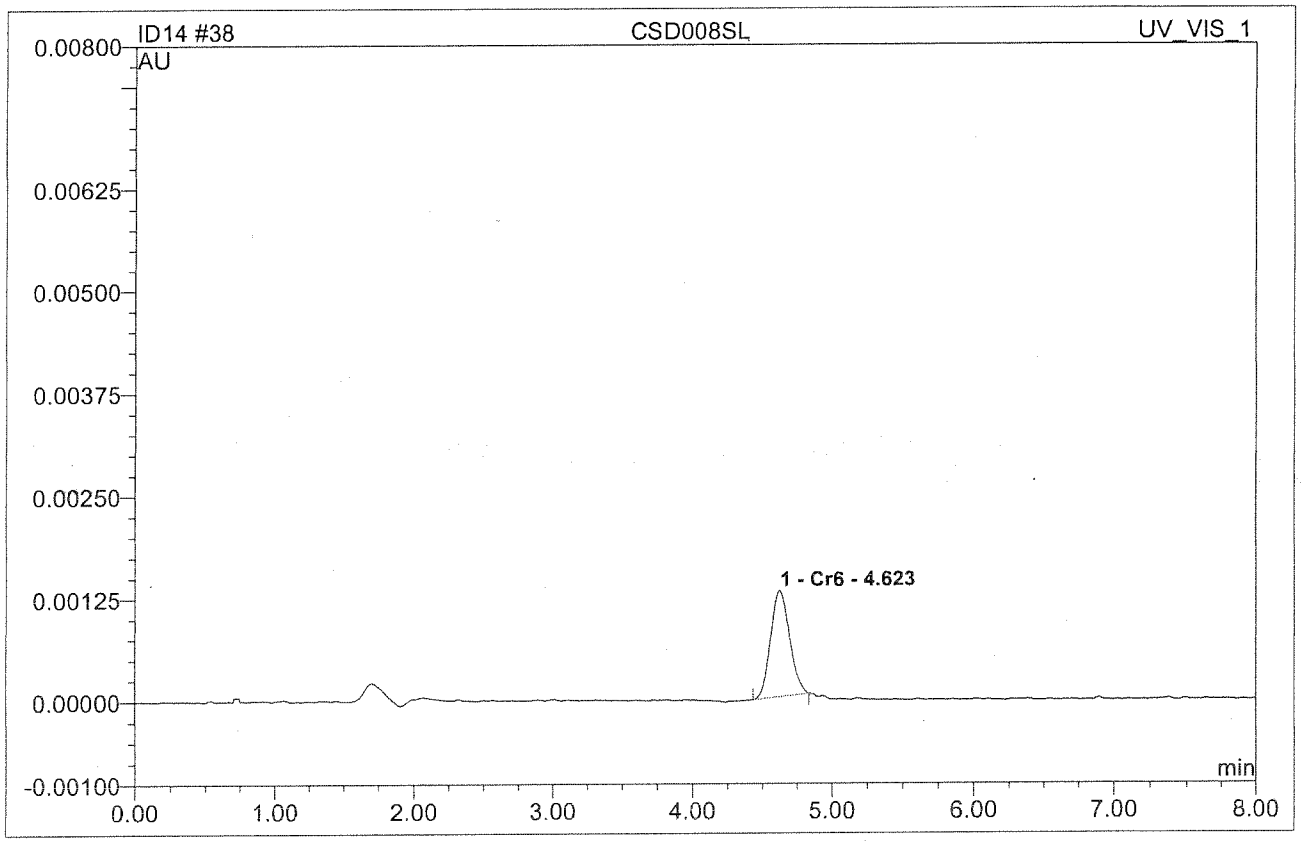
Sample Name:	**HCD008SB**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/14/2015 19:14**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID14 027 CSD008SL

Sample Name:	**CSD008SL**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/14/2015 19:35**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**

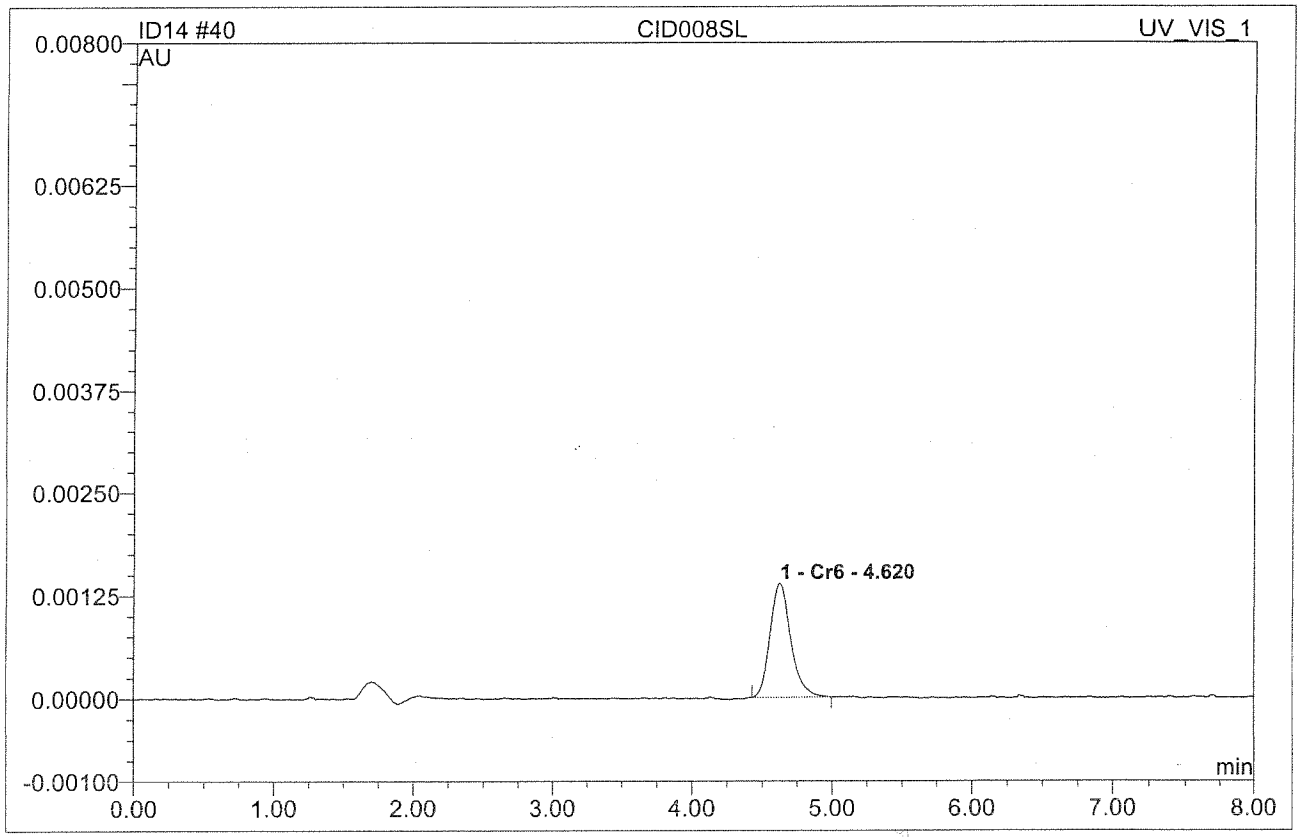


No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.62	Cr6	0.0012960	0.0002052	100.00	1.930	BMB
Total:			0.001	0.000	100.00	1.930	

ID14 029 CID008SL

DF=200

Sample Name:	**CID008SL**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**200**
Recording Time:	**4/14/2015 19:56**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.62	Cr6	0.0013810	0.0002359	100.00	440.858	BMB
Total:			0.001	0.000	100.00	440.858	220ppm

247

19.2 mg = 494.288

= 89.2%

INITIAL CALIBRATION(S)

IC RESULT FORM CalVersion : CR6.A26/IA26 (2015)

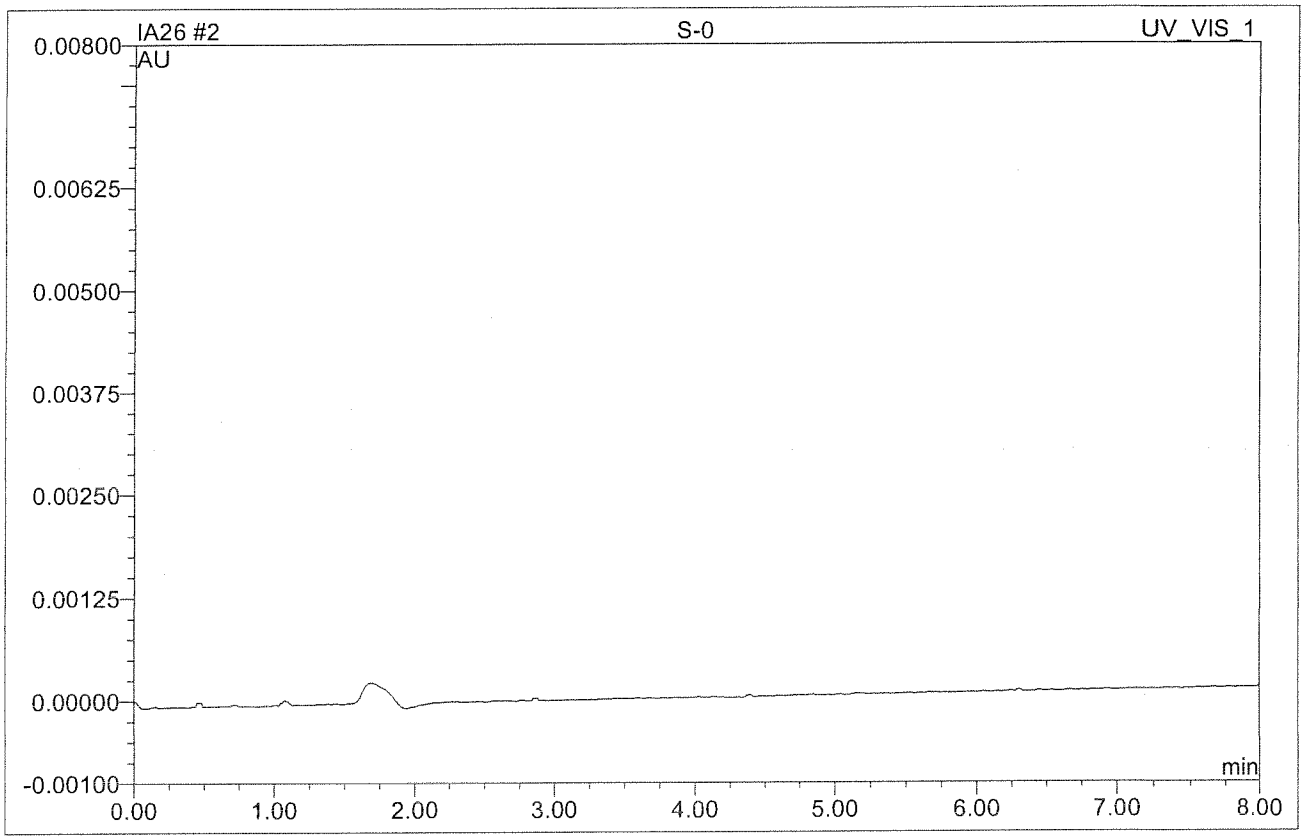
LFID	LSID	SelCmp	Cr6	DateTime	DF
IA26001	IB	C	ND	01/26/1514:29	1
IA26002	S-0	C	ND	01/26/1514:39	1
IA26003	S-1	C	0.185	01/26/1514:55	1
IA26004	S-2	C	0.513	01/26/1515:05	1
IA26005	S-3	C	0.868	01/26/1515:16	1
IA26006	S-4	C	1.998	01/26/1515:26	1
IA26007	S-5	C	4.985	01/26/1515:36	1
IA26008	S-6	C	7.644	01/26/1515:47	1
IA26009	S-7	C	9.913	01/26/1515:57	1
IA26010	ICV	C	96%	01/26/1516:10	1
IA26011	ICB	C	ND	01/26/1516:21	1

METHOD: IC59A26
SOLVENT: pH NANOPURE (SW4-02-49-03)

AA
01/27/15

IA26 002 S-0

Sample Name:	**S-0**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 14:39**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



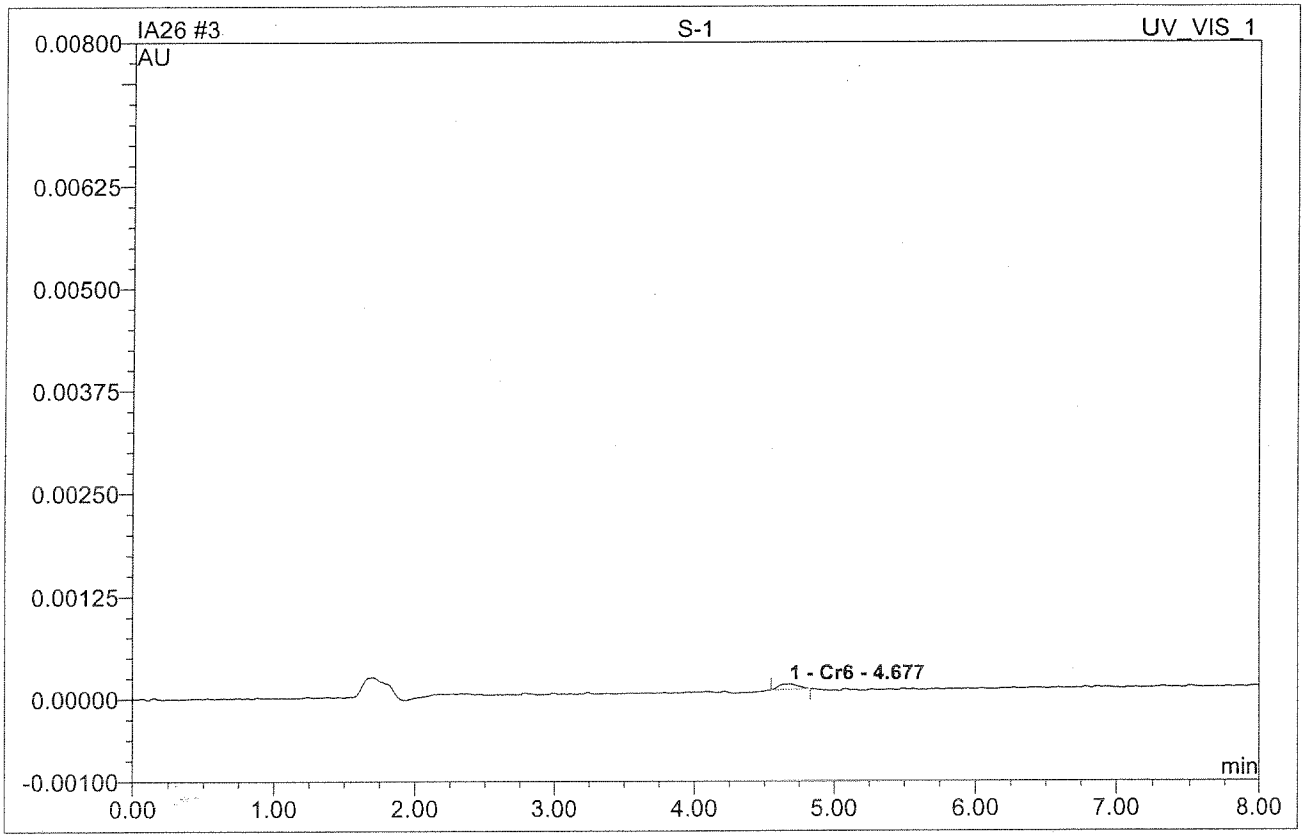
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

AA
01/27/15

IA26 003 S-1

0.2 PPB

Sample Name:	**S-1**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 14:55**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



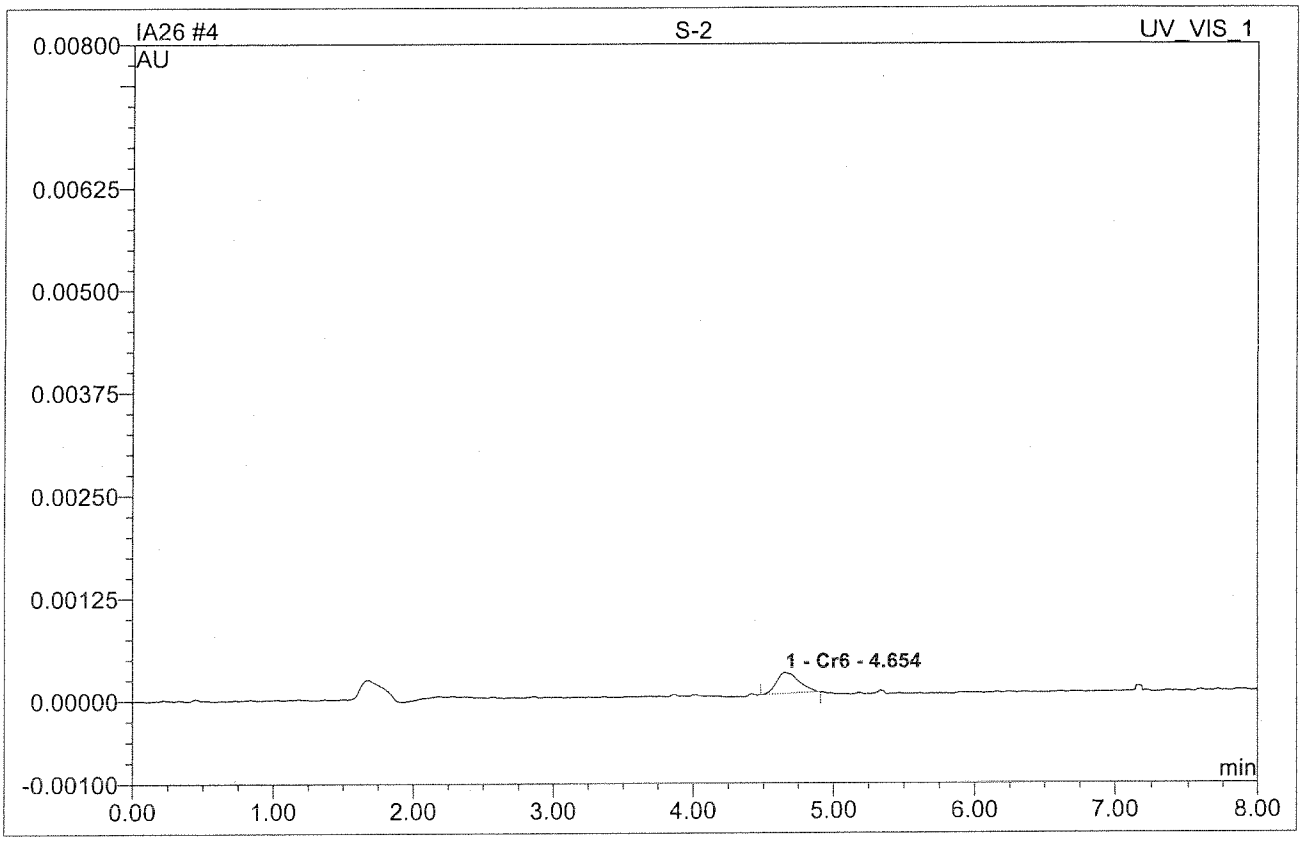
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.68	Cr6	0.0000670	0.0000102 ✓	100.00	0.185 ✓	BMB
Total:			0.000	0.000	100.00	0.185	

RA
01/27/15

IA26 004 S-2

0.5 PPB

Sample Name:	**S-2**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:05**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



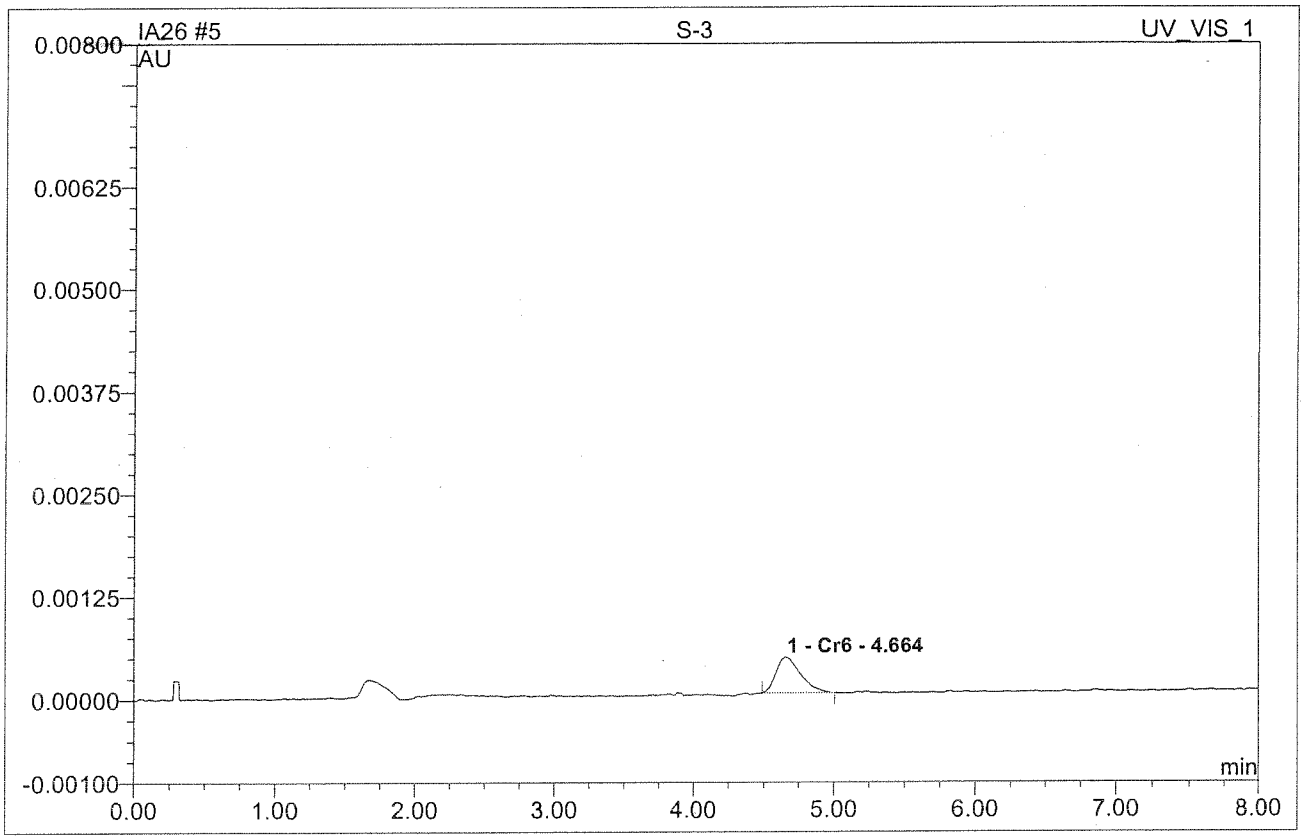
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.65	Cr6	0.0002560	0.0000469	100.00	0.513	BMB
Total:			0.000	0.000	100.00	0.513	

RA
01/27/15

IA26 005 S-3

1.0 PPB

Sample Name:	**S-3**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:16**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



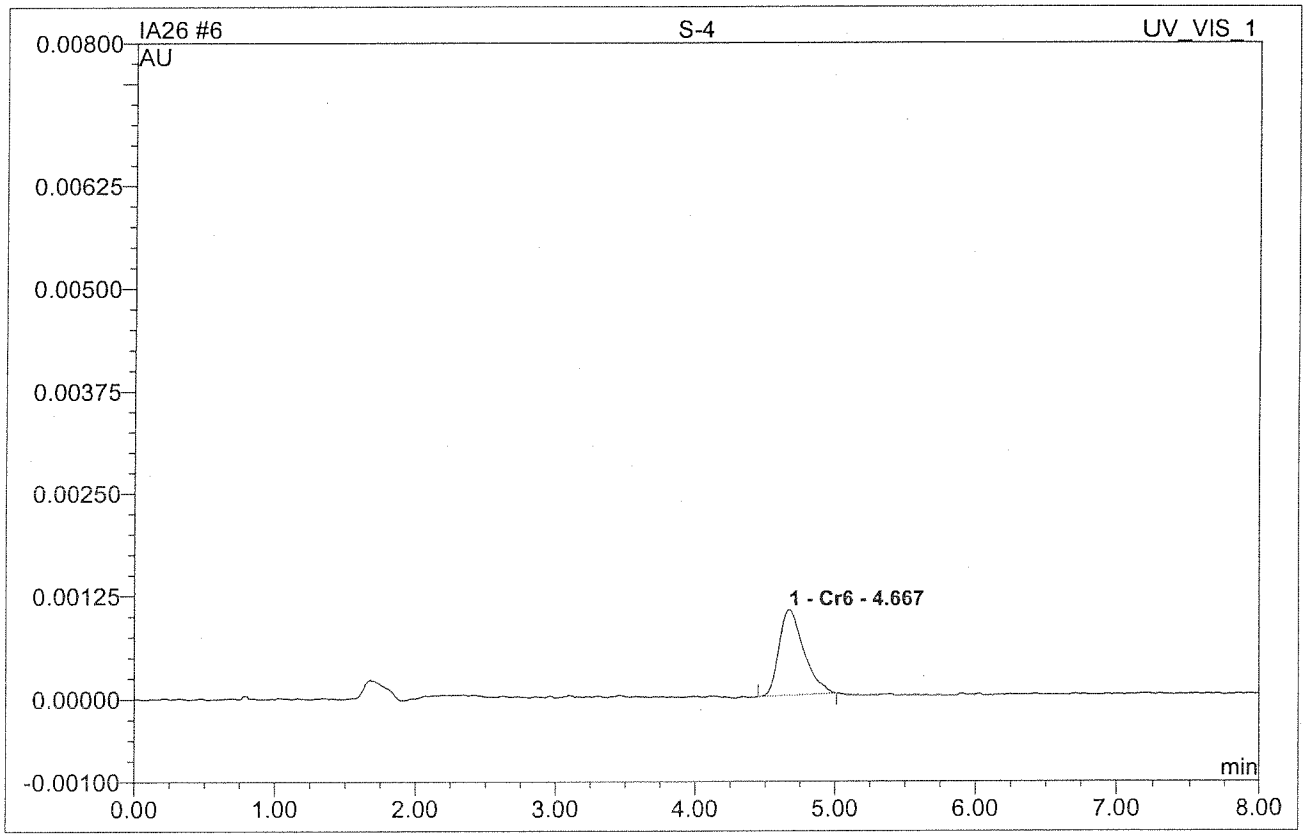
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.66	Cr6	0.0004350	0.0000865	100.00	0.868	BMB
Total:			0.000	0.000	100.00	0.868	

AS 01/27/15

IA26 006 S-4

2.0 PPB

Sample Name:	**S-4**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:26**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



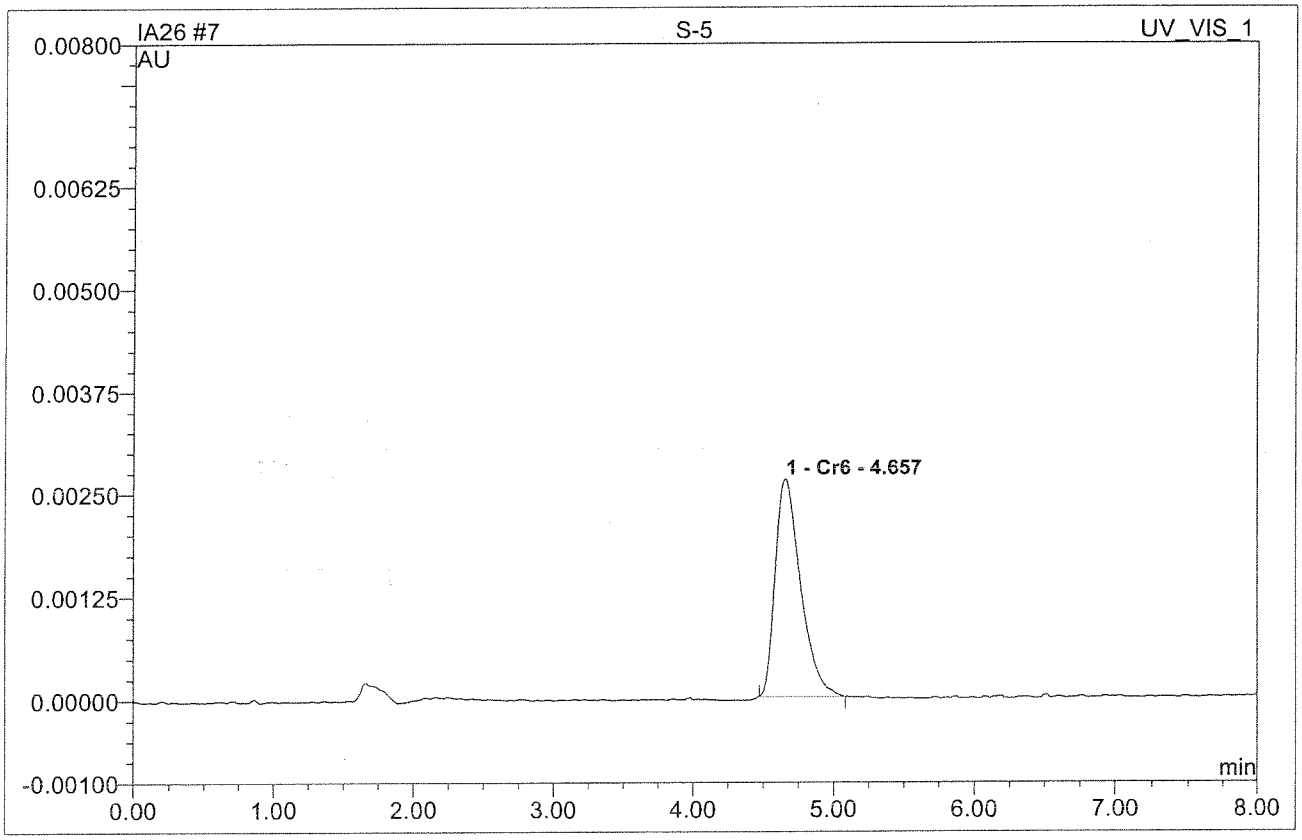
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.67	Cr6	0.0010350	0.0002128	100.00	1.998	BMB
Total:			0.001	0.000	100.00	1.998	

RA
01/27/15

IA26 007 S-5

5.0 PPB

Sample Name:	**S-5**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:36**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



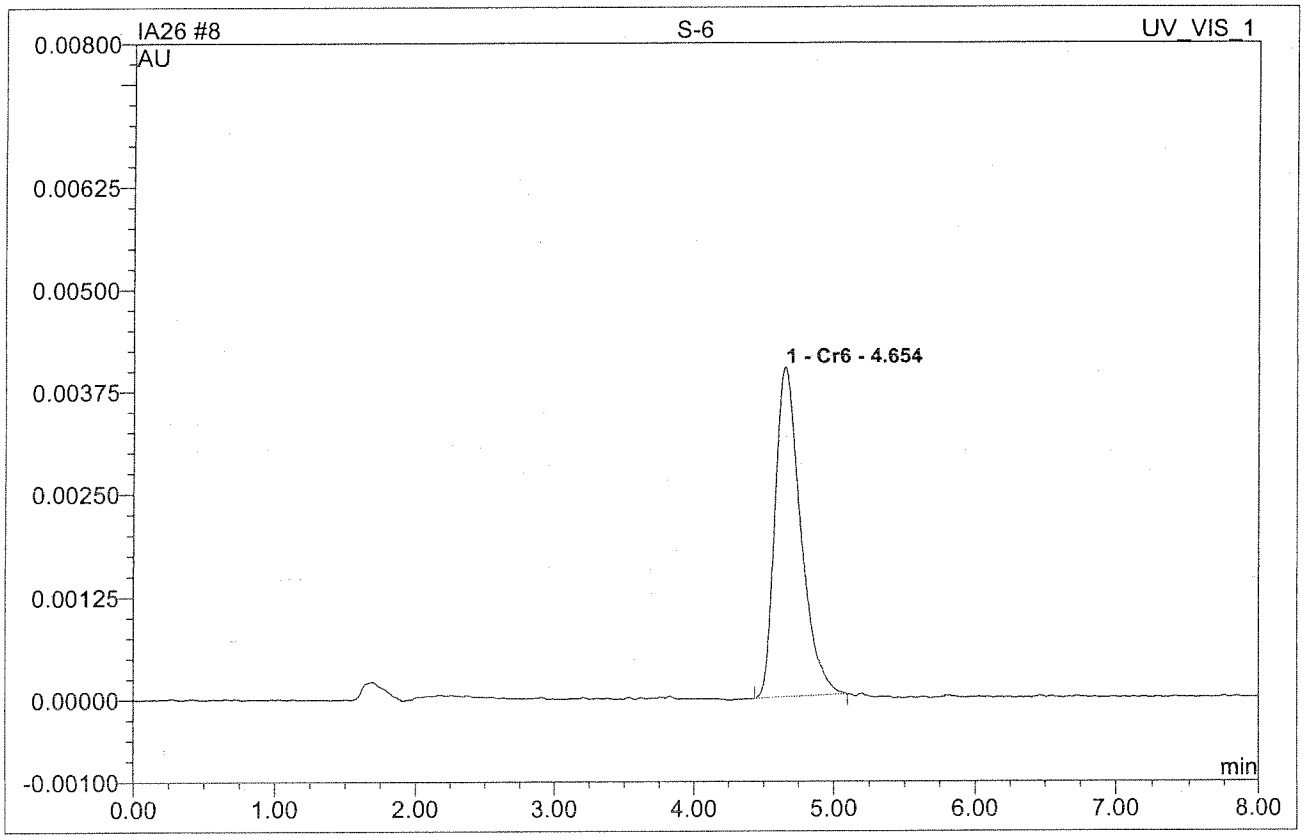
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.66	Cr6	0.0026400	0.0005466	100.00	4.985	BMB
Total:			0.003	0.001	100.00	4.985	

AA
01/27/15

IA26 008 S-6

7.5 PPB

Sample Name:	**S-6**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:47**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



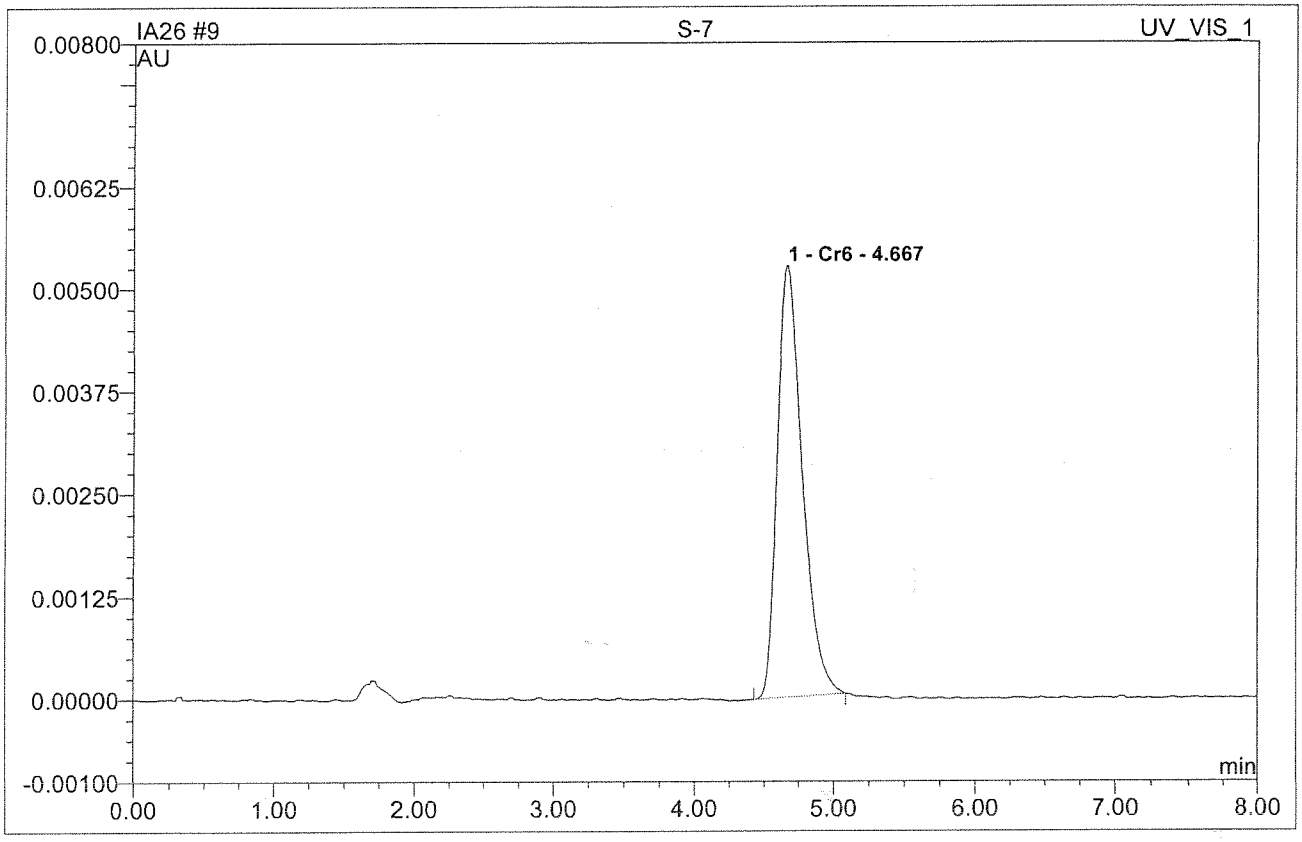
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.65	Cr6	0.0040100	0.0008438	100.00	7.644	BMB
Total:			0.004	0.001	100.00	7.644	

AA
01/27/15

IA26 009 S-7

10 PPB

Sample Name:	**S-7**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:57**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



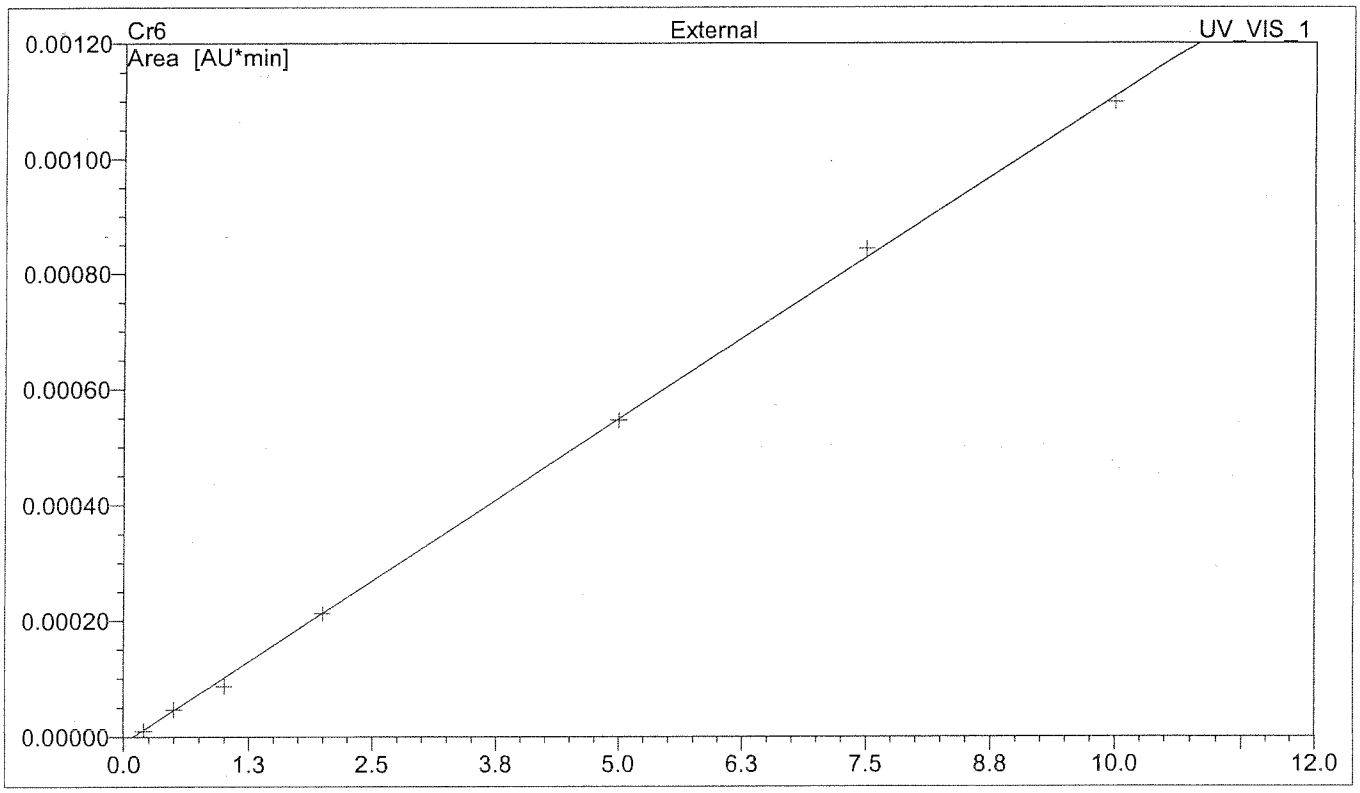
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.67	Cr6	0.0052610	0.0010973	100.00	9.913	BMB
Total:			0.005	0.001	100.00	9.913	

01/27/15

9 S-7

10 PPB

Sample Name:	**S-7**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1.0000**
Recording Time:	**1/26/2015 15:57**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Cal.Type	Points	R-Square	Offset	Slope	Curve
1	4.67	Cr6	0LOff	7	0.9995	-0.0000105	0.0001118	0.0000
Average:					0.9995	0.0000	0.0001	0.0000

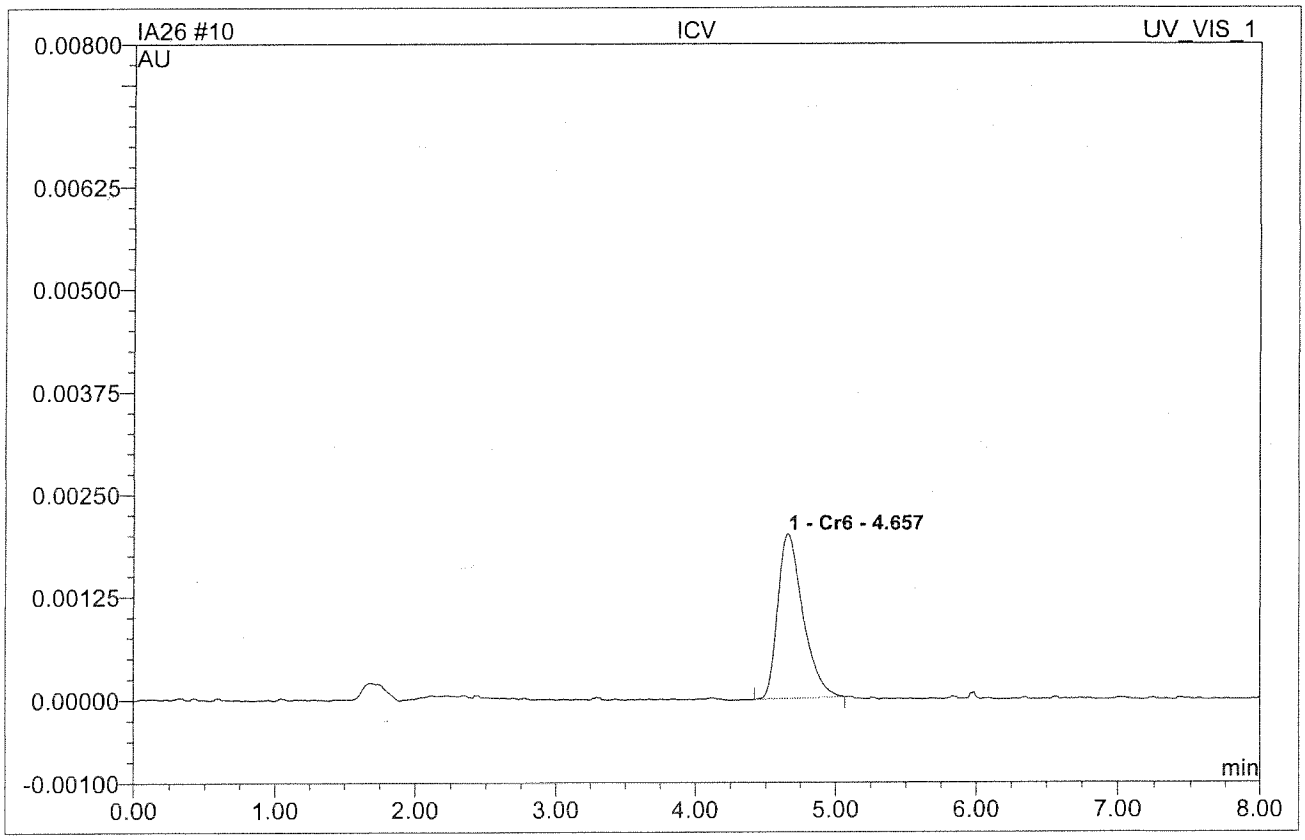
AS 01/27/15

SECOND SOURCE VERIFICATION

IA26 010 ICV

4.0 PPB

Sample Name:	**ICV**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 16:10**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**

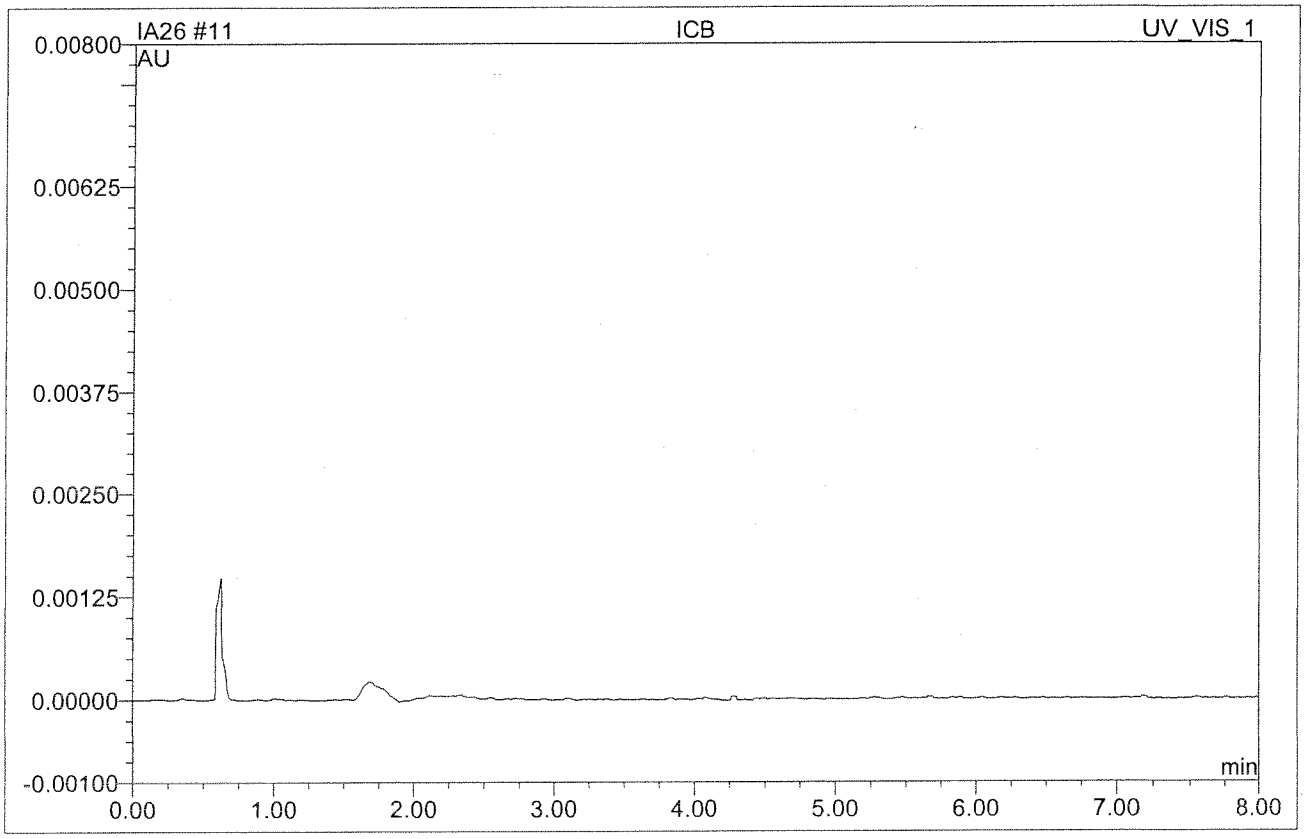


No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.66	Cr6	0.0019990	0.0004173	100.00	3.827	BMB
Total:			0.002	0.000	100.00	3.827	

AS
01/27/15

IA26 011 ICB

Sample Name:	**ICB**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 16:21**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

AA
01/27/15

DAILY CALIBRATION(S)

Continuing Calibration Summary Form

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK
SDG : 15D041
Method : 7199
QuantMethod : IC59A26
InstrumentID: 59
Parameter : Hexavalent Chromium

LFID	LSID	DF	Expected	Result	Unit	%Rec	AnalysisDateTime
ID14023	CCV217	1	2	2.009	ug/L	100	04/14/1518:43
ID14035	CCV219	1	2	2.053	ug/L	103	04/14/1521:09
ID14047	CCV221	1	2	2.009	ug/L	100	04/14/1523:14
ID14059	CCV223	1	2	2.017	ug/L	101	04/15/1501:29
ID14070	CCV225	1	2	2.033	ug/L	102	04/15/1503:34

CCV Acceptance Criteria: 90-110%

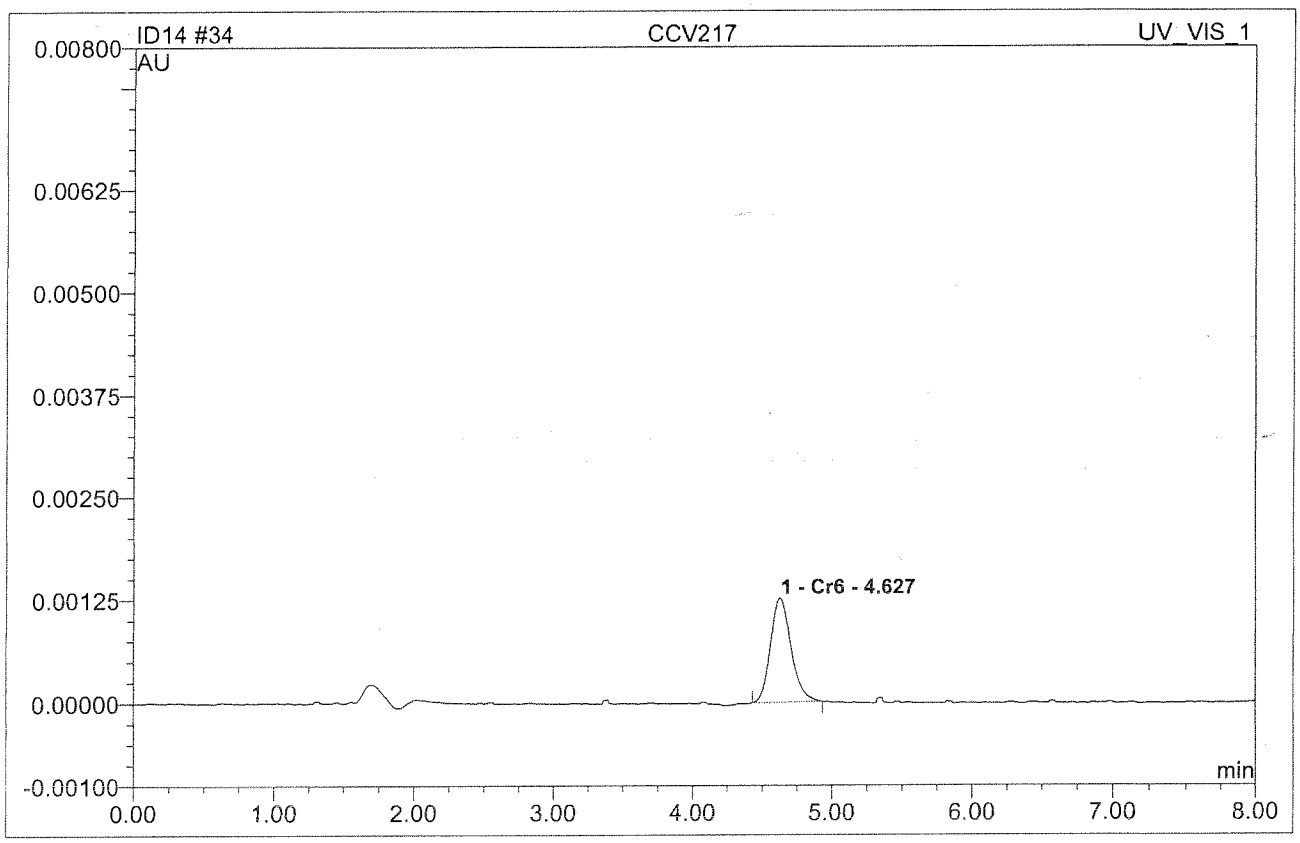
IC RESULT FORM CalVersion : CR6.A26

LFID	LSID	SelCmp	Cr6	DateTime	DF
ID14001	CCV209	C	99%	04/14/1512:46	1
ID14002	CCB209	C	ND	04/14/1513:07	1
ID14003	HCD007WB	C	ND	04/14/1513:17	1
ID14004	HCD007WL	C	1.960	04/14/1513:27	1
ID14005	HCD007WC	C	1.963	04/14/1513:38	1
ID14006	D490-01I	C	ND	04/14/1513:48	40
ID14007	D490-01IA	C	23.793	04/14/1513:59	40
ID14008	CCV211	C	97%	04/14/1514:09	1
ID14009	CCB211	C	ND	04/14/1514:19	1
ID14010	D490-01K	C	ND	04/14/1514:40	80
ID14011	D490-01KA	C	45.961	04/14/1514:50	80
ID14012	D490-01J	C	ND	04/14/1515:05	200
ID14013	D490-01JA	C	162.453	04/14/1515:16	200
ID14014	CCV213	C	99%	04/14/1515:28	1
ID14015	CCB213	C	ND	04/14/1515:39	1
ID14016	CCV215	C	97%	04/14/1517:30	1
ID14017	CCB215	C	ND	04/14/1517:41	1
ID14018	D077-02	C	ND	04/14/1517:51	1
ID14019	D077-01	C	ND	04/14/1518:02	1
ID14020	D077-01D	C	ND	04/14/1518:12	1
ID14021	D077-01M	C	0.974	04/14/1518:22	1
ID14022	D077-03	C	ND	04/14/1518:33	1
ID14023	CCV217	C	100%	04/14/1518:43	1
ID14024	CCB217	C	ND	04/14/1519:04	1
ID14025	HCD008SB	C	ND	04/14/1519:14	1
ID14026	HCD008SQ	C	ND	04/14/1519:25	1
ID14027	CSD008SL	C	1.930	04/14/1519:35	1
ID14028	CSD008SX	C	2.077	04/14/1519:46	1
ID14029	CID008SL	C	440.858	04/14/1519:56	200
ID14030	CID008SX	C	432.164	04/14/1520:06	200
ID14031	D040-09	C	ND	04/14/1520:17	1
ID14032	D040-09N	C	ND	04/14/1520:27	1
ID14033	D040-11	C	ND	04/14/1520:38	1
ID14034	D040-11N	C	ND	04/14/1520:48	1
ID14035	CCV219	C	103%	04/14/1521:09	1
ID14036	CCB219	C	ND	04/14/1521:19	1
ID14037	D040-12	C	ND	04/14/1521:30	1
ID14038	D040-12N	C	ND	04/14/1521:40	1
ID14039	D040-13	C	ND	04/14/1521:50	1
ID14040	D040-13N	C	ND	04/14/1522:01	1
ID14041	D040-14	C	ND	04/14/1522:11	1
ID14042	D040-14N	C	ND	04/14/1522:22	1
ID14043	D040-16	C	ND	04/14/1522:32	1
ID14044	D040-16N	C	ND	04/14/1522:42	1
ID14045	D040-17	C	0.350	04/14/1522:53	1
ID14046	D040-17N	C	0.378	04/14/1523:03	1
ID14047	CCV221	C	100%	04/14/1523:14	1
ID14048	CCB221	C	ND	04/14/1523:34	1
ID14049	D040-18	C	0.311	04/14/1523:45	1
ID14050	D040-18N	C	0.312	04/14/1523:55	1
ID14051	D040-19	C	ND	04/15/1500:06	1
ID14052	D040-19N	C	ND	04/15/1500:16	1
ID14053	D040-20	C	ND	04/15/1500:26	1
ID14054	D040-20N	C	ND	04/15/1500:37	1
ID14055	D041-01	C	ND	04/15/1500:47	1
ID14056	D041-01N	C	ND	04/15/1500:58	1
ID14057	D041-02	C	ND	04/15/1501:08	1
ID14058	D041-02N	C	ND	04/15/1501:18	1
ID14059	CCV223	C	101%	04/15/1501:29	1
ID14060	CCB223	C	ND	04/15/1501:50	1
ID14061	D041-04	C	ND	04/15/1502:00	1
ID14062	D041-04N	C	ND	04/15/1502:10	1
ID14063	D041-05	C	ND	04/15/1502:21	1
ID14064	D041-05N	C	ND	04/15/1502:31	1
ID14065	D041-06	C	ND	04/15/1502:42	1
ID14066	D041-06N	C	ND	04/15/1502:52	1
ID14067	D041-03I	C	ND	04/15/1503:03	5
ID14068	D041-03IN	C	ND	04/15/1503:13	5
ID14069	D041-03IA	C	5.272	04/15/1503:23	5
ID14070	CCV225	C	102%	04/15/1503:34	1
ID14071	CCB225	C	ND	04/15/1503:55	1
ID14072	CCV227	C	104%	04/15/1510:47	1
ID14073	CCB227	C	ND	04/15/1510:57	1
ID14074	D040-15	C	ND	04/15/1511:07	1

ID14075	D040-15N	C	ND	04/15/1511:18	1
ID14076	D040-15D	C	ND	04/15/1511:28	1
ID14077	D040-15ND	C	ND	04/15/1511:39	1
ID14078	D040-15M	C	3.287	04/15/1511:49	1
ID14079	D040-15NM	C	3.222	04/15/1511:59	1
ID14080	D040-15D	C	ND	04/15/1512:10	1
ID14081	D040-15M	C	621.451	04/15/1512:20	200
ID14082	D040-15NM	C	701.392	04/15/1512:31	200
ID14083	CCV229	C	103%	04/15/1512:41	1
ID14084	CCB229	C	ND	04/15/1512:51	1
ID14085	D040-17	C	0.324	04/15/1513:02	1
ID14086	D040-17N	C	0.333	04/15/1513:12	1
ID14087	D040-17A	C	0.491	04/15/1513:23	1
ID14088	D040-18	C	0.310	04/15/1513:33	1
ID14089	D040-18A	C	0.460	04/15/1513:43	1
ID14090	CCV231	C	97%	04/15/1513:54	1
ID14091	CCB231	C	ND	04/15/1514:04	1

ID14 023 CCV217

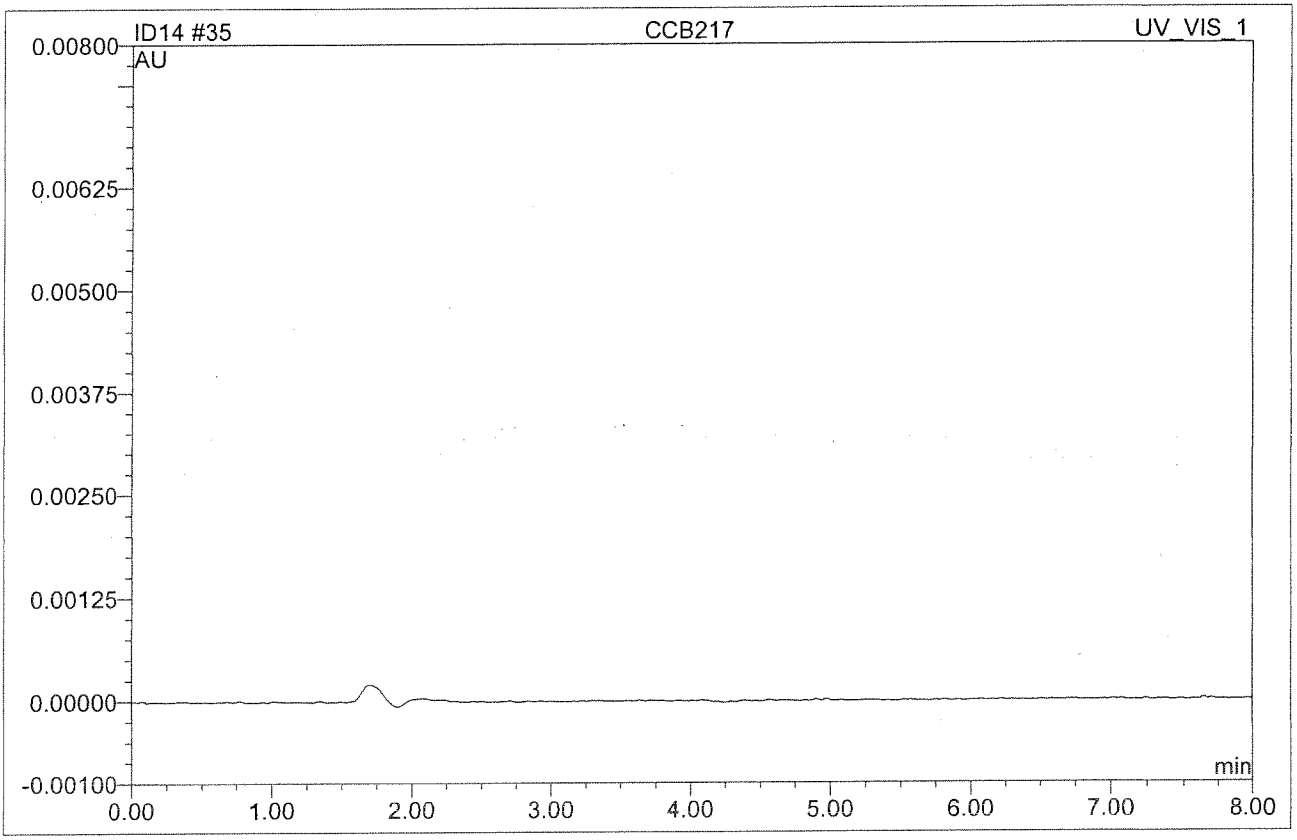
Sample Name:	**CCV217**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/14/2015 18:43**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.63	Cr6	0.0012610	0.0002140	100.00	2.009	BMB
Total:			0.001	0.000	100.00	2.009	

ID14 024 CCB217

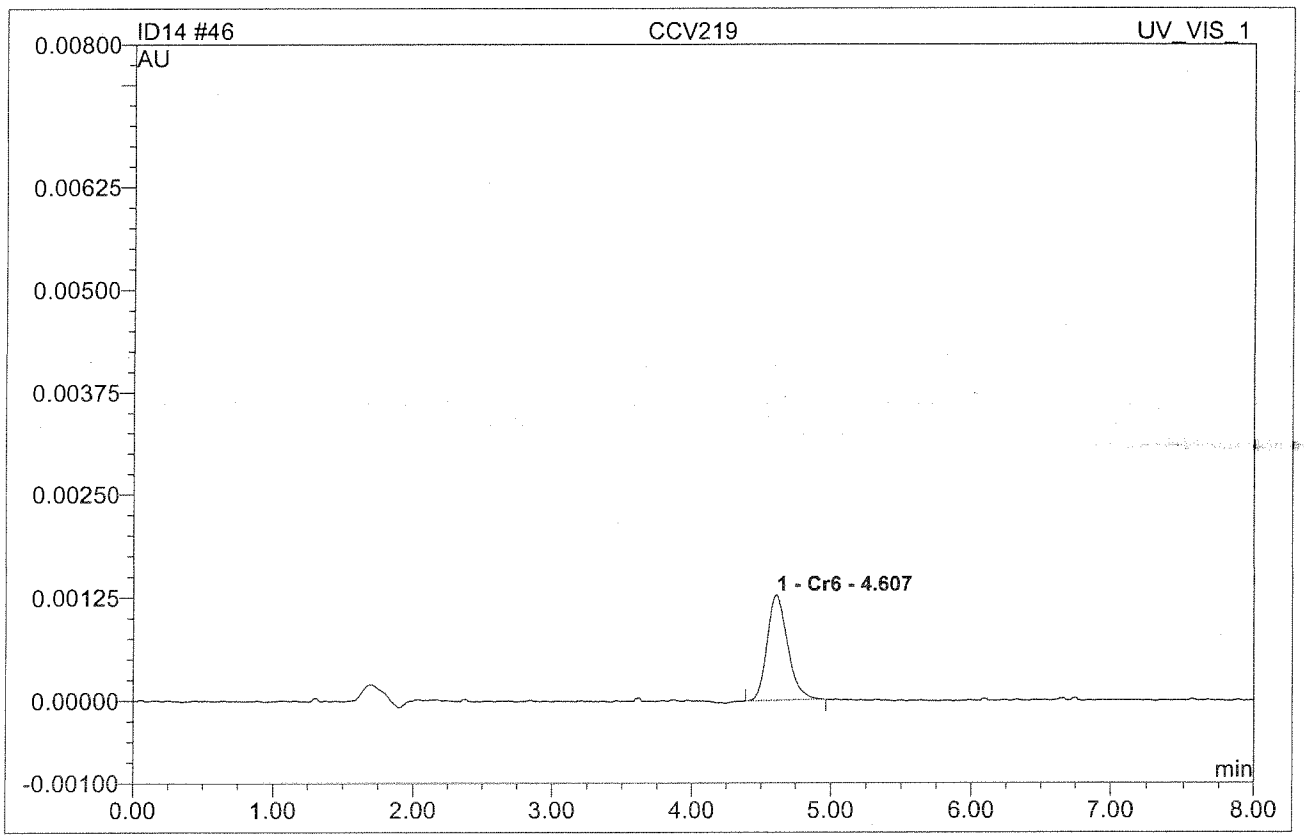
Sample Name:	**CCB217**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/14/2015 19:04**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID14 035 CCV219

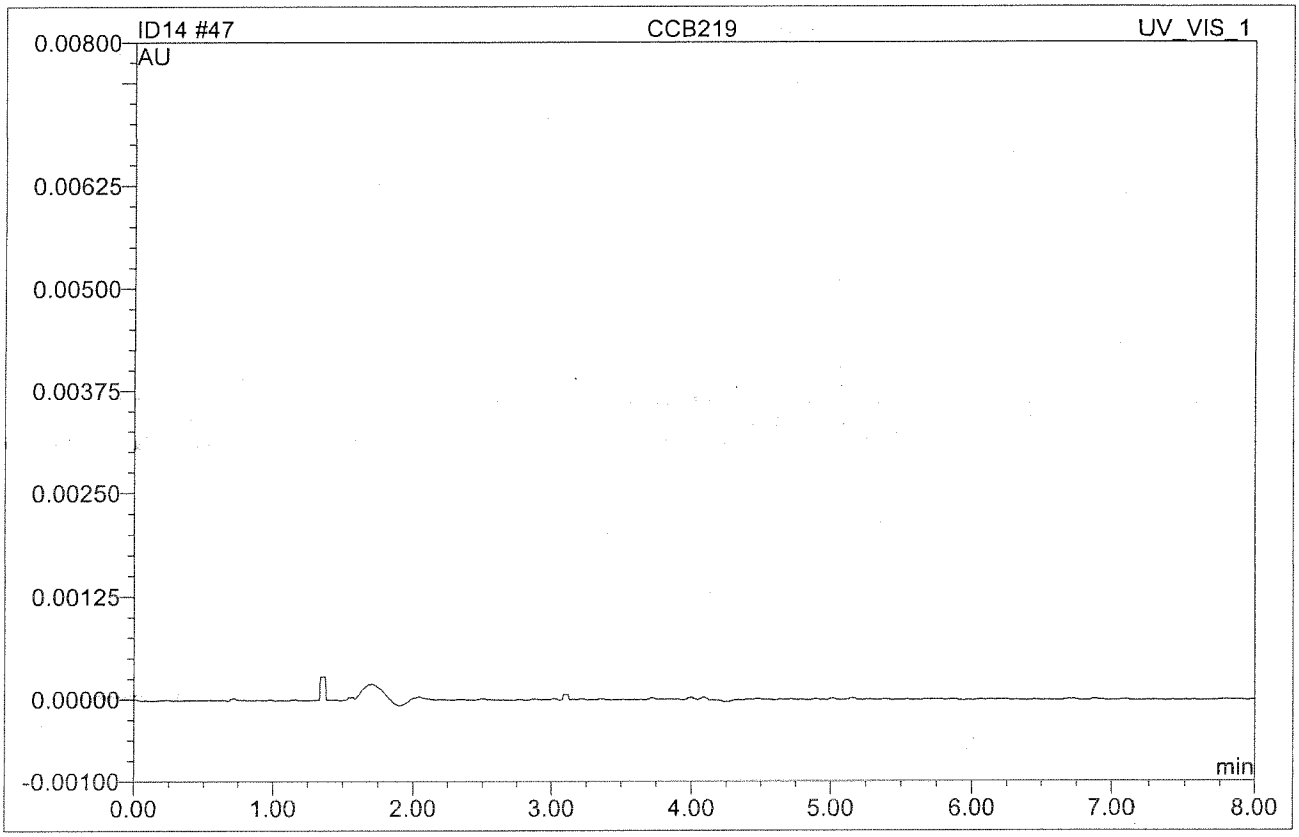
Sample Name:	**CCV219**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/14/2015 21:09**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.61	Cr6	0.0012750	0.0002189	100.00	2.053	BMB
Total:			0.001	0.000	100.00	2.053	

ID14 036 CCB219

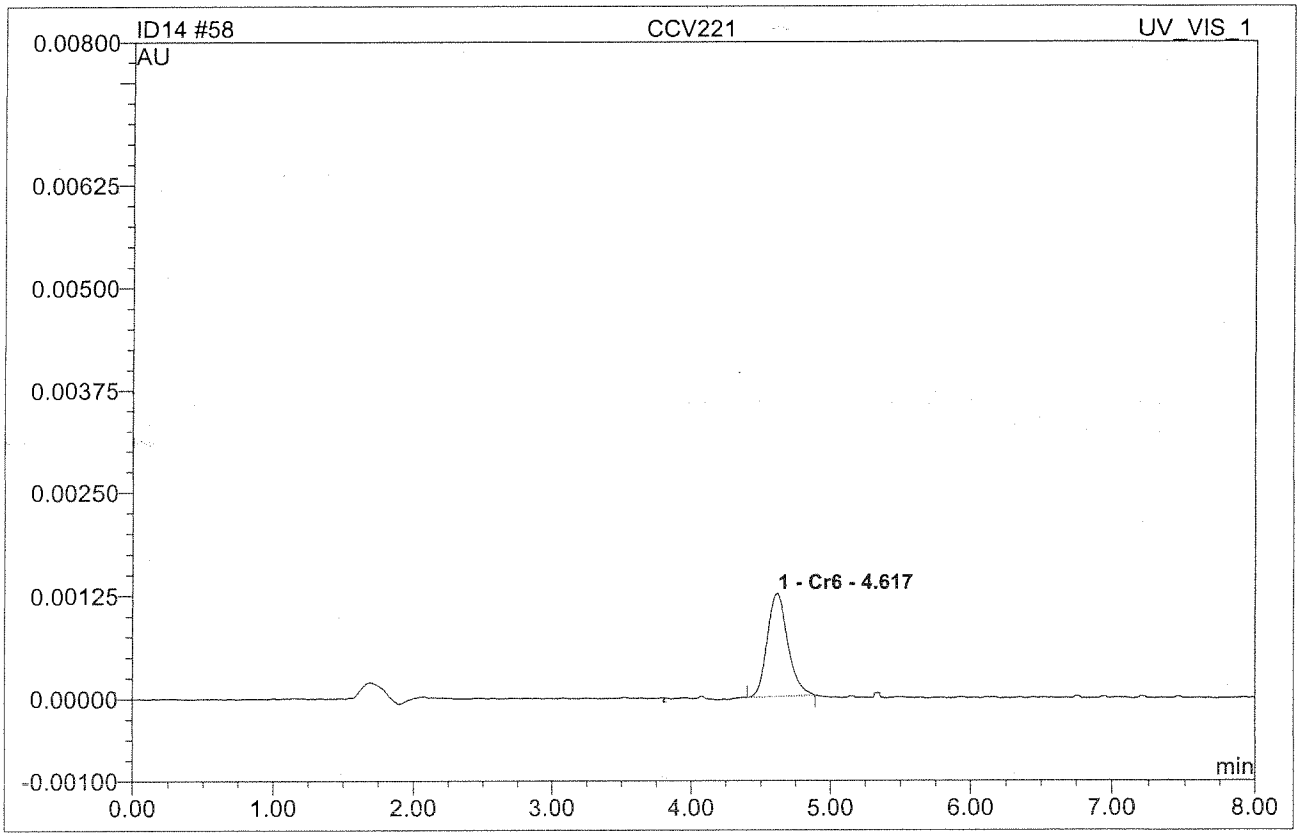
Sample Name:	**CCB219**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/14/2015 21:19**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID14 047 CCV221

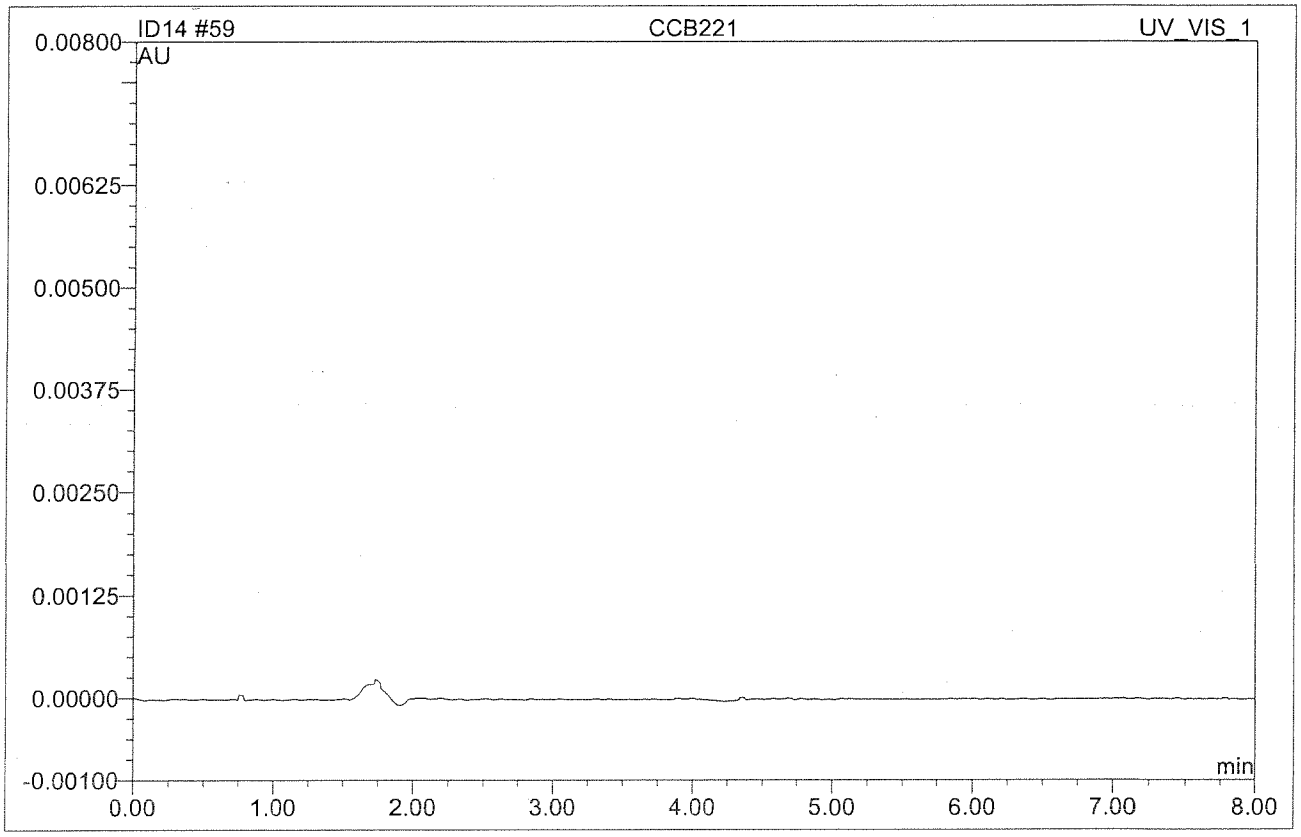
Sample Name:	**CCV221**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/14/2015 23:14**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.62	Cr6	0.0012480	0.0002141	100.00	2.009	BMB
Total:			0.001	0.000	100.00	2.009	

ID14 048 CCB221

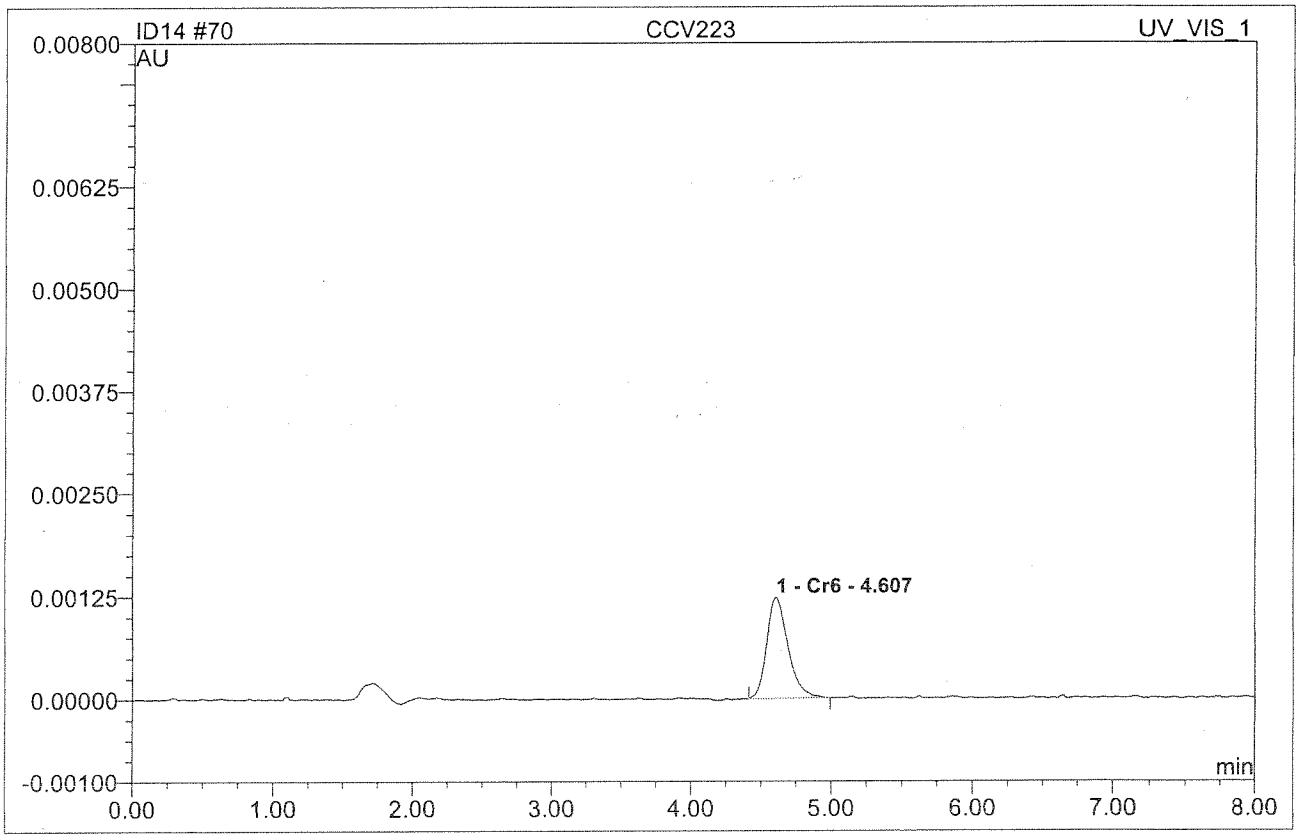
Sample Name:	**CCB221**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/14/2015 23:34**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID14 059 CCV223

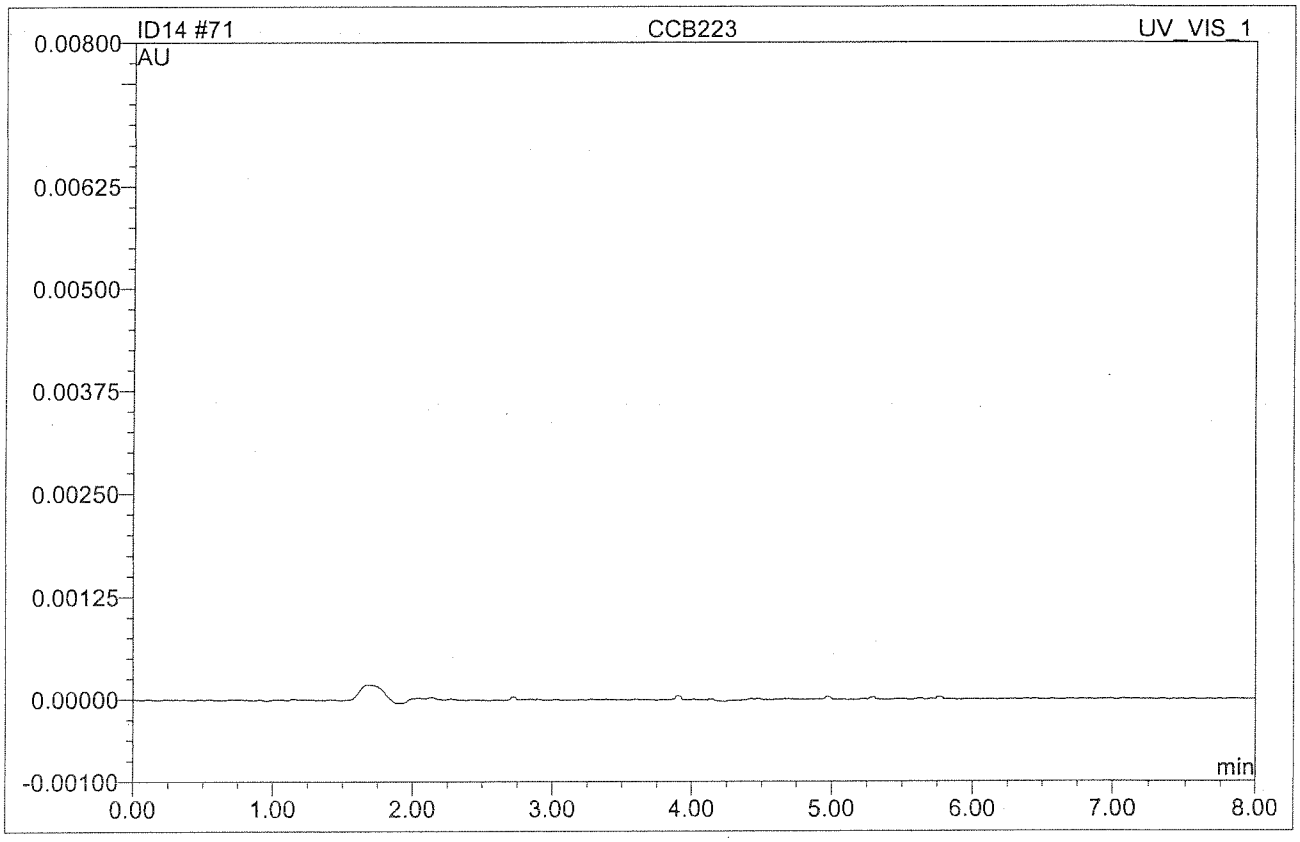
Sample Name:	**CCV223**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/15/2015 1:29**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.61	Cr6	0.0012270	0.0002149	100.00	2.017	BMB
Total:			0.001	0.000	100.00	2.017	

ID14 060 CCB223

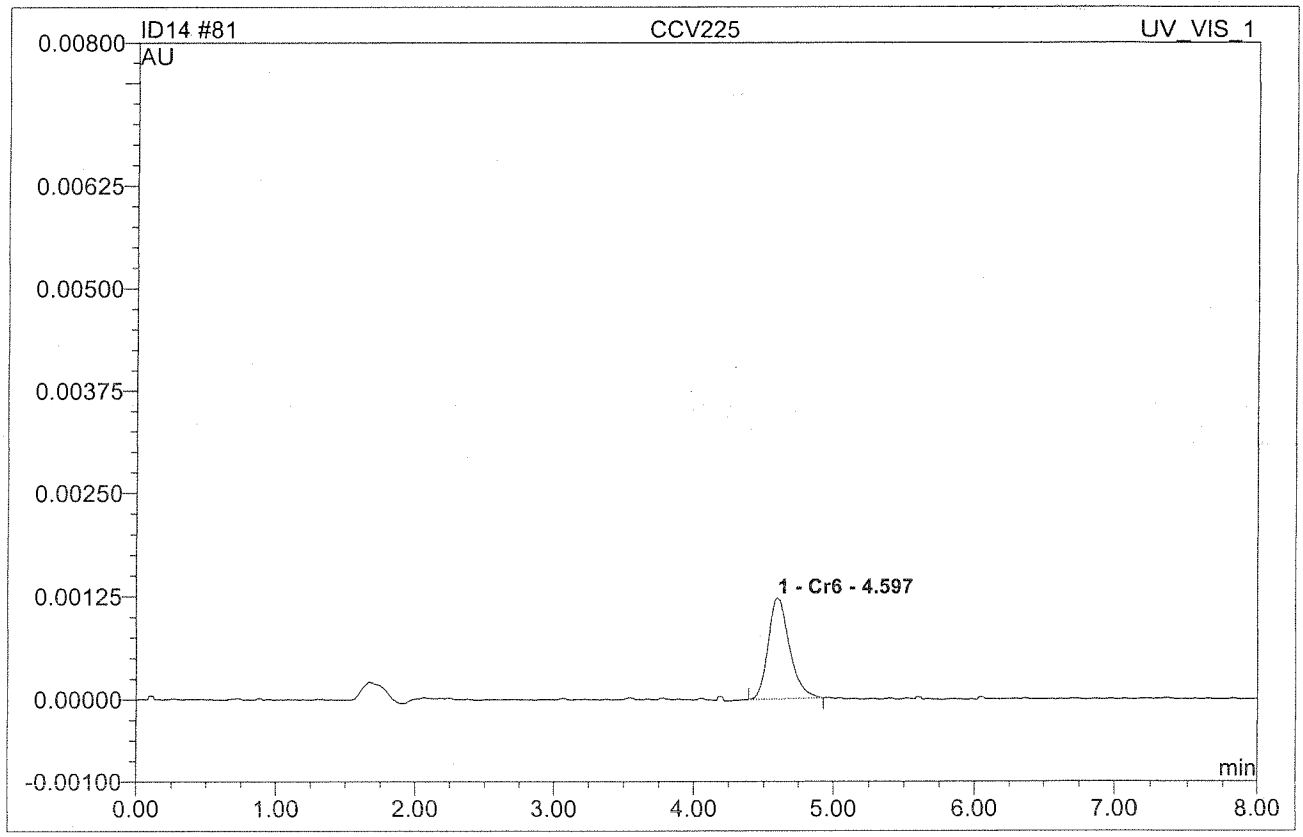
Sample Name:	**CCB223**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/15/2015 1:50**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID14 070 CCV225

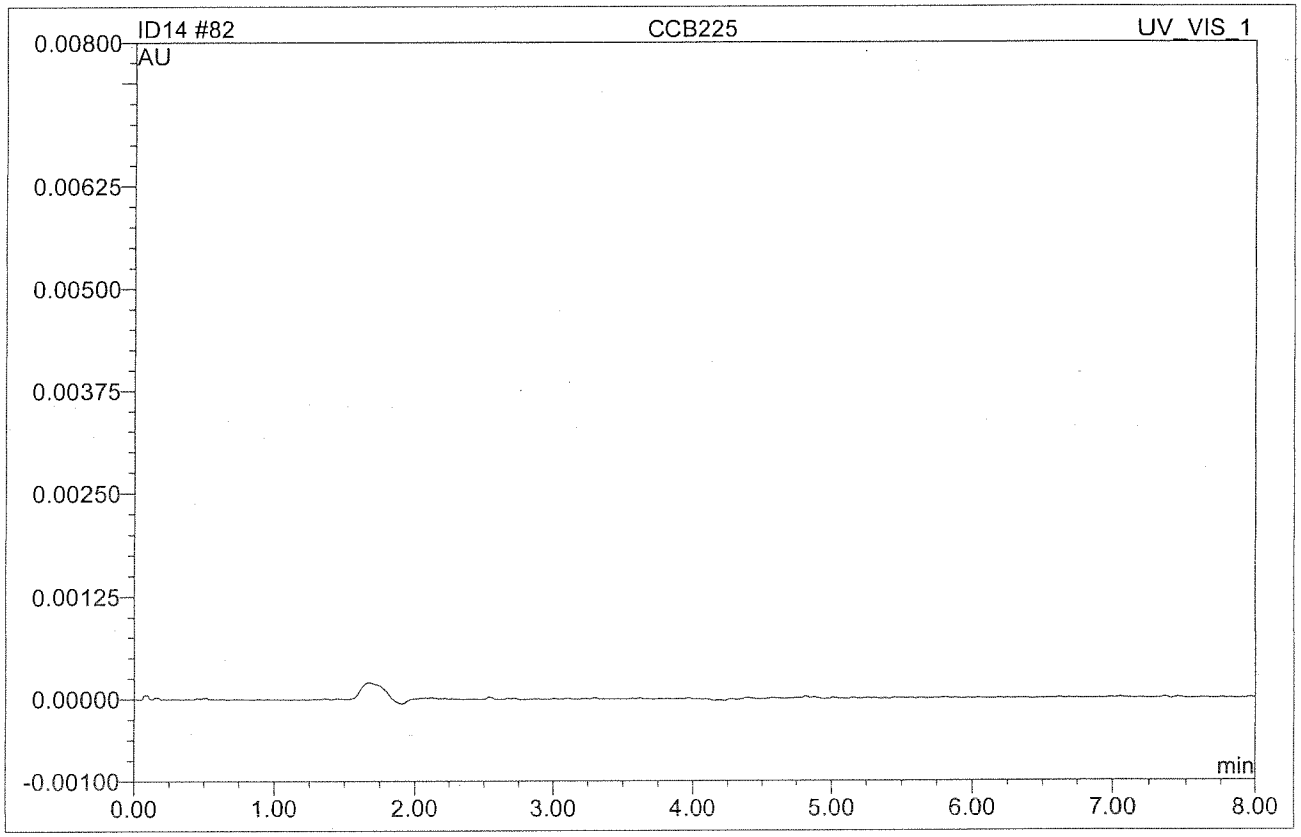
Sample Name:	**CCV225**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/15/2015 3:34**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.60	Cr6	0.0012210	0.0002167	100.00	2.033	BMB
Total:			0.001	0.000	100.00	2.033	

ID14 071 CCB225

Sample Name:	**CCB225**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/15/2015 3:55**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ANALYTICAL LOG(S)

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HEXAVALENT CHROMIUM IC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

1,5 Diphenylcarbohydrozide : 0.5 g	SW9B-04-023
MeOH : 100 ml	SW1A-005-08-12 (1L)
H_2SO_4 : 28 ml	↓ 06-12
$(NH_4)2SO_4$: 66 g	SW9A-04-027 (2L)
NH_4OH : 13 ml	↓ 023
pH Adjusted Water ID #: (range 9.3-9.5)	1/26/15 ~~R~~ SW4-02-49-03
Reagent Water ID #:	RW1-13-002

Book #:	A59-034
Instrument No.:	59
Pipette ID:	SW9A-04-017
	SW9A-04-025
	SW8A-02-21
Balance ID:	10601202
Analytical Sequence:	IA26
Method File:	IC59A26
Analytical Batch:	–

SOP #	Rev. #
☑ EMAX-218.6	5
☑ EMAX-7199	3
☐ EMAX-	

Linear Range (ppb):

S0	—	0
S1	—	0.2
S2	—	0.5
S3	—	1.0
S4	—	2.0
S5	—	5.0
S6	—	7.5
S7	—	10
ICV	—	4.0

STANDARDS ID	
ICAL	SW9B-05-61-03
ICV	↓ -61-04
CCV	– ~~61~~ 1/26/15
LCS	–
MS	–

Column : IonPac AS7 (4x255 mm) Serial # 015163

Guard Column : IonPac NG1 (4x35 mm) Serial # 024133

Flow : 1.00 mL/min

Wavelength : 530 nm

Inj Vol: 250 µL

5 mL vial kit Lot #:	038141	Snapseal
0.45 µm filter lot #:	21855728	402 # 19414007
0.2 µm filter lot #:	21852703	1.502 # 20814007

ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ CHROMELEON	
☐	

Analyzed By: NL

Date: 1/26/15

8100

Sequence: IA26
Operator: EMAXLABS
Printed: 1/27/2015 11:28:56 AM

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 11

Created: 1/26/2015 2:07:16 PM by EMAXLABS
Last Update: 1/27/2015 9:42:56 AM by EMAXLABS

No.	Sequence	Sample ID	Name	Type	Inj. Vol.	Program	Method	Status	Inj. Date/Time	Dil. Factor	Comment
1	IA26	001	IB	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:29:17 PM	1.0000	
2	IA26	002	S-0	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:39:41 PM	1.0000	
3	IA26	003	S-1	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:55:21 PM	1.0000	0.2 PPB
4	IA26	004	S-2	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:05:45 PM	1.0000	0.5 PPB
5	IA26	005	S-3	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:16:09 PM	1.0000	1.0 PPB
6	IA26	006	S-4	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:26:33 PM	1.0000	2.0 PPB
7	IA26	007	S-5	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:36:58 PM	1.0000	5.0 PPB
8	IA26	008	S-6	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:47:22 PM	1.0000	7.5 PPB
9	IA26	009	S-7	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:57:46 PM	1.0000	10 PPB
10	IA26	010	ICV	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 4:10:56 PM	1.0000	4.0 PPB
11	IA26	011	ICB	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 4:21:21 PM	1.0000	

1/27/15

FINAL

1/27/15

Chromeleon © Dionex Corporation, Version 6.70 SP2a Build 1871

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HEXAVALENT CHROMIUM IC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

1,5 Diphenylcarbohydrozide : 0.5 g	SW9B-04-035
MeOH : 100 ml	SW1A-005-08-12 (1L)
H_2SO_4 : 28 ml	↓ -06-12
$(NH_4)2SO_4$: 66 g	SW9A-04-034 (2L)
NH_4OH : 13 ml	↓ 023
pH Adjusted Water ID #: (range 9.3-9.5)	SW4-03-02-02
Reagent Water ID #:	RW1-15-001

HCD007W : D490, D077

HCD008S* : D040

*: 1.6mL aliquot of digestate was volumed to 100mL to be calculated as preparation factor of 62.5x

5 mL vial kit Lot #: 038141	Snap-Seal Container
0.45 µm filter lot #: 21855728	4 oz: 19414007
0.2 µm filter lot #: 21852703	1.5 oz: 20814007

Book #:	A59-035
Instrument No.:	59
Pipette ID:	SW9A-04-017
	SW9A-04-025
	SW8A-02-21
Balance ID:	10601202
Analytical Sequence:	ID14
Method File:	IC59A26
Analytical Batch:	HCD007W/8S

SOP #	Rev. #
☑ EMAX-218.6	5
☑ EMAX-7199	3
☐ EMAX-	

STANDARDS ID	
ICAL	–
ICV	–
CCV	SW9B-05-65-01
LCS	↓ -65-02
MS	↓ -64-07

ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ CHROMELEON	
☐	

Analyzed By: NL

Date: 4/14/15

Sequence: ID14
Operator: EMAXLABS

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 102

Created: 4/14/2015 12:45:40 PM by EMAXLABS
Last Update: 4/15/2015 2:43:22 PM by EMAXLABS

No.	Sequence	Sample ID	Name	Type	Inj. Vol.	Program	Method	Status	Inj. Date/Time	Dil. Factor
1	ID14		IB	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:29:17 PM	1.0000
2	ID14		S-0	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:39:41 PM	1.0000
3	ID14		S-1	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:55:21 PM	1.0000
4	ID14		S-2	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:05:45 PM	1.0000
5	ID14		S-3	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:16:09 PM	1.0000
6	ID14		S-4	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:26:33 PM	1.0000
7	ID14		S-5	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:36:58 PM	1.0000
8	ID14		S-6	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:47:22 PM	1.0000
9	ID14		S-7	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:57:46 PM	1.0000
10	ID14		ICV	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 4:10:56 PM	1.0000
11	ID14		ICB	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 4:21:21 PM	1.0000
12	ID14	001	CCV209	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 12:46:14 PM	1.0000
13	ID14	002	CCB209	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 1:07:02 PM	1.0000
14	ID14	003	HCD007WB	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 1:17:27 PM	1.0000
15	ID14	004	HCD007WL	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 1:27:50 PM	1.0000
16	ID14	005	HCD007WC	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 1:38:15 PM	1.0000
17	ID14	006	D490-01I	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 1:48:39 PM	40.0000
18	ID14	007	D490-01IA	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 1:59:03 PM	40.0000
19	ID14	008	CCV211	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 2:09:27 PM	1.0000
20	ID14	009	CCB211	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 2:19:51 PM	1.0000
21	ID14	010	D490-01K	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 2:40:15 PM	80.0000
22	ID14	011	D490-01KA	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 2:50:39 PM	80.0000
23	ID14	012	D490-01J	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 3:05:53 PM	200.0000
24	ID14	013	D490-01JA	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 3:16:17 PM	200.0000
25	ID14	014	CCV213	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 3:28:43 PM	1.0000
26	ID14	015	CCB213	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 3:39:07 PM	1.0000
27	ID14	016	CCV215	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 5:30:50 PM	1.0000

FINAL
4/15/15

B1103

Sequence: ID14
Operator: EMAXLABS

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 102

Created: 4/14/2015 12:45:40 PM by EMAXLABS
Last Update: 4/15/2015 2:43:22 PM by EMAXLABS

No.	Sequence	Comment
1	ID14	
2	ID14	
3	ID14	0.2 PPB
4	ID14	0.5 PPB
5	ID14	1.0 PPB
6	ID14	2.0 PPB
7	ID14	5.0 PPB
8	ID14	7.5 PPB
9	ID14	10 PPB
10	ID14	4.0 PPB
11	ID14	
12	ID14	
13	ID14	
14	ID14	
15	ID14	
16	ID14	
17	ID14	DF=40
18	ID14	DF=40; POST-SPIKE AT 1 PPB
19	ID14	
20	ID14	
21	ID14	DF=80
22	ID14	DF=80; POST-SPIKE AT 1 PPB
23	ID14	DF=200
24	ID14	DF=200; POST-SPIKE AT 1 PPB
25	ID14	
26	ID14	
27	ID14	

FINAL
N 4/15/15

Sequence: ID14
Operator: EMAXLABS

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 102

Created: 4/14/2015 12:45:40 PM by EMAXLABS
Last Update: 4/15/2015 2:43:22 PM by EMAXLABS

No.	Sequence	Sample ID	Name	Type	Inj. Vol.	Program	Method	Status	Inj. Date/Time	Dil. Factor
28	ID14	017	CCB215	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 5:41:14 PM	1.0000
29	ID14	018	D077-02	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 5:51:39 PM	1.0000
30	ID14	019	D077-01	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 6:02:03 PM	1.0000
31	ID14	020	D077-01D	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 6:12:27 PM	1.0000
32	ID14	021	D077-01M	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 6:22:51 PM	1.0000
33	ID14	022	D077-03	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 6:33:15 PM	1.0000
34	ID14	023	CCV217	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 6:43:39 PM	1.0000
35	ID14	024	CCB217	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 7:04:28 PM	1.0000
36	ID14	025	HCD008SB	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 7:14:53 PM	1.0000
37	ID14	026	HCD008SQ	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 7:25:17 PM	1.0000
38	ID14	027	CSD008SL	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 7:35:41 PM	1.0000
39	ID14	028	CSD008SX	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 7:46:05 PM	1.0000
40	ID14	029	CID008SL	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 7:56:29 PM	200.0000
41	ID14	030	CID008SX	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 8:06:53 PM	200.0000
42	ID14	031	D040-09	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 8:17:17 PM	1.0000
43	ID14	032	D040-09N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 8:27:41 PM	1.0000
44	ID14	033	D040-11	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 8:38:05 PM	1.0000
45	ID14	034	D040-11N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 8:48:30 PM	1.0000
46	ID14	035	CCV219	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 9:09:18 PM	1.0000
47	ID14	036	CCB219	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 9:19:43 PM	1.0000
48	ID14	037	D040-12	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 9:30:07 PM	1.0000
49	ID14	038	D040-12N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 9:40:31 PM	1.0000
50	ID14	039	D040-13	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 9:50:56 PM	1.0000
51	ID14	040	D040-13N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 10:01:20 PM	1.0000
52	ID14	041	D040-14	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 10:11:44 PM	1.0000
53	ID14	042	D040-14N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 10:22:09 PM	1.0000
54	ID14	043	D040-16	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 10:32:32 PM	1.0000

FINAL
4/15/15

Sequence: ID14
Operator: EMAXLABS

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 102

Created: 4/14/2015 12:45:40 PM by EMAXLABS
Last Update: 4/15/2015 2:43:22 PM by EMAXLABS

No.	Sequence	Comment
28	ID14	
29	ID14	
30	ID14	
31	ID14	
32	ID14	
33	ID14	
34	ID14	
35	ID14	
36	ID14	
37	ID14	
38	ID14	
39	ID14	
40	ID14	DF=200
41	ID14	DF=200
42	ID14	
43	ID14	
44	ID14	
45	ID14	
46	ID14	
47	ID14	
48	ID14	
49	ID14	
50	ID14	
51	ID14	
52	ID14	
53	ID14	
54	ID14	

FINAL
K 4/15/15

Sequence: ID14
Operator: EMAXLABS

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 102

Created: 4/14/2015 12:45:40 PM by EMAXLABS
Last Update: 4/15/2015 2:43:22 PM by EMAXLABS

No.	Sequence	Sample ID	Name	Type	Inj. Vol.	Program	Method	Status	Inj. Date/Time	Dil. Factor
55	ID14	044	D040-16N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 10:42:57 PM	1.0000
56	ID14	045	D040-17	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 10:53:21 PM	1.0000
57	ID14	046	D040-17N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 11:03:45 PM	1.0000
58	ID14	047	CCV221	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 11:14:09 PM	1.0000
59	ID14	048	CCB221	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 11:34:57 PM	1.0000
60	ID14	049	D040-18	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 11:45:21 PM	1.0000
61	ID14	050	D040-18N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/14/2015 11:55:45 PM	1.0000
62	ID14	051	D040-19	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 12:06:09 AM	1.0000
63	ID14	052	D040-19N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 12:16:33 AM	1.0000
64	ID14	053	D040-20	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 12:26:57 AM	1.0000
65	ID14	054	D040-20N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 12:37:22 AM	1.0000
66	ID14	055	D041-01	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 12:47:46 AM	1.0000
67	ID14	056	D041-01N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 12:58:10 AM	1.0000
68	ID14	057	D041-02	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 1:08:34 AM	1.0000
69	ID14	058	D041-02N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 1:18:58 AM	1.0000
70	ID14	059	CCV223	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 1:29:22 AM	1.0000
71	ID14	060	CCB223	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 1:50:11 AM	1.0000
72	ID14	061	D041-04	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 2:00:35 AM	1.0000
73	ID14	062	D041-04N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 2:10:59 AM	1.0000
74	ID14	063	D041-05	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 2:21:23 AM	1.0000
75	ID14	064	D041-05N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 2:31:48 AM	1.0000
76	ID14	065	D041-06	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 2:42:12 AM	1.0000
77	ID14	066	D041-06N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 2:52:36 AM	1.0000
78	ID14	067	D041-03I	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 3:03:00 AM	5.0000
79	ID14	068	D041-03IN	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 3:13:24 AM	5.0000
80	ID14	069	D041-03IA	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 3:23:48 AM	5.0000
81	ID14	070	CCV225	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 3:34:12 AM	1.0000

SIMAL
K 4/15/15

Sequence: ID14
Operator: EMAXLABS

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 102

Created: 4/14/2015 12:45:40 PM by EMAXLABS
Last Update: 4/15/2015 2:43:22 PM by EMAXLABS

No.	Sequence	Comment
55	ID14	
56	ID14	
57	ID14	
58	ID14	
59	ID14	
60	ID14	
61	ID14	
62	ID14	
63	ID14	
64	ID14	
65	ID14	
66	ID14	
67	ID14	
68	ID14	
69	ID14	
70	ID14	
71	ID14	
72	ID14	
73	ID14	
74	ID14	
75	ID14	
76	ID14	
77	ID14	
78	ID14	
79	ID14	
80	ID14	
81	ID14	

FINAL
K 4/15/15

8198

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 102

Created: 4/14/2015 12:45:40 PM by EMAXLABS
Last Update: 4/15/2015 2:43:22 PM by EMAXLABS

No.	Sequence	Sample ID	Name	Type	Inj. Vol.	Program	Method	Status	Inj. Date/Time	Dil. Factor
82	ID14	071	CCB225	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 3:55:00 AM	1.0000
83	ID14	072	CCV227	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 10:47:04 AM	1.0000
84	ID14	073	CCB227	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 10:57:29 AM	1.0000
85	ID14	074	D040-15	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 11:07:53 AM	1.0000
86	ID14	075	D040-15N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 11:18:17 AM	1.0000
87	ID14	076	D040-15D	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 11:28:41 AM	1.0000
88	ID14	077	D040-15ND	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 11:39:05 AM	1.0000
89	ID14	078	D040-15M	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 11:49:29 AM	1.0000
90	ID14	079	D040-15NM	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 11:59:54 AM	1.0000
91	ID14	080	D040-15D	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 12:10:18 PM	1.0000
92	ID14	081	D040-15M	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 12:20:42 PM	200.0000
93	ID14	082	D040-15NM	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 12:31:06 PM	200.0000
94	ID14	083	CCV229	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 12:41:30 PM	1.0000
95	ID14	084	CCB229	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 12:51:54 PM	1.0000
96	ID14	085	D040-17	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 1:02:18 PM	1.0000
97	ID14	086	D040-17N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 1:12:42 PM	1.0000
98	ID14	087	D040-17A	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 1:23:06 PM	1.0000
99	ID14	088	D040-18	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 1:33:30 PM	1.0000
100	ID14	089	D040-18A	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 1:43:54 PM	1.0000
101	ID14	090	CCV231	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 1:54:18 PM	1.0000
102	ID14	091	CCB231	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/15/2015 2:04:43 PM	1.0000

8158

FINAL
K 4/15/15

Sequence: ID14
Operator: EMAXLABS
Printed: 4/15/2015 2:43:28 PM

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 102

Created: 4/14/2015 12:45:40 PM by EMAXLABS
Last Update: 4/15/2015 2:43:22 PM by EMAXLABS

No.	Sequence	Comment
82	ID14	
83	ID14	
84	ID14	
85	ID14	
86	ID14	
87	ID14	BAD INJECTION
88	ID14	
89	ID14	SOL
90	ID14	SOL
91	ID14	
92	ID14	INSOL; DF=200
93	ID14	INSOL; DF=200
94	ID14	
95	ID14	
96	ID14	
97	ID14	
98	ID14	POST-SPIKE AT 0.2 PP B
99	ID14	
100	ID14	POST-SPIKE AT 0.2 PP B
101	ID14	
102	ID14	

FINAL
K 4/15/15

EXTRACTION LOGS

EMAX LABORATORIES, INC.

FileID: HCD008S

IC HEXAVALENT CHROMIUM SOIL SAMPLE PREPARATION LOG

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	pHAdj	FinalVol(ml)	Notes
15HCD007S01	HCD008SB	12.495	g	4/13/15 14:29	9.34	100	
15HCD007S02	CSD008SL	12.501	g	4/13/15 14:30	9.35	100	**1.25mL
15HCD007S03	CID008SL	12.499	g	4/13/15 14:31	9.34	100	*19.2mg
15HCD007S04	D040-09	12.511	g	4/13/15 14:32	9.34	100	
15HCD007S05	D040-11	12.501	g	4/13/15 14:33	9.38	100	
15HCD007S06	D040-12	12.492	g	4/13/15 14:34	9.39	100	
15HCD007S07	D040-13	12.521	g	4/13/15 14:35	9.34	100	
15HCD007S08	D040-14	12.501	g	4/13/15 14:36	9.39	100	
15HCD007S09	D040-15	12.492	g	4/13/15 14:37	9.33	100	
15HCD007S10	D040-15D	12.507	g	4/13/15 14:38	9.36	100	
15HCD007S11	D040-15M	12.489	g	4/13/15 14:39	9.39	100	SOL; **2.5mL
15HCD007S12	D040-15M	12.518	g	4/13/15 14:40	9.39	100	INSOL; *29.3mg
15HCD007S13	D040-16	12.489	g	4/13/15 14:41	9.38	100	
15HCD007S14	D040-17	12.492	g	4/13/15 14:42	9.34	100	
15HCD007S15	D040-18	12.494	g	4/13/15 14:43	9.31	100	
15HCD007S16	D040-19	12.501	g	4/13/15 14:44	9.31	100	
15HCD007S17	D040-20	12.511	g	4/13/15 14:47	9.32	100	
15HCD007S18	D041-01	12.484	g	4/13/15 14:48	9.36	100	
15HCD007S19	D041-02	12.487	g	4/13/15 14:49	9.37	100	
15HCD007S20	D041-03	12.507	g	4/13/15 14:50	9.34	100	
15HCD007S21	D041-04	12.515	g	4/13/15 14:51	9.36	100	
15HCD007S22	D041-05	12.499	g	4/13/15 14:52	9.37	100	
15HCD007S23	D041-06	12.508	g	4/13/15 14:53	9.39	100	

Calibration of pH Meter — InstrumentID: F7

BufferID	Value	Reading	DateTime
SW1-01-644	4	4	4/14/15 17:13
SW1-01-667	7	7	4/14/15 17:13
SW1-01-627	10	10.01	4/14/15 17:13
SW1-01-656	CalVer 8	8.01	4/14/15 17:13

Standards	Desc	Amt. Added	Exp.Date
SW9B-05-61-15	Cr VI (soluble) 10 ppm	**SEE NOTES	8/5/2015
SW9A-03-002	Cr VI (insoluble) Lead Chromate	*SEE NOTES	4/3/2016
	Cr VI (insoluble)		
	Cr VI (insoluble)		

Reagents ID	Desc	Amt. Added	Exp.Date
SW4-02-39-02	Phosphate Buffer	0.5mL	5/20/2015
SWR1-01-502	$MgCl_2$	0.4g	2/1/2021
SW1A-005-08-14	HNO_3	~1mL	2/6/2016
SW4-03-03-01	Alkali Digestion Solution pH 11.9	50mL	5/7/2015
SW1B-002-20-23	Silica Sand	12.5g	9/21/2021
LOT # 9592070	Filter	NA	NA

Balance ID: 10601202. Calibration check was verified prior to use.

Digestor #: B. Temp. / Thermometer ID: 95C, 111859904

Micropipette ID: SW9A-04-025; SW9A-04-017

☑ EMAX-3060 Rev.0

☐ EMAX-7199 Rev.3

Prepared By: VLe

Checked By: [illegible]

☑ DateTimeStarted 4/13/2015 15:12 ☑ DateTimeEnded 4/13/2015 17:32 Comment: DateTimeStarted and DateTimeEnded is the start and end time for alkali digestion. Date 04/14/15

FINAL
4/14/15

8112

RETENTION TIME WINDOW

RETENTION TIME WINDOW

METHOD 218.6/7199

Lab Name:	EMAX	METHOD:	EMAX-218.6/7199
Instrument ID:	DX500IC59	IC COLUMN:	AS7/AG7 / AS7/NG1
		COLUMN SIZE:	4x250mm

Compound	Ical Mean RT	from	to	Retention Time Window
CHROMIUM VI	4.66	4.57	4.76	0.095

IC59A26

QA
01/27/15

TABLE OF CONTENTS

CLIENT: **KLEINFELDER**

PROJECT: **CTO 070, UXO4, FALLBROOK**

SDG: **15D114**

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GC-VOA	**	4000 –
GC-SVOA	**	5000 –
HPLC	METHOD SW8330A	6000 – 6157
METALS	METHOD SW6020A METHOD SW7470A/SW7471A	7000 – 7148 7149 – 7186
WET	METHOD 6850 METHOD 7199	8000 – 8102 8103 – 8245
OTHERS	**	9000 –

** - Not Requested

EMAX
LABORATORIES, INC.
1835 W. 205th Street
Torrance, CA 90501
Tel: (310) 618-8889
Fax: (310) 618-0818

Date: 05-18-2015
EMAX Batch No.: 15D114

Attn: Scott Fleming

Kleinfelder
1320 Columbia St, Suite 310
San Diego, CA 92101

Subject: Laboratory Report
Project: CTO 070, UXO4, FALLBROOK

Enclosed is the Laboratory report for samples received on 04/17/15.
The data reported relate only to samples listed below :

Sample ID	Control #	Col Date	Matrix	Analysis
UXO4-TR01-S01-1.0	D114-01	04/10/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC PERCHLORATE BY 6850
UXO4-TR01-S02-3.0	D114-02	04/10/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC PERCHLORATE BY 6850
UXO4-TR02-S01-2.0	D114-03	04/13/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC PERCHLORATE BY 6850
UXO4-TR02-S02-3.0	D114-04	04/13/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC

Sample ID	Control #	Col Date	Matrix	Analysis
				PERCHLORATE BY 6850
UXO4-TR03-S01-1.5	D114-05	04/13/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850
UXO4-TR03-S02-3.0	D114-06	04/13/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850
UXO4-TR04-S01-2.0	D114-07	04/14/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850
UXO4-TR04-S02-3.0	D114-08	04/14/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850
UXO4-EB-041615	D114-09	04/16/15	WATER	NITROAROMATICS & NITRAMINES
				TOTAL METALS BY ICP-MS
				MERCURY
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850
UXO4-SB08-8.0	D114-10	04/08/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850
UXO4-SB09-6.6	D114-11	04/10/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850
UXO4-SB10-0.5	D114-12	04/16/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850

Sample ID	Control #	Col Date	Matrix	Analysis
UXO4-SB10-1.0	D114-13	04/16/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC PERCHLORATE BY 6850
UXO4-SB11-0.5	D114-14	04/16/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC PERCHLORATE BY 6850
UXO4-SB11-1.0	D114-15	04/16/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC PERCHLORATE BY 6850
UXO4-SB12-0.5	D114-16	04/16/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC PERCHLORATE BY 6850
UXO4-SB12-1.0	D114-17	04/16/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC PERCHLORATE BY 6850
UXO4-SB13-0.5	D114-18	04/16/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC PERCHLORATE BY 6850
UXO4-SB13-1.0	D114-19	04/16/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC PERCHLORATE BY 6850
UXO4-SB14-0.5	D114-20	04/16/15	SOIL	TOTAL METALS BY ICP-MS MERCURY NITROAROMATICS & NITRAMINES HEXAVALENT CHROMIUM BY IC PERCHLORATE BY 6850
UXO4-SB14-1.0	D114-21	04/16/15	SOIL	TOTAL METALS BY ICP-MS

Sample ID	Control #	Col Date	Matrix	Analysis
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850
UX04-SB15-0.5	D114-22	04/16/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850
UX04-SB15-1.0	D114-23	04/16/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850
UX04-SB16-0.5	D114-24	04/16/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850
UX04-SB16-1.0	D114-25	04/16/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850
UX04-TR04-S02-3.0MS	D114-08M	04/14/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850
UX04-TR04-S02-3.0MSD	D114-08S	04/14/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				PERCHLORATE BY 6850
UX04-TR04-S02-3.0DUP	D114-08D	04/14/15	SOIL	HEXAVALENT CHROMIUM BY IC
UX04-SB15-0.5MS	D114-22M	04/16/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY
				NITROAROMATICS & NITRAMINES
				HEXAVALENT CHROMIUM BY IC
				PERCHLORATE BY 6850
UX04-SB15-0.5MSD	D114-22S	04/16/15	SOIL	TOTAL METALS BY ICP-MS
				MERCURY

Sample ID	Control #	Col Date	Matrix	Analysis
				NITROAROMATICS & NITRAMINES
				PERCHLORATE BY 6850
UX04-SB15-0.5DUP	D114-22D	04/16/15	SOIL	HEXAVALENT CHROMIUM BY IC

The results are summarized on the following pages.

Please feel free to call if you have any questions concerning these results.

Sincerely yours,

Caspar J. Pang
Laboratory Director

This report is confidential and intended solely for the use of the individual or entity to whom it is addressed. This report shall not be reproduced except in full or without the written approval of EMAX.

EMAX certifies that results included in this report meets all NELAC & DOD requirements unless noted in the Case Narrative.

NELAC Accredited Certificate Number 02116CA
L-A-B Accredited DoD ELAP and ISO/IEC 17025 Certificate Number L2278 Testing

15D114

Chain of Custody Form

COC# 0070- 03
Page 1 of 4

CTO-070, UXO4, Fallbrook, CA

Project Manager: Gus Thrasher

Contact: sfleming@kleinfelder.com (865-924-6911)

Sampler: G. Thrasher / B. Bergeron

Sampler Phone: 858-717-5545

Signature:

Date: 4/16/15

Analytical Laboratory
EMAX Laboratory
1835 W. 205th Street
Torrance CA 90501
Phone (310) 618-8889

Attn Ye Myint

Lab TAT
28-day LIV package &
EQuIS LOD/LOQ EFWEDD

Deliver data to
sfleming@kleinfelder.com &
gkellar@kleinfelder.com

General Comments:
P=Preserved; U=Unpreserved
FP=Filtered and Preserved

	Sample ID	Location ID	Sample Matrix	Sample Date	Sample Time	# Containers	Explosives Method 8330A	Metals including Strontium Method 6020	Perchlorate Method 6850	Hexavalent Chromium Method 7199	Mercury Method 7470/7471A	Sample Comments
1	UXO4-TR01-S01-1.0	Trench 01	Soil	4/10/15	14:10	2	U	U	U	U	U	
2	UXO4-TR01-S02-3.0	Trench 01		4/10/15	14:15							
3	UXO4-TR02-S01-2.0	Trench 02		4/13/15	1100							
4	UXO4-TR02-S02-3.0	Trench 02		4/13/15	1110							
5	UXO4-TR03-S01-1.5	Trench 03		4/13/15	1300							
6	UXO4-TR03-S02-3.0	Trench 03		4/13/15	1315							
7	UXO4-TR04-S01-2.0	Trench 04		4/14/15	0800							
8	UXO4-TR04-S02-3.0	Trench 04		4/14/15	0805							

Sample Transport:
Lab Courier
Shipping Company:

Sample Disposal
Disposal by Lab - 60 day retention

Tracking # 0730

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
	4/17/15	~~655~~	Kamal M.	4/17/15	0730
Relinquished by: Kamal M	4/17/15	1000	Received by:	04-17-15	1000

① - 2.4° C
2 - 3.8°C
Custody Sealed coolers

1005

15D114

Chain of Custody Form

COC# 0070-03
Page 2 of 4

CTO-070, UXO4, Fallbrook, CA

Project Manager: Gus Thrasher

Contact: sfleming@kleinfelder.com (865-924-6911)

Sampler: G. THRASHER / B. BERGERON

Sampler Phone: 858-717-5545

Signature:

Date: 4/16/15

Analytical Laboratory
EMAX Laboratory
1835 W. 205th Street
Torrance CA 90501
Phone (310) 618-8889

Attn Ye Myint

Lab TAT
28-day LIV package &
EQuIS LOD/LOQ EFWEDD

Deliver data to
sfleming@kleinfelder.com &
gkellar@kleinfelder.com

General Comments:
P=Preserved; U=Unpreserved
FP=Filtered and Preserved

	Sample ID	Location ID	Sample Matrix	Sample Date	Sample Time	# Containers	Explosives Method 8330A	Metals including Strontium Method 6020	Perchlorate Method 6850	Hexavalent Chromium Method 7199	Mercury Method 7470/7471A	Sample Comments
8	UXO4-TR04-S02-3.0MS	TRENCH 04	SOIL	4/14/15	0805	2	U	U	U	U	U	MS
8	UXO4-TR04-S02-3.0MSD	TRENCH 04	SOIL	4/14/15	0805	2	U	U	U	U	U	MSD
9	UXO4-EB-041615	EQUIP. BLANK	WATER	4/16/15	1420	7	U	P	FU	U	P	
10	UXO4-SB08-8.0	E-10-00014	SOIL	4/08/15	1101	2	U	U	U	U	U	SAMPLE WET
11	UXO4-SB09-6.6	E-10-00050	SOIL	4/10/15	0950	2	↓	↓	↓	↓	↓	
12	UXO4-SB10-0.5	SB10	SOIL	4/16/15	1110	2	↓	↓	↓	↓	↓	
13	UXO4-SB10-1.0	SB10	SOIL	↓	1115	2	↓	↓	↓	↓	↓	
14	UXO4-SB11-0.5	SB11	SOIL	↓	1120	2	↓	↓	↓	↓	↓	

Sample Transport:
Lab Courier
Shipping Company:

Sample Disposal
Disposal by Lab - 60 day retention

Tracking # 0730

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
	4/17/15	~~1135~~	Kamal M	4/17/15	0730
KM	4/17/15	1000		04-17-15	1000

1066

15D114

Chain of Custody Form

COC# 0070- 03
Page 3 of 4

CTO-070, UXO4, Fallbrook, CA

Project Manager: Gus Thrasher

Contact: sfleming@kleinfelder.com (865-924-6911)

Sampler: G. THRASHER / B. BERGERON

Sampler Phone: 858 · 717-5545

Signature:

Date: 4/16/15

Analytical Laboratory
EMAX Laboratory
1835 W. 205th Street
Torrance CA 90501
Phone (310) 618-8889

Attn Ye Myint

Lab TAT
28-day LIV package &
EQuIS LOD/LOQ EFWEDD

Deliver data to
sfleming@kleinfelder.com &
gkellar@kleinfelder.com

General Comments:
P=Preserved; U=Unpreserved
FP=Filtered and Preserved

	Sample ID	Location ID	Sample Matrix	Sample Date	Sample Time	# Containers	Explosives Method 8330A	Metals including Strontium Method 6020	Perchlorate Method 6850	Hexavalent Chromium Method 7199	Mercury Method 7470/7471A	Sample Comments
15	UXO4-SB11-1.0	SB11	Soil	4/16/15	1125	2	✓	✓	✓	✓	✓	
16	UXO4-SB12-0.5	SB12	↓	↓	1130	↓	↓	↓	↓	↓	↓	
17	UXO4-SB12-1.0	SB12	↓	↓	1135	↓	↓	↓	↓	↓	↓	
18	UXO4-SB13-0.5	SB13	↓	↓	1140	↓	↓	↓	↓	↓	↓	
19	UXO4-SB13-1.0	SB13	↓	↓	1145	↓	↓	↓	↓	↓	↓	
20	UXO4-SB14-0.5	SB14	↓	↓	10:45	↓	↓	↓	↓	↓	↓	
21	UXO4-SB14-1.0	SB14	↓	↓	10:50	↓	↓	↓	↓	↓	↓	
22	UXO4-SB15-0.5	SB15	↓	↓	1150	↓	↓	↓	↓	↓	↓	

Sample Transport:
Lab Courier ☐
Shipping Company: ☐

Sample Disposal
Disposal by Lab - 60 day retention

Tracking # 0730

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
	4/17/15	~~0555~~	K. M.	4/17/15	0730
KM	4/17/15	1000		04-17-15	1000

1067

15D114

Chain of Custody Form

COC# 0070-03
Page 4 of 4

CTO-070, UXO4, Fallbrook, CA	Sampler: G. THRASHER / B. BERGERON	
Project Manager: Gus Thrasher	Sampler Phone: 858-717-5545	Date: 4/16/15
Contact: sfleming@kleinfelder.com (865-924-6911)	Signature:	

Analytical Laboratory
EMAX Laboratory
1835 W. 205th Street
Torrance CA 90501
Phone (310) 618-8889

Attn Ye Myint

Lab TAT
28-day LIV package &
EQuIS LOD/LOQ EFWEDD

Deliver data to
sfleming@kleinfelder.com &
gkellar@kleinfelder.com

General Comments:
P=Preserved; U=Unpreserved;
FP=Filtered and Preserved

	Sample ID	Location ID	Sample Matrix	Sample Date	Sample Time	# Containers	Explosives Method 8330A	Metals including Strontium Method 6020	Perchlorate Method 6850	Hexavalent Chromium Method 7199	Mercury Method 7470/7471A								Sample Comments
22	UXO4- SB15-0.5 MS	SB15	Soil	4/16/15	1150	2	✓	✓	✓	✓	✓								
22	UXO4- SB15-0.5 MSD	SB15	↓	↓	1150	↓	↓	↓	↓	↓	↓								
23	UXO4- SB15-1.0	SB15	↓	↓	1155	↓	↓	↓	↓	↓	↓								
24	UXO4- SB16-0.5	SB16	↓	↓	1200	↓	↓	↓	↓	↓	↓								
25	UXO4- SB16-1.0	SB16	↓	↓	1205	↓	↓	↓	↓	↓	↓								
	UXO4-																		
	UXO4-																		
	UXO4-																		

Sample Transport:
Lab Courier ☐
Shipping Company: ☐

Sample Disposal
Disposal by Lab - 60 day retention

Tracking # 0730 ~~[illegible]~~.

Relinquished by:	Date: 4/17/15	Time: ~~655~~	Received by: E. M.	Date: 4/17/15	Time: 0730
Relinquished by: K M	Date: 4/17/15	Time: 1000	Received by: [illegible]	Date: 04-17-15	Time: 1000

1608

Reference Number: SM02.7.3

SAMPLE RECEIPT FORM 1

Type of Delivery	Airbill / Tracking Number	
☐ Fedex ☐ UPS ☐ GSO ☑ Others Direct Delivery		ECN 150114
☐ EMAX Courier ☐ Client Delivery		Recipient Shen Fama
		Date 04-17-15 Time 1006

COC INSPECTION

☐ Client Name ☐ Client PM/FC ☑ Sampler Name ☑ Sampling Date/Time ☑ Sample ID ☑ Matrix
☐ Address ☐ Tel # / Fax # ☑ Courier Signature ☑ Analysis Required ☐ Preservative (if any) ☑ TAT
Safety Issues (if any) ☐ High concentrations expected ☐ From Superfund Site ☐ Rad screening required

Note:

PACKAGING INSPECTION

Container ☑ Cooler ☐ Box ☐ Other
Condition ☑ Custody Seal ☑ Intact ☐ Damaged
Packaging ☑ Bubble Pack ☐ Styrofoam ☐ Popcorn ☑ Sufficient ☑ plastic bag
Temperatures (Cool, ≤6 °C but not frozen) ☑ Cooler 1 2.4 °C ☑ Cooler 2 3.6 °C ☐ Cooler 3_____ °C ☐ Cooler 4_____ °C ☐ Cooler 5_____ °C
☐ Cooler 6_____ °C ☐ Cooler 7_____ °C ☐ Cooler 8_____ °C ☐ Cooler 9_____ °C ☐ Cooler 10_____ °C
Thermometer: A - S/N_____ B - S/N 140252070 C - S/N 140252067 D - S/N_____
FM 1/20/15

Comments: ☐ **Temperature is out of range. PM was informed IMMEDIATELY.**

Note:

DISCREPANCIES

LabSampleID 04-17-15	LabSampleContainerID	Code	ClientSample Label ID / Information	Corrective Action
2,6,7,8,9,10,16,17,18	3,11,13,14,19,20,21,	D10		R1
22,25	29,43,45,52-54,	D10		R1
↓	63	↓		R1
4	7	D7	per label: 4/16	R1
6	11,12	D10		R1

04/17/15 ym 4/17/15

☐ pH holding time requirement for water samples is 15 mins. Water samples for pH analysis are received beyond 15 minutes from sampling time.

NOTES/OBSERVATIONS:

Some of the sample jars do not include the ~~da~~ 04-17-15 year in the date.
Sample (-7) + 2 jars for (-8) have water as the matrix (on the label)

LEGEND:

Code	Description- Sample Management
D1	Analysis is not indicated in _____
D2	Analysis mismatch COC vs label
D3	Sample ID mismatch COC vs label
D4	Sample ID is not indicated in _____
D5	Container -[improper] [leaking] [broken]
D6	Date/Time is not indicated in Label
D7	Date/Time mismatch COC vs label
D8	Sample listed in COC is not received
D9	Sample received is not listed in COC
D10	No initial/date on corrections in COC/label
D11	Container count mismatch COC vs received
D12	Container size mismatch COC vs received

Code	Description-Sample Management
D13	Out of Holding Time
D14	Bubble is >6mm
D15	No trip blank in cooler
D16	Preservation not indicated in _____
D17	Preservation mismatch COC vs label
D18	Insufficient chemical preservative
D19	Insufficient Sample
D20	No filtration info for dissolved analysis
D21	No sample for moisture determination
D22	_____
D23	_____
D24	_____

☐ **Continue to next page.**

Code	Description-Sample Management
R1	Proceed as indicated in ☐ COC ☐ Label
R2	Refer to attached instruction
R3	Cancel the analysis
R4	Use vial with smallest bubble first
R5	Log-in with latest sampling date and time+1 min
R6	Adjust pH as necessary
R7	Filter and preserved as necessary
R8	_____
R9	_____
R10	_____
R11	_____
R12	_____

REVIEWS:

Sample Labeling Date 04-17-15 / 4/17/15

SRF Date 4/17/15

PM Date ~~4/17/15~~ 4/17/15 ym 4/17/15

Ye Myint

From: Gus.Thrasher@CH2M.com
Sent: Friday, April 17, 2015 3:33 PM
To: Ye Myint
Cc: SFleming@kleinfelder.com; Linh Pham
Subject: RE: COCs and SRF for 15D114 -CTO 070 Fallbrook

The COC is correct – the collection date was 4/13/15, similar to UX04-TR02-S02-2.0.

From: Ye Myint [mailto:YMyint@emaxlabs.com]
Sent: Friday, April 17, 2015 3:30 PM
To: Thrasher, Gus/SDO
Cc: SFleming@kleinfelder.com; Linh Pham
Subject: COCs and SRF for 15D114 -CTO 070 Fallbrook

Gus,

Attached are the COCs and Sample Receipt Forms with our notes for SDG: 15D114. One container received for sample UX04-TR02-S02-3.0 has collection date as 4/16 (COC – 4/13/15). Please advise.

Thanks.

Ye Myint
Project Manager
EMAX Laboratories, Inc.
1835W 205th. St.
Torrance, CA 90501
Ph: 310-618-8889 x121
Fax: 310-618-0818
E-mail: ymyint@emaxlabs.com

REPORTING CONVENTIONS

DATA QUALIFIERS:

Lab Qualifier	AFCEE Qualifier	Description
J	F	Indicates that the analyte is positively identified and the result is less than LOQ/RL but greater than LOD/MDL/DL.
N		Indicates presumptive evidence of a compound.
B	B	Indicates that the analyte is found in the associated method blank as well as in the sample at above QC level.
E	J	Indicates that the result is above the maximum calibration range or estimated value.
*	*	Out of QC limit.

Note: The above qualifiers are used to flag the results unless the project requires a different set of qualification criteria.

ACRONYMS AND ABBREVIATIONS:

CRDL	Contract Required Detection Limit
RL	Reporting Limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
DL	Detection Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DO	Diluted out

DATES

The date and time information for leaching and preparation reflect the beginning date and time of the procedure unless the method, protocol, or project specifically requires otherwise.

LABORATORY REPORT FOR

KLEINFELDER

CTO 070, UXO4, FALLBROOK

METHOD SW8330A
EXPLOSIVES

SDG#: 15D114

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D114

METHOD SW8330A
EXPLOSIVES

A total of one (1) water sample and twenty-four (24) soil samples were received on 04/17/15 to be analyzed for Explosives in accordance with Method SW8330A and project specific requirements.

Holding Time
Samples were analyzed within the prescribed holding time.

Calibration
Multi-calibration points were generated to establish initial calibration (ICAL). ICAL was verified using a secondary source (ICV). Continuing calibration (CCV) verifications were carried on a frequency specified by the project. All calibration requirements were within acceptance criteria. Refer to calibration summary forms of ICAL, ICV and CCV for details.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, four (4) method blanks were analyzed. EXD013WB, EXD014SB, EXD015SB and EXD016SB were compliant to project requirement. Refer to sample result summary forms for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, four (4) sets of LCS/LCD were analyzed. EXD013WL/EXD013WC, EXD014SL/EXD014SC, EXD015SL/EXD015SC and EXD016SL/EXD016SC - all analytes were within LCS QC limits. Refer to LCS summary forms for details.

Matrix QC Sample
Matrix spike sample was prepared and analyzed at a frequency required by the project. For this SDG, two (2) sets of MS/MSD were analyzed. D114-08M/D114-08S - all analytes were within MS QC limits. D114-22M/D114-22S - all analytes were within MS QC limits. Refer to Matrix QC summary forms for details.

Surrogate
Surrogate was added on QC and field samples. All surrogate recoveries were within QC limits. Refer to sample result summary forms for details.

Sample Analysis
All positive results above LOQ were confirmed by Biphenyl column. Confirmation was presumptive because it was based on retention time window. All project requirements were met otherwise anomalies were discussed within the associated QC parameter. Soil samples were air dried, hence no moisture correction applied to RL and MDL.

LAB CHRONICLE
EXPLOSIVES

Client : KLEINFELDER
Project : CTO 070, UX04, FALLBROOK

SDG NO. : 15D114
Instrument ID : T081

WATER

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1W	EXD013WB	1	NA	04/27/1510:21	04/20/1513:25	XD27003A	XD27002A	EXD013W	Method Blank
LCS1W	EXD013WL	1	NA	04/27/1510:56	04/20/1513:25	XD27004A	XD27002A	EXD013W	Lab Control Sample (LCS)
LCD1W	EXD013WC	1	NA	04/27/1511:31	04/20/1513:25	XD27005A	XD27002A	EXD013W	LCS Duplicate
UX04-EB-041615	D114-09	1	NA	04/27/1521:27	04/20/1513:25	XD27022A	XD27013A	EXD013W	Field Sample

FN - Filename
% Moist - Percent Moisture

LAB CHRONICLE
EXPLOSIVES

Client : KLEINFELDER
Project : CTO 070, UX04, FALLBROOK

SDG NO. : 15D114
Instrument ID : T081

SOIL

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1S	EXD014SB	1	NA	04/28/1500:57	04/21/1517:15	XD27028A	XD27024A	EXD014S	Method Blank
LCS1S	EXD014SL	1	NA	04/28/1501:32	04/21/1517:15	XD27029A	XD27024A	EXD014S	Lab Control Sample (LCS)
LCD1S	EXD014SC	1	NA	04/28/1502:07	04/21/1517:15	XD27030A	XD27024A	EXD014S	LCS Duplicate
MBLK2S	EXD015SB	1	NA	04/28/1520:22	04/21/1517:15	XD27056A	XD27047A	EXD015S	Method Blank
LCS2S	EXD015SL	1	NA	04/28/1520:57	04/21/1517:15	XD27057A	XD27047A	EXD015S	Lab Control Sample (LCS)
LCD2S	EXD015SC	1	NA	04/28/1522:05	04/21/1517:15	XD27059A	XD27058A	EXD015S	LCS Duplicate
MBLK3S	EXD016SB	1	NA	04/29/1511:44	04/22/1516:45	XD27083A	XD27081A	EXD016S	Method Blank
LCS3S	EXD016SL	1	NA	04/29/1512:18	04/22/1516:45	XD27084A	XD27081A	EXD016S	Lab Control Sample (LCS)
LCD3S	EXD016SC	1	NA	04/29/1512:53	04/22/1516:45	XD27085A	XD27081A	EXD016S	LCS Duplicate
UX04-TR01-S01-1.0	D114-01	1	NA	04/28/1516:57	04/21/1517:15	XD27050A	XD27047A	EXD014S	Field Sample
UX04-TR01-S02-3.0	D114-02	1	NA	04/28/1517:32	04/21/1517:15	XD27051A	XD27047A	EXD014S	Field Sample
UX04-TR02-S01-2.0	D114-03	1	NA	04/28/1518:06	04/21/1517:15	XD27052A	XD27047A	EXD014S	Field Sample
UX04-TR02-S02-3.0	D114-04	1	NA	04/28/1518:40	04/21/1517:15	XD27053A	XD27047A	EXD014S	Field Sample
UX04-TR03-S01-1.5	D114-05	1	NA	04/28/1519:14	04/21/1517:15	XD27054A	XD27047A	EXD014S	Field Sample
UX04-TR03-S02-3.0	D114-06	1	NA	04/28/1519:48	04/21/1517:15	XD27055A	XD27047A	EXD014S	Field Sample
UX04-TR04-S01-2.0	D114-07	1	NA	04/28/1522:39	04/21/1517:15	XD27060A	XD27058A	EXD015S	Field Sample
UX04-TR04-S02-3.0	D114-08	1	NA	04/28/1523:13	04/21/1517:15	XD27061A	XD27058A	EXD015S	Field Sample
UX04-SB08-8.0	D114-10	1	NA	04/29/1500:55	04/21/1517:15	XD27064A	XD27058A	EXD015S	Field Sample
UX04-SB09-6.6	D114-11	1	NA	04/29/1501:30	04/21/1517:15	XD27065A	XD27058A	EXD015S	Field Sample
UX04-SB10-0.5	D114-12	1	NA	04/29/1502:04	04/21/1517:15	XD27066A	XD27058A	EXD015S	Field Sample
UX04-SB10-1.0	D114-13	1	NA	04/29/1502:38	04/21/1517:15	XD27067A	XD27058A	EXD015S	Field Sample
UX04-SB11-0.5	D114-14	1	NA	04/29/1503:12	04/21/1517:15	XD27068A	XD27058A	EXD015S	Field Sample
UX04-SB11-1.0	D114-15	1	NA	04/29/1504:55	04/21/1517:15	XD27071A	XD27070A	EXD015S	Field Sample
UX04-SB12-0.5	D114-16	1	NA	04/29/1505:29	04/21/1517:15	XD27072A	XD27070A	EXD015S	Field Sample
UX04-SB12-1.0	D114-17	1	NA	04/29/1506:03	04/21/1517:15	XD27073A	XD27070A	EXD015S	Field Sample
UX04-SB13-0.5	D114-18	1	NA	04/29/1506:37	04/21/1517:15	XD27074A	XD27070A	EXD015S	Field Sample
UX04-SB13-1.0	D114-19	1	NA	04/29/1507:11	04/21/1517:15	XD27075A	XD27070A	EXD015S	Field Sample
UX04-SB14-0.5	D114-20	1	NA	04/29/1507:45	04/21/1517:15	XD27076A	XD27070A	EXD015S	Field Sample
UX04-SB14-1.0	D114-21	1	NA	04/29/1508:19	04/21/1517:15	XD27077A	XD27070A	EXD015S	Field Sample
UX04-SB15-0.5	D114-22	1	NA	04/29/1508:54	04/21/1517:15	XD27078A	XD27070A	EXD015S	Field Sample
UX04-SB15-0.5RE	D114-22R	1	NA	04/29/1513:27	04/22/1516:45	XD27086A	XD27081A	EXD016S	Field Sample
UX04-SB15-1.0	D114-23	1	NA	04/29/1509:28	04/21/1517:15	XD27079A	XD27070A	EXD015S	Field Sample
UX04-SB16-0.5	D114-24	1	NA	04/29/1510:02	04/21/1517:15	XD27080A	XD27070A	EXD015S	Field Sample
UX04-SB16-1.0	D114-25	1	NA	04/29/1511:10	04/21/1517:15	XD27082A	XD27081A	EXD015S	Field Sample
UX04-TR04-S02-3.0MS	D114-08M	1	NA	04/28/1523:47	04/21/1517:15	XD27062A	XD27058A	EXD015S	Matrix Spike Sample (MS)
UX04-TR04-S02-3.0MSD	D114-08S	1	NA	04/29/1500:21	04/21/1517:15	XD27063A	XD27058A	EXD015S	MS Duplicate (MSD)
UX04-SB15-0.5MS	D114-22M	1	NA	04/29/1514:01	04/22/1516:45	XD27087A	XD27081A	EXD016S	Matrix Spike Sample (MS)
UX04-SB15-0.5MSD	D114-22S	1	NA	04/29/1514:35	04/22/1516:45	XD27088A	XD27081A	EXD016S	MS Duplicate (MSD)

FN - Filename
% Moist - Percent Moisture

SAMPLE RESULTS

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/10/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-TR01-S01-1.0	Date Analyzed:	04/28/15 16:57
Lab Samp ID:	D114-01	Dilution Factor:	1
Lab File ID:	XD27050A	Matrix :	SOIL
Ext Btch ID:	EXD014S	% Moisture :	NA
Calib. Ref.:	XD27047A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1890	2000	94.5	70-130

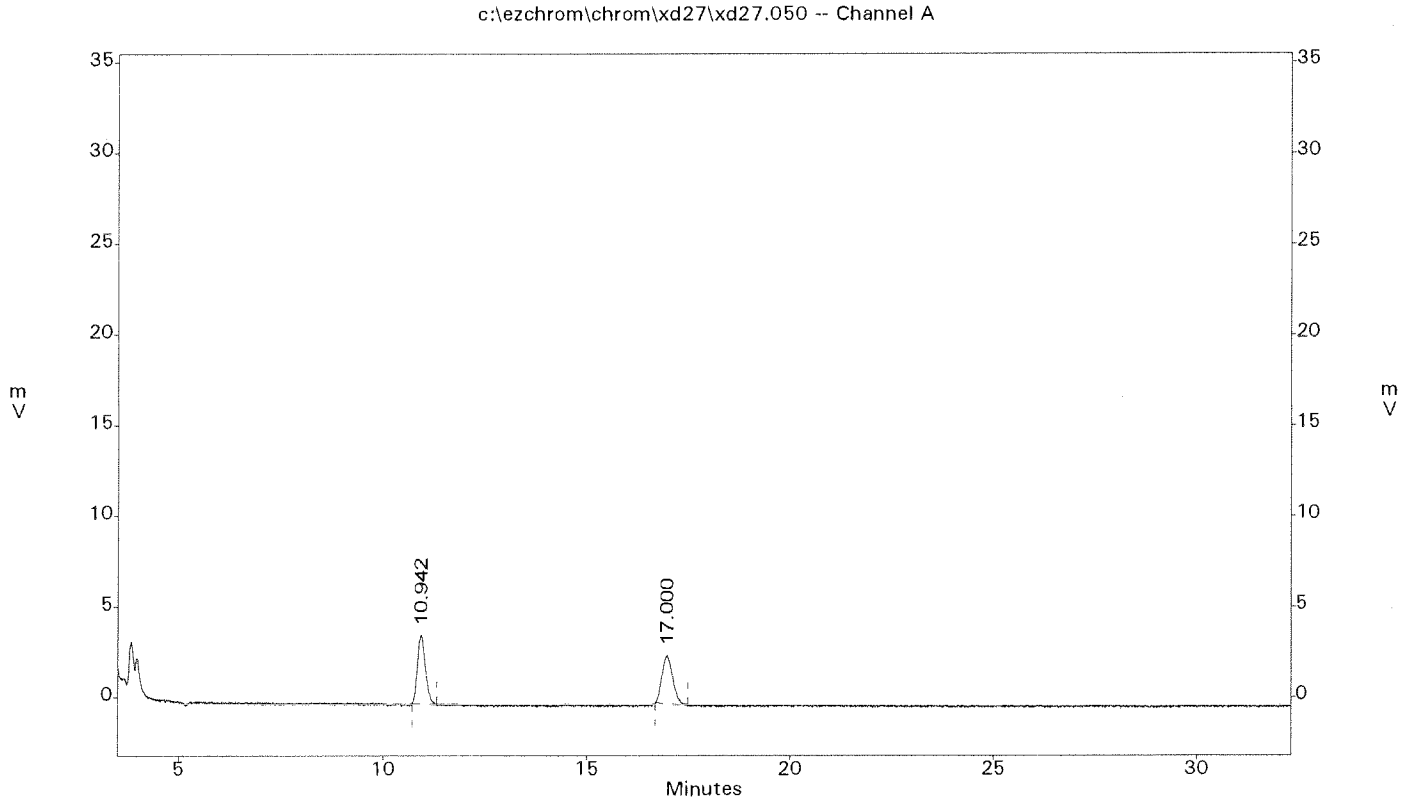
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.050
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-01
Acquired : Apr 28, 2015 16:57:57
Printed : Apr 29, 2015 09:46:45
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.725	0	0.0	0.0
--	RDX	7.375	0	0.0	0.0
--	1,3,5-TNB	9.967	0	0.0	0.0
1	1,2-Dinitrobenzene	10.942	52973	289.8	182.8
--	1,3-DNB	12.608	0	0.0	0.0
--	Tetryl	13.750	0	0.0	0.0
--	Nitrobenzene	14.833	0	0.0	0.0
--	2,4,6-TNT	16.417	0	0.0	0.0
2	3,4-DNT	17.000	50396	266.7	189.0
--	4-Am-2,6-DNT	17.817	0	0.0	0.0
--	2-Am-4,6-DNT	18.492	0	0.0	0.0
--	2,6-DNT	19.892	0	0.0	0.0
--	2,4-DNT	20.633	0	0.0	0.0
--	2-Nitrotoluene	25.008	0	0.0	0.0
--	4-Nitrotoluene	27.158	0	0.0	0.0
--	3-Nitrotoluene	29.125	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/10/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-TR01-S02-3.0	Date Analyzed:	04/28/15 17:32
Lab Samp ID:	D114-02	Dilution Factor:	1
Lab File ID:	XD27051A	Matrix :	SOIL
Ext Btch ID:	EXD014S	% Moisture :	NA
Calib. Ref.:	XD27047A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1980	2000	99.0	70-130

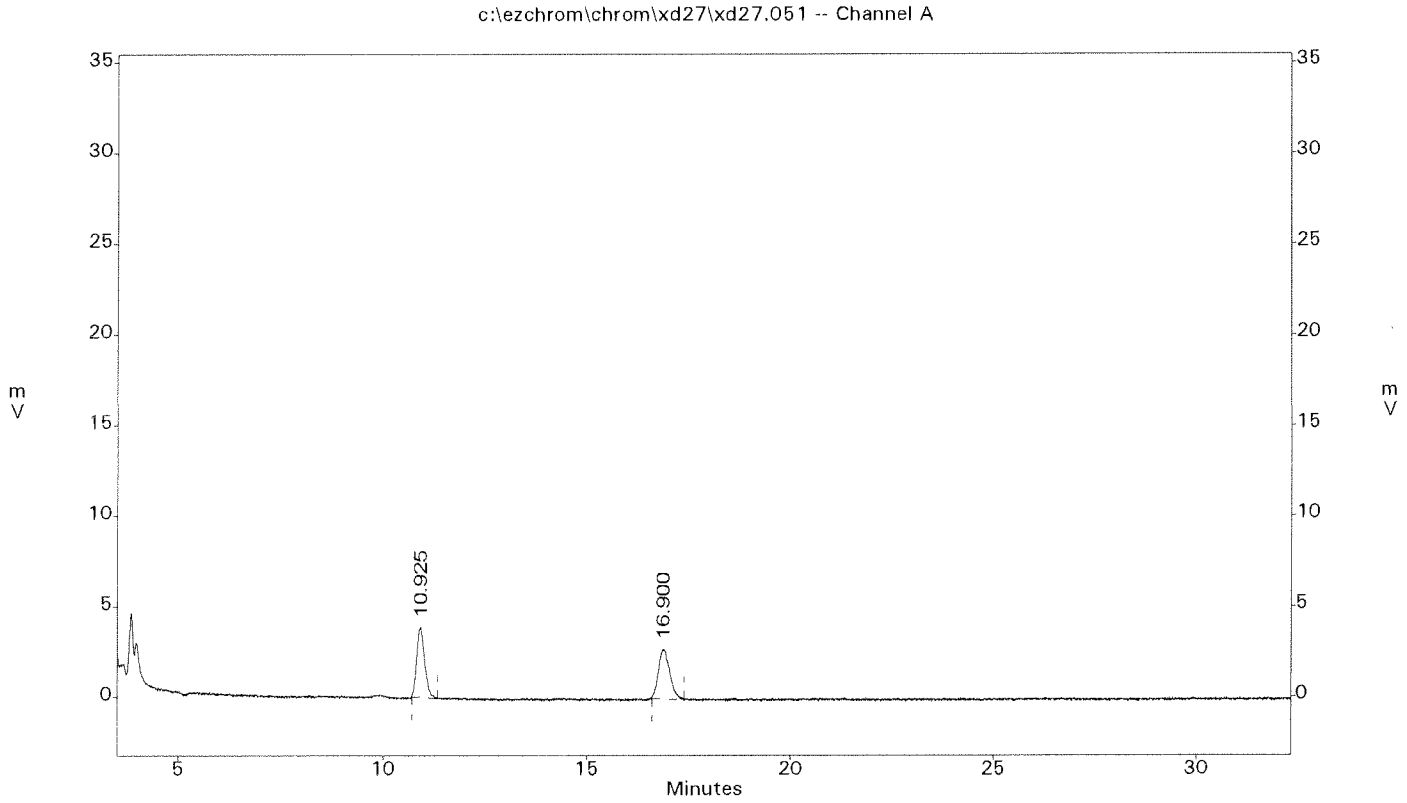
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.051
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-02
Acquired : Apr 28, 2015 17:32:11
Printed : Apr 29, 2015 09:46:57
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.725	0	0.0	0.0
--	RDX	7.375	0	0.0	0.0
--	1,3,5-TNB	9.967	0	0.0	0.0
1	1,2-Dinitrobenzene	10.925	53296	289.8	183.9
--	1,3-DNB	12.608	0	0.0	0.0
--	Tetryl	13.750	0	0.0	0.0
--	Nitrobenzene	14.833	0	0.0	0.0
--	2,4,6-TNT	16.417	0	0.0	0.0
2	3,4-DNT	16.900	52813	266.7	198.0
--	4-Am-2,6-DNT	17.817	0	0.0	0.0
--	2-Am-4,6-DNT	18.492	0	0.0	0.0
--	2,6-DNT	19.892	0	0.0	0.0
--	2,4-DNT	20.633	0	0.0	0.0
--	2-Nitrotoluene	25.008	0	0.0	0.0
--	4-Nitrotoluene	27.158	0	0.0	0.0
--	3-Nitrotoluene	29.125	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/13/15
Project	: CTO 070, UXO4, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UXO4-TR02-S01-2.0	Date Analyzed:	04/28/15 18:06
Lab Samp ID:	D114-03	Dilution Factor:	1
Lab File ID:	XD27052A	Matrix :	SOIL
Ext Btch ID:	EXD014S	% Moisture :	NA
Calib. Ref.:	XD27047A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1960	2000	97.8	70-130

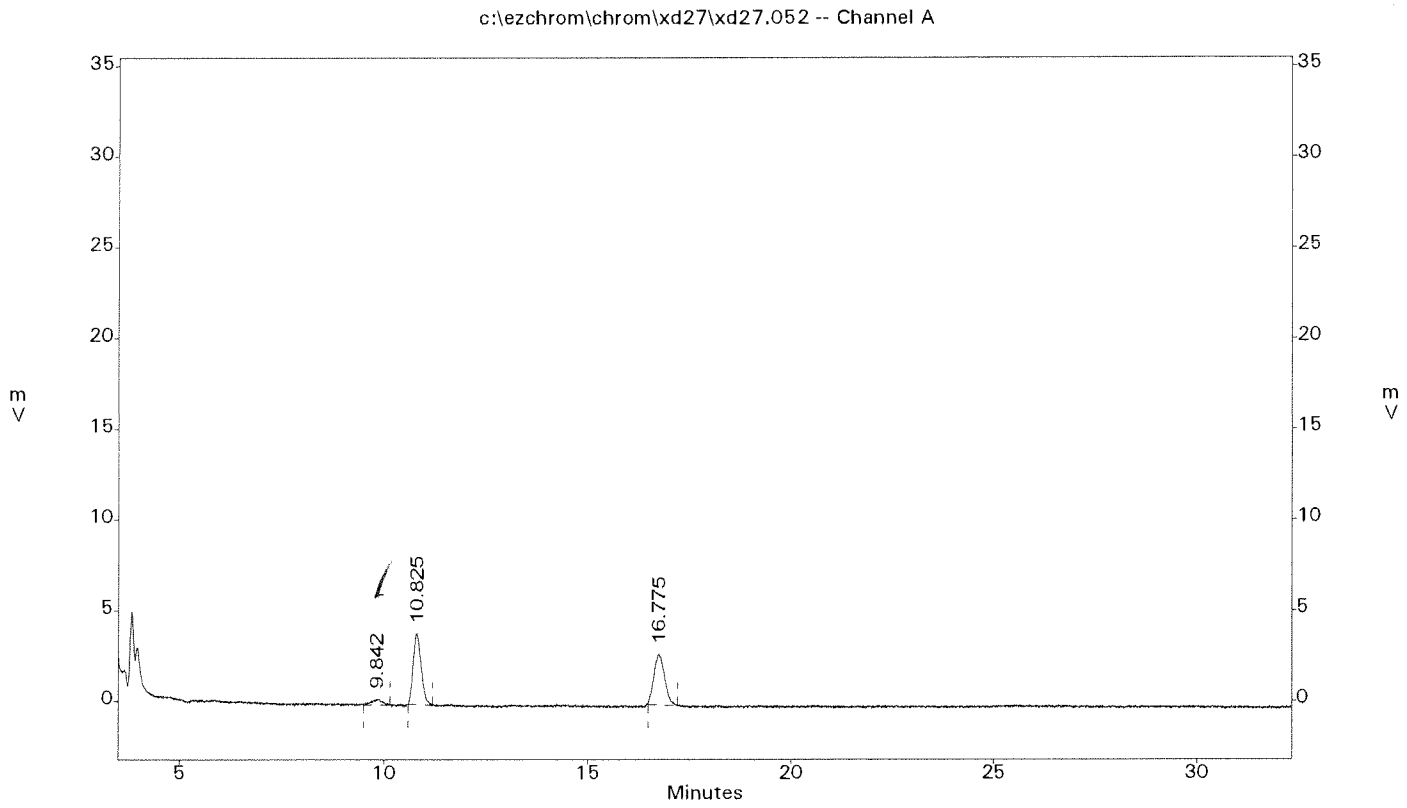
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.052
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-03
Acquired : Apr 28, 2015 18:06:19
Printed : Apr 29, 2015 09:48:40
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.725	0	0.0	0.0
--	RDX	7.375	0	0.0	0.0
1	1,3,5-TNB	9.842	5869	418.4	14.0
2	1,2-Dinitrobenzene	10.825	55185	289.8	190.4
--	1,3-DNB	12.608	0	0.0	0.0
--	Tetryl	13.750	0	0.0	0.0
--	Nitrobenzene	14.833	0	0.0	0.0
--	2,4,6-TNT	16.417	0	0.0	0.0
3	3,4-DNT	16.775	52140	266.7	195.5
--	4-Am-2,6-DNT	17.817	0	0.0	0.0
--	2-Am-4,6-DNT	18.492	0	0.0	0.0
--	2,6-DNT	19.892	0	0.0	0.0
--	2,4-DNT	20.633	0	0.0	0.0
--	2-Nitrotoluene	25.008	0	0.0	0.0
--	4-Nitrotoluene	27.158	0	0.0	0.0
--	3-Nitrotoluene	29.125	0	0.0	0.0



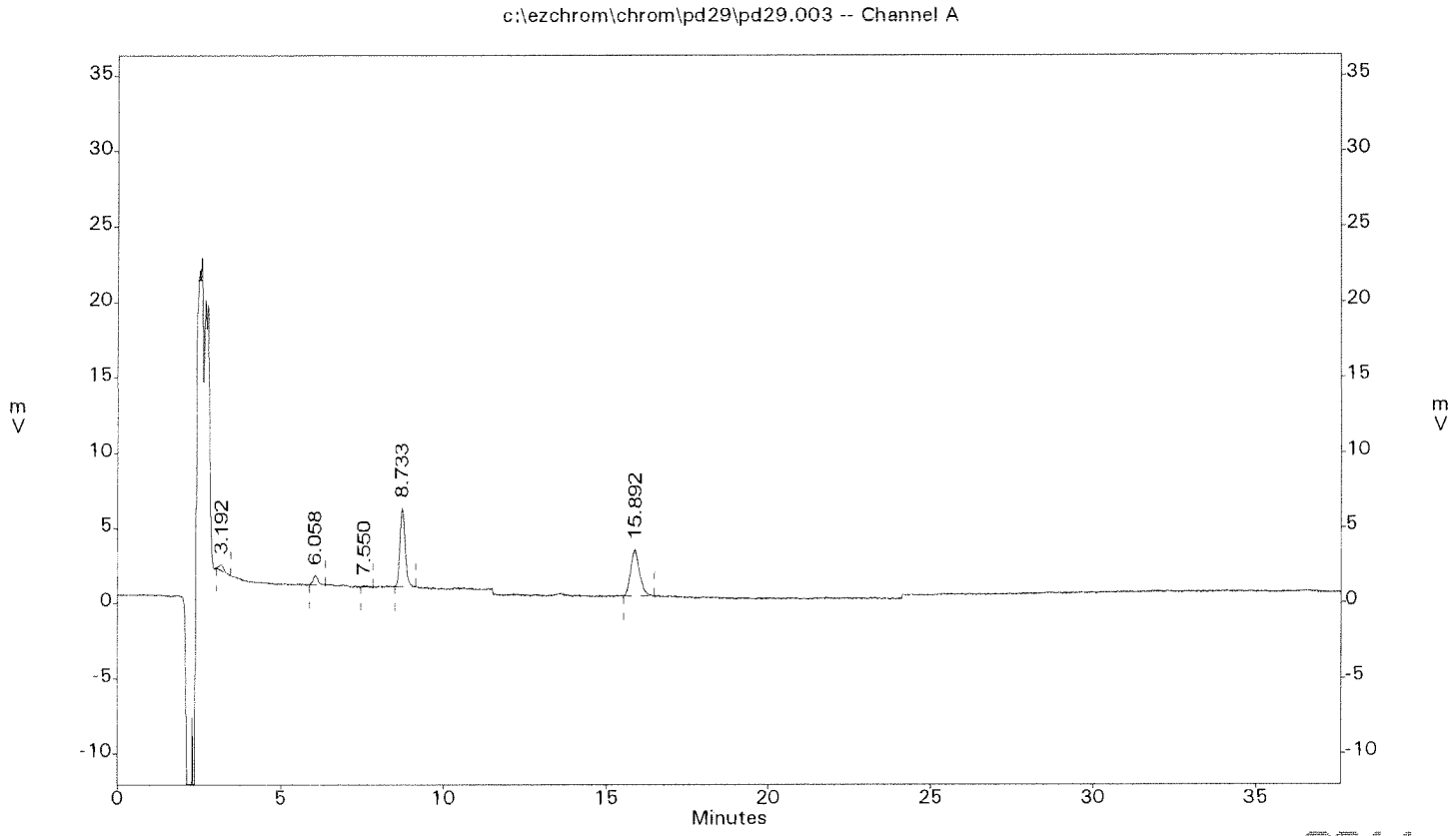
6010

Method 8330 Column: Kinetex 5u Biphenyl
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\pd29\pd29.003
Method : c:\ezchrom\methods\ex17a20c.met
Sample ID : 15D114-03
Acquired : Apr 29, 2015 13:04:35
Printed : Apr 29, 2015 15:33:47
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	2,4/2,6-DANT	3.483	0	0.0	0.0
--	HMX	4.133	0	0.0	0.0
--	RDX	4.683	0	0.0	0.0
3	3,5-Dinitroaniline	7.550	1379	552.5	2.5
--	Nitrobenzene	8.333	0	0.0	0.0
4	1,2-Dinitrobenzene	8.733	59432	364.5	163.0
--	4-Am-2,6-DNT	9.192	0	0.0	0.0
--	2-Am-4,6-DNT	9.758	0	0.0	0.0
--	2-Nitrotoluene	12.408	0	0.0	0.0
--	1,3-DNB	12.858	0	0.0	0.0
--	4-Nitrotoluene	13.808	0	0.0	0.0
--	3-Nitrotoluene	14.125	0	0.0	0.0
5	3,4-DNT	15.892	59939	267.2	224.3
--	2,6-DNT	16.508	0	0.0	0.0
--	2,4-DNT	20.800	0	0.0	0.0
--	1,3,5-TNB	21.575	0	0.0	0.0
--	Tetryl	22.092	0	0.0	0.0
--	2,4,6-TNT	28.600	0	0.0	0.0



6011

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/13/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-TR02-S02-3.0	Date Analyzed:	04/28/15 18:40
Lab Samp ID:	D114-04	Dilution Factor:	1
Lab File ID:	XD27053A	Matrix :	SOIL
Ext Btch ID:	EXD014S	% Moisture :	NA
Calib. Ref.:	XD27047A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1980	2000	98.9	70-130

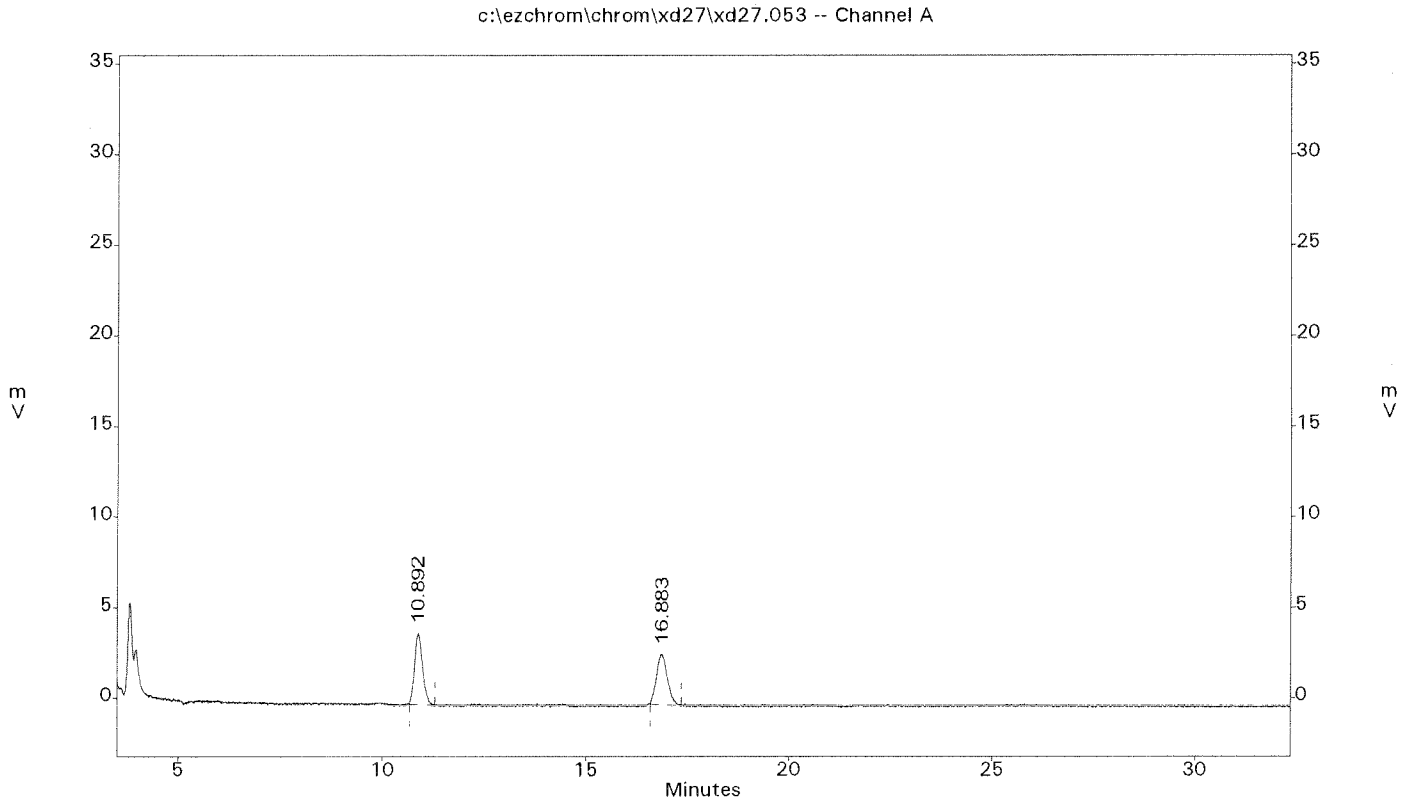
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.053
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-04
Acquired : Apr 28, 2015 18:40:28
Printed : Apr 29, 2015 09:48:59
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.725	0	0.0	0.0
--	RDX	7.375	0	0.0	0.0
--	1,3,5-TNB	9.967	0	0.0	0.0
1	1,2-Dinitrobenzene	10.892	54506	289.8	188.1
--	1,3-DNB	12.608	0	0.0	0.0
--	Tetryl	13.750	0	0.0	0.0
--	Nitrobenzene	14.833	0	0.0	0.0
--	2,4,6-TNT	16.417	0	0.0	0.0
2	3,4-DNT	16.883	52722	266.7	197.7
--	4-Am-2,6-DNT	17.817	0	0.0	0.0
--	2-Am-4,6-DNT	18.492	0	0.0	0.0
--	2,6-DNT	19.892	0	0.0	0.0
--	2,4-DNT	20.633	0	0.0	0.0
--	2-Nitrotoluene	25.008	0	0.0	0.0
--	4-Nitrotoluene	27.158	0	0.0	0.0
--	3-Nitrotoluene	29.125	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/13/15
Project	: CTO 070, UXO4, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UXO4-TR03-S01-1.5	Date Analyzed:	04/28/15 19:14
Lab Samp ID:	D114-05	Dilution Factor:	1
Lab File ID:	XD27054A	Matrix :	SOIL
Ext Btch ID:	EXD014S	% Moisture :	NA
Calib. Ref.:	XD27047A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1990	2000	99.7	70-130

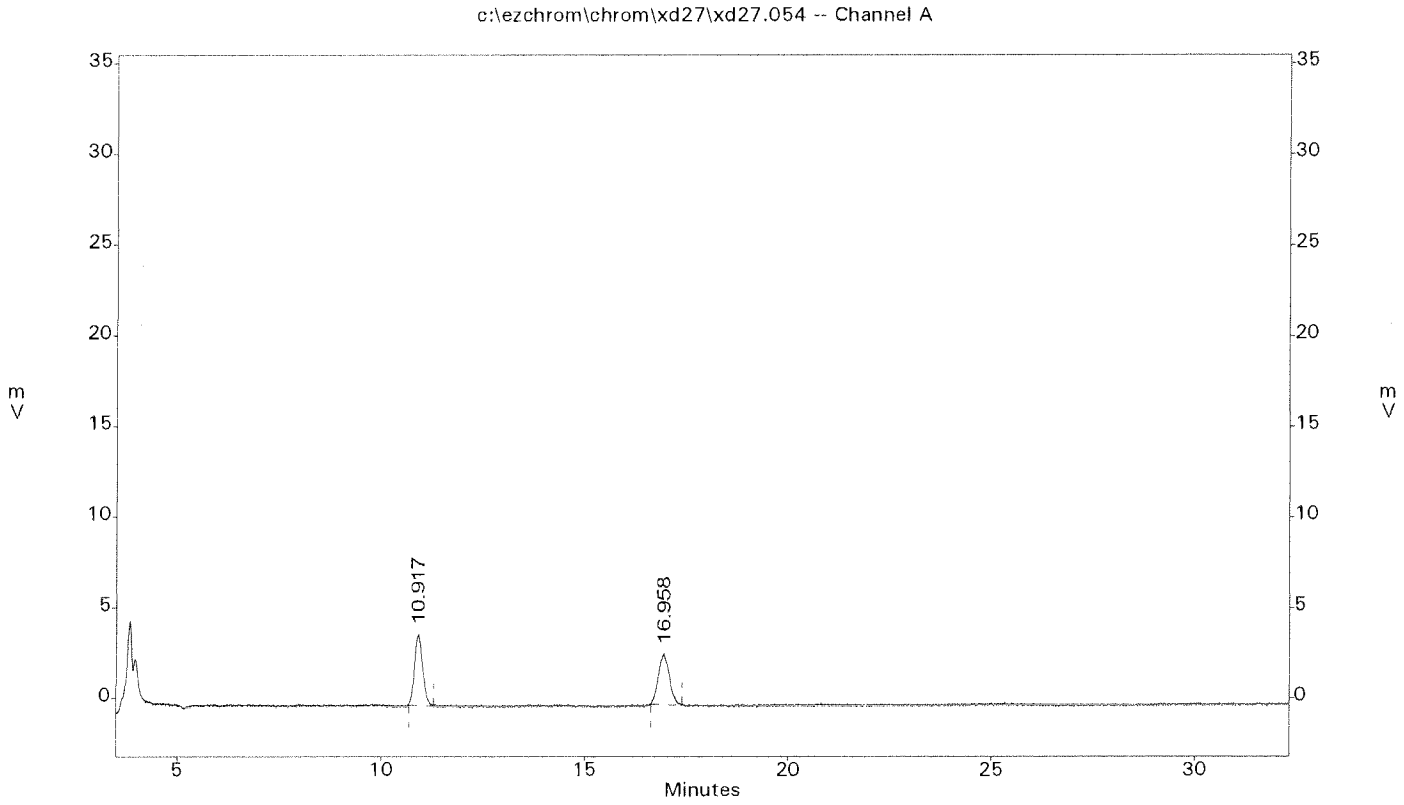
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.054
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-05
Acquired : Apr 28, 2015 19:14:36
Printed : Apr 29, 2015 09:49:11
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.725	0	0.0	0.0
--	RDX	7.375	0	0.0	0.0
--	1,3,5-TNB	9.967	0	0.0	0.0
1	1,2-Dinitrobenzene	10.917	55200	289.8	190.5
--	1,3-DNB	12.608	0	0.0	0.0
--	Tetryl	13.750	0	0.0	0.0
--	Nitrobenzene	14.833	0	0.0	0.0
--	2,4,6-TNT	16.417	0	0.0	0.0
2	3,4-DNT	16.958	53156	266.7	199.3
--	4-Am-2,6-DNT	17.817	0	0.0	0.0
--	2-Am-4,6-DNT	18.492	0	0.0	0.0
--	2,6-DNT	19.892	0	0.0	0.0
--	2,4-DNT	20.633	0	0.0	0.0
--	2-Nitrotoluene	25.008	0	0.0	0.0
--	4-Nitrotoluene	27.158	0	0.0	0.0
--	3-Nitrotoluene	29.125	0	0.0	0.0



6015

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/13/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-TR03-S02-3.0	Date Analyzed:	04/28/15 19:48
Lab Samp ID:	D114-06	Dilution Factor:	1
Lab File ID:	XD27055A	Matrix :	SOIL
Ext Btch ID:	EXD014S	% Moisture :	NA
Calib. Ref.:	XD27047A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1970	2000	98.6	70-130

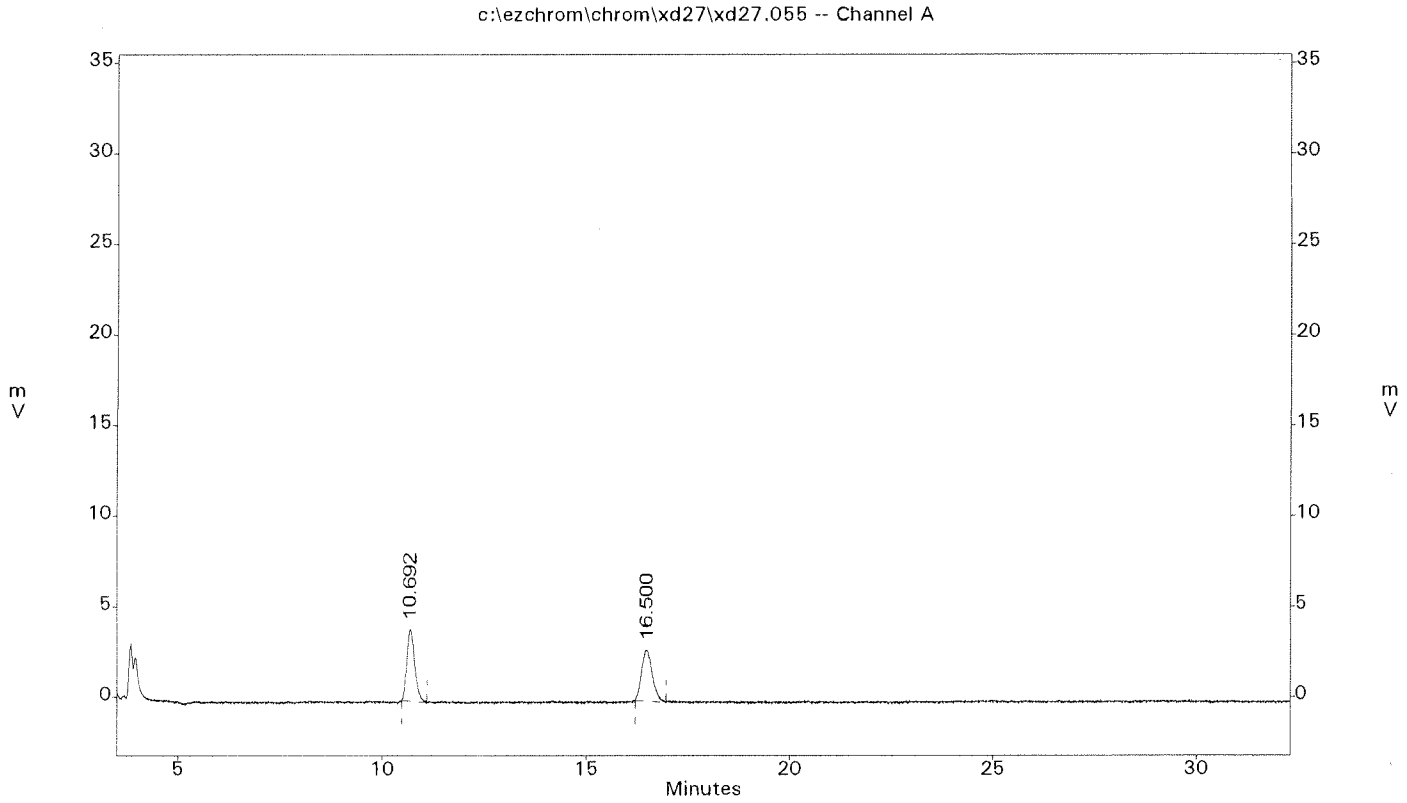
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.055
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-06
Acquired : Apr 28, 2015 19:48:44
Printed : Apr 29, 2015 09:49:40
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.725	0	0.0	0.0
--	RDX	7.375	0	0.0	0.0
--	1,3,5-TNB	9.967	0	0.0	0.0
1	1,2-Dinitrobenzene	10.692	53865	289.8	185.9
--	1,3-DNB	12.608	0	0.0	0.0
--	Tetryl	13.750	0	0.0	0.0
--	Nitrobenzene	14.833	0	0.0	0.0
--	2,4,6-TNT	16.417	0	0.0	0.0
2	3,4-DNT	16.500	52568	266.7	197.1
--	4-Am-2,6-DNT	17.817	0	0.0	0.0
--	2-Am-4,6-DNT	18.492	0	0.0	0.0
--	2,6-DNT	19.892	0	0.0	0.0
--	2,4-DNT	20.633	0	0.0	0.0
--	2-Nitrotoluene	25.008	0	0.0	0.0
--	4-Nitrotoluene	27.158	0	0.0	0.0
--	3-Nitrotoluene	29.125	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/14/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-TR04-S01-2.0	Date Analyzed:	04/28/15 22:39
Lab Samp ID:	D114-07	Dilution Factor:	1
Lab File ID:	XD27060A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27058A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1950	2000	97.3	70-130

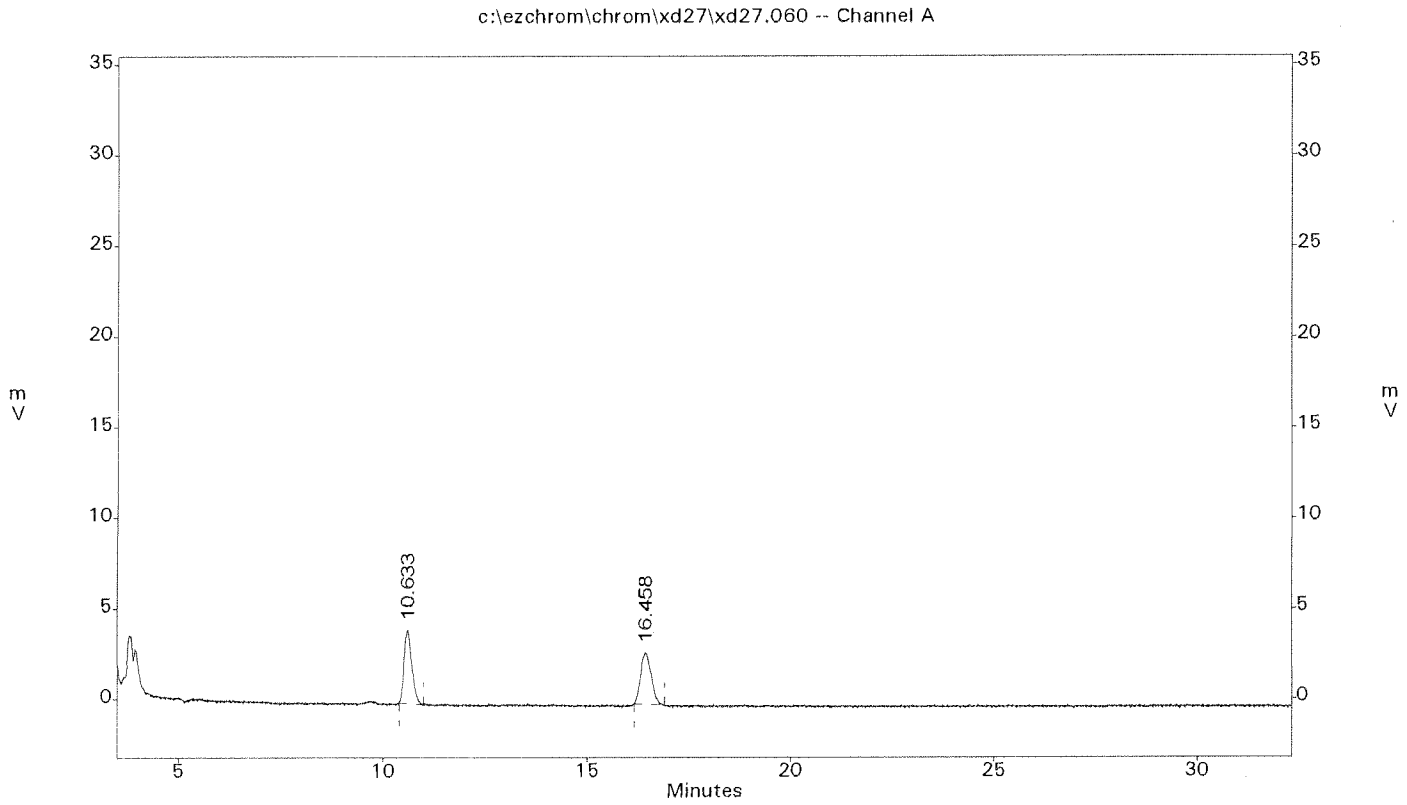
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.060
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-07
Acquired : Apr 28, 2015 22:39:26
Printed : Apr 29, 2015 09:56:32
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.658	0	0.0	0.0
--	RDX	7.167	0	0.0	0.0
--	1,3,5-TNB	9.725	0	0.0	0.0
1	1,2-Dinitrobenzene	10.633	54357	289.8	187.6
--	1,3-DNB	12.192	0	0.0	0.0
--	Tetryl	13.192	0	0.0	0.0
--	Nitrobenzene	14.350	0	0.0	0.0
--	2,4,6-TNT	15.867	0	0.0	0.0
2	3,4-DNT	16.458	51895	266.7	194.6
--	4-Am-2,6-DNT	16.883	0	0.0	0.0
--	2-Am-4,6-DNT	17.492	0	0.0	0.0
--	2,6-DNT	19.075	0	0.0	0.0
--	2,4-DNT	19.750	0	0.0	0.0
--	2-Nitrotoluene	23.967	0	0.0	0.0
--	4-Nitrotoluene	25.967	0	0.0	0.0
--	3-Nitrotoluene	27.833	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/14/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-TR04-S02-3.0	Date Analyzed:	04/28/15 23:13
Lab Samp ID:	D114-08	Dilution Factor:	1
Lab File ID:	XD27061A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27058A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2010	2000	100	70-130

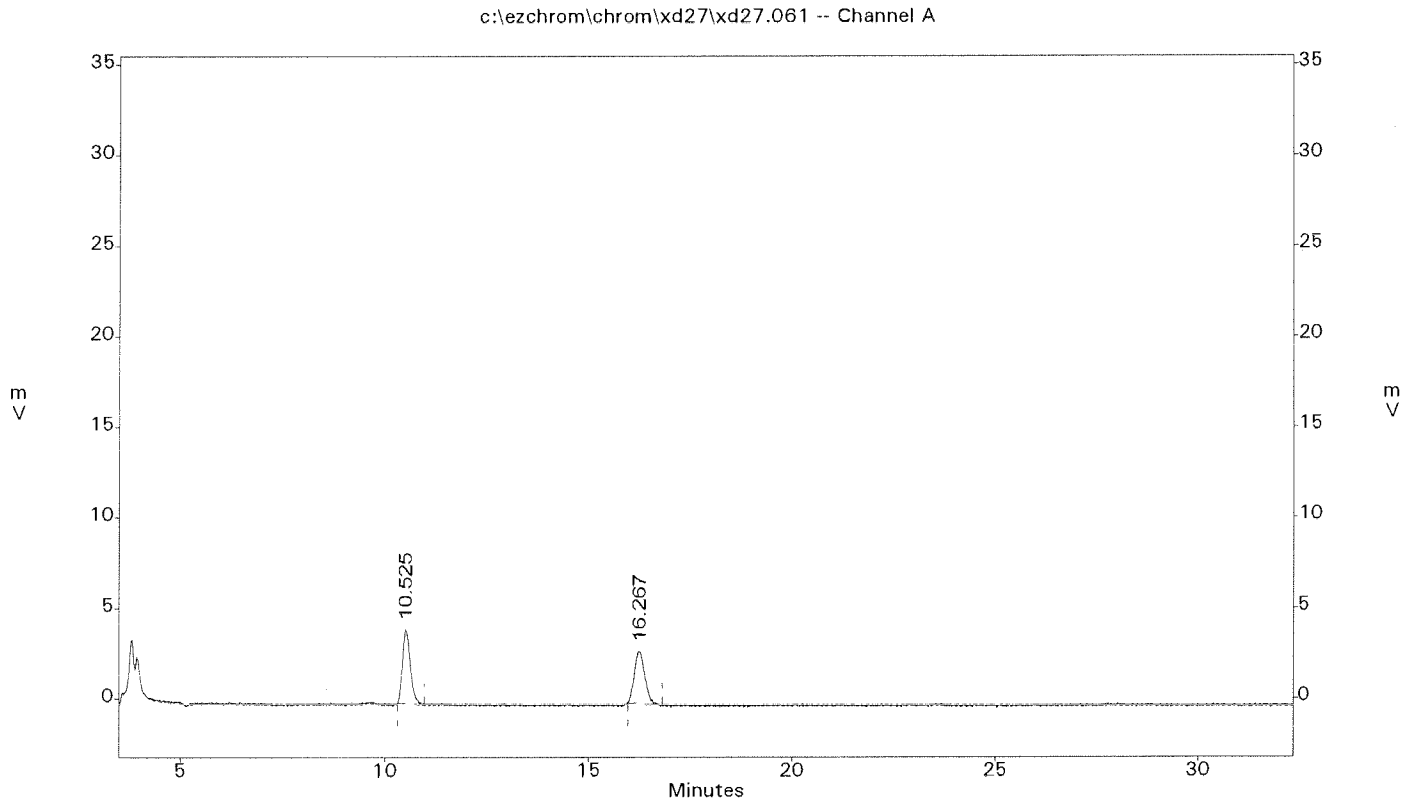
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.061
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-08
Acquired : Apr 28, 2015 23:13:34
Printed : Apr 29, 2015 09:57:00
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.658	0	0.0	0.0
--	RDX	7.167	0	0.0	0.0
--	1,3,5-TNB	9.725	0	0.0	0.0
1	1,2-Dinitrobenzene	10.525	55745	289.8	192.3
--	1,3-DNB	12.192	0	0.0	0.0
--	Tetryl	13.192	0	0.0	0.0
--	Nitrobenzene	14.350	0	0.0	0.0
--	2,4,6-TNT	15.867	0	0.0	0.0
2	3,4-DNT	16.267	53551	266.7	200.8
--	4-Am-2,6-DNT	16.883	0	0.0	0.0
--	2-Am-4,6-DNT	17.492	0	0.0	0.0
--	2,6-DNT	19.075	0	0.0	0.0
--	2,4-DNT	19.750	0	0.0	0.0
--	2-Nitrotoluene	23.967	0	0.0	0.0
--	4-Nitrotoluene	25.967	0	0.0	0.0
--	3-Nitrotoluene	27.833	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/20/15 13:25
Sample ID:	UX04-EB-041615	Date Analyzed:	04/27/15 21:27
Lab Samp ID:	D114-09	Dilution Factor:	1
Lab File ID:	XD27022A	Matrix	: WATER
Ext Btch ID:	EXD013W	% Moisture	: NA
Calib. Ref.:	XD27013A	Instrument ID	: T-081

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
HMX	ND	1.0	0.10	0.20
RDX	ND	1.0	0.16	0.40
1,3,5-TNB	ND	1.0	0.10	0.20
1,3-DNB	ND	1.0	0.10	0.20
TETRYL	ND	1.0	0.10	0.20
NITROBENZENE	ND	1.0	0.10	0.20
2,4,6-TNT	ND	1.0	0.16	0.40
4-AM-2,6-DNT	ND	1.0	0.20	0.20
2-AM-4,6-DNT	ND	1.0	0.10	0.20
2,6-DNT	ND	1.0	0.10	0.20
2,4-DNT	ND	1.0	0.12	0.20
2-NITROTOLUENE	ND	1.0	0.11	0.20
3-NITROTOLUENE	ND	1.0	0.16	0.40
4-NITROTOLUENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	4.05	4.000	101	70-130

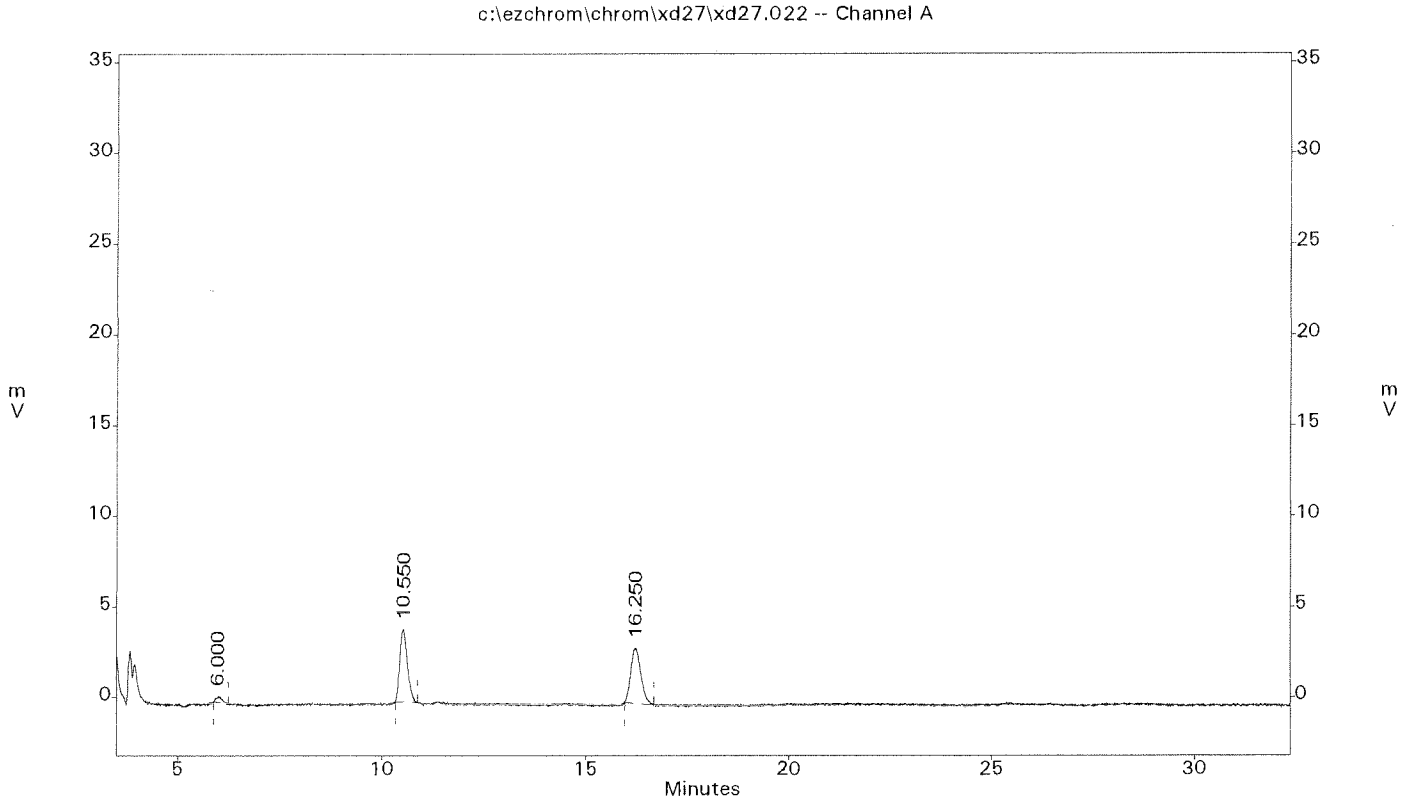
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.022
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-09
Acquired : Apr 27, 2015 21:27:08
Printed : Apr 28, 2015 09:48:50
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.708	0	0.0	0.0
--	RDX	7.317	0	0.0	0.0
--	1,3,5-TNB	9.883	0	0.0	0.0
2	1,2-Dinitrobenzene	10.550	52395	289.8	180.8
--	1,3-DNB	12.458	0	0.0	0.0
--	Tetryl	13.592	0	0.0	0.0
--	Nitrobenzene	14.633	0	0.0	0.0
--	2,4,6-TNT	16.217	0	0.0	0.0
3	3,4-DNT	16.250	54048	266.7	202.7
--	4-Am-2,6-DNT	17.442	0	0.0	0.0
--	2-Am-4,6-DNT	18.092	0	0.0	0.0
--	2,6-DNT	19.542	0	0.0	0.0
--	2,4-DNT	20.233	0	0.0	0.0
--	2-Nitrotoluene	24.508	0	0.0	0.0
--	4-Nitrotoluene	26.575	0	0.0	0.0
--	3-Nitrotoluene	28.500	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/08/15
Project	: CTO 070, UXO4, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UXO4-SB08-8.0	Date Analyzed:	04/29/15 00:55
Lab Samp ID:	D114-10	Dilution Factor:	1
Lab File ID:	XD27064A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27058A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1980	2000	99.0	70-130

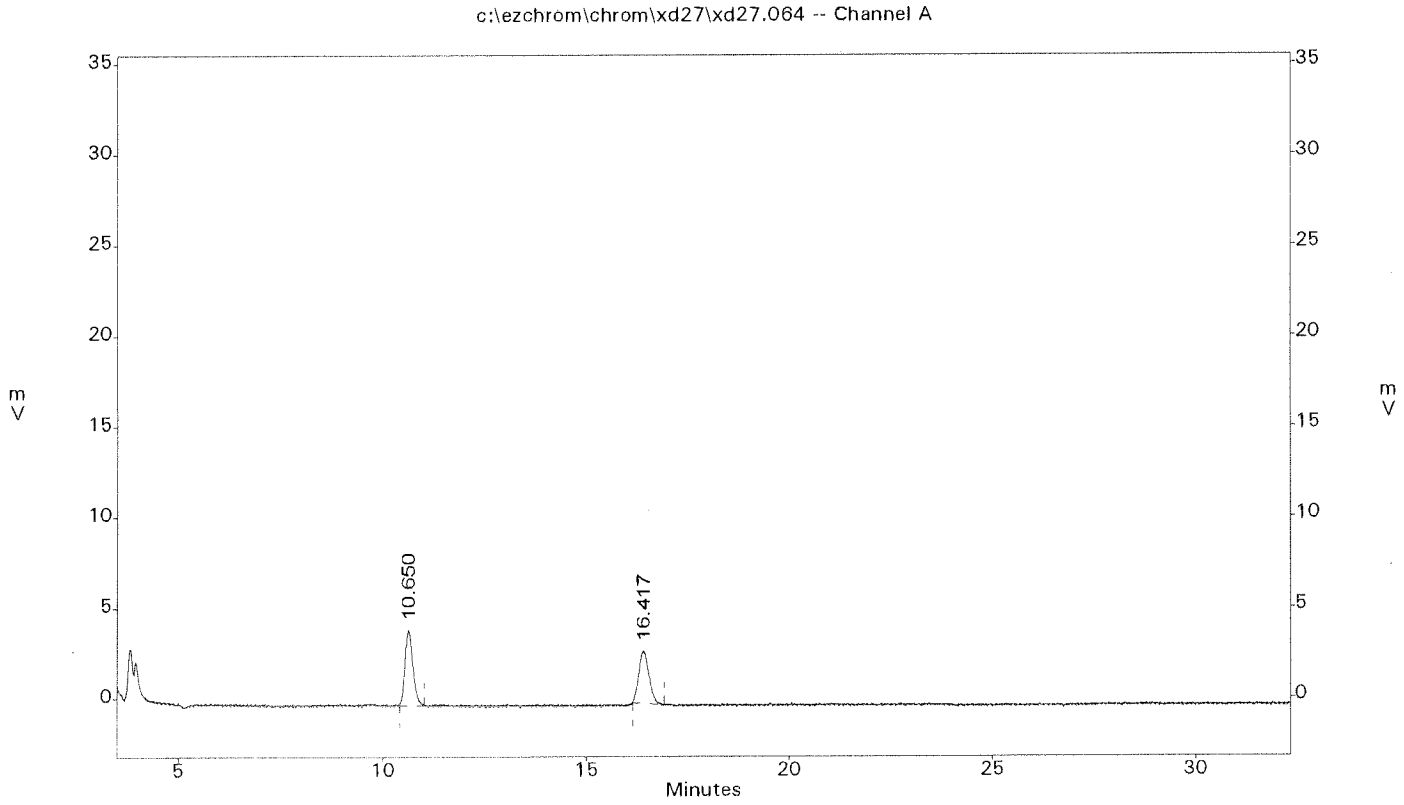
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.064
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-10
Acquired : Apr 29, 2015 00:55:59
Printed : Apr 29, 2015 09:57:56
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.658	0	0.0	0.0
--	RDX	7.167	0	0.0	0.0
--	1,3,5-TNB	9.725	0	0.0	0.0
1	1,2-Dinitrobenzene	10.650	56766	289.8	195.9
--	1,3-DNB	12.192	0	0.0	0.0
--	Tetryl	13.192	0	0.0	0.0
--	Nitrobenzene	14.350	0	0.0	0.0
--	2,4,6-TNT	15.867	0	0.0	0.0
2	3,4-DNT	16.417	52788	266.7	197.9
--	4-Am-2,6-DNT	16.883	0	0.0	0.0
--	2-Am-4,6-DNT	17.492	0	0.0	0.0
--	2,6-DNT	19.075	0	0.0	0.0
--	2,4-DNT	19.750	0	0.0	0.0
--	2-Nitrotoluene	23.967	0	0.0	0.0
--	4-Nitrotoluene	25.967	0	0.0	0.0
--	3-Nitrotoluene	27.833	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/10/15
Project	: CTO 070, UXO4, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UXO4-SB09-6.6	Date Analyzed:	04/29/15 01:30
Lab Samp ID:	D114-11	Dilution Factor:	1
Lab File ID:	XD27065A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27058A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1950	2000	97.6	70-130

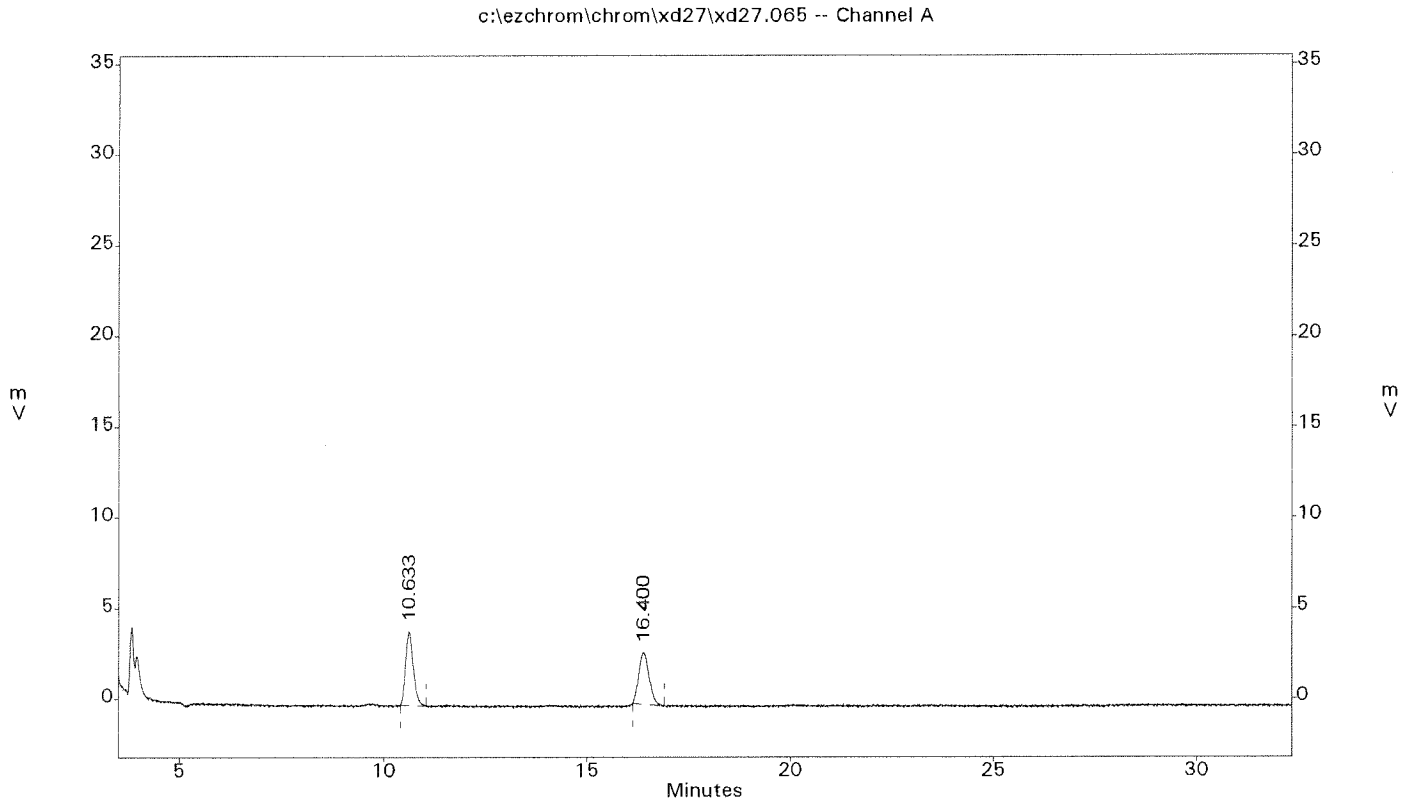
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.065
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-11
Acquired : Apr 29, 2015 01:30:07
Printed : Apr 29, 2015 09:58:08
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.658	0	0.0	0.0
--	RDX	7.167	0	0.0	0.0
--	1,3,5-TNB	9.725	0	0.0	0.0
1	1,2-Dinitrobenzene	10.633	54986	289.8	189.7
--	1,3-DNB	12.192	0	0.0	0.0
--	Tetryl	13.192	0	0.0	0.0
--	Nitrobenzene	14.350	0	0.0	0.0
--	2,4,6-TNT	15.867	0	0.0	0.0
2	3,4-DNT	16.400	52039	266.7	195.1
--	4-Am-2,6-DNT	16.883	0	0.0	0.0
--	2-Am-4,6-DNT	17.492	0	0.0	0.0
--	2,6-DNT	19.075	0	0.0	0.0
--	2,4-DNT	19.750	0	0.0	0.0
--	2-Nitrotoluene	23.967	0	0.0	0.0
--	4-Nitrotoluene	25.967	0	0.0	0.0
--	3-Nitrotoluene	27.833	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-SB10-0.5	Date Analyzed:	04/29/15 02:04
Lab Samp ID:	D114-12	Dilution Factor:	1
Lab File ID:	XD27066A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27058A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1970	2000	98.5	70-130

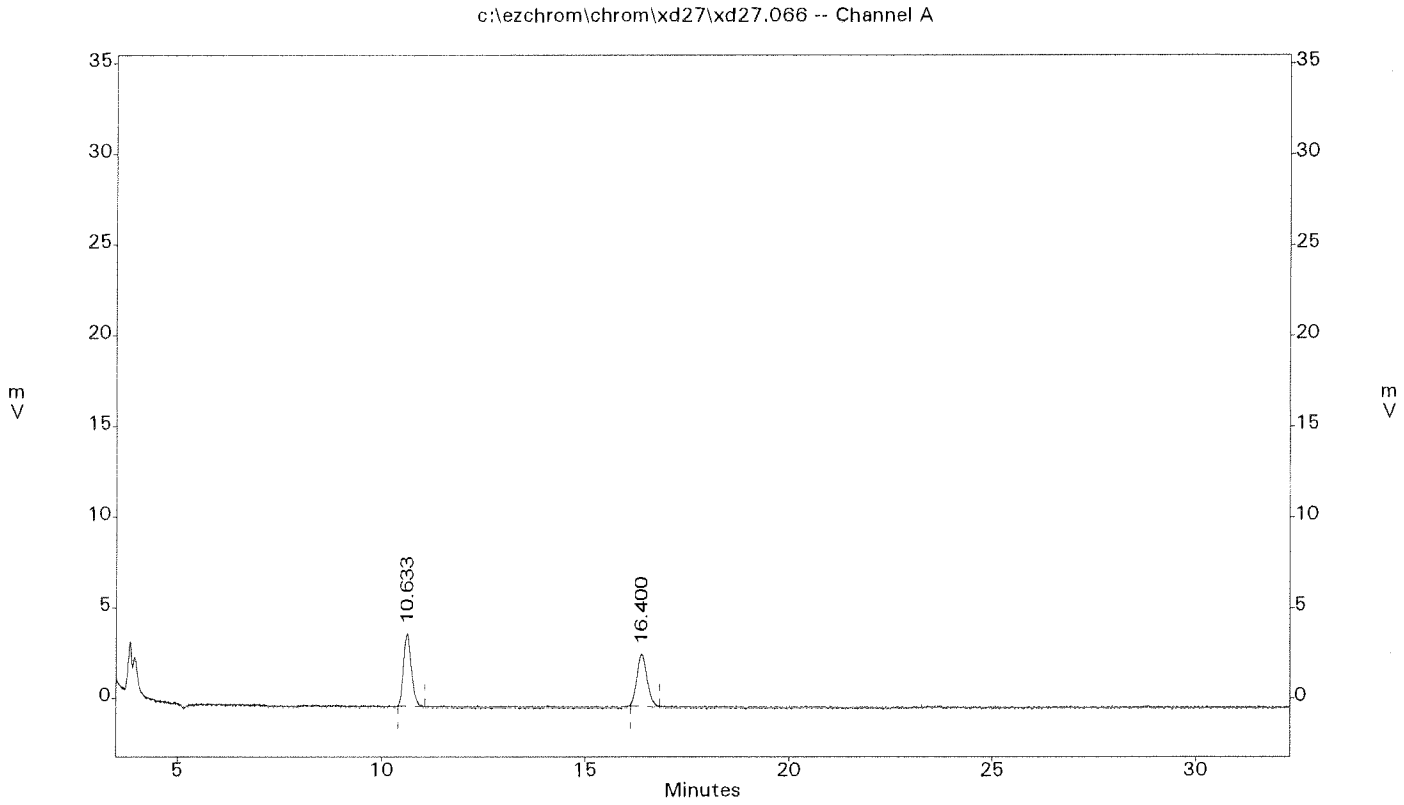
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.066
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-12
Acquired : Apr 29, 2015 02:04:15
Printed : Apr 29, 2015 09:58:22
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.658	0	0.0	0.0
--	RDX	7.167	0	0.0	0.0
--	1,3,5-TNB	9.725	0	0.0	0.0
1	1,2-Dinitrobenzene	10.633	55060	289.8	190.0
--	1,3-DNB	12.192	0	0.0	0.0
--	Tetryl	13.192	0	0.0	0.0
--	Nitrobenzene	14.350	0	0.0	0.0
--	2,4,6-TNT	15.867	0	0.0	0.0
2	3,4-DNT	16.400	52552	266.7	197.1
--	4-Am-2,6-DNT	16.883	0	0.0	0.0
--	2-Am-4,6-DNT	17.492	0	0.0	0.0
--	2,6-DNT	19.075	0	0.0	0.0
--	2,4-DNT	19.750	0	0.0	0.0
--	2-Nitrotoluene	23.967	0	0.0	0.0
--	4-Nitrotoluene	25.967	0	0.0	0.0
--	3-Nitrotoluene	27.833	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-SB10-1.0	Date Analyzed:	04/29/15 02:38
Lab Samp ID:	D114-13	Dilution Factor:	1
Lab File ID:	XD27067A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27058A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2000	2000	100	70-130

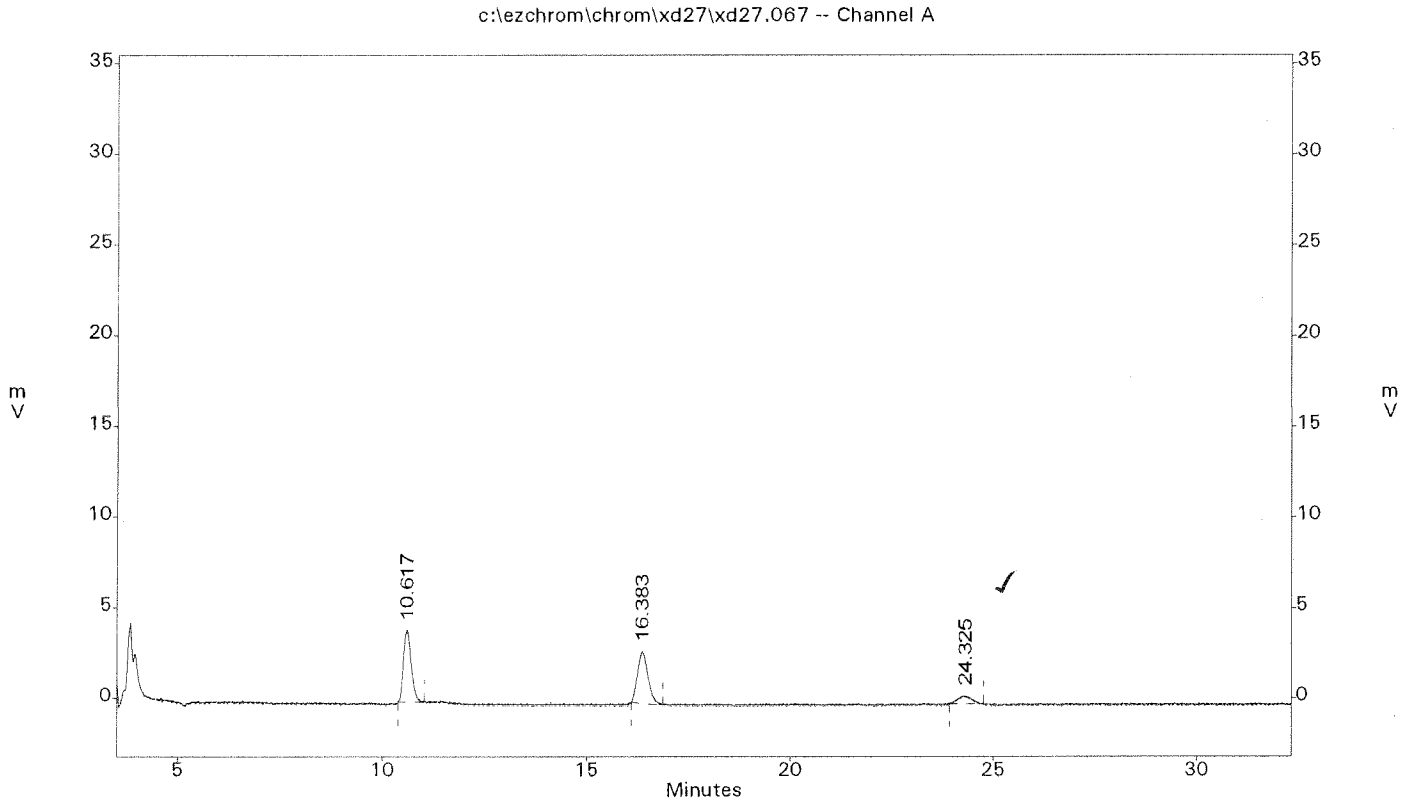
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.067
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-13
Acquired : Apr 29, 2015 02:38:23
Printed : Apr 29, 2015 09:58:46
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.658	0	0.0	0.0
--	RDX	7.167	0	0.0	0.0
--	1,3,5-TNB	9.725	0	0.0	0.0
1	1,2-Dinitrobenzene	10.617	53936	289.8	186.1
--	1,3-DNB	12.192	0	0.0	0.0
--	Tetryl	13.192	0	0.0	0.0
--	Nitrobenzene	14.350	0	0.0	0.0
--	2,4,6-TNT	15.867	0	0.0	0.0
2	3,4-DNT	16.383	53323	266.7	200.0
--	4-Am-2,6-DNT	16.883	0	0.0	0.0
--	2-Am-4,6-DNT	17.492	0	0.0	0.0
--	2,6-DNT	19.075	0	0.0	0.0
--	2,4-DNT	19.750	0	0.0	0.0
3	2-Nitrotoluene	24.325	10611	269.4	39.4
--	4-Nitrotoluene	25.967	0	0.0	0.0
--	3-Nitrotoluene	27.833	0	0.0	0.0

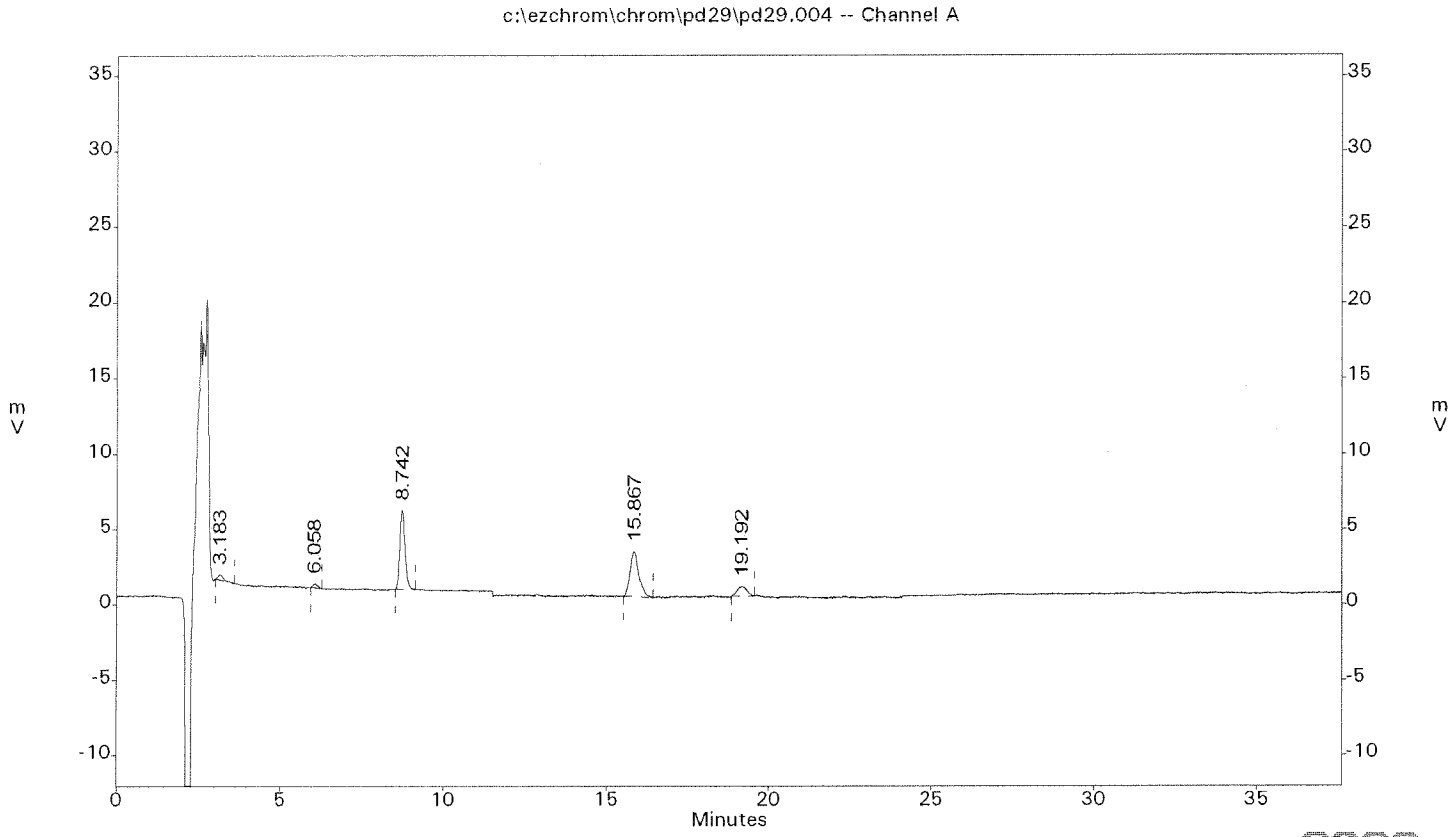


Method 8330 Column: Kinetex 5u Biphenyl
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\pd29\pd29.004
Method : c:\ezchrom\methods\ex17a20c.met
Sample ID : 15D114-13
Acquired : Apr 29, 2015 13:46:27
Printed : Apr 29, 2015 15:34:35
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	2,4/2,6-DANT	3.483	0	0.0	0.0
--	HMX	4.133	0	0.0	0.0
--	RDX	4.683	0	0.0	0.0
--	3,5-Dinitroaniline	7.708	0	0.0	0.0
--	Nitrobenzene	8.333	0	0.0	0.0
3	1,2-Dinitrobenzene	8.742	58691	364.5	161.0
--	4-Am-2,6-DNT	9.192	0	0.0	0.0
--	2-Am-4,6-DNT	9.758	0	0.0	0.0
--	2-Nitrotoluene	12.408	0	0.0	0.0
--	1,3-DNB	12.858	0	0.0	0.0
--	4-Nitrotoluene	13.808	0	0.0	0.0
--	3-Nitrotoluene	14.125	0	0.0	0.0
4	3,4-DNT	15.867	57101	267.2	213.7
--	2,6-DNT	16.508	0	0.0	0.0
--	2,4-DNT	20.800	0	0.0	0.0
--	1,3,5-TNB	21.575	0	0.0	0.0
--	Tetryl	22.092	0	0.0	0.0
--	2,4,6-TNT	28.600	0	0.0	0.0



6032

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-SB11-0.5	Date Analyzed:	04/29/15 03:12
Lab Samp ID:	D114-14	Dilution Factor:	1
Lab File ID:	XD27068A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27058A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1880	2000	94.0	70-130

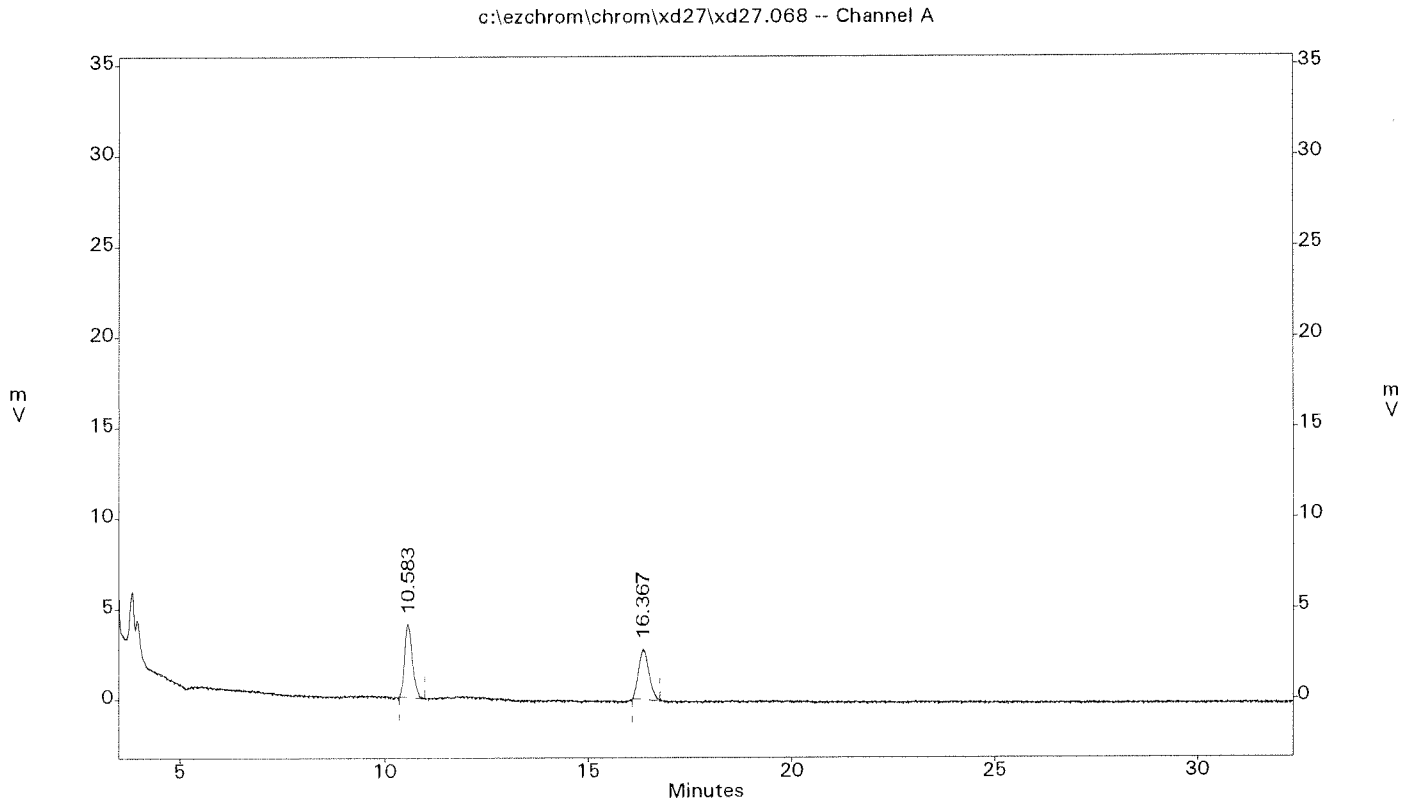
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.068
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-14
Acquired : Apr 29, 2015 03:12:31
Printed : Apr 29, 2015 09:59:02
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.658	0	0.0	0.0
--	RDX	7.167	0	0.0	0.0
--	1,3,5-TNB	9.725	0	0.0	0.0
1	1,2-Dinitrobenzene	10.583	54333	289.8	187.5
--	1,3-DNB	12.192	0	0.0	0.0
--	Tetryl	13.192	0	0.0	0.0
--	Nitrobenzene	14.350	0	0.0	0.0
--	2,4,6-TNT	15.867	0	0.0	0.0
2	3,4-DNT	16.367	50120	266.7	187.9
--	4-Am-2,6-DNT	16.883	0	0.0	0.0
--	2-Am-4,6-DNT	17.492	0	0.0	0.0
--	2,6-DNT	19.075	0	0.0	0.0
--	2,4-DNT	19.750	0	0.0	0.0
--	2-Nitrotoluene	23.967	0	0.0	0.0
--	4-Nitrotoluene	25.967	0	0.0	0.0
--	3-Nitrotoluene	27.833	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-SB11-1.0	Date Analyzed:	04/29/15 04:55
Lab Samp ID:	D114-15	Dilution Factor:	1
Lab File ID:	XD27071A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27070A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1880	2000	94.1	70-130

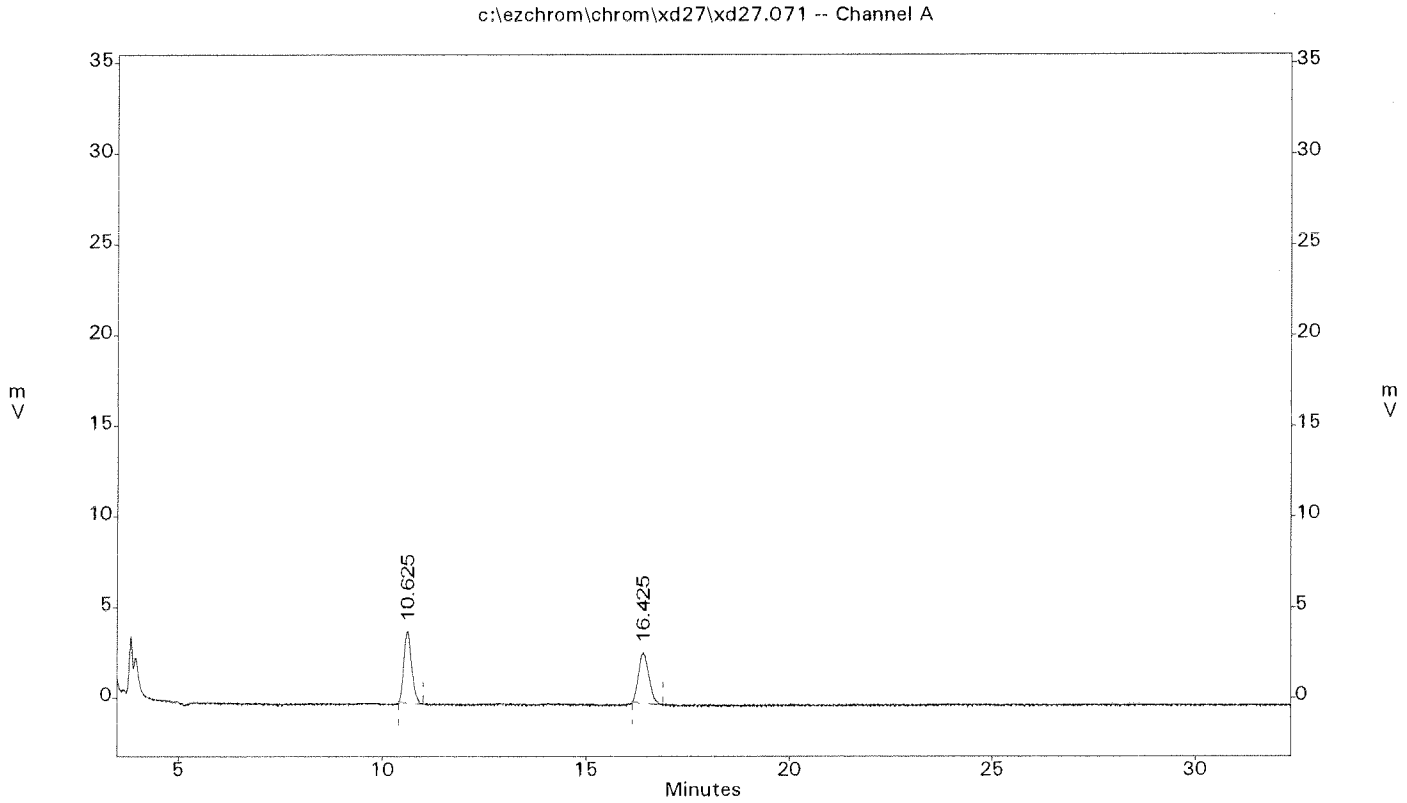
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.071
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-15
Acquired : Apr 29, 2015 04:55:02
Printed : Apr 29, 2015 10:00:49
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.675	0	0.0	0.0
--	RDX	7.217	0	0.0	0.0
--	1,3,5-TNB	9.783	0	0.0	0.0
1	1,2-Dinitrobenzene	10.625	53544	289.8	184.7
--	1,3-DNB	12.300	0	0.0	0.0
--	Tetryl	13.333	0	0.0	0.0
--	Nitrobenzene	14.483	0	0.0	0.0
--	2,4,6-TNT	16.008	0	0.0	0.0
2	3,4-DNT	16.425	50178	266.7	188.2
--	4-Am-2,6-DNT	17.125	0	0.0	0.0
--	2-Am-4,6-DNT	17.733	0	0.0	0.0
--	2,6-DNT	19.283	0	0.0	0.0
--	2,4-DNT	19.975	0	0.0	0.0
--	2-Nitrotoluene	24.242	0	0.0	0.0
--	4-Nitrotoluene	26.317	0	0.0	0.0
--	3-Nitrotoluene	28.217	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-SB12-0.5	Date Analyzed:	04/29/15 05:29
Lab Samp ID:	D114-16	Dilution Factor:	1
Lab File ID:	XD27072A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27070A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1900	2000	95.2	70-130

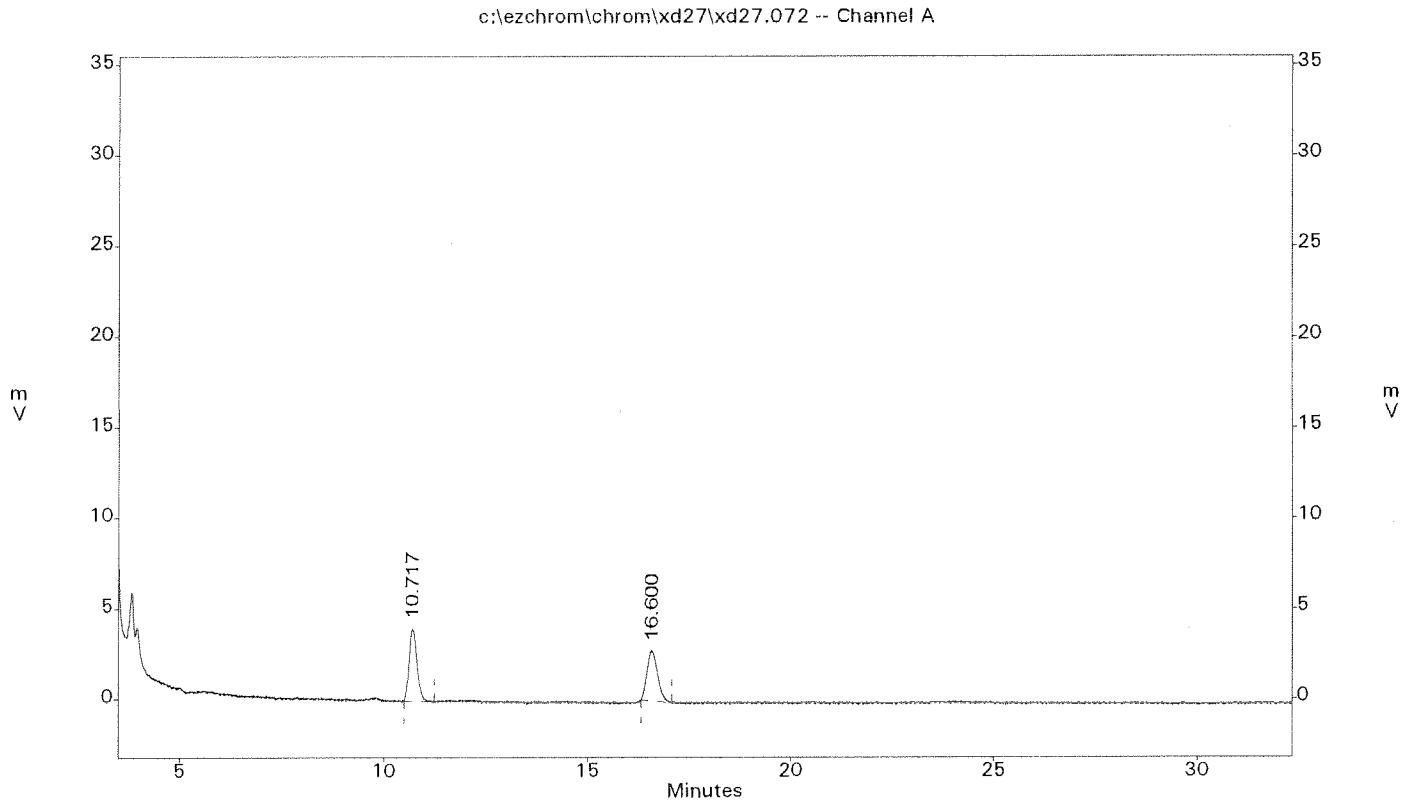
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.072
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-16
Acquired : Apr 29, 2015 05:29:10
Printed : Apr 29, 2015 10:15:26
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.675	0	0.0	0.0
--	RDX	7.217	0	0.0	0.0
--	1,3,5-TNB	9.783	0	0.0	0.0
1	1,2-Dinitrobenzene	10.717	55662	289.8	192.1
--	1,3-DNB	12.300	0	0.0	0.0
--	Tetryl	13.333	0	0.0	0.0
--	Nitrobenzene	14.483	0	0.0	0.0
--	2,4,6-TNT	16.008	0	0.0	0.0
2	3,4-DNT	16.600	50767	266.7	190.4
--	4-Am-2,6-DNT	17.125	0	0.0	0.0
--	2-Am-4,6-DNT	17.733	0	0.0	0.0
--	2,6-DNT	19.283	0	0.0	0.0
--	2,4-DNT	19.975	0	0.0	0.0
--	2-Nitrotoluene	24.242	0	0.0	0.0
--	4-Nitrotoluene	26.317	0	0.0	0.0
--	3-Nitrotoluene	28.217	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-SB12-1.0	Date Analyzed:	04/29/15 06:03
Lab Samp ID:	D114-17	Dilution Factor:	1
Lab File ID:	XD27073A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27070A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1930	2000	96.3	70-130

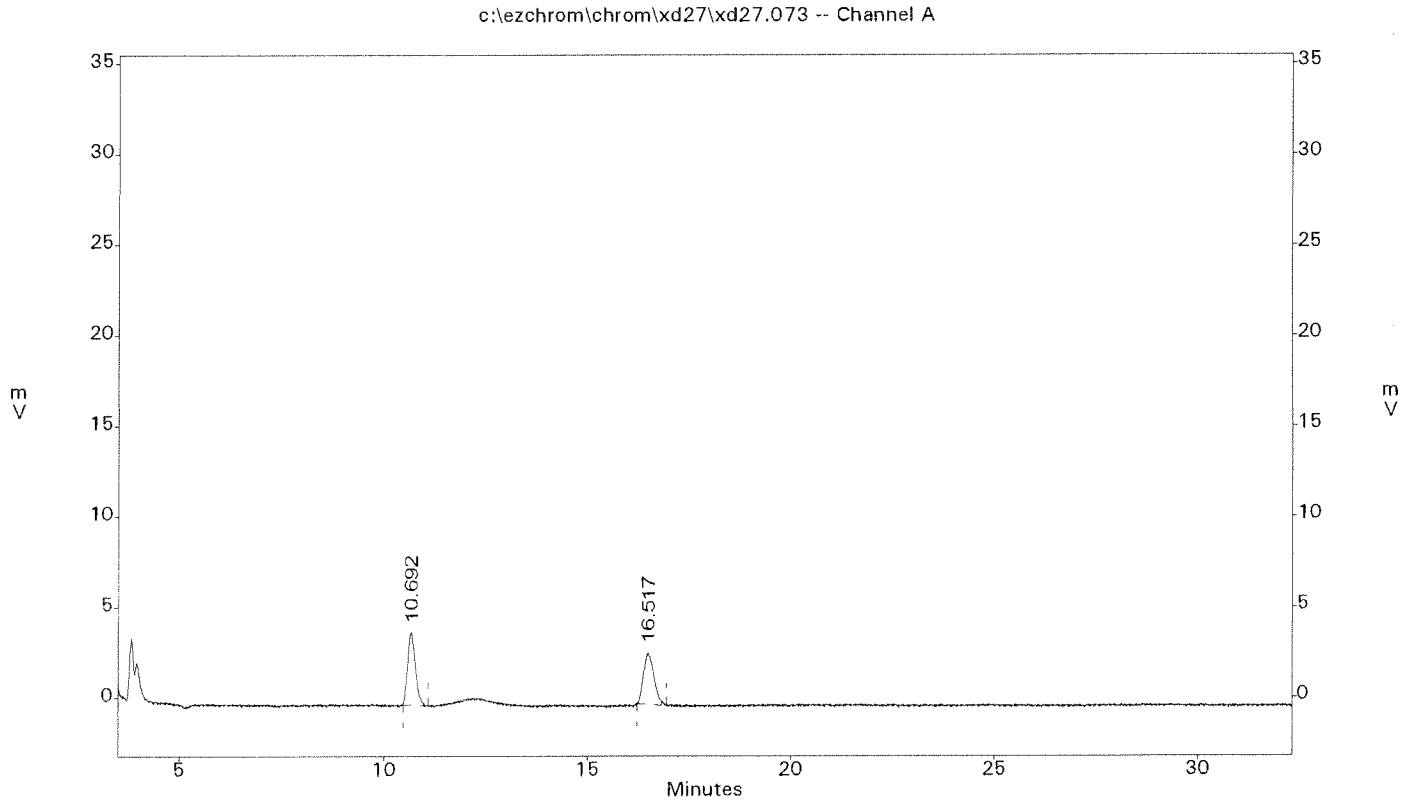
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.073
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-17
Acquired : Apr 29, 2015 06:03:19
Printed : Apr 29, 2015 10:15:49
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.675	0	0.0	0.0
--	RDX	7.217	0	0.0	0.0
--	1,3,5-TNB	9.783	0	0.0	0.0
1	1,2-Dinitrobenzene	10.692	53839	289.8	185.8
--	1,3-DNB	12.300	0	0.0	0.0
--	Tetryl	13.333	0	0.0	0.0
--	Nitrobenzene	14.483	0	0.0	0.0
--	2,4,6-TNT	16.008	0	0.0	0.0
2	3,4-DNT	16.517	51368	266.7	192.6
--	4-Am-2,6-DNT	17.125	0	0.0	0.0
--	2-Am-4,6-DNT	17.733	0	0.0	0.0
--	2,6-DNT	19.283	0	0.0	0.0
--	2,4-DNT	19.975	0	0.0	0.0
--	2-Nitrotoluene	24.242	0	0.0	0.0
--	4-Nitrotoluene	26.317	0	0.0	0.0
--	3-Nitrotoluene	28.217	0	0.0	0.0



6040

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UXO4, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UXO4-SB13-0.5	Date Analyzed:	04/29/15 06:37
Lab Samp ID:	D114-18	Dilution Factor:	1
Lab File ID:	XD27074A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27070A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1920	2000	96.2	70-130

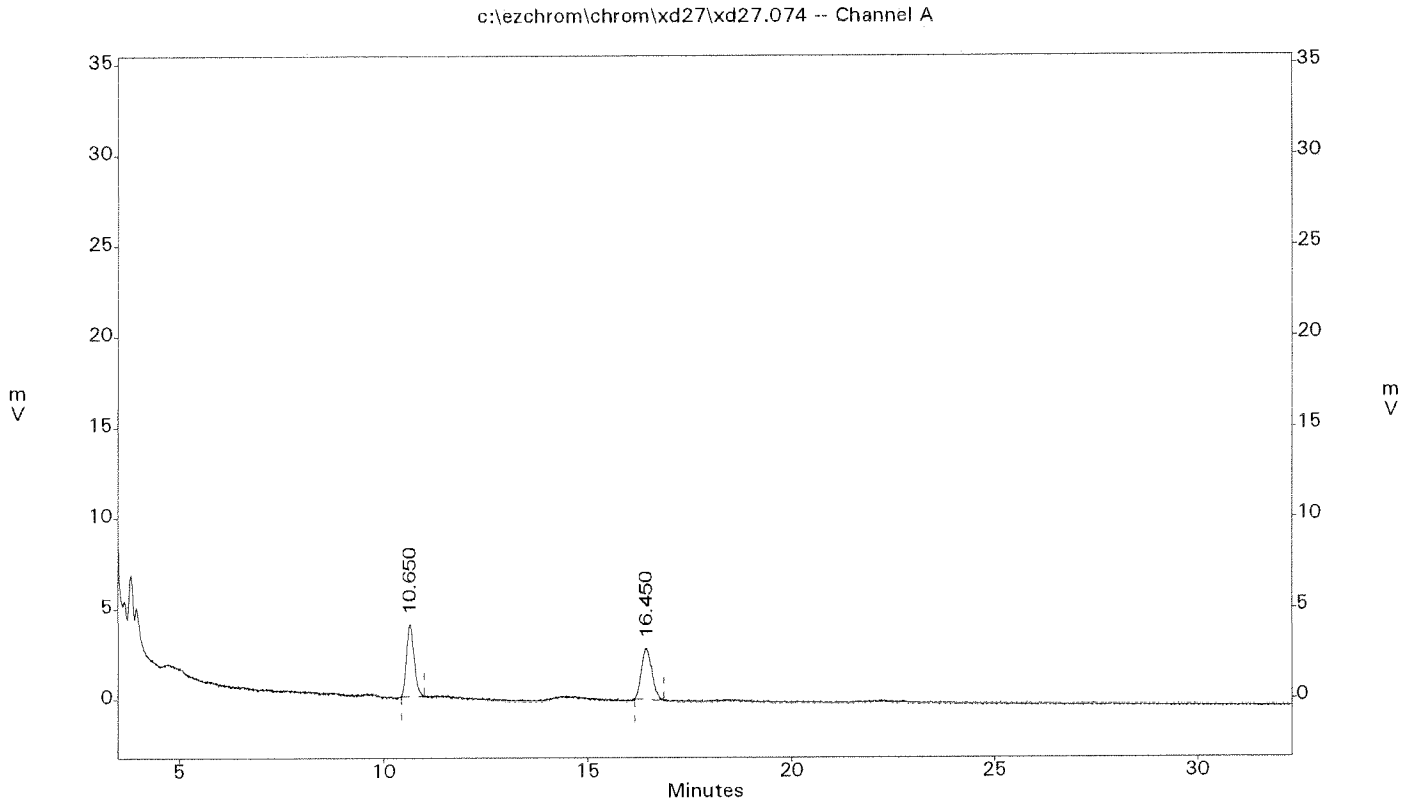
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.074
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-18
Acquired : Apr 29, 2015 06:37:27
Printed : Apr 29, 2015 10:16:01
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.675	0	0.0	0.0
--	RDX	7.217	0	0.0	0.0
--	1,3,5-TNB	9.783	0	0.0	0.0
1	1,2-Dinitrobenzene	10.650	52609	289.8	181.5
--	1,3-DNB	12.300	0	0.0	0.0
--	Tetryl	13.333	0	0.0	0.0
--	Nitrobenzene	14.483	0	0.0	0.0
--	2,4,6-TNT	16.008	0	0.0	0.0
2	3,4-DNT	16.450	51307	266.7	192.4
--	4-Am-2,6-DNT	17.125	0	0.0	0.0
--	2-Am-4,6-DNT	17.733	0	0.0	0.0
--	2,6-DNT	19.283	0	0.0	0.0
--	2,4-DNT	19.975	0	0.0	0.0
--	2-Nitrotoluene	24.242	0	0.0	0.0
--	4-Nitrotoluene	26.317	0	0.0	0.0
--	3-Nitrotoluene	28.217	0	0.0	0.0



6042

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UXO4, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UXO4-SB13-1.0	Date Analyzed:	04/29/15 07:11
Lab Samp ID:	D114-19	Dilution Factor:	1
Lab File ID:	XD27075A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27070A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2020	2000	101	70-130

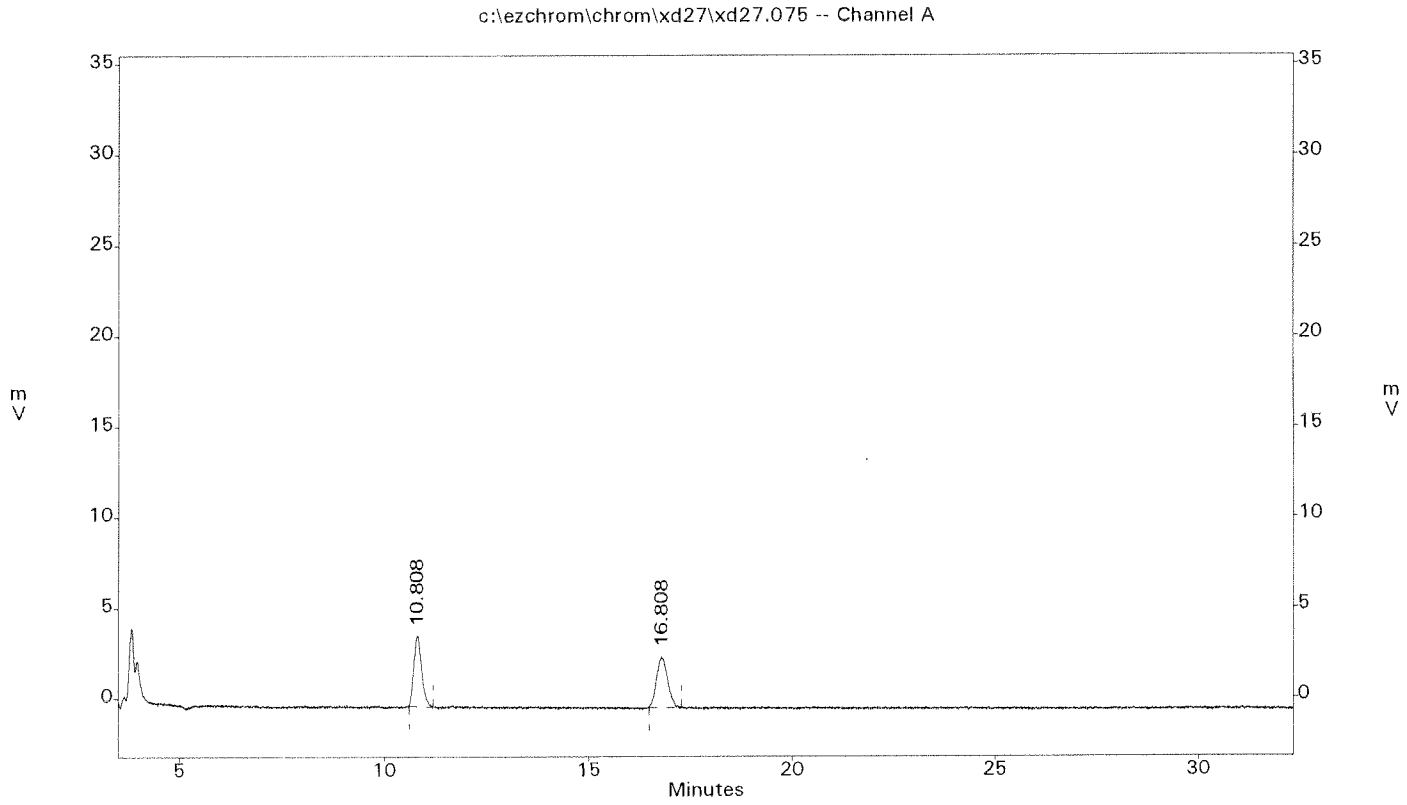
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.075
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-19
Acquired : Apr 29, 2015 07:11:36
Printed : Apr 29, 2015 10:16:32
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.675	0	0.0	0.0
--	RDX	7.217	0	0.0	0.0
--	1,3,5-TNB	9.783	0	0.0	0.0
1	1,2-Dinitrobenzene	10.808	53891	289.8	185.9
--	1,3-DNB	12.300	0	0.0	0.0
--	Tetryl	13.333	0	0.0	0.0
--	Nitrobenzene	14.483	0	0.0	0.0
--	2,4,6-TNT	16.008	0	0.0	0.0
2	3,4-DNT	16.808	53886	266.7	202.1
--	4-Am-2,6-DNT	17.125	0	0.0	0.0
--	2-Am-4,6-DNT	17.733	0	0.0	0.0
--	2,6-DNT	19.283	0	0.0	0.0
--	2,4-DNT	19.975	0	0.0	0.0
--	2-Nitrotoluene	24.242	0	0.0	0.0
--	4-Nitrotoluene	26.317	0	0.0	0.0
--	3-Nitrotoluene	28.217	0	0.0	0.0



6044

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-SB14-0.5	Date Analyzed:	04/29/15 07:45
Lab Samp ID:	D114-20	Dilution Factor:	1
Lab File ID:	XD27076A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27070A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1940	2000	96.9	70-130

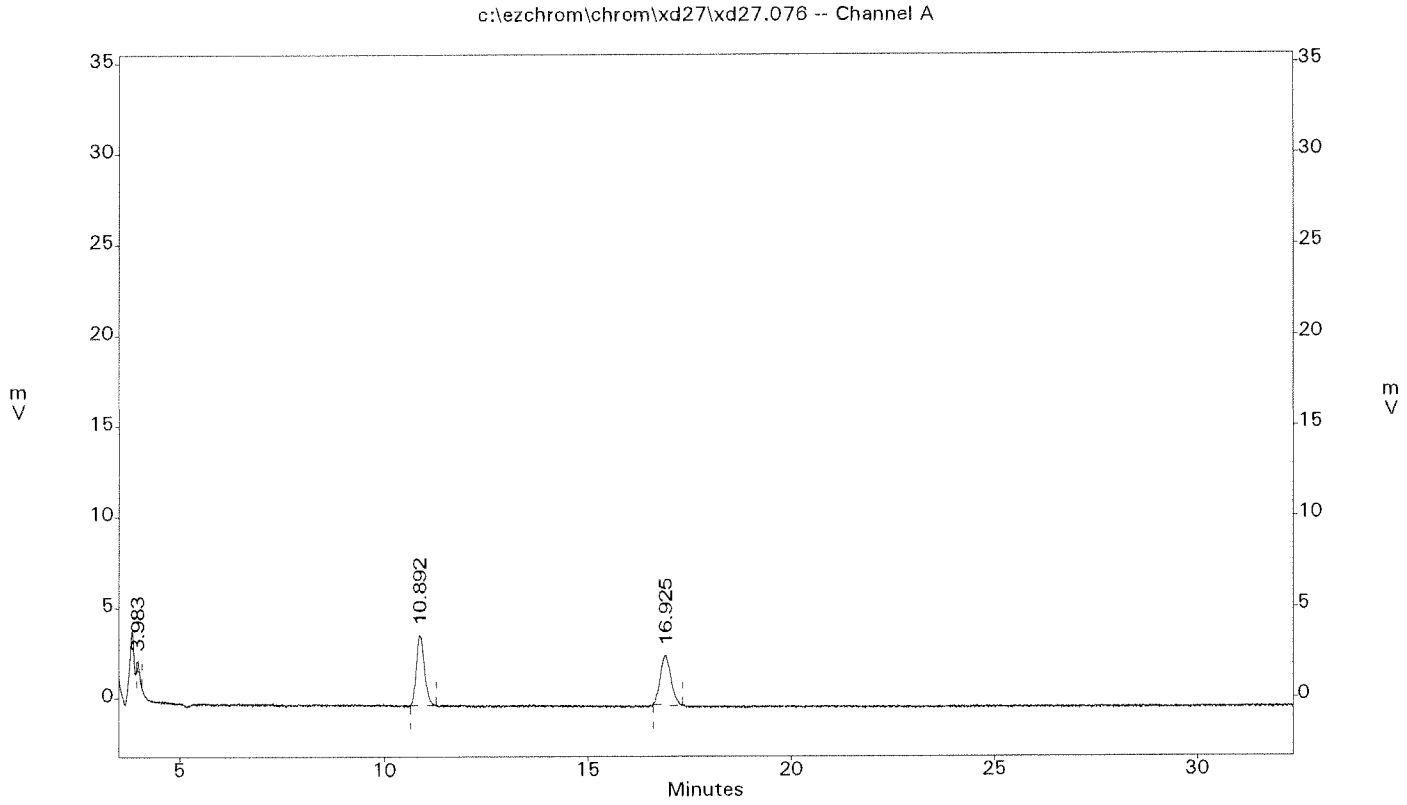
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.076
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-20
Acquired : Apr 29, 2015 07:45:44
Printed : Apr 29, 2015 10:16:49
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.675	0	0.0	0.0
--	RDX	7.217	0	0.0	0.0
--	1,3,5-TNB	9.783	0	0.0	0.0
2	1,2-Dinitrobenzene	10.892	54770	289.8	189.0
--	1,3-DNB	12.300	0	0.0	0.0
--	Tetryl	13.333	0	0.0	0.0
--	Nitrobenzene	14.483	0	0.0	0.0
--	2,4,6-TNT	16.008	0	0.0	0.0
3	3,4-DNT	16.925	51667	266.7	193.7
--	4-Am-2,6-DNT	17.125	0	0.0	0.0
--	2-Am-4,6-DNT	17.733	0	0.0	0.0
--	2,6-DNT	19.283	0	0.0	0.0
--	2,4-DNT	19.975	0	0.0	0.0
--	2-Nitrotoluene	24.242	0	0.0	0.0
--	4-Nitrotoluene	26.317	0	0.0	0.0
--	3-Nitrotoluene	28.217	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-SB14-1.0	Date Analyzed:	04/29/15 08:19
Lab Samp ID:	D114-21	Dilution Factor:	1
Lab File ID:	XD27077A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27070A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2010	2000	100	70-130

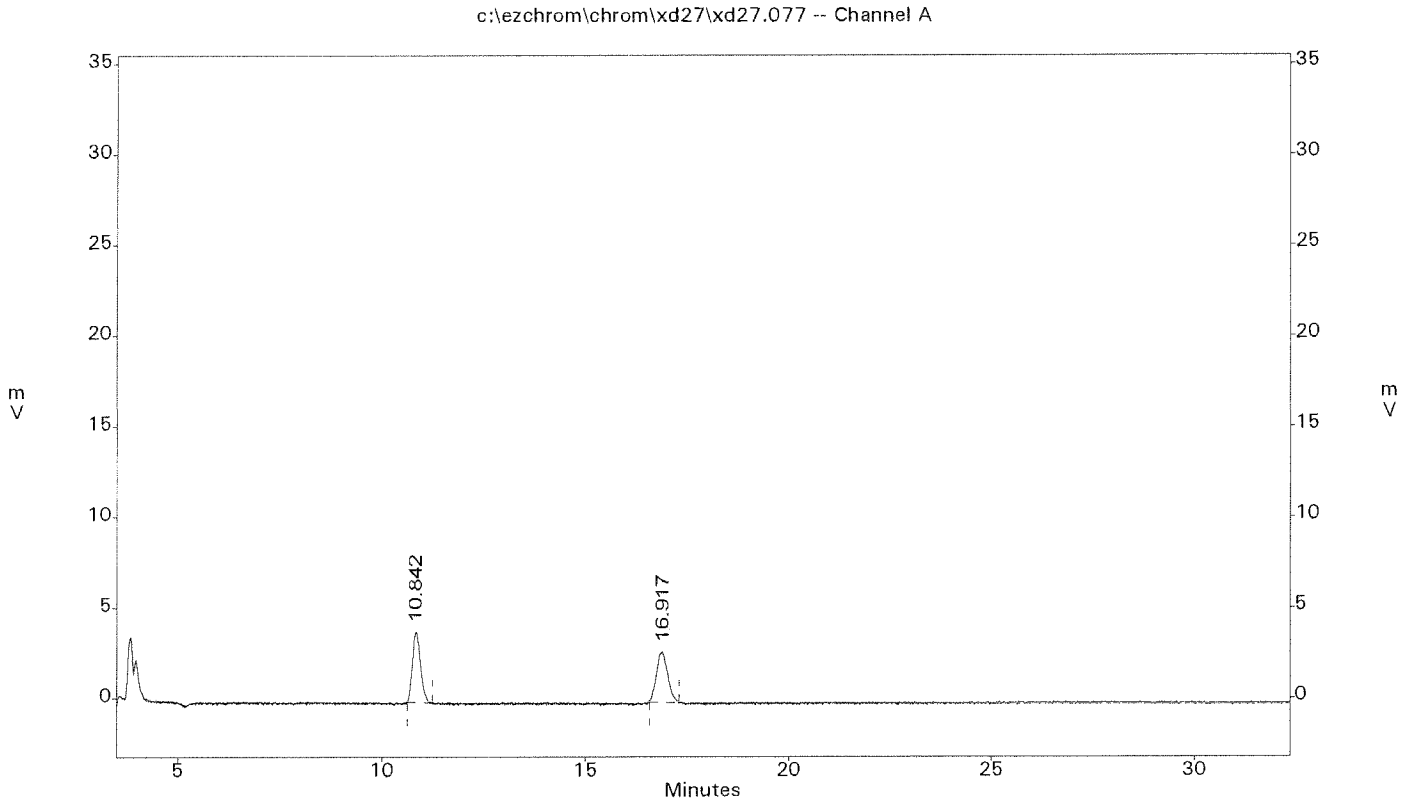
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.077
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-21
Acquired : Apr 29, 2015 08:19:53
Printed : Apr 29, 2015 10:17:03
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.675	0	0.0	0.0
--	RDX	7.217	0	0.0	0.0
--	1,3,5-TNB	9.783	0	0.0	0.0
1	1,2-Dinitrobenzene	10.842	55181	289.8	190.4
--	1,3-DNB	12.300	0	0.0	0.0
--	Tetryl	13.333	0	0.0	0.0
--	Nitrobenzene	14.483	0	0.0	0.0
--	2,4,6-TNT	16.008	0	0.0	0.0
2	3,4-DNT	16.917	53545	266.7	200.8
--	4-Am-2,6-DNT	17.125	0	0.0	0.0
--	2-Am-4,6-DNT	17.733	0	0.0	0.0
--	2,6-DNT	19.283	0	0.0	0.0
--	2,4-DNT	19.975	0	0.0	0.0
--	2-Nitrotoluene	24.242	0	0.0	0.0
--	4-Nitrotoluene	26.317	0	0.0	0.0
--	3-Nitrotoluene	28.217	0	0.0	0.0



6048

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UXO4, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UXO4-SB15-0.5	Date Analyzed:	04/29/15 08:54
Lab Samp ID:	D114-22	Dilution Factor:	1
Lab File ID:	XD27078A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27070A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1930	2000	96.3	70-130

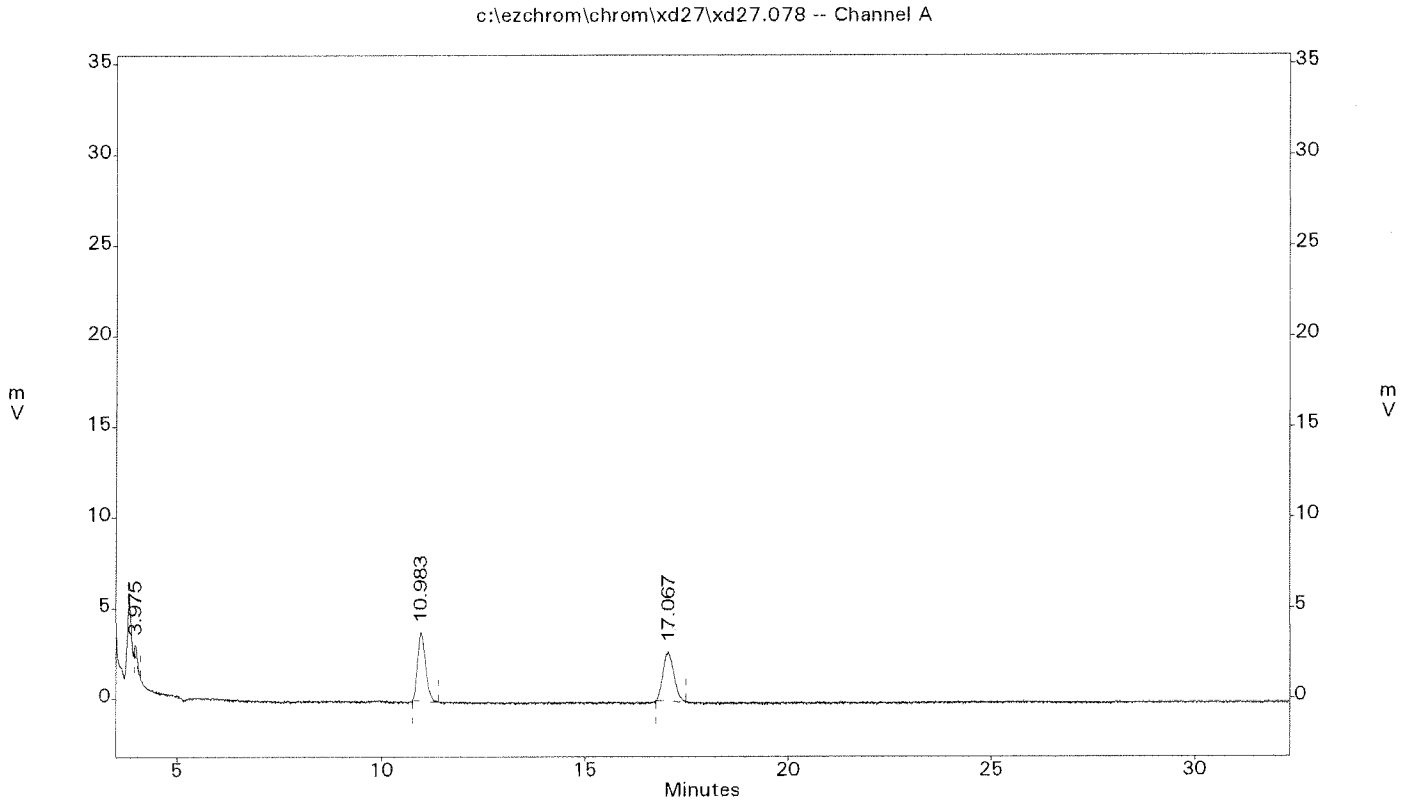
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.078
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-22
Acquired : Apr 29, 2015 08:54:01
Printed : Apr 29, 2015 10:17:33
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.675	0	0.0	0.0
--	RDX	7.217	0	0.0	0.0
--	1,3,5-TNB	9.783	0	0.0	0.0
2	1,2-Dinitrobenzene	10.983	53175	289.8	183.5
--	1,3-DNB	12.300	0	0.0	0.0
--	Tetryl	13.333	0	0.0	0.0
--	Nitrobenzene	14.483	0	0.0	0.0
--	2,4,6-TNT	16.008	0	0.0	0.0
3	3,4-DNT	17.067	51336	266.7	192.5
--	4-Am-2,6-DNT	17.125	0	0.0	0.0
--	2-Am-4,6-DNT	17.733	0	0.0	0.0
--	2,6-DNT	19.283	0	0.0	0.0
--	2,4-DNT	19.975	0	0.0	0.0
--	2-Nitrotoluene	24.242	0	0.0	0.0
--	4-Nitrotoluene	26.317	0	0.0	0.0
--	3-Nitrotoluene	28.217	0	0.0	0.0



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METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UXO4, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/22/15 16:45
Sample ID:	UXO4-SB15-0.5RE	Date Analyzed:	04/29/15 13:27
Lab Samp ID:	D114-22R	Dilution Factor:	1
Lab File ID:	XD27086A	Matrix :	SOIL
Ext Btch ID:	EXD016S	% Moisture :	NA
Calib. Ref.:	XD27081A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1930	2000	96.7	70-130

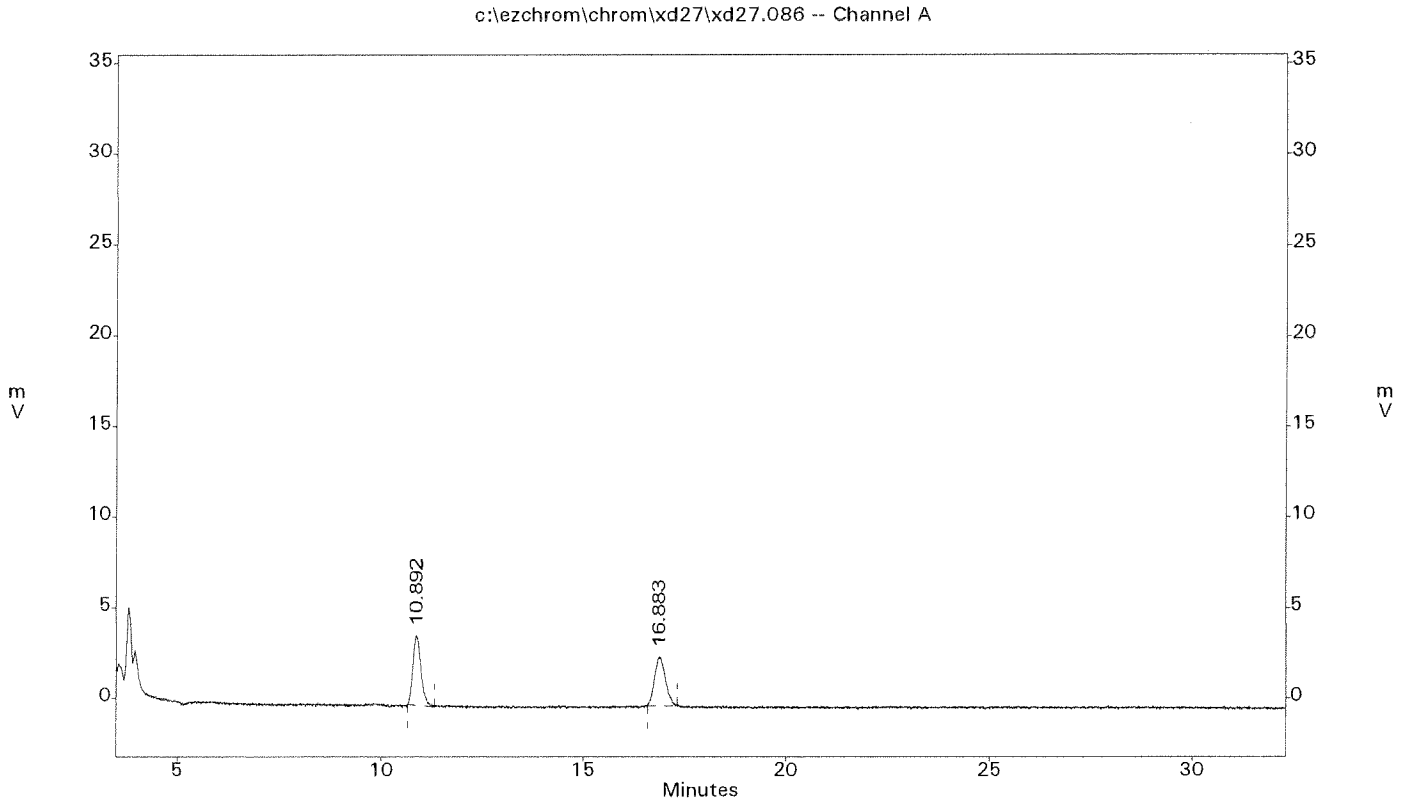
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.086
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-22R
Acquired : Apr 29, 2015 13:27:13
Printed : Apr 29, 2015 14:02:46
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.708	0	0.0	0.0
--	RDX	7.333	0	0.0	0.0
--	1,3,5-TNB	9.925	0	0.0	0.0
1	1,2-Dinitrobenzene	10.892	54905	289.8	189.4
--	1,3-DNB	12.558	0	0.0	0.0
--	Tetryl	13.683	0	0.0	0.0
--	Nitrobenzene	14.800	0	0.0	0.0
--	2,4,6-TNT	16.392	0	0.0	0.0
2	3,4-DNT	16.883	51578	266.7	193.4
--	4-Am-2,6-DNT	17.750	0	0.0	0.0
--	2-Am-4,6-DNT	18.425	0	0.0	0.0
--	2,6-DNT	19.875	0	0.0	0.0
--	2,4-DNT	20.633	0	0.0	0.0
--	2-Nitrotoluene	25.025	0	0.0	0.0
--	4-Nitrotoluene	27.208	0	0.0	0.0
--	3-Nitrotoluene	29.167	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-SB15-1.0	Date Analyzed:	04/29/15 09:28
Lab Samp ID:	D114-23	Dilution Factor:	1
Lab File ID:	XD27079A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27070A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1920	2000	96.0	70-130

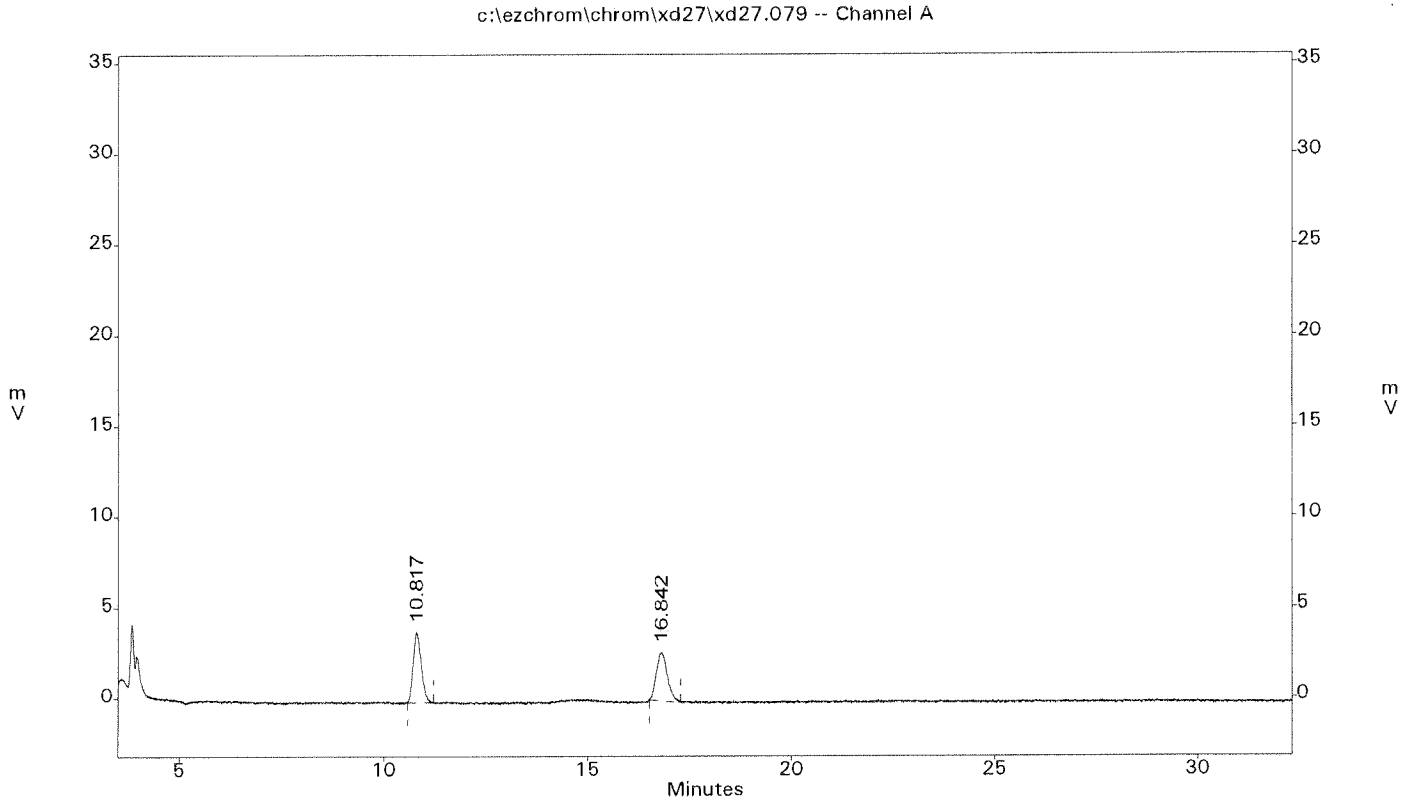
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.079
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-23
Acquired : Apr 29, 2015 09:28:09
Printed : Apr 29, 2015 11:03:19
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.675	0	0.0	0.0
--	RDX	7.217	0	0.0	0.0
--	1,3,5-TNB	9.783	0	0.0	0.0
1	1,2-Dinitrobenzene	10.817	54260	289.8	187.2
--	1,3-DNB	12.300	0	0.0	0.0
--	Tetryl	13.333	0	0.0	0.0
--	Nitrobenzene	14.483	0	0.0	0.0
--	2,4,6-TNT	16.008	0	0.0	0.0
2	3,4-DNT	16.842	51181	266.7	191.9
--	4-Am-2,6-DNT	17.125	0	0.0	0.0
--	2-Am-4,6-DNT	17.733	0	0.0	0.0
--	2,6-DNT	19.283	0	0.0	0.0
--	2,4-DNT	19.975	0	0.0	0.0
--	2-Nitrotoluene	24.242	0	0.0	0.0
--	4-Nitrotoluene	26.317	0	0.0	0.0
--	3-Nitrotoluene	28.217	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-SB16-0.5	Date Analyzed:	04/29/15 10:02
Lab Samp ID:	D114-24	Dilution Factor:	1
Lab File ID:	XD27080A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27070A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1890	2000	94.6	70-130

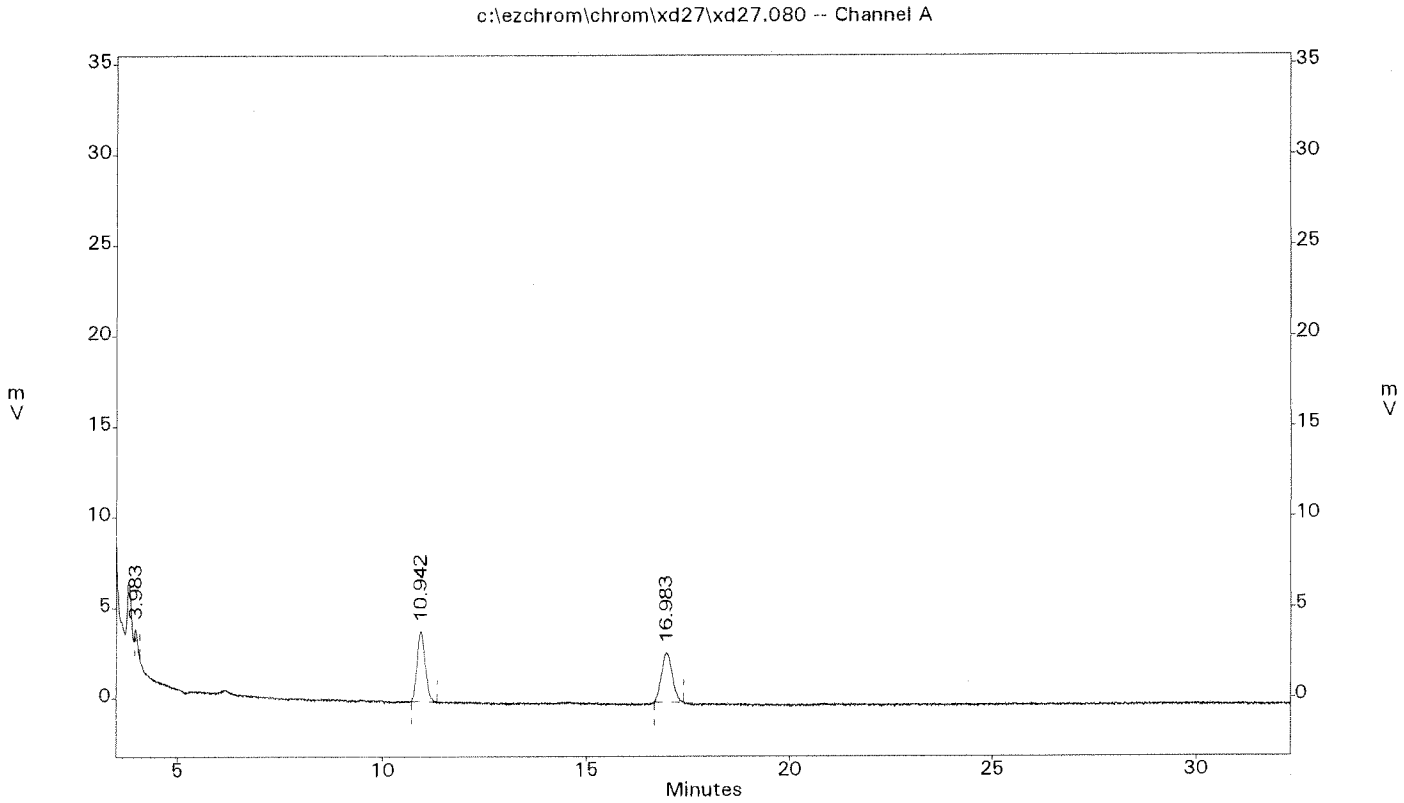
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.080
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-24
Acquired : Apr 29, 2015 10:02:18
Printed : Apr 29, 2015 11:03:31
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.675	0	0.0	0.0
--	RDX	7.217	0	0.0	0.0
--	1,3,5-TNB	9.783	0	0.0	0.0
2	1,2-Dinitrobenzene	10.942	54849	289.8	189.2
--	1,3-DNB	12.300	0	0.0	0.0
--	Tetryl	13.333	0	0.0	0.0
--	Nitrobenzene	14.483	0	0.0	0.0
--	2,4,6-TNT	16.008	0	0.0	0.0
3	3,4-DNT	16.983	50476	266.7	189.3
--	4-Am-2,6-DNT	17.125	0	0.0	0.0
--	2-Am-4,6-DNT	17.733	0	0.0	0.0
--	2,6-DNT	19.283	0	0.0	0.0
--	2,4-DNT	19.975	0	0.0	0.0
--	2-Nitrotoluene	24.242	0	0.0	0.0
--	4-Nitrotoluene	26.317	0	0.0	0.0
--	3-Nitrotoluene	28.217	0	0.0	0.0



METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	UX04-SB16-1.0	Date Analyzed:	04/29/15 11:10
Lab Samp ID:	D114-25	Dilution Factor:	1
Lab File ID:	XD27082A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27081A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1890	2000	94.6	70-130

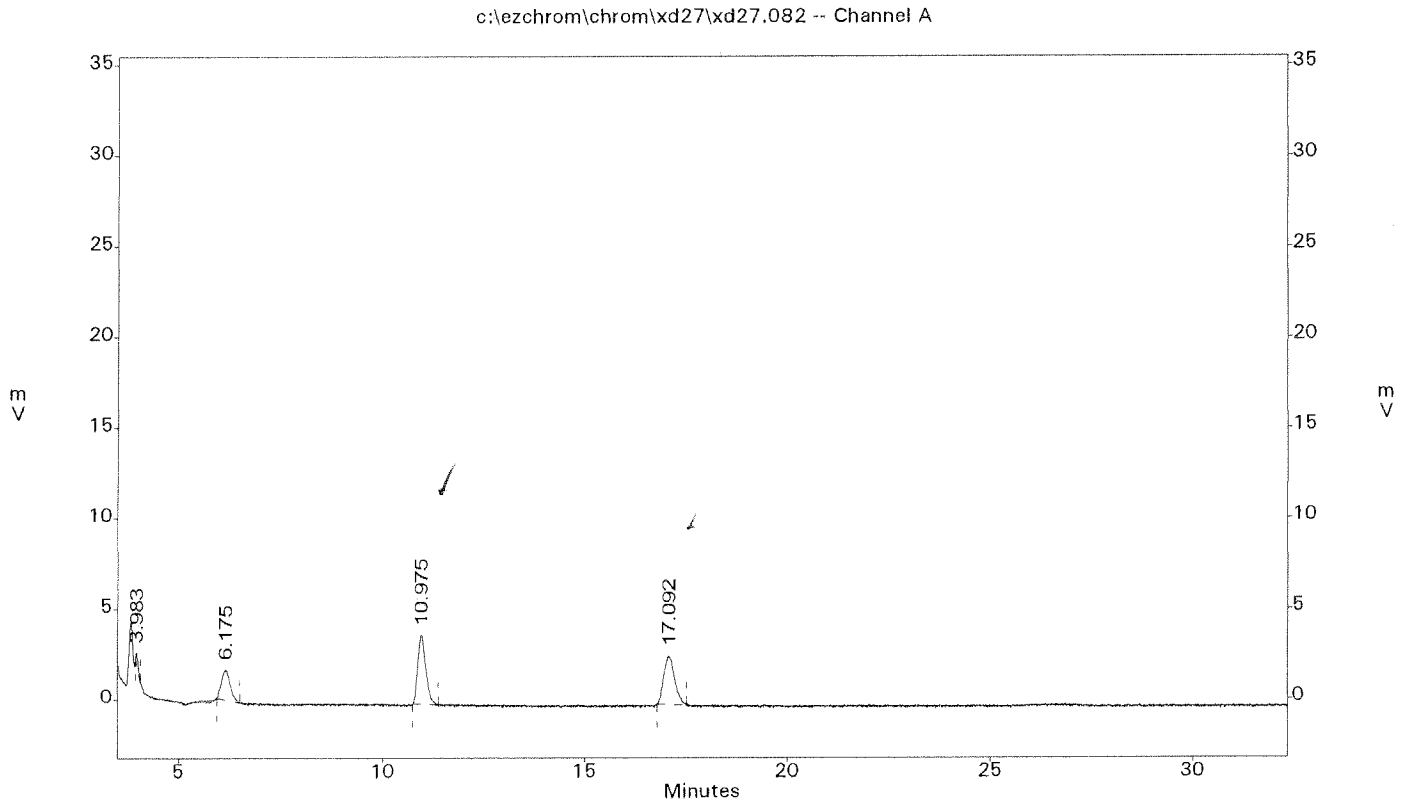
Note: All positive results are confirmed by Biphenyl column

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.082
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-25
Acquired : Apr 29, 2015 11:10:37
Printed : Apr 29, 2015 12:29:33
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.708	0	0.0	0.0
--	RDX	7.333	0	0.0	0.0
--	1,3,5-TNB	9.925	0	0.0	0.0
3	1,2-Dinitrobenzene	10.975	53824	289.8	185.7
--	1,3-DNB	12.558	0	0.0	0.0
--	Tetryl	13.683	0	0.0	0.0
--	Nitrobenzene	14.800	0	0.0	0.0
--	2,4,6-TNT	16.392	0	0.0	0.0
4	3,4-DNT	17.092	50446	266.7	189.2
--	4-Am-2,6-DNT	17.750	0	0.0	0.0
--	2-Am-4,6-DNT	18.425	0	0.0	0.0
--	2,6-DNT	19.875	0	0.0	0.0
--	2,4-DNT	20.633	0	0.0	0.0
--	2-Nitrotoluene	25.025	0	0.0	0.0
--	4-Nitrotoluene	27.208	0	0.0	0.0
--	3-Nitrotoluene	29.167	0	0.0	0.0



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QC SUMMARIES

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	NA
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/20/15
Batch No.	: 15D114	Date Extracted:	04/20/15 13:25
Sample ID:	MBLK1W	Date Analyzed:	04/27/15 10:21
Lab Samp ID:	EXD013WB	Dilution Factor:	1
Lab File ID:	XD27003A	Matrix :	WATER
Ext Btch ID:	EXD013W	% Moisture :	NA
Calib. Ref.:	XD27002A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
HMX	ND	1.0	0.10	0.20
RDX	ND	1.0	0.16	0.40
1,3,5-TNB	ND	1.0	0.10	0.20
1,3-DNB	ND	1.0	0.10	0.20
TETRYL	ND	1.0	0.10	0.20
NITROBENZENE	ND	1.0	0.10	0.20
2,4,6-TNT	ND	1.0	0.16	0.40
4-AM-2,6-DNT	ND	1.0	0.20	0.20
2-AM-4,6-DNT	ND	1.0	0.10	0.20
2,6-DNT	ND	1.0	0.10	0.20
2,4-DNT	ND	1.0	0.12	0.20
2-NITROTOLUENE	ND	1.0	0.11	0.20
3-NITROTOLUENE	ND	1.0	0.16	0.40
4-NITROTOLUENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	3.76	4.000	94.1	70-130

Note: All positive results are confirmed by Biphenyl column

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
BATCH NO.: 15D114
METHOD: SW8330A

MATRIX:	WATER			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK1W				
LAB SAMP ID:	EXD013WB	EXD013WL	EXD013WC		
LAB FILE ID:	XD27003A	XD27004A	XD27005A		
DATE EXTRACTED:	04/20/1513:25	04/20/1513:25	04/20/1513:25	DATE COLLECTED:	NA
DATE ANALYZED:	04/27/1510:21	04/27/1510:56	04/27/1511:31	DATE RECEIVED:	04/20/15
PREP. BATCH:	EXD013W	EXD013W	EXD013W		
CALIB. REF:	XD27002A	XD27002A	XD27002A		

ACCESSION:

PARAMETER	BLNK RSLT (ug/L)	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
HMX	ND	4.00	3.57	89	4.00	3.41	85	4	80-115	30
RDX	ND	4.00	3.31	83	4.00	3.22	81	3	50-160	30
1,3,5-TNB	ND	4.00	3.98	99	4.00	3.51	88	12	65-140	30
1,3-DNB	ND	4.00	3.67	92	4.00	3.33	83	10	45-160	30
Tetryl	ND	4.00	4.08	102	4.00	3.74	93	9	20-175	30
Nitrobenzene	ND	4.00	3.37	84	4.00	3.19	80	5	50-140	30
2,4,6-TNT	ND	4.00	3.99	100	4.00	3.70	93	8	50-145	30
4-AM-2,6-DNT	ND	4.00	3.60	90	4.00	3.47	87	4	55-155	30
2-AM-4,6-DNT	ND	4.00	3.86	96	4.00	3.59	90	7	50-155	30
2,6-DNT	ND	4.00	3.73	93	4.00	3.44	86	8	60-135	30
2,4-DNT	ND	4.00	4.06	102	4.00	3.62	91	11	60-135	30
2-Nitrotoluene	ND	4.00	3.41	85	4.00	3.37	84	1	45-135	30
3-Nitrotoluene	ND	4.00	3.99	100	4.00	3.21	80	22	50-130	30
4-Nitrotoluene	ND	4.00	3.49	87	4.00	3.31	83	5	50-130	30

SURROGATE PARAMETER	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	QC LIMIT (%)
3,4-Dinitrotoluene	4.00	4.15	104	4.00	4.05	101	70-130

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	NA
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/21/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	MBLK1S	Date Analyzed:	04/28/15 00:57
Lab Samp ID:	EXD014SB	Dilution Factor:	1
Lab File ID:	XD27028A	Matrix :	SOIL
Ext Btch ID:	EXD014S	% Moisture :	NA
Calib. Ref.:	XD27024A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2000	2000	99.9	70-130

Note: All positive results are confirmed by Biphenyl column

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
BATCH NO.: 15D114
METHOD: SW8330A

MATRIX:	SOIL			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK1S				
LAB SAMP ID:	EXD014SB	EXD014SL	EXD014SC		
LAB FILE ID:	XD27028A	XD27029A	XD27030A		
DATE EXTRACTED:	04/21/1517:15	04/21/1517:15	04/21/1517:15	DATE COLLECTED:	NA
DATE ANALYZED:	04/28/1500:57	04/28/1501:32	04/28/1502:07	DATE RECEIVED:	04/21/15
PREP. BATCH:	EXD014S	EXD014S	EXD014S		
CALIB. REF:	XD27024A	XD27024A	XD27024A		

ACCESSION:

PARAMETER	BLNK RSLT (ug/kg)	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	SPIKE AMT (ug/kg)	BSD RSLT (ug/kg)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
HMX	ND	2000	2180	109	2000	2090	104	4	75-125	30
RDX	ND	2000	2070	104	2000	2130	107	3	70-135	30
1,3,5-TNB	ND	2000	2160	108	2000	2140	107	1	75-125	30
1,3-DNB	ND	2000	2180	109	2000	2140	107	2	80-125	30
Tetryl	ND	2000	2040	102	2000	2070	104	2	10-150	30
Nitrobenzene	ND	2000	2110	105	2000	2070	103	2	75-125	30
2,4,6-TNT	ND	2000	1970	98	2000	1960	98	0	55-140	30
4-AM-2,6-DNT	ND	2000	1950	98	2000	2030	101	4	80-125	30
2-AM-4,6-DNT	ND	2000	2080	104	2000	2120	106	2	80-125	30
2,6-DNT	ND	2000	2040	102	2000	2000	100	2	80-120	30
2,4-DNT	ND	2000	2150	107	2000	2110	106	2	80-125	30
2-Nitrotoluene	ND	2000	2030	102	2000	1940	97	5	80-125	30
3-Nitrotoluene	ND	2000	2030	102	2000	1960	98	4	75-120	30
4-Nitrotoluene	ND	2000	2020	101	2000	1860	93	8	75-125	30

SURROGATE PARAMETER	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	SPIKE AMT (ug/kg)	BSD RSLT (ug/kg)	BSD % REC	QC LIMIT (%)
3,4-Dinitrotoluene	2000	2150	108	2000	2220	111	70-130

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	NA
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/21/15
Batch No.	: 15D114	Date Extracted:	04/21/15 17:15
Sample ID:	MBLK2S	Date Analyzed:	04/28/15 20:22
Lab Samp ID:	EXD015SB	Dilution Factor:	1
Lab File ID:	XD27056A	Matrix :	SOIL
Ext Btch ID:	EXD015S	% Moisture :	NA
Calib. Ref.:	XD27047A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2030	2000	102	70-130

Note: All positive results are confirmed by Biphenyl column

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UXO4, FALLBROOK
BATCH NO.: 15D114
METHOD: SW8330A

MATRIX:	SOIL			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK2S				
LAB SAMP ID:	EXD015SB	EXD015SL	EXD015SC		
LAB FILE ID:	XD27056A	XD27057A	XD27059A		
DATE EXTRACTED:	04/21/1517:15	04/21/1517:15	04/21/1517:15	DATE COLLECTED:	NA
DATE ANALYZED:	04/28/1520:22	04/28/1520:57	04/28/1522:05	DATE RECEIVED:	04/21/15
PREP. BATCH:	EXD015S	EXD015S	EXD015S		
CALIB. REF:	XD27047A	XD27047A	XD27058A		

ACCESSION:

PARAMETER	BLNK RSLT (ug/kg)	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	SPIKE AMT (ug/kg)	BSD RSLT (ug/kg)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
HMX	ND	2000	2090	105	2000	2040	102	3	75-125	30
RDX	ND	2000	2160	108	2000	2080	104	4	70-135	30
1,3,5-TNB	ND	2000	2190	110	2000	2170	108	1	75-125	30
1,3-DNB	ND	2000	2160	108	2000	2180	109	1	80-125	30
Tetryl	ND	2000	2080	104	2000	2070	104	0	10-150	30
Nitrobenzene	ND	2000	2010	101	2000	2060	103	3	75-125	30
2,4,6-TNT	ND	2000	2020	101	2000	1970	98	2	55-140	30
4-AM-2,6-DNT	ND	2000	2020	101	2000	1990	100	1	80-125	30
2-AM-4,6-DNT	ND	2000	2110	106	2000	2120	106	1	80-125	30
2,6-DNT	ND	2000	1900	95	2000	2020	101	6	80-120	30
2,4-DNT	ND	2000	2060	103	2000	2140	107	4	80-125	30
2-Nitrotoluene	ND	2000	1830	91	2000	1880	94	3	80-125	30
3-Nitrotoluene	ND	2000	1930	97	2000	2100	105	8	75-120	30
4-Nitrotoluene	ND	2000	1830	92	2000	2010	100	9	75-125	30

SURROGATE PARAMETER	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	SPIKE AMT (ug/kg)	BSD RSLT (ug/kg)	BSD % REC	QC LIMIT (%)
3,4-Dinitrotoluene	2000	2130	106	2000	2210	111	70-130

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	NA
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/22/15
Batch No.	: 15D114	Date Extracted:	04/22/15 16:45
Sample ID:	MBLK3S	Date Analyzed:	04/29/15 11:44
Lab Samp ID:	EXD016SB	Dilution Factor:	1
Lab File ID:	XD27083A	Matrix :	SOIL
Ext Btch ID:	EXD016S	% Moisture :	NA
Calib. Ref.:	XD27081A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	1970	2000	98.6	70-130

Note: All positive results are confirmed by Biphenyl column

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UXO4, FALLBROOK
BATCH NO.: 15D114
METHOD: SW8330A

MATRIX:	SOIL			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK3S				
LAB SAMP ID:	EXD016SB	EXD016SL	EXD016SC		
LAB FILE ID:	XD27083A	XD27084A	XD27085A		
DATE EXTRACTED:	04/22/1516:45	04/22/1516:45	04/22/1516:45	DATE COLLECTED:	NA
DATE ANALYZED:	04/29/1511:44	04/29/1512:18	04/29/1512:53	DATE RECEIVED:	04/22/15
PREP. BATCH:	EXD016S	EXD016S	EXD016S		
CALIB. REF:	XD27081A	XD27081A	XD27081A		

ACCESSION:

PARAMETER	BLNK RSLT (ug/kg)	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	SPIKE AMT (ug/kg)	BSD RSLT (ug/kg)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
HMX	ND	2000	1970	98	2000	1970	99	0	75-125	30
RDX	ND	2000	2020	101	2000	2130	107	6	70-135	30
1,3,5-TNB	ND	2000	2060	103	2000	2130	107	3	75-125	30
1,3-DNB	ND	2000	2120	106	2000	2170	108	2	80-125	30
Tetryl	ND	2000	1970	98	2000	1980	99	1	10-150	30
Nitrobenzene	ND	2000	1980	99	2000	2070	103	5	75-125	30
2,4,6-TNT	ND	2000	1910	96	2000	1980	99	3	55-140	30
4-AM-2,6-DNT	ND	2000	1850	92	2000	1930	96	4	80-125	30
2-AM-4,6-DNT	ND	2000	2010	100	2000	2080	104	3	80-125	30
2,6-DNT	ND	2000	2020	101	2000	1980	99	2	80-120	30
2,4-DNT	ND	2000	2100	105	2000	2120	106	1	80-125	30
2-Nitrotoluene	ND	2000	1920	96	2000	2000	100	4	80-125	30
3-Nitrotoluene	ND	2000	2130	106	2000	1930	96	10	75-120	30
4-Nitrotoluene	ND	2000	2010	101	2000	2010	101	0	75-125	30

SURROGATE PARAMETER	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	SPIKE AMT (ug/kg)	BSD RSLT (ug/kg)	BSD % REC	QC LIMIT (%)
3,4-Dinitrotoluene	2000	2020	101	2000	2080	104	70-130

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UXO4, FALLBROOK
BATCH NO.: 15D114
METHOD: SW8330A

MATRIX:	SOIL			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	UXO4-TR04-S02-3.0				
LAB SAMP ID:	D114-08	D114-08M	D114-08S		
LAB FILE ID:	XD27061A	XD27062A	XD27063A		
DATE EXTRACTED:	04/21/1517:15	04/21/1517:15	04/21/1517:15	DATE COLLECTED:	04/14/15
DATE ANALYZED:	04/28/1523:13	04/28/1523:47	04/29/1500:21	DATE RECEIVED:	04/17/15
PREP. BATCH:	EXD015S	EXD015S	EXD015S		
CALIB. REF:	XD27058A	XD27058A	XD27058A		

ACCESSION:

PARAMETER	SMPL RSLT (ug/kg)	SPIKE AMT (ug/kg)	MS RSLT (ug/kg)	MS % REC	SPIKE AMT (ug/kg)	MSD RSLT (ug/kg)	MSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
HMX	ND	2000	2200	110	2000	2060	103	7	75-125	30
RDX	ND	2000	1980	99	2000	2040	102	3	70-135	30
1,3,5-TNB	ND	2000	2100	105	2000	2150	108	3	75-125	30
1,3-DNB	ND	2000	2130	107	2000	2170	109	2	80-125	30
Tetryl	ND	2000	1980	99	2000	2090	104	5	10-150	30
Nitrobenzene	ND	2000	2010	100	2000	2070	104	3	75-125	30
2,4,6-TNT	ND	2000	1950	97	2000	1990	100	2	55-140	30
4-AM-2,6-DNT	ND	2000	1940	97	2000	1940	97	0	80-125	30
2-AM-4,6-DNT	ND	2000	2010	100	2000	2090	104	4	80-125	30
2,6-DNT	ND	2000	2000	100	2000	2010	101	1	80-120	30
2,4-DNT	ND	2000	2090	104	2000	2170	108	4	80-125	30
2-Nitrotoluene	ND	2000	1910	96	2000	1860	93	3	80-125	30
3-Nitrotoluene	ND	2000	1930	96	2000	2000	100	4	75-120	30
4-Nitrotoluene	ND	2000	1980	99	2000	2050	103	4	75-125	30

SURROGATE PARAMETER	SPIKE AMT (ug/kg)	MS RSLT (ug/kg)	MS % REC	SPIKE AMT (ug/kg)	MSD RSLT (ug/kg)	MSD % REC	QC LIMIT (%)
3,4-Dinitrotoluene	2000	2200	110	2000	2090	105	70-130

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UXO4, FALLBROOK
BATCH NO.: 15D114
METHOD: SW8330A

MATRIX:	SOIL			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	UXO4-SB15-0.5RE				
LAB SAMP ID:	D114-22R	D114-22M	D114-22S		
LAB FILE ID:	XD27086A	XD27087A	XD27088A		
DATE EXTRACTED:	04/22/1516:45	04/22/1516:45	04/22/1516:45	DATE COLLECTED:	04/16/15
DATE ANALYZED:	04/29/1513:27	04/29/1514:01	04/29/1514:35	DATE RECEIVED:	04/17/15
PREP. BATCH:	EXD016S	EXD016S	EXD016S		
CALIB. REF:	XD27081A	XD27081A	XD27081A		

ACCESSION:

PARAMETER	SMPL RSLT (ug/kg)	SPIKE AMT (ug/kg)	MS RSLT (ug/kg)	MS % REC	SPIKE AMT (ug/kg)	MSD RSLT (ug/kg)	MSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
HMX	ND	2000	2010	100	2000	2030	101	1	75-125	30
RDX	ND	2000	2060	103	2000	2080	104	1	70-135	30
1,3,5-TNB	ND	2000	2110	105	2000	2140	107	1	75-125	30
1,3-DNB	ND	2000	2110	105	2000	2140	107	2	80-125	30
Tetryl	ND	2000	1970	99	2000	1970	99	0	10-150	30
Nitrobenzene	ND	2000	2050	103	2000	2120	106	3	75-125	30
2,4,6-TNT	ND	2000	1900	95	2000	2000	100	5	55-140	30
4-AM-2,6-DNT	ND	2000	1770	88	2000	1860	93	5	80-125	30
2-AM-4,6-DNT	ND	2000	1980	99	2000	2050	103	3	80-125	30
2,6-DNT	ND	2000	2000	100	2000	1970	98	2	80-120	30
2,4-DNT	ND	2000	2070	104	2000	2060	103	1	80-125	30
2-Nitrotoluene	ND	2000	1870	93	2000	1830	92	2	80-125	30
3-Nitrotoluene	ND	2000	1970	98	2000	1960	98	1	75-120	30
4-Nitrotoluene	ND	2000	1850	93	2000	2080	104	12	75-125	30

SURROGATE PARAMETER	SPIKE AMT (ug/kg)	MS RSLT (ug/kg)	MS % REC	SPIKE AMT (ug/kg)	MSD RSLT (ug/kg)	MSD % REC	QC LIMIT (%)
3,4-Dinitrotoluene	2000	1970	98	2000	2030	102	70-130

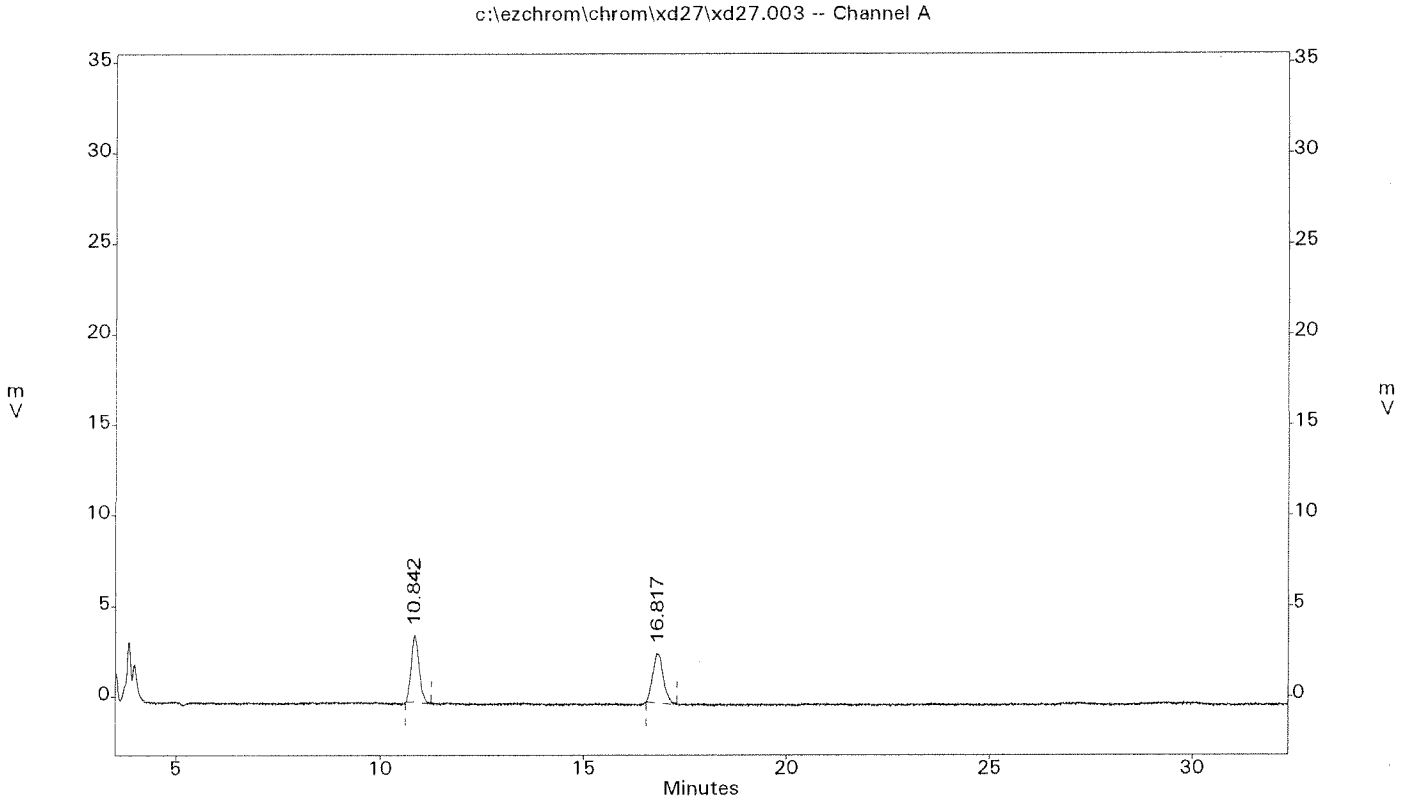
QC DATA

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.003
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD013WB
Acquired : Apr 27, 2015 10:21:04
Printed : Apr 27, 2015 16:31:06
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.692	0	0.0	0.0
--	RDX	7.292	0	0.0	0.0
--	1,3,5-TNB	9.875	0	0.0	0.0
1	1,2-Dinitrobenzene	10.842	51317	289.8	177.1
--	1,3-DNB	12.475	0	0.0	0.0
--	Tetryl	13.567	0	0.0	0.0
--	Nitrobenzene	14.708	0	0.0	0.0
--	2,4,6-TNT	16.242	0	0.0	0.0
2	3,4-DNT	16.817	50185	266.7	188.2
--	4-Am-2,6-DNT	17.483	0	0.0	0.0
--	2-Am-4,6-DNT	18.125	0	0.0	0.0
--	2,6-DNT	19.633	0	0.0	0.0
--	2,4-DNT	20.358	0	0.0	0.0
--	2-Nitrotoluene	24.683	0	0.0	0.0
--	4-Nitrotoluene	26.817	0	0.0	0.0
--	3-Nitrotoluene	28.750	0	0.0	0.0

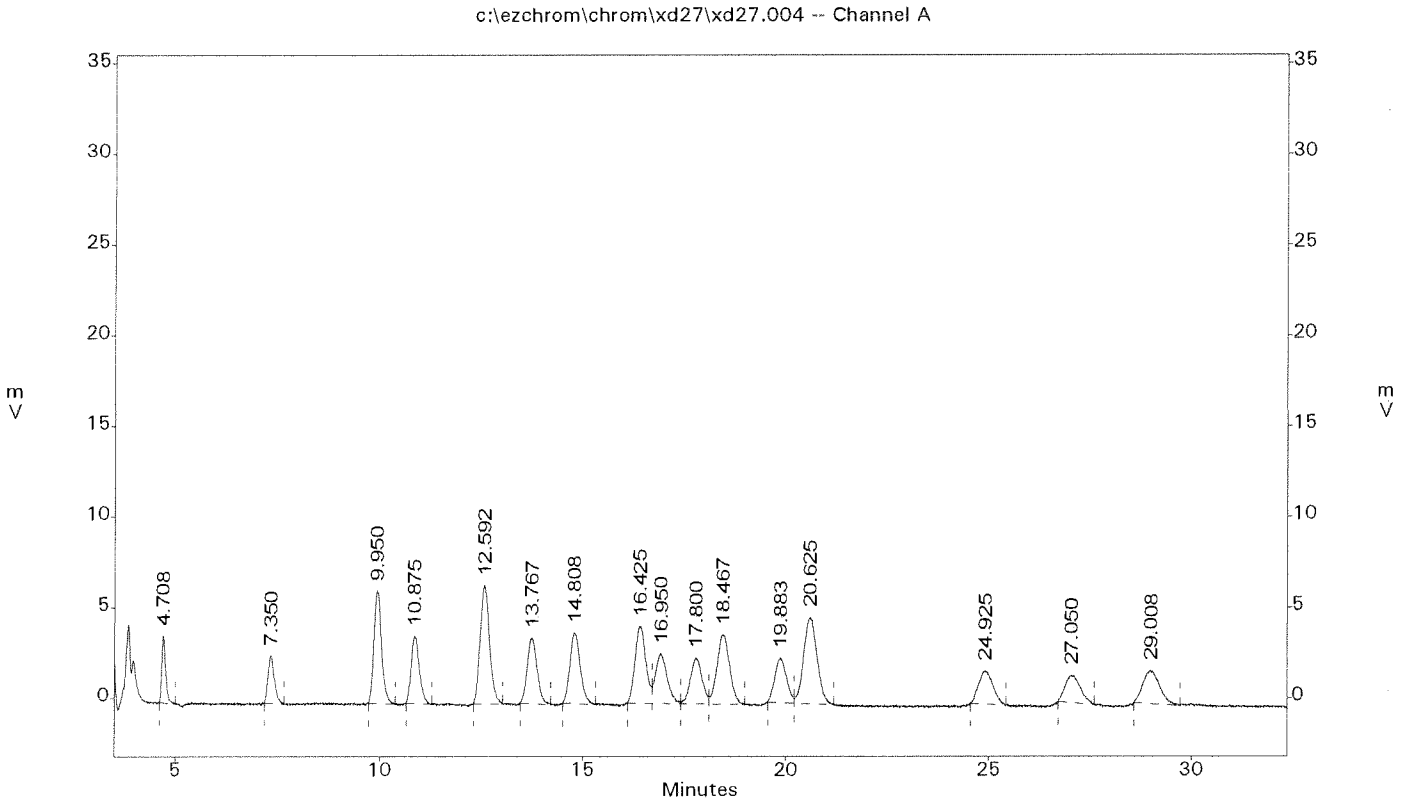


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.004
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD013WL
Acquired : Apr 27, 2015 10:56:06
Printed : Apr 27, 2015 16:31:31
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.708	25359	142.1	178.4
2	RDX	7.350	29352	177.4	165.4
3	1,3,5-TNB	9.950	83161	418.4	198.8
4	1,2-Dinitrobenzene	10.875	53342	289.8	184.0
5	1,3-DNB	12.592	104985	571.5	183.7
6	Tetryl	13.767	61957	303.8	203.9
7	Nitrobenzene	14.808	70872	420.8	168.4
8	2,4,6-TNT	16.425	79058	395.8	199.7
9	3,4-DNT	16.950	55365	266.7	207.6
10	4-Am-2,6-DNT	17.800	51763	287.5	180.1
11	2-Am-4,6-DNT	18.467	84684	439.2	192.8
12	2,6-DNT	19.883	50195	269.2	186.4
13	2,4-DNT	20.625	111401	548.5	203.1
14	2-Nitrotoluene	24.925	45959	269.4	170.6
15	4-Nitrotoluene	27.050	40728	233.7	174.3
16	3-Nitrotoluene	29.008	55247	277.1	199.4



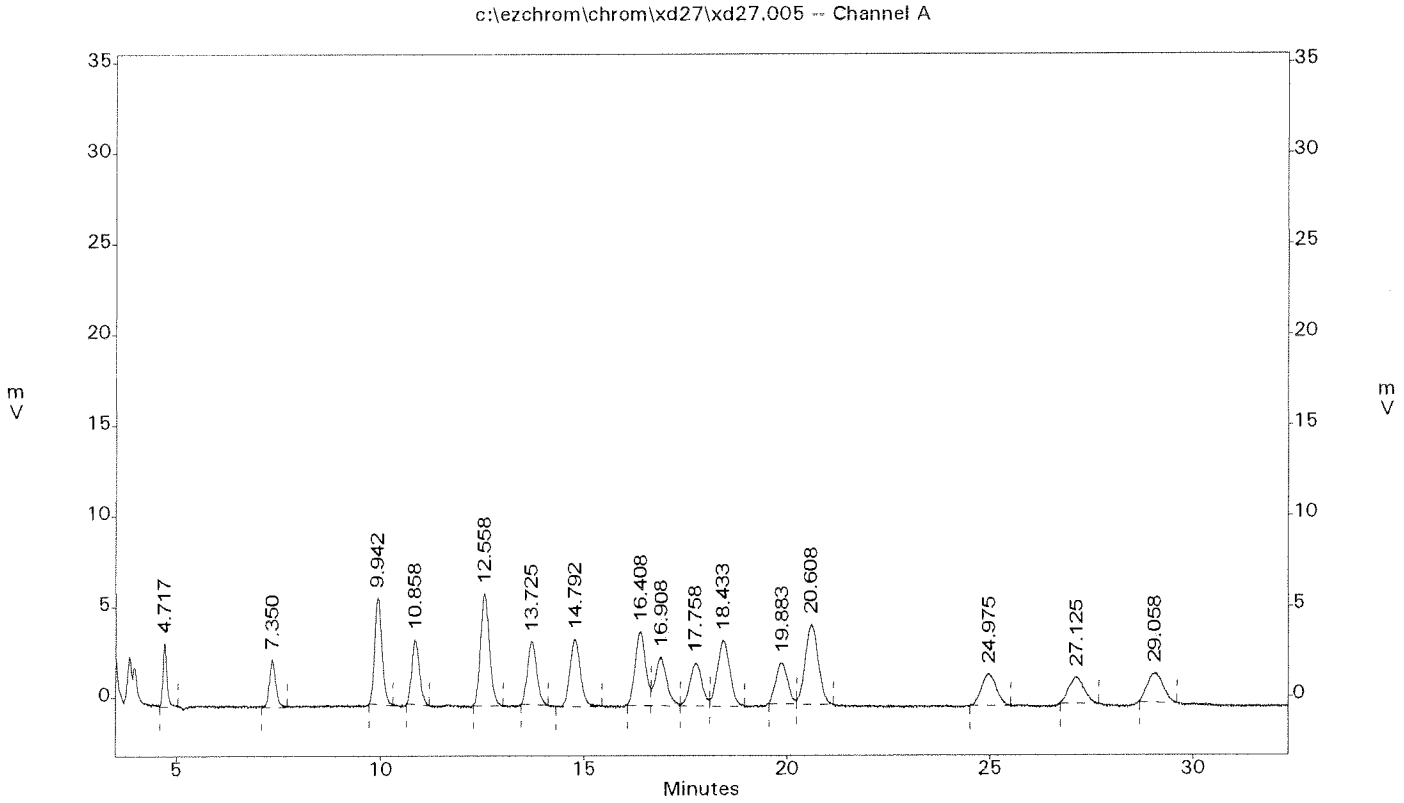
6072

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.005
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD013WC
Acquired : Apr 27, 2015 11:31:10
Printed : Apr 27, 2015 16:33:06
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.717	24246	142.1	170.6
2	RDX	7.350	28569	177.4	161.0
3	1,3,5-TNB	9.942	73486	418.4	175.6
4	1,2-Dinitrobenzene	10.858	47429	289.8	163.6
5	1,3-DNB	12.558	95164	571.5	166.5
6	Tetryl	13.725	56805	303.8	187.0
7	Nitrobenzene	14.792	67169	420.8	159.6
8	2,4,6-TNT	16.408	73308	395.8	185.2
9	3,4-DNT	16.908	54005	266.7	202.5
10	4-Am-2,6-DNT	17.758	49912	287.5	173.6
11	2-Am-4,6-DNT	18.433	78836	439.2	179.5
12	2,6-DNT	19.883	46341	269.2	172.1
13	2,4-DNT	20.608	99329	548.5	181.1
14	2-Nitrotoluene	24.975	45372	269.4	168.4
15	4-Nitrotoluene	27.125	38710	233.7	165.6
16	3-Nitrotoluene	29.058	44493	277.1	160.6

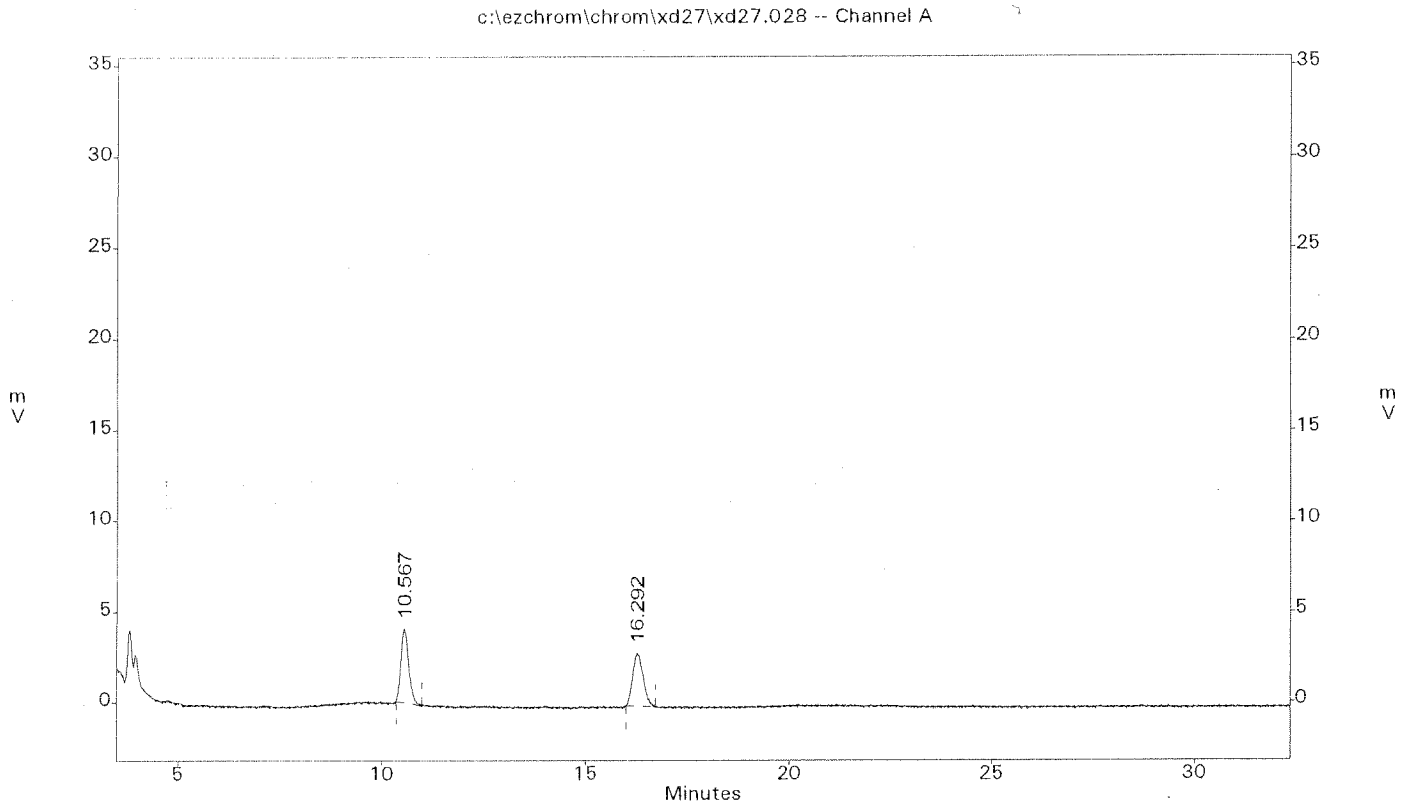


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.028
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD014SB
Acquired : Apr 28, 2015 00:57:32
Printed : Apr 28, 2015 10:10:00
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.675	0	0.0	0.0
--	RDX	7.217	0	0.0	0.0
--	1,3,5-TNB	9.758	0	0.0	0.0
1	1,2-Dinitrobenzene	10.567	55373	289.8	191.1
--	1,3-DNB	12.250	0	0.0	0.0
--	Tetryl	13.342	0	0.0	0.0
--	Nitrobenzene	14.408	0	0.0	0.0
--	2,4,6-TNT	15.975	0	0.0	0.0
2	3,4-DNT	16.292	53289	266.7	199.8
--	4-Am-2,6-DNT	17.050	0	0.0	0.0
--	2-Am-4,6-DNT	17.642	0	0.0	0.0
--	2,6-DNT	19.192	0	0.0	0.0
--	2,4-DNT	19.875	0	0.0	0.0
--	2-Nitrotoluene	24.083	0	0.0	0.0
--	4-Nitrotoluene	26.083	0	0.0	0.0
--	3-Nitrotoluene	27.942	0	0.0	0.0

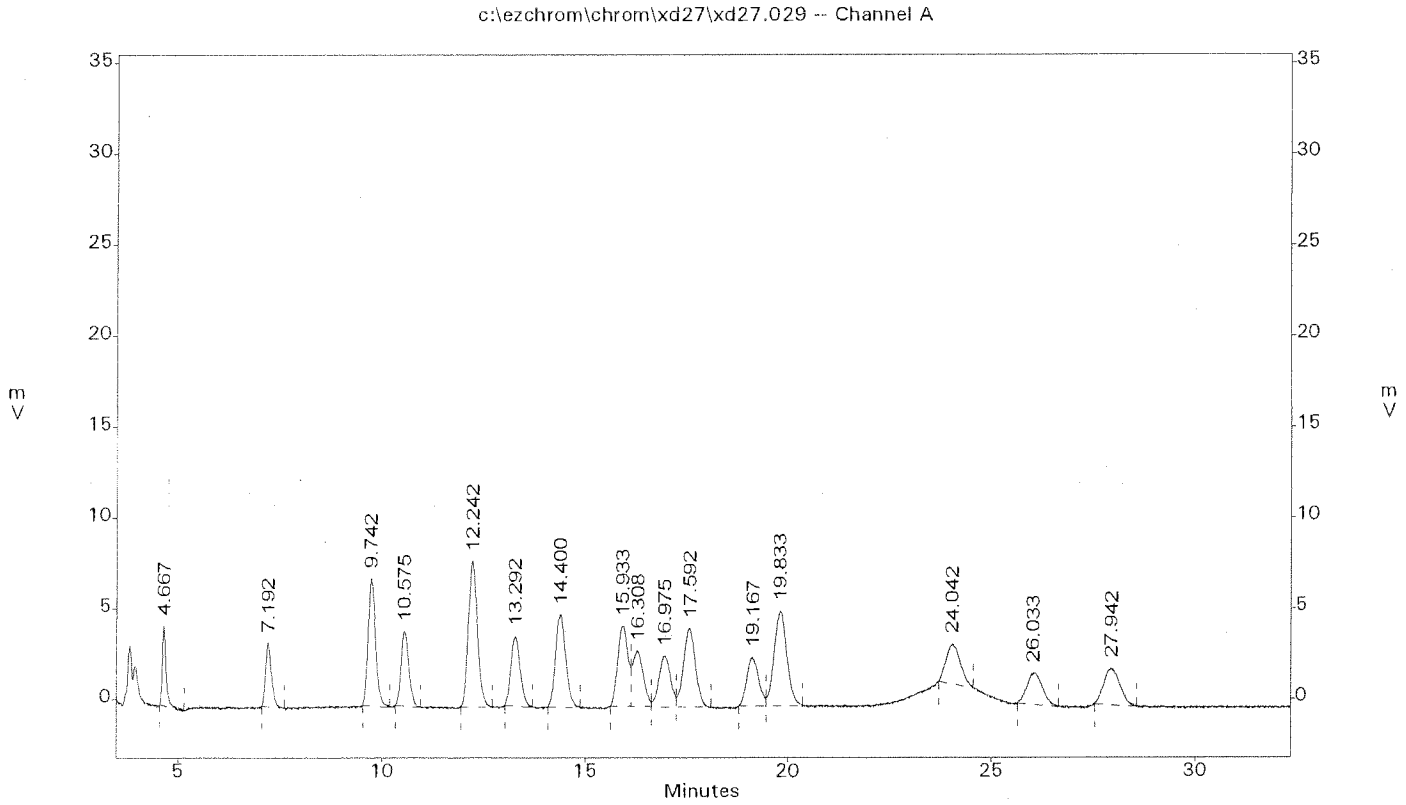


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.029
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD014SL
Acquired : Apr 28, 2015 01:32:36
Printed : Apr 28, 2015 10:10:40
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.667	31027	142.1	218.3
2	RDX	7.192	36802	177.4	207.4
3	1,3,5-TNB	9.742	90299	418.4	215.8
4	1,2-Dinitrobenzene	10.575	55620	289.8	191.9
5	1,3-DNB	12.242	124520	571.5	217.9
6	Tetryl	13.292	61887	303.8	203.7
7	Nitrobenzene	14.400	88630	420.8	210.6
8	2,4,6-TNT	15.933	77937	395.8	196.9
9	3,4-DNT	16.308	57391	266.7	215.2
10	4-Am-2,6-DNT	16.975	56140	287.5	195.3
11	2-Am-4,6-DNT	17.592	91315	439.2	207.9
12	2,6-DNT	19.167	54868	269.2	203.8
13	2,4-DNT	19.833	117738	548.5	214.6
14	2-Nitrotoluene	24.042	54813	269.4	203.4
15	4-Nitrotoluene	26.033	47182	233.7	201.9
16	3-Nitrotoluene	27.942	56377	277.1	203.4

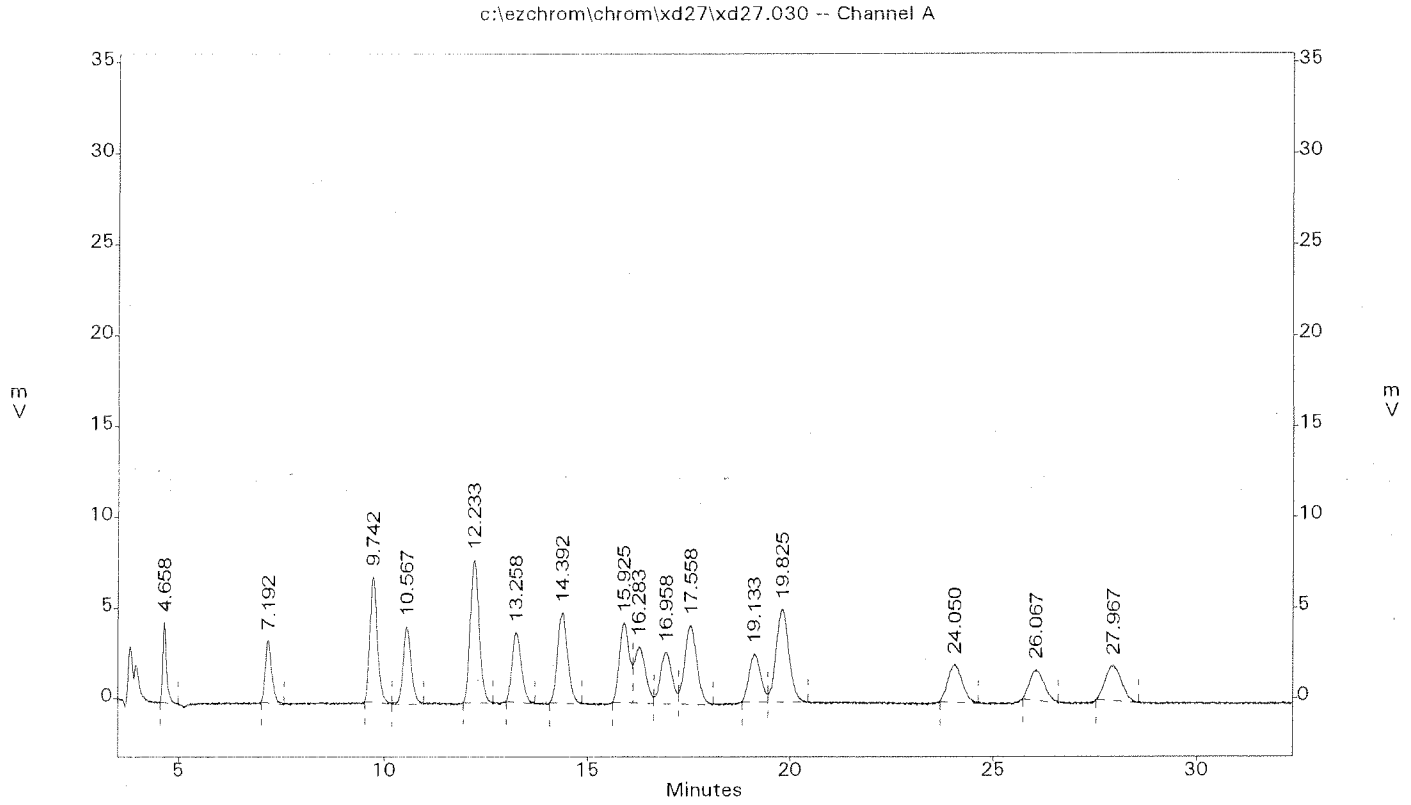


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.030
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD014SC
Acquired : Apr 28, 2015 02:07:40
Printed : Apr 28, 2015 10:10:53
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	29665	142.1	208.7
2	RDX	7.192	37791	177.4	213.0
3	1,3,5-TNB	9.742	89388	418.4	213.6
4	1,2-Dinitrobenzene	10.567	58632	289.8	202.3
5	1,3-DNB	12.233	122546	571.5	214.4
6	Tetryl	13.258	62920	303.8	207.1
7	Nitrobenzene	14.392	87055	420.8	206.9
8	2,4,6-TNT	15.925	77650	395.8	196.2
9	3,4-DNT	16.283	59182	266.7	221.9
10	4-Am-2,6-DNT	16.958	58332	287.5	202.9
11	2-Am-4,6-DNT	17.558	93057	439.2	211.9
12	2,6-DNT	19.133	53836	269.2	200.0
13	2,4-DNT	19.825	115898	548.5	211.3
14	2-Nitrotoluene	24.050	52266	269.4	194.0
15	4-Nitrotoluene	26.067	43539	233.7	186.3
16	3-Nitrotoluene	27.967	54415	277.1	196.4

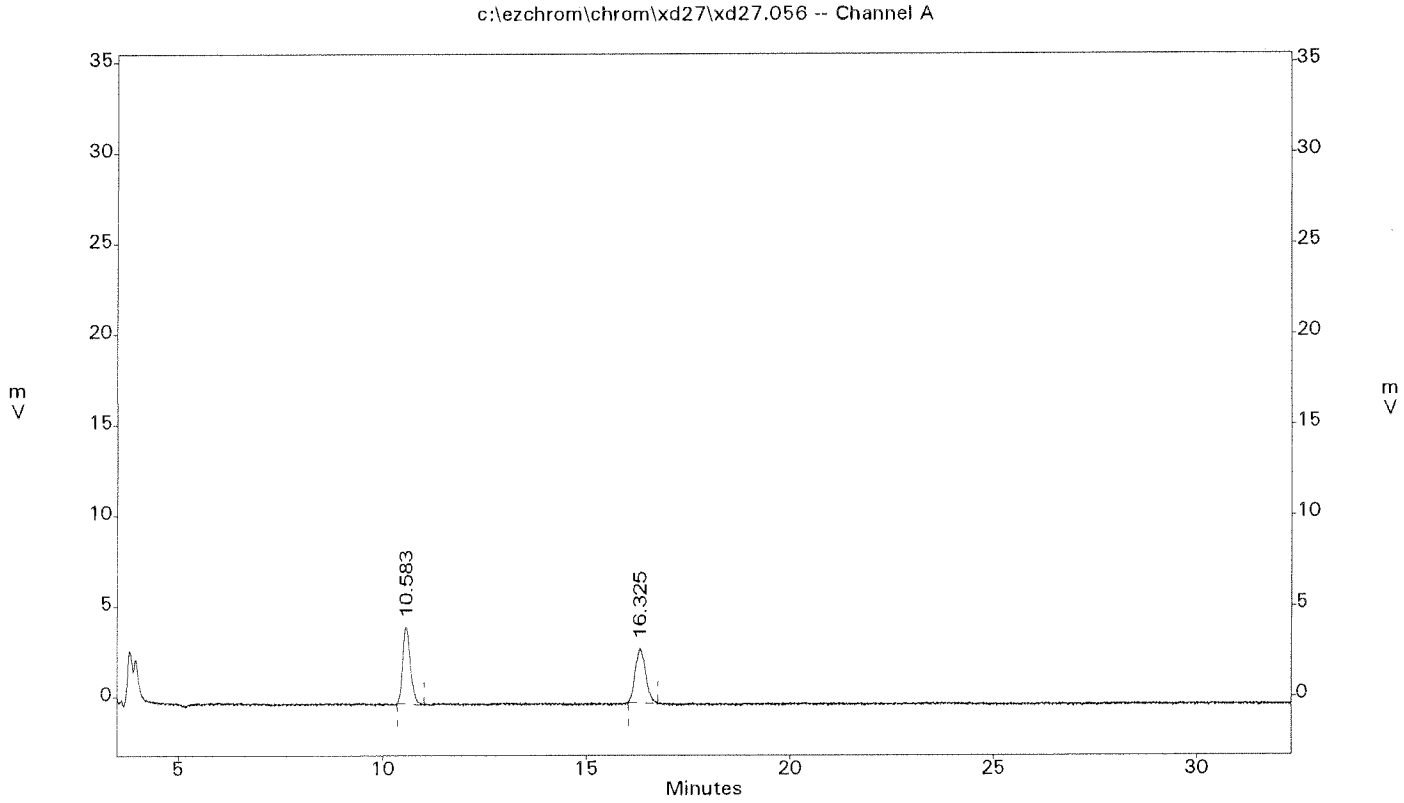


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.056
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD015SB
Acquired : Apr 28, 2015 20:22:52
Printed : Apr 29, 2015 09:50:05
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.725	0	0.0	0.0
--	RDX	7.375	0	0.0	0.0
--	1,3,5-TNB	9.967	0	0.0	0.0
1	1,2-Dinitrobenzene	10.583	56692	289.8	195.6
--	1,3-DNB	12.608	0	0.0	0.0
--	Tetryl	13.750	0	0.0	0.0
--	Nitrobenzene	14.833	0	0.0	0.0
2	3,4-DNT	16.325	54160	266.7	203.1
--	2,4,6-TNT	16.417	0	0.0	0.0
--	4-Am-2,6-DNT	17.817	0	0.0	0.0
--	2-Am-4,6-DNT	18.492	0	0.0	0.0
--	2,6-DNT	19.892	0	0.0	0.0
--	2,4-DNT	20.633	0	0.0	0.0
--	2-Nitrotoluene	25.008	0	0.0	0.0
--	4-Nitrotoluene	27.158	0	0.0	0.0
--	3-Nitrotoluene	29.125	0	0.0	0.0



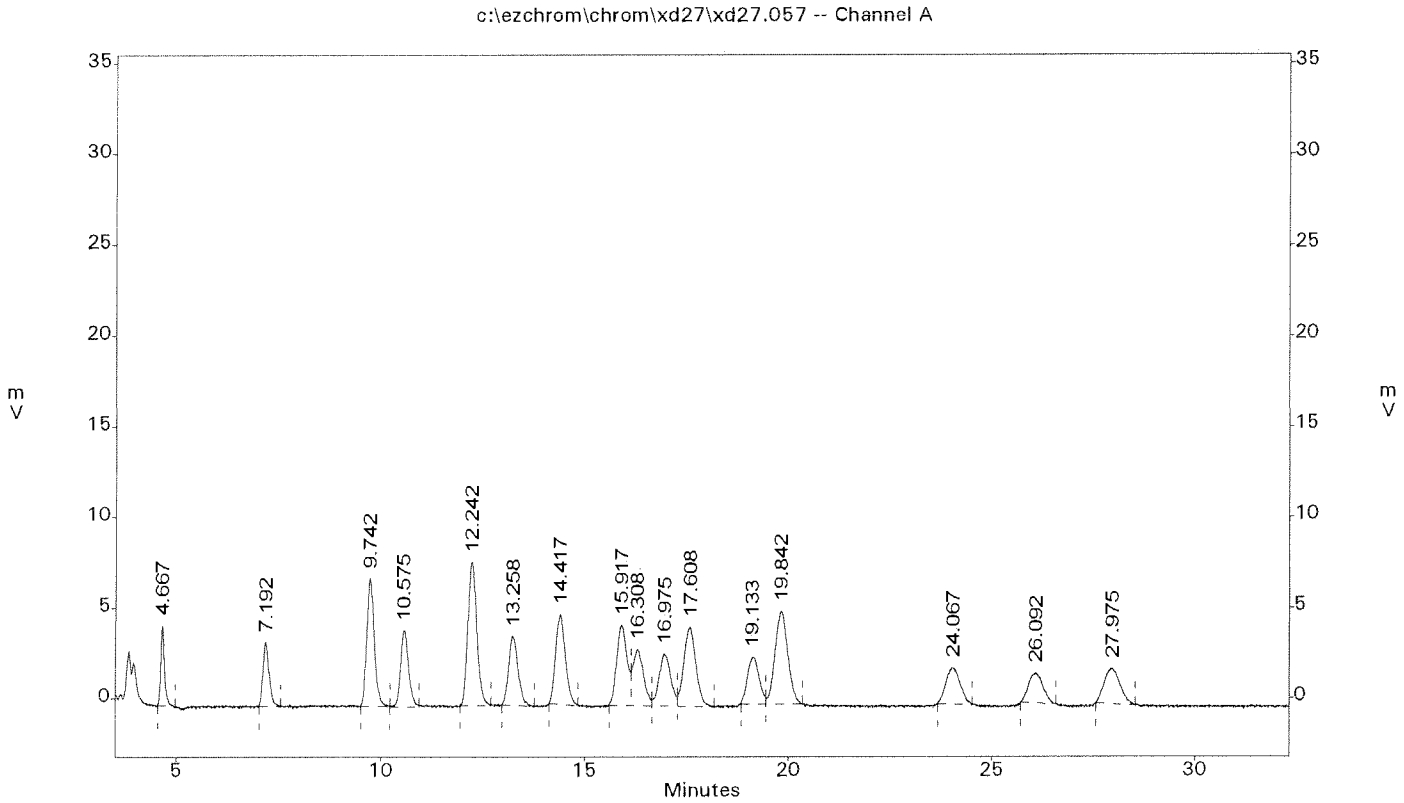
6077

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.057
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD015SL
Acquired : Apr 28, 2015 20:57:01
Printed : Apr 29, 2015 09:54:05
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.667	29724	142.1	209.2
2	RDX	7.192	38409	177.4	216.5
3	1,3,5-TNB	9.742	91805	418.4	219.4
4	1,2-Dinitrobenzene	10.575	58133	289.8	200.6
5	1,3-DNB	12.242	123510	571.5	216.1
6	Tetryl	13.258	63075	303.8	207.6
7	Nitrobenzene	14.417	84676	420.8	201.2
8	2,4,6-TNT	15.917	79846	395.8	201.7
9	3,4-DNT	16.308	56704	266.7	212.6
10	4-Am-2,6-DNT	16.975	58070	287.5	202.0
11	2-Am-4,6-DNT	17.608	92823	439.2	211.3
12	2,6-DNT	19.133	51203	269.2	190.2
13	2,4-DNT	19.842	113135	548.5	206.2
14	2-Nitrotoluene	24.067	49279	269.4	182.9
15	4-Nitrotoluene	26.092	42801	233.7	183.1
16	3-Nitrotoluene	27.975	53494	277.1	193.0

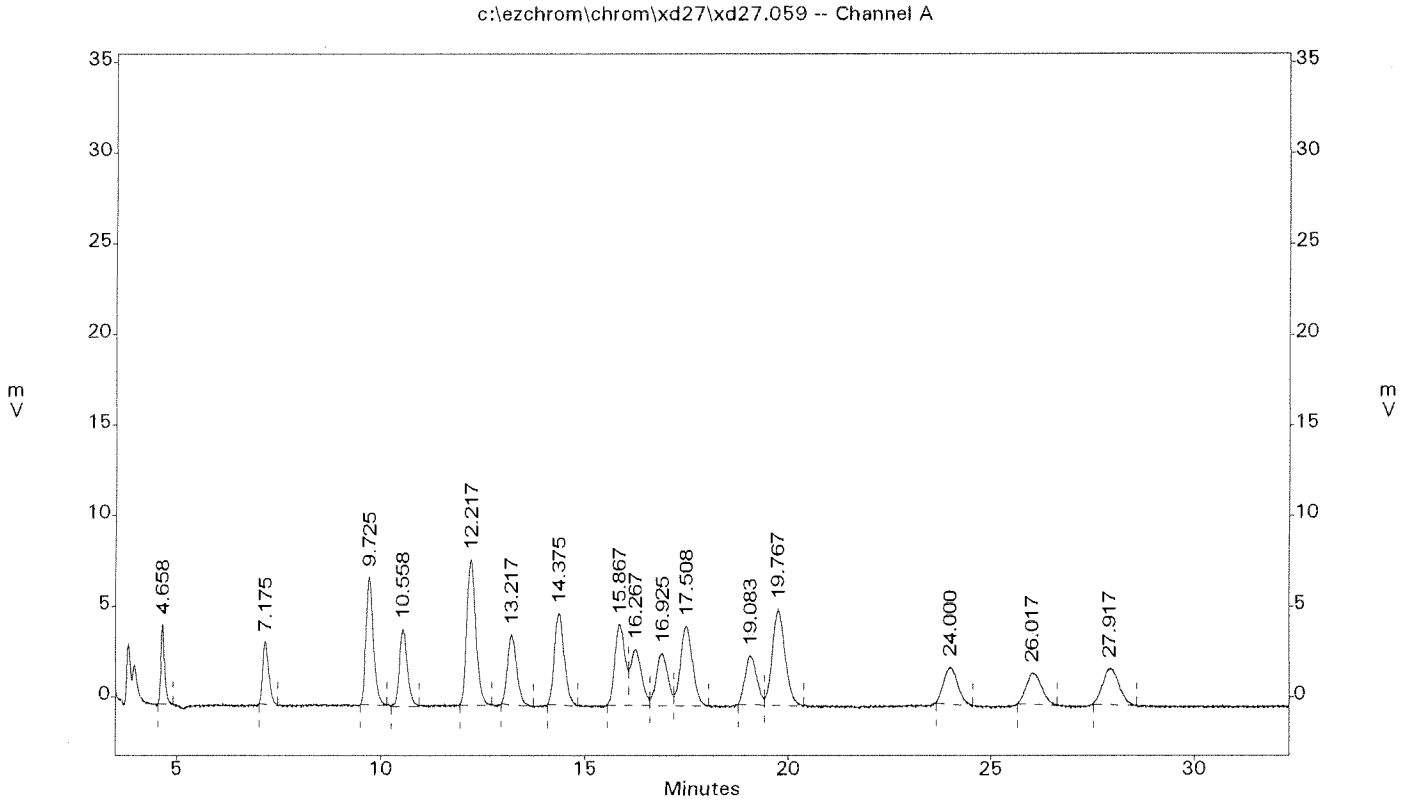


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.059
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD015SC
Acquired : Apr 28, 2015 22:05:17
Printed : Apr 29, 2015 09:55:46
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	28962	142.1	203.8
2	RDX	7.175	36940	177.4	208.2
3	1,3,5-TNB	9.725	90607	418.4	216.6
4	1,2-Dinitrobenzene	10.558	58360	289.8	201.4
5	1,3-DNB	12.217	124630	571.5	218.1
6	Tetryl	13.217	62953	303.8	207.2
7	Nitrobenzene	14.375	86842	420.8	206.4
8	2,4,6-TNT	15.867	77958	395.8	196.9
9	3,4-DNT	16.267	59060	266.7	221.5
10	4-Am-2,6-DNT	16.925	57223	287.5	199.1
11	2-Am-4,6-DNT	17.508	93310	439.2	212.4
12	2,6-DNT	19.083	54334	269.2	201.8
13	2,4-DNT	19.767	117460	548.5	214.1
14	2-Nitrotoluene	24.000	50736	269.4	188.3
15	4-Nitrotoluene	26.017	46885	233.7	200.6
16	3-Nitrotoluene	27.917	58226	277.1	210.1

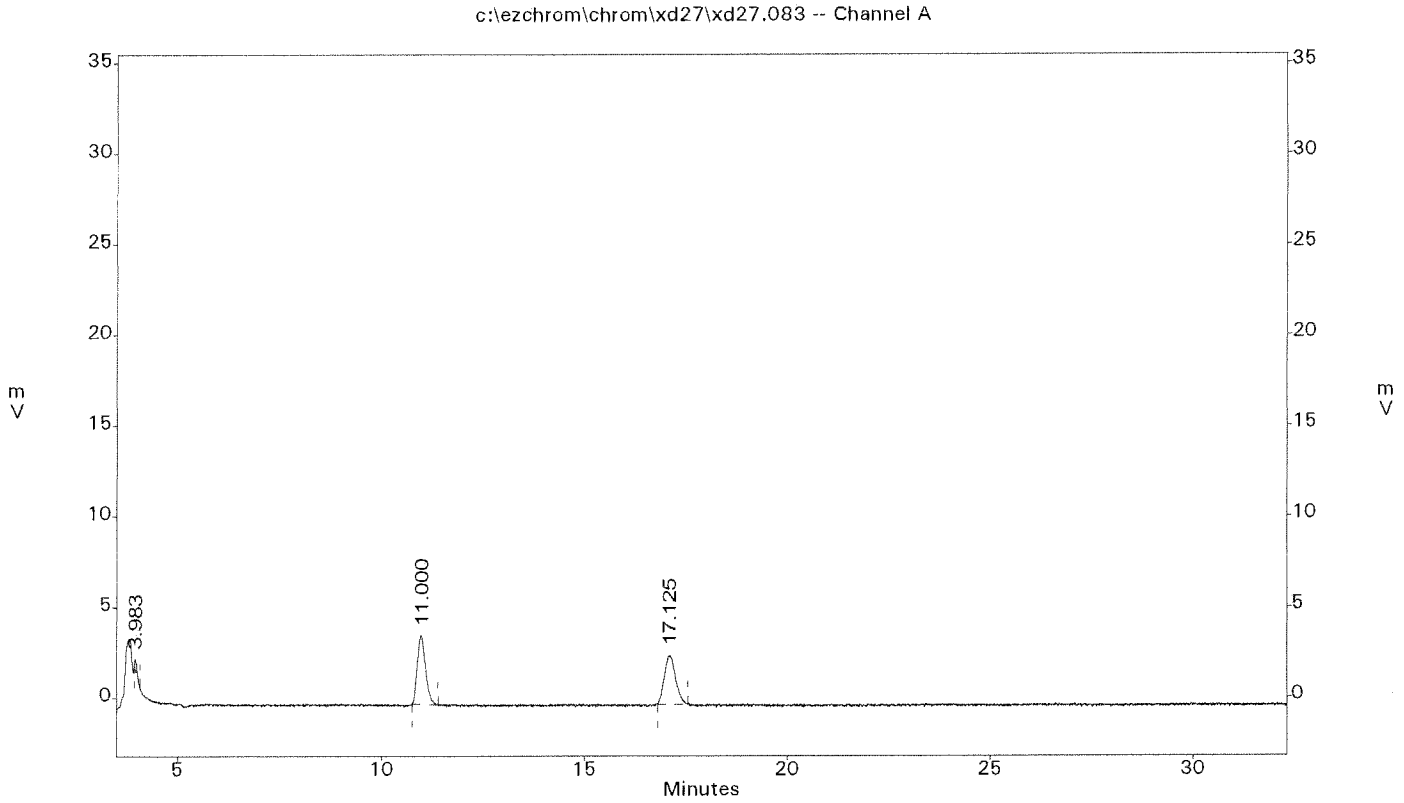


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.083
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD016SB
Acquired : Apr 29, 2015 11:44:47
Printed : Apr 29, 2015 12:29:52
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.708	0	0.0	0.0
--	RDX	7.333	0	0.0	0.0
--	1,3,5-TNB	9.925	0	0.0	0.0
2	1,2-Dinitrobenzene	11.000	54453	289.8	187.9
--	1,3-DNB	12.558	0	0.0	0.0
--	Tetryl	13.683	0	0.0	0.0
--	Nitrobenzene	14.800	0	0.0	0.0
--	2,4,6-TNT	16.392	0	0.0	0.0
3	3,4-DNT	17.125	52574	266.7	197.1
--	4-Am-2,6-DNT	17.750	0	0.0	0.0
--	2-Am-4,6-DNT	18.425	0	0.0	0.0
--	2,6-DNT	19.875	0	0.0	0.0
--	2,4-DNT	20.633	0	0.0	0.0
--	2-Nitrotoluene	25.025	0	0.0	0.0
--	4-Nitrotoluene	27.208	0	0.0	0.0
--	3-Nitrotoluene	29.167	0	0.0	0.0



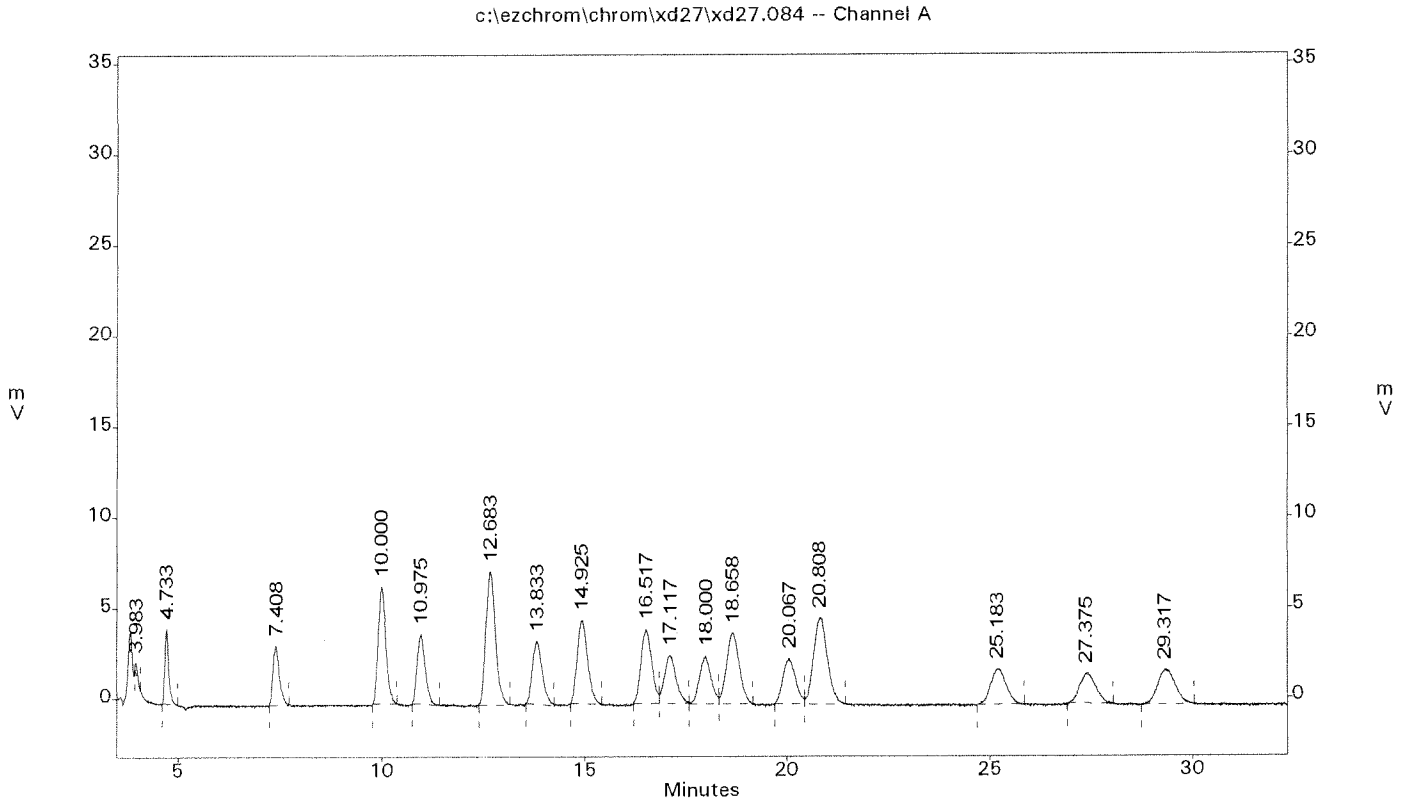
6080

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.084
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD016SL
Acquired : Apr 29, 2015 12:18:56
Printed : Apr 29, 2015 12:53:28
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
2	HMX	4.733	27941	142.1	196.6
3	RDX	7.408	35798	177.4	201.8
4	1,3,5-TNB	10.000	86342	418.4	206.4
5	1,2-Dinitrobenzene	10.975	54292	289.8	187.3
6	1,3-DNB	12.683	120956	571.5	211.6
7	Tetryl	13.833	59839	303.8	196.9
8	Nitrobenzene	14.925	83240	420.8	197.8
9	2,4,6-TNT	16.517	75728	395.8	191.3
10	3,4-DNT	17.117	53907	266.7	202.1
11	4-Am-2,6-DNT	18.000	53065	287.5	184.6
12	2-Am-4,6-DNT	18.658	88131	439.2	200.6
13	2,6-DNT	20.067	54296	269.2	201.7
14	2,4-DNT	20.808	114935	548.5	209.5
15	2-Nitrotoluene	25.183	51863	269.4	192.5
16	4-Nitrotoluene	27.375	47078	233.7	201.4
17	3-Nitrotoluene	29.317	58996	277.1	212.9

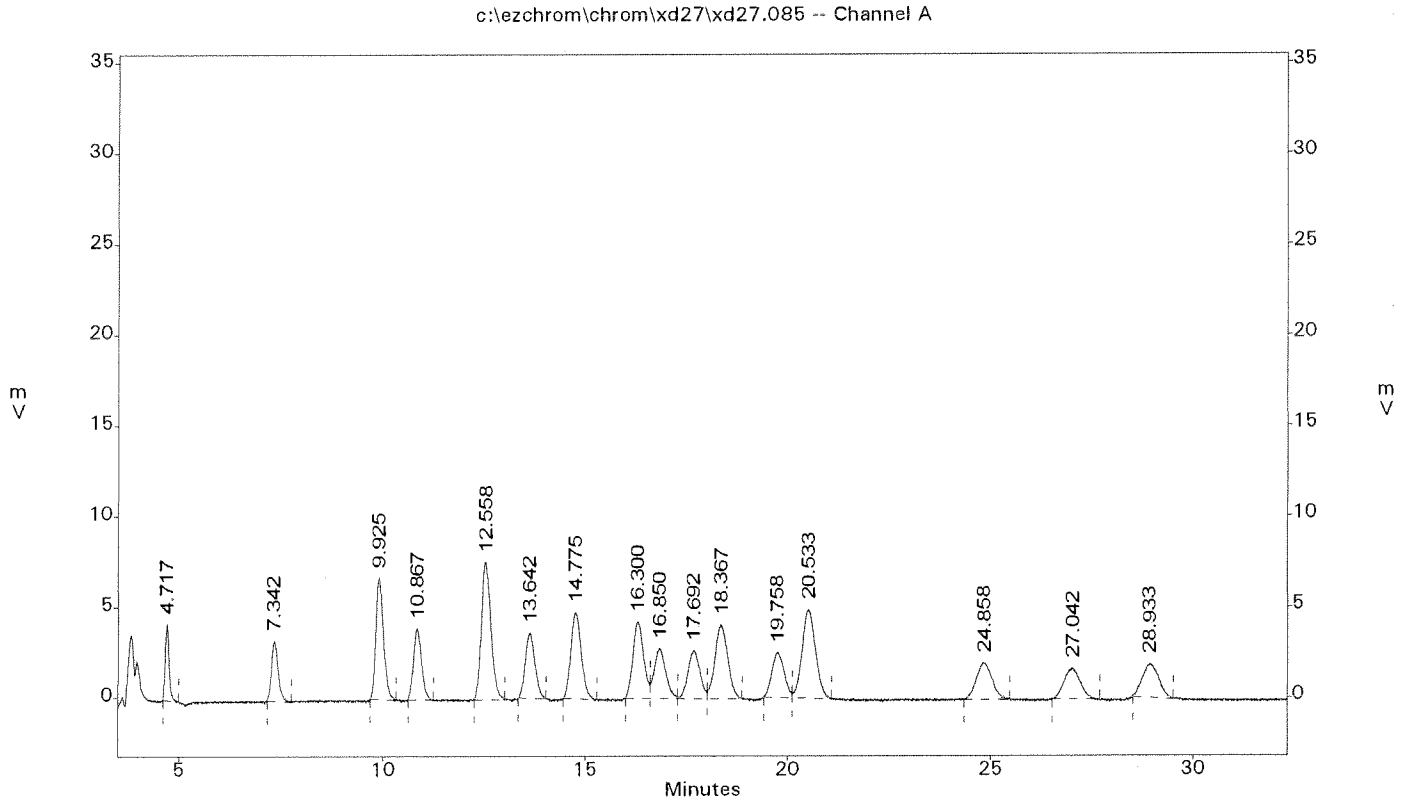


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.085
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EXD016SC
Acquired : Apr 29, 2015 12:53:04
Printed : Apr 29, 2015 13:25:38
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.717	27999	142.1	197.0
2	RDX	7.342	37856	177.4	213.4
3	1,3,5-TNB	9.925	89147	418.4	213.1
4	1,2-Dinitrobenzene	10.867	55039	289.8	189.9
5	1,3-DNB	12.558	123988	571.5	216.9
6	Tetryl	13.642	60254	303.8	198.3
7	Nitrobenzene	14.775	87097	420.8	207.0
8	2,4,6-TNT	16.300	78407	395.8	198.1
9	3,4-DNT	16.850	55386	266.7	207.7
10	4-Am-2,6-DNT	17.692	55379	287.5	192.6
11	2-Am-4,6-DNT	18.367	91241	439.2	207.7
12	2,6-DNT	19.758	53404	269.2	198.3
13	2,4-DNT	20.533	116157	548.5	211.8
14	2-Nitrotoluene	24.858	53970	269.4	200.3
15	4-Nitrotoluene	27.042	47029	233.7	201.2
16	3-Nitrotoluene	28.933	53482	277.1	193.0

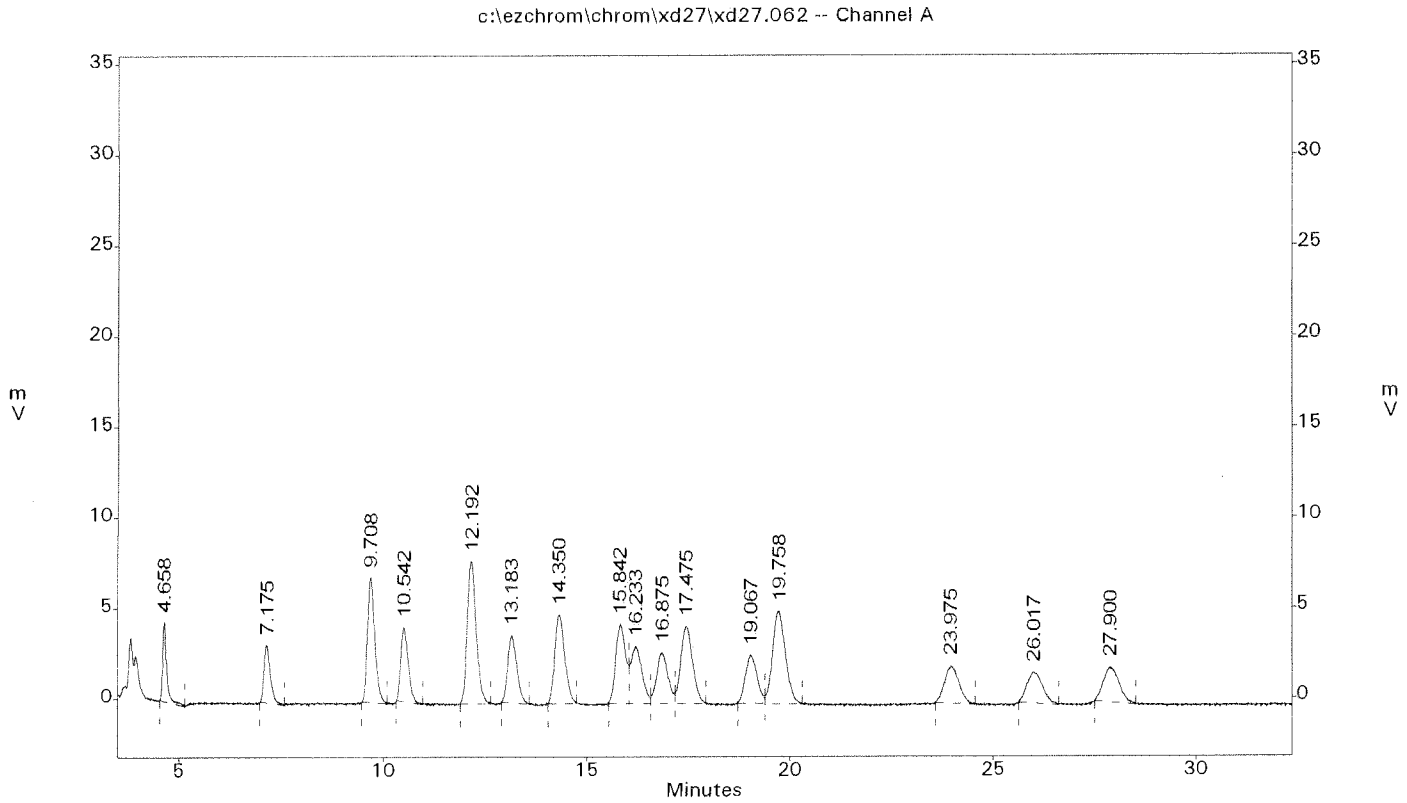


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.062
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-08M
Acquired : Apr 28, 2015 23:47:42
Printed : Apr 29, 2015 09:57:13
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	31321	142.1	220.4
2	RDX	7.175	35084	177.4	197.8
3	1,3,5-TNB	9.708	87802	418.4	209.9
4	1,2-Dinitrobenzene	10.542	54122	289.8	186.7
5	1,3-DNB	12.192	121987	571.5	213.4
6	Tetryl	13.183	60217	303.8	198.2
7	Nitrobenzene	14.350	84529	420.8	200.9
8	2,4,6-TNT	15.842	77097	395.8	194.8
9	3,4-DNT	16.233	58578	266.7	219.7
10	4-Am-2,6-DNT	16.875	55673	287.5	193.7
11	2-Am-4,6-DNT	17.475	88214	439.2	200.8
12	2,6-DNT	19.067	53762	269.2	199.7
13	2,4-DNT	19.758	114411	548.5	208.6
14	2-Nitrotoluene	23.975	51583	269.4	191.5
15	4-Nitrotoluene	26.017	46248	233.7	197.9
16	3-Nitrotoluene	27.900	53413	277.1	192.7



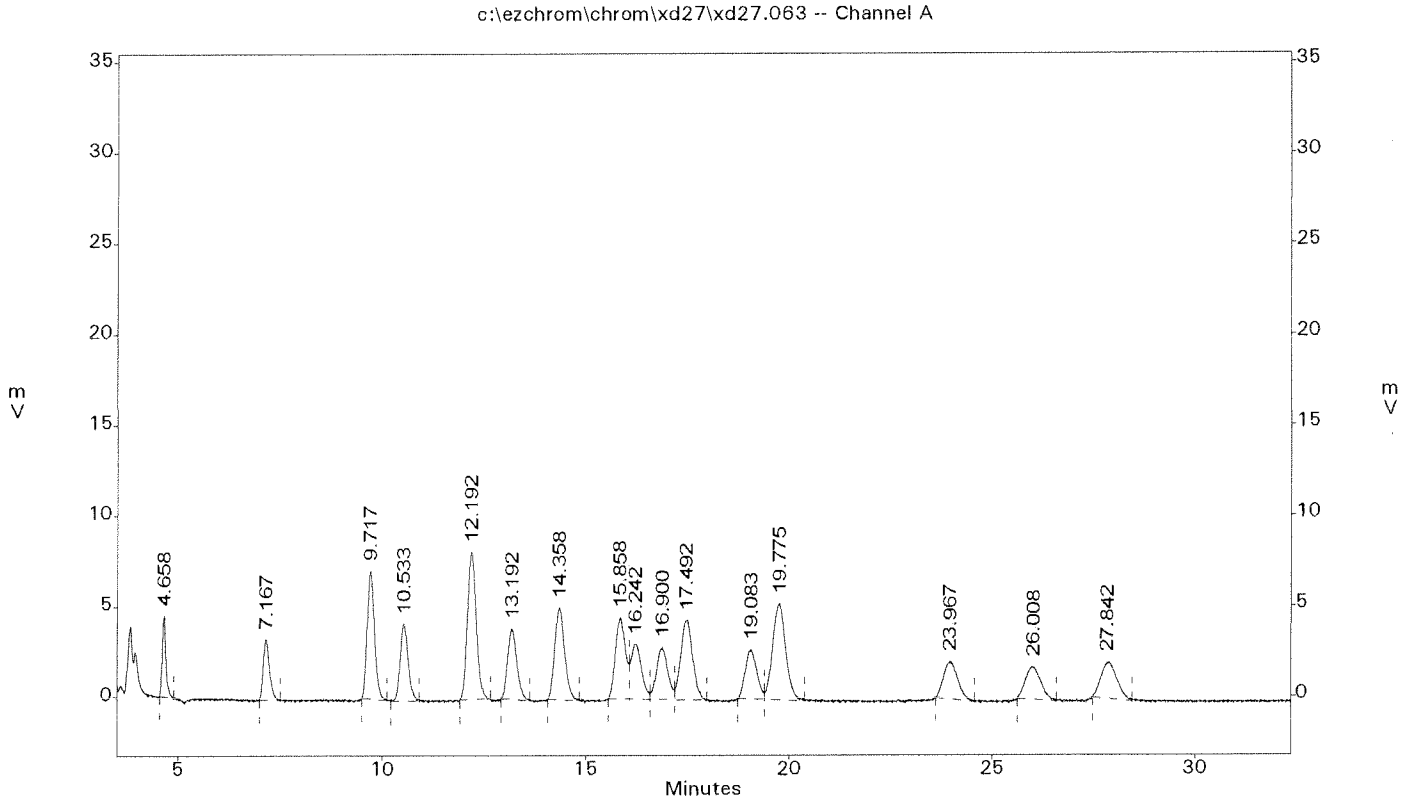
6083

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.063
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-08S
Acquired : Apr 29, 2015 00:21:50
Printed : Apr 29, 2015 09:57:23
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	29286	142.1	206.1
2	RDX	7.167	36278	177.4	204.5
3	1,3,5-TNB	9.717	90145	418.4	215.4
4	1,2-Dinitrobenzene	10.533	57548	289.8	198.6
5	1,3-DNB	12.192	124260	571.5	217.4
6	Tetryl	13.192	63359	303.8	208.5
7	Nitrobenzene	14.358	87239	420.8	207.3
8	2,4,6-TNT	15.858	78778	395.8	199.0
9	3,4-DNT	16.242	55826	266.7	209.3
10	4-Am-2,6-DNT	16.900	55876	287.5	194.4
11	2-Am-4,6-DNT	17.492	91729	439.2	208.8
12	2,6-DNT	19.083	54200	269.2	201.3
13	2,4-DNT	19.775	118885	548.5	216.7
14	2-Nitrotoluene	23.967	50155	269.4	186.2
15	4-Nitrotoluene	26.008	47976	233.7	205.3
16	3-Nitrotoluene	27.842	55509	277.1	200.3

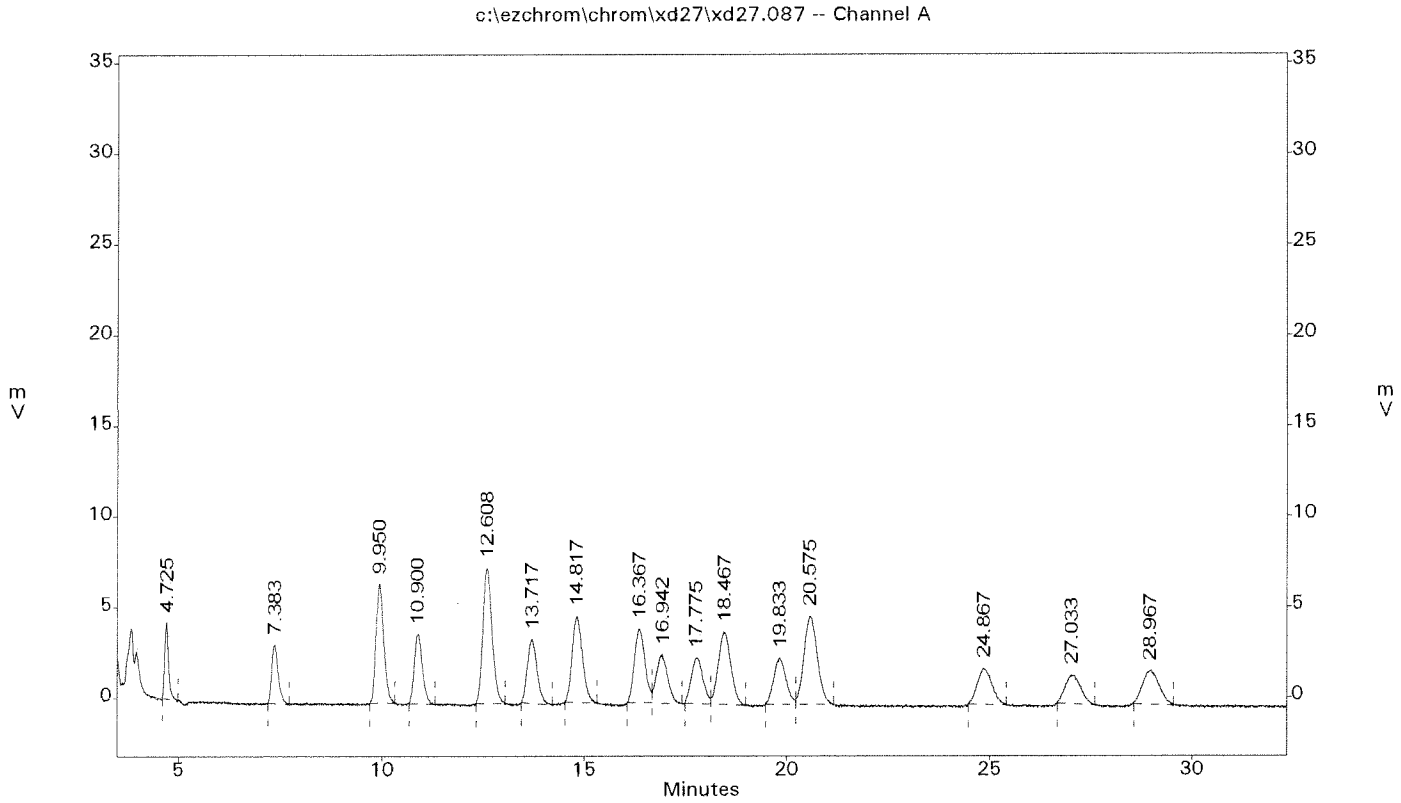


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.087
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-22M
Acquired : Apr 29, 2015 14:01:21
Printed : Apr 29, 2015 14:49:20
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.725	28512	142.1	200.6
2	RDX	7.383	36601	177.4	206.3
3	1,3,5-TNB	9.950	88166	418.4	210.7
4	1,2-Dinitrobenzene	10.900	54566	289.8	188.3
5	1,3-DNB	12.608	120498	571.5	210.8
6	Tetryl	13.717	59949	303.8	197.3
7	Nitrobenzene	14.817	86406	420.8	205.3
8	2,4,6-TNT	16.367	75327	395.8	190.3
9	3,4-DNT	16.942	52410	266.7	196.5
10	4-Am-2,6-DNT	17.775	50759	287.5	176.6
11	2-Am-4,6-DNT	18.467	86995	439.2	198.1
12	2,6-DNT	19.833	53983	269.2	200.5
13	2,4-DNT	20.575	113681	548.5	207.2
14	2-Nitrotoluene	24.867	50302	269.4	186.7
15	4-Nitrotoluene	27.033	43293	233.7	185.2
16	3-Nitrotoluene	28.967	54529	277.1	196.8

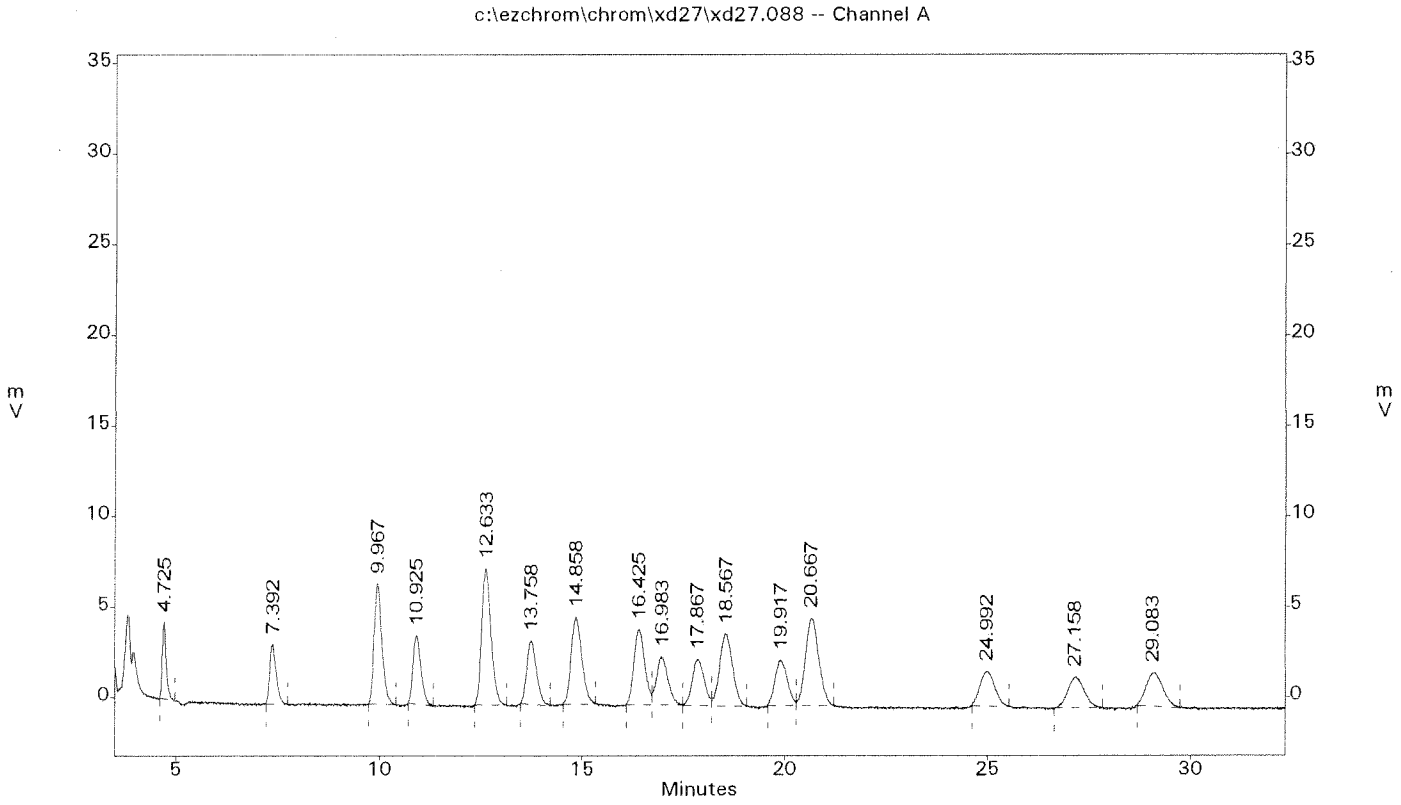


EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.088
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-22S
Acquired : Apr 29, 2015 14:35:29
Printed : Apr 29, 2015 15:22:17
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.725	28843	142.1	203.0
2	RDX	7.392	36881	177.4	207.9
3	1,3,5-TNB	9.967	89392	418.4	213.7
4	1,2-Dinitrobenzene	10.925	53251	289.8	183.7
5	1,3-DNB	12.633	122427	571.5	214.2
6	Tetryl	13.758	59920	303.8	197.2
7	Nitrobenzene	14.858	89251	420.8	212.1
8	2,4,6-TNT	16.425	79091	395.8	199.8
9	3,4-DNT	16.983	54202	266.7	203.3
10	4-Am-2,6-DNT	17.867	53588	287.5	186.4
11	2-Am-4,6-DNT	18.567	90052	439.2	205.0
12	2,6-DNT	19.917	52998	269.2	196.8
13	2,4-DNT	20.667	112845	548.5	205.7
14	2-Nitrotoluene	24.992	49317	269.4	183.0
15	4-Nitrotoluene	27.158	48648	233.7	208.1
16	3-Nitrotoluene	29.083	54212	277.1	195.6



6086

INITIAL CALIBRATIONS

INITIAL CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
LFID & Datetime: XA29002A 01/29/15 18:02
LFID & Datetime: XA29003A 01/29/15 18:36
LFID & Datetime: XA29004A 01/29/15 19:10
LFID & Datetime: XA29005A 01/29/15 19:45
LFID & Datetime: XA29006A 01/29/15 20:19
LFID & Datetime: XA29007A 01/29/15 20:53
LFID & Datetime: XA29008A 01/29/15 21:27
LFID & Datetime: XA29009A 01/29/15 22:01
CONC UNIT: ppb

COMPOUND	CONC X	CALIBRATION FACTORS (AREA)/UNIT 0.50X	1.00X	2.50X	5.00X	10.00X	15.00X	20.00X	40.00X	MEAN	%RSD
HMX	20.00	167	131	141	137	139	141	142	140	142.1	7.6
RDX	20.00	185	158	179	173	179	182	181	183	177.4	5.0
1,3,5-TNB	20.00	504	364	421	393	411	418	417	420	418.4	9.5
1,3-DNB	20.00	537	555	587	567	571	581	585	590	571.5	3.2
Tetryl	20.00	330	262	306	292	300	310	315	315	303.8	6.6
Nitrobenzene	20.00	439	424	426	408	412	415	419	423	420.8	2.3
2,4,6-TNT	20.00	400	380	390	369	403	403	411	411	395.8	3.8
4-AM-2,6-DNT	20.00	354	290	261	261	283	284	282	285	287.5	10.0
2-AM-4,6-DNT	20.00	552	375	451	407	437	426	433	432	439.2	11.6
2,6-DNT	20.00	310	235	289	244	277	261	263	275	269.2	9.0
2,4-DNT	20.00	562	458	589	554	550	552	560	565	548.5	7.0
2-Nitrotoluene	20.00	280	334	292	231	247	250	256	265	269.4	12.1
4-Nitrotoluene	20.00	239	276	233	205	227	224	230	237	233.7	8.6
3-Nitrotoluene	20.00	250	285	288	258	282	281	281	294	277.1	5.4
SURROGATE	**X**	**0.50X**	**1.00X**	**2.50X**	**5.00X**	**10.00X**	**15.00X**	**20.00X**	**40.00X**	**MEAN**	**%RSD**
1,2-Dinitrobenzene	20.00	308	300	304	279	276	287	281	283	289.8	4.3
3,4-DNT	20.00	318	290	258	244	249	256	254	263	266.7	9.4

EX81A29.met

AA 02/03/15

INITIAL CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
LFID & Datetime: XA29002A 01/29/15 18:02
LFID & Datetime: XA29003A 01/29/15 18:36
LFID & Datetime: XA29004A 01/29/15 19:10
LFID & Datetime: XA29005A 01/29/15 19:45
LFID & Datetime: XA29006A 01/29/15 20:19
LFID & Datetime: XA29007A 01/29/15 20:53
LFID & Datetime: XA29008A 01/29/15 21:27
LFID & Datetime: XA29009A 01/29/15 22:01

COMPOUND	RT OF STANDARDS (MIN) 0.5X	1.0X	2.5X	5.0X	10.0X	15.0X	20.0X	40.0X	MEAN RT	RT WINDOW FROM	TO	RTWINDOW WIDTH
HMX	4.658	4.675	4.667	4.650	4.658	4.650	4.650	4.658	4.658	4.592	4.724	0.066
RDX	7.192	7.208	7.208	7.167	7.158	7.142	7.158	7.167	7.175	7.004	7.346	0.171
1,3,5-TNB	9.817	9.850	9.800	9.783	9.775	9.750	9.758	9.792	9.791	9.593	9.989	0.198
1,3-DNB	12.392	12.383	12.317	12.250	12.258	12.242	12.250	12.300	12.299	12.011	12.587	0.288
Tetryl	13.333	13.367	13.325	13.217	13.242	13.208	13.208	13.292	13.274	12.886	13.662	0.388
Nitrobenzene	14.558	14.608	14.542	14.458	14.467	14.450	14.442	14.517	14.505	14.175	14.835	0.330
2,4,6-TNT	16.075	16.117	16.050	15.983	15.983	15.967	15.967	16.058	16.025	15.623	16.427	0.402
4-AM-2,6-DNT	17.100	17.225	17.058	16.933	16.950	16.933	16.908	17.067	17.022	16.379	17.665	0.643
2-AM-4,6-DNT	17.725	17.792	17.717	17.508	17.533	17.517	17.508	17.650	17.619	16.938	18.300	0.681
2,6-DNT	19.417	19.375	19.325	19.183	19.167	19.208	19.158	19.300	19.267	18.710	19.824	0.557
2,4-DNT	20.058	20.067	20.058	19.875	19.892	19.917	19.883	20.017	19.971	19.442	20.500	0.529
2-Nitrotoluene	24.317	24.442	24.425	24.100	24.150	24.208	24.125	24.283	24.256	23.581	24.931	0.675
4-Nitrotoluene	26.500	26.467	26.442	26.142	26.200	26.300	26.200	26.367	26.327	25.533	27.121	0.794
3-Nitrotoluene	28.375	28.433	28.375	28.042	28.092	28.192	28.067	28.225	28.225	27.427	29.023	0.798

SURROGATE	0.5X	1.0X	2.5X	5.0X	10.0X	15.0X	20.0X	40.0X	RT	FROM	TO	WIDTH
1,2-Dinitrobenzene	10.642	10.700	10.642	10.567	10.575	10.550	10.558	10.617	10.606	10.468	10.744	0.138
3,4-DNT	16.475	16.533	16.467	16.325	16.325	16.325	16.317	16.425	16.399	15.912	16.886	0.487

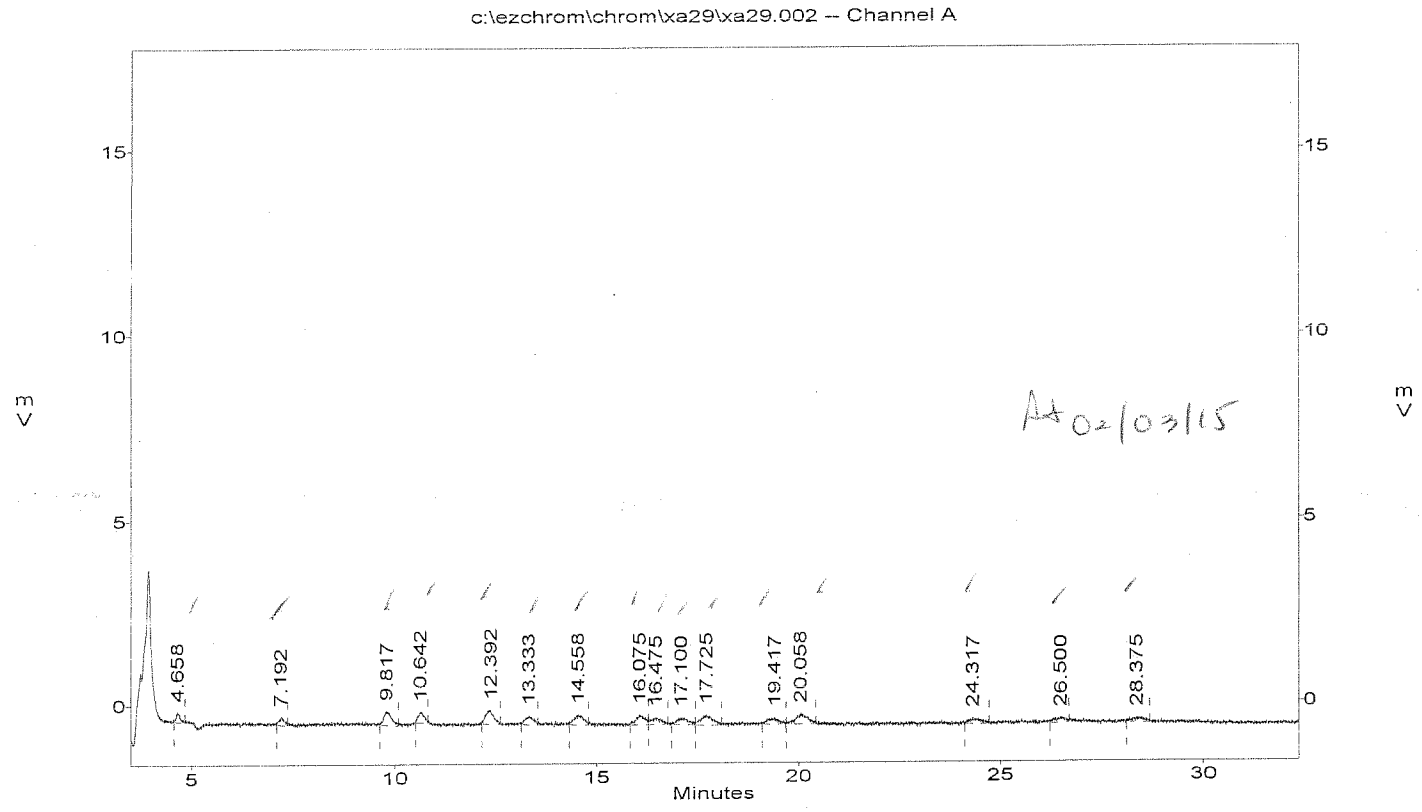
EX81A29.met

AA
02/03/15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.002
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2901 10 ppb
Acquired : Jan 29, 2015 18:02:27
Printed : Jan 30, 2015 16:02:51
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	1672	142.1	10.0
2	RDX	7.192	1849	177.4	10.0
3	1,3,5-TNB	9.817	5038	418.4	10.0
4	1,2-Dinitrobenzene	10.642	3084	289.8	10.0
5	1,3-DNB	12.392	5368	571.5	10.0
6	Tetryl	13.333	3296	303.8	10.0
7	Nitrobenzene	14.558	4389	420.8	10.0
8	2,4,6-TNT	16.075	3997	395.8	10.0
9	3,4-DNT	16.475	3184	266.7	10.0
10	4-Am-2,6-DNT	17.100	3536	287.5	10.0
11	2-Am-4,6-DNT	17.725	5520	439.2	10.0
12	2,6-DNT	19.417	3099	269.2	10.0
13	2,4-DNT	20.058	5616	548.5	10.0
14	2-Nitrotoluene	24.317	2801	269.4	10.0
15	4-Nitrotoluene	26.500	2388	233.7	10.0
16	3-Nitrotoluene	28.375	2502	277.1	10.0

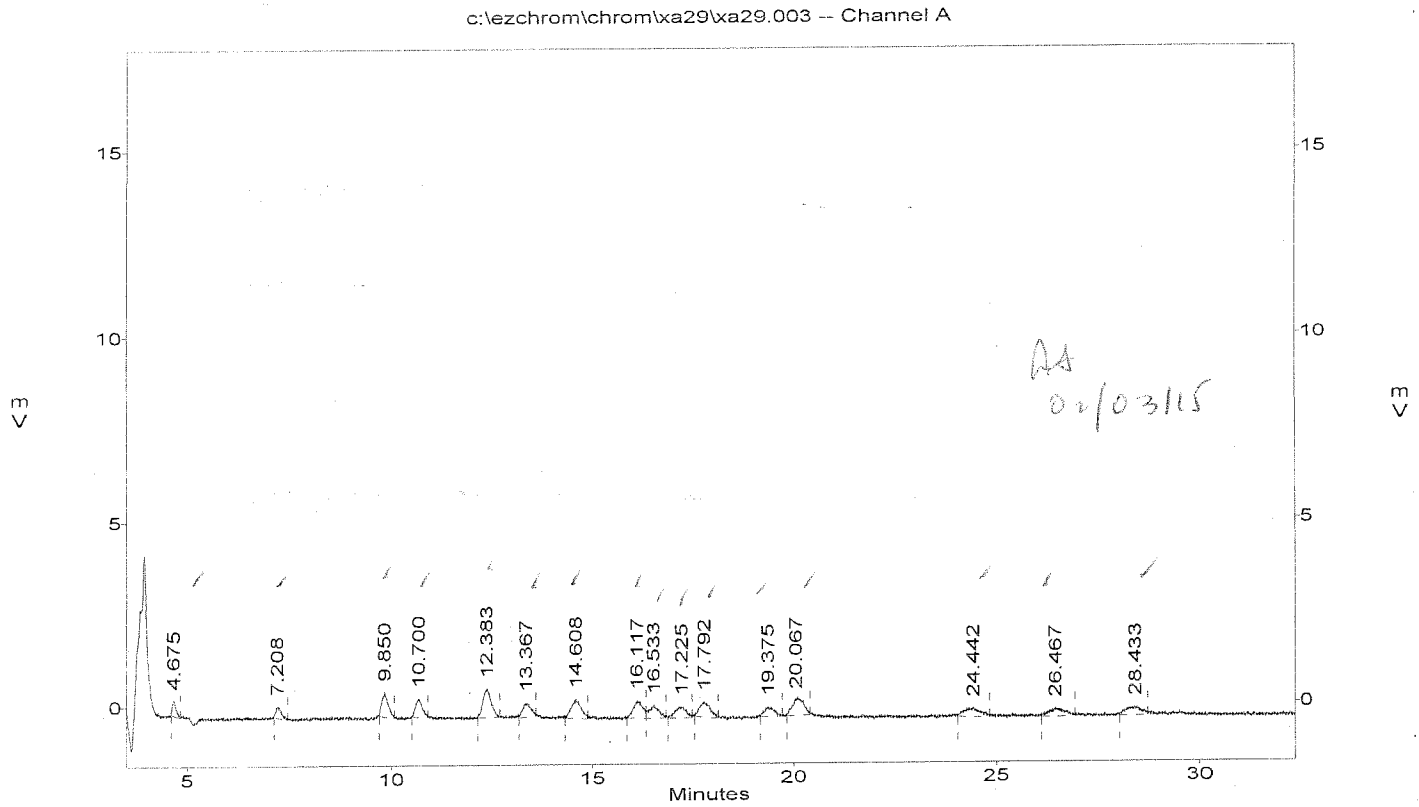


6090

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.003
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2902 20 ppb
Acquired : Jan 29, 2015 18:36:39
Printed : Jan 30, 2015 16:03:22
User : LErmol
Channel A Results

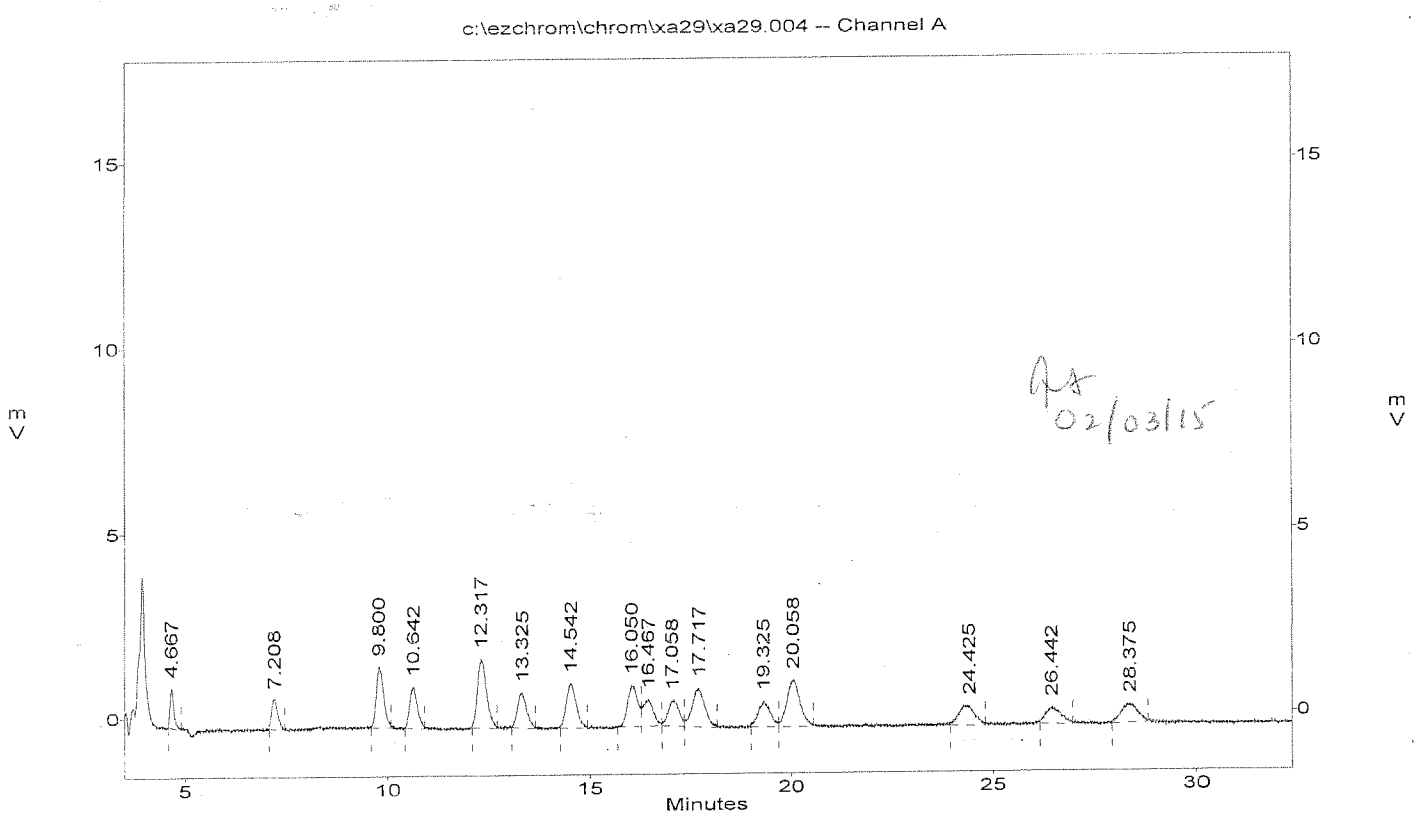
#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.675	2614	142.1	20.0
2	RDX	7.208	3154	177.4	20.0
3	1,3,5-TNB	9.850	7276	418.4	20.0
4	1,2-Dinitrobenzene	10.700	6002	289.8	20.0
5	1,3-DNB	12.383	11096	571.5	20.0
6	Tetryl	13.367	5243	303.8	20.0
7	Nitrobenzene	14.608	8479	420.8	20.0
8	2,4,6-TNT	16.117	7609	395.8	20.0
9	3,4-DNT	16.533	5808	266.7	20.0
10	4-Am-2,6-DNT	17.225	5808	287.5	20.0
11	2-Am-4,6-DNT	17.792	7504	439.2	20.0
12	2,6-DNT	19.375	4707	269.2	20.0
13	2,4-DNT	20.067	9166	548.5	20.0
14	2-Nitrotoluene	24.442	6687	269.4	20.0
15	4-Nitrotoluene	26.467	5518	233.7	20.0
16	3-Nitrotoluene	28.433	5693	277.1	20.0



EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.004
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2903 50 ppb
Acquired : Jan 29, 2015 19:10:52
Printed : Jan 30, 2015 16:03:32
User : LErmol
Channel A Results

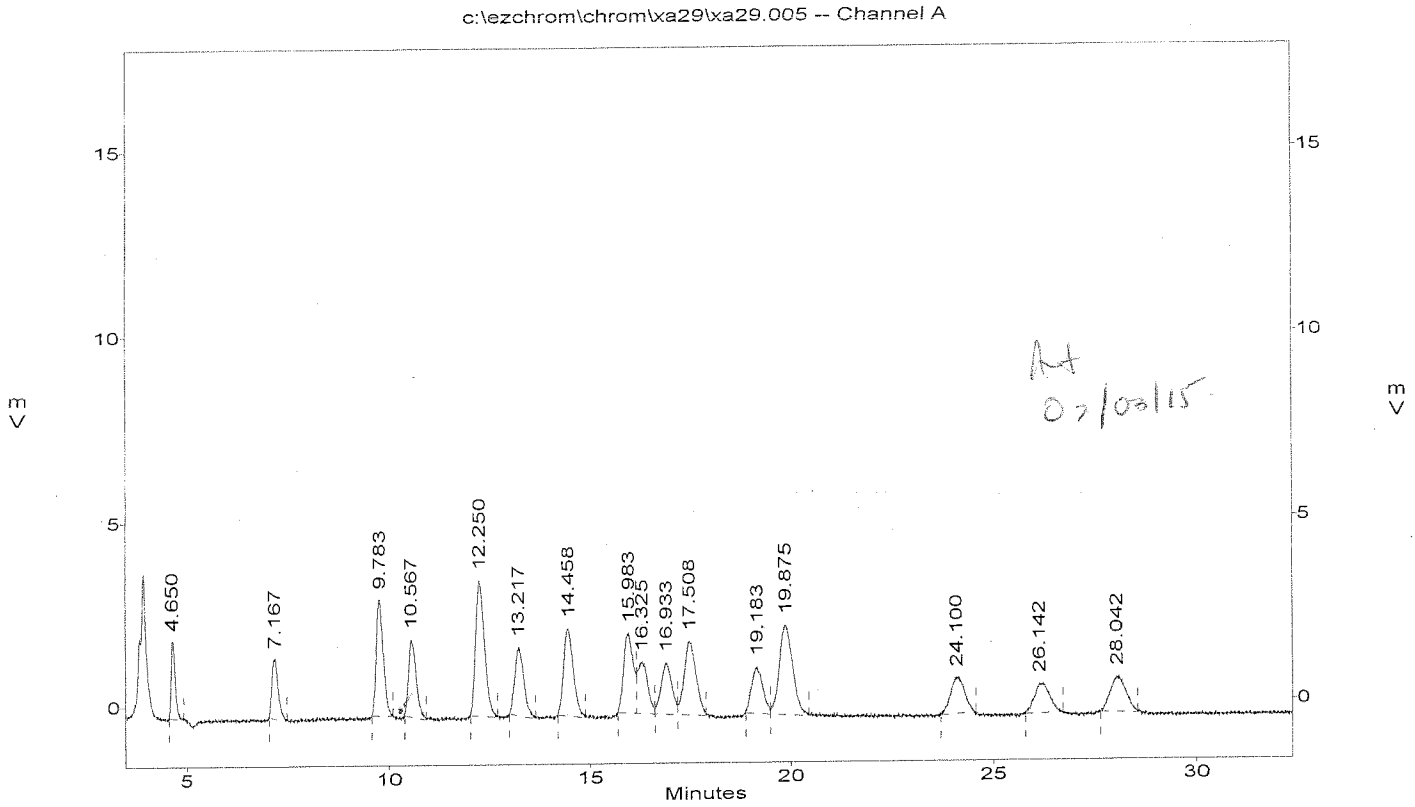
#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.667	7031	142.1	50.0
2	RDX	7.208	8935	177.4	50.0
3	1,3,5-TNB	9.800	21036	418.4	50.0
4	1,2-Dinitrobenzene	10.642	15221	289.8	50.0
5	1,3-DNB	12.317	29337	571.5	50.0
6	Tetryl	13.325	15301	303.8	50.0
7	Nitrobenzene	14.542	21303	420.8	50.0
8	2,4,6-TNT	16.050	19491	395.8	50.0
9	3,4-DNT	16.467	12912	266.7	50.0
10	4-Am-2,6-DNT	17.058	13066	287.5	50.0
11	2-Am-4,6-DNT	17.717	22556	439.2	50.0
12	2,6-DNT	19.325	14473	269.2	50.0
13	2,4-DNT	20.058	29431	548.5	50.0
14	2-Nitrotoluene	24.425	14609	269.4	50.0
15	4-Nitrotoluene	26.442	11628	233.7	50.0
16	3-Nitrotoluene	28.375	14376	277.1	50.0



EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.005
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2904 100 ppb
Acquired : Jan 29, 2015 19:45:05
Printed : Jan 30, 2015 16:03:43
User : LErmol
Channel A Results

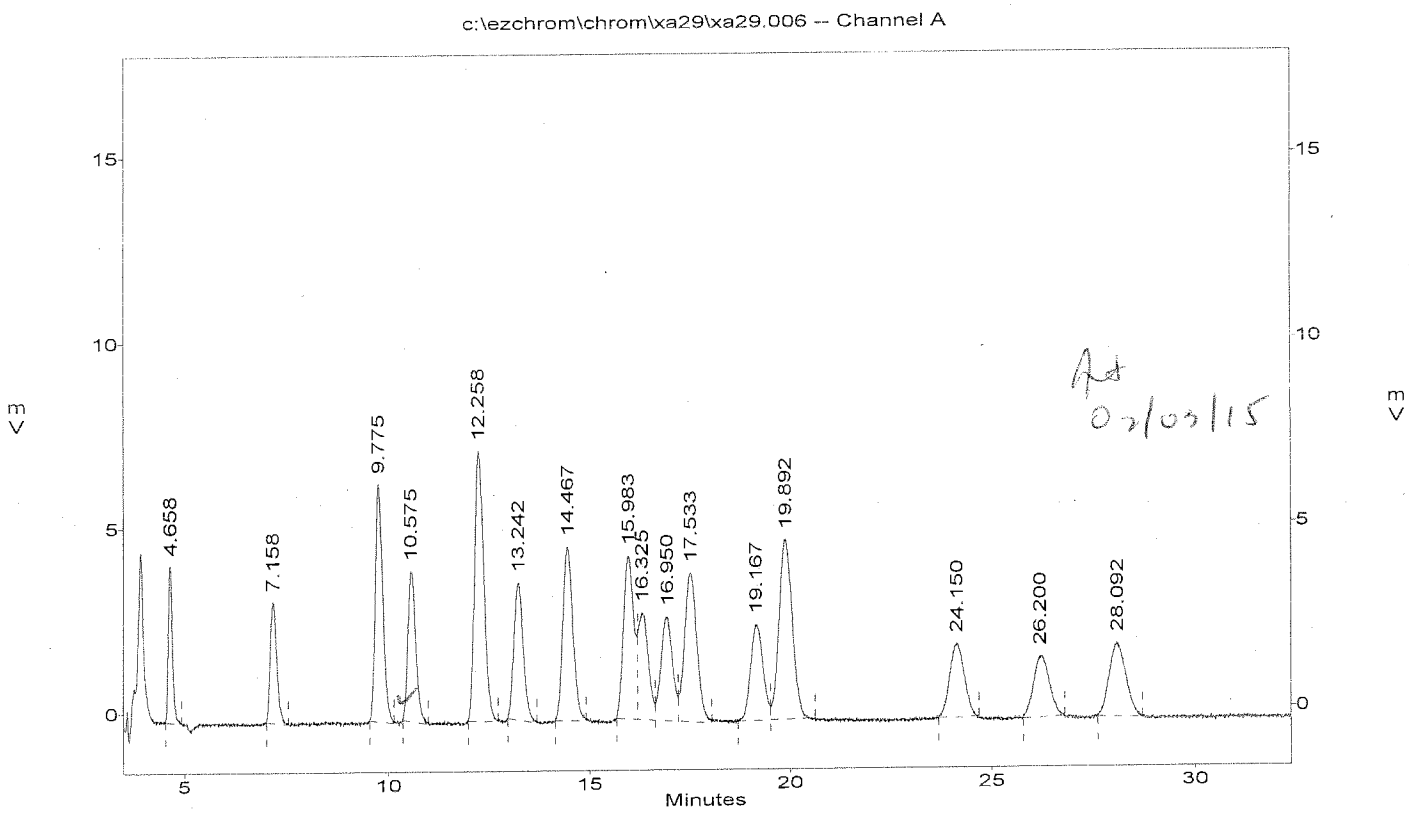
#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.650	13682	142.1	100.0
2	RDX	7.167	17266	177.4	100.0
3	1,3,5-TNB	9.783	39294	418.4	100.0
4	1,2-Dinitrobenzene	10.567	27901	289.8	100.0
5	1,3-DNB	12.250	56684	571.5	100.0
6	Tetryl	13.217	29235	303.8	100.0
7	Nitrobenzene	14.458	40838	420.8	100.0
8	2,4,6-TNT	15.983	36868	395.8	100.0
9	3,4-DNT	16.325	24446	266.7	100.0
10	4-Am-2,6-DNT	16.933	26121	287.5	100.0
11	2-Am-4,6-DNT	17.508	40711	439.2	100.0
12	2,6-DNT	19.183	24357	269.2	100.0
13	2,4-DNT	19.875	55350	548.5	100.0
14	2-Nitrotoluene	24.100	23138	269.4	100.0
15	4-Nitrotoluene	26.142	20464	233.7	100.0
16	3-Nitrotoluene	28.042	25774	277.1	100.0



EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.006
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2905 200 ppb
Acquired : Jan 29, 2015 20:19:17
Printed : Jan 30, 2015 16:04:17
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	27710	142.1	200.0
2	RDX	7.158	35812	177.4	200.0
3	1,3,5-TNB	9.775	82212	418.4	200.0
4	1,2-Dinitrobenzene	10.575	55299	289.8	200.0
5	1,3-DNB	12.258	114254	571.5	200.0
6	Tetryl	13.242	60077	303.8	200.0
7	Nitrobenzene	14.467	82410	420.8	200.0
8	2,4,6-TNT	15.983	80603	395.8	200.0
9	3,4-DNT	16.325	49848	266.7	200.0
10	4-Am-2,6-DNT	16.950	56555	287.5	200.0
11	2-Am-4,6-DNT	17.533	87358	439.2	200.0
12	2,6-DNT	19.167	55431	269.2	200.0
13	2,4-DNT	19.892	109963	548.5	200.0
14	2-Nitrotoluene	24.150	49350	269.4	200.0
15	4-Nitrotoluene	26.200	45365	233.7	200.0
16	3-Nitrotoluene	28.092	56370	277.1	200.0

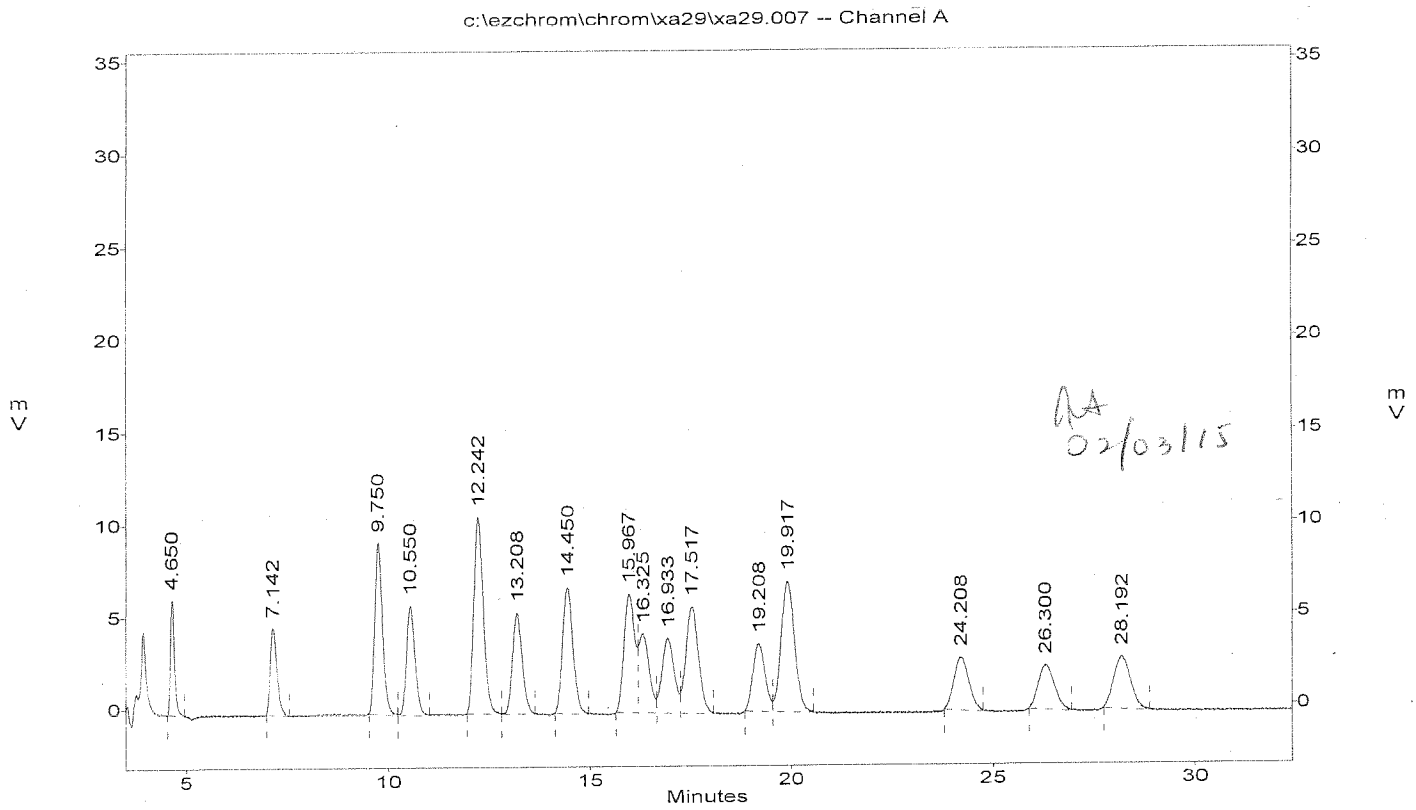


6094

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.007
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2906 300 ppb
Acquired : Jan 29, 2015 20:53:30
Printed : Jan 30, 2015 16:04:49
User : LErmol
Channel A Results

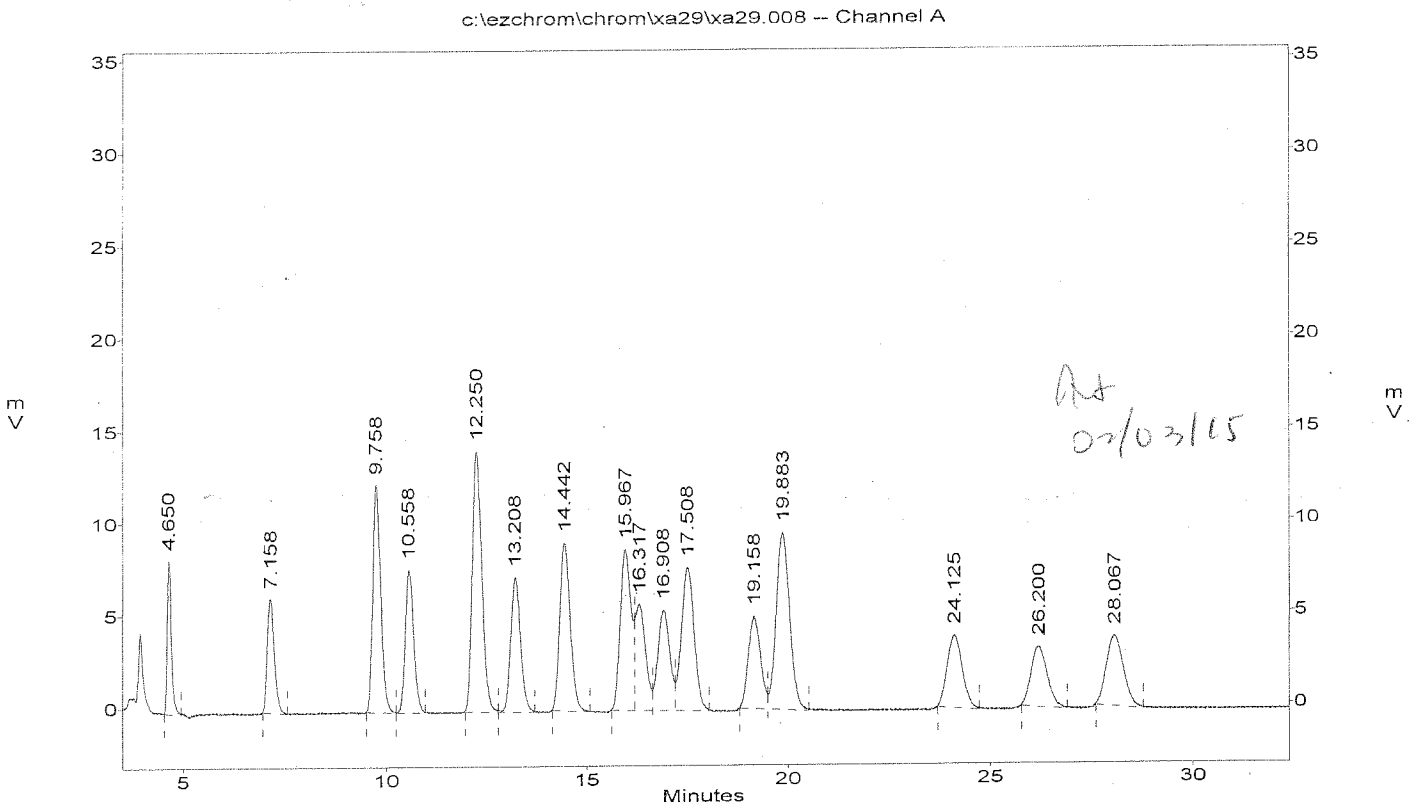
#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.650	42305	142.1	300.0
2	RDX	7.142	54521	177.4	300.0
3	1,3,5-TNB	9.750	125471	418.4	300.0
4	1,2-Dinitrobenzene	10.550	85951	289.8	300.0
5	1,3-DNB	12.242	174209	571.5	300.0
6	Tetryl	13.208	93099	303.8	300.0
7	Nitrobenzene	14.450	124632	420.8	300.0
8	2,4,6-TNT	15.967	120888	395.8	300.0
9	3,4-DNT	16.325	76751	266.7	300.0
10	4-Am-2,6-DNT	16.933	85199	287.5	300.0
11	2-Am-4,6-DNT	17.517	127848	439.2	300.0
12	2,6-DNT	19.208	78177	269.2	300.0
13	2,4-DNT	19.917	165495	548.5	300.0
14	2-Nitrotoluene	24.208	74959	269.4	300.0
15	4-Nitrotoluene	26.300	67252	233.7	300.0
16	3-Nitrotoluene	28.192	84221	277.1	300.0



EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.008
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2907 400 ppb
Acquired : Jan 29, 2015 21:27:43
Printed : Jan 30, 2015 16:05:13
User : LErmol
Channel A Results

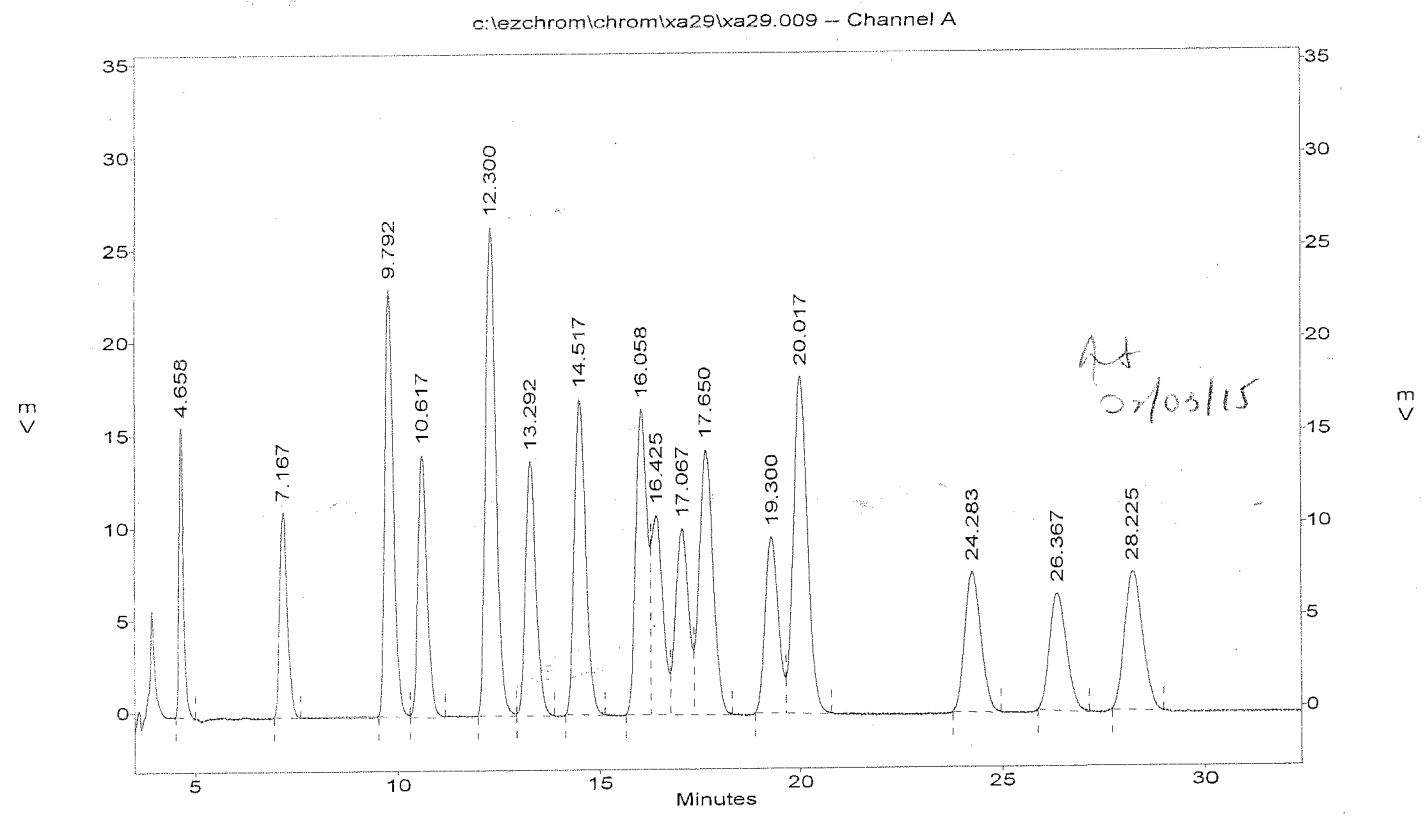
#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.650	56819	142.1	400.0
2	RDX	7.158	72429	177.4	400.0
3	1,3,5-TNB	9.758	166817	418.4	400.0
4	1,2-Dinitrobenzene	10.558	112258	289.8	400.0
5	1,3-DNB	12.250	234157	571.5	400.0
6	Tetryl	13.208	125939	303.8	400.0
7	Nitrobenzene	14.442	167502	420.8	400.0
8	2,4,6-TNT	15.967	164527	395.8	400.0
9	3,4-DNT	16.317	101436	266.7	400.0
10	4-Am-2,6-DNT	16.908	112639	287.5	400.0
11	2-Am-4,6-DNT	17.508	173220	439.2	400.0
12	2,6-DNT	19.158	105032	269.2	400.0
13	2,4-DNT	19.883	224055	548.5	400.0
14	2-Nitrotoluene	24.125	102525	269.4	400.0
15	4-Nitrotoluene	26.200	91929	233.7	400.0
16	3-Nitrotoluene	28.067	112241	277.1	400.0



EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.009
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2908 800 ppb
Acquired : Jan 29, 2015 22:01:56
Printed : Jan 30, 2015 16:05:29
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	111980	142.1	800.0
2	RDX	7.167	146777	177.4	800.0
3	1,3,5-TNB	9.792	335703	418.4	800.0
4	1,2-Dinitrobenzene	10.617	226419	289.8	800.0
5	1,3-DNB	12.300	471816	571.5	800.0
6	Tetryl	13.292	251959	303.8	800.0
7	Nitrobenzene	14.517	338135	420.8	800.0
8	2,4,6-TNT	16.058	328661	395.8	800.0
9	3,4-DNT	16.425	210578	266.7	800.0
10	4-Am-2,6-DNT	17.067	227837	287.5	800.0
11	2-Am-4,6-DNT	17.650	345951	439.2	800.0
12	2,6-DNT	19.300	220261	269.2	800.0
13	2,4-DNT	20.017	451765	548.5	800.0
14	2-Nitrotoluene	24.283	211611	269.4	800.0
15	4-Nitrotoluene	26.367	189654	233.7	800.0
16	3-Nitrotoluene	28.225	234893	277.1	800.0



INITIAL CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001(T017)
GC Column : KINETEX 5U BIPHENYL
Column size ID : 250MM X 4.6MM
LFID & Datetime: PA20002A 01/20/15 13:03
LFID & Datetime: PA20003A 01/20/15 13:45
LFID & Datetime: PA20004A 01/20/15 14:29
LFID & Datetime: PA20005A 01/20/15 15:11
LFID & Datetime: PA20006A 01/20/15 15:53
LFID & Datetime: PA20007A 01/20/15 16:35
CONC UNIT: ppb

COMPOUND	CONC X	CALIBRATION FACTORS (AREA)/UNIT 0.50X	1.00X	2.50X	5.00X	10.00X	20.00X	MEAN	%RSD	
2,4/2,6-DANT	40.00	367	423	411	375	360	310	374.2	10.8	✓
HMX	20.00	296	286	271	245	240	230	261.4	10.3	✓
RDX	20.00	336	305	283	264	258	243	281.5	12.2	✓
3,5-Dinitroaniline	20.00	534	600	585	552	528	517	552.5	6.0	✓
Nitrobenzene	20.00	348	369	381	352	348	339	356.4	4.4	✓
4-AM-2,6-DNT	20.00	422	477	459	439	412	411	436.8	6.2	✓
2-AM-4,6-DNT	20.00	511	570	535	520	483	490	518.1	6.1	✓
2-Nitrotoluene	20.00	337	284	303	294	288	260	294.1	8.7	✓
1,3-DNB	20.00	523	627	589	578	562	544	570.5	6.4	✓
4-Nitrotoluene	20.00	391	379	347	305	301	279	333.6	13.6	✓
3-Nitrotoluene	20.00	520	436	405	395	394	374	420.6	12.5	✓
2,6-DNT	20.00	256	323	247	272	231	249	262.9	12.2	✓
2,4-DNT	20.00	514	383	561	553	513	515	506.6	12.6	✓
1,3,5-TNB	20.00	265	259	352	365	343	341	320.6	14.5	✓
Tetryl	20.00	302	222	282	309	275	289	279.9	11.1	✓
2,4,6-TNT	20.00	446	443	525	540	587	576	519.6	12.0	✓
SURROGATE	**X**	**0.50X**	**1.00X**	**2.50X**	**5.00X**	**10.00X**	**20.00X**	**MEAN**	**%RSD**	
1,2-Dinitrobenzene	20.00	384	415	398	345	323	322	364.5	11.0	✓
3,4-DNT	20.00	240	273	275	296	254	266	267.2	7.2	✓

EX17A20C.met

RA
01/23/15

INITIAL CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001(T017)
GC Column : KINETEX 5U BIPHENYL
Column size ID : 250MM X 4.6MM
LFID & Datetime: PA20002A 01/20/15 13:03
LFID & Datetime: PA20003A 01/20/15 13:45
LFID & Datetime: PA20004A 01/20/15 14:29
LFID & Datetime: PA20005A 01/20/15 15:11
LFID & Datetime: PA20006A 01/20/15 15:53
LFID & Datetime: PA20007A 01/20/15 16:35

COMPOUND	RT OF STANDARDS (MIN) 0.5X	1.0X	2.5X	5.0X	10.0X	20.0X	MEAN RT	RT WINDOW FROM	TO	RTWINDOW WIDTH
2,4/2,6-DANT	3.550	3.542	3.558	3.558	3.550	3.558	3.553	3.368	3.738	0.185
HMX	4.217	4.217	4.233	4.233	4.225	4.233	4.226	4.012	4.440	0.214
RDX	4.783	4.775	4.800	4.792	4.783	4.792	4.788	4.550	5.026	0.238
3,5-Dinitroaniline	7.850	7.858	7.883	7.900	7.900	7.908	7.883	7.482	8.284	0.401
Nitrobenzene	8.467	8.475	8.525	8.533	8.542	8.542	8.514	8.101	8.927	0.413
4-AM-2,6-DNT	9.367	9.383	9.417	9.417	9.442	9.450	9.413	8.914	9.912	0.499
2-AM-4,6-DNT	9.925	9.950	10.000	10.000	10.017	10.033	9.988	9.464	10.512	0.524
2-Nitrotoluene	12.608	12.608	12.708	12.700	12.733	12.742	12.683	12.024	13.342	0.659
1,3-DNB	13.000	13.025	13.100	13.092	13.158	13.167	13.090	12.396	13.784	0.694
4-Nitrotoluene	14.008	14.025	14.075	14.100	14.175	14.183	14.094	13.343	14.845	0.751
3-Nitrotoluene	14.342	14.367	14.458	14.417	14.517	14.508	14.435	13.636	15.234	0.799
2,6-DNT	16.692	16.675	16.883	16.783	16.950	16.917	16.817	15.789	17.845	1.028
2,4-DNT	20.942	20.950	21.150	21.067	21.317	21.300	21.121	19.727	22.515	1.394
1,3,5-TNB	21.758	21.783	21.908	21.808	22.058	22.033	21.891	20.567	23.215	1.324
Tetryl	22.408	22.300	22.525	22.450	22.742	22.692	22.520	20.781	24.259	1.739
2,4,6-TNT	28.842	28.850	29.092	29.025	29.375	29.317	29.083	26.994	31.172	2.089
SURROGATE	**0.5X**	**1.0X**	**2.5X**	**5.0X**	**10.0X**	**20.0X**	**RT**	**FROM**	**TO**	**WIDTH**
1,2-Dinitrobenzene	8.867	8.867	8.900	8.900	8.908	8.917	8.893	8.439	9.347	0.454
3,4-DNT	16.033	16.025	16.142	16.117	16.242	16.242	16.134	15.123	17.145	1.011

EX17A20C.met

AA
01/23/15

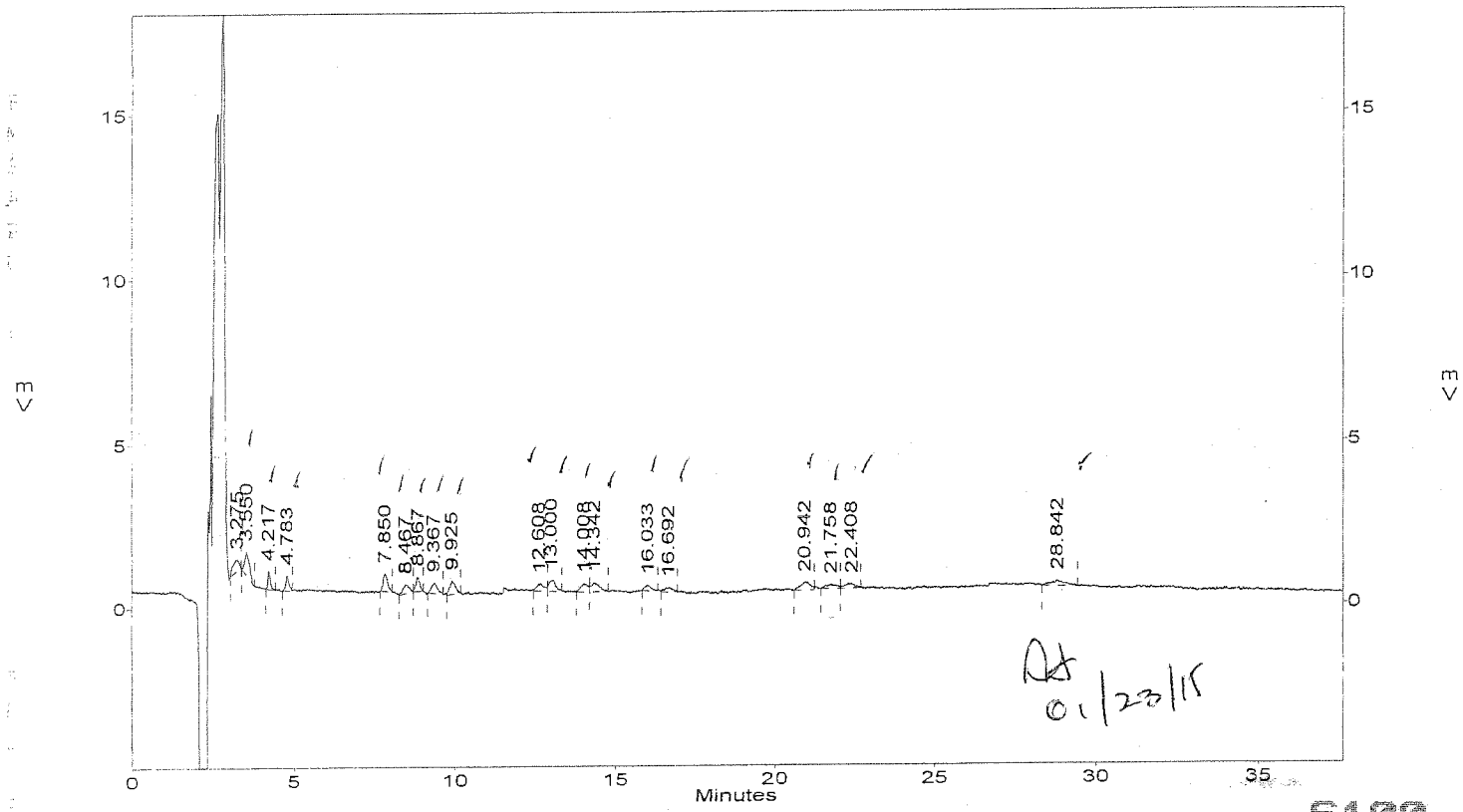
Method 8330 Column: Kinetex 5u Biphenyl
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\pa20\pa20.002
Method : c:\ezchrom\methods\ex17a20c.met
Sample ID : EX17A20C01
Acquired : Jan 20, 2015 13:03:49
Printed : Jan 21, 2015 14:34:58
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
2	2,4/2,6-DANT	3.550	7340	374.2	20.0
3	HMX	4.217	2960	261.4	10.0
4	RDX	4.783	3358	281.5	10.0
5	3,5-Dinitroaniline	7.850	5340	552.5	10.0
6	Nitrobenzene	8.467	3484	356.4	10.0
7	1,2-Dinitrobenzene	8.867	3843	364.5	10.0
8	4-Am-2,6-DNT	9.367	4224	436.8	10.0
9	2-Am-4,6-DNT	9.925	5109	518.1	10.0
10	2-Nitrotoluene	12.608	3369	294.1	10.0
11	1,3-DNB	13.000	5225	570.5	10.0
12	4-Nitrotoluene	14.008	3905	333.6	10.0
13	3-Nitrotoluene	14.342	5197	420.6	10.0
14	3,4-DNT	16.033	2395	267.2	10.0
15	2,6-DNT	16.692	2558	262.9	10.0
16	2,4-DNT	20.942	5144	506.6	10.0
17	1,3,5-TNB	21.758	2649	320.6	10.0
18	Tetryl	22.408	3022	279.9	10.0
19	2,4,6-TNT	28.842	4457	519.6	10.0

c:\ezchrom\chrom\pa20\pa20.002 -- Channel A



01/23/15

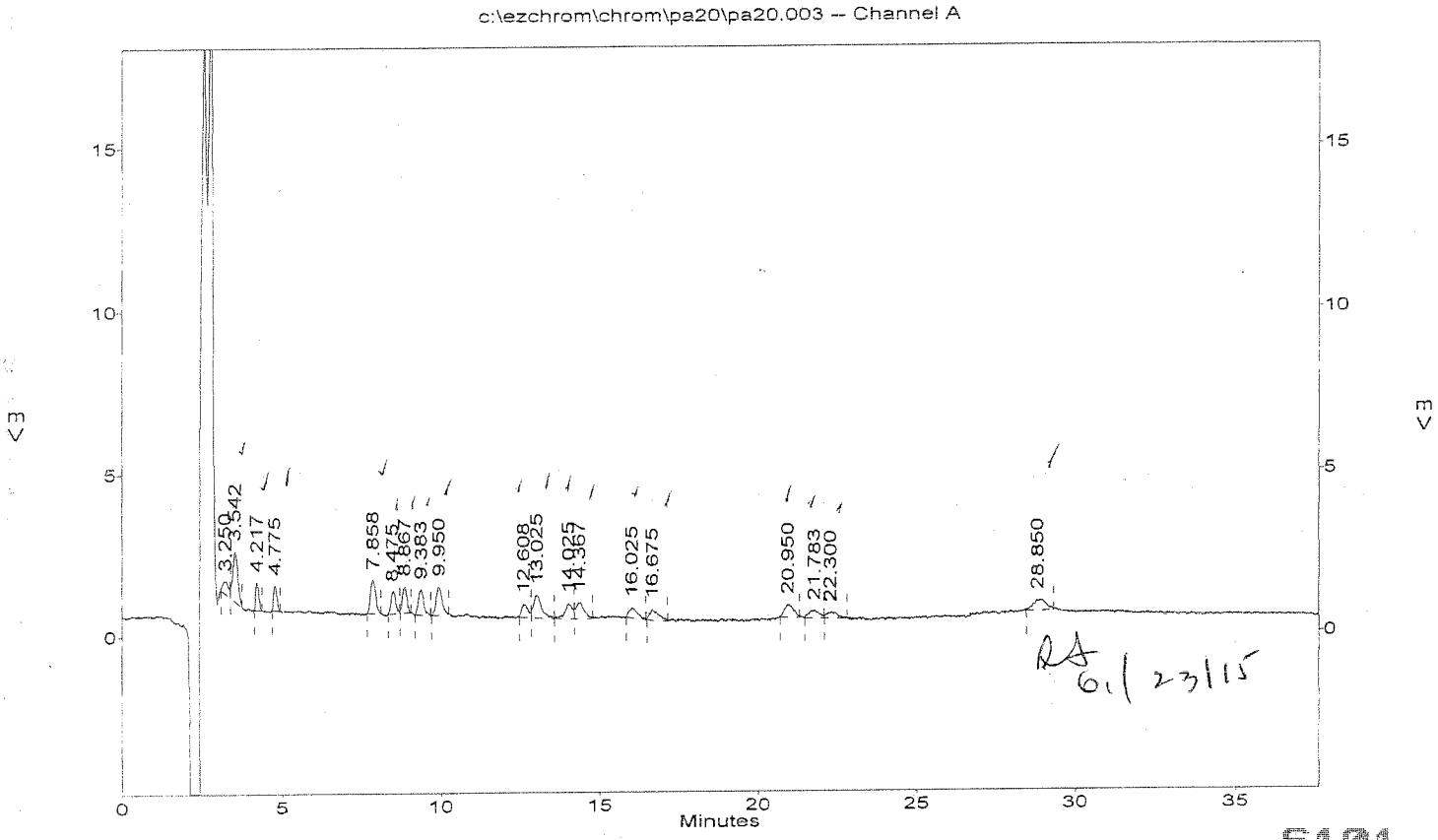
6100

Method 8330 Column: Kinetex 5u Biphenyl
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\pa20\pa20.003
Method : c:\ezchrom\methods\ex17a20c.met
Sample ID : EX17A20C02
Acquired : Jan 20, 2015 13:45:41
Printed : Jan 21, 2015 14:35:13
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
2	2,4/2,6-DANT	3.542	16937	374.2	40.0
3	HMX	4.217	5729	261.4	20.0
4	RDX	4.775	6099	281.5	20.0
5	3,5-Dinitroaniline	7.858	11994	552.5	20.0
6	Nitrobenzene	8.475	7382	356.4	20.0
7	1,2-Dinitrobenzene	8.867	8299	364.5	20.0
8	4-Am-2,6-DNT	9.383	9543	436.8	20.0
9	2-Am-4,6-DNT	9.950	11400	518.1	20.0
10	2-Nitrotoluene	12.608	5672	294.1	20.0
11	1,3-DNB	13.025	12549	570.5	20.0
12	4-Nitrotoluene	14.025	7576	333.6	20.0
13	3-Nitrotoluene	14.367	8728	420.6	20.0
14	3,4-DNT	16.025	5456	267.2	20.0
15	2,6-DNT	16.675	6453	262.9	20.0
16	2,4-DNT	20.950	7664	506.6	20.0
17	1,3,5-TNB	21.783	5176	320.6	20.0
18	Tetryl	22.300	4444	279.9	20.0
19	2,4,6-TNT	28.850	8867	519.6	20.0



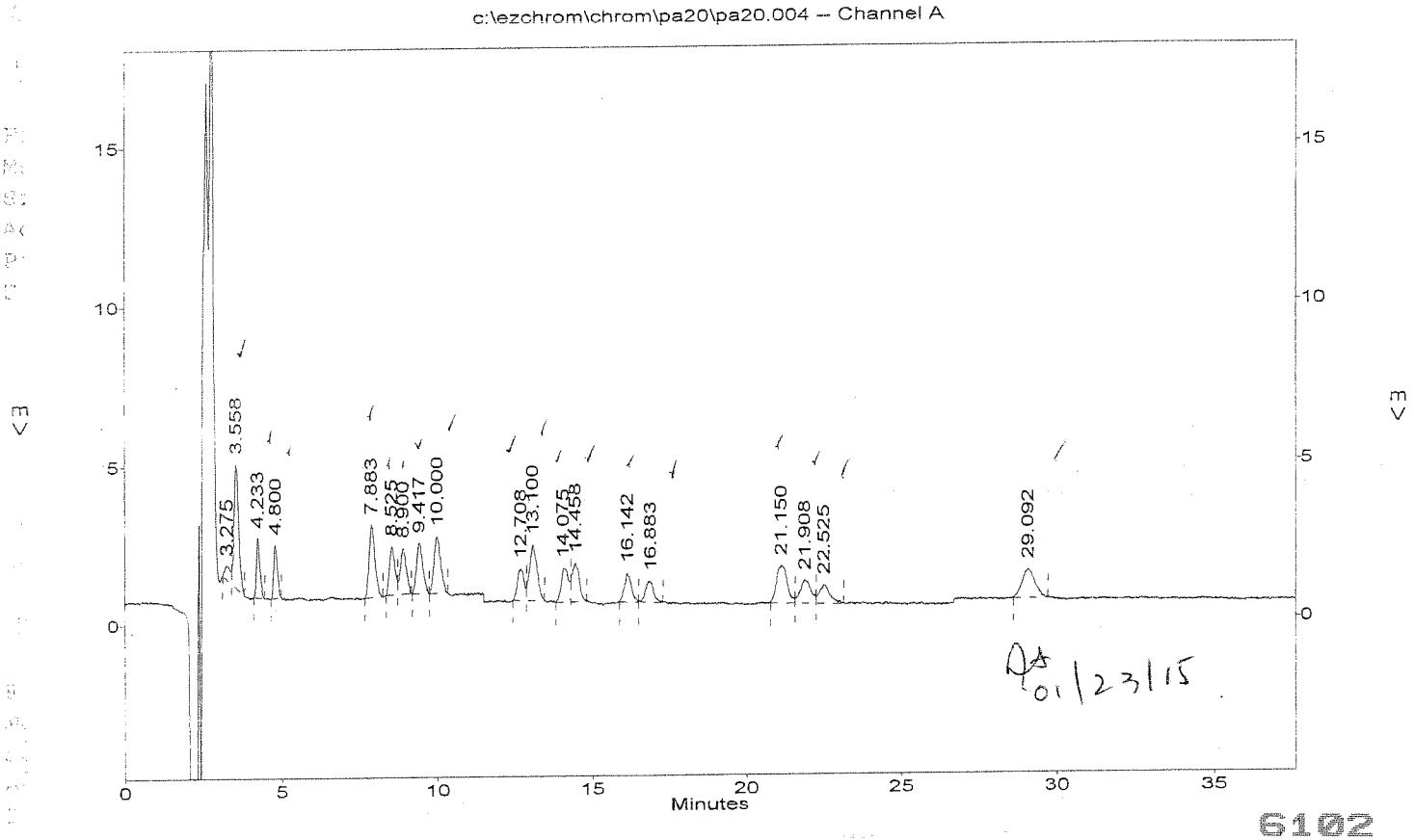
6101

Method 8330 Column: Kinetex 5u Biphenyl
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\pa20\pa20.004
Method : c:\ezchrom\methods\ex17a20c.met
Sample ID : EX17A20C03
Acquired : Jan 20, 2015 14:29:40
Printed : Jan 21, 2015 14:35:48
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
2	2,4/2,6-DANT	3.558	41053	374.2	100.0
3	HMX	4.233	13565	261.4	50.0
4	RDX	4.800	14157	281.5	50.0
5	3,5-Dinitroaniline	7.883	29257	552.5	50.0
6	Nitrobenzene	8.525	19072	356.4	50.0
7	1,2-Dinitrobenzene	8.900	19895	364.5	50.0
8	4-Am-2,6-DNT	9.417	22974	436.8	50.0
9	2-Am-4,6-DNT	10.000	26726	518.1	50.0
10	2-Nitrotoluene	12.708	15130	294.1	50.0
11	1,3-DNB	13.100	29450	570.5	50.0
12	4-Nitrotoluene	14.075	17367	333.6	50.0
13	3-Nitrotoluene	14.458	20251	420.6	50.0
14	3,4-DNT	16.142	13758	267.2	50.0
15	2,6-DNT	16.883	12329	262.9	50.0
16	2,4-DNT	21.150	28027	506.6	50.0
17	1,3,5-TNB	21.908	17596	320.6	50.0
18	Tetryl	22.525	14102	279.9	50.0
19	2,4,6-TNT	29.092	26262	519.6	50.0



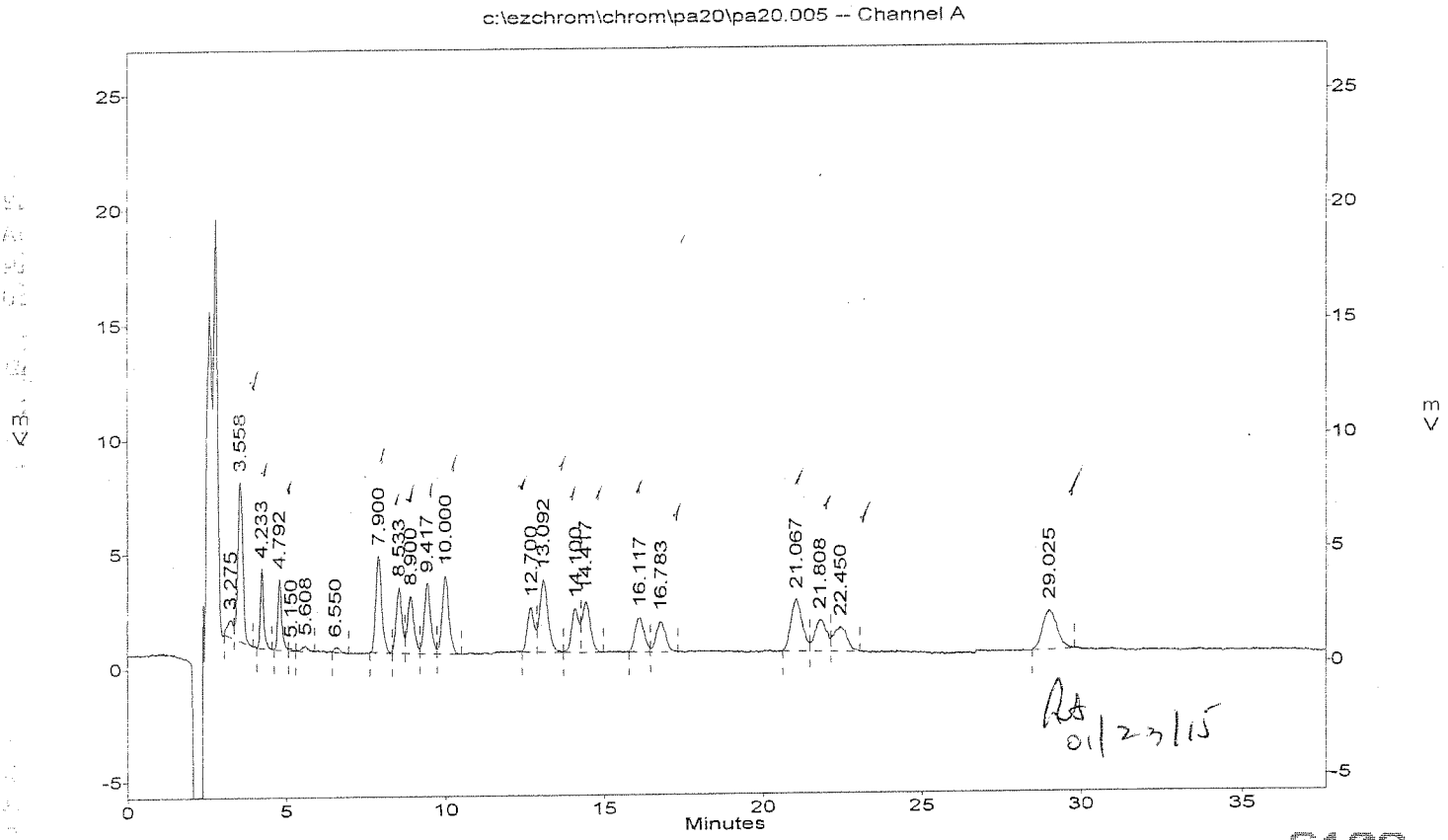
6102

Method 8330 Column: Kinetex 5u Biphenyl
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\pa20\pa20.005
Method : c:\ezchrom\methods\ex17a20c.met
Sample ID : EX17A20C04
Acquired : Jan 20, 2015 15:11:32
Printed : Jan 21, 2015 14:36:10
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
2	2,4/2,6-DANT	3.558	74972	374.2	200.0
3	HMX	4.233	24464	261.4	100.0
4	RDX	4.792	26422	281.5	100.0
8	3,5-Dinitroaniline	7.900	55205	552.5	100.0
9	Nitrobenzene	8.533	35223	356.4	100.0
10	1,2-Dinitrobenzene	8.900	34544	364.5	100.0
11	4-Am-2,6-DNT	9.417	43878	436.8	100.0
12	2-Am-4,6-DNT	10.000	52041	518.1	100.0
13	2-Nitrotoluene	12.700	29392	294.1	100.0
14	1,3-DNB	13.092	57797	570.5	100.0
15	4-Nitrotoluene	14.100	30471	333.6	100.0
16	3-Nitrotoluene	14.417	39462	420.6	100.0
17	3,4-DNT	16.117	29579	267.2	100.0
18	2,6-DNT	16.783	27183	262.9	100.0
19	2,4-DNT	21.067	55349	506.6	100.0
20	1,3,5-TNB	21.808	36463	320.6	100.0
21	Tetryl	22.450	30927	279.9	100.0
22	2,4,6-TNT	29.025	54002	519.6	100.0



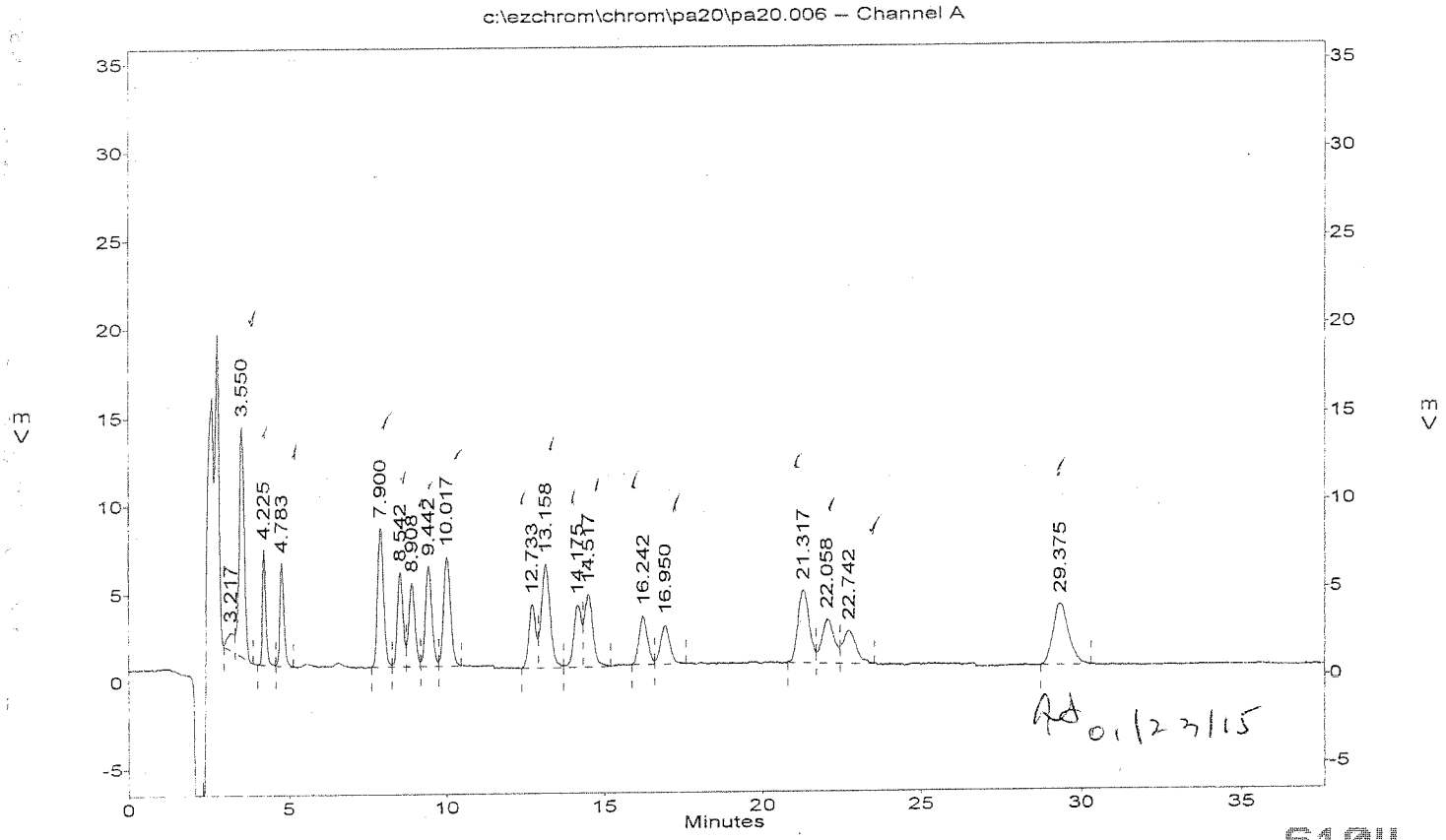
6103

Method 8330 Column: Kinetex 5u Biphenyl
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\pa20\pa20.006
Method : c:\ezchrom\methods\ex17a20c.met
Sample ID : EX17A20C05
Acquired : Jan 20, 2015 15:53:25
Printed : Jan 21, 2015 14:36:27
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
2	2,4/2,6-DANT	3.550	143844	374.2	400.0
3	HMX	4.225	47917	261.4	200.0
4	RDX	4.783	51573	281.5	200.0
5	3,5-Dinitroaniline	7.900	105525	552.5	200.0
6	Nitrobenzene	8.542	69550	356.4	200.0
7	1,2-Dinitrobenzene	8.908	64524	364.5	200.0
8	4-Am-2,6-DNT	9.442	82381	436.8	200.0
9	2-Am-4,6-DNT	10.017	96650	518.1	200.0
10	2-Nitrotoluene	12.733	57565	294.1	200.0
11	1,3-DNB	13.158	112402	570.5	200.0
12	4-Nitrotoluene	14.175	60299	333.6	200.0
13	3-Nitrotoluene	14.517	78807	420.6	200.0
14	3,4-DNT	16.242	50761	267.2	200.0
15	2,6-DNT	16.950	46197	262.9	200.0
16	2,4-DNT	21.317	102506	506.6	200.0
17	1,3,5-TNB	22.058	68526	320.6	200.0
18	Tetryl	22.742	54937	279.9	200.0
19	2,4,6-TNT	29.375	117411	519.6	200.0

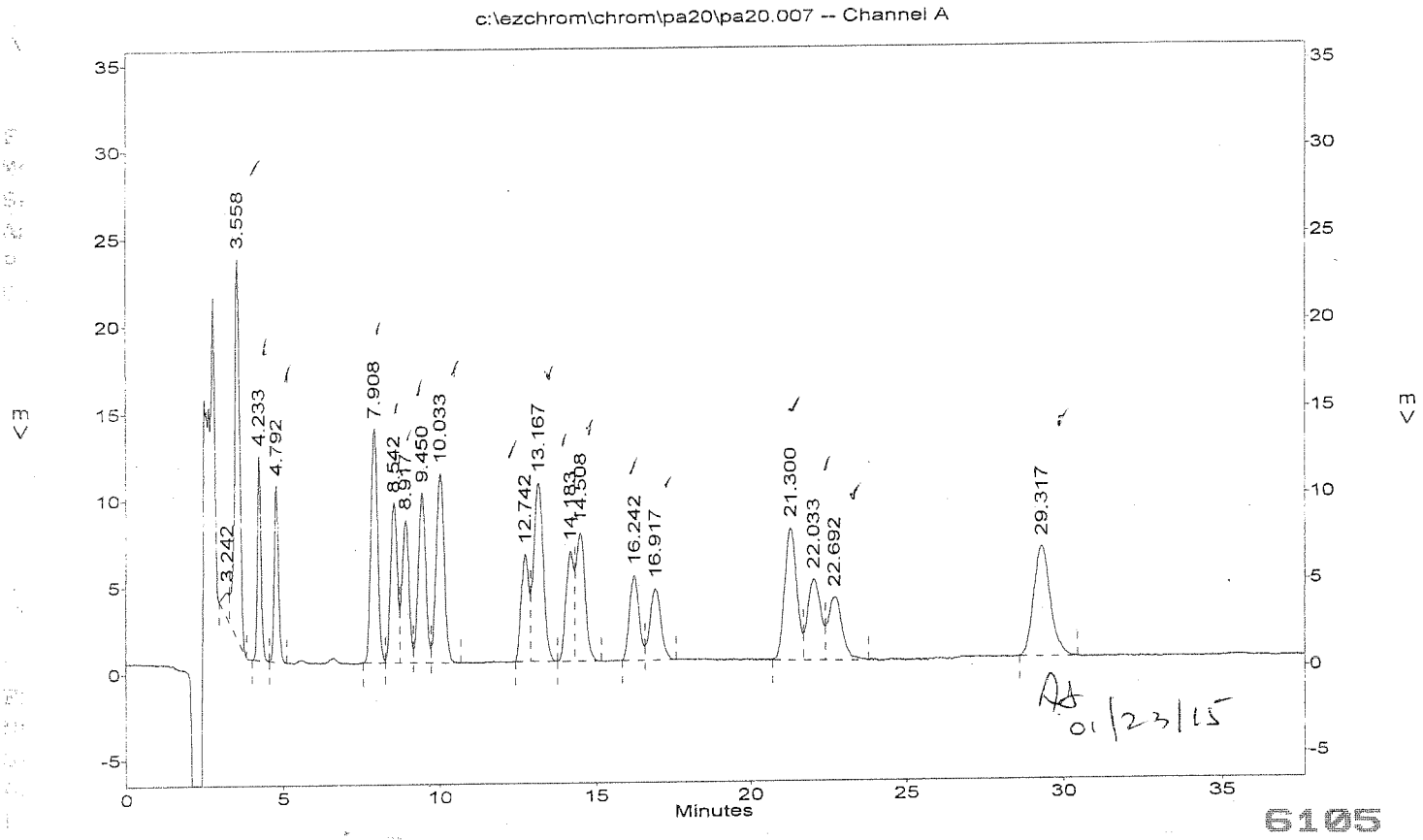


Method 8330 Column: Kinetex 5u Biphenyl
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\pa20\pa20.007
Method : c:\ezchrom\methods\ex17a20c.met
Sample ID : EX17A20C06
Acquired : Jan 20, 2015 16:35:17
Printed : Jan 21, 2015 14:36:44
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
2	2,4/2,6-DANT	3.558	247954	374.2	800.0
3	HMX	4.233	92116	261.4	400.0
4	RDX	4.792	97107	281.5	400.0
5	3,5-Dinitroaniline	7.908	206697	552.5	400.0
6	Nitrobenzene	8.542	135780	356.4	400.0
7	1,2-Dinitrobenzene	8.917	128788	364.5	400.0
8	4-Am-2,6-DNT	9.450	164407	436.8	400.0
9	2-Am-4,6-DNT	10.033	195800	518.1	400.0
10	2-Nitrotoluene	12.742	103826	294.1	400.0
11	1,3-DNB	13.167	217586	570.5	400.0
12	4-Nitrotoluene	14.183	111464	333.6	400.0
13	3-Nitrotoluene	14.508	149558	420.6	400.0
14	3,4-DNT	16.242	106426	267.2	400.0
15	2,6-DNT	16.917	99736	262.9	400.0
16	2,4-DNT	21.300	206154	506.6	400.0
17	1,3,5-TNB	22.033	136309	320.6	400.0
18	Tetryl	22.692	115710	279.9	400.0
19	2,4,6-TNT	29.317	230586	519.6	400.0



6105

SECOND SOURCE VERIFICATION

INITIAL CALIBRATION VERIFICATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XA29010A 01/29/2015 22:36
CONC UNIT : ppb

COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.658	4.592	4.724	400.0	142.100	57155	402.17	1		15
RDX	7.142	6.971	7.313	400.0	177.400	74241	418.46	5		15
1,3,5-TNB	9.758	9.560	9.956	400.0	418.400	168447	402.60	1		15
1,3-DNB	12.242	11.954	12.530	400.0	571.500	237334	415.26	4		15
Tetryl	13.200	12.812	13.588	400.0	303.800	126985	417.95	4		15
Nitrobenzene	14.433	14.103	14.763	400.0	420.800	169842	403.64	1		15
2,4,6-TNT	15.950	15.548	16.352	400.0	395.800	164351	415.19	4		15
4-AM-2,6-DNT	16.908	16.265	17.551	400.0	287.500	115382	401.38	0		15
2-AM-4,6-DNT	17.500	16.819	18.181	400.0	439.200	174113	396.40	-1		15
2,6-DNT	19.150	18.593	19.707	400.0	269.200	110261	409.52	2		15
2,4-DNT	19.867	19.338	20.396	400.0	548.500	229472	418.33	5		15
2-Nitrotoluene	24.108	23.433	24.783	400.0	269.400	102522	380.51	-5		15
4-Nitrotoluene	26.200	25.406	26.994	400.0	233.700	93448	399.82	-0		15
3-Nitrotoluene	28.042	27.244	28.840	400.0	277.100	115242	415.86	4		15
SURROGATE	**MINUTES**	**FROM**	**TO**	**TRUECON**	**CF**	**AREA**	**CONC**	**%D**	**QL**	**LIMITS**
1,2-Dinitrobenzene	10.558	10.420	10.696	400.0	289.800	114476	394.98	-1		15
3,4-DNT	16.308	15.821	16.795	400.0	266.700	104671	392.51	-2		15

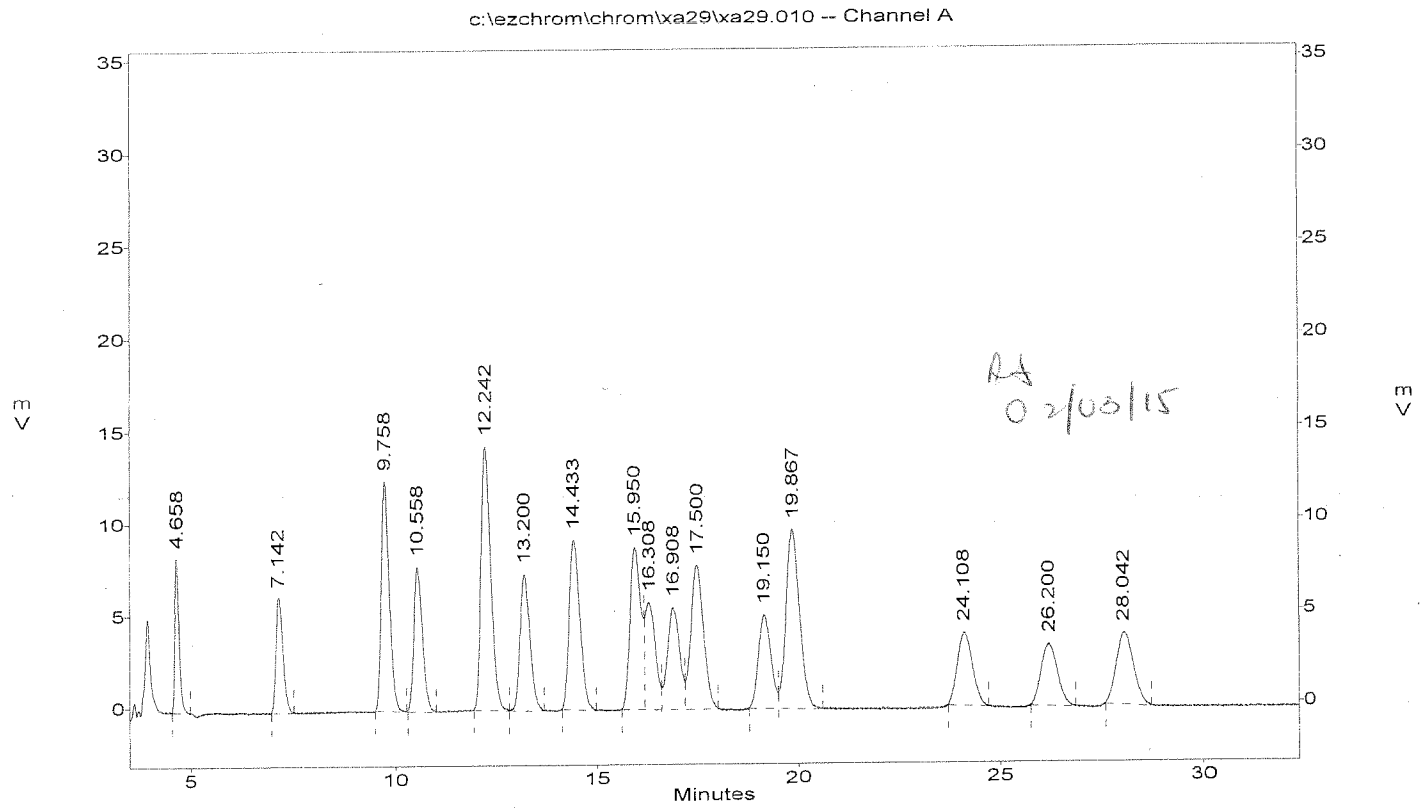
EX81A29.met

AA
02/03/15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xa29\xa29.010
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : IEX81A2901
Acquired : Jan 29, 2015 22:36:08
Printed : Jan 30, 2015 16:07:39
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	57155	142.1	402.2
2	RDX	7.142	74241	177.4	418.5
3	1,3,5-TNB	9.758	168447	418.4	402.6
4	1,2-Dinitrobenzene	10.558	114476	289.8	395.0
5	1,3-DNB	12.242	237334	571.5	415.3
6	Tetryl	13.200	126985	303.8	417.9
7	Nitrobenzene	14.433	169842	420.8	403.6
8	2,4,6-TNT	15.950	164351	395.8	415.2
9	3,4-DNT	16.308	104671	266.7	392.5
10	4-Am-2,6-DNT	16.908	115382	287.5	401.4
11	2-Am-4,6-DNT	17.500	174113	439.2	396.4
12	2,6-DNT	19.150	110261	269.2	409.5
13	2,4-DNT	19.867	229472	548.5	418.3
14	2-Nitrotoluene	24.108	102522	269.4	380.5
15	4-Nitrotoluene	26.200	93448	233.7	399.8
16	3-Nitrotoluene	28.042	115242	277.1	415.9



INITIAL CALIBRATION VERIFICATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001(T017)
GC Columm : KINETEX 5U BIPHENYL
Column size ID : 250MM X 4.6MM
Mid Conc Init LFID & Datetime: PA20006A 01/20/2015 15:53
Conc Cont LFID & Datetime: PA20008A 01/20/2015 17:17
CONC UNIT : ppb

COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
2,4/2,6-DANT	3.550	3.365	3.735	400.0	374.200	144631	386.48	-3		15
HMX	4.225	4.011	4.439	200.0	261.400	46846	179.23	-10		15
RDX	4.792	4.554	5.030	200.0	281.500	50022	177.73	-11		15
3,5-Dinitroaniline	7.892	7.491	8.293	200.0	552.500	101764	184.17	-8		15
Nitrobenzene	8.525	8.112	8.938	200.0	356.400	66619	186.93	-7		15
4-AM-2,6-DNT	9.425	8.926	9.924	200.0	436.800	80555	184.43	-8		15
2-AM-4,6-DNT	10.000	9.476	10.524	200.0	518.100	94981	183.33	-8		15
2-Nitrotoluene	12.692	12.033	13.351	200.0	294.100	54250	184.48	-8		15
1,3-DNB	13.108	12.414	13.802	200.0	570.500	112220	196.71	-2		15
4-Nitrotoluene	14.108	13.357	14.859	200.0	333.600	57727	173.05	-13		15
3-Nitrotoluene	14.442	13.643	15.241	200.0	420.600	77824	185.03	-7		15
2,6-DNT	16.858	15.830	17.886	200.0	262.900	49377	187.84	-6		15
2,4-DNT	21.175	19.781	22.569	200.0	506.600	100986	199.34	-0		15
1,3,5-TNB	21.908	20.584	23.232	200.0	320.600	63049	196.65	-2		15
Tetryl	22.583	20.844	24.322	200.0	279.900	49965	178.48	-11		15
2,4,6-TNT	29.200	27.111	31.289	200.0	519.600	119483	229.93	15		15

SURROGATE	MINUTES	FROM	TO	TRUECON	CF	AREA	CONC	%D	QL	LIMITS
1,2-Dinitrobenzene	8.908	8.454	9.362	200.0	364.500	63616	174.51	-13		15
3,4-DNT	16.158	15.147	17.169	200.0	267.200	53416	199.92	-0		15

EX17A20C.met

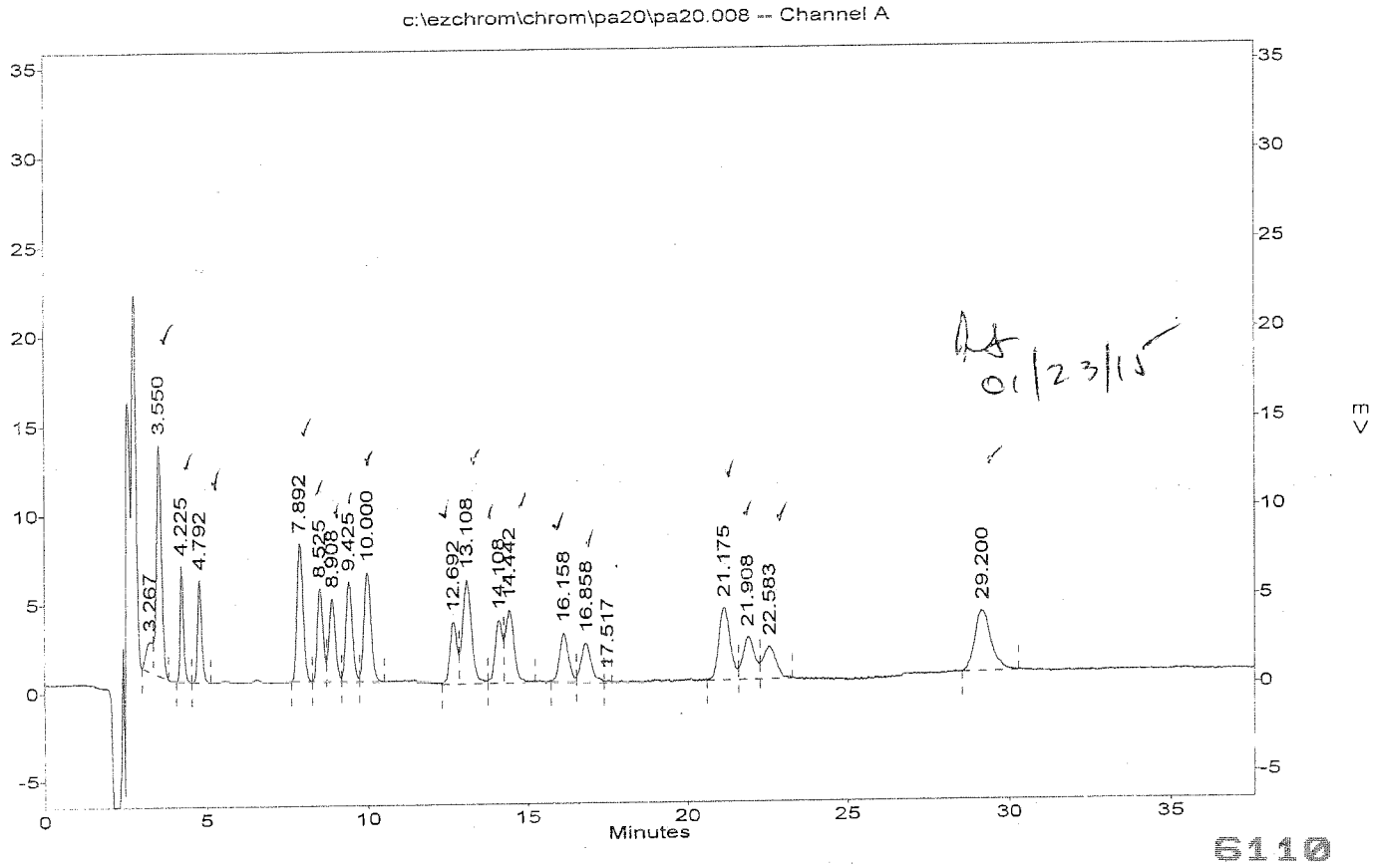
AS
01/23/15

Method 8330 Column: Kinetex 5u Biphenyl
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\pa20\pa20.008
Method : c:\ezchrom\methods\ex17a20c.met
Sample ID : IEX17A20C01
Acquired : Jan 20, 2015 17:17:10
Printed : Jan 21, 2015 14:38:43
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
2	2,4/2,6-DANT	3.550	144631	374.2	386.5
3	HMX	4.225	46846	261.4	179.2
4	RDX	4.792	50022	281.5	177.7
5	3,5-Dinitroaniline	7.892	101764	552.5	184.2
6	Nitrobenzene	8.525	66619	356.4	186.9
7	1,2-Dinitrobenzene	8.908	63616	364.5	174.5
8	4-Am-2,6-DNT	9.425	80555	436.8	184.4
9	2-Am-4,6-DNT	10.000	94981	518.1	183.3
10	2-Nitrotoluene	12.692	54250	294.1	184.5
11	1,3-DNB	13.108	112220	570.5	196.7
12	4-Nitrotoluene	14.108	57727	333.6	173.1
13	3-Nitrotoluene	14.442	77824	420.6	185.0
14	3,4-DNT	16.158	53416	267.2	199.9
15	2,6-DNT	16.858	49377	262.9	187.8
17	2,4-DNT	21.175	100986	506.6	199.3
18	1,3,5-TNB	21.908	63049	320.6	196.7
19	Tetryl	22.583	49965	279.9	178.5
20	2,4,6-TNT	29.200	119483	519.6	229.9



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DAILY CALIBRATIONS

CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Columm : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD27002A 04/27/2015 09:45
CONC UNIT : ppb

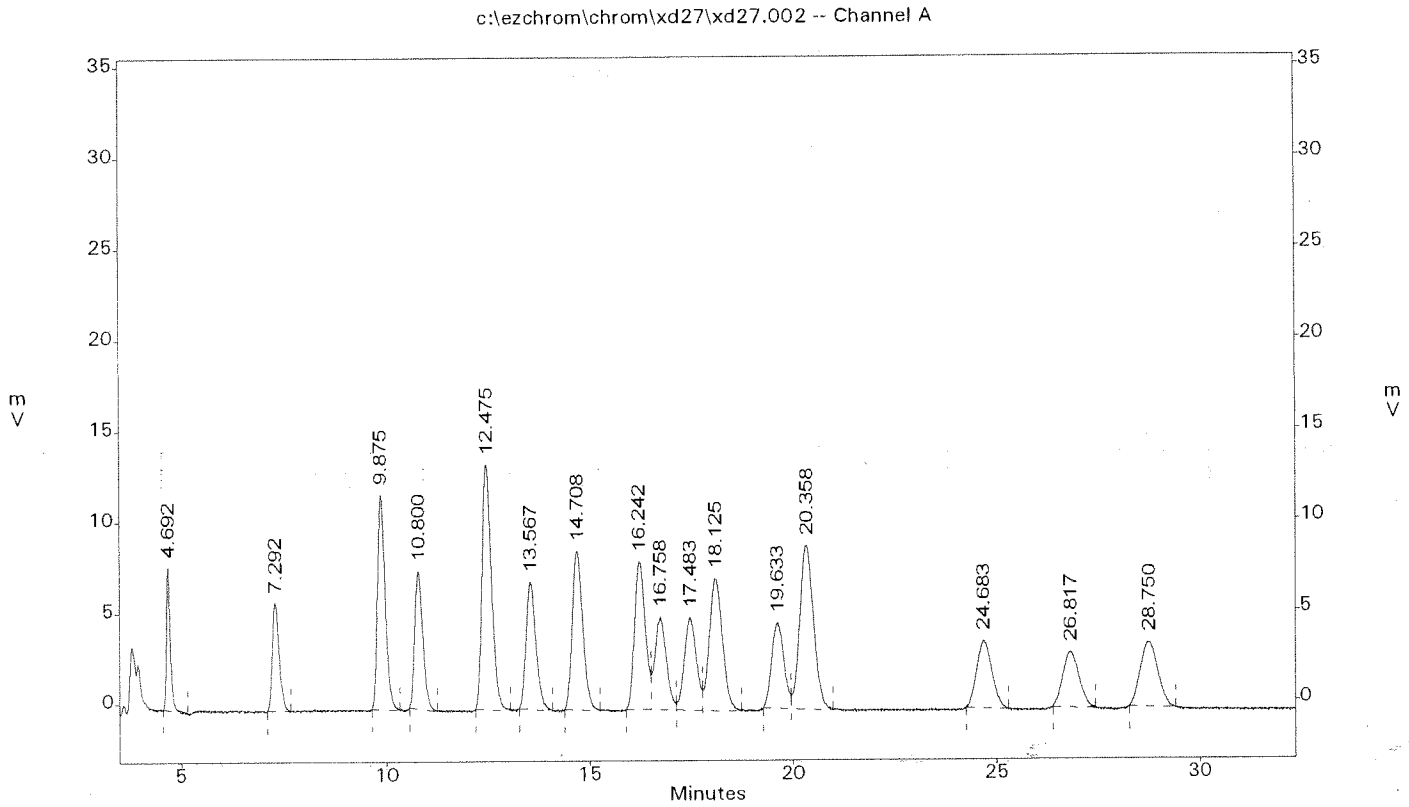
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.692	4.626	4.758	400.0	142.100	54637	384.45	-4		15
RDX	7.292	7.121	7.463	400.0	177.400	69735	393.07	-2		15
1,3,5-TNB	9.875	9.677	10.073	400.0	418.400	159167	380.42	-5		15
1,3-DNB	12.475	12.187	12.763	400.0	571.500	221991	388.41	-3		15
Tetryl	13.567	13.179	13.955	400.0	303.800	121318	399.30	-0		15
Nitrobenzene	14.708	14.378	15.038	400.0	420.800	161084	382.83	-4		15
2,4,6-TNT	16.242	15.840	16.644	400.0	395.800	152290	384.72	-4		15
4-AM-2,6-DNT	17.483	16.840	18.126	400.0	287.500	107300	373.27	-7		15
2-AM-4,6-DNT	18.125	17.444	18.806	400.0	439.200	166169	378.32	-5		15
2,6-DNT	19.633	19.076	20.190	400.0	269.200	101622	377.44	-6		15
2,4-DNT	20.358	19.829	20.887	400.0	548.500	214101	390.31	-2		15
2-Nitrotoluene	24.683	24.008	25.358	400.0	269.400	97957	363.57	-9		15
4-Nitrotoluene	26.817	26.023	27.611	400.0	233.700	86837	371.54	-7		15
3-Nitrotoluene	28.750	27.952	29.548	400.0	277.100	108697	392.25	-2		15
SURROGATE	**MINUTES**	**FROM**	**TO**	**TRUECON**	**CF**	**AREA**	**CONC**	**%D**	**QL**	**LIMITS**
1,2-Dinitrobenzene	10.800	10.662	10.938	400.0	289.800	108809	375.43	-6		15
3,4-DNT	16.758	16.271	17.245	400.0	266.700	102936	386.00	-4		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.002
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29080
Acquired : Apr 27, 2015 09:45:55
Printed : Apr 27, 2015 10:53:01
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.692	54637	142.1	384.5
2	RDX	7.292	69735	177.4	393.1
3	1,3,5-TNB	9.875	159167	418.4	380.4
4	1,2-Dinitrobenzene	10.800	108809	289.8	375.4
5	1,3-DNB	12.475	221991	571.5	388.4
6	Tetryl	13.567	121318	303.8	399.3
7	Nitrobenzene	14.708	161084	420.8	382.8
8	2,4,6-TNT	16.242	152290	395.8	384.7
9	3,4-DNT	16.758	102936	266.7	386.0
10	4-Am-2,6-DNT	17.483	107300	287.5	373.3
11	2-Am-4,6-DNT	18.125	166169	439.2	378.3
12	2,6-DNT	19.633	101622	269.2	377.4
13	2,4-DNT	20.358	214101	548.5	390.3
14	2-Nitrotoluene	24.683	97957	269.4	363.6
15	4-Nitrotoluene	26.817	86837	233.7	371.5
16	3-Nitrotoluene	28.750	108697	277.1	392.2



CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD27013A 04/27/2015 16:11
CONC UNIT : ppb

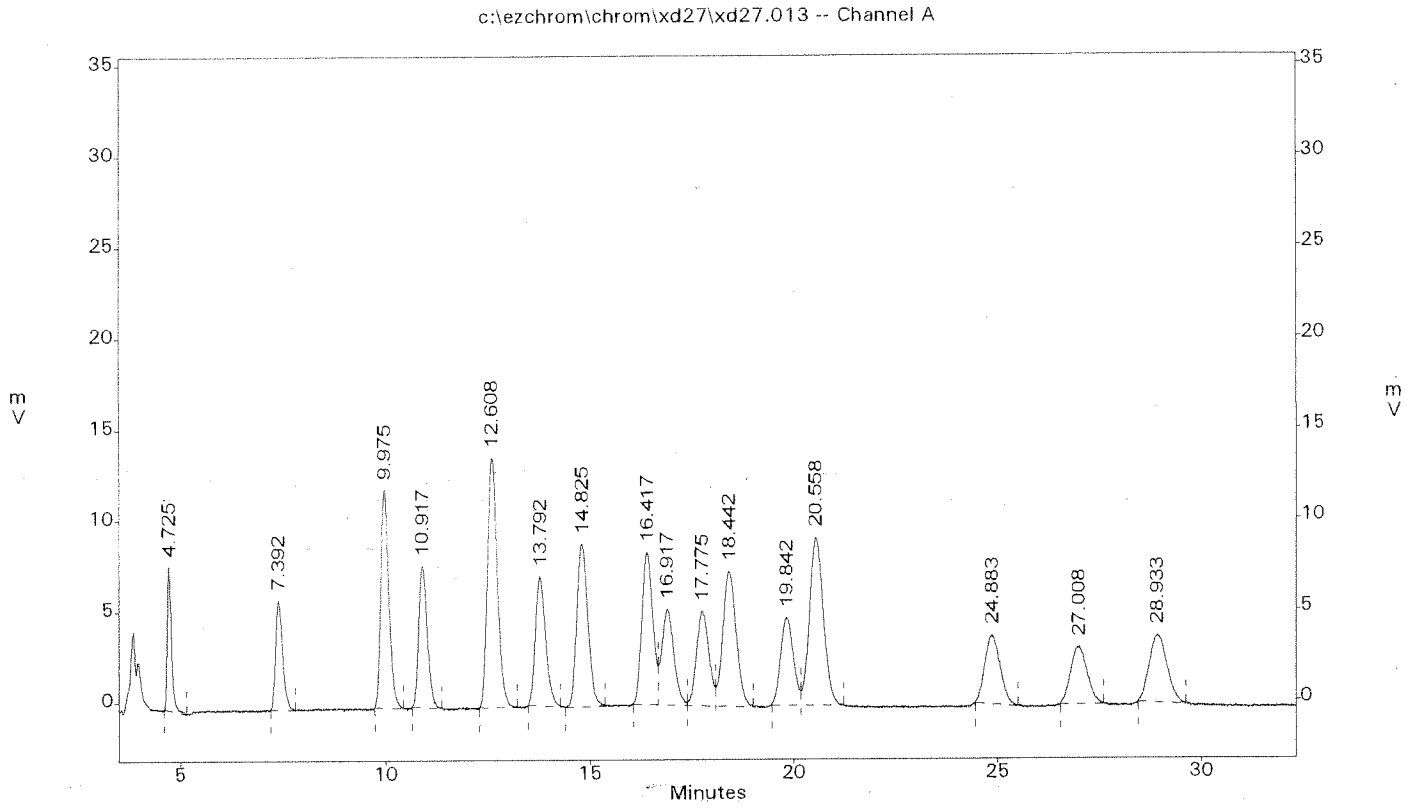
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.725	4.659	4.791	400.0	142.100	56105	394.78	-1		15
RDX	7.392	7.221	7.563	400.0	177.400	72953	411.20	3		15
1,3,5-TNB	9.975	9.777	10.173	400.0	418.400	166263	397.38	-1		15
1,3-DNB	12.608	12.320	12.896	400.0	571.500	232915	407.52	2		15
Tetryl	13.792	13.404	14.180	400.0	303.800	125505	413.08	3		15
Nitrobenzene	14.825	14.495	15.155	400.0	420.800	169978	403.96	1		15
2,4,6-TNT	16.417	16.015	16.819	400.0	395.800	158986	401.64	0		15
4-AM-2,6-DNT	17.775	17.132	18.418	400.0	287.500	112398	391.00	-2		15
2-AM-4,6-DNT	18.442	17.761	19.123	400.0	439.200	170772	388.80	-3		15
2,6-DNT	19.842	19.285	20.399	400.0	269.200	106191	394.41	-1		15
2,4-DNT	20.558	20.029	21.087	400.0	548.500	222608	405.82	1		15
2-Nitrotoluene	24.883	24.208	25.558	400.0	269.400	101146	375.41	-6		15
4-Nitrotoluene	27.008	26.214	27.802	400.0	233.700	89795	384.19	-4		15
3-Nitrotoluene	28.933	28.135	29.731	400.0	277.100	113194	408.47	2		15
SURROGATE	**MINUTES**	**FROM**	**TO**	**TRUECON**	**CF**	**AREA**	**CONC**	**%D**	**QL**	**LIMITS**
1,2-Dinitrobenzene	10.917	10.779	11.055	400.0	289.800	114299	394.37	-1		15
3,4-DNT	16.917	16.430	17.404	400.0	266.700	110764	415.35	4		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.013
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29081
Acquired : Apr 27, 2015 16:11:29
Printed : Apr 27, 2015 16:50:53
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.725	56105	142.1	394.8
2	RDX	7.392	72953	177.4	411.2
3	1,3,5-TNB	9.975	166263	418.4	397.4
4	1,2-Dinitrobenzene	10.917	114299	289.8	394.4
5	1,3-DNB	12.608	232915	571.5	407.5
6	Tetryl	13.792	125505	303.8	413.1
7	Nitrobenzene	14.825	169978	420.8	404.0
8	2,4,6-TNT	16.417	158986	395.8	401.6
9	3,4-DNT	16.917	110764	266.7	415.4
10	4-Am-2,6-DNT	17.775	112398	287.5	391.0
11	2-Am-4,6-DNT	18.442	170772	439.2	388.8
12	2,6-DNT	19.842	106191	269.2	394.4
13	2,4-DNT	20.558	222608	548.5	405.8
14	2-Nitrotoluene	24.883	101146	269.4	375.4
15	4-Nitrotoluene	27.008	89795	233.7	384.2
16	3-Nitrotoluene	28.933	113194	277.1	408.5



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CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD27024A 04/27/2015 22:37
CONC UNIT : ppb

COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.675	4.609	4.741	400.0	142.100	58252	409.89	2		15
RDX	7.217	7.046	7.388	400.0	177.400	73683	415.32	4		15
1,3,5-TNB	9.758	9.560	9.956	400.0	418.400	167272	399.79	-0		15
1,3-DNB	12.250	11.962	12.538	400.0	571.500	236200	413.27	3		15
Tetryl	13.342	12.954	13.730	400.0	303.800	128268	422.17	6		15
Nitrobenzene	14.408	14.078	14.738	400.0	420.800	168781	401.12	0		15
2,4,6-TNT	15.975	15.573	16.377	400.0	395.800	158946	401.54	0		15
4-AM-2,6-DNT	17.050	16.407	17.693	400.0	287.500	113495	394.82	-1		15
2-AM-4,6-DNT	17.642	16.961	18.323	400.0	439.200	174775	397.91	-1		15
2,6-DNT	19.192	18.635	19.749	400.0	269.200	107721	400.09	0		15
2,4-DNT	19.875	19.346	20.404	400.0	548.500	226235	412.43	3		15
2-Nitrotoluene	24.083	23.408	24.758	400.0	269.400	104517	387.92	-3		15
4-Nitrotoluene	26.083	25.289	26.877	400.0	233.700	91083	389.70	-3		15
3-Nitrotoluene	27.942	27.144	28.740	400.0	277.100	115483	416.73	4		15

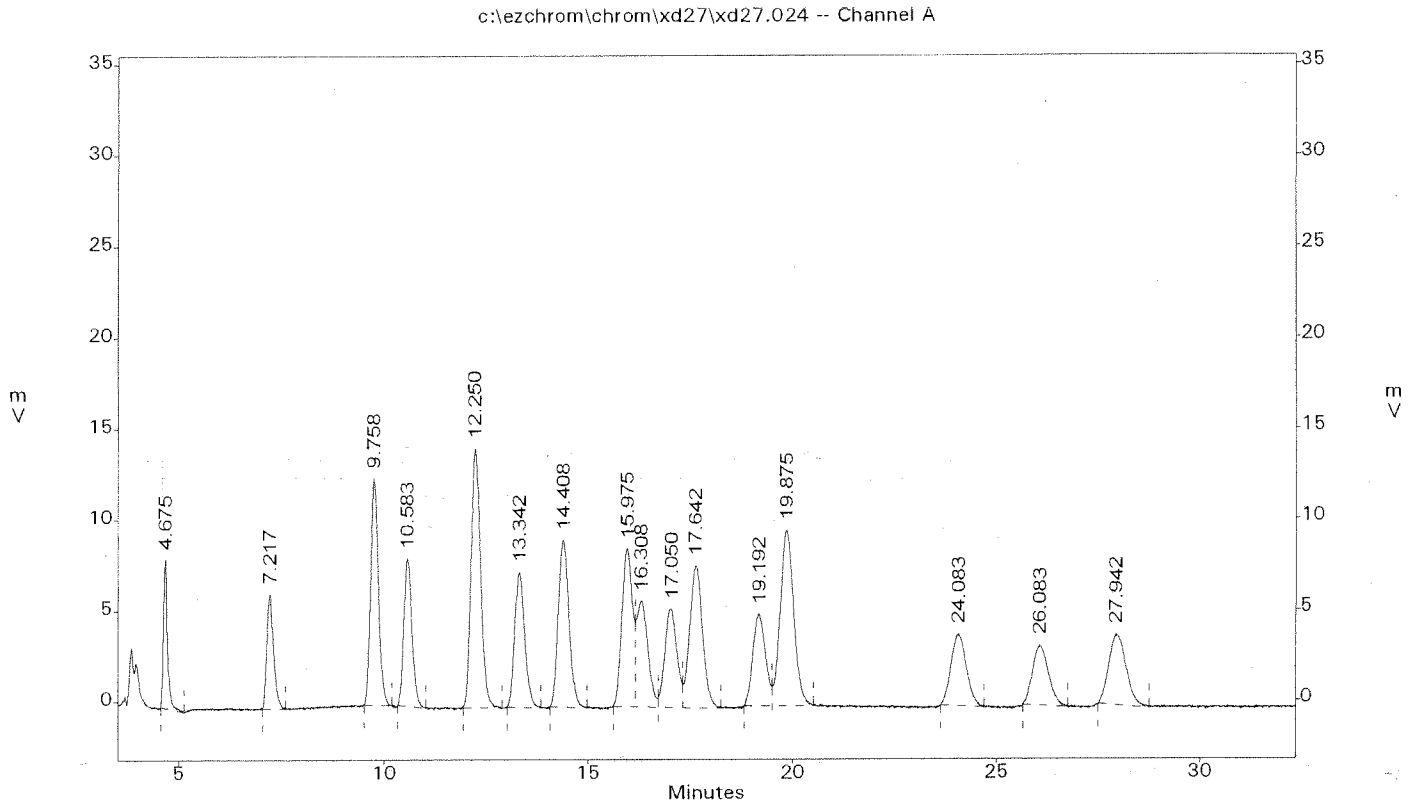
SURROGATE	MINUTES	FROM	TO	TRUECON	CF	AREA	CONC	%D	QL	LIMITS
1,2-Dinitrobenzene	10.583	10.445	10.721	400.0	289.800	115817	399.61	-0		15
3,4-DNT	16.308	15.821	16.795	400.0	266.700	111612	418.53	5		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.024
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29082
Acquired : Apr 27, 2015 22:37:16
Printed : Apr 28, 2015 09:50:20
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.675	58252	142.1	409.9
2	RDX	7.217	73683	177.4	415.3
3	1,3,5-TNB	9.758	167272	418.4	399.8
4	1,2-Dinitrobenzene	10.583	115817	289.8	399.6
5	1,3-DNB	12.250	236200	571.5	413.3
6	Tetryl	13.342	128268	303.8	422.2
7	Nitrobenzene	14.408	168781	420.8	401.1
8	2,4,6-TNT	15.975	158946	395.8	401.5
9	3,4-DNT	16.308	111612	266.7	418.5
10	4-Am-2,6-DNT	17.050	113495	287.5	394.8
11	2-Am-4,6-DNT	17.642	174775	439.2	397.9
12	2,6-DNT	19.192	107721	269.2	400.1
13	2,4-DNT	19.875	226235	548.5	412.4
14	2-Nitrotoluene	24.083	104517	269.4	387.9
15	4-Nitrotoluene	26.083	91083	233.7	389.7
16	3-Nitrotoluene	27.942	115483	277.1	416.7



CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Columm : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD27036A 04/28/2015 08:59
CONC UNIT : ppb

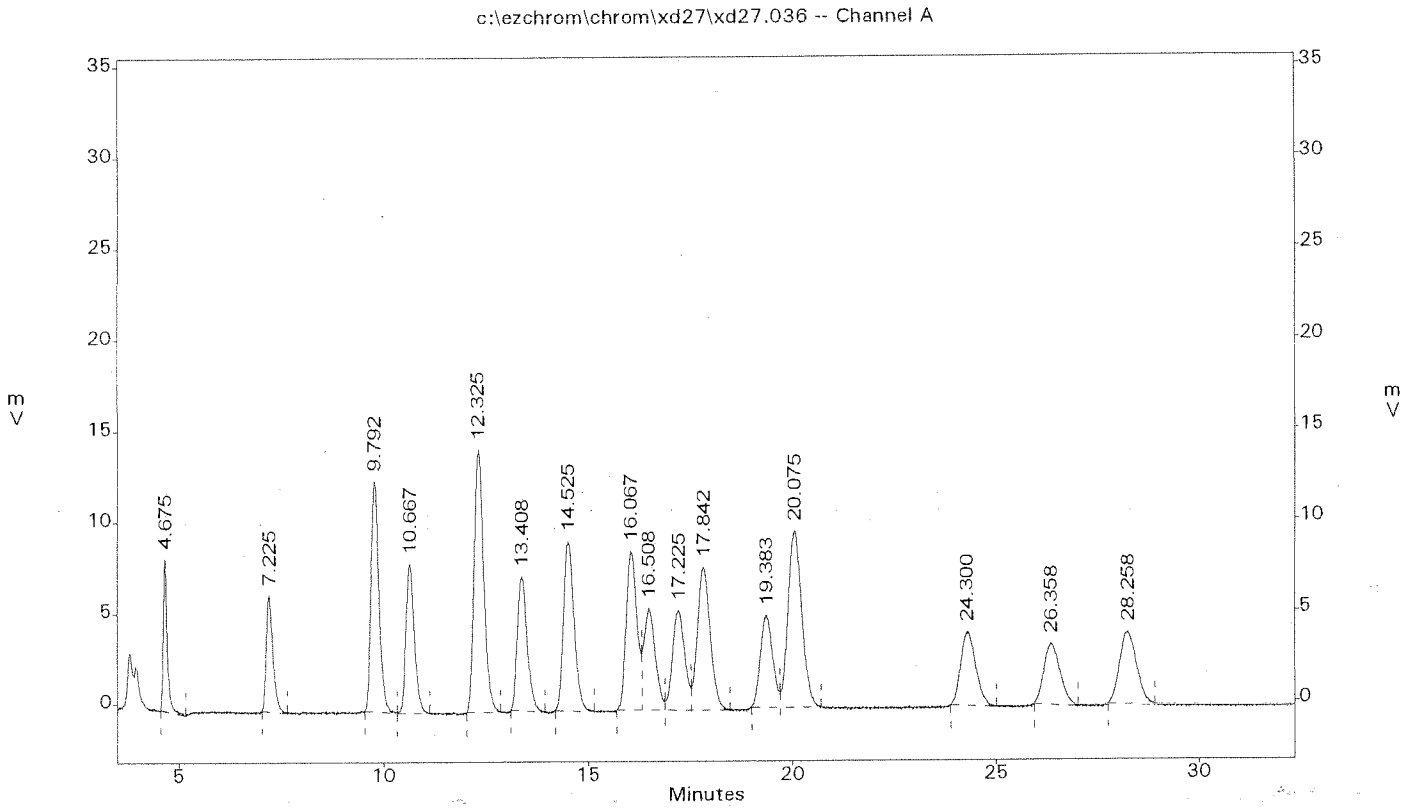
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.675	4.609	4.741	400.0	142.100	59093	415.81	4		15
RDX	7.225	7.054	7.396	400.0	177.400	74735	421.25	5		15
1,3,5-TNB	9.792	9.594	9.990	400.0	418.400	171052	408.82	2		15
1,3-DNB	12.325	12.037	12.613	400.0	571.500	237569	415.67	4		15
Tetryl	13.408	13.020	13.796	400.0	303.800	126528	416.45	4		15
Nitrobenzene	14.525	14.195	14.855	400.0	420.800	171320	407.15	2		15
2,4,6-TNT	16.067	15.665	16.469	400.0	395.800	164214	414.84	4		15
4-AM-2,6-DNT	17.225	16.582	17.868	400.0	287.500	115915	403.24	1		15
2-AM-4,6-DNT	17.842	17.161	18.523	400.0	439.200	177469	404.04	1		15
2,6-DNT	19.383	18.826	19.940	400.0	269.200	108072	401.39	0		15
2,4-DNT	20.075	19.546	20.604	400.0	548.500	227147	414.09	4		15
2-Nitrotoluene	24.300	23.625	24.975	400.0	269.400	106017	393.48	-2		15
4-Nitrotoluene	26.358	25.564	27.152	400.0	233.700	93952	401.98	0		15
3-Nitrotoluene	28.258	27.460	29.056	400.0	277.100	117352	423.48	6		15
SURROGATE	MINUTES	FROM	TO	TRUECON	CF	AREA	CONC	%D	QL	LIMITS
1,2-Dinitrobenzene	10.667	10.529	10.805	400.0	289.800	119835	413.47	3		15
3,4-DNT	16.508	16.021	16.995	400.0	266.700	108188	405.69	1		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.036
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29083
Acquired : Apr 28, 2015 08:59:43
Printed : Apr 28, 2015 10:13:30
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.675	59093	142.1	415.8
2	RDX	7.225	74735	177.4	421.2
3	1,3,5-TNB	9.792	171052	418.4	408.8
4	1,2-Dinitrobenzene	10.667	119835	289.8	413.5
5	1,3-DNB	12.325	237569	571.5	415.7
6	Tetryl	13.408	126528	303.8	416.4
7	Nitrobenzene	14.525	171320	420.8	407.2
8	2,4,6-TNT	16.067	164214	395.8	414.8
9	3,4-DNT	16.508	108188	266.7	405.7
10	4-Am-2,6-DNT	17.225	115915	287.5	403.2
11	2-Am-4,6-DNT	17.842	177469	439.2	404.0
12	2,6-DNT	19.383	108072	269.2	401.4
13	2,4-DNT	20.075	227147	548.5	414.1
14	2-Nitrotoluene	24.300	106017	269.4	393.5
15	4-Nitrotoluene	26.358	93952	233.7	402.0
16	3-Nitrotoluene	28.258	117352	277.1	423.5



CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD27047A 04/28/2015 15:15
CONC UNIT : ppb

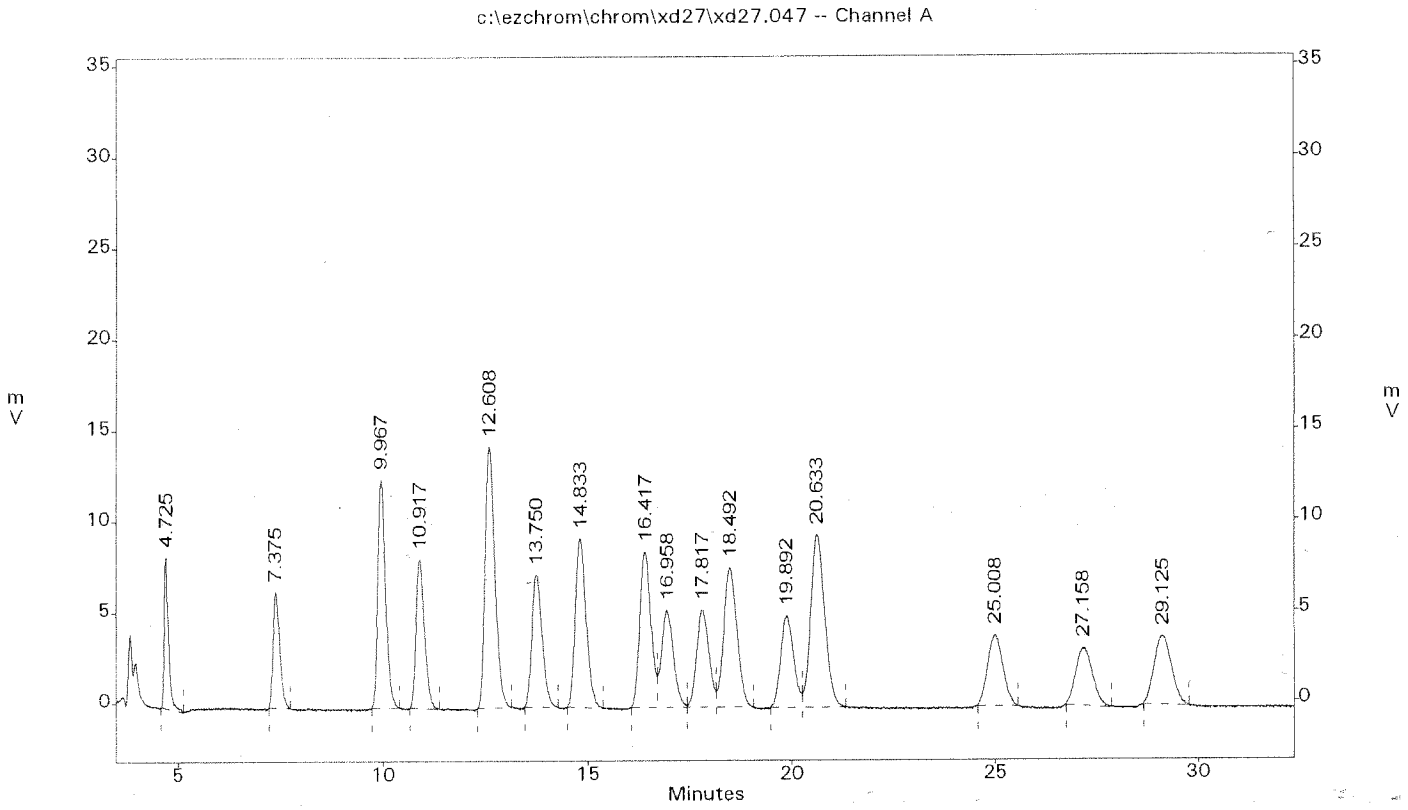
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.725	4.659	4.791	400.0	142.100	60071	422.69	6		15
RDX	7.375	7.204	7.546	400.0	177.400	74171	418.07	5		15
1,3,5-TNB	9.967	9.769	10.165	400.0	418.400	171109	408.96	2		15
1,3-DNB	12.608	12.320	12.896	400.0	571.500	238709	417.66	4		15
Tetryl	13.750	13.362	14.138	400.0	303.800	127563	419.85	5		15
Nitrobenzene	14.833	14.503	15.163	400.0	420.800	173395	412.08	3		15
2,4,6-TNT	16.417	16.015	16.819	400.0	395.800	163971	414.23	4		15
4-AM-2,6-DNT	17.817	17.174	18.460	400.0	287.500	114821	399.43	-0		15
2-AM-4,6-DNT	18.492	17.811	19.173	400.0	439.200	175954	400.59	0		15
2,6-DNT	19.892	19.335	20.449	400.0	269.200	113570	421.82	5		15
2,4-DNT	20.633	20.104	21.162	400.0	548.500	231506	422.04	6		15
2-Nitrotoluene	25.008	24.333	25.683	400.0	269.400	104215	386.80	-3		15
4-Nitrotoluene	27.158	26.364	27.952	400.0	233.700	92779	396.96	-1		15
3-Nitrotoluene	29.125	28.327	29.923	400.0	277.100	113571	409.83	2		15
SURROGATE	**MINUTES**	**FROM**	**TO**	**TRUECON**	**CF**	**AREA**	**CONC**	**%D**	**QL**	**LIMITS**
1,2-Dinitrobenzene	10.917	10.779	11.055	400.0	289.800	118907	410.27	3		15
3,4-DNT	16.958	16.471	17.445	400.0	266.700	110858	415.71	4		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.047
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29084
Acquired : Apr 28, 2015 15:15:28
Printed : Apr 28, 2015 15:48:13
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.725	60071	142.1	422.7
2	RDX	7.375	74171	177.4	418.1
3	1,3,5-TNB	9.967	171109	418.4	409.0
4	1,2-Dinitrobenzene	10.917	118907	289.8	410.3
5	1,3-DNB	12.608	238709	571.5	417.7
6	Tetryl	13.750	127563	303.8	419.9
7	Nitrobenzene	14.833	173395	420.8	412.1
8	2,4,6-TNT	16.417	163971	395.8	414.2
9	3,4-DNT	16.958	110858	266.7	415.7
10	4-Am-2,6-DNT	17.817	114821	287.5	399.4
11	2-Am-4,6-DNT	18.492	175954	439.2	400.6
12	2,6-DNT	19.892	113570	269.2	421.8
13	2,4-DNT	20.633	231506	548.5	422.0
14	2-Nitrotoluene	25.008	104215	269.4	386.8
15	4-Nitrotoluene	27.158	92779	233.7	397.0
16	3-Nitrotoluene	29.125	113571	277.1	409.8



CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Columm : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD27058A 04/28/2015 21:31
CONC UNIT : ppb

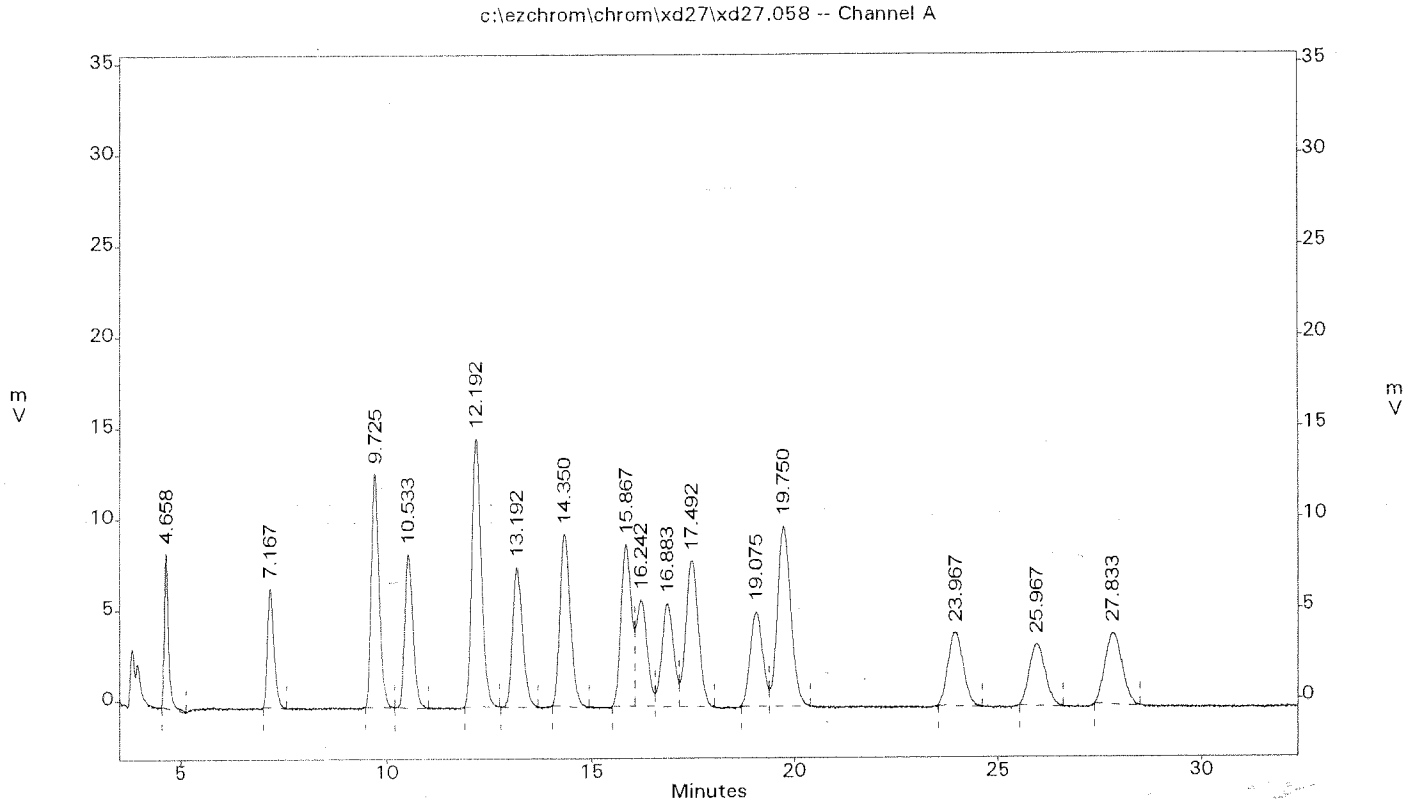
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.658	4.592	4.724	400.0	142.100	60009	422.25	6		15
RDX	7.167	6.996	7.338	400.0	177.400	75184	423.78	6		15
1,3,5-TNB	9.725	9.527	9.923	400.0	418.400	171340	409.51	2		15
1,3-DNB	12.192	11.904	12.480	400.0	571.500	237936	416.31	4		15
Tetryl	13.192	12.804	13.580	400.0	303.800	132295	435.43	9		15
Nitrobenzene	14.350	14.020	14.680	400.0	420.800	171977	408.71	2		15
2,4,6-TNT	15.867	15.465	16.269	400.0	395.800	160430	405.28	1		15
4-AM-2,6-DNT	16.883	16.240	17.526	400.0	287.500	115557	401.99	0		15
2-AM-4,6-DNT	17.492	16.811	18.173	400.0	439.200	175542	399.65	-0		15
2,6-DNT	19.075	18.518	19.632	400.0	269.200	110116	408.99	2		15
2,4-DNT	19.750	19.221	20.279	400.0	548.500	231446	421.93	5		15
2-Nitrotoluene	23.967	23.292	24.642	400.0	269.400	106797	396.38	-1		15
4-Nitrotoluene	25.967	25.173	26.761	400.0	233.700	94904	406.05	2		15
3-Nitrotoluene	27.833	27.035	28.631	400.0	277.100	115377	416.35	4		15
SURROGATE	MINUTES	FROM	TO	TRUECON	CF	AREA	CONC	%D	QL	LIMITS
1,2-Dinitrobenzene	10.533	10.395	10.671	400.0	289.800	120843	416.95	4		15
3,4-DNT	16.242	15.755	16.729	400.0	266.700	111991	419.95	5		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.058
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29085
Acquired : Apr 28, 2015 21:31:09
Printed : Apr 29, 2015 09:54:47
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	60009	142.1	422.3
2	RDX	7.167	75184	177.4	423.8
3	1,3,5-TNB	9.725	171340	418.4	409.5
4	1,2-Dinitrobenzene	10.533	120843	289.8	417.0
5	1,3-DNB	12.192	237936	571.5	416.3
6	Tetryl	13.192	132295	303.8	435.4
7	Nitrobenzene	14.350	171977	420.8	408.7
8	2,4,6-TNT	15.867	160430	395.8	405.3
9	3,4-DNT	16.242	111991	266.7	420.0
10	4-Am-2,6-DNT	16.883	115557	287.5	402.0
11	2-Am-4,6-DNT	17.492	175542	439.2	399.7
12	2,6-DNT	19.075	110116	269.2	409.0
13	2,4-DNT	19.750	231446	548.5	421.9
14	2-Nitrotoluene	23.967	106797	269.4	396.4
15	4-Nitrotoluene	25.967	94904	233.7	406.1
16	3-Nitrotoluene	27.833	115377	277.1	416.4



CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD27070A 04/29/2015 04:20
CONC UNIT : ppb

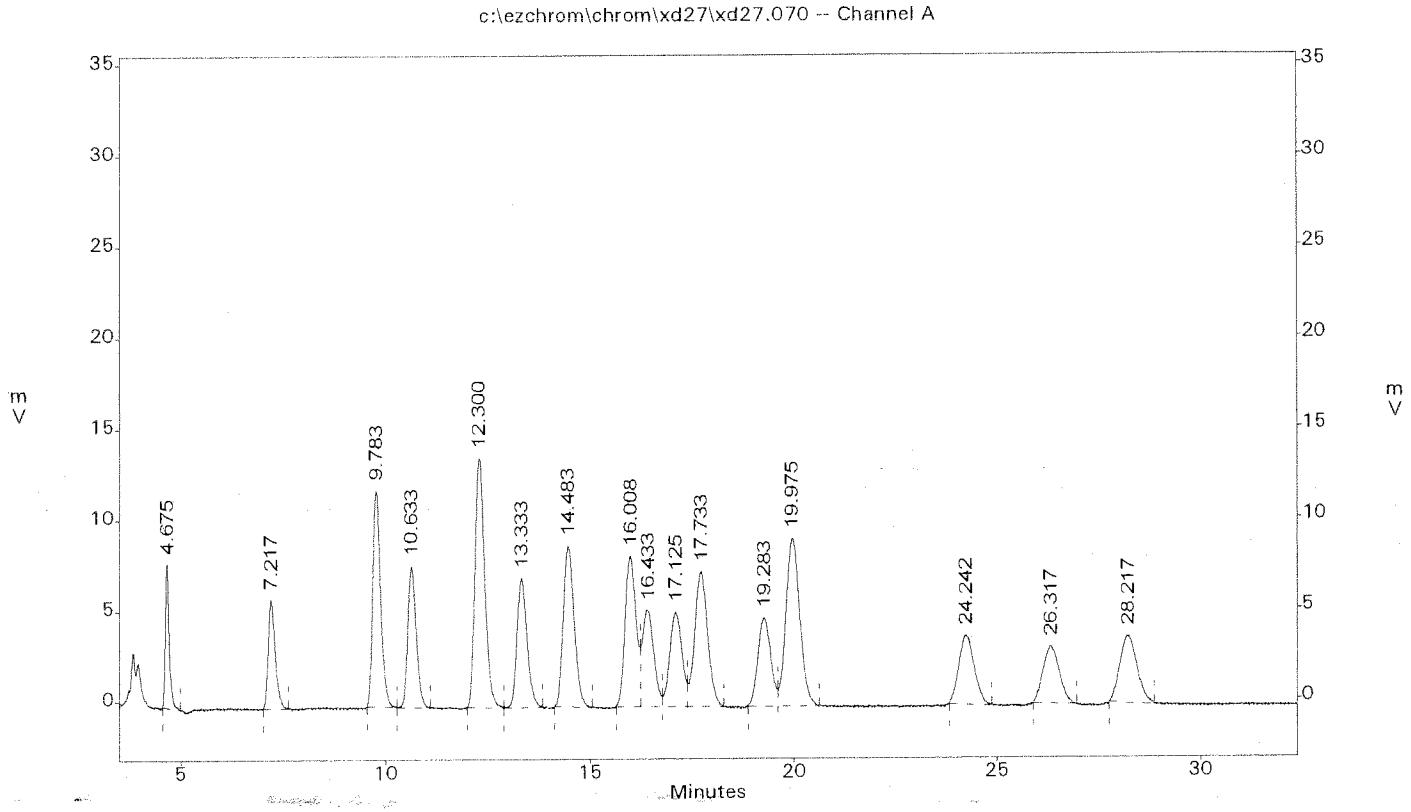
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.675	4.609	4.741	400.0	142.100	54291	382.02	-4		15
RDX	7.217	7.046	7.388	400.0	177.400	71795	404.68	1		15
1,3,5-TNB	9.783	9.585	9.981	400.0	418.400	162645	388.73	-3		15
1,3-DNB	12.300	12.012	12.588	400.0	571.500	229846	402.15	1		15
Tetryl	13.333	12.945	13.721	400.0	303.800	125844	414.19	4		15
Nitrobenzene	14.483	14.153	14.813	400.0	420.800	165368	393.01	-2		15
2,4,6-TNT	16.008	15.606	16.410	400.0	395.800	156227	394.67	-1		15
4-AM-2,6-DNT	17.125	16.482	17.768	400.0	287.500	109808	381.99	-5		15
2-AM-4,6-DNT	17.733	17.052	18.414	400.0	439.200	169612	386.15	-3		15
2,6-DNT	19.283	18.726	19.840	400.0	269.200	107532	399.39	-0		15
2,4-DNT	19.975	19.446	20.504	400.0	548.500	222372	405.39	1		15
2-Nitrotoluene	24.242	23.567	24.917	400.0	269.400	102349	379.87	-5		15
4-Nitrotoluene	26.317	25.523	27.111	400.0	233.700	87547	374.58	-6		15
3-Nitrotoluene	28.217	27.419	29.015	400.0	277.100	111731	403.19	1		15
SURROGATE	MINUTES	FROM	TO	TRUECON	CF	AREA	CONC	%D	QL	LIMITS
1,2-Dinitrobenzene	10.633	10.495	10.771	400.0	289.800	114115	393.74	-2		15
3,4-DNT	16.433	15.946	16.920	400.0	266.700	105107	394.14	-1		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.070
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29086
Acquired : Apr 29, 2015 04:20:51
Printed : Apr 29, 2015 10:00:01
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.675	54291	142.1	382.0
2	RDX	7.217	71795	177.4	404.7
3	1,3,5-TNB	9.783	162645	418.4	388.7
4	1,2-Dinitrobenzene	10.633	114115	289.8	393.7
5	1,3-DNB	12.300	229846	571.5	402.2
6	Tetryl	13.333	125844	303.8	414.2
7	Nitrobenzene	14.483	165368	420.8	393.0
8	2,4,6-TNT	16.008	156227	395.8	394.7
9	3,4-DNT	16.433	105107	266.7	394.1
10	4-Am-2,6-DNT	17.125	109808	287.5	382.0
11	2-Am-4,6-DNT	17.733	169612	439.2	386.2
12	2,6-DNT	19.283	107532	269.2	399.4
13	2,4-DNT	19.975	222372	548.5	405.4
14	2-Nitrotoluene	24.242	102349	269.4	379.9
15	4-Nitrotoluene	26.317	87547	233.7	374.6
16	3-Nitrotoluene	28.217	111731	277.1	403.2



6125

CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD27081A 04/29/2015 10:36
CONC UNIT : ppb

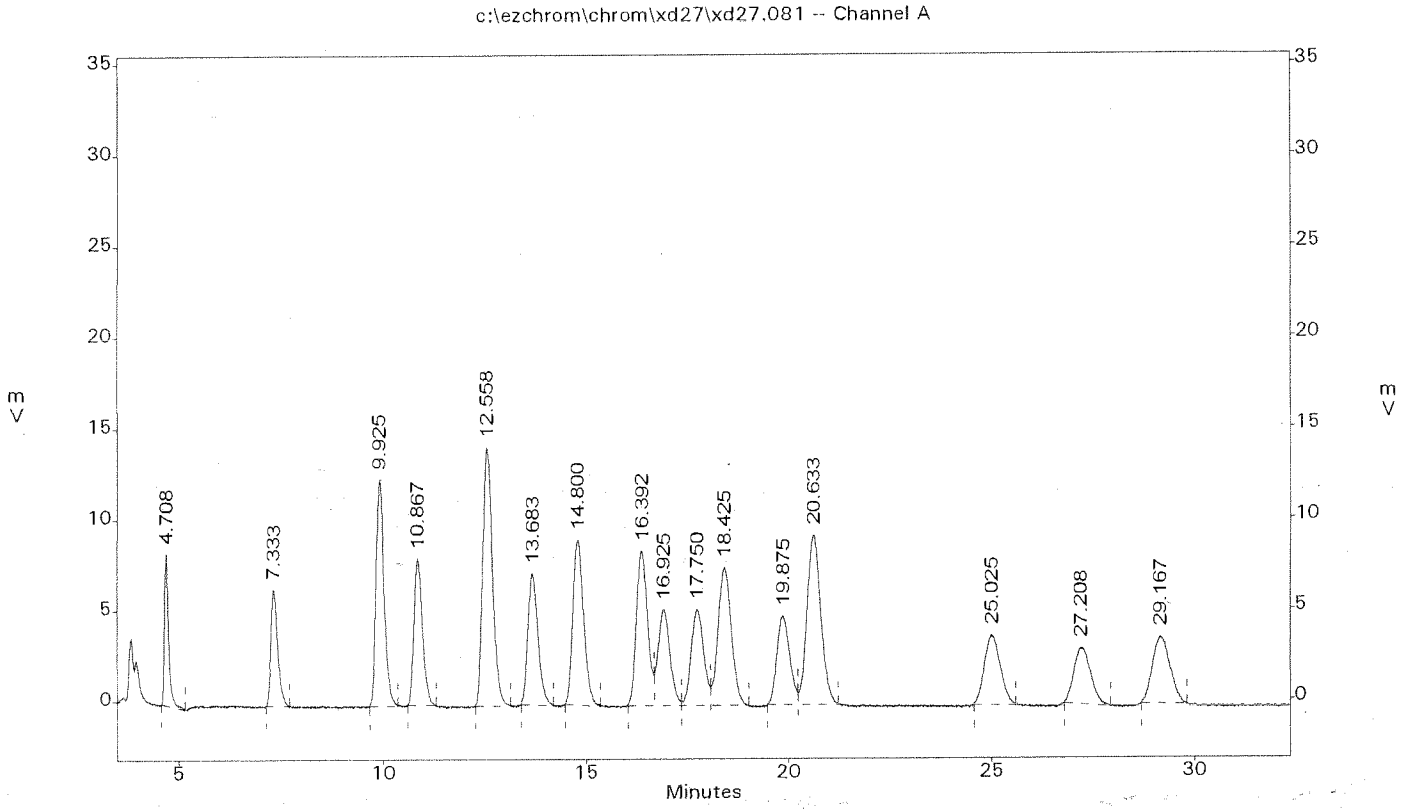
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.708	4.642	4.774	400.0	142.100	59705	420.11	5		15
RDX	7.333	7.162	7.504	400.0	177.400	74869	422.01	6		15
1,3,5-TNB	9.925	9.727	10.123	400.0	418.400	172385	412.01	3		15
1,3-DNB	12.558	12.270	12.846	400.0	571.500	238250	416.86	4		15
Tetryl	13.683	13.295	14.071	400.0	303.800	127276	418.91	5		15
Nitrobenzene	14.800	14.470	15.130	400.0	420.800	170210	404.52	1		15
2,4,6-TNT	16.392	15.990	16.794	400.0	395.800	164890	416.55	4		15
4-AM-2,6-DNT	17.750	17.107	18.393	400.0	287.500	115880	403.11	1		15
2-AM-4,6-DNT	18.425	17.744	19.106	400.0	439.200	176186	401.12	0		15
2,6-DNT	19.875	19.318	20.432	400.0	269.200	109407	406.35	2		15
2,4-DNT	20.633	20.104	21.162	400.0	548.500	226540	412.99	3		15
2-Nitrotoluene	25.025	24.350	25.700	400.0	269.400	103875	385.53	-4		15
4-Nitrotoluene	27.208	26.414	28.002	400.0	233.700	91538	391.65	-2		15
3-Nitrotoluene	29.167	28.369	29.965	400.0	277.100	111918	403.87	1		15
SURROGATE	**MINUTES**	**FROM**	**TO**	**TRUECON**	**CF**	**AREA**	**CONC**	**%D**	**QL**	**LIMITS**
1,2-Dinitrobenzene	10.867	10.729	11.005	400.0	289.800	116731	402.76	1		15
3,4-DNT	16.925	16.438	17.412	400.0	266.700	109845	411.91	3		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.081
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29087
Acquired : Apr 29, 2015 10:36:28
Printed : Apr 29, 2015 11:12:17
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.708	59705	142.1	420.1
2	RDX	7.333	74869	177.4	422.0
3	1,3,5-TNB	9.925	172385	418.4	412.0
4	1,2-Dinitrobenzene	10.867	116731	289.8	402.8
5	1,3-DNB	12.558	238250	571.5	416.9
6	Tetryl	13.683	127276	303.8	418.9
7	Nitrobenzene	14.800	170210	420.8	404.5
8	2,4,6-TNT	16.392	164890	395.8	416.6
9	3,4-DNT	16.925	109845	266.7	411.9
10	4-Am-2,6-DNT	17.750	115880	287.5	403.1
11	2-Am-4,6-DNT	18.425	176186	439.2	401.1
12	2,6-DNT	19.875	109407	269.2	406.4
13	2,4-DNT	20.633	226540	548.5	413.0
14	2-Nitrotoluene	25.025	103875	269.4	385.5
15	4-Nitrotoluene	27.208	91538	233.7	391.7
16	3-Nitrotoluene	29.167	111918	277.1	403.9



CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD27090A 04/29/2015 15:43
CONC UNIT : ppb

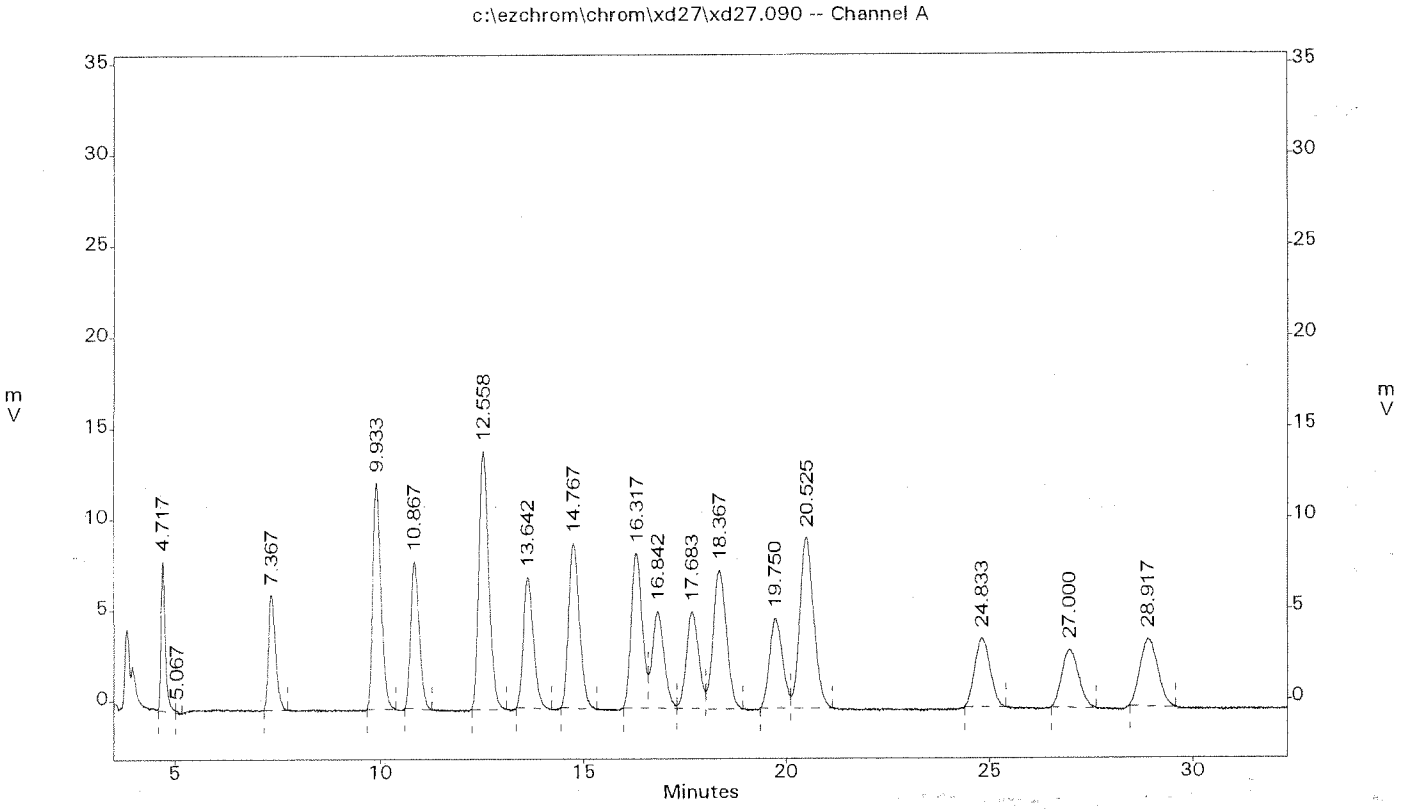
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.717	4.651	4.783	400.0	142.100	60120	423.03	6		15
RDX	7.367	7.196	7.538	400.0	177.400	75110	423.36	6		15
1,3,5-TNB	9.933	9.735	10.131	400.0	418.400	170731	408.05	2		15
1,3-DNB	12.558	12.270	12.846	400.0	571.500	237335	415.26	4		15
Tetryl	13.642	13.254	14.030	400.0	303.800	125478	412.99	3		15
Nitrobenzene	14.767	14.437	15.097	400.0	420.800	169038	401.73	0		15
2,4,6-TNT	16.317	15.915	16.719	400.0	395.800	161972	409.18	2		15
4-AM-2,6-DNT	17.683	17.040	18.326	400.0	287.500	114392	397.94	-1		15
2-AM-4,6-DNT	18.367	17.686	19.048	400.0	439.200	175065	398.57	-0		15
2,6-DNT	19.750	19.193	20.307	400.0	269.200	110307	409.70	2		15
2,4-DNT	20.525	19.996	21.054	400.0	548.500	228023	415.69	4		15
2-Nitrotoluene	24.833	24.158	25.508	400.0	269.400	100479	372.93	-7		15
4-Nitrotoluene	27.000	26.206	27.794	400.0	233.700	92802	397.06	-1		15
3-Nitrotoluene	28.917	28.119	29.715	400.0	277.100	111607	402.75	1		15
SURROGATE	**MINUTES**	**FROM**	**TO**	**TRUECON**	**CF**	**AREA**	**CONC**	**%D**	**QL**	**LIMITS**
1,2-Dinitrobenzene	10.867	10.729	11.005	400.0	289.800	117340	404.87	1		15
3,4-DNT	16.842	16.355	17.329	400.0	266.700	109633	411.11	3		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.090
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29088
Acquired : Apr 29, 2015 15:43:46
Printed : Apr 29, 2015 16:24:22
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.717	60120	142.1	423.0
3	RDX	7.367	75110	177.4	423.4
4	1,3,5-TNB	9.933	170731	418.4	408.1
5	1,2-Dinitrobenzene	10.867	117340	289.8	404.9
6	1,3-DNB	12.558	237335	571.5	415.3
7	Tetryl	13.642	125478	303.8	413.0
8	Nitrobenzene	14.767	169038	420.8	401.7
9	2,4,6-TNT	16.317	161972	395.8	409.2
10	3,4-DNT	16.842	109633	266.7	411.1
11	4-Am-2,6-DNT	17.683	114392	287.5	397.9
12	2-Am-4,6-DNT	18.367	175065	439.2	398.6
13	2,6-DNT	19.750	110307	269.2	409.7
14	2,4-DNT	20.525	228023	548.5	415.7
15	2-Nitrotoluene	24.833	100479	269.4	372.9
16	4-Nitrotoluene	27.000	92802	233.7	397.1
17	3-Nitrotoluene	28.917	111607	277.1	402.7



CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD27099A 04/29/2015 20:51
CONC UNIT : ppb

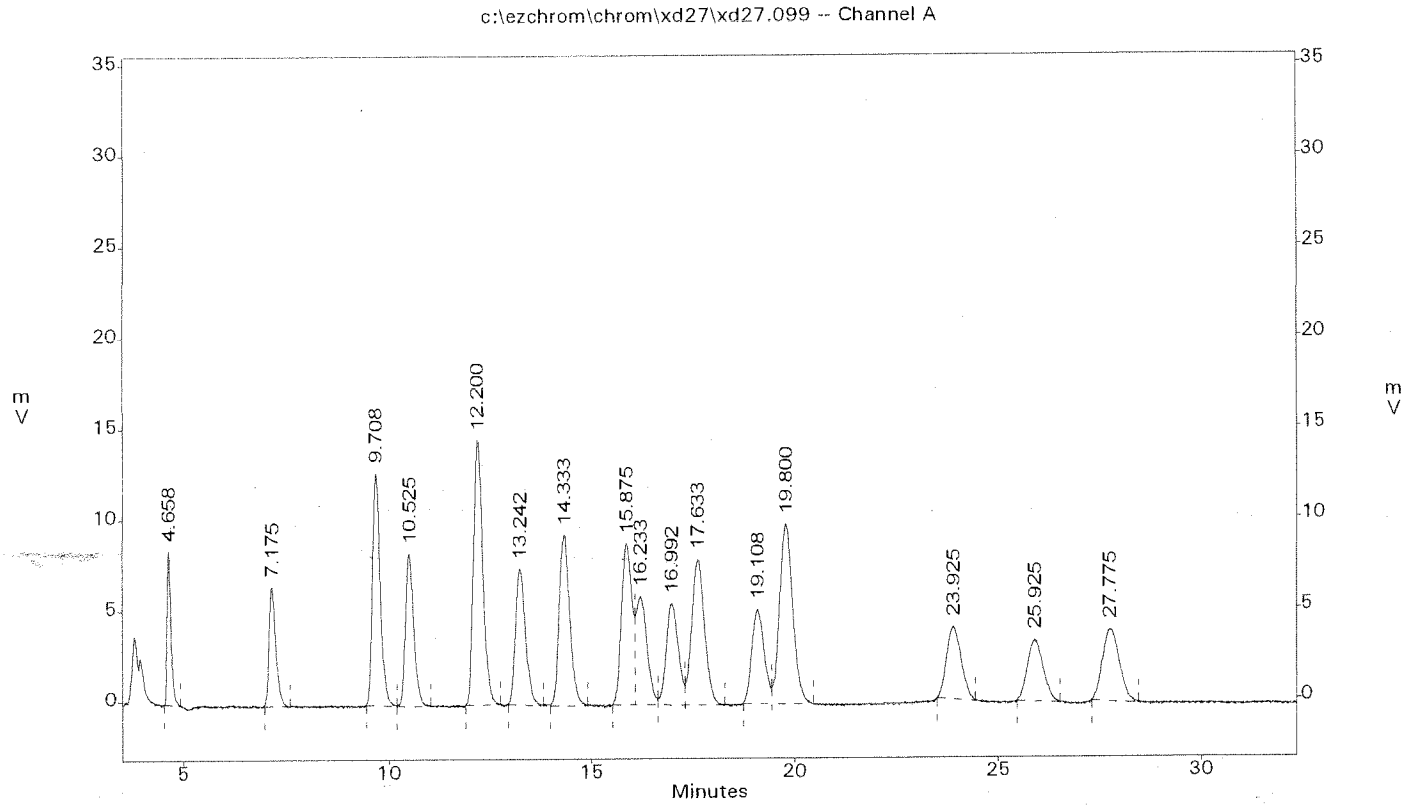
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.658	4.592	4.724	400.0	142.100	56920	400.52	0		15
RDX	7.175	7.004	7.346	400.0	177.400	76497	431.18	8		15
1,3,5-TNB	9.708	9.510	9.906	400.0	418.400	171953	410.97	3		15
1,3-DNB	12.200	11.912	12.488	400.0	571.500	237742	415.97	4		15
Tetryl	13.242	12.854	13.630	400.0	303.800	129522	426.30	7		15
Nitrobenzene	14.333	14.003	14.663	400.0	420.800	173075	411.32	3		15
2,4,6-TNT	15.875	15.473	16.277	400.0	395.800	161586	408.20	2		15
4-AM-2,6-DNT	16.992	16.349	17.635	400.0	287.500	117284	408.00	2		15
2-AM-4,6-DNT	17.633	16.952	18.314	400.0	439.200	178109	405.50	1		15
2,6-DNT	19.108	18.551	19.665	400.0	269.200	110111	408.97	2		15
2,4-DNT	19.800	19.271	20.329	400.0	548.500	229234	417.90	4		15
2-Nitrotoluene	23.925	23.250	24.600	400.0	269.400	101575	377.00	-6		15
4-Nitrotoluene	25.925	25.131	26.719	400.0	233.700	92758	396.87	-1		15
3-Nitrotoluene	27.775	26.977	28.573	400.0	277.100	115381	416.37	4		15
SURROGATE	**MINUTES**	**FROM**	**TO**	**TRUECON**	**CF**	**AREA**	**CONC**	**%D**	**QL**	**LIMITS**
1,2-Dinitrobenzene	10.525	10.387	10.663	400.0	289.800	121489	419.18	5		15
3,4-DNT	16.233	15.746	16.720	400.0	266.700	113534	425.74	6		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.099
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29089
Acquired : Apr 29, 2015 20:51:36
Printed : Apr 30, 2015 09:53:41
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	56920	142.1	400.5
2	RDX	7.175	76497	177.4	431.2
3	1,3,5-TNB	9.708	171953	418.4	411.0
4	1,2-Dinitrobenzene	10.525	121489	289.8	419.2
5	1,3-DNB	12.200	237742	571.5	416.0
6	Tetryl	13.242	129522	303.8	426.3
7	Nitrobenzene	14.333	173075	420.8	411.3
8	2,4,6-TNT	15.875	161586	395.8	408.2
9	3,4-DNT	16.233	113534	266.7	425.7
10	4-Am-2,6-DNT	16.992	117284	287.5	408.0
11	2-Am-4,6-DNT	17.633	178109	439.2	405.5
12	2,6-DNT	19.108	110111	269.2	409.0
13	2,4-DNT	19.800	229234	548.5	417.9
14	2-Nitrotoluene	23.925	101575	269.4	377.0
15	4-Nitrotoluene	25.925	92758	233.7	396.9
16	3-Nitrotoluene	27.775	115381	277.1	416.4



CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001 (T081)
GC Column : VARIAN C18
Column size ID : 15CMX4.6MM
Mid Conc Init LFID & Datetime: XA29008A 01/29/2015 21:27
Conc Cont LFID & Datetime: XD27107A 04/30/2015 01:25
CONC UNIT : ppb

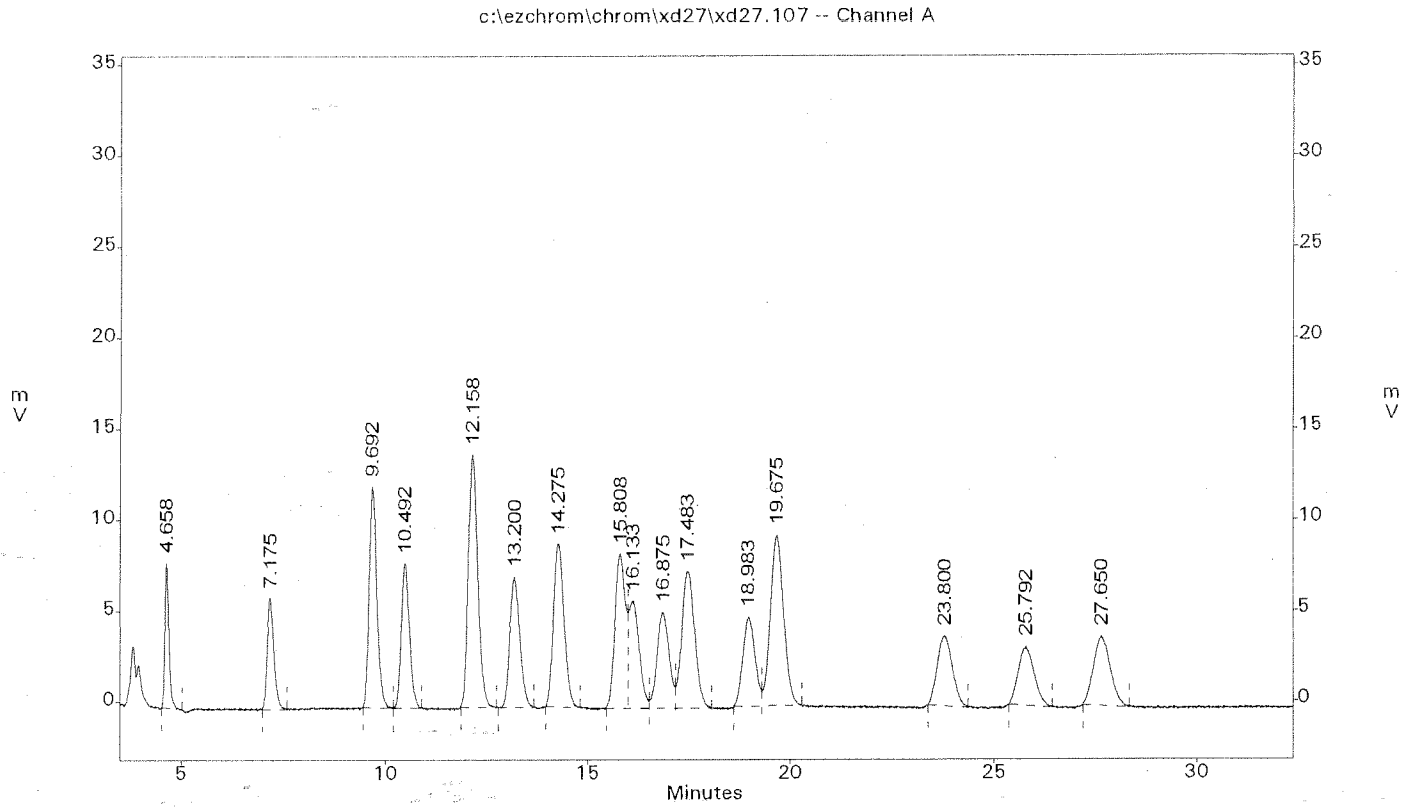
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
HMX	4.658	4.592	4.724	400.0	142.100	54922	386.46	-3		15
RDX	7.175	7.004	7.346	400.0	177.400	72794	410.31	3		15
1,3,5-TNB	9.692	9.494	9.890	400.0	418.400	164093	392.19	-2		15
1,3-DNB	12.158	11.870	12.446	400.0	571.500	227610	398.24	-0		15
Tetryl	13.200	12.812	13.588	400.0	303.800	123271	405.73	1		15
Nitrobenzene	14.275	13.945	14.605	400.0	420.800	163732	389.12	-3		15
2,4,6-TNT	15.808	15.406	16.210	400.0	395.800	154115	389.33	-3		15
4-AM-2,6-DNT	16.875	16.232	17.518	400.0	287.500	111504	387.89	-3		15
2-AM-4,6-DNT	17.483	16.802	18.164	400.0	439.200	168450	383.51	-4		15
2,6-DNT	18.983	18.426	19.540	400.0	269.200	105284	391.04	-2		15
2,4-DNT	19.675	19.146	20.204	400.0	548.500	217922	397.28	-1		15
2-Nitrotoluene	23.800	23.125	24.475	400.0	269.400	99819	370.48	-7		15
4-Nitrotoluene	25.792	24.998	26.586	400.0	233.700	88198	377.36	-6		15
3-Nitrotoluene	27.650	26.852	28.448	400.0	277.100	112108	404.55	1		15
SURROGATE	MINUTES	FROM	TO	TRUECON	CF	AREA	CONC	%D	QL	LIMITS
1,2-Dinitrobenzene	10.492	10.354	10.630	400.0	289.800	114897	396.44	-1		15
3,4-DNT	16.133	15.646	16.620	400.0	266.700	109858	411.96	3		15

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.107
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : CEX81A29090
Acquired : Apr 30, 2015 01:25:17
Printed : Apr 30, 2015 09:59:16
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.658	54922	142.1	386.5
2	RDX	7.175	72794	177.4	410.3
3	1,3,5-TNB	9.692	164093	418.4	392.2
4	1,2-Dinitrobenzene	10.492	114897	289.8	396.4
5	1,3-DNB	12.158	227610	571.5	398.2
6	Tetryl	13.200	123271	303.8	405.7
7	Nitrobenzene	14.275	163732	420.8	389.1
8	2,4,6-TNT	15.808	154115	395.8	389.3
9	3,4-DNT	16.133	109858	266.7	412.0
10	4-Am-2,6-DNT	16.875	111504	287.5	387.9
11	2-Am-4,6-DNT	17.483	168450	439.2	383.5
12	2,6-DNT	18.983	105284	269.2	391.0
13	2,4-DNT	19.675	217922	548.5	397.3
14	2-Nitrotoluene	23.800	99819	269.4	370.5
15	4-Nitrotoluene	25.792	88198	233.7	377.4
16	3-Nitrotoluene	27.650	112108	277.1	404.6



CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001(T017)
GC Column : KINETEX 5U BIPHENYL
Column size ID : 250MM X 4.6MM
Mid Conc Init LFID & Datetime: PA20006A 01/20/2015 15:53
Conc Cont LFID & Datetime: PD29002A 04/29/2015 12:22
CONC UNIT : ppb

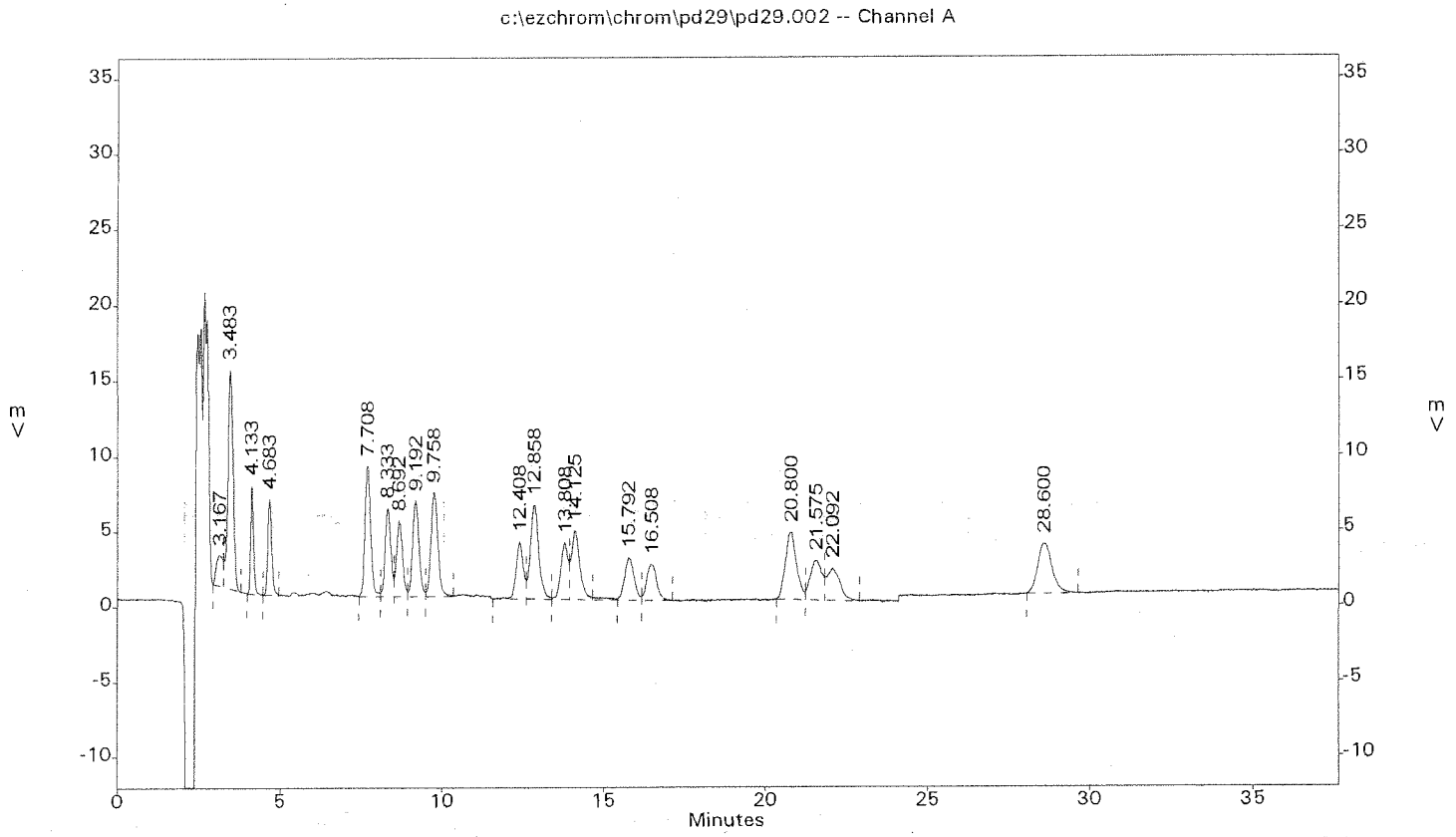
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
2,4/2,6-DANT	3.483	3.298	3.668	400.0	374.200	155761	416.22	4		15
HMX	4.133	3.919	4.347	200.0	261.400	48440	185.33	-7		15
RDX	4.683	4.445	4.921	200.0	281.500	52125	185.20	-7		15
3,5-Dinitroaniline	7.708	7.307	8.109	200.0	552.500	108890	197.07	-1		15
Nitrobenzene	8.333	7.920	8.746	200.0	356.400	72375	203.07	2		15
4-AM-2,6-DNT	9.192	8.693	9.691	200.0	436.800	87185	199.60	-0		15
2-AM-4,6-DNT	9.758	9.234	10.282	200.0	518.100	103319	199.42	-0		15
2-Nitrotoluene	12.408	11.749	13.067	200.0	294.100	60141	204.51	2		15
1,3-DNB	12.858	12.164	13.552	200.0	570.500	115258	202.04	1		15
4-Nitrotoluene	13.808	13.057	14.559	200.0	333.600	59268	177.67	-11		15
3-Nitrotoluene	14.125	13.326	14.924	200.0	420.600	84528	200.96	0		15
2,6-DNT	16.508	15.480	17.536	200.0	262.900	52844	201.03	1		15
2,4-DNT	20.800	19.406	22.194	200.0	506.600	107794	212.78	6		15
1,3,5-TNB	21.575	20.251	22.899	200.0	320.600	66754	208.21	4		15
Tetryl	22.092	20.353	23.831	200.0	279.900	60351	215.58	8		15
2,4,6-TNT	28.600	26.511	30.689	200.0	519.600	103090	198.39	-1		15
SURROGATE	MINUTES	FROM	TO	TRUECON	CF	AREA	CONC	%D	QL	LIMITS
1,2-Dinitrobenzene	8.692	8.238	9.146	200.0	364.500	65279	179.08	-10		15
3,4-DNT	15.792	14.781	16.803	200.0	267.200	58453	218.77	9		15

Method 8330 Column: Kinetex 5u Biphenyl
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\pd29\pd29.002
Method : c:\ezchrom\methods\ex17a20c.met
Sample ID : CEX17A20C038
Acquired : Apr 29, 2015 12:22:43
Printed : Apr 29, 2015 15:32:57
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
2	2,4/2,6-DANT	3.483	155761	374.2	416.2
3	HMX	4.133	48440	261.4	185.3
4	RDX	4.683	52125	281.5	185.2
5	3,5-Dinitroaniline	7.708	108890	552.5	197.1
6	Nitrobenzene	8.333	72375	356.4	203.1
7	1,2-Dinitrobenzene	8.692	65279	364.5	179.1
8	4-Am-2,6-DNT	9.192	87185	436.8	199.6
9	2-Am-4,6-DNT	9.758	103319	518.1	199.4
10	2-Nitrotoluene	12.408	60141	294.1	204.5
11	1,3-DNB	12.858	115258	570.5	202.0
12	4-Nitrotoluene	13.808	59268	333.6	177.7
13	3-Nitrotoluene	14.125	84528	420.6	201.0
14	3,4-DNT	15.792	58453	267.2	218.8
15	2,6-DNT	16.508	52844	262.9	201.0
16	2,4-DNT	20.800	107794	506.6	212.8
17	1,3,5-TNB	21.575	66754	320.6	208.2
18	Tetryl	22.092	60351	279.9	215.6
19	2,4,6-TNT	28.600	103090	519.6	198.4



6135

CONTINUE CALIBRATION
METHOD 8330

Lab Name : EMAX Inc
Instrument ID : HPLC1 LCT001(T017)
GC Columm : KINETEX 5U BIPHENYL
Column size ID : 250MM X 4.6MM
Mid Conc Init LFID & Datetime: PA20006A 01/20/2015 15:53
Conc Cont LFID & Datetime: PD29007A 04/29/2015 15:44
CONC UNIT : ppb

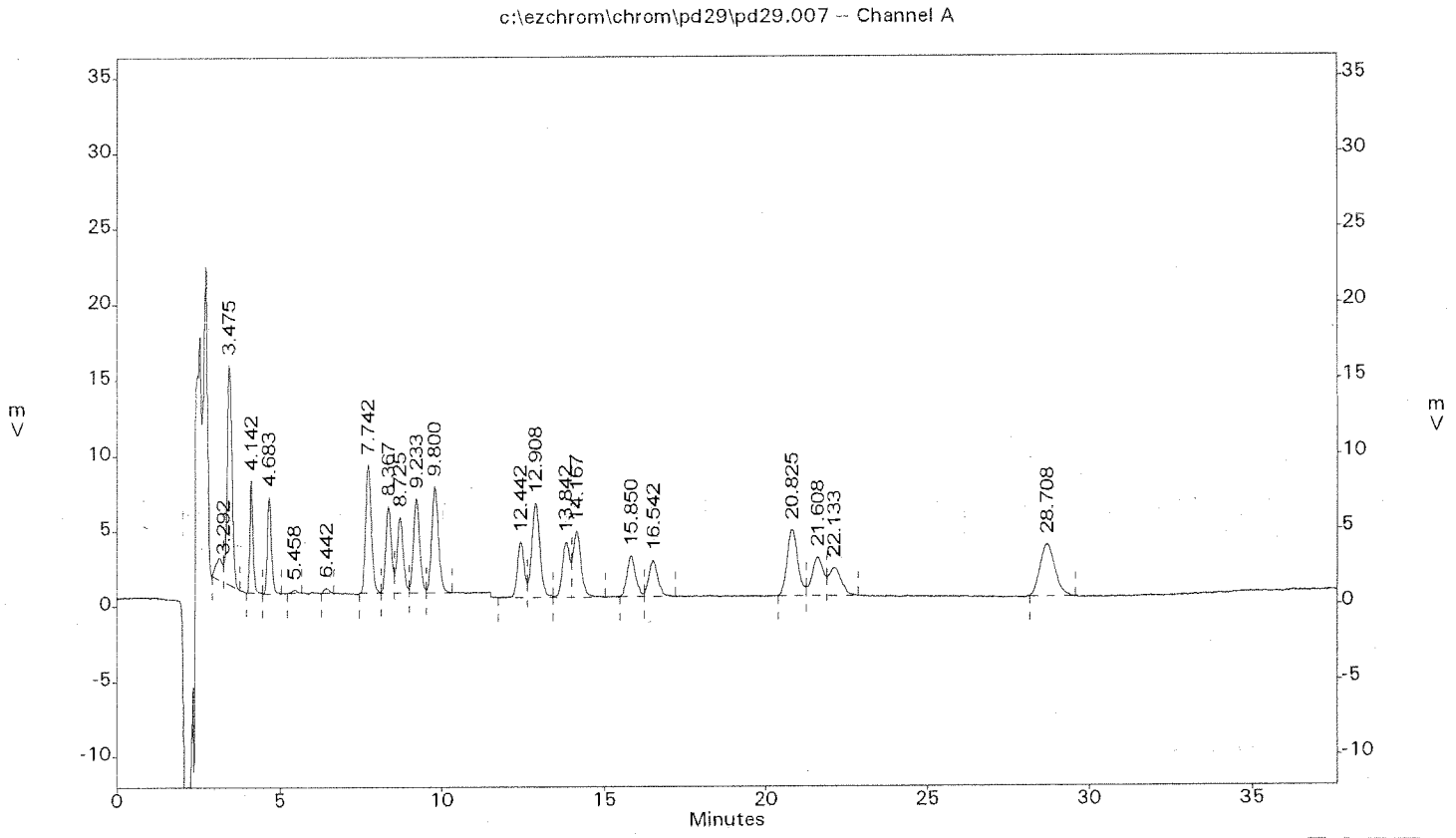
COMPOUND	RT MINUTES	RT WINDOW FROM	RT WINDOW TO	TRUE CONC	AVERAGE CF	RESULT AREA	RESULT CONC	%D	QL	%D LIMITS
2,4/2,6-DANT	3.475	3.290	3.660	400.0	374.200	151134	403.86	1		15
HMX	4.142	3.928	4.356	200.0	261.400	50559	193.43	-3		15
RDX	4.683	4.445	4.921	200.0	281.500	54019	191.93	-4		15
3,5-Dinitroaniline	7.742	7.341	8.143	200.0	552.500	108412	196.21	-2		15
Nitrobenzene	8.367	7.954	8.780	200.0	356.400	71795	201.45	1		15
4-AM-2,6-DNT	9.233	8.734	9.732	200.0	436.800	86438	197.89	-1		15
2-AM-4,6-DNT	9.800	9.276	10.324	200.0	518.100	102664	198.16	-1		15
2-Nitrotoluene	12.442	11.783	13.101	200.0	294.100	53976	183.55	-8		15
1,3-DNB	12.908	12.214	13.602	200.0	570.500	108480	190.15	-5		15
4-Nitrotoluene	13.842	13.091	14.593	200.0	333.600	58080	174.11	-13		15
3-Nitrotoluene	14.167	13.368	14.966	200.0	420.600	75646	179.85	-10		15
2,6-DNT	16.542	15.514	17.570	200.0	262.900	46809	178.07	-11		15
2,4-DNT	20.825	19.431	22.219	200.0	506.600	103795	204.89	2		15
1,3,5-TNB	21.608	20.284	22.932	200.0	320.600	63160	197.00	-2		15
Tetryl	22.133	20.394	23.872	200.0	279.900	50511	180.43	-10		15
2,4,6-TNT	28.708	26.619	30.797	200.0	519.600	112769	217.01	9		15
SURROGATE	MINUTES	FROM	TO	TRUECON	CF	AREA	CONC	%D	QL	LIMITS
1,2-Dinitrobenzene	8.725	8.271	9.179	200.0	364.500	67057	183.96	-8		15
3,4-DNT	15.850	14.839	16.861	200.0	267.200	48839	182.79	-9		15

Method 8330 Column: Kinetex 5u Biphenyl
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\pd29\pd29.007
Method : c:\ezchrom\methods\ex17a20c.met
Sample ID : CEX17A20C039
Acquired : Apr 29, 2015 15:44:39
Printed : Apr 29, 2015 16:33:17
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
2	2,4/2,6-DANT	3.475	151134	374.2	403.9
3	HMX	4.142	50559	261.4	193.4
4	RDX	4.683	54019	281.5	191.9
7	3,5-Dinitroaniline	7.742	108412	552.5	196.2
8	Nitrobenzene	8.367	71795	356.4	201.4
9	1,2-Dinitrobenzene	8.725	67057	364.5	184.0
10	4-Am-2,6-DNT	9.233	86438	436.8	197.9
11	2-Am-4,6-DNT	9.800	102664	518.1	198.2
12	2-Nitrotoluene	12.442	53976	294.1	183.5
13	1,3-DNB	12.908	108480	570.5	190.2
14	4-Nitrotoluene	13.842	58080	333.6	174.1
15	3-Nitrotoluene	14.167	75646	420.6	179.8
16	3,4-DNT	15.850	48839	267.2	182.8
17	2,6-DNT	16.542	46809	262.9	178.1
18	2,4-DNT	20.825	103795	506.6	204.9
19	1,3,5-TNB	21.608	63160	320.6	197.0
20	Tetryl	22.133	50511	279.9	180.4
21	2,4,6-TNT	28.708	112769	519.6	217.0



ANALYTICAL LOGS

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HPLC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

8330C ICAL

58% MeOH
41.5% H2O
1.5% ACN
flow: 1.0 mL/min
press: 3420 psi
inj: 50 µl
Col: Biphenyl (706U725-4) LG
Guard col: ATO-9207
Autosampler: method 8
Pump: method 8
Detector: table B
0.1 min - λ = 247 nm
11.6 min - λ = 254 nm
26.8 min - λ = 240 nm

Syringes: MSF-01-02-07
MSF-01-02-06

Book #:	A17-022
Instrument No.:	17
Analytical Sequence:	pa20
Method File:	ex17a20
Analytical Batch:	cex17a20001

SOP #	Rev. #
☑ EMAX-8330	7
☐ EMAX-8332	2
☐ EMAX-	

	STANDARDS ID	Conc. (µg/L)
ICAL	SHIC-07-70-03	10-~~5~~400 LG
ICV	SHIC-07-71-01	200
DCC	SHIC-07-68-03	200
DCC	—	—
IB	SHIC-07-67-03	n/a

SOLVENT	ID
Acetonitrile	SWIA-009-24
Methanol	21
Water	25

Data File	
ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ EZC_5_HPLC	
☐	

Analyzed By: LE

Date: 1/20/15

File Edit Method Batch Options Analysis Control Window Help

Method Data Batch Setup Batch Preview Single STOP Recalib Analyze Reports

Run	Run Type	Sample ID	Method	Filename	Level	Mult.	Description
1	Unknown	IB17A2001	ex17a20c.met	PA20.001	0	1	
2	Begin Calibration	EX17A20C01	ex17a20c.met	PA20.002	1	1	
3	Calibration	EX17A20C02	ex17a20c.met	PA20.003	2	1	
4	Calibration	EX17A20C03	ex17a20c.met	PA20.004	3	1	
5	Calibration	EX17A20C04	ex17a20c.met	PA20.005	4	1	
6	Calibration	EX17A20C05	ex17a20c.met	PA20.006	5	1	
7	End Calibration	EX17A20C06	ex17a20c.met	PA20.007	6	1	
8	Unknown	IEX17A20C01	ex17a20c.met	PA20.008	0	1	
9	Unknown	CEX17A20C001	ex17a20c.met	PA20.009	0	1	
10	Unknown	P	ex17a20c.met	PA20.010	0	1	FINAL
11	Unknown	P	ex17a20c.met	PA20.011	0	1	
12	Unknown	P	ex17a20c.met	PA20.012	0	1	
13	Unknown	P	ex17a20c.met	PA20.013	0	1	
14	Unknown	P	ex17a20c.met	PA20.014	0	1	
15	Unknown	P	ex17a20c.met	PA20.015	0	1	
16	Unknown	P	ex17a20c.met	PA20.016	0	1	
17	Unknown	P	ex17a20c.met	PA20.017	0	1	
18	Unknown	P	ex17a20c.met	PA20.018	0	1	
19	Unknown	P	ex17a20c.met	PA20.019	0	1	
20	Unknown	P	ex17a20c.met	PA20.020	0	1	
21	Unknown	P	ex17a20c.met	PA20.021	0	1	
22	Unknown	P	ex17a20c.met	PA20.022	0	1	
23	Unknown	P	ex17a20c.met	PA20.023	0	1	
24	Unknown	P	ex17a20c.met	PA20.024	0	1	
25	Unknown	P	ex17a20c.met	PA20.025	0	1	
26	Unknown	P	ex17a20c.met	PA20.026	0	1	
27	Unknown	P	ex17a20c.met	PA20.027	0	1	
28	Unknown	P	ex17a20c.met	PA20.028	0	1	
29	Unknown	P	ex17a20c.met	PA20.029	0	1	
30	Unknown	P	ex17a20c.met	PA20.030	0	1	
31	Unknown	P	ex17a20c.met	PA20.031	0	1	
32	Unknown	P	ex17a20c.met	PA20.032	0	1	
33	Unknown	P	ex17a20c.met	PA20.033	0	1	
34	Unknown	P	ex17a20c.met	PA20.034	0	1	

Waiting For Trigger...

Start | Exploring - Chrom | EZChrom Chromat... | Method: Ex81a20... | Method: Ex17a... | Method: Ex17a20c... | Calculator | Document - WordP... | 5:13 PM

Tuesday, January 20, 201

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HPLC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

8330 ICAL
49% MeOH & 51% H2O
flow: 0.8 ml/min
press: 3500 psi
λ = 254 nm
inj: 50 µl
Col.: C18 (R008620005)
time: 33 min
Syringes: MSF01-02-07 (500µl)
↓ 06 (50µl)

EXA008W: LOQ & LOD
EXA011W: 15A111
EXA014W: 15A111
EXA013S: 15A107
↓ 15A122

Book #: A81-020
Instrument No.: 81
Analytical Sequence: xa29
Method File: ex81a29
Analytical Batch: cex81a29001

SOP #	Rev. #
☑ EMAX-8330	7
☐ EMAX-8332	2
☐ EMAX-	

	STANDARDS ID	Conc. (µg/L)
ICAL	SHIC-07-71-02	10-800
ICV	↓ 71-03	400
DCC	↓ 65-03	400
DCC	—	—
IB	SHIC-07-67-03	n/a

SOLVENT	ID
Acetonitrile	—
Methanol	SW1A-005-09-21
Water	↓ 25

Data File	
ELECTRONIC DATA ARCHIVAL	
Location	Date
☑ EZC_5_HPLC	2/2/15
☐	

Analyzed By: LC
Date: 01/29/15

Method: Ex81a2... 2.015 - [Batc...

File Edit Method Batch Options Analysis Window Help

Method | Data | Batch | Integ. | Peaks | Batch | Custom | Review | Reproc | Recalib | Analyze | Reports

Run	Run Type	Sample ID	Method	Filename	Level	Sample Amt.	ISTD Amt.	Mult.
1	Unknown	IB81A2901	ex81a29.met	XA29.001	0	1	0	1
2	Begin Calibration	EX81A2901 10 ppb	ex81a29.met	XA29.002	0	1	0	1
3	Calibration	EX81A2902 20 ppb	ex81a29.met	XA29.003	0	1	0	1
4	Calibration	EX81A2903 50 ppb	ex81a29.met	XA29.004	0	1	0	1
5	Calibration	EX81A2904 100 ppb	ex81a29.met	XA29.005	0	1	0	1
6	Calibration	EX81A2905 200 ppb	ex81a29.met	XA29.006	0	1	0	1
7	Calibration	EX81A2906 300 ppb	ex81a29.met	XA29.007	0	1	0	1
8	Calibration	EX81A2907 400 ppb	ex81a29.met	XA29.008	0	1	0	1
9	End Calibration	EX81A2908 800 ppb	ex81a29.met	XA29.009	0	1	0	1
10	Unknown	IEX81A2901	ex81a29.met	XA29.010	0	1	0	1
11	Unknown	CEX81A29001	ex81a29.met	XA29.011	0	1	0	1
12	Unknown	EXA008WB	ex81a29.met	XA29.012	0	1	0	1
13	Unknown	EXA008WL	ex81a29.met	XA29.013	0	1	0	1
14	Unknown	EXA008WC	ex81a29.met	XA29.014	0	1	0	1
15	Unknown	EXA008WX	ex81a29.met	XA29.015	0	1	0	1
16	Unknown	EXA008WY	ex81a29.met	XA29.016	0	1	0	1
17	Unknown	LOQ-14	ex81a29.met	XA29.017	0	1	0	1
18	Unknown	LOD-14	ex81a29.met	XA29.018	0	1	0	1
19	Unknown	EXA011WB	ex81a29.met	XA29.019	0	1	0	1
20	Unknown	EXA011WL	ex81a29.met	XA29.020	0	1	0	1
21	Unknown	EXA011WC	ex81a29.met	XA29.021	0	1	0	1
22	Unknown	15A111-33	ex81a29.met	XA29.022	0	1	0	1
23	Unknown	CEX81A29002	ex81a29.met	XA29.023	0	1	0	1
24	Unknown	Spike Check	ex81a29.met	XA29.024	0	1	0	1
25	Unknown	EXA014WB	ex81a29.met	XA29.025	0	1	0	1
26	Unknown	EXA014WL	ex81a29.met	XA29.026	0	1	0	1
27	Unknown	EXA014WC	ex81a29.met	XA29.027	0	1	0	1
28	Unknown	15A111-33	ex81a29.met	XA29.028	0	1	0	1
29	Unknown	EXA013SB	ex81a29.met	XA29.029	0	1	0	1
30	Unknown	EXA013SL	ex81a29.met	XA29.030	0	1	0	1
31	Unknown	EXA013SC	ex81a29.met	XA29.031	0	1	0	1
32	Unknown	15A107-01	ex81a29.met	XA29.032	0	1	0	1
33	Unknown	15A107-03	ex81a29.met	XA29.033	0	1	0	1
34	Unknown	CEX81A29003	ex81a29.met	XA29.034	0	1	0	1

FINAL

Method Development

Start | EZChrom Chromat... | Method: Ex17a20c... | Exploring - Export | Calculator | Method: Ex81a29... | Method: Ex81a... | Document - WordP... | 11:34 AM

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HPLC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

EX2013W:	152080, 152114
	152082
	152111
	152126
	152090 1 LE 4/27/15
EX2014S:	152065
	152070
	152082
	152114
EX2015S:	152114
EX2016S:	152114
EX2017W:	152139
	152140
	152145
	152163
	152090
EX2020W:	152174
	152183
	152192
	152180

Book #:	A81-020
Instrument No.:	81
Analytical Sequence:	xd27
Method File:	ex81a29
Analytical Batch:	cex81a29080

SOP #	Rev. #
☑ EMAX-8330	7
☐ EMAX-8332	2
☐ EMAX-	

	STANDARDS ID	Conc. (µg/L)
ICAL	—	—
ICV	—	—
DCC	—	—
DCC	SHIC-07-78-01	400
IB	74-01	n/a

SOLVENT	ID
Acetonitrile	—
Methanol	SWIA-005-09-21
Water	12-06

Data File	
ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ EZC_5_HPLC	
☐	

Analyzed By: LE

Date: 4/27/15

Method: Ex81a29.met Batch: xd27.seq Data: XD27.001 - [Batch: xd27.seq]

File Edit Method Batch Options Analysis Control Window Help

Run	Run Type	Sample ID	Method	Filename	Mult.	Description
1	Unknown	IB81D2701	ex81a29.met	XD27.001	1	
2	Unknown	CEX81A29080	ex81a29.met	XD27.002	1	
3	Unknown	EXD013WB	ex81a29.met	XD27.003	1	
4	Unknown	EXD013WL	ex81a29.met	XD27.004	1	
5	Unknown	EXD013WC	ex81a29.met	XD27.005	1	
6	Unknown	15D080-02	ex81a29.met	XD27.006	1	
7	Unknown	15D080-03	ex81a29.met	XD27.007	1	
8	Unknown	15D080-04	ex81a29.met	XD27.008	1	
9	Unknown	15D082-02	ex81a29.met	XD27.009	1	
10	Unknown	15D082-03	ex81a29.met	XD27.010	1	
11	Unknown	15D082-07	ex81a29.met	XD27.011	1	
12	Unknown	15D082-11	ex81a29.met	XD27.012	1	
13	Unknown	CEX81A29081	ex81a29.met	XD27.013	1	
14	Unknown	15D111-01	ex81a29.met	XD27.014	1	
15	Unknown	15D111-02	ex81a29.met	XD27.015	1	
16	Unknown	15D111-03	ex81a29.met	XD27.016	1	FINAL
17	Unknown	15D111-03M	ex81a29.met	XD27.017	1	
18	Unknown	15D111-03S	ex81a29.met	XD27.018	1	
19	Unknown	15D111-04	ex81a29.met	XD27.019	1	
20	Unknown	15D111-05	ex81a29.met	XD27.020	1	
21	Unknown	15D111-06	ex81a29.met	XD27.021	1	
22	Unknown	15D114-09	ex81a29.met	XD27.022	1	
23	Unknown	15D126-01	ex81a29.met	XD27.023	1	
24	Unknown	CEX81A29082	ex81a29.met	XD27.024	1	
25	Unknown	15D126-02	ex81a29.met	XD27.025	1	
26	Unknown	15D126-03	ex81a29.met	XD27.026	1	
27	Unknown	15D091-01 QC	ex81a29.met	XD27.027	1	
28	Unknown	EXD014SB	ex81a29.met	XD27.028	1	
29	Unknown	EXD014SL	ex81a29.met	XD27.029	1	
30	Unknown	EXD014SC	ex81a29.met	XD27.030	1	
31	Unknown	15D065-17	ex81a29.met	XD27.031	1	
32	Unknown	15D065-18	ex81a29.met	XD27.032	1	
33	Unknown	15D065-19	ex81a29.met	XD27.033	1	
34	Unknown	15D070-06	ex81a29.met	XD27.034	1	
35	Unknown	IB81D2702	ex81a29.met	XD27.035	1	

Monday, April 27, 2015
4:52 PM

Start | E2Chrom Chromatography... | Method: Ex81a29.met... | Method: Ex81a29.met - B...

Method: Ex81a29.met Batch: Xd27.seq Data: XD27.014 - [Batch: xd27.seq]

File Edit Method Batch Options Analysis Control Window Help

un	Run Type	Sample ID	Method	Filename	Mult.	Description
36	Unknown	CEX81A29083	ex81a29.met	XD27.036	1	
37	Unknown	15D070-07	ex81a29.met	XD27.037	1	
38	Unknown	15D070-07M	ex81a29.met	XD27.038	1	
39	Unknown	15D070-07S	ex81a29.met	XD27.039	1	
40	Unknown	15D070-08	ex81a29.met	XD27.040	1	
41	Unknown	15D070-09	ex81a29.met	XD27.041	1	
42	Unknown	15D070-10	ex81a29.met	XD27.042	1	
43	Unknown	15D070-11	ex81a29.met	XD27.043	1	
44	Unknown	15D070-12	ex81a29.met	XD27.044	1	
45	Unknown	15D070-13	ex81a29.met	XD27.045	1	
46	Unknown	15D082-04	ex81a29.met	XD27.046	1	
47	Unknown	CEX81A29084	ex81a29.met	XD27.047	1	
48	Unknown	15D082-05	ex81a29.met	XD27.048	1	
49	Unknown	15D082-06	ex81a29.met	XD27.049	1	
50	Unknown	15D114-01	ex81a29.met	XD27.050	1	
51	Unknown	15D114-02	ex81a29.met	XD27.051	1	
52	Unknown	15D114-03	ex81a29.met	XD27.052	1	
53	Unknown	15D114-04	ex81a29.met	XD27.053	1	
54	Unknown	15D114-05	ex81a29.met	XD27.054	1	
55	Unknown	15D114-06	ex81a29.met	XD27.055	1	
56	Unknown	EXD015SB	ex81a29.met	XD27.056	1	
57	Unknown	EXD015SL	ex81a29.met	XD27.057	1	
58	Unknown	CEX81A29085	ex81a29.met	XD27.058	1	
59	Unknown	EXD015SC	ex81a29.met	XD27.059	1	
60	Unknown	15D114-07	ex81a29.met	XD27.060	1	
61	Unknown	15D114-08	ex81a29.met	XD27.061	1	
62	Unknown	15D114-08M	ex81a29.met	XD27.062	1	
63	Unknown	15D114-08S	ex81a29.met	XD27.063	1	
64	Unknown	15D114-10	ex81a29.met	XD27.064	1	
65	Unknown	15D114-11	ex81a29.met	XD27.065	1	
66	Unknown	15D114-12	ex81a29.met	XD27.066	1	
67	Unknown	15D114-13	ex81a29.met	XD27.067	1	
68	Unknown	15D114-14	ex81a29.met	XD27.068	1	
69	Unknown	IB81D2703	ex81a29.met	XD27.069	1	
70	Unknown	CEX81A29086	ex81a29.met	XD27.070	1	

FINAL

Monday, April 27, 2015

Start | E2Chrom Chromatography | Method: Ex81a29.met... | Method Ex81a29.met - B... | untitled - Paint | 4:52 PM

Method: Ex81a29.met Batch: Xd27.seq Data: Xd27.091 - [Batch: xd27.seq]

File Edit Method Batch Options Analysis Control Window Help

Run	Run Type	Sample ID	Method	Filename	Mult.	Description
70	Unknown	CEX81A29086	ex81a29.met	XD27.070	1	
71	Unknown	15D114-15	ex81a29.met	XD27.071	1	
72	Unknown	15D114-16	ex81a29.met	XD27.072	1	
73	Unknown	15D114-17	ex81a29.met	XD27.073	1	
74	Unknown	15D114-18	ex81a29.met	XD27.074	1	
75	Unknown	15D114-19	ex81a29.met	XD27.075	1	
76	Unknown	15D114-20	ex81a29.met	XD27.076	1	
77	Unknown	15D114-21	ex81a29.met	XD27.077	1	
78	Unknown	15D114-22	ex81a29.met	XD27.078	1	
79	Unknown	15D114-23	ex81a29.met	XD27.079	1	
80	Unknown	15D114-24	ex81a29.met	XD27.080	1	
81	Unknown	CEX81A29087	ex81a29.met	XD27.081	1	
82	Unknown	15D114-25	ex81a29.met	XD27.082	1	
83	Unknown	EXD016SB	ex81a29.met	XD27.083	1	FINAL
84	Unknown	EXD016SL	ex81a29.met	XD27.084	1	
85	Unknown	EXD016SC	ex81a29.met	XD27.085	1	
86	Unknown	15D114-22R	ex81a29.met	XD27.086	1	
87	Unknown	15D114-22M	ex81a29.met	XD27.087	1	
88	Unknown	15D114-22S	ex81a29.met	XD27.088	1	
89	Unknown	IB81D2704	ex81a29.met	XD27.089	1	
90	Unknown	CEX81A29088	ex81a29.met	XD27.090	1	
91	Unknown	EXD017WB	ex81a29.met	XD27.091	1	
92	Unknown	EXD017WL	ex81a29.met	XD27.092	1	
93	Unknown	EXD017WC	ex81a29.met	XD27.093	1	
94	Unknown	15D139-01	ex81a29.met	XD27.094	1	
95	Unknown	15D140-01	ex81a29.met	XD27.095	1	
96	Unknown	15D145-01	ex81a29.met	XD27.096	1	
97	Unknown	15D163-01	ex81a29.met	XD27.097	1	
98	Unknown	15D090-01	ex81a29.met	XD27.098	1	
99	Unknown	CEX81A29089	ex81a29.met	XD27.099	1	
100	Unknown	EXD020WB	ex81a29.met	XD27.100	1	
101	Unknown	EXD020WL	ex81a29.met	XD27.101	1	
102	Unknown	EXD020WC	ex81a29.met	XD27.102	1	
103	Unknown	15D174-18	ex81a29.met	XD27.103	1	
104	Unknown	15D183-01	ex81a29.met	XD27.104	1	
105	Unknown	15D192-01	ex81a29.met	XD27.105	1	
106	Unknown	15D180-01	ex81a29.met	XD27.106	1	
107	Unknown	CEX81A29090	ex81a29.met	XD27.107	1	RE 4/29/15
108	Unknown	[illegible]	ex81a29.met	XD27.108	1	

Wednesday, April 29, 2015

Start | E2Chrom Chromatograp... | Method: Ex81a29... | Method: Ex17a20c.met... | untitled - Paint | Exploring - Export | Method: Ex17a20c.met... | 4:20 PM

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HPLC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

Conf. for A114

Book #:	A17-023
Instrument No.:	17
Analytical Sequence:	pd29
Method File:	ex17a20pLC LC 4/29/15
Analytical Batch:	cex17a20c038

SOP #	Rev. #
☒ EMAX-8330	7
☐ EMAX-8332	2
☐ EMAX-	

	STANDARDS ID	Conc. (µg/L)
ICAL	—	—
ICV	—	—
DCC	—	—
DCC	SHIC-07-74-02	200
IB	↓ 74-01	na

SOLVENT	ID
Acetonitrile	SWIA-005-10-24
Methanol	↓ 09-21
Water	12-06

SYRINGES
☐ 50 µL - MSF-01-02-06
☐ 500 µL - MSF-01-02-07
☐ 1000 µL - MSF-01-02-08
☐

Data File	
ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ EZC_5_HPLC	
☐	

Analyzed By: LS

Date: 4/29/15

6147

Method: Ex17a20c.met Batch: Pd29.seq Data: Pd29.006 - [Batch: pd29.seq]

File Edit Method Batch Options Analysis Control Window Help

Run	Run Type	Sample ID	Method	Filename	Sample Amt.	Mult.	Description
1	Unknown	IB17D2901	ex17a20c.met	PD29.001	1	1	
2	Unknown	CEX17A20C038	ex17a20c.met	PD29.002	1	1	
3	Unknown	15D114-03	ex17a20c.met	PD29.003	1	1	
4	Unknown	15D114-13	ex17a20c.met	PD29.004	1	1	
5	Unknown	15D114-25	ex17a20c.met	PD29.005	1	1	
6	Unknown	CEX17A20C039	ex17a20c.met	PD29.006	1	1	No injection
7	Unknown	CEX17A20C039	ex17a20c.met	PD29.007	1	1	
8	Unknown	P	ex17a20c.met	PD29.008	1	1	
9	Unknown	P	ex17a20c.met	PD29.009	1	1	
10	Unknown	P	ex17a20c.met	PD29.010	1	1	
11	Unknown	P	ex17a20c.met	PD29.011	1	1	
12	Unknown	P	ex17a20c.met	PD29.012	1	1	
13	Unknown	P	ex17a20c.met	PD29.013	1	1	
14	Unknown	P	ex17a20c.met	PD29.014	1	1	
15	Unknown	P	ex17a20c.met	PD29.015	1	1	
16	Unknown	P	ex17a20c.met	PD29.016	1	1	
17	Unknown	P	ex17a20c.met	PD29.017	1	1	
18	Unknown	P	ex17a20c.met	PD29.018	1	1	
19	Unknown	P	ex17a20c.met	PD29.019	1	1	
20	Unknown	P	ex17a20c.met	PD29.020	1	1	
21	Unknown	P	ex17a20c.met	PD29.021	1	1	
22	Unknown	P	ex17a20c.met	PD29.022	1	1	
23	Unknown	P	ex17a20c.met	PD29.023	1	1	
24	Unknown	P	ex17a20c.met	PD29.024	1	1	
25	Unknown	P	ex17a20c.met	PD29.025	1	1	
26	Unknown	P	ex17a20c.met	PD29.026	1	1	
27	Unknown	P	ex17a20c.met	PD29.027	1	1	
28	Unknown	P	ex17a20c.met	PD29.028	1	1	
29	Unknown	P	ex17a20c.met	PD29.029	1	1	
30	Unknown	P	ex17a20c.met	PD29.030	1	1	
31	Unknown	P	ex17a20c.met	PD29.031	1	1	
32	Unknown	P	ex17a20c.met	PD29.032	1	1	
33	Unknown	P	ex17a20c.met	PD29.033	1	1	
34	Unknown	P	ex17a20c.met	PD29.034	1	1	

FINAL

dlc 4/29/15

Instrument 2 [1017] - Running CEX17A20C039 [Run 6]...

Wednesday, April 29, 2015

Start | EZChrom Chromatograp... | Method: Ex81a29.met ... | Method: Ex17a20c.met ... | untitled - Paint | Exploring - Export | Method: Ex17a20c... | 3:39 PM

EXTRACTION LOGS

EMAX LABORATORIES, INC.

EXTRACTION LOG
for
EXPLOSIVES

Note: For samples and relevant QCs/Standards extracted, refer to attached extraction sequence.

SOP	Rev. #
☑ EMAX-8330	7
☐ EMAX-8332	1
☐ EMAX-	

Book #.: EEX-026

Preparation Batch: EXD013 W

Matrix WATER

Micropipette ID: PE97C-03 (100-ul)

Micropipette ID:

Comments:

Lab Sample ID	
EXD013-WB	
-WL	
-WC	
D080-02	✓
-03	✓
-04	✓
D082-02	✓
-03	✓
-07	✓
-11	✓
D111-01	✓
-02	✓
-03	✓
-03m	✓
-03S	✓
-04	✓
-05	✓
-06	✓
D114-09	✓
D126-01	✓
-02	✓
-03	✓
D091-01	✓

Standards	ID	Amount Added (ml)
Surrogate (PEG)	SHIB-06-64-03	0.08 ✓
LCS/MS (8330)	SHIB-06-65-01	0.08 ✓
LCS/MS		
LCS/MS		
LCS/MS		

Reagent	Lot # / ID
Acetonitrile	54330
NaCl	SW/A-005-11-16
$CaCl_2$	SPIB-08-06-01
Silica Sand	-
Reagent Water	55007
SPE Disk	-
Methanol	-
Acetone	-

Prepared By: [illegible] Witnessed By: AGG

Standard Added By: [illegible] Checked By: [illegible]

Extract Received By: [illegible] 4/27/15 Location: SE04A

Disposed By: Disposed On: 6150

FileID: EXD013W

EMAX LABORATORIES, INC.

EXTRACTION LOG FOR EXPLOSIVES

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Ve(ml)	ExpAmt	ExpVe(ml)	PrepFctr	Comments
15EXD013W01	EXD013WB	200	ml	4/20/15 13:12	4	200	4	1	
15EXD013W02	EXD013WL	200	ml	4/20/15 13:12	4	200	4	1	
15EXD013W03	EXD013WC	200	ml	4/20/15 13:12	4	200	4	1	
15EXD013W04	D080-02	200	ml	4/20/15 13:12	4	200	4	1	
15EXD013W05	D080-03	200	ml	4/20/15 13:12	4	200	4	1	
15EXD013W06	D080-04	200	ml	4/20/15 13:12	4	200	4	1	
15EXD013W07	D082-02	200	ml	4/20/15 13:12	4	200	4	1	
15EXD013W08	D082-03	200	ml	4/20/15 13:13	4	200	4	1	
15EXD013W09	D082-07	200	ml	4/20/15 13:13	4	200	4	1	
15EXD013W10	D082-11	200	ml	4/20/15 13:13	4	200	4	1	
15EXD013W11	D111-01	200	ml	4/20/15 13:13	4	200	4	1	
15EXD013W12	D111-02	200	ml	4/20/15 13:13	4	200	4	1	
15EXD013W13	D111-03	200	ml	4/20/15 13:13	4	200	4	1	
15EXD013W14	D111-03M	200	ml	4/20/15 13:13	4	200	4	1	
15EXD013W15	D111-03S	200	ml	4/20/15 13:13	4	200	4	1	
15EXD013W16	D111-04	200	ml	4/20/15 13:13	4	200	4	1	
15EXD013W17	D111-05	200	ml	4/20/15 13:13	4	200	4	1	
15EXD013W18	D111-06	200	ml	4/20/15 13:14	4	200	4	1	
15EXD013W19	D114-09	200	ml	4/20/15 13:14	4	200	4	1	✓
15EXD013W20	D126-01	200	ml	4/20/15 13:14	4	200	4	1	
15EXD013W21	D126-02	200	ml	4/20/15 13:14	4	200	4	1	
15EXD013W22	D126-03	200	ml	4/20/15 13:14	4	200	4	1	
15EXD013W23	D091-01	200	ml	4/20/15 13:14	4	200	4	1	QC HPLC WATER Lot #104106
									SWIA-005-12-11

Balance ID: 10203192. Calibration check was verified prior to use.

Ve=extract volume

PreptFctr=(ExpAmt/Aliquot)(Ve/ExpVe)

☑ Extraction Started @ 4/20/15 13:25

Prepared By: JVille

☑ Extraction Ended @ 4/20/15 17:08

Checked By: JM

Comments:

Date 4/20/15

SOP EMAX-8330 Rev. 7

EMAX LABORATORIES, INC.

EXTRACTION LOG *for* EXPLOSIVES

Note: For samples and relevant QCs/Standards extracted, refer to attached extraction sequence.

SOP	Rev. #
☑ EMAX-8330	7
☐ EMAX-8332	1
☐ EMAX-	

Book #.: EEX-026

Preparation Batch: EXD014S

Matrix Soil

Micropipette ID: PE00-04 (1000 ml)

Micropipette ID:

Comments:

Lab Sample ID	
EXD014 -SB	
-SL	
-SC	
D065 -17	—
-18	—
-19	—
D070 -06	—
-07	—
-07M	—
-07S	—
-08	—
-09	—
-10	—
-11	—
-12	—
-13	—
D082 -04	—
-05	—
-06	—
D114 -01	—
-02	—
-03	—
-04	—
-05	—
-06	

Standards	ID	Amount Added (ml)
Surrogate	SHIB-06-64-03	0.4
LCS/MS	SHIB-06-65-01	0.4
LCS/MS		
LCS/MS		
LCS/MS		

Reagent	Lot # / ID
Acetonitrile	54330
NaCl	–
$CaCl_2$	SPIB-08-06-01
Silica Sand	SWIB-002-43-21
Reagent Water	–
SPE Disk	–
Methanol	–
Acetone	–

Prepared By: my

Witnessed By: AGG

Standard Added By: my

Checked By: JM

Extract Received By: ~~AGG~~ AGG 4/22/10 ~~AGG~~ AT 4/23

Location: SE04 #06

Disposed By:

Disposed On:

EMAX LABORATORIES, INC.

FileID: EXD014S

EXTRACTION LOG FOR EXPLOSIVES

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Ve(ml)	ExpAmt	ExpVe(ml)	PrepFctr	Comments
15EXD015S01	EXD014SB	2	g	4/21/15 15:38	20	2	20	1	
15EXD015S02	EXD014SL	2	g	4/21/15 15:38	20	2	20	1	
15EXD015S03	EXD014SC	2	g	4/21/15 15:38	20	2	20	1	
15EXD015S04	D065-17	2.01	g	4/21/15 15:39	20	2	20	1	
15EXD015S05	D065-18	2	g	4/21/15 15:40	20	2	20	1	
15EXD015S06	D065-19	2.01	g	4/21/15 15:41	20	2	20	1	
15EXD015S07	D070-06	2	g	4/21/15 15:42	20	2	20	1	
15EXD015S08	D070-07	2	g	4/21/15 15:42	20	2	20	1	
15EXD015S09	D070-07M	2	g	4/21/15 15:43	20	2	20	1	
15EXD015S10	D070-07S	2	g	4/21/15 15:44	20	2	20	1	
15EXD015S11	D070-08	2	g	4/21/15 15:44	20	2	20	1	
15EXD015S12	D070-09	2.01	g	4/21/15 15:45	20	2	20	1	
15EXD015S13	D070-10	2	g	4/21/15 15:46	20	2	20	1	
15EXD015S14	D070-11	2	g	4/21/15 15:46	20	2	20	1	
15EXD015S15	D070-12	2	g	4/21/15 15:47	20	2	20	1	
15EXD015S16	D070-13	2	g	4/21/15 15:48	20	2	20	1	
15EXD015S17	D082-04	2.01	g	4/21/15 15:48	20	2	20	1	
15EXD015S18	D082-05	2	g	4/21/15 15:49	20	2	20	1	
15EXD015S19	D082-06	2.01	g	4/21/15 15:49	20	2	20	1	
15EXD015S20	D114-01	2	g	4/21/15 15:50	20	2	20	1	
15EXD015S21	D114-02	2	g	4/21/15 15:51	20	2	20	1	
15EXD015S22	D114-03	2	g	4/21/15 15:52	20	2	20	1	
15EXD015S23	D114-04	2	g	4/21/15 15:52	20	2	20	1	
15EXD015S24	D114-05	2.01	g	4/21/15 15:53	20	2	20	1	
15EXD015S25	D114-06	2.01	g	4/21/15 15:53	20	2	20	1	
									ADD005

Balance ID: 10203192. Calibration check was verified prior to use.

Ve=extract volume

PreptFctr=(ExpAmt/Aliquot)(Ve/ExpVe

☑ Extraction Started @ 4/21/15 17:15

Prepared By: MYokoo

☑ Extraction Ended @ 4/22/15 11:15

Checked By: JM

Comments:

Date 4/22/15

SOP EMAX-8330 Rev. 7

EMAX LABORATORIES, INC.

EXTRACTION LOG *for* EXPLOSIVES

Note: For samples and relevant QCs/Standards extracted, refer to attached extraction sequence.

SOP	Rev. #
☑ EMAX-8330	7
☐ EMAX-8332	1
☐ EMAX-	

Book #.: EEX-026

Preparation Batch: EXD015 S

Matrix soil

Micropipette ID: PE00-04 (1000 ml)

Micropipette ID:

Comments:

Lab Sample ID	
EXD015 -SB	
-SL	
-SC	
D114 -07	
-08	
-08M	
-08S	
~~my 4/21/15 -09~~	
-10	
-11	
-12	
-13	
-14	
-15	
-16	
-17	
-18	
-19	
-20	
-21	
-22	
-23	
-24	
-25	

Standards	ID	Amount Added (ml)
Surrogate	SHIB-06-64-03	0.4
LCS/MS	SHIB-06-65-01	0.4
LCS/MS		
LCS/MS		
LCS/MS		

Reagent	Lot # / ID
Acetonitrile	54330
NaCl	–
$CaCl_2$	SPIB-08-06-01
Silica Sand	SWIB-002-43-21
Reagent Water	
SPE Disk	
Methanol	
Acetone	

Prepared By: my Witnessed By: AGG

Standard Added By: my Checked By: JM

Extract Received By: AA 4/23 Location: SE04 #06

Disposed By: Disposed On:

FileID: EXD015S

EMAX LABORATORIES, INC.

EXTRACTION LOG FOR EXPLOSIVES

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Ve(ml)	ExpAmt	ExpVe(ml)	PrepFctr	Comments
15EXD015S01	EXD015SB	2	g	4/21/15 15:54	20	2	20	1	
15EXD015S02	EXD015SL	2	g	4/21/15 15:55	20	2	20	1	
15EXD015S03	EXD015SC	2	g	4/21/15 15:56	20	2	20	1	
15EXD015S04	D114-07	2	g	4/21/15 15:57	20	2	20	1	
15EXD015S05	D114-08	2	g	4/21/15 15:57	20	2	20	1	
15EXD015S06	D114-08M	2	g	4/21/15 15:58	20	2	20	1	
15EXD015S07	D114-08S	2	g	4/21/15 15:58	20	2	20	1	
15EXD015S08	D114-10	2.01	g	4/21/15 15:59	20	2	20	1	
15EXD015S09	D114-11	2	g	4/21/15 16:00	20	2	20	1	
15EXD015S10	D114-12	2	g	4/21/15 16:01	20	2	20	1	
15EXD015S11	D114-13	2	g	4/21/15 16:02	20	2	20	1	
15EXD015S12	D114-14	2	g	4/21/15 16:03	20	2	20	1	
15EXD015S13	D114-15	2	g	4/21/15 16:03	20	2	20	1	
15EXD015S14	D114-16	2	g	4/21/15 16:04	20	2	20	1	
15EXD015S15	D114-17	2	g	4/21/15 16:05	20	2	20	1	
15EXD015S16	D114-18	2	g	4/21/15 16:06	20	2	20	1	
15EXD015S17	D114-19	2.01	g	4/21/15 16:07	20	2	20	1	
15EXD015S18	D114-20	2.01	g	4/21/15 16:07	20	2	20	1	
15EXD015S19	D114-21	2	g	4/21/15 16:08	20	2	20	1	
15EXD015S20	D114-22	2	g	4/21/15 16:09	20	2	20	1	X
15EXD015S21	D114-23	2	g	4/21/15 16:09	20	2	20	1	
15EXD015S22	D114-24	2	g	4/21/15 16:10	20	2	20	1	
15EXD015S23	D114-25	2	g	4/21/15 16:10	20	2	20	1	
									ADD006

Balance ID: 10203192. Calibration check was verified prior to use.

Ve=extract volume

PreptFctr=(ExpAmt/Aliquot)(Ve/ExpVe)

☑ Extraction Started @ 4/21/15 17:15

Prepared By: MYokoo

☑ Extraction Ended @ 4/22/15 11:15

Checked By: JM

Date 4/22/15

Comments:

SOP EMAX-8330 Rev. 7

EMAX LABORATORIES, INC.

EXTRACTION LOG *for* EXPLOSIVES

Note: For samples and relevant QCs/Standards extracted, refer to attached extraction sequence.

SOP	Rev. #
☐ EMAX-8330	7
☑ EMAX-8332	1
☐ EMAX-	

Book #.: EEX-026

Preparation Batch: EXD016 S

Matrix Soil

Micropipette ID: PE00-04 (1000 ml)

Micropipette ID:

Comments:

Lab Sample ID	
EXD016 -SB	
-SL	
-SC	
D114 -22R	✓
-22M	✓
-22S	✓

Standards	ID	Amount Added (ml)
Surrogate	SHIB-06-64-03	0.4 ✓
LCS/MS	SHIB-06-65-01	0.4 ✓
LCS/MS		
LCS/MS		
LCS/MS		

Reagent	Lot # / ID
Acetonitrile	54330
NaCl	–
$CaCl_2$	SPIB-08-06-01
Silica Sand	SWIB-002-43-21
Reagent Water	–
SPE Disk	–
Methanol	–
Acetone	–

Prepared By: [illegible] Witnessed By: [illegible]

Standard Added By: [illegible] Checked By: JM

Extract Received By: [illegible] 4/23 Location: SE04-8330-04

Disposed By: Disposed On:

6156

FileID: EXD016S

EMAX LABORATORIES, INC.

EXTRACTION LOG FOR EXPLOSIVES

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Ve(ml)	ExpAmt	ExpVe(ml)	PrepFctr	Comments
15EXD015S01	EXD016SB	2	g	4/22/15 16:32	20	2	20	1	
15EXD015S02	EXD016SL	2	g	4/22/15 16:33	20	2	20	1	
15EXD015S03	EXD016SC	2	g	4/22/15 16:33	20	2	20	1	
15EXD015S04	D114-22R	2	g	4/22/15 16:35	20	2	20	1	
15EXD015S05	D114-22M	2	g	4/22/15 16:36	20	2	20	1	
15EXD015S06	D114-22S	2	g	4/22/15 16:36	20	2	20	1	

Balance ID: 10203192. Calibration check was verified prior to use.

Ve=extract volume

PreptFctr=(ExpAmt/Aliquot)(Ve/ExpVe)

☑ Extraction Started @ 4/22/15 16:45

Prepared By: MYokoo

☑ Extraction Ended @ 4/23/15 10:45

Checked By: JM

Comments:

Date 4/23/15

SOP EMAX-8330 Rev. 7

6157

LABORATORY REPORT FOR

KLEINFELDER

CTO 070, UXO4, FALLBROOK

METALS / MERCURY

SDG#: 15D114

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D114

METHOD SW6020A
METALS BY ICP-MS

A total of one (1) water sample and twenty-four (24) soil samples were received on 04/17/15 to be analyzed for Metals by ICP-MS in accordance with Method SW6020A and project specific requirements.

Holding Time
Samples were digested and analyzed within the prescribed holding time.

Calibration
Initial Calibration was established as prescribed by the method and was verified using a secondary source (ICV). Interference checks were performed and results were within required limits. Continuing calibration verifications and continuing calibration blanks were carried out at the frequency specified by the project. All calibration requirements were within acceptance criteria. MRL was analyzed as required by the project.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, three (3) method blanks were analyzed. IMD025WB, IMD028SB and IMD029SB were compliant to project requirement. Refer to sample result summary forms for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, three (3) sets of LCS/LCD were analyzed. IMD025WL/IMD025WC, IMD028SL/IMD028SC and IMD029SL/IMD029SC - all analytes were within LCS QC limits. Refer to LCS summary forms for details.

Matrix QC Sample
Matrix spike sample was prepared and analyzed at a frequency required by the project. For this SDG, two (2) sets of MS/MSD were analyzed and the following were noted:
D114-08M/D114-08S:
- Percent recovery and RPD for Iron (9X) was not within MS/MSD QC limits.
- Percent recoveries for Antimony, Barium (3X), Calcium, Cobalt, Copper, Lead, Magnesium, Manganese (7X), Strontium and Tin were not within MS/MSD QC limits.
- Percent recoveries for Nickel and Vanadium were not within MSD QC limits.

The rest of the analytes were in control.

D114-22M/D114-22S:
- Percent recoveries for Aluminum (2X) and Antimony were not within MS/MSD QC limits.
- Percent recovery for Iron (4X) was not within MS QC limits.
- Percent recoveries for Barium (2X) and Manganese (8X) were not within MSD QC limits.

The rest of analytes were within control.
The enclosed value (#X) is the ratio of parent sample result and spike amount. Presence of matrix interference was suspected.
Analytical spike and serial dilution were analyzed and evaluated as appropriate. Results were within expected values. Refer to Matrix QC summary forms for details.

Sample Analysis
Samples were analyzed according to prescribed analytical procedures. Results were evaluated in accordance to project requirements. For this SDG, all quality control requirements were met with the exception of those that were discussed within the associated QC parameter.

LAB CHRONICLE
METALS BY ICP-MS

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK

SDG NO. : 15D114
Instrument ID : T-IF6

SOIL

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1S	IMD028SB	0.966	NA	04/24/1513:33	04/21/1515:26	F6D13019	F6D13017	IMD028S	Method Blank
LCS1S	IMD028SL	0.985	NA	04/24/1513:38	04/21/1515:26	F6D13020	F6D13017	IMD028S	Lab Control Sample (LCS)
LCD1S	IMD028SC	0.971	NA	04/24/1513:42	04/21/1515:26	F6D13021	F6D13017	IMD028S	LCS Duplicate
UXO4-TR01-S01-1.0	D114-01	0.976	6.9	04/24/1513:46	04/21/1515:26	F6D13022	F6D13017	IMD028S	Field Sample
UXO4-TR01-S02-3.0	D114-02	0.976	8.8	04/24/1513:50	04/21/1515:26	F6D13023	F6D13017	IMD028S	Field Sample
UXO4-TR02-S01-2.0	D114-03	0.995	6.5	04/24/1513:54	04/21/1515:26	F6D13024	F6D13017	IMD028S	Field Sample
UXO4-TR02-S02-3.0	D114-04	0.971	7.8	04/24/1513:59	04/21/1515:26	F6D13025	F6D13017	IMD028S	Field Sample
UXO4-TR03-S01-1.5	D114-05	0.995	10.2	04/24/1514:03	04/21/1515:26	F6D13026	F6D13017	IMD028S	Field Sample
UXO4-TR03-S02-3.0	D114-06	0.990	15.2	04/24/1514:07	04/21/1515:26	F6D13027	F6D13017	IMD028S	Field Sample
UXO4-TR04-S01-2.0	D114-07	0.995	9.3	04/24/1514:24	04/21/1515:26	F6D13031	F6D13029	IMD028S	Field Sample
UXO4-TR04-S02-3.0MS	D114-0BM	0.976	13.7	04/24/1514:28	04/21/1515:26	F6D13032	F6D13029	IMD028S	Matrix Spike Sample (MS)
UXO4-TR04-S02-3.0MSD	D114-0BS	0.971	13.7	04/24/1514:32	04/21/1515:26	F6D13033	F6D13029	IMD028S	MS Duplicate (MSD)
UXO4-TR04-S02-3.0AS	D114-08A	0.976	13.7	04/24/1514:37	04/21/1515:26	F6D13034	F6D13029	IMD028S	Analytical Spike Sample
UXO4-TR04-S02-3.0	D114-0B	0.976	13.7	04/24/1514:41	04/21/1515:26	F6D13035	F6D13029	IMD028S	Field Sample
UXO4-TR04-S02-3.0DL	D114-0BJ	4.88	13.7	04/24/1514:45	04/21/1515:26	F6D13036	F6D13029	IMD028S	Diluted Sample
UXO4-SB0B-8.0	D114-10	0.962	10.8	04/24/1514:49	04/21/1515:26	F6D13037	F6D13029	IMD028S	Field Sample
UXO4-SB09-6.6	D114-11	0.976	21.3	04/24/1514:53	04/21/1515:26	F6D13038	F6D13029	IMD028S	Field Sample
UXO4-SB10-0.5	D114-12	0.995	3.8	04/24/1514:57	04/21/1515:26	F6D13039	F6D13029	IMD028S	Field Sample
UXO4-SB10-1.0	D114-13	0.966	9.5	04/24/1515:15	04/21/1515:26	F6D13043	F6D13041	IMD028S	Field Sample
UXO4-SB11-0.5	D114-14	0.971	1.8	04/24/1515:19	04/21/1515:26	F6D13044	F6D13041	IMD028S	Field Sample
UXO4-SB11-1.0	D114-15	0.990	5.0	04/24/1515:23	04/21/1515:26	F6D13045	F6D13041	IMD028S	Field Sample
UXO4-SB12-0.5	D114-16	0.976	1.0	04/24/1515:27	04/21/1515:26	F6D13046	F6D13041	IMD028S	Field Sample
UXO4-SB12-1.0	D114-17	0.976	2.3	04/24/1515:31	04/21/1515:26	F6D13047	F6D13041	IMD028S	Field Sample
UXO4-SB13-0.5	D114-18	0.990	1.2	04/24/1515:36	04/21/1515:26	F6D13048	F6D13041	IMD028S	Field Sample
UXO4-SB13-1.0	D114-19	0.990	4.2	04/24/1515:40	04/21/1515:26	F6D13049	F6D13041	IMD028S	Field Sample
UXO4-SB14-0.5	D114-20	0.985	4.9	04/24/1515:44	04/21/1515:26	F6D13050	F6D13041	IMD028S	Field Sample
UXO4-TR04-S02-3.0DL	D114-08I	4.88	13.7	04/24/1517:49	04/21/1515:26	F6D13079	F6D13071	IMD028S	Diluted Sample
MBLK2S	IMD029SB	0.990	NA	04/24/1516:34	04/21/1515:33	F6D13061	F6D13059	IMD029S	Method Blank
LCS2S	IMD029SL	0.990	NA	04/24/1516:38	04/21/1515:33	F6D13062	F6D13059	IMD029S	Lab Control Sample (LCS)
LCD2S	IMD029SC	0.990	NA	04/24/1516:42	04/21/1515:33	F6D13063	F6D13059	IMD029S	LCS Duplicate
UXO4-SB14-1.0	D114-21	0.985	7.6	04/24/1516:47	04/21/1515:33	F6D13064	F6D13059	IMD029S	Field Sample
UXO4-SB15-0.5MS	D114-22M	0.985	1.3	04/24/1516:51	04/21/1515:33	F6D13065	F6D13059	IMD029S	Matrix Spike Sample (MS)
UXO4-SB15-0.5MSD	D114-22S	0.962	1.3	04/24/1516:55	04/21/1515:33	F6D13066	F6D13059	IMD029S	MS Duplicate (MSD)
UXO4-SB15-0.5AS	D114-22A	0.971	1.3	04/24/1516:59	04/21/1515:33	F6D13067	F6D13059	IMD029S	Analytical Spike Sample
UXO4-SB15-0.5	D114-22	0.971	1.3	04/24/1517:03	04/21/1515:33	F6D13068	F6D13059	IMD029S	Field Sample
UXO4-SB15-0.5DL	D114-22J	4.85	1.3	04/24/1517:07	04/21/1515:33	F6D13069	F6D13059	IMD029S	Diluted Sample
UXO4-SB15-1.0	D114-23	0.980	2.7	04/24/1517:33	04/21/1515:33	F6D13075	F6D13071	IMD029S	Field Sample
UXO4-SB16-0.5	D114-24	0.976	4.0	04/24/1517:37	04/21/1515:33	F6D13076	F6D13071	IMD029S	Field Sample
UXO4-SB16-1.0	D114-25	0.990	6.4	04/24/1517:41	04/21/1515:33	F6D13077	F6D13071	IMD029S	Field Sample

WATER

Client	Laboratory	Dilution	%	Analysis	Extraction	Sample	Calibration	Prep.

Sample ID	Sample ID	Factor	Moist	DateTime	DateTime	Data FN	Data FN	Batch	Notes
MBLK1W	IMD025WB	1	NA	04/24/1516:04	04/21/1510:53	F6D13054	F6D13052	IMD025W	Method Blank
LCS1W	IMD025WL	1	NA	04/24/1516:08	04/21/1510:53	F6D13055	F6D13052	IMD025W	Lab Control Sample (LCS)
LCD1W	IMD025WC	1	NA	04/24/1516:12	04/21/1510:53	F6D13056	F6D13052	IMD025W	LCS Duplicate
UX04-EB-041615	D114-09	1	NA	04/24/1516:17	04/21/1510:53	F6D13057	F6D13052	IMD025W	Field Sample

FN - Filename
% Moist - Percent Moisture

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/10/15
Project	: CTO 070, UXO4, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UXO4-TR01-S01-1.0	Date Analyzed:	04/24/15 13:46
Lab Samp ID:	D114-01	Dilution Factor:	0.976
Lab File ID:	F6D13022	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	6.9
Calib. Ref.:	F6D13017	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	14900	105	10.5	21.0
Antimony	ND	0.524	0.105	0.210
Arsenic	1.41	0.524	0.0524	0.105
Barium	94.8	0.524	0.0755	0.105
Beryllium	0.314J	0.524	0.0524	0.105
Cadmium	0.197J	0.524	0.0598	0.105
Calcium	1440	105	17.8	21.0
Chromium	12.2	0.524	0.0524	0.105
Cobalt	5.61	0.524	0.0524	0.105
Copper	5.94	0.524	0.105	0.210
Iron	18800	105	5.24	10.5
Lead	4.18	0.524	0.0524	0.105
Magnesium	3350	105	10.5	21.0
Manganese	245	0.524	0.160	0.210
Molybdenum	0.211J	0.524	0.105	0.210
Nickel	4.75	0.524	0.0660	0.105
Potassium	1550	105	10.5	21.0
Selenium	0.0749J	0.524	0.0524	0.105
Silver	ND	0.524	0.0524	0.105
Sodium	234	105	10.5	21.0
Strontium	12.5	0.524	0.0524	0.105
Thallium	0.277J	0.524	0.0524	0.105
Tin	ND	21.0	5.24	10.5
Vanadium	43.6	0.524	0.199	0.262
Zinc	26.6	2.10	0.716	1.05

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/10/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-TR01-S02-3.0	Date Analyzed:	04/24/15 13:50
Lab Samp ID:	D114-02	Dilution Factor:	0.976
Lab File ID:	F6D13023	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	8.8
Calib. Ref.:	F6D13017	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	14800	107	10.7	21.4
Antimony	0.254J	0.535	0.107	0.214
Arsenic	2.48	0.535	0.0535	0.107
Barium	116	0.535	0.0771	0.107
Beryllium	0.310J	0.535	0.0535	0.107
Cadmium	0.222J	0.535	0.0610	0.107
Calcium	1630	107	18.2	21.4
Chromium	15.3	0.535	0.0535	0.107
Cobalt	7.58	0.535	0.0535	0.107
Copper	11.8	0.535	0.107	0.214
Iron	28000	107	5.35	10.7
Lead	39.9	0.535	0.0535	0.107
Magnesium	3870	107	10.7	21.4
Manganese	347	0.535	0.164	0.214
Molybdenum	0.485J	0.535	0.107	0.214
Nickel	6.91	0.535	0.0674	0.107
Potassium	2120	107	10.7	21.4
Selenium	0.0871J	0.535	0.0535	0.107
Silver	ND	0.535	0.0535	0.107
Sodium	258	107	10.7	21.4
Strontium	13.7	0.535	0.0535	0.107
Thallium	0.318J	0.535	0.0535	0.107
Tin	12.6J	21.4	5.35	10.7
Vanadium	50.4	0.535	0.203	0.268
Zinc	91.0	2.14	0.731	1.07

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/13/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-TR02-S01-2.0	Date Analyzed:	04/24/15 13:54
Lab Samp ID:	D114-03	Dilution Factor:	0.995
Lab File ID:	F6D13024	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	6.5
Calib. Ref.:	F6D13017	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	17200	106	10.6	21.3
Antimony	0.215J	0.532	0.106	0.213
Arsenic	2.07	0.532	0.0532	0.106
Barium	85.1	0.532	0.0766	0.106
Beryllium	0.249J	0.532	0.0532	0.106
Cadmium	0.173J	0.532	0.0607	0.106
Calcium	1210	106	18.1	21.3
Chromium	13.2	0.532	0.0532	0.106
Cobalt	5.67	0.532	0.0532	0.106
Copper	11.5	0.532	0.106	0.213
Iron	23800	106	5.32	10.6
Lead	6.94	0.532	0.0532	0.106
Magnesium	2890	106	10.6	21.3
Manganese	279	0.532	0.163	0.213
Molybdenum	0.484J	0.532	0.106	0.213
Nickel	6.12	0.532	0.0670	0.106
Potassium	1400	106	10.6	21.3
Selenium	0.0677J	0.532	0.0532	0.106
Silver	ND	0.532	0.0532	0.106
Sodium	203	106	10.6	21.3
Strontium	10.2	0.532	0.0532	0.106
Thallium	0.231J	0.532	0.0532	0.106
Tin	ND	21.3	5.32	10.6
Vanadium	42.4	0.532	0.202	0.266
Zinc	40.6	2.13	0.727	1.06

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/13/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-TR02-S02-3.0	Date Analyzed:	04/24/15 13:59
Lab Samp ID:	D114-04	Dilution Factor:	0.971
Lab File ID:	F6D13025	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	7.8
Calib. Ref.:	F6D13017	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	23500	105	10.5	21.1
Antimony	0.237J	0.527	0.105	0.211
Arsenic	1.82	0.527	0.0527	0.105
Barium	82.6	0.527	0.0758	0.105
Beryllium	0.212J	0.527	0.0527	0.105
Cadmium	0.214J	0.527	0.0600	0.105
Calcium	1070	105	17.9	21.1
Chromium	10.9	0.527	0.0527	0.105
Cobalt	5.31	0.527	0.0527	0.105
Copper	17.7	0.527	0.105	0.211
Iron	20400	105	5.27	10.5
Lead	9.83	0.527	0.0527	0.105
Magnesium	2670	105	10.5	21.1
Manganese	174	0.527	0.161	0.211
Molybdenum	0.389J	0.527	0.105	0.211
Nickel	4.83	0.527	0.0663	0.105
Potassium	1420	105	10.5	21.1
Selenium	0.0923J	0.527	0.0527	0.105
Silver	0.0552J	0.527	0.0527	0.105
Sodium	193	105	10.5	21.1
Strontium	11.2	0.527	0.0527	0.105
Thallium	0.215J	0.527	0.0527	0.105
Tin	ND	21.1	5.27	10.5
Vanadium	41.0	0.527	0.200	0.263
Zinc	54.0	2.11	0.719	1.05

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/13/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-TR03-S01-1.5	Date Analyzed:	04/24/15 14:03
Lab Samp ID:	D114-05	Dilution Factor:	0.995
Lab File ID:	F6D13026	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	10.2
Calib. Ref.:	F6D13017	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	14200	111	11.1	22.2
Antimony	0.116J	0.554	0.111	0.222
Arsenic	1.80	0.554	0.0554	0.111
Barium	78.8	0.554	0.0798	0.111
Beryllium	0.249J	0.554	0.0554	0.111
Cadmium	0.209J	0.554	0.0632	0.111
Calcium	1230	111	18.8	22.2
Chromium	11.2	0.554	0.0554	0.111
Cobalt	6.43	0.554	0.0554	0.111
Copper	5.54	0.554	0.111	0.222
Iron	19400	111	5.54	11.1
Lead	3.23	0.554	0.0554	0.111
Magnesium	3670	111	11.1	22.2
Manganese	210	0.554	0.170	0.222
Molybdenum	0.233J	0.554	0.111	0.222
Nickel	3.85	0.554	0.0698	0.111
Potassium	2140	111	11.1	22.2
Selenium	0.0769J	0.554	0.0554	0.111
Silver	ND	0.554	0.0554	0.111
Sodium	149	111	11.1	22.2
Strontium	11.3	0.554	0.0554	0.111
Thallium	0.308J	0.554	0.0554	0.111
Tin	ND	22.2	5.54	11.1
Vanadium	51.6	0.554	0.211	0.277
Zinc	26.0	2.22	0.757	1.11

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/13/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-TR03-S02-3.0	Date Analyzed:	04/24/15 14:07
Lab Samp ID:	D114-06	Dilution Factor:	0.990
Lab File ID:	F6D13027	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	15.2
Calib. Ref.:	F6D13017	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	16900	117	11.7	23.3
Antimony	0.139J	0.584	0.117	0.233
Arsenic	1.96	0.584	0.0584	0.117
Barium	99.0	0.584	0.0841	0.117
Beryllium	0.345J	0.584	0.0584	0.117
Cadmium	0.229J	0.584	0.0665	0.117
Calcium	1500	117	19.8	23.3
Chromium	14.1	0.584	0.0584	0.117
Cobalt	7.23	0.584	0.0584	0.117
Copper	5.82	0.584	0.117	0.233
Iron	23200	117	5.84	11.7
Lead	3.91	0.584	0.0584	0.117
Magnesium	4400	117	11.7	23.3
Manganese	240	0.584	0.179	0.233
Molybdenum	0.265J	0.584	0.117	0.233
Nickel	4.76	0.584	0.0735	0.117
Potassium	2470	117	11.7	23.3
Selenium	0.0925J	0.584	0.0584	0.117
Silver	ND	0.584	0.0584	0.117
Sodium	240	117	11.7	23.3
Strontium	13.7	0.584	0.0584	0.117
Thallium	0.388J	0.584	0.0584	0.117
Tin	ND	23.3	5.84	11.7
Vanadium	60.1	0.584	0.222	0.292
Zinc	31.3	2.33	0.797	1.17

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/14/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-TR04-S01-2.0	Date Analyzed:	04/24/15 14:24
Lab Samp ID:	D114-07	Dilution Factor:	0.995
Lab File ID:	F6D13031	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	9.3
Calib. Ref.:	F6D13029	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	13900	110	11.0	21.9
Antimony	0.201J	0.549	0.110	0.219
Arsenic	1.91	0.549	0.0549	0.110
Barium	87.3	0.549	0.0790	0.110
Beryllium	0.227J	0.549	0.0549	0.110
Cadmium	0.190J	0.549	0.0625	0.110
Calcium	1190	110	18.6	21.9
Chromium	16.4	0.549	0.0549	0.110
Cobalt	6.43	0.549	0.0549	0.110
Copper	61.3	0.549	0.110	0.219
Iron	25200	110	5.49	11.0
Lead	9.91	0.549	0.0549	0.110
Magnesium	3540	110	11.0	21.9
Manganese	213	0.549	0.168	0.219
Molybdenum	0.341J	0.549	0.110	0.219
Nickel	4.78	0.549	0.0691	0.110
Potassium	2230	110	11.0	21.9
Selenium	0.0780J	0.549	0.0549	0.110
Silver	ND	0.549	0.0549	0.110
Sodium	142	110	11.0	21.9
Strontium	10.3	0.549	0.0549	0.110
Thallium	0.284J	0.549	0.0549	0.110
Tin	ND	21.9	5.49	11.0
Vanadium	66.0	0.549	0.208	0.274
Zinc	39.0	2.19	0.749	1.10

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/14/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-TR04-S02-3.0	Date Analyzed:	04/24/15 14:41
Lab Samp ID:	D114-08	Dilution Factor:	0.976
Lab File ID:	F6D13035	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	13.7
Calib. Ref.:	F6D13029	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	17800	113	11.3	22.6
Antimony	0.178J	0.565	0.113	0.226
Arsenic	1.71	0.565	0.0565	0.113
Barium	96.5	0.565	0.0814	0.113
Beryllium	0.368J	0.565	0.0565	0.113
Cadmium	0.278J	0.565	0.0645	0.113
Calcium	1850	113	19.2	22.6
Chromium	14.9	0.565	0.0565	0.113
Cobalt	7.46E	0.565	0.0565	0.113
Copper	12.9E	0.565	0.113	0.226
Iron	25800	113	5.65	11.3
Lead	18.1	0.565	0.0565	0.113
Magnesium	3800	113	11.3	22.6
Manganese	173E	0.565	0.173	0.226
Molybdenum	0.249J	0.565	0.113	0.226
Nickel	6.49	0.565	0.0712	0.113
Potassium	1750	113	11.3	22.6
Selenium	0.0909J	0.565	0.0565	0.113
Silver	ND	0.565	0.0565	0.113
Sodium	205	113	11.3	22.6
Strontium	15.4	0.565	0.0565	0.113
Thallium	0.307J	0.565	0.0565	0.113
Tin	12.6J	22.6	5.65	11.3
Vanadium	43.4	0.565	0.215	0.283
Zinc	40.5	2.26	0.772	1.13

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/14/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-TR04-S02-3.0DL	Date Analyzed:	04/24/15 17:49
Lab Samp ID:	D114-08I	Dilution Factor:	4.88
Lab File ID:	F6D13079	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	13.7
Calib. Ref.:	F6D13071	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	19300	565	56.5	113
Antimony	ND	2.83	0.565	1.13
Arsenic	1.72J	2.83	0.283	0.565
Barium	96.8	2.83	0.407	0.565
Beryllium	0.445J	2.83	0.283	0.565
Cadmium	ND	2.83	0.322	0.565
Calcium	2050	565	96.1	113
Chromium	16.3	2.83	0.283	0.565
Cobalt	8.24	2.83	0.283	0.565
Copper	14.7	2.83	0.565	1.13
Iron	28600	565	28.3	56.5
Lead	18.5	2.83	0.283	0.565
Magnesium	4090	565	56.5	113
Manganese	190	2.83	0.865	1.13
Molybdenum	ND	2.83	0.565	1.13
Nickel	7.27	2.83	0.356	0.565
Potassium	1940	565	56.5	113
Selenium	ND	2.83	0.283	0.565
Silver	ND	2.83	0.283	0.565
Sodium	196J	565	56.5	113
Strontium	15.8	2.83	0.283	0.565
Thallium	0.302J	2.83	0.283	0.565
Tin	ND	113	28.3	56.5
Vanadium	47.6	2.83	1.07	1.41
Zinc	42.3	11.3	3.86	5.65

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 10:53
Sample ID:	UX04-EB-041615	Date Analyzed:	04/24/15 16:17
Lab Samp ID:	D114-09	Dilution Factor:	1
Lab File ID:	F6D13057	Matrix :	WATER
Ext Btch ID:	IMD025W	% Moisture :	NA
Calib. Ref.:	F6D13052	Instrument ID :	T-IF6

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Aluminum	ND	100	10.0	20.0
Antimony	ND	1.00	0.250	0.500
Arsenic	ND	1.00	0.100	0.200
Barium	0.807J	1.00	0.250	0.500
Beryllium	ND	1.00	0.0500	0.100
Cadmium	ND	1.00	0.100	0.200
Calcium	441	100	13.0	25.0
Chromium	0.326J	1.00	0.100	0.200
Cobalt	ND	1.00	0.100	0.200
Copper	0.360J	1.00	0.250	0.500
Iron	21.9J	100	5.00	10.0
Lead	0.0623J	1.00	0.0500	0.100
Magnesium	185	100	5.00	10.0
Manganese	0.553J	1.00	0.100	0.200
Molybdenum	ND	2.00	0.250	0.500
Nickel	0.344J	1.00	0.100	0.200
Potassium	41.5J	100	10.0	20.0
Selenium	ND	1.00	0.150	0.300
Silver	ND	1.00	0.100	0.200
Sodium	1720	100	25.0	50.0
Strontium	2.53	2.00	0.500	1.00
Thallium	ND	1.00	0.100	0.200
Tin	ND	1.00	0.100	0.200
Vanadium	ND	1.00	0.250	0.500
Zinc	6.30J	20.0	5.00	10.0

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/08/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-SB08-8.0	Date Analyzed:	04/24/15 14:49
Lab Samp ID:	D114-10	Dilution Factor:	0.962
Lab File ID:	F6D13037	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	10.8
Calib. Ref.:	F6D13029	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	11500	108	10.8	21.6
Antimony	ND	0.539	0.108	0.216
Arsenic	1.51	0.539	0.0539	0.108
Barium	95.8	0.539	0.0777	0.108
Beryllium	0.195J	0.539	0.0539	0.108
Cadmium	0.193J	0.539	0.0615	0.108
Calcium	1580	108	18.3	21.6
Chromium	11.6	0.539	0.0539	0.108
Cobalt	6.40	0.539	0.0539	0.108
Copper	6.51	0.539	0.108	0.216
Iron	19400	108	5.39	10.8
Lead	2.69	0.539	0.0539	0.108
Magnesium	4060	108	10.8	21.6
Manganese	162	0.539	0.165	0.216
Molybdenum	0.131J	0.539	0.108	0.216
Nickel	3.78	0.539	0.0679	0.108
Potassium	2140	108	10.8	21.6
Selenium	0.0674J	0.539	0.0539	0.108
Silver	ND	0.539	0.0539	0.108
Sodium	137	108	10.8	21.6
Strontium	11.2	0.539	0.0539	0.108
Thallium	0.299J	0.539	0.0539	0.108
Tin	ND	21.6	5.39	10.8
Vanadium	46.1	0.539	0.205	0.270
Zinc	26.4	2.16	0.737	1.08

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/10/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-SB09-6.6	Date Analyzed:	04/24/15 14:53
Lab Samp ID:	D114-11	Dilution Factor:	0.976
Lab File ID:	F6D13038	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	21.3
Calib. Ref.:	F6D13029	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	16100	124	12.4	24.8
Antimony	0.283J	0.620	0.124	0.248
Arsenic	2.57	0.620	0.0620	0.124
Barium	124	0.620	0.0893	0.124
Beryllium	0.288J	0.620	0.0620	0.124
Cadmium	0.246J	0.620	0.0707	0.124
Calcium	1900	124	21.1	24.8
Chromium	16.4	0.620	0.0620	0.124
Cobalt	7.80	0.620	0.0620	0.124
Copper	11.1	0.620	0.124	0.248
Iron	29300	124	6.20	12.4
Lead	27.7	0.620	0.0620	0.124
Magnesium	4890	124	12.4	24.8
Manganese	219	0.620	0.190	0.248
Molybdenum	0.355J	0.620	0.124	0.248
Nickel	5.46	0.620	0.0781	0.124
Potassium	2090	124	12.4	24.8
Selenium	0.110J	0.620	0.0620	0.124
Silver	ND	0.620	0.0620	0.124
Sodium	156	124	12.4	24.8
Strontium	14.3	0.620	0.0620	0.124
Thallium	0.316J	0.620	0.0620	0.124
Tin	10.9J	24.8	6.20	12.4
Vanadium	68.3	0.620	0.236	0.310
Zinc	72.0	2.48	0.847	1.24

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-SB10-0.5	Date Analyzed:	04/24/15 14:57
Lab Samp ID:	D114-12	Dilution Factor:	0.995
Lab File ID:	F6D13039	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	3.8
Calib. Ref.:	F6D13029	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	17700	103	10.3	20.7
Antimony	0.108J	0.517	0.103	0.207
Arsenic	2.78	0.517	0.0517	0.103
Barium	175	0.517	0.0745	0.103
Beryllium	0.338J	0.517	0.0517	0.103
Cadmium	0.251J	0.517	0.0590	0.103
Calcium	6960	103	17.6	20.7
Chromium	15.7	0.517	0.0517	0.103
Cobalt	5.89	0.517	0.0517	0.103
Copper	5.34	0.517	0.103	0.207
Iron	21200	103	5.17	10.3
Lead	3.60	0.517	0.0517	0.103
Magnesium	5090	103	10.3	20.7
Manganese	94.4	0.517	0.158	0.207
Molybdenum	0.108J	0.517	0.103	0.207
Nickel	5.65	0.517	0.0652	0.103
Potassium	1440	103	10.3	20.7
Selenium	0.106J	0.517	0.0517	0.103
Silver	ND	0.517	0.0517	0.103
Sodium	474	103	10.3	20.7
Strontium	25.8	0.517	0.0517	0.103
Thallium	0.305J	0.517	0.0517	0.103
Tin	ND	20.7	5.17	10.3
Vanadium	56.0	0.517	0.197	0.259
Zinc	23.5	2.07	0.706	1.03

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-SB10-1.0	Date Analyzed:	04/24/15 15:15
Lab Samp ID:	D114-13	Dilution Factor:	0.966
Lab File ID:	F6D13043	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	9.5
Calib. Ref.:	F6D13041	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	21200	107	10.7	21.3
Antimony	0.123J	0.534	0.107	0.213
Arsenic	3.99	0.534	0.0534	0.107
Barium	91.3	0.534	0.0769	0.107
Beryllium	0.388J	0.534	0.0534	0.107
Cadmium	0.366J	0.534	0.0608	0.107
Calcium	2150	107	18.1	21.3
Chromium	17.7	0.534	0.0534	0.107
Cobalt	7.98	0.534	0.0534	0.107
Copper	7.12	0.534	0.107	0.213
Iron	24900	107	5.34	10.7
Lead	3.30	0.534	0.0534	0.107
Magnesium	5930	107	10.7	21.3
Manganese	89.9	0.534	0.163	0.213
Molybdenum	ND	0.534	0.107	0.213
Nickel	5.93	0.534	0.0672	0.107
Potassium	1340	107	10.7	21.3
Selenium	0.131J	0.534	0.0534	0.107
Silver	ND	0.534	0.0534	0.107
Sodium	1050	107	10.7	21.3
Strontium	25.0	0.534	0.0534	0.107
Thallium	0.314J	0.534	0.0534	0.107
Tin	ND	21.3	5.34	10.7
Vanadium	75.6	0.534	0.203	0.267
Zinc	25.9	2.13	0.729	1.07

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-SB11-0.5	Date Analyzed:	04/24/15 15:19
Lab Samp ID:	D114-14	Dilution Factor:	0.971
Lab File ID:	F6D13044	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	1.8
Calib. Ref.:	F6D13041	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	9540	98.9	9.89	19.8
Antimony	0.109J	0.494	0.0989	0.198
Arsenic	1.50	0.494	0.0494	0.0989
Barium	82.2	0.494	0.0712	0.0989
Beryllium	0.196J	0.494	0.0494	0.0989
Cadmium	0.144J	0.494	0.0564	0.0989
Calcium	1020	98.9	16.8	19.8
Chromium	12.0	0.494	0.0494	0.0989
Cobalt	6.05	0.494	0.0494	0.0989
Copper	5.30	0.494	0.0989	0.198
Iron	16300	98.9	4.94	9.89
Lead	3.54	0.494	0.0494	0.0989
Magnesium	3030	98.9	9.89	19.8
Manganese	209	0.494	0.151	0.198
Molybdenum	0.359J	0.494	0.0989	0.198
Nickel	4.54	0.494	0.0623	0.0989
Potassium	2620	98.9	9.89	19.8
Selenium	0.116J	0.494	0.0494	0.0989
Silver	ND	0.494	0.0494	0.0989
Sodium	94.0J	98.9	9.89	19.8
Strontium	9.58	0.494	0.0494	0.0989
Thallium	0.275J	0.494	0.0494	0.0989
Tin	ND	19.8	4.94	9.89
Vanadium	45.8	0.494	0.188	0.247
Zinc	23.8	1.98	0.675	0.989

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-SB11-1.0	Date Analyzed:	04/24/15 15:23
Lab Samp ID:	D114-15	Dilution Factor:	0.990
Lab File ID:	F6D13045	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	5.0
Calib. Ref.:	F6D13041	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	15400	104	10.4	20.8
Antimony	0.111J	0.521	0.104	0.208
Arsenic	2.09	0.521	0.0521	0.104
Barium	106	0.521	0.0750	0.104
Beryllium	0.263J	0.521	0.0521	0.104
Cadmium	0.177J	0.521	0.0594	0.104
Calcium	1410	104	17.7	20.8
Chromium	15.2	0.521	0.0521	0.104
Cobalt	6.62	0.521	0.0521	0.104
Copper	5.17	0.521	0.104	0.208
Iron	22900	104	5.21	10.4
Lead	3.29	0.521	0.0521	0.104
Magnesium	4330	104	10.4	20.8
Manganese	184	0.521	0.159	0.208
Molybdenum	0.429J	0.521	0.104	0.208
Nickel	5.36	0.521	0.0657	0.104
Potassium	2300	104	10.4	20.8
Selenium	0.122J	0.521	0.0521	0.104
Silver	ND	0.521	0.0521	0.104
Sodium	159	104	10.4	20.8
Strontium	12.3	0.521	0.0521	0.104
Thallium	0.366J	0.521	0.0521	0.104
Tin	ND	20.8	5.21	10.4
Vanadium	64.5	0.521	0.198	0.261
Zinc	28.9	2.08	0.712	1.04

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-SB12-0.5	Date Analyzed:	04/24/15 15:27
Lab Samp ID:	D114-16	Dilution Factor:	0.976
Lab File ID:	F6D13046	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	1.0
Calib. Ref.:	F6D13041	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	7180	98.6	9.86	19.7
Antimony	0.109J	0.493	0.0986	0.197
Arsenic	1.12	0.493	0.0493	0.0986
Barium	73.3	0.493	0.0710	0.0986
Beryllium	0.166J	0.493	0.0493	0.0986
Cadmium	0.131J	0.493	0.0562	0.0986
Calcium	1190	98.6	16.8	19.7
Chromium	8.38	0.493	0.0493	0.0986
Cobalt	4.95	0.493	0.0493	0.0986
Copper	6.16	0.493	0.0986	0.197
Iron	11000	98.6	4.93	9.86
Lead	5.28	0.493	0.0493	0.0986
Magnesium	1930	98.6	9.86	19.7
Manganese	297	0.493	0.151	0.197
Molybdenum	0.388J	0.493	0.0986	0.197
Nickel	3.60	0.493	0.0621	0.0986
Potassium	2060	98.6	9.86	19.7
Selenium	0.114J	0.493	0.0493	0.0986
Silver	ND	0.493	0.0493	0.0986
Sodium	60.0J	98.6	9.86	19.7
Strontium	10.4	0.493	0.0493	0.0986
Thallium	0.202J	0.493	0.0493	0.0986
Tin	ND	19.7	4.93	9.86
Vanadium	28.6	0.493	0.187	0.246
Zinc	20.9	1.97	0.673	0.986

METHOD SW6020A
METALS BY ICP-MS

Client : KLEINFELDER	Date Collected: 04/16/15
Project : CTO 070, UXO4, FALLBROOK	Date Received: 04/17/15
SDG NO. : 15D114	Date Extracted: 04/21/15 15:26
Sample ID: UXO4-SB12-1.0	Date Analyzed: 04/24/15 15:31
Lab Samp ID: D114-17	Dilution Factor: 0.976
Lab File ID: F6D13047	Matrix : SOIL
Ext Btch ID: IMD028S	% Moisture : 2.3
Calib. Ref.: F6D13041	Instrument ID : T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	7860	99.9	9.99	20.0
Antimony	ND	0.499	0.0999	0.200
Arsenic	1.13	0.499	0.0499	0.0999
Barium	73.8	0.499	0.0719	0.0999
Beryllium	0.188J	0.499	0.0499	0.0999
Cadmium	0.129J	0.499	0.0569	0.0999
Calcium	1050	99.9	17.0	20.0
Chromium	9.09	0.499	0.0499	0.0999
Cobalt	5.09	0.499	0.0499	0.0999
Copper	5.99	0.499	0.0999	0.200
Iron	12100	99.9	4.99	9.99
Lead	2.55	0.499	0.0499	0.0999
Magnesium	2130	99.9	9.99	20.0
Manganese	266	0.499	0.153	0.200
Molybdenum	0.278J	0.499	0.0999	0.200
Nickel	3.63	0.499	0.0629	0.0999
Potassium	2050	99.9	9.99	20.0
Selenium	0.110J	0.499	0.0499	0.0999
Silver	ND	0.499	0.0499	0.0999
Sodium	65.4J	99.9	9.99	20.0
Strontium	9.41	0.499	0.0499	0.0999
Thallium	0.227J	0.499	0.0499	0.0999
Tin	ND	20.0	4.99	9.99
Vanadium	31.9	0.499	0.190	0.250
Zinc	19.0	2.00	0.682	0.999

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-SB13-0.5	Date Analyzed:	04/24/15 15:36
Lab Samp ID:	D114-18	Dilution Factor:	0.990
Lab File ID:	F6D13048	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	1.2
Calib. Ref.:	F6D13041	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	8820	100	10.0	20.0
Antimony	0.119J	0.501	0.100	0.200
Arsenic	1.28	0.501	0.0501	0.100
Barium	77.6	0.501	0.0721	0.100
Beryllium	0.179J	0.501	0.0501	0.100
Cadmium	0.151J	0.501	0.0571	0.100
Calcium	1130	100	17.0	20.0
Chromium	9.32	0.501	0.0501	0.100
Cobalt	6.74	0.501	0.0501	0.100
Copper	5.87	0.501	0.100	0.200
Iron	12800	100	5.01	10.0
Lead	5.67	0.501	0.0501	0.100
Magnesium	2170	100	10.0	20.0
Manganese	335	0.501	0.153	0.200
Molybdenum	0.346J	0.501	0.100	0.200
Nickel	4.05	0.501	0.0631	0.100
Potassium	2110	100	10.0	20.0
Selenium	0.111J	0.501	0.0501	0.100
Silver	ND	0.501	0.0501	0.100
Sodium	83.2J	100	10.0	20.0
Strontium	9.87	0.501	0.0501	0.100
Thallium	0.220J	0.501	0.0501	0.100
Tin	ND	20.0	5.01	10.0
Vanadium	32.8	0.501	0.190	0.251
Zinc	20.8	2.00	0.684	1.00

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-SB13-1.0	Date Analyzed:	04/24/15 15:40
Lab Samp ID:	D114-19	Dilution Factor:	0.990
Lab File ID:	F6D13049	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	4.2
Calib. Ref.:	F6D13041	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	11600	103	10.3	20.7
Antimony	ND	0.517	0.103	0.207
Arsenic	1.59	0.517	0.0517	0.103
Barium	79.3	0.517	0.0744	0.103
Beryllium	0.222J	0.517	0.0517	0.103
Cadmium	0.120J	0.517	0.0589	0.103
Calcium	1160	103	17.6	20.7
Chromium	12.0	0.517	0.0517	0.103
Cobalt	6.40	0.517	0.0517	0.103
Copper	5.51	0.517	0.103	0.207
Iron	17700	103	5.17	10.3
Lead	2.97	0.517	0.0517	0.103
Magnesium	3120	103	10.3	20.7
Manganese	244	0.517	0.158	0.207
Molybdenum	0.292J	0.517	0.103	0.207
Nickel	4.61	0.517	0.0651	0.103
Potassium	2010	103	10.3	20.7
Selenium	0.106J	0.517	0.0517	0.103
Silver	ND	0.517	0.0517	0.103
Sodium	120	103	10.3	20.7
Strontium	10.3	0.517	0.0517	0.103
Thallium	0.285J	0.517	0.0517	0.103
Tin	ND	20.7	5.17	10.3
Vanadium	46.5	0.517	0.196	0.258
Zinc	23.6	2.07	0.706	1.03

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	UX04-SB14-0.5	Date Analyzed:	04/24/15 15:44
Lab Samp ID:	D114-20	Dilution Factor:	0.985
Lab File ID:	F6D13050	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	4.9
Calib. Ref.:	F6D13041	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	18500	104	10.4	20.7
Antimony	ND	0.518	0.104	0.207
Arsenic	1.84	0.518	0.0518	0.104
Barium	117	0.518	0.0746	0.104
Beryllium	0.345J	0.518	0.0518	0.104
Cadmium	0.207J	0.518	0.0590	0.104
Calcium	2250	104	17.6	20.7
Chromium	14.4	0.518	0.0518	0.104
Cobalt	8.39	0.518	0.0518	0.104
Copper	5.72	0.518	0.104	0.207
Iron	20400	104	5.18	10.4
Lead	3.66	0.518	0.0518	0.104
Magnesium	3760	104	10.4	20.7
Manganese	306	0.518	0.158	0.207
Molybdenum	0.281J	0.518	0.104	0.207
Nickel	5.51	0.518	0.0653	0.104
Potassium	1980	104	10.4	20.7
Selenium	0.104J	0.518	0.0518	0.104
Silver	ND	0.518	0.0518	0.104
Sodium	580	104	10.4	20.7
Strontium	18.0	0.518	0.0518	0.104
Thallium	0.322J	0.518	0.0518	0.104
Tin	ND	20.7	5.18	10.4
Vanadium	50.7	0.518	0.197	0.259
Zinc	27.5	2.07	0.707	1.04

METHOD SW6020A
METALS BY ICP-MS

Client : KLEINFELDER	Date Collected: 04/16/15
Project : CTO 070, UXO4, FALLBROOK	Date Received: 04/17/15
SDG NO. : 15D114	Date Extracted: 04/21/15 15:33
Sample ID: UXO4-SB14-1.0	Date Analyzed: 04/24/15 16:47
Lab Samp ID: D114-21	Dilution Factor: 0.985
Lab File ID: F6D13064	Matrix : SOIL
Ext Btch ID: IMD029S	% Moisture : 7.6
Calib. Ref.: F6D13059	Instrument ID : T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	12600	107	10.7	21.3
Antimony	ND	0.533	0.107	0.213
Arsenic	1.52	0.533	0.0533	0.107
Barium	91.7	0.533	0.0768	0.107
Beryllium	0.304J	0.533	0.0533	0.107
Cadmium	0.199J	0.533	0.0608	0.107
Calcium	1430	107	18.1	21.3
Chromium	12.1	0.533	0.0533	0.107
Cobalt	5.63	0.533	0.0533	0.107
Copper	4.88	0.533	0.107	0.213
Iron	17800	107	5.33	10.7
Lead	2.97	0.533	0.0533	0.107
Magnesium	3320	107	10.7	21.3
Manganese	197	0.533	0.163	0.213
Molybdenum	0.175J	0.533	0.107	0.213
Nickel	4.64	0.533	0.0672	0.107
Potassium	1630	107	10.7	21.3
Selenium	0.0962J	0.533	0.0533	0.107
Silver	ND	0.533	0.0533	0.107
Sodium	467	107	10.7	21.3
Strontium	14.3	0.533	0.0533	0.107
Thallium	0.296J	0.533	0.0533	0.107
Tin	ND	21.3	5.33	10.7
Vanadium	46.1	0.533	0.203	0.267
Zinc	21.3	2.13	0.728	1.07

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:33
Sample ID:	UX04-SB15-0.5	Date Analyzed:	04/24/15 17:03
Lab Samp ID:	D114-22	Dilution Factor:	0.971
Lab File ID:	F6D13068	Matrix :	SOIL
Ext Btch ID:	IMD029S	% Moisture :	1.3
Calib. Ref.:	F6D13059	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	5940	98.4	9.84	19.7
Antimony	0.123J	0.492	0.0984	0.197
Arsenic	1.01	0.492	0.0492	0.0984
Barium	59.9	0.492	0.0708	0.0984
Beryllium	0.147J	0.492	0.0492	0.0984
Cadmium	0.108J	0.492	0.0561	0.0984
Calcium	856	98.4	16.7	19.7
Chromium	7.50	0.492	0.0492	0.0984
Cobalt	4.61	0.492	0.0492	0.0984
Copper	4.72	0.492	0.0984	0.197
Iron	10500	98.4	4.92	9.84
Lead	4.33	0.492	0.0492	0.0984
Magnesium	1880	98.4	9.84	19.7
Manganese	215	0.492	0.151	0.197
Molybdenum	0.291J	0.492	0.0984	0.197
Nickel	2.85	0.492	0.0620	0.0984
Potassium	2130	98.4	9.84	19.7
Selenium	0.0950J	0.492	0.0492	0.0984
Silver	ND	0.492	0.0492	0.0984
Sodium	70.5J	98.4	9.84	19.7
Strontium	7.62	0.492	0.0492	0.0984
Thallium	0.175J	0.492	0.0492	0.0984
Tin	ND	19.7	4.92	9.84
Vanadium	29.0	0.492	0.187	0.246
Zinc	17.3	1.97	0.672	0.984

METHOD SW6020A
METALS BY ICP-MS

Client : KLEINFELDER	Date Collected: 04/16/15
Project : CTO 070, UX04, FALLBROOK	Date Received: 04/17/15
SDG NO. : 15D114	Date Extracted: 04/21/15 15:33
Sample ID: UX04-SB15-1.0	Date Analyzed: 04/24/15 17:33
Lab Samp ID: D114-23	Dilution Factor: 0.980
Lab File ID: F6D13075	Matrix : SOIL
Ext Btch ID: IMD029S	% Moisture : 2.7
Calib. Ref.: F6D13071	Instrument ID : T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	6390	101	10.1	20.1
Antimony	ND	0.504	0.101	0.201
Arsenic	1.13	0.504	0.0504	0.101
Barium	78.8	0.504	0.0725	0.101
Beryllium	0.185J	0.504	0.0504	0.101
Cadmium	0.126J	0.504	0.0574	0.101
Calcium	1000	101	17.1	20.1
Chromium	8.30	0.504	0.0504	0.101
Cobalt	5.53	0.504	0.0504	0.101
Copper	6.19	0.504	0.101	0.201
Iron	10800	101	5.04	10.1
Lead	2.76	0.504	0.0504	0.101
Magnesium	1920	101	10.1	20.1
Manganese	343	0.504	0.154	0.201
Molybdenum	0.327J	0.504	0.101	0.201
Nickel	3.72	0.504	0.0635	0.101
Potassium	1960	101	10.1	20.1
Selenium	0.132J	0.504	0.0504	0.101
Silver	ND	0.504	0.0504	0.101
Sodium	83.0J	101	10.1	20.1
Strontium	9.69	0.504	0.0504	0.101
Thallium	0.203J	0.504	0.0504	0.101
Tin	ND	20.1	5.04	10.1
Vanadium	28.8	0.504	0.191	0.252
Zinc	17.7	2.01	0.688	1.01

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:33
Sample ID:	UX04-SB16-0.5	Date Analyzed:	04/24/15 17:37
Lab Samp ID:	D114-24	Dilution Factor:	0.976
Lab File ID:	F6D13076	Matrix :	SOIL
Ext Btch ID:	IMD029S	% Moisture :	4.0
Calib. Ref.:	F6D13071	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	9840	102	10.2	20.3
Antimony	0.117J	0.508	0.102	0.203
Arsenic	0.932	0.508	0.0508	0.102
Barium	153	0.508	0.0732	0.102
Beryllium	0.198J	0.508	0.0508	0.102
Cadmium	0.220J	0.508	0.0579	0.102
Calcium	2110	102	17.3	20.3
Chromium	10.8	0.508	0.0508	0.102
Cobalt	6.95	0.508	0.0508	0.102
Copper	11.1	0.508	0.102	0.203
Iron	20600	102	5.08	10.2
Lead	5.09	0.508	0.0508	0.102
Magnesium	3770	102	10.2	20.3
Manganese	312	0.508	0.156	0.203
Molybdenum	0.914	0.508	0.102	0.203
Nickel	4.21	0.508	0.0641	0.102
Potassium	4920	102	10.2	20.3
Selenium	0.189J	0.508	0.0508	0.102
Silver	ND	0.508	0.0508	0.102
Sodium	129	102	10.2	20.3
Strontium	14.9	0.508	0.0508	0.102
Thallium	0.257J	0.508	0.0508	0.102
Tin	ND	20.3	5.08	10.2
Vanadium	59.4	0.508	0.193	0.254
Zinc	32.7	2.03	0.694	1.02

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	04/16/15
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/17/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:33
Sample ID:	UX04-SB16-1.0	Date Analyzed:	04/24/15 17:41
Lab Samp ID:	D114-25	Dilution Factor:	0.990
Lab File ID:	F6D13077	Matrix :	SOIL
Ext Btch ID:	IMD029S	% Moisture :	6.4
Calib. Ref.:	F6D13071	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	10600	106	10.6	21.2
Antimony	ND	0.529	0.106	0.212
Arsenic	0.973	0.529	0.0529	0.106
Barium	162	0.529	0.0762	0.106
Beryllium	0.213J	0.529	0.0529	0.106
Cadmium	0.221J	0.529	0.0603	0.106
Calcium	2040	106	18.0	21.2
Chromium	10.6	0.529	0.0529	0.106
Cobalt	7.01	0.529	0.0529	0.106
Copper	11.1	0.529	0.106	0.212
Iron	21400	106	5.29	10.6
Lead	2.99	0.529	0.0529	0.106
Magnesium	3940	106	10.6	21.2
Manganese	301	0.529	0.162	0.212
Molybdenum	0.771	0.529	0.106	0.212
Nickel	4.21	0.529	0.0666	0.106
Potassium	4360	106	10.6	21.2
Selenium	0.205J	0.529	0.0529	0.106
Silver	ND	0.529	0.0529	0.106
Sodium	148	106	10.6	21.2
Strontium	15.4	0.529	0.0529	0.106
Thallium	0.262J	0.529	0.0529	0.106
Tin	ND	21.2	5.29	10.6
Vanadium	62.0	0.529	0.201	0.264
Zinc	30.9	2.12	0.722	1.06

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	NA
Project	: CTO 070, UXO4, FALLBROOK	Date Received:	04/21/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 10:53
Sample ID:	MBLK1W	Date Analyzed:	04/24/15 16:04
Lab Samp ID:	IMD025WB	Dilution Factor:	1
Lab File ID:	F6D13054	Matrix :	WATER
Ext Btch ID:	IMD025W	% Moisture :	NA
Calib. Ref.:	F6D13052	Instrument ID :	T-IF6

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Aluminum	ND	100	10.0	20.0
Antimony	ND	1.00	0.250	0.500
Arsenic	ND	1.00	0.100	0.200
Barium	ND	1.00	0.250	0.500
Beryllium	ND	1.00	0.0500	0.100
Cadmium	ND	1.00	0.100	0.200
Calcium	ND	100	13.0	25.0
Chromium	ND	1.00	0.100	0.200
Cobalt	ND	1.00	0.100	0.200
Copper	ND	1.00	0.250	0.500
Iron	ND	100	5.00	10.0
Lead	ND	1.00	0.0500	0.100
Magnesium	ND	100	5.00	10.0
Manganese	ND	1.00	0.100	0.200
Molybdenum	ND	2.00	0.250	0.500
Nickel	ND	1.00	0.100	0.200
Potassium	ND	100	10.0	20.0
Selenium	ND	1.00	0.150	0.300
Silver	ND	1.00	0.100	0.200
Sodium	ND	100	25.0	50.0
Strontium	ND	2.00	0.500	1.00
Thallium	ND	1.00	0.100	0.200
Tin	ND	1.00	0.100	0.200
Vanadium	ND	1.00	0.250	0.500
Zinc	ND	20.0	5.00	10.0

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
SDG NO.: 15D114
METHOD: SW6020A

MATRIX:	WATER			% MOISTURE:	NA
DILTN FACTR:	1	1	1		
SAMPLE ID:	MBLK1W				
CONTROL NO.:	IMD025WB	IMD025WL	IMD025WC		
LAB FILE ID:	F6D13054	F6D13055	F6D13056		
DATIME EXTRCTD:	04/21/1510:53	04/21/1510:53	04/21/1510:53	DATE COLLECTED:	NA
DATIME ANALYZD:	04/24/1516:04	04/24/1516:08	04/24/1516:12	DATE RECEIVED:	04/21/15
PREP. BATCH:	IMD025W	IMD025W	IMD025W		
CALIB. REF:	F6D13052	F6D13052	F6D13052		

ACCESSION:

PARAMETER	BLNK RSLT ug/L	SPIKE AMT ug/L	BS RSLT ug/L	BS % REC	SPIKE AMT ug/L	BSD RSLT ug/L	BSD % REC	RPD %	QC LIMIT %	MAX RPD %
Aluminum	ND	3000	2690	90	3000	2650	88	1	80-120	20
Antimony	ND	30.0	28.9	96	30.0	28.5	95	1	80-120	20
Arsenic	ND	30.0	28.3	94	30.0	28.1	94	1	80-120	20
Barium	ND	30.0	29.4	98	30.0	28.5	95	3	80-120	20
Beryllium	ND	30.0	27.5	92	30.0	27.0	90	2	80-120	20
Cadmium	ND	30.0	27.1	90	30.0	26.6	89	2	80-120	20
Calcium	ND	3000	2980	99	3000	2920	97	2	80-120	20
Chromium	ND	30.0	28.6	95	30.0	28.3	94	1	80-120	20
Cobalt	ND	30.0	27.5	92	30.0	27.2	91	1	80-120	20
Copper	ND	30.0	28.0	93	30.0	27.8	93	0	80-120	20
Iron	ND	3000	3100	103	3000	3040	101	2	80-120	20
Lead	ND	30.0	28.3	94	30.0	27.8	93	2	80-120	20
Magnesium	ND	3000	2740	91	3000	2700	90	1	80-120	20
Manganese	ND	30.0	27.7	92	30.0	27.3	91	1	80-120	20
Molybdenum	ND	30.0	27.4	91	30.0	26.8	89	2	80-120	20
Nickel	ND	30.0	28.8	96	30.0	28.3	94	2	80-120	20
Potassium	ND	3000	2900	97	3000	2870	96	1	80-120	20
Selenium	ND	30.0	29.8	99	30.0	29.5	98	1	80-120	20
Silver	ND	30.0	28.9	96	30.0	28.1	94	3	80-120	20
Sodium	ND	3000	2850	95	3000	2800	93	2	80-120	20
Strontium	ND	30.0	28.4	95	30.0	27.8	93	2	80-120	20
Thallium	ND	30.0	28.0	93	30.0	27.6	92	1	80-120	20
Tin	ND	30.0	29.9	100	30.0	29.2	97	2	80-120	20
Vanadium	ND	30.0	29.9	100	30.0	29.8	99	0	80-120	20
Zinc	ND	60.0	61.2	102	60.0	59.6	99	3	80-120	20

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	NA
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/21/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:26
Sample ID:	MBLK1S	Date Analyzed:	04/24/15 13:33
Lab Samp ID:	IMD028SB	Dilution Factor:	0.966
Lab File ID:	F6D13019	Matrix :	SOIL
Ext Btch ID:	IMD028S	% Moisture :	NA
Calib. Ref.:	F6D13017	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	ND	96.6	9.66	19.3
Antimony	ND	0.483	0.0966	0.193
Arsenic	ND	0.483	0.0483	0.0966
Barium	ND	0.483	0.0696	0.0966
Beryllium	ND	0.483	0.0483	0.0966
Cadmium	ND	0.483	0.0551	0.0966
Calcium	ND	96.6	16.4	19.3
Chromium	ND	0.483	0.0483	0.0966
Cobalt	ND	0.483	0.0483	0.0966
Copper	ND	0.483	0.0966	0.193
Iron	ND	96.6	4.83	9.66
Lead	ND	0.483	0.0483	0.0966
Magnesium	ND	96.6	9.66	19.3
Manganese	ND	0.483	0.148	0.193
Molybdenum	ND	0.483	0.0966	0.193
Nickel	ND	0.483	0.0609	0.0966
Potassium	ND	96.6	9.66	19.3
Selenium	ND	0.483	0.0483	0.0966
Silver	ND	0.483	0.0483	0.0966
Sodium	ND	96.6	9.66	19.3
Strontium	ND	0.483	0.0483	0.0966
Thallium	ND	0.483	0.0483	0.0966
Tin	ND	19.3	4.83	9.66
Vanadium	ND	0.483	0.184	0.242
Zinc	ND	1.93	0.660	0.966

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
SDG NO.: 15D114
METHOD: SW6020A

MATRIX:	SOIL			% MOISTURE:	NA
DILTN FACTR:	0.966	0.985	0.971		
SAMPLE ID:	MBLK1S				
CONTROL NO.:	IMD028SB	IMD028SL	IMD028SC		
LAB FILE ID:	F6D13019	F6D13020	F6D13021		
DATIME EXTRCTD:	04/21/1515:26	04/21/1515:26	04/21/1515:26	DATE COLLECTED:	NA
DATIME ANALYZD:	04/24/1513:33	04/24/1513:38	04/24/1513:42	DATE RECEIVED:	04/21/15
PREP. BATCH:	IMD028S	IMD028S	IMD028S		
CALIB. REF:	F6D13017	F6D13017	F6D13017		

ACCESSION:

PARAMETER	BLNK RSLT mg/kg	SPIKE AMT mg/kg	BS RSLT mg/kg	BS % REC	SPIKE AMT mg/kg	BSD RSLT mg/kg	BSD % REC	RPD %	QC LIMIT %	MAX RPD %
Aluminum	ND	2500	2430	97	2500	2400	96	1	80-120	20
Antimony	ND	25.0	24.6	99	25.0	24.1	96	2	80-120	20
Arsenic	ND	25.0	25.1	101	25.0	24.7	99	2	80-120	20
Barium	ND	25.0	25.1	100	25.0	24.3	97	3	80-120	20
Beryllium	ND	25.0	25.3	101	25.0	25.2	101	1	80-120	20
Cadmium	ND	25.0	23.7	95	25.0	23.3	93	2	80-120	20
Calcium	ND	2500	2540	102	2500	2490	100	2	80-120	20
Chromium	ND	25.0	25.1	101	25.0	24.4	98	3	80-120	20
Cobalt	ND	25.0	24.0	96	25.0	23.4	94	2	80-120	20
Copper	ND	25.0	23.8	95	25.0	23.4	94	2	80-120	20
Iron	ND	2500	2610	104	2500	2580	103	1	80-120	20
Lead	ND	25.0	24.4	98	25.0	24.2	97	1	80-120	20
Magnesium	ND	2500	2500	100	2500	2470	99	1	80-120	20
Manganese	ND	25.0	24.3	97	25.0	23.7	95	2	80-120	20
Molybdenum	ND	25.0	24.6	98	25.0	24.2	97	2	80-120	20
Nickel	ND	25.0	24.6	99	25.0	24.3	97	1	80-120	20
Potassium	ND	2500	2510	100	2500	2500	100	0	80-120	20
Selenium	ND	25.0	25.2	101	25.0	24.8	99	2	80-120	20
Silver	ND	25.0	24.4	97	25.0	23.8	95	3	75-120	20
Sodium	ND	2500	2430	97	2500	2440	97	0	80-120	20
Strontium	ND	25.0	24.3	97	25.0	24.1	96	1	80-120	20
Thallium	ND	25.0	24.5	98	25.0	24.2	97	1	80-120	20
Tin	ND	25.0	27.1	109	25.0	26.6	106	2	80-120	20
Vanadium	ND	25.0	26.3	105	25.0	25.8	103	2	80-120	20
Zinc	ND	50.0	50.2	100	50.0	48.8	98	3	80-120	20

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	NA
Project	: CTO 070, UX04, FALLBROOK	Date Received:	04/21/15
SDG NO.	: 15D114	Date Extracted:	04/21/15 15:33
Sample ID:	MBLK2S	Date Analyzed:	04/24/15 16:34
Lab Samp ID:	IMD029SB	Dilution Factor:	0.990
Lab File ID:	F6D13061	Matrix :	SOIL
Ext Btch ID:	IMD029S	% Moisture :	NA
Calib. Ref.:	F6D13059	Instrument ID :	T-IF6

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	ND	99.0	9.90	19.8
Antimony	ND	0.495	0.0990	0.198
Arsenic	ND	0.495	0.0495	0.0990
Barium	ND	0.495	0.0713	0.0990
Beryllium	ND	0.495	0.0495	0.0990
Cadmium	ND	0.495	0.0564	0.0990
Calcium	ND	99.0	16.8	19.8
Chromium	ND	0.495	0.0495	0.0990
Cobalt	ND	0.495	0.0495	0.0990
Copper	ND	0.495	0.0990	0.198
Iron	ND	99.0	4.95	9.90
Lead	ND	0.495	0.0495	0.0990
Magnesium	ND	99.0	9.90	19.8
Manganese	ND	0.495	0.151	0.198
Molybdenum	ND	0.495	0.0990	0.198
Nickel	ND	0.495	0.0624	0.0990
Potassium	ND	99.0	9.90	19.8
Selenium	ND	0.495	0.0495	0.0990
Silver	ND	0.495	0.0495	0.0990
Sodium	ND	99.0	9.90	19.8
Strontium	ND	0.495	0.0495	0.0990
Thallium	ND	0.495	0.0495	0.0990
Tin	ND	19.8	4.95	9.90
Vanadium	ND	0.495	0.188	0.247
Zinc	ND	1.98	0.676	0.990

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
SDG NO.: 15D114
METHOD: SW6020A

MATRIX:	SOIL			% MOISTURE:	NA
DILTN FACTR:	0.990	0.990	0.990		
SAMPLE ID:	MBLK2S				
CONTROL NO.:	IMD029SB	IMD029SL	IMD029SC		
LAB FILE ID:	F6D13061	F6D13062	F6D13063		
DATIME EXTRCTD:	04/21/1515:33	04/21/1515:33	04/21/1515:33	DATE COLLECTED:	NA
DATIME ANALYZD:	04/24/1516:34	04/24/1516:38	04/24/1516:42	DATE RECEIVED:	04/21/15
PREP. BATCH:	IMD029S	IMD029S	IMD029S		
CALIB. REF:	F6D13059	F6D13059	F6D13059		

ACCESSION:

PARAMETER	BLNK RSLT mg/kg	SPIKE AMT mg/kg	BS RSLT mg/kg	BS % REC	SPIKE AMT mg/kg	BSD RSLT mg/kg	BSD % REC	RPD %	QC LIMIT %	MAX RPD %
Aluminum	ND	2500	2370	95	2500	2330	93	2	80-120	20
Antimony	ND	25.0	24.6	98	25.0	24.7	99	1	80-120	20
Arsenic	ND	25.0	24.8	99	25.0	24.9	99	0	80-120	20
Barium	ND	25.0	25.3	101	25.0	25.3	101	0	80-120	20
Beryllium	ND	25.0	23.5	94	25.0	23.6	94	0	80-120	20
Cadmium	ND	25.0	23.5	94	25.0	23.5	94	0	80-120	20
Calcium	ND	2500	2580	103	2500	2520	101	2	80-120	20
Chromium	ND	25.0	24.7	99	25.0	24.7	99	0	80-120	20
Cobalt	ND	25.0	24.0	96	25.0	23.6	95	1	80-120	20
Copper	ND	25.0	23.7	95	25.0	23.8	95	0	80-120	20
Iron	ND	2500	2650	106	2500	2620	105	1	80-120	20
Lead	ND	25.0	24.2	97	25.0	24.1	96	0	80-120	20
Magnesium	ND	2500	2420	97	2500	2370	95	2	80-120	20
Manganese	ND	25.0	24.2	97	25.0	23.7	95	2	80-120	20
Molybdenum	ND	25.0	24.3	97	25.0	24.1	97	1	80-120	20
Nickel	ND	25.0	24.4	98	25.0	24.5	98	0	80-120	20
Potassium	ND	2500	2510	100	2500	2530	101	1	80-120	20
Selenium	ND	25.0	25.1	101	25.0	25.5	102	2	80-120	20
Silver	ND	25.0	24.2	97	25.0	24.3	97	0	75-120	20
Sodium	ND	2500	2420	97	2500	2410	97	0	80-120	20
Strontium	ND	25.0	24.6	98	25.0	24.7	99	0	80-120	20
Thallium	ND	25.0	24.1	97	25.0	24.1	96	0	80-120	20
Tin	ND	25.0	27.3	109	25.0	27.0	108	1	80-120	20
Vanadium	ND	25.0	26.0	104	25.0	26.3	105	1	80-120	20
Zinc	ND	50.0	51.7	103	50.0	49.3	99	5	80-120	20

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
SDG NO.: 15D114
METHOD: SW6020A

MATRIX:	SOIL			% MOISTURE:	13.7
DILTN FACTR:	0.976	0.976	0.971		
SAMPLE ID:	UX04-TR04-S02-3.0				
CONTROL NO.:	D114-08	D114-08M	D114-08S		
LAB FILE ID:	F6D13035	F6D13032	F6D13033		
DATIME EXTRCTD:	04/21/1515:26	04/21/1515:26	04/21/1515:26	DATE COLLECTED:	04/14/15
DATIME ANALYZD:	04/24/1514:41	04/24/1514:28	04/24/1514:32	DATE RECEIVED:	04/17/15
PREP. BATCH:	IMD028S	IMD028S	IMD028S		
CALIB. REF:	F6D13029	F6D13029	F6D13029		

ACCESSION:

PARAMETER	SMPL RSLT mg/kg	SPIKE AMT mg/kg	MS RSLT mg/kg	MS % REC	SPIKE AMT mg/kg	MSD RSLT mg/kg	MSD % REC	RPD %	QC LIMIT %	MAX RPD %
Aluminum	17800	2900	20700	99	2900	20800	104	1	80-120	20
Antimony	0.178J	29.0	22.2	76*	29.0	22.8	78*	3	80-120	20
Arsenic	1.71	29.0	28.1	91	29.0	27.1	88	4	80-120	20
Barium	96.5	29.0	105	29*	29.0	100	14*	4	80-120	20
Beryllium	0.368J	29.0	25.3	86	29.0	25.2	86	0	80-120	20
Cadmium	0.278J	29.0	27.3	93	29.0	27.0	92	1	80-120	20
Calcium	1850	2900	3910	71*	2900	3750	66*	4	80-120	20
Chromium	14.9	29.0	39.1	83	29.0	38.4	81	2	80-120	20
Cobalt	8.24	29.0	28.6	70*	29.0	27.7	67*	3	80-120	20
Copper	14.7	29.0	34.1	73*	29.0	30.5	61*	11	80-120	20
Iron	25800	2900	31500	195*	2900	22500	-115*	33*	80-120	20
Lead	18.1	29.0	34.1	55*	29.0	32.2	49*	6	80-120	20
Magnesium	3800	2900	5610	62*	2900	5480	58*	2	80-120	20
Manganese	190	29.0	158	-52*	29.0	131	-144*	18	80-120	20
Molybdenum	0.249J	29.0	26.3	90	29.0	26.1	89	1	80-120	20
Nickel	6.49	29.0	29.8	80	29.0	28.7	77*	4	80-120	20
Potassium	1750	2900	4170	84	2900	4130	82	1	80-120	20
Selenium	0.0909J	29.0	27.5	94	29.0	27.2	93	1	80-120	20
Silver	ND	29.0	27.0	93	29.0	27.0	93	0	75-120	20
Sodium	205	2900	2690	86	2900	2590	82	4	80-120	20
Strontium	15.4	29.0	36.0	71*	29.0	36.5	73*	1	80-120	20
Thallium	0.307J	29.0	27.1	93	29.0	26.8	92	1	80-120	20
Tin	12.6J	29.0	32.3	68*	29.0	32.1	67*	1	80-120	20
Vanadium	43.4	29.0	77.8	119	29.0	66.0	78*	16	80-120	20
Zinc	40.5	57.9	99.0	101	57.9	92.4	90	7	80-120	20

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
SDG NO.: 15D114
METHOD: SW6020A

MATRIX:	SOIL			% MOISTURE:	1.3
DILTN FACTR:	0.971	0.985	0.962		
SAMPLE ID:	UX04-SB15-0.5				
CONTROL NO.:	D114-22	D114-22M	D114-22S		
LAB FILE ID:	F6D13068	F6D13065	F6D13066		
DATIME EXTRCTD:	04/21/1515:33	04/21/1515:33	04/21/1515:33	DATE COLLECTED:	04/16/15
DATIME ANALYZD:	04/24/1517:03	04/24/1516:51	04/24/1516:55	DATE RECEIVED:	04/17/15
PREP. BATCH:	IMD029S	IMD029S	IMD029S		
CALIB. REF:	F6D13059	F6D13059	F6D13059		

ACCESSION:

PARAMETER	SMPL RSLT mg/kg	SPIKE AMT mg/kg	MS RSLT mg/kg	MS % REC	SPIKE AMT mg/kg	MSD RSLT mg/kg	MSD % REC	RPD %	QC LIMIT %	MAX RPD %
Aluminum	5940	2530	10000	162*	2530	9890	156*	2	80-120	20
Antimony	0.123J	25.3	20.2	79*	25.3	20.1	79*	1	80-120	20
Arsenic	1.01	25.3	24.9	94	25.3	24.3	92	2	80-120	20
Barium	59.9	25.3	86.1	104	25.3	94.6	137*	9	80-120	20
Beryllium	0.147J	25.3	22.5	88	25.3	22.2	87	1	80-120	20
Cadmium	0.108J	25.3	23.2	91	25.3	23.1	91	1	80-120	20
Calcium	856	2530	3290	96	2530	3220	93	2	80-120	20
Chromium	7.50	25.3	31.0	93	25.3	30.4	91	2	80-120	20
Cobalt	4.61	25.3	26.4	86	25.3	27.2	89	3	80-120	20
Copper	4.72	25.3	26.6	86	25.3	26.3	85	1	80-120	20
Iron	10500	2530	13900	133*	2530	13100	103	6	80-120	20
Lead	4.33	25.3	28.2	94	25.3	27.2	90	4	80-120	20
Magnesium	1880	2530	4240	93	2530	4090	87	4	80-120	20
Manganese	215	25.3	236	82	25.3	364	589*	43*	80-120	20
Molybdenum	0.291J	25.3	23.9	93	25.3	23.5	92	2	80-120	20
Nickel	2.85	25.3	25.6	90	25.3	25.4	89	1	80-120	20
Potassium	2130	2530	4540	95	2530	4420	91	3	80-120	20
Selenium	0.0950J	25.3	24.4	96	25.3	23.9	94	2	80-120	20
Silver	ND	25.3	23.9	95	25.3	23.2	91	3	75-120	20
Sodium	70.5J	2530	2420	93	2530	2340	90	3	80-120	20
Strontium	7.62	25.3	31.3	93	25.3	31.4	94	0	80-120	20
Thallium	0.175J	25.3	23.9	93	25.3	23.0	90	4	80-120	20
Tin	ND	25.3	27.5	109	25.3	27.1	107	2	80-120	20
Vanadium	29.0	25.3	56.1	107	25.3	53.8	98	4	80-120	20
Zinc	17.3	50.7	65.1	94	50.7	64.1	93	1	80-120	20

EMAX QUALITY CONTROL DATA
SERIAL DILUTION ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
BATCH NO.: 15D114
METHOD: SW6020A

MATRIX:	SOIL		% MOISTURE:	13.7
DILUTION FACTOR:	0.976	4.88		
SAMPLE ID:	UX04-TR04-S02-	UX04-TR04-S02-		
EMAX SAMP ID:	D114-08	D114-08J		
LAB FILE ID:	F6D13035	F6D13036		
DATE EXTRACTED:	04/21/1515:26	04/21/1515:26	DATE COLLECTED:	04/14/15
DATE ANALYZED:	04/24/1514:41	04/24/1514:45	DATE RECEIVED:	04/17/15
PREP. BATCH:	IMD028S	IMD028S		
CALIB. REF:	F6D13029	F6D13029		

ACCESSION:

PARAMETER	SMPL RSLT (mg/kg)	SERIAL DIL RSLT (mg/kg)	DIF RSLT %	QC LIMIT (%)
Aluminum	17800	19600	10	10
Antimony	.178J	ND	NA	10
Arsenic	1.71	1.72J	1	10
Barium	96.5	97.5	1	10
Beryllium	.368J	.434J	NA	10
Cadmium	.278J	ND	NA	10
Calcium	1850	2090	13*	10
Chromium	14.9	16.8	13*	10
Cobalt^	8.24	9.03	10	10
Copper^	14.7	16.5	12*	10
Iron	25800	28800	12*	10
Lead	18.1	19.4	7	10
Magnesium	3800	4250	12*	10
Manganese^	190	211	11*	10
Molybdenum	.249J	ND	NA	10
Nickel	6.49	7.49	15*	10
Potassium	1750	1950	12*	10
Selenium	.0909J	ND	NA	10
Silver	ND	ND	0	10
Sodium	205	207J	NA	10
Strontium	15.4	16.2	5	10
Thallium	.307J	.318J	NA	10
Tin	12.6J	ND	NA	10
Vanadium	43.4	48.8	13*	10
Zinc	40.5	44.2	9	10

^ D114-08J : Analyzed at DF 24.4 on 04/24/15 17:53 | Data File IDF6D13080

EMAX QUALITY CONTROL DATA
SERIAL DILUTION ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
BATCH NO.: 15D114
METHOD: SW6020A

MATRIX:	SOIL		% MOISTURE:	1.3
DILUTION FACTOR:	0.971	4.85		
SAMPLE ID:	UX04-SB15-0.5	UX04-SB15-0.5DL		
EMAX SAMP ID:	D114-22	D114-22J		
LAB FILE ID:	F6D13068	F6D13069		
DATE EXTRACTED:	04/21/1515:33	04/21/1515:33	DATE COLLECTED:	04/16/15
DATE ANALYZED:	04/24/1517:03	04/24/1517:07	DATE RECEIVED:	04/17/15
PREP. BATCH:	IMD029S	IMD029S		
CALIB. REF:	F6D13059	F6D13059		

ACCESSION:

PARAMETER	SMPL RSLT (mg/kg)	SERIAL DIL RSLT (mg/kg)	DIF RSLT %	QC LIMIT (%)
Aluminum	5940	6280	6	10
Antimony	.123J	ND	NA	10
Arsenic	1.01	.901J	11R	10
Barium	59.9	60	0	10
Beryllium	.147J	ND	NA	10
Cadmium	.108J	ND	NA	10
Calcium	856	926	8	10
Chromium	7.5	7.61	2	10
Cobalt	4.61	4.79	4	10
Copper	4.72	5.08	8	10
Iron	10500	11200	6	10
Lead	4.33	4.38	1	10
Magnesium	1880	2000	6	10
Manganese	215	225	5	10
Molybdenum	.291J	ND	NA	10
Nickel	2.85	3.03	6	10
Potassium	2130	2220	5	10
Selenium	.0950J	ND	NA	10
Silver	ND	ND	0	10
Sodium	70.5J	51.7J	NA	10
Strontium	7.62	7.86	3	10
Thallium	.175J	ND	NA	10
Tin	ND	ND	0	10
Vanadium	29	29.1	0	10
Zinc	17.3	18.9	9	10

EMAX QUALITY CONTROL DATA
ANALYTICAL SPIKE ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
SDG NO.: 15D114
METHOD: SW6020A

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MATRIX:	SOIL		% MOISTURE:	13.7
DILTN FACTR:	0.976	0.976		
SAMPLE ID:	UX04-TR04-S02-3.0			
CONTROL NO.:	D114-08	D114-08A		
LAB FILE ID:	F6D13035	F6D13034		
DATIME EXTRCTD:	04/21/1515:26	04/21/1515:26	DATE COLLECTED:	04/14/15
DATIME ANALYZD:	04/24/1514:41	04/24/1514:37	DATE RECEIVED:	04/17/15
PREP. BATCH:	IMD028S	IMD028S		
CALIB. REF:	F6D13029	F6D13029		

ACCESSION:

PARAMETER	SMPL RSLT (mg/kg)	SPIKE AMT (mg/kg)	AS RSLT (mg/kg)	AS % REC	QC LIMIT (%)
Aluminum	17800	2830	19700	65*	75-125
Antimony	0.178J	28.3	26.3	92	75-125
Arsenic	1.71	28.3	27.0	90	75-125
Barium	96.5	28.3	124	98	75-125
Beryllium	0.368J	28.3	23.2	81	75-125
Cadmium	0.278J	28.3	25.0	87	75-125
Calcium	1850	2830	4550	96	75-125
Chromium	14.9	28.3	37.1	78	75-125
Cobalt^	8.24	142	137	91	75-125
Copper^	14.7	142	142	90	75-125
Iron	25800	2830	28600	99	75-125
Lead	18.1	28.3	40.9	80	75-125
Magnesium	3800	2830	6230	86	75-125
Manganese^	190	142	318	90	75-125
Molybdenum	0.249J	28.3	27.0	95	75-125
Nickel	6.49	28.3	28.6	78	75-125
Potassium	1750	2830	4440	95	75-125
Selenium	0.0909J	28.3	26.3	93	75-125
Silver	ND	28.3	24.5	87	75-120
Sodium	205	2830	2820	92	75-125
Strontium	15.4	28.3	38.6	82	75-125
Thallium	0.307J	28.3	25.0	87	75-125
Tin	12.6J	28.3	38.8	93	75-125
Vanadium	43.4	28.3	67.9	87	75-125
Zinc	40.5	56.5	88.6	85	75-125

^ D114-08A : Analyzed at DF 4.88 on 04/24/15 17:45 | Data File IDF6D13078

EMAX QUALITY CONTROL DATA
ANALYTICAL SPIKE ANALYSIS

CLIENT: KLEINFELDER
PROJECT: CTO 070, UX04, FALLBROOK
SDG NO.: 15D114
METHOD: SW6020A

MATRIX:	SOIL		% MOISTURE:	1.3
DILTN FACTR:	0.971	0.971		
SAMPLE ID:	UX04-SB15-0.5			
CONTROL NO.:	D114-22	D114-22A		
LAB FILE ID:	F6D13068	F6D13067		
DATIME EXTRCTD:	04/21/1515:33	04/21/1515:33	DATE COLLECTED:	04/16/15
DATIME ANALYZD:	04/24/1517:03	04/24/1516:59	DATE RECEIVED:	04/17/15
PREP. BATCH:	IMD029S	IMD029S		
CALIB. REF:	F6D13059	F6D13059		

ACCESSION:

PARAMETER	SMPL RSLT (mg/kg)	SPIKE AMT (mg/kg)	AS RSLT (mg/kg)	AS % REC	QC LIMIT (%)
Aluminum	5940	2460	8380	99	75-125
Antimony	0.123J	24.6	23.5	95	75-125
Arsenic	1.01	24.6	24.9	97	75-125
Barium	59.9	24.6	83.9	98	75-125
Beryllium	0.147J	24.6	22.7	92	75-125
Cadmium	0.108J	24.6	23.0	93	75-125
Calcium	856	2460	3410	104	75-125
Chromium	7.50	24.6	29.9	91	75-125
Cobalt	4.61	24.6	26.0	87	75-125
Copper	4.72	24.6	25.8	86	75-125
Iron	10500	2460	12900	98	75-125
Lead	4.33	24.6	27.3	93	75-125
Magnesium	1880	2460	4350	100	75-125
Manganese	215	24.6	232	68*	75-125
Molybdenum	0.291J	24.6	24.2	97	75-125
Nickel	2.85	24.6	24.9	89	75-125
Potassium	2130	2460	4610	101	75-125
Selenium	0.0950J	24.6	24.5	99	75-125
Silver	ND	24.6	22.7	92	75-120
Sodium	70.5J	2460	2540	101	75-125
Strontium	7.62	24.6	31.0	95	75-125
Thallium	0.175J	24.6	23.3	94	75-125
Tin	ND	24.6	27.1	110	75-125
Vanadium	29.0	24.6	53.5	100	75-125
Zinc	17.3	49.2	62.4	92	75-125

ICP-MS QC CHECK TABLE

QC	CCV HIGH	ICV	CCV	ICSAB	ICSA
Limit%	95-105	90-110	90-110	80-120	80-120
Comp	ug/L	ug/L	ug/L	ug/L	ug/L
Al	5000	3000	2500	100000	100000
Sb	50	30	25	20	0
As	50	30	25	20	0
Ba	50	30	25	20	0
Be	50	30	25	20	0
B	50	30	25	20	0
Cd	50	30	25	20	0
Ca	5000	3000	2500	100000	100000
Cr	50	30	25	20	0
Co	50	30	25	20	0
Cu	50	30	25	20	0
Fe	5000	30	2500	100000	100000
Pb	50	30	25	20	0
Mg	5000	3000	2500	100000	100000
Mn	50	30	25	20	0
Mo	50	30	25	2000	2000
Ni	50	30	25	20	0
P	500	300	250	100000	100000
K	5000	3000	2500	100000	100000
Se	50	30	25	20	0
Si	5000	3000	2500	200	0
Ag	50	30	25	20	0
Na	2500	1500	1250	100000	100000
Sr	50	30	25	20	0
Tl	50	30	25	20	0
Sn	50	30	25	20	0
Ti	50	30	25	2000	2000
Th	50	30	25	20	0
W	50	30	25	20	0
V	50	30	25	20	0
U	50	30	25	20	0
Zn	100	60	50	20	0
Zr	30	20	15	20	0

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
ICP-MS

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Start Date: 4/24/15 12:25

End Date: 4/24/15 20:18

Comments:

All soil/solid samples are diluted at 10x dilution prior to analysis.

Filter Lot #:

- CCV8, CCV9, CCV10 Be failed
- D114-08A, -08J Mn, Co failed

Book #:	AF6-013
Instrument No.:	F6
Analytical Batch:	IF6013
Analytical Sequence:	F6013
Method File:	FMX6020
Micropipette ID:	☑ 142781004
Micropipette ID:	☑ ICP-06
Micropipette ID:	☐ 339362028
Micropipette ID:	☑ GFAA-07
Micropipette ID:	☐

SOP #	Rev. #
☑ EMAX-6020	8
☑ EMAX-200.8	5
☐ EMAX-	

STANDARDS ID		STANDARDS ID	
S0	SM6B059.09.04	MRL1 (1)	SM6B059.11.03
S1	09.05	MRL2 (0.5)	11.04
S2	09.06	MRL3 (0.2)	11.05
S3	10.01	MRL4	NA
S4	10.02	MRL5	
S5	NA	MRL6	
S6		Internal Standard	SM6B058-94.04
S7		Post-Spike 1	SM6A-0078.10
ICV	SM6B059.10.03	Post-Spike 2	0.11
CCV	10.04	Post-Spike 3	NA
ICSA	11.01	Post-Spike 4	
ICSAB	11.02		
6020 TUNE SOLN.	02.04		
200.8 TUNE SOLN.	02.05		

Analyzed By: CM

Date: 4/24/15

7043

SEQUENCE FILE : IF6D13

4-18	19-33	34-43	44-53	54-63
LFID	LSID	TIME	DATE	DF
F6D13003	BLNK	12:25	04/24/15	1.00
F6D13004	S0	12:29	04/24/15	1.00
F6D13005	S1 0.5	12:33	04/24/15	1.00
F6D13006	S2 5	12:38	04/24/15	1.00
F6D13007	S3 25	12:42	04/24/15	1.00
F6D13008	S4 50	12:46	04/24/15	1.00
F6D13009	ICV	12:50	04/24/15	1.00
F6D13010	ICB	12:54	04/24/15	1.00
F6D13011	MRLD2401	12:59	04/24/15	1.00
F6D13012	MRLD2402	13:03	04/24/15	1.00
F6D13013	ICSA	13:07	04/24/15	1.00
F6D13014	ICSAB	13:12	04/24/15	1.00
F6D13015	MRLD2403	13:16	04/24/15	1.00
F6D13016	MRLD2402	13:21	04/24/15	1.00
F6D13017	CCV1	13:25	04/24/15	1.00
F6D13018	CCB1	13:29	04/24/15	1.00
F6D13019	IMD028SB	13:33	04/24/15	1.00
F6D13020	IMD028SL	13:38	04/24/15	1.00
F6D13021	IMD028SC	13:42	04/24/15	1.00
F6D13022	D114-01	13:46	04/24/15	1.00
F6D13023	D114-02	13:50	04/24/15	1.00
F6D13024	D114-03	13:54	04/24/15	1.00
F6D13025	D114-04	13:59	04/24/15	1.00
F6D13026	D114-05	14:03	04/24/15	1.00
F6D13027	D114-06	14:07	04/24/15	1.00
F6D13028	BLANK	14:11	04/24/15	1.00
F6D13029	CCV2	14:16	04/24/15	1.00
F6D13030	CCB2	14:20	04/24/15	1.00
F6D13031	D114-07	14:24	04/24/15	1.00
F6D13032	D114-08M	14:28	04/24/15	1.00
F6D13033	D114-08S	14:32	04/24/15	1.00
F6D13034	D114-08A	14:37	04/24/15	1.00
F6D13035	D114-08	14:41	04/24/15	1.00
F6D13036	D114-08J	14:45	04/24/15	5.00
F6D13037	D114-10	14:49	04/24/15	1.00
F6D13038	D114-11	14:53	04/24/15	1.00
F6D13039	D114-12	14:57	04/24/15	1.00
F6D13040	BLANK	15:02	04/24/15	1.00
F6D13041	CCV3	15:06	04/24/15	1.00
F6D13042	CCB3	15:10	04/24/15	1.00
F6D13043	D114-13	15:15	04/24/15	1.00
F6D13044	D114-14	15:19	04/24/15	1.00
F6D13045	D114-15	15:23	04/24/15	1.00
F6D13046	D114-16	15:27	04/24/15	1.00
F6D13047	D114-17	15:31	04/24/15	1.00
F6D13048	D114-18	15:36	04/24/15	1.00
F6D13049	D114-19	15:40	04/24/15	1.00
F6D13050	D114-20	15:44	04/24/15	1.00
F6D13051	BLANK	15:48	04/24/15	1.00
F6D13052	CCV4	15:53	04/24/15	1.00
F6D13053	CCB4	15:57	04/24/15	1.00

F6D13054	IMD025WB	16:04	04/24/15	1.00
F6D13055	IMD025WL	16:08	04/24/15	1.00
F6D13056	IMD025WC	16:12	04/24/15	1.00
F6D13057	D114-09	16:17	04/24/15	1.00
F6D13058	D117-01	16:21	04/24/15	1.00
F6D13059	CCV5	16:25	04/24/15	1.00
F6D13060	CCB5	16:30	04/24/15	1.00
F6D13061	IMD029SB	16:34	04/24/15	1.00
F6D13062	IMD029SL	16:38	04/24/15	1.00
F6D13063	IMD029SC	16:42	04/24/15	1.00
F6D13064	D114-21	16:47	04/24/15	1.00
F6D13065	D114-22M	16:51	04/24/15	1.00
F6D13066	D114-22S	16:55	04/24/15	1.00
F6D13067	D114-22A	16:59	04/24/15	1.00
F6D13068	D114-22	17:03	04/24/15	1.00
F6D13069	D114-22J	17:07	04/24/15	5.00
F6D13070	BLANK	17:11	04/24/15	1.00
F6D13071	CCV6	17:16	04/24/15	1.00
F6D13072	CCB6	17:20	04/24/15	1.00
F6D13073	BLANK	17:24	04/24/15	5.00
F6D13074	BLANK	17:28	04/24/15	1.00
F6D13075	D114-23	17:33	04/24/15	1.00
F6D13076	D114-24	17:37	04/24/15	1.00
F6D13077	D114-25	17:41	04/24/15	1.00
F6D13078	D114-08A w MnCo	17:45	04/24/15	5.00
F6D13079	D114-08I	17:49	04/24/15	5.00
F6D13080	D114-08J	17:53	04/24/15	25.00
F6D13081	BLANK	17:58	04/24/15	1.00
F6D13082	CCV7	18:02	04/24/15	1.00
F6D13083	CCB7	18:06	04/24/15	1.00
F6D13084	IMD024SB	18:11	04/24/15	1.00
F6D13085	IMD024SL	18:15	04/24/15	1.00
F6D13086	IMD024SC	18:19	04/24/15	1.00
F6D13087	D065-17	18:23	04/24/15	1.00
F6D13088	D065-18	18:27	04/24/15	1.00
F6D13089	D065-19	18:32	04/24/15	1.00
F6D13090	D070-06	18:36	04/24/15	1.00
F6D13091	D070-07M	18:40	04/24/15	1.00
F6D13092	D070-07S	18:44	04/24/15	1.00
F6D13093	BLANK	18:48	04/24/15	1.00
F6D13094	CCV8	18:53	04/24/15	1.00
F6D13095	CCB8	18:57	04/24/15	1.00
F6D13096	D070-07A	19:01	04/24/15	1.00
F6D13097	D070-07	19:06	04/24/15	1.00
F6D13098	D070-07J	19:10	04/24/15	5.00
F6D13099	D070-08	19:14	04/24/15	1.00
F6D13100	D070-09	19:18	04/24/15	1.00
F6D13101	D070-10	19:23	04/24/15	1.00
F6D13102	D070-11	19:27	04/24/15	1.00
F6D13103	D070-12	19:31	04/24/15	1.00
F6D13104	D070-13	19:35	04/24/15	1.00
F6D13105	BLANK	19:40	04/24/15	1.00
F6D13106	CCV9	19:44	04/24/15	1.00
F6D13107	CCB9	19:48	04/24/15	1.00

F6D13108	D082-04	19:52	04/24/15	1.00
F6D13109	D082-05	19:57	04/24/15	1.00
F6D13110	D082-06	20:01	04/24/15	1.00
F6D13111	BLANK	20:05	04/24/15	1.00
F6D13112	BLANK	20:09	04/24/15	1.00
F6D13113	CCV10	20:14	04/24/15	1.00
F6D13114	CCB10	20:18	04/24/15	1.00

SDG : 15D114 UNIT : % ICPMS CHECK : IF6D13 DATE : 04/24/15 INST : EMAXTIF6

ANALYTE	Li	Be	B	Na	Mg	Al	Si	P	K	Ca	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	As	Se	Sr	Zr	Mo	Ag	Cd	Sn	Sb	Ba	W	Tl	Pb	U
BLNK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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S2 5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S3 25	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S4 50	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICV	99	100	103	100	102	101	102	101	100	100	98	102	95	93	103	92	95	93	100	99	101	95	78*	96	99	95	102	99	99	97	98	98	100
ICB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD2401	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD2402	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICSA	----	----	----	97	93	93	----	101	97	98	101	----	----	----	98	----	----	----	----	----	----	----	----	96	----	----	----	----	----	----	----	----	----
ICSAB	100	94	92	97	93	92	106	100	98	99	102	100	99	93	98	92	89	86	101	102	107	91	37*	98	93	94	101	102	100	100	93	94	100
MRLD2403	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD2402	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV1	101	98	97	98	98	98	98	99	101	99	100	102	100	95	103	93	99	97	101	101	105	99	73*	98	101	98	103	102	101	100	100	100	104
CCB1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD028SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD028SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD028SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV2	102	100	98	98	98	99	97	98	101	100	101	102	101	97	104	95	100	97	102	101	105	100	79*	95	99	97	102	102	101	101	100	102	105
CCB2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-11	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-12	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV3	103	95	92	97	96	97	98	98	103	100	101	103	101	96	103	95	101	98	100	101	106	100	84*	95	99	97	101	101	100	100	99	100	103
CCB3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-13	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-14	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-15	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-16	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-17	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-18	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-19	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-20	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV4	103	95	93	97	96	97	98	98	101	101	102	102	100	98	104	96	99	97	101	101	104	102	82*	95	100	96	102	101	101	100	98	100	104
CCB4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

IMD025WB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD025WL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD025WC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-09	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D117-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV5	103	94	92	98	95	97	98	97	102	101	101	102	99	97	103	97	99	97	100	101	104	100	74*	95	99	96	101	101	101	100	100	99	104
CCB5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD029SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD029SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD029SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-21	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-22M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-22S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-22A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-22	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-22J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV6	103	94	92	98	96	98	97	97	102	99	100	102	100	97	103	95	99	97	100	100	104	101	74*	95	99	96	101	100	100	101	99	99	104
CCB6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-23	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-24	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-25	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08I	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV7	103	95	92	98	96	97	97	96	102	100	100	101	99	96	104	95	98	95	99	100	103	100	73*	95	99	97	101	100	101	100	99	98	103
CCB7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD024SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD024SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD024SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D065-17	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D065-18	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D065-19	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-07M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-07S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV8	105	87*	84*	95	91	92	94	91	99	100	99	102	100	99	104	97	100	98	99	100	105	102	86*	94	98	96	101	99	101	99	97	99	103
CCB8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-07A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-07J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-08	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-09	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-11	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-12	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-13	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV9	104	87*	87*	97	93	93	97	92	101	101	99	102	99	98	103	96	98	96	99	99	103	100	88*	93	98	95	100	98	101	98	98	97	102
CCB9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

D082-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D082-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D082-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV10	103	88*	85*	96	91	93	95	92	102	100	100	102	100	98	103	94	99	96	98	99	104	102	82*	93	97	94	100	98	101	98	97	97	100
CCB10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

QC limit of each parameter are listed in a table attached next to all the ICP check forms

* : Out of QC Limit

SDG : 15D114　　UNIT : UG/L　　SUMMARY of CALIBRATION BLANKS : IF6D13 (WATER)　　DATE : 04/24/15　　INST : EMAXTIF6

ANALYTE	Li	Be	B	Na	Mg	Al	Si	P	K	Ca	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	As	Se	Sr	Zr	Mo	Ag	Cd	Sn	Sb	Ba	W	Tl	Pb	U
BLNK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S1 0.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S2 5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S3 25	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S4 50	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICV	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICB	-.045	-.001	-.445	-3.28	.059	.068	1.42	-2.37	-9.10	-.320	-.011	.039	-.010	.001	.825	.001	.000	-.001	-.014	.010	.005	-.000	-.011	.017	.001	-.003	.003	.011	.000	.011	.002	-.001	.004
MRLD2401	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD2402	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICSA	.405	.008	-.053	----	----	----	4.52	----	----	----	----	.037	1.25	.399	----	.233	.180	.491	2.62	.200	.047	.600	.072	----	.018	.292	.028	.047	.103	.177	.002	.183	.003
ICSAB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD2403	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD2402	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB1	-.119	.000	-.585	-5.20	.554	.454	.418	-3.34	-11.8	.098	.001	.014	-.023	-.003	1.28	-.001	-.009	-.004	-.015	.000	.000	-.000	-.011	.084	.000	-.004	.001	.006	-.001	.009	.000	-.004	.003
IMD028SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD028SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD028SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB2	-.140	-.002	-.866	-9.24	.167	.668	.434	-1.26	-11.3	-.338	.033	-.062	-.031	.015	1.85	-.000	-.011	-.005	-.018	-.021	-.003	-.002	-.010	.015	.001	-.005	.003	.005	.004	.004	.000	-.004	.002
D114-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-11	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-12	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB3	-.019	-.001	-.959	-11.8	.299	.914	.424	-1.77	-12.1	-.135	.028	-.032	-.027	.014	2.24	-.000	-.009	-.004	-.000	-.015	.000	-.000	-.010	.015	.000	-.002	.004	.002	.008	.007	.001	-.003	.003
D114-13	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-14	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-15	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-16	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-17	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-18	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-19	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-20	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB4	-.019	-.002	-1.05	-13.1	.313	.898	.456	-1.54	-13.7	-.209	.050	-.053	-.031	.033	2.39	-.000	-.007	-.006	-.004	-.021	-.002	.000	-.009	.013	.000	-.004	.003	-.001	.004	.007	.000	-.003	.003

IMD025WB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD025WL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD025WC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-09	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D117-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB5	.058	.000	-1.05	-11.7	.257	.501	.547	-2.02	-13.7	-.094	.012	-.009	-.025	.017	1.48	-.000	-.010	-.005	.000	-.002	.001	-.000	-.010	.009	.002	-.001	.004	.022	.004	.004	.002	-.004	.004
IMD029SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD029SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD029SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-21	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-22M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-22S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-22A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-22	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-22J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB6	.019	-.000	-1.05	-12.5	.328	.519	.539	-3.70	-14.9	-.107	.011	.000	-.023	.023	1.67	.000	-.010	-.004	.002	-.002	.001	.000	-.010	.012	.003	-.000	.008	.006	.004	.007	.001	-.003	.004
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-23	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-24	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-25	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08I	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB7	.088	.000	-1.10	-13.4	.146	.442	.327	-1.77	-14.1	-.994	.029	-.015	-.031	.024	1.70	-.001	-.014	-.008	-.029	-.017	-.001	.001	-.010	.010	.000	-.004	.003	.001	.005	.007	.000	-.005	.003
IMD024SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD024SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD024SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D065-17	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D065-18	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D065-19	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-07M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-07S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB8	.187	-.003	-.994	-12.7	.540	.556	.362	-3.80	-14.0	1.62	.024	.026	-.036	.018	1.75	-.001	-.014	-.009	-.033	-.010	.002	.018	-.010	.012	.001	-.002	.007	.000	.003	.007	.002	-.003	.004
D070-07A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-07J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-08	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-09	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-11	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-12	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-13	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB9	.247	-.003	-.994	-15.3	.862	.710	.424	-3.40	-16.1	2.74	.044	.026	-.035	.024	1.90	-.001	-.016	-.009	-.021	-.006	-.001	.027	-.009	.006	.000	-.004	.004	-.004	.008	.008	.000	-.004	.003

D082-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D082-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D082-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB10	.249	-.000	-1.17	-15.8	.452	.476	.389	-3.49	-16.7	.592	.013	.006	-.035	.015	1.38	-.002	-.016	-.010	-.028	-.008	.002	.013	-.010	.008	.000	-.002	.003	-.005	.003	.006	.000	-.004	.003

QC limit of each parameter are listed in a table attached next to all the ICP check forms

* : Out of QC Limit

SDG : 15D114 UNIT : UG/L SUMMARY of CALIBRATION BLANKS : IF6D13 (SOIL) DATE : 04/24/15 INST : EMAXTIF6

ANALYTE	Li	Be	B	Na	Mg	Al	Si	P	K	Ca	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	As	Se	Sr	Zr	Mo	Ag	Cd	Sn	Sb	Ba	W	Tl	Pb	U
BLNK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S1 0.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S2 5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S3 25	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S4 50	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICV	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICB	-.045	-.001	-.445	-3.28	.059	.068	1.42	-2.37	-9.10	-.320	-.011	.039	-.010	.001	.825	.001	.000	-.001	-.014	.010	.005	-.000	-.011	.017	.001	-.003	.003	.011	.000	.011	.002	-.001	.004
MRLD2401	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD2402	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ICSA	.405	.008	-.053	----	----	----	4.52	----	----	----	----	.037	1.25	.399	----	.233	.180	.491	2.62	.200	.047	.600	.072	----	.018	.292	.028	.047	.103	.177	.002	.183	.003
ICSAB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD2403	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MRLD2402	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB1	-.119	.000	-.585	-5.20	.554	.454	.418	-3.34	-11.8	.098	.001	.014	-.023	-.003	1.28	-.001	-.009	-.004	-.015	.000	.000	-.000	-.011	.084	.000	-.004	.001	.006	-.001	.009	.000	-.004	.003
IMD028SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD028SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD028SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB2	-.140	-.002	-.866	-9.24	.167	.668	.434	-1.26	-11.3	-.338	.033	-.062	-.031	.015	1.85	-.000	-.011	-.005	-.018	-.021	-.003	-.002	-.010	.015	.001	-.005	.003	.005	.004	.004	.000	-.004	.002
D114-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-11	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-12	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB3	-.019	-.001	-.959	-11.8	.299	.914	.424	-1.77	-12.1	-.135	.028	-.032	-.027	.014	2.24	-.000	-.009	-.004	-.000	-.015	.000	-.000	-.010	.015	.000	-.002	.004	.002	.008	.007	.001	-.003	.003
D114-13	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-14	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-15	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-16	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-17	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-18	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-19	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-20	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB4	-.019	-.002	-1.05	-13.1	.313	.898	.456	-1.54	-13.7	-.209	.050	-.053	-.031	.033	2.39	-.000	-.007	-.006	-.004	-.021	-.002	.000	-.009	.013	.000	-.004	.003	-.001	.004	.007	.000	-.003	.003

7053

IMD025WB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD025WL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD025WC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-09	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D117-01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB5	.058	.000	-1.05	-11.7	.257	.501	.547	-2.02	-13.7	-.094	.012	-.009	-.025	.017	1.48	-.000	-.010	-.005	.000	-.002	.001	-.000	-.010	.009	.002	-.001	.004	.022	.004	.004	.002	-.004	.004
IMD029SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD029SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD029SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-21	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-22M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-22S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-22A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-22	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-22J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB6	.019	-.000	-1.05	-12.5	.328	.519	.539	-3.70	-14.9	-.107	.011	.000	-.023	.023	1.67	.000	-.010	-.004	.002	-.002	.001	.000	-.010	.012	.003	-.000	.008	.006	.004	.007	.001	-.003	.004
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-23	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-24	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-25	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08I	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D114-08J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB7	.088	.000	-1.10	-13.4	.146	.442	.327	-1.77	-14.1	-.994	.029	-.015	-.031	.024	1.70	-.001	-.014	-.008	-.029	-.017	-.001	.001	-.010	.010	.000	-.004	.003	.001	.005	.007	.000	-.005	.003
IMD024SB	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD024SL	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
IMD024SC	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D065-17	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D065-18	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D065-19	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-07M	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-07S	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB8	.187	-.003	-.994	-12.7	.540	.556	.362	-3.80	-14.0	1.62	.024	.026	-.036	.018	1.75	-.001	-.014	-.009	-.033	-.010	.002	.018	-.010	.012	.001	-.002	.007	.000	.003	.007	.002	-.003	.004
D070-07A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-07J	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-08	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-09	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-11	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-12	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D070-13	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB9	.247	-.003	-.994	-15.3	.862	.710	.424	-3.40	-16.1	2.74	.044	.026	-.035	.024	1.90	-.001	-.016	-.009	-.021	-.006	-.001	.027	-.009	.006	.000	-.004	.004	-.004	.008	.008	.000	-.004	.003

D082-04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D082-05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
D082-06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BLANK	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCV10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CCB10	.249	-.000	-1.17	-15.8	.452	.476	.389	-3.49	-16.7	.592	.013	.006	-.035	.015	1.38	-.002	-.016	-.010	-.028	-.008	.002	.013	-.010	.008	.000	-.002	.003	-.005	.003	.006	.000	-.004	.003

QC limit of each parameter are listed in a table attached next to all the ICP check forms

* : Out of QC Limit

	Method	Type	Vial	Data File	Sample	Comment	Dil/Lvl	ISTD Conc	Action on Failure	Skip	Result
1		Keyword		TUNBEG	Start of TUNE						
2	C:\ICPCHEM\1\METHODS\TN6020_C.M	Tun6	1301	F6D13001	6020tunchk		1.000				
3	C:\ICPCHEM\1\METHODS\TN200_8C.M	Tun2	1302	F6D13002	200.8tunchk		1.000				
4		Keyword		TUNEND	End of TUNE						
5		Keyword		CALBEG	Start of CALIB						
6	C:\ICPCHEM\1\METHODS\EMX6020.M	CalBlk	1101	F6D13003	BLNK		Level 1				
7	C:\ICPCHEM\1\METHODS\EMX6020.M	CalBlk	1102	F6D13004	S0		Level 1				
8	C:\ICPCHEM\1\METHODS\EMX6020.M	CalStd	1104	F6D13005	S1 0.5		Level 2				
9	C:\ICPCHEM\1\METHODS\EMX6020.M	CalStd	1105	F6D13006	S2 5		Level 3				
10	C:\ICPCHEM\1\METHODS\EMX6020.M	CalStd	1106	F6D13007	S3 25		Level 4				
11	C:\ICPCHEM\1\METHODS\EMX6020.M	CalStd	1107	F6D13008	S4 50		Level 5				
12	C:\ICPCHEM\1\METHODS\EMX6020.M	ICV1	1204	F6D13009	ICV		1.000				
13	C:\ICPCHEM\1\METHODS\EMX6020.M	ICB	1102	F6D13010	ICB		1.000				
14	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1305	F6D13011	MRLD2401	1/100/10 ppb	1.000				
15	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1306	F6D13012	MRLD2402	0.5/50/4 ppb	1.000				
16	C:\ICPCHEM\1\METHODS\EMX6020.M	ICS-A	1303	F6D13013	ICSA		1.000				
17	C:\ICPCHEM\1\METHODS\EMX6020.M	ICS-AB	1304	F6D13014	ICSAB		1.000				
18	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1207	F6D13015	MRLD2403	500 ppb CAT	1.000				
19	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1306	F6D13016	MRLD2402	0.5/50/4 ppb	1.000				
20	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D13017	CCV1		1.000				
21	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D13018	CCB1		1.000				
22		Keyword		CALEND	End of CALIB						
23		Keyword		SMPLBEG	Start of SMPL						
24	C:\ICPCHEM\1\METHODS\EMX6020.M	MBS	2101	F6D13019	IMD028SB		1.000				
25	C:\ICPCHEM\1\METHODS\EMX6020.M	LCSS	2102	F6D13020	IMD028SL		1.000				
26	C:\ICPCHEM\1\METHODS\EMX6020.M	LCSS	2103	F6D13021	IMD028SC		1.000				
27	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2104	F6D13022	D114-01		1.000				
28	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2105	F6D13023	D114-02		1.000				
29	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2106	F6D13024	D114-03		1.000				
30	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2107	F6D13025	D114-04		1.000				
31	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2108	F6D13026	D114-05		1.000				
32	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2109	F6D13027	D114-06		1.000				
33	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	F6D13028	BLANK		1.000				
34	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D13029	CCV2		1.000				
35	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D13030	CCB2		1.000				
36	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2110	F6D13031	D114-07		1.000				
37	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2111	F6D13032	D114-08M		1.000				
38	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2112	F6D13033	D114-08S		1.000				
39	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2201	F6D13034	D114-08A	Mn Co failed	1.000				
40	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2202	F6D13035	D114-08		1.000				
41	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2203	F6D13036	D114-08J		5.000				
42	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2204	F6D13037	D114-10		1.000				

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	Method	Type	Vial	Data File	Sample	Comment	Dil/Lvl	ISTD Conc	Action on Failure	Skip	Result
43	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2205	F6D13038	D114-11		1.000				
44	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2206	F6D13039	D114-12		1.000				
45	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	F6D13040	BLANK		1.000				
46	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D13041	CCV3		1.000				
47	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D13042	CCB3		1.000				
48	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2207	F6D13043	D114-13		1.000				
49	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2208	F6D13044	D114-14		1.000				
50	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2209	F6D13045	D114-15		1.000				
51	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2210	F6D13046	D114-16		1.000				
52	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2211	F6D13047	D114-17		1.000				
53	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2212	F6D13048	D114-18		1.000				
54	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2301	F6D13049	D114-19		1.000				
55	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2302	F6D13050	D114-20		1.000				
56	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	F6D13051	BLANK		1.000				
57	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D13052	CCV4		1.000				
58	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D13053	CCB4		1.000				
59	C:\ICPCHEM\1\METHODS\EMX6020.M	MBW	2303	F6D13054	IMD025WB		1.000				
60	C:\ICPCHEM\1\METHODS\EMX6020.M	LCS	2304	F6D13055	IMD025WL		1.000				
61	C:\ICPCHEM\1\METHODS\EMX6020.M	LCS	2305	F6D13056	IMD025WC		1.000				
62	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2306	F6D13057	D114-09		1.000				
63	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2307	F6D13058	D117-01		1.000				
64	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D13059	CCV5		1.000				
65	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D13060	CCB5		1.000				
66	C:\ICPCHEM\1\METHODS\EMX6020.M	MBS	2308	F6D13061	IMD029SB		1.000				
67	C:\ICPCHEM\1\METHODS\EMX6020.M	LCSS	2309	F6D13062	IMD029SL		1.000				
68	C:\ICPCHEM\1\METHODS\EMX6020.M	LCSS	2310	F6D13063	IMD029SC		1.000				
69	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2311	F6D13064	D114-21		1.000				
70	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2312	F6D13065	D114-22M		1.000				
71	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2401	F6D13066	D114-22S		1.000				
72	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2402	F6D13067	D114-22A		1.000				
73	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2403	F6D13068	D114-22		1.000				
74	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2404	F6D13069	D114-22J		5.000				
75	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	F6D13070	BLANK		1.000				
76	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D13071	CCV6		1.000				
77	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D13072	CCB6		1.000				
78	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2408	F6D13073	BLANK		5.000				
79	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2409	F6D13074	BLANK		1.000				
80	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2405	F6D13075	D114-23		1.000				
81	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2406	F6D13076	D114-24		1.000				
82	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2407	F6D13077	D114-25		1.000				
83	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2408	F6D13078	D114-08A		5.000				
84	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2409	F6D13079	D114-08I		5.000				

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	Method	Type	Vial	Data File	Sample	Comment	Dil/Lvl	ISTD Conc	Action on Failure	Skip	Result
85	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2410	F6D13080	D114-08J		25.00				
86	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	F6D13081	BLANK		1.000				
87	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D13082	CCV7		1.000				
88	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D13083	CCB7		1.000				
89	C:\ICPCHEM\1\METHODS\EMX6020.M	MBS	2411	F6D13084	IMD024SB		1.000				
90	C:\ICPCHEM\1\METHODS\EMX6020.M	LCSS	2412	F6D13085	IMD024SL		1.000				
91	C:\ICPCHEM\1\METHODS\EMX6020.M	LCSS	2501	F6D13086	IMD024SC		1.000				
92	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2502	F6D13087	D065-17		1.000				
93	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2503	F6D13088	D065-18		1.000				
94	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2504	F6D13089	D065-19		1.000				
95	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	3107	F6D13090	D070-06		1.000				
96	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2505	F6D13091	D070-07M		1.000				
97	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2506	F6D13092	D070-07S		1.000				
98	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	F6D13093	BLANK		1.000				
99	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D13094	CCV8	Be failed	1.000				
100	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D13095	CCB8		1.000				
101	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2507	F6D13096	D070-07A		1.000				
102	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2508	F6D13097	D070-07		1.000				
103	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2509	F6D13098	D070-07J		5.000				
104	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2510	F6D13099	D070-08		1.000				
105	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2511	F6D13100	D070-09		1.000				
106	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	2512	F6D13101	D070-10		1.000				
107	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	3101	F6D13102	D070-11		1.000				
108	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	3102	F6D13103	D070-12		1.000				
109	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	3103	F6D13104	D070-13		1.000				
110	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	F6D13105	BLANK		1.000				
111	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D13106	CCV9	Be failed	1.000				
112	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D13107	CCB9		1.000				
113	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	3104	F6D13108	D082-04		1.000				
114	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	3105	F6D13109	D082-05		1.000				
115	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	3106	F6D13110	D082-06		1.000				
116	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	F6D13111	BLANK		1.000				
117	C:\ICPCHEM\1\METHODS\EMX6020.M	Sample	1101	F6D13112	BLANK		1.000				
118	C:\ICPCHEM\1\METHODS\EMX6020.M	CCV	1206	F6D13113	CCV10	Be failed	1.000				
119	C:\ICPCHEM\1\METHODS\EMX6020.M	CCB	1102	F6D13114	CCB10		1.000				
120		Keyword		StandBy							
121		Keyword		SMPLEND	End of SMPL						
122		Keyword		End	End of Sequence						
123		Keyword		CCVBEG	Start of CCV						
124		Keyword		CCVEND	End of CCV						
125		Keyword		BLKBEG	Start of BLANK						
126		Keyword		BLKEND	End of BLANK						

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Last Calib: Apr 24, 2015 12:49 pm
Calibration Type: External Calibration Method
Calibration Title:
Weighting Method: 1/(SD*SD)
Mass Interpolation Fit for VIS: Point to Point
Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Multi Tune: #1 h2.u
#2 he.u
#3 norm.u

=== Standard Files ===
<Data Correction>
Bkg File: ---
Rejected Masses: ---
Interference Correction: ON

	Data File	Sample Name	Date Acquired
1	c:\data\if62015\d\if6d13.b\f6d13004.d\f6d13004.d#	S0	Apr 24 2015 12:29 pm
2	c:\data\if62015\d\if6d13.b\f6d13005.d\f6d13005.d#	S1 0.5	Apr 24 2015 12:33 pm
3	c:\data\if62015\d\if6d13.b\f6d13006.d\f6d13006.d#	S2 5	Apr 24 2015 12:38 pm
4	c:\data\if62015\d\if6d13.b\f6d13007.d\f6d13007.d#	S3 25	Apr 24 2015 12:42 pm
5	c:\data\if62015\d\if6d13.b\f6d13008.d\f6d13008.d#	S4 50	Apr 24 2015 12:46 pm
6	---		
7	---		
8	---		
9	---		
10	---		
11	---		
12	---		
13	---		
14	---		
15	---		
16	---		
17	---		
18	---		
19	---		
20	---		

Calibration - C:\DATA\IF62015\D\IF6D13.B\EMX6020.C

=== ISTD Table ===

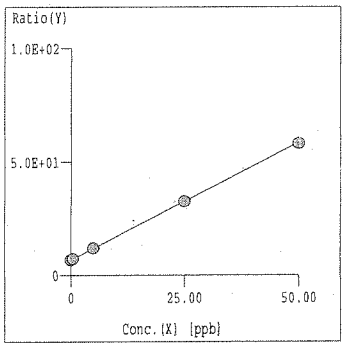
Fix ISTD Conc: ON

	Step	Mass	Element	VIS	Units	All Levels
1	3	6	Li		ppb	100.0
2	1	45	Sc		ppb	100.0
3	2	45	Sc		ppb	100.0
4	3	45	Sc		ppb	100.0
5	1	72	Ge		ppb	100.0
6	2	72	Ge		ppb	100.0
7	3	72	Ge		ppb	100.0
8	3	115	In		ppb	100.0
9	3	159	Tb		ppb	100.0
10	3	209	Bi		ppb	100.0

7060

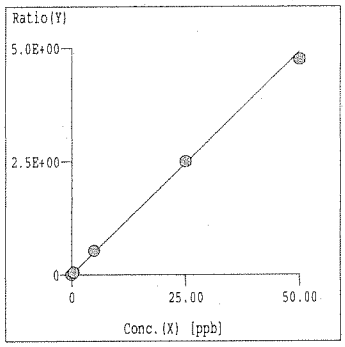
=== Graph Detail ===

Step Mass Element	ISTD	Unit
(3) 7 Li	6	ppb



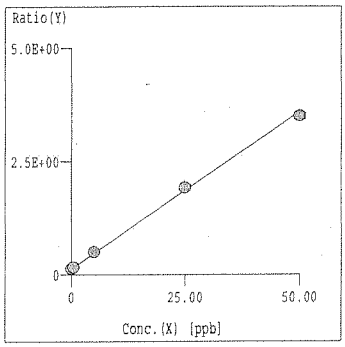
Curve Fit: Y=aX+b
r = 1.0000
Y = 1.036E+000*X +6.669E+000
X = 9.654E-001*Y -6.438E+000
DL = 9.245E-02 ppb
BEC = 6.438 ppb

Step Mass Element	ISTD	Unit
(3) 9 Be	45	ppb



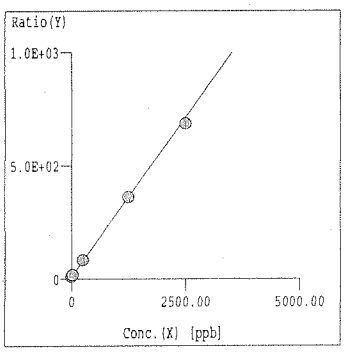
Curve Fit: Y=aX+b
r = 0.9997
Y = 9.855E-002*X +7.428E-004
X = 1.015E+001*Y -7.537E-003
DL = 6.099E-03 ppb
BEC = 7.537E-03 ppb

Step Mass Element	ISTD	Unit
(3) 11 B	45	ppb



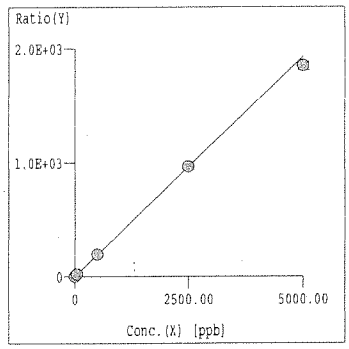
Curve Fit: Y=aX+b
r = 0.9995
Y = 6.922E-002*X +1.290E-001
X = 1.445E+001*Y -1.864E+000
DL = 1.448E-01 ppb
BEC = 1.864 ppb

Step Mass Element	ISTD	Unit
(1) 23 Na	45	ppb



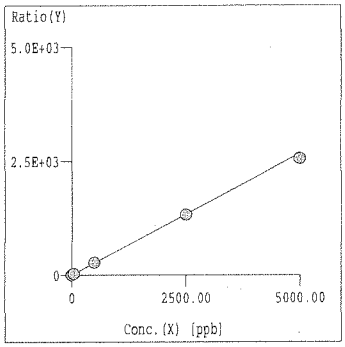
Curve Fit: Y=aX+b
r = 0.9998
Y = 2.814E-001*X +1.063E+001
X = 3.554E+000*Y -3.776E+001
DL = 1.116 ppb
BEC = 37.76 ppb

Step Mass Element	ISTD	Unit
(3) 24 Mg	45	ppb



Curve Fit: Y=aX+b
r = 0.9998
Y = 3.862E-001*X +1.297E-001
X = 2.589E+000*Y -3.359E-001
DL = 2.077E-02 ppb
BEC = 3.359E-01 ppb

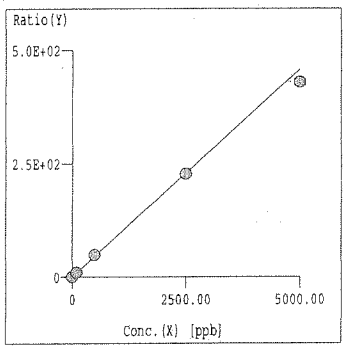
Step Mass Element	ISTD	Unit
(3) 27 Al	45	ppb



Curve Fit: Y=aX+b
r = 0.9998
Y = 5.347E-001*X +8.209E-002
X = 1.870E+000*Y -1.535E-001
DL = 7.201E-03 ppb
BEC = 1.535E-01 ppb

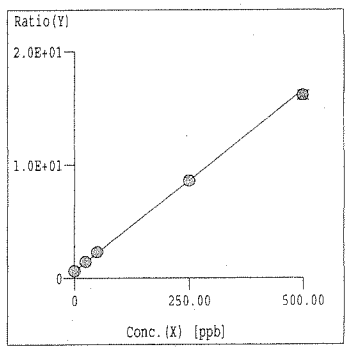
=== Graph Detail ===

Step	Mass	Element	ISTD	Unit
(1)	28	Si	45	ppb



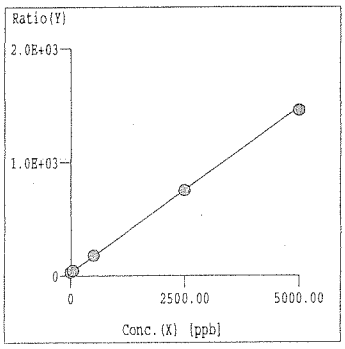
Curve Fit: Y=aX+b
r = 0.9996
Y = 9.157E-002*X +6.786E-002
X = 1.092E+001*Y -7.411E-001
DL = 5.048E-02 ppb
BEC = 7.411E-01 ppb

Step	Mass	Element	ISTD	Unit
(3)	31	P	45	ppb



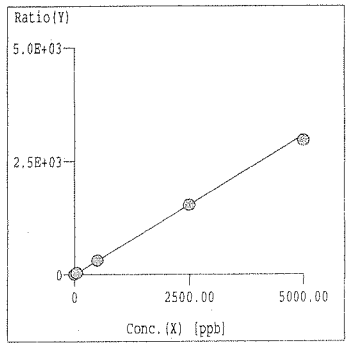
Curve Fit: Y=aX+b
r = 0.9999
Y = 3.193E-002*X +6.226E-001
X = 3.132E+001*Y -1.950E+001
DL = 1.403 ppb
BEC = 19.50 ppb

Step	Mass	Element	ISTD	Unit
(2)	39	K	45	ppb



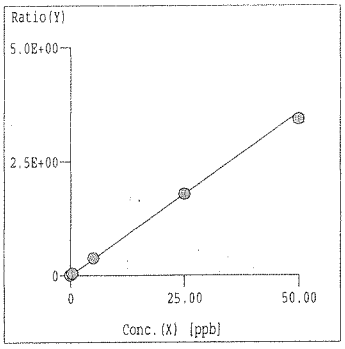
Curve Fit: Y=aX+b
r = 1.0000
Y = 2.909E-001*X +2.981E+001
X = 3.437E+000*Y -1.025E+002
DL = 4.894 ppb
BEC = 102.5 ppb

Step	Mass	Element	ISTD	Unit
(1)	40	Ca	45	ppb



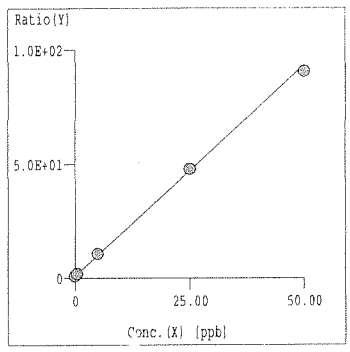
Curve Fit: Y=aX+b
r = 0.9998
Y = 6.142E-001*X +1.827E+000
X = 1.628E+000*Y -2.974E+000
DL = 1.690E-01 ppb
BEC = 2.974 ppb

Step	Mass	Element	ISTD	Unit
(3)	47	Ti	45	ppb



Curve Fit: Y=aX+b
r = 0.9998
Y = 7.134E-002*X +3.730E-003
X = 1.402E+001*Y -5.228E-002
DL = 4.526E-02 ppb
BEC = 5.228E-02 ppb

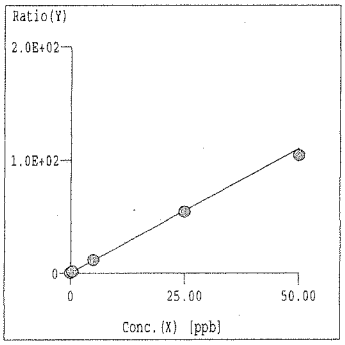
Step	Mass	Element	ISTD	Unit
(2)	51	V	45	ppb



Curve Fit: Y=aX+b
r = 0.9997
Y = 1.852E+000*X +9.337E-001
X = 5.401E-001*Y -5.043E-001
DL = 2.383E-02 ppb
BEC = 5.043E-01 ppb

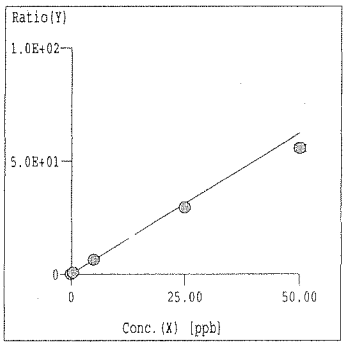
=== Graph Detail ===

Step	Mass	Element	ISTD	Unit
(2)	52	Cr	45	ppb



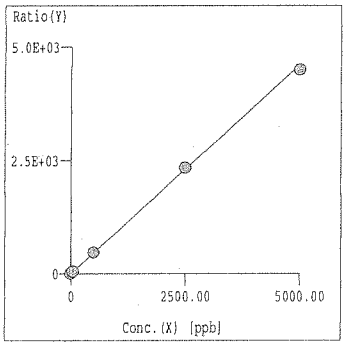
Curve Fit: Y=aX+b
r = 0.9998
Y = 2.200E+000*X +3.252E-001
X = 4.545E-001*Y -1.478E-001
DL = 6.987E-03 ppb
BEC = 1.478E-01 ppb

Step	Mass	Element	ISTD	Unit
(3)	55	Mn	45	ppb



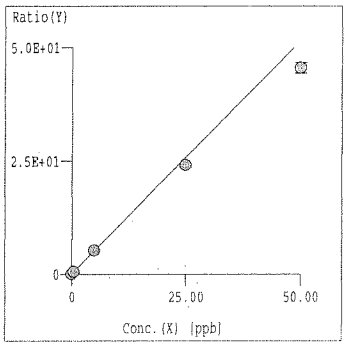
Curve Fit: Y=aX+b
r = 0.9996
Y = 1.248E+000*X +5.425E-002
X = 8.011E-001*Y -4.345E-002
DL = 6.706E-03 ppb
BEC = 4.345E-02 ppb

Step	Mass	Element	ISTD	Unit
(1)	56	Fe	45	ppb



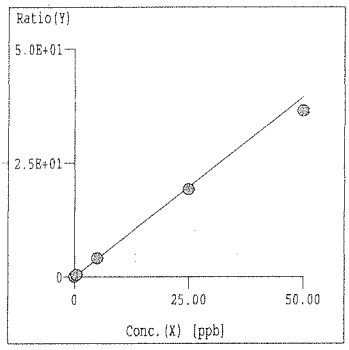
Curve Fit: Y=aX+b
r = 0.9998
Y = 9.223E-001*X +2.190E-001
X = 1.084E+000*Y -2.374E-001
DL = 2.045E-02 ppb
BEC = 2.374E-01 ppb

Step	Mass	Element	ISTD	Unit
(3)	59	Co	45	ppb



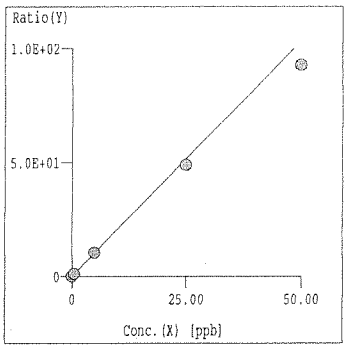
Curve Fit: Y=aX+b
r = 0.9995
Y = 1.032E+000*X +6.381E-003
X = 9.691E-001*Y -6.184E-003
DL = 1.751E-03 ppb
BEC = 6.184E-03 ppb

Step	Mass	Element	ISTD	Unit
(2)	60	Ni	45	ppb



Curve Fit: Y=aX+b
r = 0.9996
Y = 7.897E-001*X +2.293E-002
X = 1.266E+000*Y -2.903E-002
DL = 4.139E-03 ppb
BEC = 2.903E-02 ppb

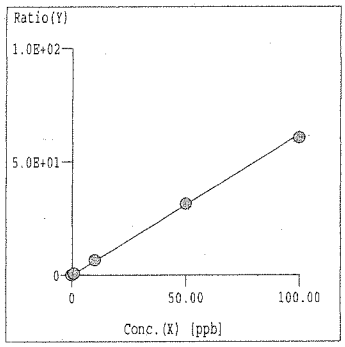
Step	Mass	Element	ISTD	Unit
(2)	63	Cu	45	ppb



Curve Fit: Y=aX+b
r = 0.9996
Y = 2.063E+000*X +5.538E-002
X = 4.846E-001*Y -2.684E-002
DL = 4.822E-03 ppb
BEC = 2.684E-02 ppb

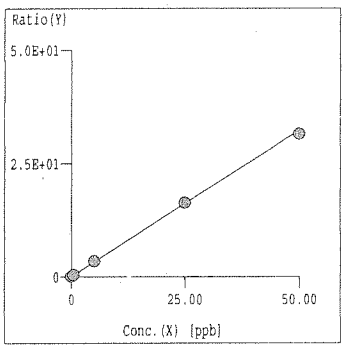
=== Graph Detail ===

Step Mass Element	ISTD	Unit
(3) 66 Zn	72	ppb



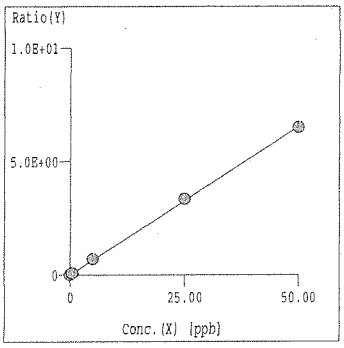
Curve Fit: Y=aX+b
r = 0.9998
Y = 6.192E-001*X +6.359E-002
X = 1.615E+000*Y -1.027E-001
DL = 1.498E-02 ppb
BEC = 1.027E-01 ppb

Step Mass Element	ISTD	Unit
(2) 75 As	72	ppb



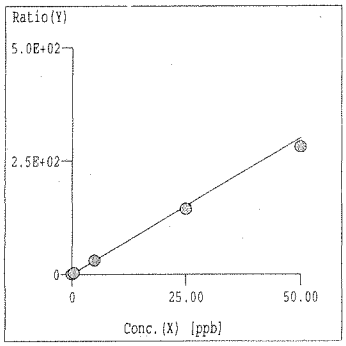
Curve Fit: Y=aX+b
r = 0.9999
Y = 6.437E-001*X +6.277E-002
X = 1.554E+000*Y -9.752E-002
DL = 1.635E-03 ppb
BEC = 9.752E-02 ppb

Step Mass Element	ISTD	Unit
(1) 78 Se	72	ppb



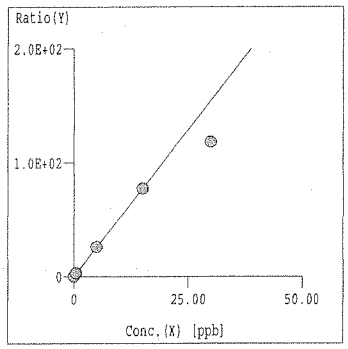
Curve Fit: Y=aX+b
r = 0.9999
Y = 1.305E-001*X +1.475E-003
X = 7.662E+000*Y -1.130E-002
DL = 1.070E-02 ppb
BEC = 1.130E-02 ppb

Step Mass Element	ISTD	Unit
(3) 88 Sr	72	ppb



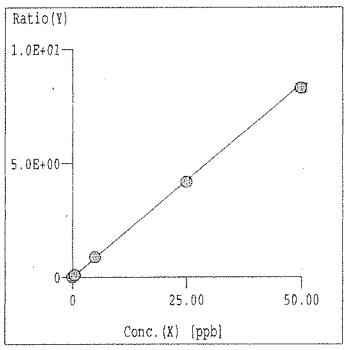
Curve Fit: Y=aX+b
r = 0.9999
Y = 6.010E+000*X +6.872E-002
X = 1.664E-001*Y -1.144E-002
DL = 3.773E-03 ppb
BEC = 1.144E-02 ppb

Step Mass Element	ISTD	Unit
(3) 90 Zr	72	ppb



Curve Fit: Y=aX+b
r = 0.9887
Y = 5.157E+000*X +9.088E-002
X = 1.939E-001*Y -1.762E-002
DL = 8.514E-04 ppb
BEC = 1.762E-02 ppb

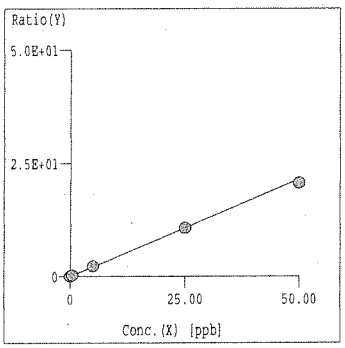
Step Mass Element	ISTD	Unit
(3) 95 Mo	115	ppb



Curve Fit: Y=aX+b
r = 1.0000
Y = 1.694E-001*X +2.045E-003
X = 5.903E+000*Y -1.207E-002
DL = 9.853E-03 ppb
BEC = 1.207E-02 ppb

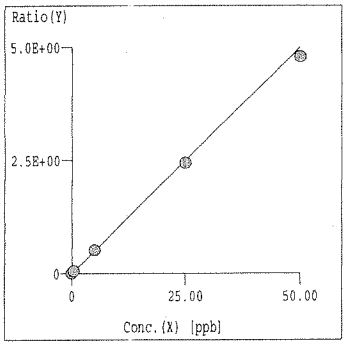
=== Graph Detail ===

Step Mass Element	ISTD	Unit
(3) 107 Ag	115	ppb



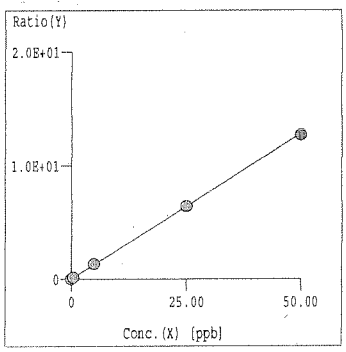
Curve Fit: Y=aX+b
r = 0.9998
Y = 4.296E-001*X +1.239E-003
X = 2.328E+000*Y -2.884E-003
DL = 2.373E-03 ppb
BEC = 2.884E-03 ppb

Step Mass Element	ISTD	Unit
(3) 111 Cd	115	ppb



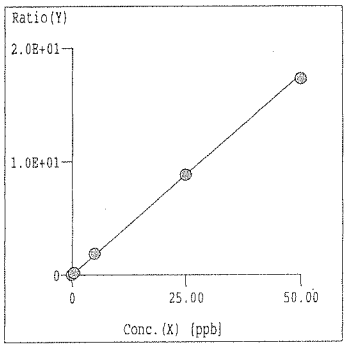
Curve Fit: Y=aX+b
r = 0.9999
Y = 1.001E-001*X +5.672E-004
X = 9.991E+000*Y -5.667E-003
DL = 6.589E-03 ppb
BEC = 5.667E-03 ppb

Step Mass Element	ISTD	Unit
(3) 118 Sn	115	ppb



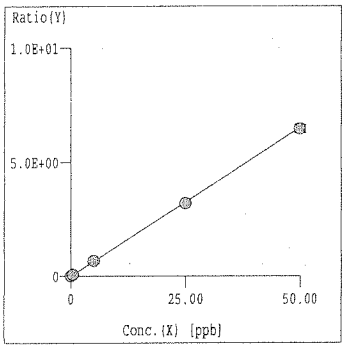
Curve Fit: Y=aX+b
r = 1.0000
Y = 2.566E-001*X +2.260E-003
X = 3.897E+000*Y -8.807E-003
DL = 4.428E-04 ppb
BEC = 8.807E-03 ppb

Step Mass Element	ISTD	Unit
(3) 121 Sb	115	ppb



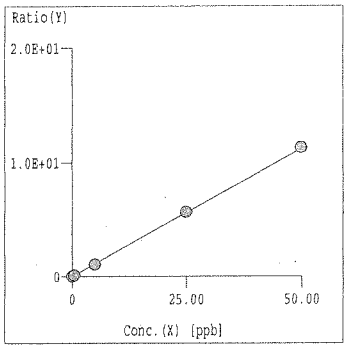
Curve Fit: Y=aX+b
r = 0.9999
Y = 3.530E-001*X +1.225E-002
X = 2.833E+000*Y -3.470E-002
DL = 1.066E-02 ppb
BEC = 3.470E-02 ppb

Step Mass Element	ISTD	Unit
(3) 137 Ba	115	ppb



Curve Fit: Y=aX+b
r = 1.0000
Y = 1.303E-001*X +1.397E-003
X = 7.675E+000*Y -1.072E-002
DL = 3.889E-03 ppb
BEC = 1.072E-02 ppb

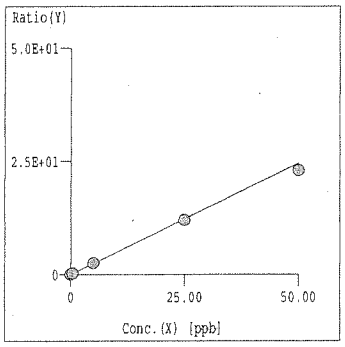
Step Mass Element	ISTD	Unit
(3) 182 W	159	ppb



Curve Fit: Y=aX+b
r = 1.0000
Y = 2.239E-001*X +2.021E-003
X = 4.466E+000*Y -9.028E-003
DL = 1.161E-03 ppb
BEC = 9.028E-03 ppb

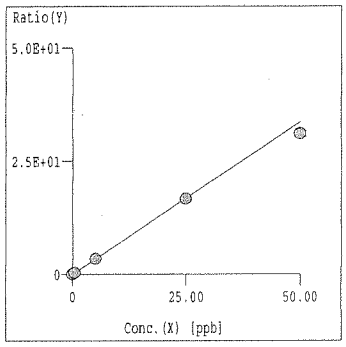
=== Graph Detail ===

Step Mass Element	ISTD	Unit
(3) 205 Tl	159	ppb



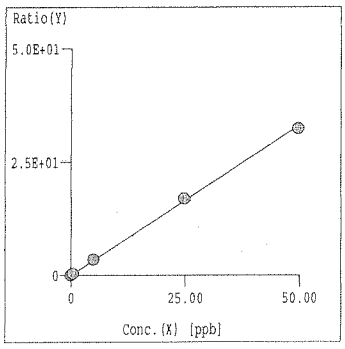
Curve Fit: Y=aX+b
r = 0.9997
Y = 4.908E-001*X +1.258E-003
X = 2.038E+000*Y -2.563E-003
DL = 1.232E-03 ppb
BEC = 2.563E-03 ppb

Step Mass Element	ISTD	Unit
(3) 208 Pb	159	ppb



Curve Fit: Y=aX+b
r = 0.9994
Y = 6.724E-001*X +7.461E-003
X = 1.487E+000*Y -1.110E-002
DL = 3.788E-03 ppb
BEC = 1.110E-02 ppb

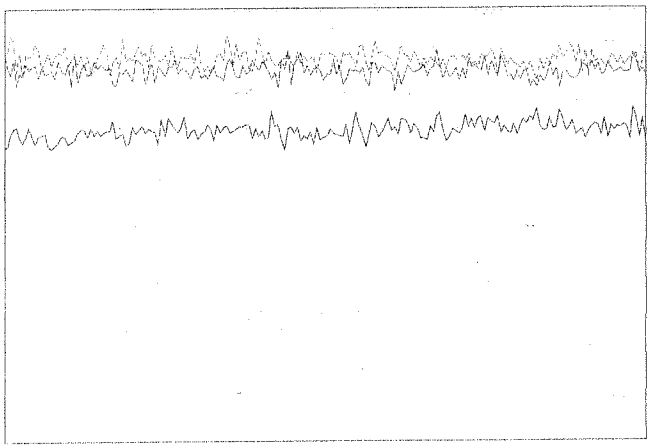
Step Mass Element	ISTD	Unit
(3) 238 U	159	ppb



Curve Fit: Y=aX+b
r = 0.9997
Y = 6.623E-001*X +6.551E-004
X = 1.510E+000*Y -9.892E-004
DL = 5.799E-04 ppb
BEC = 9.892E-04 ppb

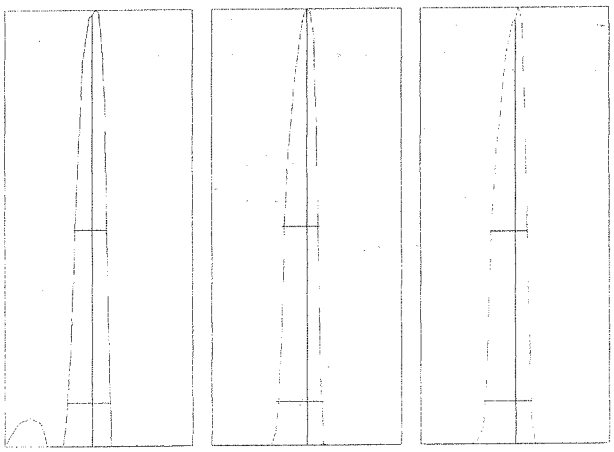
Tune Report

Tune File : NORM.U
Comment : IF6D13



Integration Time:	0.1000 sec	
Sampling Period:	0.6200 sec	
n:	200	
Oxide:	156/140	1.694%
Doubly Charged:	70/140	1.040%

m/z	Range	Count	Mean	RSD%	Background
7	20,000	13632.0	14349.2	2.64	7.60
89	100,000	83975.0	85455.2	2.14	6.70
205	50,000	45458.0	44172.9	2.24	18.00
156/140	5	1.869%	1.743%	4.89	
70/140	2	1.048%	1.057%	5.22	



m/z:	7	89	205
Height:	14,115	88,030	44,956
Axis:	6.95	89.05	205.05
W-50%:	0.55	0.60	0.60
W-10%:	0.700	0.7500	0.7500

Integration Time:	0.1000 sec
Acquisition Time:	22.7600 sec

Y axis : Linear

Generated : Apr 24, 2015 11:59:00
Printed : Apr 24, 2015 11:59:02

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Tune Report

Tune File : NORM.U
Comment : IF6D13

Tuning Parameters

===Plasma Condition===			===Ion Lenses===			===Q-Pole Parameters===		
RF Power	:	1500 W	Extract 1	:	0 V	AMU Gain	:	128
RF Matching	:	1.74 V	Extract 2	:	-110 V	AMU Offset	:	127
Smpl Depth	:	8 mm	Omega Bias-ce	:	-30 V	Axis Gain	:	1
Torch-H	:	-0.3 mm	Omega Lens-ce	:	0.6 V	Axis Offset	:	-0.08
Torch-V	:	-0.5 mm	Cell Entrance	:	-26 V	QP Bias	:	-3 V
Carrier Gas	:	0.9 L/min	QP Focus	:	1 V			
Makeup Gas	:	0.12 L/min	Cell Exit	:	-30 V	===Detector Parameters===		
Optional Gas	:	--- %				Discriminator	:	8 mV
Nebulizer Pump	:	0.1 rps	===Octopole Parameters===			Analog HV	:	2060 V
Sample Pump	:	--- rps	OctP RF	:	169 V	Pulse HV	:	1390 V
S/C Temp	:	2 degC	OctP Bias	:	-6 V			

===Reaction Cell===								
Reaction Mode	:	OFF						
H2 Gas	:	0 mL/min	He Gas	:	0 mL/min	Optional Gas	:	--- %

Generated : Apr 24, 2015 11:59:00
Printed : Apr 24, 2015 11:59:05

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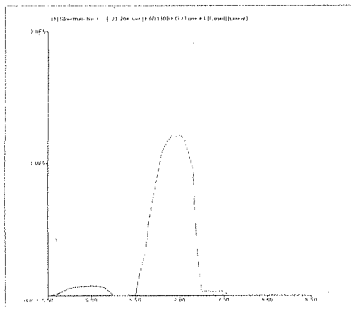
6020 QC Tune Report

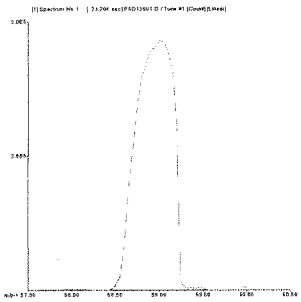
Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13001.D
Date Acquired: Apr 24 2015 12:16 pm
Acq. Method: TN6020_C.M
Operator: CCapul
Sample Name: 6020tunchk
Misc Info:
Vial Number: 1301
Current Method: C:\ICPCHEM\1\METHODS\TN6020_C.M

RSD (%)

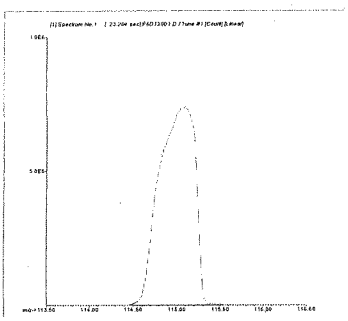
Element	Actual	Required	Flag
7 Li	3.10	5.00	
59 Co	1.59	5.00	
115 In	1.40	5.00	
205 Tl	1.70	5.00	



7 Li
Mass Calib.
Actual: 6.95
Required: 6.90 - 7.10
Flag:
Peak Width-10%
Actual: 0.60
Limit 0.90
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width-10%
Actual: 0.60
Limit 0.90
Flag:



115 In

Mass Calib.

Actual: 115.05

Required: 114.90 - 115.10

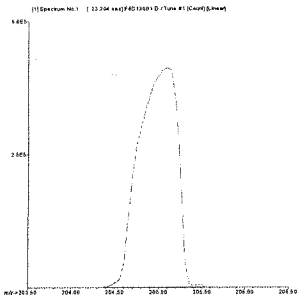
Flag:

Peak Width-10%

Actual: 0.60

Limit 0.90

Flag:



205 Tl

Mass Calib.

Actual: 205.05

Required: 204.90 - 205.10

Flag:

Peak Width-10%

Actual: 0.60

Limit 0.90

Flag:

Calibration Blank QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13003
Date Acquired:	Apr 24 2015 12:25 pm
Operator:	CCapul
Sample Name:	BLNK
Misc Info:	
Vial Number:	1101
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.
Last Cal Update:	Apr 24 2015 12:28 pm
Sample Type:	CalBlk
Total Dil Factor:	1.00

QC&ISTD Elements

Element		CPS Mean		SD	RSD(%)
6	Li	1182144.00	A	5872.00	0.50
7	Li	77204.69	P	534.30	0.69
9	Be	51.11	P	13.88	27.16
11	B	8202.52	P	253.30	3.09
23	Na	276799.00	P	387.90	0.14
24	Mg	12969.44	P	272.60	2.10
27	Al	13178.55	P	153.10	1.16
28	Si	2847.05	P	124.40	4.37
31	P	29831.31	P	412.10	1.38
39	K	180222.00	P	866.90	0.48
40	Ca	116246.20	P	2054.00	1.77
45	Sc	2550140.00	A	24180.00	0.95
45	Sc	621948.00	P	3158.00	0.51
45	Sc	4743301.00	A	26470.00	0.56
47	Ti	171.12	P	17.11	10.00
51	V	5688.70	P	32.51	0.57
52	Cr	2293.09	P	86.23	3.76
55	Mn	3509.43	P	99.82	2.84
56	Fe	16826.90	P	273.10	1.62
59	Co	441.13	P	28.35	6.43
60	Ni	152.22	P	8.15	5.35
63	Cu	504.01	P	15.51	3.08
66	Zn	1796.84	P	143.10	7.96
72	Ge	696434.63	P	8142.00	1.17
72	Ge	324632.19	P	2315.00	0.71
72	Ge	1131499.00	A	3849.00	0.34
75	As	203.34	P	21.67	10.66
78	Se	7.56	P	1.02	13.47
88	Sr	1128.98	P	107.70	9.54
90	Zr	1006.74	P	26.67	2.65
95	Mo	256.68	P	12.02	4.68
107	Ag	123.34	P	8.82	7.15
111	Cd	35.99	P	20.19	56.10
115	In	7263414.00	A	70640.00	0.97
118	Sn	234.46	P	15.03	6.41
121	Sb	1000.08	P	135.30	13.53
137	Ba	162.23	P	12.62	7.78
159	Tb	9020487.00	A	146900.00	1.63
182	W	393.35	P	34.80	8.85
205	Tl	156.67	P	29.06	18.55
208	Pb	926.72	P	47.26	5.10
209	Bi	5069650.00	A	39290.00	0.78
235	U	15.56	P	6.94	44.61
238	U	161.12	P	34.70	21.54

Calibration Blank QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13004
Date Acquired:	Apr 24 2015 12:29 pm
Operator:	CCapul
Sample Name:	S0
Misc Info:	
Vial Number:	1102
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.
Last Cal Update:	Apr 24 2015 12:28 pm
Sample Type:	CalBlk
Total Dil Factor:	1.00

QC&ISTD Elements

Element		CPS Mean		SD	RSD(%)
6	Li	1159753.00	A	12050.00	1.04
7	Li	77218.85	P	916.80	1.19
9	Be	32.22	P	9.62	29.86
11	B	5949.18	P	142.50	2.40
23	Na	264081.00	P	1421.00	0.54
24	Mg	6069.23	P	169.60	2.79
27	Al	3840.63	P	40.00	1.04
28	Si	1740.17	P	31.80	1.83
31	P	28640.11	P	558.40	1.95
39	K	180580.80	P	385.30	0.21
40	Ca	46723.11	P	799.20	1.71
45	Sc	2567034.00	A	20650.00	0.80
45	Sc	613402.38	P	8850.00	1.44
45	Sc	4679394.00	A	35410.00	0.76
47	Ti	140.01	P	50.00	35.71
51	V	5569.10	P	17.98	0.32
52	Cr	1980.59	P	30.98	1.56
55	Mn	2512.53	P	111.70	4.45
56	Fe	5610.18	P	171.00	3.05
59	Co	296.68	P	29.63	9.99
60	Ni	132.22	P	6.01	4.55
63	Cu	317.56	P	16.74	5.27
66	Zn	683.38	P	41.64	6.09
72	Ge	704157.69	P	7013.00	1.00
72	Ge	321292.31	P	1659.00	0.52
72	Ge	1114306.00	A	11690.00	1.05
75	As	201.56	P	2.04	1.01
78	Se	8.22	P	3.36	40.82
88	Sr	754.49	P	87.71	11.63
90	Zr	965.63	P	19.25	1.99
95	Mo	134.45	P	40.74	30.30
107	Ag	84.45	P	24.12	28.56
111	Cd	33.06	P	15.88	48.04
115	In	7180581.00	A	50200.00	0.70
118	Sn	162.23	P	1.92	1.19
121	Sb	820.05	P	84.14	10.26
137	Ba	100.00	P	12.02	12.02
159	Tb	8719993.00	A	86720.00	0.99
182	W	176.67	P	8.82	4.99
205	Tl	91.11	P	18.36	20.15
208	Pb	614.47	P	71.21	11.59
209	Bi	4883157.00	A	69450.00	1.42
235	U	26.67	P	3.33	12.50
238	U	56.67	P	11.55	20.38

Calibration Standard QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13005.D\F6D13005.D#
Date Acquired: Apr 24 2015 12:33 pm
Operator: CCapul
Sample Name: S1 0.5
Misc Info:
Vial Number: 1104
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:32 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	1153715.00	A	20750.00	1.80
7 Li	83157.48	P	613.40	0.74
9 Be	2372.48	P	92.16	3.88
11 B	7579.98	P	104.10	1.37
23 Na	443920.41	P	3059.00	0.69
24 Mg	941948.19	A	9196.00	0.98
27 Al	1272622.00	A	8967.00	0.70
28 Si	244025.70	P	2348.00	0.96
31 P	65581.57	P	662.50	1.01
39 K	266964.31	P	905.30	0.34
40 Ca	836414.63	A	6337.00	0.76
45 Sc	2508734.00	A	12500.00	0.50
45 Sc	601745.69	P	4957.00	0.82
45 Sc	4584255.00	A	106300.00	2.32
47 Ti	1994.66	P	187.00	9.38
51 V	11564.62	P	112.70	0.97
52 Cr	8657.94	P	64.17	0.74
55 Mn	31433.59	P	33.66	0.11
56 Fe	1240497.00	A	8589.00	0.69
59 Co	24707.34	P	235.80	0.95
60 Ni	2599.14	P	4.34	0.17
63 Cu	6825.42	P	70.67	1.04
66 Zn	8132.56	P	142.40	1.75
72 Ge	683548.69	P	3733.00	0.55
72 Ge	319428.50	P	2784.00	0.87
72 Ge	1089926.00	A	18260.00	1.68
75 As	1264.51	P	20.16	1.59
78 Se	464.23	P	14.87	3.20
88 Sr	33098.35	P	522.60	1.58
90 Zr	33498.07	P	553.40	1.65
95 Mo	6152.68	P	84.79	1.38
107 Ag	16550.33	P	424.90	2.57
111 Cd	3674.32	P	79.56	2.17
115 In	7038139.00	A	4085.00	0.06
118 Sn	9615.87	P	313.90	3.26
121 Sb	13553.73	P	232.00	1.71
137 Ba	4696.53	P	126.40	2.69
159 Tb	8597637.00	A	18310.00	0.21
182 W	9656.04	P	225.80	2.34
205 Tl	21858.79	P	70.05	0.32
208 Pb	30791.79	P	403.20	1.31
209 Bi	4842730.00	A	55220.00	1.14
235 U	257.79	P	11.71	4.54
238 U	30006.76	P	725.10	2.42

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1153715.40	1.80	1159752.60	99.5	60 - 125	
45 Sc	2508733.80	0.50	2567033.50	97.7	60 - 125	
45 Sc	601745.69	0.82	613402.44	98.1	60 - 125	
45 Sc	4584255.00	2.32	4679393.50	98.0	60 - 125	
72 Ge	683548.69	0.55	704157.69	97.1	60 - 125	
72 Ge	319428.50	0.87	321292.31	99.4	60 - 125	
72 Ge	1089926.30	1.68	1114306.40	97.8	60 - 125	
115 In	7038139.00	0.06	7180580.50	98.0	60 - 125	
159 Tb	8597637.00	0.21	8719993.00	98.6	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: **Pass**
ISTD: **Pass**

Calibration Standard QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13006.D\F6D13006.D#
Date Acquired: Apr 24 2015 12:38 pm
Operator: CCapul
Sample Name: S2 5
Misc Info:
Vial Number: 1105
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:36 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	1124523.00	A	21850.00	1.94
7 Li	133812.80	P	3490.00	2.61
9 Be	24016.59	P	370.90	1.54
11 B	22719.15	P	473.90	2.09
23 Na	2063061.00	A	25570.00	1.24
24 Mg	8842704.00	A	60100.00	0.68
27 Al	12290680.00	A	66080.00	0.54
28 Si	1212581.00	A	14090.00	1.16
31 P	103496.40	P	1023.00	0.99
39 K	1072595.00	A	12110.00	1.13
40 Ca	7684271.00	A	16750.00	0.22
45 Sc	2488688.00	A	18190.00	0.73
45 Sc	601434.31	P	2673.00	0.44
45 Sc	4526177.00	A	61890.00	1.37
47 Ti	17163.93	P	547.30	3.19
51 V	64437.39	P	560.50	0.87
52 Cr	69702.78	P	152.30	0.22
55 Mn	287222.31	P	2935.00	1.02
56 Fe	11714110.00	A	53650.00	0.46
59 Co	237789.30	P	2406.00	1.01
60 Ni	24504.20	P	318.40	1.30
63 Cu	62681.10	P	203.80	0.33
66 Zn	71687.09	P	754.00	1.05
72 Ge	678387.63	P	1480.00	0.22
72 Ge	315110.69	P	1856.00	0.59
72 Ge	1079231.00	A	11300.00	1.05
75 As	10825.22	P	136.20	1.26
78 Se	4699.69	P	45.37	0.97
88 Sr	327327.69	P	2740.00	0.84
90 Zr	279932.81	P	3321.00	1.19
95 Mo	59937.73	P	788.20	1.32
107 Ag	155679.50	P	1100.00	0.71
111 Cd	35342.41	P	549.00	1.55
115 In	6873469.00	A	144400.00	2.10
118 Sn	91243.20	P	1442.00	1.58
121 Sb	128873.50	P	2065.00	1.60
137 Ba	46209.77	P	933.40	2.02
159 Tb	8727443.00	A	148100.00	1.70
182 W	92271.16	P	1438.00	1.56
205 Tl	219995.09	P	3072.00	1.40
208 Pb	302706.31	P	1328.00	0.44
209 Bi	4805544.00	A	63780.00	1.33
235 U	2316.97	P	66.61	2.87
238 U	303024.41	P	2363.00	0.78

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1124522.60	1.94	1159752.60	97.0	60 - 125	
45 Sc	2488687.80	0.73	2567033.50	96.9	60 - 125	
45 Sc	601434.31	0.44	613402.44	98.0	60 - 125	
45 Sc	4526177.00	1.37	4679393.50	96.7	60 - 125	
72 Ge	678387.63	0.22	704157.69	96.3	60 - 125	
72 Ge	315110.69	0.59	321292.31	98.1	60 - 125	
72 Ge	1079230.90	1.05	1114306.40	96.9	60 - 125	
115 In	6873469.50	2.10	7180580.50	95.7	60 - 125	
159 Tb	8727443.00	1.70	8719993.00	100.1	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: **Pass**
ISTD: **Pass**

Calibration Standard QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13007.D\F6D13007.D#
Date Acquired: Apr 24 2015 12:42 pm
Operator: CCapul
Sample Name: S3 25
Misc Info:
Vial Number: 1106
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:40 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	1113978.00	A	22650.00	2.03
7 Li	361828.09	P	4420.00	1.22
9 Be	114731.20	P	1843.00	1.61
11 B	88199.29	P	1684.00	1.91
23 Na	9131473.00	A	78130.00	0.86
24 Mg	44268272.00	A	391000.00	0.88
27 Al	60762080.00	A	406700.00	0.67
28 Si	5745720.00	A	28640.00	0.50
31 P	393605.50	P	1928.00	0.49
39 K	4469730.00	A	47540.00	1.06
40 Ca	38695380.00	A	78520.00	0.20
45 Sc	2530594.00	A	31420.00	1.24
45 Sc	595378.63	P	3507.00	0.59
45 Sc	4595222.00	A	72630.00	1.58
47 Ti	81789.55	P	691.30	0.85
51 V	284194.69	P	1400.00	0.49
52 Cr	322649.59	P	940.30	0.29
55 Mn	1349053.00	A	10550.00	0.78
56 Fe	59054168.00	A	432200.00	0.73
59 Co	1107068.00	A	10360.00	0.94
60 Ni	114250.50	P	778.10	0.68
63 Cu	290668.50	P	1677.00	0.58
66 Zn	336210.50	P	667.60	0.20
72 Ge	682864.00	P	3483.00	0.51
72 Ge	309787.19	P	2782.00	0.90
72 Ge	1071985.00	A	4189.00	0.39
75 As	50425.24	P	364.80	0.72
78 Se	22779.61	P	206.80	0.91
88 Sr	1535989.00	A	9787.00	0.64
90 Zr	826593.81	P	22660.00	2.74
95 Mo	283831.31	P	1945.00	0.69
107 Ag	729740.38	P	8120.00	1.11
111 Cd	165972.70	P	1204.00	0.73
115 In	6818109.00	A	112300.00	1.65
118 Sn	437248.50	P	3019.00	0.69
121 Sb	600543.63	P	2529.00	0.42
137 Ba	217923.30	P	2187.00	1.00
159 Tb	8589430.00	A	124600.00	1.45
182 W	484806.50	P	2538.00	0.52
205 Tl	1030555.00	A	1576.00	0.15
208 Pb	1429549.00	P	6372.00	0.45
209 Bi	4674635.00	A	12660.00	0.27
235 U	10691.46	P	141.10	1.32
238 U	1452690.00	A	20810.00	1.43

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1113977.90	2.03	1159752.60	96.1	60 - 125	
45 Sc	2530594.30	1.24	2567033.50	98.6	60 - 125	
45 Sc	595378.56	0.59	613402.44	97.1	60 - 125	
45 Sc	4595222.50	1.58	4679393.50	98.2	60 - 125	
72 Ge	682864.00	0.51	704157.69	97.0	60 - 125	
72 Ge	309787.16	0.90	321292.31	96.4	60 - 125	
72 Ge	1071985.40	0.39	1114306.40	96.2	60 - 125	
115 In	6818108.50	1.65	7180580.50	95.0	60 - 125	
159 Tb	8589430.00	1.45	8719993.00	98.5	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: **Pass**
ISTD: **Pass**

Calibration Standard QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13008.D\F6D13008.D#
Date Acquired: Apr 24 2015 12:46 pm
Operator: CCapul
Sample Name: S4 50
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:45 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	1086616.00	A	34420.00	3.17
7 Li	629238.88	A	11200.00	1.78
9 Be	220556.50	P	478.00	0.22
11 B	162293.50	P	3723.00	2.29
23 Na	17738410.00	A	80070.00	0.45
24 Mg	85940840.00	A	2148000.00	2.50
27 Al	118672700.00	A	3198000.00	2.69
28 Si	11107170.00	A	112700.00	1.01
31 P	748634.13	M	21840.00	2.92
39 K	8883814.00	A	142700.00	1.61
40 Ca	76402032.00	A	893000.00	1.17
45 Sc	2591463.00	A	37270.00	1.44
45 Sc	611022.31	P	7933.00	1.30
45 Sc	4645982.00	A	82700.00	1.78
47 Ti	158899.59	P	880.20	0.55
51 V	552895.31	P	3981.00	0.72
52 Cr	635241.13	P	3509.00	0.55
55 Mn	2583008.00	A	29990.00	1.16
56 Fe	116477500.00	A	992500.00	0.85
59 Co	2112835.00	A	19490.00	0.92
60 Ni	222382.09	P	500.20	0.22
63 Cu	565940.50	P	2958.00	0.52
66 Zn	643429.63	P	4616.00	0.72
72 Ge	680745.38	P	1442.00	0.21
72 Ge	313058.09	P	1689.00	0.54
72 Ge	1063698.00	A	12730.00	1.20
75 As	98419.50	P	241.40	0.25
78 Se	44151.90	P	177.10	0.40
88 Sr	2977031.00	A	75910.00	2.55
90 Zr	1254903.00	A	21600.00	1.72
95 Mo	552639.88	P	6781.00	1.23
107 Ag	1373782.00	A	5034.00	0.37
111 Cd	319055.59	P	4839.00	1.52
115 In	6672794.00	A	179900.00	2.70
118 Sn	845898.19	M	27570.00	3.26
121 Sb	1151470.00	A	22110.00	1.92
137 Ba	430274.69	P	3800.00	0.88
159 Tb	8717031.00	A	28260.00	0.32
182 W	984475.50	A	4232.00	0.43
205 Tl	1997705.00	A	16710.00	0.84
208 Pb	2704592.00	A	48290.00	1.79
209 Bi	4692073.00	A	119900.00	2.56
235 U	21193.58	P	720.70	3.40
238 U	2819506.00	A	15690.00	0.56

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1086615.50	3.17	1159752.60	93.7	60 - 125	
45 Sc	2591463.00	1.44	2567033.50	101.0	60 - 125	
45 Sc	611022.31	1.30	613402.44	99.6	60 - 125	
45 Sc	4645981.50	1.78	4679393.50	99.3	60 - 125	
72 Ge	680745.38	0.21	704157.69	96.7	60 - 125	
72 Ge	313058.16	0.54	321292.31	97.4	60 - 125	
72 Ge	1063697.80	1.20	1114306.40	95.5	60 - 125	
115 In	6672794.50	2.70	7180580.50	92.9	60 - 125	
159 Tb	8717031.00	0.32	8719993.00	100.0	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

ICV QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13009.D\F6D13009.D#
Date Acquired:	Apr 24 2015 12:50 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	ICV
Misc Info:	
Vial Number:	1204
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	ICV1
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc. RSD(%)	Expected	QC Range(%)	Flag
7 Li	29.79	ppb	411086.7	0.70	30.00	90 - 110	
9 Be	29.95	ppb	133588.5	0.90	30.00	90 - 110	
11 B	30.87	ppb	102498.3	1.07	30.00	90 - 110	
23 Na	1504.00	ppb	11086760.0	1.26	1500.00	90 - 110	
24 Mg	3049.00	ppb	53277072.0	1.28	3000.00	90 - 110	
27 Al	3041.00	ppb	73561528.0	1.31	3000.00	90 - 110	
28 Si	3050.00	ppb	7138146.0	0.90	3000.00	90 - 110	
31 P	303.70	ppb	466894.7	0.38	300.00	90 - 110	
39 K	3009.00	ppb	5447645.0	0.75	3000.00	90 - 110	
40 Ca	2999.00	ppb	47116328.0	1.28	3000.00	90 - 110	
47 Ti	29.47	ppb	95296.5	0.33	30.00	90 - 110	
51 V	30.74	ppb	348259.0	0.65	30.00	90 - 110	
52 Cr	28.62	ppb	380994.4	1.43	30.00	90 - 110	
55 Mn	27.94	ppb	1580442.0	0.41	30.00	90 - 110	
56 Fe	3076.00	ppb	72505056.0	0.83	3000.00	90 - 110	
59 Co	27.60	ppb	1288681.0	1.14	30.00	90 - 110	
60 Ni	28.65	ppb	136317.4	1.26	30.00	90 - 110	
63 Cu	27.91	ppb	346929.0	0.64	30.00	90 - 110	
66 Zn	60.27	ppb	398862.3	1.26	60.00	90 - 110	
75 As	29.61	ppb	59750.4	0.49	30.00	90 - 110	
78 Se	30.38	ppb	27232.7	0.33	30.00	90 - 110	
88 Sr	28.64	ppb	1837244.0	1.35	30.00	90 - 110	
90 Zr	15.58	ppb	857925.4	2.39	20.00	90 - 110	Fail
95 Mo	28.91	ppb	333498.0	1.35	30.00	90 - 110	
107 Ag	29.58	ppb	864878.6	1.66	30.00	90 - 110	
111 Cd	28.53	ppb	194414.3	0.59	30.00	90 - 110	
118 Sn	30.60	ppb	534526.9	1.60	30.00	90 - 110	
121 Sb	29.74	ppb	715327.7	1.58	30.00	90 - 110	
137 Ba	29.81	ppb	264422.6	0.73	30.00	90 - 110	
182 W	29.22	ppb	566848.0	1.56	30.00	90 - 110	
205 Tl	29.36	ppb	1248049.0	1.47	30.00	90 - 110	
208 Pb	29.32	ppb	1708257.0	0.72	30.00	90 - 110	
235 U	0.21	ppb	12722.3	0.67	0.21	90 - 110	
238 U	30.07	ppb	1724782.0	1.47	29.79	90 - 110	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1095505.3	0.74	1159752.60	94.5	60 - 125	
45 Sc	2555230.5	0.87	2567033.50	99.5	60 - 125	
45 Sc	601906.8	0.48	613402.44	98.1	60 - 125	
45 Sc	4524115.5	0.34	4679393.50	96.7	60 - 125	
72 Ge	686567.9	0.74	704157.69	97.5	60 - 125	
72 Ge	312460.0	0.55	321292.31	97.3	60 - 125	
72 Ge	1067047.6	1.52	1114306.40	95.8	60 - 125	
115 In	6806382.0	0.98	7180580.50	94.8	60 - 125	
159 Tb	8660756.0	0.66	8719993.00	99.3	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

1 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

7077

ICB QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13010.D\F6D13010.D#
Date Acquired:	Apr 24 2015 12:54 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	ICB
Misc Info:	
Vial Number:	1102
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	ICB
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc RSD(%)	High Limit	Flag
7 Li	-0.0451	ppb	73288.6	137.99	0.20	
9 Be	-0.0015	ppb	26.7	8.14	0.10	
11 B	-0.4451	ppb	4383.0	24.65	5.00	
23 Na	-3.2820	ppb	234635.4	32.33	40.00	
24 Mg	0.0588	ppb	6802.9	27.30	10.00	
27 Al	0.0678	ppb	5281.1	24.83	20.00	
28 Si	1.4220	ppb	4789.8	4.48	20.00	
31 P	-2.3650	ppb	24421.1	13.88	10.00	
39 K	-9.1000	ppb	160500.0	8.71	20.00	
40 Ca	-0.3201	ppb	39436.1	10.07	25.00	
47 Ti	-0.0109	ppb	132.2	78.52	0.50	
51 V	0.0392	ppb	5945.0	27.47	0.50	
52 Cr	-0.0103	ppb	1787.9	25.75	0.20	
55 Mn	0.0013	ppb	2491.4	151.34	0.20	
56 Fe	0.8248	ppb	23677.9	12.32	10.00	
59 Co	0.0012	ppb	338.9	61.83	0.20	
60 Ni	0.0000	ppb	135.6	7828.40	0.20	
63 Cu	-0.0014	ppb	310.2	35.13	0.40	
66 Zn	-0.0144	ppb	583.4	43.32	2.00	
75 As	0.0102	ppb	215.8	50.77	0.20	
78 Se	0.0050	ppb	14.4	119.61	0.20	
90 Zr	-0.0112	ppb	351.1	5.26	2.00	
95 Mo	0.0171	ppb	345.6	19.46	0.40	
107 Ag	0.0015	ppb	131.1	29.13	0.20	
111 Cd	-0.0025	ppb	22.0	67.69	0.20	
118 Sn	0.0031	ppb	214.5	82.94	0.20	
121 Sb	0.0107	ppb	1122.3	21.48	0.40	
137 Ba	0.0009	ppb	105.6	212.14	0.20	
182 W	0.0110	ppb	391.1	28.44	1.00	
205 Tl	0.0023	ppb	208.9	28.56	0.20	
208 Pb	-0.0014	ppb	568.9	63.44	0.10	
235 U	-0.0001	ppb	23.3	74.79	1.00	
238 U	0.0041	ppb	296.7	19.71	0.10	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1106862.4	1.66	1159752.60	95.4	60 - 125	
45 Sc	2419749.3	2.37	2567033.50	94.3	60 - 125	
45 Sc	590822.0	0.59	613402.44	96.3	60 - 125	
45 Sc	4465039.0	2.00	4679393.50	95.4	60 - 125	
72 Ge	681437.6	0.89	704157.69	96.8	60 - 125	
72 Ge	311190.6	0.28	321292.31	96.9	60 - 125	
72 Ge	1067031.3	1.02	1114306.40	95.8	60 - 125	
115 In	7000139.0	0.86	7180580.50	97.5	60 - 125	
159 Tb	8747764.0	0.90	8719993.00	100.3	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures — 0 :Max. Number of Failures Allowed

0 :ISTD Failures — 0 :Max. Nnumber of ISTD Failures Allowed

Data Results:

Analytes: Pass

ISTD: Pass

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13011.D\F6D13011.D#
Date Acquired:	Apr 24 2015 12:59 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	MRLD2401
Misc Info:	1/100/10 ppb
Vial Number:	1305
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	83012.8	0.0000	0.8941	ppb	12.85	225.00	
9 Be	# 3	45	4400.8	0.0000	1.0040	ppb	1.23	225.00	
11 B	# 3	45	36952.5	0.0000	10.2300	ppb	2.47	225.00	
23 Na	# 1	45	935050.3	0.0000	101.8000	ppb	2.87	269999.99	
24 Mg	# 3	45	1761055.0	0.0000	102.9000	ppb	2.03	269999.99	
27 Al	# 3	45	2339732.0	0.0000	98.9500	ppb	1.23	90000.00	
28 Si	# 1	45	4718.7	0.0000	1.4230	ppb	3.70	18000.00	
31 P	# 3	45	99154.0	0.0000	50.8200	ppb	0.77	359999.99	
39 K	# 2	45	340571.3	0.0000	99.6900	ppb	1.08	269999.99	
40 Ca	# 1	45	1613613.0	0.0000	107.3000	ppb	0.84	269999.99	
47 Ti	# 3	45	3507.2	0.0000	1.0610	ppb	4.03	2700.00	
51 V	# 2	45	17348.1	0.0000	1.1140	ppb	1.65	2700.00	
52 Cr	# 2	45	15135.0	0.0000	1.0400	ppb	1.60	2700.00	
55 Mn	# 3	45	57334.2	0.0000	0.9969	ppb	2.61	2700.00	
56 Fe	# 1	45	2387365.0	0.0000	108.4000	ppb	1.68	90000.00	
59 Co	# 3	45	45523.7	0.0000	0.9930	ppb	0.65	2700.00	
60 Ni	# 2	45	4848.6	0.0000	1.0310	ppb	1.10	2700.00	
63 Cu	# 2	45	13364.6	0.0000	1.0920	ppb	0.84	2700.00	
66 Zn	# 3	72	70639.8	0.0000	10.6900	ppb	1.40	2700.00	
75 As	# 2	72	2273.1	0.0000	1.0430	ppb	1.14	2700.00	
78 Se	# 1	72	924.5	0.0000	1.0460	ppb	0.96	2700.00	
88 Sr	# 3	72	127326.5	0.0000	1.9920	ppb	1.56	2700.00	
90 Zr	# 3	72	125964.1	0.0000	2.2930	ppb	1.55	1800.00	
95 Mo	# 3	115	11777.5	0.0000	0.9990	ppb	0.94	2700.00	
107 Ag	# 3	115	29600.9	0.0000	0.9995	ppb	1.39	225.00	
111 Cd	# 3	115	7232.1	0.0000	1.0450	ppb	1.87	2700.00	
118 Sn	# 3	115	18542.9	0.0000	1.0430	ppb	2.73	2700.00	
121 Sb	# 3	115	25846.9	0.0000	1.0300	ppb	2.04	2700.00	
137 Ba	# 3	115	8975.4	0.0000	0.9913	ppb	2.38	2700.00	
182 W	# 3	159	3762304.0	0.0000	195.1000	ppb	0.35	900.00	
205 Tl	# 3	159	43635.3	0.0000	1.0300	ppb	1.93	2700.00	
208 Pb	# 3	159	60318.8	0.0000	1.0310	ppb	2.24	2700.00	
235 U	# 3	159	445.6	0.0000	0.0069	ppb	9.77	27.00	
238 U	# 3	159	59934.7	0.0000	1.0500	ppb	1.16	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1093112.00	0.98	1159752.60	94.3	60 - 125	
45 Sc # 1	2382631.80	2.57	2567033.50	92.8	60 - 125	
45 Sc # 2	579072.38	0.07	613402.44	94.4	60 - 125	
45 Sc # 3	4415729.50	1.43	4679393.50	94.4	60 - 125	
72 Ge # 1	670309.31	0.70	704157.69	95.2	60 - 125	
72 Ge # 2	309702.31	0.38	321292.31	96.4	60 - 125	
72 Ge # 3	1057271.40	1.09	1114306.40	94.9	60 - 125	
115 In # 3	6875221.00	1.48	7180580.50	95.7	60 - 125	
159 Tb # 3	8612404.00	2.06	8719993.00	98.8	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7079

ICS-A QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13013.D\F6D13013.D#
Date Acquired:	Apr 24 2015 01:07 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	ICSA
Misc Info:	
Vial Number:	1303
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	ICS-A
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc RSD(%)	High Limit	Flag
7 Li	0.40	ppb	64995.0	22.48	---	
9 Be	0.01	ppb	61.1	32.48	---	
11 B	-0.05	ppb	5144.4	19.86	---	
23 Na	96770.00	ppb	637434180.0	1.12	120000.00	
24 Mg	93050.00	ppb	1474751000.0	0.99	120000.00	
27 Al	92520.00	ppb	2030463000.0	0.73	120000.00	
28 Si	4.52	ppb	11269.1	1.74	---	
31 P	100900.00	ppb	132282600.0	0.35	---	
39 K	97150.00	ppb	160940500.0	0.28	120000.00	
40 Ca	98020.00	ppb	1408678000.0	2.25	120000.00	
47 Ti	2022.00	ppb	5921486.0	0.38	2400.00	
51 V	0.04	ppb	5701.6	8.83	---	
52 Cr	1.25	ppb	17535.9	1.10	---	
55 Mn	0.40	ppb	22692.8	1.02	---	
56 Fe	98460.00	ppb	2124797100.0	1.35	120000.00	
59 Co	0.23	ppb	10109.5	1.60	---	
60 Ni	0.18	ppb	939.8	1.17	---	
63 Cu	0.49	ppb	6081.1	1.38	---	
66 Zn	2.62	ppb	17351.0	1.89	---	
75 As	0.20	ppb	564.9	2.24	---	
78 Se	0.05	ppb	47.1	50.94	---	
88 Sr	0.60	ppb	37870.2	1.88	---	
90 Zr	0.07	ppb	4785.4	3.03	---	
95 Mo	1927.00	ppb	19788670.0	0.49	2400.00	
107 Ag	0.02	ppb	535.6	9.90	---	
111 Cd	0.29	ppb	1804.9	4.04	---	
118 Sn	0.03	ppb	574.5	15.22	---	
121 Sb	0.05	ppb	1754.6	7.77	---	
137 Ba	0.10	ppb	900.1	6.23	---	
182 W	0.18	ppb	3296.1	3.76	---	
205 Tl	0.00	ppb	178.9	68.82	---	
208 Pb	0.18	ppb	10330.9	1.60	---	
235 U	0.00	ppb	27.8	212.53	---	
238 U	0.00	ppb	185.6	5.17	---	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	917081.9	1.62	1159752.60	79.1	60 - 125	
45 Sc	2340114.3	1.23	2567033.50	91.2	60 - 125	
45 Sc	568867.1	0.43	613402.44	92.7	60 - 125	
45 Sc	4104132.0	1.37	4679393.50	87.7	60 - 125	
72 Ge	622260.9	0.08	704157.69	88.4	60 - 125	
72 Ge	294648.2	0.26	321292.31	91.7	60 - 125	
72 Ge	1030097.2	0.24	1114306.40	92.4	60 - 125	
115 In	6062588.5	0.79	7180580.50	84.4	60 - 125	
159 Tb	7927028.0	1.25	8719993.00	90.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Nnumber of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7080

ICS-AB QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13014.D\F6D13014.D#
Date Acquired:	Apr 24 2015 01:12 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	ICSAB
Misc Info:	
Vial Number:	1304
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	ICS-AB
Dilution Factor:	1.00

QC Elements

Element	Conc.		CPS	Conc RSD(%)	Expected	QC Range(%)	Flag
7 Li	20.04	ppb	251476.2	1.27	20.00	80 - 120	
9 Be	18.84	ppb	76785.6	0.92	20.00	80 - 120	
11 B	18.46	ppb	58180.6	1.17	20.00	80 - 120	
23 Na	97430.00	ppb	631053820.0	1.02	100000.00	80 - 120	
24 Mg	93310.00	ppb	1489906900.0	0.84	100000.00	80 - 120	
27 Al	92170.00	ppb	2037813000.0	0.82	100000.00	80 - 120	
28 Si	212.60	ppb	449572.5	1.03	200.00	80 - 120	
31 P	100500.00	ppb	132710300.0	0.25	100000.00	80 - 120	
39 K	98200.00	ppb	159371900.0	0.78	100000.00	80 - 120	
40 Ca	98950.00	ppb	1398194900.0	2.05	100000.00	80 - 120	
47 Ti	2047.00	ppb	6037800.0	0.45	2000.00	80 - 120	
51 V	20.03	ppb	211873.9	0.98	20.00	80 - 120	
52 Cr	19.80	ppb	244670.5	0.86	20.00	80 - 120	
55 Mn	18.65	ppb	964665.8	0.74	20.00	80 - 120	
56 Fe	98360.00	ppb	2087485100.0	0.21	100000.00	80 - 120	
59 Co	18.31	ppb	781534.7	0.83	20.00	80 - 120	
60 Ni	17.76	ppb	78303.0	0.95	20.00	80 - 120	
63 Cu	17.22	ppb	198327.4	1.17	20.00	80 - 120	
66 Zn	20.22	ppb	131778.4	1.05	20.00	80 - 120	
75 As	20.36	ppb	38256.9	1.50	20.00	80 - 120	
78 Se	21.40	ppb	17199.0	0.30	20.00	80 - 120	
88 Sr	18.12	ppb	1140664.0	0.33	20.00	80 - 120	
90 Zr	7.42	ppb	401466.9	0.92	20.00	80 - 120	Fail
95 Mo	1964.00	ppb	20000250.0	0.55	2000.00	80 - 120	
107 Ag	18.58	ppb	479677.8	0.37	20.00	80 - 120	
111 Cd	18.83	ppb	113289.9	1.10	20.00	80 - 120	
118 Sn	20.21	ppb	311714.5	0.49	20.00	80 - 120	
121 Sb	20.50	ppb	435636.8	0.06	20.00	80 - 120	
137 Ba	20.05	ppb	157062.5	0.41	20.00	80 - 120	
182 W	20.08	ppb	355310.5	0.87	20.00	80 - 120	
205 Tl	18.68	ppb	724395.5	1.39	20.00	80 - 120	
208 Pb	18.83	ppb	1000627.0	1.32	20.00	80 - 120	
235 U	0.14	ppb	7783.7	4.37	0.14	80 - 120	
238 U	20.03	ppb	1048012.0	1.02	19.86	80 - 120	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	916865.6	0.18	1159752.60	79.1	60 - 125	
45 Sc	2301169.3	2.13	2567033.50	89.6	60 - 125	
45 Sc	557306.1	0.80	613402.44	90.9	60 - 125	
45 Sc	4134622.5	0.88	4679393.50	88.4	60 - 125	
72 Ge	615344.8	0.67	704157.69	87.4	60 - 125	
72 Ge	290569.2	0.66	321292.31	90.4	60 - 125	
72 Ge	1046936.6	0.24	1114306.40	94.0	60 - 125	
115 In	6009222.5	0.07	7180580.50	83.7	60 - 125	
159 Tb	7899135.0	1.15	8719993.00	90.6	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

1 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13015.D\F6D13015.D#
Date Acquired:	Apr 24 2015 01:16 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	MRLD2403
Misc Info:	500 ppb CAT
Vial Number:	1207
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	69477.4	0.0000	-0.0663	ppb	116.94	225.00	
9 Be	# 3	45	25.6	0.0000	-0.0018	ppb	107.08	225.00	
11 B	# 3	45	4185.2	0.0000	-0.5138	ppb	10.73	225.00	
23 Na	# 1	45	3812299.0	0.0000	507.2000	ppb	2.52	269999.99	
24 Mg	# 3	45	8744196.0	0.0000	505.3000	ppb	0.99	269999.99	
27 Al	# 3	45	11854930.0	0.0000	494.9000	ppb	0.90	90000.00	
28 Si	# 1	45	2342.5	0.0000	0.2878	ppb	5.18	18000.00	
31 P	# 3	45	25333.7	0.0000	-1.7810	ppb	4.13	359999.99	
39 K	# 2	45	1075587.0	0.0000	519.3000	ppb	0.50	269999.99	
40 Ca	# 1	45	8078702.0	0.0000	526.1000	ppb	1.30	269999.99	
47 Ti	# 3	45	484.5	0.0000	0.0994	ppb	9.98	2700.00	
51 V	# 2	45	5264.8	0.0000	-0.0261	ppb	77.68	2700.00	
52 Cr	# 2	45	1574.1	0.0000	-0.0275	ppb	4.93	2700.00	
55 Mn	# 3	45	3799.5	0.0000	0.0245	ppb	14.59	2700.00	
56 Fe	# 1	45	12526890.0	0.0000	546.1000	ppb	1.66	90000.00	
59 Co	# 3	45	375.6	0.0000	0.0019	ppb	29.72	2700.00	
60 Ni	# 2	45	146.7	0.0000	0.0022	ppb	76.90	2700.00	
63 Cu	# 2	45	506.5	0.0000	0.0144	ppb	9.75	2700.00	
66 Zn	# 3	72	1244.5	0.0000	0.0831	ppb	8.28	2700.00	
75 As	# 2	72	173.8	0.0000	-0.0130	ppb	24.36	2700.00	
78 Se	# 1	72	10.0	0.0000	-0.0003	ppb	870.94	2700.00	
88 Sr	# 3	72	1244.5	0.0000	0.0077	ppb	14.89	2700.00	
90 Zr	# 3	72	400.0	0.0000	-0.0104	ppb	5.26	1800.00	
95 Mo	# 3	115	17095.4	0.0000	1.3880	ppb	10.46	2700.00	
107 Ag	# 3	115	123.3	0.0000	0.0011	ppb	41.99	225.00	
111 Cd	# 3	115	25.7	0.0000	-0.0021	ppb	60.20	2700.00	
118 Sn	# 3	115	243.3	0.0000	0.0043	ppb	44.57	2700.00	
121 Sb	# 3	115	800.1	0.0000	-0.0033	ppb	48.61	2700.00	
137 Ba	# 3	115	121.1	0.0000	0.0022	ppb	55.73	2700.00	
182 W	# 3	159	777.8	0.0000	0.0293	ppb	12.72	900.00	
205 Tl	# 3	159	268.9	0.0000	0.0035	ppb	30.20	2700.00	
208 Pb	# 3	159	535.6	0.0000	-0.0023	ppb	29.86	2700.00	
235 U	# 3	159	42.2	0.0000	0.0002	ppb	47.17	27.00	
238 U	# 3	159	264.5	0.0000	0.0034	ppb	14.21	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1052669.60	0.44	1159752.60	90.8	60 - 125	
45 Sc # 1	2486401.30	1.48	2567033.50	96.9	60 - 125	
45 Sc # 2	594671.25	0.69	613402.44	96.9	60 - 125	
45 Sc # 3	4478308.50	0.46	4679393.50	95.7	60 - 125	
72 Ge # 1	695801.94	0.56	704157.69	98.8	60 - 125	
72 Ge # 2	319288.19	0.19	321292.31	99.4	60 - 125	
72 Ge # 3	1081293.80	1.10	1114306.40	97.0	60 - 125	
115 In # 3	7209493.00	0.52	7180580.50	100.4	60 - 125	
159 Tb # 3	9064649.00	2.25	8719993.00	104.0	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7082

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13016.D\F6D13016.D#
Date Acquired: Apr 24 2015 01:21 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: MRLD2402
Misc Info: 0.5/50/4 ppb
Vial Number: 1306
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	72893.6	0.0000	0.4761	ppb	19.96	225.00	
9 Be	# 3	45	2130.2	0.0000	0.4853	ppb	10.77	225.00	
11 B	# 3	45	5210.0	0.0000	-0.1488	ppb	46.91	225.00	
23 Na	# 1	45	590051.9	0.0000	47.4200	ppb	3.01	269999.99	
24 Mg	# 3	45	884098.9	0.0000	51.8200	ppb	2.79	269999.99	
27 Al	# 3	45	1188811.0	0.0000	50.4900	ppb	1.88	90000.00	
28 Si	# 1	45	2392.5	0.0000	0.3201	ppb	6.10	18000.00	
31 P	# 3	45	23138.9	0.0000	-2.9910	ppb	9.55	359999.99	
39 K	# 2	45	251641.8	0.0000	44.5700	ppb	1.44	269999.99	
40 Ca	# 1	45	852411.5	0.0000	53.4000	ppb	0.92	269999.99	
47 Ti	# 3	45	1825.7	0.0000	0.5308	ppb	3.34	2700.00	
51 V	# 2	45	11100.9	0.0000	0.5149	ppb	2.05	2700.00	
52 Cr	# 2	45	8267.7	0.0000	0.4910	ppb	1.48	2700.00	
55 Mn	# 3	45	29252.6	0.0000	0.4905	ppb	3.88	2700.00	
56 Fe	# 1	45	1291044.0	0.0000	56.6300	ppb	1.82	90000.00	
59 Co	# 3	45	23200.3	0.0000	0.5062	ppb	4.03	2700.00	
60 Ni	# 2	45	2505.8	0.0000	0.5104	ppb	0.88	2700.00	
63 Cu	# 2	45	6516.6	0.0000	0.5100	ppb	0.85	2700.00	
66 Zn	# 3	72	30191.2	0.0000	4.4930	ppb	3.00	2700.00	
75 As	# 2	72	1223.6	0.0000	0.5011	ppb	2.37	2700.00	
78 Se	# 1	72	465.8	0.0000	0.5064	ppb	0.17	2700.00	
88 Sr	# 3	72	31974.6	0.0000	0.4900	ppb	0.46	2700.00	
90 Zr	# 3	72	420.0	0.0000	-0.0099	ppb	3.57	1800.00	
95 Mo	# 3	115	9857.1	0.0000	0.8027	ppb	6.12	2700.00	
107 Ag	# 3	115	14848.4	0.0000	0.4809	ppb	2.94	225.00	
111 Cd	# 3	115	3527.8	0.0000	0.4876	ppb	2.02	2700.00	
118 Sn	# 3	115	9730.4	0.0000	0.5221	ppb	4.12	2700.00	
121 Sb	# 3	115	13846.2	0.0000	0.5144	ppb	2.93	2700.00	
137 Ba	# 3	115	4668.7	0.0000	0.4910	ppb	4.27	2700.00	
182 W	# 3	159	413.4	0.0000	0.0117	ppb	26.61	900.00	
205 Tl	# 3	159	22300.6	0.0000	0.5077	ppb	1.67	2700.00	
208 Pb	# 3	159	31468.2	0.0000	0.5146	ppb	1.55	2700.00	
235 U	# 3	159	236.7	0.0000	0.0033	ppb	0.92	27.00	
238 U	# 3	159	30876.6	0.0000	0.5226	ppb	1.36	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1017907.70	2.79	1159752.60	87.8	60 - 125	
45 Sc # 1	2461824.80	0.81	2567033.50	95.9	60 - 125	
45 Sc # 2	588230.63	0.23	613402.44	95.9	60 - 125	
45 Sc # 3	4390927.00	2.52	4679393.50	93.8	60 - 125	
72 Ge # 1	689434.63	1.52	704157.69	97.9	60 - 125	
72 Ge # 2	317567.03	1.03	321292.31	98.8	60 - 125	
72 Ge # 3	1061032.90	1.54	1114306.40	95.2	60 - 125	
115 In # 3	7144790.00	1.41	7180580.50	99.5	60 - 125	
159 Tb # 3	8903788.00	0.81	8719993.00	102.1	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7083

CCV QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13017.D\F6D13017.D#
Date Acquired: Apr 24 2015 01:25 pm
Operator: CCapul
Sample Name: CCV1
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:49 pm
Sample Type: CCV
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	Expected	QC Range(%)	Flag
7 Li	25.19 ppb	0.79	25.00	90 - 110	
9 Be	24.57 ppb	1.67	25.00	90 - 110	
11 B	24.19 ppb	1.21	25.00	90 - 110	
23 Na	1228.00 ppb	1.56	1250.00	90 - 110	
24 Mg	2444.00 ppb	1.66	2500.00	90 - 110	
27 Al	2444.00 ppb	1.55	2500.00	90 - 110	
28 Si	2450.00 ppb	1.32	2500.00	90 - 110	
31 P	246.80 ppb	0.60	250.00	90 - 110	
39 K	2524.00 ppb	1.42	2500.00	90 - 110	
40 Ca	2483.00 ppb	1.96	2500.00	90 - 110	
47 Ti	24.95 ppb	0.47	25.00	90 - 110	
51 V	25.49 ppb	0.27	25.00	90 - 110	
52 Cr	24.94 ppb	0.66	25.00	90 - 110	
55 Mn	23.65 ppb	0.72	25.00	90 - 110	
56 Fe	2579.00 ppb	0.74	2500.00	90 - 110	
59 Co	23.33 ppb	1.66	25.00	90 - 110	
60 Ni	24.81 ppb	0.35	25.00	90 - 110	
63 Cu	24.21 ppb	0.73	25.00	90 - 110	
66 Zn	50.33 ppb	0.50	50.00	90 - 110	
75 As	25.37 ppb	0.73	25.00	90 - 110	
78 Se	26.19 ppb	0.48	25.00	90 - 110	
88 Sr	24.80 ppb	0.95	25.00	90 - 110	
90 Zr	11.01 ppb	0.80	15.00	90 - 110	Fail
95 Mo	24.48 ppb	0.54	25.00	90 - 110	
107 Ag	25.22 ppb	1.51	25.00	90 - 110	
111 Cd	24.39 ppb	0.66	25.00	90 - 110	
118 Sn	25.68 ppb	1.77	25.00	90 - 110	
121 Sb	25.38 ppb	2.37	25.00	90 - 110	
137 Ba	25.16 ppb	1.08	25.00	90 - 110	
182 W	24.98 ppb	0.78	25.00	90 - 110	
205 Tl	25.08 ppb	0.44	25.00	90 - 110	
208 Pb	25.06 ppb	2.10	25.00	90 - 110	
235 U	0.18 ppb	0.43	0.18	90 - 110	
238 U	25.97 ppb	0.99	24.82	90 - 110	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	973197.19	1.21	1159752.60	83.9	60 - 125	
45 Sc	2400203.80	1.88	2567033.50	93.5	60 - 125	
45 Sc	562317.13	0.14	613402.44	91.7	60 - 125	
45 Sc	4315489.50	0.83	4679393.50	92.2	60 - 125	
72 Ge	651685.31	0.17	704157.69	92.5	60 - 125	
72 Ge	298629.25	0.95	321292.31	92.9	60 - 125	
72 Ge	1017331.30	1.52	1114306.40	91.3	60 - 125	
115 In	6709445.50	2.06	7180580.50	93.4	60 - 125	
159 Tb	8715661.00	1.72	8719993.00	100.0	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

CCB QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13018.D\F6D13018.D#
Date Acquired: Apr 24 2015 01:29 pm
Operator: CCapul
Sample Name: CCB1
Misc Info:
Vial Number: 1102
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:49 pm
Sample Type: CCB
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	High Limit	Flag
7 Li	-0.12 ppb	22.98	0.20	
9 Be	0.00 ppb	3333.60	0.10	
11 B	-0.59 ppb	14.08	5.00	
23 Na	-5.20 ppb	6.38	40.00	
24 Mg	0.55 ppb	4.43	10.00	
27 Al	0.45 ppb	0.35	20.00	
28 Si	0.42 ppb	5.48	20.00	
31 P	-3.34 ppb	9.00	10.00	
39 K	-11.79 ppb	8.72	20.00	
40 Ca	0.10 ppb	35.17	25.00	
47 Ti	0.00 ppb	1010.20	0.50	
51 V	0.01 ppb	103.83	0.50	
52 Cr	-0.02 ppb	15.12	0.20	
55 Mn	0.00 ppb	47.36	0.20	
56 Fe	1.29 ppb	9.63	10.00	
59 Co	0.00 ppb	20.22	0.20	
60 Ni	-0.01 ppb	23.51	0.20	
63 Cu	0.00 ppb	41.34	0.40	
66 Zn	-0.01 ppb	27.71	2.00	
75 As	0.00 ppb	530.62	0.20	
78 Se	0.00 ppb	240.36	0.20	
88 Sr	0.00 ppb	114.14	0.20	
90 Zr	-0.01 ppb	3.28	2.00	
95 Mo	0.08 ppb	6.63	0.40	
107 Ag	0.00 ppb	19.04	0.20	
111 Cd	0.00 ppb	95.84	0.20	
118 Sn	0.00 ppb	84.82	0.20	
121 Sb	0.01 ppb	36.45	0.40	
137 Ba	0.00 ppb	115.11	0.20	
182 W	0.01 ppb	7.57	1.00	
205 Tl	0.00 ppb	99.40	0.20	
208 Pb	0.00 ppb	22.68	0.10	
235 U	0.00 ppb	157.90	1.00	
238 U	0.00 ppb	42.26	0.10	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1007814.30	0.60	1159752.60	86.9	60 - 125	
45 Sc	2356411.50	0.47	2567033.50	91.8	60 - 125	
45 Sc	580982.19	0.63	613402.44	94.7	60 - 125	
45 Sc	4277583.00	1.26	4679393.50	91.4	60 - 125	
72 Ge	673790.63	0.28	704157.69	95.7	60 - 125	
72 Ge	312240.19	0.44	321292.31	97.2	60 - 125	
72 Ge	1051060.40	0.77	1114306.40	94.3	60 - 125	
115 In	7039805.00	0.81	7180580.50	98.0	60 - 125	
159 Tb	8972912.00	0.65	8719993.00	102.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

CCB QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13019.D\F6D13019.D#
Date Acquired: Apr 24 2015 01:33 pm
Operator: CCapul
Sample Name: IMD028SB
Misc Info:
Vial Number: 2101
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:49 pm
Sample Type: MBS
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	High Limit	Flag
7 Li	0.00 ppb	6582.60	0.50	
9 Be	0.00 ppb	50.02	0.50	
11 B	-0.66 ppb	3.77	10.00	
23 Na	-3.42 ppb	9.66	100.00	
24 Mg	1.19 ppb	2.59	100.00	
27 Al	1.89 ppb	1.79	100.00	
28 Si	1.58 ppb	2.83	50.00	
31 P	5.27 ppb	7.66	10.00	
39 K	-10.12 ppb	14.89	100.00	
40 Ca	7.30 ppb	1.26	100.00	
47 Ti	0.04 ppb	5.78	0.50	
51 V	-0.17 ppb	5.07	0.50	
52 Cr	-0.02 ppb	5.29	0.50	
55 Mn	0.02 ppb	7.63	0.50	
56 Fe	1.47 ppb	3.96	100.00	
59 Co	0.00 ppb	32.37	0.50	
60 Ni	0.04 ppb	1.30	0.50	
63 Cu	0.05 ppb	1.37	0.50	
66 Zn	0.47 ppb	1.50	2.00	
75 As	-0.03 ppb	5.51	0.50	
78 Se	0.00 ppb	115.13	0.50	
88 Sr	0.01 ppb	10.17	0.50	
90 Zr	-0.01 ppb	7.37	5.00	
95 Mo	0.07 ppb	10.96	0.50	
107 Ag	0.00 ppb	81.53	0.50	
111 Cd	0.00 ppb	24.08	0.50	
118 Sn	3.73 ppb	0.64	20.00	
121 Sb	0.00 ppb	60.61	0.50	
137 Ba	0.02 ppb	3.47	0.50	
182 W	0.01 ppb	18.70	2.00	
205 Tl	0.00 ppb	133.48	0.50	
208 Pb	0.00 ppb	69.80	0.50	
235 U	0.00 ppb	570.39	#VALUE!	
238 U	0.00 ppb	23.64	0.50	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1033455.10	2.21	1159752.60	89.1	60 - 125	
45 Sc	2386840.50	0.81	2567033.50	93.0	60 - 125	
45 Sc	586899.75	1.40	613402.44	95.7	60 - 125	
45 Sc	4449533.50	0.91	4679393.50	95.1	60 - 125	
72 Ge	655326.06	1.00	704157.69	93.1	60 - 125	
72 Ge	313942.94	1.02	321292.31	97.7	60 - 125	
72 Ge	1069200.30	0.65	1114306.40	96.0	60 - 125	
115 In	7100192.50	0.93	7180580.50	98.9	60 - 125	
159 Tb	9088066.00	1.54	8719993.00	104.2	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

LCS QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13020.D\F6D13020.D#
Date Acquired:	Apr 24 2015 01:38 pm
Operator:	CCapul
Sample Name:	IMD028SL
Misc Info:	
Vial Number:	2102
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	LCSS
Final Dil Factor:	1.00

Analyte Elements

Element	CPS Mean	Conc.		RSD(%)	Expected	QC Range(%)	Flag
7 Li	630705.13	53.19	ppb	1.13	50.00	80 - 120	
9 Be	223020.50	51.38	ppb	1.65	50.00	80 - 120	
11 B	162472.30	51.43	ppb	0.84	50.00	80 - 120	
23 Na	34825112.00	4943.00	ppb	1.78	5000.00	80 - 120	
24 Mg	86183912.00	5067.00	ppb	1.26	5000.00	80 - 120	
27 Al	116112100.00	4930.00	ppb	0.75	5000.00	80 - 120	
28 Si	5017.69	1.46	ppb	5.92	5000.00	80 - 120	Fail
31 P	36686.38	6.59	ppb	3.77	500.00	80 - 120	Fail
39 K	8849985.00	5088.00	ppb	1.57	5000.00	80 - 120	
40 Ca	78729248.00	5156.00	ppb	0.83	5000.00	80 - 120	
47 Ti	160022.59	50.88	ppb	1.66	50.00	80 - 120	
51 V	584072.19	53.32	ppb	0.47	50.00	80 - 120	
52 Cr	660306.00	51.06	ppb	0.81	50.00	80 - 120	
55 Mn	2710436.00	49.26	ppb	2.04	50.00	80 - 120	
56 Fe	121406100.00	5298.00	ppb	0.08	5000.00	80 - 120	
59 Co	2213929.00	48.72	ppb	2.81	50.00	80 - 120	
60 Ni	231665.80	50.03	ppb	0.81	50.00	80 - 120	
63 Cu	584527.13	48.30	ppb	0.56	50.00	80 - 120	
66 Zn	663569.19	102.00	ppb	0.83	100.00	80 - 120	
75 As	100589.60	51.03	ppb	0.67	50.00	80 - 120	
78 Se	45348.28	51.07	ppb	0.76	50.00	80 - 120	
88 Sr	3117448.00	49.41	ppb	0.64	50.00	80 - 120	
90 Zr	7783.52	0.13	ppb	3.05	30.00	80 - 120	Fail
95 Mo	580957.81	49.97	ppb	1.21	50.00	80 - 120	
107 Ag	1458255.00	49.47	ppb	1.47	50.00	80 - 120	
111 Cd	330688.50	48.14	ppb	1.11	50.00	80 - 120	
118 Sn	970076.00	55.09	ppb	0.87	50.00	80 - 120	
121 Sb	1212830.00	50.03	ppb	1.55	50.00	80 - 120	
137 Ba	455663.69	50.96	ppb	2.48	50.00	80 - 120	
182 W	1032.30	0.04	ppb	7.05	50.00	80 - 120	Fail
205 Tl	2156868.00	49.77	ppb	0.79	50.00	80 - 120	
208 Pb	2947550.00	49.64	ppb	1.11	50.00	80 - 120	
235 U	22683.94	0.36	ppb	0.65	0.35	80 - 120	
238 U	3053593.00	52.21	ppb	0.76	49.65	80 - 120	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1021071.00	1.34	1159752.60	88.0	60 - 125	
45 Sc	2484691.30	1.36	2567033.50	96.8	60 - 125	
45 Sc	586086.44	0.68	613402.44	95.5	60 - 125	
45 Sc	4404606.50	1.21	4679393.50	94.1	60 - 125	
72 Ge	680243.63	0.48	704157.69	96.6	60 - 125	
72 Ge	305671.38	0.50	321292.31	95.1	60 - 125	
72 Ge	1049553.00	0.30	1114306.40	94.2	60 - 125	
115 In	6861544.50	0.60	7180580.50	95.6	60 - 125	
159 Tb	8830038.00	1.94	8719993.00	101.3	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

4 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

LCS QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13021.D\F6D13021.D#
Date Acquired:	Apr 24 2015 01:42 pm
Operator:	CCapul
Sample Name:	IMD028SC
Misc Info:	
Vial Number:	2103
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	LCSS
Final Dil Factor:	1.00

Analyte Elements

Element	CPS Mean	Conc.		RSD(%)	Expected	QC Range(%)	Flag
7 Li	634384.81	52.97	ppb	1.11	50.00	80 - 120	
9 Be	223756.20	51.84	ppb	0.93	50.00	80 - 120	
11 B	162757.91	51.83	ppb	2.54	50.00	80 - 120	
23 Na	35636140.00	5016.00	ppb	0.50	5000.00	80 - 120	
24 Mg	86142752.00	5093.00	ppb	1.56	5000.00	80 - 120	
27 Al	115647600.00	4938.00	ppb	0.31	5000.00	80 - 120	
28 Si	5684.62	1.74	ppb	0.31	5000.00	80 - 120	Fail
31 P	37133.26	7.06	ppb	8.57	500.00	80 - 120	Fail
39 K	8964536.00	5152.00	ppb	0.63	5000.00	80 - 120	
40 Ca	79102952.00	5137.00	ppb	0.07	5000.00	80 - 120	
47 Ti	158130.09	50.55	ppb	0.09	50.00	80 - 120	
51 V	583107.81	53.19	ppb	0.96	50.00	80 - 120	
52 Cr	650761.13	50.28	ppb	1.51	50.00	80 - 120	
55 Mn	2668205.00	48.76	ppb	0.20	50.00	80 - 120	
56 Fe	122662100.00	5308.00	ppb	0.86	5000.00	80 - 120	
59 Co	2179204.00	48.21	ppb	1.14	50.00	80 - 120	
60 Ni	231915.70	50.05	ppb	0.61	50.00	80 - 120	
63 Cu	583348.81	48.18	ppb	0.35	50.00	80 - 120	
66 Zn	655624.31	100.50	ppb	0.49	100.00	80 - 120	
75 As	100681.10	50.85	ppb	0.18	50.00	80 - 120	
78 Se	45497.69	51.01	ppb	0.59	50.00	80 - 120	
88 Sr	3143163.00	49.68	ppb	0.31	50.00	80 - 120	
90 Zr	7359.95	0.12	ppb	2.21	30.00	80 - 120	Fail
95 Mo	580363.50	49.83	ppb	2.07	50.00	80 - 120	
107 Ag	1444916.00	48.93	ppb	1.32	50.00	80 - 120	
111 Cd	329886.19	47.94	ppb	0.85	50.00	80 - 120	
118 Sn	967420.88	54.84	ppb	0.76	50.00	80 - 120	
121 Sb	1203556.00	49.56	ppb	1.00	50.00	80 - 120	
137 Ba	448837.81	50.10	ppb	1.02	50.00	80 - 120	
182 W	1051.19	0.04	ppb	9.19	50.00	80 - 120	Fail
205 Tl	2152004.00	49.82	ppb	1.02	50.00	80 - 120	
208 Pb	2947758.00	49.80	ppb	0.89	50.00	80 - 120	
235 U	22587.13	0.36	ppb	1.46	0.35	80 - 120	
238 U	3042318.00	52.19	ppb	0.52	49.65	80 - 120	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1030852.90	1.26	1159752.60	88.9	60 - 125	
45 Sc	2505710.30	0.65	2567033.50	97.6	60 - 125	
45 Sc	586452.88	0.33	613402.44	95.6	60 - 125	
45 Sc	4379755.50	0.61	4679393.50	93.6	60 - 125	
72 Ge	683321.94	0.41	704157.69	97.0	60 - 125	
72 Ge	306993.44	0.37	321292.31	95.5	60 - 125	
72 Ge	1052381.80	0.45	1114306.40	94.4	60 - 125	
115 In	6874549.50	1.51	7180580.50	95.7	60 - 125	
159 Tb	8800935.00	0.41	8719993.00	100.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

4 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13022.D\F6D13022.D#
Date Acquired: Apr 24 2015 01:46 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-01
Misc Info:
Vial Number: 2104
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	305180.8	0.0000	22.4400	ppb	2.87	225.00	
9 Be	# 3	45	2912.6	0.0000	0.5984	ppb	7.31	225.00	
11 B	# 3	45	24523.1	0.0000	5.4020	ppb	2.87	225.00	
23 Na	# 1	45	3738873.0	0.0000	446.1000	ppb	1.94	269999.99	
24 Mg	# 3	45	120411500.0	0.0000	6394.0000	ppb	0.67	269999.99	
27 Al	# 3	45	741662020.0	0.0000	28440.0000	ppb	1.05	90000.00	
28 Si	# 1	45	3741252.0	0.0000	1487.0000	ppb	0.68	18000.00	
31 P	# 3	45	111985.9	0.0000	52.4300	ppb	2.31	359999.99	
39 K	# 2	45	5926416.0	0.0000	2965.0000	ppb	0.27	269999.99	
40 Ca	# 1	45	46253488.0	0.0000	2739.0000	ppb	1.40	269999.99	
47 Ti	# 3	45	5938559.0	0.0000	1707.0000	ppb	0.35	2700.00	
51 V	# 2	45	1027993.0	0.0000	83.0900	ppb	1.88	2700.00	
52 Cr	# 2	45	341945.6	0.0000	23.2500	ppb	0.82	2700.00	
55 Mn	# 3	45	28478820.0	0.0000	467.8000	ppb	0.90	2700.00	
56 Fe	# 1	45	907096000.0	0.0000	35810.0000	ppb	1.12	90000.00	
59 Co	# 3	45	539360.6	0.0000	10.7100	ppb	0.63	2700.00	
60 Ni	# 2	45	47719.3	0.0000	9.0700	ppb	0.43	2700.00	
63 Cu	# 2	45	155656.3	0.0000	11.3300	ppb	0.65	2700.00	
66 Zn	# 3	72	341635.3	0.0000	50.7000	ppb	0.68	2700.00	
75 As	# 2	72	5690.3	0.0000	2.6890	ppb	0.89	2700.00	
78 Se	# 1	72	136.9	0.0000	0.1429	ppb	9.48	2700.00	
88 Sr	# 3	72	1554571.0	0.0000	23.8100	ppb	0.62	2700.00	
90 Zr	# 3	72	92438.3	0.0000	1.6330	ppb	1.31	1800.00	
95 Mo	# 3	115	4771.0	0.0000	0.4022	ppb	4.19	2700.00	
107 Ag	# 3	115	1354.6	0.0000	0.0435	ppb	6.88	225.00	
111 Cd	# 3	115	2589.3	0.0000	0.3750	ppb	1.73	2700.00	
118 Sn	# 3	115	97711.8	0.0000	5.5940	ppb	0.51	2700.00	
121 Sb	# 3	115	5057.8	0.0000	0.1761	ppb	4.23	2700.00	
137 Ba	# 3	115	1601704.0	0.0000	180.9000	ppb	0.74	2700.00	
182 W	# 3	159	930.1	0.0000	0.0377	ppb	10.47	900.00	
205 Tl	# 3	159	23146.4	0.0000	0.5280	ppb	0.42	2700.00	
208 Pb	# 3	159	477015.5	0.0000	7.9700	ppb	0.39	2700.00	
235 U	# 3	159	837.8	0.0000	0.0129	ppb	1.35	27.00	
238 U	# 3	159	110766.1	0.0000	1.8810	ppb	1.65	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1020312.40	1.41	1159752.60	88.0	60 - 125	
45 Sc # 1	2746831.80	1.93	2567033.50	107.0	60 - 125	
45 Sc # 2	664119.06	0.31	613402.44	108.3	60 - 125	
45 Sc # 3	4876334.00	0.98	4679393.50	104.2	60 - 125	
72 Ge # 1	679986.38	0.87	704157.69	96.6	60 - 125	
72 Ge # 2	317180.44	0.80	321292.31	98.7	60 - 125	
72 Ge # 3	1086027.80	0.91	1114306.40	97.5	60 - 125	
115 In # 3	6796467.50	0.79	7180580.50	94.7	60 - 125	
159 Tb # 3	8889410.00	1.30	8719993.00	101.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

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Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13023.D\F6D13023.D#
Date Acquired:	Apr 24 2015 01:50 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-02
Misc Info:	
Vial Number:	2105
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	288275.2	0.0000	20.6500	ppb	0.86	225.00	
9 Be	# 3	45	2847.0	0.0000	0.5793	ppb	2.68	225.00	
11 B	# 3	45	22627.8	0.0000	4.7770	ppb	2.04	225.00	
23 Na	# 1	45	4064025.0	0.0000	482.6000	ppb	0.68	269999.99	
24 Mg	# 3	45	137672400.0	0.0000	7241.0000	ppb	0.61	269999.99	
27 Al	# 3	45	728247300.0	0.0000	27660.0000	ppb	0.73	90000.00	
28 Si	# 1	45	4321210.0	0.0000	1700.0000	ppb	1.38	18000.00	
31 P	# 3	45	199545.6	0.0000	107.4000	ppb	1.58	359999.99	
39 K	# 2	45	7836984.0	0.0000	3970.0000	ppb	0.22	269999.99	
40 Ca	# 1	45	51814320.0	0.0000	3037.0000	ppb	1.09	269999.99	
47 Ti	# 3	45	7097003.0	0.0000	2021.0000	ppb	0.56	2700.00	
51 V	# 2	45	1160569.0	0.0000	94.2600	ppb	0.19	2700.00	
52 Cr	# 2	45	417935.2	0.0000	28.5700	ppb	0.22	2700.00	
55 Mn	# 3	45	39818100.0	0.0000	647.9000	ppb	1.04	2700.00	
56 Fe	# 1	45	1337140000.0	0.0000	52240.0000	ppb	1.01	90000.00	
59 Co	# 3	45	719658.2	0.0000	14.1600	ppb	0.15	2700.00	
60 Ni	# 2	45	67624.3	0.0000	12.9200	ppb	0.67	2700.00	
63 Cu	# 2	45	301690.5	0.0000	22.0800	ppb	0.52	2700.00	
66 Zn	# 3	72	1172295.0	0.0000	170.0000	ppb	1.59	2700.00	
75 As	# 2	72	9784.0	0.0000	4.6370	ppb	0.10	2700.00	
78 Se	# 1	72	154.9	0.0000	0.1628	ppb	6.92	2700.00	
88 Sr	# 3	72	1717288.0	0.0000	25.6600	ppb	0.23	2700.00	
90 Zr	# 3	72	103983.3	0.0000	1.7930	ppb	1.28	1800.00	
95 Mo	# 3	115	10585.5	0.0000	0.9068	ppb	1.77	2700.00	
107 Ag	# 3	115	2401.4	0.0000	0.0793	ppb	4.18	225.00	
111 Cd	# 3	115	2855.5	0.0000	0.4141	ppb	3.94	2700.00	
118 Sn	# 3	115	409531.8	0.0000	23.4700	ppb	1.21	2700.00	
121 Sb	# 3	115	12210.2	0.0000	0.4740	ppb	2.74	2700.00	
137 Ba	# 3	115	1920079.0	0.0000	216.8000	ppb	3.05	2700.00	
182 W	# 3	159	1212.3	0.0000	0.0520	ppb	2.98	900.00	
205 Tl	# 3	159	25997.6	0.0000	0.5948	ppb	0.69	2700.00	
208 Pb	# 3	159	4445851.0	0.0000	74.5600	ppb	0.67	2700.00	
235 U	# 3	159	907.8	0.0000	0.0140	ppb	1.49	27.00	
238 U	# 3	159	117217.7	0.0000	1.9950	ppb	0.86	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1027478.90	0.86	1159752.60	88.6	60 - 125	
45 Sc # 1	2775350.50	1.15	2567033.50	108.1	60 - 125	
45 Sc # 2	661416.06	0.57	613402.44	107.8	60 - 125	
45 Sc # 3	4922890.00	0.36	4679393.50	105.2	60 - 125	
72 Ge # 1	681738.63	0.58	704157.69	96.8	60 - 125	
72 Ge # 2	321040.03	0.40	321292.31	99.9	60 - 125	
72 Ge # 3	1113301.90	0.65	1114306.40	99.9	60 - 125	
115 In # 3	6799960.50	2.13	7180580.50	94.7	60 - 125	
159 Tb # 3	8867747.00	0.84	8719993.00	101.7	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7090

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13024.D\F6D13024.D#
Date Acquired: Apr 24 2015 01:54 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-03
Misc Info:
Vial Number: 2106
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	237083.2	0.0000	16.4000	ppb	1.55	225.00	
9 Be	# 3	45	2151.3	0.0000	0.4679	ppb	7.16	225.00	
11 B	# 3	45	18862.5	0.0000	4.0720	ppb	2.50	225.00	
23 Na	# 1	45	3034686.0	0.0000	380.9000	ppb	0.11	269999.99	
24 Mg	# 3	45	96309352.0	0.0000	5432.0000	ppb	1.02	269999.99	
27 Al	# 3	45	791345600.0	0.0000	32240.0000	ppb	0.98	90000.00	
28 Si	# 1	45	4352953.0	0.0000	1845.0000	ppb	0.16	18000.00	
31 P	# 3	45	132124.0	0.0000	70.6300	ppb	0.61	359999.99	
39 K	# 2	45	4980376.0	0.0000	2637.0000	ppb	0.64	269999.99	
40 Ca	# 1	45	36051872.0	0.0000	2276.0000	ppb	1.59	269999.99	
47 Ti	# 3	45	5214327.0	0.0000	1592.0000	ppb	0.78	2700.00	
51 V	# 2	45	926983.7	0.0000	79.6000	ppb	0.80	2700.00	
52 Cr	# 2	45	343888.0	0.0000	24.8600	ppb	0.22	2700.00	
55 Mn	# 3	45	30019390.0	0.0000	523.8000	ppb	0.67	2700.00	
56 Fe	# 1	45	1063242000.0	0.0000	44760.0000	ppb	0.53	90000.00	
59 Co	# 3	45	505202.0	0.0000	10.6600	ppb	1.43	2700.00	
60 Ni	# 2	45	56948.9	0.0000	11.5100	ppb	0.83	2700.00	
63 Cu	# 2	45	278643.0	0.0000	21.5800	ppb	0.70	2700.00	
66 Zn	# 3	72	506397.7	0.0000	76.2600	ppb	1.00	2700.00	
75 As	# 2	72	7883.3	0.0000	3.8940	ppb	1.12	2700.00	
78 Se	# 1	72	117.3	0.0000	0.1273	ppb	6.34	2700.00	
88 Sr	# 3	72	1237116.0	0.0000	19.2100	ppb	1.93	2700.00	
90 Zr	# 3	72	88720.9	0.0000	1.5890	ppb	2.69	1800.00	
95 Mo	# 3	115	10468.7	0.0000	0.9100	ppb	0.78	2700.00	
107 Ag	# 3	115	2631.5	0.0000	0.0885	ppb	1.49	225.00	
111 Cd	# 3	115	2222.2	0.0000	0.3257	ppb	5.67	2700.00	
118 Sn	# 3	115	117700.0	0.0000	6.8360	ppb	0.46	2700.00	
121 Sb	# 3	115	10396.5	0.0000	0.4048	ppb	2.32	2700.00	
137 Ba	# 3	115	1396355.0	0.0000	159.9000	ppb	1.64	2700.00	
182 W	# 3	159	951.2	0.0000	0.0403	ppb	9.61	900.00	
205 Tl	# 3	159	18463.5	0.0000	0.4336	ppb	0.79	2700.00	
208 Pb	# 3	159	756587.6	0.0000	13.0400	ppb	2.05	2700.00	
235 U	# 3	159	672.3	0.0000	0.0106	ppb	9.05	27.00	
238 U	# 3	159	94817.1	0.0000	1.6590	ppb	1.66	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1002326.00	2.56	1159752.60	86.4	60 - 125	
45 Sc # 1	2575743.00	0.29	2567033.50	100.3	60 - 125	
45 Sc # 2	624952.75	0.09	613402.44	101.9	60 - 125	
45 Sc # 3	4590695.50	0.56	4679393.50	98.1	60 - 125	
72 Ge # 1	648729.81	0.28	704157.69	92.1	60 - 125	
72 Ge # 2	306825.19	0.43	321292.31	95.5	60 - 125	
72 Ge # 3	1070961.90	0.29	1114306.40	96.1	60 - 125	
115 In # 3	6701301.00	0.40	7180580.50	93.3	60 - 125	
159 Tb # 3	8624957.00	1.49	8719993.00	98.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7091

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13025.D\F6D13025.D#
Date Acquired: Apr 24 2015 01:59 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-04
Misc Info:
Vial Number: 2107
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	207192.9	0.0000	14.0200	ppb	2.14	225.00	
9 Be	# 3	45	1933.5	0.0000	0.4032	ppb	2.67	225.00	
11 B	# 3	45	29179.3	0.0000	6.9600	ppb	2.54	225.00	
23 Na	# 1	45	2971125.0	0.0000	365.9000	ppb	1.38	269999.99	
24 Mg	# 3	45	93688464.0	0.0000	5078.0000	ppb	1.75	269999.99	
27 Al	# 3	45	1140146900.0	0.0000	44640.0000	ppb	1.41	90000.00	
28 Si	# 1	45	4561344.0	0.0000	1904.0000	ppb	1.29	18000.00	
31 P	# 3	45	146953.7	0.0000	76.8400	ppb	1.36	359999.99	
39 K	# 2	45	5066605.0	0.0000	2691.0000	ppb	1.13	269999.99	
40 Ca	# 1	45	32757880.0	0.0000	2036.0000	ppb	1.41	269999.99	
47 Ti	# 3	45	5005701.0	0.0000	1468.0000	ppb	0.87	2700.00	
51 V	# 2	45	905672.9	0.0000	77.9300	ppb	1.11	2700.00	
52 Cr	# 2	45	287005.4	0.0000	20.7700	ppb	1.61	2700.00	
55 Mn	# 3	45	19724690.0	0.0000	330.7000	ppb	0.50	2700.00	
56 Fe	# 1	45	932746300.0	0.0000	38660.0000	ppb	0.72	90000.00	
59 Co	# 3	45	497324.3	0.0000	10.0800	ppb	1.15	2700.00	
60 Ni	# 2	45	45294.4	0.0000	9.1700	ppb	1.26	2700.00	
63 Cu	# 2	45	432168.6	0.0000	33.5600	ppb	0.54	2700.00	
66 Zn	# 3	72	688708.8	0.0000	102.5000	ppb	1.10	2700.00	
75 As	# 2	72	7072.4	0.0000	3.4520	ppb	0.82	2700.00	
78 Se	# 1	72	159.3	0.0000	0.1752	ppb	2.31	2700.00	
88 Sr	# 3	72	1383729.0	0.0000	21.2400	ppb	0.85	2700.00	
90 Zr	# 3	72	109795.4	0.0000	1.9470	ppb	0.59	1800.00	
95 Mo	# 3	115	8497.3	0.0000	0.7395	ppb	1.15	2700.00	
107 Ag	# 3	115	3086.0	0.0000	0.1048	ppb	4.05	225.00	
111 Cd	# 3	115	2749.8	0.0000	0.4060	ppb	6.14	2700.00	
118 Sn	# 3	115	136526.1	0.0000	7.9650	ppb	0.63	2700.00	
121 Sb	# 3	115	11411.7	0.0000	0.4497	ppb	3.73	2700.00	
137 Ba	# 3	115	1363094.0	0.0000	156.8000	ppb	1.28	2700.00	
182 W	# 3	159	1320.1	0.0000	0.0576	ppb	2.85	900.00	
205 Tl	# 3	159	17871.5	0.0000	0.4091	ppb	1.82	2700.00	
208 Pb	# 3	159	1111373.0	0.0000	18.6700	ppb	0.29	2700.00	
235 U	# 3	159	751.2	0.0000	0.0115	ppb	2.78	27.00	
238 U	# 3	159	97556.2	0.0000	1.6640	ppb	1.92	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	977982.25	2.84	1159752.60	84.3	60 - 125	
45 Sc # 1	2615834.50	0.92	2567033.50	101.9	60 - 125	
45 Sc # 2	623603.94	0.88	613402.44	101.7	60 - 125	
45 Sc # 3	4777177.00	1.27	4679393.50	102.1	60 - 125	
72 Ge # 1	654737.19	1.26	704157.69	93.0	60 - 125	
72 Ge # 2	309548.50	0.22	321292.31	96.3	60 - 125	
72 Ge # 3	1083657.30	0.91	1114306.40	97.2	60 - 125	
115 In # 3	6672950.50	0.79	7180580.50	92.9	60 - 125	
159 Tb # 3	8845489.00	0.47	8719993.00	101.4	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7092

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13026.D\F6D13026.D#
Date Acquired:	Apr 24 2015 02:03 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-05
Misc Info:	
Vial Number:	2108
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	215115.1	0.0000	14.2700	ppb	1.89	225.00	
9 Be	# 3	45	2131.3	0.0000	0.4487	ppb	3.51	225.00	
11 B	# 3	45	12132.0	0.0000	1.8330	ppb	9.24	225.00	
23 Na	# 1	45	2296246.0	0.0000	268.5000	ppb	2.37	269999.99	
24 Mg	# 3	45	121249000.0	0.0000	6624.0000	ppb	0.60	269999.99	
27 Al	# 3	45	647497020.0	0.0000	25550.0000	ppb	0.06	90000.00	
28 Si	# 1	45	3783577.0	0.0000	1550.0000	ppb	1.01	18000.00	
31 P	# 3	45	126649.4	0.0000	64.1900	ppb	0.67	359999.99	
39 K	# 2	45	7380231.0	0.0000	3859.0000	ppb	1.20	269999.99	
40 Ca	# 1	45	36295460.0	0.0000	2215.0000	ppb	0.92	269999.99	
47 Ti	# 3	45	7436069.0	0.0000	2199.0000	ppb	0.25	2700.00	
51 V	# 2	45	1111260.0	0.0000	93.2000	ppb	0.66	2700.00	
52 Cr	# 2	45	287583.5	0.0000	20.2600	ppb	0.15	2700.00	
55 Mn	# 3	45	22440110.0	0.0000	379.2000	ppb	0.37	2700.00	
56 Fe	# 1	45	860306300.0	0.0000	35010.0000	ppb	0.65	90000.00	
59 Co	# 3	45	567381.2	0.0000	11.6000	ppb	0.72	2700.00	
60 Ni	# 2	45	35259.1	0.0000	6.9430	ppb	0.69	2700.00	
63 Cu	# 2	45	132399.6	0.0000	9.9920	ppb	0.20	2700.00	
66 Zn	# 3	72	312657.6	0.0000	46.9600	ppb	0.47	2700.00	
75 As	# 2	72	6765.4	0.0000	3.2570	ppb	1.86	2700.00	
78 Se	# 1	72	131.1	0.0000	0.1388	ppb	3.96	2700.00	
88 Sr	# 3	72	1313898.0	0.0000	20.3700	ppb	0.75	2700.00	
90 Zr	# 3	72	87497.2	0.0000	1.5640	ppb	1.20	1800.00	
95 Mo	# 3	115	4944.4	0.0000	0.4199	ppb	2.06	2700.00	
107 Ag	# 3	115	1592.4	0.0000	0.0520	ppb	2.86	225.00	
111 Cd	# 3	115	2590.4	0.0000	0.3774	ppb	1.26	2700.00	
118 Sn	# 3	115	93042.9	0.0000	5.3580	ppb	1.99	2700.00	
121 Sb	# 3	115	5832.5	0.0000	0.2098	ppb	3.20	2700.00	
137 Ba	# 3	115	1251817.0	0.0000	142.2000	ppb	1.13	2700.00	
182 W	# 3	159	967.9	0.0000	0.0404	ppb	10.97	900.00	
205 Tl	# 3	159	24023.7	0.0000	0.5565	ppb	2.19	2700.00	
208 Pb	# 3	159	344429.3	0.0000	5.8390	ppb	0.86	2700.00	
235 U	# 3	159	883.4	0.0000	0.0138	ppb	4.08	27.00	
238 U	# 3	159	114325.9	0.0000	1.9700	ppb	2.09	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1003211.00	1.99	1159752.60	86.5	60 - 125	
45 Sc # 1	2664337.80	1.08	2567033.50	103.8	60 - 125	
45 Sc # 2	640436.69	0.60	613402.44	104.4	60 - 125	
45 Sc # 3	4739533.00	0.88	4679393.50	101.3	60 - 125	
72 Ge # 1	669142.44	1.17	704157.69	95.0	60 - 125	
72 Ge # 2	313333.28	0.52	321292.31	97.5	60 - 125	
72 Ge # 3	1072807.40	0.74	1114306.40	96.3	60 - 125	
115 In # 3	6756405.00	0.26	7180580.50	94.1	60 - 125	
159 Tb # 3	8757336.00	1.39	8719993.00	100.4	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7093

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13027.D\F6D13027.D#
Date Acquired: Apr 24 2015 02:07 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-06
Misc Info:
Vial Number: 2109
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	246320.2	0.0000	17.3100	ppb	1.20	225.00	
9 Be	# 3	45	2830.4	0.0000	0.5917	ppb	1.33	225.00	
11 B	# 3	45	14306.2	0.0000	2.4480	ppb	1.04	225.00	
23 Na	# 1	45	3349809.0	0.0000	411.2000	ppb	1.63	269999.99	
24 Mg	# 3	45	139672610.0	0.0000	7545.0000	ppb	0.77	269999.99	
27 Al	# 3	45	743152380.0	0.0000	29000.0000	ppb	0.83	90000.00	
28 Si	# 1	45	3450624.0	0.0000	1421.0000	ppb	1.51	18000.00	
31 P	# 3	45	111861.1	0.0000	53.5900	ppb	0.96	359999.99	
39 K	# 2	45	8091717.0	0.0000	4235.0000	ppb	0.76	269999.99	
40 Ca	# 1	45	41810980.0	0.0000	2565.0000	ppb	1.30	269999.99	
47 Ti	# 3	45	8082351.0	0.0000	2364.0000	ppb	0.13	2700.00	
51 V	# 2	45	1229649.0	0.0000	103.0000	ppb	1.37	2700.00	
52 Cr	# 2	45	343154.7	0.0000	24.1700	ppb	0.58	2700.00	
55 Mn	# 3	45	24631800.0	0.0000	411.6000	ppb	0.99	2700.00	
56 Fe	# 1	45	974145790.0	0.0000	39830.0000	ppb	0.36	90000.00	
59 Co	# 3	45	613152.1	0.0000	12.3900	ppb	2.37	2700.00	
60 Ni	# 2	45	41449.2	0.0000	8.1560	ppb	0.59	2700.00	
63 Cu	# 2	45	132315.3	0.0000	9.9720	ppb	0.40	2700.00	
66 Zn	# 3	72	353880.0	0.0000	53.5700	ppb	0.10	2700.00	
75 As	# 2	72	6880.3	0.0000	3.3540	ppb	0.65	2700.00	
78 Se	# 1	72	143.3	0.0000	0.1585	ppb	9.94	2700.00	
88 Sr	# 3	72	1501105.0	0.0000	23.4500	ppb	1.36	2700.00	
90 Zr	# 3	72	98315.2	0.0000	1.7730	ppb	1.63	1800.00	
95 Mo	# 3	115	5298.9	0.0000	0.4532	ppb	5.77	2700.00	
107 Ag	# 3	115	1466.8	0.0000	0.0479	ppb	5.69	225.00	
111 Cd	# 3	115	2678.6	0.0000	0.3925	ppb	7.50	2700.00	
118 Sn	# 3	115	97177.1	0.0000	5.6240	ppb	0.40	2700.00	
121 Sb	# 3	115	6478.4	0.0000	0.2382	ppb	4.51	2700.00	
137 Ba	# 3	115	1485825.0	0.0000	169.6000	ppb	0.27	2700.00	
182 W	# 3	159	1064.5	0.0000	0.0452	ppb	8.58	900.00	
205 Tl	# 3	159	28758.8	0.0000	0.6655	ppb	0.25	2700.00	
208 Pb	# 3	159	395273.1	0.0000	6.6910	ppb	0.84	2700.00	
235 U	# 3	159	994.5	0.0000	0.0156	ppb	7.15	27.00	
238 U	# 3	159	132764.1	0.0000	2.2840	ppb	0.72	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1001498.20	1.19	1159752.60	86.4	60 - 125	
45 Sc # 1	2651627.50	1.57	2567033.50	103.3	60 - 125	
45 Sc # 2	641320.38	0.25	613402.44	104.6	60 - 125	
45 Sc # 3	4792909.50	0.28	4679393.50	102.4	60 - 125	
72 Ge # 1	646868.94	0.22	704157.69	91.9	60 - 125	
72 Ge # 2	309671.03	0.92	321292.31	96.4	60 - 125	
72 Ge # 3	1064634.40	0.82	1114306.40	95.5	60 - 125	
115 In # 3	6724217.50	1.05	7180580.50	93.6	60 - 125	
159 Tb # 3	8771571.00	1.01	8719993.00	100.6	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

CCV QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13029.D\F6D13029.D#
Date Acquired: Apr 24 2015 02:16 pm
Operator: CCapul
Sample Name: CCV2
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:49 pm
Sample Type: CCV
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	Expected	QC Range(%)	Flag
7 Li	25.40 ppb	1.37	25.00	90 - 110	
9 Be	24.88 ppb	1.55	25.00	90 - 110	
11 B	24.60 ppb	0.53	25.00	90 - 110	
23 Na	1222.00 ppb	0.26	1250.00	90 - 110	
24 Mg	2449.00 ppb	0.53	2500.00	90 - 110	
27 Al	2465.00 ppb	1.03	2500.00	90 - 110	
28 Si	2421.00 ppb	1.10	2500.00	90 - 110	
31 P	245.60 ppb	1.61	250.00	90 - 110	
39 K	2522.00 ppb	1.41	2500.00	90 - 110	
40 Ca	2498.00 ppb	1.07	2500.00	90 - 110	
47 Ti	25.29 ppb	0.71	25.00	90 - 110	
51 V	25.62 ppb	1.11	25.00	90 - 110	
52 Cr	25.15 ppb	1.06	25.00	90 - 110	
55 Mn	24.13 ppb	1.49	25.00	90 - 110	
56 Fe	2595.00 ppb	0.33	2500.00	90 - 110	
59 Co	23.82 ppb	0.59	25.00	90 - 110	
60 Ni	24.88 ppb	0.69	25.00	90 - 110	
63 Cu	24.28 ppb	1.08	25.00	90 - 110	
66 Zn	50.93 ppb	0.88	50.00	90 - 110	
75 As	25.34 ppb	1.09	25.00	90 - 110	
78 Se	26.17 ppb	0.93	25.00	90 - 110	
88 Sr	24.93 ppb	0.65	25.00	90 - 110	
90 Zr	11.89 ppb	1.15	15.00	90 - 110	Fail
95 Mo	23.72 ppb	0.58	25.00	90 - 110	
107 Ag	24.73 ppb	1.36	25.00	90 - 110	
111 Cd	24.32 ppb	0.58	25.00	90 - 110	
118 Sn	25.52 ppb	1.07	25.00	90 - 110	
121 Sb	25.41 ppb	0.69	25.00	90 - 110	
137 Ba	25.30 ppb	1.54	25.00	90 - 110	
182 W	25.29 ppb	0.86	25.00	90 - 110	
205 Tl	25.08 ppb	1.90	25.00	90 - 110	
208 Pb	25.45 ppb	0.86	25.00	90 - 110	
235 U	0.18 ppb	0.59	0.18	90 - 110	
238 U	26.32 ppb	1.07	24.82	90 - 110	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	882244.56	1.51	1159752.60	76.1	60 - 125	
45 Sc	2206963.00	0.70	2567033.50	86.0	60 - 125	
45 Sc	521983.59	1.39	613402.44	85.1	60 - 125	
45 Sc	3910751.50	0.19	4679393.50	83.6	60 - 125	
72 Ge	604499.25	0.90	704157.69	85.8	60 - 125	
72 Ge	278534.06	1.61	321292.31	86.7	60 - 125	
72 Ge	938716.63	0.25	1114306.40	84.2	60 - 125	
115 In	6429661.00	0.65	7180580.50	89.5	60 - 125	
159 Tb	8490787.00	1.01	8719993.00	97.4	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

CCB QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13030.D\F6D13030.D#
Date Acquired: Apr 24 2015 02:20 pm
Operator: CCapul
Sample Name: CCB2
Misc Info:
Vial Number: 1102
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:49 pm
Sample Type: CCB
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	High Limit	Flag
7 Li	-0.14 ppb	48.55	0.20	
9 Be	0.00 ppb	123.06	0.10	
11 B	-0.87 ppb	3.12	5.00	
23 Na	-9.24 ppb	7.55	40.00	
24 Mg	0.17 ppb	7.98	10.00	
27 Al	0.67 ppb	2.21	20.00	
28 Si	0.43 ppb	12.49	20.00	
31 P	-1.26 ppb	10.66	10.00	
39 K	-11.33 ppb	9.28	20.00	
40 Ca	-0.34 ppb	11.90	25.00	
47 Ti	0.03 ppb	43.66	0.50	
51 V	-0.06 ppb	13.55	0.50	
52 Cr	-0.03 ppb	10.68	0.20	
55 Mn	0.01 ppb	8.81	0.20	
56 Fe	1.85 ppb	6.07	10.00	
59 Co	0.00 ppb	33.19	0.20	
60 Ni	-0.01 ppb	6.13	0.20	
63 Cu	-0.01 ppb	12.24	0.40	
66 Zn	-0.02 ppb	28.89	2.00	
75 As	-0.02 ppb	7.41	0.20	
78 Se	0.00 ppb	91.87	0.20	
88 Sr	0.00 ppb	49.40	0.20	
90 Zr	-0.01 ppb	15.18	2.00	
95 Mo	0.01 ppb	6.27	0.40	
107 Ag	0.00 ppb	55.35	0.20	
111 Cd	0.00 ppb	38.81	0.20	
118 Sn	0.00 ppb	41.64	0.20	
121 Sb	0.01 ppb	48.30	0.40	
137 Ba	0.00 ppb	45.59	0.20	
182 W	0.00 ppb	17.82	1.00	
205 Tl	0.00 ppb	174.55	0.20	
208 Pb	0.00 ppb	15.26	0.10	
235 U	0.00 ppb	4.83	1.00	
238 U	0.00 ppb	10.65	0.10	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	919804.25	0.43	1159752.60	79.3	60 - 125	
45 Sc	2215092.30	1.79	2567033.50	86.3	60 - 125	
45 Sc	532296.69	0.66	613402.44	86.8	60 - 125	
45 Sc	4000373.80	1.13	4679393.50	85.5	60 - 125	
72 Ge	630951.19	1.90	704157.69	89.6	60 - 125	
72 Ge	291373.25	1.50	321292.31	90.7	60 - 125	
72 Ge	970380.69	1.08	1114306.40	87.1	60 - 125	
115 In	6794065.50	0.96	7180580.50	94.6	60 - 125	
159 Tb	8906076.00	1.08	8719993.00	102.1	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7096

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13031.D\F6D13031.D#
Date Acquired:	Apr 24 2015 02:24 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-07
Misc Info:	
Vial Number:	2110
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	225847.9	0.0000	16.6600	ppb	0.84	225.00	
9 Be	# 3	45	1886.9	0.0000	0.4132	ppb	1.73	225.00	
11 B	# 3	45	13916.9	0.0000	2.5550	ppb	1.01	225.00	
23 Na	# 1	45	2139238.0	0.0000	258.8000	ppb	1.77	269999.99	
24 Mg	# 3	45	113287200.0	0.0000	6448.0000	ppb	2.94	269999.99	
27 Al	# 3	45	615709890.0	0.0000	25310.0000	ppb	2.26	90000.00	
28 Si	# 1	45	3391228.0	0.0000	1444.0000	ppb	0.21	18000.00	
31 P	# 3	45	212173.2	0.0000	126.5000	ppb	1.66	359999.99	
39 K	# 2	45	7400051.0	0.0000	4064.0000	ppb	0.37	269999.99	
40 Ca	# 1	45	34114160.0	0.0000	2163.0000	ppb	0.97	269999.99	
47 Ti	# 3	45	7231261.0	0.0000	2228.0000	ppb	0.96	2700.00	
51 V	# 2	45	1366081.0	0.0000	120.3000	ppb	1.81	2700.00	
52 Cr	# 2	45	402477.5	0.0000	29.8100	ppb	1.28	2700.00	
55 Mn	# 3	45	22018930.0	0.0000	387.7000	ppb	1.97	2700.00	
56 Fe	# 1	45	1086463000.0	0.0000	45960.0000	ppb	1.23	90000.00	
59 Co	# 3	45	550784.4	0.0000	11.7300	ppb	2.02	2700.00	
60 Ni	# 2	45	42123.1	0.0000	8.7080	ppb	1.06	2700.00	
63 Cu	# 2	45	1408723.0	0.0000	111.8000	ppb	2.24	2700.00	
66 Zn	# 3	72	459489.1	0.0000	71.1000	ppb	0.55	2700.00	
75 As	# 2	72	6934.4	0.0000	3.4810	ppb	0.17	2700.00	
78 Se	# 1	72	129.3	0.0000	0.1422	ppb	14.44	2700.00	
88 Sr	# 3	72	1176169.0	0.0000	18.7700	ppb	0.96	2700.00	
90 Zr	# 3	72	90196.3	0.0000	1.6610	ppb	1.61	1800.00	
95 Mo	# 3	115	7060.9	0.0000	0.6217	ppb	2.23	2700.00	
107 Ag	# 3	115	2170.3	0.0000	0.0739	ppb	2.30	225.00	
111 Cd	# 3	115	2317.6	0.0000	0.3466	ppb	4.93	2700.00	
118 Sn	# 3	115	139835.1	0.0000	8.2780	ppb	1.01	2700.00	
121 Sb	# 3	115	9304.5	0.0000	0.3661	ppb	2.93	2700.00	
137 Ba	# 3	115	1363569.0	0.0000	159.1000	ppb	1.29	2700.00	
182 W	# 3	159	1010.1	0.0000	0.0427	ppb	1.17	900.00	
205 Tl	# 3	159	22255.1	0.0000	0.5178	ppb	0.66	2700.00	
208 Pb	# 3	159	1058814.0	0.0000	18.0600	ppb	0.34	2700.00	
235 U	# 3	159	892.3	0.0000	0.0140	ppb	5.65	27.00	
238 U	# 3	159	122704.3	0.0000	2.1250	ppb	2.91	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	943830.38	0.99	1159752.60	81.4	60 - 125	
45 Sc # 1	2563783.00	1.97	2567033.50	99.9	60 - 125	
45 Sc # 2	610593.38	1.31	613402.44	99.5	60 - 125	
45 Sc # 3	4550320.00	1.75	4679393.50	97.2	60 - 125	
72 Ge # 1	646400.88	1.37	704157.69	91.8	60 - 125	
72 Ge # 2	301040.19	0.57	321292.31	93.7	60 - 125	
72 Ge # 3	1042137.40	0.88	1114306.40	93.5	60 - 125	
115 In # 3	6577620.50	2.35	7180580.50	91.6	60 - 125	
159 Tb # 3	8714632.00	0.78	8719993.00	99.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7097

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13032.D\F6D13032.D#
Date Acquired:	Apr 24 2015 02:28 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-08M
Misc Info:	
Vial Number:	2111
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	833234.0	0.0000	77.6900	ppb	0.88	225.00	
9 Be	# 3	45	210666.7	0.0000	44.7900	ppb	1.08	225.00	
11 B	# 3	45	158797.0	0.0000	46.2200	ppb	1.48	225.00	
23 Na	# 1	45	34355140.0	0.0000	4755.0000	ppb	0.11	269999.99	
24 Mg	# 3	45	182698800.0	0.0000	9914.0000	ppb	1.50	269999.99	
27 Al	# 3	45	932324610.0	0.0000	36540.0000	ppb	1.17	90000.00	
28 Si	# 1	45	4343987.0	0.0000	1861.0000	ppb	1.65	18000.00	
31 P	# 3	45	133448.9	0.0000	68.0800	ppb	0.92	359999.99	
39 K	# 2	45	13831830.0	0.0000	7376.0000	ppb	1.53	269999.99	
40 Ca	# 1	45	108262700.0	0.0000	6917.0000	ppb	0.60	269999.99	
47 Ti	# 3	45	6043727.0	0.0000	1775.0000	ppb	0.46	2700.00	
51 V	# 2	45	1625148.0	0.0000	137.5000	ppb	0.45	2700.00	
52 Cr	# 2	45	968416.9	0.0000	69.0800	ppb	1.29	2700.00	
55 Mn	# 3	45	16610310.0	0.0000	278.8000	ppb	1.13	2700.00	
56 Fe	# 1	45	1307069100.0	0.0000	55630.0000	ppb	0.49	90000.00	
59 Co	# 3	45	2492432.0	0.0000	50.6100	ppb	1.03	2700.00	
60 Ni	# 2	45	264509.1	0.0000	52.6600	ppb	0.11	2700.00	
63 Cu	# 2	45	790781.4	0.0000	60.2500	ppb	0.68	2700.00	
66 Zn	# 3	72	1169480.0	0.0000	175.0000	ppb	0.33	2700.00	
75 As	# 2	72	98203.4	0.0000	49.7100	ppb	0.44	2700.00	
78 Se	# 1	72	40205.5	0.0000	48.5600	ppb	1.10	2700.00	
88 Sr	# 3	72	4128277.0	0.0000	63.6700	ppb	1.38	2700.00	
90 Zr	# 3	72	118273.0	0.0000	2.1080	ppb	1.05	1800.00	
95 Mo	# 3	115	525373.3	0.0000	46.5100	ppb	0.86	2700.00	
107 Ag	# 3	115	1367046.0	0.0000	47.7400	ppb	1.27	225.00	
111 Cd	# 3	115	321792.8	0.0000	48.2200	ppb	0.42	2700.00	
118 Sn	# 3	115	977366.3	0.0000	57.1300	ppb	1.11	2700.00	
121 Sb	# 3	115	923069.4	0.0000	39.1900	ppb	2.33	2700.00	
137 Ba	# 3	115	1611289.0	0.0000	185.5000	ppb	1.55	2700.00	
182 W	# 3	159	1543.5	0.0000	0.0690	ppb	2.58	900.00	
205 Tl	# 3	159	2079155.0	0.0000	47.9400	ppb	1.57	2700.00	
208 Pb	# 3	159	3582355.0	0.0000	60.2900	ppb	1.71	2700.00	
235 U	# 3	159	22944.3	0.0000	0.3664	ppb	1.94	27.00	
238 U	# 3	159	3074927.0	0.0000	52.5500	ppb	1.02	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	956230.31	2.05	1159752.60	82.5	60 - 125	
45 Sc # 1	2547410.00	1.32	2567033.50	99.2	60 - 125	
45 Sc # 2	635773.81	0.76	613402.44	103.6	60 - 125	
45 Sc # 3	4771773.00	0.78	4679393.50	102.0	60 - 125	
72 Ge # 1	634258.38	1.42	704157.69	90.1	60 - 125	
72 Ge # 2	306289.16	0.99	321292.31	95.3	60 - 125	
72 Ge # 3	1078772.80	1.59	1114306.40	96.8	60 - 125	
115 In # 3	6666848.50	1.72	7180580.50	92.8	60 - 125	
159 Tb # 3	8835861.00	0.22	8719993.00	101.3	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7098

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13033.D\F6D13033.D#
Date Acquired:	Apr 24 2015 02:32 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-08S
Misc Info:	
Vial Number:	2112
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	848150.9	0.0000	78.2100	ppb	1.30	225.00	
9 Be	# 3	45	214421.7	0.0000	44.8100	ppb	2.24	225.00	
11 B	# 3	45	164967.7	0.0000	47.2200	ppb	1.42	225.00	
23 Na	# 1	45	34800860.0	0.0000	4606.0000	ppb	1.70	269999.99	
24 Mg	# 3	45	182534590.0	0.0000	9735.0000	ppb	1.70	269999.99	
27 Al	# 3	45	961135230.0	0.0000	37020.0000	ppb	2.75	90000.00	
28 Si	# 1	45	4470115.0	0.0000	1832.0000	ppb	1.78	18000.00	
31 P	# 3	45	124704.2	0.0000	60.9300	ppb	1.03	359999.99	
39 K	# 2	45	13892120.0	0.0000	7345.0000	ppb	1.11	269999.99	
40 Ca	# 1	45	109154300.0	0.0000	6670.0000	ppb	2.11	269999.99	
47 Ti	# 3	45	5864634.0	0.0000	1693.0000	ppb	0.72	2700.00	
51 V	# 2	45	1398287.0	0.0000	117.3000	ppb	1.02	2700.00	
52 Cr	# 2	45	965731.0	0.0000	68.3000	ppb	0.24	2700.00	
55 Mn	# 3	45	14111220.0	0.0000	232.8000	ppb	1.66	2700.00	
56 Fe	# 1	45	980473410.0	0.0000	39920.0000	ppb	0.86	90000.00	
59 Co	# 3	45	2463721.0	0.0000	49.1700	ppb	1.65	2700.00	
60 Ni	# 2	45	258741.0	0.0000	51.0700	ppb	0.83	2700.00	
63 Cu	# 2	45	718649.1	0.0000	54.2900	ppb	0.27	2700.00	
66 Zn	# 3	72	1081554.0	0.0000	164.2000	ppb	1.34	2700.00	
75 As	# 2	72	95324.6	0.0000	48.2400	ppb	0.94	2700.00	
78 Se	# 1	72	41017.1	0.0000	48.2700	ppb	0.59	2700.00	
88 Sr	# 3	72	4151004.0	0.0000	64.9500	ppb	0.46	2700.00	
90 Zr	# 3	72	114969.5	0.0000	2.0790	ppb	1.36	1800.00	
95 Mo	# 3	115	530826.1	0.0000	46.4800	ppb	0.37	2700.00	
107 Ag	# 3	115	1389691.0	0.0000	48.0000	ppb	0.64	225.00	
111 Cd	# 3	115	324219.4	0.0000	48.0600	ppb	0.65	2700.00	
118 Sn	# 3	115	986120.3	0.0000	57.0200	ppb	0.49	2700.00	
121 Sb	# 3	115	965538.5	0.0000	40.5500	ppb	1.33	2700.00	
137 Ba	# 3	115	1568620.0	0.0000	178.6000	ppb	1.76	2700.00	
182 W	# 3	159	1159.0	0.0000	0.0490	ppb	11.01	900.00	
205 Tl	# 3	159	2089534.0	0.0000	47.6900	ppb	0.48	2700.00	
208 Pb	# 3	159	3441289.0	0.0000	57.3200	ppb	1.47	2700.00	
235 U	# 3	159	23347.3	0.0000	0.3691	ppb	1.80	27.00	
238 U	# 3	159	3097777.0	0.0000	52.3900	ppb	1.03	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	967320.31	0.22	1159752.60	83.4	60 - 125	
45 Sc # 1	2663192.30	0.62	2567033.50	103.7	60 - 125	
45 Sc # 2	641187.63	0.71	613402.44	104.5	60 - 125	
45 Sc # 3	4855798.00	1.57	4679393.50	103.8	60 - 125	
72 Ge # 1	650977.19	1.32	704157.69	92.4	60 - 125	
72 Ge # 2	306352.56	0.70	321292.31	95.4	60 - 125	
72 Ge # 3	1063250.90	1.86	1114306.40	95.4	60 - 125	
115 In # 3	6738971.00	0.42	7180580.50	93.8	60 - 125	
159 Tb # 3	8927728.00	1.25	8719993.00	102.4	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes:	Pass
ISTD:	Pass

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13034.D\F6D13034.D#
Date Acquired:	Apr 24 2015 02:37 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-08A
Misc Info:	
Vial Number:	2201
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	823143.7	0.0000	73.1100	ppb	3.53	225.00	
9 Be	# 3	45	204582.7	0.0000	40.9500	ppb	1.67	225.00	
11 B	# 3	45	160709.6	0.0000	43.9600	ppb	1.54	225.00	
23 Na	# 1	45	38438180.0	0.0000	4988.0000	ppb	1.19	269999.99	
24 Mg	# 3	45	215367600.0	0.0000	11010.0000	ppb	4.77	269999.99	
27 Al	# 3	45	941250430.0	0.0000	34750.0000	ppb	5.28	90000.00	
28 Si	# 1	45	3303064.0	0.0000	1326.0000	ppb	1.15	18000.00	
31 P	# 3	45	123162.6	0.0000	56.6100	ppb	2.55	359999.99	
39 K	# 2	45	15096290.0	0.0000	7860.0000	ppb	0.73	269999.99	
40 Ca	# 1	45	134492000.0	0.0000	8052.0000	ppb	0.30	269999.99	
47 Ti	# 3	45	6283952.0	0.0000	1738.0000	ppb	2.34	2700.00	
51 V	# 2	45	1455063.0	0.0000	120.1000	ppb	0.76	2700.00	
52 Cr	# 2	45	941872.4	0.0000	65.5300	ppb	0.81	2700.00	
55 Mn	# 3	45	20932460.0	0.0000	330.9000	ppb	2.26	2700.00	
56 Fe	# 1	45	1267554900.0	0.0000	50560.0000	ppb	0.70	90000.00	
59 Co	# 3	45	2556182.0	0.0000	48.9000	ppb	3.57	2700.00	
60 Ni	# 2	45	260138.6	0.0000	50.5300	ppb	1.79	2700.00	
63 Cu	# 2	45	803852.9	0.0000	59.7600	ppb	2.26	2700.00	
66 Zn	# 3	72	1045482.0	0.0000	156.6000	ppb	2.50	2700.00	
75 As	# 2	72	95519.9	0.0000	47.8200	ppb	0.54	2700.00	
78 Se	# 1	72	40238.0	0.0000	46.4800	ppb	0.64	2700.00	
88 Sr	# 3	72	4422600.0	0.0000	68.2900	ppb	1.71	2700.00	
90 Zr	# 3	72	93466.8	0.0000	1.6650	ppb	3.52	1800.00	
95 Mo	# 3	115	537322.1	0.0000	47.8200	ppb	3.19	2700.00	
107 Ag	# 3	115	1233972.0	0.0000	43.3200	ppb	1.76	225.00	
111 Cd	# 3	115	293169.2	0.0000	44.1700	ppb	1.26	2700.00	
118 Sn	# 3	115	1168599.0	0.0000	68.6800	ppb	0.71	2700.00	
121 Sb	# 3	115	1088551.0	0.0000	46.4700	ppb	2.20	2700.00	
137 Ba	# 3	115	1899278.0	0.0000	219.8000	ppb	2.66	2700.00	
182 W	# 3	159	1940.2	0.0000	0.0882	ppb	5.73	900.00	
205 Tl	# 3	159	1936086.0	0.0000	44.2500	ppb	4.65	2700.00	
208 Pb	# 3	159	4331855.0	0.0000	72.2900	ppb	6.03	2700.00	
235 U	# 3	159	20494.7	0.0000	0.3244	ppb	5.76	27.00	
238 U	# 3	159	2764680.0	0.0000	46.8100	ppb	2.81	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	999309.44	4.17	1159752.60	86.2	60 - 125	
45 Sc # 1	2718386.80	1.68	2567033.50	105.9	60 - 125	
45 Sc # 2	651796.06	2.05	613402.44	106.3	60 - 125	
45 Sc # 3	5067241.00	1.37	4679393.50	108.3	60 - 125	
72 Ge # 1	663264.63	0.76	704157.69	94.2	60 - 125	
72 Ge # 2	309717.28	0.67	321292.31	96.4	60 - 125	
72 Ge # 3	1077777.10	2.52	1114306.40	96.7	60 - 125	
115 In # 3	6630778.00	0.94	7180580.50	92.3	60 - 125	
159 Tb # 3	8923004.00	3.35	8719993.00	102.3	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7100

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13035.D\F6D13035.D#
Date Acquired:	Apr 24 2015 02:41 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-08
Misc Info:	
Vial Number:	2202
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	295462.3	0.0000	23.3400	ppb	1.32	225.00	
9 Be	# 3	45	3126.0	0.0000	0.6504	ppb	3.80	225.00	
11 B	# 3	45	18520.9	0.0000	3.6870	ppb	5.73	225.00	
23 Na	# 1	45	3080595.0	0.0000	363.1000	ppb	2.41	269999.99	
24 Mg	# 3	45	125165000.0	0.0000	6723.0000	ppb	0.59	269999.99	
27 Al	# 3	45	811572930.0	0.0000	31480.0000	ppb	0.39	90000.00	
28 Si	# 1	45	3310214.0	0.0000	1323.0000	ppb	2.12	18000.00	
31 P	# 3	45	117774.1	0.0000	57.0200	ppb	1.45	359999.99	
39 K	# 2	45	6000598.0	0.0000	3089.0000	ppb	0.47	269999.99	
40 Ca	# 1	45	54825160.0	0.0000	3265.0000	ppb	1.36	269999.99	
47 Ti	# 3	45	5929304.0	0.0000	1724.0000	ppb	1.02	2700.00	
51 V	# 2	45	923982.4	0.0000	76.7000	ppb	0.01	2700.00	
52 Cr	# 2	45	377907.9	0.0000	26.4200	ppb	0.30	2700.00	
55 Mn	# 3	45	18383880.0	0.0000	305.5000	ppb	0.30	2700.00	
56 Fe	# 1	45	1149291000.0	0.0000	45630.0000	ppb	1.01	90000.00	
59 Co	# 3	45	656206.2	0.0000	13.1900	ppb	0.96	2700.00	
60 Ni	# 2	45	58751.7	0.0000	11.4800	ppb	0.40	2700.00	
63 Cu	# 2	45	304257.5	0.0000	22.7900	ppb	0.63	2700.00	
66 Zn	# 3	72	474092.6	0.0000	71.5400	ppb	0.44	2700.00	
75 As	# 2	72	6247.6	0.0000	3.0190	ppb	1.54	2700.00	
78 Se	# 1	72	150.7	0.0000	0.1608	ppb	4.11	2700.00	
88 Sr	# 3	72	1749591.0	0.0000	27.2300	ppb	0.47	2700.00	
90 Zr	# 3	72	88984.2	0.0000	1.5970	ppb	1.09	1800.00	
95 Mo	# 3	115	5141.1	0.0000	0.4406	ppb	2.07	2700.00	
107 Ag	# 3	115	2854.8	0.0000	0.0962	ppb	1.39	225.00	
111 Cd	# 3	115	3337.3	0.0000	0.4915	ppb	2.85	2700.00	
118 Sn	# 3	115	383572.2	0.0000	22.2800	ppb	1.48	2700.00	
121 Sb	# 3	115	8282.8	0.0000	0.3152	ppb	2.99	2700.00	
137 Ba	# 3	115	1490264.0	0.0000	170.6000	ppb	0.93	2700.00	
182 W	# 3	159	1100.1	0.0000	0.0462	ppb	3.56	900.00	
205 Tl	# 3	159	23835.5	0.0000	0.5432	ppb	1.61	2700.00	
208 Pb	# 3	159	1918524.0	0.0000	32.0600	ppb	1.26	2700.00	
235 U	# 3	159	845.6	0.0000	0.0130	ppb	9.37	27.00	
238 U	# 3	159	110763.9	0.0000	1.8780	ppb	1.92	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	957766.56	1.45	1159752.60	82.6	60 - 125	
45 Sc # 1	2731589.00	2.26	2567033.50	106.4	60 - 125	
45 Sc # 2	646349.31	0.44	613402.44	105.4	60 - 125	
45 Sc # 3	4820271.00	0.50	4679393.50	103.0	60 - 125	
72 Ge # 1	670774.94	0.85	704157.69	95.3	60 - 125	
72 Ge # 2	311432.28	0.91	321292.31	96.9	60 - 125	
72 Ge # 3	1068627.80	0.81	1114306.40	95.9	60 - 125	
115 In # 3	6705010.50	0.89	7180580.50	93.4	60 - 125	
159 Tb # 3	8898826.00	0.96	8719993.00	102.1	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13036.D\F6D13036.D#
Date Acquired: Apr 24 2015 02:45 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-08J
Misc Info:
Vial Number: 2203
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	105116.4	0.0000	4.6430	ppb	4.75	225.00	
9 Be	# 3	45	646.7	0.0000	0.1536	ppb	14.15	225.00	
11 B	# 3	45	5805.8	0.0000	0.1967	ppb	43.97	225.00	
23 Na	# 1	45	739042.5	0.0000	73.2000	ppb	0.70	269999.99	
24 Mg	# 3	45	23638640.0	0.0000	1503.0000	ppb	0.16	269999.99	
27 Al	# 3	45	150746400.0	0.0000	6924.0000	ppb	0.74	90000.00	
28 Si	# 1	45	643599.0	0.0000	296.2000	ppb	0.46	18000.00	
31 P	# 3	45	43349.1	0.0000	13.8500	ppb	1.57	359999.99	
39 K	# 2	45	1261231.0	0.0000	688.9000	ppb	1.30	269999.99	
40 Ca	# 1	45	10785790.0	0.0000	739.0000	ppb	1.26	269999.99	
47 Ti	# 3	45	1115538.0	0.0000	384.0000	ppb	0.55	2700.00	
51 V	# 2	45	180201.3	0.0000	17.2600	ppb	0.80	2700.00	
52 Cr	# 2	45	73527.8	0.0000	5.9520	ppb	1.25	2700.00	
55 Mn	# 3	45	3522670.0	0.0000	69.2700	ppb	0.35	2700.00	
56 Fe	# 1	45	222736610.0	0.0000	10200.0000	ppb	0.25	90000.00	
59 Co	# 3	45	126705.7	0.0000	3.0100	ppb	1.16	2700.00	
60 Ni	# 2	45	11585.6	0.0000	2.6490	ppb	1.61	2700.00	
63 Cu	# 2	45	61180.2	0.0000	5.3860	ppb	1.55	2700.00	
66 Zn	# 3	72	96649.4	0.0000	15.6400	ppb	1.41	2700.00	
75 As	# 2	72	1327.8	0.0000	0.6086	ppb	2.46	2700.00	
78 Se	# 1	72	35.3	0.0000	0.0306	ppb	1.69	2700.00	
88 Sr	# 3	72	342553.0	0.0000	5.7370	ppb	0.94	2700.00	
90 Zr	# 3	72	17871.9	0.0000	0.3319	ppb	1.07	1800.00	
95 Mo	# 3	115	1185.6	0.0000	0.0931	ppb	17.69	2700.00	
107 Ag	# 3	115	687.8	0.0000	0.0212	ppb	3.71	225.00	
111 Cd	# 3	115	652.7	0.0000	0.0923	ppb	5.79	2700.00	
118 Sn	# 3	115	75900.6	0.0000	4.4380	ppb	0.85	2700.00	
121 Sb	# 3	115	2399.2	0.0000	0.0674	ppb	3.95	2700.00	
137 Ba	# 3	115	298881.6	0.0000	34.4800	ppb	1.56	2700.00	
182 W	# 3	159	287.8	0.0000	0.0055	ppb	24.46	900.00	
205 Tl	# 3	159	5001.1	0.0000	0.1125	ppb	1.21	2700.00	
208 Pb	# 3	159	409715.9	0.0000	6.8710	ppb	0.94	2700.00	
235 U	# 3	159	193.3	0.0000	0.0026	ppb	28.10	27.00	
238 U	# 3	159	22652.8	0.0000	0.3853	ppb	0.44	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	915983.19	1.92	1159752.60	79.0	60 - 125	
45 Sc # 1	2367097.80	1.78	2567033.50	92.2	60 - 125	
45 Sc # 2	547848.69	0.85	613402.44	89.3	60 - 125	
45 Sc # 3	4071127.80	1.01	4679393.50	87.0	60 - 125	
72 Ge # 1	646125.44	0.90	704157.69	91.8	60 - 125	
72 Ge # 2	292112.38	1.06	321292.31	90.9	60 - 125	
72 Ge # 3	991585.50	1.86	1114306.40	89.0	60 - 125	
115 In # 3	6651933.00	1.58	7180580.50	92.6	60 - 125	
159 Tb # 3	8854369.00	0.95	8719993.00	101.5	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13037.D\F6D13037.D#
Date Acquired:	Apr 24 2015 02:49 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-10
Misc Info:	
Vial Number:	2204
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	260244.1	0.0000	19.6000	ppb	2.24	225.00	
9 Be	# 3	45	1722.4	0.0000	0.3623	ppb	4.52	225.00	
11 B	# 3	45	11442.5	0.0000	1.6340	ppb	8.79	225.00	
23 Na	# 1	45	2069850.0	0.0000	253.4000	ppb	1.57	269999.99	
24 Mg	# 3	45	137305790.0	0.0000	7522.0000	ppb	0.67	269999.99	
27 Al	# 3	45	539783420.0	0.0000	21360.0000	ppb	0.77	90000.00	
28 Si	# 1	45	3695253.0	0.0000	1597.0000	ppb	1.55	18000.00	
31 P	# 3	45	346701.7	0.0000	210.2000	ppb	1.50	359999.99	
39 K	# 2	45	7268899.0	0.0000	3969.0000	ppb	1.30	269999.99	
40 Ca	# 1	45	45547100.0	0.0000	2932.0000	ppb	0.71	269999.99	
47 Ti	# 3	45	7458693.0	0.0000	2212.0000	ppb	1.19	2700.00	
51 V	# 2	45	976509.2	0.0000	85.4300	ppb	1.55	2700.00	
52 Cr	# 2	45	292197.4	0.0000	21.4900	ppb	0.95	2700.00	
55 Mn	# 3	45	17691620.0	0.0000	299.8000	ppb	1.55	2700.00	
56 Fe	# 1	45	836325700.0	0.0000	35890.0000	ppb	0.71	90000.00	
59 Co	# 3	45	579339.8	0.0000	11.8700	ppb	0.60	2700.00	
60 Ni	# 2	45	34153.3	0.0000	7.0180	ppb	0.62	2700.00	
63 Cu	# 2	45	153275.1	0.0000	12.0800	ppb	1.07	2700.00	
66 Zn	# 3	72	324069.3	0.0000	48.9900	ppb	0.61	2700.00	
75 As	# 2	72	5639.1	0.0000	2.8030	ppb	0.15	2700.00	
78 Se	# 1	72	113.3	0.0000	0.1249	ppb	3.20	2700.00	
88 Sr	# 3	72	1326425.0	0.0000	20.6900	ppb	0.68	2700.00	
90 Zr	# 3	72	72421.8	0.0000	1.3000	ppb	1.35	1800.00	
95 Mo	# 3	115	2953.8	0.0000	0.2436	ppb	3.50	2700.00	
107 Ag	# 3	115	964.5	0.0000	0.0300	ppb	3.07	225.00	
111 Cd	# 3	115	2483.0	0.0000	0.3579	ppb	2.92	2700.00	
118 Sn	# 3	115	95686.6	0.0000	5.4590	ppb	0.63	2700.00	
121 Sb	# 3	115	4508.7	0.0000	0.1526	ppb	5.70	2700.00	
137 Ba	# 3	115	1577982.0	0.0000	177.6000	ppb	1.43	2700.00	
182 W	# 3	159	1442.4	0.0000	0.0640	ppb	6.96	900.00	
205 Tl	# 3	159	24116.1	0.0000	0.5542	ppb	0.99	2700.00	
208 Pb	# 3	159	297095.2	0.0000	4.9960	ppb	1.69	2700.00	
235 U	# 3	159	867.8	0.0000	0.0135	ppb	4.99	27.00	
238 U	# 3	159	123898.5	0.0000	2.1190	ppb	1.86	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	965191.31	1.50	1159752.60	83.2	60 - 125	
45 Sc # 1	2526426.00	1.06	2567033.50	98.4	60 - 125	
45 Sc # 2	613704.56	0.53	613402.44	100.0	60 - 125	
45 Sc # 3	4726630.00	1.13	4679393.50	101.0	60 - 125	
72 Ge # 1	637551.50	0.25	704157.69	90.5	60 - 125	
72 Ge # 2	302037.72	0.43	321292.31	94.0	60 - 125	
72 Ge # 3	1065954.60	0.64	1114306.40	95.7	60 - 125	
115 In # 3	6820871.00	1.39	7180580.50	95.0	60 - 125	
159 Tb # 3	8827062.00	2.36	8719993.00	101.2	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13038.D\F6D13038.D#
Date Acquired:	Apr 24 2015 02:53 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-11
Misc Info:	
Vial Number:	2205
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	241885.8	0.0000	18.1500	ppb	2.07	225.00	
9 Be	# 3	45	2190.2	0.0000	0.4641	ppb	4.77	225.00	
11 B	# 3	45	13823.5	0.0000	2.3730	ppb	0.95	225.00	
23 Na	# 1	45	2125329.0	0.0000	251.6000	ppb	1.46	269999.99	
24 Mg	# 3	45	143636190.0	0.0000	7891.0000	ppb	1.56	269999.99	
27 Al	# 3	45	656483970.0	0.0000	26040.0000	ppb	0.75	90000.00	
28 Si	# 1	45	3350707.0	0.0000	1401.0000	ppb	1.41	18000.00	
31 P	# 3	45	326901.7	0.0000	197.7000	ppb	2.04	359999.99	
39 K	# 2	45	6309500.0	0.0000	3363.0000	ppb	1.20	269999.99	
40 Ca	# 1	45	49128220.0	0.0000	3061.0000	ppb	0.17	269999.99	
47 Ti	# 3	45	8105137.0	0.0000	2410.0000	ppb	0.37	2700.00	
51 V	# 2	45	1280989.0	0.0000	110.1000	ppb	1.06	2700.00	
52 Cr	# 2	45	365154.7	0.0000	26.3700	ppb	0.88	2700.00	
55 Mn	# 3	45	20789590.0	0.0000	353.3000	ppb	1.00	2700.00	
56 Fe	# 1	45	1138073000.0	0.0000	47270.0000	ppb	0.69	90000.00	
59 Co	# 3	45	611995.8	0.0000	12.5800	ppb	1.62	2700.00	
60 Ni	# 2	45	43630.5	0.0000	8.8000	ppb	0.41	2700.00	
63 Cu	# 2	45	232565.6	0.0000	17.9800	ppb	0.32	2700.00	
66 Zn	# 3	72	758885.4	0.0000	116.1000	ppb	0.38	2700.00	
75 As	# 2	72	8350.9	0.0000	4.1380	ppb	0.92	2700.00	
78 Se	# 1	72	160.4	0.0000	0.1781	ppb	1.91	2700.00	
88 Sr	# 3	72	1466891.0	0.0000	23.1300	ppb	0.46	2700.00	
90 Zr	# 3	72	85058.1	0.0000	1.5460	ppb	1.94	1800.00	
95 Mo	# 3	115	6600.7	0.0000	0.5725	ppb	1.39	2700.00	
107 Ag	# 3	115	2065.8	0.0000	0.0693	ppb	4.92	225.00	
111 Cd	# 3	115	2678.8	0.0000	0.3960	ppb	4.40	2700.00	
118 Sn	# 3	115	299866.4	0.0000	17.5300	ppb	1.18	2700.00	
121 Sb	# 3	115	11545.2	0.0000	0.4560	ppb	2.47	2700.00	
137 Ba	# 3	115	1743187.0	0.0000	200.7000	ppb	0.47	2700.00	
182 W	# 3	159	1299.0	0.0000	0.0568	ppb	1.85	900.00	
205 Tl	# 3	159	22198.3	0.0000	0.5102	ppb	1.36	2700.00	
208 Pb	# 3	159	2646380.0	0.0000	44.6100	ppb	0.75	2700.00	
235 U	# 3	159	1533.5	0.0000	0.0241	ppb	5.86	27.00	
238 U	# 3	159	210380.6	0.0000	3.6000	ppb	0.56	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	949753.44	0.61	1159752.60	81.9	60 - 125	
45 Sc # 1	2610408.50	0.37	2567033.50	101.7	60 - 125	
45 Sc # 2	625768.19	0.30	613402.44	102.0	60 - 125	
45 Sc # 3	4713799.50	1.59	4679393.50	100.7	60 - 125	
72 Ge # 1	649057.00	0.75	704157.69	92.2	60 - 125	
72 Ge # 2	306298.34	0.37	321292.31	95.3	60 - 125	
72 Ge # 3	1054790.80	0.50	1114306.40	94.7	60 - 125	
115 In # 3	6665166.50	1.02	7180580.50	92.8	60 - 125	
159 Tb # 3	8820396.00	0.14	8719993.00	101.2	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13039.D\F6D13039.D#
Date Acquired: Apr 24 2015 02:57 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-12
Misc Info:
Vial Number: 2206
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	355547.8	0.0000	29.2900	ppb	1.16	225.00	
9 Be	# 3	45	3214.9	0.0000	0.6532	ppb	1.57	225.00	
11 B	# 3	45	35836.3	0.0000	8.6200	ppb	3.37	225.00	
23 Na	# 1	45	7142157.0	0.0000	917.5000	ppb	0.84	269999.99	
24 Mg	# 3	45	187799300.0	0.0000	9848.0000	ppb	0.46	269999.99	
27 Al	# 3	45	906225470.0	0.0000	34320.0000	ppb	1.33	90000.00	
28 Si	# 1	45	3999875.0	0.0000	1643.0000	ppb	1.65	18000.00	
31 P	# 3	45	117768.2	0.0000	55.1900	ppb	0.78	359999.99	
39 K	# 2	45	5361152.0	0.0000	2777.0000	ppb	0.83	269999.99	
40 Ca	# 1	45	219548300.0	0.0000	13450.0000	ppb	0.56	269999.99	
47 Ti	# 3	45	6355349.0	0.0000	1804.0000	ppb	0.93	2700.00	
51 V	# 2	45	1288529.0	0.0000	108.2000	ppb	0.57	2700.00	
52 Cr	# 2	45	430469.9	0.0000	30.4200	ppb	0.63	2700.00	
55 Mn	# 3	45	11255360.0	0.0000	182.6000	ppb	1.49	2700.00	
56 Fe	# 1	45	1005714000.0	0.0000	41040.0000	ppb	0.35	90000.00	
59 Co	# 3	45	580688.3	0.0000	11.3900	ppb	0.92	2700.00	
60 Ni	# 2	45	55403.5	0.0000	10.9300	ppb	0.36	2700.00	
63 Cu	# 2	45	136623.5	0.0000	10.3200	ppb	0.88	2700.00	
66 Zn	# 3	72	303338.6	0.0000	45.5000	ppb	1.37	2700.00	
75 As	# 2	72	10795.6	0.0000	5.3850	ppb	0.86	2700.00	
78 Se	# 1	72	182.9	0.0000	0.2055	ppb	5.97	2700.00	
88 Sr	# 3	72	3226709.0	0.0000	49.9600	ppb	0.59	2700.00	
90 Zr	# 3	72	125570.8	0.0000	2.2490	ppb	1.82	1800.00	
95 Mo	# 3	115	2511.4	0.0000	0.2084	ppb	2.72	2700.00	
107 Ag	# 3	115	1093.4	0.0000	0.0350	ppb	3.47	225.00	
111 Cd	# 3	115	3308.1	0.0000	0.4858	ppb	2.33	2700.00	
118 Sn	# 3	115	98572.1	0.0000	5.7050	ppb	1.46	2700.00	
121 Sb	# 3	115	5780.3	0.0000	0.2088	ppb	4.56	2700.00	
137 Ba	# 3	115	2963255.0	0.0000	338.2000	ppb	1.38	2700.00	
182 W	# 3	159	807.8	0.0000	0.0319	ppb	5.59	900.00	
205 Tl	# 3	159	25623.4	0.0000	0.5902	ppb	1.89	2700.00	
208 Pb	# 3	159	412598.5	0.0000	6.9560	ppb	0.59	2700.00	
235 U	# 3	159	1043.4	0.0000	0.0163	ppb	3.61	27.00	
238 U	# 3	159	140967.6	0.0000	2.4160	ppb	0.88	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	960843.19	1.00	1159752.60	82.8	60 - 125	
45 Sc # 1	2657241.80	1.25	2567033.50	103.5	60 - 125	
45 Sc # 2	640057.63	0.19	613402.44	104.3	60 - 125	
45 Sc # 3	4937462.50	1.18	4679393.50	105.5	60 - 125	
72 Ge # 1	646464.50	0.54	704157.69	91.8	60 - 125	
72 Ge # 2	305908.84	0.80	321292.31	95.2	60 - 125	
72 Ge # 3	1074415.90	1.44	1114306.40	96.4	60 - 125	
115 In # 3	6723896.00	0.39	7180580.50	93.6	60 - 125	
159 Tb # 3	8808013.00	0.36	8719993.00	101.0	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

CCV QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13041.D\F6D13041.D#
Date Acquired: Apr 24 2015 03:06 pm
Operator: CCapul
Sample Name: CCV3
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:49 pm
Sample Type: CCV
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	Expected	QC Range(%)	Flag
7 Li	25.66 ppb	0.45	25.00	90 - 110	
9 Be	23.74 ppb	1.01	25.00	90 - 110	
11 B	23.07 ppb	2.90	25.00	90 - 110	
23 Na	1208.00 ppb	0.52	1250.00	90 - 110	
24 Mg	2412.00 ppb	1.24	2500.00	90 - 110	
27 Al	2428.00 ppb	1.74	2500.00	90 - 110	
28 Si	2438.00 ppb	0.55	2500.00	90 - 110	
31 P	244.00 ppb	1.65	250.00	90 - 110	
39 K	2569.00 ppb	0.93	2500.00	90 - 110	
40 Ca	2508.00 ppb	0.34	2500.00	90 - 110	
47 Ti	25.33 ppb	0.88	25.00	90 - 110	
51 V	25.78 ppb	0.65	25.00	90 - 110	
52 Cr	25.18 ppb	0.81	25.00	90 - 110	
55 Mn	23.92 ppb	0.89	25.00	90 - 110	
56 Fe	2585.00 ppb	0.55	2500.00	90 - 110	
59 Co	23.72 ppb	2.03	25.00	90 - 110	
60 Ni	25.23 ppb	0.99	25.00	90 - 110	
63 Cu	24.55 ppb	1.28	25.00	90 - 110	
66 Zn	50.09 ppb	0.90	50.00	90 - 110	
75 As	25.34 ppb	0.29	25.00	90 - 110	
78 Se	26.41 ppb	0.95	25.00	90 - 110	
88 Sr	25.01 ppb	0.15	25.00	90 - 110	
90 Zr	12.62 ppb	1.31	15.00	90 - 110	Fail
95 Mo	23.79 ppb	0.45	25.00	90 - 110	
107 Ag	24.82 ppb	0.53	25.00	90 - 110	
111 Cd	24.23 ppb	1.60	25.00	90 - 110	
118 Sn	25.36 ppb	0.43	25.00	90 - 110	
121 Sb	25.14 ppb	1.20	25.00	90 - 110	
137 Ba	24.96 ppb	0.12	25.00	90 - 110	
182 W	25.02 ppb	0.83	25.00	90 - 110	
205 Tl	24.69 ppb	0.90	25.00	90 - 110	
208 Pb	24.92 ppb	1.14	25.00	90 - 110	
235 U	0.18 ppb	0.87	0.18	90 - 110	
238 U	25.71 ppb	0.23	24.82	90 - 110	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	860743.81	0.56	1159752.60	74.2	60 - 125	
45 Sc	2326701.50	0.77	2567033.50	90.6	60 - 125	
45 Sc	534262.88	1.02	613402.44	87.1	60 - 125	
45 Sc	4078767.00	1.25	4679393.50	87.2	60 - 125	
72 Ge	628626.63	0.03	704157.69	89.3	60 - 125	
72 Ge	288283.91	0.39	321292.31	89.7	60 - 125	
72 Ge	979526.00	0.44	1114306.40	87.9	60 - 125	
115 In	6648108.00	0.54	7180580.50	92.6	60 - 125	
159 Tb	8620524.00	0.61	8719993.00	98.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

CCB QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13042.D\F6D13042.D#
Date Acquired: Apr 24 2015 03:10 pm
Operator: CCapul
Sample Name: CCB3
Misc Info:
Vial Number: 1102
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:49 pm
Sample Type: CCB
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	High Limit	Flag
7 Li	-0.02 ppb	1108.60	0.20	
9 Be	0.00 ppb	217.27	0.10	
11 B	-0.96 ppb	4.48	5.00	
23 Na	-11.78 ppb	5.56	40.00	
24 Mg	0.30 ppb	6.18	10.00	
27 Al	0.91 ppb	1.76	20.00	
28 Si	0.42 ppb	7.07	20.00	
31 P	-1.77 ppb	25.44	10.00	
39 K	-12.13 ppb	16.74	20.00	
40 Ca	-0.14 ppb	57.90	25.00	
47 Ti	0.03 ppb	49.24	0.50	
51 V	-0.03 ppb	18.09	0.50	
52 Cr	-0.03 ppb	5.25	0.20	
55 Mn	0.01 ppb	15.12	0.20	
56 Fe	2.24 ppb	7.99	10.00	
59 Co	0.00 ppb	168.22	0.20	
60 Ni	-0.01 ppb	6.10	0.20	
63 Cu	0.00 ppb	27.05	0.40	
66 Zn	0.00 ppb	491.22	2.00	
75 As	-0.01 ppb	23.69	0.20	
78 Se	0.00 ppb	595.31	0.20	
88 Sr	0.00 ppb	32.33	0.20	
90 Zr	-0.01 ppb	3.62	2.00	
95 Mo	0.02 ppb	9.58	0.40	
107 Ag	0.00 ppb	27.64	0.20	
111 Cd	0.00 ppb	132.31	0.20	
118 Sn	0.00 ppb	33.83	0.20	
121 Sb	0.00 ppb	106.92	0.40	
137 Ba	0.01 ppb	22.29	0.20	
182 W	0.01 ppb	35.73	1.00	
205 Tl	0.00 ppb	11.59	0.20	
208 Pb	0.00 ppb	39.30	0.10	
235 U	0.00 ppb	349.22	1.00	
238 U	0.00 ppb	11.69	0.10	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	865243.25	0.84	1159752.60	74.6	60 - 125	
45 Sc	2303924.30	2.49	2567033.50	89.8	60 - 125	
45 Sc	553470.06	1.21	613402.44	90.2	60 - 125	
45 Sc	3983305.80	1.00	4679393.50	85.1	60 - 125	
72 Ge	658996.25	0.69	704157.69	93.6	60 - 125	
72 Ge	298973.63	0.32	321292.31	93.1	60 - 125	
72 Ge	1002951.30	0.50	1114306.40	90.0	60 - 125	
115 In	6894700.50	1.40	7180580.50	96.0	60 - 125	
159 Tb	8831715.00	0.05	8719993.00	101.3	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13043.D\F6D13043.D#
Date Acquired:	Apr 24 2015 03:15 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-13
Misc Info:	
Vial Number:	2207
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	466969.3	0.0000	41.7800	ppb	2.16	225.00	
9 Be	# 3	45	3563.9	0.0000	0.7261	ppb	5.47	225.00	
11 B	# 3	45	38962.9	0.0000	9.5540	ppb	1.30	225.00	
23 Na	# 1	45	15282620.0	0.0000	1961.0000	ppb	1.48	269999.99	
24 Mg	# 3	45	211655100.0	0.0000	11120.0000	ppb	1.99	269999.99	
27 Al	# 3	45	1044561000.0	0.0000	39630.0000	ppb	2.18	90000.00	
28 Si	# 1	45	3600221.0	0.0000	1446.0000	ppb	3.38	18000.00	
31 P	# 3	45	98687.3	0.0000	43.1900	ppb	1.24	359999.99	
39 K	# 2	45	5037956.0	0.0000	2518.0000	ppb	0.11	269999.99	
40 Ca	# 1	45	67241432.0	0.0000	4026.0000	ppb	0.85	269999.99	
47 Ti	# 3	45	7398026.0	0.0000	2104.0000	ppb	2.16	2700.00	
51 V	# 2	45	1740021.0	0.0000	141.7000	ppb	0.36	2700.00	
52 Cr	# 2	45	483937.1	0.0000	33.1300	ppb	0.58	2700.00	
55 Mn	# 3	45	10363370.0	0.0000	168.4000	ppb	3.03	2700.00	
56 Fe	# 1	45	1170652000.0	0.0000	46710.0000	ppb	0.56	90000.00	
59 Co	# 3	45	761219.6	0.0000	14.9600	ppb	2.07	2700.00	
60 Ni	# 2	45	58127.3	0.0000	11.1100	ppb	1.12	2700.00	
63 Cu	# 2	45	182253.9	0.0000	13.3400	ppb	0.59	2700.00	
66 Zn	# 3	72	327881.7	0.0000	48.4900	ppb	0.44	2700.00	
75 As	# 2	72	15271.7	0.0000	7.4830	ppb	0.91	2700.00	
78 Se	# 1	72	219.8	0.0000	0.2448	ppb	9.32	2700.00	
88 Sr	# 3	72	3069593.0	0.0000	46.8600	ppb	0.61	2700.00	
90 Zr	# 3	72	122798.4	0.0000	2.1670	ppb	0.79	1800.00	
95 Mo	# 3	115	2209.1	0.0000	0.1811	ppb	1.76	2700.00	
107 Ag	# 3	115	803.4	0.0000	0.0248	ppb	2.98	225.00	
111 Cd	# 3	115	4669.2	0.0000	0.6854	ppb	3.76	2700.00	
118 Sn	# 3	115	100527.2	0.0000	5.7950	ppb	1.85	2700.00	
121 Sb	# 3	115	6319.4	0.0000	0.2304	ppb	0.63	2700.00	
137 Ba	# 3	115	1505638.0	0.0000	171.1000	ppb	0.57	2700.00	
182 W	# 3	159	1270.1	0.0000	0.0545	ppb	2.28	900.00	
205 Tl	# 3	159	25901.8	0.0000	0.5880	ppb	1.92	2700.00	
208 Pb	# 3	159	372531.9	0.0000	6.1900	ppb	0.86	2700.00	
235 U	# 3	159	996.7	0.0000	0.0153	ppb	6.03	27.00	
238 U	# 3	159	128423.6	0.0000	2.1690	ppb	0.70	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	935046.63	1.90	1159752.60	80.6	60 - 125	
45 Sc # 1	2717299.30	1.46	2567033.50	105.9	60 - 125	
45 Sc # 2	660843.88	0.71	613402.44	107.7	60 - 125	
45 Sc # 3	4930137.50	1.26	4679393.50	105.4	60 - 125	
72 Ge # 1	657882.56	1.08	704157.69	93.4	60 - 125	
72 Ge # 2	312975.34	0.12	321292.31	97.4	60 - 125	
72 Ge # 3	1089784.00	1.10	1114306.40	97.8	60 - 125	
115 In # 3	6751271.50	0.54	7180580.50	94.0	60 - 125	
159 Tb # 3	8936035.00	1.52	8719993.00	102.5	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7108

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13044.D\F6D13044.D#
Date Acquired: Apr 24 2015 03:19 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-14
Misc Info:
Vial Number: 2208
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	187185.6	0.0000	12.0400	ppb	1.08	225.00	
9 Be	# 3	45	1880.2	0.0000	0.3967	ppb	2.56	225.00	
11 B	# 3	45	12216.5	0.0000	1.8740	ppb	1.60	225.00	
23 Na	# 1	45	1649072.0	0.0000	190.1000	ppb	0.68	269999.99	
24 Mg	# 3	45	111695300.0	0.0000	6127.0000	ppb	1.48	269999.99	
27 Al	# 3	45	486775620.0	0.0000	19290.0000	ppb	2.51	90000.00	
28 Si	# 1	45	3760965.0	0.0000	1596.0000	ppb	1.71	18000.00	
31 P	# 3	45	268236.8	0.0000	158.4000	ppb	1.96	359999.99	
39 K	# 2	45	9855151.0	0.0000	5295.0000	ppb	1.63	269999.99	
40 Ca	# 1	45	32585600.0	0.0000	2059.0000	ppb	0.13	269999.99	
47 Ti	# 3	45	7208609.0	0.0000	2140.0000	ppb	1.62	2700.00	
51 V	# 2	45	1081683.0	0.0000	92.5700	ppb	0.81	2700.00	
52 Cr	# 2	45	338132.2	0.0000	24.3400	ppb	1.20	2700.00	
55 Mn	# 3	45	24867810.0	0.0000	421.9000	ppb	0.85	2700.00	
56 Fe	# 1	45	780833220.0	0.0000	32910.0000	ppb	0.67	90000.00	
59 Co	# 3	45	596282.5	0.0000	12.2400	ppb	1.25	2700.00	
60 Ni	# 2	45	45676.7	0.0000	9.1870	ppb	1.09	2700.00	
63 Cu	# 2	45	139175.8	0.0000	10.7200	ppb	1.09	2700.00	
66 Zn	# 3	72	319115.9	0.0000	48.0600	ppb	0.57	2700.00	
75 As	# 2	72	6333.0	0.0000	3.0370	ppb	1.25	2700.00	
78 Se	# 1	72	212.2	0.0000	0.2341	ppb	7.83	2700.00	
88 Sr	# 3	72	1246486.0	0.0000	19.3700	ppb	0.85	2700.00	
90 Zr	# 3	72	65722.6	0.0000	1.1730	ppb	1.21	1800.00	
95 Mo	# 3	115	8511.8	0.0000	0.7269	ppb	1.57	2700.00	
107 Ag	# 3	115	1256.8	0.0000	0.0402	ppb	3.76	225.00	
111 Cd	# 3	115	2019.7	0.0000	0.2910	ppb	4.34	2700.00	
118 Sn	# 3	115	91435.5	0.0000	5.2320	ppb	1.23	2700.00	
121 Sb	# 3	115	6100.4	0.0000	0.2195	ppb	3.61	2700.00	
137 Ba	# 3	115	1471975.0	0.0000	166.2000	ppb	2.31	2700.00	
182 W	# 3	159	1224.5	0.0000	0.0520	ppb	5.44	900.00	
205 Tl	# 3	159	24582.6	0.0000	0.5565	ppb	2.90	2700.00	
208 Pb	# 3	159	431982.2	0.0000	7.1590	ppb	0.81	2700.00	
235 U	# 3	159	774.5	0.0000	0.0118	ppb	1.39	27.00	
238 U	# 3	159	107628.6	0.0000	1.8130	ppb	2.30	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	977850.19	0.68	1159752.60	84.3	60 - 125	
45 Sc # 1	2572354.00	1.36	2567033.50	100.2	60 - 125	
45 Sc # 2	627673.00	1.20	613402.44	102.3	60 - 125	
45 Sc # 3	4721128.50	1.48	4679393.50	100.9	60 - 125	
72 Ge # 1	662649.81	0.97	704157.69	94.1	60 - 125	
72 Ge # 2	313876.50	0.18	321292.31	97.7	60 - 125	
72 Ge # 3	1070002.30	0.47	1114306.40	96.0	60 - 125	
115 In # 3	6800157.50	1.92	7180580.50	94.7	60 - 125	
159 Tb # 3	8961209.00	1.30	8719993.00	102.8	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13045.D\F6D13045.D#
Date Acquired: Apr 24 2015 03:23 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-15
Misc Info:
Vial Number: 2209
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	239908.9	0.0000	17.7800	ppb	1.72	225.00	
9 Be	# 3	45	2452.5	0.0000	0.5055	ppb	4.73	225.00	
11 B	# 3	45	13928.0	0.0000	2.2850	ppb	2.48	225.00	
23 Na	# 1	45	2592117.0	0.0000	304.8000	ppb	1.86	269999.99	
24 Mg	# 3	45	155533700.0	0.0000	8304.0000	ppb	0.34	269999.99	
27 Al	# 3	45	768524990.0	0.0000	29640.0000	ppb	1.16	90000.00	
28 Si	# 1	45	3898213.0	0.0000	1583.0000	ppb	2.86	18000.00	
31 P	# 3	45	180209.4	0.0000	96.8700	ppb	1.06	359999.99	
39 K	# 2	45	8566895.0	0.0000	4411.0000	ppb	1.07	269999.99	
40 Ca	# 1	45	44727120.0	0.0000	2705.0000	ppb	0.78	269999.99	
47 Ti	# 3	45	9412202.0	0.0000	2720.0000	ppb	1.10	2700.00	>LRS
51 V	# 2	45	1499921.0	0.0000	123.7000	ppb	1.61	2700.00	
52 Cr	# 2	45	421024.5	0.0000	29.1800	ppb	0.87	2700.00	
55 Mn	# 3	45	21343380.0	0.0000	352.5000	ppb	0.82	2700.00	
56 Fe	# 1	45	1088746000.0	0.0000	43910.0000	ppb	2.37	90000.00	
59 Co	# 3	45	636245.6	0.0000	12.7100	ppb	0.30	2700.00	
60 Ni	# 2	45	53106.8	0.0000	10.2800	ppb	1.07	2700.00	
63 Cu	# 2	45	133989.5	0.0000	9.9260	ppb	0.55	2700.00	
66 Zn	# 3	72	371176.9	0.0000	55.5200	ppb	1.03	2700.00	
75 As	# 2	72	8334.2	0.0000	4.0190	ppb	1.85	2700.00	
78 Se	# 1	72	212.0	0.0000	0.2332	ppb	3.24	2700.00	
88 Sr	# 3	72	1532989.0	0.0000	23.6600	ppb	1.10	2700.00	
90 Zr	# 3	72	79959.7	0.0000	1.4210	ppb	0.97	1800.00	
95 Mo	# 3	115	9522.4	0.0000	0.8229	ppb	2.75	2700.00	
107 Ag	# 3	115	1729.1	0.0000	0.0569	ppb	1.47	225.00	
111 Cd	# 3	115	2332.0	0.0000	0.3404	ppb	2.82	2700.00	
118 Sn	# 3	115	96180.2	0.0000	5.5600	ppb	0.41	2700.00	
121 Sb	# 3	115	5875.9	0.0000	0.2125	ppb	2.44	2700.00	
137 Ba	# 3	115	1784732.0	0.0000	203.5000	ppb	2.04	2700.00	
182 W	# 3	159	876.7	0.0000	0.0351	ppb	9.48	900.00	
205 Tl	# 3	159	30696.5	0.0000	0.7019	ppb	2.07	2700.00	
208 Pb	# 3	159	378188.2	0.0000	6.3230	ppb	0.29	2700.00	
235 U	# 3	159	1089.0	0.0000	0.0169	ppb	1.36	27.00	
238 U	# 3	159	135620.9	0.0000	2.3050	ppb	2.31	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	956516.44	0.76	1159752.60	82.5	60 - 125	
45 Sc # 1	2689599.50	2.33	2567033.50	104.8	60 - 125	
45 Sc # 2	652459.50	1.11	613402.44	106.4	60 - 125	
45 Sc # 3	4849596.00	1.03	4679393.50	103.6	60 - 125	
72 Ge # 1	664497.69	0.84	704157.69	94.4	60 - 125	
72 Ge # 2	314512.25	0.59	321292.31	97.9	60 - 125	
72 Ge # 3	1077587.80	0.94	1114306.40	96.7	60 - 125	
115 In # 3	6731456.50	0.23	7180580.50	93.7	60 - 125	
159 Tb # 3	8880442.00	1.41	8719993.00	101.8	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

1 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

7110

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13046.D\F6D13046.D#
Date Acquired:	Apr 24 2015 03:27 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-16
Misc Info:	
Vial Number:	2210
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	155026.1	0.0000	8.7130	ppb	0.84	225.00	
9 Be	# 3	45	1609.0	0.0000	0.3373	ppb	8.30	225.00	
11 B	# 3	45	10640.8	0.0000	1.3810	ppb	6.24	225.00	
23 Na	# 1	45	1168191.0	0.0000	121.8000	ppb	2.35	269999.99	
24 Mg	# 3	45	71591488.0	0.0000	3911.0000	ppb	1.18	269999.99	
27 Al	# 3	45	369039200.0	0.0000	14560.0000	ppb	1.27	90000.00	
28 Si	# 1	45	4649995.0	0.0000	1952.0000	ppb	0.95	18000.00	
31 P	# 3	45	417318.0	0.0000	256.3000	ppb	1.53	359999.99	
39 K	# 2	45	7687647.0	0.0000	4182.0000	ppb	1.30	269999.99	
40 Ca	# 1	45	38624072.0	0.0000	2415.0000	ppb	0.24	269999.99	
47 Ti	# 3	45	5006787.0	0.0000	1481.0000	ppb	1.06	2700.00	
51 V	# 2	45	667851.4	0.0000	57.9800	ppb	0.59	2700.00	
52 Cr	# 2	45	232717.9	0.0000	17.0000	ppb	0.46	2700.00	
55 Mn	# 3	45	35695780.0	0.0000	603.4000	ppb	1.21	2700.00	
56 Fe	# 1	45	537499780.0	0.0000	22410.0000	ppb	1.17	90000.00	
59 Co	# 3	45	491547.4	0.0000	10.0500	ppb	1.72	2700.00	
60 Ni	# 2	45	35758.0	0.0000	7.3130	ppb	0.86	2700.00	
63 Cu	# 2	45	159315.2	0.0000	12.4900	ppb	0.68	2700.00	
66 Zn	# 3	72	285436.9	0.0000	42.4200	ppb	1.51	2700.00	
75 As	# 2	72	4772.1	0.0000	2.2790	ppb	1.83	2700.00	
78 Se	# 1	72	213.8	0.0000	0.2321	ppb	0.43	2700.00	
88 Sr	# 3	72	1380290.0	0.0000	21.1700	ppb	1.04	2700.00	
90 Zr	# 3	72	38174.7	0.0000	0.6652	ppb	2.50	1800.00	
95 Mo	# 3	115	9389.0	0.0000	0.7864	ppb	2.27	2700.00	
107 Ag	# 3	115	987.8	0.0000	0.0303	ppb	11.63	225.00	
111 Cd	# 3	115	1889.7	0.0000	0.2663	ppb	4.63	2700.00	
118 Sn	# 3	115	85545.8	0.0000	4.7940	ppb	0.08	2700.00	
121 Sb	# 3	115	6261.6	0.0000	0.2208	ppb	1.32	2700.00	
137 Ba	# 3	115	1345988.0	0.0000	148.8000	ppb	0.36	2700.00	
182 W	# 3	159	1203.4	0.0000	0.0497	ppb	10.25	900.00	
205 Tl	# 3	159	18552.5	0.0000	0.4103	ppb	1.14	2700.00	
208 Pb	# 3	159	660833.7	0.0000	10.7200	ppb	0.78	2700.00	
235 U	# 3	159	695.6	0.0000	0.0103	ppb	6.78	27.00	
238 U	# 3	159	95013.0	0.0000	1.5660	ppb	1.51	2700.00	

ISTD Elements

Element		CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	# 3	987819.56	1.89	1159752.60	85.2	60 - 125	
45 Sc	# 1	2600529.00	1.20	2567033.50	101.3	60 - 125	
45 Sc	# 2	616742.44	0.55	613402.44	100.5	60 - 125	
45 Sc	# 3	4739543.50	2.07	4679393.50	101.3	60 - 125	
72 Ge	# 1	672960.63	2.29	704157.69	95.6	60 - 125	
72 Ge	# 2	311948.50	0.60	321292.31	97.1	60 - 125	
72 Ge	# 3	1084231.30	1.71	1114306.40	97.3	60 - 125	
115 In	# 3	6941652.50	1.08	7180580.50	96.7	60 - 125	
159 Tb	# 3	9157085.00	0.34	8719993.00	105.0	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7111

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13047.D\F6D13047.D#
Date Acquired:	Apr 24 2015 03:31 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-17
Misc Info:	
Vial Number:	2211
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	162436.7	0.0000	9.2210	ppb	1.79	225.00	
9 Be	# 3	45	1812.4	0.0000	0.3767	ppb	5.00	225.00	
11 B	# 3	45	9653.4	0.0000	1.0500	ppb	9.08	225.00	
23 Na	# 1	45	1210684.0	0.0000	131.0000	ppb	0.57	269999.99	
24 Mg	# 3	45	79010008.0	0.0000	4274.0000	ppb	0.83	269999.99	
27 Al	# 3	45	402541090.0	0.0000	15730.0000	ppb	1.92	90000.00	
28 Si	# 1	45	4443177.0	0.0000	1902.0000	ppb	2.19	18000.00	
31 P	# 3	45	281719.9	0.0000	164.8000	ppb	1.00	359999.99	
39 K	# 2	45	7508939.0	0.0000	4114.0000	ppb	0.91	269999.99	
40 Ca	# 1	45	32863670.0	0.0000	2095.0000	ppb	0.56	269999.99	
47 Ti	# 3	45	5512056.0	0.0000	1614.0000	ppb	0.64	2700.00	
51 V	# 2	45	728924.8	0.0000	63.8000	ppb	0.94	2700.00	
52 Cr	# 2	45	247042.3	0.0000	18.1900	ppb	0.67	2700.00	
55 Mn	# 3	45	31798890.0	0.0000	532.1000	ppb	0.80	2700.00	
56 Fe	# 1	45	570581890.0	0.0000	24260.0000	ppb	0.29	90000.00	
59 Co	# 3	45	504040.5	0.0000	10.2000	ppb	0.90	2700.00	
60 Ni	# 2	45	35293.3	0.0000	7.2730	ppb	1.86	2700.00	
63 Cu	# 2	45	151826.4	0.0000	11.9900	ppb	0.69	2700.00	
66 Zn	# 3	72	260765.6	0.0000	38.0700	ppb	0.66	2700.00	
75 As	# 2	72	4661.0	0.0000	2.2530	ppb	0.91	2700.00	
78 Se	# 1	72	200.7	0.0000	0.2210	ppb	10.00	2700.00	
88 Sr	# 3	72	1249071.0	0.0000	18.8300	ppb	0.94	2700.00	
90 Zr	# 3	72	47459.3	0.0000	0.8165	ppb	1.89	1800.00	
95 Mo	# 3	115	6729.6	0.0000	0.5569	ppb	2.47	2700.00	
107 Ag	# 3	115	1035.6	0.0000	0.0317	ppb	0.76	225.00	
111 Cd	# 3	115	1849.5	0.0000	0.2591	ppb	5.22	2700.00	
118 Sn	# 3	115	88089.4	0.0000	4.9090	ppb	1.64	2700.00	
121 Sb	# 3	115	4687.6	0.0000	0.1555	ppb	3.94	2700.00	
137 Ba	# 3	115	1344100.0	0.0000	147.8000	ppb	2.29	2700.00	
182 W	# 3	159	825.6	0.0000	0.0315	ppb	13.07	900.00	
205 Tl	# 3	159	20395.3	0.0000	0.4535	ppb	1.56	2700.00	
208 Pb	# 3	159	313210.0	0.0000	5.1020	ppb	0.70	2700.00	
235 U	# 3	159	727.8	0.0000	0.0108	ppb	2.83	27.00	
238 U	# 3	159	94541.7	0.0000	1.5660	ppb	0.30	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1001508.50	1.57	1159752.60	86.4	60 - 125	
45 Sc # 1	2549868.00	0.25	2567033.50	99.3	60 - 125	
45 Sc # 2	612167.25	0.89	613402.44	99.8	60 - 125	
45 Sc # 3	4786394.00	0.21	4679393.50	102.3	60 - 125	
72 Ge # 1	661745.38	0.47	704157.69	94.0	60 - 125	
72 Ge # 2	308005.97	0.49	321292.31	95.9	60 - 125	
72 Ge # 3	1103270.10	0.97	1114306.40	99.0	60 - 125	
115 In # 3	6982117.00	1.94	7180580.50	97.2	60 - 125	
159 Tb # 3	9111154.00	0.12	8719993.00	104.5	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13048.D\F6D13048.D#
Date Acquired: Apr 24 2015 03:36 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-18
Misc Info:
Vial Number: 2212
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	168684.0	0.0000	10.2100	ppb	2.21	225.00	
9 Be	# 3	45	1715.7	0.0000	0.3569	ppb	8.01	225.00	
11 B	# 3	45	13637.8	0.0000	2.2600	ppb	2.80	225.00	
23 Na	# 1	45	1501569.0	0.0000	166.1000	ppb	1.42	269999.99	
24 Mg	# 3	45	79899088.0	0.0000	4330.0000	ppb	1.15	269999.99	
27 Al	# 3	45	449793890.0	0.0000	17610.0000	ppb	1.10	90000.00	
28 Si	# 1	45	4653046.0	0.0000	1940.0000	ppb	1.35	18000.00	
31 P	# 3	45	336394.0	0.0000	201.0000	ppb	0.48	359999.99	
39 K	# 2	45	7986453.0	0.0000	4209.0000	ppb	1.34	269999.99	
40 Ca	# 1	45	36319128.0	0.0000	2255.0000	ppb	1.13	269999.99	
47 Ti	# 3	45	5314897.0	0.0000	1559.0000	ppb	0.76	2700.00	
51 V	# 2	45	778232.3	0.0000	65.5100	ppb	1.38	2700.00	
52 Cr	# 2	45	262615.2	0.0000	18.6000	ppb	0.40	2700.00	
55 Mn	# 3	45	39828980.0	0.0000	667.8000	ppb	1.28	2700.00	
56 Fe	# 1	45	616343870.0	0.0000	25520.0000	ppb	0.83	90000.00	
59 Co	# 3	45	663087.8	0.0000	13.4500	ppb	2.62	2700.00	
60 Ni	# 2	45	40780.0	0.0000	8.0820	ppb	0.15	2700.00	
63 Cu	# 2	45	154179.2	0.0000	11.7100	ppb	0.58	2700.00	
66 Zn	# 3	72	283736.2	0.0000	41.5200	ppb	0.63	2700.00	
75 As	# 2	72	5403.3	0.0000	2.5460	ppb	0.78	2700.00	
78 Se	# 1	72	204.2	0.0000	0.2224	ppb	7.22	2700.00	
88 Sr	# 3	72	1304216.0	0.0000	19.7000	ppb	0.99	2700.00	
90 Zr	# 3	72	51790.1	0.0000	0.8945	ppb	0.55	1800.00	
95 Mo	# 3	115	8306.1	0.0000	0.6897	ppb	2.35	2700.00	
107 Ag	# 3	115	1002.3	0.0000	0.0305	ppb	7.70	225.00	
111 Cd	# 3	115	2145.5	0.0000	0.3012	ppb	2.35	2700.00	
118 Sn	# 3	115	86872.1	0.0000	4.8380	ppb	0.81	2700.00	
121 Sb	# 3	115	6710.7	0.0000	0.2374	ppb	3.18	2700.00	
137 Ba	# 3	115	1408763.0	0.0000	154.8000	ppb	0.68	2700.00	
182 W	# 3	159	876.7	0.0000	0.0342	ppb	3.50	900.00	
205 Tl	# 3	159	19615.2	0.0000	0.4382	ppb	2.26	2700.00	
208 Pb	# 3	159	691086.7	0.0000	11.3200	ppb	1.38	2700.00	
235 U	# 3	159	588.9	0.0000	0.0087	ppb	7.25	27.00	
238 U	# 3	159	90466.2	0.0000	1.5050	ppb	0.90	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	978200.31	1.04	1159752.60	84.3	60 - 125	
45 Sc # 1	2618382.80	1.46	2567033.50	102.0	60 - 125	
45 Sc # 2	636692.63	0.18	613402.44	103.8	60 - 125	
45 Sc # 3	4777481.50	0.69	4679393.50	102.1	60 - 125	
72 Ge # 1	669304.44	1.08	704157.69	95.1	60 - 125	
72 Ge # 2	317495.97	0.34	321292.31	98.8	60 - 125	
72 Ge # 3	1100979.00	0.16	1114306.40	98.8	60 - 125	
115 In # 3	6985431.50	0.59	7180580.50	97.3	60 - 125	
159 Tb # 3	9068803.00	1.15	8719993.00	104.0	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13049.D\F6D13049.D#
Date Acquired: Apr 24 2015 03:40 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-19
Misc Info:
Vial Number: 2301
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	198174.7	0.0000	12.8000	ppb	1.76	225.00	
9 Be	# 3	45	2092.5	0.0000	0.4303	ppb	3.61	225.00	
11 B	# 3	45	10545.2	0.0000	1.2790	ppb	4.10	225.00	
23 Na	# 1	45	2001782.0	0.0000	231.3000	ppb	2.07	269999.99	
24 Mg	# 3	45	112893900.0	0.0000	6030.0000	ppb	1.18	269999.99	
27 Al	# 3	45	580517310.0	0.0000	22390.0000	ppb	1.46	90000.00	
28 Si	# 1	45	4620251.0	0.0000	1908.0000	ppb	2.73	18000.00	
31 P	# 3	45	225755.7	0.0000	126.3000	ppb	2.18	359999.99	
39 K	# 2	45	7466473.0	0.0000	3898.0000	ppb	0.69	269999.99	
40 Ca	# 1	45	36469240.0	0.0000	2243.0000	ppb	0.98	269999.99	
47 Ti	# 3	45	7224812.0	0.0000	2088.0000	ppb	0.70	2700.00	
51 V	# 2	45	1074132.0	0.0000	89.9100	ppb	0.63	2700.00	
52 Cr	# 2	45	330080.9	0.0000	23.2300	ppb	0.99	2700.00	
55 Mn	# 3	45	28616020.0	0.0000	472.8000	ppb	1.12	2700.00	
56 Fe	# 1	45	834872190.0	0.0000	34240.0000	ppb	0.81	90000.00	
59 Co	# 3	45	620060.3	0.0000	12.3900	ppb	1.80	2700.00	
60 Ni	# 2	45	45382.1	0.0000	8.9290	ppb	0.75	2700.00	
63 Cu	# 2	45	141575.2	0.0000	10.6700	ppb	0.96	2700.00	
66 Zn	# 3	72	312383.9	0.0000	45.6600	ppb	0.89	2700.00	
75 As	# 2	72	6488.8	0.0000	3.0820	ppb	0.58	2700.00	
78 Se	# 1	72	188.7	0.0000	0.2043	ppb	2.36	2700.00	
88 Sr	# 3	72	1320152.0	0.0000	19.9200	ppb	1.12	2700.00	
90 Zr	# 3	72	61135.3	0.0000	1.0580	ppb	2.48	1800.00	
95 Mo	# 3	115	6849.7	0.0000	0.5650	ppb	4.42	2700.00	
107 Ag	# 3	115	1296.8	0.0000	0.0402	ppb	3.26	225.00	
111 Cd	# 3	115	1665.3	0.0000	0.2318	ppb	4.09	2700.00	
118 Sn	# 3	115	92572.5	0.0000	5.1420	ppb	1.10	2700.00	
121 Sb	# 3	115	5208.9	0.0000	0.1759	ppb	1.86	2700.00	
137 Ba	# 3	115	1400690.0	0.0000	153.5000	ppb	1.07	2700.00	
182 W	# 3	159	701.2	0.0000	0.0258	ppb	10.61	900.00	
205 Tl	# 3	159	24441.2	0.0000	0.5518	ppb	1.99	2700.00	
208 Pb	# 3	159	348225.0	0.0000	5.7540	ppb	1.28	2700.00	
235 U	# 3	159	792.3	0.0000	0.0120	ppb	2.20	27.00	
238 U	# 3	159	108203.0	0.0000	1.8170	ppb	0.50	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	994322.19	1.05	1159752.60	85.7	60 - 125	
45 Sc # 1	2644164.00	1.05	2567033.50	103.0	60 - 125	
45 Sc # 2	641601.31	0.71	613402.44	104.6	60 - 125	
45 Sc # 3	4848441.00	1.55	4679393.50	103.6	60 - 125	
72 Ge # 1	670591.69	0.60	704157.69	95.2	60 - 125	
72 Ge # 2	317017.41	0.48	321292.31	98.7	60 - 125	
72 Ge # 3	1102409.00	2.42	1114306.40	98.9	60 - 125	
115 In # 3	7005152.50	0.85	7180580.50	97.6	60 - 125	
159 Tb # 3	8984541.00	0.81	8719993.00	103.0	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13050.D\F6D13050.D#
Date Acquired: Apr 24 2015 03:44 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: Dl14-20
Misc Info:
Vial Number: 2302
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	268673.3	0.0000	20.1900	ppb	1.99	225.00	
9 Be	# 3	45	3342.7	0.0000	0.6660	ppb	2.33	225.00	
11 B	# 3	45	31628.8	0.0000	7.2110	ppb	1.32	225.00	
23 Na	# 1	45	8983617.0	0.0000	1120.0000	ppb	1.42	269999.99	
24 Mg	# 3	45	141367700.0	0.0000	7269.0000	ppb	0.95	269999.99	
27 Al	# 3	45	960725890.0	0.0000	35680.0000	ppb	1.69	90000.00	
28 Si	# 1	45	4826527.0	0.0000	1911.0000	ppb	2.10	18000.00	
31 P	# 3	45	127439.6	0.0000	59.7500	ppb	1.13	359999.99	
39 K	# 2	45	7629089.0	0.0000	3821.0000	ppb	0.53	269999.99	
40 Ca	# 1	45	73696232.0	0.0000	4348.0000	ppb	0.17	269999.99	
47 Ti	# 3	45	7425262.0	0.0000	2067.0000	ppb	1.45	2700.00	
51 V	# 2	45	1217223.0	0.0000	97.8500	ppb	1.73	2700.00	
52 Cr	# 2	45	409604.8	0.0000	27.7100	ppb	0.20	2700.00	
55 Mn	# 3	45	37091600.0	0.0000	590.0000	ppb	1.30	2700.00	
56 Fe	# 1	45	1000348000.0	0.0000	39330.0000	ppb	1.01	90000.00	
59 Co	# 3	45	841910.1	0.0000	16.2000	ppb	1.76	2700.00	
60 Ni	# 2	45	56236.1	0.0000	10.6300	ppb	0.41	2700.00	
63 Cu	# 2	45	152720.8	0.0000	11.0500	ppb	0.87	2700.00	
66 Zn	# 3	72	364203.0	0.0000	53.1100	ppb	0.88	2700.00	
75 As	# 2	72	7369.0	0.0000	3.5460	ppb	0.54	2700.00	
78 Se	# 1	72	184.0	0.0000	0.2004	ppb	6.99	2700.00	
88 Sr	# 3	72	2309433.0	0.0000	34.7500	ppb	0.24	2700.00	
90 Zr	# 3	72	117870.8	0.0000	2.0500	ppb	1.41	1800.00	
95 Mo	# 3	115	6459.5	0.0000	0.5430	ppb	4.84	2700.00	
107 Ag	# 3	115	2122.5	0.0000	0.0690	ppb	4.51	225.00	
111 Cd	# 3	115	2784.3	0.0000	0.3993	ppb	2.02	2700.00	
118 Sn	# 3	115	99867.2	0.0000	5.6570	ppb	1.07	2700.00	
121 Sb	# 3	115	5086.7	0.0000	0.1750	ppb	2.24	2700.00	
137 Ba	# 3	115	2019446.0	0.0000	225.6000	ppb	0.71	2700.00	
182 W	# 3	159	731.2	0.0000	0.0275	ppb	9.91	900.00	
205 Tl	# 3	159	27372.4	0.0000	0.6216	ppb	1.74	2700.00	
208 Pb	# 3	159	425254.8	0.0000	7.0670	ppb	1.08	2700.00	
235 U	# 3	159	813.4	0.0000	0.0124	ppb	7.40	27.00	
238 U	# 3	159	112142.1	0.0000	1.8940	ppb	0.46	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	974080.31	2.03	1159752.60	84.0	60 - 125	
45 Sc # 1	2757420.30	0.73	2567033.50	107.4	60 - 125	
45 Sc # 2	668327.75	0.36	613402.44	109.0	60 - 125	
45 Sc # 3	5035721.50	1.46	4679393.50	107.6	60 - 125	
72 Ge # 1	665859.81	0.75	704157.69	94.6	60 - 125	
72 Ge # 2	314177.06	0.20	321292.31	97.8	60 - 125	
72 Ge # 3	1105315.00	1.06	1114306.40	99.2	60 - 125	
115 In # 3	6869599.50	0.62	7180580.50	95.7	60 - 125	
159 Tb # 3	8934825.00	0.82	8719993.00	102.5	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

CCV QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13052.D\F6D13052.D#
Date Acquired: Apr 24 2015 03:53 pm
Operator: CCapul
Sample Name: CCV4
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:49 pm
Sample Type: CCV
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	Expected	QC Range(%)	Flag
7 Li	25.85 ppb	0.84	25.00	90 - 110	
9 Be	23.64 ppb	0.67	25.00	90 - 110	
11 B	23.29 ppb	2.13	25.00	90 - 110	
23 Na	1217.00 ppb	2.12	1250.00	90 - 110	
24 Mg	2406.00 ppb	1.65	2500.00	90 - 110	
27 Al	2435.00 ppb	2.85	2500.00	90 - 110	
28 Si	2439.00 ppb	0.44	2500.00	90 - 110	
31 P	243.80 ppb	2.00	250.00	90 - 110	
39 K	2525.00 ppb	1.01	2500.00	90 - 110	
40 Ca	2520.00 ppb	0.82	2500.00	90 - 110	
47 Ti	25.41 ppb	2.32	25.00	90 - 110	
51 V	25.58 ppb	0.43	25.00	90 - 110	
52 Cr	24.99 ppb	0.52	25.00	90 - 110	
55 Mn	24.53 ppb	1.62	25.00	90 - 110	
56 Fe	2603.00 ppb	1.11	2500.00	90 - 110	
59 Co	24.05 ppb	1.82	25.00	90 - 110	
60 Ni	24.80 ppb	0.93	25.00	90 - 110	
63 Cu	24.13 ppb	0.83	25.00	90 - 110	
66 Zn	50.37 ppb	1.21	50.00	90 - 110	
75 As	25.23 ppb	0.53	25.00	90 - 110	
78 Se	25.88 ppb	0.79	25.00	90 - 110	
88 Sr	25.39 ppb	1.73	25.00	90 - 110	
90 Zr	12.28 ppb	2.06	15.00	90 - 110	Fail
95 Mo	23.73 ppb	0.59	25.00	90 - 110	
107 Ag	24.91 ppb	1.75	25.00	90 - 110	
111 Cd	24.07 ppb	0.69	25.00	90 - 110	
118 Sn	25.50 ppb	1.02	25.00	90 - 110	
121 Sb	25.13 ppb	1.50	25.00	90 - 110	
137 Ba	25.36 ppb	1.30	25.00	90 - 110	
182 W	25.01 ppb	0.57	25.00	90 - 110	
205 Tl	24.45 ppb	1.07	25.00	90 - 110	
208 Pb	25.12 ppb	0.78	25.00	90 - 110	
235 U	0.18 ppb	2.88	0.18	90 - 110	
238 U	25.92 ppb	1.39	24.82	90 - 110	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	851323.50	1.06	1159752.60	73.4	60 - 125	
45 Sc	2307528.30	0.77	2567033.50	89.9	60 - 125	
45 Sc	536687.38	0.15	613402.44	87.5	60 - 125	
45 Sc	4055751.50	1.95	4679393.50	86.7	60 - 125	
72 Ge	631479.56	0.46	704157.69	89.7	60 - 125	
72 Ge	284728.06	0.73	321292.31	88.6	60 - 125	
72 Ge	974273.81	2.01	1114306.40	87.4	60 - 125	
115 In	6666053.50	0.66	7180580.50	92.8	60 - 125	
159 Tb	8679415.00	0.77	8719993.00	99.5	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

CCB QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13053.D\F6D13053.D#
Date Acquired: Apr 24 2015 03:57 pm
Operator: CCapul
Sample Name: CCB4
Misc Info:
Vial Number: 1102
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:49 pm
Sample Type: CCB
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	High Limit	Flag
7 Li	-0.02 ppb	347.91	0.20	
9 Be	0.00 ppb	159.75	0.10	
11 B	-1.05 ppb	3.87	5.00	
23 Na	-13.11 ppb	2.45	40.00	
24 Mg	0.31 ppb	8.69	10.00	
27 Al	0.90 ppb	0.59	20.00	
28 Si	0.46 ppb	8.32	20.00	
31 P	-1.54 ppb	3.98	10.00	
39 K	-13.68 ppb	11.37	20.00	
40 Ca	-0.21 ppb	37.66	25.00	
47 Ti	0.05 ppb	17.89	0.50	
51 V	-0.05 ppb	9.99	0.50	
52 Cr	-0.03 ppb	10.03	0.20	
55 Mn	0.03 ppb	9.04	0.20	
56 Fe	2.39 ppb	5.20	10.00	
59 Co	0.00 ppb	68.54	0.20	
60 Ni	-0.01 ppb	38.88	0.20	
63 Cu	-0.01 ppb	11.20	0.40	
66 Zn	0.00 ppb	102.71	2.00	
75 As	-0.02 ppb	33.20	0.20	
78 Se	0.00 ppb	63.56	0.20	
88 Sr	0.00 ppb	426.49	0.20	
90 Zr	-0.01 ppb	9.99	2.00	
95 Mo	0.01 ppb	5.80	0.40	
107 Ag	0.00 ppb	163.78	0.20	
111 Cd	0.00 ppb	74.08	0.20	
118 Sn	0.00 ppb	12.17	0.20	
121 Sb	0.00 ppb	148.30	0.40	
137 Ba	0.00 ppb	103.16	0.20	
182 W	0.01 ppb	14.86	1.00	
205 Tl	0.00 ppb	71.27	0.20	
208 Pb	0.00 ppb	26.03	0.10	
235 U	0.00 ppb	193.79	1.00	
238 U	0.00 ppb	21.27	0.10	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	851752.25	1.61	1159752.60	73.4	60 - 125	
45 Sc	2301125.50	1.11	2567033.50	89.6	60 - 125	
45 Sc	548931.56	1.01	613402.44	89.5	60 - 125	
45 Sc	4020536.30	0.41	4679393.50	85.9	60 - 125	
72 Ge	653979.44	0.97	704157.69	92.9	60 - 125	
72 Ge	295454.91	0.82	321292.31	92.0	60 - 125	
72 Ge	1004476.90	0.38	1114306.40	90.1	60 - 125	
115 In	6905533.50	0.44	7180580.50	96.2	60 - 125	
159 Tb	8918441.00	1.17	8719993.00	102.3	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

CCB QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13054.D\F6D13054.D#
Date Acquired: Apr 24 2015 04:04 pm
Operator: CCapul
Sample Name: IMD025WB
Misc Info:
Vial Number: 2303
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:49 pm
Sample Type: MBW
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	High Limit	Flag
7 Li	0.03 ppb	55.62	1.00	
9 Be	0.00 ppb	43.53	0.50	
11 B	-1.13 ppb	0.27	5.00	
23 Na	-11.53 ppb	3.37	50.00	
24 Mg	0.86 ppb	2.92	50.00	
27 Al	1.63 ppb	2.55	50.00	
28 Si	0.74 ppb	10.43	25.00	
31 P	-1.05 ppb	31.06	25.00	
39 K	-15.04 ppb	4.25	50.00	
40 Ca	8.70 ppb	1.38	50.00	
47 Ti	0.08 ppb	33.03	1.00	
51 V	-0.07 ppb	8.75	0.50	
52 Cr	-0.03 ppb	13.16	0.50	
55 Mn	0.04 ppb	5.33	0.50	
56 Fe	2.05 ppb	3.54	50.00	
59 Co	0.00 ppb	29.33	0.50	
60 Ni	-0.01 ppb	19.96	0.50	
63 Cu	0.03 ppb	0.77	0.50	
66 Zn	0.88 ppb	2.58	10.00	
75 As	-0.03 ppb	19.75	0.50	
78 Se	0.00 ppb	138.48	0.50	
88 Sr	0.01 ppb	6.86	1.00	
90 Zr	-0.01 ppb	7.95	2.50	
95 Mo	0.00 ppb	86.08	1.00	
107 Ag	0.00 ppb	34.37	0.50	
111 Cd	0.00 ppb	114.96	0.50	
118 Sn	0.00 ppb	56.76	0.50	
121 Sb	0.00 ppb	94.24	0.50	
137 Ba	0.02 ppb	10.30	0.50	
182 W	0.00 ppb	46.37	1.00	
205 Tl	0.00 ppb	112.63	0.50	
208 Pb	0.00 ppb	82.55	0.50	
235 U	0.00 ppb	42.30	#VALUE!	
238 U	0.00 ppb	48.64	0.50	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	844431.50	1.27	1159752.60	72.8	60 - 125	
45 Sc	2290936.00	1.47	2567033.50	89.2	60 - 125	
45 Sc	553048.13	0.53	613402.44	90.2	60 - 125	
45 Sc	4032317.50	1.88	4679393.50	86.2	60 - 125	
72 Ge	652887.50	0.51	704157.69	92.7	60 - 125	
72 Ge	299236.69	0.06	321292.31	93.1	60 - 125	
72 Ge	1001183.90	1.28	1114306.40	89.8	60 - 125	
115 In	6936276.00	1.14	7180580.50	96.6	60 - 125	
159 Tb	9144205.00	0.67	8719993.00	104.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

LCS QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13055.D\F6D13055.D#
Date Acquired:	Apr 24 2015 04:08 pm
Operator:	CCapul
Sample Name:	IMD025WL
Misc Info:	
Vial Number:	2304
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	LCS
Final Dil Factor:	1.00

Analyte Elements

Element	CPS Mean	Conc.		RSD(%)	Expected	QC Range(%)	Flag
7 Li	320737.31	29.12	ppb	2.05	30.00	80 - 120	
9 Be	111780.60	27.54	ppb	1.89	30.00	80 - 120	
11 B	82007.54	26.91	ppb	0.58	30.00	80 - 120	
23 Na	18697950.00	2851.00	ppb	2.32	3000.00	80 - 120	
24 Mg	43577832.00	2740.00	ppb	1.50	3000.00	80 - 120	
27 Al	59137848.00	2686.00	ppb	2.74	3000.00	80 - 120	
28 Si	8059.46	3.09	ppb	4.18	3000.00	80 - 120	Fail
31 P	25925.96	0.23	ppb	300.09	300.00	80 - 120	Fail
39 K	4822155.00	2898.00	ppb	0.53	3000.00	80 - 120	
40 Ca	42113168.00	2977.00	ppb	0.75	3000.00	80 - 120	
47 Ti	83945.77	28.52	ppb	1.49	30.00	80 - 120	
51 V	311126.09	29.91	ppb	0.62	30.00	80 - 120	
52 Cr	348809.59	28.55	ppb	1.04	30.00	80 - 120	
55 Mn	1428069.00	27.74	ppb	0.87	30.00	80 - 120	
56 Fe	65857248.00	3104.00	ppb	0.71	3000.00	80 - 120	
59 Co	1169857.00	27.52	ppb	0.92	30.00	80 - 120	
60 Ni	125680.10	28.78	ppb	1.16	30.00	80 - 120	
63 Cu	318869.00	27.95	ppb	0.59	30.00	80 - 120	
66 Zn	383512.59	61.19	ppb	1.69	60.00	80 - 120	
75 As	54175.58	28.35	ppb	0.76	30.00	80 - 120	
78 Se	25265.53	29.84	ppb	1.04	30.00	80 - 120	
88 Sr	1723446.00	28.37	ppb	1.83	30.00	80 - 120	
90 Zr	5105.56	0.08	ppb	1.44	20.00	80 - 120	Fail
95 Mo	313931.00	27.40	ppb	1.37	30.00	80 - 120	
107 Ag	838155.13	28.86	ppb	1.17	30.00	80 - 120	
111 Cd	183096.80	27.06	ppb	0.92	30.00	80 - 120	
118 Sn	518347.31	29.88	ppb	0.65	30.00	80 - 120	
121 Sb	690104.69	28.89	ppb	0.55	30.00	80 - 120	
137 Ba	259223.30	29.42	ppb	0.21	30.00	80 - 120	
182 W	616.71	0.02	ppb	11.97	30.00	80 - 120	Fail
205 Tl	1235596.00	27.97	ppb	1.01	30.00	80 - 120	
208 Pb	1710781.00	28.26	ppb	0.13	30.00	80 - 120	
235 U	12604.37	0.20	ppb	1.09	0.21	80 - 120	
238 U	1757119.00	29.48	ppb	1.85	29.79	80 - 120	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	870985.13	1.55	1159752.60	75.1	60 - 125	
45 Sc	2300750.80	1.15	2567033.50	89.6	60 - 125	
45 Sc	552450.69	1.50	613402.44	90.1	60 - 125	
45 Sc	4118127.50	1.94	4679393.50	88.0	60 - 125	
72 Ge	648519.69	0.36	704157.69	92.1	60 - 125	
72 Ge	295828.75	1.02	321292.31	92.1	60 - 125	
72 Ge	1010674.60	2.02	1114306.40	90.7	60 - 125	
115 In	6759149.50	0.43	7180580.50	94.1	60 - 125	
159 Tb	9000437.00	0.43	8719993.00	103.2	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

4 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

LCS QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13056.D\F6D13056.D#
Date Acquired:	Apr 24 2015 04:12 pm
Operator:	CCapul
Sample Name:	IMD025WC
Misc Info:	
Vial Number:	2305
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	LCS
Final Dil Factor:	1.00

Analyte Elements

Element	CPS Mean	Conc.		RSD(%)	Expected	QC Range(%)	Flag
7 Li	325640.19	29.45	ppb	2.95	30.00	80 - 120	
9 Be	111869.40	27.00	ppb	0.66	30.00	80 - 120	
11 B	81979.27	26.32	ppb	0.45	30.00	80 - 120	
23 Na	18831350.00	2795.00	ppb	2.31	3000.00	80 - 120	
24 Mg	43859112.00	2702.00	ppb	0.59	3000.00	80 - 120	
27 Al	59634820.00	2653.00	ppb	0.74	3000.00	80 - 120	
28 Si	6874.16	2.44	ppb	3.21	3000.00	80 - 120	Fail
31 P	25684.41	-0.36	ppb	80.60	300.00	80 - 120	Fail
39 K	4836171.00	2871.00	ppb	0.66	3000.00	80 - 120	
40 Ca	42430900.00	2921.00	ppb	1.57	3000.00	80 - 120	
47 Ti	83918.46	27.93	ppb	0.76	30.00	80 - 120	
51 V	313893.09	29.82	ppb	1.07	30.00	80 - 120	
52 Cr	349654.09	28.28	ppb	0.90	30.00	80 - 120	
55 Mn	1436998.00	27.34	ppb	0.30	30.00	80 - 120	
56 Fe	66257540.00	3040.00	ppb	1.70	3000.00	80 - 120	
59 Co	1178548.00	27.17	ppb	0.95	30.00	80 - 120	
60 Ni	125099.90	28.31	ppb	0.27	30.00	80 - 120	
63 Cu	321299.41	27.83	ppb	0.70	30.00	80 - 120	
66 Zn	376863.69	59.58	ppb	1.00	60.00	80 - 120	
75 As	54410.02	28.10	ppb	0.40	30.00	80 - 120	
78 Se	25448.75	29.55	ppb	1.00	30.00	80 - 120	
88 Sr	1706533.00	27.83	ppb	0.08	30.00	80 - 120	
90 Zr	4929.92	0.08	ppb	3.45	20.00	80 - 120	Fail
95 Mo	313732.91	26.84	ppb	0.61	30.00	80 - 120	
107 Ag	831078.81	28.06	ppb	1.42	30.00	80 - 120	
111 Cd	183712.41	26.61	ppb	0.56	30.00	80 - 120	
118 Sn	515909.81	29.15	ppb	0.31	30.00	80 - 120	
121 Sb	694649.13	28.50	ppb	0.72	30.00	80 - 120	
137 Ba	255848.80	28.47	ppb	0.68	30.00	80 - 120	
182 W	665.60	0.02	ppb	12.63	30.00	80 - 120	Fail
205 Tl	1229380.00	27.58	ppb	0.69	30.00	80 - 120	
208 Pb	1695564.00	27.76	ppb	1.05	30.00	80 - 120	
235 U	12628.82	0.20	ppb	1.35	0.21	80 - 120	
238 U	1731166.00	28.79	ppb	0.90	29.79	80 - 120	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	876073.81	1.61	1159752.60	75.5	60 - 125	
45 Sc	2363469.00	1.92	2567033.50	92.1	60 - 125	
45 Sc	559020.00	0.62	613402.44	91.1	60 - 125	
45 Sc	4202983.50	0.22	4679393.50	89.8	60 - 125	
72 Ge	659598.19	0.08	704157.69	93.7	60 - 125	
72 Ge	299782.50	0.51	321292.31	93.3	60 - 125	
72 Ge	1019808.10	1.10	1114306.40	91.5	60 - 125	
115 In	6894731.50	0.87	7180580.50	96.0	60 - 125	
159 Tb	9080504.00	0.88	8719993.00	104.1	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

4 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13057.D\F6D13057.D#
Date Acquired:	Apr 24 2015 04:17 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-09
Misc Info:	
Vial Number:	2306
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	60727.2	0.0000	0.2610	ppb	18.93	225.00	
9 Be	# 3	45	14.4	0.0000	-0.0040	ppb	67.87	225.00	
11 B	# 3	45	105105.0	0.0000	35.0800	ppb	0.64	225.00	
23 Na	# 1	45	11587390.0	0.0000	1716.0000	ppb	1.47	269999.99	
24 Mg	# 3	45	2934493.0	0.0000	184.5000	ppb	1.09	269999.99	
27 Al	# 3	45	184196.7	0.0000	8.2260	ppb	1.74	90000.00	
28 Si	# 1	45	293986.8	0.0000	136.0000	ppb	0.81	18000.00	
31 P	# 3	45	29549.2	0.0000	3.0150	ppb	0.79	359999.99	
39 K	# 2	45	237225.7	0.0000	41.5200	ppb	1.11	269999.99	
40 Ca	# 1	45	6394207.0	0.0000	440.5000	ppb	0.84	269999.99	
47 Ti	# 3	45	1618.0	0.0000	0.4995	ppb	6.75	2700.00	
51 V	# 2	45	5529.1	0.0000	0.0231	ppb	14.84	2700.00	
52 Cr	# 2	45	5907.7	0.0000	0.3263	ppb	1.05	2700.00	
55 Mn	# 3	45	30620.8	0.0000	0.5532	ppb	2.05	2700.00	
56 Fe	# 1	45	480017.0	0.0000	21.9400	ppb	1.47	90000.00	
59 Co	# 3	45	966.7	0.0000	0.0166	ppb	7.69	2700.00	
60 Ni	# 2	45	1666.6	0.0000	0.3437	ppb	1.42	2700.00	
63 Cu	# 2	45	4516.7	0.0000	0.3597	ppb	0.88	2700.00	
66 Zn	# 3	72	40900.9	0.0000	6.3050	ppb	1.13	2700.00	
75 As	# 2	72	212.9	0.0000	0.0111	ppb	51.55	2700.00	
78 Se	# 1	72	13.3	0.0000	0.0043	ppb	123.06	2700.00	
88 Sr	# 3	72	157579.2	0.0000	2.5330	ppb	0.90	2700.00	
90 Zr	# 3	72	914.5	0.0000	-0.0004	ppb	157.59	1800.00	
95 Mo	# 3	115	552.3	0.0000	0.0344	ppb	8.27	2700.00	
107 Ag	# 3	115	168.9	0.0000	0.0027	ppb	36.58	225.00	
111 Cd	# 3	115	58.1	0.0000	0.0026	ppb	62.10	2700.00	
118 Sn	# 3	115	514.5	0.0000	0.0198	ppb	5.09	2700.00	
121 Sb	# 3	115	3639.5	0.0000	0.1121	ppb	6.20	2700.00	
137 Ba	# 3	115	7477.9	0.0000	0.8070	ppb	1.60	2700.00	
182 W	# 3	159	273.3	0.0000	0.0044	ppb	19.62	900.00	
205 Tl	# 3	159	126.7	0.0000	0.0003	ppb	160.30	2700.00	
208 Pb	# 3	159	4482.7	0.0000	0.0623	ppb	3.79	2700.00	
235 U	# 3	159	31.1	0.0000	0.0000	ppb	875.33	27.00	
238 U	# 3	159	711.2	0.0000	0.0108	ppb	5.48	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	875236.94	2.71	1159752.60	75.5	60 - 125	
45 Sc # 1	2347489.00	0.84	2567033.50	91.4	60 - 125	
45 Sc # 2	566266.69	0.50	613402.44	92.3	60 - 125	
45 Sc # 3	4110531.50	0.91	4679393.50	87.8	60 - 125	
72 Ge # 1	657244.69	1.50	704157.69	93.3	60 - 125	
72 Ge # 2	304517.72	0.73	321292.31	94.8	60 - 125	
72 Ge # 3	1030771.60	1.78	1114306.40	92.5	60 - 125	
115 In # 3	7017220.50	1.27	7180580.50	97.7	60 - 125	
159 Tb # 3	9085819.00	2.85	8719993.00	104.2	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

CCV QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13059.D\F6D13059.D#
Date Acquired:	Apr 24 2015 04:25 pm
Operator:	CCapul
Sample Name:	CCV5
Misc Info:	
Vial Number:	1206
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update:	Apr 24 2015 12:49 pm
Sample Type:	CCV
Total Dil Factor:	1.00

QC Elements

Element	Conc.	RSD(%)	Expected	QC Range(%)	Flag
7 Li	25.72 ppb	1.05	25.00	90 - 110	
9 Be	23.55 ppb	1.64	25.00	90 - 110	
11 B	23.00 ppb	2.61	25.00	90 - 110	
23 Na	1220.00 ppb	1.03	1250.00	90 - 110	
24 Mg	2385.00 ppb	2.25	2500.00	90 - 110	
27 Al	2429.00 ppb	1.73	2500.00	90 - 110	
28 Si	2442.00 ppb	0.96	2500.00	90 - 110	
31 P	242.70 ppb	1.47	250.00	90 - 110	
39 K	2541.00 ppb	0.68	2500.00	90 - 110	
40 Ca	2537.00 ppb	1.39	2500.00	90 - 110	
47 Ti	25.23 ppb	2.38	25.00	90 - 110	
51 V	25.61 ppb	0.59	25.00	90 - 110	
52 Cr	24.79 ppb	1.30	25.00	90 - 110	
55 Mn	24.35 ppb	1.30	25.00	90 - 110	
56 Fe	2575.00 ppb	1.21	2500.00	90 - 110	
59 Co	24.25 ppb	3.20	25.00	90 - 110	
60 Ni	24.82 ppb	0.21	25.00	90 - 110	
63 Cu	24.13 ppb	0.82	25.00	90 - 110	
66 Zn	50.10 ppb	0.86	50.00	90 - 110	
75 As	25.14 ppb	0.59	25.00	90 - 110	
78 Se	26.10 ppb	0.43	25.00	90 - 110	
88 Sr	25.05 ppb	2.05	25.00	90 - 110	
90 Zr	11.04 ppb	1.97	15.00	90 - 110	Fail
95 Mo	23.76 ppb	0.71	25.00	90 - 110	
107 Ag	24.74 ppb	1.02	25.00	90 - 110	
111 Cd	24.08 ppb	0.87	25.00	90 - 110	
118 Sn	25.34 ppb	1.15	25.00	90 - 110	
121 Sb	25.15 ppb	0.24	25.00	90 - 110	
137 Ba	25.19 ppb	0.30	25.00	90 - 110	
182 W	25.08 ppb	1.04	25.00	90 - 110	
205 Tl	24.98 ppb	1.36	25.00	90 - 110	
208 Pb	24.82 ppb	0.68	25.00	90 - 110	
235 U	0.18 ppb	1.47	0.18	90 - 110	
238 U	25.93 ppb	0.42	24.82	90 - 110	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	845495.31	0.69	1159752.60	72.9	60 - 125	
45 Sc	2353267.50	0.55	2567033.50	91.7	60 - 125	
45 Sc	555861.06	0.22	613402.44	90.6	60 - 125	
45 Sc	4100010.30	1.33	4679393.50	87.6	60 - 125	
72 Ge	634534.00	0.37	704157.69	90.1	60 - 125	
72 Ge	296311.09	0.93	321292.31	92.2	60 - 125	
72 Ge	996449.25	1.60	1114306.40	89.4	60 - 125	
115 In	6746372.00	0.66	7180580.50	94.0	60 - 125	
159 Tb	8779462.00	0.61	8719993.00	100.7	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

CCB QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13060.D\F6D13060.D#
Date Acquired: Apr 24 2015 04:30 pm
Operator: CCapul
Sample Name: CCB5
Misc Info:
Vial Number: 1102
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:49 pm
Sample Type: CCB
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	High Limit	Flag
7 Li	0.06 ppb	144.81	0.20	
9 Be	0.00 ppb	1112.80	0.10	
11 B	-1.05 ppb	2.52	5.00	
23 Na	-11.75 ppb	2.39	40.00	
24 Mg	0.26 ppb	13.73	10.00	
27 Al	0.50 ppb	4.48	20.00	
28 Si	0.55 ppb	6.68	20.00	
31 P	-2.02 ppb	40.28	10.00	
39 K	-13.65 ppb	10.35	20.00	
40 Ca	-0.09 ppb	72.11	25.00	
47 Ti	0.01 ppb	72.13	0.50	
51 V	-0.01 ppb	95.03	0.50	
52 Cr	-0.03 ppb	2.80	0.20	
55 Mn	0.02 ppb	6.01	0.20	
56 Fe	1.48 ppb	6.97	10.00	
59 Co	0.00 ppb	83.77	0.20	
60 Ni	-0.01 ppb	19.93	0.20	
63 Cu	-0.01 ppb	30.27	0.40	
66 Zn	0.00 ppb	609.12	2.00	
75 As	0.00 ppb	110.27	0.20	
78 Se	0.00 ppb	176.51	0.20	
88 Sr	0.00 ppb	272.34	0.20	
90 Zr	-0.01 ppb	8.57	2.00	
95 Mo	0.01 ppb	21.72	0.40	
107 Ag	0.00 ppb	41.66	0.20	
111 Cd	0.00 ppb	279.95	0.20	
118 Sn	0.00 ppb	64.44	0.20	
121 Sb	0.02 ppb	11.75	0.40	
137 Ba	0.00 ppb	65.18	0.20	
182 W	0.00 ppb	23.79	1.00	
205 Tl	0.00 ppb	50.18	0.20	
208 Pb	0.00 ppb	20.34	0.10	
235 U	0.00 ppb	69.13	1.00	
238 U	0.00 ppb	11.61	0.10	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	838461.06	1.74	1159752.60	72.3	60 - 125	
45 Sc	2307434.00	1.33	2567033.50	89.9	60 - 125	
45 Sc	558146.63	1.39	613402.44	91.0	60 - 125	
45 Sc	4062418.80	0.60	4679393.50	86.8	60 - 125	
72 Ge	654972.25	0.20	704157.69	93.0	60 - 125	
72 Ge	302497.66	1.38	321292.31	94.2	60 - 125	
72 Ge	1008830.30	1.24	1114306.40	90.5	60 - 125	
115 In	7019344.00	1.16	7180580.50	97.8	60 - 125	
159 Tb	9186432.00	0.30	8719993.00	105.3	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

CCB QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13061.D\F6D13061.D#
Date Acquired: Apr 24 2015 04:34 pm
Operator: CCapul
Sample Name: IMD029SB
Misc Info:
Vial Number: 2308
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:49 pm
Sample Type: MBS
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	High Limit	Flag
7 Li	0.02 ppb	644.84	0.50	
9 Be	0.00 ppb	56.60	0.50	
11 B	-1.10 ppb	1.86	10.00	
23 Na	-8.72 ppb	5.57	100.00	
24 Mg	0.93 ppb	2.68	100.00	
27 Al	2.10 ppb	1.17	100.00	
28 Si	1.75 ppb	32.69	50.00	
31 P	6.24 ppb	1.78	10.00	
39 K	-13.86 ppb	2.88	100.00	
40 Ca	17.46 ppb	0.86	100.00	
47 Ti	0.04 ppb	10.90	0.50	
51 V	-0.18 ppb	4.28	0.50	
52 Cr	-0.03 ppb	7.12	0.50	
55 Mn	0.06 ppb	5.76	0.50	
56 Fe	1.58 ppb	2.87	100.00	
59 Co	0.00 ppb	261.04	0.50	
60 Ni	0.03 ppb	5.61	0.50	
63 Cu	0.05 ppb	7.50	0.50	
66 Zn	0.86 ppb	3.05	2.00	
75 As	-0.03 ppb	13.60	0.50	
78 Se	0.00 ppb	64.10	0.50	
88 Sr	0.01 ppb	10.08	0.50	
90 Zr	-0.01 ppb	2.52	5.00	
95 Mo	0.01 ppb	38.62	0.50	
107 Ag	0.00 ppb	118.91	0.50	
111 Cd	0.00 ppb	134.86	0.50	
118 Sn	3.66 ppb	0.80	20.00	
121 Sb	0.00 ppb	20.98	0.50	
137 Ba	0.03 ppb	15.04	0.50	
182 W	0.00 ppb	470.56	2.00	
205 Tl	0.00 ppb	182.81	0.50	
208 Pb	0.00 ppb	12.96	0.50	
235 U	0.00 ppb	325.39	#VALUE!	
238 U	0.00 ppb	24.74	0.50	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	891885.81	1.00	1159752.60	76.9	60 - 125	
45 Sc	2330404.00	1.19	2567033.50	90.8	60 - 125	
45 Sc	583441.50	1.06	613402.44	95.1	60 - 125	
45 Sc	4249348.50	0.66	4679393.50	90.8	60 - 125	
72 Ge	656427.31	0.83	704157.69	93.2	60 - 125	
72 Ge	313124.13	0.68	321292.31	97.5	60 - 125	
72 Ge	1047981.10	0.59	1114306.40	94.0	60 - 125	
115 In	7149831.50	0.99	7180580.50	99.6	60 - 125	
159 Tb	9342984.00	1.55	8719993.00	107.1	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

LCS QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13062.D\F6D13062.D#
Date Acquired:	Apr 24 2015 04:38 pm
Operator:	CCapul
Sample Name:	IMD029SL
Misc Info:	
Vial Number:	2309
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	LCSS
Final Dil Factor:	1.00

Analyte Elements

Element	CPS Mean	Conc.		RSD(%)	Expected	QC Range(%)	Flag
7 Li	538850.81	52.95	ppb	2.86	50.00	80 - 120	
9 Be	199278.50	47.55	ppb	1.24	50.00	80 - 120	
11 B	144850.80	47.35	ppb	1.06	50.00	80 - 120	
23 Na	33632840.00	4879.00	ppb	0.42	5000.00	80 - 120	
24 Mg	80191408.00	4883.00	ppb	1.67	5000.00	80 - 120	
27 Al	108932600.00	4791.00	ppb	0.29	5000.00	80 - 120	
28 Si	5925.89	1.92	ppb	4.39	5000.00	80 - 120	Fail
31 P	35610.86	6.73	ppb	3.94	500.00	80 - 120	Fail
39 K	8684346.00	5063.00	ppb	0.50	5000.00	80 - 120	
40 Ca	77871752.00	5213.00	ppb	0.33	5000.00	80 - 120	
47 Ti	152606.30	50.25	ppb	0.69	50.00	80 - 120	
51 V	568557.88	52.62	ppb	0.25	50.00	80 - 120	
52 Cr	635305.00	49.81	ppb	0.54	50.00	80 - 120	
55 Mn	2600562.00	48.95	ppb	1.75	50.00	80 - 120	
56 Fe	119965100.00	5350.00	ppb	0.73	5000.00	80 - 120	
59 Co	2124153.00	48.41	ppb	1.11	50.00	80 - 120	
60 Ni	225537.91	49.39	ppb	0.26	50.00	80 - 120	
63 Cu	570422.63	47.81	ppb	0.66	50.00	80 - 120	
66 Zn	673319.69	104.50	ppb	0.91	100.00	80 - 120	
75 As	98247.80	50.03	ppb	0.82	50.00	80 - 120	
78 Se	44413.09	50.77	ppb	0.63	50.00	80 - 120	
88 Sr	3104489.00	49.69	ppb	0.92	50.00	80 - 120	
90 Zr	7538.94	0.12	ppb	2.61	30.00	80 - 120	Fail
95 Mo	574274.63	49.05	ppb	1.91	50.00	80 - 120	
107 Ag	1451488.00	48.90	ppb	1.46	50.00	80 - 120	
111 Cd	328209.91	47.45	ppb	0.64	50.00	80 - 120	
118 Sn	976901.00	55.09	ppb	1.07	50.00	80 - 120	
121 Sb	1211756.00	49.64	ppb	1.02	50.00	80 - 120	
137 Ba	459933.91	51.08	ppb	1.28	50.00	80 - 120	
182 W	955.63	0.04	ppb	10.51	50.00	80 - 120	Fail
205 Tl	2170298.00	48.75	ppb	1.68	50.00	80 - 120	
208 Pb	2981552.00	48.87	ppb	1.03	50.00	80 - 120	
235 U	22972.24	0.36	ppb	2.50	0.35	80 - 120	
238 U	3087040.00	51.39	ppb	1.70	49.65	80 - 120	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	875816.75	0.73	1159752.60	75.5	60 - 125	
45 Sc	2430982.30	1.19	2567033.50	94.7	60 - 125	
45 Sc	577951.25	0.39	613402.44	94.2	60 - 125	
45 Sc	4251966.50	0.10	4679393.50	90.9	60 - 125	
72 Ge	670151.19	0.93	704157.69	95.2	60 - 125	
72 Ge	304498.72	0.85	321292.31	94.8	60 - 125	
72 Ge	1039405.70	1.65	1114306.40	93.3	60 - 125	
115 In	6909795.00	1.44	7180580.50	96.2	60 - 125	
159 Tb	9071701.00	1.29	8719993.00	104.0	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

4 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

7125

LCS QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13063.D\F6D13063.D#
Date Acquired:	Apr 24 2015 04:42 pm
Operator:	CCapul
Sample Name:	IMD029SC
Misc Info:	
Vial Number:	2310
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	LCSS
Final Dil Factor:	1.00

Analyte Elements

Element	CPS Mean	Conc.		RSD(%)	Expected	QC Range(%)	Flag
7 Li	549979.69	52.85	ppb	2.57	50.00	80 - 120	
9 Be	204360.70	47.64	ppb	0.93	50.00	80 - 120	
11 B	148616.50	47.47	ppb	0.78	50.00	80 - 120	
23 Na	34231700.00	4877.00	ppb	1.11	5000.00	80 - 120	
24 Mg	80541936.00	4792.00	ppb	0.16	5000.00	80 - 120	
27 Al	109590300.00	4709.00	ppb	0.24	5000.00	80 - 120	
28 Si	4616.45	1.30	ppb	4.16	5000.00	80 - 120	Fail
31 P	35982.29	6.40	ppb	5.38	500.00	80 - 120	Fail
39 K	8787797.00	5118.00	ppb	0.91	5000.00	80 - 120	
40 Ca	77512128.00	5096.00	ppb	1.00	5000.00	80 - 120	
47 Ti	154535.41	49.72	ppb	0.45	50.00	80 - 120	
51 V	573841.88	53.06	ppb	1.22	50.00	80 - 120	
52 Cr	637032.81	49.90	ppb	1.68	50.00	80 - 120	
55 Mn	2605114.00	47.91	ppb	0.67	50.00	80 - 120	
56 Fe	120702000.00	5288.00	ppb	1.04	5000.00	80 - 120	
59 Co	2144283.00	47.74	ppb	0.35	50.00	80 - 120	
60 Ni	226489.09	49.55	ppb	1.59	50.00	80 - 120	
63 Cu	573698.69	48.03	ppb	1.32	50.00	80 - 120	
66 Zn	642767.88	99.65	ppb	1.10	100.00	80 - 120	
75 As	98696.21	50.24	ppb	0.17	50.00	80 - 120	
78 Se	45205.37	51.56	ppb	0.81	50.00	80 - 120	
88 Sr	3118859.00	49.86	ppb	1.10	50.00	80 - 120	
90 Zr	7305.47	0.12	ppb	3.77	30.00	80 - 120	Fail
95 Mo	581536.63	48.78	ppb	0.94	50.00	80 - 120	
107 Ag	1483295.00	49.08	ppb	1.53	50.00	80 - 120	
111 Cd	333858.19	47.40	ppb	0.46	50.00	80 - 120	
118 Sn	985271.00	54.57	ppb	1.60	50.00	80 - 120	
121 Sb	1242238.00	49.98	ppb	1.49	50.00	80 - 120	
137 Ba	468732.31	51.13	ppb	1.86	50.00	80 - 120	
182 W	1014.53	0.04	ppb	7.52	50.00	80 - 120	Fail
205 Tl	2207812.00	48.69	ppb	0.85	50.00	80 - 120	
208 Pb	3023415.00	48.66	ppb	0.37	50.00	80 - 120	
235 U	23150.35	0.35	ppb	1.47	0.35	80 - 120	
238 U	3144639.00	51.40	ppb	0.45	49.65	80 - 120	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	895765.06	1.70	1159752.60	77.2	60 - 125	
45 Sc	2475007.80	0.25	2567033.50	96.4	60 - 125	
45 Sc	578580.88	1.11	613402.44	94.3	60 - 125	
45 Sc	4351846.00	0.17	4679393.50	93.0	60 - 125	
72 Ge	671703.25	0.64	704157.69	95.4	60 - 125	
72 Ge	304593.66	0.48	321292.31	94.8	60 - 125	
72 Ge	1040703.50	1.85	1114306.40	93.4	60 - 125	
115 In	7035558.00	1.04	7180580.50	98.0	60 - 125	
159 Tb	9238267.00	0.89	8719993.00	105.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

4 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13064.D\F6D13064.D#
Date Acquired:	Apr 24 2015 04:47 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-21
Misc Info:	
Vial Number:	2311
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	197447.7	0.0000	13.7700	ppb	0.82	225.00	
9 Be	# 3	45	2818.1	0.0000	0.5710	ppb	4.22	225.00	
11 B	# 3	45	18189.5	0.0000	3.4530	ppb	4.67	225.00	
23 Na	# 1	45	6932989.0	0.0000	876.0000	ppb	1.76	269999.99	
24 Mg	# 3	45	119040900.0	0.0000	6236.0000	ppb	1.01	269999.99	
27 Al	# 3	45	625145980.0	0.0000	23650.0000	ppb	1.43	90000.00	
28 Si	# 1	45	4447025.0	0.0000	1800.0000	ppb	1.58	18000.00	
31 P	# 3	45	86118.0	0.0000	35.0600	ppb	2.03	359999.99	
39 K	# 2	45	6020571.0	0.0000	3067.0000	ppb	0.59	269999.99	
40 Ca	# 1	45	44635088.0	0.0000	2692.0000	ppb	1.40	269999.99	
47 Ti	# 3	45	5987842.0	0.0000	1698.0000	ppb	0.70	2700.00	
51 V	# 2	45	1052325.0	0.0000	86.5500	ppb	0.61	2700.00	
52 Cr	# 2	45	328536.3	0.0000	22.7200	ppb	0.47	2700.00	
55 Mn	# 3	45	22826980.0	0.0000	369.9000	ppb	0.55	2700.00	
56 Fe	# 1	45	830084670.0	0.0000	33380.0000	ppb	2.61	90000.00	
59 Co	# 3	45	539066.7	0.0000	10.5600	ppb	1.09	2700.00	
60 Ni	# 2	45	45030.5	0.0000	8.7060	ppb	0.50	2700.00	
63 Cu	# 2	45	123759.9	0.0000	9.1600	ppb	0.54	2700.00	
66 Zn	# 3	72	272124.7	0.0000	40.0300	ppb	0.50	2700.00	
75 As	# 2	72	6064.9	0.0000	2.8570	ppb	1.33	2700.00	
78 Se	# 1	72	167.6	0.0000	0.1805	ppb	9.71	2700.00	
88 Sr	# 3	72	1767687.0	0.0000	26.8500	ppb	0.83	2700.00	
90 Zr	# 3	72	82318.9	0.0000	1.4400	ppb	0.79	1800.00	
95 Mo	# 3	115	4056.3	0.0000	0.3280	ppb	3.59	2700.00	
107 Ag	# 3	115	1759.1	0.0000	0.0553	ppb	0.95	225.00	
111 Cd	# 3	115	2674.9	0.0000	0.3739	ppb	3.61	2700.00	
118 Sn	# 3	115	93887.4	0.0000	5.1890	ppb	0.36	2700.00	
121 Sb	# 3	115	4470.9	0.0000	0.1452	ppb	3.15	2700.00	
137 Ba	# 3	115	1577888.0	0.0000	172.0000	ppb	2.52	2700.00	
182 W	# 3	159	872.3	0.0000	0.0336	ppb	0.57	900.00	
205 Tl	# 3	159	25022.2	0.0000	0.5559	ppb	3.08	2700.00	
208 Pb	# 3	159	343144.0	0.0000	5.5790	ppb	2.08	2700.00	
235 U	# 3	159	748.9	0.0000	0.0111	ppb	3.95	27.00	
238 U	# 3	159	97368.2	0.0000	1.6090	ppb	1.58	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	943375.06	2.50	1159752.60	81.3	60 - 125	
45 Sc # 1	2697219.50	2.81	2567033.50	105.1	60 - 125	
45 Sc # 2	652867.94	0.64	613402.44	106.4	60 - 125	
45 Sc # 3	4943126.50	0.51	4679393.50	105.6	60 - 125	
72 Ge # 1	669616.31	1.56	704157.69	95.1	60 - 125	
72 Ge # 2	318924.91	0.62	321292.31	99.3	60 - 125	
72 Ge # 3	1095120.90	0.97	1114306.40	98.3	60 - 125	
115 In # 3	7039500.00	1.18	7180580.50	98.0	60 - 125	
159 Tb # 3	9132285.00	1.97	8719993.00	104.7	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7127

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13065.D\F6D13065.D#
Date Acquired: Apr 24 2015 04:51 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-22M
Misc Info:
Vial Number: 2312
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	680964.5	0.0000	62.2500	ppb	2.26	225.00	
9 Be	# 3	45	210930.1	0.0000	45.1600	ppb	0.68	225.00	
11 B	# 3	45	155461.1	0.0000	45.5300	ppb	1.43	225.00	
23 Na	# 1	45	35446512.0	0.0000	4840.0000	ppb	1.73	269999.99	
24 Mg	# 3	45	155474300.0	0.0000	8495.0000	ppb	1.13	269999.99	
27 Al	# 3	45	510438020.0	0.0000	20140.0000	ppb	1.22	90000.00	
28 Si	# 1	45	5049146.0	0.0000	2134.0000	ppb	1.61	18000.00	
31 P	# 3	45	296397.8	0.0000	176.4000	ppb	1.30	359999.99	
39 K	# 2	45	16800780.0	0.0000	9096.0000	ppb	0.47	269999.99	
40 Ca	# 1	45	104777200.0	0.0000	6602.0000	ppb	0.87	269999.99	
47 Ti	# 3	45	4941953.0	0.0000	1462.0000	ppb	0.21	2700.00	
51 V	# 2	45	1312221.0	0.0000	112.4000	ppb	1.19	2700.00	
52 Cr	# 2	45	859864.6	0.0000	62.0900	ppb	1.44	2700.00	
55 Mn	# 3	45	27940690.0	0.0000	472.3000	ppb	0.66	2700.00	
56 Fe	# 1	45	664715580.0	0.0000	27910.0000	ppb	0.03	90000.00	
59 Co	# 3	45	2583785.0	0.0000	52.8300	ppb	0.66	2700.00	
60 Ni	# 2	45	254291.9	0.0000	51.2600	ppb	0.34	2700.00	
63 Cu	# 2	45	691644.5	0.0000	53.3600	ppb	0.63	2700.00	
66 Zn	# 3	72	884923.8	0.0000	130.4000	ppb	0.61	2700.00	
75 As	# 2	72	100256.3	0.0000	49.8300	ppb	0.49	2700.00	
78 Se	# 1	72	42941.6	0.0000	48.8400	ppb	0.18	2700.00	
88 Sr	# 3	72	4128661.0	0.0000	62.7300	ppb	0.70	2700.00	
90 Zr	# 3	72	60043.3	0.0000	1.0460	ppb	0.51	1800.00	
95 Mo	# 3	115	563258.7	0.0000	47.8900	ppb	0.80	2700.00	
107 Ag	# 3	115	1430642.0	0.0000	47.9800	ppb	1.27	225.00	
111 Cd	# 3	115	323684.4	0.0000	46.5900	ppb	1.03	2700.00	
118 Sn	# 3	115	983443.6	0.0000	55.2100	ppb	0.95	2700.00	
121 Sb	# 3	115	993152.2	0.0000	40.5000	ppb	0.70	2700.00	
137 Ba	# 3	115	1561514.0	0.0000	172.6000	ppb	0.49	2700.00	
182 W	# 3	159	1839.1	0.0000	0.0816	ppb	4.43	900.00	
205 Tl	# 3	159	2126729.0	0.0000	47.8100	ppb	0.73	2700.00	
208 Pb	# 3	159	3441965.0	0.0000	56.4700	ppb	0.33	2700.00	
235 U	# 3	159	23007.8	0.0000	0.3582	ppb	0.14	27.00	
238 U	# 3	159	3065148.0	0.0000	51.0700	ppb	0.47	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	957056.94	1.78	1159752.60	82.5	60 - 125	
45 Sc # 1	2582818.00	0.82	2567033.50	100.6	60 - 125	
45 Sc # 2	627859.56	0.62	613402.44	102.4	60 - 125	
45 Sc # 3	4739163.50	1.87	4679393.50	101.3	60 - 125	
72 Ge # 1	673568.50	1.23	704157.69	95.7	60 - 125	
72 Ge # 2	311978.41	0.52	321292.31	97.1	60 - 125	
72 Ge # 3	1095013.60	0.94	1114306.40	98.3	60 - 125	
115 In # 3	6940501.00	1.23	7180580.50	96.7	60 - 125	
159 Tb # 3	9062747.00	0.95	8719993.00	103.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13066.D\F6D13066.D#
Date Acquired:	Apr 24 2015 04:55 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-22S
Misc Info:	
Vial Number:	2401
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	694989.9	0.0000	62.1900	ppb	2.28	225.00	
9 Be	# 3	45	214259.1	0.0000	45.5800	ppb	1.06	225.00	
11 B	# 3	45	157040.9	0.0000	45.7000	ppb	1.40	225.00	
23 Na	# 1	45	36650680.0	0.0000	4810.0000	ppb	2.23	269999.99	
24 Mg	# 3	45	154475600.0	0.0000	8386.0000	ppb	0.43	269999.99	
27 Al	# 3	45	517827490.0	0.0000	20300.0000	ppb	1.12	90000.00	
28 Si	# 1	45	5341085.0	0.0000	2170.0000	ppb	1.87	18000.00	
31 P	# 3	45	289235.7	0.0000	170.4000	ppb	0.52	359999.99	
39 K	# 2	45	16933930.0	0.0000	9069.0000	ppb	0.72	269999.99	
40 Ca	# 1	45	109042400.0	0.0000	6604.0000	ppb	2.27	269999.99	
47 Ti	# 3	45	5075168.0	0.0000	1491.0000	ppb	1.01	2700.00	
51 V	# 2	45	1301789.0	0.0000	110.3000	ppb	0.41	2700.00	
52 Cr	# 2	45	874346.5	0.0000	62.4600	ppb	0.81	2700.00	
55 Mn	# 3	45	44479920.0	0.0000	747.1000	ppb	1.79	2700.00	
56 Fe	# 1	45	668750590.0	0.0000	26980.0000	ppb	0.37	90000.00	
59 Co	# 3	45	2749554.0	0.0000	55.8600	ppb	0.80	2700.00	
60 Ni	# 2	45	261056.4	0.0000	52.0500	ppb	0.88	2700.00	
63 Cu	# 2	45	706512.8	0.0000	53.9200	ppb	0.85	2700.00	
66 Zn	# 3	72	877078.1	0.0000	131.6000	ppb	0.51	2700.00	
75 As	# 2	72	102075.0	0.0000	49.8700	ppb	0.59	2700.00	
78 Se	# 1	72	43919.4	0.0000	48.9900	ppb	0.37	2700.00	
88 Sr	# 3	72	4162877.0	0.0000	64.4200	ppb	0.63	2700.00	
90 Zr	# 3	72	56903.4	0.0000	1.0090	ppb	0.77	1800.00	
95 Mo	# 3	115	569251.1	0.0000	48.2600	ppb	0.61	2700.00	
107 Ag	# 3	115	1421822.0	0.0000	47.5500	ppb	0.54	225.00	
111 Cd	# 3	115	329872.3	0.0000	47.3500	ppb	1.52	2700.00	
118 Sn	# 3	115	991826.6	0.0000	55.5300	ppb	1.56	2700.00	
121 Sb	# 3	115	1014150.0	0.0000	41.2400	ppb	1.26	2700.00	
137 Ba	# 3	115	1761697.0	0.0000	194.2000	ppb	0.99	2700.00	
182 W	# 3	159	1766.9	0.0000	0.0774	ppb	6.11	900.00	
205 Tl	# 3	159	2112925.0	0.0000	47.1300	ppb	1.36	2700.00	
208 Pb	# 3	159	3423988.0	0.0000	55.7400	ppb	0.88	2700.00	
235 U	# 3	159	23088.0	0.0000	0.3566	ppb	0.51	27.00	
238 U	# 3	159	3081104.0	0.0000	50.9300	ppb	1.42	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	977759.25	2.88	1159752.60	84.3	60 - 125	
45 Sc # 1	2687583.00	1.59	2567033.50	104.7	60 - 125	
45 Sc # 2	634725.69	0.77	613402.44	103.5	60 - 125	
45 Sc # 3	4769680.00	1.31	4679393.50	101.9	60 - 125	
72 Ge # 1	686808.44	1.00	704157.69	97.5	60 - 125	
72 Ge # 2	317334.91	1.18	321292.31	98.8	60 - 125	
72 Ge # 3	1075157.10	1.23	1114306.40	96.5	60 - 125	
115 In # 3	6960075.50	0.98	7180580.50	96.9	60 - 125	
159 Tb # 3	9134987.00	1.81	8719993.00	104.8	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13067.D\F6D13067.D#
Date Acquired: Apr 24 2015 04:59 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-22A
Misc Info:
Vial Number: 2402
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	698393.7	0.0000	60.1900	ppb	1.90	225.00	
9 Be	# 3	45	220666.2	0.0000	46.1700	ppb	1.58	225.00	
11 B	# 3	45	165561.8	0.0000	47.4700	ppb	1.32	225.00	
23 Na	# 1	45	39886300.0	0.0000	5169.0000	ppb	1.92	269999.99	
24 Mg	# 3	45	165754000.0	0.0000	8851.0000	ppb	0.98	269999.99	
27 Al	# 3	45	441944510.0	0.0000	17040.0000	ppb	1.15	90000.00	
28 Si	# 1	45	4697909.0	0.0000	1884.0000	ppb	0.55	18000.00	
31 P	# 3	45	296387.6	0.0000	171.9000	ppb	1.64	359999.99	
39 K	# 2	45	17785780.0	0.0000	9374.0000	ppb	0.71	269999.99	
40 Ca	# 1	45	116050600.0	0.0000	6937.0000	ppb	0.58	269999.99	
47 Ti	# 3	45	5031785.0	0.0000	1454.0000	ppb	1.12	2700.00	
51 V	# 2	45	1305663.0	0.0000	108.8000	ppb	1.24	2700.00	
52 Cr	# 2	45	863962.5	0.0000	60.7100	ppb	0.79	2700.00	
55 Mn	# 3	45	28505510.0	0.0000	470.9000	ppb	1.82	2700.00	
56 Fe	# 1	45	660902400.0	0.0000	26320.0000	ppb	0.86	90000.00	
59 Co	# 3	45	2646472.0	0.0000	52.8900	ppb	2.02	2700.00	
60 Ni	# 2	45	257638.1	0.0000	50.5400	ppb	0.67	2700.00	
63 Cu	# 2	45	698491.5	0.0000	52.4400	ppb	0.75	2700.00	
66 Zn	# 3	72	875528.6	0.0000	126.8000	ppb	0.15	2700.00	
75 As	# 2	72	104341.2	0.0000	50.7200	ppb	0.21	2700.00	
78 Se	# 1	72	45371.2	0.0000	49.7900	ppb	1.17	2700.00	
88 Sr	# 3	72	4219351.0	0.0000	63.0000	ppb	0.65	2700.00	
90 Zr	# 3	72	41247.7	0.0000	0.7002	ppb	0.44	1800.00	
95 Mo	# 3	115	589144.6	0.0000	49.2700	ppb	1.05	2700.00	
107 Ag	# 3	115	1398273.0	0.0000	46.1300	ppb	0.57	225.00	
111 Cd	# 3	115	330651.8	0.0000	46.8100	ppb	0.47	2700.00	
118 Sn	# 3	115	997950.9	0.0000	55.1100	ppb	1.08	2700.00	
121 Sb	# 3	115	1192083.0	0.0000	47.8200	ppb	0.66	2700.00	
137 Ba	# 3	115	1567399.0	0.0000	170.5000	ppb	1.79	2700.00	
182 W	# 3	159	1996.9	0.0000	0.0885	ppb	6.40	900.00	
205 Tl	# 3	159	2129363.0	0.0000	47.4400	ppb	1.94	2700.00	
208 Pb	# 3	159	3408358.0	0.0000	55.4200	ppb	0.83	2700.00	
235 U	# 3	159	22468.0	0.0000	0.3467	ppb	1.96	27.00	
238 U	# 3	159	3033585.0	0.0000	50.0800	ppb	0.29	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1012426.80	4.31	1159752.60	87.3	60 - 125	
45 Sc # 1	2722920.50	2.11	2567033.50	106.1	60 - 125	
45 Sc # 2	645158.44	0.83	613402.44	105.2	60 - 125	
45 Sc # 3	4848696.00	0.43	4679393.50	103.6	60 - 125	
72 Ge # 1	698082.13	0.91	704157.69	99.1	60 - 125	
72 Ge # 2	318964.03	0.23	321292.31	99.3	60 - 125	
72 Ge # 3	1114240.90	1.14	1114306.40	100.0	60 - 125	
115 In # 3	7055921.50	0.52	7180580.50	98.3	60 - 125	
159 Tb # 3	9145523.00	1.06	8719993.00	104.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7130

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13068.D\F6D13068.D#
Date Acquired:	Apr 24 2015 05:03 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-22
Misc Info:	
Vial Number:	2403
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	148514.4	0.0000	7.6530	ppb	2.69	225.00	
9 Be	# 3	45	1467.9	0.0000	0.2990	ppb	4.57	225.00	
11 B	# 3	45	9756.8	0.0000	1.0360	ppb	5.24	225.00	
23 Na	# 1	45	1374307.0	0.0000	143.3000	ppb	2.88	269999.99	
24 Mg	# 3	45	71848288.0	0.0000	3828.0000	ppb	0.65	269999.99	
27 Al	# 3	45	313741790.0	0.0000	12070.0000	ppb	1.36	90000.00	
28 Si	# 1	45	4713410.0	0.0000	1907.0000	ppb	0.55	18000.00	
31 P	# 3	45	293434.6	0.0000	169.6000	ppb	1.40	359999.99	
39 K	# 2	45	8269457.0	0.0000	4321.0000	ppb	1.48	269999.99	
40 Ca	# 1	45	28873000.0	0.0000	1740.0000	ppb	1.73	269999.99	
47 Ti	# 3	45	4908252.0	0.0000	1416.0000	ppb	1.39	2700.00	
51 V	# 2	45	707411.5	0.0000	58.9500	ppb	0.64	2700.00	
52 Cr	# 2	45	217588.4	0.0000	15.2400	ppb	0.55	2700.00	
55 Mn	# 3	45	26505390.0	0.0000	436.9000	ppb	0.63	2700.00	
56 Fe	# 1	45	533349500.0	0.0000	21440.0000	ppb	1.59	90000.00	
59 Co	# 3	45	470172.5	0.0000	9.3690	ppb	0.19	2700.00	
60 Ni	# 2	45	29589.6	0.0000	5.8020	ppb	0.50	2700.00	
63 Cu	# 2	45	127510.6	0.0000	9.5890	ppb	0.10	2700.00	
66 Zn	# 3	72	242378.9	0.0000	35.0900	ppb	0.62	2700.00	
75 As	# 2	72	4498.9	0.0000	2.0610	ppb	1.64	2700.00	
78 Se	# 1	72	187.3	0.0000	0.1931	ppb	4.63	2700.00	
88 Sr	# 3	72	1035879.0	0.0000	15.4900	ppb	0.78	2700.00	
90 Zr	# 3	72	34122.0	0.0000	0.5772	ppb	0.61	1800.00	
95 Mo	# 3	115	7325.5	0.0000	0.5911	ppb	1.43	2700.00	
107 Ag	# 3	115	955.6	0.0000	0.0282	ppb	3.09	225.00	
111 Cd	# 3	115	1623.5	0.0000	0.2205	ppb	5.44	2700.00	
118 Sn	# 3	115	86842.3	0.0000	4.7130	ppb	1.37	2700.00	
121 Sb	# 3	115	7216.6	0.0000	0.2505	ppb	4.34	2700.00	
137 Ba	# 3	115	1137036.0	0.0000	121.7000	ppb	1.30	2700.00	
182 W	# 3	159	1049.0	0.0000	0.0408	ppb	12.82	900.00	
205 Tl	# 3	159	16516.5	0.0000	0.3554	ppb	2.50	2700.00	
208 Pb	# 3	159	556467.4	0.0000	8.7930	ppb	0.97	2700.00	
235 U	# 3	159	583.4	0.0000	0.0083	ppb	6.03	27.00	
238 U	# 3	159	83097.1	0.0000	1.3340	ppb	1.45	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1017752.70	2.45	1159752.60	87.8	60 - 125	
45 Sc # 1	2698055.80	2.34	2567033.50	105.1	60 - 125	
45 Sc # 2	642651.19	1.09	613402.44	104.8	60 - 125	
45 Sc # 3	4860012.00	1.64	4679393.50	103.9	60 - 125	
72 Ge # 1	702345.31	0.71	704157.69	99.7	60 - 125	
72 Ge # 2	323869.75	1.69	321292.31	100.8	60 - 125	
72 Ge # 3	1112253.00	0.30	1114306.40	99.8	60 - 125	
115 In # 3	7169055.00	1.27	7180580.50	99.8	60 - 125	
159 Tb # 3	9400751.00	0.31	8719993.00	107.8	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7131

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13069.D\F6D13069.D#
Date Acquired: Apr 24 2015 05:07 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-22J
Misc Info:
Vial Number: 2404
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	89864.2	0.0000	1.3520	ppb	2.47	225.00	
9 Be	# 3	45	353.4	0.0000	0.0679	ppb	14.23	225.00	
11 B	# 3	45	3660.6	0.0000	-0.7507	ppb	5.06	225.00	
23 Na	# 1	45	421661.6	0.0000	21.0300	ppb	3.87	269999.99	
24 Mg	# 3	45	14975370.0	0.0000	816.0000	ppb	1.68	269999.99	
27 Al	# 3	45	64885488.0	0.0000	2554.0000	ppb	1.62	90000.00	
28 Si	# 1	45	990900.9	0.0000	423.8000	ppb	3.54	18000.00	
31 P	# 3	45	84813.6	0.0000	36.4200	ppb	2.45	359999.99	
39 K	# 2	45	1836018.0	0.0000	905.2000	ppb	0.36	269999.99	
40 Ca	# 1	45	5947549.0	0.0000	376.9000	ppb	0.89	269999.99	
47 Ti	# 3	45	1019264.0	0.0000	300.7000	ppb	0.70	2700.00	
51 V	# 2	45	142988.1	0.0000	11.8300	ppb	0.97	2700.00	
52 Cr	# 2	45	44749.0	0.0000	3.0990	ppb	0.58	2700.00	
55 Mn	# 3	45	5444303.0	0.0000	91.7600	ppb	1.13	2700.00	
56 Fe	# 1	45	106724400.0	0.0000	4539.0000	ppb	0.59	90000.00	
59 Co	# 3	45	95875.9	0.0000	1.9500	ppb	1.02	2700.00	
60 Ni	# 2	45	6243.4	0.0000	1.2330	ppb	1.76	2700.00	
63 Cu	# 2	45	27078.3	0.0000	2.0680	ppb	2.12	2700.00	
66 Zn	# 3	72	54151.0	0.0000	7.6790	ppb	0.40	2700.00	
75 As	# 2	72	971.2	0.0000	0.3666	ppb	1.99	2700.00	
78 Se	# 1	72	44.4	0.0000	0.0371	ppb	14.31	2700.00	
88 Sr	# 3	72	216838.2	0.0000	3.1990	ppb	0.66	2700.00	
90 Zr	# 3	72	6927.5	0.0000	0.1020	ppb	5.53	1800.00	
95 Mo	# 3	115	1612.4	0.0000	0.1178	ppb	5.67	2700.00	
107 Ag	# 3	115	302.2	0.0000	0.0067	ppb	20.57	225.00	
111 Cd	# 3	115	360.1	0.0000	0.0435	ppb	22.59	2700.00	
118 Sn	# 3	115	17608.4	0.0000	0.9275	ppb	3.07	2700.00	
121 Sb	# 3	115	2040.2	0.0000	0.0442	ppb	15.96	2700.00	
137 Ba	# 3	115	233371.5	0.0000	24.4300	ppb	2.74	2700.00	
182 W	# 3	159	301.1	0.0000	0.0052	ppb	24.39	900.00	
205 Tl	# 3	159	3620.6	0.0000	0.0753	ppb	4.47	2700.00	
208 Pb	# 3	159	114364.2	0.0000	1.7840	ppb	0.83	2700.00	
235 U	# 3	159	133.3	0.0000	0.0015	ppb	16.02	27.00	
238 U	# 3	159	16888.2	0.0000	0.2681	ppb	1.35	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1113636.50	0.84	1159752.60	96.0	60 - 125	
45 Sc # 1	2549138.00	1.24	2567033.50	99.3	60 - 125	
45 Sc # 2	626334.81	0.82	613402.44	102.1	60 - 125	
45 Sc # 3	4750305.50	0.56	4679393.50	101.5	60 - 125	
72 Ge # 1	704405.06	0.52	704157.69	100.0	60 - 125	
72 Ge # 2	325111.47	0.71	321292.31	101.2	60 - 125	
72 Ge # 3	1123743.80	1.43	1114306.40	100.8	60 - 125	
115 In # 3	7331969.00	2.10	7180580.50	102.1	60 - 125	
159 Tb # 3	9477297.00	1.40	8719993.00	108.7	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

CCV QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13071.D\F6D13071.D#
Date Acquired:	Apr 24 2015 05:16 pm
Operator:	CCapul
Sample Name:	CCV6
Misc Info:	
Vial Number:	1206
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update:	Apr 24 2015 12:49 pm
Sample Type:	CCV
Total Dil Factor:	1.00

QC Elements

Element	Conc.	RSD(%)	Expected	QC Range(%)	Flag
7 Li	25.76 ppb	2.27	25.00	90 - 110	
9 Be	23.52 ppb	0.78	25.00	90 - 110	
11 B	23.06 ppb	1.57	25.00	90 - 110	
23 Na	1219.00 ppb	0.38	1250.00	90 - 110	
24 Mg	2411.00 ppb	1.19	2500.00	90 - 110	
27 Al	2449.00 ppb	0.19	2500.00	90 - 110	
28 Si	2423.00 ppb	0.23	2500.00	90 - 110	
31 P	243.40 ppb	0.47	250.00	90 - 110	
39 K	2556.00 ppb	1.52	2500.00	90 - 110	
40 Ca	2473.00 ppb	0.52	2500.00	90 - 110	
47 Ti	25.01 ppb	0.91	25.00	90 - 110	
51 V	25.60 ppb	1.03	25.00	90 - 110	
52 Cr	25.12 ppb	1.36	25.00	90 - 110	
55 Mn	24.21 ppb	0.44	25.00	90 - 110	
56 Fe	2586.00 ppb	0.72	2500.00	90 - 110	
59 Co	23.76 ppb	0.92	25.00	90 - 110	
60 Ni	24.73 ppb	1.07	25.00	90 - 110	
63 Cu	24.19 ppb	0.63	25.00	90 - 110	
66 Zn	49.79 ppb	0.56	50.00	90 - 110	
75 As	24.93 ppb	0.47	25.00	90 - 110	
78 Se	26.01 ppb	0.74	25.00	90 - 110	
88 Sr	25.21 ppb	0.93	25.00	90 - 110	
90 Zr	11.13 ppb	1.31	15.00	90 - 110	Fail
95 Mo	23.85 ppb	0.86	25.00	90 - 110	
107 Ag	24.82 ppb	1.39	25.00	90 - 110	
111 Cd	24.12 ppb	0.72	25.00	90 - 110	
118 Sn	25.20 ppb	1.00	25.00	90 - 110	
121 Sb	24.89 ppb	1.34	25.00	90 - 110	
137 Ba	24.96 ppb	0.87	25.00	90 - 110	
182 W	25.16 ppb	1.37	25.00	90 - 110	
205 Tl	24.83 ppb	2.81	25.00	90 - 110	
208 Pb	24.71 ppb	1.60	25.00	90 - 110	
235 U	0.18 ppb	1.93	0.18	90 - 110	
238 U	26.01 ppb	0.85	24.82	90 - 110	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	862461.00	1.67	1159752.60	74.4	60 - 125	
45 Sc	2368187.30	0.48	2567033.50	92.3	60 - 125	
45 Sc	554503.81	0.65	613402.44	90.4	60 - 125	
45 Sc	4164650.30	0.35	4679393.50	89.0	60 - 125	
72 Ge	641889.69	0.15	704157.69	91.2	60 - 125	
72 Ge	298542.00	0.68	321292.31	92.9	60 - 125	
72 Ge	1012735.60	0.90	1114306.40	90.9	60 - 125	
115 In	6903258.00	1.13	7180580.50	96.1	60 - 125	
159 Tb	9010492.00	1.34	8719993.00	103.3	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

CCB QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13072.D\F6D13072.D#
Date Acquired: Apr 24 2015 05:20 pm
Operator: CCapul
Sample Name: CCB6
Misc Info:
Vial Number: 1102
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:49 pm
Sample Type: CCB
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	High Limit	Flag
7 Li	0.02 ppb	132.60	0.20	
9 Be	0.00 ppb	485.41	0.10	
11 B	-1.05 ppb	1.17	5.00	
23 Na	-12.48 ppb	4.06	40.00	
24 Mg	0.33 ppb	3.35	10.00	
27 Al	0.52 ppb	6.96	20.00	
28 Si	0.54 ppb	10.89	20.00	
31 P	-3.70 ppb	9.19	10.00	
39 K	-14.90 ppb	8.50	20.00	
40 Ca	-0.11 ppb	16.62	25.00	
47 Ti	0.01 ppb	48.99	0.50	
51 V	0.00 ppb	339.71	0.50	
52 Cr	-0.02 ppb	13.09	0.20	
55 Mn	0.02 ppb	10.00	0.20	
56 Fe	1.67 ppb	5.97	10.00	
59 Co	0.00 ppb	111.10	0.20	
60 Ni	-0.01 ppb	20.46	0.20	
63 Cu	0.00 ppb	32.78	0.40	
66 Zn	0.00 ppb	323.73	2.00	
75 As	0.00 ppb	228.54	0.20	
78 Se	0.00 ppb	289.52	0.20	
88 Sr	0.00 ppb	113.71	0.20	
90 Zr	-0.01 ppb	8.86	2.00	
95 Mo	0.01 ppb	13.54	0.40	
107 Ag	0.00 ppb	24.80	0.20	
111 Cd	0.00 ppb	136.85	0.20	
118 Sn	0.01 ppb	24.82	0.20	
121 Sb	0.01 ppb	37.05	0.40	
137 Ba	0.00 ppb	67.12	0.20	
182 W	0.01 ppb	28.97	1.00	
205 Tl	0.00 ppb	24.60	0.20	
208 Pb	0.00 ppb	29.84	0.10	
235 U	0.00 ppb	52.70	1.00	
238 U	0.00 ppb	10.28	0.10	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	848531.94	1.12	1159752.60	73.2	60 - 125	
45 Sc	2315216.80	0.96	2567033.50	90.2	60 - 125	
45 Sc	557005.50	1.20	613402.44	90.8	60 - 125	
45 Sc	4096530.00	1.26	4679393.50	87.5	60 - 125	
72 Ge	652048.13	0.40	704157.69	92.6	60 - 125	
72 Ge	299212.75	0.56	321292.31	93.1	60 - 125	
72 Ge	1009173.60	1.45	1114306.40	90.6	60 - 125	
115 In	7016206.50	0.60	7180580.50	97.7	60 - 125	
159 Tb	9208876.00	0.32	8719993.00	105.6	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13075.D\F6D13075.D#
Date Acquired:	Apr 24 2015 05:33 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-23
Misc Info:	
Vial Number:	2405
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	143599.3	0.0000	7.6680	ppb	1.28	225.00	
9 Be	# 3	45	1763.5	0.0000	0.3683	ppb	7.82	225.00	
11 B	# 3	45	8568.3	0.0000	0.7348	ppb	4.81	225.00	
23 Na	# 1	45	1495707.0	0.0000	164.8000	ppb	3.12	269999.99	
24 Mg	# 3	45	70055936.0	0.0000	3808.0000	ppb	0.18	269999.99	
27 Al	# 3	45	323016510.0	0.0000	12680.0000	ppb	1.93	90000.00	
28 Si	# 1	45	4692842.0	0.0000	1952.0000	ppb	0.28	18000.00	
31 P	# 3	45	263148.6	0.0000	153.5000	ppb	1.31	359999.99	
39 K	# 2	45	7144449.0	0.0000	3887.0000	ppb	0.33	269999.99	
40 Ca	# 1	45	32106150.0	0.0000	1989.0000	ppb	0.60	269999.99	
47 Ti	# 3	45	4722183.0	0.0000	1390.0000	ppb	2.24	2700.00	
51 V	# 2	45	657128.8	0.0000	57.1500	ppb	0.62	2700.00	
52 Cr	# 2	45	225364.0	0.0000	16.4900	ppb	0.40	2700.00	
55 Mn	# 3	45	40549472.0	0.0000	682.0000	ppb	1.98	2700.00	
56 Fe	# 1	45	518037500.0	0.0000	21400.0000	ppb	0.45	90000.00	
59 Co	# 3	45	540360.6	0.0000	10.9900	ppb	1.95	2700.00	
60 Ni	# 2	45	36084.2	0.0000	7.3940	ppb	0.44	2700.00	
63 Cu	# 2	45	156626.1	0.0000	12.3000	ppb	0.45	2700.00	
66 Zn	# 3	72	238579.5	0.0000	35.1700	ppb	1.22	2700.00	
75 As	# 2	72	4695.7	0.0000	2.2430	ppb	0.36	2700.00	
78 Se	# 1	72	239.6	0.0000	0.2613	ppb	4.85	2700.00	
88 Sr	# 3	72	1264662.0	0.0000	19.2500	ppb	0.66	2700.00	
90 Zr	# 3	72	38857.5	0.0000	0.6721	ppb	0.28	1800.00	
95 Mo	# 3	115	7891.4	0.0000	0.6486	ppb	1.32	2700.00	
107 Ag	# 3	115	927.8	0.0000	0.0278	ppb	2.41	225.00	
111 Cd	# 3	115	1808.9	0.0000	0.2506	ppb	5.73	2700.00	
118 Sn	# 3	115	85090.8	0.0000	4.6950	ppb	0.62	2700.00	
121 Sb	# 3	115	4683.2	0.0000	0.1535	ppb	0.56	2700.00	
137 Ba	# 3	115	1437024.0	0.0000	156.4000	ppb	0.77	2700.00	
182 W	# 3	159	1146.8	0.0000	0.0458	ppb	6.20	900.00	
205 Tl	# 3	159	18609.3	0.0000	0.4033	ppb	0.68	2700.00	
208 Pb	# 3	159	345328.0	0.0000	5.4870	ppb	0.50	2700.00	
235 U	# 3	159	664.5	0.0000	0.0096	ppb	5.30	27.00	
238 U	# 3	159	90386.7	0.0000	1.4600	ppb	0.35	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	982804.88	0.78	1159752.60	84.7	60 - 125	
45 Sc # 1	2624774.30	0.28	2567033.50	102.2	60 - 125	
45 Sc # 2	615547.75	0.07	613402.44	100.3	60 - 125	
45 Sc # 3	4763532.50	1.77	4679393.50	101.8	60 - 125	
72 Ge # 1	673559.44	1.28	704157.69	95.7	60 - 125	
72 Ge # 2	311667.56	0.29	321292.31	97.0	60 - 125	
72 Ge # 3	1092360.90	0.25	1114306.40	98.0	60 - 125	
115 In # 3	7049970.50	1.06	7180580.50	98.2	60 - 125	
159 Tb # 3	9341709.00	0.78	8719993.00	107.1	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

7135

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13076.D\F6D13076.D#
Date Acquired:	Apr 24 2015 05:37 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-24
Misc Info:	
Vial Number:	2406
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	224046.7	0.0000	14.3200	ppb	0.95	225.00	
9 Be	# 3	45	2038.0	0.0000	0.3904	ppb	8.73	225.00	
11 B	# 3	45	22918.3	0.0000	4.5020	ppb	1.92	225.00	
23 Na	# 1	45	2272458.0	0.0000	254.4000	ppb	0.35	269999.99	
24 Mg	# 3	45	149078400.0	0.0000	7422.0000	ppb	0.16	269999.99	
27 Al	# 3	45	538133180.0	0.0000	19350.0000	ppb	1.83	90000.00	
28 Si	# 1	45	4571437.0	0.0000	1805.0000	ppb	0.87	18000.00	
31 P	# 3	45	554708.0	0.0000	314.5000	ppb	1.44	359999.99	
39 K	# 2	45	19365470.0	0.0000	9685.0000	ppb	1.05	269999.99	
40 Ca	# 1	45	70403768.0	0.0000	4144.0000	ppb	0.15	269999.99	
47 Ti	# 3	45	10004640.0	0.0000	2696.0000	ppb	1.23	2700.00	
51 V	# 2	45	1479033.0	0.0000	116.9000	ppb	0.49	2700.00	
52 Cr	# 2	45	319543.6	0.0000	21.2000	ppb	0.26	2700.00	
55 Mn	# 3	45	39785940.0	0.0000	612.8000	ppb	1.01	2700.00	
56 Fe	# 1	45	1035145000.0	0.0000	40600.0000	ppb	1.10	90000.00	
59 Co	# 3	45	734294.2	0.0000	13.6800	ppb	0.94	2700.00	
60 Ni	# 2	45	44634.4	0.0000	8.2820	ppb	0.17	2700.00	
63 Cu	# 2	45	307391.1	0.0000	21.8800	ppb	0.53	2700.00	
66 Zn	# 3	72	451978.3	0.0000	64.2300	ppb	0.48	2700.00	
75 As	# 2	72	4023.0	0.0000	1.8330	ppb	1.67	2700.00	
78 Se	# 1	72	332.7	0.0000	0.3723	ppb	4.62	2700.00	
88 Sr	# 3	72	1998336.0	0.0000	29.3000	ppb	0.50	2700.00	
90 Zr	# 3	72	55306.6	0.0000	0.9278	ppb	2.20	1800.00	
95 Mo	# 3	115	21896.5	0.0000	1.7990	ppb	1.73	2700.00	
107 Ag	# 3	115	1868.0	0.0000	0.0580	ppb	11.13	225.00	
111 Cd	# 3	115	3129.4	0.0000	0.4325	ppb	2.78	2700.00	
118 Sn	# 3	115	88026.5	0.0000	4.7980	ppb	0.28	2700.00	
121 Sb	# 3	115	6664.1	0.0000	0.2298	ppb	1.72	2700.00	
137 Ba	# 3	115	2797537.0	0.0000	300.9000	ppb	1.47	2700.00	
182 W	# 3	159	2172.5	0.0000	0.0960	ppb	5.52	900.00	
205 Tl	# 3	159	23011.9	0.0000	0.5051	ppb	1.58	2700.00	
208 Pb	# 3	159	623354.7	0.0000	10.0200	ppb	0.86	2700.00	
235 U	# 3	159	771.2	0.0000	0.0113	ppb	1.74	27.00	
238 U	# 3	159	104643.7	0.0000	1.7090	ppb	0.73	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1042080.80	0.18	1159752.60	89.9	60 - 125	
45 Sc # 1	2764381.30	0.71	2567033.50	107.7	60 - 125	
45 Sc # 2	680135.44	0.65	613402.44	110.9	60 - 125	
45 Sc # 3	5200971.50	1.50	4679393.50	111.1	60 - 125	
72 Ge # 1	664648.94	0.92	704157.69	94.4	60 - 125	
72 Ge # 2	323722.78	0.27	321292.31	100.8	60 - 125	
72 Ge # 3	1134463.90	1.18	1114306.40	101.8	60 - 125	
115 In # 3	7136480.50	0.61	7180580.50	99.4	60 - 125	
159 Tb # 3	9237760.00	1.06	8719993.00	105.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

7136

Sample QC Report

Data File:	C:\DATA\IF62015\D\IF6D13.B\F6D13077.D\F6D13077.D#
Date Acquired:	Apr 24 2015 05:41 pm
Acq. Method:	EMX6020.M
Operator:	CCapul
Sample Name:	D114-25
Misc Info:	
Vial Number:	2407
Current Method:	C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File:	C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update:	Apr 24 2015 12:49 pm
Sample Type:	Sample
Dilution Factor:	1.00
Autodil Factor:	Undiluted
Final Dil Factor:	1.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	239166.1	0.0000	15.5500	ppb	2.99	225.00	
9 Be	# 3	45	2103.6	0.0000	0.4020	ppb	3.48	225.00	
11 B	# 3	45	17785.6	0.0000	3.0670	ppb	2.16	225.00	
23 Na	# 1	45	2380361.0	0.0000	280.6000	ppb	1.31	269999.99	
24 Mg	# 3	45	149727200.0	0.0000	7441.0000	ppb	0.51	269999.99	
27 Al	# 3	45	556499070.0	0.0000	19970.0000	ppb	0.63	90000.00	
28 Si	# 1	45	4312567.0	0.0000	1772.0000	ppb	1.08	18000.00	
31 P	# 3	45	402360.2	0.0000	222.3000	ppb	1.15	359999.99	
39 K	# 2	45	16174870.0	0.0000	8243.0000	ppb	1.16	269999.99	
40 Ca	# 1	45	62969632.0	0.0000	3856.0000	ppb	0.32	269999.99	
47 Ti	# 3	45	9724067.0	0.0000	2616.0000	ppb	1.83	2700.00	
51 V	# 2	45	1452225.0	0.0000	117.2000	ppb	0.83	2700.00	
52 Cr	# 2	45	295232.7	0.0000	19.9900	ppb	1.22	2700.00	
55 Mn	# 3	45	36980200.0	0.0000	568.6000	ppb	1.11	2700.00	
56 Fe	# 1	45	991196990.0	0.0000	40450.0000	ppb	0.65	90000.00	
59 Co	# 3	45	713252.5	0.0000	13.2600	ppb	0.86	2700.00	
60 Ni	# 2	45	41993.2	0.0000	7.9530	ppb	0.98	2700.00	
63 Cu	# 2	45	290142.1	0.0000	21.0800	ppb	0.67	2700.00	
66 Zn	# 3	72	415754.9	0.0000	58.5200	ppb	1.00	2700.00	
75 As	# 2	72	3938.1	0.0000	1.8400	ppb	0.27	2700.00	
78 Se	# 1	72	332.7	0.0000	0.3884	ppb	4.65	2700.00	
88 Sr	# 3	72	2007082.0	0.0000	29.1500	ppb	1.17	2700.00	
90 Zr	# 3	72	51487.5	0.0000	0.8541	ppb	0.97	1800.00	
95 Mo	# 3	115	17623.8	0.0000	1.4570	ppb	0.63	2700.00	
107 Ag	# 3	115	2099.1	0.0000	0.0662	ppb	4.40	225.00	
111 Cd	# 3	115	3000.2	0.0000	0.4177	ppb	3.87	2700.00	
118 Sn	# 3	115	87977.5	0.0000	4.8340	ppb	0.94	2700.00	
121 Sb	# 3	115	5703.6	0.0000	0.1935	ppb	1.01	2700.00	
137 Ba	# 3	115	2826094.0	0.0000	306.3000	ppb	1.82	2700.00	
182 W	# 3	159	1656.8	0.0000	0.0719	ppb	1.99	900.00	
205 Tl	# 3	159	22365.2	0.0000	0.4960	ppb	3.59	2700.00	
208 Pb	# 3	159	348111.4	0.0000	5.6520	ppb	1.94	2700.00	
235 U	# 3	159	870.1	0.0000	0.0130	ppb	9.82	27.00	
238 U	# 3	159	116608.9	0.0000	1.9250	ppb	1.14	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	1049933.90	0.48	1159752.60	90.5	60 - 125	
45 Sc # 1	2656944.30	0.72	2567033.50	103.5	60 - 125	
45 Sc # 2	666273.69	1.00	613402.44	108.6	60 - 125	
45 Sc # 3	5210371.50	1.66	4679393.50	111.3	60 - 125	
72 Ge # 1	638028.19	1.29	704157.69	90.6	60 - 125	
72 Ge # 2	315737.97	0.29	321292.31	98.3	60 - 125	
72 Ge # 3	1145208.50	0.54	1114306.40	102.8	60 - 125	
115 In # 3	7080424.00	0.92	7180580.50	98.6	60 - 125	
159 Tb # 3	9144162.00	1.90	8719993.00	104.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13078.D\F6D13078.D#
Date Acquired: Apr 24 2015 05:45 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-08A
Misc Info:
Vial Number: 2408
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	621188.8	0.0000	56.5900	ppb	2.02	225.00	
9 Be	# 3	45	209879.6	0.0000	48.5400	ppb	1.03	225.00	
11 B	# 3	45	153200.2	0.0000	48.5900	ppb	0.84	225.00	
23 Na	# 1	45	35709512.0	0.0000	5262.0000	ppb	1.09	269999.99	
24 Mg	# 3	45	112200300.0	0.0000	6622.0000	ppb	0.80	269999.99	
27 Al	# 3	45	281460190.0	0.0000	12000.0000	ppb	0.60	90000.00	
28 Si	# 1	45	723503.9	0.0000	329.1000	ppb	2.12	18000.00	
31 P	# 3	45	45766.6	0.0000	13.1800	ppb	2.63	359999.99	
39 K	# 2	45	10433390.0	0.0000	6099.0000	ppb	0.89	269999.99	
40 Ca	# 1	45	89112896.0	0.0000	6056.0000	ppb	1.01	269999.99	
47 Ti	# 3	45	1368226.0	0.0000	437.1000	ppb	0.85	2700.00	
51 V	# 2	45	727326.5	0.0000	67.4200	ppb	0.78	2700.00	
52 Cr	# 2	45	671527.3	0.0000	52.6300	ppb	0.58	2700.00	
55 Mn	# 3	45	6151469.0	0.0000	112.3000	ppb	0.35	2700.00	
56 Fe	# 1	45	338854020.0	0.0000	15340.0000	ppb	1.10	90000.00	
59 Co	# 3	45	2195705.0	0.0000	48.5000	ppb	0.89	2700.00	
60 Ni	# 2	45	223651.4	0.0000	48.9400	ppb	0.65	2700.00	
63 Cu	# 2	45	598281.0	0.0000	50.1100	ppb	0.56	2700.00	
66 Zn	# 3	72	720160.6	0.0000	111.7000	ppb	1.92	2700.00	
75 As	# 2	72	94009.6	0.0000	49.4400	ppb	0.91	2700.00	
78 Se	# 1	72	42295.3	0.0000	51.0400	ppb	0.49	2700.00	
88 Sr	# 3	72	3334546.0	0.0000	53.3200	ppb	0.20	2700.00	
90 Zr	# 3	72	23688.2	0.0000	0.4239	ppb	0.86	1800.00	
95 Mo	# 3	115	546712.8	0.0000	47.3500	ppb	0.68	2700.00	
107 Ag	# 3	115	1350843.0	0.0000	46.1500	ppb	2.05	225.00	
111 Cd	# 3	115	318648.5	0.0000	46.7200	ppb	0.38	2700.00	
118 Sn	# 3	115	949294.2	0.0000	54.2900	ppb	1.36	2700.00	
121 Sb	# 3	115	1136235.0	0.0000	47.2000	ppb	2.25	2700.00	
137 Ba	# 3	115	734942.6	0.0000	82.7800	ppb	1.17	2700.00	
182 W	# 3	159	1146.8	0.0000	0.0485	ppb	5.89	900.00	
205 Tl	# 3	159	2113269.0	0.0000	48.3900	ppb	2.29	2700.00	
208 Pb	# 3	159	3190925.0	0.0000	53.3200	ppb	0.37	2700.00	
235 U	# 3	159	21229.2	0.0000	0.3366	ppb	2.06	27.00	
238 U	# 3	159	2926180.0	0.0000	49.6400	ppb	0.56	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	951478.19	0.32	1159752.60	82.0	60 - 125	
45 Sc # 1	2394606.80	1.53	2567033.50	93.3	60 - 125	
45 Sc # 2	578322.63	0.58	613402.44	94.3	60 - 125	
45 Sc # 3	4386693.00	0.80	4679393.50	93.7	60 - 125	
72 Ge # 1	634877.25	1.24	704157.69	90.2	60 - 125	
72 Ge # 2	294824.38	0.70	321292.31	91.8	60 - 125	
72 Ge # 3	1040359.60	1.70	1114306.40	93.4	60 - 125	
115 In # 3	6813602.50	1.08	7180580.50	94.9	60 - 125	
159 Tb # 3	8899598.00	0.81	8719993.00	102.1	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

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Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13079.D\F6D13079.D#
Date Acquired: Apr 24 2015 05:49 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-08I
Misc Info:
Vial Number: 2409
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	105216.1	0.0000	4.5740	ppb	3.16	225.00	
9 Be	# 3	45	704.5	0.0000	0.1573	ppb	4.09	225.00	
11 B	# 3	45	5298.9	0.0000	-0.0986	ppb	92.05	225.00	
23 Na	# 1	45	752704.6	0.0000	69.2900	ppb	2.00	269999.99	
24 Mg	# 3	45	24244780.0	0.0000	1447.0000	ppb	0.83	269999.99	
27 Al	# 3	45	158396190.0	0.0000	6829.0000	ppb	0.54	90000.00	
28 Si	# 1	45	737842.6	0.0000	321.6000	ppb	0.98	18000.00	
31 P	# 3	45	43411.9	0.0000	11.8500	ppb	2.99	359999.99	
39 K	# 2	45	1347137.0	0.0000	685.8000	ppb	1.08	269999.99	
40 Ca	# 1	45	11179520.0	0.0000	725.4000	ppb	0.83	269999.99	
47 Ti	# 3	45	1193307.0	0.0000	385.6000	ppb	0.15	2700.00	
51 V	# 2	45	188696.7	0.0000	16.8400	ppb	0.79	2700.00	
52 Cr	# 2	45	76580.8	0.0000	5.7770	ppb	0.61	2700.00	
55 Mn	# 3	45	3644918.0	0.0000	67.2800	ppb	1.31	2700.00	
56 Fe	# 1	45	232800610.0	0.0000	10100.0000	ppb	1.02	90000.00	
59 Co	# 3	45	130723.4	0.0000	2.9150	ppb	0.51	2700.00	
60 Ni	# 2	45	12066.2	0.0000	2.5720	ppb	0.62	2700.00	
63 Cu	# 2	45	63172.9	0.0000	5.1850	ppb	0.47	2700.00	
66 Zn	# 3	72	96994.8	0.0000	14.9500	ppb	0.87	2700.00	
75 As	# 2	72	1400.5	0.0000	0.6075	ppb	3.68	2700.00	
78 Se	# 1	72	40.7	0.0000	0.0352	ppb	26.66	2700.00	
88 Sr	# 3	72	349652.3	0.0000	5.5800	ppb	1.33	2700.00	
90 Zr	# 3	72	18450.4	0.0000	0.3263	ppb	2.91	1800.00	
95 Mo	# 3	115	1333.4	0.0000	0.1016	ppb	8.57	2700.00	
107 Ag	# 3	115	671.2	0.0000	0.0196	ppb	24.78	225.00	
111 Cd	# 3	115	697.3	0.0000	0.0950	ppb	4.53	2700.00	
118 Sn	# 3	115	77340.0	0.0000	4.3440	ppb	1.57	2700.00	
121 Sb	# 3	115	3073.8	0.0000	0.0910	ppb	3.20	2700.00	
137 Ba	# 3	115	308978.0	0.0000	34.2300	ppb	0.93	2700.00	
182 W	# 3	159	280.0	0.0000	0.0046	ppb	41.33	900.00	
205 Tl	# 3	159	4911.1	0.0000	0.1068	ppb	2.72	2700.00	
208 Pb	# 3	159	403603.1	0.0000	6.5510	ppb	1.28	2700.00	
235 U	# 3	159	176.7	0.0000	0.0023	ppb	23.21	27.00	
238 U	# 3	159	22913.2	0.0000	0.3772	ppb	2.91	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	922448.31	1.50	1159752.60	79.5	60 - 125	
45 Sc # 1	2499241.80	2.14	2567033.50	97.4	60 - 125	
45 Sc # 2	587460.00	0.41	613402.44	95.8	60 - 125	
45 Sc # 3	4337363.50	0.91	4679393.50	92.7	60 - 125	
72 Ge # 1	669846.13	0.36	704157.69	95.1	60 - 125	
72 Ge # 2	308639.03	0.53	321292.31	96.1	60 - 125	
72 Ge # 3	1040696.10	1.88	1114306.40	93.4	60 - 125	
115 In # 3	6925487.00	0.98	7180580.50	96.4	60 - 125	
159 Tb # 3	9148432.00	0.91	8719993.00	104.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Sample QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13080.D\F6D13080.D#
Date Acquired: Apr 24 2015 05:53 pm
Acq. Method: EMX6020.M
Operator: CCapul
Sample Name: D114-08J
Misc Info:
Vial Number: 2410
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal. Update: Apr 24 2015 12:49 pm
Sample Type: Sample
Dilution Factor: 25.00
Autodil Factor: Undiluted
Final Dil Factor: 25.00

Tune #	Name
#1	h2.u
#2	he.u
#3	norm.u

QC Elements

Element	Tune	ISTD	CPS	Corr Conc	Raw Conc	Units	Conc RSD(%)	High Limit	Flag
7 Li	# 3	6	69370.6	0.0000	0.8722	ppb	12.74	225.00	
9 Be	# 3	45	123.3	0.0000	0.0225	ppb	16.49	225.00	
11 B	# 3	45	2735.9	0.0000	-0.9165	ppb	8.02	225.00	
23 Na	# 1	45	277298.2	0.0000	3.6050	ppb	32.09	269999.99	
24 Mg	# 3	45	5077239.0	0.0000	314.8000	ppb	0.63	269999.99	
27 Al	# 3	45	33005640.0	0.0000	1479.0000	ppb	1.40	90000.00	
28 Si	# 1	45	154338.4	0.0000	70.0200	ppb	3.80	18000.00	
31 P	# 3	45	30427.2	0.0000	3.3430	ppb	15.02	359999.99	
39 K	# 2	45	396358.5	0.0000	137.1000	ppb	2.19	269999.99	
40 Ca	# 1	45	2478450.0	0.0000	166.4000	ppb	2.29	269999.99	
47 Ti	# 3	45	246915.4	0.0000	82.9100	ppb	2.35	2700.00	
51 V	# 2	45	42861.4	0.0000	3.5660	ppb	1.03	2700.00	
52 Cr	# 2	45	17194.8	0.0000	1.2260	ppb	0.94	2700.00	
55 Mn	# 3	45	779666.6	0.0000	14.9300	ppb	1.05	2700.00	
56 Fe	# 1	45	48443832.0	0.0000	2204.0000	ppb	1.40	90000.00	
59 Co	# 3	45	27775.2	0.0000	0.6390	ppb	0.73	2700.00	
60 Ni	# 2	45	2547.8	0.0000	0.5382	ppb	3.16	2700.00	
63 Cu	# 2	45	14026.2	0.0000	1.1680	ppb	0.28	2700.00	
66 Zn	# 3	72	21812.7	0.0000	3.3160	ppb	4.53	2700.00	
75 As	# 2	72	409.8	0.0000	0.1128	ppb	1.34	2700.00	
78 Se	# 1	72	14.2	0.0000	0.0051	ppb	63.29	2700.00	
88 Sr	# 3	72	76330.3	0.0000	1.2210	ppb	1.99	2700.00	
90 Zr	# 3	72	4081.9	0.0000	0.0593	ppb	10.15	1800.00	
95 Mo	# 3	115	400.0	0.0000	0.0219	ppb	14.94	2700.00	
107 Ag	# 3	115	246.7	0.0000	0.0054	ppb	27.79	225.00	
111 Cd	# 3	115	166.6	0.0000	0.0183	ppb	17.94	2700.00	
118 Sn	# 3	115	16651.7	0.0000	0.9254	ppb	0.81	2700.00	
121 Sb	# 3	115	1394.6	0.0000	0.0222	ppb	9.44	2700.00	
137 Ba	# 3	115	64782.1	0.0000	7.1480	ppb	2.12	2700.00	
182 W	# 3	159	123.3	0.0000	-0.0030	ppb	31.57	900.00	
205 Tl	# 3	159	1140.1	0.0000	0.0230	ppb	10.53	2700.00	
208 Pb	# 3	159	87301.2	0.0000	1.4190	ppb	3.41	2700.00	
235 U	# 3	159	60.0	0.0000	0.0005	ppb	61.93	27.00	
238 U	# 3	159	4848.9	0.0000	0.0796	ppb	3.29	2700.00	

ISTD Elements

Element	CPS Mean	CPS RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li # 3	916065.38	1.87	1159752.60	79.0	60 - 125	
45 Sc # 1	2383620.80	2.80	2567033.50	92.9	60 - 125	
45 Sc # 2	568749.38	1.14	613402.44	92.7	60 - 125	
45 Sc # 3	4172115.30	1.07	4679393.50	89.2	60 - 125	
72 Ge # 1	663134.81	1.15	704157.69	94.2	60 - 125	
72 Ge # 2	302661.50	0.57	321292.31	94.2	60 - 125	
72 Ge # 3	1030963.20	2.72	1114306.40	92.5	60 - 125	
115 In # 3	6946147.50	1.16	7180580.50	96.7	60 - 125	
159 Tb # 3	9084416.00	1.89	8719993.00	104.2	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

CCV QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13082.D\F6D13082.D#
Date Acquired: Apr 24 2015 06:02 pm
Operator: CCapul
Sample Name: CCV7
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:49 pm
Sample Type: CCV
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	Expected	QC Range(%)	Flag
7 Li	25.67 ppb	1.28	25.00	90 - 110	
9 Be	23.68 ppb	2.40	25.00	90 - 110	
11 B	23.08 ppb	2.56	25.00	90 - 110	
23 Na	1226.00 ppb	0.82	1250.00	90 - 110	
24 Mg	2401.00 ppb	3.15	2500.00	90 - 110	
27 Al	2416.00 ppb	2.82	2500.00	90 - 110	
28 Si	2431.00 ppb	0.77	2500.00	90 - 110	
31 P	240.00 ppb	1.62	250.00	90 - 110	
39 K	2539.00 ppb	0.29	2500.00	90 - 110	
40 Ca	2497.00 ppb	0.93	2500.00	90 - 110	
47 Ti	25.02 ppb	1.50	25.00	90 - 110	
51 V	25.37 ppb	0.71	25.00	90 - 110	
52 Cr	24.70 ppb	0.61	25.00	90 - 110	
55 Mn	23.89 ppb	1.36	25.00	90 - 110	
56 Fe	2603.00 ppb	0.67	2500.00	90 - 110	
59 Co	23.67 ppb	2.28	25.00	90 - 110	
60 Ni	24.58 ppb	0.09	25.00	90 - 110	
63 Cu	23.84 ppb	0.68	25.00	90 - 110	
66 Zn	49.50 ppb	1.07	50.00	90 - 110	
75 As	24.94 ppb	0.30	25.00	90 - 110	
78 Se	25.82 ppb	1.96	25.00	90 - 110	
88 Sr	24.91 ppb	3.01	25.00	90 - 110	
90 Zr	11.02 ppb	0.67	15.00	90 - 110	Fail
95 Mo	23.84 ppb	0.39	25.00	90 - 110	
107 Ag	24.86 ppb	1.16	25.00	90 - 110	
111 Cd	24.18 ppb	0.92	25.00	90 - 110	
118 Sn	25.22 ppb	0.19	25.00	90 - 110	
121 Sb	25.05 ppb	0.69	25.00	90 - 110	
137 Ba	25.16 ppb	1.58	25.00	90 - 110	
182 W	24.90 ppb	1.15	25.00	90 - 110	
205 Tl	24.68 ppb	2.19	25.00	90 - 110	
208 Pb	24.62 ppb	1.00	25.00	90 - 110	
235 U	0.17 ppb	3.21	0.18	90 - 110	
238 U	25.63 ppb	2.51	24.82	90 - 110	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	845017.25	0.60	1159752.60	72.9	60 - 125	
45 Sc	2316439.30	1.36	2567033.50	90.2	60 - 125	
45 Sc	550251.94	0.60	613402.44	89.7	60 - 125	
45 Sc	4106629.00	1.93	4679393.50	87.8	60 - 125	
72 Ge	634860.06	0.80	704157.69	90.2	60 - 125	
72 Ge	291177.44	0.71	321292.31	90.6	60 - 125	
72 Ge	996673.63	1.79	1114306.40	89.4	60 - 125	
115 In	6719722.50	0.87	7180580.50	93.6	60 - 125	
159 Tb	8881892.00	1.13	8719993.00	101.9	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

CCB QC Report

Data File: C:\DATA\IF62015\D\IF6D13.B\F6D13083.D\F6D13083.D#
Date Acquired: Apr 24 2015 06:06 pm
Operator: CCapul
Sample Name: CCB7
Misc Info:
Vial Number: 1102
Current Method: C:\ICPCHEM\1\METHODS\EMX6020.M
Calibration File: C:\DATA\IF62015\A\IF6A01.B\EMX6020.C
Last Cal Update: Apr 24 2015 12:49 pm
Sample Type: CCB
Total Dil Factor: 1.00

QC Elements

Element	Conc.	RSD(%)	High Limit	Flag
7 Li	0.09 ppb	153.72	0.20	
9 Be	0.00 ppb	491.40	0.10	
11 B	-1.10 ppb	2.67	5.00	
23 Na	-13.41 ppb	1.62	40.00	
24 Mg	0.15 ppb	5.09	10.00	
27 Al	0.44 ppb	4.08	20.00	
28 Si	0.33 ppb	21.73	20.00	
31 P	-1.78 ppb	13.49	10.00	
39 K	-14.07 ppb	10.96	20.00	
40 Ca	-0.99 ppb	3.89	25.00	
47 Ti	0.03 ppb	50.59	0.50	
51 V	-0.01 ppb	48.15	0.50	
52 Cr	-0.03 ppb	8.89	0.20	
55 Mn	0.02 ppb	10.98	0.20	
56 Fe	1.70 ppb	7.70	10.00	
59 Co	0.00 ppb	31.24	0.20	
60 Ni	-0.01 ppb	12.05	0.20	
63 Cu	-0.01 ppb	18.18	0.40	
66 Zn	-0.03 ppb	40.24	2.00	
75 As	-0.02 ppb	14.29	0.20	
78 Se	0.00 ppb	136.26	0.20	
88 Sr	0.00 ppb	41.61	0.20	
90 Zr	-0.01 ppb	8.25	2.00	
95 Mo	0.01 ppb	24.34	0.40	
107 Ag	0.00 ppb	44.68	0.20	
111 Cd	0.00 ppb	19.13	0.20	
118 Sn	0.00 ppb	61.41	0.20	
121 Sb	0.00 ppb	167.14	0.40	
137 Ba	0.00 ppb	42.99	0.20	
182 W	0.01 ppb	21.99	1.00	
205 Tl	0.00 ppb	1171.70	0.20	
208 Pb	0.00 ppb	9.33	0.10	
235 U	0.00 ppb	75.43	1.00	
238 U	0.00 ppb	14.61	0.10	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	839079.75	0.48	1159752.60	72.3	60 - 125	
45 Sc	2271228.50	0.65	2567033.50	88.5	60 - 125	
45 Sc	543196.31	0.58	613402.44	88.6	60 - 125	
45 Sc	3998399.50	0.93	4679393.50	85.4	60 - 125	
72 Ge	640686.06	0.33	704157.69	91.0	60 - 125	
72 Ge	293947.25	0.84	321292.31	91.5	60 - 125	
72 Ge	994052.25	1.28	1114306.40	89.2	60 - 125	
115 In	6882313.00	1.96	7180580.50	95.8	60 - 125	
159 Tb	8858503.00	1.75	8719993.00	101.6	60 - 125	

ISTD Ref File : C:\DATA\IF62015\D\IF6D13.B\F6D13004.D\F6D13004.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

EMAX LABORATORIES, INC.

DIGESTION LOG
for
ICP-MS

Note: For samples, relevant QCs/Standards digested, refer to attached digestion sequence.

Comments:

Digestion Vessel Lot # 1309222-7A-4277 BC

All Samples pH < 2

Book #:	EIM-053
Batch:	IMD025W
Matrix:	WATER
Digestor ID:	E

SOP #	Rev. #
☐ EMAX-200.8	5
☑ EMAX-6020	8
☐ EMAX-	

Start	Temp	End	Temp
	93.4 °C		94.1 °C

Standards	ID	Amount Added (ml/g)
LCS-1	SM6A-007-02-13	0.15
LCS-2	SM6A-007-02-14	0.15
MS	SAME spike VOL & SOLN AS LCS 1,2	
Blank Soil (Bead)	NA	
Reagent	**Lot# / ID**	**Amount Added (ml)**
HNO_3	SNIA-005-11-08	0.5 + 1.0
HCl	SNIA-005-08-04	0.25 + 0.25
H_2O_2	NA	NA
HNO_3(1:1)	NA	NA
pH Strip (0-14)	HC413032	

Digestate Location	Metals
Extract Location	
☑ Reagent Water ID:	SM5A-03-01-24
☑ Thermometer ID:	101993366 / E31
☑ Pipette ID:	239360318
☐ Pipette ID:	
☐ Pipette ID:	
☐ HNO_3 dispenser checked @ 5.0 ml with Class A volumetric flask	
☐ HCl dispenser checked @ 5.0 ml with Class A volumetric flask	

Prepared By: SK

Standard Added By: SK Witnessed By: [illegible]

Extract Rcvd By: [illegible] Checked By: [illegible]

EMAX LABORATORIES, INC.

DIGESTION LOG FOR METALS

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Vd(ml)	ExpAmt	ExpVd(ml)	PrepFctr	Comments
15IMD025W01	IMD025WB	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W02	IMD025WL	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W03	IMD025WC	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W04	D080-02	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W05	D080-03	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W06	D080-04	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W07	D108-03	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W08	D111-01	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W09	D111-02	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W10	D111-03	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W11	D111-03M	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W12	D111-03S	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W13	D111-04	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W14	D111-05	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W15	D111-06	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W16	D114-09	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W17	D126-01	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W18	D126-02	50	ml	4/21/15 10:09	50	50	50	1	
15IMD025W19	D126-03	50	ml	4/21/15 10:09	50	50	50	1	

SK 4/21/15

Vd=digestate volume

PrepFctr=(ExpAmt/Aliquot)*(Vd/ExpVd)

☑ Digestion Started @ 4/21/15 10:53

Prepared By: SKusum

☑ Digestion Ended @ 4/21/15 13:08

Checked By: [illegible]

Comments:

Date 4/21/15

EMAX LABORATORIES, INC.

DIGESTION LOG
for
ICP-MS

Note: For samples, relevant QCs/Standards digested, refer to attached digestion sequence.

Comments:

Digestion Vessel Lot # 19414007

Book #:	EIM-053
Batch:	IMD028S
Matrix:	SOIL
Digestor ID:	D

SOP #	Rev. #
☐ EMAX-200.8	5
☑ EMAX-6020	8
☐ EMAX-	

Start	Temp	End	Temp
	95.5 °C		96.1 °C

Standards	ID	Amount Added (ml/g)
LCS-1	SM6A-007-02-13	5.0
LCS-2	SM6A-007-02-14	5.0
MS	SAME SPIKE VOL & SOIL AS LCS 1,2	
Blank Soil (Bead)	SM5A-03-01-23	
Reagent	**Lot# / ID**	**Amount Added (ml)**
HNO_3	SW1A-005-11-08	10
HCl	SW1A-005-08-04	5+5
H_2O_2	SW1A-005-08-15	10
HNO_3(1:1)	SM5B-03-54-02	10
pH Strip (0-14)	NA	

Digestate Location	metals
Extract Location	
☑ Reagent Water ID:	SM5A-03-01-24
☑ Thermometer ID:	140553509/D7
☑ Pipette ID:	142780035
☐ Pipette ID:	
☐ Pipette ID:	
☐ HNO_3 dispenser checked @ 5.0 ml with Class A volumetric flask	
☐ HCl dispenser checked @ 5.0 ml with Class A volumetric flask	

Prepared By: SK

Standard Added By: SK Witnessed By: [illegible]

Extract Rcvd By: [illegible] Checked By: [illegible]

EMAX LABORATORIES INC

DIGESTION LOG FOR METALS

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Vd(ml)	ExpAmt	ExpVd(ml)	PrepFctr	Comments
15IMD028S01	IMD028SB	2.07	g	4/21/15 12:23	100	2	100	0.966	
15IMD028S02	IMD028SL	2.03	g	4/21/15 12:24	100	2	100	0.985	
15IMD028S03	IMD028SC	2.06	g	4/21/15 12:24	100	2	100	0.971	
15IMD028S04	D114-01	2.05	g	4/21/15 12:25	100	2	100	0.976	✓
15IMD028S05	D114-02	2.05	g	4/21/15 12:26	100	2	100	0.976	✓
15IMD028S06	D114-03	2.01	g	4/21/15 12:26	100	2	100	0.995	✓
15IMD028S07	D114-04	2.06	g	4/21/15 12:27	100	2	100	0.971	✓
15IMD028S08	D114-05	2.01	g	4/21/15 12:28	100	2	100	0.995	✓
15IMD028S09	D114-06	2.02	g	4/21/15 12:28	100	2	100	0.99	✓
15IMD028S10	D114-07	2.01	g	4/21/15 12:28	100	2	100	0.995	✓
15IMD028S11	D114-08	2.05	g	4/21/15 12:30	100	2	100	0.976	✓
15IMD028S12	D114-08M	2.05	g	4/21/15 12:30	100	2	100	0.976	✓
15IMD028S13	D114-08S	2.06	g	4/21/15 12:31	100	2	100	0.971	✓
15IMD028S14	D114-10	2.08	g	4/21/15 12:32	100	2	100	0.962	✓
15IMD028S15	D114-11	2.05	g	4/21/15 12:33	100	2	100	0.976	✓
15IMD028S16	D114-12	2.01	g	4/21/15 12:33	100	2	100	0.995	✓
15IMD028S17	D114-13	2.07	g	4/21/15 12:34	100	2	100	0.966	✓
15IMD028S18	D114-14	2.06	g	4/21/15 12:35	100	2	100	0.971	✓
15IMD028S19	D114-15	2.02	g	4/21/15 12:35	100	2	100	0.99	✓
15IMD028S20	D114-16	2.05	g	4/21/15 12:36	100	2	100	0.976	✓
15IMD028S21	D114-17	2.05	g	4/21/15 12:36	100	2	100	0.976	✓
15IMD028S22	D114-18	2.02	g	4/21/15 12:37	100	2	100	0.99	✓
15IMD028S23	D114-19	2.02	g	4/21/15 12:37	100	2	100	0.99	✓
15IMD028S24	D114-20	2.03	g	4/21/15 12:38	100	2	100	0.985	✓

SK 4/21/15

Balance ID: 10304418. Calibration check was verified prior to use.

Vd=digestate volume

PrepFctr=(ExpAmt/Aliquot)*(Vd/ExpVd)

☑ Digestion Started @ 4/21/15 15:26

Prepared By: SKusum

☑ Digestion Ended @ 4/21/15 17:09

Checked By: [illegible]

Comments:

Date 4/21/15

EMAX LABORATORIES, INC.

DIGESTION LOG
for
ICP-MS

Note: For samples, relevant QCs/Standards digested, refer to attached digestion sequence.

Comments:

Digestion Vessel Lot # 19414007

Book #: EIM-053
Batch: 1MD029S
Matrix: SOIL
Digestor ID: C

SOP #	Rev. #
☐ EMAX-200.8	5
☑ EMAX-6020	8
☐ EMAX-	

Start	Temp	End	Temp
	94.8 °C		95.3 °C

Standards	ID	Amount Added (ml/g)
LCS-1	SM6A-007-02-13	5.0
LCS-2	SM6A-007-02-14	5.0
MS	SAME SPIKE VOL & SOLN AS LCS1,2	
Blank Soil (Bead)	SM5A-03-01-23	
Reagent	**Lot# / ID**	**Amount Added (ml)**
HNO_3	SW1A-005-11-08	10
HCl	SW1A-005-08-04	5+5
H_2O_2	SW1A-005-08-15	10
HNO_3(1:1)	SM5B-03-54-02	10
pH Strip (0-14)	NA	

Digestate Location	metals
Extract Location	
☑ Reagent Water ID:	SM5A-03-01-24
☑ Thermometer ID:	140245688 /C7
☑ Pipette ID:	14278035
☐ Pipette ID:	
☐ Pipette ID:	
☐ HNO_3 dispenser checked @ 5.0 ml with Class A volumetric flask	
☐ HCl dispenser checked @ 5.0 ml with Class A volumetric flask	

Prepared By: SK

Standard Added By: SK Witnessed By: [illegible]

Extract Rcvd By: [illegible] Checked By: [illegible]

EMAX LABORATORIES, INC.

DIGESTION LOG FOR METALS

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Vd(ml)	ExpAmt	ExpVd(ml)	PrepFctr	Comments
15IMD029S01	IMD029SB	2.02	g	4/21/15 12:39	100	2	100	0.99	
15IMD029S02	IMD029SL	2.02	g	4/21/15 12:40	100	2	100	0.99	
15IMD029S03	IMD029SC	2.02	g	4/21/15 12:40	100	2	100	0.99	
15IMD029S04	D114-21	2.03	g	4/21/15 12:41	100	2	100	0.985	✓
15IMD029S05	D114-22	2.06	g	4/21/15 12:41	100	2	100	0.971	✓
15IMD029S06	D114-22M	2.03	g	4/21/15 12:42	100	2	100	0.985	✓
15IMD029S07	D114-22S	2.08	g	4/21/15 12:42	100	2	100	0.962	✓
15IMD029S08	D114-23	2.04	g	4/21/15 12:43	100	2	100	0.98	✓
15IMD029S09	D114-24	2.05	g	4/21/15 12:43	100	2	100	0.976	✓
15IMD029S10	D114-25	2.02	g	4/21/15 12:44	100	2	100	0.99	✓

SK 4/21/15

Balance ID: 10304418. Calibration check was verified prior to use.

Vd=digestate volume

PrepFctr=(ExpAmt/Aliquot)*(Vd/ExpVd)

☑ Digestion Started @ 4/21/15 15:33

Prepared By: SKusum

☑ Digestion Ended @ 4/21/15 17:13

Checked By: [illegible]

Comments:

Date 4/21/15

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D114

METHOD SW7470A/SW7471A
MERCURY

A total of one (1) water sample and twenty-four (24) soil samples were received on 04/17/15 to be analyzed for Mercury in accordance with Method SW7470A/SW7471A and project specific requirements.

Holding Time
Samples were analyzed within the prescribed holding time.

Calibration
Multi-calibration points were generated to establish initial calibration (ICAL). ICAL was verified using a secondary source (ICV). Continuing calibration (CCV) verifications were carried on a frequency specified by the project. All calibration requirements were within acceptance criteria.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, three (3) method blanks were analyzed. HGD020SB, HGD021SB and HGD023WB were compliant to project requirement. Refer to sample result summary forms for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, three (3) sets of LCS/LCD were analyzed. Mercury was within LCS QC limits in HGD020SL/HGD020SC, HGD021SL/HGD021SC and HGD023WL/HGD023WC. Refer to LCS summary forms for details.

Matrix QC Sample
Matrix spike sample was prepared and analyzed at a frequency required by the project. For this SDG, two (2) sets of MS/MSD were analyzed. Mercury was within MS QC limits in D114-08M/D114-08S. Mercury was within MS QC limits in D114-22M/D114-22S. Refer to Matrix QC summary forms for details.

Sample Analysis
Samples were analyzed according to prescribed analytical procedures. Results were evaluated in accordance to project requirements. For this SDG, all quality control requirements were met.

LAB CHRONICLE
MERCURY

Client : KLEINFELDER
Project : CTO 070, UX04, FALLBROOK

SDG NO. : 15D114
Instrument ID : TI047

WATER

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1W	HGD023WB	1	NA	04/27/1518:04	04/27/1513:00	M47D015011	M47D015	HGD023W	Method Blank
LCS1W	HGD023WL	1	NA	04/27/1518:06	04/27/1513:00	M47D015012	M47D015	HGD023W	Lab Control Sample (LCS)
LCD1W	HGD023WC	1	NA	04/27/1518:08	04/27/1513:00	M47D015013	M47D015	HGD023W	LCS Duplicate
UX04-EB-041615	D114-09	1	NA	04/27/1518:40	04/27/1513:00	M47D015028	M47D015	HGD023W	Field Sample

FN - Filename
% Moist - Percent Moisture

METHOD SW7470A
MERCURY

Client : KLEINFELDER
Project : CTO 070, UX04, FALLBROOK
Batch No. : 15D114

Matrix : WATER
InstrumentID : 47

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/L)	DIL'N FACTOR	MOIST (%)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1W	HGD023W8	ND	1	NA	0.2	0.054	0.1	04/27/1518:04	04/27/1513:00	M47D015011	M47D015	HGD023W	NA	NA
LCS1W	HGD023WL	2.50	1	NA	0.2	0.054	0.1	04/27/1518:06	04/27/1513:00	M47D015012	M47D015	HGD023W	NA	NA
LCD1W	HGD023WC	2.49	1	NA	0.2	0.054	0.1	04/27/1518:08	04/27/1513:00	M47D015013	M47D015	HGD023W	NA	NA
UX04-EB-041615	D114-09	ND	1	NA	0.2	0.054	0.1	04/27/1518:40	04/27/1513:00	M47D015028	M47D015	HGD023W	04/16/1514:20	04/17/15

EMAX QUALITY CONTROL DATA
LAB CONTROL SAMPLE ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UX04, FALLBROOK
BATCH NO. : 15D114
METHOD : SW7470A

MATRIX	WATER		% MOISTURE: N/A
DILUTION FACTOR	1	1	1
SAMPLE ID	MBLK1W	LCS1W	LCD1W
LAB SAMPLE ID	HGD023WB	HGD023WL	HGD023WC
LAB FILE ID	M47D015011	M47D015012	M47D015013
DATE PREPARED	04/27/1513:00	04/27/1513:00	04/27/1513:00
DATE ANALYZED	04/27/1518:04	04/27/1518:06	04/27/1518:08
PREP BATCH	HGD023W	HGD023W	HGD023W
CALIBRATION REF	M47D015	M47D015	M47D015

ACCESSION:

PARAMETER	MB RESULT (ug/L)	SPIKE AMT (ug/L)	BS RESULT (ug/L)	BS REC (%)	SPIKE AMT (ug/L)	BSD RESULT (ug/L)	BSD REC (%)	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Mercury	ND	2.50	2.50	100	2.50	2.49	100	0	80-120	20

LAB CHRONICLE
MERCURY

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK

SDG NO. : 15D114
Instrument ID : TI047

SOIL

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1S	HGD020SB	1	NA	04/23/1511:01	04/22/1517:15	M47D014011	M47D014	HGD020S	Method Blank
LCS1S	HGD020SL	1	NA	04/23/1511:04	04/22/1517:15	M47D014012	M47D014	HGD020S	Lab Control Sample (LCS)
LCD1S	HGD020SC	1	NA	04/23/1511:06	04/22/1517:15	M47D014013	M47D014	HGD020S	LCS Duplicate
UXO4-TR04-S02-3.0	D114-08	1	13.7	04/23/1511:10	04/22/1517:15	M47D014015	M47D014	HGD020S	Field Sample
UXO4-TR04-S02-3.0MS	D114-08M	1	13.7	04/23/1511:14	04/22/1517:15	M47D014017	M47D014	HGD020S	Matrix Spike Sample (MS)
UXO4-TR04-S02-3.0MSD	D114-08S	1	13.7	04/23/1511:17	04/22/1517:15	M47D014018	M47D014	HGD020S	MS Duplicate (MSD)
UXO4-TR01-S01-1.0	D114-01	1	6.9	04/23/1511:19	04/22/1517:15	M47D014019	M47D014	HGD020S	Field Sample
UXO4-TR01-S02-3.0	D114-02	1	8.8	04/23/1511:21	04/22/1517:15	M47D014020	M47D014	HGD020S	Field Sample
UXO4-TR02-S01-2.0	D114-03	1	6.5	04/23/1511:27	04/22/1517:15	M47D014023	M47D014	HGD020S	Field Sample
UXO4-TR02-S02-3.0	D114-04	1	7.8	04/23/1511:29	04/22/1517:15	M47D014024	M47D014	HGD020S	Field Sample
UXO4-TR03-S01-1.5	D114-05	1	10.2	04/23/1511:31	04/22/1517:15	M47D014025	M47D014	HGD020S	Field Sample
UXO4-TR03-S02-3.0	D114-06	1	15.2	04/23/1511:34	04/22/1517:15	M47D014026	M47D014	HGD020S	Field Sample
UXO4-TR04-S01-2.0	D114-07	1	9.3	04/23/1511:36	04/22/1517:15	M47D014027	M47D014	HGD020S	Field Sample
UXO4-SB08-8.0	D114-10	1	10.8	04/23/1511:38	04/22/1517:15	M47D014028	M47D014	HGD020S	Field Sample
UXO4-SB09-6.6	D114-11	1	21.3	04/23/1511:41	04/22/1517:15	M47D014029	M47D014	HGD020S	Field Sample
UXO4-SB10-0.5	D114-12	1	3.8	04/23/1511:43	04/22/1517:15	M47D014030	M47D014	HGD020S	Field Sample
UXO4-SB10-1.0	D114-13	1	9.5	04/23/1511:45	04/22/1517:15	M47D014031	M47D014	HGD020S	Field Sample
UXO4-SB11-0.5	D114-14	1	1.8	04/23/1511:47	04/22/1517:15	M47D014032	M47D014	HGD020S	Field Sample
UXO4-SB11-1.0	D114-15	1	5.0	04/23/1511:53	04/22/1517:15	M47D014035	M47D014	HGD020S	Field Sample
UXO4-SB12-0.5	D114-16	1	1.0	04/23/1511:55	04/22/1517:15	M47D014036	M47D014	HGD020S	Field Sample
UXO4-SB12-1.0	D114-17	1	2.3	04/23/1511:57	04/22/1517:15	M47D014037	M47D014	HGD020S	Field Sample
UXO4-SB13-0.5	D114-18	1	1.2	04/23/1512:00	04/22/1517:15	M47D014038	M47D014	HGD020S	Field Sample
UXO4-SB13-1.0	D114-19	1	4.2	04/23/1512:02	04/22/1517:15	M47D014039	M47D014	HGD020S	Field Sample
UXO4-SB14-0.5	D114-20	1	4.9	04/23/1512:04	04/22/1517:15	M47D014040	M47D014	HGD020S	Field Sample
MBLK2S	HGD021SB	1	NA	04/23/1512:06	04/22/1517:20	M47D014041	M47D014	HGD021S	Method Blank
LCS2S	HGD021SL	1	NA	04/23/1512:09	04/22/1517:20	M47D014042	M47D014	HGD021S	Lab Control Sample (LCS)
LCD2S	HGD021SC	1	NA	04/23/1512:11	04/22/1517:20	M47D014043	M47D014	HGD021S	LCS Duplicate
UXO4-SB15-0.5	D114-22	1	1.3	04/23/1512:20	04/22/1517:20	M47D014047	M47D014	HGD021S	Field Sample
UXO4-SB15-0.5MS	D114-22M	1	1.3	04/23/1512:24	04/22/1517:20	M47D014049	M47D014	HGD021S	Matrix Spike Sample (MS)
UXO4-SB15-0.5MSD	D114-22S	1	1.3	04/23/1512:26	04/22/1517:20	M47D014050	M47D014	HGD021S	MS Duplicate (MSD)
UXO4-SB14-1.0	D114-21	1	7.6	04/23/1512:28	04/22/1517:20	M47D014051	M47D014	HGD021S	Field Sample
UXO4-SB15-1.0	D114-23	1	2.7	04/23/1512:31	04/22/1517:20	M47D014052	M47D014	HGD021S	Field Sample
UXO4-SB16-0.5	D114-24	1	4.0	04/23/1512:33	04/22/1517:20	M47D014053	M47D014	HGD021S	Field Sample
UXO4-SB16-1.0	D114-25	1	6.4	04/23/1512:35	04/22/1517:20	M47D014054	M47D014	HGD021S	Field Sample

FN - Filename
% Moist - Percent Moisture

METHOD SW7471A
MERCURY

Client : KLEINFELDER
Project : CTO 070, UX04, FALLBROOK
Batch No. : 15D114

Matrix : SOIL
InstrumentID : 47

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (mg/Kg)	DIL'N FACTOR	MOIST (%)	LOQ (mg/Kg)	DL (mg/Kg)	LOD (mg/Kg)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1S	HGD020SB	ND	1	NA	0.0998	0.00998	0.02	04/23/1511:01	04/22/1517:15	M47D014011	M47D014	HGD020S	NA	NA
LCS1S	HGD020SL	0.427	1	NA	0.1	0.01	0.02	04/23/1511:04	04/22/1517:15	M47D014012	M47D014	HGD020S	NA	NA
LCD1S	HGD020SC	0.437	1	NA	0.1	0.01	0.02	04/23/1511:06	04/22/1517:15	M47D014013	M47D014	HGD020S	NA	NA
UX04-TR04-S02-3.0	D114-08	0.0598J	1	13.7	0.114	0.0114	0.0229	04/23/1511:10	04/22/1517:15	M47D014015	M47D014	HGD020S	04/14/1508:05	04/17/15
UX04-TR04-S02-3.0MS	D114-08M	0.527	1	13.7	0.115	0.0115	0.023	04/23/1511:14	04/22/1517:15	M47D014017	M47D014	HGD020S	04/14/1508:05	04/17/15
UX04-TR04-S02-3.0MSD	D114-08S	0.558	1	13.7	0.113	0.0113	0.0227	04/23/1511:17	04/22/1517:15	M47D014018	M47D014	HGD020S	04/14/1508:05	04/17/15
UX04-TR01-S01-1.0	D114-01	ND	1	6.9	0.107	0.0107	0.0214	04/23/1511:19	04/22/1517:15	M47D014019	M47D014	HGD020S	04/10/1514:10	04/17/15
UX04-TR01-S02-3.0	D114-02	0.0437J	1	8.8	0.108	0.0108	0.0217	04/23/1511:21	04/22/1517:15	M47D014020	M47D014	HGD020S	04/10/1514:15	04/17/15
UX04-TR02-S01-2.0	D114-03	0.0247J	1	6.5	0.106	0.0106	0.0213	04/23/1511:27	04/22/1517:15	M47D014023	M47D014	HGD020S	04/13/1511:00	04/17/15
UX04-TR02-S02-3.0	D114-04	0.0334J	1	7.8	0.107	0.0107	0.0213	04/23/1511:29	04/22/1517:15	M47D014024	M47D014	HGD020S	04/13/1511:10	04/17/15
UX04-TR03-S01-1.5	D114-05	0.0120J	1	10.2	0.111	0.0111	0.0222	04/23/1511:31	04/22/1517:15	M47D014025	M47D014	HGD020S	04/13/1513:00	04/17/15
UX04-TR03-S02-3.0	D114-06	ND	1	15.2	0.115	0.0115	0.023	04/23/1511:34	04/22/1517:15	M47D014026	M47D014	HGD020S	04/13/1513:15	04/17/15
UX04-TR04-S01-2.0	D114-07	0.0356J	1	9.3	0.109	0.0109	0.0219	04/23/1511:36	04/22/1517:15	M47D014027	M47D014	HGD020S	04/14/1508:00	04/17/15
UX04-SB08-8.0	D114-10	ND	1	10.8	0.112	0.0112	0.0224	04/23/1511:38	04/22/1517:15	M47D014028	M47D014	HGD020S	04/08/1511:01	04/17/15
UX04-SB09-6.6	D114-11	0.0173J	1	21.3	0.126	0.0126	0.0253	04/23/1511:41	04/22/1517:15	M47D014029	M47D014	HGD020S	04/10/1509:50	04/17/15
UX04-SB10-0.5	D114-12	ND	1	3.8	0.102	0.0102	0.0204	04/23/1511:43	04/22/1517:15	M47D014030	M47D014	HGD020S	04/16/1511:10	04/17/15
UX04-SB10-1.0	D114-13	0.0125J	1	9.5	0.11	0.011	0.022	04/23/1511:45	04/22/1517:15	M47D014031	M47D014	HGD020S	04/16/1511:15	04/17/15
UX04-SB11-0.5	D114-14	ND	1	1.8	0.101	0.0101	0.0201	04/23/1511:47	04/22/1517:15	M47D014032	M47D014	HGD020S	04/16/1511:20	04/17/15
UX04-SB11-1.0	D114-15	ND	1	5.0	0.105	0.0105	0.0211	04/23/1511:53	04/22/1517:15	M47D014035	M47D014	HGD020S	04/16/1511:25	04/17/15
UX04-SB12-0.5	D114-16	ND	1	1.0	0.101	0.0101	0.0202	04/23/1511:55	04/22/1517:15	M47D014036	M47D014	HGD020S	04/16/1511:30	04/17/15
UX04-SB12-1.0	D114-17	ND	1	2.3	0.102	0.0102	0.0204	04/23/1511:57	04/22/1517:15	M47D014037	M47D014	HGD020S	04/16/1511:35	04/17/15
UX04-S813-0.5	D114-18	ND	1	1.2	0.101	0.0101	0.0201	04/23/1512:00	04/22/1517:15	M47D014038	M47D014	HGD020S	04/16/1511:40	04/17/15
UX04-SB13-1.0	D114-19	ND	1	4.2	0.104	0.0104	0.0209	04/23/1512:02	04/22/1517:15	M47D014039	M47D014	HGD020S	04/16/1511:45	04/17/15
UX04-SB14-0.5	D114-20	0.0120J	1	4.9	0.103	0.0103	0.0207	04/23/1512:04	04/22/1517:15	M47D014040	M47D014	HGD020S	04/16/1510:45	04/17/15
MBLK2S	HGD021SB	ND	1	NA	0.1	0.01	0.02	04/23/1512:06	04/22/1517:20	M47D014041	M47D014	HGD021S	NA	NA
LCS2S	HGD021SL	0.438	1	NA	0.1	0.01	0.02	04/23/1512:09	04/22/1517:20	M47D014042	M47D014	HGD021S	NA	NA
LCD2S	HGD021SC	0.434	1	NA	0.0998	0.00998	0.02	04/23/1512:11	04/22/1517:20	M47D014043	M47D014	HGD021S	NA	NA
UX04-SB15-0.5	D114-22	ND	1	1.3	0.101	0.0101	0.0202	04/23/1512:20	04/22/1517:20	M47D014047	M47D014	HGD021S	04/16/1511:50	04/17/15
UX04-SB15-0.5MS	D114-22M	0.454	1	1.3	0.1	0.01	0.02	04/23/1512:24	04/22/1517:20	M47D014049	M47D014	HGD021S	04/16/1511:50	04/17/15
UX04-SB15-0.5MSD	D114-22S	0.455	1	1.3	0.101	0.0101	0.0201	04/23/1512:26	04/22/1517:20	M47D014050	M47D014	HGD021S	04/16/1511:50	04/17/15
UX04-SB14-1.0	D114-21	ND	1	7.6	0.108	0.0108	0.0216	04/23/1512:28	04/22/1517:20	M47D014051	M47D014	HGD021S	04/16/1510:50	04/17/15
UX04-SB15-1.0	D114-23	ND	1	2.7	0.102	0.0102	0.0204	04/23/1512:31	04/22/1517:20	M47D014052	M47D014	HGD021S	04/16/1511:55	04/17/15
UX04-SB16-0.5	D114-24	ND	1	4.0	0.103	0.0103	0.0207	04/23/1512:33	04/22/1517:20	M47D014053	M47D014	HGD021S	04/16/1512:00	04/17/15
UX04-SB16-1.0	D114-25	ND	1	6.4	0.107	0.0107	0.0213	04/23/1512:35	04/22/1517:20	M47D014054	M47D014	HGD021S	04/16/1512:05	04/17/15

EMAX QUALITY CONTROL DATA
LAB CONTROL SAMPLE ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UX04, FALLBROOK
BATCH NO. : 15D114
METHOD : SW7471A

MATRIX	SOIL		% MOISTURE: N/A
DILUTION FACTOR	1	1	1
SAMPLE ID	MBLK1S	LCS1S	LCD1S
LAB SAMPLE ID	HGD020SB	HGD020SL	HGD020SC
LAB FILE ID	M47D014011	M47D014012	M47D014013
DATE PREPARED	04/22/1517:15	04/22/1517:15	04/22/1517:15
DATE ANALYZED	04/23/1511:01	04/23/1511:04	04/23/1511:06
PREP BATCH	HGD020S	HGD020S	HGD020S
CALIBRATION REF	M47D014	M47D014	M47D014

ACCESSION:

PARAMETER	MB RESULT (mg/Kg)	SPIKE AMT (mg/Kg)	BS RESULT (mg/Kg)	BS REC (%)	SPIKE AMT (mg/Kg)	BSD RESULT (mg/Kg)	BSD REC (%)	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Mercury	ND	0.417	0.427	102	0.417	0.437	105	2	80-120	20

7155

EMAX QUALITY CONTROL DATA
LAB CONTROL SAMPLE ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UX04, FALLBROOK
BATCH NO. : 15D114
METHOD : SW7471A

MATRIX	SOIL		% MOISTURE: N/A
DILUTION FACTOR	1	1	1
SAMPLE ID	MBLK2S	LCS2S	LCD2S
LAB SAMPLE ID	HGD021SB	HGD021SL	HGD021SC
LAB FILE ID	M47D014041	M47D014042	M47D014043
DATE PREPARED	04/22/1517:20	04/22/1517:20	04/22/1517:20
DATE ANALYZED	04/23/1512:06	04/23/1512:09	04/23/1512:11
PREP BATCH	HGD021S	HGD021S	HGD021S
CALIBRATION REF	M47D014	M47D014	M47D014

ACCESSION:

PARAMETER	MB RESULT (mg/Kg)	SPIKE AMT (mg/Kg)	BS RESULT (mg/Kg)	BS REC (%)	SPIKE AMT (mg/Kg)	BSD RESULT (mg/Kg)	BSD REC (%)	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Mercury	ND	0.417	0.438	105	0.416	0.434	104	1	80-120	20

7155

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UX04, FALLBROOK
BATCH NO. : 15D114
METHOD : SW7471A

MATRIX	SOIL		% MOISTURE: 13.7
DILUTION FACTOR	1	1	1
SAMPLE ID	UX04-TR04-S02-3.0	UX04-TR04-S02-3.0MS	UX04-TR04-S02-3.0MSD
LAB SAMPLE ID	D114-08	D114-08M	D114-08S
LAB FILE ID	M47D014015	M47D014017	M47D014018
DATE PREPARED	04/22/1517:15	04/22/1517:15	04/22/1517:15
DATE ANALYZED	04/23/1511:10	04/23/1511:14	04/23/1511:17
PREP BATCH	HGD021S	HGD021S	HGD021S
CALIBRATION REF	M47D014	M47D014	M47D014

ACCESSION:

PARAMETER	PARENT RESULT (mg/Kg)	SPIKE AMT (mg/Kg)	MS RESULT (mg/Kg)	MS REC (%)	SPIKE AMT (mg/Kg)	MSD RESULT (mg/Kg)	MSD REC (%)	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Mercury	0.0598J	0.479	0.527	97	0.473	0.558	105	6	80-120	20

7157

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UXO4, FALLBROOK
BATCH NO. : 15D114
METHOD : SW7471A

MATRIX	SOIL		% MOISTURE: 1.3
DILUTION FACTOR	1	1	1
SAMPLE ID	UXO4-SB15-0.5	UXO4-SB15-0.5MS	UXO4-SB15-0.5MSD
LAB SAMPLE ID	D114-22	D114-22M	D114-22S
LA8 FILE ID	M47D014047	M47D014049	M47D014050
DATE PREPARED	04/22/1517:20	04/22/1517:20	04/22/1517:20
DATE ANALYZED	04/23/1512:20	04/23/1512:24	04/23/1512:26
PREP BATCH	HGD021S	HGD021S	HGD021S
CALIBRATION REF	M47D014	M47D014	M47D014

ACCESSION:

PARAMETER	PARENT RESULT (mg/Kg)	SPIKE AMT (mg/Kg)	MS RESULT (mg/Kg)	MS REC (%)	SPIKE AMT (mg/Kg)	MSD RESULT (mg/Kg)	MSD REC (%)	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Mercury	ND	0.418	0.454	109	0.420	0.455	108	0	80-120	20

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
MERCURY

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Start Date: 4/23/15 **Start Time:** 10:37

End Date: 4/23/15 **End Time:** 13:48

Comments:

QC OK

Book #:	A47-097
Instrument No.:	47
Analytical Sequence/Batch:	M47D014
Method File:	HG1
Micropipette ID:	☐ ICP DOE-1
Micropipette ID:	☑ HG-03
Micropipette ID:	☑ HG-04
Micropipette ID:	☐

SOP #	Rev. #
☐ EMAX-7470	7
☑ EMAX-7471	7
☐ EMAX-245.1	3
☐ EMAX-	

STANDARDS ID	
S1	BLANK
S2	JM3B-11-100-01
S3	↓
S4	↓
S5	↓
S6	↓
CCV	↓
ICV	JM3B-11-100-02
LCS	↓
Analytical Spike	
	JM3B-11-100-03 TV 3 ug/L

Analyzed By: NT

Date: 4/23/15

"M47D014"

EMAXlfid	EMAXlsid	conc	Raw_resp	rsd/rf	adatetime	DF
M47D014001	STD01REP1	0	5564		04/23/1510:37	1
M47D014002	STD02REP1	.2	25582		04/23/1510:39	1
M47D014003	STD03REP1	.5	62531		04/23/1510:42	1
M47D014004	STD04REP1	1	113300		04/23/1510:44	1
M47D014005	STD05REP1	2	221415		04/23/1510:46	1
M47D014006	STD06REP1	5	559545		04/23/1510:48	1
M47D014007	ICV	2.06	231834	0	04/23/1510:53	1
M47D014008	ICB	-.013	2530	0	04/23/1510:55	1
M47D014009	CCV1	2.05	231190	0	04/23/1510:57	1
M47D014010	CCB1	-.036	72	0	04/23/1510:59	1
M47D014011	HGD020SB	.021	6397	0	04/23/1511:01	1
M47D014012	HGD020SL	2.56	287650	0	04/23/1511:04	1
M47D014013	HGD020SC	2.62	294805	0	04/23/1511:06	1
M47D014014	D114-08A	3.42	382348	0	04/23/1511:08	1
M47D014015	D114-08	.314	38806	0	04/23/1511:10	1
M47D014016	D114-08J	.054	10047	0	04/23/1511:12	5
M47D014017	D114-08M	2.75	308663	0	04/23/1511:14	1
M47D014018	D114-08S	2.95	330412	0	04/23/1511:17	1
M47D014019	D114-01	.042	8630	0	04/23/1511:19	1
M47D014020	D114-02	.242	30789	0	04/23/1511:21	1
M47D014021	CCV2	2.02	227597	0	04/23/1511:23	1
M47D014022	CCB2	-.023	1516	0	04/23/1511:25	1
M47D014023	D114-03	.139	19418	0	04/23/1511:27	1
M47D014024	D114-04	.188	24817	0	04/23/1511:29	1
M47D014025	D114-05	.065	11180	0	04/23/1511:31	1
M47D014026	D114-06	.055	10162	0	04/23/1511:34	1
M47D014027	D114-07	.195	25617	0	04/23/1511:36	1
M47D014028	D114-10	-.003	3712	0	04/23/1511:38	1
M47D014029	D114-11	.082	13085	0	04/23/1511:41	1
M47D014030	D114-12	.032	7581	0	04/23/1511:43	1
M47D014031	D114-13	.068	11543	0	04/23/1511:45	1
M47D014032	D114-14	.047	9229	0	04/23/1511:47	1
M47D014033	CCV3	2.05	231016	0	04/23/1511:49	1
M47D014034	CCB3	-.041	-494	0	04/23/1511:51	1
M47D014035	D114-15	.028	7103	0	04/23/1511:53	1
M47D014036	D114-16	.037	8083	0	04/23/1511:55	1
M47D014037	D114-17	.019	6090	0	04/23/1511:57	1
M47D014038	D114-18	.011	5216	0	04/23/1512:00	1
M47D014039	D114-19	.04	8401	0	04/23/1512:02	1
M47D014040	D114-20	.07	11816	0	04/23/1512:04	1
M47D014041	HGD021SB	-.07	-3770	0	04/23/1512:06	1
M47D014042	HGD021SL	2.63	295600	0	04/23/1512:09	1
M47D014043	HGD021SC	2.61	293607	0	04/23/1512:11	1
M47D014044	D114-22A	3.18	356316	0	04/23/1512:13	1
M47D014045	CCV4	2.07	233853	0	04/23/1512:16	1
M47D014046	CCB4	-.007	3265	0	04/23/1512:18	1
M47D014047	D114-22	.055	10070	0	04/23/1512:20	1
M47D014048	D114-22J	-.005	3489	0	04/23/1512:22	5
M47D014049	D114-22M	2.72	305038	0	04/23/1512:24	1
M47D014050	D114-22S	2.71	304072	0	04/23/1512:26	1
M47D014051	D114-21	.016	5810	0	04/23/1512:28	1
M47D014052	D114-23	.007	4780	0	04/23/1512:31	1
M47D014053	D114-24	.041	8519	0	04/23/1512:33	1
M47D014054	D114-25	.011	5289	0	04/23/1512:35	1
M47D014055	HGD022SB	-.034	237	0	04/23/1512:37	1
M47D014056	HGD022SL	2.65	297906	0	04/23/1512:39	1
M47D014057	CCV5	2.07	233748	0	04/23/1512:41	1
M47D014058	CCB5	-.024	1415	0	04/23/1512:44	1
M47D014059	D130-08A	3.12	349413	0	04/23/1512:46	1
M47D014060	D130-08	-.007	3257	0	04/23/1512:48	1
M47D014061	D130-08J	-.031	572	0	04/23/1512:50	5
M47D014062	D130-08M	2.62	294734	0	04/23/1512:52	1
M47D014063	D130-08D	.02	6247	0	04/23/1512:55	1
M47D014064	D130-01	.054	9979	0	04/23/1512:57	1
M47D014065	D130-02	-.003	3663	0	04/23/1512:59	1
M47D014066	D130-03	-.009	3039	0	04/23/1513:01	1
M47D014067	D130-04	.115	16802	0	04/23/1513:03	1
M47D014068	D130-05	.021	6401	0	04/23/1513:05	1
M47D014069	CCV6	2.06	232225	0	04/23/1513:07	1
M47D014070	CCB6	-.065	-3152	0	04/23/1513:09	1
M47D014071	D130-06	.361	44045	0	04/23/1513:12	1
M47D014072	D130-07	.03	7397	0	04/23/1513:14	1
M47D014073	D130-09	-.001	3904	0	04/23/1513:16	1

M47D014074	D130-10	.357	43621	0	04/23/1513:18	1
M47D014075	D130-11	.054	10014	0	04/23/1513:20	1
M47D014076	D130-12	-.007	3212	0	04/23/1513:22	1
M47D014077	D130-13	.12	17360	0	04/23/1513:24	1
M47D014078	D130-14	.052	9814	0	04/23/1513:27	1
M47D014079	D130-15	.076	12474	0	04/23/1513:29	1
M47D014080	D130-16	.047	9271	0	04/23/1513:31	1
M47D014081	CCV7	2.1	236565	0	04/23/1513:34	1
M47D014082	CCB7	.002	4199	0	04/23/1513:36	1
M47D014083	D130-17	-.029	863	0	04/23/1513:39	1
M47D014084	D130-18	.147	20291	0	04/23/1513:42	1
M47D014085	D130-19	.043	8735	0	04/23/1513:44	1
M47D014086	CCV8	2.09	235454	0	04/23/1513:46	1
M47D014087	CCB8	-.005	3480	0	04/23/1513:48	1
**********	**********	**********	**********	**********	**********	***
EMAXlfid	EMAXlsid	Xint	Yint	rrf	adatetime	DF
M47D014001	BLANK	-3.656877E-02	4050.451	.99992	04/23/1513:48	1

M47D014

cup	sample ID	extended ID	weight	volume	? A D F P S U SC UI US C1..7
1	ICV		1.0000	1.0000	
2	ICB		1.0000	1.0000	
3	CCV1		1.0000	1.0000	
4	CCB1		1.0000	1.0000	
5	HGD020SB		1.0000	1.0000	
6	HGD020SL		1.0000	1.0000	
7	HGD020SC		1.0000	1.0000	
8	D114-08A		1.0000	1.0000	
9	D114-08		1.0000	1.0000	
10	D114-08J		1.0000	1.0000	
11	D114-08M		1.0000	1.0000	
12	D114-08S		1.0000	1.0000	
13	D114-01		1.0000	1.0000	
14	D114-02		1.0000	1.0000	
15	CCV2		1.0000	1.0000	
16	CCB2		1.0000	1.0000	
17	D114-03		1.0000	1.0000	
18	D114-04		1.0000	1.0000	
19	D114-05		1.0000	1.0000	
20	D114-06		1.0000	1.0000	
21	D114-07		1.0000	1.0000	
22	D114-10		1.0000	1.0000	
23	D114-11		1.0000	1.0000	
24	D114-12		1.0000	1.0000	
25	D114-13		1.0000	1.0000	
26	D114-14		1.0000	1.0000	
27	CCV3		1.0000	1.0000	
28	CCB3		1.0000	1.0000	
29	D114-15		1.0000	1.0000	
30	D114-16		1.0000	1.0000	
31	D114-17		1.0000	1.0000	
32	D114-18		1.0000	1.0000	
33	D114-19		1.0000	1.0000	
34	D114-20		1.0000	1.0000	
35	HGD021SB		1.0000	1.0000	
36	HGD021SL		1.0000	1.0000	
37	HGD021SC		1.0000	1.0000	
38	D114-22A		1.0000	1.0000	
39	CCV4		1.0000	1.0000	
40	CCB4		1.0000	1.0000	
41	D114-22		1.0000	1.0000	
42	D114-22J		1.0000	1.0000	
43	D114-22M		1.0000	1.0000	
44	D114-22S		1.0000	1.0000	

HT 4/23/15

7162

cup	sample ID	extended ID	weight	volume	? A D F P S U SC UI US C1..7
1	D114-21		1.0000	1.0000	
2	D114-23		1.0000	1.0000	
3	D114-24		1.0000	1.0000	
4	D114-25		1.0000	1.0000	
5	HGD022SB		1.0000	1.0000	
6	HGD022SL		1.0000	1.0000	
7	CCV5		1.0000	1.0000	
8	CCB5		1.0000	1.0000	
9	D130-08A		1.0000	1.0000	
10	D130-08		1.0000	1.0000	
11	D130-08J		1.0000	1.0000	
12	D130-08M		1.0000	1.0000	
13	D130-08D		1.0000	1.0000	
14	D130-01		1.0000	1.0000	
15	D130-02		1.0000	1.0000	
16	D130-03		1.0000	1.0000	
17	D130-04		1.0000	1.0000	
18	D130-05		1.0000	1.0000	
19	CCV6		1.0000	1.0000	
20	CCB6		1.0000	1.0000	
21	D130-06		1.0000	1.0000	
22	D130-07		1.0000	1.0000	
23	D130-09		1.0000	1.0000	
24	D130-10		1.0000	1.0000	
25	D130-11		1.0000	1.0000	
26	D130-12		1.0000	1.0000	
27	D130-13		1.0000	1.0000	
28	D130-14		1.0000	1.0000	
29	D130-15		1.0000	1.0000	
30	D130-16		1.0000	1.0000	
31	CCV7		1.0000	1.0000	
32	CCB7		1.0000	1.0000	
33	D130-17		1.0000	1.0000	
34	D130-18		1.0000	1.0000	
35	D130-19		1.0000	1.0000	
36	CCV8		1.0000	1.0000	
37	CCB8		1.0000	1.0000	
38			1.0000	1.0000	
39			1.0000	1.0000	
40			1.0000	1.0000	
41			1.0000	1.0000	
42			1.0000	1.0000	
43			1.0000	1.0000	
44			1.0000	1.0000	

NT 4/23/15

WinHg Database 1.3

File Utility Help

RN⇩ RN⇧

Protocol HG1 Dataset/Proto M47D014 /HG1

Protocol | Line info | Cal Curve | Report | Ctrl Chart | Viewer

Reset

Calib Coeffs

New Cal

Update Coeffs

Spike Coeffs

A

B 9.02688e-6

C -3.63309e-2

Rho .999920

Type Linear

Calibrated

Accepted

Accept

Rel. Abs.
559545

Accepted

New

Include S1 Rep 1 ☑ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Conc. 5.01

S	Conc.	Calc.	Dev.	Mean	SD or %RSD	Rep 1	Rep 2	Rep 3
01	.00000	.014	.014	5564	0	5564		
02	.20000	.195	-.005	25582	0%	25582		
03	.50000	.528	.028	62531	0%	62531		
04	1.0000	.986	-.014	113300	0%	113300		
05	2.0000	1.96	-.038	221416	0%	221415		
06	5.0000	5.01	.015	559546	0%	559545		

Ready CAP NUM

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Standard: 1 Rep: 1				Seq: 1	10:37:19 23 Apr 15	HG		
Hg	.000	ug/l	5564					
*** Standard: 2 Rep: 1				Seq: 2	10:39:53 23 Apr 15	HG		
Hg	.200	ug/l	25582					
*** Standard: 3 Rep: 1				Seq: 3	10:42:06 23 Apr 15	HG		
Hg	.500	ug/l	62531					
*** Standard: 4 Rep: 1				Seq: 4	10:44:10 23 Apr 15	HG		
Hg	1.00	ug/l	113300					
*** Standard: 5 Rep: 1				Seq: 5	10:46:10 23 Apr 15	HG		
Hg	2.00	ug/l	221415					
*** Standard: 6 Rep: 1				Seq: 6	10:48:30 23 Apr 15	HG		
Hg	5.00	ug/l	559545					
*** Sample ID: ICV				Seq: 7	10:53:07 23 Apr 15	HG		
Hg	2.06	ug/l	231834					
*** Sample ID: ICB				Seq: 8	10:55:09 23 Apr 15	HG		
Hg	-.013	ug/l	2530					
*** Sample ID: CCV1				Seq: 9	10:57:20 23 Apr 15	HG		
Hg	2.05	ug/l	231190					
*** Sample ID: CCB1				Seq: 10	10:59:21 23 Apr 15	HG		
Hg	-.036	ug/l	72					
*** Sample ID: HGD020SB				Seq: 11	11:01:43 23 Apr 15	HG		
Hg	.021	ug/l	6397					
*** Sample ID: HGD020SL				Seq: 12	11:04:11 23 Apr 15	HG		
Hg	2.56	ug/l	287650					
*** Sample ID: HGD020SC				Seq: 13	11:06:15 23 Apr 15	HG		
Hg	2.62	ug/l	294805					
*** Sample ID: D114-08A				Seq: 14	11:08:28 23 Apr 15	HG		
Hg	3.42	ug/l	382348					
*** Sample ID: D114-08				Seq: 15	11:10:33 23 Apr 15	HG		
Hg	.314	ug/l	38806					

Line	Conc.	Units	SD/RSD	1	2	3	4	5

*** Sample ID: D114-08J Seq: 16 11:12:53 23 Apr 15 HG

Hg .054 ug/l 10047

*** Sample ID: D114-08M Seq: 17 11:14:52 23 Apr 15 HG

Hg 2.75 ug/l 308663

*** Sample ID: D114-08S Seq: 18 11:17:13 23 Apr 15 HG

Hg 2.95 ug/l 330412

*** Sample ID: D114-01 Seq: 19 11:19:26 23 Apr 15 HG

Hg .042 ug/l 8630

*** Sample ID: D114-02 Seq: 20 11:21:24 23 Apr 15 HG

Hg .242 ug/l 30789

*** Sample ID: CCV2 Seq: 21 11:23:33 23 Apr 15 HG

Hg 2.02 ug/l 227597

*** Sample ID: CCB2 Seq: 22 11:25:36 23 Apr 15 HG

Hg -.023 ug/l 1516

*** Sample ID: D114-03 Seq: 23 11:27:33 23 Apr 15 HG

Hg .139 ug/l 19418

*** Sample ID: D114-04 Seq: 24 11:29:31 23 Apr 15 HG

Hg .188 ug/l 24817

*** Sample ID: D114-05 Seq: 25 11:31:40 23 Apr 15 HG

Hg .065 ug/l 11180

*** Sample ID: D114-06 Seq: 26 11:34:44 23 Apr 15 HG

Hg .055 ug/l 10162

*** Sample ID: D114-07 Seq: 27 11:36:53 23 Apr 15 HG

Hg .195 ug/l 25617

*** Sample ID: D114-10 Seq: 28 11:38:57 23 Apr 15 HG

Hg -.003 ug/l 3712

*** Sample ID: D114-11 Seq: 29 11:41:20 23 Apr 15 HG

Hg .082 ug/l 13085

*** Sample ID: D114-12 Seq: 30 11:43:18 23 Apr 15 HG

Hg .032 ug/l 7581

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: D114-13				Seq: 31	11:45:16 23 Apr 15			HG
Hg	.068	ug/l	11543					
*** Sample ID: D114-14				Seq: 32	11:47:14 23 Apr 15			HG
Hg	.047	ug/l	9229					
*** Sample ID: CCV3				Seq: 33	11:49:15 23 Apr 15			HG
Hg	2.05	ug/l	231016					
*** Sample ID: CCB3				Seq: 34	11:51:18 23 Apr 15			HG
Hg	-.041	ug/l	-494					
*** Sample ID: D114-15				Seq: 35	11:53:33 23 Apr 15			HG
Hg	.028	ug/l	7103					
*** Sample ID: D114-16				Seq: 36	11:55:34 23 Apr 15			HG
Hg	.037	ug/l	8083					
*** Sample ID: D114-17				Seq: 37	11:57:53 23 Apr 15			HG
Hg	.019	ug/l	6090					
*** Sample ID: D114-18				Seq: 38	12:00:06 23 Apr 15			HG
Hg	.011	ug/l	5216					
*** Sample ID: D114-19				Seq: 39	12:02:08 23 Apr 15			HG
Hg	.040	ug/l	8401					
*** Sample ID: D114-20				Seq: 40	12:04:16 23 Apr 15			HG
Hg	.070	ug/l	11816					
*** Sample ID: HGD021SB				Seq: 41	12:06:50 23 Apr 15			HG
Hg	-.070	ug/l	-3770					
*** Sample ID: HGD021SL				Seq: 42	12:09:08 23 Apr 15			HG
Hg	2.63	ug/l	295600					
*** Sample ID: HGD021SC				Seq: 43	12:11:27 23 Apr 15			HG
Hg	2.61	ug/l	293607					
*** Sample ID: D114-22A				Seq: 44	12:13:26 23 Apr 15			HG
Hg	3.18	ug/l	356316					
*** Sample ID: CCV4				Seq: 45	12:16:26 23 Apr 15			HG
Hg	2.07	ug/l	233853					

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: CCB4				Seq: 46	12:18:46 23 Apr 15	HG		
Hg	-.007	ug/l	3265					
*** Sample ID: D114-22				Seq: 47	12:20:47 23 Apr 15	HG		
Hg	.055	ug/l	10070					
*** Sample ID: D114-22J				Seq: 48	12:22:49 23 Apr 15	HG		
Hg	-.005	ug/l	3489					
*** Sample ID: D114-22M				Seq: 49	12:24:50 23 Apr 15	HG		
Hg	2.72	ug/l	305038					
*** Sample ID: D114-22S				Seq: 50	12:26:50 23 Apr 15	HG		
Hg	2.71	ug/l	304072					
*** Sample ID: D114-21				Seq: 51	12:28:51 23 Apr 15	HG		
Hg	.016	ug/l	5810					
*** Sample ID: D114-23				Seq: 52	12:31:00 23 Apr 15	HG		
Hg	.007	ug/l	4780					
*** Sample ID: D114-24				Seq: 53	12:33:12 23 Apr 15	HG		
Hg	.041	ug/l	8519					
*** Sample ID: D114-25				Seq: 54	12:35:11 23 Apr 15	HG		
Hg	.011	ug/l	5289					
*** Sample ID: HGD022SB				Seq: 55	12:37:11 23 Apr 15	HG		
Hg	-.034	ug/l	237					
*** Sample ID: HGD022SL				Seq: 56	12:39:25 23 Apr 15	HG		
Hg	2.65	ug/l	297906					
*** Sample ID: CCV5				Seq: 57	12:41:38 23 Apr 15	HG		
Hg	2.07	ug/l	233748					
*** Sample ID: CCB5				Seq: 58	12:44:09 23 Apr 15	HG		
Hg	-.024	ug/l	1415					
*** Sample ID: D130-08A				Seq: 59	12:46:21 23 Apr 15	HG		
Hg	3.12	ug/l	349413					
*** Sample ID: D130-08				Seq: 60	12:48:21 23 Apr 15	HG		
Hg	-.007	ug/l	3257					

Line	Conc.	Units	SD/RSD	1	2	3	4	5

*** Sample ID: D130-08J Seq: 61 12:50:44 23 Apr 15 HG

Hg -.031 ug/l 572

*** Sample ID: D130-08M Seq: 62 12:52:57 23 Apr 15 HG

Hg 2.62 ug/l 294734

*** Sample ID: D130-08D Seq: 63 12:55:07 23 Apr 15 HG

Hg .020 ug/l 6247

*** Sample ID: D130-01 Seq: 64 12:57:28 23 Apr 15 HG

Hg .054 ug/l 9979

*** Sample ID: D130-02 Seq: 65 12:59:30 23 Apr 15 HG

Hg -.003 ug/l 3663

*** Sample ID: D130-03 Seq: 66 13:01:29 23 Apr 15 HG

Hg -.009 ug/l 3039

*** Sample ID: D130-04 Seq: 67 13:03:30 23 Apr 15 HG

Hg .115 ug/l 16802

*** Sample ID: D130-05 Seq: 68 13:05:51 23 Apr 15 HG

Hg .021 ug/l 6401

*** Sample ID: CCV6 Seq: 69 13:07:55 23 Apr 15 HG

Hg 2.06 ug/l 232225

*** Sample ID: CCB6 Seq: 70 13:09:56 23 Apr 15 HG

Hg -.065 ug/l -3152

*** Sample ID: D130-06 Seq: 71 13:12:11 23 Apr 15 HG

Hg .361 ug/l 44045

*** Sample ID: D130-07 Seq: 72 13:14:17 23 Apr 15 HG

Hg .030 ug/l 7397

*** Sample ID: D130-09 Seq: 73 13:16:18 23 Apr 15 HG

Hg -.001 ug/l 3904

*** Sample ID: D130-10 Seq: 74 13:18:33 23 Apr 15 HG

Hg .357 ug/l 43621

*** Sample ID: D130-11 Seq: 75 13:20:36 23 Apr 15 HG

Hg .054 ug/l 10014

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: D130-12				Seq:	76	13:22:41 23 Apr 15		HG
Hg	-.007	ug/l	3212					
*** Sample ID: D130-13				Seq:	77	13:24:55 23 Apr 15		HG
Hg	.120	ug/l	17360					
*** Sample ID: D130-14				Seq:	78	13:27:05 23 Apr 15		HG
Hg	.052	ug/l	9814					
*** Sample ID: D130-15				Seq:	79	13:29:37 23 Apr 15		HG
Hg	.076	ug/l	12474					
*** Sample ID: D130-16				Seq:	80	13:31:49 23 Apr 15		HG
Hg	.047	ug/l	9271					
*** Sample ID: CCV7				Seq:	81	13:34:00 23 Apr 15		HG
Hg	2.10	ug/l	236565					
*** Sample ID: CCB7				Seq:	82	13:36:52 23 Apr 15		HG
Hg	.002	ug/l	4199					
*** Sample ID: D130-17				Seq:	83	13:39:08 23 Apr 15		HG
Hg	-.029	ug/l	863					
*** Sample ID: D130-18				Seq:	84	13:42:20 23 Apr 15		HG
Hg	.147	ug/l	20291					
*** Sample ID: D130-19				Seq:	85	13:44:22 23 Apr 15		HG
Hg	.043	ug/l	8735					
*** Sample ID: CCV8				Seq:	86	13:46:23 23 Apr 15		HG
Hg	2.09	ug/l	235454					
*** Sample ID: CCB8				Seq:	87	13:48:56 23 Apr 15		HG
Hg	-.005	ug/l	3480					

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
MERCURY

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Start Date: 4/27/15 Start Time: 17:41

End Date: 4/27/15 End Time: 20:03

Comments:

QC OK

Book #:	A47-097
Instrument No.:	47
Analytical Sequence/Batch:	M47D015
Method File:	HG1
Micropipette ID:	☐ ICP DOE-1
Micropipette ID:	☑ HG-03
Micropipette ID:	☑ HG-04
Micropipette ID:	☐

SOP #	Rev. #
☑ EMAX-7470	7
☐ EMAX-7471	7
☑ EMAX-245.1	3
☐ EMAX-	

STANDARDS ID	
S1	BLANK
S2	SM3B-11-100-04
S3	↓
S4	↓
S5	↓
S6	↓
CCV	↓
ICV	SM3B-11-100-05
LCS	↓
Analytical Spike	
	SM3B-11-100-06 TV 3ug/L

Analyzed By: NT

Date: 4/27/15

7171

"M47D015"

EMAXlfid	EMAXlsid	conc	Raw_resp	rsd/rf	adatetime	DF
M47D015001	STD01REP1	0	5118		04/27/1517:41	1
M47D015002	STD02REP1	.2	17317		04/27/1517:43	1
M47D015003	STD03REP1	.5	37545		04/27/1517:45	1
M47D015004	STD04REP1	1	72755		04/27/1517:47	1
M47D015005	STD05REP1	2	141506		04/27/1517:49	1
M47D015006	STD06REP1	5	344334		04/27/1517:52	1
M47D015007	ICV	1.96	137811	0	04/27/1517:54	1
M47D015008	ICB	-.046	1320	0	04/27/1517:57	1
M47D015009	CCV1	1.96	137870	0	04/27/1517:59	1
M47D015010	CCB1	-.059	400	0	04/27/1518:01	1
M47D015011	HGD023WB	-.034	2120	0	04/27/1518:04	1
M47D015012	HGD023WL	2.5	174305	0	04/27/1518:06	1
M47D015013	HGD023WC	2.49	173725	0	04/27/1518:08	1
M47D015014	D544-01A	2.98	207333	0	04/27/1518:10	1
M47D015015	D544-01	-.044	1419	0	04/27/1518:12	1
M47D015016	D544-01J	-.042	1588	0	04/27/1518:14	5
M47D015017	D544-01M	2.73	190187	0	04/27/1518:16	1
M47D015018	D544-01S	2.71	189137	0	04/27/1518:18	1
M47D015019	D544-03	-.04	1715	0	04/27/1518:20	1
M47D015020	D584-01	-.028	2533	0	04/27/1518:23	1
M47D015021	CCV2	2.19	153148	0	04/27/1518:25	1
M47D015022	CCB2	-.048	1131	0	04/27/1518:27	1
M47D015023	D080-02	-.027	2607	0	04/27/1518:29	1
M47D015024	D080-03	-.04	1725	0	04/27/1518:32	1
M47D015025	D080-04	-.024	2759	0	04/27/1518:34	1
M47D015026	D082-07	-.027	2613	0	04/27/1518:36	1
M47D015027	D082-11	-.13	-4443	0	04/27/1518:38	1
M47D015028	D114-09	-.04	1680	0	04/27/1518:40	1
M47D015029	D126-01	.022	5923	0	04/27/1518:42	1
M47D015030	D126-02	.144	14214	0	04/27/1518:45	1
M47D015031	D126-03	-.046	1314	0	04/27/1518:47	1
M47D015032	HGD024WB	-.072	-497	0	04/27/1518:49	1
M47D015033	CCV3	2.17	152394	0	04/27/1518:51	1
M47D015034	CCB3	-.02	3037	0	04/27/1518:53	1
M47D015035	HGD024WL	2.75	191267	0	04/27/1518:55	1
M47D015036	D150-02A	3.29	228186	0	04/27/1518:57	1
M47D015037	D150-02	-.044	1411	0	04/27/1518:59	1
M47D015038	D150-02J	-.019	3122	0	04/27/1519:01	5
M47D015039	D150-02M	2.72	189496	0	04/27/1519:03	1
M47D015040	D150-02D	-.064	69	0	04/27/1519:06	1
M47D015041	D138-02	-.031	2303	0	04/27/1519:08	1
M47D015042	D148-01	-.058	503	0	04/27/1519:10	1
M47D015043	D148-02	-.029	2456	0	04/27/1519:12	1
M47D015044	TXD005SB	-.002	4294	0	04/27/1519:14	1
M47D015045	CCV4	2.13	149143	0	04/27/1519:16	1
M47D015046	CCB4	-.041	1631	0	04/27/1519:18	1
M47D015047	D092-05A	3.27	227227	0	04/27/1519:21	1
M47D015048	D092-05	.074	9481	0	04/27/1519:23	1
M47D015049	D092-05J	-.072	-466	0	04/27/1519:25	5
M47D015050	D092-05M	2.58	180156	0	04/27/1519:27	1
M47D015051	D092-05D	-.047	1193	0	04/27/1519:29	1
M47D015052	D092-02	-.004	4185	0	04/27/1519:31	1
M47D015053	TXD006SB	-.035	2033	0	04/27/1519:33	1
M47D015054	D130-13A	3.29	228283	0	04/27/1519:35	1
M47D015055	D130-13	-.044	1404	0	04/27/1519:37	1
M47D015056	D130-13J	-.04	1698	0	04/27/1519:39	5
M47D015057	CCV5	2.21	154642	0	04/27/1519:42	1
M47D015058	CCB5	-.05	1019	0	04/27/1519:44	1
M47D015059	D130-13M	2.63	183106	0	04/27/1519:46	1
M47D015060	D130-13D	-.144	-5344	0	04/27/1519:48	1
M47D015061	D130-06	-.041	1610	0	04/27/1519:50	1
M47D015062	D130-14	-.06	339	0	04/27/1519:52	1
M47D015063	D130-15	-.006	4032	0	04/27/1519:55	1
M47D015064	D130-16	-.052	856	0	04/27/1519:57	1
M47D015065	D130-17	-.035	2012	0	04/27/1519:59	1
M47D015066	CCV6	2.15	150898	0	04/27/1520:01	1
M47D015067	CCB6	-.079	-937	0	04/27/1520:03	1
**********	**********	**********	**********	**********	**********	***
EMAXlfid	EMAXlsid	Xint	Yint	rrf	adatetime	DF
M47D015001	BLANK	-.0650574	4426.992	.9999818	04/27/1520:03	1

M47D015

cup	sample ID	extended ID	weight	volume	? A D F P S U SC UI US C1..7
1	ICV		1.0000	1.0000	
2	ICB		1.0000	1.0000	
3	CCV1		1.0000	1.0000	
4	CCB1		1.0000	1.0000	
5	HGD023WB		1.0000	1.0000	
6	HGD023WL		1.0000	1.0000	
7	HGD023WC		1.0000	1.0000	
8	D544-01A		1.0000	1.0000	
9	D544-01		1.0000	1.0000	
10	D544-01J		1.0000	1.0000	
11	D544-01M		1.0000	1.0000	
12	D544-01S		1.0000	1.0000	
13	D544-03		1.0000	1.0000	
14	D584-01		1.0000	1.0000	
15	CCV2		1.0000	1.0000	
16	CCB2		1.0000	1.0000	
17	D080-02		1.0000	1.0000	
18	D080-03		1.0000	1.0000	
19	D080-04		1.0000	1.0000	
20	D082-07		1.0000	1.0000	
21	D082-11		1.0000	1.0000	
22	D114-09		1.0000	1.0000	
23	D126-01		1.0000	1.0000	
24	D126-02		1.0000	1.0000	
25	D126-03		1.0000	1.0000	
26	HGD024WB		1.0000	1.0000	
27	CCV3		1.0000	1.0000	
28	CCB3		1.0000	1.0000	
29	HGD024WL		1.0000	1.0000	
30	D150-02A		1.0000	1.0000	
31	D150-02		1.0000	1.0000	
32	D150-02J		1.0000	1.0000	
33	D150-02M		1.0000	1.0000	
34	D150-02D		1.0000	1.0000	
35	D138-02		1.0000	1.0000	
36	D148-01		1.0000	1.0000	
37	D148-02		1.0000	1.0000	
38	TXD005SB	TCLP	1.0000	1.0000	
39	CCV4		1.0000	1.0000	
40	CCB4		1.0000	1.0000	
41	D092-05A	TCLP	1.0000	1.0000	
42	D092-05	TCLP	1.0000	1.0000	
43	D092-05J	TCLP	1.0000	1.0000	
44	D092-05M	TCLP	1.0000	1.0000	

NT 4/27/15

cup	sample ID	extended ID	weight	volume	? A D F P S U SC UI US C1..7
1	D092-05D	TCLP	1.0000	1.0000	
2	D092-02	TCLP	1.0000	1.0000	
3	TXD006SB	TCLP	1.0000	1.0000	
4	D130-13A	TCLP	1.0000	1.0000	
5	D130-13	TCLP	1.0000	1.0000	
6	D130-13J	TCLP	1.0000	1.0000	
7	CCV5		1.0000	1.0000	
8	CCB5		1.0000	1.0000	
9	D130-13M	TCLP	1.0000	1.0000	
10	D130-13D	TCLP	1.0000	1.0000	
11	D130-06	TCLP	1.0000	1.0000	
12	D130-14	TCLP	1.0000	1.0000	
13	D130-15	TCLP	1.0000	1.0000	
14	D130-16	TCLP	1.0000	1.0000	
15	D130-17	TCLP	1.0000	1.0000	
16	CCV6		1.0000	1.0000	
17	CCB6		1.0000	1.0000	
18			1.0000	1.0000	
19			1.0000	1.0000	
20			1.0000	1.0000	
21			1.0000	1.0000	
22			1.0000	1.0000	
23			1.0000	1.0000	
24			1.0000	1.0000	
25			1.0000	1.0000	
26			1.0000	1.0000	
27			1.0000	1.0000	
28			1.0000	1.0000	
29			1.0000	1.0000	
30			1.0000	1.0000	
31			1.0000	1.0000	
32			1.0000	1.0000	
33			1.0000	1.0000	
34			1.0000	1.0000	
35			1.0000	1.0000	
36			1.0000	1.0000	
37			1.0000	1.0000	
38			1.0000	1.0000	
39			1.0000	1.0000	
40			1.0000	1.0000	
41			1.0000	1.0000	
42			1.0000	1.0000	
43			1.0000	1.0000	
44			1.0000	1.0000	

NT 4/27/15

WinHg Database 1.3

File Utility Help

Protocol HG1 Dataset/Proto M47D015 /HG1

Protocol | Line info | Cal Curve | Report | Ctrl Chart | Viewer

Reset

Calib Coeffs

New Cal

Update Coeffs

Spike Coeffs

A

B 1.46951e-5

C -6.50024e-2

Rho .999982

Type Linear

☑ Calibrated

☑ Accepted

Accept

Rel. Abs.
344334

Accepted

New

Include S1 Rep 1 ☑ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Conc. 5.00

S	Conc.	Calc.	Dev.	Mean	SD or %RSD	Rep 1	Rep 2	Rep 3
01	.00000	.010	.010	5119	1	5118		
02	.20000	.189	-.011	17318	0%	17317		
03	.50000	.487	-.013	37546	0%	37545		
04	1.0000	1.00	.004	72756	0%	72755		
05	2.0000	2.01	.014	141507	0%	141506		
06	5.0000	5.00	-.005	344334	0%	344334		

Ready CAP NUM

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Standard: 1 Rep: 1				Seq: 1	17:41:33 27 Apr 15	HG		
Hg	.000	ug/l	5118					
*** Standard: 2 Rep: 1				Seq: 2	17:43:34 27 Apr 15	HG		
Hg	.200	ug/l	17317					
*** Standard: 3 Rep: 1				Seq: 3	17:45:36 27 Apr 15	HG		
Hg	.500	ug/l	37545					
*** Standard: 4 Rep: 1				Seq: 4	17:47:36 27 Apr 15	HG		
Hg	1.00	ug/l	72755					
*** Standard: 5 Rep: 1				Seq: 5	17:49:45 27 Apr 15	HG		
Hg	2.00	ug/l	141506					
*** Standard: 6 Rep: 1				Seq: 6	17:52:06 27 Apr 15	HG		
Hg	5.00	ug/l	344334					
*** Sample ID: ICV				Seq: 7	17:54:48 27 Apr 15	HG		
Hg	1.96	ug/l	137811					
*** Sample ID: ICB				Seq: 8	17:57:08 27 Apr 15	HG		
Hg	-.046	ug/l	1320					
*** Sample ID: CCV1				Seq: 9	17:59:36 27 Apr 15	HG		
Hg	1.96	ug/l	137870					
*** Sample ID: CCB1				Seq: 10	18:01:35 27 Apr 15	HG		
Hg	-.059	ug/l	400					
*** Sample ID: HGD023WB				Seq: 11	18:04:03 27 Apr 15	HG		
Hg	-.034	ug/l	2120					
*** Sample ID: HGD023WL				Seq: 12	18:06:01 27 Apr 15	HG		
Hg	2.50	ug/l	174305					
*** Sample ID: HGD023WC				Seq: 13	18:08:11 27 Apr 15	HG		
Hg	2.49	ug/l	173725					
*** Sample ID: D544-01A				Seq: 14	18:10:09 27 Apr 15	HG		
Hg	2.98	ug/l	207333					
*** Sample ID: D544-01				Seq: 15	18:12:08 27 Apr 15	HG		
Hg	-.044	ug/l	1419					

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: D544-01J				Seq:	16	18:14:11 27 Apr 15		HG
Hg	-.042	ug/l	1588					
*** Sample ID: D544-01M				Seq:	17	18:16:11 27 Apr 15		HG
Hg	2.73	ug/l	190187					
*** Sample ID: D544-01S				Seq:	18	18:18:32 27 Apr 15		HG
Hg	2.71	ug/l	189137					
*** Sample ID: D544-03				Seq:	19	18:20:45 27 Apr 15		HG
Hg	-.040	ug/l	1715					
*** Sample ID: D584-01				Seq:	20	18:23:13 27 Apr 15		HG
Hg	-.028	ug/l	2533					
*** Sample ID: CCV2				Seq:	21	18:25:33 27 Apr 15		HG
Hg	2.19	ug/l	153148					
*** Sample ID: CCB2				Seq:	22	18:27:31 27 Apr 15		HG
Hg	-.048	ug/l	1131					
*** Sample ID: D080-02				Seq:	23	18:29:30 27 Apr 15		HG
Hg	-.027	ug/l	2607					
*** Sample ID: D080-03				Seq:	24	18:32:12 27 Apr 15		HG
Hg	-.040	ug/l	1725					
*** Sample ID: D080-04				Seq:	25	18:34:13 27 Apr 15		HG
Hg	-.024	ug/l	2759					
*** Sample ID: D082-07				Seq:	26	18:36:27 27 Apr 15		HG
Hg	-.027	ug/l	2613					
*** Sample ID: D082-11				Seq:	27	18:38:37 27 Apr 15		HG
Hg	-.130	ug/l	-4443					
*** Sample ID: D114-09				Seq:	28	18:40:38 27 Apr 15		HG
Hg	-.040	ug/l	1680					
*** Sample ID: D126-01				Seq:	29	18:42:52 27 Apr 15		HG
Hg	.022	ug/l	5923					
*** Sample ID: D126-02				Seq:	30	18:45:35 27 Apr 15		HG
Hg	.144	ug/l	14214					

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: D126-03				Seq:	31	18:47:48 27 Apr 15		HG
Hg	-.046	ug/l	1314					
*** Sample ID: HGD024WB				Seq:	32	18:49:49 27 Apr 15		HG
Hg	-.072	ug/l	-497					
*** Sample ID: CCV3				Seq:	33	18:51:48 27 Apr 15		HG
Hg	2.17	ug/l	152394					
*** Sample ID: CCB3				Seq:	34	18:53:47 27 Apr 15		HG
Hg	-.020	ug/l	3037					
*** Sample ID: HGD024WL				Seq:	35	18:55:49 27 Apr 15		HG
Hg	2.75	ug/l	191267					
*** Sample ID: D150-02A				Seq:	36	18:57:47 27 Apr 15		HG
Hg	3.29	ug/l	228186					
*** Sample ID: D150-02				Seq:	37	18:59:50 27 Apr 15		HG
Hg	-.044	ug/l	1411					
*** Sample ID: D150-02J				Seq:	38	19:01:53 27 Apr 15		HG
Hg	-.019	ug/l	3122					
*** Sample ID: D150-02M				Seq:	39	19:03:53 27 Apr 15		HG
Hg	2.72	ug/l	189496					
*** Sample ID: D150-02D				Seq:	40	19:06:45 27 Apr 15		HG
Hg	-.064	ug/l	69					
*** Sample ID: D138-02				Seq:	41	19:08:47 27 Apr 15		HG
Hg	-.031	ug/l	2303					
*** Sample ID: D148-01				Seq:	42	19:10:46 27 Apr 15		HG
Hg	-.058	ug/l	503					
*** Sample ID: D148-02				Seq:	43	19:12:44 27 Apr 15		HG
Hg	-.029	ug/l	2456					
*** Sample ID: TXD005SB			TCLP	Seq:	44	19:14:46 27 Apr 15		HG
Hg	-.002	ug/l	4294					
*** Sample ID: CCV4				Seq:	45	19:16:45 27 Apr 15		HG
Hg	2.13	ug/l	149143					

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: CCB4				Seq: 46	19:18:46 27 Apr 15	HG		
Hg	-.041	ug/l	1631					
*** Sample ID: D092-05A				Seq: 47	19:21:07 27 Apr 15	HG		
			TCLP					
Hg	3.27	ug/l	227227					
*** Sample ID: D092-05				Seq: 48	19:23:06 27 Apr 15	HG		
			TCLP					
Hg	.074	ug/l	9481					
*** Sample ID: D092-05J				Seq: 49	19:25:05 27 Apr 15	HG		
			TCLP					
Hg	-.072	ug/l	-466					
*** Sample ID: D092-05M				Seq: 50	19:27:05 27 Apr 15	HG		
			TCLP					
Hg	2.58	ug/l	180156					
*** Sample ID: D092-05D				Seq: 51	19:29:18 27 Apr 15	HG		
			TCLP					
Hg	-.047	ug/l	1193					
*** Sample ID: D092-02				Seq: 52	19:31:26 27 Apr 15	HG		
			TCLP					
Hg	-.004	ug/l	4185					
*** Sample ID: TXD006SB				Seq: 53	19:33:26 27 Apr 15	HG		
			TCLP					
Hg	-.035	ug/l	2033					
*** Sample ID: D130-13A				Seq: 54	19:35:25 27 Apr 15	HG		
			TCLP					
Hg	3.29	ug/l	228283					
*** Sample ID: D130-13				Seq: 55	19:37:27 27 Apr 15	HG		
			TCLP					
Hg	-.044	ug/l	1404					
*** Sample ID: D130-13J				Seq: 56	19:39:51 27 Apr 15	HG		
			TCLP					
Hg	-.040	ug/l	1698					
*** Sample ID: CCV5				Seq: 57	19:42:01 27 Apr 15	HG		
Hg	2.21	ug/l	154642					
*** Sample ID: CCB5				Seq: 58	19:44:12 27 Apr 15	HG		
Hg	-.050	ug/l	1019					
*** Sample ID: D130-13M				Seq: 59	19:46:15 27 Apr 15	HG		
			TCLP					
Hg	2.63	ug/l	183106					
*** Sample ID: D130-13D				Seq: 60	19:48:27 27 Apr 15	HG		
			TCLP					
Hg	-.144	ug/l	-5344					

Line	Conc.	Units	SD/RSD	1	2	3	4	5
*** Sample ID: D130-06				Seq: 61	19:50:28 27 Apr 15	HG		
			TCLP					
Hg	-.041	ug/l	1610					
*** Sample ID: D130-14				Seq: 62	19:52:38 27 Apr 15	HG		
			TCLP					
Hg	-.060	ug/l	339					
*** Sample ID: D130-15				Seq: 63	19:55:00 27 Apr 15	HG		
			TCLP					
Hg	-.006	ug/l	4032					
*** Sample ID: D130-16				Seq: 64	19:57:03 27 Apr 15	HG		
			TCLP					
Hg	-.052	ug/l	856					
*** Sample ID: D130-17				Seq: 65	19:59:05 27 Apr 15	HG		
			TCLP					
Hg	-.035	ug/l	2012					
*** Sample ID: CCV6				Seq: 66	20:01:07 27 Apr 15	HG		
Hg	2.15	ug/l	150898					
*** Sample ID: CCB6				Seq: 67	20:03:12 27 Apr 15	HG		
Hg	-.079	ug/l	-937					

EMAX LABORATORIES, INC.

DIGESTION LOG
for
MERCURY

Note: For samples, relevant QCs/Standards digested, refer to attached digestion sequence.

Comments:

Digestion Vessel Lot #: 19414007

Book #: E47-097
Batch No.: HGD020S
Matrix: Soil

SOP #	Rev. #
☐ EMAX-7470	7
☑ EMAX-7471	7
☐ EMAX-245.1	3
☐ EMAX-	

Standards	ID	Conc. (µg/L)	Amount Added (ml)
ICAL	SM38-11-100-01	100	0.2, 0.5, 1, 2, 5
CCV	↓	↓	2
ICV	SM38-11-100-02	↓	2
LCS/MS	↓	↓	2.5
Reagent	**ID / Lot #**		
HNO_3 / aqua	SW1A-005-11-08		
HCl / regia	SW1A-005-08-04		
H_2SO_4	N/A		
$KMnO_4$	SM5B-03-54-01		
$K_2S_2O_8$	N/A		
$NH_2OH \cdot HCl$	SM5B-03-53-02		
$SnCl_2$	SM5B-03-52-04		
Silica Sand	SW1B-002-43-08		
Reagent Water	SM5A-03-01-24		
pH strip 0-14	N/A		

Digestor ID/ Temp (°C): A / 94.9
Thermometer ID/LOC: 11124125 / A17
Thermometer ID/LOC: N/A
Pipette ID: ICP DDE-1, HG-03, HG-04

☐ H_2SO_4 dispenser checked @ 2.5 ml with Class A graduated cylinder
☑ HCl dispenser checked @ 30 ml with Class A graduated cylinder
☑ HNO_3 dispenser checked @ 10 ml with Class A graduated cylinder

Prepared By: NT
Standard Added By: NT Witnessed By: SK

EMAX LABORATORIES INC

DIGESTION LOG FOR MERCURY

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Vd(ml)	ExpAmt	ExpVd(ml)	PrepFctr	Comments
15HGD020S01	HGD020SB	0.601	g	4/22/15 15:58	100	0.6	100	0.998	
15HGD020S02	HGD020SL	0.6	g	4/22/15 15:59	100	0.6	100	1	
15HGD020S03	HGD020SC	0.6	g	4/22/15 16:00	100	0.6	100	1	
15HGD020S04	D114-01	0.602	g	4/22/15 16:00	100	0.6	100	0.997	
15HGD020S05	D114-02	0.607	g	4/22/15 16:01	100	0.6	100	0.988	
15HGD020S06	D114-03	0.603	g	4/22/15 16:01	100	0.6	100	0.995	
15HGD020S07	D114-04	0.611	g	4/22/15 16:02	100	0.6	100	0.982	
15HGD020S08	D114-05	0.603	g	4/22/15 16:02	100	0.6	100	0.995	
15HGD020S09	D114-06	0.614	g	4/22/15 16:03	100	0.6	100	0.977	
15HGD020S10	D114-07	0.604	g	4/22/15 16:03	100	0.6	100	0.993	
15HGD020S11	D114-08	0.608	g	4/22/15 16:05	100	0.6	100	0.987	
15HGD020S12	D114-08M	0.605	g	4/22/15 16:06	100	0.6	100	0.992	
15HGD020S13	D114-08S	0.613	g	4/22/15 16:10	100	0.6	100	0.979	
15HGD020S14	D114-10	0.6	g	4/22/15 16:27	100	0.6	100	1	
15HGD020S15	D114-11	0.603	g	4/22/15 16:27	100	0.6	100	0.995	
15HGD020S16	D114-12	0.611	g	4/22/15 16:27	100	0.6	100	0.982	
15HGD020S17	D114-13	0.602	g	4/22/15 16:28	100	0.6	100	0.997	
15HGD020S18	D114-14	0.608	g	4/22/15 16:28	100	0.6	100	0.987	
15HGD020S19	D114-15	0.6	g	4/22/15 16:29	100	0.6	100	1	
15HGD020S20	D114-16	0.6	g	4/22/15 16:30	100	0.6	100	1	
15HGD020S21	D114-17	0.603	g	4/22/15 16:31	100	0.6	100	0.995	
15HGD020S22	D114-18	0.604	g	4/22/15 16:31	100	0.6	100	0.993	
15HGD020S23	D114-19	0.6	g	4/22/15 16:32	100	0.6	100	1	
15HGD020S24	D114-20	0.611	g	4/22/15 16:32	100	0.6	100	0.982	
15HGD020S25	S-0/CCB/ICB	0.6	g	4/22/15 16:32	100	0.6	100	1	
15HGD020S26	S-0.2	0.6	g	4/22/15 16:32	100	0.6	100	1	
15HGD020S27	S-0.5	0.6	g	4/22/15 16:32	100	0.6	100	1	
15HGD020S28	S-1	0.6	g	4/22/15 16:32	100	0.6	100	1	
15HGD020S29	S-2/CCV	0.6	g	4/22/15 16:32	100	0.6	100	1	
15HGD020S30	S-5	0.6	g	4/22/15 16:32	100	0.6	100	1	
15HGD020S31	ICV	0.6	g	4/22/15 16:32	100	0.6	100	1	
15HGD020S32	PS SOIL	0.6	g	4/22/15 16:32	100	0.6	100	1	

NT
4/22/15

Balance ID: 10601202. Calibration check was verified prior to use.

Vd=digestate volume

PrepFctr=(ExpAmt/Aliquot)*(Vd/ExpVd)

☑ Digestion Started @ 4/22/15 17:15

Prepared By: NTan

☑ Digestion Ended @ 4/22/15 18:15

Checked By: NT

Comments:

Date 4/22/15

SOP EMAX-7471 Rev. 7

EMAX LABORATORIES, INC.

DIGESTION LOG
for
MERCURY

Note: For samples, relevant QCs/Standards digested, refer to attached digestion sequence.

Comments:

Digestion Vessel Lot #: 19414007

ICAL on HGD0203

Book #: E47-097
Batch No.: HGD0215
Matrix: Soil

SOP #	Rev. #
☐ EMAX-7470	7
☑ EMAX-7471	7
☐ EMAX-245.1	3
☐ EMAX-	

Standards	ID	Conc. (µg/L)	Amount Added (ml)
ICAL	SM3B-11-100-01	100	0.2, 0.5, 1, 2, 5
CCV	↓	↓	2
ICV	SM3B-11-100-02	↓	2
LCS/MS	↓	↓	2.5
Reagent	**ID / Lot #**		
HNO_3 / aqua	SW1A-005-11-08		
HCl / regia	SW1A-005-08-04		
H_2SO_4	N/A		
$KMnO_4$	SM5B-03-54-01		
$K_2S_2O_8$	N/A		
$NH_2OH \cdot HCl$	SM5B-03-53-02		
$SnCl_2$	SM5B-03-52-04		
Silica Sand	SW1B-002-43-08		
Reagent Water	SM5A-03-01-24		
pH strip 0-14	N/A		
Digestor ID/ Temp (°C)	C / 95.1		
Thermometer ID/LOC:	14024568 8 / C9		
Thermometer ID/LOC:	N/A		
Pipette ID:	ICP DOE-1, HG-03, HG-04		
☐ H_2SO_4 dispenser checked @ 2.5 ml with Class A graduated cylinder			
☑ HCl dispenser checked @ 30 ml with Class A graduated cylinder			
☑ HNO_3 dispenser checked @ 10 ml with Class A graduated cylinder			

Prepared By: NT

Standard Added By: NT Witnessed By: SK

EMAX LABORATORIES INC

DIGESTION LOG FOR MERCURY

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Vd(ml)	ExpAmt	ExpVd(ml)	PrepFctr	Comments
15HGD021S01	HGD021SB	0.6	g	4/22/15 16:33	100	0.6	100	1	
15HGD021S02	HGD021SL	0.6	g	4/22/15 16:33	100	0.6	100	1	
15HGD021S03	HGD021SC	0.601	g	4/22/15 16:34	100	0.6	100	0.998	
15HGD021S04	D114-21	0.602	g	4/22/15 16:34	100	0.6	100	0.997	
15HGD021S05	D114-22	0.603	g	4/22/15 16:34	100	0.6	100	0.995	
15HGD021S06	D114-22M	0.607	g	4/22/15 16:35	100	0.6	100	0.988	
15HGD021S07	D114-22S	0.604	g	4/22/15 16:35	100	0.6	100	0.993	
15HGD021S08	D114-23	0.605	g	4/22/15 16:36	100	0.6	100	0.992	
15HGD021S09	D114-24	0.605	g	4/22/15 16:36	100	0.6	100	0.992	
15HGD021S10	D114-25	0.601	g	4/22/15 16:37	100	0.6	100	0.998	

NT
4/22/15

Balance ID: 10601202. Calibration check was verified prior to use.

Vd=digestate volume

PrepFctr=(ExpAmt/Aliquot)*(Vd/ExpVd)

☑ Digestion Started @ 4/22/15 17:20

Prepared By: NTan

☑ Digestion Ended @ 4/22/15 18:20

Checked By: NT

Comments:

Date 4/22/15

SOP EMAX-7471 Rev. 7

EMAX LABORATORIES, INC.

DIGESTION LOG
for
MERCURY

Note: For samples, relevant QCs/Standards digested, refer to attached digestion sequence.

Comments:

Digestion Vessel Lot #: 19414007

All samples PH = <2

Book #: E47-097

Batch No.: HGD023W

Matrix: Water

SOP #	Rev. #
☑ EMAX-7470	7
☐ EMAX-7471	7
☑ EMAX-245.1	3
☐ EMAX-	

Standards	ID	Conc. (µg/L)	Amount Added (ml)
ICAL	SM3B-11-100-04	50	0.2, 0.5, 1, 2, 5
CCV	↓	↓	2
ICV	SM3B-11-100-05	↓	2
LCS/MS	↓	↓	2.5

Reagent	ID / Lot #
HNO_3	SW1A-005-11-08
HCl	N/A
H_2SO_4	SW1A-005-06-16
$KMnO_4$	SM5B-03-54-01
$K_2S_2O_8$	SM5B-03-53-03
$NH_2OH \cdot HCl$	SM5B-03-53-02
$SnCl_2$	SM5B-03-52-04
Silica Sand	N/A
Reagent Water	SM5A-03-01-24
pH strip 0-14	HC413032

Digestor ID/ Temp (°C): A / 94.8

Thermometer ID/LOC: 11124125 / A18

Thermometer ID/LOC: N/A

Pipette ID: ICP DOE-1, HG-03, HG-04

☑ H_2SO_4 dispenser checked @ 2.5 ml with Class A graduated cylinder

☐ HCl dispenser checked @ ___ ml with Class A graduated cylinder

☐ HNO_3 dispenser checked @ ___ ml with Class A graduated cylinder

Prepared By: NT

Standard Added By: NT Witnessed By: [illegible]

EMAX LABORATORIES, INC.

DIGESTION LOG FOR MERCURY

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	Vd(ml)	ExpAmt	ExpVd(ml)	PrepFctr	Comments
15HGD023W01	HGD023WB	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W02	HGD023WL	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W03	HGD023WC	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W04	D544-01	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W05	D544-01M	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W06	D544-01S	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W07	D544-03	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W08	D584-01	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W09	D080-02	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W10	D080-03	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W11	D080-04	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W12	D082-07	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W13	D082-11	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W14	D114-09	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W15	D126-01	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W16	D126-02	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W17	D126-03	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W18	S-0/CCB/ICB	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W19	S-0.2	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W20	S-0.5	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W21	S-1	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W22	S-2/CCV	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W23	S-5	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W24	ICV	50	ml	4/27/15 11:02	80	50	80	1	
15HGD023W25	P5 H2O	50	ml	4/27/15 11:02	80	50	80	1	

NT
4/27/15

Vd=digestate volume

PrepFctr=(ExpAmt/Aliquot)*(Vd/ExpVd)

☑ Digestion Started @ 4/27/15 13:00

☑ Digestion Ended @ 4/27/15 15:30

Comments:

Prepared By: NTan

Checked By: NT

Date 4/27/15

SOP EMAX-245.1 Rev. 3 EMAX-7470 Rev. 7

LABORATORY REPORT FOR

KLEINFELDER

CTO 070, UXO4, FALLBROOK

WET CHEMICAL ANALYSES

SDG#: 15D114

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D114

METHOD 6850
PERCHLORATE

A total of one (1) water sample and twenty-four (24) soil samples were received on 04/17/15 to be analyzed for Perchlorate in accordance with Method 6850 and project specific requirements.

Holding Time
Samples were analyzed within the prescribed holding time.

Calibration
Calibration was performed as prescribed by the method and was verified using a secondary source (ICV). All calibration requirements were within acceptance criteria.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, three (3) method blanks were analyzed. PLD007WB, PLD008SB and PLD009SB were compliant to project requirement. Refer to sample result summary forms for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, three (3) sets of LCS/LCD were analyzed. Perchlorate was within LCS QC limits in PLD007WL/PLD007WC, PLD008SL/PLD008SC and PLD009SL/PLD009SC. Refer to LCS summary forms for details.

Matrix QC Sample
Matrix spike sample was prepared and analyzed at a frequency required by the project. For this SDG, two (2) sets of MS/MSD were analyzed and the following was noted: Perchlorate was within MS QC limits in D114-08M/D114-08S. D114-22M/D114-22S - RPD for Perchlorate, (RPD=16*), was >RPD limit. High RPD is indicative of sample inhomogeneity. Refer to Matrix QC summary forms for details.

Sample Analysis
Samples were analyzed according to prescribed analytical procedures. Results were evaluated in accordance to project requirements. For this SDG, all quality control requirements were met with the exception of those that were discussed within the associated QC parameter.

SAMPLE RESULTS

METHOD 6850
PERCHLORATE

Client : KLEINFELDER
Project : CTO 070, UX04, FALLBROOK
Batch No. : 15D114

Matrix : WATER
InstrumentID : G0

Client SAMPLE ID	EMAX SAMPLE ID	RESULT (ug/L)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1W	PLD007WB	ND	1	NA	0.5	0.1	0.2	04/28/1512:49	NA	15MD28008	MD28007	15PLD007W	NA	NA
LCS1W	PLD007WL	0.428J	1	NA	0.5	0.1	0.2	04/28/1513:03	NA	15MD28009	MD28007	15PLD007W	NA	NA
LCD1W	PLD007WC	0.435J	1	NA	0.5	0.1	0.2	04/28/1513:18	NA	15MD28010	MD28007	15PLD007W	NA	NA
UX04-EB-041615	D114-09	ND	1	NA	0.5	0.1	0.2	04/28/1514:25	NA	15MD28014	MD28007	15PLD007W	04/16/1514:20	04/17/15

METHOD 6850
PERCHLORATE

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK
Batch No. : 15D114

Matrix : SOIL
InstrumentID : GO

Client SAMPLE ID	EMAX SAMPLE ID	RESULT (ug/kg)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1S	PLD008S8	ND	1	NA	4	0.5	2	04/24/1512:39	04/21/1517:52	15MD24007	MD24006	15PLD008S	NA	NA
LCS1S	PLD008SL	3.48J	1	NA	4	0.5	2	04/24/1512:54	04/21/1517:52	15MD24008	MD24006	15PLD008S	NA	NA
LCD1S	PLD008SC	3.72J	1	NA	4	0.5	2	04/24/1513:09	04/21/1517:52	15MD24009	MD24006	15PLD008S	NA	NA
UXO4-TR01-S01-1.0	D114-01	ND	1	6.9	4.3	0.537	2.15	04/24/1513:23	04/21/1517:52	15MD24010	MD24006	15PLD008S	04/10/1514:10	04/17/15
UXO4-TR01-S02-3.0	D114-02	ND	1	8.8	4.39	0.548	2.19	04/24/1513:38	04/21/1517:52	15MD24011	MD24006	15PLD008S	04/10/1514:15	04/17/15
UXO4-TR02-S01-2.0	D114-03	ND	1	6.5	4.28	0.535	2.14	04/24/1513:53	04/21/1517:52	15MD24012	MD24006	15PLD008S	04/13/1511:00	04/17/15
UXO4-TR02-S02-3.0	D114-04	ND	1	7.8	4.34	0.542	2.17	04/24/1515:27	04/21/1517:52	15MD24013	MD24006	15PLD008S	04/13/1511:10	04/17/15
UXO4-TR03-S01-1.5	D114-05	ND	1	10.2	4.45	0.557	2.23	04/24/1515:42	04/21/1517:52	15MD24014	MD24006	15PLD008S	04/13/1513:00	04/17/15
UXO4-TR03-S02-3.0	D114-06	ND	1	15.2	4.72	0.59	2.36	04/24/1515:57	04/21/1517:52	15MD24015	MD24006	15PLD008S	04/13/1513:15	04/17/15
UXO4-TR04-S01-2.0	D114-07	ND	1	9.3	4.41	0.551	2.21	04/24/1516:11	04/21/1517:52	15MD24016	MD24006	15PLD008S	04/14/1508:00	04/17/15
UXO4-TR04-S02-3.0	D114-08	ND	1	13.7	4.63	0.579	2.32	04/24/1517:05	04/21/1517:52	15MD24018	MD24017	15PLD008S	04/14/1508:05	04/17/15
UXO4-TR04-S02-3.0MS	D114-08M	4.01J	1	13.7	4.63	0.579	2.32	04/24/1517:20	04/21/1517:52	15MD24019	MD24017	15PLD008S	04/14/1508:05	04/17/15
UXO4-SB08-8.0	D114-10	ND	1	10.8	4.48	0.561	2.24	04/24/1518:09	04/21/1517:52	15MD24021	MD24017	15PLD008S	04/08/1511:01	04/17/15
UXO4-SB09-6.6	D114-11	ND	1	21.3	5.08	0.635	2.54	04/24/1518:24	04/21/1517:52	15MD24022	MD24017	15PLD008S	04/10/1509:50	04/17/15
UXO4-SB10-0.5	D114-12	ND	1	3.8	4.16	0.52	2.08	04/24/1518:41	04/21/1517:52	15MD24023	MD24017	15PLD008S	04/16/1511:10	04/17/15
UXO4-SB10-1.0	D114-13	ND	1	9.5	4.42	0.552	2.21	04/24/1518:57	04/21/1517:52	15MD24024	MD24017	15PLD008S	04/16/1511:15	04/17/15
UXO4-SB11-0.5	D114-14	ND	1	1.8	4.07	0.509	2.04	04/24/1519:11	04/21/1517:52	15MD24025	MD24017	15PLD008S	04/16/1511:20	04/17/15
UXO4-SB11-1.0	D114-15	ND	1	5.0	4.21	0.526	2.11	04/24/1519:26	04/21/1517:52	15MD24026	MD24017	15PLD008S	04/16/1511:25	04/17/15
UXO4-SB12-0.5	D114-16	ND	1	1.0	4.04	0.505	2.02	04/24/1519:40	04/21/1517:52	15MD24027	MD24017	15PLD008S	04/16/1511:30	04/17/15
UXO4-SB12-1.0	D114-17	ND	1	2.3	4.09	0.512	2.05	04/24/1520:09	04/21/1517:52	15MD24029	MD24028	15PLD008S	04/16/1511:35	04/17/15
UXO4-SB13-0.5	D114-18	ND	1	1.2	4.05	0.506	2.02	04/24/1520:24	04/21/1517:52	15MD24030	MD24028	15PLD008S	04/16/1511:40	04/17/15
UXO4-SB13-1.0	D114-19	ND	1	4.2	4.18	0.522	2.09	04/24/1520:38	04/21/1517:52	15MD24031	MD24028	15PLD008S	04/16/1511:45	04/17/15
UXO4-SB14-0.5	D114-20	3.76J	1	4.9	4.21	0.526	2.1	04/24/1520:53	04/21/1517:52	15MD24032	MD24028	15PLD008S	04/16/1510:45	04/17/15
UXO4-TR04-S02-3.0MSD	D114-08S	4.24J	1	13.7	4.63	0.579	2.32	04/24/1521:08	04/21/1517:52	15MD24033	MD24028	15PLD008S	04/14/1508:05	04/17/15
MBLK2S	PLD009SB	ND	1	NA	4	0.5	2	04/24/1521:22	04/21/1518:02	15MD24034	MD24028	15PLD009S	NA	NA
LCS2S	PLD009SL	3.44J	1	NA	4	0.5	2	04/24/1521:37	04/21/1518:02	15MD24035	MD24028	15PLD009S	NA	NA
LCD2S	PLD009SC	3.44J	1	NA	4	0.5	2	04/24/1521:51	04/21/1518:02	15MD24036	MD24028	15PLD009S	NA	NA
UXO4-SB14-1.0	D114-21	2.29J	1	7.6	4.33	0.541	2.16	04/24/1522:06	04/21/1518:02	15MD24037	MD24028	15PLD009S	04/16/1510:50	04/17/15
UXO4-SB15-1.0	D114-23	ND	1	2.7	4.11	0.514	2.06	04/24/1522:21	04/21/1518:02	15MD24038	MD24028	15PLD009S	04/16/1511:55	04/17/15
UXO4-SB15-0.5	D114-22	ND	1	1.3	4.05	0.507	2.03	04/24/1522:50	04/21/1518:02	15MD24040	MD24039	15PLD009S	04/16/1511:50	04/17/15
UXO4-SB15-0.5MS	D114-22M	3.26J	1	1.3	4.05	0.507	2.03	04/24/1523:04	04/21/1518:02	15MD24041	MD24039	15PLD009S	04/16/1511:50	04/17/15
UXO4-SB15-0.5MSD	D114-22S	3.81J	1	1.3	4.05	0.507	2.03	04/24/1523:19	04/21/1518:02	15MD24042	MD24039	15PLD009S	04/16/1511:50	04/17/15
UXO4-SB16-1.0	D114-25	ND	1	6.4	4.27	0.534	2.14	04/24/1523:33	04/21/1518:02	15MD24043	MD24039	15PLD009S	04/16/1512:05	04/17/15
UXO4-SB16-0.5	D114-24	ND	1	4.0	4.17	0.521	2.08	04/25/1501:30	04/21/1518:02	15MD24051	MD24050	15PLD009S	04/16/1512:00	04/17/15

Method 6850
EMAX Laboratories
Instrument # G0

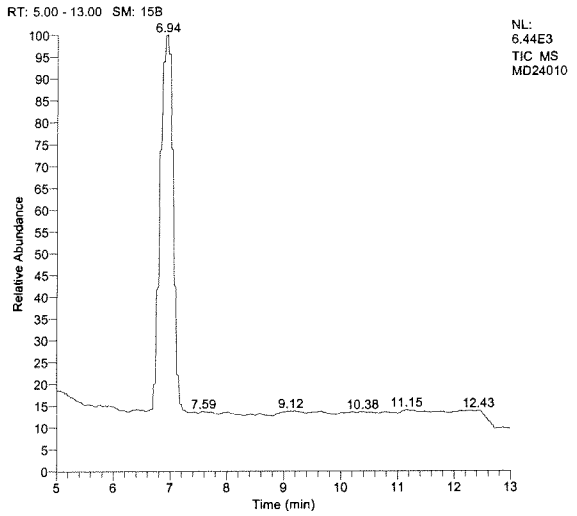
Sample Summary

EMAX Lab ID:	D114-01
Lab File ID:	MD24010
Acquisition Date:	04/24/15 01:23:51 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

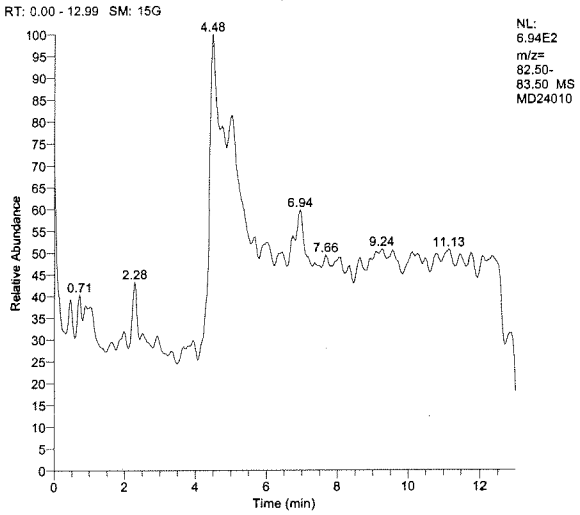
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB2
Injection Volume(ul):	20.00
Run Time(min):	12.99

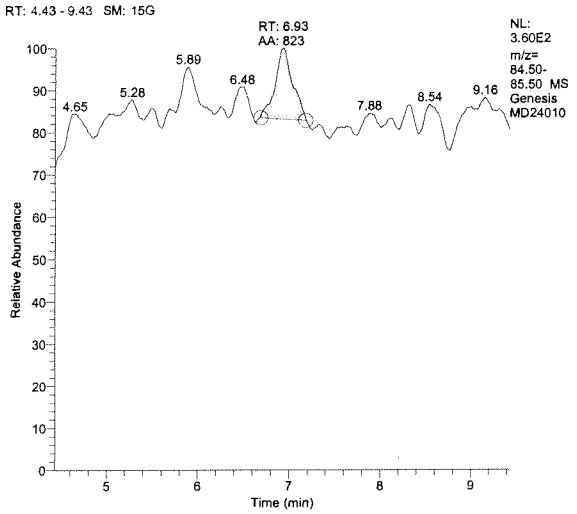
TIC



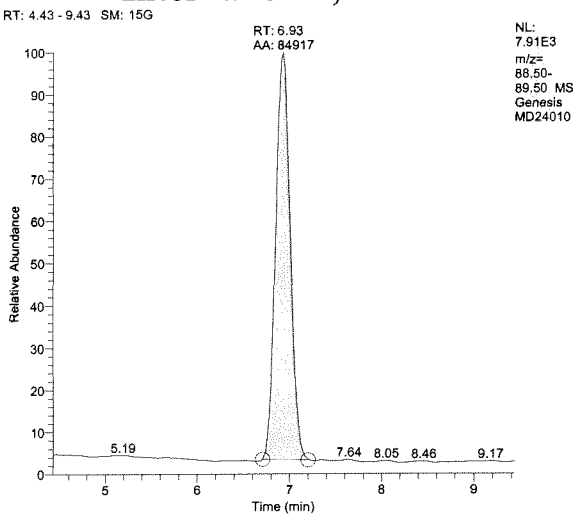
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.93	823	0.000	0.036	ppb	10.03
Perchlorate_89_ISTD	6.93	84917	2.000	N/A	ppb	470.12

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

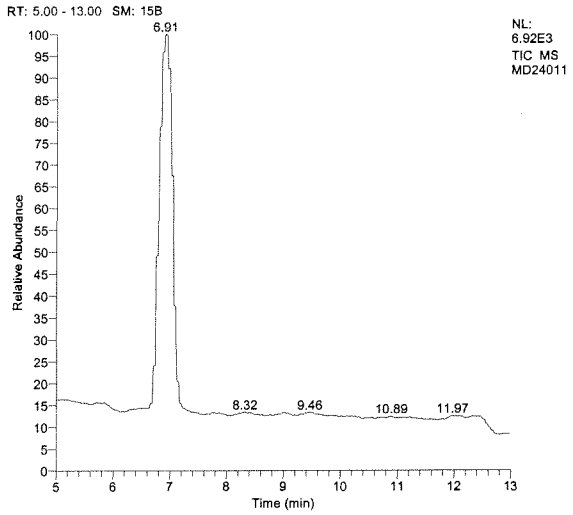
Sample Summary

EMAX Lab ID:	D114-02
Lab File ID:	MD24011
Acquisition Date:	04/24/15 01:38:35 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

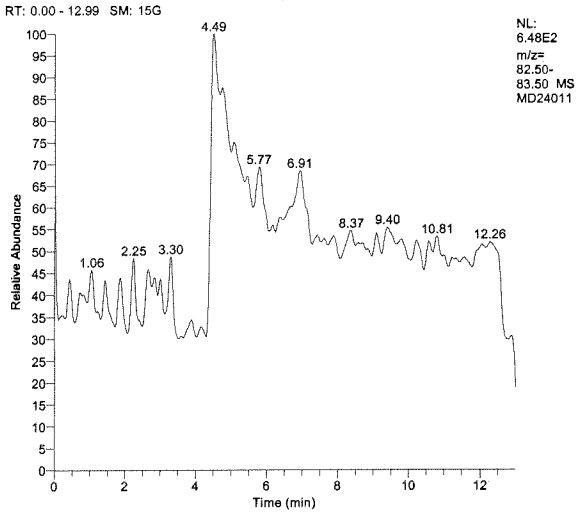
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB3
Injection Volume(ul):	20.00
Run Time(min):	12.99

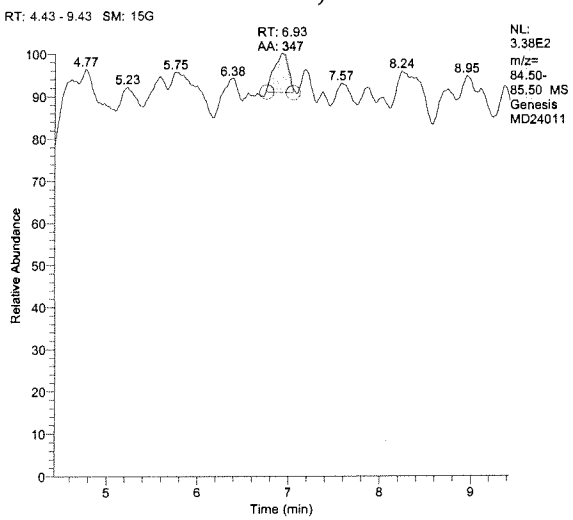
TIC



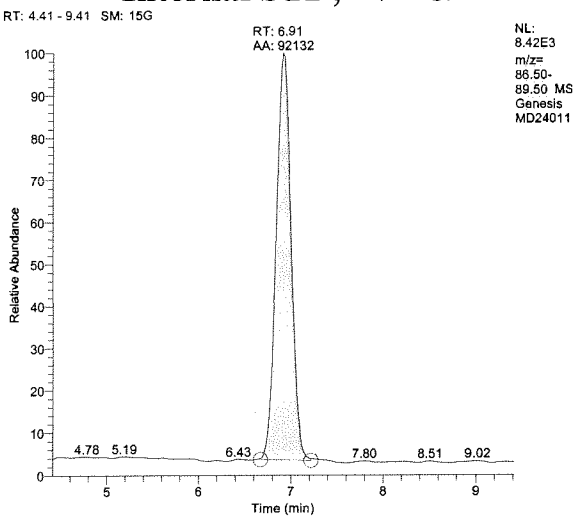
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.93	347	0.000	0.011	ppb	3.87
Perchlorate_89_ISTD	6.91	92132	2.000	N/A	ppb	1139.76

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

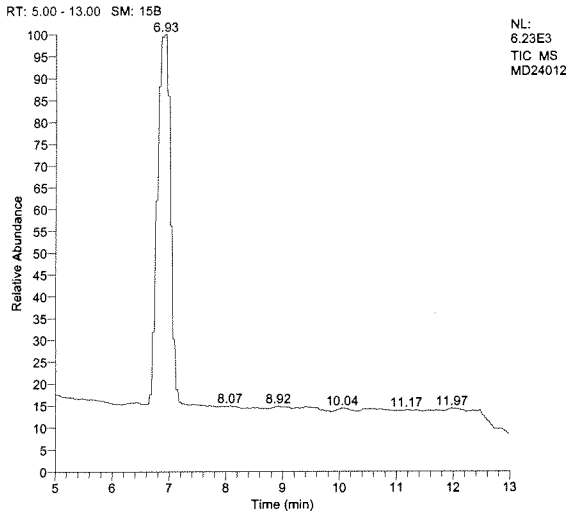
Sample Summary

EMAX Lab ID:	D114-03
Lab File ID:	MD24012
Acquisition Date:	04/24/15 01:53:07 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB4
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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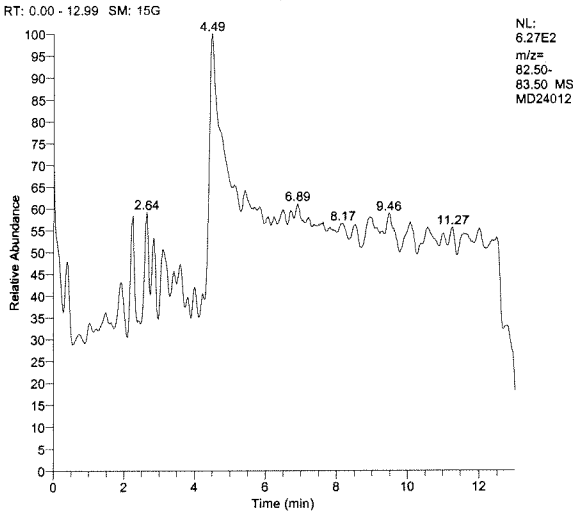
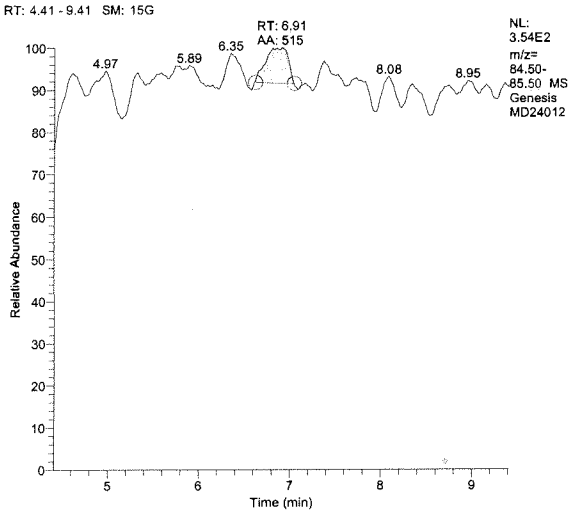


Perchlorate, m/z=85



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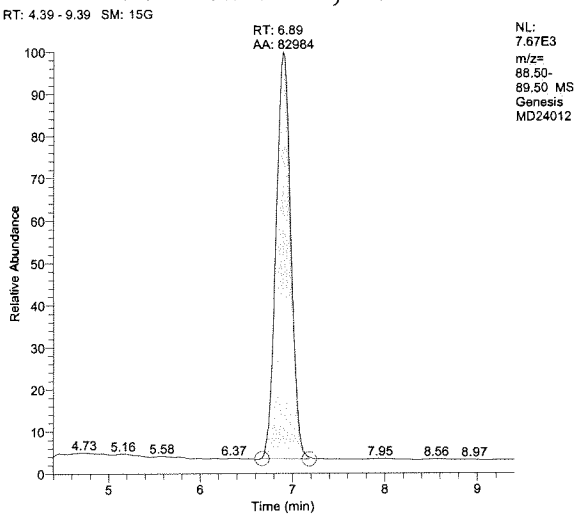


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.91	515	0.000	0.021	ppb	5.27
Perchlorate_89_ISTD	6.89	82984	2.000	N/A	ppb	992.15

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

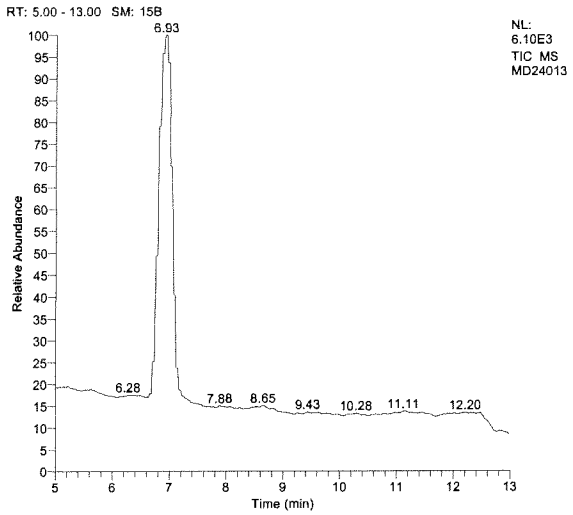
Sample Summary

EMAX Lab ID:	D114-04
Lab File ID:	MD24013
Acquisition Date:	04/24/15 03:27:33 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB5
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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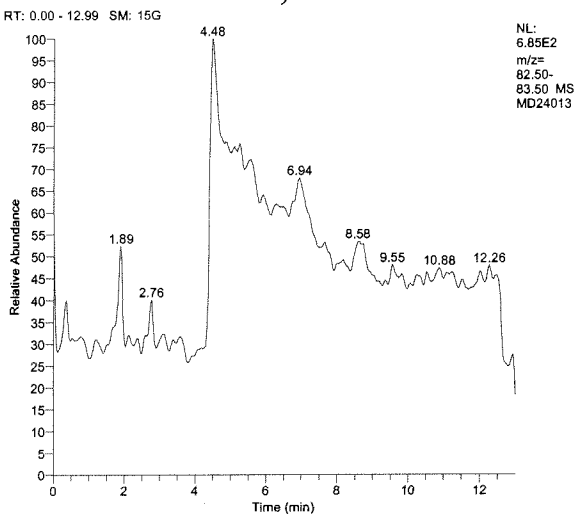
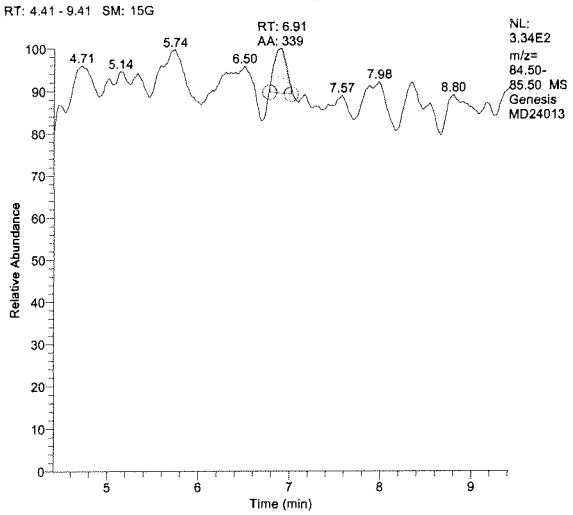


Perchlorate, m/z=85



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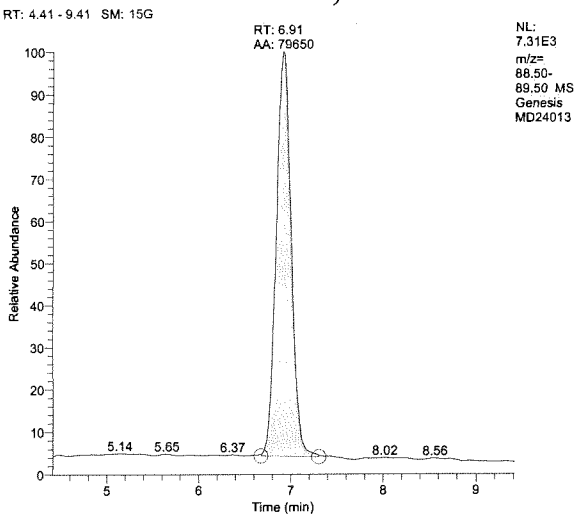


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.91	339	0.000	0.013	ppb	3.44
Perchlorate_89_ISTD	6.91	79650	2.000	N/A	ppb	1098.11

83/85 Ratio: N/a

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

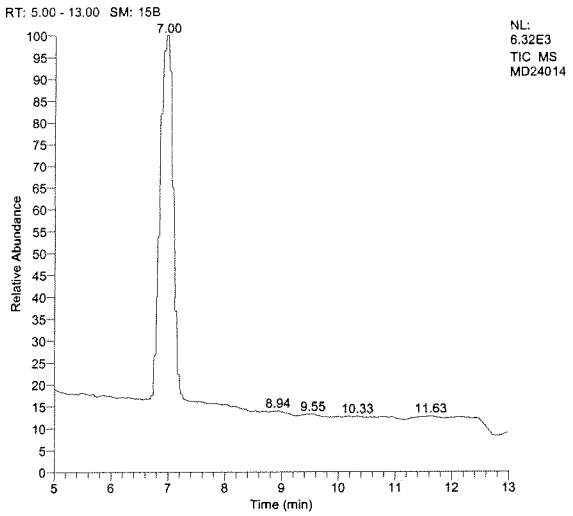
Sample Summary

EMAX Lab ID:	D114-05
Lab File ID:	MD24014
Acquisition Date:	04/24/15 03:42:23 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB6
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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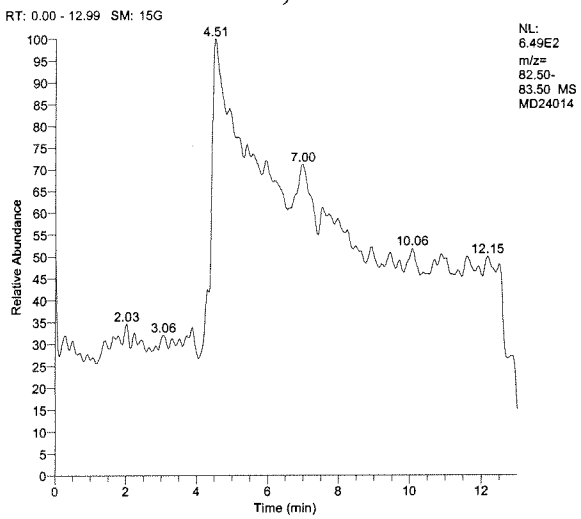
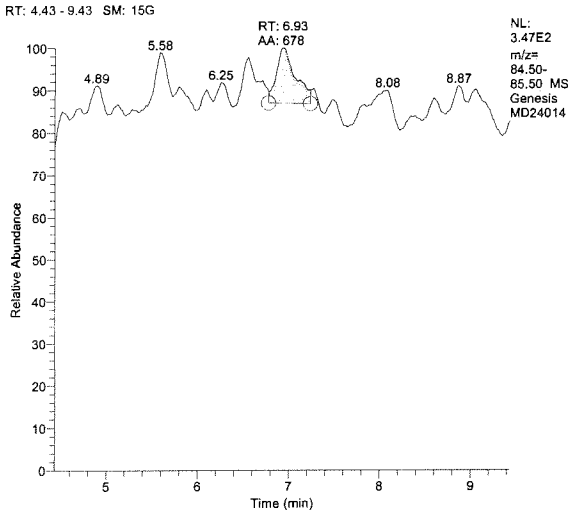


Perchlorate, m/z=85



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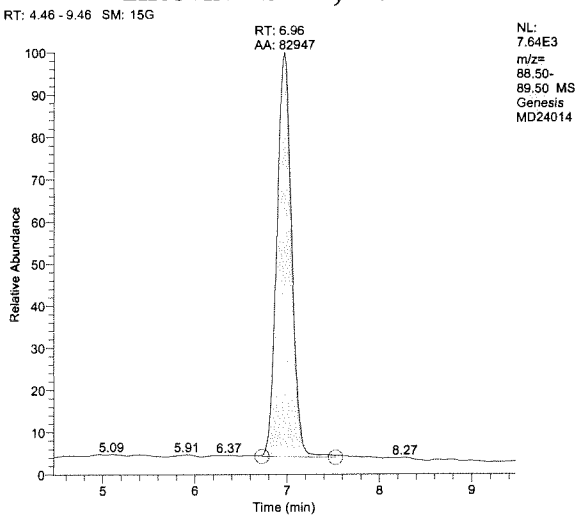


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.93	678	0.000	0.029	ppb	5.37
Perchlorate_89_ISTD	6.96	82947	2.000	N/A	ppb	580.18

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

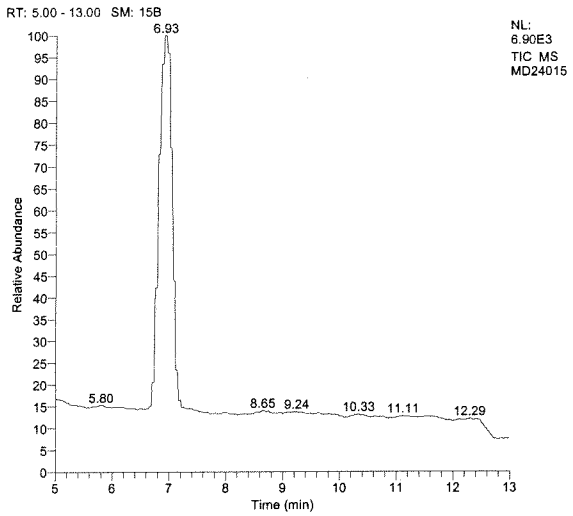
Sample Summary

EMAX Lab ID:	D114-06
Lab File ID:	MD24015
Acquisition Date:	04/24/15 03:57:01 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB7
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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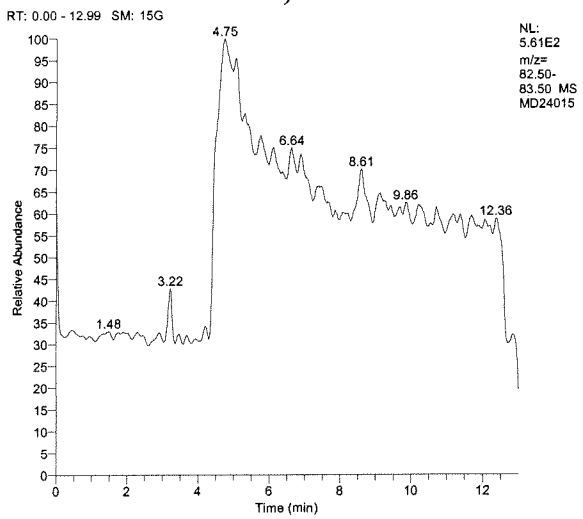

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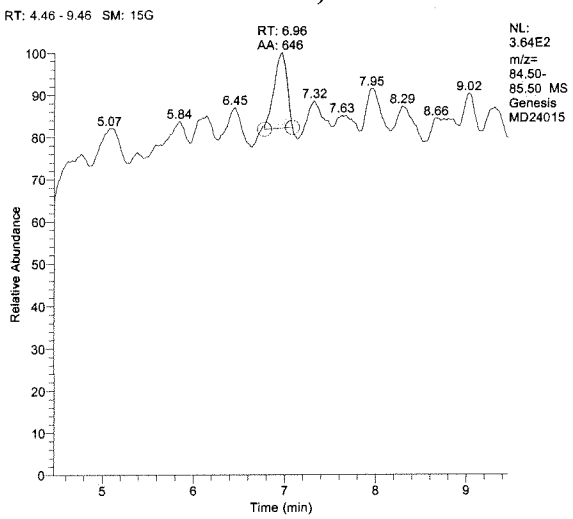

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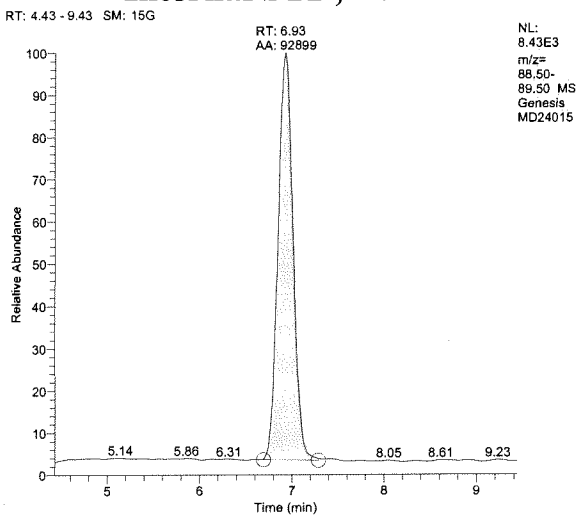


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.96	646	0.000	0.024	ppb	6.74
Perchlorate_89_ISTD	6.93	92899	2.000	N/A	ppb	902.84

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

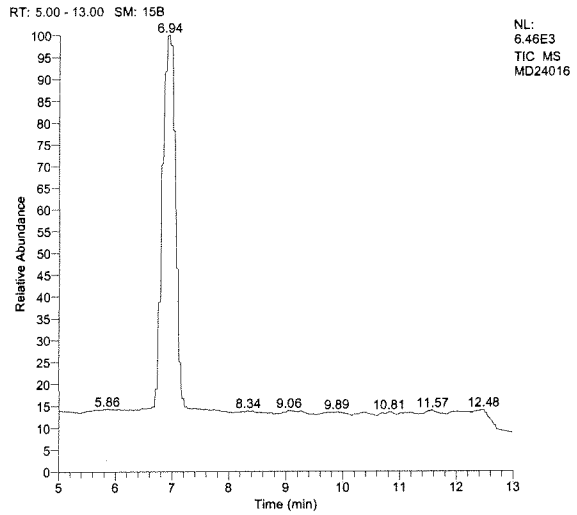
Sample Summary

EMAX Lab ID:	D114-07
Lab File ID:	MD24016
Acquisition Date:	04/24/15 04:11:35 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB8
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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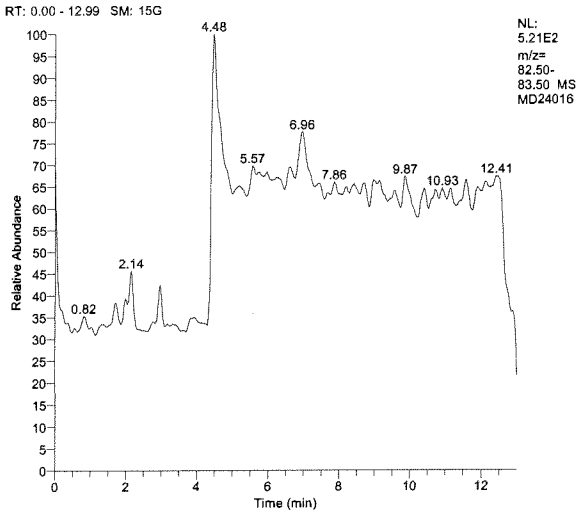
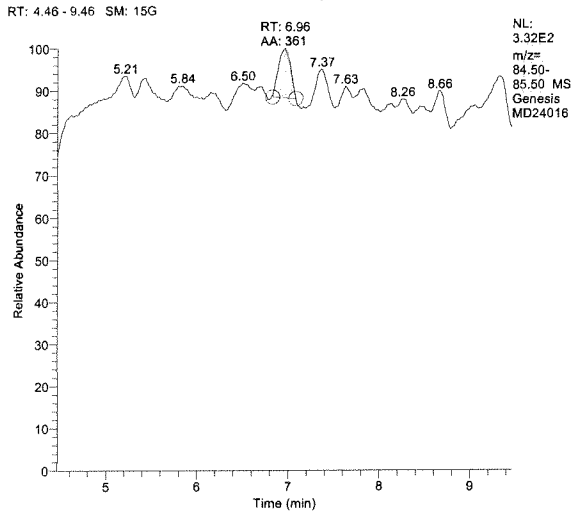


Perchlorate, m/z=85



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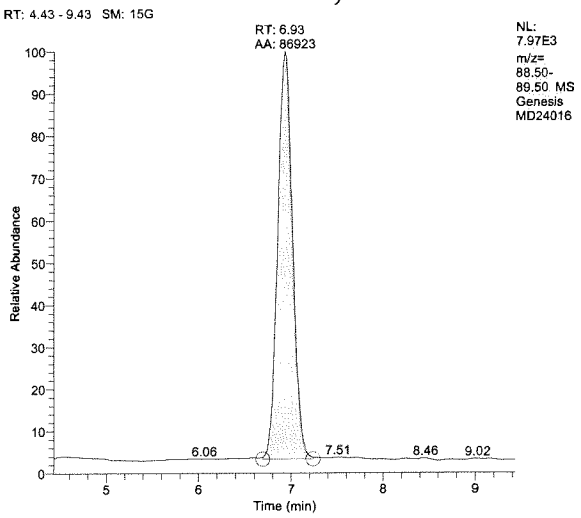


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.96	361	0.000	0.012	ppb	7.13
Perchlorate_89_ISTD	6.93	86923	2.000	N/A	ppb	654.97

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

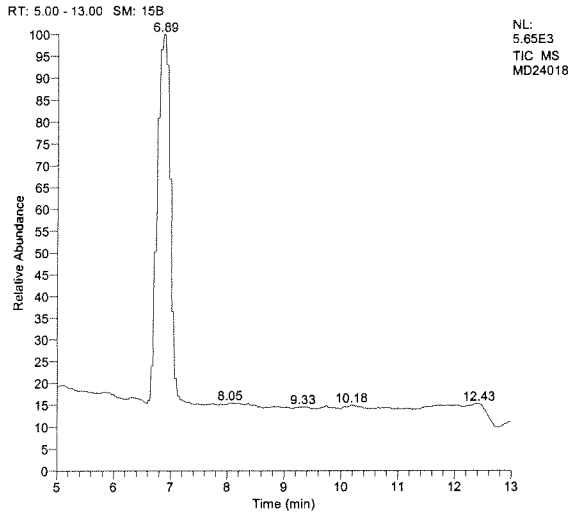
Sample Summary

EMAX Lab ID:	D114-08
Lab File ID:	MD24018
Acquisition Date:	04/24/15 05:05:41 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RC1
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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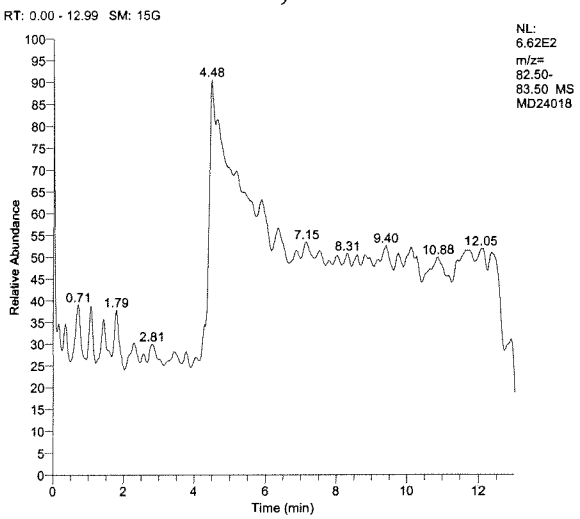
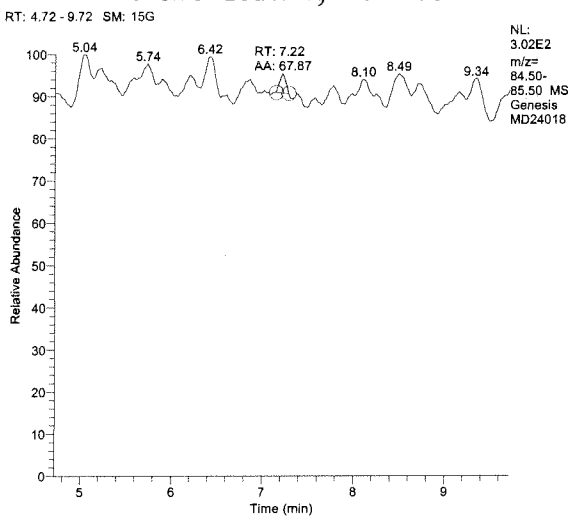


Perchlorate, m/z=85



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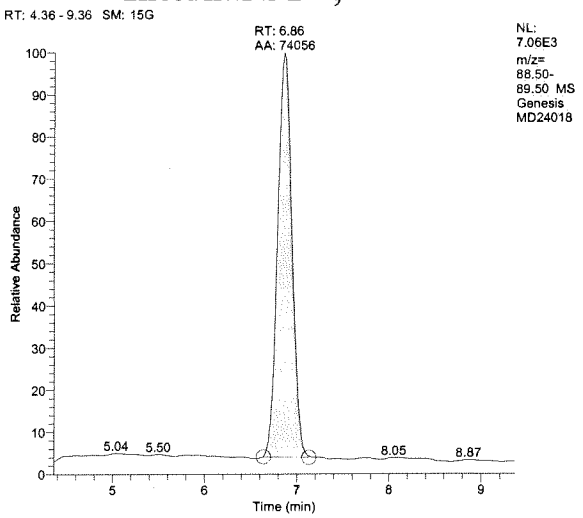


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	7.22	68	0.000	-0.002	ppb	2.61
Perchlorate_89_ISTD	6.86	74056	2.000	N/A	ppb	516.16

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

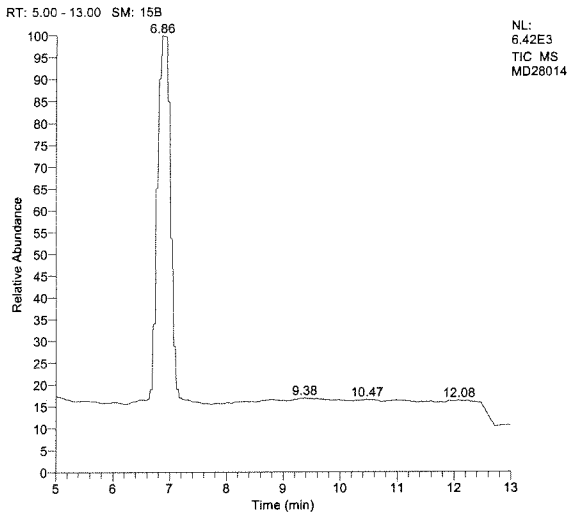
Sample Summary

EMAX Lab ID:	D114-09
Lab File ID:	MD28014
Acquisition Date:	04/28/15 02:25:14 PM
Data Path:	C:\XCALIBUR\DATA\MD28
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB5
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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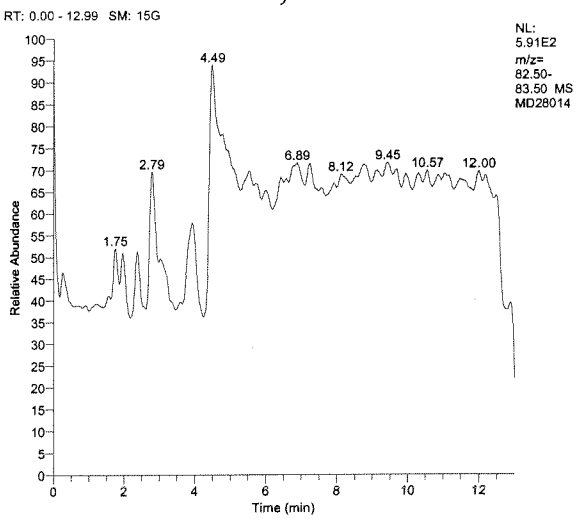
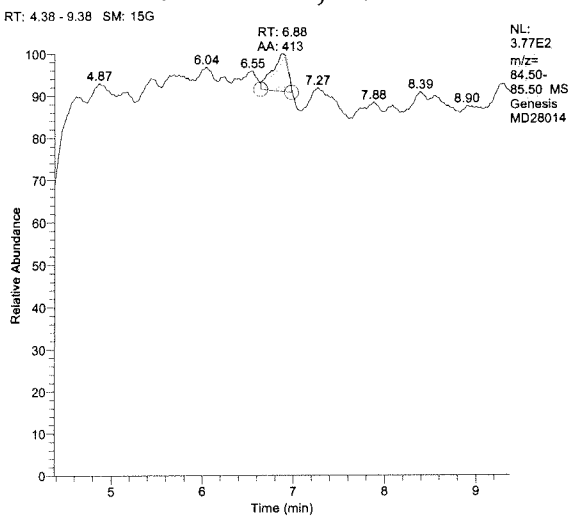
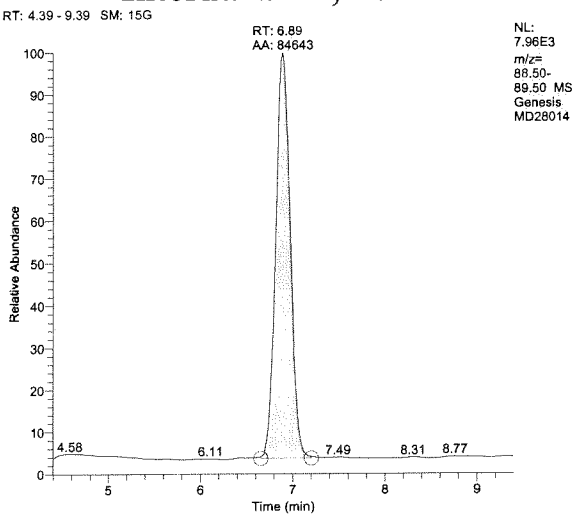


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.88	413	0.000	0.015	ppb	3.65
Perchlorate_89_ISTD	6.89	84643	2.000	N/A	ppb	1221.91

83/85 Ratio: N/A
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

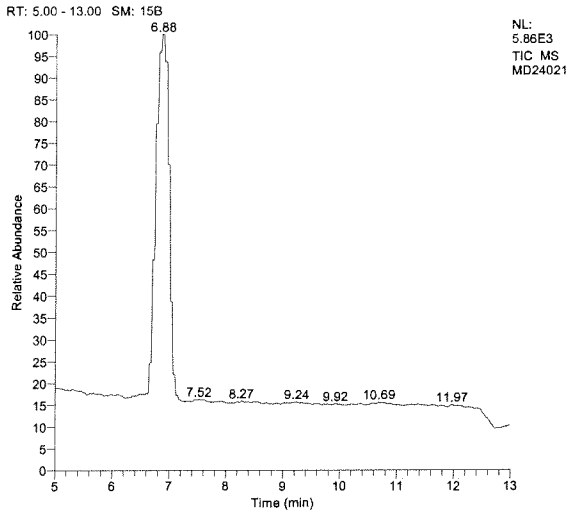
Sample Summary

EMAX Lab ID:	D114-10
Lab File ID:	MD24021
Acquisition Date:	04/24/15 06:09:19 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RC4
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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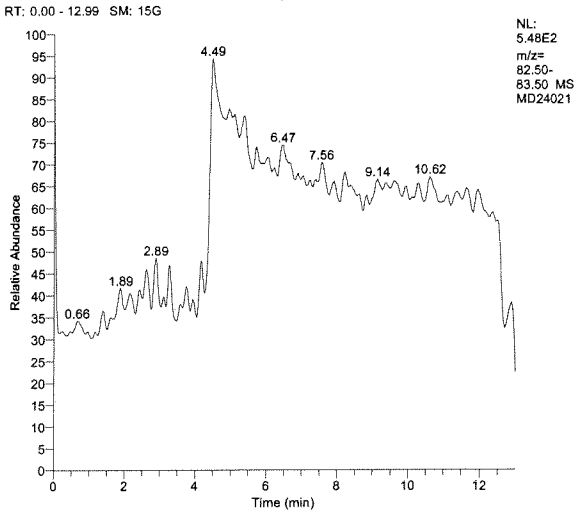
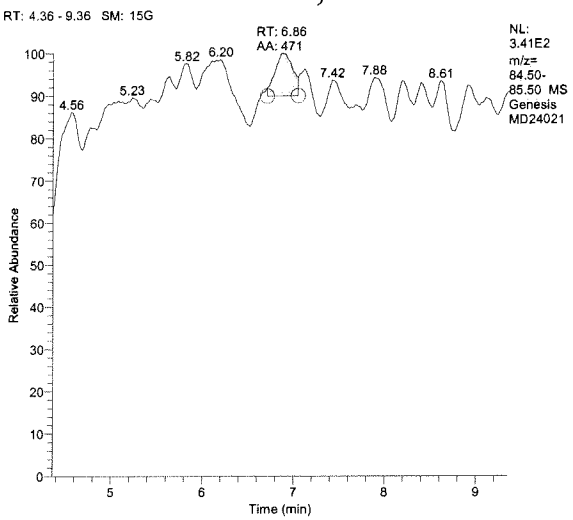
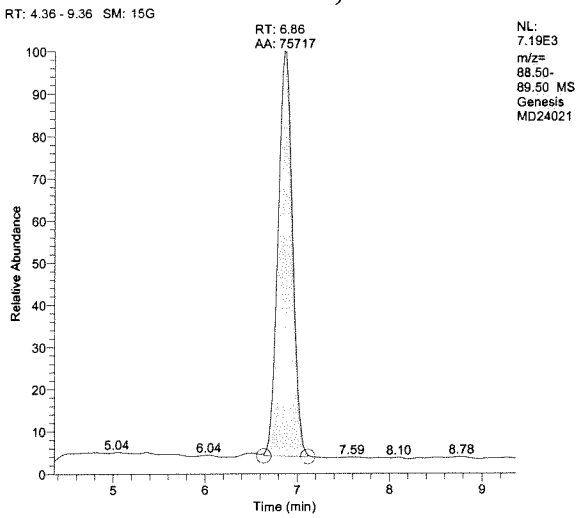


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.86	471	0.000	0.021	ppb	2.70
Perchlorate_89_ISTD	6.86	75717	2.000	N/A	ppb	514.46

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

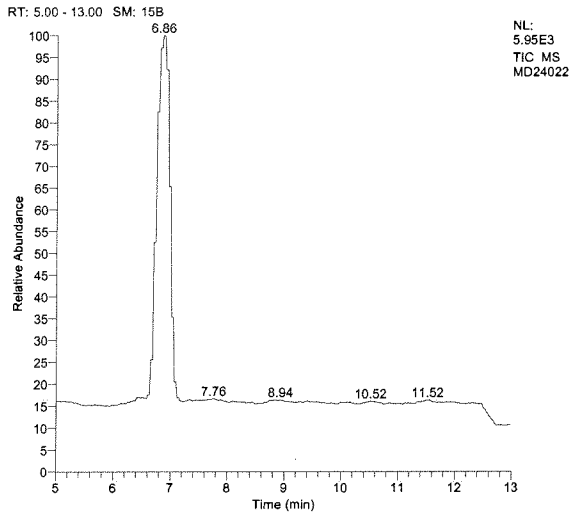
Sample Summary

EMAX Lab ID:	D114-11
Lab File ID:	MD24022
Acquisition Date:	04/24/15 06:24:57 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RC5
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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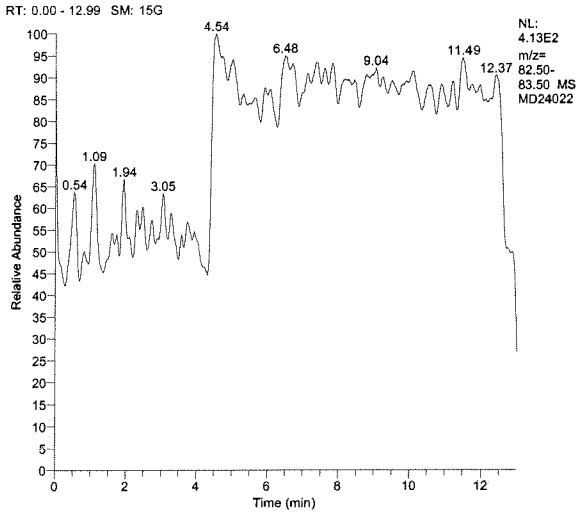

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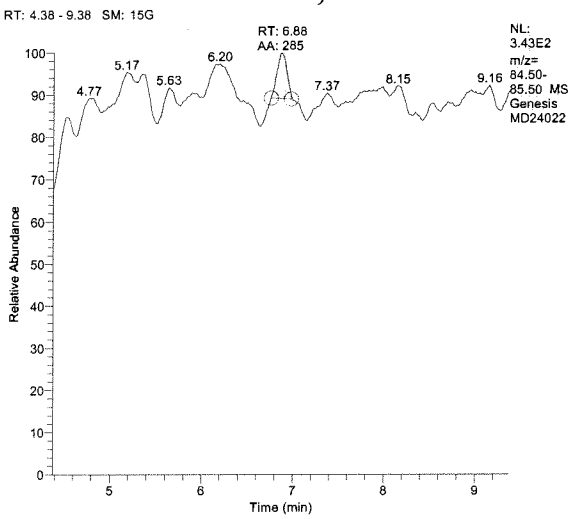

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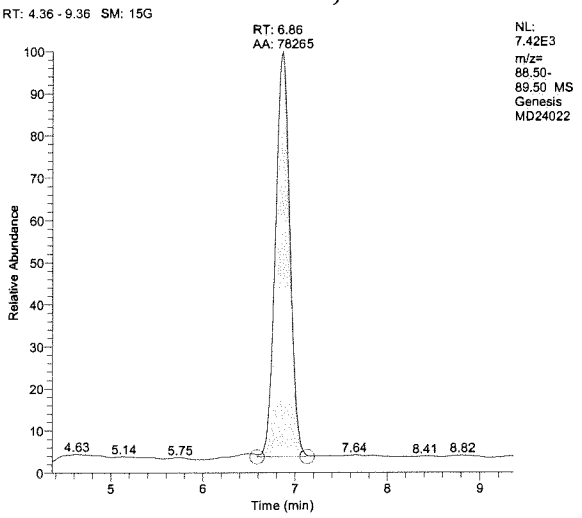


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.88	285	0.000	0.010	ppb	4.58
Perchlorate_89_ISTD	6.86	78265	2.000	N/A	ppb	582.61

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

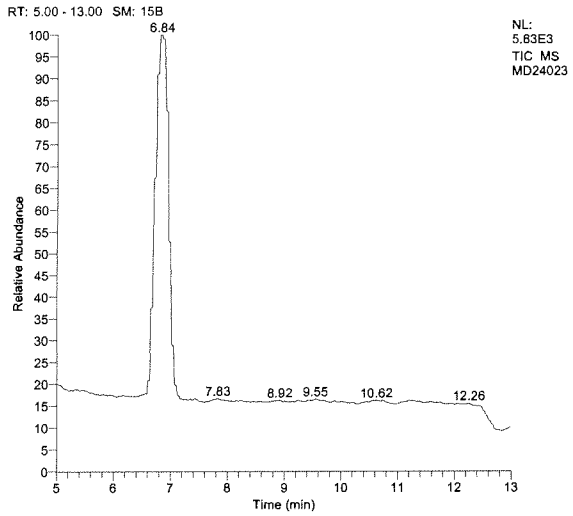
Sample Summary

EMAX Lab ID:	D114-12
Lab File ID:	MD24023
Acquisition Date:	04/24/15 06:41:23 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

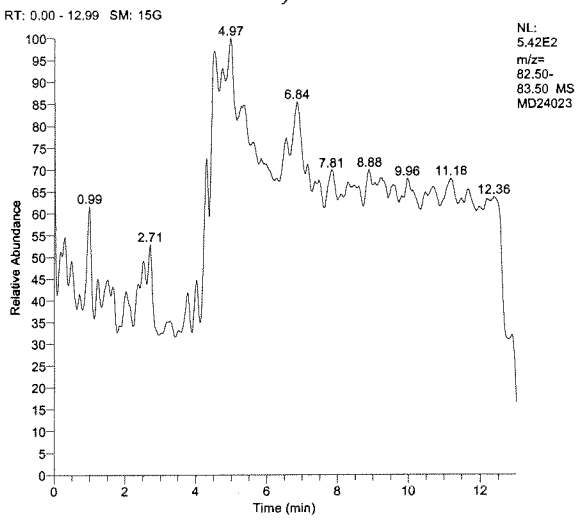
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RC6
Injection Volume(ul):	20.00
Run Time(min):	12.99

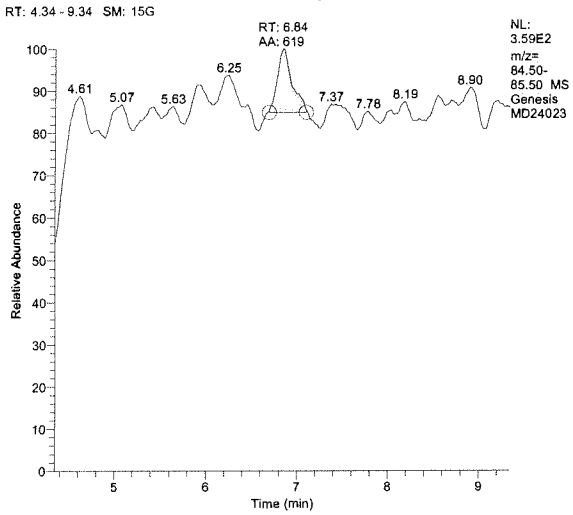
TIC



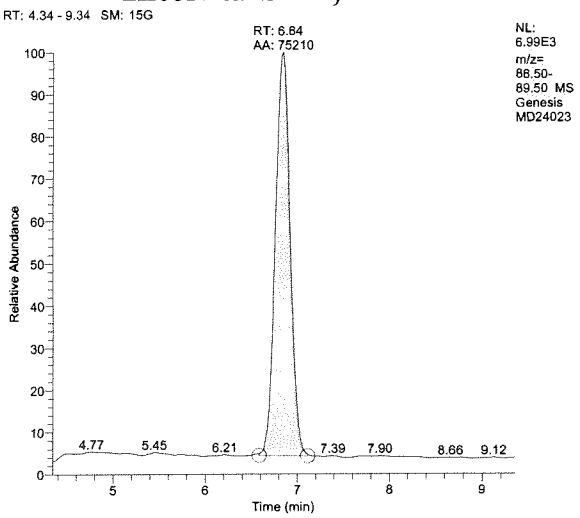
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.84	619	0.000	0.030	ppb	7.38
Perchlorate_89_ISTD	6.84	75210	2.000	N/A	ppb	728.84

83/85 Ratio: N/a

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

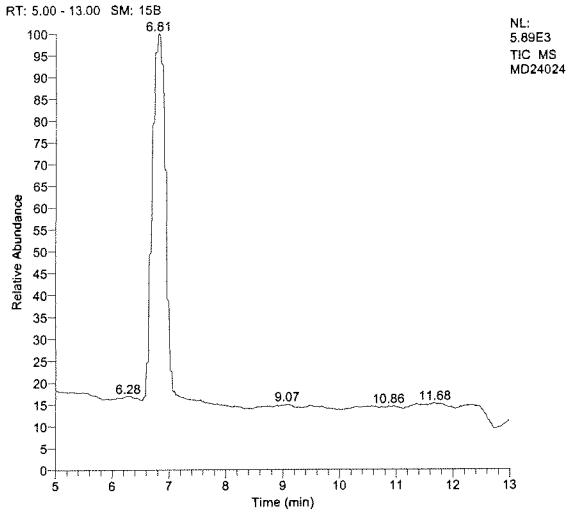
Sample Summary

EMAX Lab ID:	D114-13
Lab File ID:	MD24024
Acquisition Date:	04/24/15 06:57:11 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RC7
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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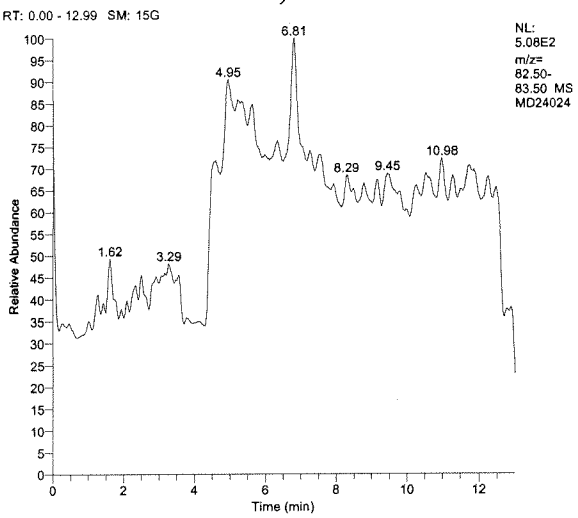
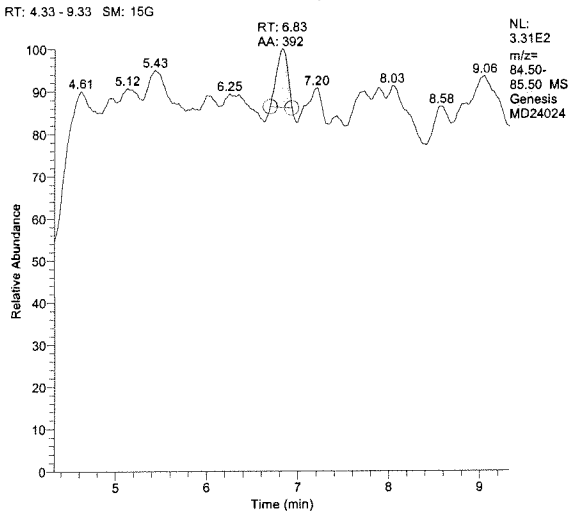
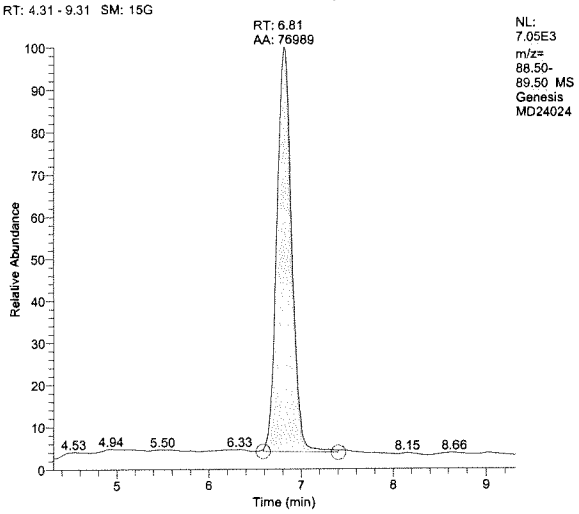


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.83	392	0.000	0.016	ppb	5.52
Perchlorate_89_ISTD	6.81	76989	2.000	N/A	ppb	1147.43

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

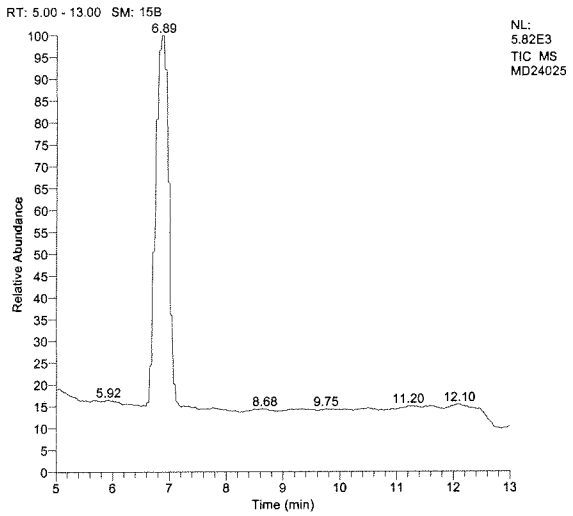
Sample Summary

EMAX Lab ID:	D114-14
Lab File ID:	MD24025
Acquisition Date:	04/24/15 07:11:43 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RC8
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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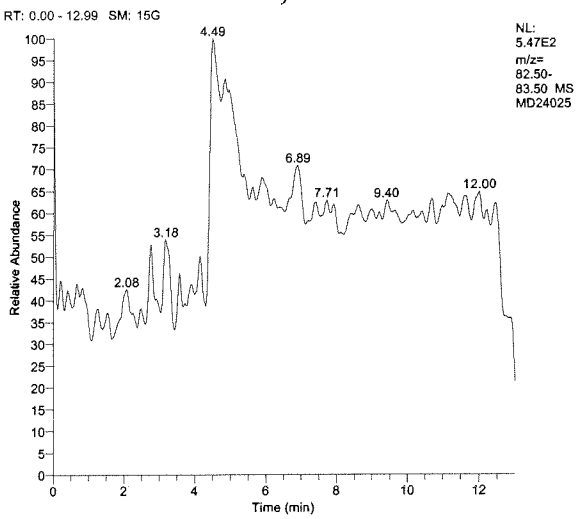
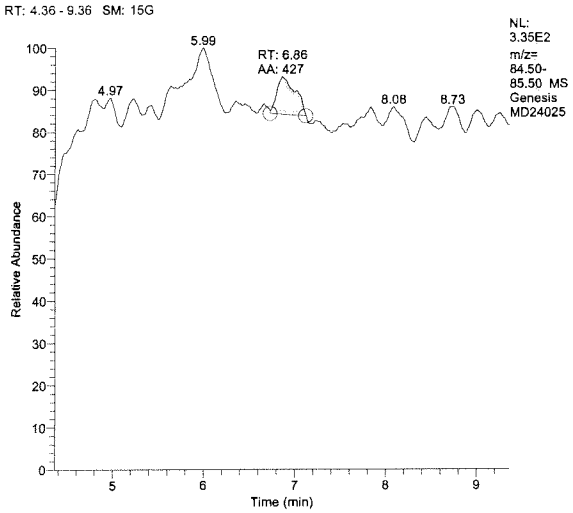
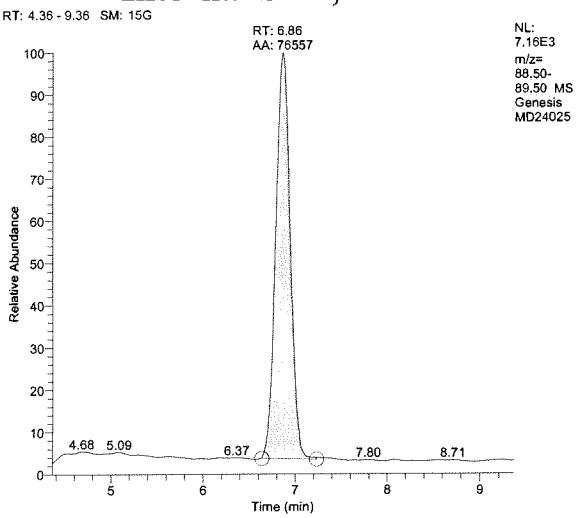


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.86	427	0.000	0.018	ppb	4.26
Perchlorate_89_ISTD	6.86	76557	2.000	N/A	ppb	716.06

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

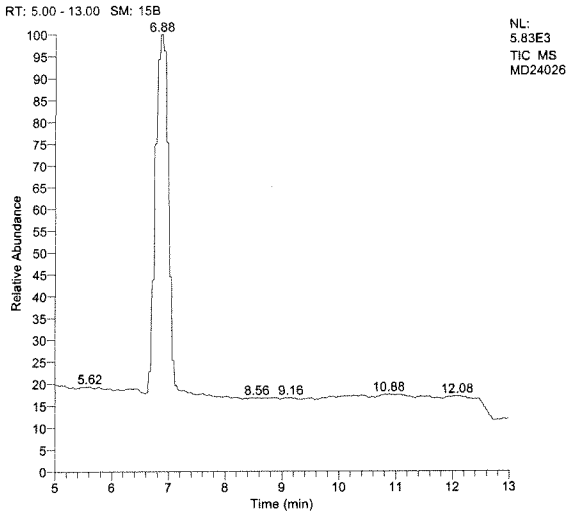
Sample Summary

EMAX Lab ID:	D114-15
Lab File ID:	MD24026
Acquisition Date:	04/24/15 07:26:15 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RD1
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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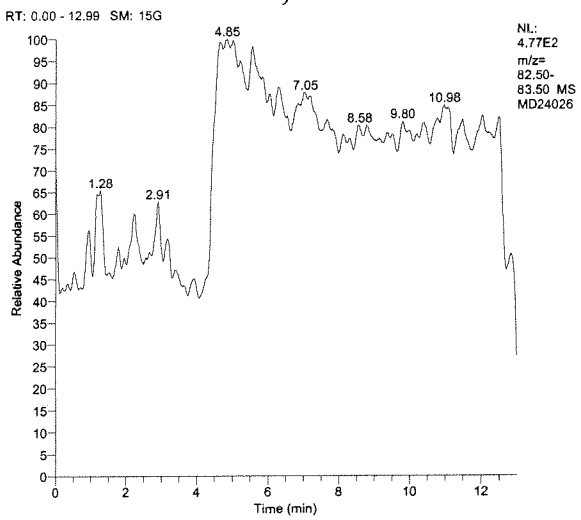
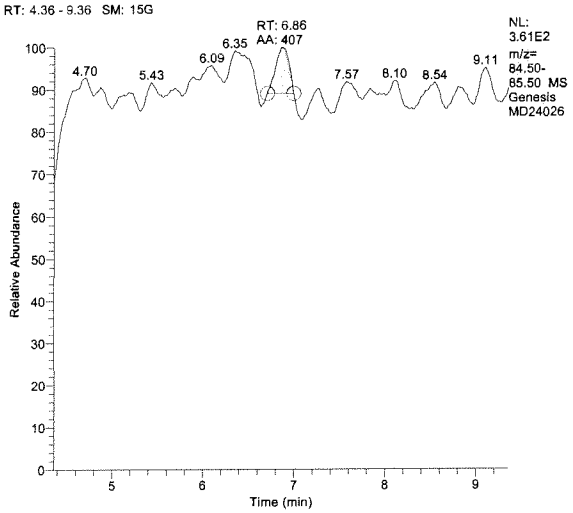
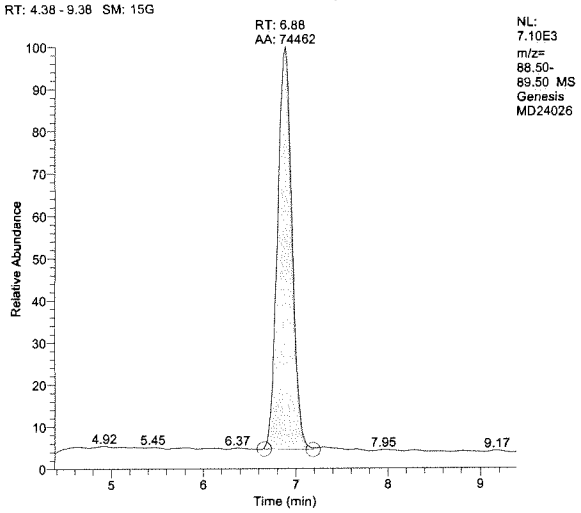


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.86	407	0.000	0.018	ppb	4.75
Perchlorate_89_ISTD	6.88	74462	2.000	N/A	ppb	1287.42

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

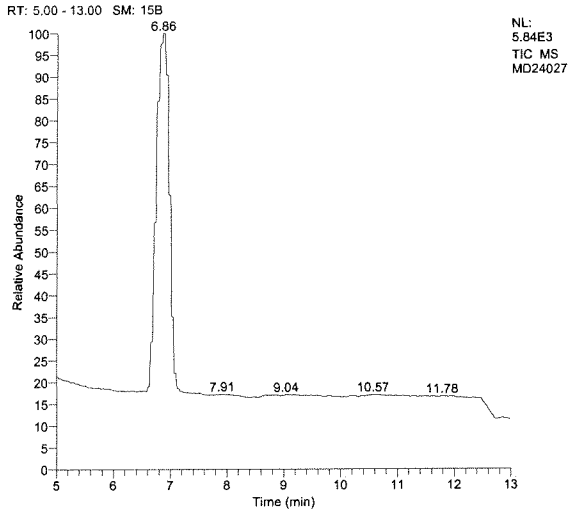
Sample Summary

EMAX Lab ID:	D114-16
Lab File ID:	MD24027
Acquisition Date:	04/24/15 07:40:47 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

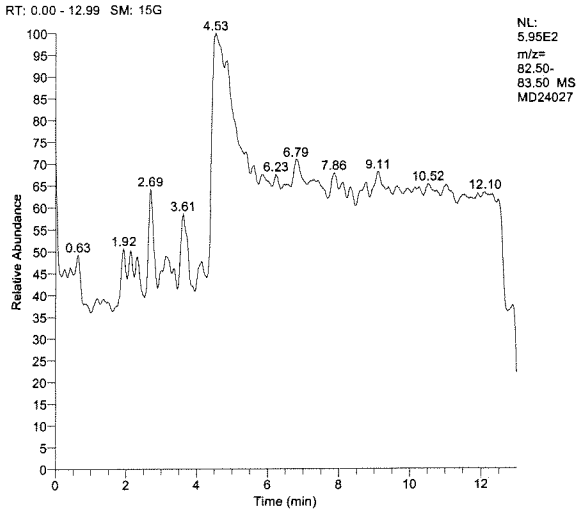
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RD2
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



Parent, m/z=83



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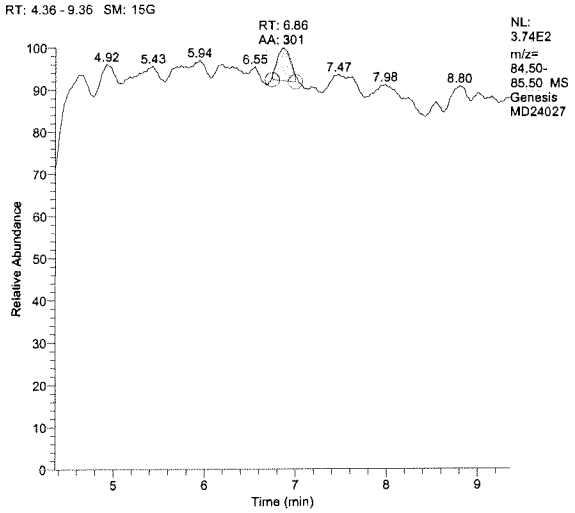

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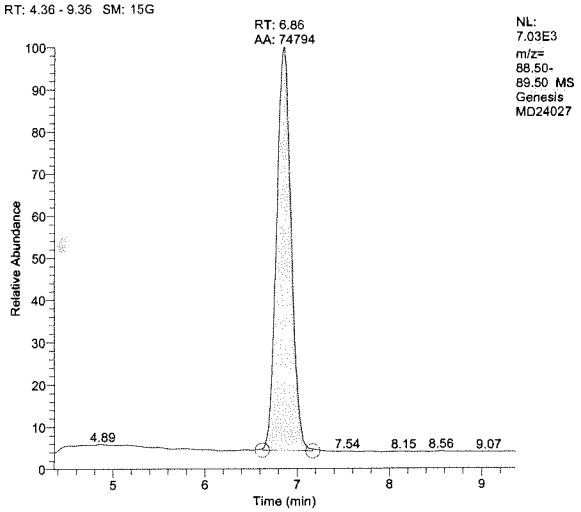


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.86	301	0.000	0.012	ppb	4.10
Perchlorate_89_ISTD	6.86	74794	2.000	N/A	ppb	808.41

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

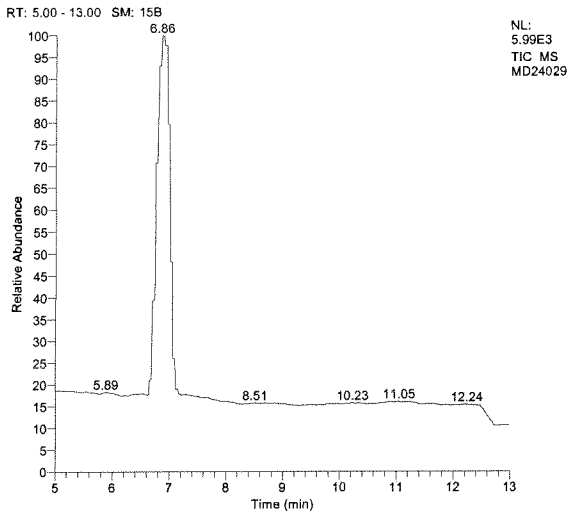
Sample Summary

EMAX Lab ID:	D114-17
Lab File ID:	MD24029
Acquisition Date:	04/24/15 08:09:51 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	QC
Calibration Level:	2 PPB
Vial:	RD3
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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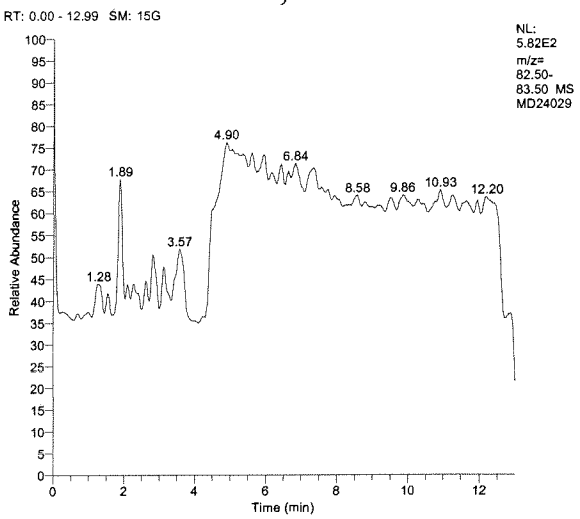
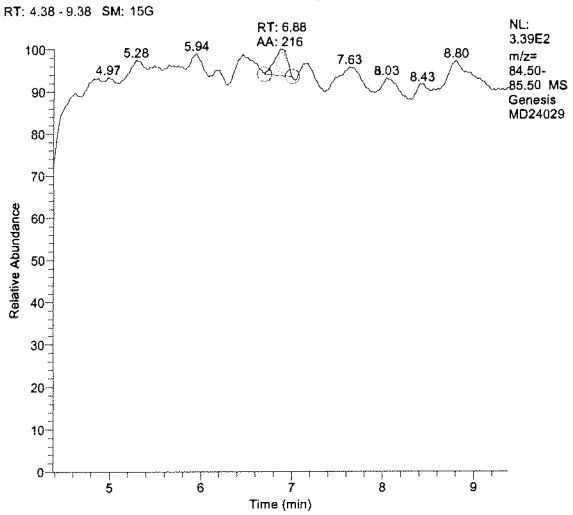
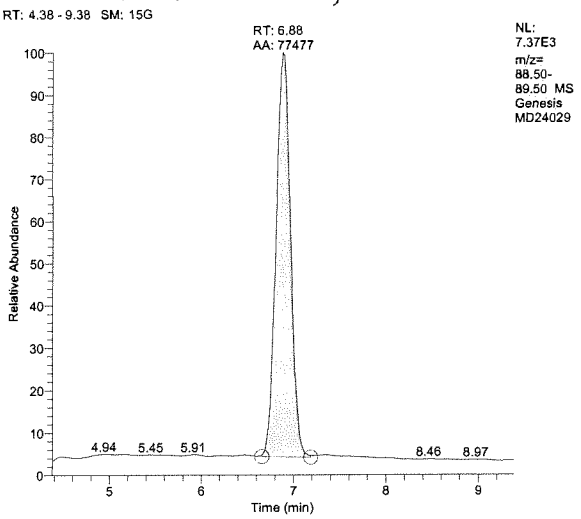


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	2.000	N/A	ppb	N/A
Perchlorate_85	6.88	216	2.000	0.006	ppb	3.13
Perchlorate_89_ISTD	6.88	77477	2.000	N/A	ppb	1569.71

83/85 Ratio: N/a
(Control Limit: +/-30%)

Friday, April 24, 2015, 20:24:28

Method 6850
EMAX Laboratories
Instrument # G0

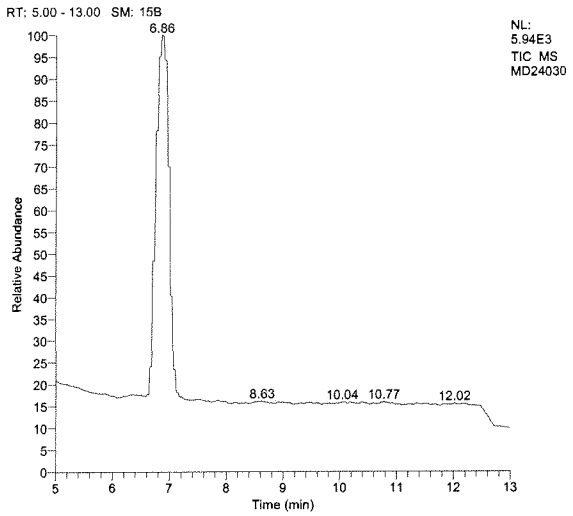
Sample Summary

EMAX Lab ID:	D114-18
Lab File ID:	MD24030
Acquisition Date:	04/24/15 08:24:23 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RD4
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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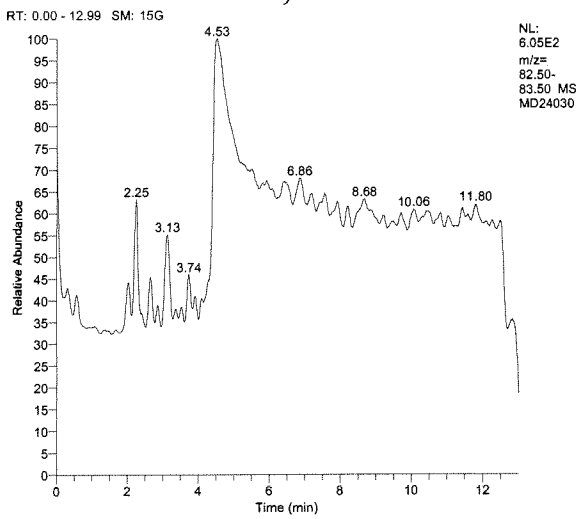
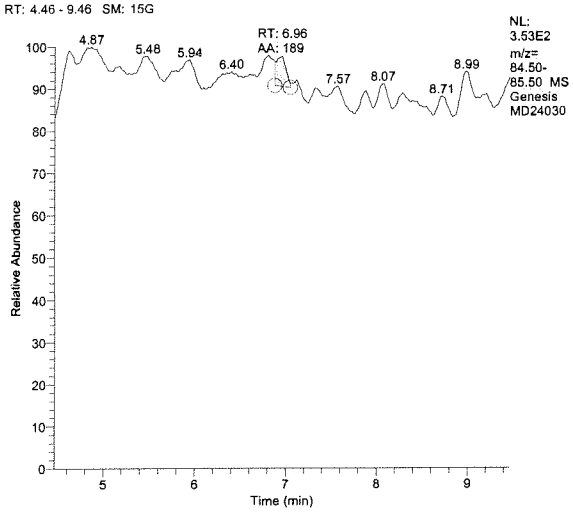
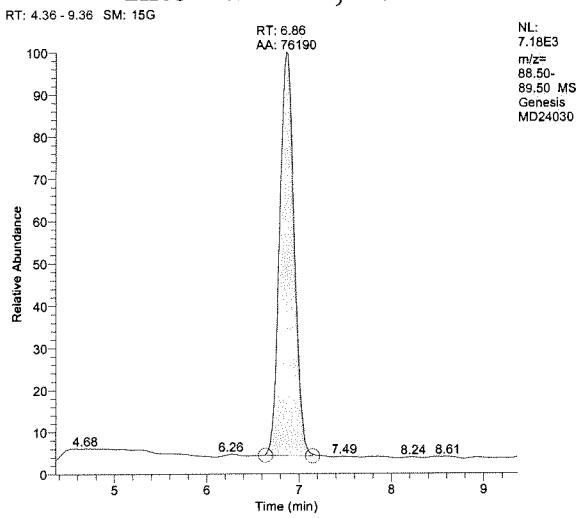


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.96	189	0.000	0.005	ppb	4.35
Perchlorate_89_ISTD	6.86	76190	2.000	N/A	ppb	287.27

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

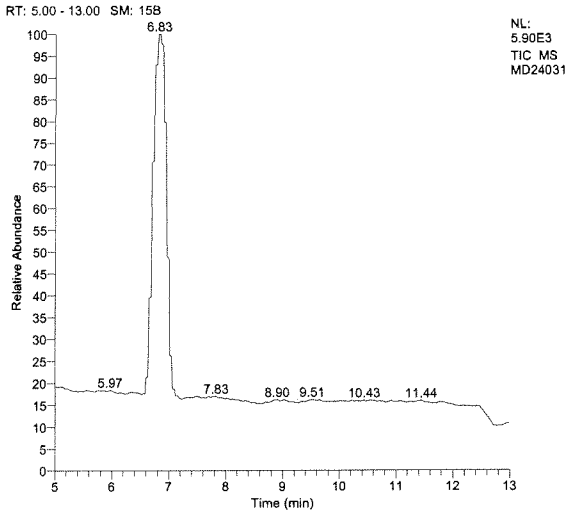
Sample Summary

EMAX Lab ID:	D114-19
Lab File ID:	MD24031
Acquisition Date:	04/24/15 08:38:55 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RD5
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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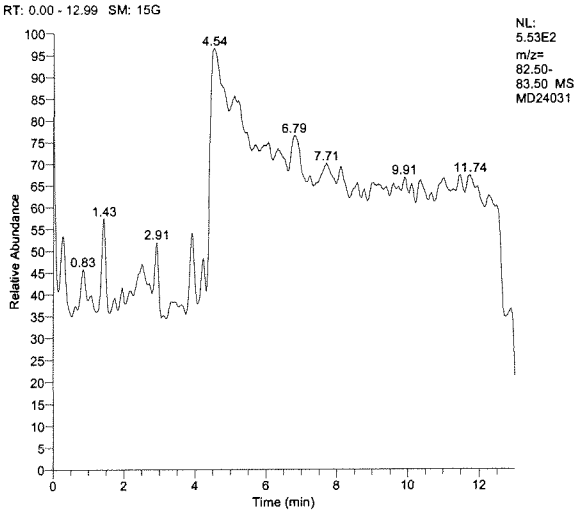
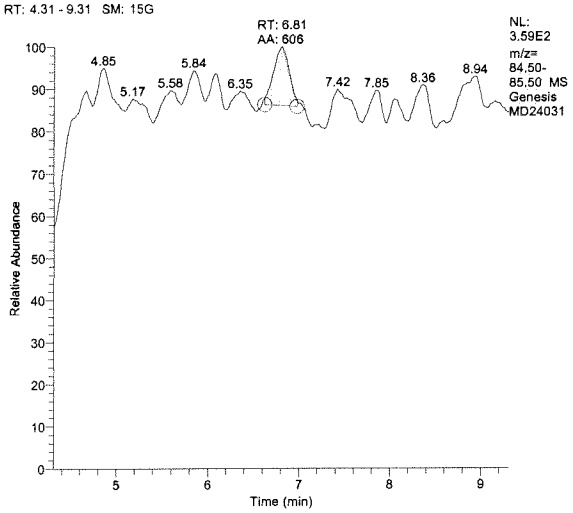
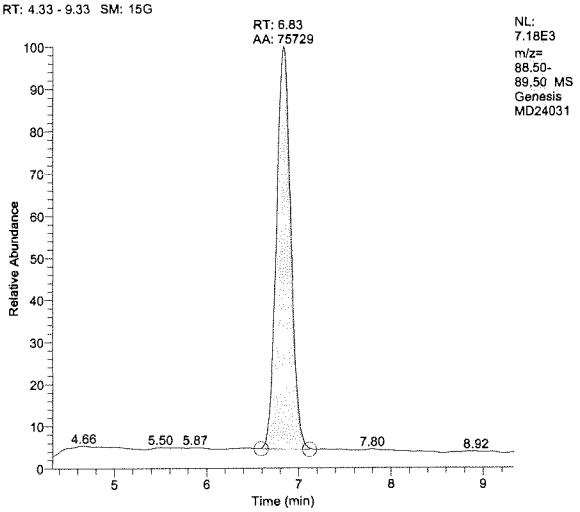


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.81	606	0.000	0.029	ppb	5.59
Perchlorate_89_ISTD	6.83	75729	2.000	N/A	ppb	834.98

83/85 Ratio: N/a

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

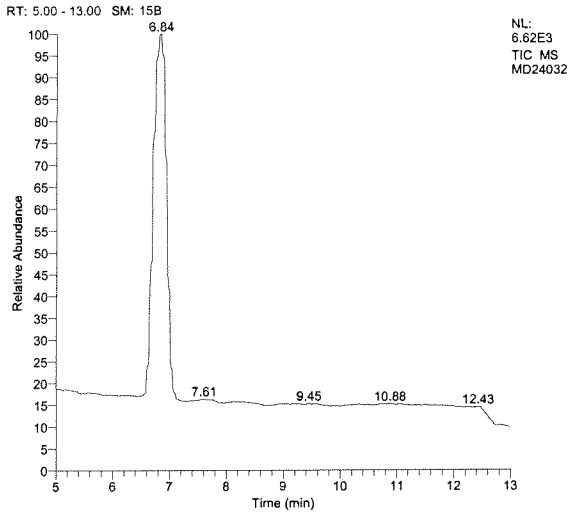
Sample Summary

EMAX Lab ID:	D114-20
Lab File ID:	MD24032
Acquisition Date:	04/24/15 08:53:27 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RD6
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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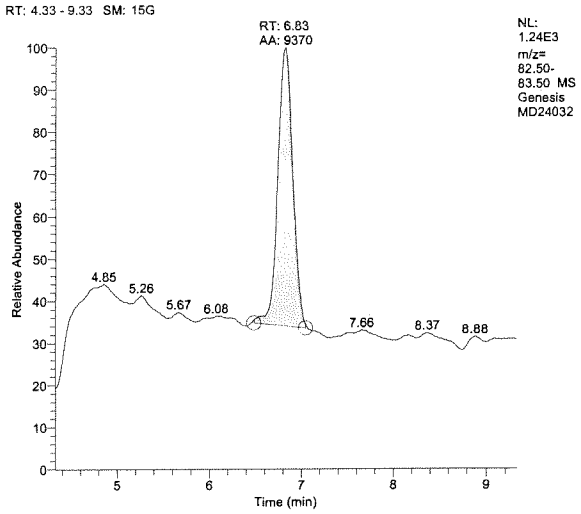
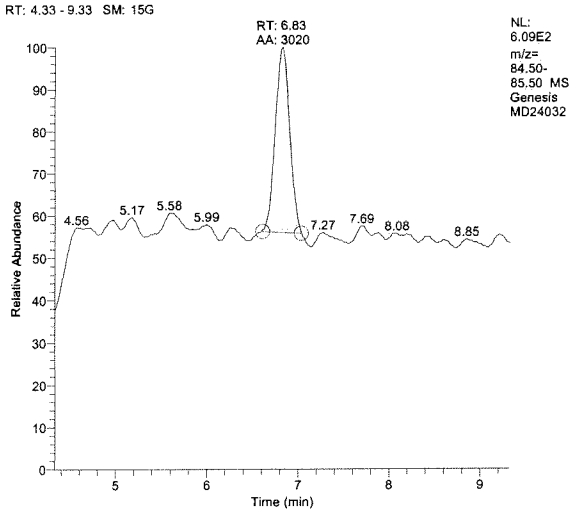
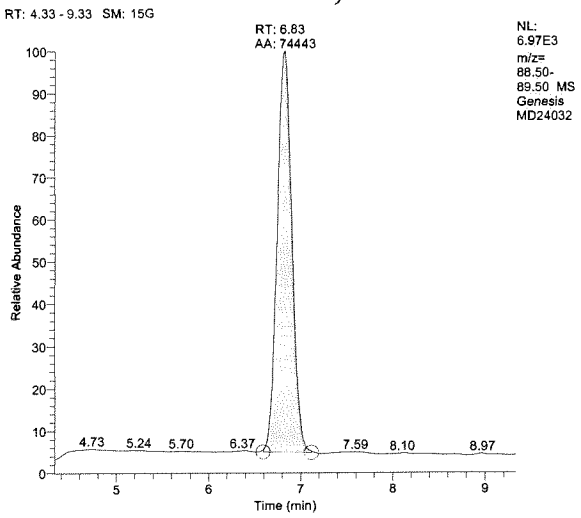


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.83	9370	0.000	0.179	ppb	73.66
Perchlorate_85	6.83	3020	0.000	0.169	ppb	39.28
Perchlorate_89_ISTD	6.83	74443	2.000	N/A	ppb	1978.89

83/85 Ratio: 3.10

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

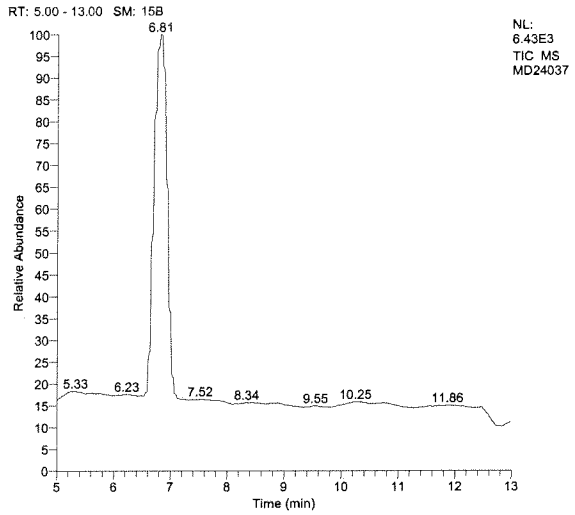
Sample Summary

EMAX Lab ID:	D114-21
Lab File ID:	MD24037
Acquisition Date:	04/24/15 10:06:27 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

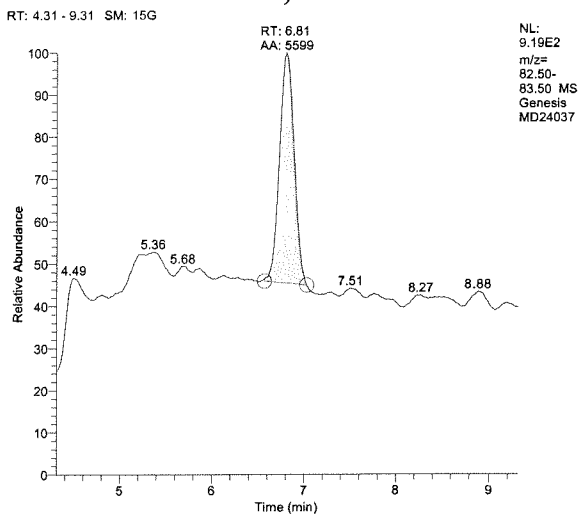
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RE2
Injection Volume(ul):	20.00
Run Time(min):	12.99

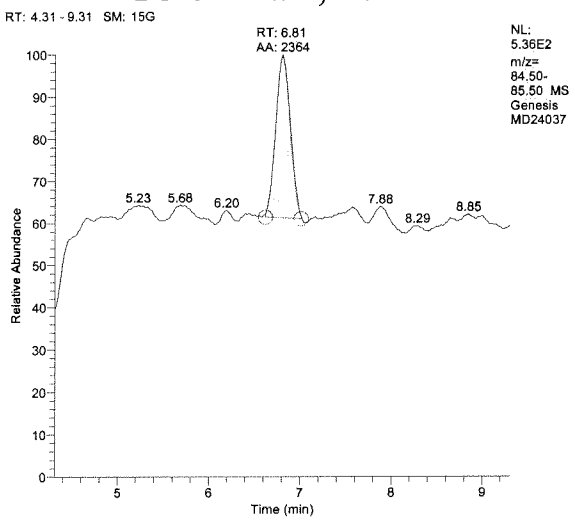
TIC



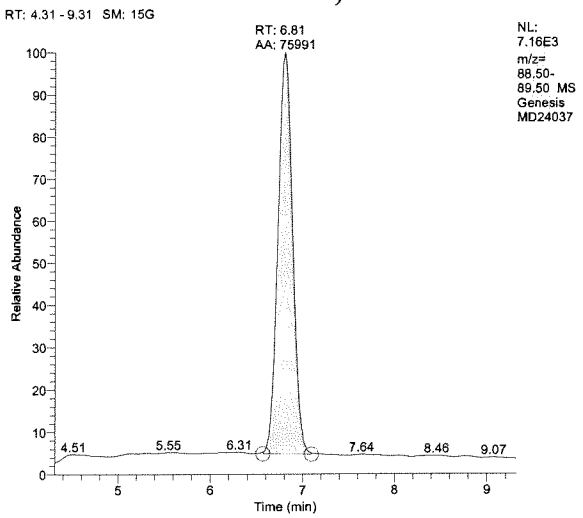
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.81	5599	0.000	0.106	ppb	65.41
Perchlorate_85	6.81	2364	0.000	0.128	ppb	31.06
Perchlorate_89_ISTD	6.81	75991	2.000	N/A	ppb	802.70

83/85 Ratio: 2.31

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

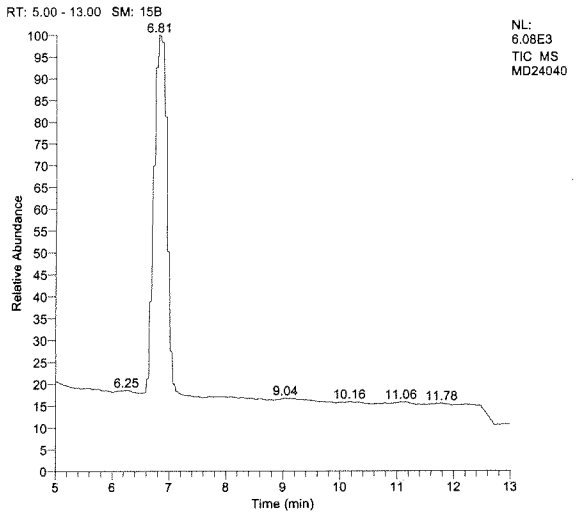
Sample Summary

EMAX Lab ID:	D114-22
Lab File ID:	MD24040
Acquisition Date:	04/24/15 10:50:09 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RE5
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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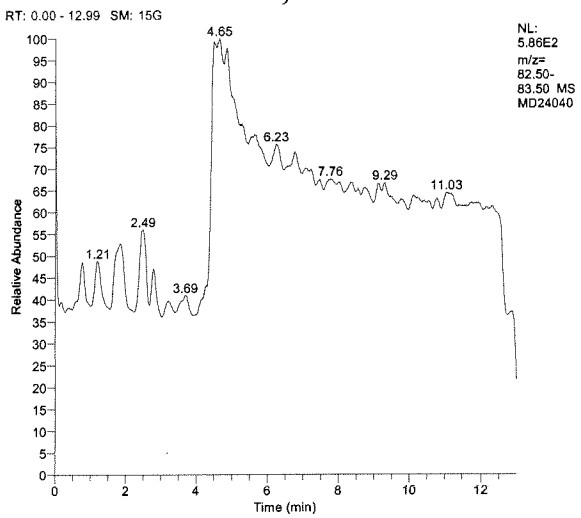
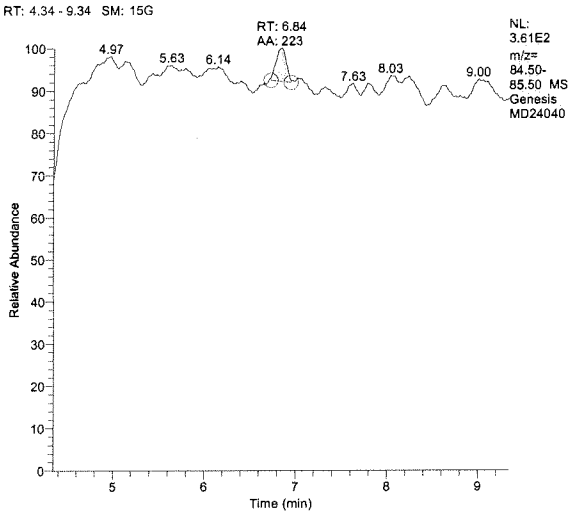
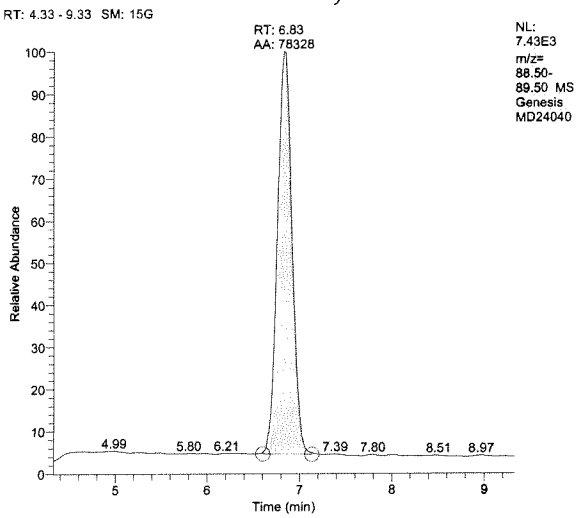


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.84	223	0.000	0.007	ppb	4.95
Perchlorate_89_ISTD	6.83	78328	2.000	N/A	ppb	1265.02

83/85 Ratio: N/A

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

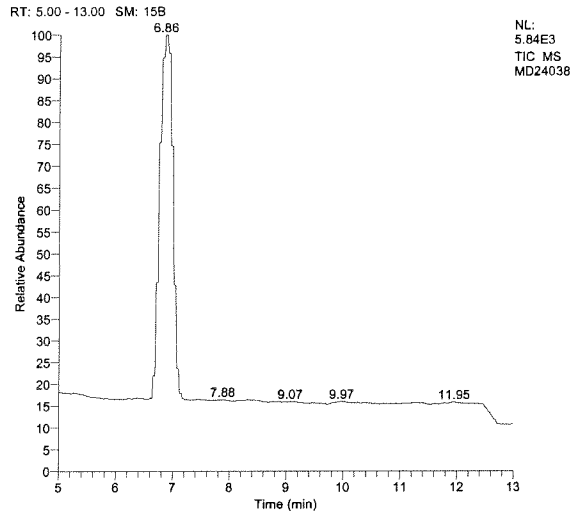
Sample Summary

EMAX Lab ID:	D114-23
Lab File ID:	MD24038
Acquisition Date:	04/24/15 10:21:05 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RE3
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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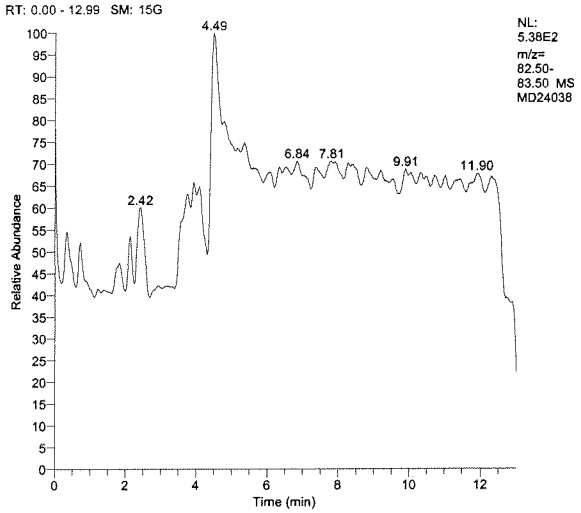
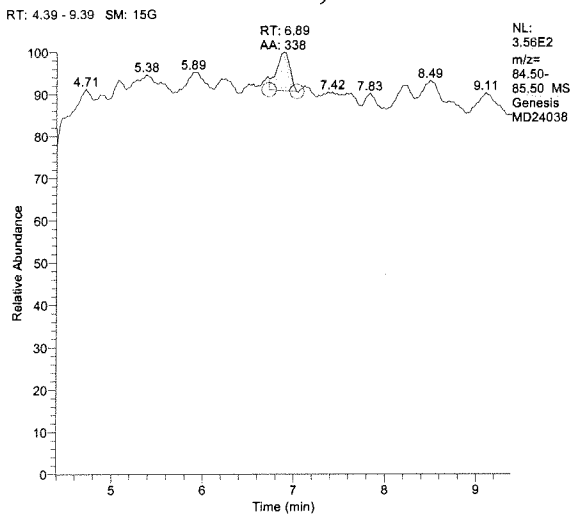
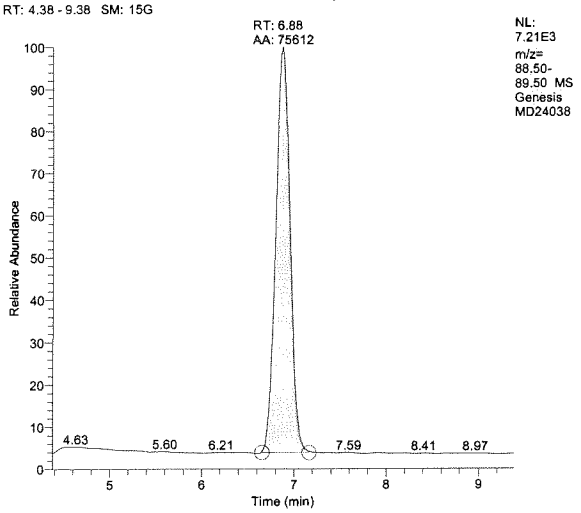


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.89	338	0.000	0.014	ppb	8.95
Perchlorate_89_ISTD	6.88	75612	2.000	N/A	ppb	1423.37

83/85 Ratio: N/A
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

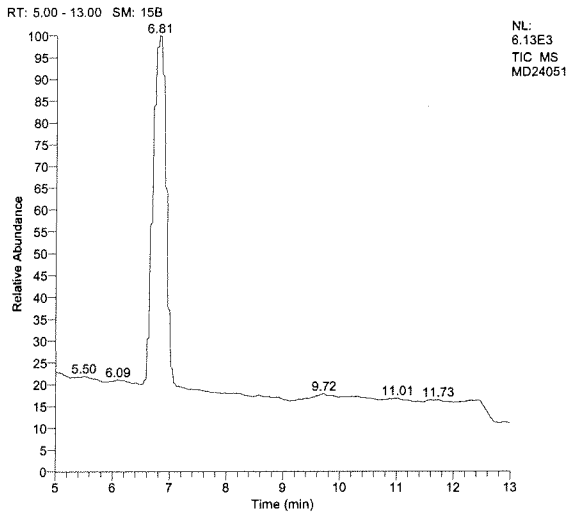
Sample Summary

EMAX Lab ID:	D114-24
Lab File ID:	MD24051
Acquisition Date:	04/25/15 01:30:19 AM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RE4
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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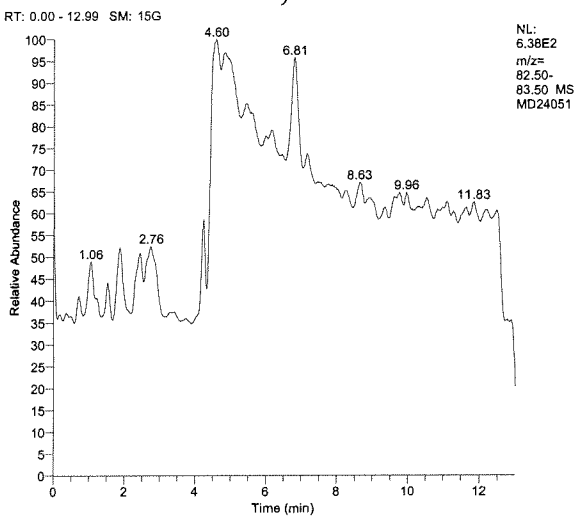
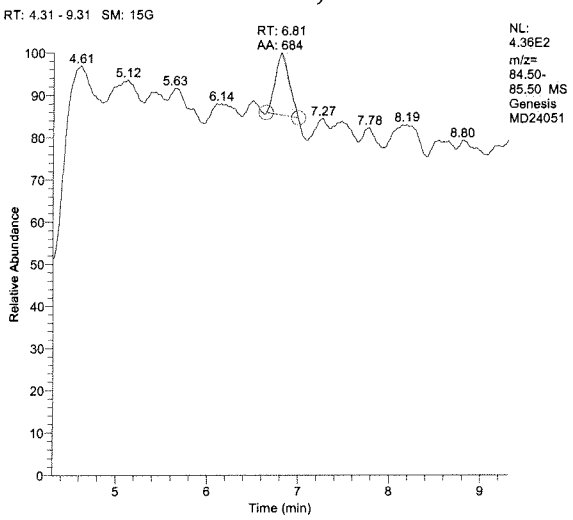
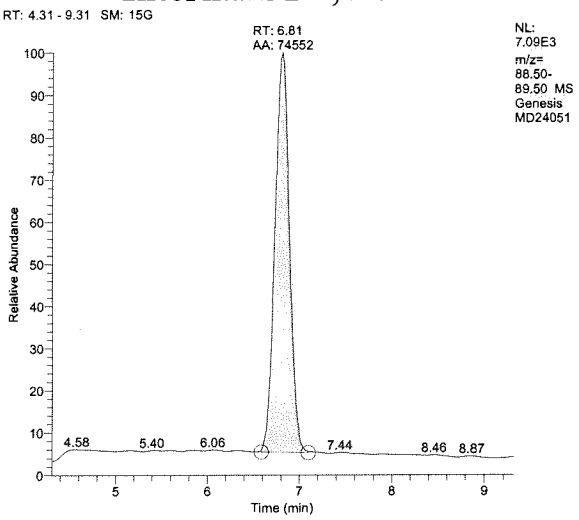


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.81	684	0.000	0.034	ppb	8.61
Perchlorate_89_ISTD	6.81	74552	2.000	N/A	ppb	678.72

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

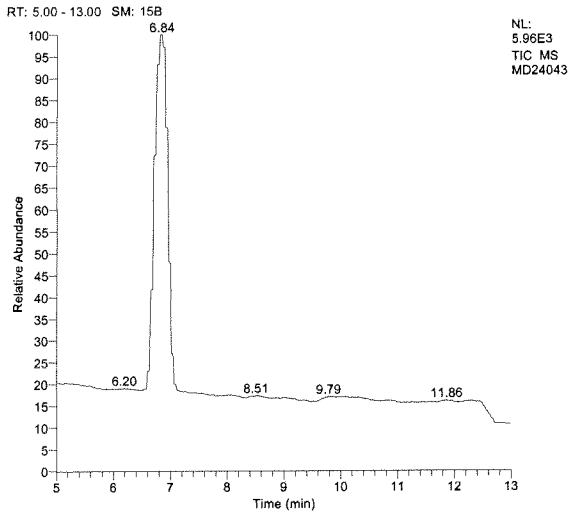
Sample Summary

EMAX Lab ID:	D114-25
Lab File ID:	MD24043
Acquisition Date:	04/24/15 11:33:43 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RE8
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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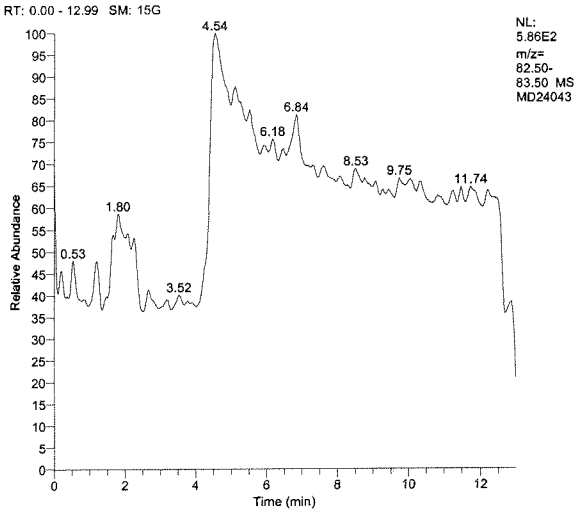
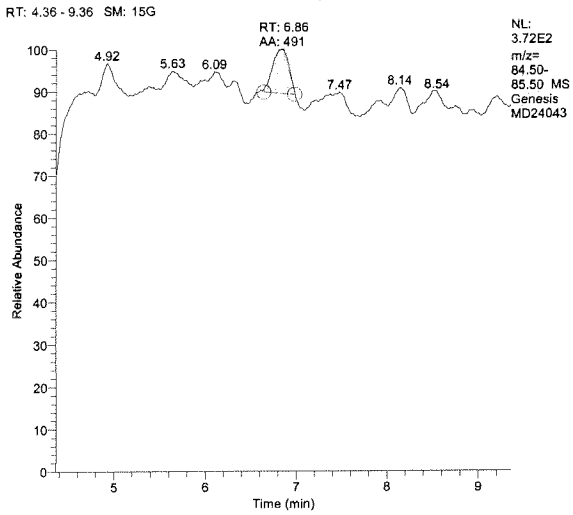
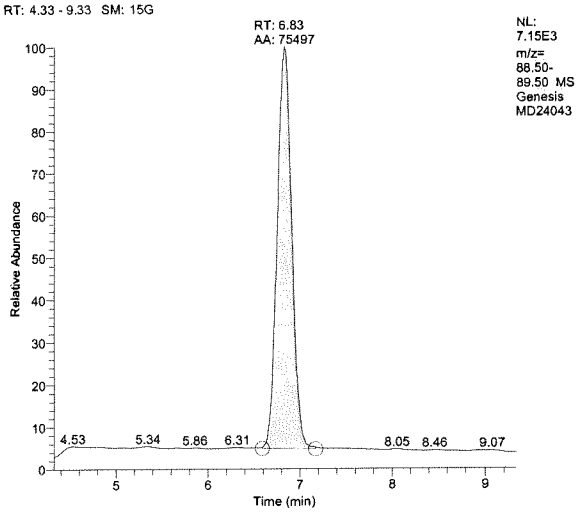


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.86	491	0.000	0.022	ppb	5.19
Perchlorate_89_ISTD	6.83	75497	2.000	N/A	ppb	1246.43

83/85 Ratio: N/a
(Control Limit: +/-30%)

QC SUMMARIES

EMAX QUALITY CONTROL DATA
LAB CONTROL SAMPLE ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UX04, FALLBROOK
BATCH NO. : 15D114
METHOD : 6850

MATRIX : WATER % MOISTURE: NA

DILUTION FACTOR:	1	1	1
SAMPLE ID :	MBLK1W	LCS1W	LCD1W
LAB SAMPLE ID :	PLD007WB	PLD007WL	PLD007WC
LAB FILE ID :	15MD28008	15MD28009	15MD28010
DATE PREPARED :	NA	NA	NA
DATE ANALYZED :	04/28/1512:49	04/28/1513:03	04/28/1513:18
PREP BATCH :	15PLD007W	15PLD007W	15PLD007W
CALIBRATION REF:	MD28007	MD28007	MD28007

ACCESSION:

PARAMETER	MB RESULT (ug/L)	SPIKE AMT (ug/L)	BS RESULT (ug/L)	BS REC (%)	SPIKE AMT (ug/L)	BSD RESULT (ug/L)	BSD REC (%)	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Perchlorate	ND	0.5	0.428J	86	0.5	0.435J	87	2	80-120	15

EMAX QUALITY CONTROL DATA
LAB CONTROL SAMPLE ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UXO4, FALLBROOK
BATCH NO. : 15D114
METHOD : 6850

MATRIX : SOIL % MOISTURE: NA

DILUTION FACTOR:	1	1	1
SAMPLE ID :	MBLK1S	LCS1S	LCD1S
LAB SAMPLE ID :	PLD008SB	PLD008SL	PLD008SC
LAB FILE ID :	15MD24007	15MD24008	15MD24009
DATE PREPARED :	04/21/1517:52	04/21/1517:52	04/21/1517:52
DATE ANALYZED :	04/24/1512:39	04/24/1512:54	04/24/1513:09
PREP BATCH :	15PLD008S	15PLD008S	15PLD008S
CALIBRATION REF:	MD24006	MD24006	MD24006

ACCESSION:

PARAMETER	MB RESULT (ug/kg)	SPIKE AMT (ug/kg)	BS RESULT (ug/kg)	BS REC (%)	SPIKE AMT (ug/kg)	BSD RESULT (ug/kg)	BSD REC (%)	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Perchlorate	ND	4	3.48J	87	4	3.72J	93	7	80-120	15

EMAX QUALITY CONTROL DATA
LAB CONTROL SAMPLE ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UXO4, FALLBROOK
BATCH NO. : 15D114
METHOD : 6850

MATRIX : SOIL % MOISTURE: NA

DILUTION FACTOR:	1	1	1
SAMPLE ID :	MBLK2S	LCS2S	LCD2S
LAB SAMPLE ID :	PLD009SB	PLD009SL	PLD009SC
LAB FILE ID :	15MD24034	15MD24035	15MD24036
DATE PREPARED :	04/21/1518:02	04/21/1518:02	04/21/1518:02
DATE ANALYZED :	04/24/1521:22	04/24/1521:37	04/24/1521:51
PREP BATCH :	15PLD009S	15PLD009S	15PLD009S
CALIBRATION REF:	MD24028	MD24028	MD24028

ACCESSION:

PARAMETER	MB RESULT (ug/kg)	SPIKE AMT (ug/kg)	BS RESULT (ug/kg)	BS REC (%)	SPIKE AMT (ug/kg)	BSD RESULT (ug/kg)	BSD REC (%)	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Perchlorate	ND	4	3.44J	86	4	3.44J	86	0	80-120	15

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UXO4, FALLBROOK
BATCH NO. : 15D114
METHOD : 6850

MATRIX : SOIL % MOISTURE: 13.7

DILUTION FACTOR:	1	1	1
SAMPLE ID :	UXO4-TR04-S02-3.0	UXO4-TR04-S02-3.0MS	UXO4-TR04-S02-3.0MSD
LAB SAMPLE ID :	D114-08	D114-08M	D114-08S
LAB FILE ID :	15MD24018	15MD24019	15MD24033
DATE PREPARED :	04/21/1517:52	04/21/1517:52	04/21/1517:52
DATE ANALYZED :	04/24/1517:05	04/24/1517:20	04/24/1521:08
PREP BATCH :	15PLD008S	15PLD008S	15PLD008S
CALIBRATION REF:	MD24017	MD24017	MD24028

ACCESSION:

PARAMETER	PARENT RESULT (ug/kg)	SPIKE AMT (ug/kg)	MS RESULT (ug/kg)	MS REC (%)	SPIKE AMT (ug/kg)	MSD RESULT (ug/kg)	MSD REC (%)	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Perchlorate	ND	4.635	4.01J	87	4.635	4.24J	91	6	80-120	15

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UXO4, FALLBROOK
BATCH NO. : 15D114
METHOD : 6850

MATRIX : SOIL % MOISTURE: 1.3

DILUTION FACTOR:	1	1	1
SAMPLE ID :	UXO4-SB15-0.5	UXO4-SB15-0.5MS	UXO4-SB15-0.5MSD
LAB SAMPLE ID :	D114-22	D114-22M	D114-22S
LAB FILE ID :	15MD24040	15MD24041	15MD24042
DATE PREPARED :	04/21/1518:02	04/21/1518:02	04/21/1518:02
DATE ANALYZED :	04/24/1522:50	04/24/1523:04	04/24/1523:19
PREP BATCH :	15PLD009S	15PLD009S	15PLD009S
CALIBRATION REF:	MD24039	MD24039	MD24039

ACCESSION:

PARAMETER	PARENT RESULT (ug/kg)	SPIKE AMT (ug/kg)	MS RESULT (ug/kg)	MS REC (%)	SPIKE AMT (ug/kg)	MSD RESULT (ug/kg)	MSD REC (%)	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Perchlorate	ND	4.053	3.26J	80	4.053	3.81J	94	16*	80-120	15

QC DATA

Method 6850
EMAX Laboratories
Instrument # G0

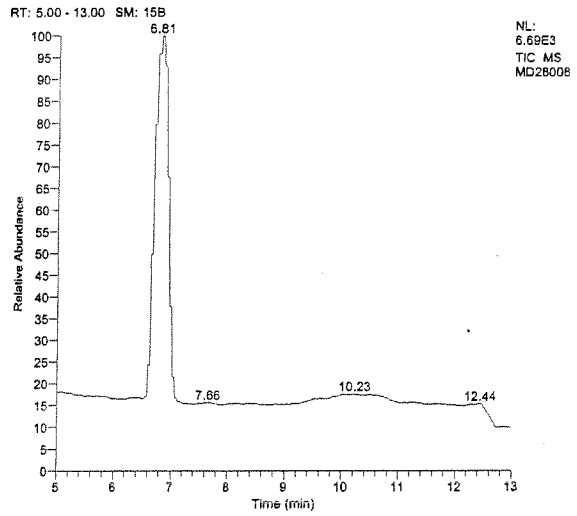
Sample Summary

EMAX Lab ID:	PLD007WB
Lab File ID:	MD28008
Acquisition Date:	04/28/15 12:49:08 PM
Data Path:	C:\XCALIBUR\DATA\MD28
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

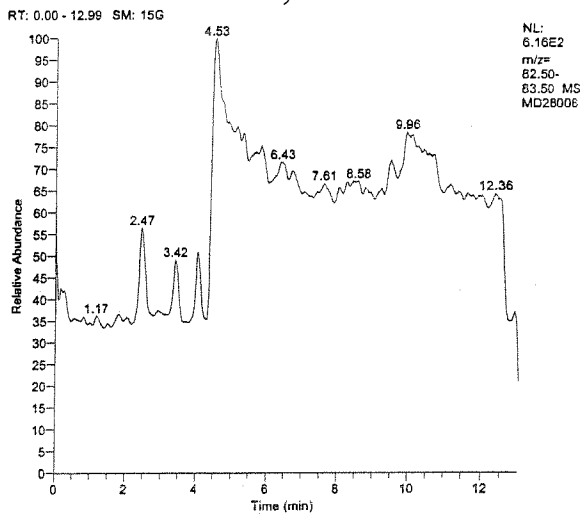
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA7
Injection Volume(ul):	20.00
Run Time(min):	12.99

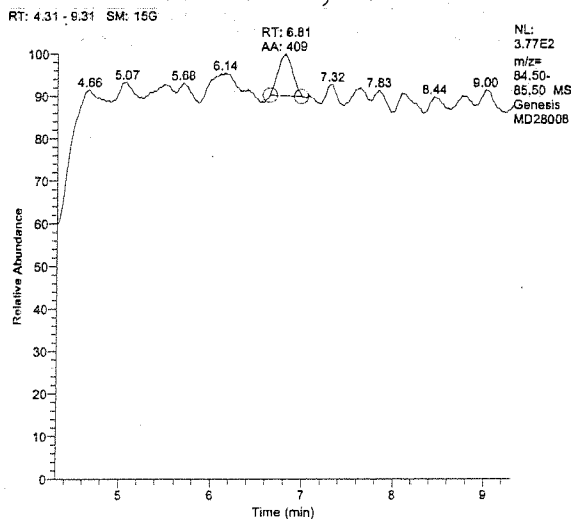
TIC



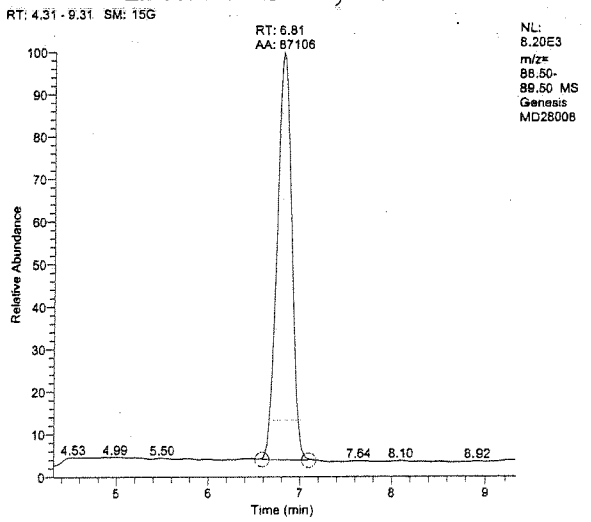
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.81	409	0.000	0.015	ppb	6.96
Perchlorate_89_ISTD	6.81	87106	2.000	N/A	ppb	1110.55

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

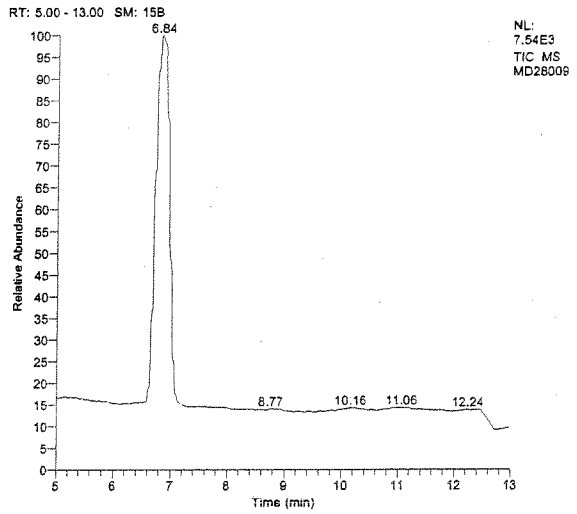
Sample Summary

EMAX Lab ID:	PLD007WL
Lab File ID:	MD28009
Acquisition Date:	04/28/15 01:03:40 PM
Data Path:	C:\XCALIBUR\DATA\MD28
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

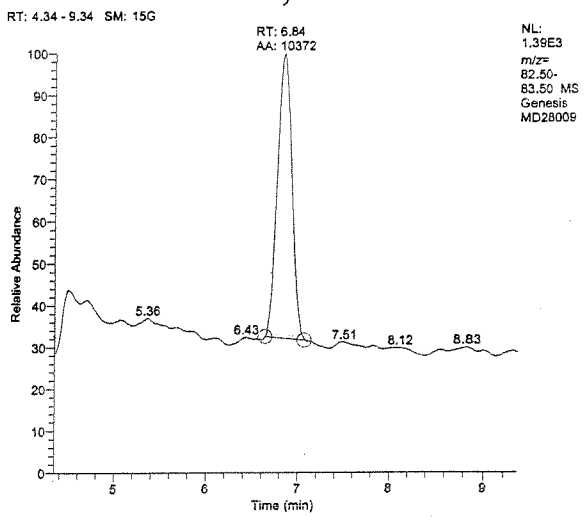
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA8
Injection Volume(ul):	20.00
Run Time(min):	12.99

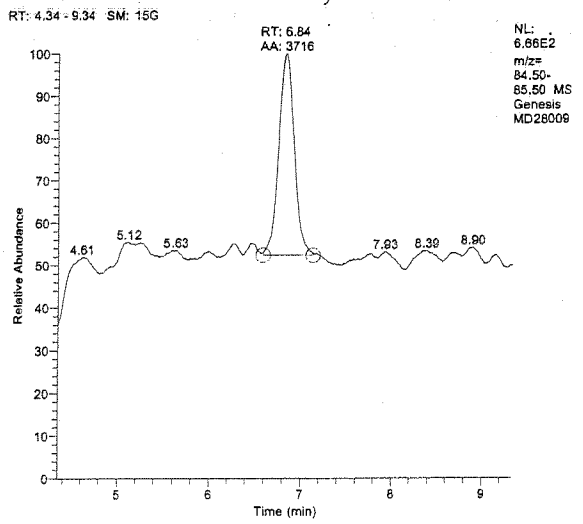
TIC



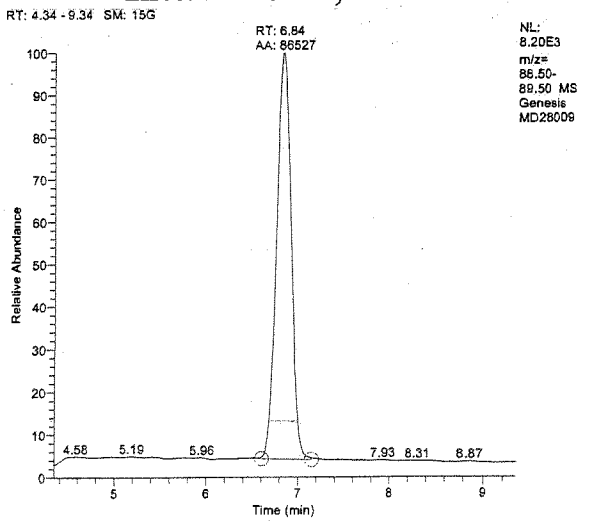
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.84	10372	0.000	0.171	ppb	123.66
Perchlorate_85	6.84	3716	0.000	0.179	ppb	39.34
Perchlorate_89_ISTD	6.84	86527	2.000	N/A	ppb	1353.12

83/85 Ratio: 2.79

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

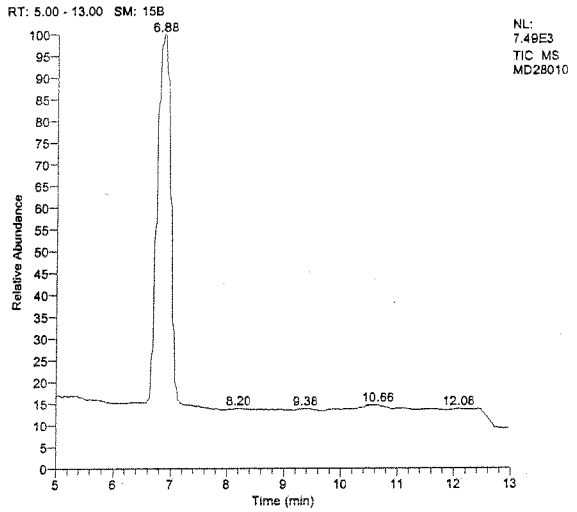
Sample Summary

EMAX Lab ID:	PLD007WC
Lab File ID:	MD28010
Acquisition Date:	04/28/15 01:18:12 PM
Data Path:	C:\XCALIBUR\DATA\MD28
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

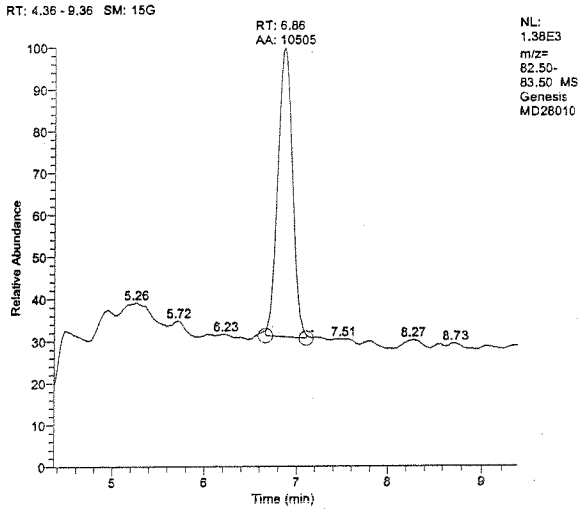
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB1
Injection Volume(ul):	20.00
Run Time(min):	12.99

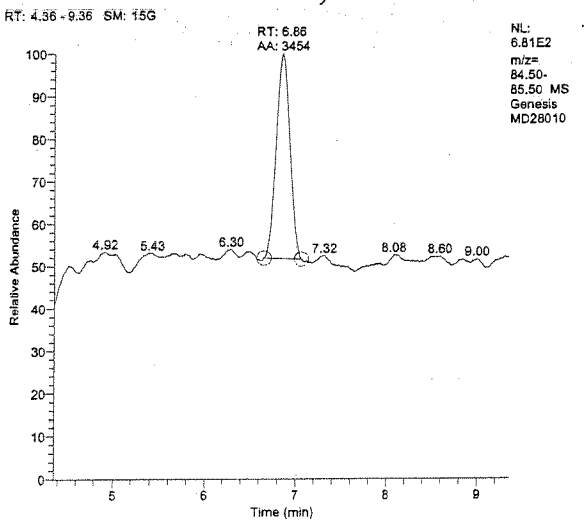
TIC



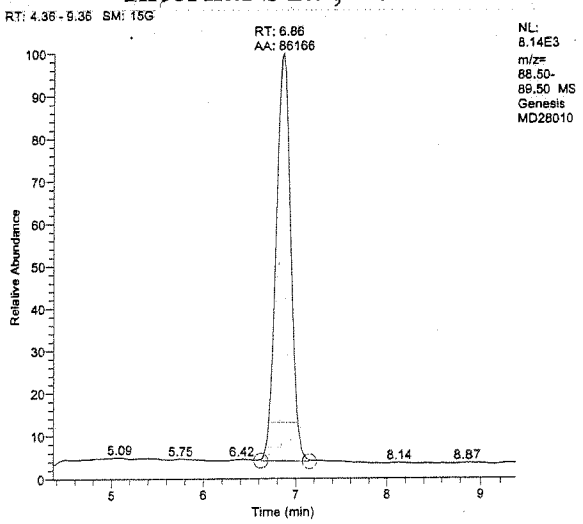
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.86	10505	0.000	0.174	ppb	105.08
Perchlorate_85	6.86	3454	0.000	0.167	ppb	60.51
Perchlorate_89_ISTD	6.86	86166	2.000	N/A	ppb	1121.67

83/85 Ratio: 3.04

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

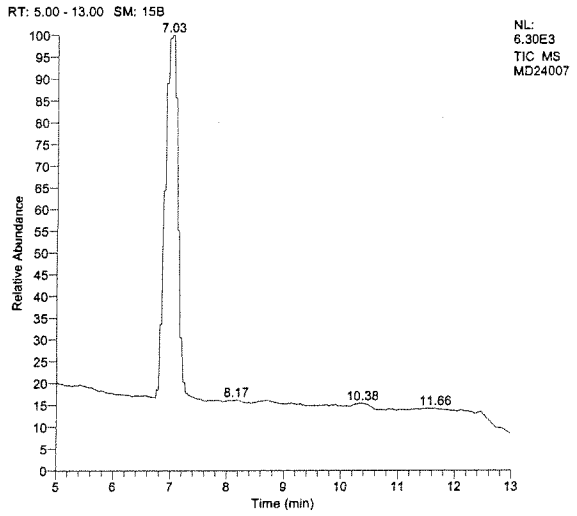
Sample Summary

EMAX Lab ID:	PLD008SB
Lab File ID:	MD24007
Acquisition Date:	04/24/15 12:39:57 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA7
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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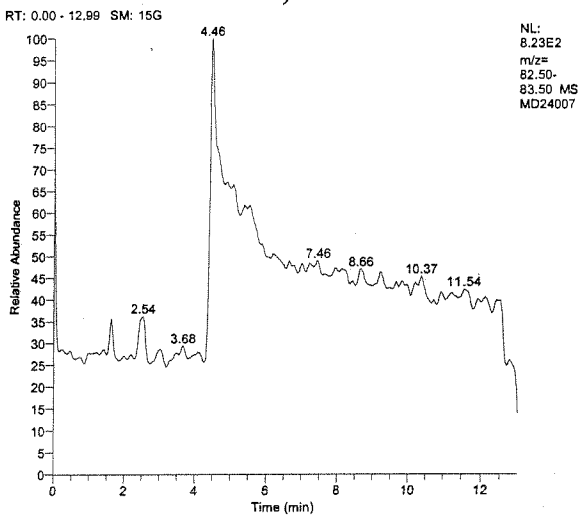
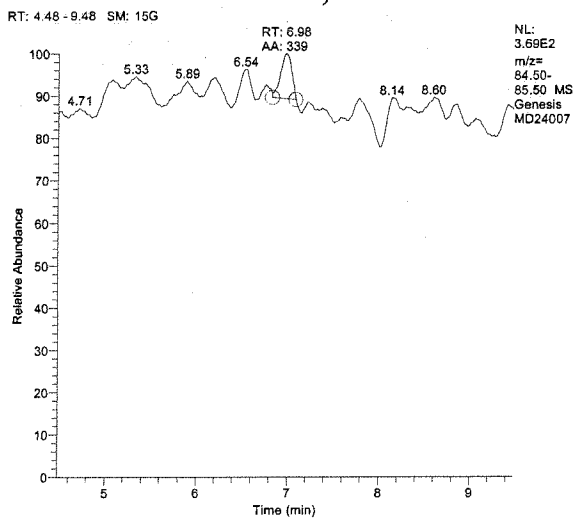
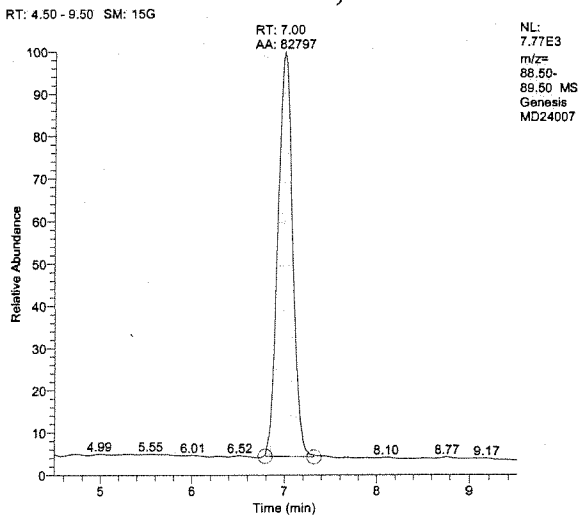


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.98	339	0.000	0.012	ppb	5.18
Perchlorate_89_ISTD	7.00	82797	2.000	N/A	ppb	1004.60

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

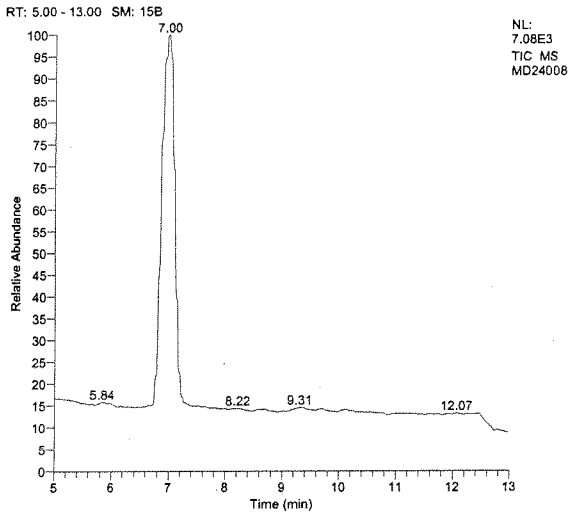
Sample Summary

EMAX Lab ID:	PLD008SL
Lab File ID:	MD24008
Acquisition Date:	04/24/15 12:54:45 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA8
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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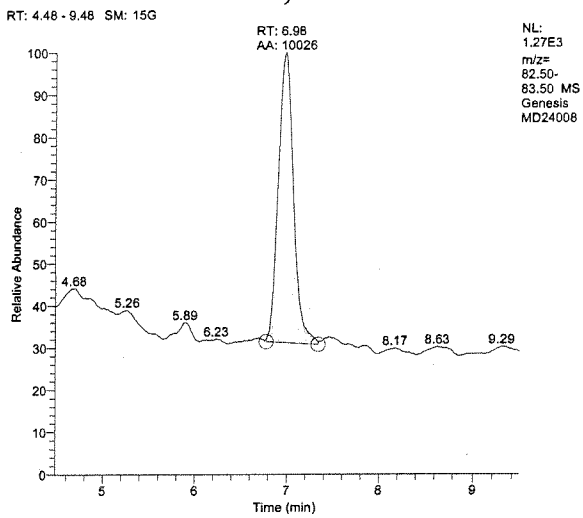
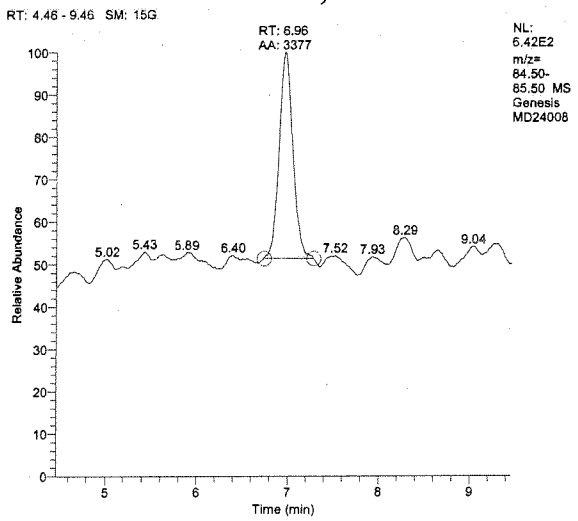
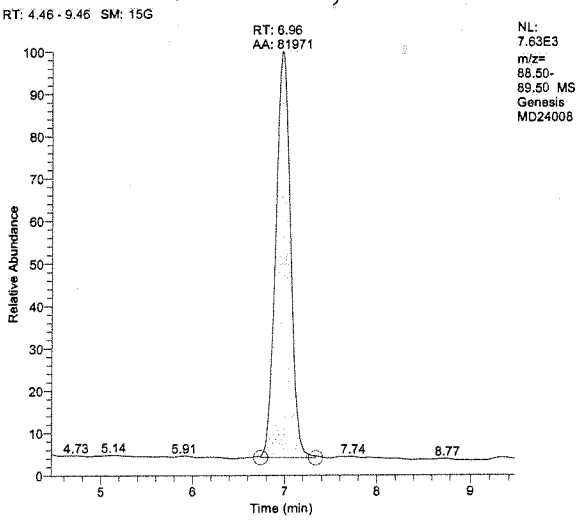


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.98	10026	0.000	0.174	ppb	106.71
Perchlorate_85	6.96	3377	0.000	0.171	ppb	45.48
Perchlorate_89_ISTD	6.96	81971	2.000	N/A	ppb	681.45

83/85 Ratio: 2.97

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

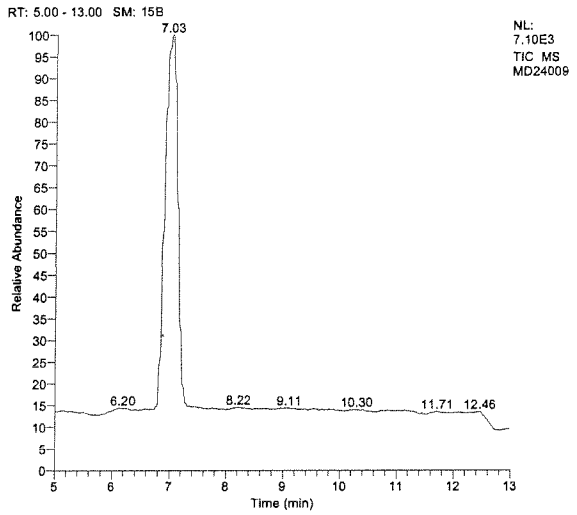
Sample Summary

EMAX Lab ID:	PLD008SC
Lab File ID:	MD24009
Acquisition Date:	04/24/15 01:09:17 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

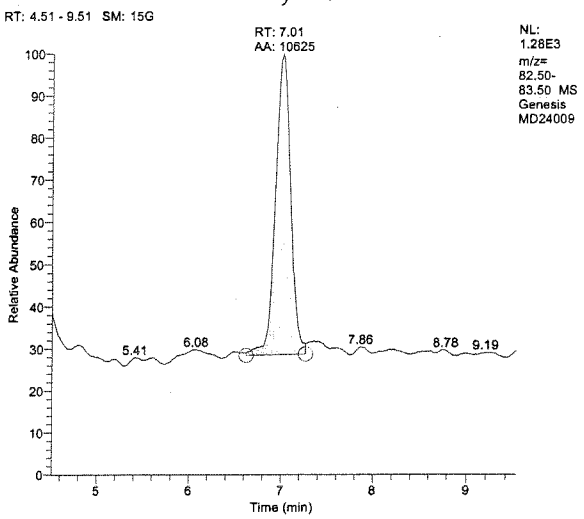
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB1
Injection Volume(ul):	20.00
Run Time(min):	12.99

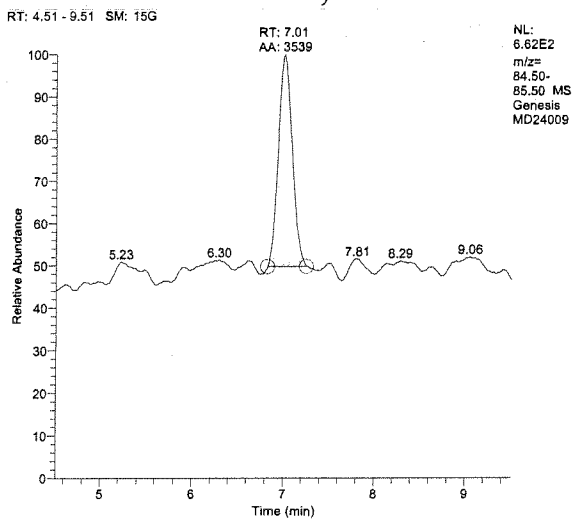
TIC



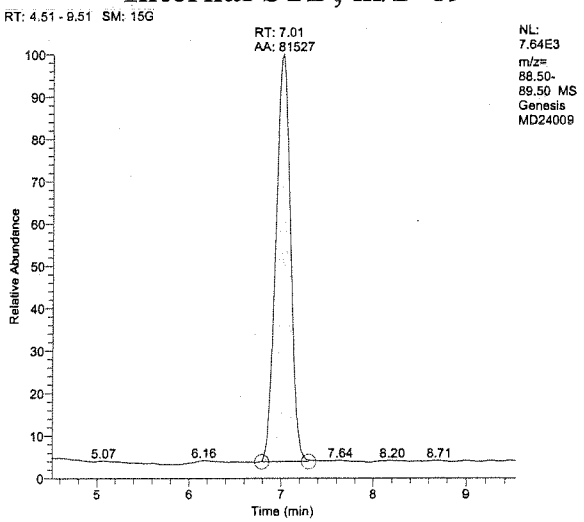
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.01	10625	0.000	0.186	ppb	153.30
Perchlorate_85	7.01	3539	0.000	0.181	ppb	47.76
Perchlorate_89_ISTD	7.01	81527	2.000	N/A	ppb	793.77

83/85 Ratio: 3.00

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

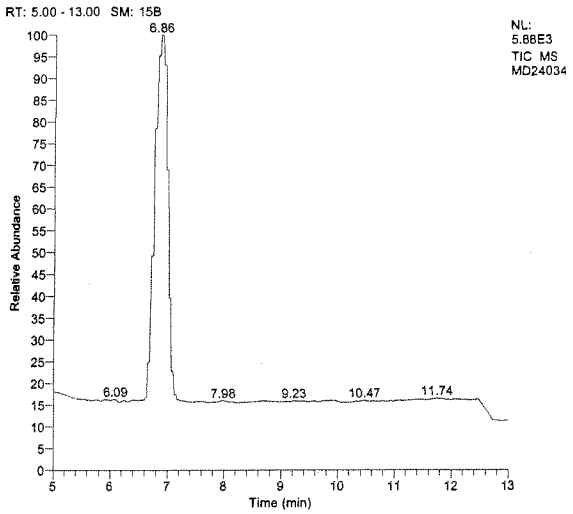
Sample Summary

EMAX Lab ID:	PLD009SB
Lab File ID:	MD24034
Acquisition Date:	04/24/15 09:22:39 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

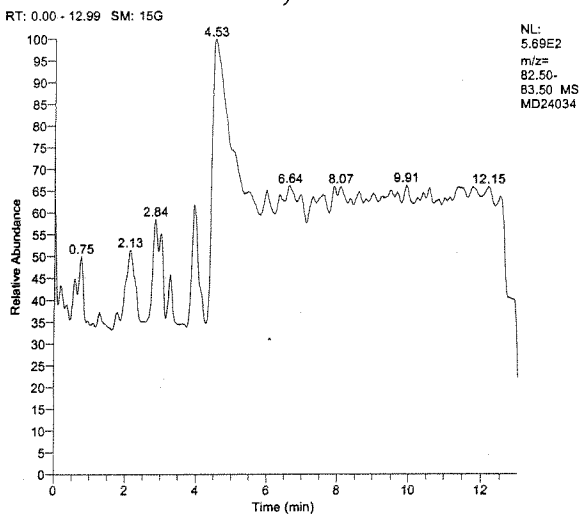
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RD7
Injection Volume(ul):	20.00
Run Time(min):	12.99

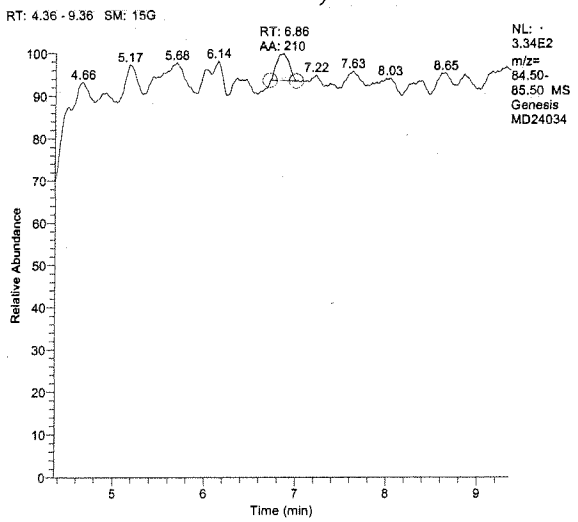
TIC



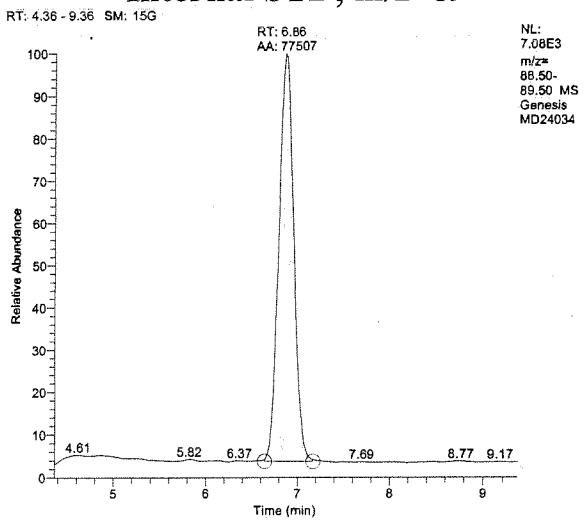
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	N/A	N/A	0.000	N/A	ppb	N/A
Perchlorate_85	6.86	210	0.000	0.006	ppb	4.04
Perchlorate_89_ISTD	6.86	77507	2.000	N/A	ppb	1330.50

83/85 Ratio: N/a
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

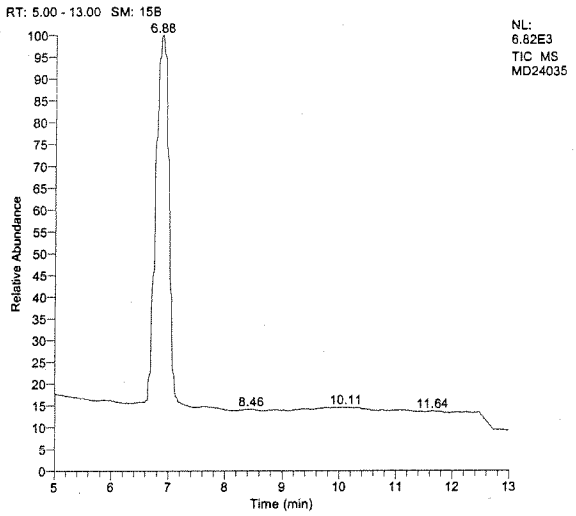
Sample Summary

EMAX Lab ID:	PLD009SL
Lab File ID:	MD24035
Acquisition Date:	04/24/15 09:37:17 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RD8
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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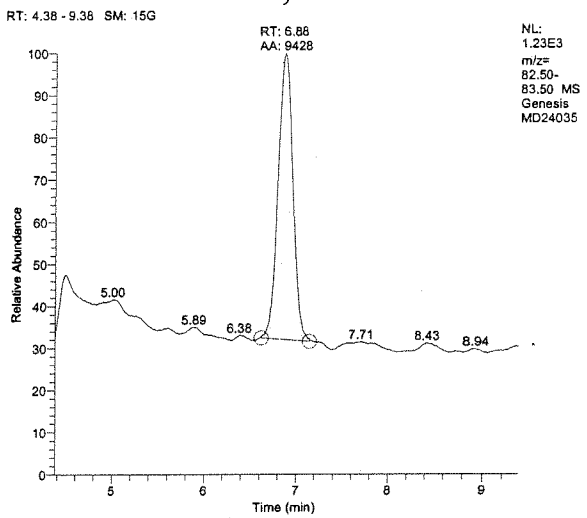
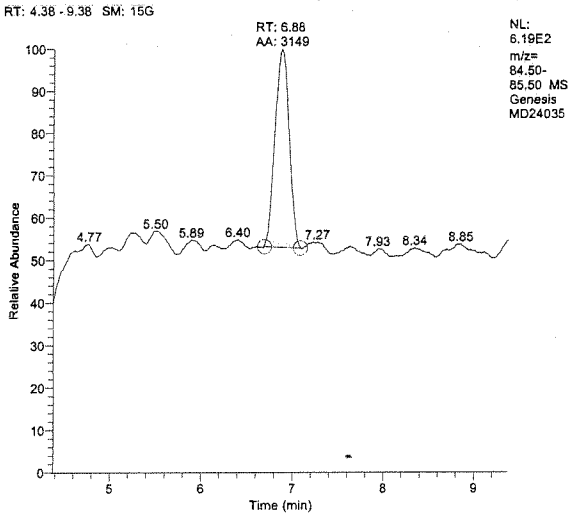
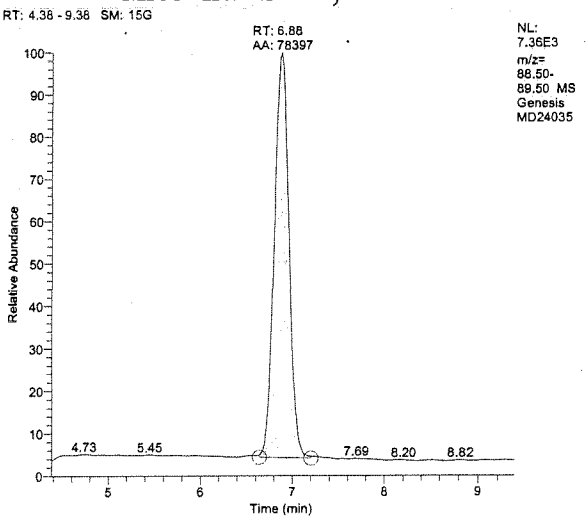


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.88	9428	0.000	0.172	ppb	128.49
Perchlorate_85	6.88	3149	0.000	0.167	ppb	54.20
Perchlorate_89_ISTD	6.88	78397	2.000	N/A	ppb	1123.97

83/85 Ratio: 2.99
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

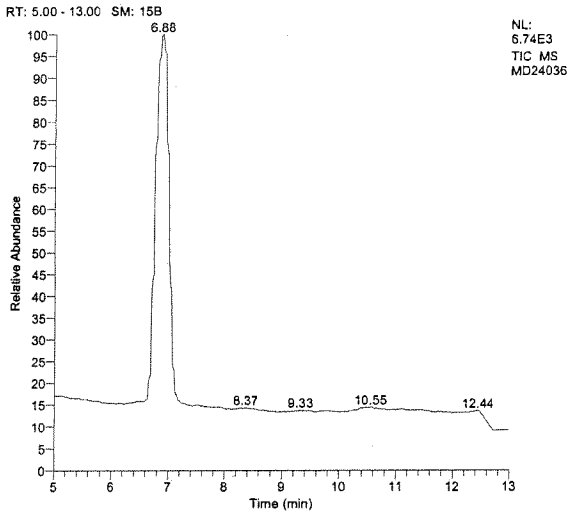
Sample Summary

EMAX Lab ID:	PLD009SC
Lab File ID:	MD24036
Acquisition Date:	04/24/15 09:51:49 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RE1
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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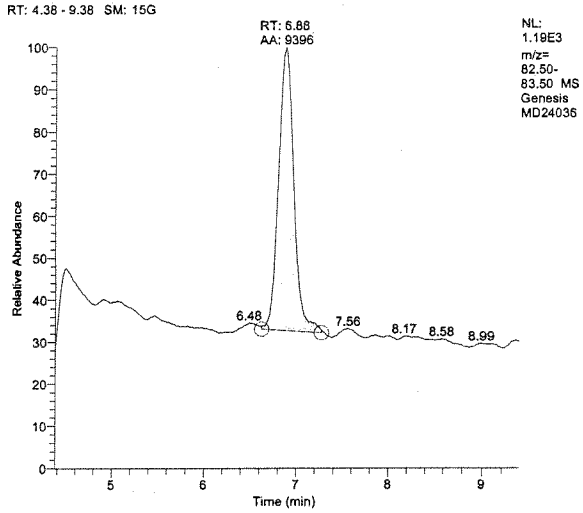
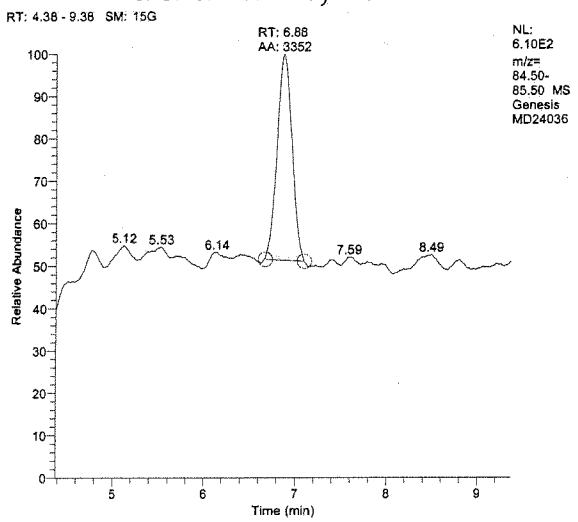


Perchlorate, m/z=85



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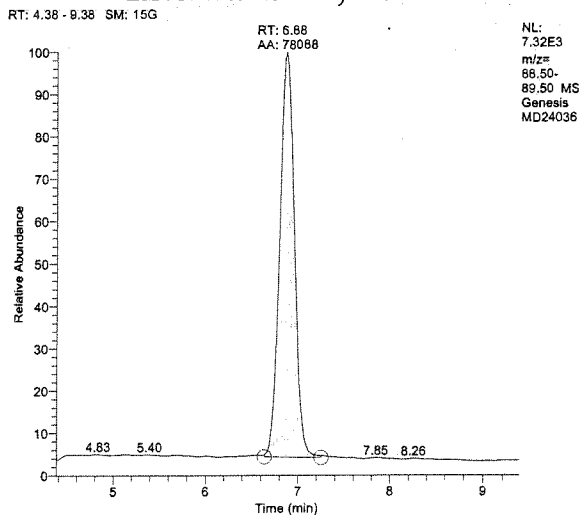


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.88	9396	0.000	0.172	ppb	95.69
Perchlorate_85	6.88	3352	0.000	0.179	ppb	60.15
Perchlorate_89_ISTD	6.88	78088	2.000	N/A	ppb	1194.47

83/85 Ratio: 2.90

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

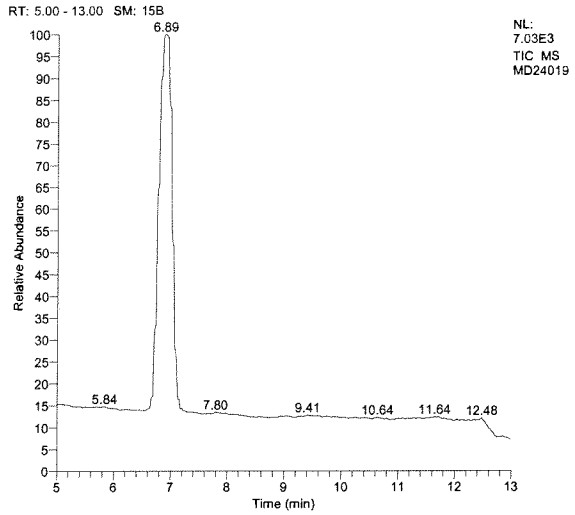
Sample Summary

EMAX Lab ID:	D114-08M
Lab File ID:	MD24019
Acquisition Date:	04/24/15 05:20:29 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RC2
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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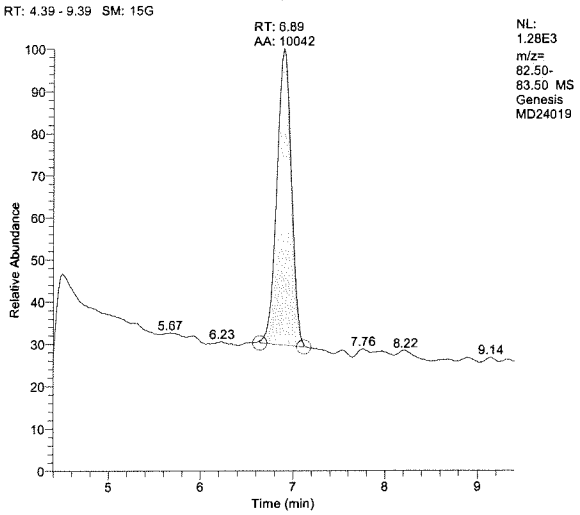
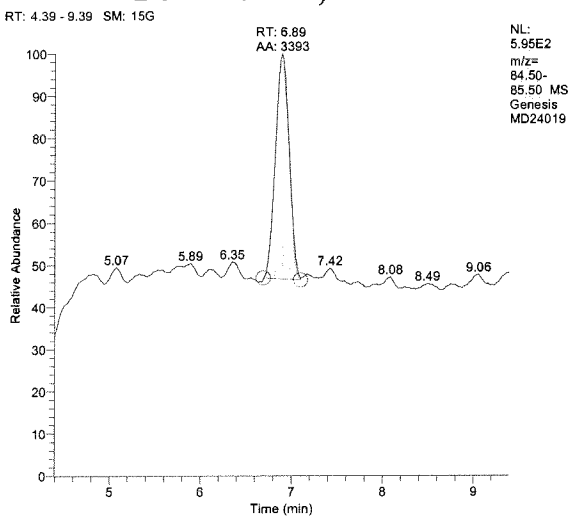
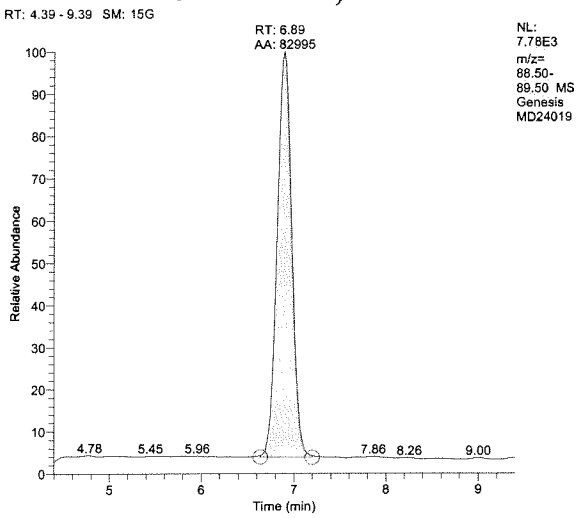


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.89	10042	0.000	0.173	ppb	142.29
Perchlorate_85	6.89	3393	0.000	0.170	ppb	67.96
Perchlorate_89_ISTD	6.89	82995	2.000	N/A	ppb	1422.06

83/85 Ratio: 2.96

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

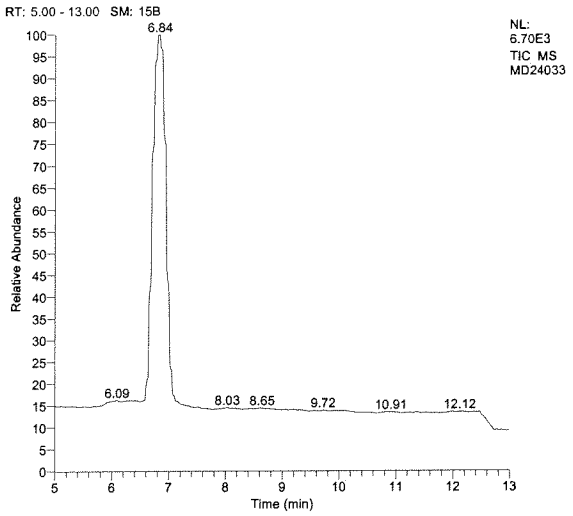
Sample Summary

EMAX Lab ID:	D114-08S
Lab File ID:	MD24033
Acquisition Date:	04/24/15 09:08:01 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

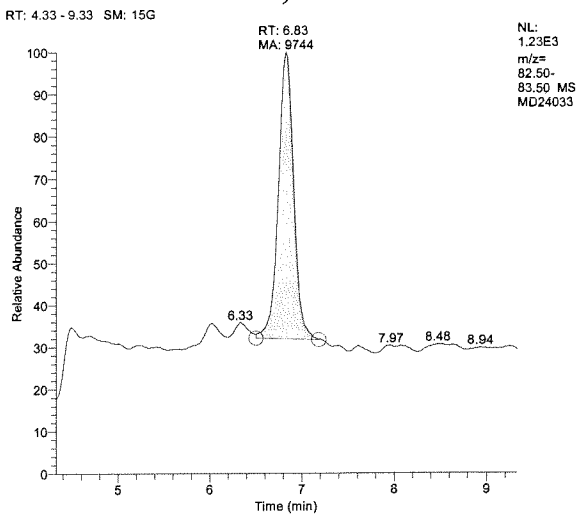
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RC3
Injection Volume(ul):	20.00
Run Time(min):	12.99

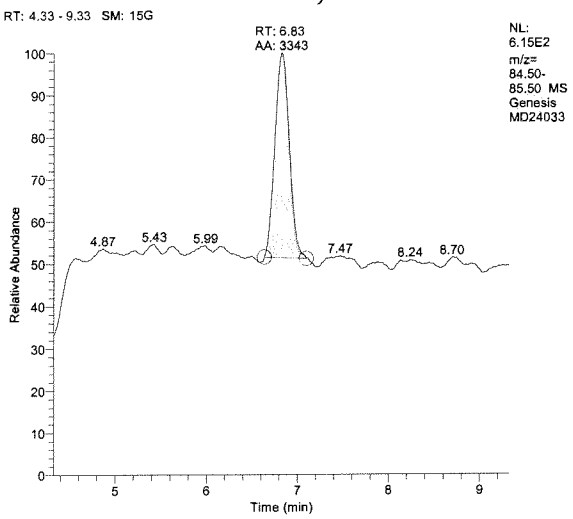
TIC



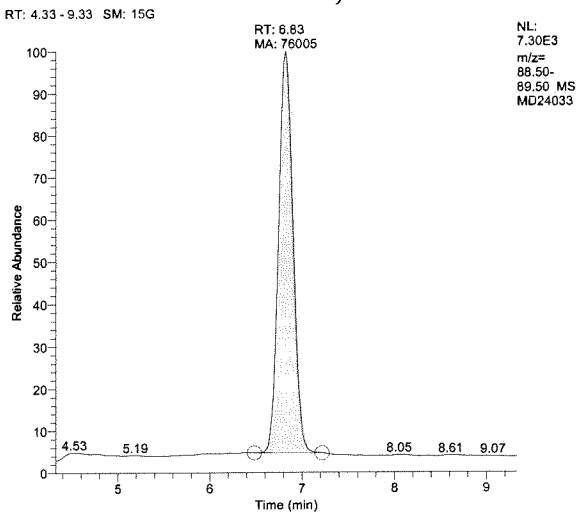
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.83	9744	0.000	0.183	ppb	126.61
Perchlorate_85	6.83	3343	0.000	0.183	ppb	57.96
Perchlorate_89_ISTD	6.83	76005	2.000	N/A	ppb	980.33

83/85 Ratio: 2.91
(Control Limit: +/-30%)

Monday, April 27, 2015, 14:04:16

Method 6850
EMAX Laboratories
Instrument # G0

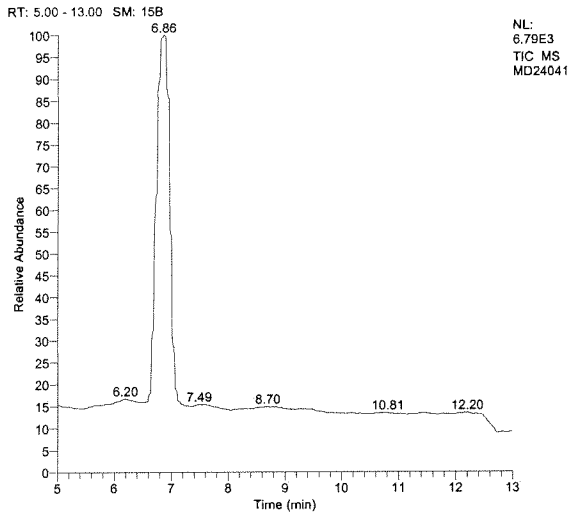
Sample Summary

EMAX Lab ID:	D114-22M
Lab File ID:	MD24041
Acquisition Date:	04/24/15 11:04:41 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RE6
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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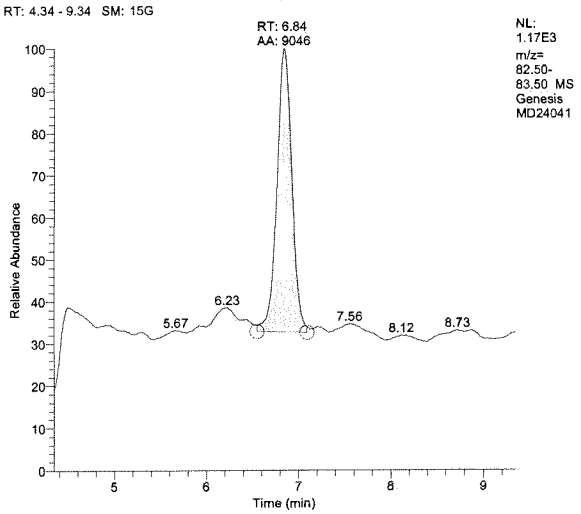
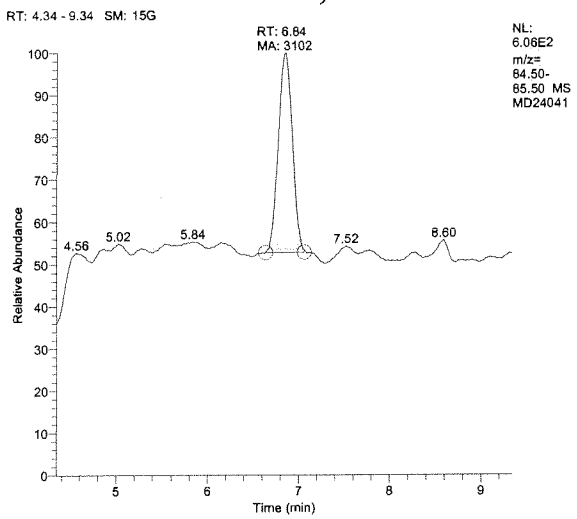
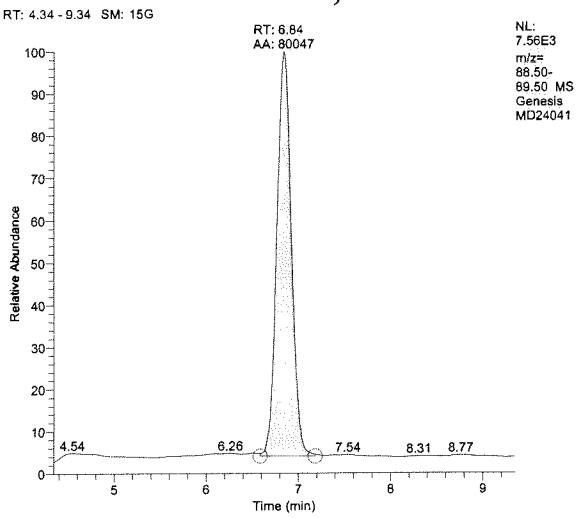


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.84	9046	0.000	0.161	ppb	62.12
Perchlorate_85	6.84	3102	0.000	0.161	ppb	49.28
Perchlorate_89_ISTD	6.84	80047	2.000	N/A	ppb	871.95

83/85 Ratio: 2.92
(Control Limit: +/-30%)

Monday, April 27, 2015, 12:06:46

Method 6850
EMAX Laboratories
Instrument # G0

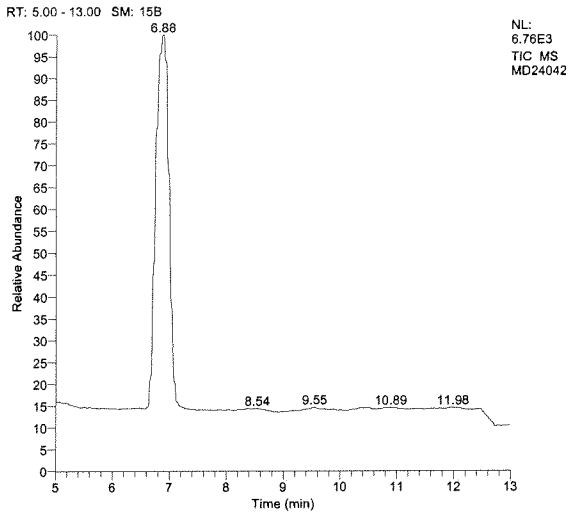
Sample Summary

EMAX Lab ID:	D114-22S
Lab File ID:	MD24042
Acquisition Date:	04/24/15 11:19:13 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

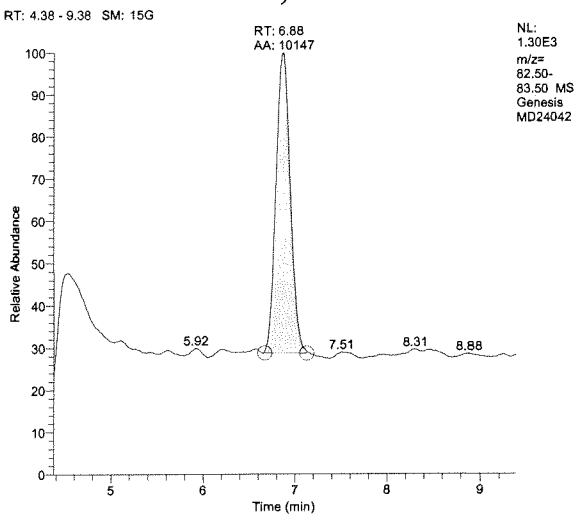
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RE7
Injection Volume(ul):	20.00
Run Time(min):	12.99

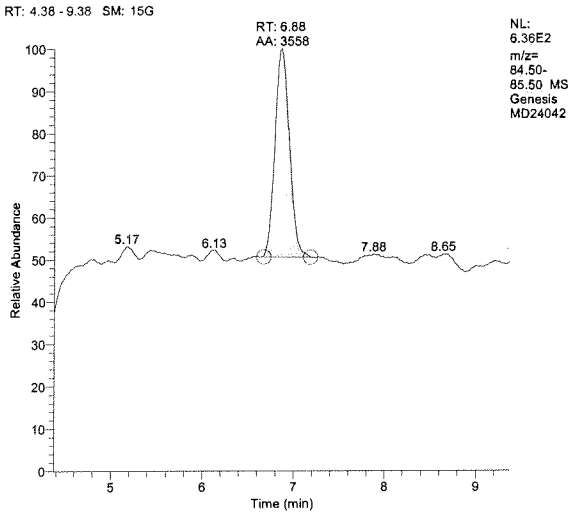
TIC



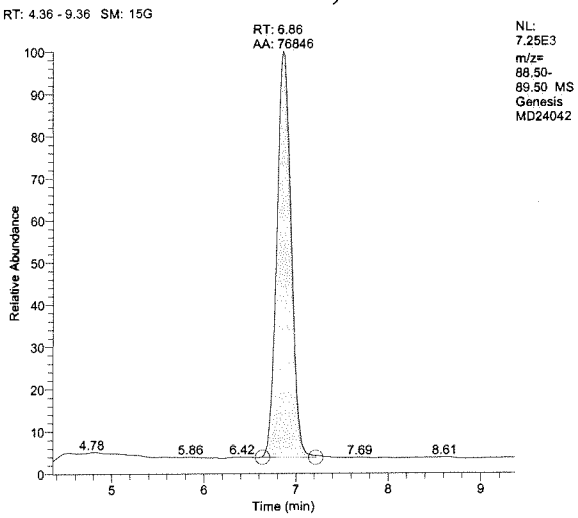
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.88	10147	0.000	0.188	ppb	117.13
Perchlorate_85	6.88	3558	0.000	0.193	ppb	66.33
Perchlorate_89_ISTD	6.86	76846	2.000	N/A	ppb	1299.30

83/85 Ratio: 2.85

(Control Limit: +/-30%)

Friday, April 24, 2015, 23:33:49

INITIAL CALIBRATIONS

Component : Perchlorate_83
Method/CalSet : PLGOD14/MD14(2015)

LFID	LSID	S	Dilf	RT	Area	SpkAmt	Con	Units	ISTDArea	83/85	Cntrl Lim	Anl DateTime	%Rec
MD14001	IBGOD141	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/14/15 13:51	
MD14002	QC	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/14/15 14:06	
MD14003	BLANK(IS)	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/14/15 14:20	
MD14004	PLGOD14001	P	1.000	7.06	5341	0.100	0.109	ppb	70673	3.0	2.29-3.81	04/14/15 14:35	109
MD14005	PLGOD14002	P	1.000	7.05	9182	0.200	0.190	ppb	68799	2.8	2.29-3.81	04/14/15 14:49	95
MD14006	PLGOD14003	P	1.000	7.03	22790	0.500	0.493	ppb	65361	3.0	2.29-3.81	04/14/15 15:04	99
MD14007	PLGOD14004	P	1.000	7.03	46244	1.000	0.992	ppb	65765	3.1	2.29-3.81	04/14/15 15:18	99
MD14008	PLGOD14005	P	1.000	7.01	92020	2.000	1.921	ppb	67513	3.0	2.29-3.81	04/14/15 15:33	96
MD14009	PLGOD14006	P	1.000	7.03	231564	5.000	5.165	ppb	63156	3.0	2.29-3.81	04/14/15 15:47	103
MD14010	PLGOD14007	P	1.000	7.01	341260	7.500	7.429	ppb	64697	3.1	2.29-3.81	04/14/15 16:02	99
MD14011	IPLGOD14001	P	1.000	7.01	81841	0.000	1.752	ppb	65848	3.1	2.29-3.81	04/14/15 16:16	
MD14012	LOQ-01	P	1.000	7.00	8110	0.000	0.164	ppb	70425	2.9	2.29-3.81	04/14/15 16:31	
MD14013	IPCS	P	1.000	6.81	7553	0.000	0.160	ppb	67212	2.8	2.29-3.81	04/14/15 16:46	

83/85 Ratio: +/-25%

LFID	LSID	S	Dilf	RT	Area	SpkAmt	Con	Units	ISTDArea	83/85	Cntrl Lim	Anl DateTime	%Rec
MD14001	IBGOD141	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.13-3.96	04/14/15 13:51	
MD14002	QC	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.13-3.96	04/14/15 14:06	
MD14003	BLANK(IS)	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.13-3.96	04/14/15 14:20	
MD14004	PLGOD14001	P	1.000	7.06	5341	0.100	0.109	ppb	70673	3.0	2.13-3.96	04/14/15 14:35	109
MD14005	PLGOD14002	P	1.000	7.05	9182	0.200	0.190	ppb	68799	2.8	2.13-3.96	04/14/15 14:49	95
MD14006	PLGOD14003	P	1.000	7.03	22790	0.500	0.493	ppb	65361	3.0	2.13-3.96	04/14/15 15:04	99
MD14007	PLGOD14004	P	1.000	7.03	46244	1.000	0.992	ppb	65765	3.1	2.13-3.96	04/14/15 15:18	99
MD14008	PLGOD14005	P	1.000	7.01	92020	2.000	1.921	ppb	67513	3.0	2.13-3.96	04/14/15 15:33	96
MD14009	PLGOD14006	P	1.000	7.03	231564	5.000	5.165	ppb	63156	3.0	2.13-3.96	04/14/15 15:47	103
MD14010	PLGOD14007	P	1.000	7.01	341260	7.500	7.429	ppb	64697	3.1	2.13-3.96	04/14/15 16:02	99
MD14011	IPLGOD14001	P	1.000	7.01	81841	0.000	1.752	ppb	65848	3.1	2.13-3.96	04/14/15 16:16	
MD14012	LOQ-01	P	1.000	7.00	8110	0.000	0.164	ppb	70425	2.9	2.13-3.96	04/14/15 16:31	
MD14013	IPCS	P	1.000	6.81	7553	0.000	0.160	ppb	67212	2.8	2.13-3.96	04/14/15 16:46	

83/85 Ratio: +/-30%
ICV (IS) +/-50%: (32924-98772)

04/15/15

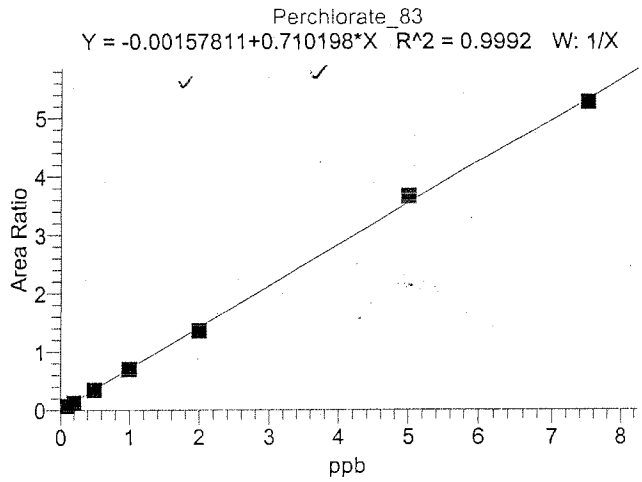
Calibration Summary

Identification

Component Name:	Perchlorate_83
Detector Type:	MS
Operator:	None
Expected RT (min):	7.00
Window (sec):	60.00000

Genesis Peak Integration

Smoothing Points:	15
S/N Threshold:	1.00
Valley Detection:	Enabled
Expected Peak Width (sec):	5.00000
Constrain Peak Width:	No
Peak Height (%):	N/A
Tailing Factor:	N/A
Identify By:	Highest Peak
Minimum Peak Height (S/N):	3.00
Ion Ratio Confirmation:	Yes
Window %:	Absolute
Qualifier Ion Coelution (min):	0.100



QC Level	Amount
2 PPB	2.000

Cal Level	Amount
0.1 ppb	0.100
0.2 ppb	0.200
0.5 ppb	0.500
1 ppb	1.000
2 ppb	2.000
5 ppb	5.000
7.5 ppb	7.500

Sample ID	Data File Name	Area	ISTD Area	Area Ratio	Calculated Amount	% Diff	% RSD	Calibration Flags
PLG0D14001	MD14004	5341 ✓	70673 ✓	0.076	0.109	8.63	0.000	N/A
PLG0D14002	MD14005	9182 ✓	68799 ✓	0.133	0.190	-4.93	0.000	N/A
PLG0D14003	MD14006	22790 ✓	65361 ✓	0.349	0.493	-1.37	0.000	N/A
PLG0D14004	MD14007	46244 ✓	65765 ✓	0.703	0.992	-0.77	0.000	N/A
PLG0D14005	MD14008	92020 ✓	67513 ✓	1.363	1.921	-3.93	0.000	N/A
PLG0D14006	MD14009	231564 ✓	63156 ✓	3.667	5.165	3.30	0.000	N/A
PLG0D14007	MD14010	341260 ✓	64697 ✓	5.275	7.429	-0.94	0.000	N/A
IPLG0D14001	MD14011	81841 ✓	65848	1.243	1.752	N/A	N/A	N/A

AS
04/15/15

There is no signature data to report.

8052

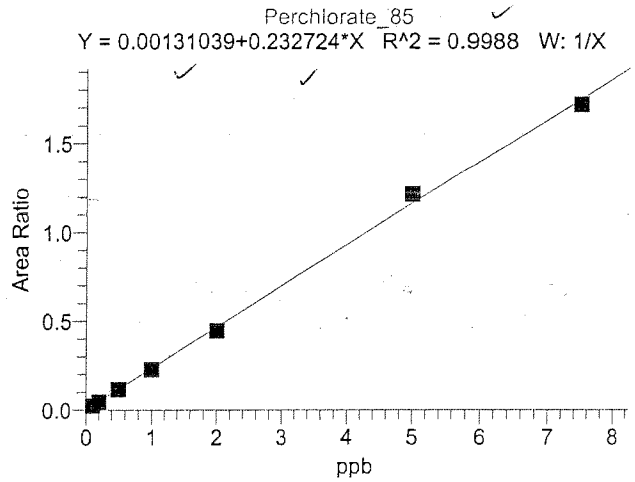
Calibration Summary

Identification

Component Name:	Perchlorate_85
Detector Type:	MS
Operator:	None
Expected RT (min):	7.00
Window (sec):	60.00000

Genesis Peak Integration

Smoothing Points:	15
S/N Threshold:	0.50
Valley Detection:	Enabled
Expected Peak Width (sec):	5.00000
Constrain Peak Width:	No
Peak Height (%):	N/A
Tailing Factor:	N/A
Identify By:	Highest Peak
Minimum Peak Height (S/N):	1.00
Ion Ratio Confirmation:	No
Window %:	N/A
Qualifier Ion Coelution (min):	N/A



QC Level	Amount
2 PPB	2.000

Cal Level	Amount
0.1 ppb	0.100
0.2 ppb	0.200
0.5 ppb	0.500
1 ppb	1.000
2 ppb	2.000
5 ppb	5.000
7.5 ppb	7.500

Sample ID	Data File Name	Area	ISTD Area	Area Ratio	Calculated Amount	% Diff	% RSD	Calibration Flags
PLG0D14001	MD14004	1799	70673	0.025	0.104	3.77	0.000	N/A
PLG0D14002	MD14005	3298	68799	0.048	0.200	0.16	0.000	N/A
PLG0D14003	MD14006	7645	65361	0.117	0.497	-0.60	0.000	N/A
PLG0D14004	MD14007	15081	65765	0.229	0.980	-2.02	0.000	N/A
PLG0D14005	MD14008	30196	67513	0.447	1.916	-4.19	0.000	N/A
PLG0D14006	MD14009	76891	63156	1.217	5.226	4.52	0.000	N/A
PLG0D14007	MD14010	111158	64697	1.718	7.377	-1.64	0.000	N/A
IPLG0D14001	MD14011	26426	65848	0.401	1.719	N/A	N/A	N/A

AA
04/15/15

There is no signature data to report.

8053

Method 6850
EMAX Laboratories
Instrument # G0

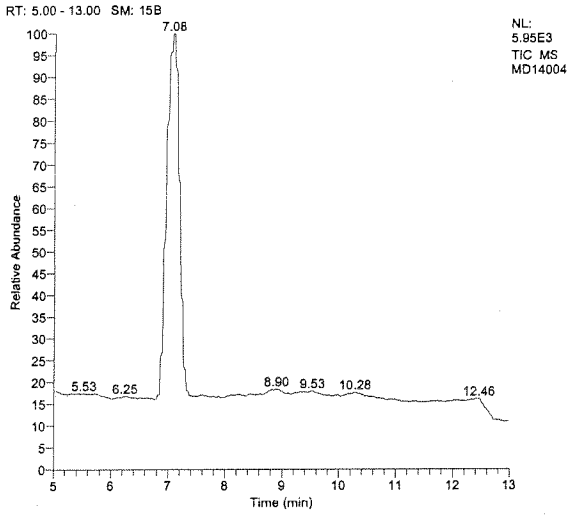
Sample Summary

EMAX Lab ID:	PLG0D14001
Lab File ID:	MD14004
Acquisition Date:	04/14/15 02:35:13 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

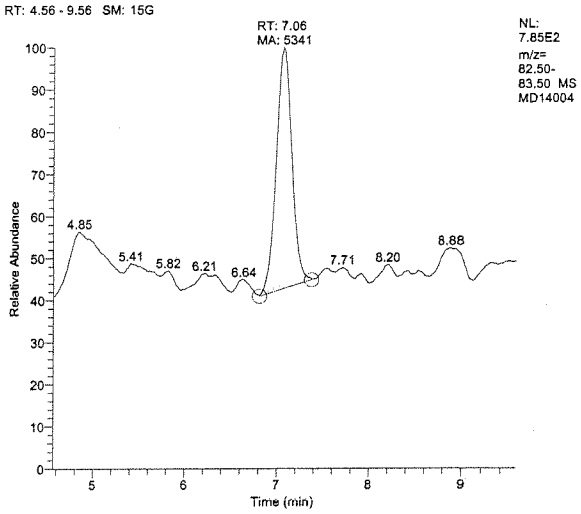
Run Parameters

Sample Type:	Std Clear
Calibration Level:	0.1 ppb
Vial:	RA4
Injection Volume(ul):	20.00
Run Time(min):	12.99

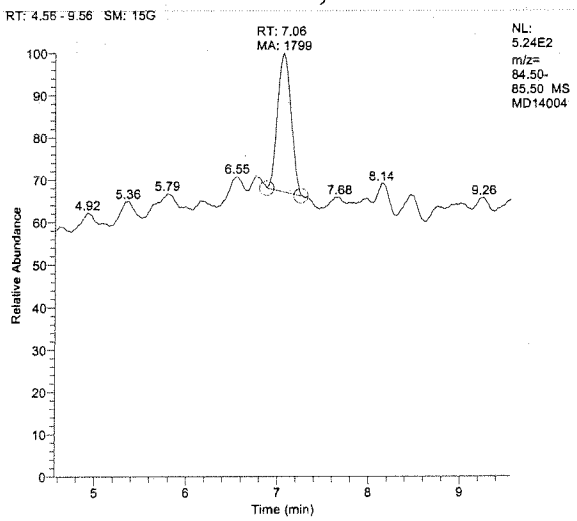
TIC



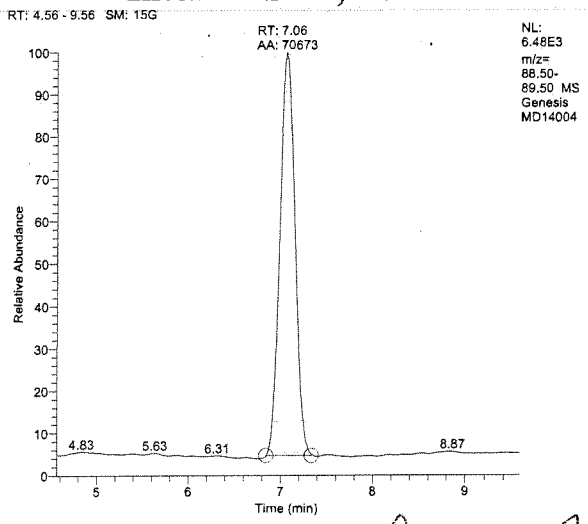
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



RS 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.06	5341	0.100	0.109	ppb	50.58
Perchlorate_85	7.06	1799	0.100	0.104	ppb	31.77
Perchlorate_89_ISTD	7.06	70673	2.000	N/A	ppb	261.94

83/85 Ratio: 2.97

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

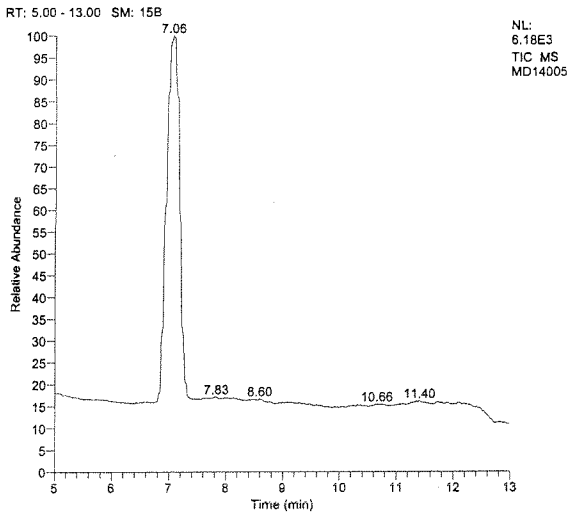
Sample Summary

EMAX Lab ID:	PLG0D14002
Lab File ID:	MD14005
Acquisition Date:	04/14/15 02:49:45 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

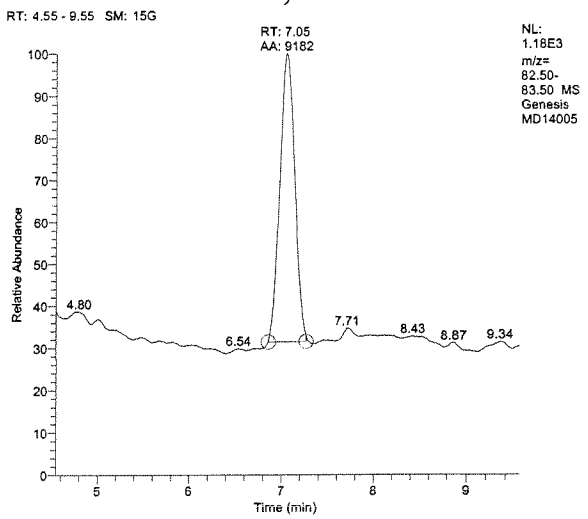
Run Parameters

Sample Type:	Std Update
Calibration Level:	0.2 ppb
Vial:	RA5
Injection Volume(ul):	20.00
Run Time(min):	12.99

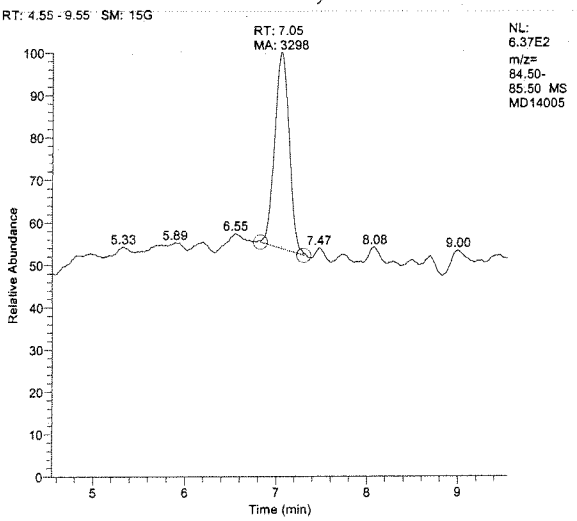
TIC



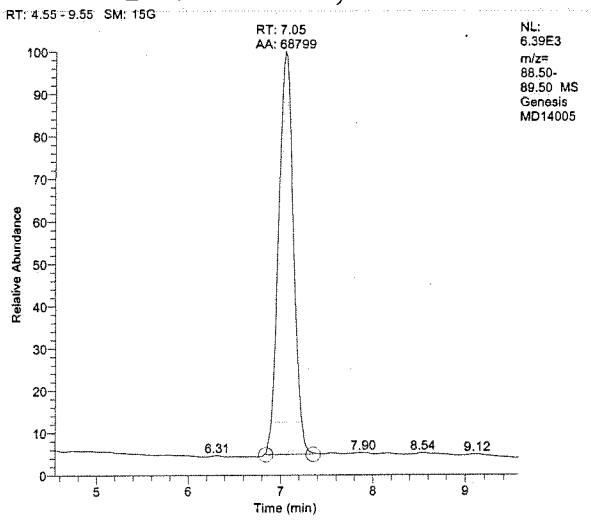
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AA 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.05	9182	0.200	0.190	ppb	55.02
Perchlorate_85	7.05	3298	0.200	0.200	ppb	36.18
Perchlorate_89_ISTD	7.05	68799	2.000	N/A	ppb	335.43

83/85 Ratio: 2.78 ✓
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

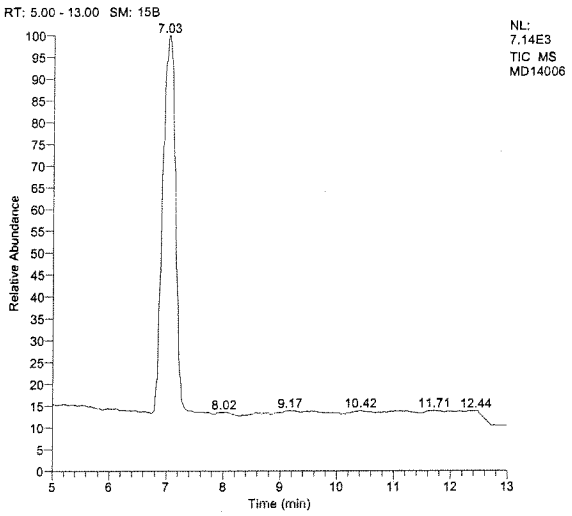
Sample Summary

EMAX Lab ID:	PLG0D14003
Lab File ID:	MD14006
Acquisition Date:	04/14/15 03:04:17 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

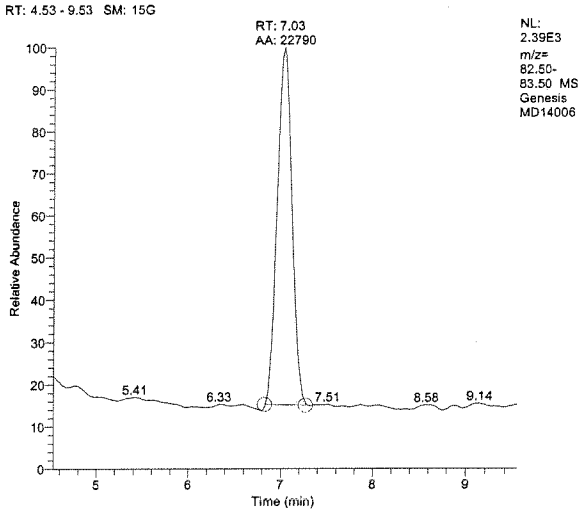
Run Parameters

Sample Type:	Std Update
Calibration Level:	0.5 ppb
Vial:	RA6
Injection Volume(ul):	20.00
Run Time(min):	12.99

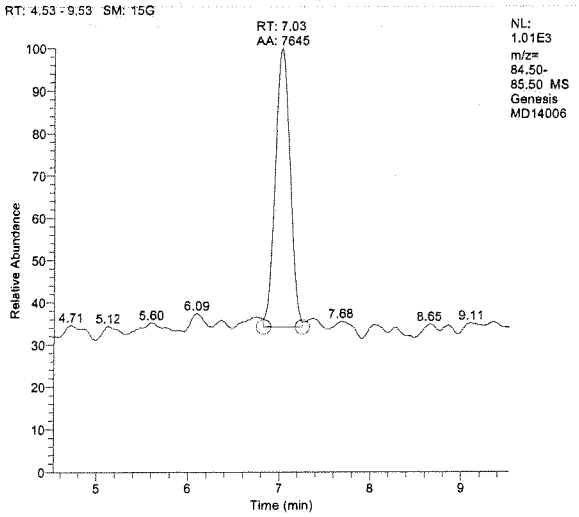
TIC



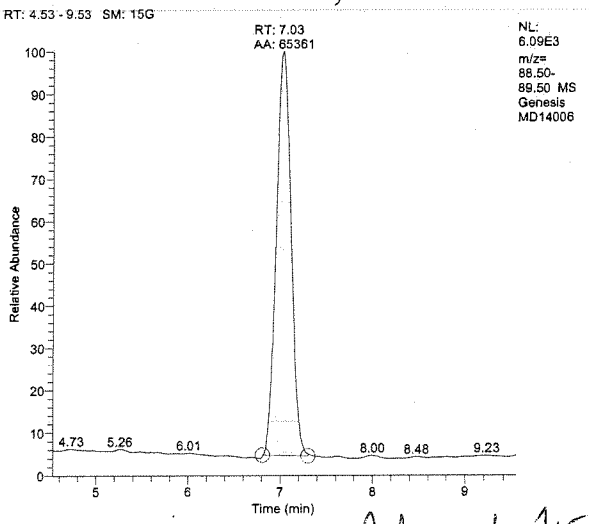
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AA 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.03	22790	0.500	0.493	ppb	180.86
Perchlorate_85	7.03	7645	0.500	0.497	ppb	71.17
Perchlorate_89_ISTD	7.03	65361	2.000	N/A	ppb	401.07

83/85 Ratio: 2.98 ✓
(Control Limit: +/-30%)

Wednesday, April 15, 2015, 11:05:09

Method 6850
EMAX Laboratories
Instrument # G0

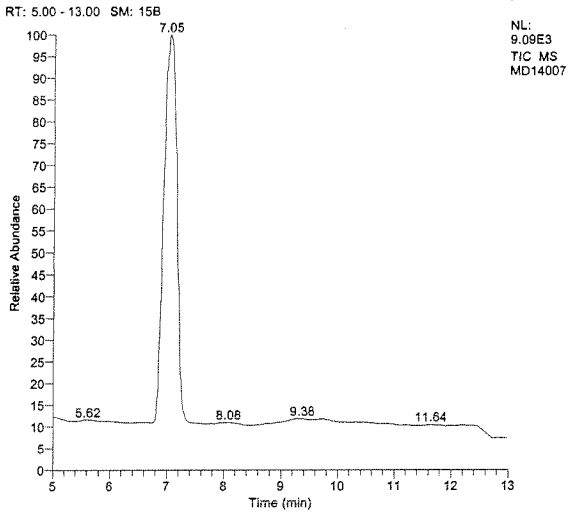
Sample Summary

EMAX Lab ID:	PLG0D14004
Lab File ID:	MD14007
Acquisition Date:	04/14/15 03:18:51 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

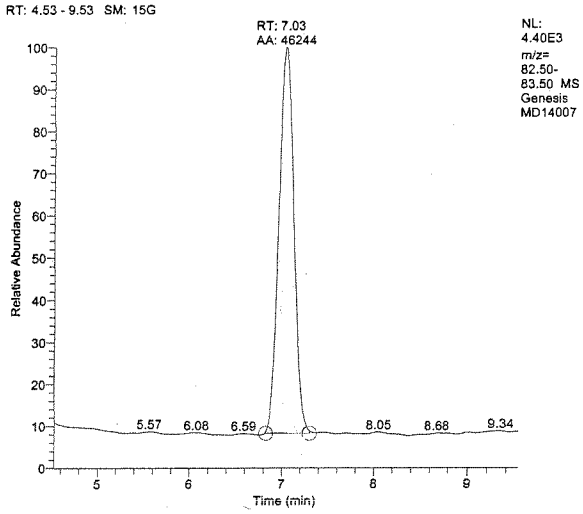
Run Parameters

Sample Type:	Std Update
Calibration Level:	1 ppb
Vial:	RA7
Injection Volume(ul):	20.00
Run Time(min):	12.99

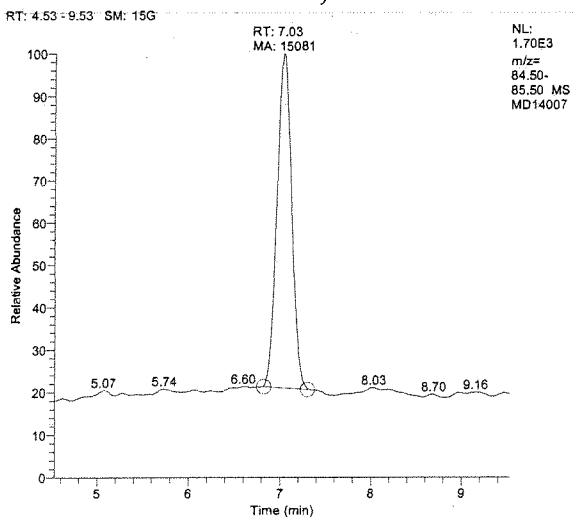
TIC



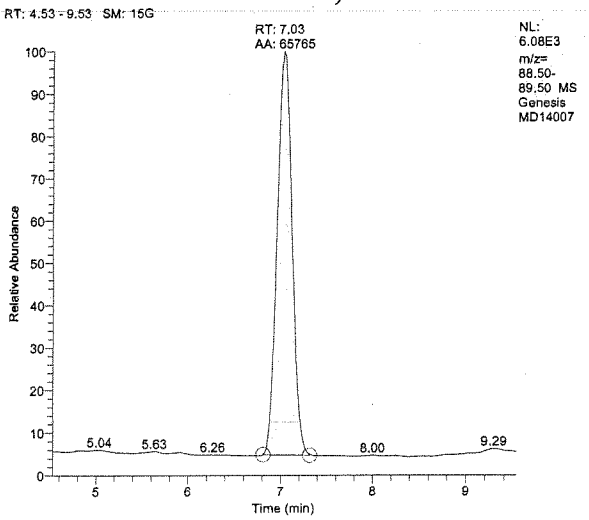
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AA 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.03	46244	1.000	0.992	ppb	451.51
Perchlorate_85	7.03	15081	1.000	0.980	ppb	120.19
Perchlorate_89_ISTD	7.03	65765	2.000	N/A	ppb	659.86

83/85 Ratio: 3.07 ✓
(Control Limit: +/-30%)

Wednesday, April 15, 2015, 11:05:11

Method 6850
EMAX Laboratories
Instrument # G0

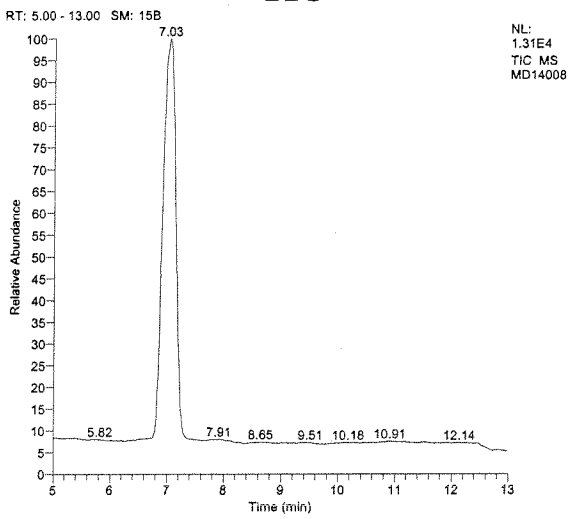
Sample Summary

EMAX Lab ID:	PLG0D14005
Lab File ID:	MD14008
Acquisition Date:	04/14/15 03:33:21 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

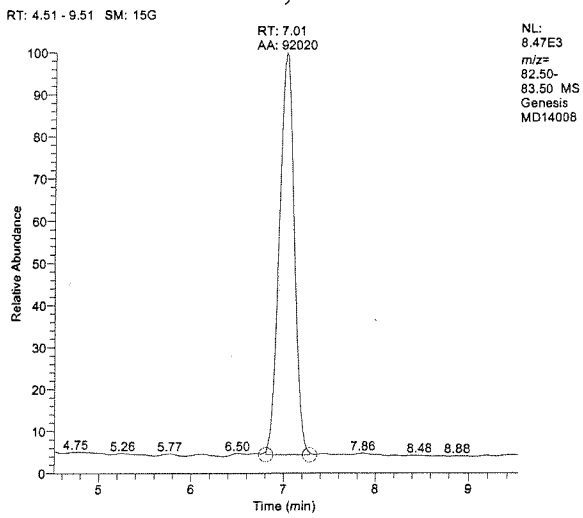
Run Parameters

Sample Type:	Std Update
Calibration Level:	2 ppb
Vial:	RA8
Injection Volume(ul):	20.00
Run Time(min):	12.99

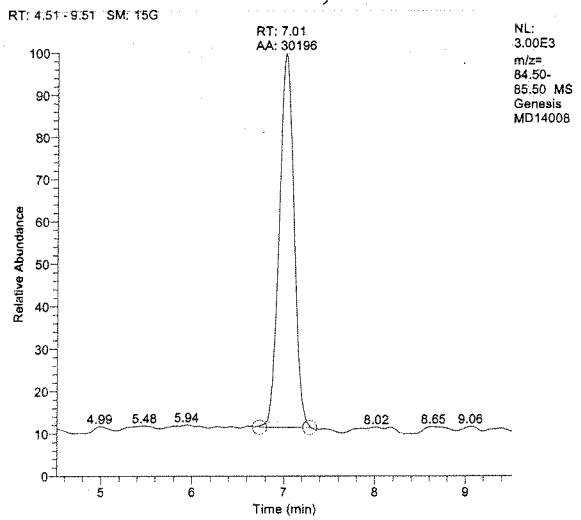
TIC



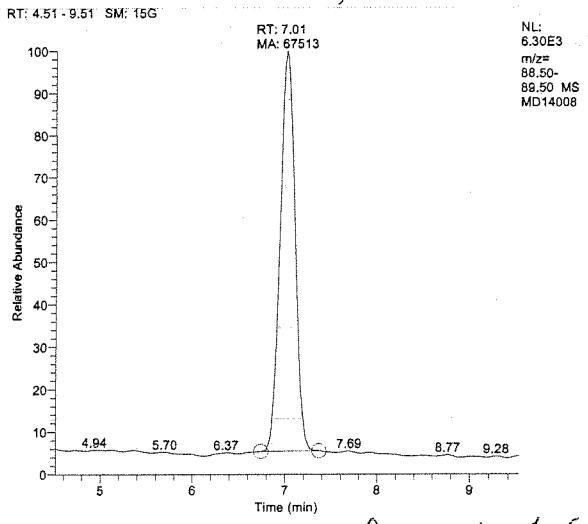
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AA 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.01	92020	2.000	1.921	ppb	550.88
Perchlorate_85	7.01	30196	2.000	1.916	ppb	197.12
Perchlorate_89_ISTD	7.01	67513	2.000	N/A	ppb	327.71

83/85 Ratio: 3.05

(Control Limit: +/-30%)

±25: (2.29 - 3.81)

±30: (2.13 - 3.96)

Wednesday, April 15, 2015, 11:05:12

8058

Method 6850
EMAX Laboratories
Instrument # G0

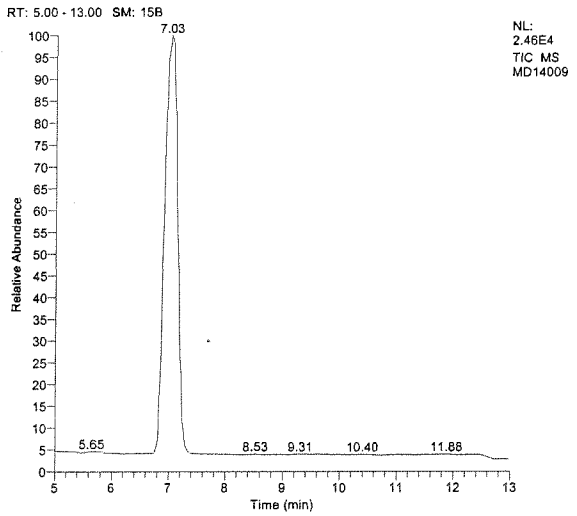
Sample Summary

EMAX Lab ID:	PLG0D14006
Lab File ID:	MD14009
Acquisition Date:	04/14/15 03:47:55 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

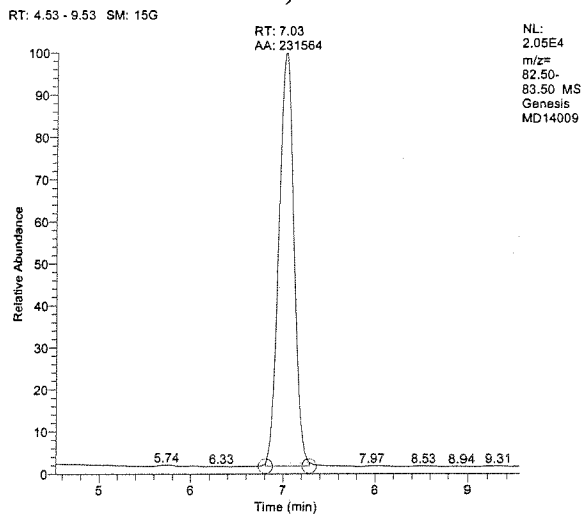
Run Parameters

Sample Type:	Std Update
Calibration Level:	5 ppb
Vial:	RB1
Injection Volume(ul):	20.00
Run Time(min):	12.99

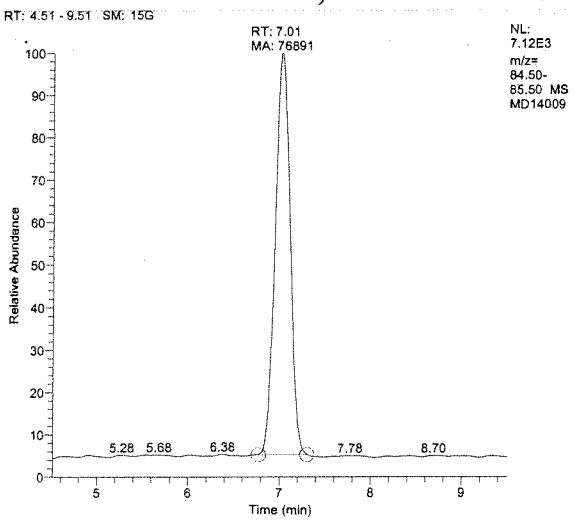
TIC



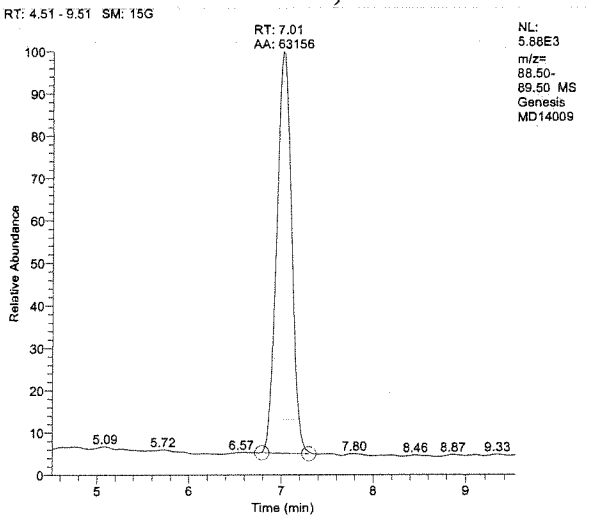
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AA 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.03	231564 ✓	5.000	5.165 ✓	ppb	1439.34
Perchlorate_85	7.01	76891 ✓	5.000	5.226 ✓	ppb	798.90
Perchlorate_89_ISTD	7.01	63156 ✓	2.000	N/A	ppb	446.53

83/85 Ratio: 3.01 ✓
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

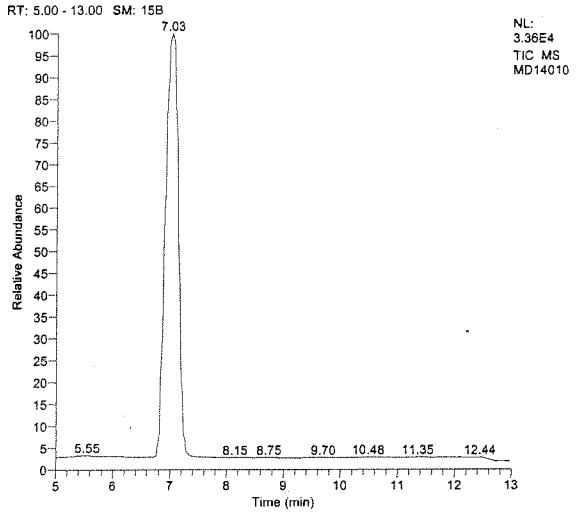
Sample Summary

EMAX Lab ID:	PLG0D14007
Lab File ID:	MD14010
Acquisition Date:	04/14/15 04:02:25 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

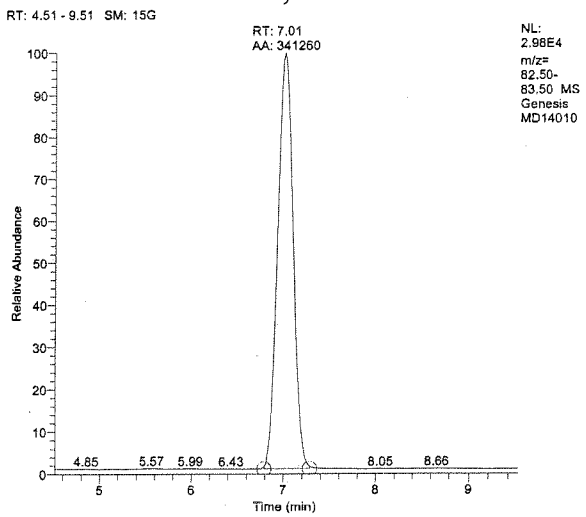
Run Parameters

Sample Type:	Std Update
Calibration Level:	7.5 ppb
Vial:	RB2
Injection Volume(ul):	20.00
Run Time(min):	12.99

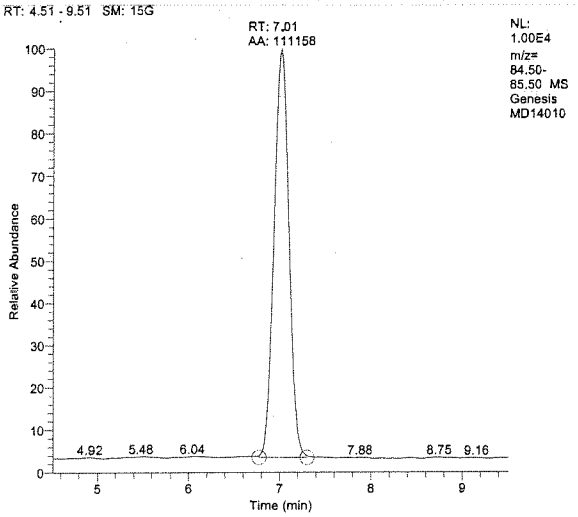
TIC



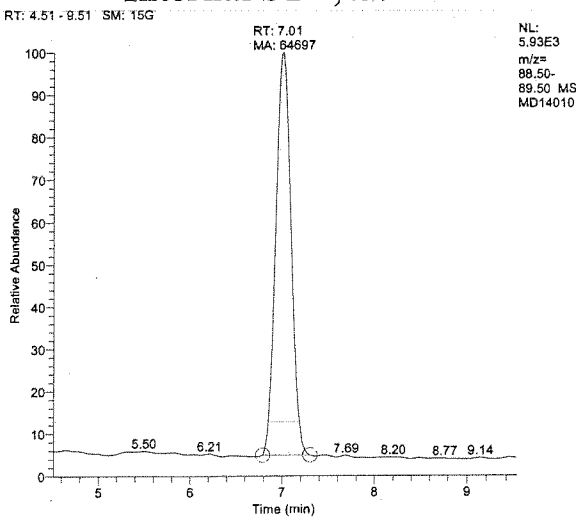
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AS 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.01	341260	7.500	7.429	ppb	2357.40
Perchlorate_85	7.01	111158	7.500	7.377	ppb	1010.27
Perchlorate_89_ISTD	7.01	64697	2.000	N/A	ppb	549.46

83/85 Ratio: 3.07 ✓
(Control Limit: +/-30%)

SECOND SOURCE VERIFICATION

Method 6850
EMAX Laboratories
Instrument # G0

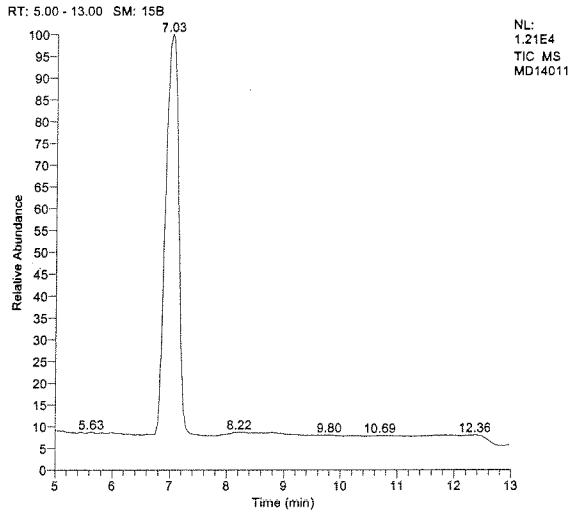
Sample Summary

EMAX Lab ID:	IPLG0D14001
Lab File ID:	MD14011
Acquisition Date:	04/14/15 04:16:57 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

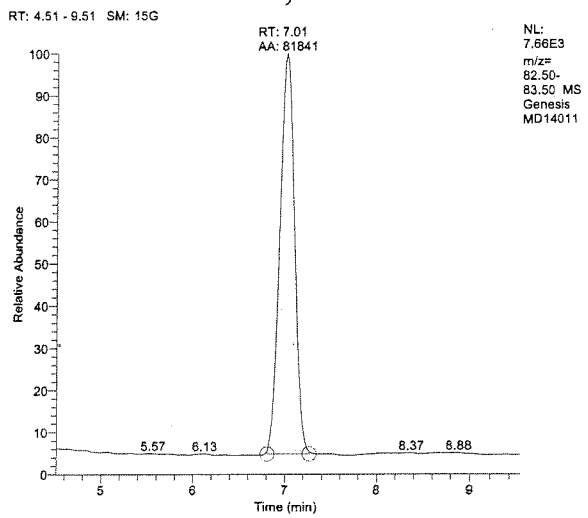
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB3
Injection Volume(ul):	20.00
Run Time(min):	12.99

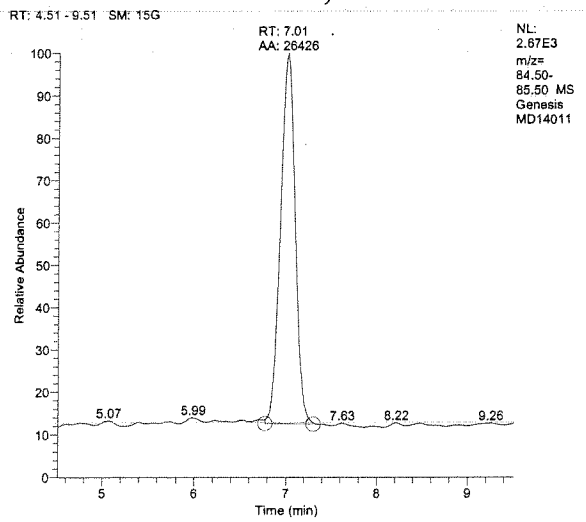
TIC



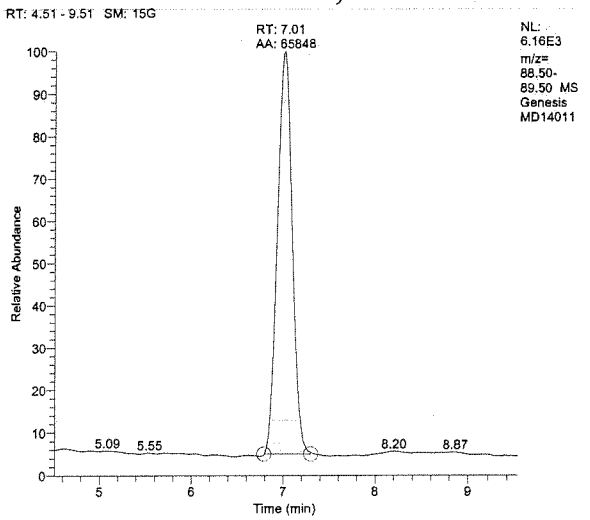
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AS 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.01	81841	0.000	1.752	ppb	491.72
Perchlorate_85	7.01	26426	0.000	1.719	ppb	294.08
Perchlorate_89_ISTD	7.01	65848	2.000	N/A	ppb	273.55

83/85 Ratio: 3.10 ✓
(Control Limit: +/-30%)

IW (IS) ± 50: (32,924 – 98,772) ✓

Wednesday, April 15, 2015, 11:05:16

8062

Method 6850
EMAX Laboratories
Instrument # G0

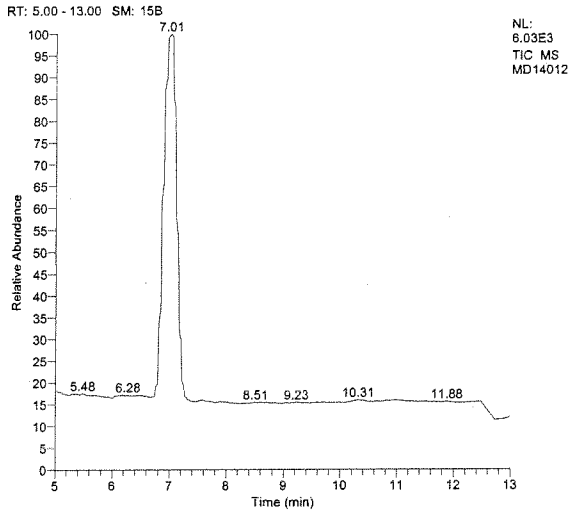
Sample Summary

EMAX Lab ID:	LOQ-01 0.2PPB
Lab File ID:	MD14012
Acquisition Date:	04/14/15 04:31:31 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

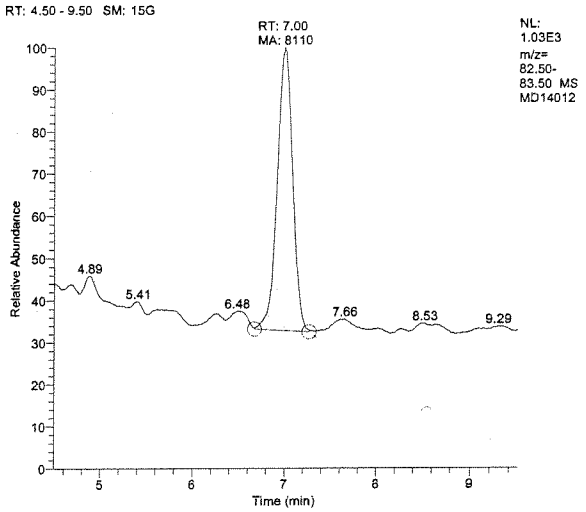
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB4
Injection Volume(ul):	20.00
Run Time(min):	12.99

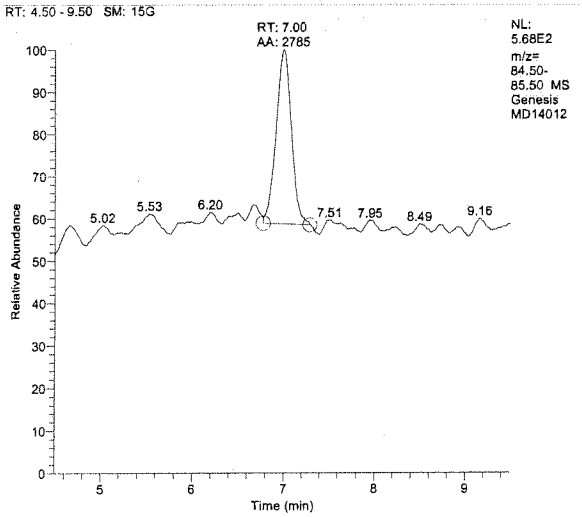
TIC



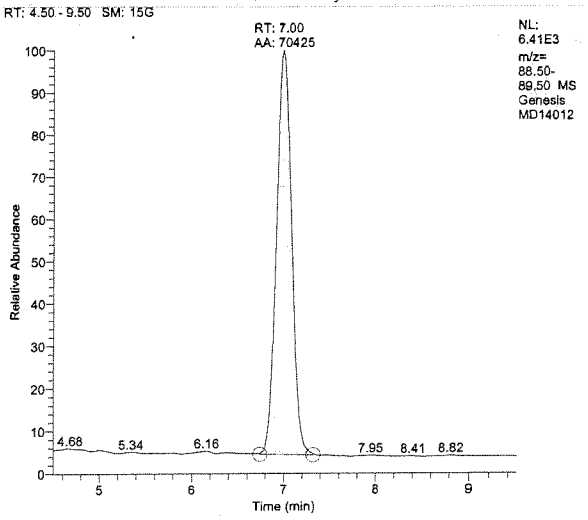
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AS 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.00	8110	0.000	0.164	ppb	62.82
Perchlorate_85	7.00	2785	0.000	0.164	ppb	31.88
Perchlorate_89_ISTD	7.00	70425	2.000	N/A	ppb	1104.30

83/85 Ratio: 2.91 ✓
(Control Limit: +/-30%)

Wednesday, April 15, 2015, 11:05:16

Method 6850
EMAX Laboratories
Instrument # G0

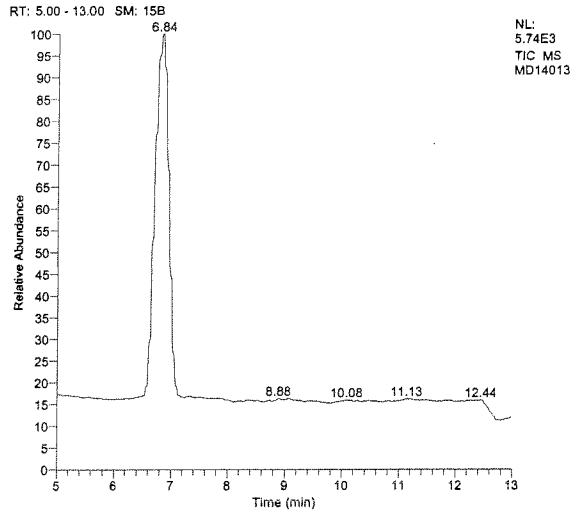
Sample Summary

EMAX Lab ID:	IPCS 0.2PPB/400PPM
Lab File ID:	MD14013
Acquisition Date:	04/14/15 04:46:01 PM
Data Path:	C:\XCALIBUR\DATA\MD14
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

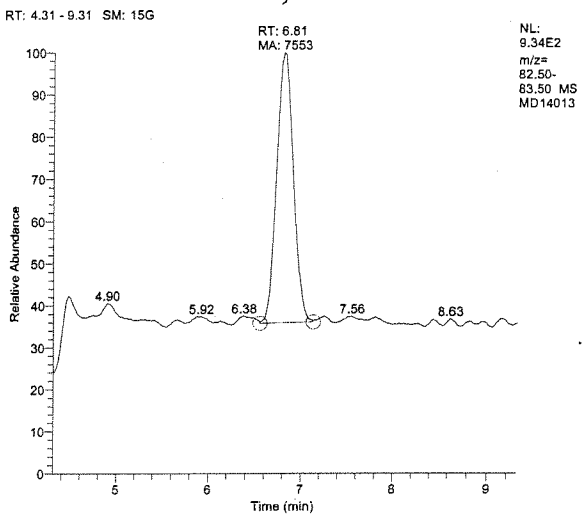
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RB5
Injection Volume(ul):	20.00
Run Time(min):	12.99

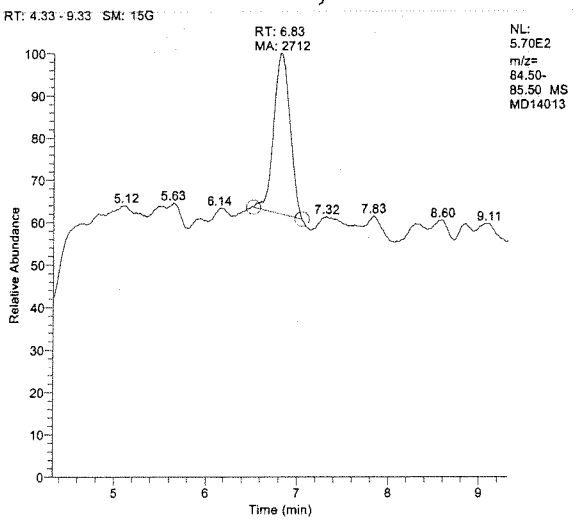
TIC



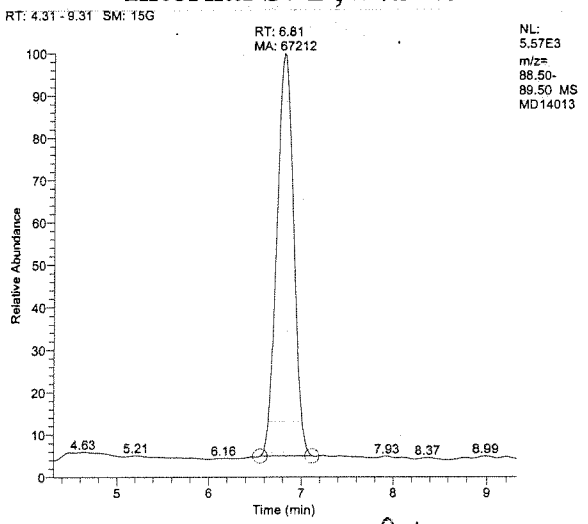
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



AJ 04/15/15

Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.81	7553	0.000	0.160	ppb	104.50
Perchlorate_85	6.83	2712	0.000	0.168	ppb	35.26
Perchlorate_89_ISTD	6.81	67212	2.000	N/A	ppb	397.88

83/85 Ratio: 2.78

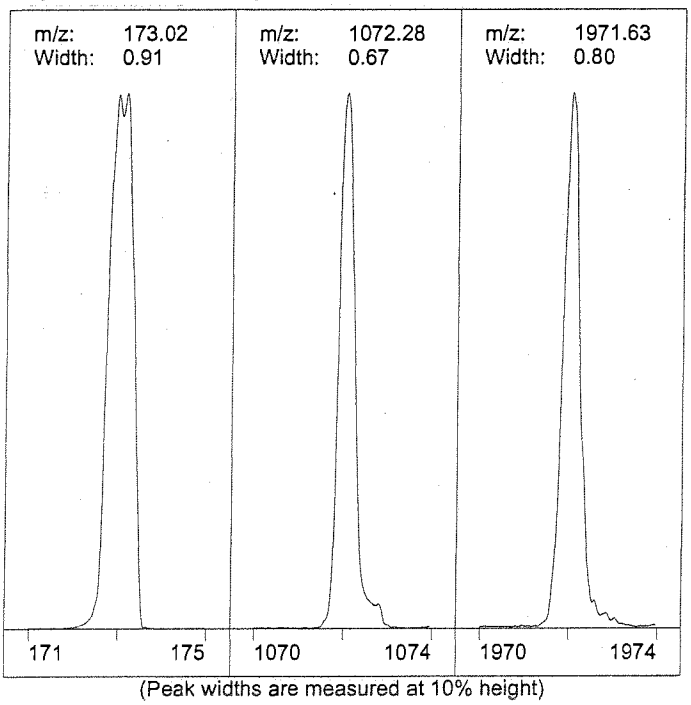
(Control Limit: +/-30%)

Wednesday, April 15, 2015, 11:05:18

AutoTune Report

Laboratory:
Instrument ID: MSQ Plus
Serial Number: MSQ20789

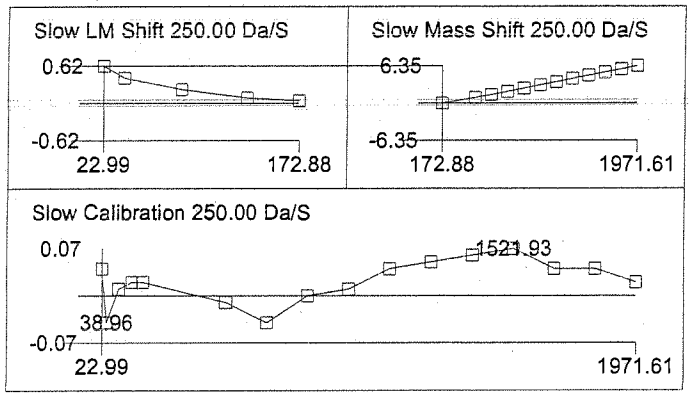
Filename: Calibration_150414120744.msqreport
Tune Date: 4/14/2015 12:07:44 PM
Report Date: 4/14/2015 12:09:35 PM
User Name: dionex xcaliber
Computer Name: XCALIBER



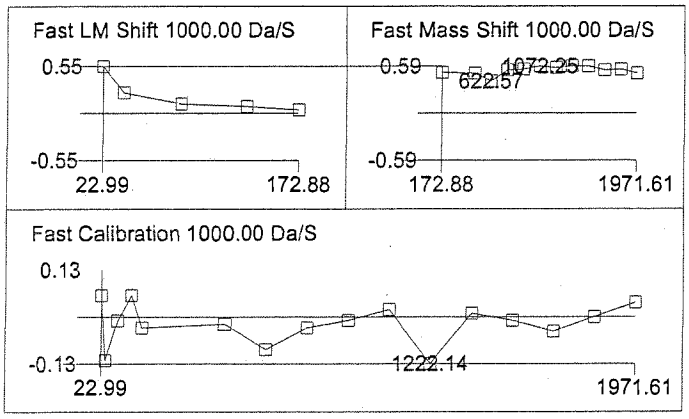
(Peak widths are measured at 10% height)

Tune Parameters	Set Point	Actual
Probe Temperature (°C)	349	344
Needle Voltage (kV)	3.0	3.0
Detector Voltage (V)	1800	1808
RF Lens Bias (V)	0.5	0.6
Ion Energy (V)	0.5	n/a
Ion Energy Ramp (mV/amu)	0.3	n/a
Low Mass Resolution	12.7	n/a
High Mass Resolution	12.5	n/a
Cone(V)	75	74
RF Frequency	235322272	n/a
Linearity Adjust	-0.03	n/a
Low Mass Res Mid Point	56	n/a
High Mass Res Mid Point	13745	n/a

Mass Calibration Results	Fast	Slow
Calibration Type	Autotune	Autotune
Missed Ref Peaks	0	0
Standard Deviation[max 0.2]	✓ 0.0540	0.0311
R.M.S Error	0.0575	0.0373
Max Residual Error(m/z)[max 0.3]	0.1255	0.0665
Calibrated Range Min(m/z)	22.9898	22.9898
Calibrated Range Max(m/z)	1971.6149	1971.6149



Ref-Peak	Search-	From-To	Real-Peak	Mass-Shift
22.99	18.99	26.99	23.03	0.04
38.96	37.01	41.01	38.92	-0.04
83.05	81.00	85.00	83.06	0.01 ✓
132.91	130.92	134.92	132.93	0.02
172.88	170.91	174.91	172.90	0.02
472.67	470.69	474.69	472.66	-0.01
622.57	620.56	624.56	622.53	-0.04
772.46	770.42	774.42	772.46	-0.00
922.36	920.35	924.35	922.37	0.01
1072.25	1070.26	1074.26	1072.29	0.04
1222.14	1220.19	1224.19	1222.19	0.05
1372.04	1370.09	1374.09	1372.10	0.06
1521.93	1520.00	1524.00	1522.00	0.07
1671.83	1669.89	1673.89	1671.86	0.04
1821.72	1819.76	1823.76	1821.76	0.04
1971.61	1969.65	1973.65	1971.64	0.02



Ref-Peak	Search-	From-To	Real-Peak	Mass-Shift
22.99	18.99	26.99	23.05	0.06
38.96	37.03	41.03	38.84	-0.12
83.05	80.92	84.92	83.04	-0.01
132.91	130.89	134.89	132.96	0.06
172.88	170.94	174.94	172.85	-0.03
472.67	470.64	474.64	472.65	-0.02
622.57	620.55	624.55	622.48	-0.09
772.46	770.37	774.37	772.43	-0.03
922.36	920.32	924.32	922.34	-0.01
1072.25	1070.24	1074.24	1072.27	0.02
1222.14	1220.17	1224.17	1222.02	-0.13
1372.04	1369.91	1373.91	1372.05	0.01
1521.93	1519.94	1523.94	1521.92	-0.01
1671.83	1669.81	1673.81	1671.79	-0.04
1821.72	1819.68	1823.68	1821.72	-0.00
1971.61	1969.61	1973.61	1971.65	0.04

Diagnostic Messages

No messages.

AutoTune Status: Pass

Reviewed By: _____ Date: 04/14/15

8065

DAILY CALIBRATIONS

Continuing Calibration Summary Form

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK
SDG : 15D114
Method : 6850
InstrumentID : GO
Parameter : Perchlorate

LFID	LSID	DF	Expected	Result	Unit	83/85	%Rec	AnalysisDateTime
15MD24003	IPCS	1	0.2	0.165	ug/L	2.8	82	04/24/1511:33
15MD24004	LOD-01	1	0.1	0.100	ug/L	3.0	100	04/24/1511:48
15MD24005	LOQ-01	1	0.2	0.184	ug/L	2.7	92	04/24/1512:03
15MD24006	CPLGOD14021	1	2.000	1.924	ug/L	3.0	96	04/24/1512:17
15MD24017	CPLGOD14022	1	2.000	1.902	ug/L	3.0	95	04/24/1516:26
15MD24028	CPLGOD14023	1	0.000	1.943	ug/L	3.1		04/24/1519:55
15MD24039	CPLGOD14024	1	2.000	1.960	ug/L	3.1	98	04/24/1522:35
15MD24050	CPLGOD14025	1	2.000	1.942	ug/L	3.1	97	04/25/1501:15
15MD24052	CPLGOD14026	1	2.000	1.888	ug/L	3.1	94	04/25/1501:44
15MD24053	LOD-02	1	0.1	0.090	ug/L	2.8	90	04/25/1501:59

83/85 Ratio Acceptance Criteria: ✓25% __30%
LOD/LOQ Acceptance Criteria: __20% ✓25%
CCV Acceptance Criteria: 85-115%

Component : Perchlorate_83
Method/CalSet : PLGOD14/MD14(2015)

LFID	LSID	S	Dilf	RT	Area	SpkAmt	Con	Units	ISTDArea	83/85	Cntrl Lim	Anl DateTime	%Rec
MD24001	IBGOD241	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 11:04	
MD24002	BLANK(IS)	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 11:19	
MD24003	IPCS	P	1.000	6.83	9090	0.000	0.165	ppb	78468	2.8	2.29-3.81	04/24/15 11:33	
MD24004	LOD-01	P	1.000	7.01	5702	0.000	0.100	ppb	82366	3.0	2.29-3.81	04/24/15 11:48	
MD24005	LOQ-01	P	1.000	6.96	10329	0.000	0.184	ppb	79869	2.7	2.29-3.81	04/24/15 12:03	
MD24006	CPLGOD14021	P	1.000	6.98	112041	2.000	1.924	ppb	82096	3.0	2.29-3.81	04/24/15 12:17	96
MD24007	PLD008SB	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 12:39	
MD24008	PLD008SL	P	1.000	6.98	10026	0.000	0.174	ppb	81971	3.0	2.29-3.81	04/24/15 12:54	
MD24009	PLD008SC	P	1.000	7.01	10625	0.000	0.186	ppb	81527	3.0	2.29-3.81	04/24/15 13:09	
MD24010	D114-01	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 13:23	
MD24011	D114-02	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 13:38	
MD24012	D114-03	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 13:53	
MD24013	D114-04	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 15:27	
MD24014	D114-05	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 15:42	
MD24015	D114-06	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 15:57	
MD24016	D114-07	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 16:11	
MD24017	CPLGOD14022	P	1.000	6.98	112944	2.000	1.902	ppb	83730	3.0	2.29-3.81	04/24/15 16:26	95
MD24018	D114-08	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 17:05	
MD24019	D114-08M	P	1.000	6.89	10042	0.000	0.173	ppb	82995	3.0	2.29-3.81	04/24/15 17:20	
MD24020	D114-08S	*	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 17:35	
MD24021	D114-10	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 18:09	
MD24022	D114-11	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 18:24	
MD24023	D114-12	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 18:41	
MD24024	D114-13	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 18:57	
MD24025	D114-14	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 19:11	
MD24026	D114-15	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 19:26	
MD24027	D114-16	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 19:40	
MD24028	CPLGOD14023	P	1.000	6.89	105811	0.000	1.943	ppb	76752	3.1	2.29-3.81	04/24/15 19:55	
MD24029	D114-17	P	1.000	N/A	N/A	2.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 20:09	
MD24030	D114-18	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 20:24	
MD24031	D114-19	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 20:38	
MD24032	D114-20	P	1.000	6.83	9370	0.000	0.179	ppb	74443	3.1	2.29-3.81	04/24/15 20:53	
MD24033	D114-08S	P	1.000	6.83	9744	0.000	0.183	ppb	76005	2.9	2.29-3.81	04/24/15 21:08	
MD24034	PLD009SB	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 21:22	
MD24035	PLD009SL	P	1.000	6.88	9428	0.000	0.172	ppb	78397	3.0	2.29-3.81	04/24/15 21:37	
MD24036	PLD009SC	P	1.000	6.88	9396	0.000	0.172	ppb	78088	2.8	2.29-3.81	04/24/15 21:51	
MD24037	D114-21	P	1.000	6.81	5599	0.000	0.106	ppb	75991	2.4	2.29-3.81	04/24/15 22:06	
MD24038	D114-23	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 22:21	
MD24039	CPLGOD14024	P	1.000	6.86	106388	2.000	1.960	ppb	76532	3.1	2.29-3.81	04/24/15 22:35	98
MD24040	D114-22	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 22:50	
MD24041	D114-22M	P	1.000	6.84	9046	0.000	0.161	ppb	80047	2.9	2.29-3.81	04/24/15 23:04	
MD24042	D114-22S	P	1.000	6.88	10147	0.000	0.188	ppb	76846	2.9	2.29-3.81	04/24/15 23:19	
MD24043	D114-25	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/24/15 23:33	
MD24044	D130-08	P	1.000	6.79	5378	0.000	0.103	ppb	75297	3.2	2.29-3.81	04/24/15 23:48	
MD24045	D130-08M	P	1.000	6.77	14654	0.000	0.285	ppb	73025	2.9	2.29-3.81	04/25/15 12:02	
MD24046	D130-08S	P	1.000	6.77	15147	0.000	0.286	ppb	75178	3.0	2.29-3.81	04/25/15 12:17	
MD24047	D130-09	P	1.000	6.74	23559	0.000	0.443	ppb	75292	2.9	2.29-3.81	04/25/15 12:31	
MD24048	D130-18	P	1.000	6.84	3829	0.000	0.073	ppb	76145	3.1	2.29-3.81	04/25/15 12:46	
MD24049	D130-19	P	1.000	6.79	4396	0.000	0.085	ppb	75115	2.6	2.29-3.81	04/25/15 01:01	
MD24050	CPLGOD14025	P	1.000	6.88	103720	2.000	1.942	ppb	75280	3.1	2.29-3.81	04/25/15 01:15	97
MD24051	D114-24	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/25/15 01:30	
MD24052	CPLGOD14026	P	1.000	6.88	103215	2.000	1.888	ppb	77070	3.1	2.29-3.81	04/25/15 01:44	94
MD24053	LOD-02	P	1.000	6.86	4839	0.000	0.090	ppb	77766	2.8	2.29-3.81	04/25/15 01:59	
MD24054	BLANK(IS)	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/25/15 02:13	
MD24055	SHUTDOWN	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/25/15 02:28	

83/85 Ratio: +/-25%

Method 6850
EMAX Laboratories
Instrument # G0

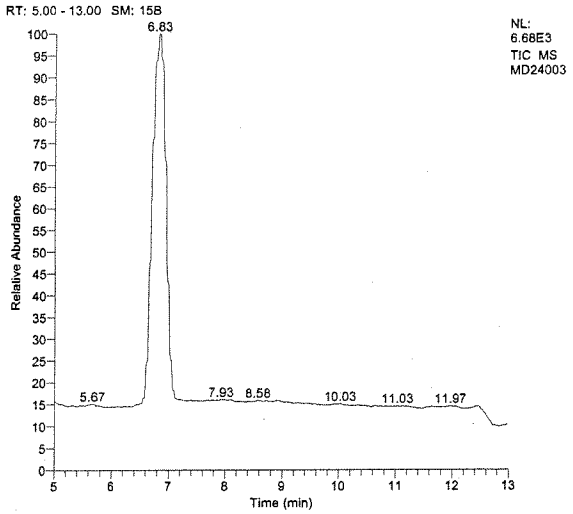
Sample Summary

EMAX Lab ID:	IPCS 0.2PPB/400PPM
Lab File ID:	MD24003
Acquisition Date:	04/24/15 11:33:49 AM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA3
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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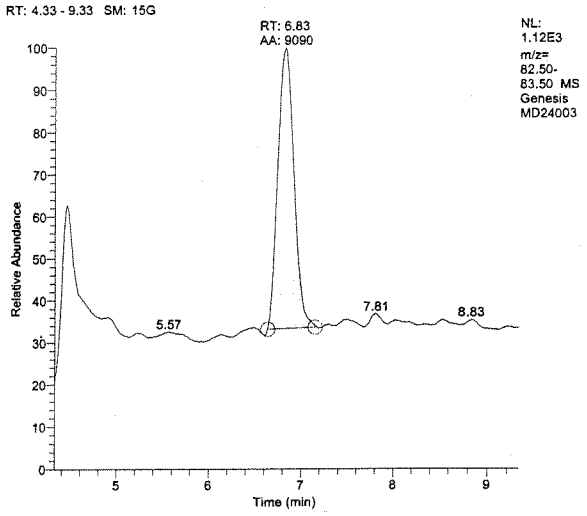
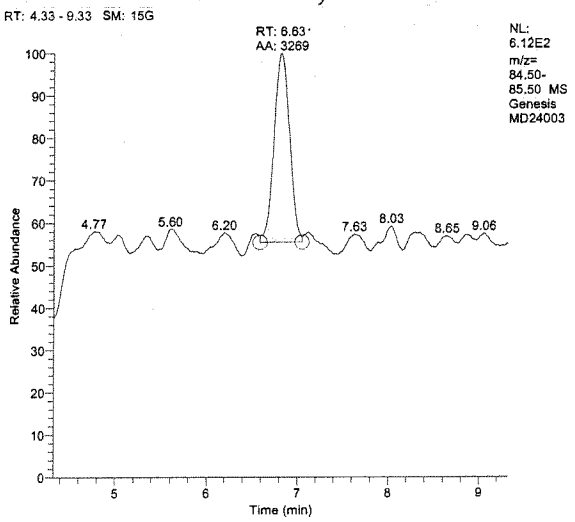
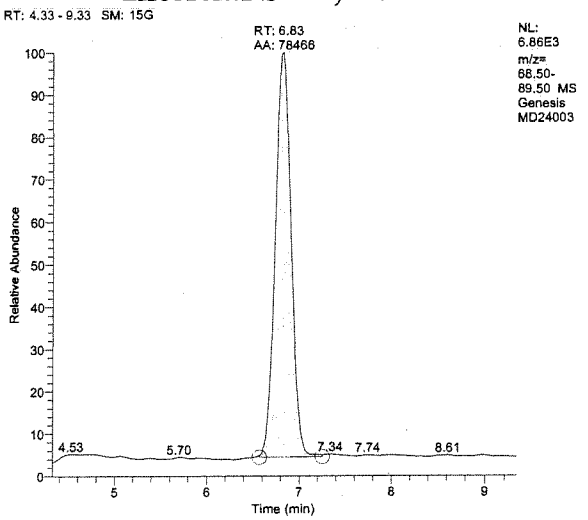


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.83	9090	0.000	0.165	ppb	105.27
Perchlorate_85	6.83	3269	0.000	0.173	ppb	28.07
Perchlorate_89_ISTD	6.83	78468	2.000	N/A	ppb	413.46

83/85 Ratio: 2.78

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

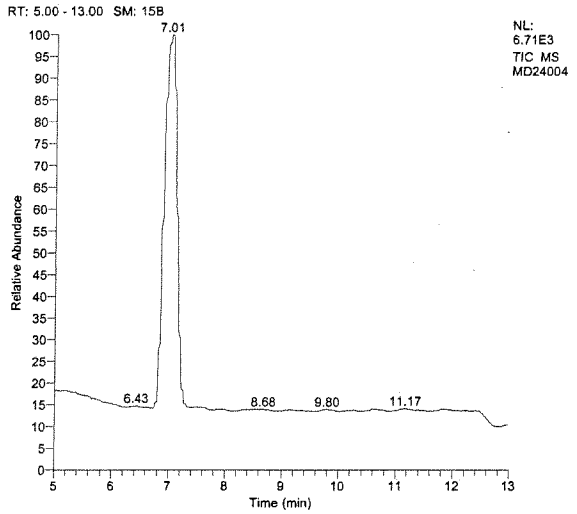
Sample Summary

EMAX Lab ID:	LOD-01 0.1PPB
Lab File ID:	MD24004
Acquisition Date:	04/24/15 11:48:27 AM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA4
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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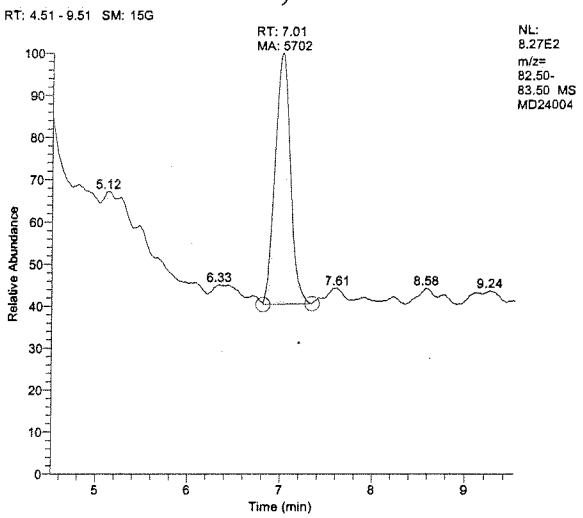

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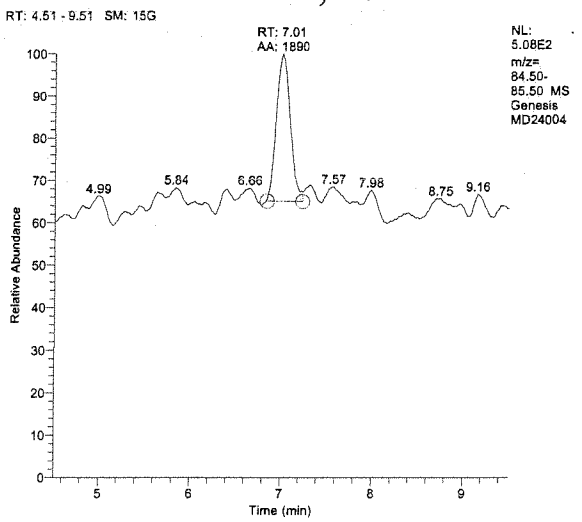

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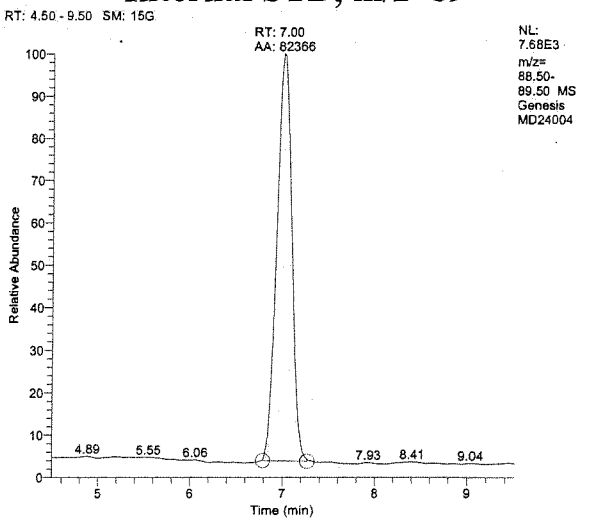


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	7.01	5702	0.000	0.100	ppb	58.34
Perchlorate_85	7.01	1890	0.000	0.093	ppb	15.37
Perchlorate_89_ISTD	7.00	82366	2.000	N/A	ppb	349.95

83/85 Ratio: 3.02

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

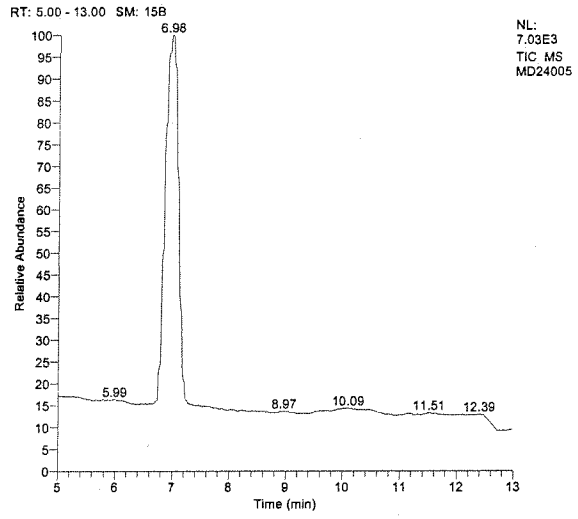
Sample Summary

EMAX Lab ID:	LOQ-01 0.2PPB
Lab File ID:	MD24005
Acquisition Date:	04/24/15 12:03:01 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA5
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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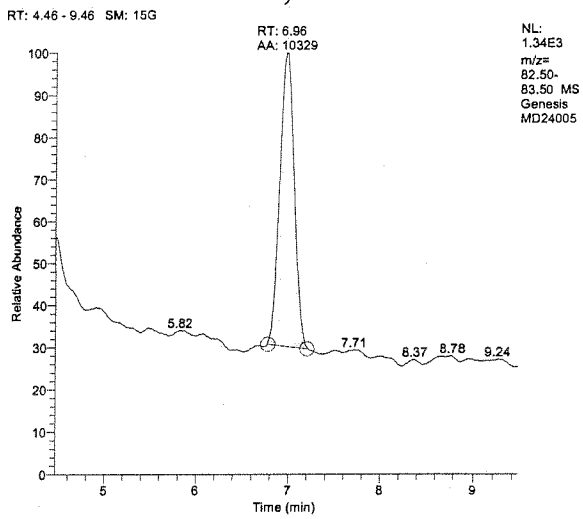

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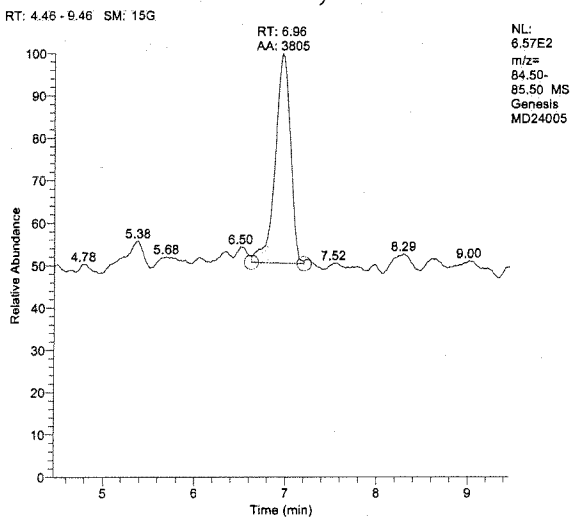

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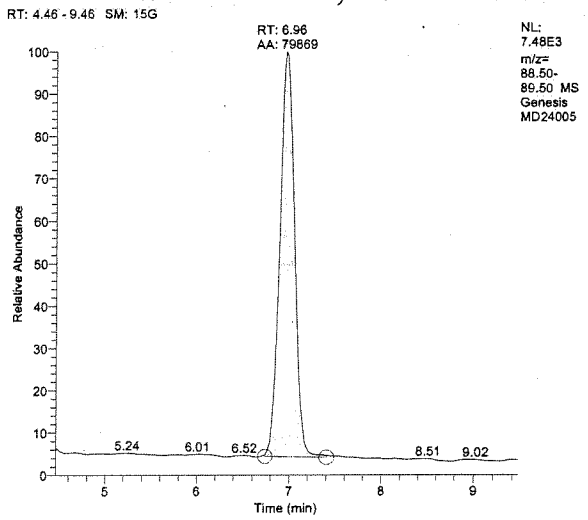


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.96	10329	0.000	0.184	ppb	131.98
Perchlorate_85	6.96	3805	0.000	0.199	ppb	82.81
Perchlorate_89_ISTD	6.96	79869	2.000	N/A	ppb	697.44

83/85 Ratio: 2.71
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

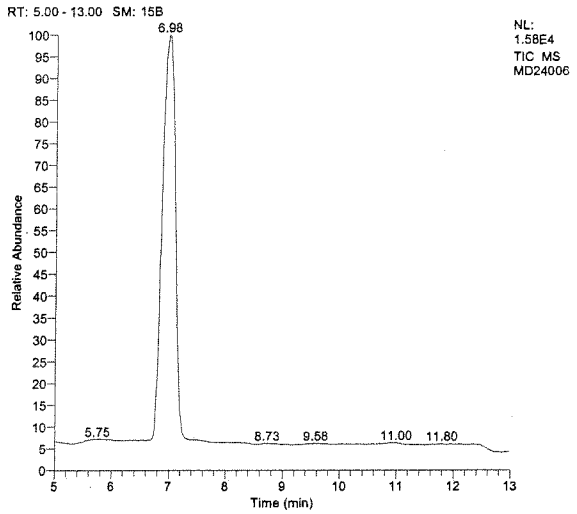
Sample Summary

EMAX Lab ID:	CPLG0D14021
Lab File ID:	MD24006
Acquisition Date:	04/24/15 12:17:37 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	QC
Calibration Level:	2 PPB
Vial:	RA6
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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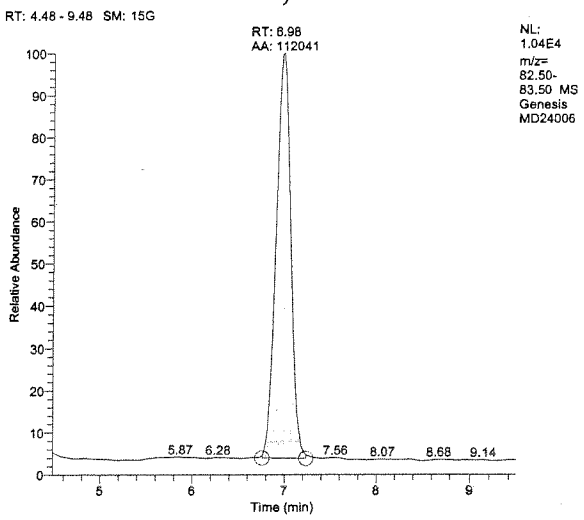

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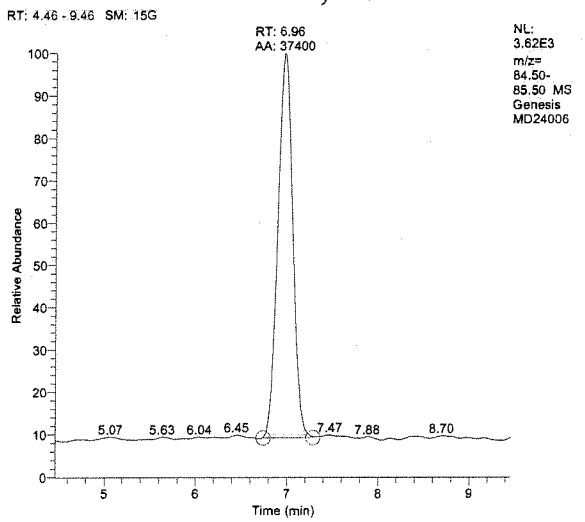

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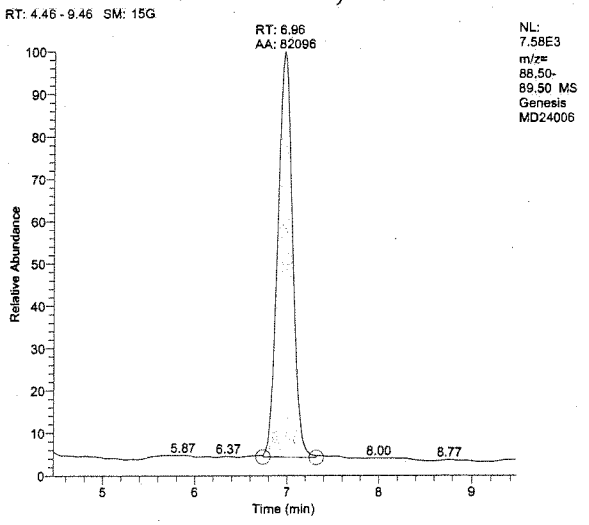


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.98	112041	2.000	1.924	ppb	443.92
Perchlorate_85	6.96	37400	2.000	1.952	ppb	433.51
Perchlorate_89_ISTD	6.96	82096	2.000	N/A	ppb	307.16

83/85 Ratio: 3.00

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

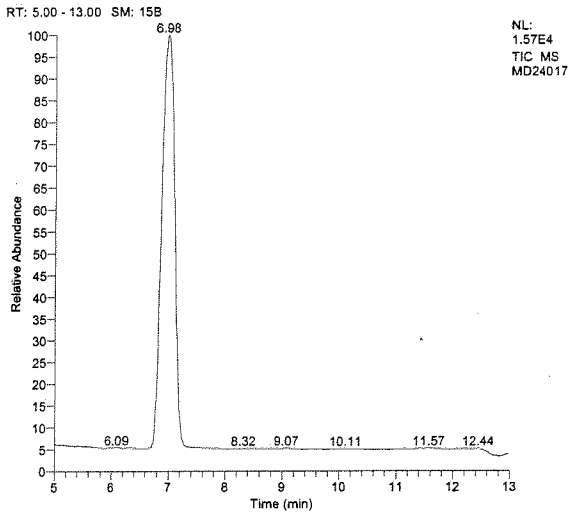
Sample Summary

EMAX Lab ID:	CPLG0D14022
Lab File ID:	MD24017
Acquisition Date:	04/24/15 04:26:05 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	QC
Calibration Level:	2 PPB
Vial:	RA6
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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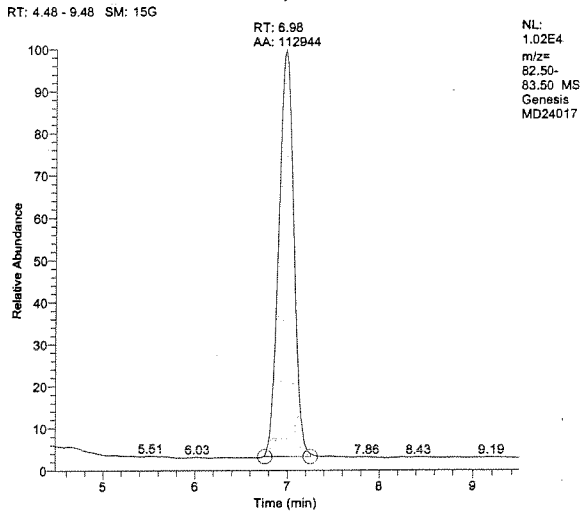

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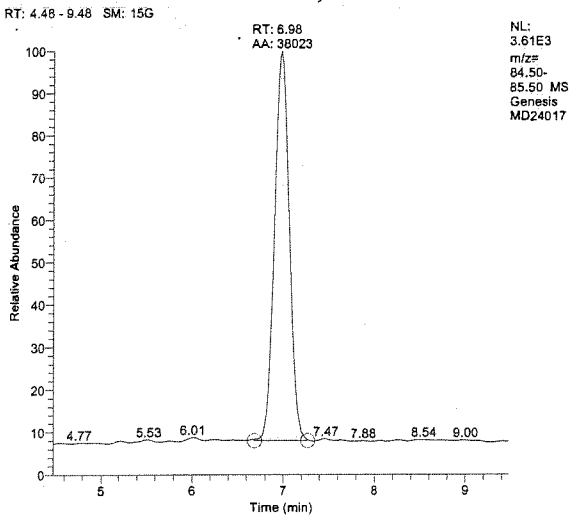

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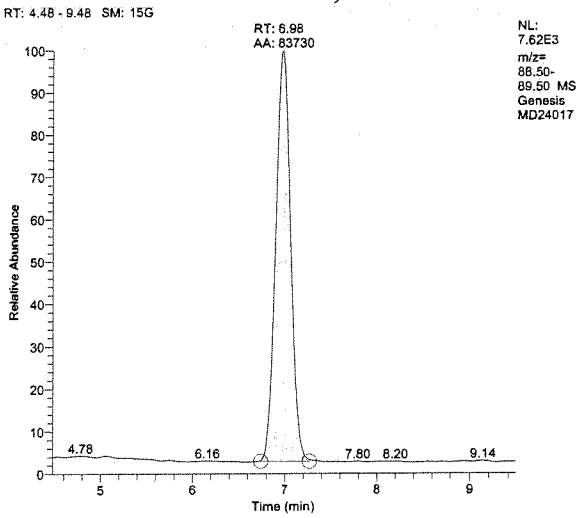


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.98	112944	2.000	1.902	ppb	782.90
Perchlorate_85	6.98	38023	2.000	1.946	ppb	706.48
Perchlorate_89_ISTD	6.98	83730	2.000	N/A	ppb	1838.29

83/85 Ratio: 2.97
(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

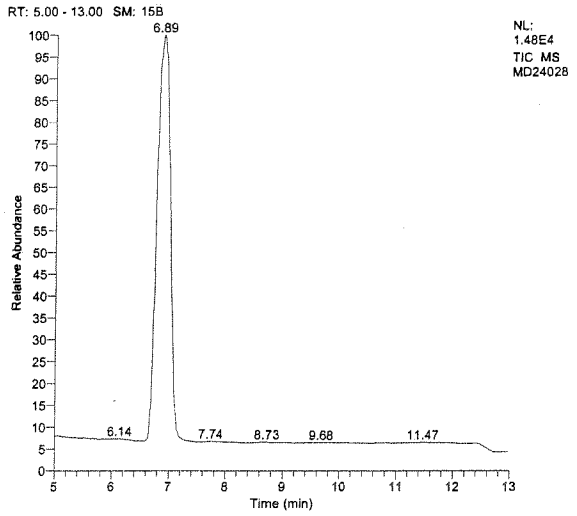
Sample Summary

EMAX Lab ID:	CPLG0D14023
Lab File ID:	MD24028
Acquisition Date:	04/24/15 07:55:19 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA6
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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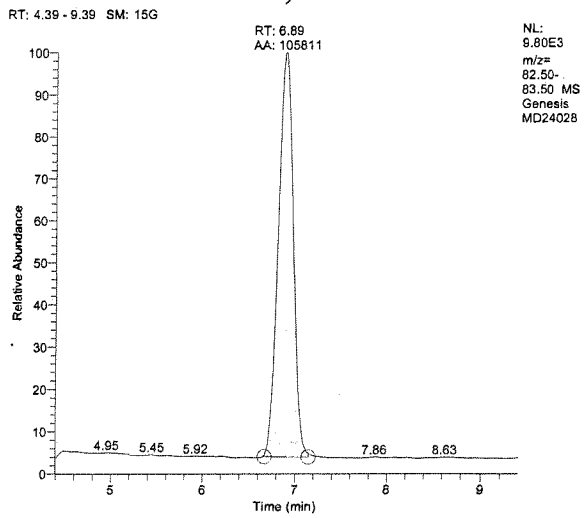

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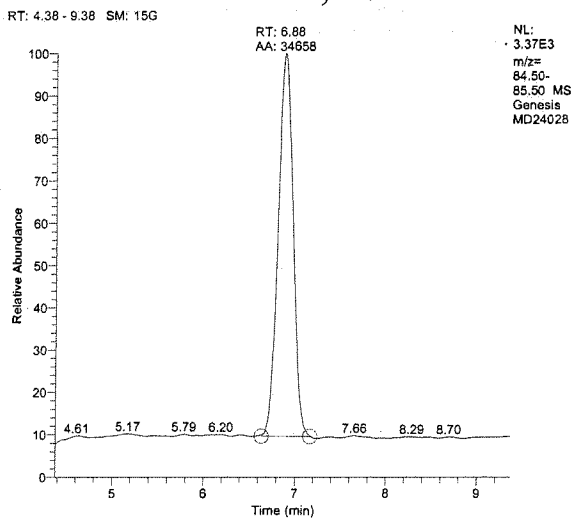

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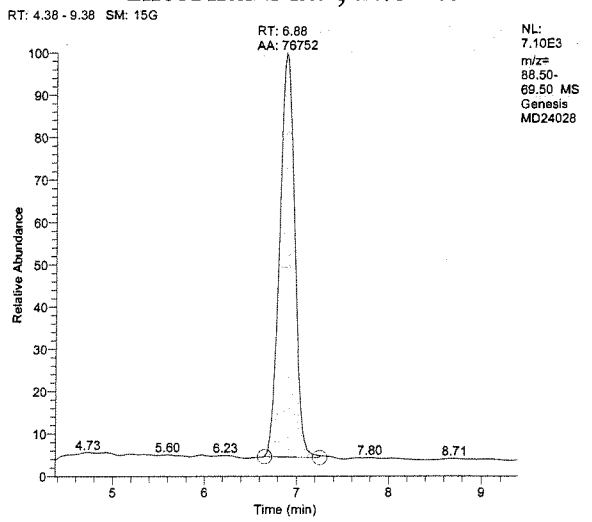


Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.89	105811	0.000	1.943	ppb	955.66
Perchlorate_85	6.88	34658	0.000	1.935	ppb	558.08
Perchlorate_89_ISTD	6.88	76752	2.000	N/A	ppb	704.45

83/85 Ratio: 3.05

(Control Limit: +/-30%)

Friday, April 24, 2015, 20:09:56

Method 6850
EMAX Laboratories
Instrument # G0

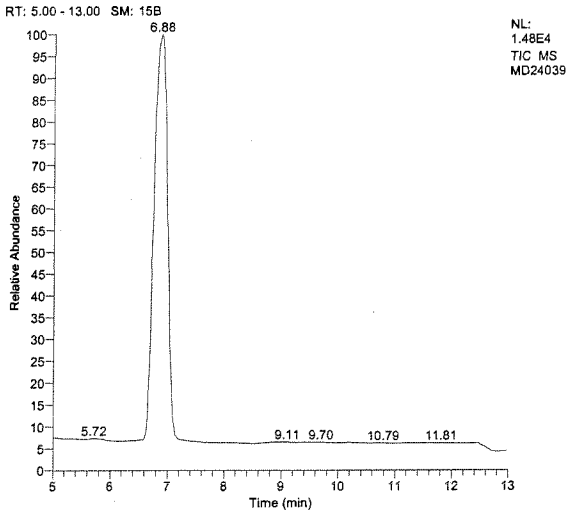
Sample Summary

EMAX Lab ID:	CPLG0D14024
Lab File ID:	MD24039
Acquisition Date:	04/24/15 10:35:37 PM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	QC
Calibration Level:	2 PPB
Vial:	RA6
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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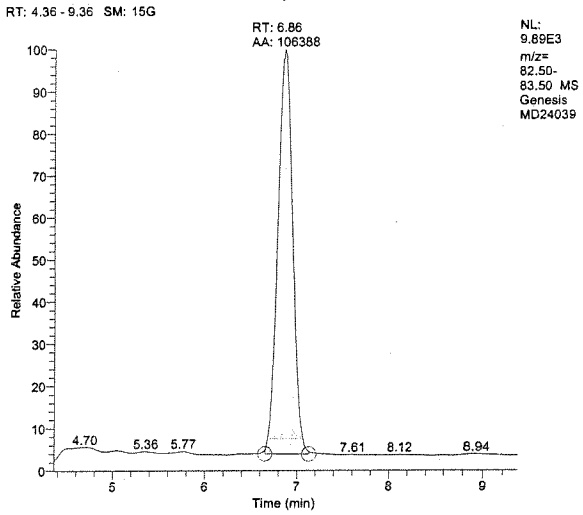
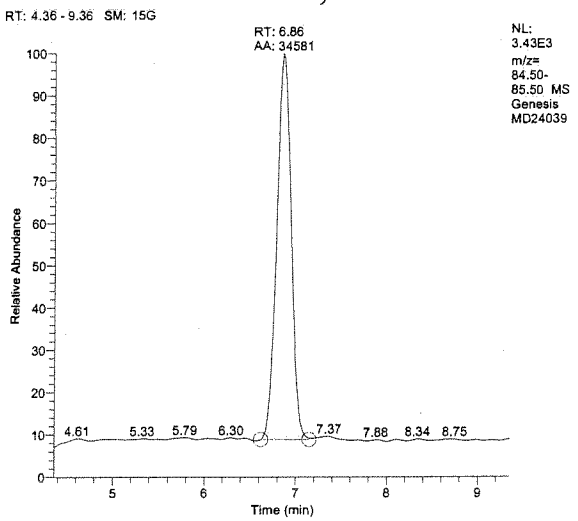
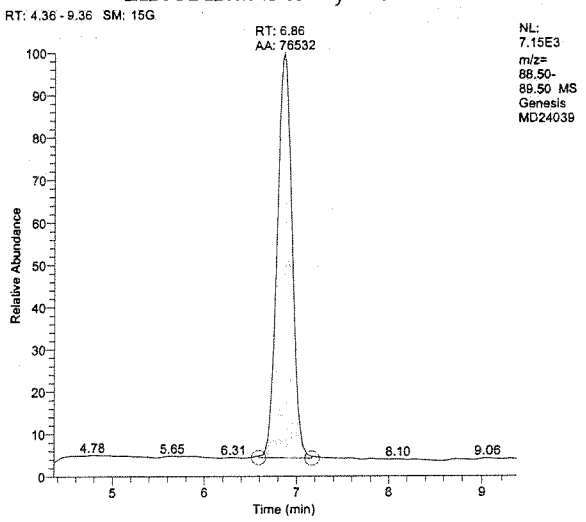


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.86	106388	2.000	1.960	ppb	2011.97
Perchlorate_85	6.86	34581	2.000	1.936	ppb	537.97
Perchlorate_89_ISTD	6.86	76532	2.000	N/A	ppb	1067.44

83/85 Ratio: 3.08

(Control Limit: +/-30%)

Friday, April 24, 2015, 22:50:14

Method 6850
EMAX Laboratories
Instrument # G0

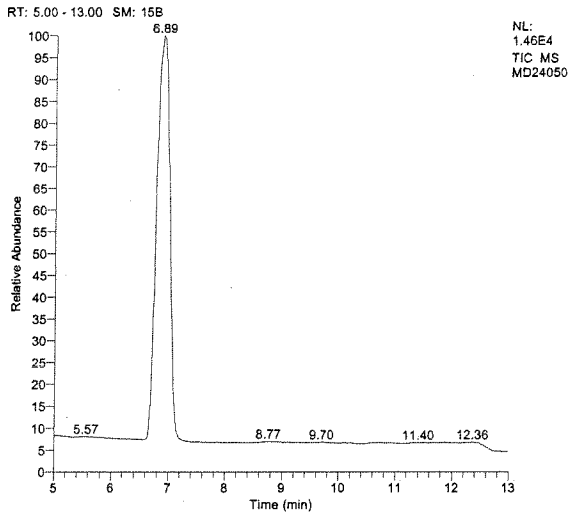
Sample Summary

EMAX Lab ID:	CPLG0D14025
Lab File ID:	MD24050
Acquisition Date:	04/25/15 01:15:39 AM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	QC
Calibration Level:	2 PPB
Vial:	RA6
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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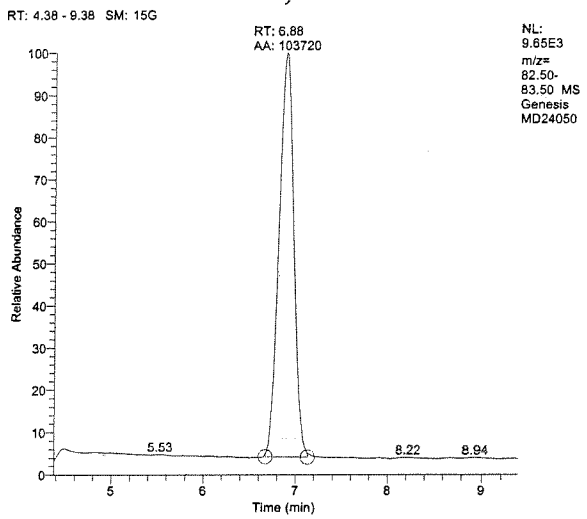
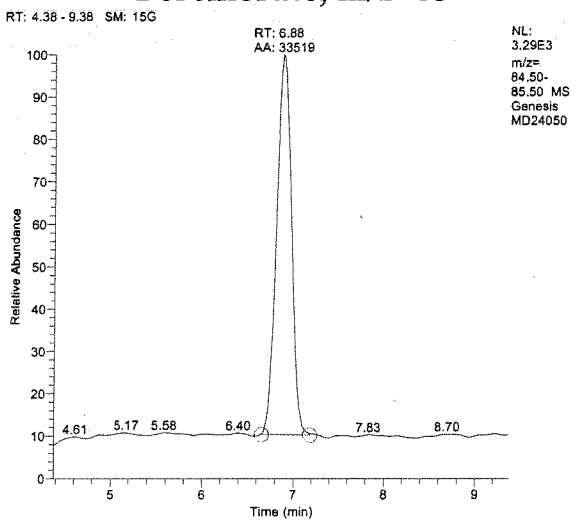
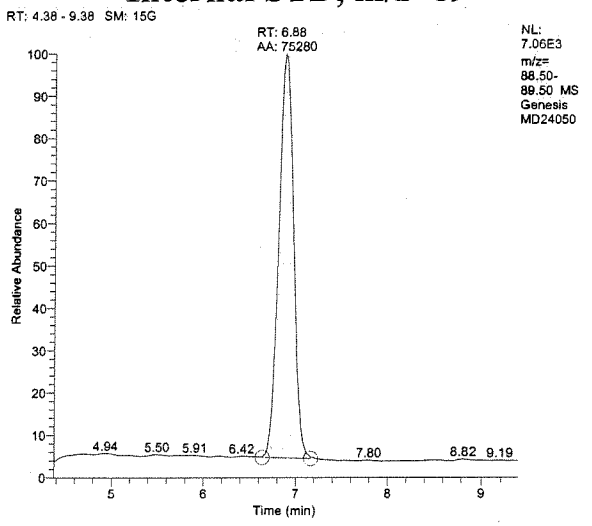


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.88	103720	2.000	1.942	ppb	787.03
Perchlorate_85	6.88	33519	2.000	1.908	ppb	469.33
Perchlorate_89_ISTD	6.88	75280	2.000	N/A	ppb	549.92

83/85 Ratio: 3.09

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

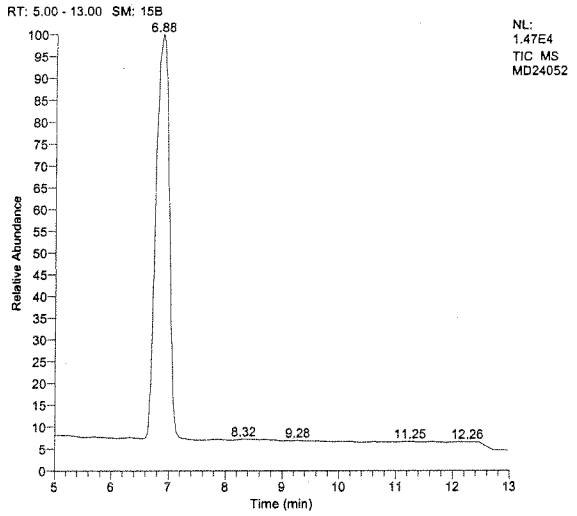
Sample Summary

EMAX Lab ID:	CPLG0D14026
Lab File ID:	MD24052
Acquisition Date:	04/25/15 01:44:57 AM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	QC
Calibration Level:	2 PPB
Vial:	RA6
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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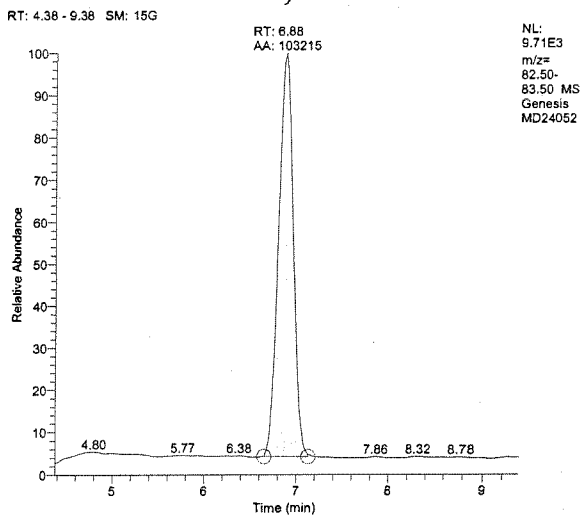
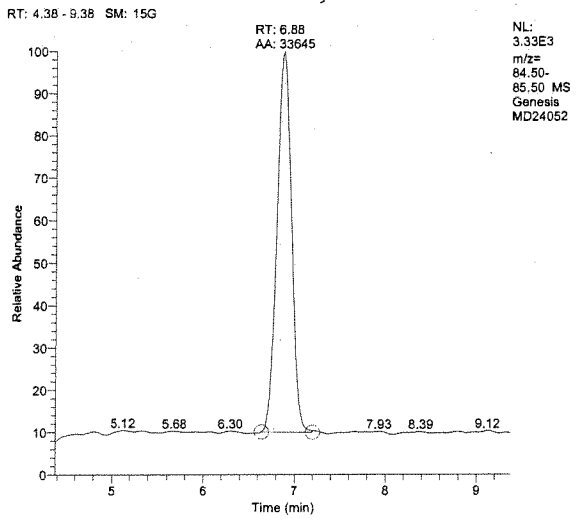
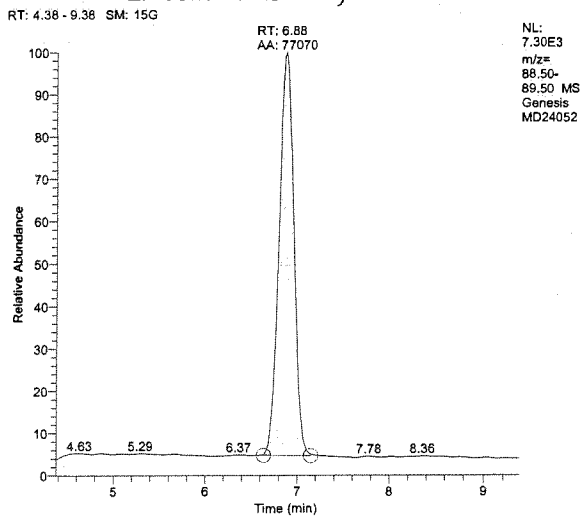


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.88	103215	2.000	1.888	ppb	706.90
Perchlorate_85	6.88	33645	2.000	1.870	ppb	636.28
Perchlorate_89_ISTD	6.88	77070	2.000	N/A	ppb	747.86

83/85 Ratio: 3.07

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

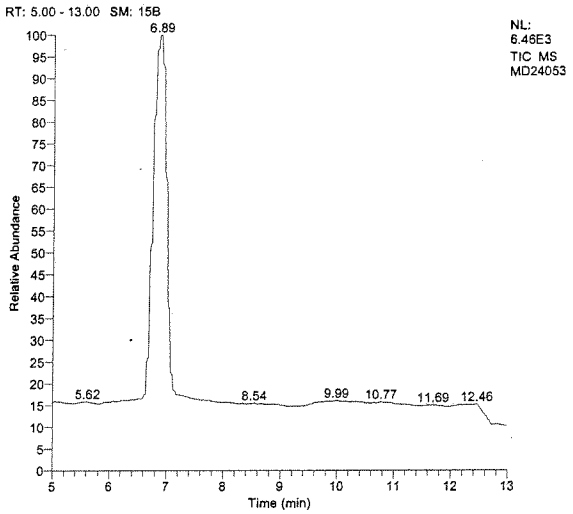
Sample Summary

EMAX Lab ID:	LOD-02 0.1PPB
Lab File ID:	MD24053
Acquisition Date:	04/25/15 01:59:29 AM
Data Path:	C:\XCALIBUR\DATA\MD24
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

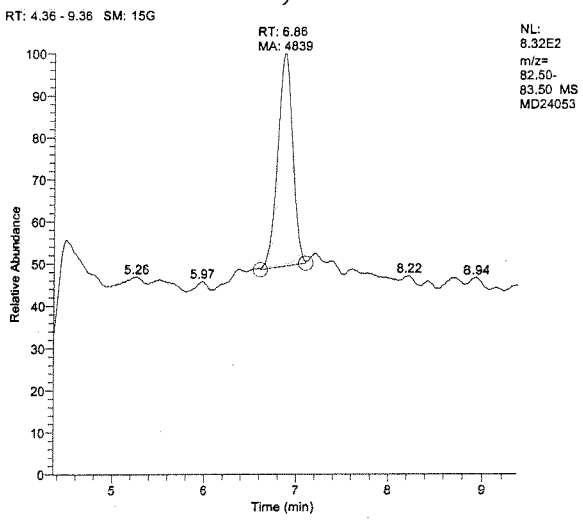
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA4
Injection Volume(ul):	20.00
Run Time(min):	12.99

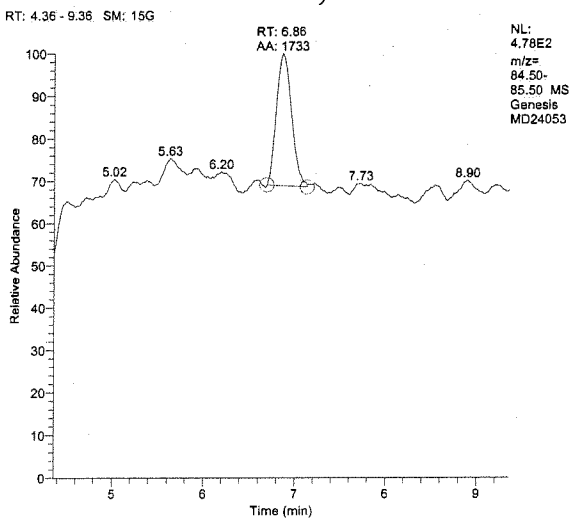
TIC



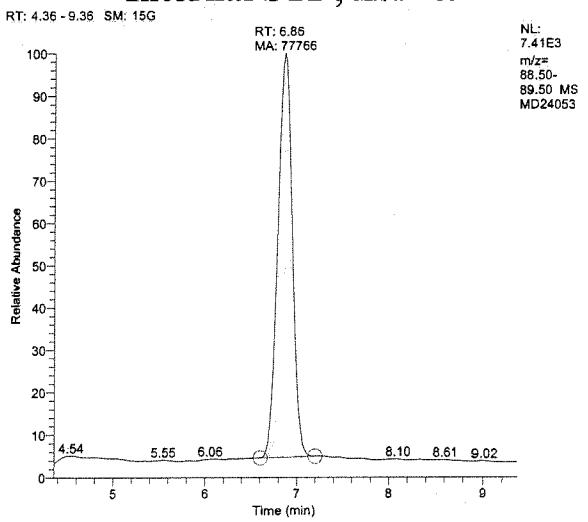
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.86	4839	0.000	0.090	ppb	36.66
Perchlorate_85	6.86	1733	0.000	0.090	ppb	22.82
Perchlorate_89_ISTD	6.86	77766	2.000	N/A	ppb	459.19

83/85 Ratio: 2.79
(Control Limit: +/-30%)

Monday, April 27, 2015, 12:06:49

Continuing Calibration Summary Form

Client : KLEINFELDER
Project : CTO 070, UX04, FALLBROOK
SDG : 15D114
Method : 6850
InstrumentID : G0
Parameter : Perchlorate

LFID	LSID	DF	Expected	Result	Unit	83/85	%Rec	AnalysisDateTime
15MD28004	IPCS	1	0.2	0.172	ug/L	2.8	86	04/28/1511:51
15MD28005	LOD-01	1	0.1	0.081	ug/L	2.4	81	04/28/1512:05
15MD28006	LOQ-01	1	0.2	0.170	ug/L	2.6	85	04/28/1512:20
15MD28007	CPLG0D14030	1	2.000	1.892	ug/L	3.0	95	04/28/1512:34
15MD28017	CPLG0D14031	1	2.000	1.844	ug/L	3.0	92	04/28/1515:08
15MD28022	CPLG0D14032	1	2.000	1.920	ug/L	3.1	96	04/28/1516:38
15MD28023	LOD-02	1	0.1	0.078	ug/L	2.4	78	04/28/1516:53

83/85 Ratio Acceptance Criteria: ✓ 25% __ 30%
LOD/LOQ Acceptance Criteria: __ 20% ✓ 25%
CCV Acceptance Criteria: 85-115%

Component : Perchlorate_83
Method/CalSet : PLGOD14/MD14(2015)

LFID	LSID	S	Dilf	RT	Area	SpkAmt	Con	Units	ISTDArea	83/85	Cntrl Lim	Anl DateTime	%Rec
MD28001	IBGOD281	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/28/15 11:03	
MD28002	IBGOD282	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/28/15 11:21	
MD28003	BLANK(IS)	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/28/15 11:36	
MD28004	IPCS	P	1.000	6.66	10475	0.000	0.172	ppb	86774	2.8	2.29-3.81	04/28/15 11:51	
MD28005	LOD-01	P	1.000	6.84	4890	0.000	0.081	ppb	87212	2.4	2.29-3.81	04/28/15 12:05	
MD28006	LOQ-01	P	1.000	6.81	10069	0.000	0.170	ppb	84287	2.6	2.29-3.81	04/28/15 12:20	
MD28007	CPLGOD14030	P	1.000	6.83	115583	2.000	1.892	ppb	86104	3.0	2.29-3.81	04/28/15 12:34	95
MD28008	PLD007WB	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/28/15 12:49	
MD28009	PLD007WL	P	1.000	6.84	10372	0.000	0.171	ppb	86527	2.8	2.29-3.81	04/28/15 13:03	
MD28010	PLD007WC	P	1.000	6.86	10505	0.000	0.174	ppb	86166	3.0	2.29-3.81	04/28/15 13:18	
MD28011	D148-03	P	1.000	6.72	13271	0.000	0.215	ppb	87839	2.8	2.29-3.81	04/28/15 13:40	
MD28012	D148-03M	P	1.000	6.72	24575	0.000	0.402	ppb	86611	2.9	2.29-3.81	04/28/15 13:55	
MD28013	D148-03S	P	1.000	6.72	23169	0.000	0.382	ppb	85900	2.7	2.29-3.81	04/28/15 14:10	
MD28014	D114-09	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/28/15 14:25	
MD28015	D114-09M	P	1.000	6.89	11131	0.000	0.180	ppb	88115	2.8	2.29-3.81	04/28/15 14:39	
MD28016	D114-09S	P	1.000	6.83	10685	0.000	0.177	ppb	86102	2.9	2.29-3.81	04/28/15 14:54	
MD28017	CPLGOD14031	P	1.000	6.84	111935	2.000	1.844	ppb	85559	3.0	2.29-3.81	04/28/15 15:08	92
MD28018	D187-01	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/28/15 15:40	
MD28019	D187-02	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/28/15 15:55	
MD28020	D187-03	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/28/15 16:09	
MD28021	D187-04	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/28/15 16:24	
MD28022	CPLGOD14032	P	1.000	6.88	112324	2.000	1.920	ppb	82486	3.1	2.29-3.81	04/28/15 16:38	96
MD28023	LOD-02	P	1.000	6.91	4600	0.000	0.078	ppb	85621	2.4	2.29-3.81	04/28/15 16:53	
MD28024	BLANK(IS)	P	1.000	N/A	N/A	0.000	N/A	ppb	N/A	N/A	2.29-3.81	04/28/15 17:07	

83/85 Ratio: +/-25%

Method 6850
EMAX Laboratories
Instrument # G0

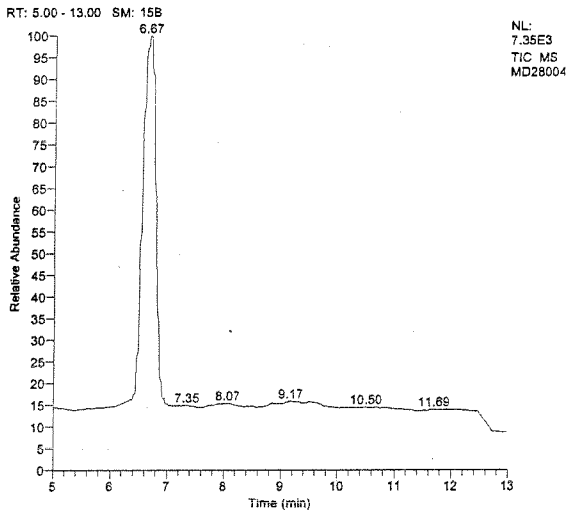
Sample Summary

EMAX Lab ID:	IPCS 0.2PPB/400PPM
Lab File ID:	MD28004
Acquisition Date:	04/28/15 11:51:00 AM
Data Path:	C:\XCALIBUR\DATA\MD28
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

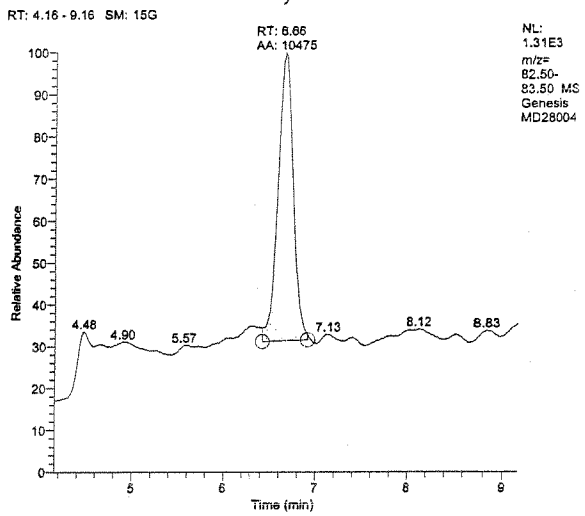
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA3
Injection Volume(ul):	20.00
Run Time(min):	12.99

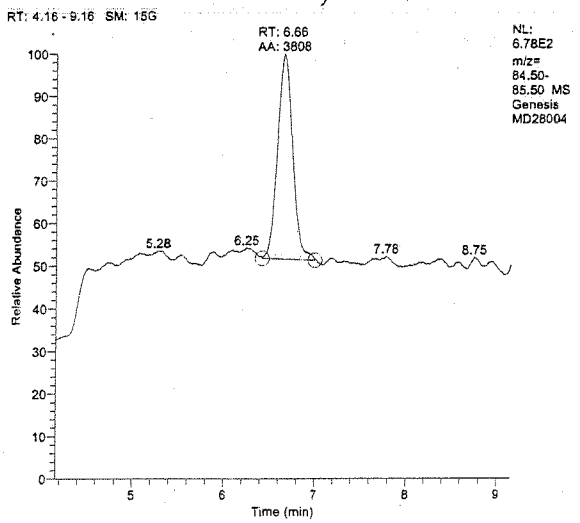
TIC



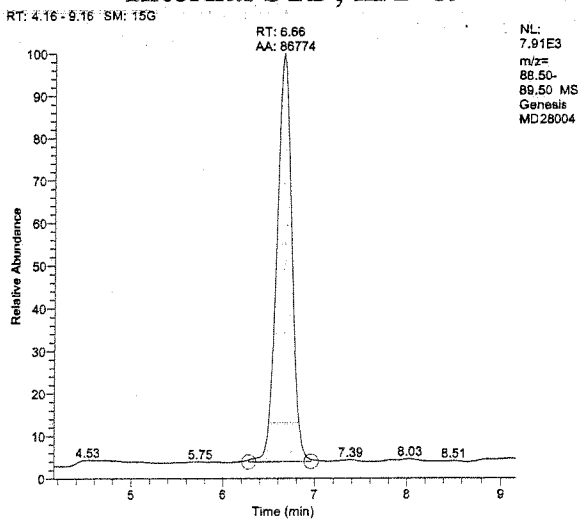
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.66	10475	0.000	0.172	ppb	73.87
Perchlorate_85	6.66	3808	0.000	0.183	ppb	59.54
Perchlorate_89_ISTD	6.66	86774	2.000	N/A	ppb	689.96

83/85 Ratio: 2.75

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

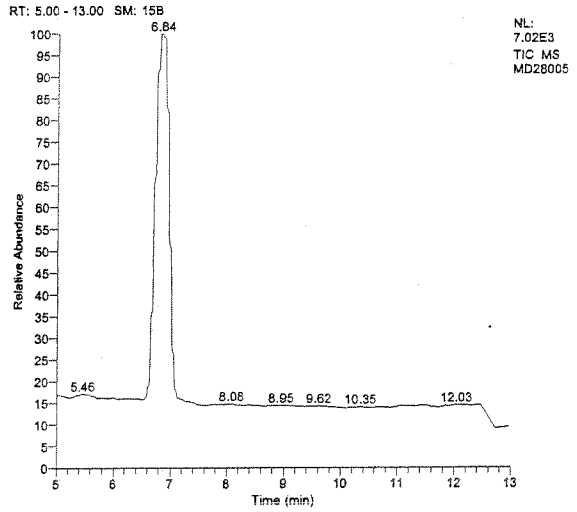
Sample Summary

EMAX Lab ID:	LOD-01 0.1PPB
Lab File ID:	MD28005
Acquisition Date:	04/28/15 12:05:32 PM
Data Path:	C:\XCALIBUR\DATA\MD28
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA4
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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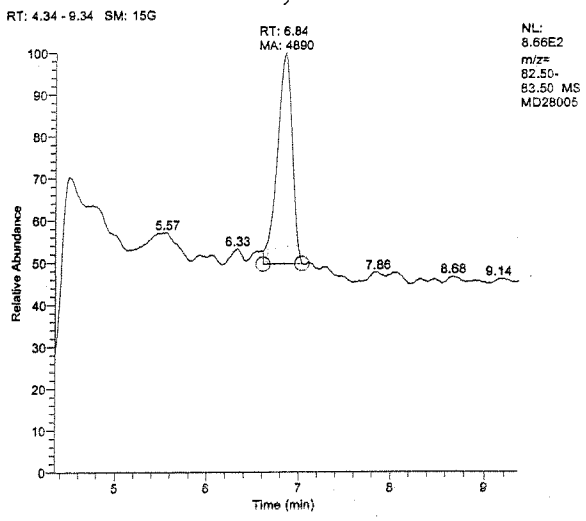
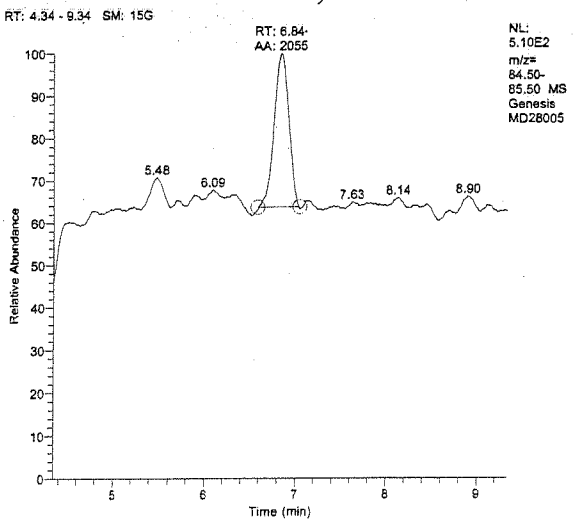
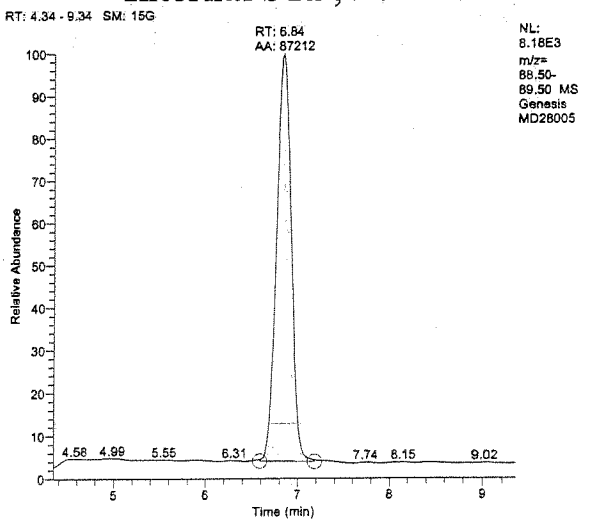


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.84	4890	0.000	0.081	ppb	40.76
Perchlorate_85	6.84	2055	0.000	0.096	ppb	32.39
Perchlorate_89_ISTD	6.84	87212	2.000	N/A	ppb	1510.01

83/85 Ratio: 2.38

(Control Limit: +/-30%)

Tuesday, April 28, 2015, 17:31:06

Method 6850
EMAX Laboratories
Instrument # G0

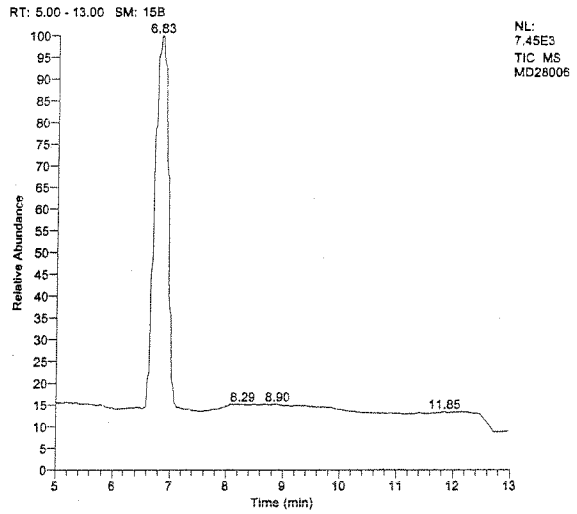
Sample Summary

EMAX Lab ID:	LOQ-01 0.2PPB
Lab File ID:	MD28006
Acquisition Date:	04/28/15 12:20:04 PM
Data Path:	C:\XCALIBUR\DATA\MD28
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA5
Injection Volume(ul):	20.00
Run Time(min):	12.99

TIC



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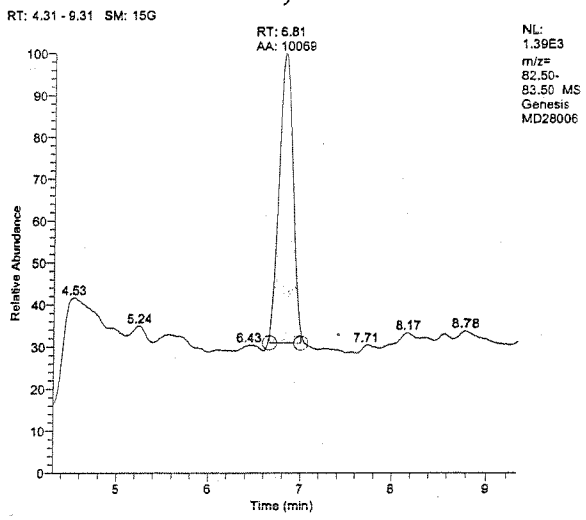
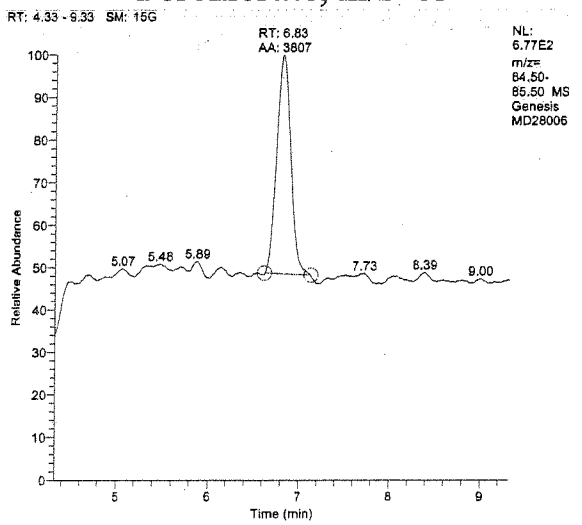
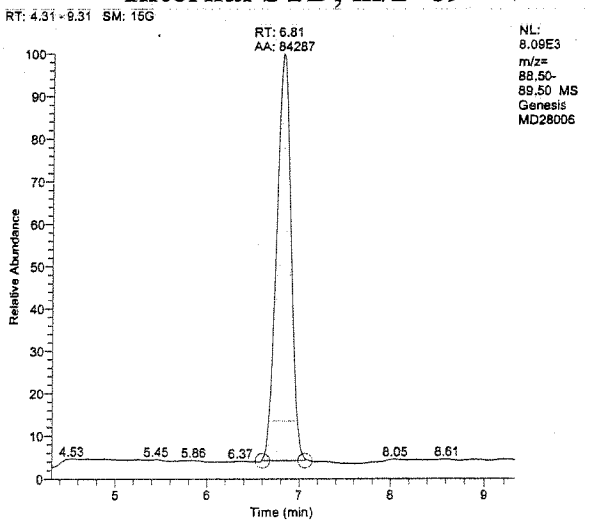


Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.81	10069	0.000	0.170	ppb	42.29
Perchlorate_85	6.83	3807	0.000	0.188	ppb	71.62
Perchlorate_89_ISTD	6.81	84287	2.000	N/A	ppb	343.16

83/85 Ratio: 2.64

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

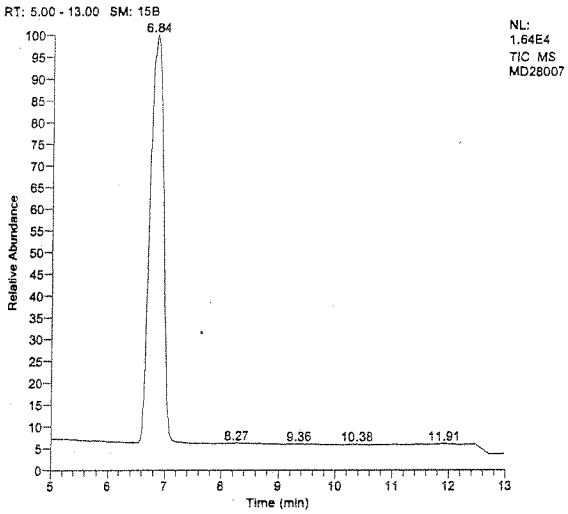
Sample Summary

EMAX Lab ID:	CPLG0D14030
Lab File ID:	MD28007
Acquisition Date:	04/28/15 12:34:36 PM
Data Path:	C:\XCALIBUR\DATA\MD28
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

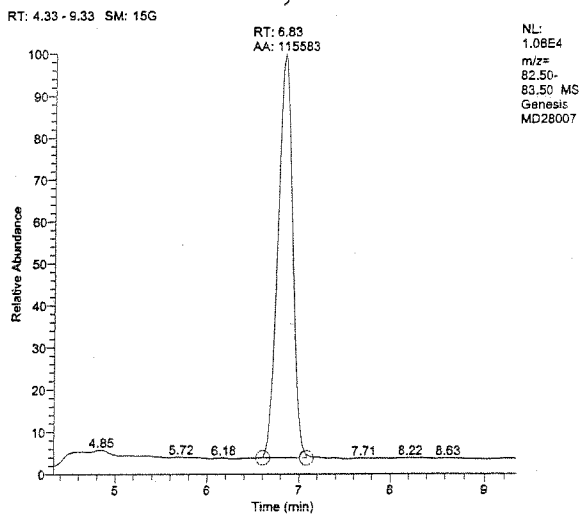
Run Parameters

Sample Type:	QC
Calibration Level:	2 PPB
Vial:	RA6
Injection Volume(ul):	20.00
Run Time(min):	12.99

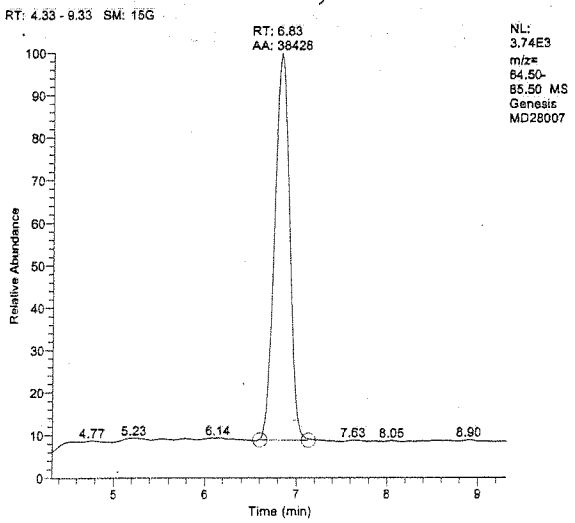
TIC



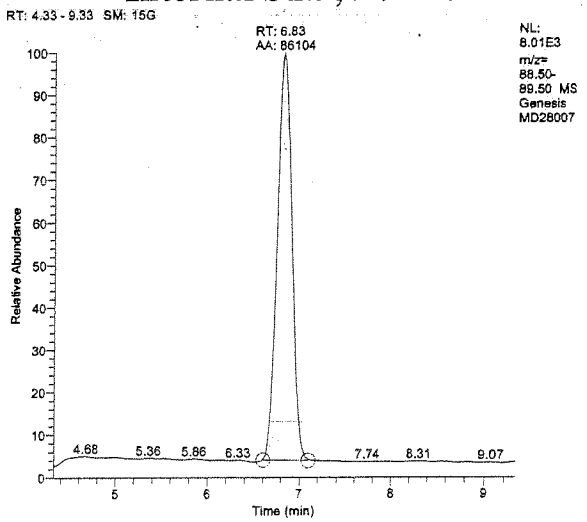
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.83	115583	2.000	1.892	ppb	655.87
Perchlorate_85	6.83	38428	2.000	1.912	ppb	656.92
Perchlorate_89_ISTD	6.83	86104	2.000	N/A	ppb	949.40

83/85 Ratio: 3.01

(Control Limit: +/-30%)

Method 6850
EMAX Laboratories
Instrument # G0

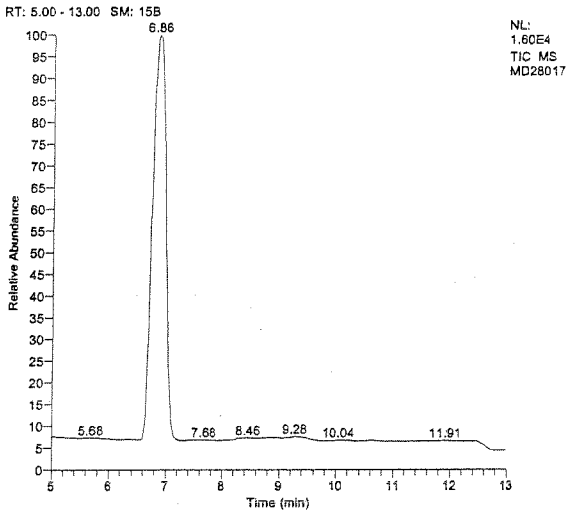
Sample Summary

EMAX Lab ID:	CPLG0D14031
Lab File ID:	MD28017
Acquisition Date:	04/28/15 03:08:58 PM
Data Path:	C:\XCALIBUR\DATA\MD28
Instrument Method:	C:\Xcalibur\methods\PLG0D14.meth
Operator:	CDam

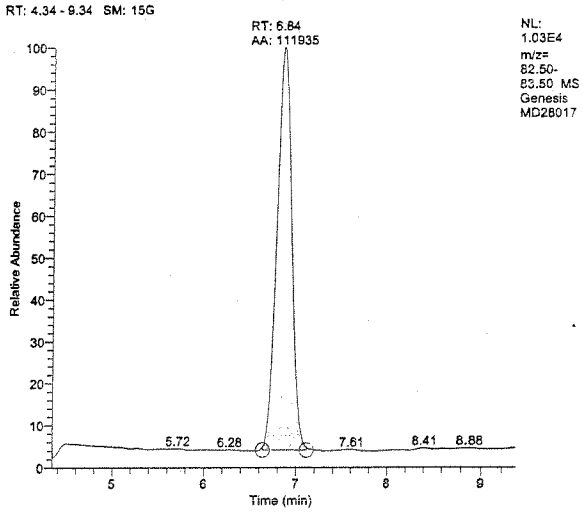
Run Parameters

Sample Type:	QC
Calibration Level:	2 PPB
Vial:	RA6
Injection Volume(ul):	20.00
Run Time(min):	12.99

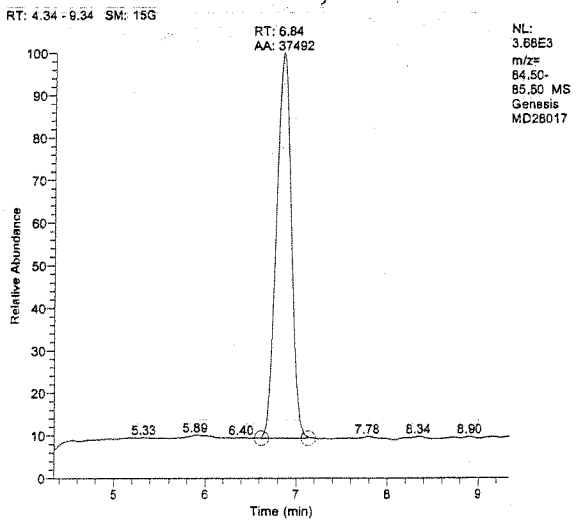
TIC



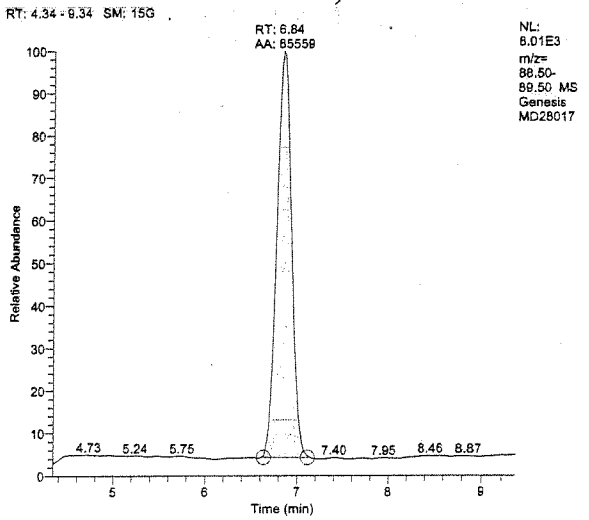
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.84	111935	2.000	1.844	ppb	591.23
Perchlorate_85	6.84	37492	2.000	1.877	ppb	794.04
Perchlorate_89_ISTD	6.84	85559	2.000	N/A	ppb	403.43

83/85 Ratio: 2.99

(Control Limit: +/-30%)

Tuesday, April 28, 2015, 15:23:42

Method 6850
EMAX Laboratories
Instrument # G0

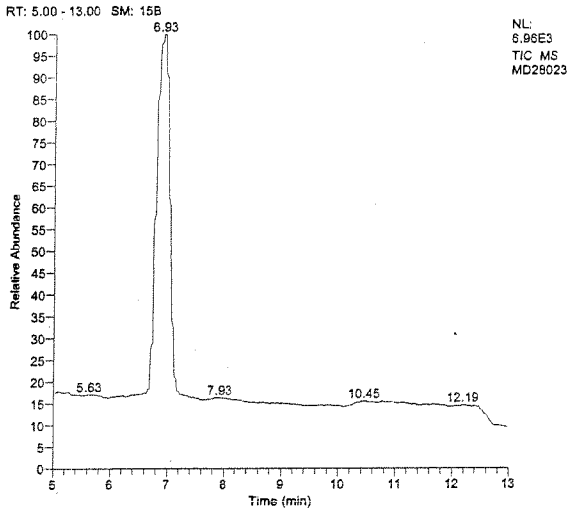
Sample Summary

EMAX Lab ID:	LOD-02 0.1PPB
Lab File ID:	MD28023
Acquisition Date:	04/28/15 04:53:22 PM
Data Path:	C:\XCALIBUR\DATA\MD28
Instrument Method:	C:\Xcalibur\methods\PLG0D14
Operator:	CDam

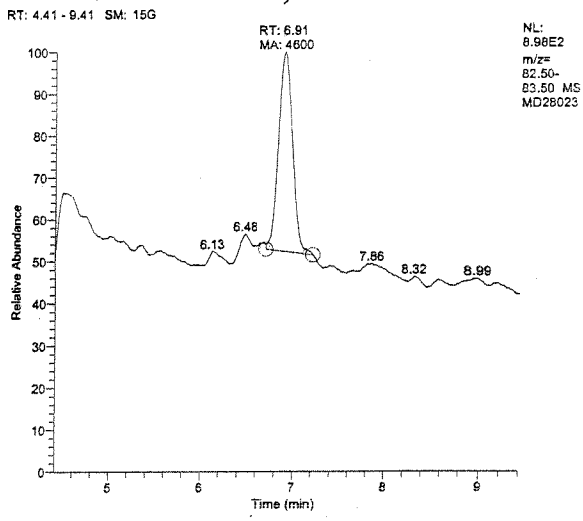
Run Parameters

Sample Type:	Unknown
Calibration Level:	
Vial:	RA4
Injection Volume(ul):	20.00
Run Time(min):	12.99

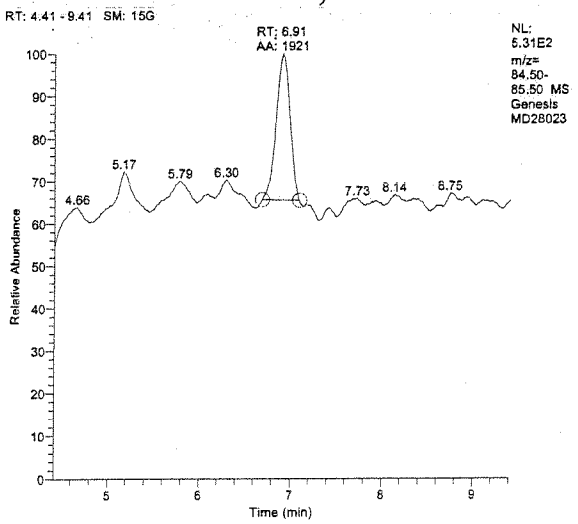
TIC



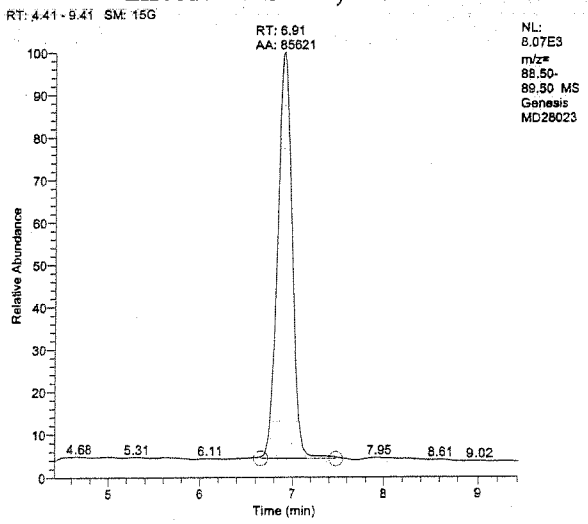
Parent, m/z=83



Perchlorate, m/z=85



Internal STD, m/z=89



Sample Summary Table

Component	RT	Area	Actual Amount	Calculated Amount	Units	S/N
Perchlorate_83	6.91	4600	0.000	0.078	ppb	43.06
Perchlorate_85	6.91	1921	0.000	0.091	ppb	25.81
Perchlorate_89_ISTD	6.91	85621	2.000	N/A	ppb	692.18

83/85 Ratio: 2.39

(Control Limit: +/-30%)

Tuesday, April 28, 2015, 17:31:07

ANALYTICAL LOGS

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
PERCHLORATE BY HPLC/MS

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

ICAL: PLG0D14

*4mL Internal Standard added to each 1mL sample vial prior to analysis.

**LOQ - 01 (0.2 ppb)
2mL Standard → 1000 mL H2O

MD14002: QC for H2O, Lot#: 55007; ID: SWIA-005-12-06

Book #:	AG0-005
Instrument No.:	G0
Analytical Sequence:	MD14
Method File:	PLG0D14
Analytical Batch:	—

SOP #	Rev. #
☑ EMAX-6850	1
☐ EMAX-	

STANDARDS ID		Conc. (µg/L)
ICAL	SHIC-10-05-03	(0.1-7.5) ppb / 2 ppb
ICV	06-01	2 ppb / 2 ppb
DCC1	05-02	2 ppb / 2 ppb
DCC2	—	—
LCS	—	—
MS	—	—
IS *	SHIB-07-08-02	500 ppb
IPC	SHIC-10-05-01	0.2 ppb / 400 ppm
LODV **	SHIB-07-07-08	100 ppb

SOLVENT	ID
Acetonitrile	SWIA-005-009-24
Methanol	—
Water	SWIA-005-10-25
Acetic Acid	SPIA-07-10-01

FILTER	ID
0.20 µm PTFE Membrane	21831377
0.45 µm PTFE Membrane	—

Data File	

SYRINGES
☑ 1 mL - MSF-01-01-01
☐ 100 µL - MSF-01-01-02
☐ 25 µL - MSF-01-01-03
☑ 10 µL - MSF-01-01-04
☐
☐

ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ XCALIBURG0	
☐	

Analyzed By: [illegible]

Date: 04/14/15

Thermo Xcalibur Sequence Setup - MD14.sld

File Edit Change Actions View GoTo Help

	Position	Sample ID	File Name	Inj Vol	Dil Factor	Sample Type	Level	Path	Inst Meth	Proc Meth	Cal File
1	RA1	IBG0D141	MD14001	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
2	RA2	QC H20 LOT#:55007	MD14002	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
3	RA3	BLANK(IS)	MD14003	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
4	RA4	PLG0D14001	MD14004	20.000	1.000	Std Clear	0.1 ppb	C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
5	RA5	PLG0D14002	MD14005	20.000	1.000	Std Update	0.2 ppb	C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
6	RA6	PLG0D14003	MD14006	20.000	1.000	Std Update	0.5 ppb	C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
7	RA7	PLG0D14004	MD14007	20.000	1.000	Std Update	1 ppb	C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
8	RA8	PLG0D14005	MD14008	20.000	1.000	Std Update	2 ppb	C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
9	RB1	PLG0D14006	MD14009	20.000	1.000	Std Update	5 ppb	C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
10	RB2	PLG0D14007	MD14010	20.000	1.000	Std Update	7.5 ppb	C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
11	RB3	IPLG0D14001	MD14011	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
12	RB4	LOQ-01 0.2PPB	MD14012	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
13	RB5	IPCS 0.2PPB/400PPM	MD14013	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
				0.001	0.000						

FINAL ca 04/15/15

04/15/15

For Help, press F1

CAP NUM 4/15/2015 Wednesday, April 15, 2015

Start Thermo Xcalibur Seqd...

0089

LFID	EFID	Dil Factor
MD14001	IBG0D141	1.000
MD14002	QC H20 LOT#:55007	1.000
MD14003	BLANK(IS)	1.000
MD14004	PLG0D14001	1.000
MD14005	PLG0D14002	1.000
MD14006	PLG0D14003	1.000
MD14007	PLG0D14004	1.000
MD14008	PLG0D14005	1.000
MD14009	PLG0D14006	1.000
MD14010	PLG0D14007	1.000
MD14011	IPLG0D14001	1.000
MD14012	LOQ-01 0.2PPB	1.000
MD14013	IPCS 0.2PPB/400PPM	1.000

FINAL cl 04/15/15

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
PERCHLORATE BY HPLC/MS

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

*4µL Internal Standard added to each 1mL sample vial prior to analysis.

** LOD - 01, 02 (0.1 ppb)
1mL Standard → 1000 mL H2O
** LOQ - 01 (0.2 ppb)
2mL Standard → 1000 mL H2O

MD24020 : Bad Injection. (PF)

PLD008S : D114 (1-8), (10-20) } 500mL of aliquot of each sample were
PLD009S : D114 (21-25), D130 } volumed to 1000mL H2O to be calculated as prep. factor of 2X prior to analysis.

Book #:	AG0-005
Instrument No.:	G0
Analytical Sequence:	MD24
Method File:	PLGDD14
Analytical Batch:	PLD008S & PLD009S

SOP #	Rev. #
☑ EMAX-6850	1
☐ EMAX-	

STANDARDS ID		Conc. (µg/L)
ICAL	—	—
ICV	—	—
DCC1	SHIC-10-05-02	2ppb / 2ppb
DCC2	—	—
LCS	—	—
MS	—	—
IS *	SHIB-07-08-02	~~0.2ppb~~ 500ppb ~~400ppm~~ } cd 04
IPC	SHIC-10-06-02	0.2ppb / 400ppm
LODV **	SHIB-07-07-03	100 ppb

SOLVENT	ID
Acetonitrile	SWIA-005-069-24
Methanol	—
Water	SWIA-005-12-06
Acetic Acid	SPIA-07-10-01

FILTER	ID
0.20 µm PTFE Membrane	21852712
0.45 µm PTFE Membrane	—

Data File	

SYRINGES
☑ 1 mL - MSF-01-01-01
☐ 100 µL - MSF-01-01-02
☐ 25 µL - MSF-01-01-03
☑ 10 µL - MSF-01-01-04
☐
☐

ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ XCALIBURG0	
☐	

Analyzed By: cd
Date: 04/24/15

8091

Thermo Xcalibur Sequence Setup - MD24.sld

File Edit Change Actions View GoTo Help

	Position	Sample ID	File Name	Inj Vol	Dil Factor	Sample Type	Level	Path	Inst Meth	Proc Meth	Cal File
1	RA1	IBGOD241	MD24001	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
2	RA2	BLANK(IS)	MD24002	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
3	RA3	IPCS 0.2PPB/400PPM	MD24003	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
4	RA4	LOD-01 0.1PPB	MD24004	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
5	RA5	LOQ-01 0.2PPB	MD24005	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
6	RA6	CPLGOD14021	MD24006	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
7	RA7	PLD008SB	MD24007	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
8	RA8	PLD008SL	MD24008	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
9	RB1	PLD008SC	MD24009	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
10	RB2	D114-01	MD24010	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
11	RB3	D114-02	MD24011	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
12	RB4	D114-03	MD24012	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
13	RB5	D114-04	MD24013	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
14	RB6	D114-05	MD24014	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
15	RB7	D114-06	MD24015	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
16	RB8	D114-07	MD24016	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
17	RA6	CPLGOD14022	MD24017	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
18	RC1	D114-08	MD24018	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
19	RC2	D114-08M	MD24019	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
20	RC3	D114-08S * Bad injection. PR	MD24020	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
21	RC4	D114-10	MD24021	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
22	RC5	D114-11	MD24022	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
23	RC6	D114-12	MD24023	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
24	RC7	D114-13	MD24024	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
25	RC8	D114-14	MD24025	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
26	RD1	D114-15	MD24026	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
27	RD2	D114-16	MD24027	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
28	RA6	CPLGOD14023	MD24028	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
29	RD3	D114-17	MD24029	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
30	RD4	D114-18	MD24030	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
31	RD5	D114-19	MD24031	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
32	RD6	D114-20	MD24032	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
33	RC3	D114-08S	MD24033	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
34	RD7	PLD009SB	MD24034	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
35	RD8	PLD009SL	MD24035	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
36	RE1	PLD009SC	MD24036	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
37	RE2	D114-21	MD24037	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
38	RE3	D114-23	MD24038	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
39	RA6	CPLGOD14024	MD24039	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
40	RE5	D114-22	MD24040	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
41	RE6	D114-22M	MD24041	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
42	RE7	D114-22S	MD24042	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
43	RE8	D114-25	MD24043	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
44	GA1	D130-08	MD24044	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
45	GA2	D130-08M	MD24045	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
46	GA3	D130-08S	MD24046	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
47	GA4	D130-09	MD24047	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
48	GA5	D130-18	MD24048	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14
49	GA6	D130-19	MD24049	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14	C:\Xcalibur\methods\PLGOD14

For Help, press F1

FINAL 04/27/15

CAP NUM 4/27/2015 Monday, April 27, 2015

Start | Thermo Xcalibur Sequ... | IceBOSLINK Event Log | c:\Xcalibur\methods\... | Chromeleon Xpress | Untitled - Paint | 2:51 PM

Thermo Xcalibur Sequence Setup - MD24.sld

File Edit Change Actions View GoTo Help

	Position	Sample ID	File Name	Inj Vol	Dil Factor	Sample Type	Level	Path	Inst Meth	Proc Meth	Cal File
8	RA8	PLD008SL	MD24008	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
9	RB1	PLD008SC	MD24009	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
10	RB2	D114-01	MD24010	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
11	RB3	D114-02	MD24011	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
12	RB4	D114-03	MD24012	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
13	RB5	D114-04	MD24013	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
14	RB6	D114-05	MD24014	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
15	RB7	D114-06	MD24015	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
16	RB8	D114-07	MD24016	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
17	RA6	CPLG0D14022	MD24017	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
18	RC1	D114-08	MD24018	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
19	RC2	D114-08M	MD24019	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
20	RC3	D114-08S	MD24020	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
21	RC4	D114-10	MD24021	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
22	RC5	D114-11	MD24022	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
23	RC6	D114-12	MD24023	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
24	RC7	D114-13	MD24024	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
25	RC8	D114-14	MD24025	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
26	RD1	D114-15	MD24026	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
27	RD2	D114-16	MD24027	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
28	RA6	CPLG0D14023	MD24028	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
29	RD3	D114-17	MD24029	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
30	RD4	D114-18	MD24030	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
31	RD5	D114-19	MD24031	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
32	RD6	D114-20	MD24032	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
33	RC3	D114-08S	MD24033	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
34	RD7	PLD009SB	MD24034	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
35	RD8	PLD009SL	MD24035	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
36	RE1	PLD009SC	MD24036	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
37	RE2	D114-21	MD24037	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
38	RE3	D114-23	MD24038	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
39	RA6	CPLG0D14024	MD24039	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
40	RE5	D114-22	MD24040	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
41	RE6	D114-22M	MD24041	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
42	RE7	D114-22S	MD24042	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
43	RE8	D114-25	MD24043	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
44	GA1	D130-08	MD24044	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
45	GA2	D130-08M	MD24045	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
46	GA3	D130-08S	MD24046	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
47	GA4	D130-09	MD24047	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
48	GA5	D130-1B	MD24048	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
49	GA6	D130-19	MD24049	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
50	RA6	CPLG0D14025	MD24050	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
51	RE4	D114-24	MD24051	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
52	RA6	CPLG0D14026	MD24052	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
53	RA4	LOD-02 0.1PPB	MD24053	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
54	RA2	BLANK(IS)	MD24054	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
55	RA2	SHUTDOWN	MD24055	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD24	C:\Xcalibur\methods\A_B_C_SHI	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
				0.001	0.000						

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FINAL cl 04/27/15

CAP NUM 4/27/2015 Monday, April 27, 2015

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0093

LFID	EFID	Dil Factor
MD24001	IBG0D241	1.000
MD24002	BLANK(IS)	1.000
MD24003	IPCS 0.2PPB/400PPM	1.000
MD24004	LOD-01 0.1PPB	1.000
MD24005	LOQ-01 0.2PPB	1.000
MD24006	CPLG0D14021	1.000
MD24007	PLD008SB	1.000
MD24008	PLD008SL	1.000
MD24009	PLD008SC	1.000
MD24010	D114-01	1.000
MD24011	D114-02	1.000
MD24012	D114-03	1.000
MD24013	D114-04	1.000
MD24014	D114-05	1.000
MD24015	D114-06	1.000
MD24016	D114-07	1.000
MD24017	CPLG0D14022	1.000
MD24018	D114-08	1.000
MD24019	D114-08M	1.000
MD24020	D114-08S	1.000
MD24021	D114-10	1.000
MD24022	D114-11	1.000
MD24023	D114-12	1.000
MD24024	D114-13	1.000
MD24025	D114-14	1.000
MD24026	D114-15	1.000
MD24027	D114-16	1.000
MD24028	CPLG0D14023	1.000
MD24029	D114-17	1.000
MD24030	D114-18	1.000
MD24031	D114-19	1.000
MD24032	D114-20	1.000
MD24033	D114-08S	1.000
MD24034	PLD009SB	1.000
MD24035	PLD009SL	1.000
MD24036	PLD009SC	1.000
MD24037	D114-21	1.000
MD24038	D114-23	1.000
MD24039	CPLG0D14024	1.000
MD24040	D114-22	1.000
MD24041	D114-22M	1.000
MD24042	D114-22S	1.000
MD24043	D114-25	1.000
MD24044	D130-08	1.000
MD24045	D130-08M	1.000
MD24046	D130-08S	1.000
MD24047	D130-09	1.000
MD24048	D130-18	1.000
MD24049	D130-19	1.000
MD24050	CPLG0D14025	1.000
MD24051	D114-24	1.000
MD24052	CPLG0D14026	1.000
MD24053	LOD-02 0.1PPB	1.000
MD24054	BLANK(IS)	1.000
MD24055	SHUTDOWN	1.000

FINAL ce 04/27/15

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
PERCHLORATE BY HPLC/MS

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

*4µL Internal Standard added to each 1mL sample vial prior to analysis.

**LOD-01, 02 (0.1 ppb)
1mL Standard → 1000mL H2O
**LOQ-01 (0.2ppb)
2mL Standard → 1000mL H2O

⊕PLD007WL/WC: (0.2ppb)
2mL Standard → 1000mL H2O

⊠D114.09M/09S (0.2ppb)
2mL Standard → 1000mL H2O

PLD007W: D114 & D187: 500mL aliquot of each sample were volumed to 1000mL H2O to be calculated as prep. factor of 2X prior to analysis. cd 04/28/15

D148-03 (From batch PLD010S): 500mL aliquot of each sample were volumed to 1000mL H2O to be calculated as prep. factor of 2X prior to analysis.

Book #:	AG0-005
Instrument No.:	G0
Analytical Sequence:	MD28
Method File:	PLD0D14 cd 04/28/15
Analytical Batch:	PLD007W

SOP #	Rev. #
☑ EMAX-6850	1
☐ EMAX-	

STANDARDS ID		Conc. (µg/L)
ICAL	—	—
ICV	—	—
DCC1	SHIC-10-05-02	2ppb / 20ppb
DCC2	—	—
LCS ⊕	SHIB-07-09-01	100 ppb
MS ⊠	—	—
IS *	SHID-07-08-02	500 ppb
IPC	SHIC-10-06-03	0.2ppb / 400 ppm
LODV**	SHIB-07-09-01	100 ppb

SOLVENT	ID
Acetonitrile	SWIA-005-009-24
Methanol	—
Water	SWIA-005-12-06
Acetic Acid	SPIA-07-10-01

FILTER	ID
0.20 µm PTFE Membrane	21852712
0.45 µm PTFE Membrane	—

Data File	

SYRINGES
☑ 1 mL - MSF-01-01-01
☐ 100 µL - MSF-01-01-02
☐ 25 µL - MSF-01-01-03
☑ 10 µL - MSF-01-01-04
☐
☐

ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ XCALIBURG0	
☐	

Analyzed By: cd
Date: 04/28/15

Thermo Xcalibur Sequence Setup - MD28.sld

File Edit Change Actions View GoTo Help

	Position	Sample ID	File Name	Inj Vol	Dil Factor	Sample Type	Level	Path	Inst Meth	Proc Meth	Cal File
1	RA1	IBG0D281	MD28001	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
2	RC6	IBG0D282	MD28002	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
3	RA2	BLANK(IS)	MD28003	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
4	RA3	IPCS 0.2PPB/400PPM	MD28004	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
5	RA4	LOD-01 0.1PPB	MD28005	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
6	RA5	LOQ-01 0.2PPB	MD28006	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
7	RA6	CPLG0D14030	MD28007	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
8	RA7	PLD007WB	MD28008	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
9	RA8	PLD007WL	MD28009	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
10	RB1	PLD007WC	MD28010	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
11	RB2	D148-03	MD28011	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
12	RB3	D148-03M	MD28012	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
13	RB4	D148-03S	MD28013	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
14	RB5	D114-09	MD28014	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
15	RB6	D114-09M	MD28015	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
16	RB7	D114-09S	MD28016	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
17	RA6	CPLG0D14031	MD28017	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
18	RB8	D187-01	MD28018	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
19	RC1	D187-02	MD28019	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
20	RC2	D187-03	MD28020	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
21	RC3	D187-04	MD28021	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
22	RA6	CPLG0D14032	MD28022	20.000	1.000	QC	2 PPB	C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
23	RA4	LOD-02 0.1PPB	MD28023	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
24	RA2	BLANK(IS)	MD28024	20.000	1.000	Unknown		C:\XCALIBUR\DATA\MD28	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14	C:\Xcalibur\methods\PLG0D14
				0.001	0.000						

FINAL cl 04/28/15

For Help, press F1

CAP NUM 4/28/2015 Tuesday, April 28, 2015

8096

LFID	EFID	Dil Factor
MD28001	IBG0D281	1.000
MD28002	IBG0D282	1.000
MD28003	BLANK(IS)	1.000
MD28004	IPCS 0.2PPB/400PPM	1.000
MD28005	LOD-01 0.1PPB	1.000
~~MD28006~~	~~LOQ-01 0.2PPB~~	~~1.000~~
MD28007	CPLG0D14030	1.000
MD28008	PLD007WB	1.000
MD28009	PLD007WL	1.000
MD28010	PLD007WC	1.000
MD28011	D148-03	1.000
MD28012	D148-03M	1.000
MD28013	D148-03S	1.000
MD28014	D114-09	1.000
MD28015	D114-09M	1.000
MD28016	D114-09S	1.000
MD28017	CPLG0D14031	1.000
MD28018	D187-01	1.000
MD28019	D187-02	1.000
MD28020	D187-03	1.000
MD28021	D187-04	1.000
MD28022	CPLG0D14032	1.000
MD28023	LOD-02 0.1PPB	1.000
MD28024	BLANK(IS)	1.000

FINAL cl 04/28/15

EXTRACTION LOGS

EMAX LABORATORIES, INC.

EXTRACTION LOG
for
PERCHLORATE BY HPLC/MS

Note: For samples, relevant QCs/Standards extracted, refer to attached extraction sequence.

Comments:

① 4µL Internal Standard added to each 1mL sample vial prior to analysis.

PLD008S: D114 - (1-8), (10-20)

Syringes:

☑ MSF - 01-01-01 → 1000µL

cd 04/21/18

☑ MSF - 01-01-02 → 100µL

☑ MSF - 01-01-04 → 10µL

Book #.: EPC-004

Preparation Batch: PLD008S

Matrix Soil

SOP	Rev. #
☑ EMAX-6850	0
☐ EMAX-	

Standards	ID	Amount Added (ml)
LCS/MS	(1000 ppb) SHIB-07-08-01	16µL
Internal Standard	(500 ppb) SHIB-07-08-02	① 4µL

Reagent	Lot # / ID
H_2O	SWIA-005-12-06
Sand	124605 / SWIB-002-41-14

SDG#	Extract Location

Prepared By: SC / cd

Standard Added By: cd

EMAX LABORATORIES, INC.

FileID: PLD008S

SAMPLE PREPARATION LOG FOR PERCHLORATE

PrepBatchID	LabSampleID	Aliquot	DateTime	Unit	Ve(ml)	ExpAmt	ExpVe(ml)	AliquotFctr	Comments
15PLD008S01	PLD008SB	3.99	4/21/15 16:53	g	40	4	40	1	
15PLD008S02	PLD008SL	4.02	4/21/15 16:55	g	40	4	40	1	
15PLD008S03	PLD008SC	4	4/21/15 16:56	g	40	4	40	1	
15PLD008S04	D114-01	4.01	4/21/15 17:09	g	40	4	40	1	
15PLD008S05	D114-02	4.02	4/21/15 17:10	g	40	4	40	1	
15PLD008S06	D114-03	4.01	4/21/15 17:10	g	40	4	40	1	
15PLD008S07	D114-04	4.02	4/21/15 17:11	g	40	4	40	1	
15PLD008S08	D114-05	4	4/21/15 17:12	g	40	4	40	1	
15PLD008S09	D114-06	3.99	4/21/15 17:17	g	40	4	40	1	
15PLD008S10	D114-07	4.01	4/21/15 17:18	g	40	4	40	1	
15PLD008S11	D114-08	4.01	4/21/15 17:20	g	40	4	40	1	
15PLD008S12	D114-08M	3.99	4/21/15 17:21	g	40	4	40	1	
15PLD008S13	D114-08S	4	4/21/15 17:22	g	40	4	40	1	
15PLD008S14	D114-10	3.99	4/21/15 17:23	g	40	4	40	1	
15PLD008S15	D114-11	4.01	4/21/15 17:24	g	40	4	40	1	
15PLD008S16	D114-12	4.02	4/21/15 17:25	g	40	4	40	1	
15PLD008S17	D114-13	3.99	4/21/15 17:26	g	40	4	40	1	
15PLD008S18	D114-14	4.02	4/21/15 17:27	g	40	4	40	1	
15PLD008S19	D114-15	4.01	4/21/15 17:27	g	40	4	40	1	
15PLD008S20	D114-16	4.01	4/21/15 17:29	g	40	4	40	1	FINAL
15PLD008S21	D114-17	4	4/21/15 17:29	g	40	4	40	1	
15PLD008S22	D114-18	4	4/21/15 17:30	g	40	4	40	1	
15PLD008S23	D114-19	4.01	4/21/15 17:31	g	40	4	40	1	
15PLD008S24	D114-20	3.99	4/21/15 17:32	g	40	4	40	1	

Balance ID: 10304418. Calibration check was verified prior to use.

Ve=extract volume

AliquotFctr=ExpAmt/Aliquot

☑ Extraction Started @ 4/21/15 17:52

Prepared By: CDam/SCerva

☑ Extraction Ended @ 4/22/15 9:56

Checked By: [illegible]

Date 04/21/15

EMAX LABORATORIES, INC.

EXTRACTION LOG
for
PERCHLORATE BY HPLC/MS

Note: For samples, relevant QCs/Standards extracted, refer to attached extraction sequence.

Comments:

① 4µL Internal Standard added to each 1mL sample vial prior to analysis.

PLD009S: D114 - (21-25) & D130

Syringes:

☑ 1000µL - MSF-01-01-01

☑ 100µL - MSF-01-01-02

☑ 10µL - MSF-01-01-04

Book #.: EPC-004

Preparation Batch: PLD009S

Matrix Soil

SOP	Rev. #
☑ EMAX-6850	0
☐ EMAX-	

Standards	ID	Amount Added (ml)
LCS/MS	(1000ppb) SHIB-07-08-01	16µL
Internal Standard	(500ppb) SHIB-07-08-02	① 4µL

Reagent	Lot # / ID
H_2O	SWIA-005-12-06
Sand	124605 | SWIB-002-41-19

SDG#	Extract Location

Prepared By: SC / cl

Standard Added By: cl

8101

EMAX LABORATORIES, INC.

FileID: PLD009S

SAMPLE PREPARATION LOG FOR PERCHLORATE

PrepBatchID	LabSampleID	Aliquot	DateTime	Unit	Ve(ml)	ExpAmt	ExpVe(ml)	AliquotFctr	Comments
15PLD009S01	PLD009SB	4.01	4/21/15 17:37	g	40	4	40	1	
15PLD009S02	PLD009SL	4.02	4/21/15 17:38	g	40	4	40	1	
15PLD009S03	PLD009SC	3.99	4/21/15 17:39	g	40	4	40	1	
15PLD009S04	D114-21	4.01	4/21/15 17:40	g	40	4	40	1	
15PLD009S05	D114-22	4.02	4/21/15 17:41	g	40	4	40	1	
15PLD009S06	D114-22M	4	4/21/15 17:42	g	40	4	40	1	
15PLD009S07	D114-22S	4.01	4/21/15 17:43	g	40	4	40	1	
15PLD009S08	D114-23	4.01	4/21/15 17:44	g	40	4	40	1	
15PLD009S09	D114-24	4	4/21/15 17:45	g	40	4	40	1	
15PLD009S10	D114-25	4.01	4/21/15 17:46	g	40	4	40	1	
15PLD009S11	D130-08	4	4/21/15 17:46	g	40	4	40	1	
15PLD009S12	D130-08M	4.02	4/21/15 17:47	g	40	4	40	1	
15PLD009S13	D130-08S	4	4/21/15 17:48	g	40	4	40	1	
15PLD009S14	D130-09	4	4/21/15 17:49	g	40	4	40	1	
15PLD009S15	D130-18	3.99	4/21/15 17:50	g	40	4	40	1	
15PLD009S16	D130-19	3.99	4/21/15 17:51	g	40	4	40	1	

FINAL

Balance ID: 10304418. Calibration check was verified prior to use.

Ve=extract volume

AliquotFctr=ExpAmt/Aliquot

☑ Extraction Started @ 4/21/15 18:02

☑ Extraction Ended @ 4/22/15 9:57

Prepared By: CDam/SCerva

Checked By: [illegible]

Date 04/21/15

81102

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D114

METHOD 7199
HEXAVALENT CHROMIUM

One (1) water sample was received on 04/17/15 to be analyzed for Hexavalent Chromium in accordance with Method 7199 and project specific requirements.

Holding Time
The sample was analyzed within the prescribed holding time.

Calibration
Calibration was performed as prescribed by the method and was verified using a secondary source (ICV). All calibration requirements were within acceptance criteria.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, one (1) method blank was analyzed. Hexavalent Chromium was not detected in HCD013WB. Refer to sample result summary form for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, one (1) set of LCS/LCD was analyzed. Hexavalent Chromium was within LCS QC limits in HCD013WL/HCD013WC. Refer to LCS summary form for details.

Matrix QC Sample
No matrix QC sample was designated on this SDG.

Sample Analysis
The sample was analyzed according to prescribed analytical procedures. Results were evaluated in accordance to project requirements. For this SDG, all quality control requirements were met.

SAMPLE RESULTS

METHOD 7199
HEXAVALENT CHROMIUM

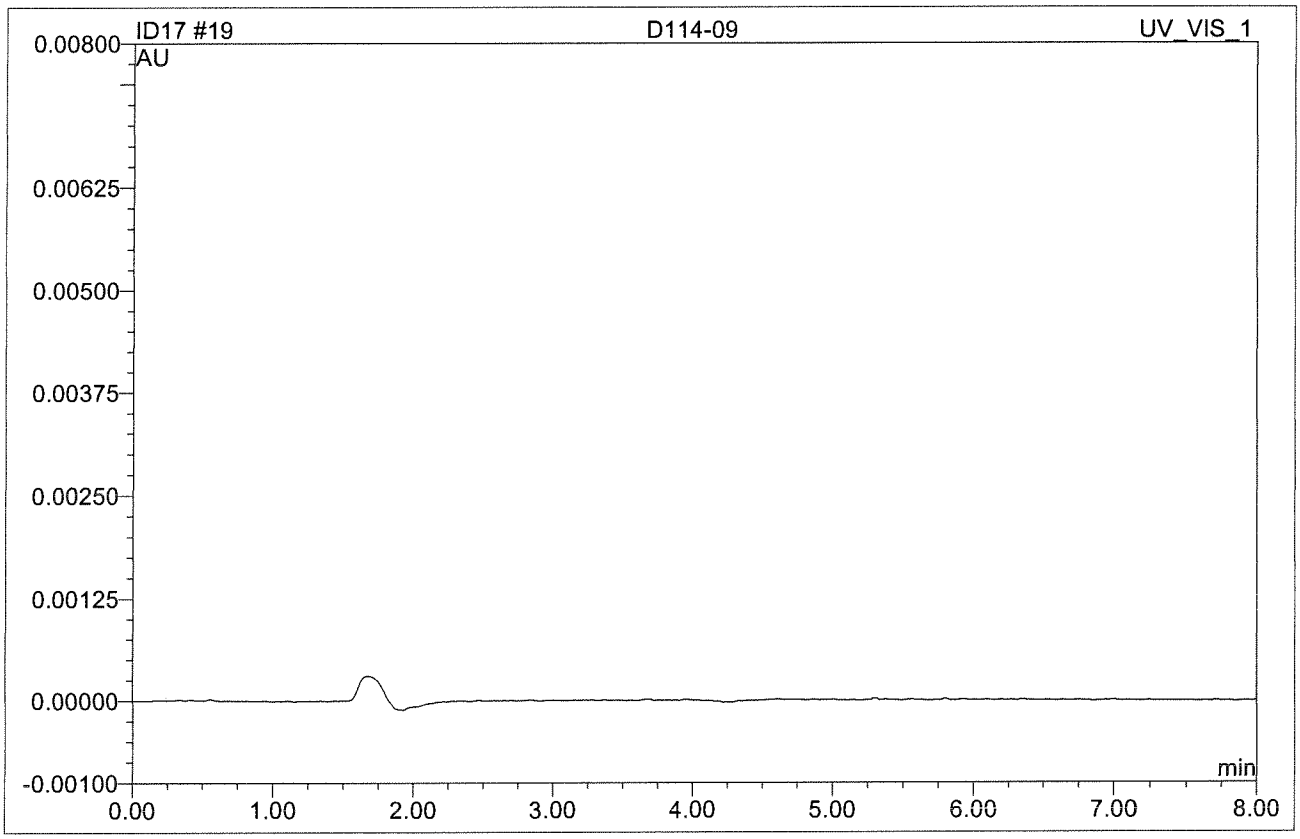
Client : KLEINFELDER
Project : CTO 070, UX04, FALLBROOK
Batch No. : 15D114

Matrix : WATER
InstrumentID : 59

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/L)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1W	HCD013WB	ND	1	NA	0.2	0.05	0.1	04/17/1513:00	NA	ID17006	ID17001	HCD013W	NA	NA
UX04-EB-041615	D114-09	ND	1	NA	0.2	0.05	0.1	04/17/1513:21	NA	ID17008	ID17001	HCD013W	04/16/1514:20	04/17/15
LCS1W	HCD013WL	2.04	1	NA	0.2	0.05	0.1	04/17/1514:44	NA	ID17016	ID17013	HCD013W	NA	NA
LCD1W	HCD013WC	2.00	1	NA	0.2	0.05	0.1	04/17/1515:05	NA	ID17018	ID17013	HCD013W	NA	NA

ID17 008 D114-09

Sample Name:	**D114-09**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/17/2015 13:21**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

QC SUMMARIES

EMAX QUALITY CONTROL DATA
LAB CONTROL SAMPLE ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UX04, FALLBROOK
BATCH NO. : 15D114
METHOD : 7199

MATRIX : WATER % MOISTURE: NA

DILUTION FACTOR:	1	1	1
SAMPLE ID :	MBLK1W	LCS1W	LCD1W
LAB SAMPLE ID :	HCD013WB	HCD013WL	HCD013WC
LAB FILE ID :	ID17006	ID17016	ID17018
DATE PREPARED :	NA	NA	NA
DATE ANALYZED :	04/17/1513:00	04/17/1514:44	04/17/1515:05
PREP BATCH :	HCD013W	HCD013W	HCD013W
CALIBRATION REF:	ID17001	ID17013	ID17013

ACCESSION:

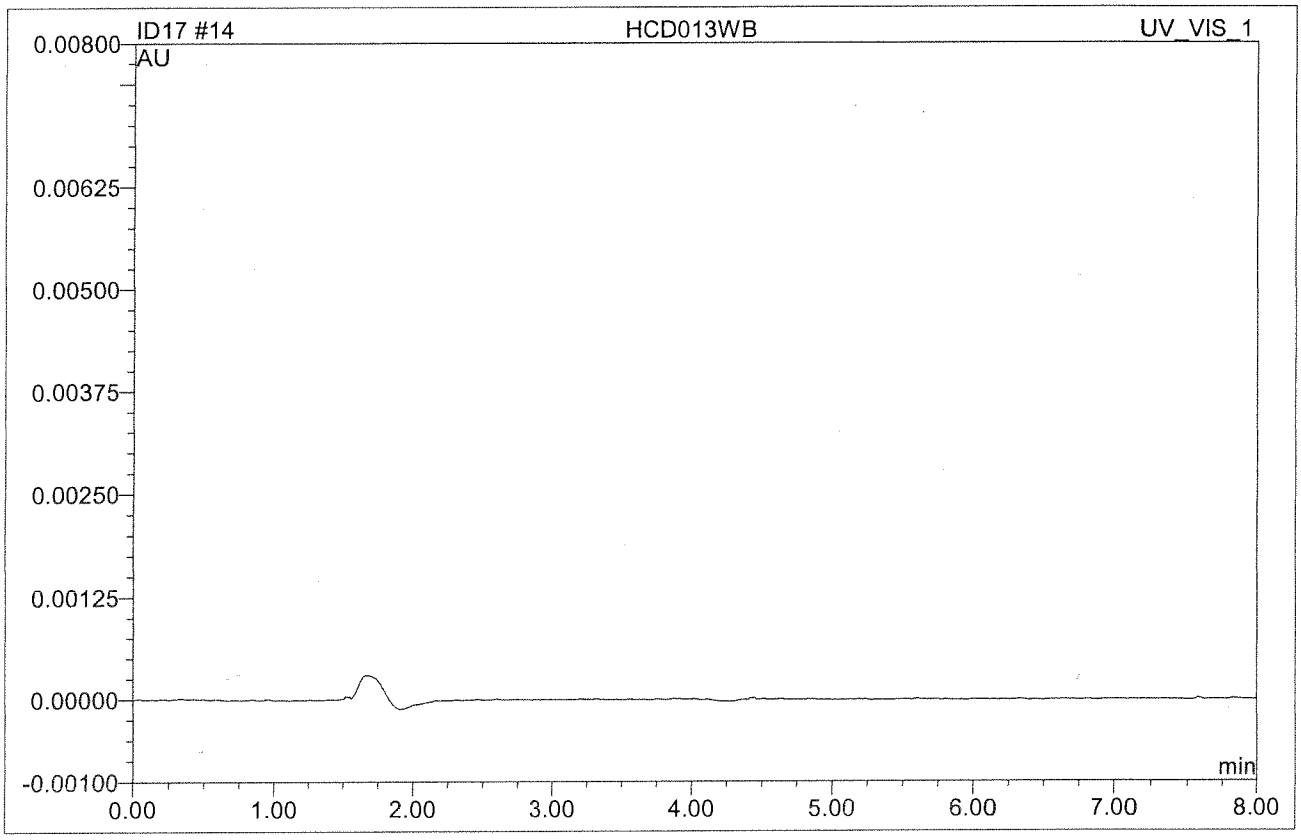
PARAMETER	MB RESULT (ug/L)	SPIKE AMT (ug/L)	BS RESULT (ug/L)	BS REC (%)	SPIKE AMT (ug/L)	BSD RESULT (ug/L)	BSD REC (%)	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Hexavalent Chromium	ND	2	2.04	102	2	2.00	100	2	80-120	20

0193

QC DATA

ID17 003 HCD013WB

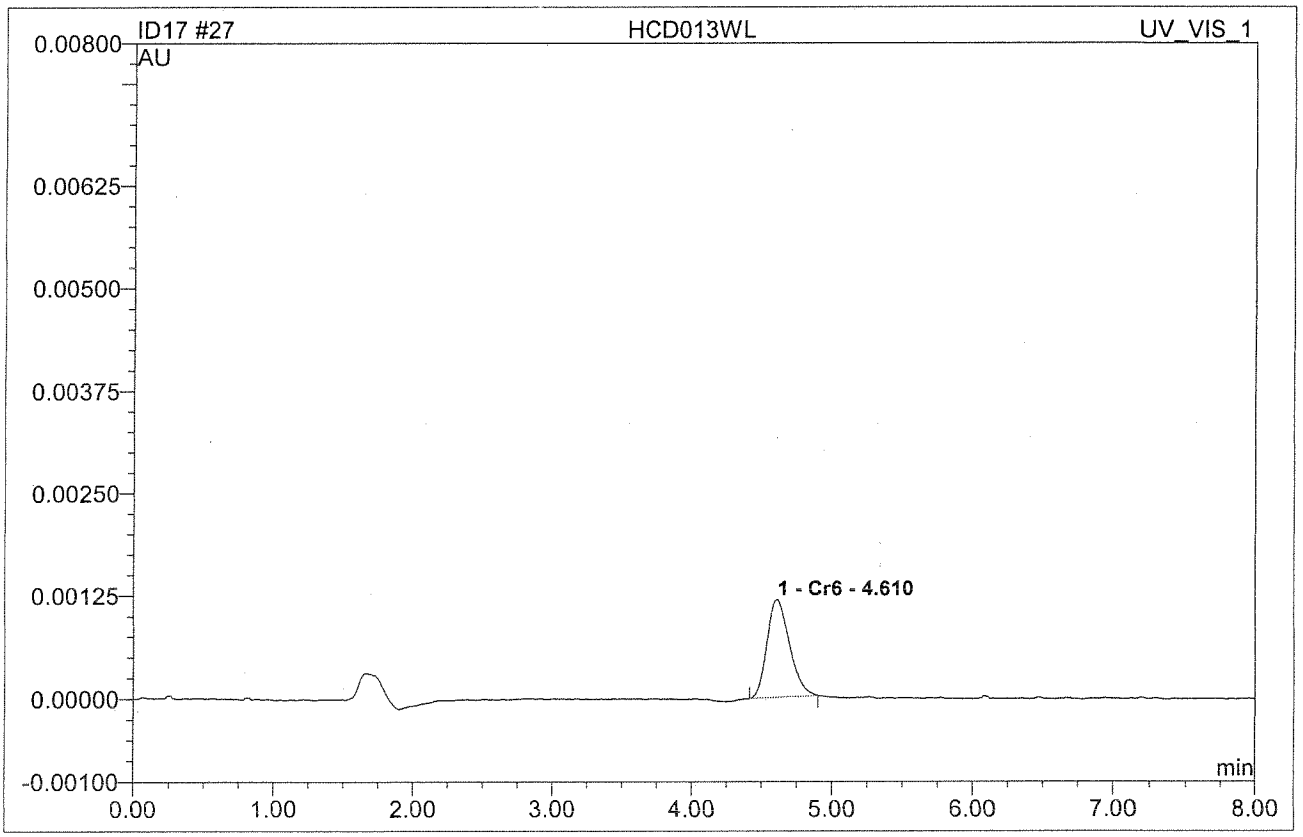
Sample Name:	**HCD013WB**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/17/2015 12:29**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID17 016 HCD013WL

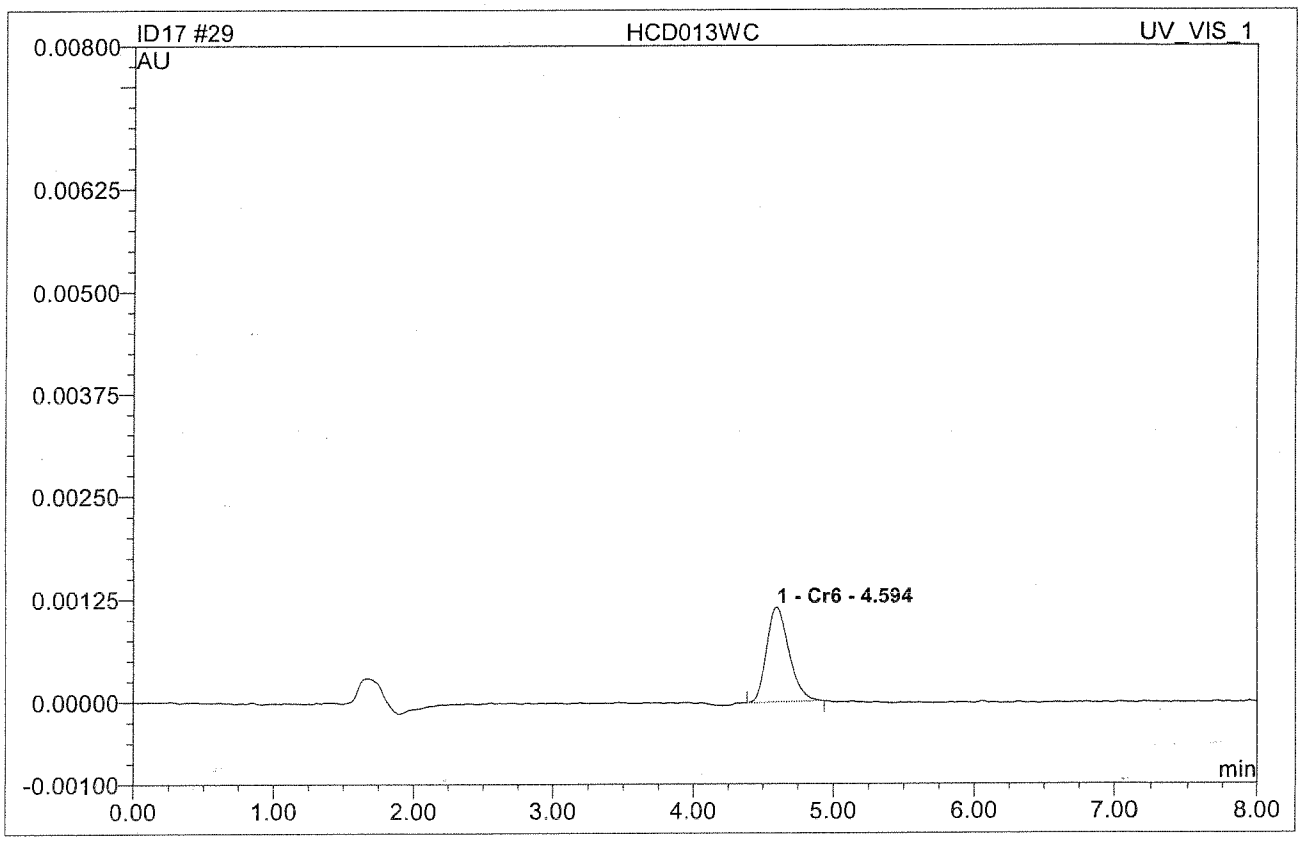
Sample Name:	**HCD013WL**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/17/2015 14:44**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.61	Cr6	0.0011840	0.0002178	100.00	2.042	BMB
Total:			0.001	0.000	100.00	2.042	

ID17 018 HCD013WC

Sample Name:	**HCD013WC**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/17/2015 15:05**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.59	Cr6	0.0011530	0.0002134	100.00	2.004	BMB
Total:			0.001	0.000	100.00	2.004	

INITIAL CALIBRATION(S)

IC RESULT FORM CalVersion : CR6.A26/IA26 (2015)

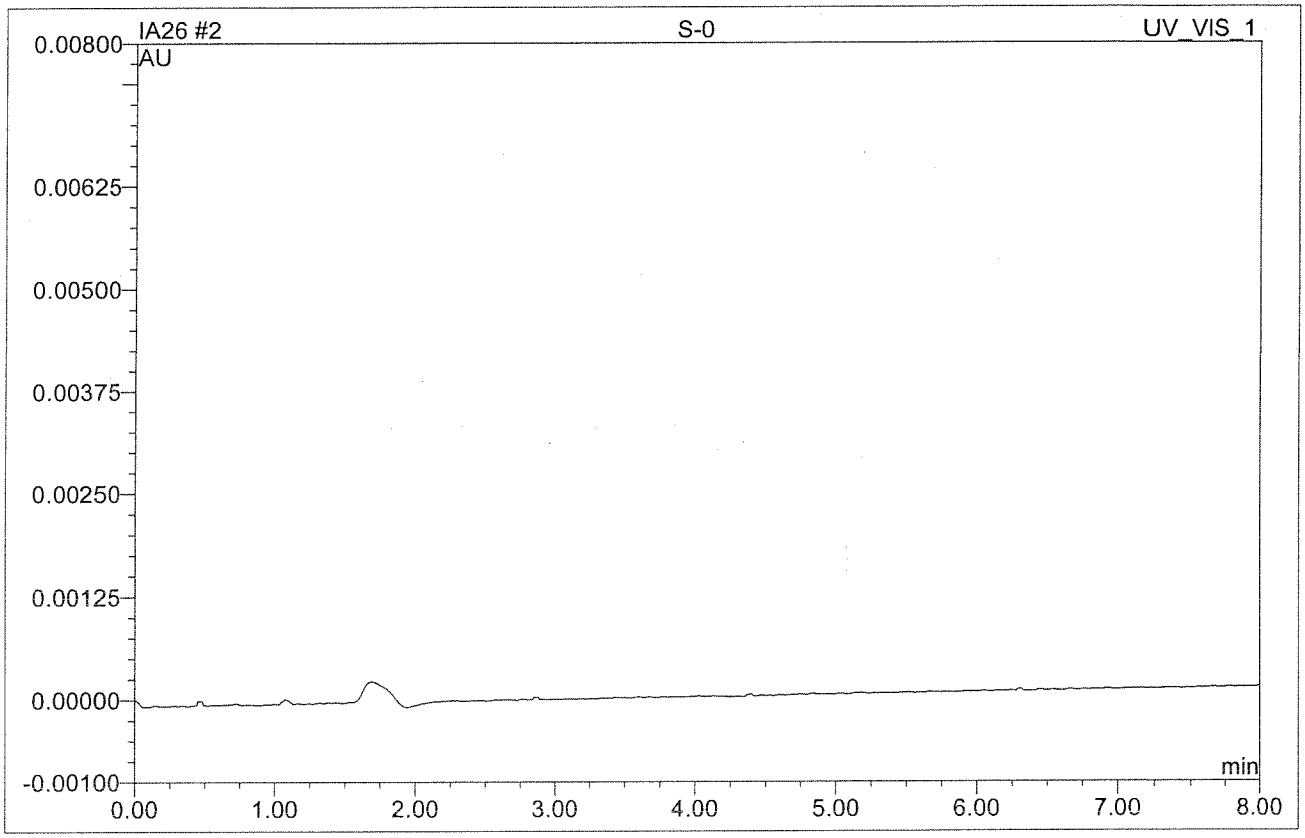
LFID	LSID	SelCmp	Cr6	DateTime	DF
IA26001	IB	C	ND	01/26/1514:29	1
IA26002	S-0	C	ND	01/26/1514:39	1
IA26003	S-1	C	0.185	01/26/1514:55	1
IA26004	S-2	C	0.513	01/26/1515:05	1
IA26005	S-3	C	0.868	01/26/1515:16	1
IA26006	S-4	C	1.998	01/26/1515:26	1
IA26007	S-5	C	4.985	01/26/1515:36	1
IA26008	S-6	C	7.644	01/26/1515:47	1
IA26009	S-7	C	9.913	01/26/1515:57	1
IA26010	ICV	C	96%	01/26/1516:10	1
IA26011	ICB	C	ND	01/26/1516:21	1

METHOD: IC59A26
SOLVENT: pH NANOPURE (SW4-02-49-03)

AA
01/27/15

IA26 002 S-0

Sample Name:	**S-0**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 14:39**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



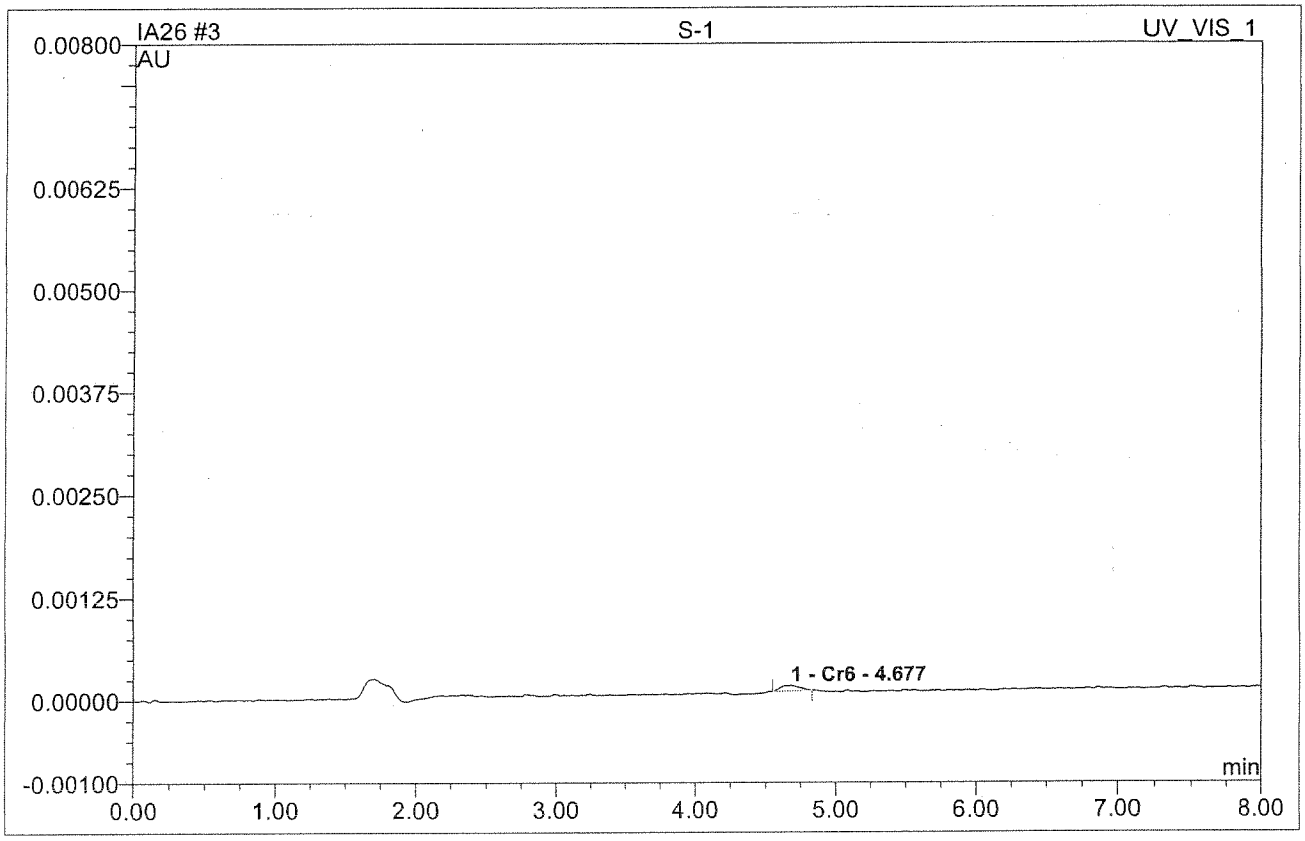
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

AA
01/27/15

IA26 003 S-1

0.2 PPB

Sample Name:	**S-1**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 14:55**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



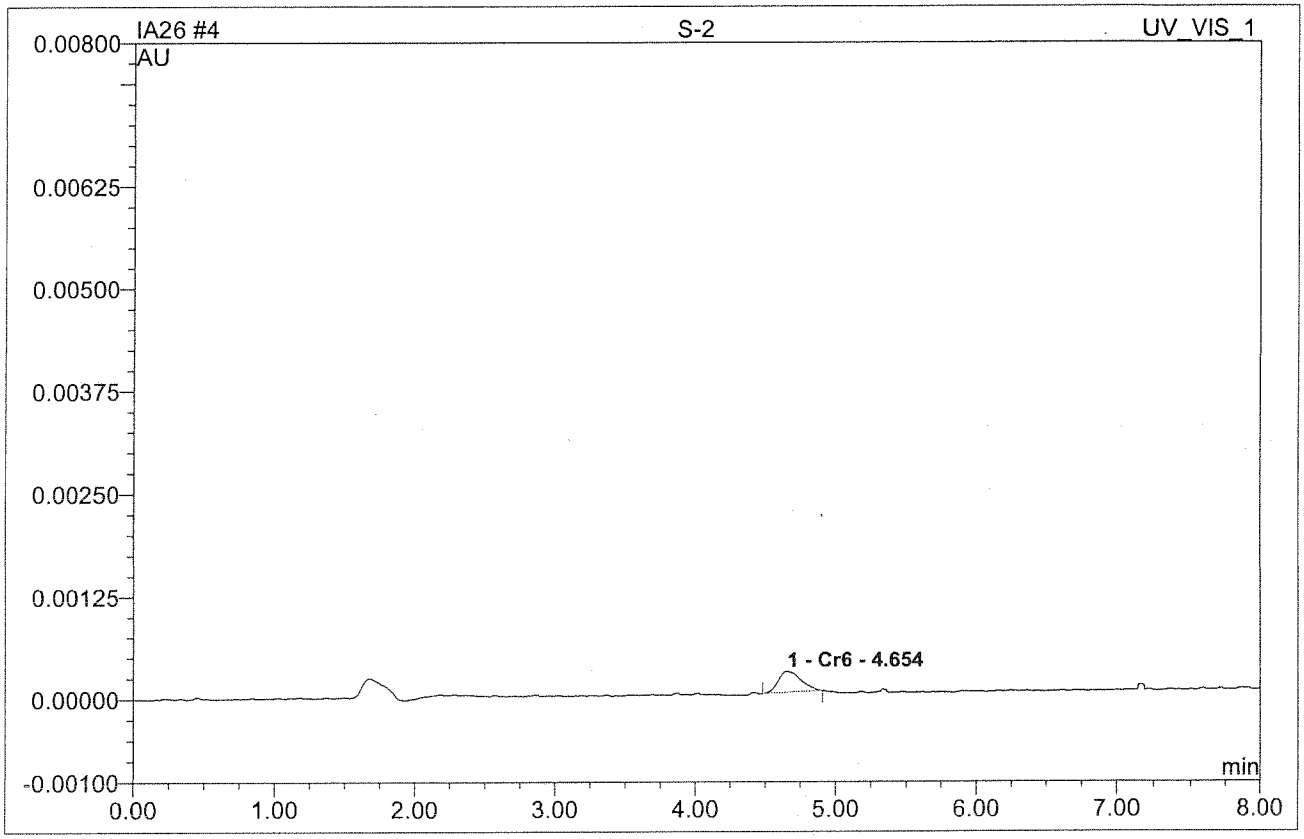
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.68	Cr6	0.0000670	0.0000102 ✓	100.00	0.185 ✓	BMB
Total:			0.000	0.000	100.00	0.185	

RA
01/27/15

IA26 004 S-2

0.5 PPB

Sample Name:	**S-2**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:05**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



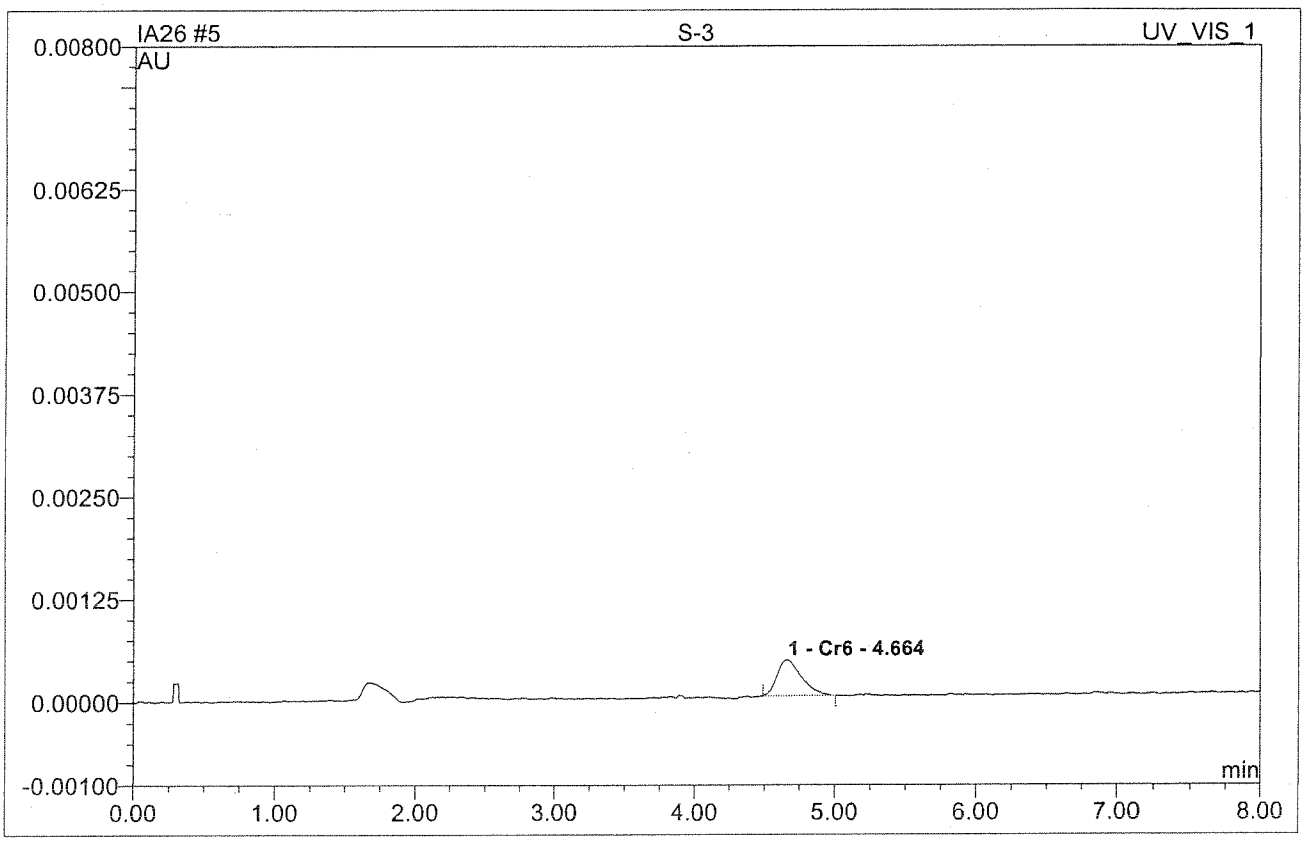
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.65	Cr6	0.0002560	0.0000469	100.00	0.513	BMB
Total:			0.000	0.000	100.00	0.513	

RA
01/27/15

IA26 005 S-3

1.0 PPB

Sample Name:	**S-3**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:16**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



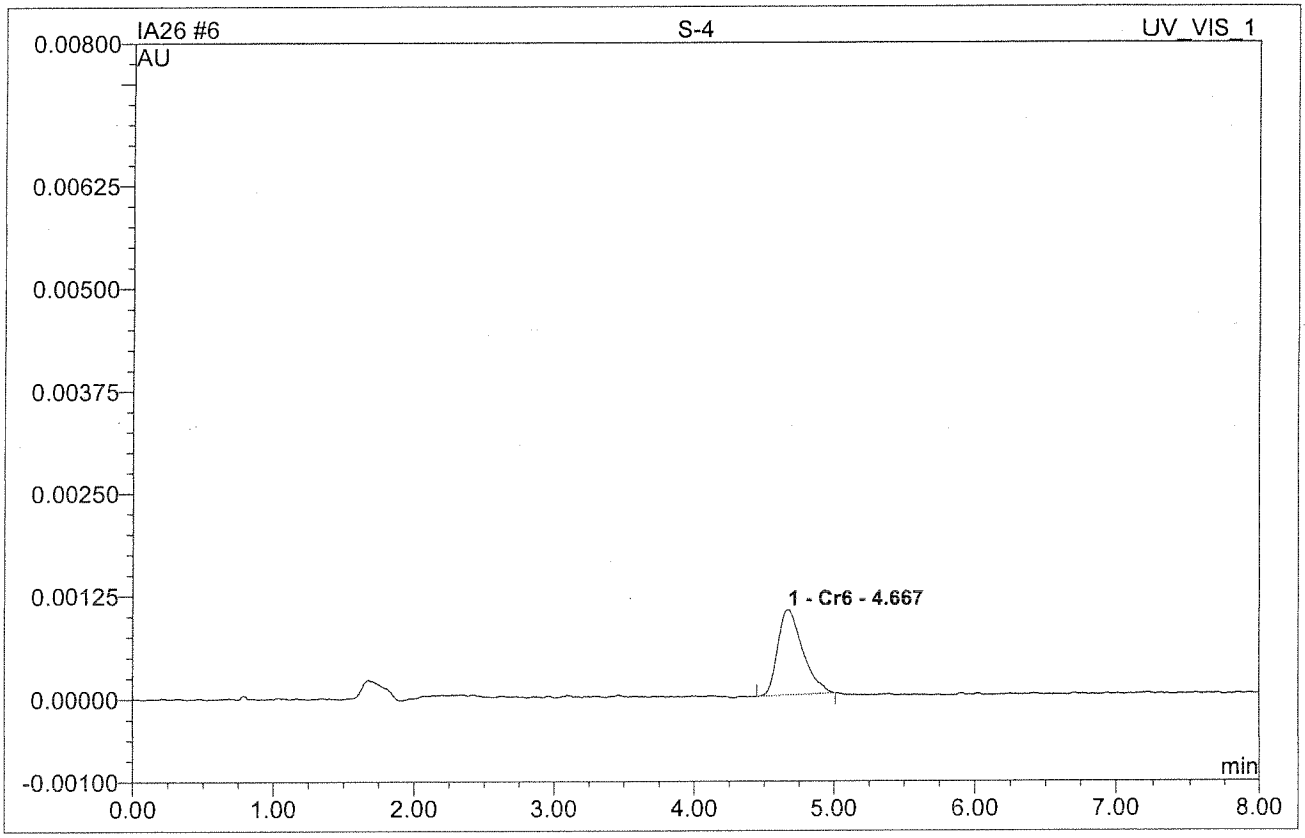
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.66	Cr6	0.0004350	0.0000865	100.00	0.868	BMB
Total:			0.000	0.000	100.00	0.868	

AS 01/27/15

IA26 006 S-4

2.0 PPB

Sample Name:	**S-4**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:26**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



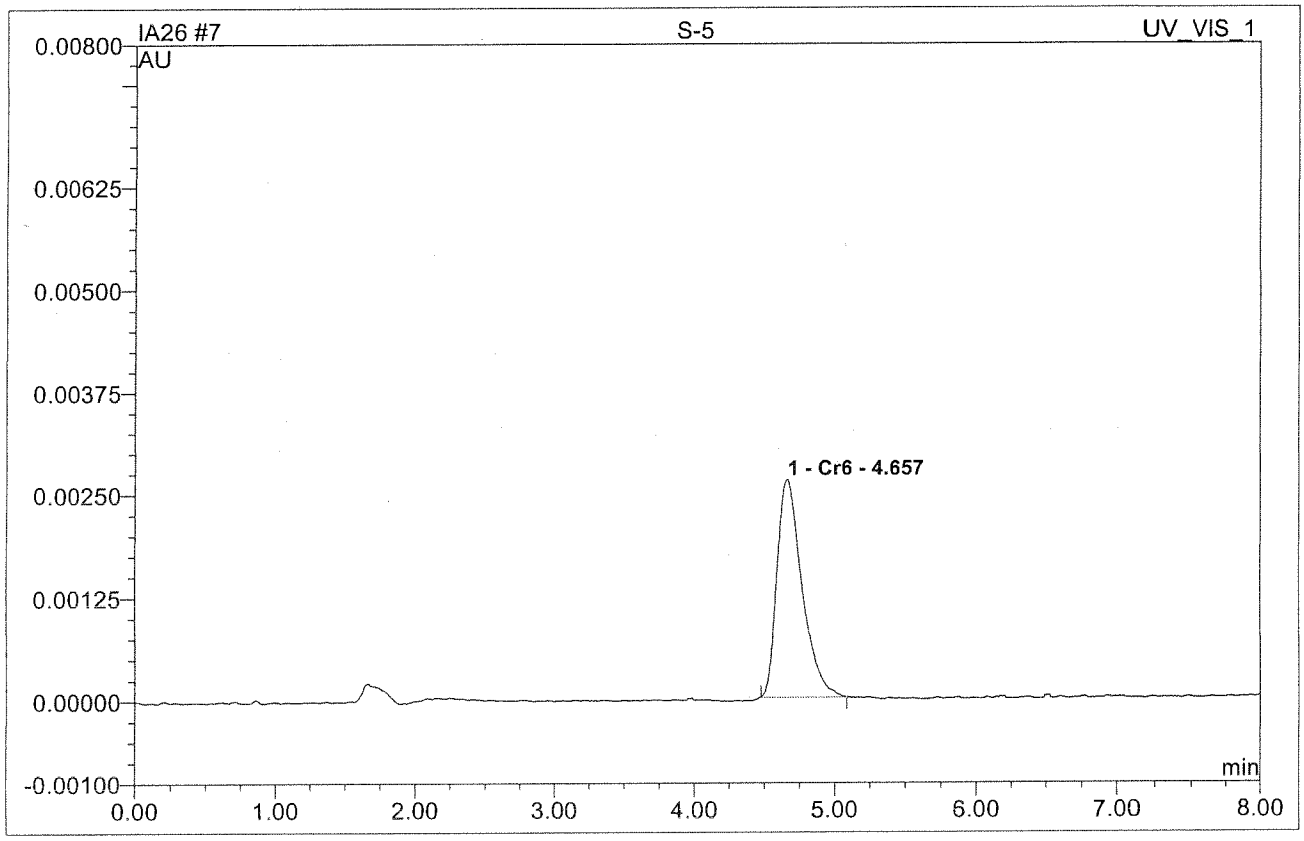
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.67	Cr6	0.0010350	0.0002128	100.00	1.998	BMB
Total:			0.001	0.000	100.00	1.998	

RA
01/27/15

IA26 007 S-5

5.0 PPB

Sample Name:	**S-5**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:36**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



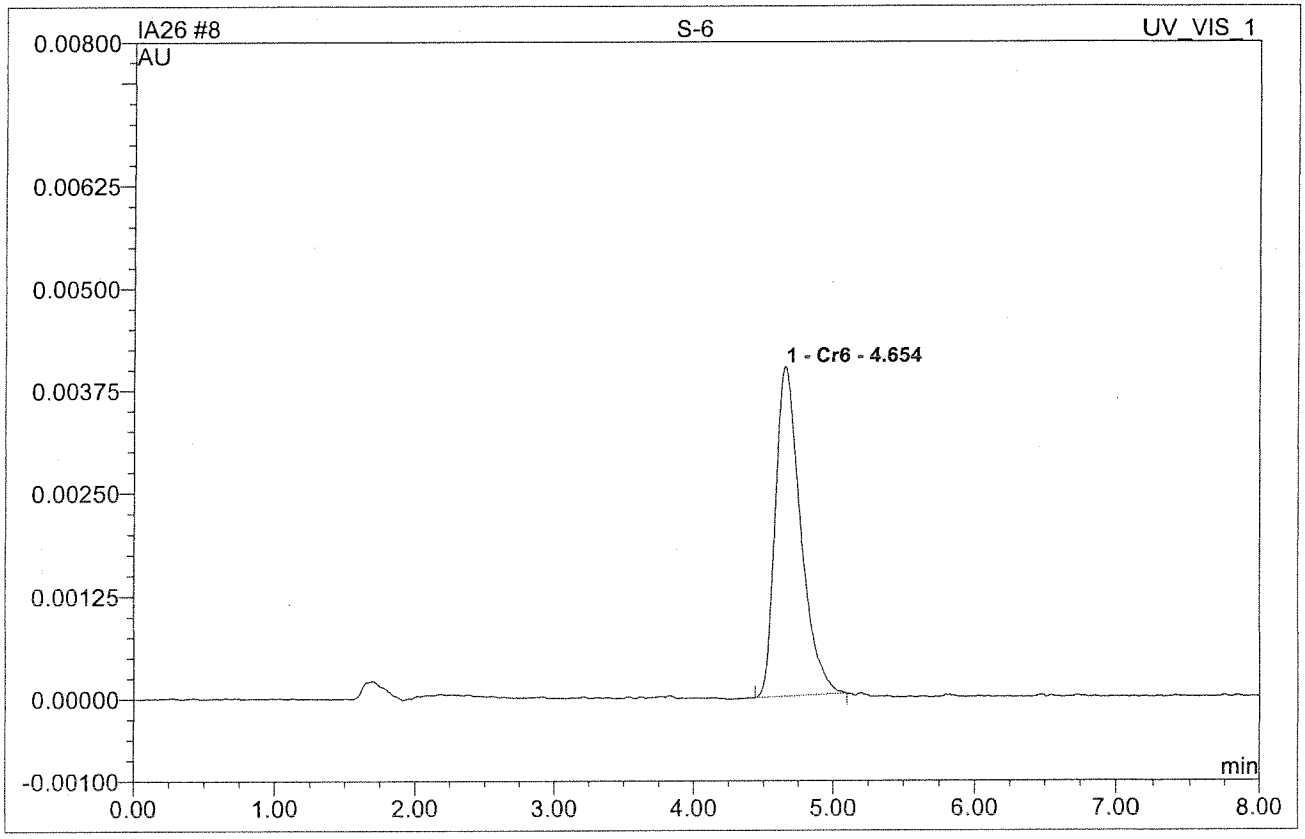
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.66	Cr6	0.0026400	0.0005466	100.00	4.985	BMB
Total:			0.003	0.001	100.00	4.985	

AA
01/27/15

IA26 008 S-6

7.5 PPB

Sample Name:	**S-6**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:47**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



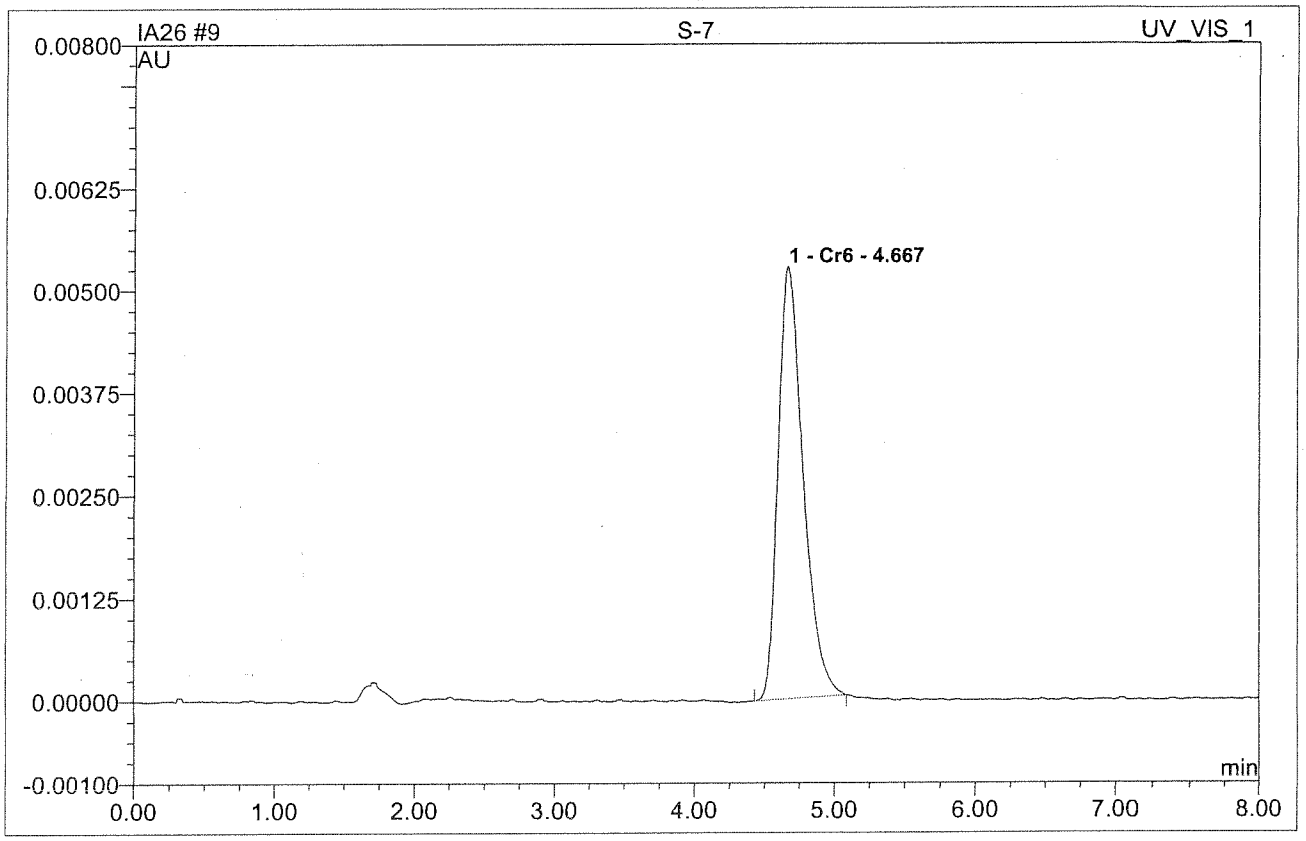
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.65	Cr6	0.0040100	0.0008438	100.00	7.644	BMB
Total:			0.004	0.001	100.00	7.644	

AA
01/27/15

IA26 009 S-7

10 PPB

Sample Name:	**S-7**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 15:57**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



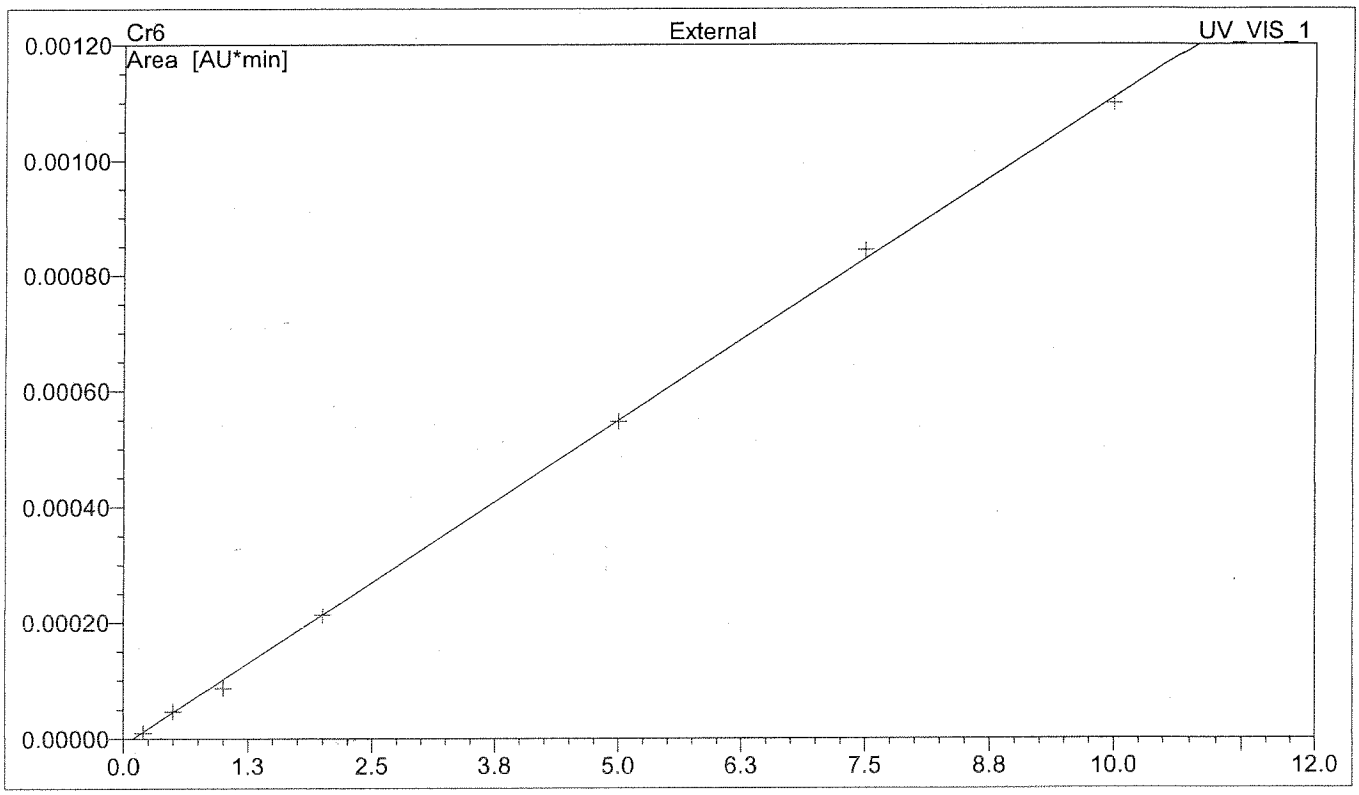
No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.67	Cr6	0.0052610	0.0010973	100.00	9.913	BMB
Total:			0.005	0.001	100.00	9.913	

AJ 01/27/15

9 S-7

10 PPB

Sample Name:	**S-7**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1.0000**
Recording Time:	**1/26/2015 15:57**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Cal.Type	Points	R-Square	Offset	Slope	Curve
1	4.67	Cr6	0LOff	7	0.9995	-0.0000105	0.0001118	0.0000
Average:					0.9995	0.0000	0.0001	0.0000

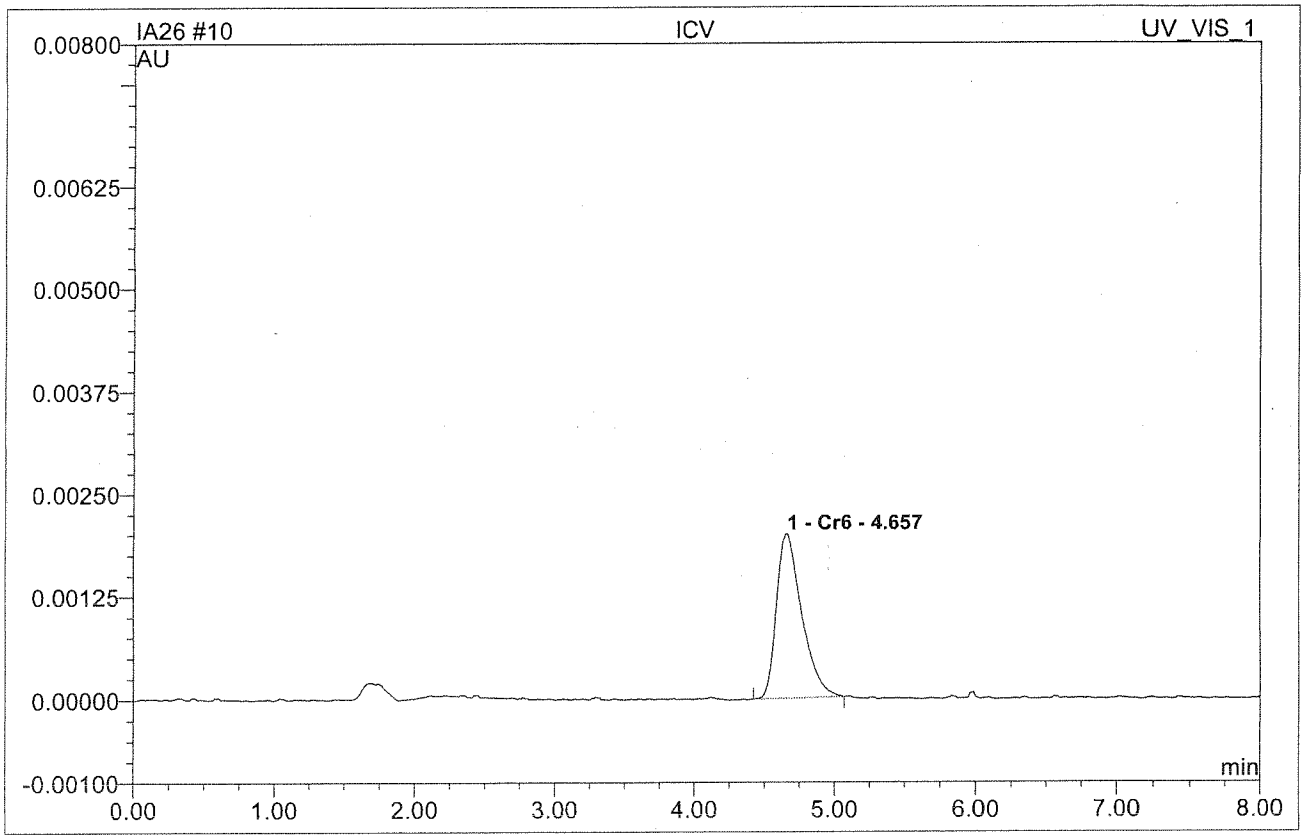
AA 01/27/15

SECOND SOURCE VERIFICATION

IA26 010 ICV

4.0 PPB

Sample Name:	**ICV**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 16:10**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**

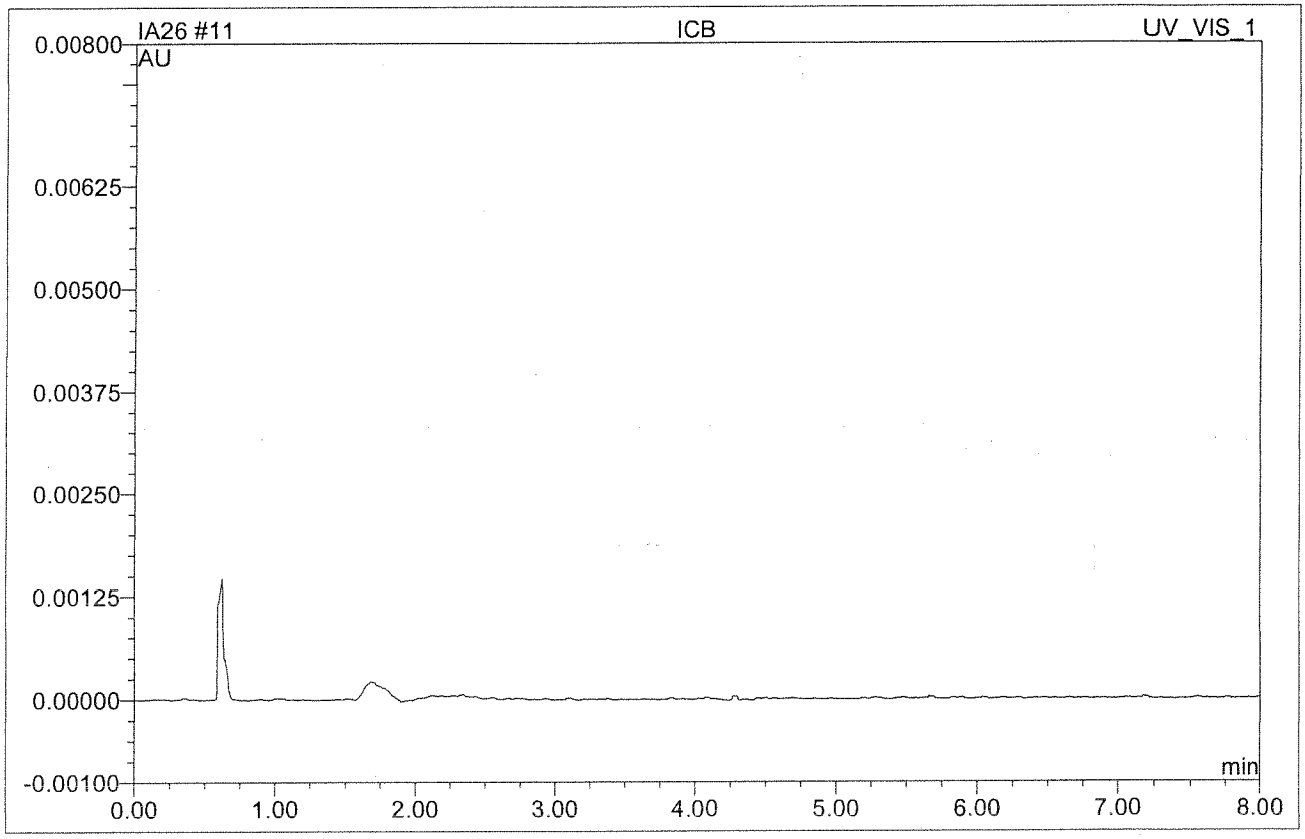


No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.66	Cr6	0.0019990	0.0004173	100.00	3.827	BMB
Total:			0.002	0.000	100.00	3.827	

AS
01/27/15

IA26 011 ICB

Sample Name:	**ICB**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**1/26/2015 16:21**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

NA
01/27/15

DAILY CALIBRATION(S)

Continuing Calibration Summary Form

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK
SDG : 15D114
Method : 7199
QuantMethod : IC59A26
InstrumentID: 59
Parameter : Hexavalent Chromium

LFID	LSID	DF	Expected	Result	Unit	%Rec	AnalysisDateTime
ID17001	CCV239	1	2	1.964	ug/L	98	04/17/1512:08
ID17013	CCV241	1	2	1.955	ug/L	98	04/17/1514:13
ID17020	CCV243	1	2	1.967	ug/L	98	04/17/1515:25

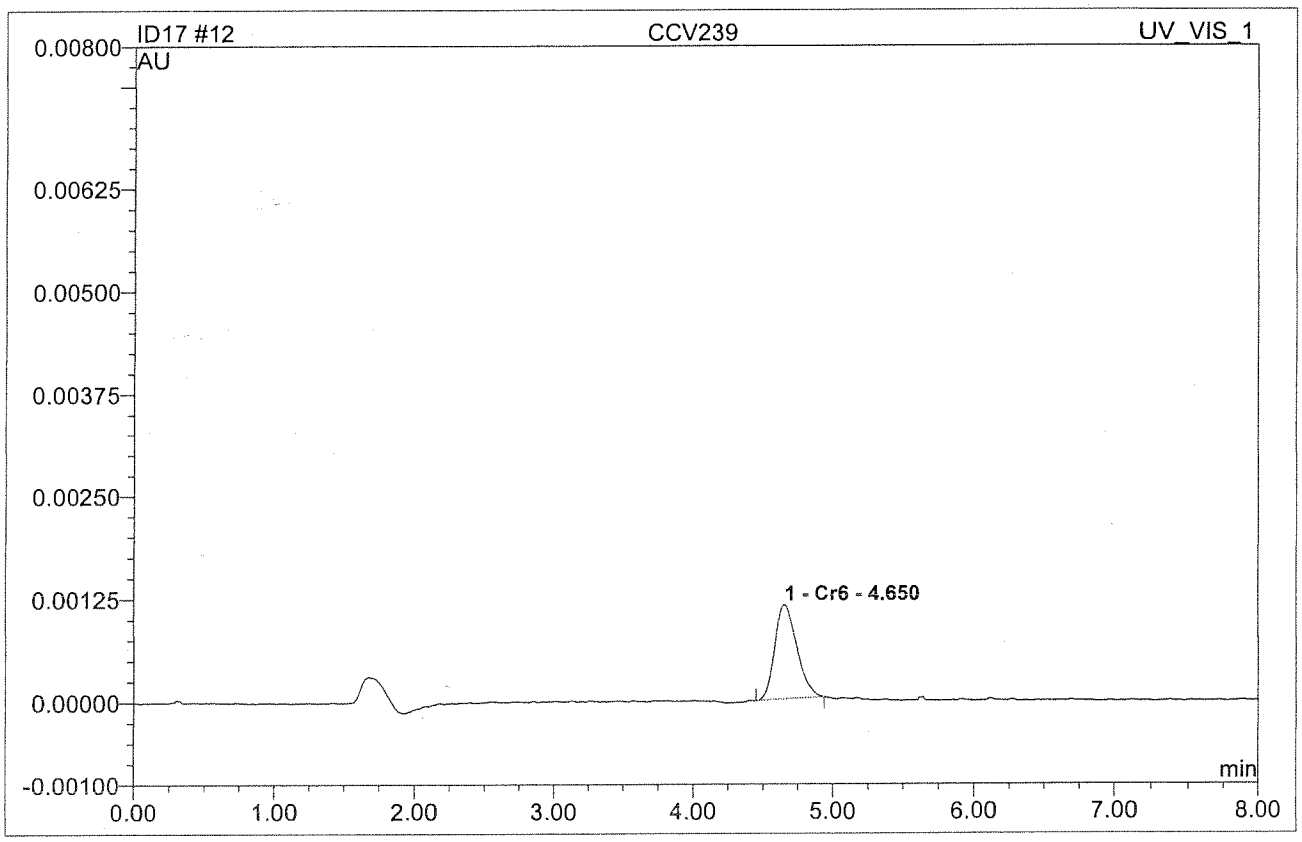
CCV Acceptance Criteria: 90-110%

IC RESULT FORM CalVersion : CR6.A26

LFID	LSID	SelCmp	Cr6	DateTime	DF
ID17001	CCV239	C	98%	04/17/1512:08	1
ID17002	CCB239	C	ND	04/17/1512:18	1
ID17003	HCD013WB	C	ND	04/17/1512:29	1
ID17004	D106-06I	C	ND	04/17/1512:39	5
ID17005	D106-06IA	C	5.253	04/17/1512:49	5
ID17006	HCD013WB	C	ND	04/17/1513:00	1
ID17007	HCD013WQ	C	ND	04/17/1513:10	1
ID17008	D114-09	C	ND	04/17/1513:21	1
ID17009	D114-09N	C	ND	04/17/1513:31	1
ID17010	D106-07	C	ND	04/17/1513:41	1
ID17011	D106-07D	C	ND	04/17/1513:52	1
ID17012	D106-07M	C	0.940	04/17/1514:02	1
ID17013	CCV241	C	98%	04/17/1514:13	1
ID17014	CCB241	C	ND	04/17/1514:23	1
ID17015	D106-03I	DC	9.523	04/17/1514:33	5
ID17016	HCD013WL	C	2.042	04/17/1514:44	1
ID17017	HCD013WX	C	2.090	04/17/1514:54	1
ID17018	HCD013WC	C	2.004	04/17/1515:05	1
ID17019	HCD013WY	C	2.005	04/17/1515:15	1
ID17020	CCV243	C	98%	04/17/1515:25	1
ID17021	CCB243	C	ND	04/17/1515:36	1
ID17022	D123-01	C	ND	04/17/1516:35	1
ID17023	D123-01D	C	ND	04/17/1516:45	1
ID17024	D123-01M	C	1.054	04/17/1516:56	1
ID17025	D123-02	C	ND	04/17/1517:06	1
ID17026	D123-03	C	0.336	04/17/1517:16	1
ID17027	D123-04	C	5.537	04/17/1517:27	1
ID17028	D123-06	C	2.411	04/17/1517:37	1
ID17029	D123-07	C	0.302	04/17/1517:48	1
ID17030	D123-08	C	0.239	04/17/1517:58	1
ID17031	D123-09	C	ND	04/17/1518:08	1
ID17032	CCV245	C	97%	04/17/1518:19	1
ID17033	CCB245	C	ND	04/17/1518:29	1
ID17034	D123-05	C	0.146	04/17/1518:40	1
ID17035	CCV247	C	97%	04/17/1518:50	1
ID17036	CCB247	C	ND	04/17/1519:00	1
ID17037	D123-08N	C	0.262	04/17/1519:11	1
ID17038	D123-08A	C	0.488	04/17/1519:21	1
ID17039	D123-06I	C	2.476	04/17/1519:32	2
ID17040	D123-04I	C	5.413	04/17/1519:42	2
ID17041	D123-04IA	C	7.509	04/17/1519:52	2
ID17042	D123-05	C	0.161	04/17/1520:03	1
ID17043	D123-05A	C	0.362	04/17/1520:13	1
ID17044	CCV249	C	101%	04/17/1520:34	1
ID17045	CCB249	C	ND	04/17/1520:44	1

ID17 001 CCV239

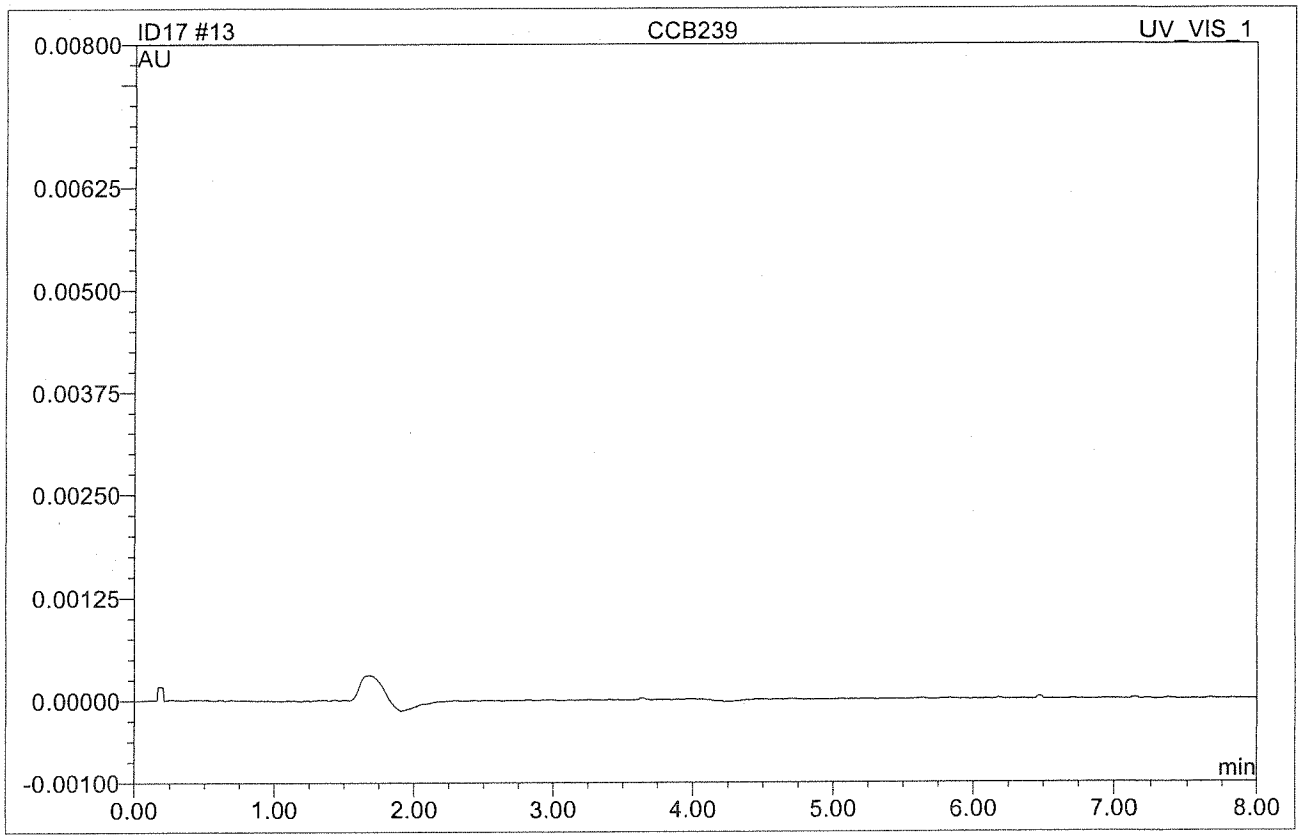
Sample Name:	**CCV239**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/17/2015 12:08**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.65	Cr6	0.0011420	0.0002091	100.00	1.964	BMB
Total:			0.001	0.000	100.00	1.964	

ID17 002 CCB239

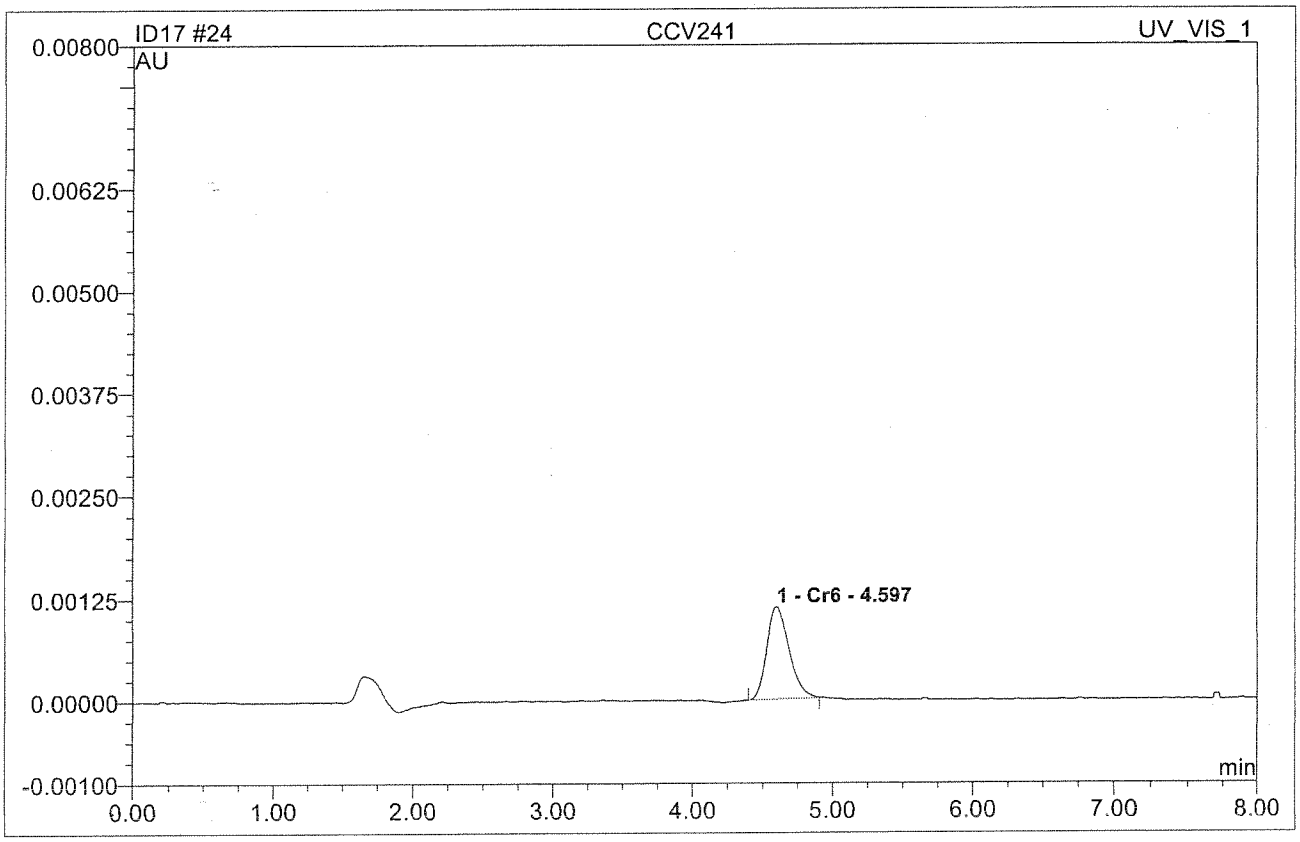
Sample Name:	**CCB239**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/17/2015 12:18**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID17 013 CCV241

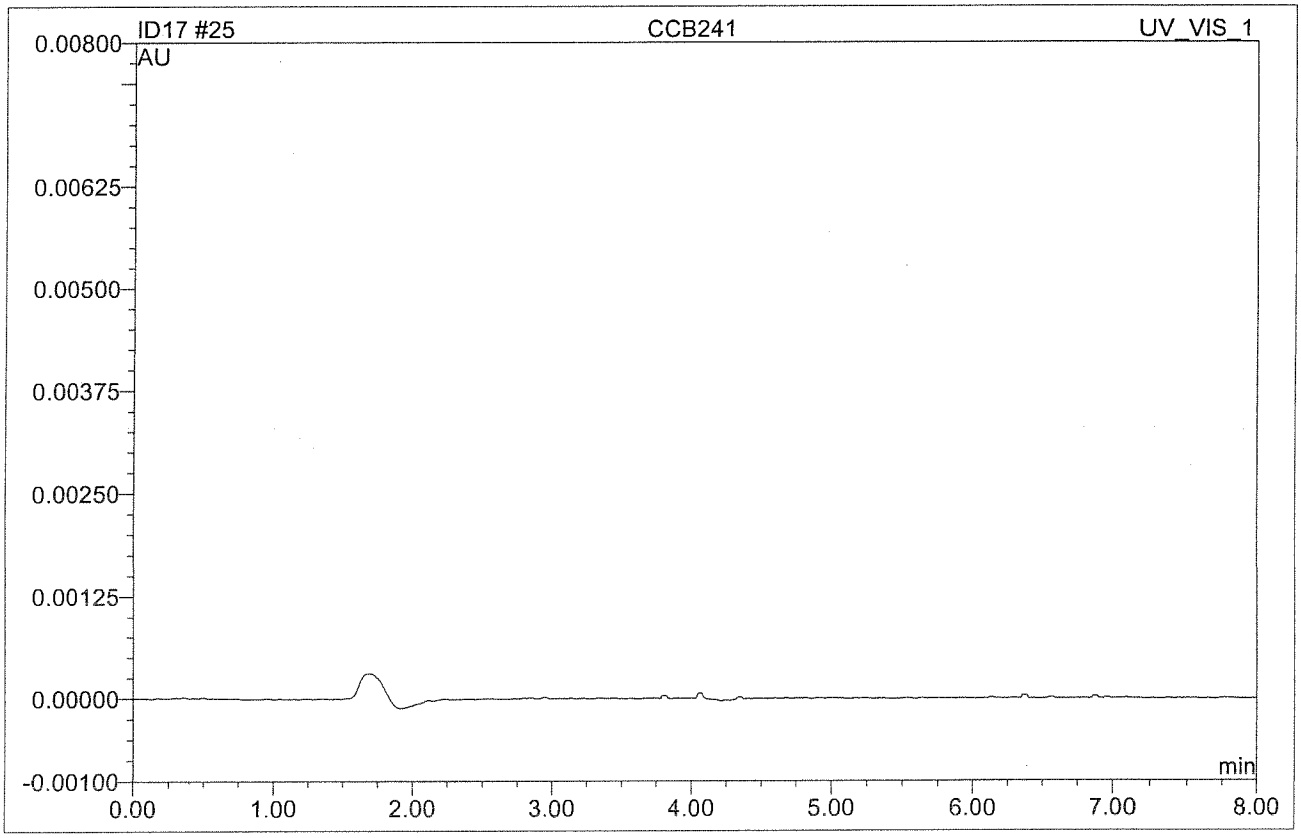
Sample Name:	**CCV241**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/17/2015 14:13**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.60	Cr6	0.0011250	0.0002080	100.00	1.955	BMB
Total:			0.001	0.000	100.00	1.955	

ID17 014 CCB241

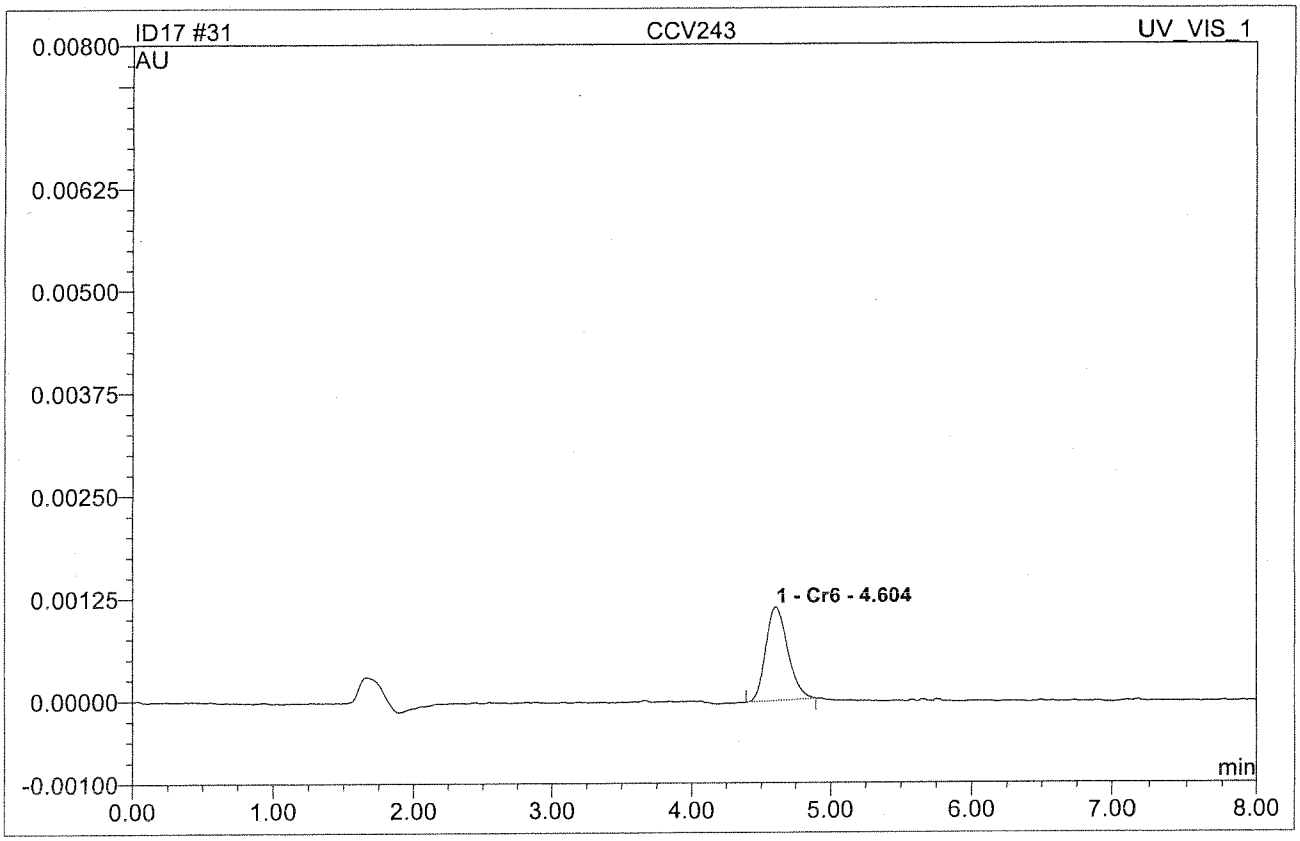
Sample Name:	**CCB241**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/17/2015 14:23**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ID17 020 CCV243

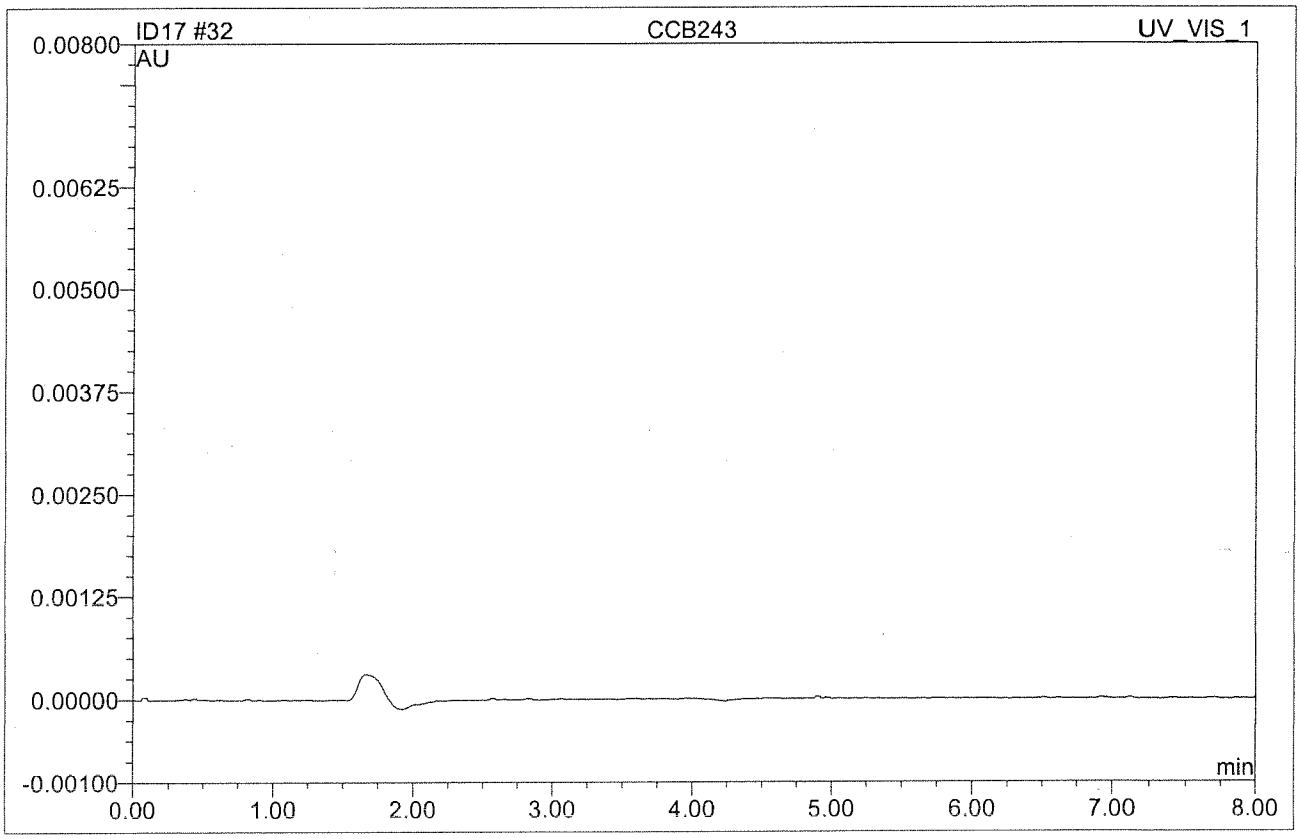
Sample Name:	**CCV243**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/17/2015 15:25**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
1	4.60	Cr6	0.0011400	0.0002094	100.00	1.967	BMB
Total:			0.001	0.000	100.00	1.967	

ID17 021 CCB243

Sample Name:	**CCB243**	*Injection Volume:*	**250.0**
Vial Number:	**0**	*Channel:*	**UV_VIS_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Cr6 Program**	*Bandwidth:*	**n.a.**
Quantif. Method:	**IC59A26**	*Dilution Factor:*	**1**
Recording Time:	**4/17/2015 15:36**	*Sample Weight:*	**1.0000**
Run Time (min):	**8.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height AU	Area AU*min	Rel.Area %	Amount	Type
Total:			0.000	0.000	0.00	0.000	

ANALYTICAL LOG(S)

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HEXAVALENT CHROMIUM IC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

1,5 Diphenylcarbohydrozide : 0.5 g	SW9B-04-028
MeOH : 100 ml	SW1A-005-08-12 1L
H_2SO_4 : 28 ml	↓ 06-12
$(NH_4)2SO_4$: 66 g	SW9A-04-027 2L
NH_4OH : 13 ml	↓ 023
pH Adjusted Water ID #: (range 9.3-9.5)	NL 1/26/15 SW4-02-49-03
Reagent Water ID #:	RW1-13-002

Book #:	A59-034
Instrument No.:	59
Pipette ID:	SW9A-04-017
	SW9A-04-025
	SW8A-02-21
Balance ID:	10601202
Analytical Sequence:	IA26
Method File:	IC59A26
Analytical Batch:	–

SOP #	Rev. #
☑ EMAX-218.6	5
☑ EMAX-7199	3
☐ EMAX-	

Linear Range (ppb):

S0	—	0
S1	—	0.2
S2	—	0.5
S3	—	1.0
S4	—	2.0
S5	—	5.0
S6	—	7.5
S7	—	10
ICV	—	4.0

STANDARDS ID	
ICAL	SW9B-05-61-03
ICV	↓ -61-04
CCV	– ~~61~~ NL 1/26/15
LCS	–
MS	–

Column : IonPac AS7 (4x250 mm) Serial # 015163

Guard Column IonPac NG1 (4x35 mm) Serial # 024133

Flow : 1.00 mL/min

Wavelength : 530 nm

Inj Vol: 250 µL

5 mL vial kit Lot #:	038141	Snapseal
0.45 µm filter lot #:	21855728	402 # 19414007
0.2 µm filter lot #:	21852703	1502 # 20814007

ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ CHROMELEON	
☐	

Analyzed By: NL

Date: 1/26/15

8137

Sequence: IA26
Operator: EMAXLABS

Printed: 1/27/2015 11:28:56 AM

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 11

Created: 1/26/2015 2:07:16 PM by EMAXLABS
Last Update: 1/27/2015 9:42:56 AM by EMAXLABS

No.	Sequence	Sample ID	Name	Type	Inj. Vol.	Program	Method	Status	Inj. Date/Time	Dil. Factor	Comment
1	IA26	001	IB	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:29:17 PM	1.0000	
2	IA26	002	S-0	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:39:41 PM	1.0000	
3	IA26	003	S-1	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:55:21 PM	1.0000	0.2 PPB
4	IA26	004	S-2	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:05:45 PM	1.0000	0.5 PPB
5	IA26	005	S-3	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:16:09 PM	1.0000	1.0 PPB
6	IA26	006	S-4	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:26:33 PM	1.0000	2.0 PPB
7	IA26	007	S-5	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:36:58 PM	1.0000	5.0 PPB
8	IA26	008	S-6	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:47:22 PM	1.0000	7.5 PPB
9	IA26	009	S-7	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:57:46 PM	1.0000	10 PPB
10	IA26	010	ICV	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 4:10:56 PM	1.0000	4.0 PPB
11	IA26	011	ICB	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 4:21:21 PM	1.0000	

FINAL

1/27/15

1/27/15

81139

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EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HEXAVALENT CHROMIUM IC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

1,5 Diphenylcarbohydrozide : 0.5 g	SW9B-04-035
MeOH : 100 ml	SW1A-005-08-12 } 1L
H_2SO_4 : 28 ml	↓ -06-12
$(NH_4)2SO_4$: 66 g	SW9A-04-034 } 2L
NH_4OH : 13 ml	↓ 023
pH Adjusted Water ID #: (range 9.3-9.5)	SW4-03-02-02
Reagent Water ID #:	RW1-15-001

HCD013WS D106, D114, D123

Book #:	A59-035
Instrument No.:	59
Pipette ID:	SW9A-04-017
	SW9A-04-025
	SW8A-02-21
Balance ID:	10601202
Analytical Sequence:	ID17
Method File:	IC59A26
Analytical Batch:	HCD013WB

SOP #	Rev. #
☑ EMAX-218.6	5
☑ EMAX-7199	3
☐ EMAX-	

STANDARDS ID	
ICAL	–
ICV	–
CCV	SW9B-05-65-17
LCS	↓ -65-18
MS	↓ -64-07

ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ CHROMELEON	
☐	

5 mL vial kit Lot #: 038141 Snap-Seal Container

0.45 µm filter lot #: ~~19414007~~ 21855728 4 oz: 19414007

0.2 µm filter lot #: ~~20814007~~ 21852703 1.5 oz: 20814007 ✓ 4/17/15

Analyzed By: ✓

Date: 4/17/15

8139

Sequence: ID17
Operator: EMAXLABS

Printed: 4/20/2015 11:00:46 AM

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 56

Created: 4/17/2015 10:44:23 AM by EMAXLABS
Last Update: 4/20/2015 10:53:50 AM by EMAXLABS

No.	Sequence	Sample ID	Name	Type	Inj. Vol.	Program	Method	Status	Inj. Date/Time	Dil. Factor
1	ID17		IB	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:29:17 PM	1.0000
2	ID17		S-0	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:39:41 PM	1.0000
3	ID17		S-1	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 2:55:21 PM	1.0000
4	ID17		S-2	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:05:45 PM	1.0000
5	ID17		S-3	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:16:09 PM	1.0000
6	ID17		S-4	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:26:33 PM	1.0000
7	ID17		S-5	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:36:58 PM	1.0000
8	ID17		S-6	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:47:22 PM	1.0000
9	ID17		S-7	Standard	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 3:57:46 PM	1.0000
10	ID17		ICV	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 4:10:56 PM	1.0000
11	ID17		ICB	Unknown	250.0	Cr6 Program	IC59A26	Finished	1/26/2015 4:21:21 PM	1.0000
12	ID17	001	CCV239	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 12:08:18 PM	1.0000
13	ID17	002	CCB239	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 12:18:42 PM	1.0000
14	ID17	003	HCD013WB	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 12:29:06 PM	1.0000
15	ID17	004	D106-06I	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 12:39:30 PM	5.0000
16	ID17	005	D106-06IA	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 12:49:54 PM	5.0000
17	ID17	006	HCD013WB	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 1:00:18 PM	1.0000
18	ID17	007	HCD013WQ	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 1:10:43 PM	1.0000
19	ID17	008	D114-09	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 1:21:07 PM	1.0000
20	ID17	009	D114-09N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 1:31:31 PM	1.0000
21	ID17	010	D106-07	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 1:41:55 PM	1.0000
22	ID17	011	D106-07D	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 1:52:19 PM	1.0000
23	ID17	012	D106-07M	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 2:02:43 PM	1.0000
24	ID17	013	CCV241	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 2:13:07 PM	1.0000
25	ID17	014	CCB241	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 2:23:32 PM	1.0000
26	ID17	015	D106-03I DF=5	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 2:33:55 PM	5.0000
27	ID17	016	HCD013WL	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 2:44:20 PM	1.0000

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FINAL
4/20/15

Sequence: ID17
Operator: EMAXLABS
Printed: 4/20/2015 11:00:46 AM

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 56

Created: 4/17/2015 10:44:23 AM by EMAXLABS
Last Update: 4/20/2015 10:53:50 AM by EMAXLABS

No.	Sequence	Comment
1	ID17	
2	ID17	
3	ID17	0.2 PPB
4	ID17	0.5 PPB
5	ID17	1.0 PPB
6	ID17	2.0 PPB
7	ID17	5.0 PPB
8	ID17	7.5 PPB
9	ID17	10 PPB
10	ID17	4.0 PPB
11	ID17	
12	ID17	
13	ID17	
14	ID17	
15	ID17	DF=5
16	ID17	DF=5; POST-SPIKE AT 1 PPB
17	ID17	
18	ID17	
19	ID17	
20	ID17	
21	ID17	
22	ID17	
23	ID17	
24	ID17	
25	ID17	
26	ID17	DF=5
27	ID17	

FINAL
n 4/20/15

81141

Sequence: ID17
Operator: EMAXLABS

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 56

Created: 4/17/2015 10:44:23 AM by EMAXLABS
Last Update: 4/20/2015 10:53:50 AM by EMAXLABS

No.	Sequence	Sample ID	Name	Type	Inj. Vol.	Program	Method	Status	Inj. Date/Time	Dil. Factor
28	ID17	017	HCD013WX	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 2:54:44 PM	1.0000
29	ID17	018	HCD013WC	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 3:05:08 PM	1.0000
30	ID17	019	HCD013WY	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 3:15:32 PM	1.0000
31	ID17	020	CCV243	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 3:25:56 PM	1.0000
32	ID17	021	CCB243	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 3:36:20 PM	1.0000
33	ID17	022	D123-01	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 4:35:14 PM	1.0000
34	ID17	023	D123-01D	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 4:45:38 PM	1.0000
35	ID17	024	D123-01M	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 4:56:01 PM	1.0000
36	ID17	025	D123-02	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 5:06:26 PM	1.0000
37	ID17	026	D123-03	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 5:16:50 PM	1.0000
38	ID17	027	D123-04	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 5:27:14 PM	1.0000
39	ID17	028	D123-06	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 5:37:38 PM	1.0000
40	ID17	029	D123-07	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 5:48:02 PM	1.0000
41	ID17	030	D123-08	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 5:58:26 PM	1.0000
42	ID17	031	D123-09	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 6:08:50 PM	1.0000
43	ID17	032	CCV245	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 6:19:15 PM	1.0000
44	ID17	033	CCB245	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 6:29:39 PM	1.0000
45	ID17	034	D123-05	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 6:40:03 PM	1.0000
46	ID17	035	CCV247	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 6:50:27 PM	1.0000
47	ID17	036	CCB247	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 7:00:51 PM	1.0000
48	ID17	037	D123-08N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 7:11:15 PM	1.0000
49	ID17	038	D123-08A	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 7:21:39 PM	1.0000
50	ID17	039	D123-06I	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 7:32:04 PM	2.0000
51	ID17	040	D123-04I	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 7:42:28 PM	2.0000
52	ID17	041	D123-04IA	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 7:52:52 PM	2.0000
53	ID17	042	D123-05N	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 8:03:16 PM	1.0000
54	ID17	043	D123-05A	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 8:13:40 PM	1.0000

nc 4/20/15

8142

FINAL
nc 4/20/15

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 56

Created: 4/17/2015 10:44:23 AM by EMAXLABS
Last Update: 4/20/2015 10:53:50 AM by EMAXLABS

No.	Sequence	Comment
28	ID17	
29	ID17	
30	ID17	
31	ID17	
32	ID17	
33	ID17	
34	ID17	
35	ID17	
36	ID17	
37	ID17	
38	ID17	
39	ID17	
40	ID17	
41	ID17	
42	ID17	
43	ID17	
44	ID17	
45	ID17	
46	ID17	
47	ID17	
48	ID17	
49	ID17	POST-SPIKE AT 0.2 PPB
50	ID17	DF=2
51	ID17	DF=2
52	ID17	DF=2; POST-SPIKE AT 1PPB
53	ID17	
54	ID17	POST-SPIKE AT 0.2 PPB

FINAL
h 4/20/15

8143

Sequence: ID17
Operator: EMAXLABS

Printed: 4/20/2015 11:00:46 AM

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 56

Created: 4/17/2015 10:44:23 AM by EMAXLABS
Last Update: 4/20/2015 10:53:50 AM by EMAXLABS

No.	Sequence	Sample ID	Name	Type	Inj. Vol.	Program	Method	Status	Inj. Date/Time	Dil. Factor
55	ID17	044	CCV249	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 8:34:28 PM	1.0000
56	ID17	045	CCB249	Unknown	250.0	Cr6 Program	IC59A26	Finished	4/17/2015 8:44:52 PM	1.0000

FINAL
n. 4/20/15

6114

Sequence: ID17
Operator: EMAXLABS
Printed: 4/20/2015 11:00:46 AM

Title: Temporary sequence for manual data acquisition
Datasource: DG7B3Q91_local
Location: DX600\2015
Timebase: DX600
#Samples: 56

Created: 4/17/2015 10:44:23 AM by EMAXLABS
Last Update: 4/20/2015 10:53:50 AM by EMAXLABS

No.	Sequence	Comment
55	ID17	
56	ID17	

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FINAL
n-4/20/15

01145

PRESERVATION LOG

EMAX LABORATORIES, INC.

pH ADJUSTMENT/SAMPLE PRESERVATION LOG FOR HEXAVALENT CHROMIUM

SOP ☐ EMAX-218.6 Rev. 5 ☑ EMAX-7199 Rev. 3 Book #: PHC-011

Matrix: W Start Date: 4/17/15 Time: 1200 End Date: 4/17/15 Time: 1215

Sample Prep ID	Lab Sample ID	Initial pH	Final pH	Notes
01	D114-09	6.21	9.31	0.2mL → 40mL
02				
03				
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				K 4/17/15
25				

Standards	ID	pH
Buffer 7	SW1-01-706	7.00
Buffer 10	↓ 707	10.01
Check pH Buffer (8)	↓ 697	8.00
pH meter	F7	

Reagent	Standard ID #
NaOH	SW4-02-39-02
$(NH_4)_2SO_4/NH_4OH$	
Reagent Water	

Legend:

Color	Texture	Clarity	Artifacts
Bu = Blue Bl = Black	Cs = Coarse	Cr = Clear	Rk = Rocks
Bn = Brown Gn = Green	Md = Medium	Cy = Cloudy	Sl = Shale
Og = Orange Rd = Red	Fn = Fine	Td = Turbid	Vg = Vegetation
Yw = Yellow			

☐ Samples were received with preservation

Comments:

Prepared By: K

Standard Added By: K

Checked By: [illegible]

RETENTION TIME WINDOW

RETENTION TIME WINDOW

METHOD 218.6/7199

Lab Name:	EMAX	METHOD:	EMAX-218.6/7199
Instrument ID:	DX500IC59	IC COLUMN:	AS7/AG7 / AS7/NG1
		COLUMN SIZE:	4x250mm

Compound	Ical Mean RT	from	to	Retention Time Window
CHROMIUM VI	**4.66**	4.57	4.76	**0.095**

IC59A26

AS
01/27/15

CASE NARRATIVE

Client : KLEINFELDER

Project: CTO 070, UXO4, FALLBROOK

SDG : 15D114

METHOD 7199
HEXAVALENT CHROMIUM

A total of twenty-four (24) soil samples were received on 04/17/15 to be analyzed for Hexavalent Chromium in accordance with Method 7199 and project specific requirements.

Holding Time
Samples were analyzed within the prescribed holding time.

Calibration
Calibration was performed as prescribed by the method and was verified using a secondary source (ICV). All calibration requirements were within acceptance criteria.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, two (2) method blanks were analyzed. HCD012SB and HCD013SB were compliant to project requirement. Refer to sample result summary forms for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, two (2) soluble LCSs were analyzed. Hexavalent Chromium was within LCS QC limits in CSD012SL. Hexavalent Chromium was within LCS QC limits in CSD013SL. Two (2) insoluble LCS were also analyzed and Hexavalent Chromium was within LCS QC limits. Refer to LCS summary forms for details.

Matrix QC Sample
Matrix spike sample was prepared and analyzed at a frequency required by the project. For this SDG, two (2) soluble MS were analyzed. Matrix spike recovery for Hexavalent Chromium was within MS QC limits in D114-08M. Matrix spike recovery for Hexavalent Chromium was within MS QC limits in D114-22M. Two (2) insoluble MS were also analyzed and matrix spike recoveries for Hexavalent Chromium were within MS QC limits. Sample duplicate was analyzed and RPD was within expected value. Refer to Matrix QC summary forms for details.

Sample Analysis
Samples were analyzed according to prescribed analytical procedures. Results were evaluated in accordance to project requirements. For this SDG, all quality control requirements were met.

SAMPLE RESULTS

METHOD 7199
HEXAVALENT CHROMIUM

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK
Batch No. : 15D114

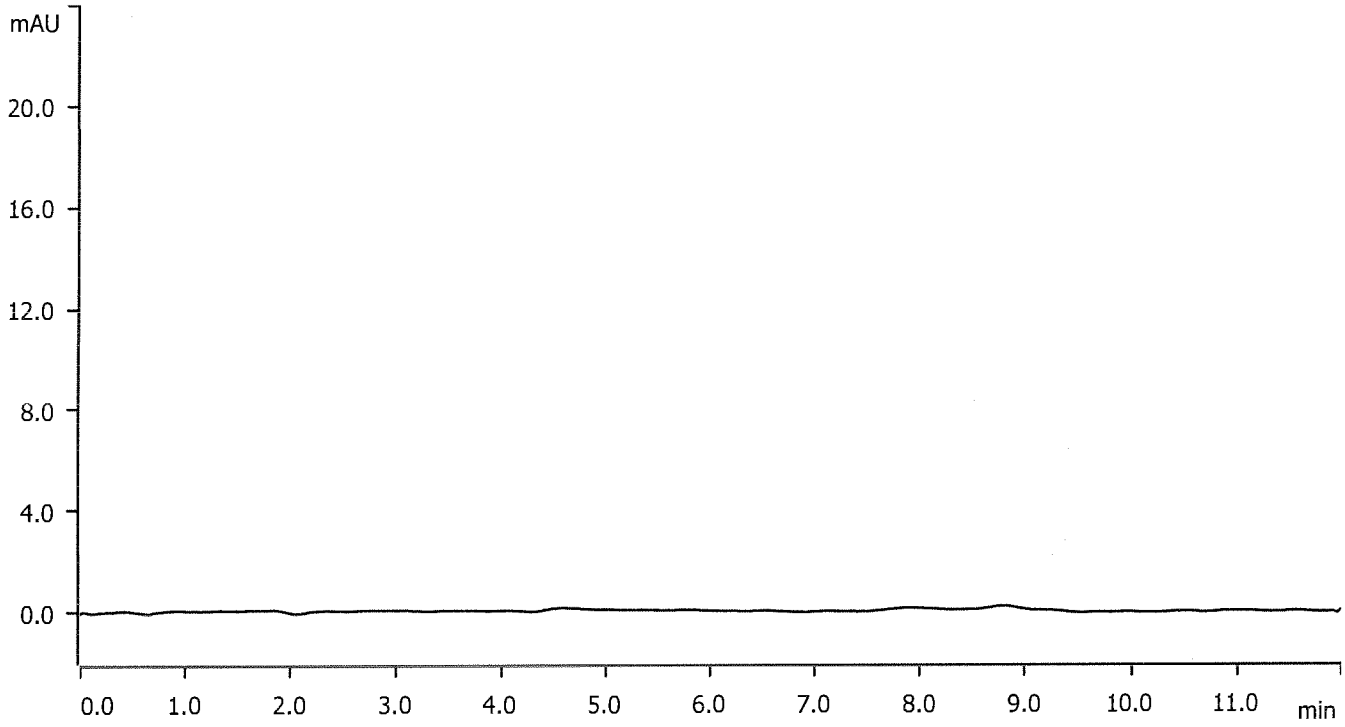
Matrix : SOIL
InstrumentID : G2

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/kg)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1S	HCD012SB	ND	1	NA	100	13	40	04/23/1514:06	04/22/1511:36	DD24-03	DD24-01	HCD012S	NA	NA
LCS1S	CSD012SL	982	1	NA	100	13	40	04/23/1515:11	04/22/1511:36	DD24-05	DD24-01	HCD012S	NA	NA
UXO4-TR04-S02-3.0	D114-08	22.0J	1	13.7	116	15.1	46.3	04/23/1516:16	04/22/1511:36	DD24-09	DD24-01	HCD012S	04/14/1508:05	04/17/15
UXO4-TR04-S02-3.0DUP	D114-08D	ND	1	13.7	116	15.1	46.3	04/23/1516:48	04/22/1511:36	DD24-11	DD24-01	HCD012S	04/14/1508:05	04/17/15
UXO4-TR04-S02-3.0MS	D114-08M	2690	1	13.7	116	15.1	46.3	04/23/1518:25	04/22/1511:36	DD24-17	DD24-13	HCD012S	04/14/1508:05	04/17/15
UXO4-TR01-S01-1.0	D114-01	ND	1	6.9	107	14	43	04/23/1518:57	04/22/1511:36	DD24-19	DD24-13	HCD012S	04/10/1514:10	04/17/15
UXO4-TR01-S02-3.0	D114-02	ND	1	8.8	110	14.3	43.9	04/23/1519:29	04/22/1511:36	DD24-21	DD24-13	HCD012S	04/10/1514:15	04/17/15
UXO4-TR02-S01-2.0	D114-03	ND	1	6.5	107	13.9	42.8	04/23/1520:01	04/22/1511:36	DD24-23	DD24-13	HCD012S	04/13/1511:00	04/17/15
UXO4-TR02-S02-3.0	D114-04	ND	1	7.8	108	14.1	43.4	04/23/1521:06	04/22/1511:36	DD24-27	DD24-25	HCD012S	04/13/1511:10	04/17/15
UXO4-TR03-S01-1.5	D114-05	ND	1	10.2	111	14.5	44.5	04/23/1521:38	04/22/1511:36	DD24-29	DD24-25	HCD012S	04/13/1513:00	04/17/15
UXO4-TR03-S02-3.0	D114-06	ND	1	15.2	118	15.3	47.2	04/23/1522:10	04/22/1511:36	DD24-31	DD24-25	HCD012S	04/13/1513:15	04/17/15
UXO4-TR04-S01-2.0	D114-07	ND	1	9.3	110	14.3	44.1	04/23/1522:42	04/22/1511:36	DD24-33	DD24-25	HCD012S	04/14/1508:00	04/17/15
UXO4-SB08-8.0	D114-10	ND	1	10.8	112	14.6	44.8	04/23/1523:14	04/22/1511:36	DD24-35	DD24-25	HCD012S	04/08/1511:01	04/17/15
UXO4-SB09-6.6	D114-11	ND	1	21.3	127	16.5	50.8	04/24/1500:19	04/22/1511:36	DD24-39	DD24-37	HCD012S	04/10/1509:50	04/17/15
UXO4-SB10-0.5	D114-12	ND	1	3.8	104	13.5	41.6	04/24/1500:51	04/22/1511:36	DD24-41	DD24-37	HCD012S	04/16/1511:10	04/17/15
UXO4-SB10-1.0	D114-13	ND	1	9.5	110	14.4	44.2	04/24/1501:23	04/22/1511:36	DD24-43	DD24-37	HCD012S	04/16/1511:15	04/17/15
MBLK2S	HCD013SB	ND	1	NA	100	13	40	04/24/1501:55	04/22/1511:36	DD24-45	DD24-37	HCD013S	NA	NA
LCS2S	CSD013SL	1010	1	NA	100	13	40	04/24/1502:28	04/22/1511:36	DD24-47	DD24-37	HCD013S	NA	NA
UXO4-SB11-0.5	D114-14	ND	1	1.8	102	13.2	40.7	04/24/1504:05	04/22/1511:36	DD24-53	DD24-49	HCD013S	04/16/1511:20	04/17/15
UXO4-SB11-1.0	D114-15	22.1J	1	5.0	105	13.7	42.1	04/24/1504:37	04/22/1511:36	DD24-55	DD24-49	HCD013S	04/16/1511:25	04/17/15
UXO4-SB12-0.5	D114-16	ND	1	1.0	101	13.1	40.4	04/24/1505:09	04/22/1511:36	DD24-57	DD24-49	HCD013S	04/16/1511:30	04/17/15
UXO4-SB12-1.0	D114-17	ND	1	2.3	102	13.3	40.9	04/24/1505:42	04/22/1511:36	DD24-59	DD24-49	HCD013S	04/16/1511:35	04/17/15
UXO4-SB13-0.5	D114-18	ND	1	1.2	101	13.2	40.5	04/24/1506:46	04/22/1511:36	DD24-63	DD24-61	HCD013S	04/16/1511:40	04/17/15
UXO4-SB13-1.0	D114-19	17.7J	1	4.2	104	13.6	41.8	04/24/1507:18	04/22/1511:36	DD24-65	DD24-61	HCD013S	04/16/1511:45	04/17/15
UXO4-SB14-0.5	D114-20	ND	1	4.9	105	13.7	42.1	04/24/1507:50	04/22/1511:36	DD24-67	DD24-61	HCD013S	04/16/1510:45	04/17/15
UXO4-SB14-1.0	D114-21	ND	1	7.6	108	14.1	43.3	04/24/1508:22	04/22/1511:36	DD24-69	DD24-61	HCD013S	04/16/1510:50	04/17/15
UXO4-SB15-1.0	D114-23	ND	1	2.7	103	13.4	41.1	04/24/1508:55	04/22/1511:36	DD24-71	DD24-61	HCD013S	04/16/1511:55	04/17/15
UXO4-SB16-0.5	D114-24	ND	1	4.0	104	13.5	41.7	04/24/1509:59	04/22/1511:36	DD24-75	DD24-73	HCD013S	04/16/1512:00	04/17/15
UXO4-SB16-1.0	D114-25	ND	1	6.4	107	13.9	42.7	04/24/1510:31	04/22/1511:36	DD24-77	DD24-73	HCD013S	04/16/1512:05	04/17/15
UXO4-SB15-0.5	D114-22	ND	1	1.3	101	13.2	40.5	04/24/1511:36	04/22/1511:36	DD24-81	DD24-79	HCD013S	04/16/1511:50	04/17/15
UXO4-SB15-0.5DUP	D114-22D	ND	1	1.3	101	13.2	40.5	04/24/1512:08	04/22/1511:36	DD24-83	DD24-79	HCD013S	04/16/1511:50	04/17/15
UXO4-SB15-0.5MS	D114-22M	1710	1	1.3	101	13.2	40.5	04/24/1512:40	04/22/1511:36	DD24-85	DD24-79	HCD013S	04/16/1511:50	04/17/15

Sample data

Sequence	DD24-19
Ident	D114-01
Determination start	2015-04-23 18:57:29 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

Hexavalent Chromium



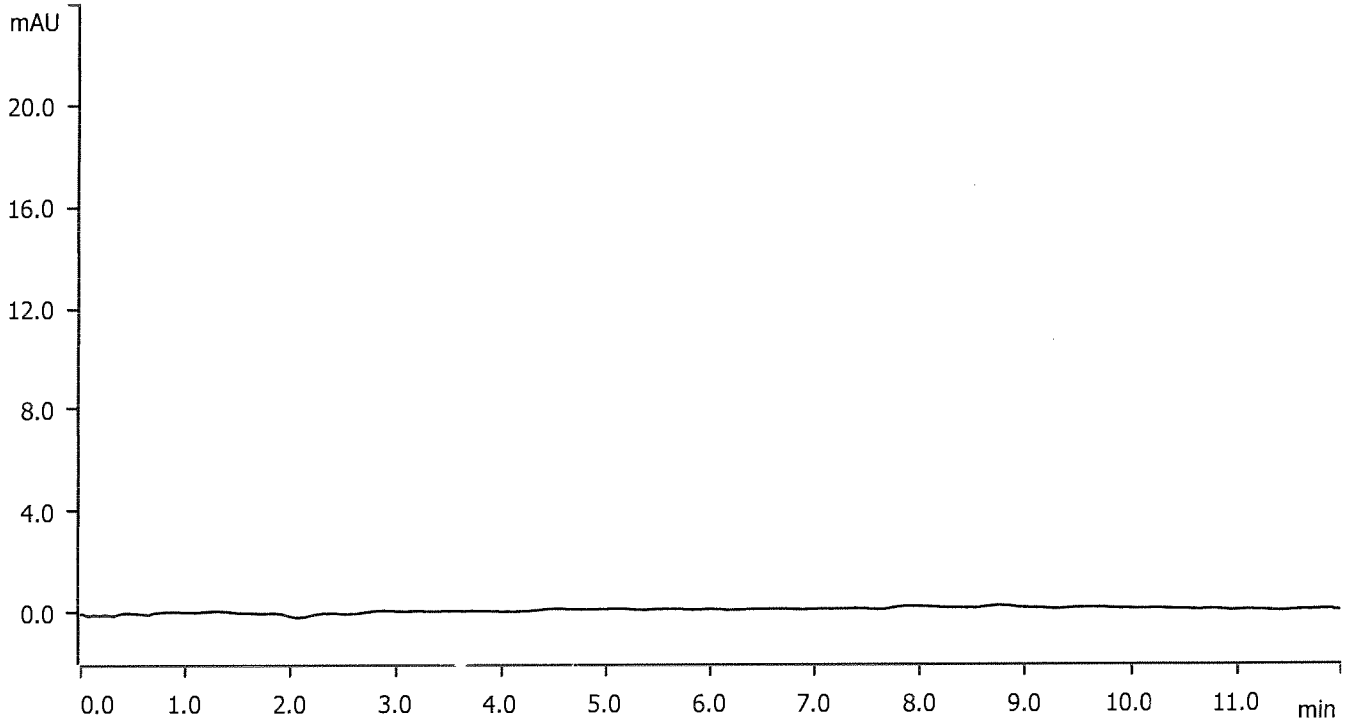
Metrohm

8153

Sample data

Sequence	DD24-21
Ident	D114-02
Determination start	2015-04-23 19:29:42 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

Hexavalent Chromium



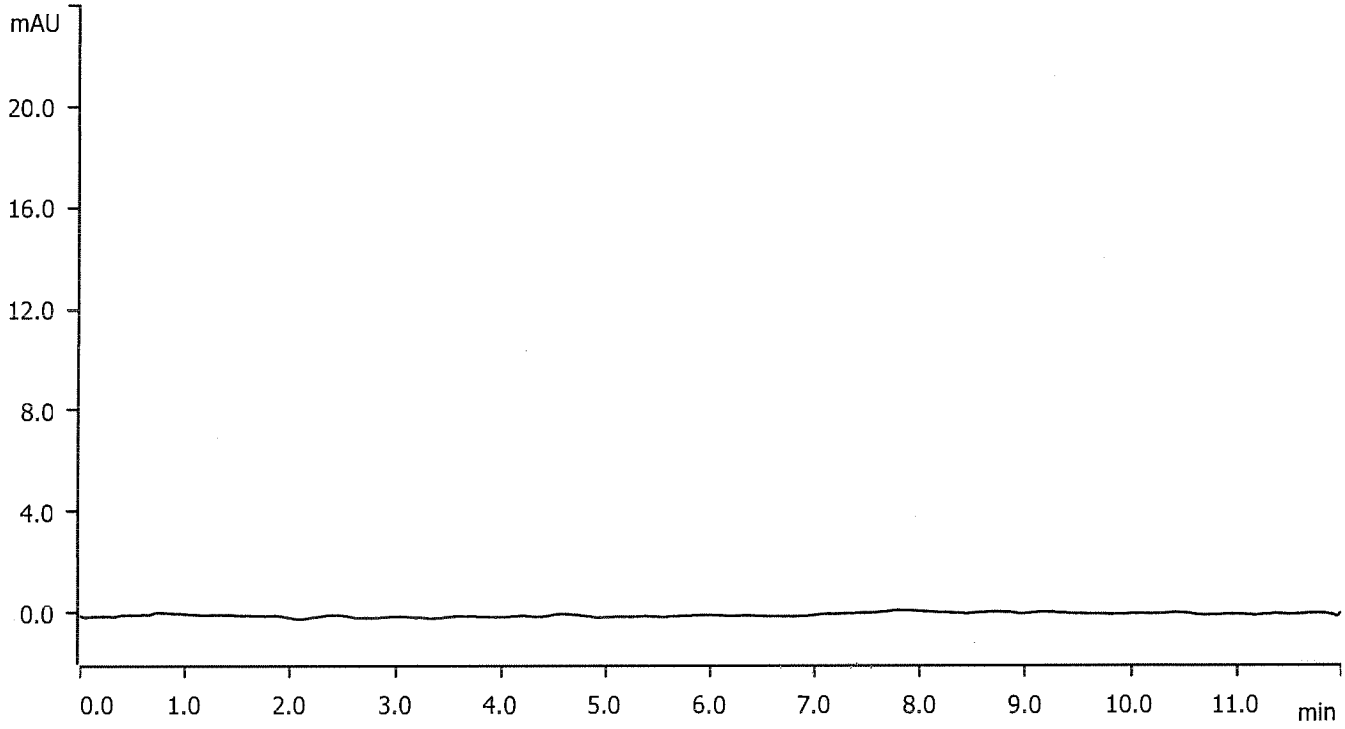
Metrohm

8154

Sample data

Sequence	DD24-23
Ident	D114-03 ✓
Determination start	2015-04-23 20:01:54 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

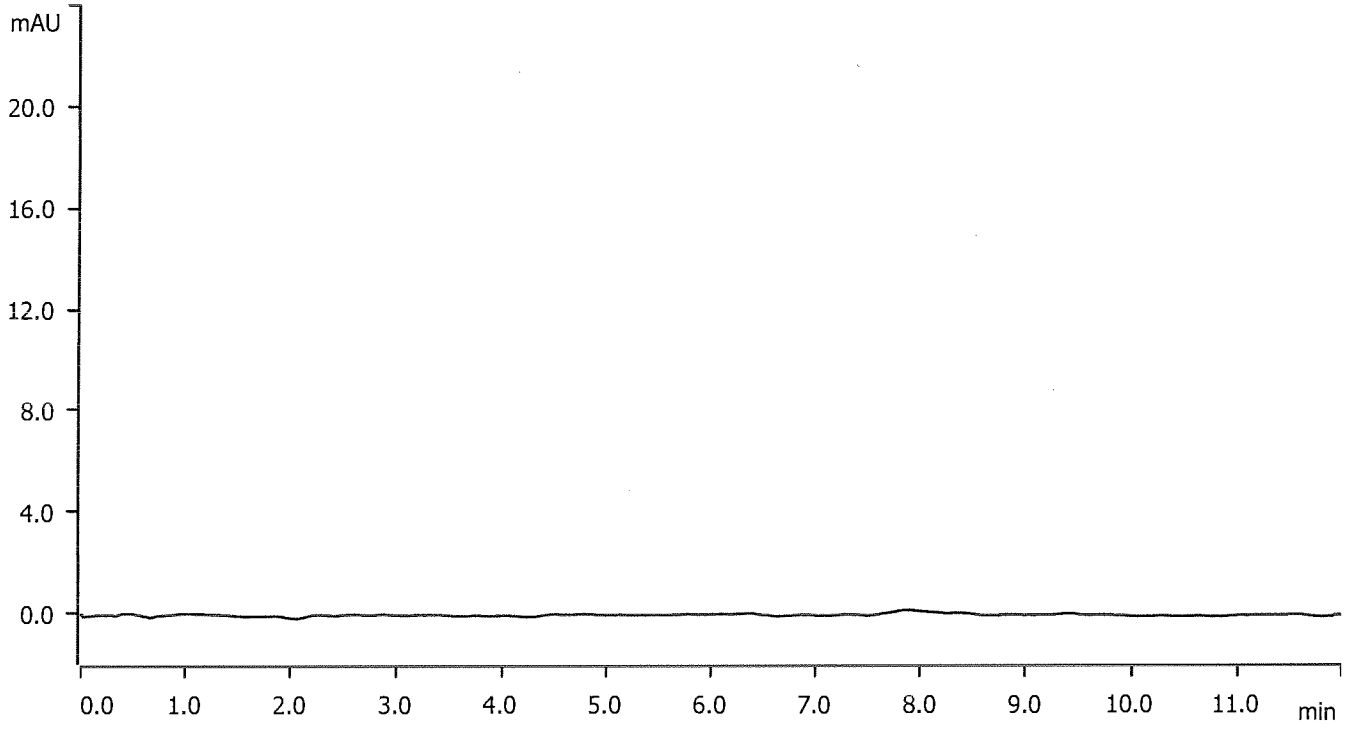
Hexavalent Chromium



Sample data

Sequence	DD24-27
Ident	D114-04
Determination start	2015-04-23 21:06:12 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

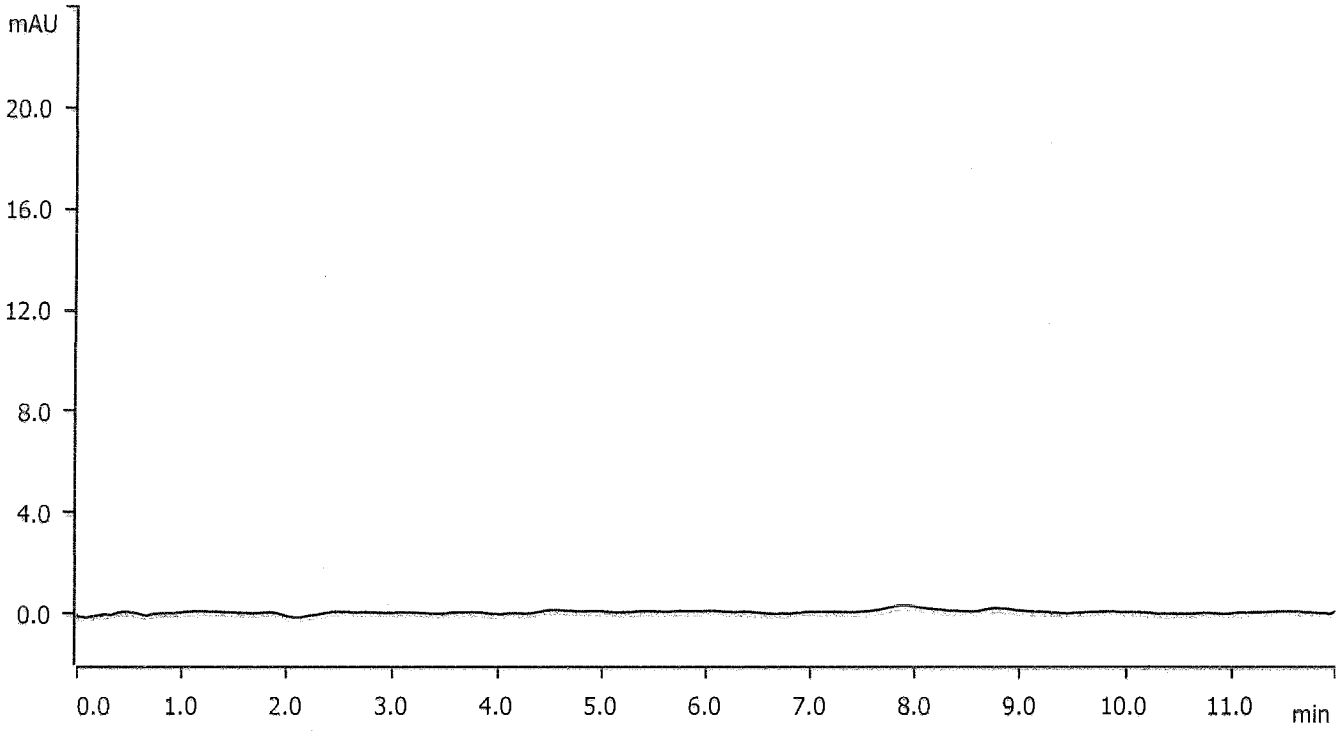
Hexavalent Chromium



Sample data

Sequence	DD24-29
Ident	D114-05
Determination start	2015-04-23 21:38:18 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

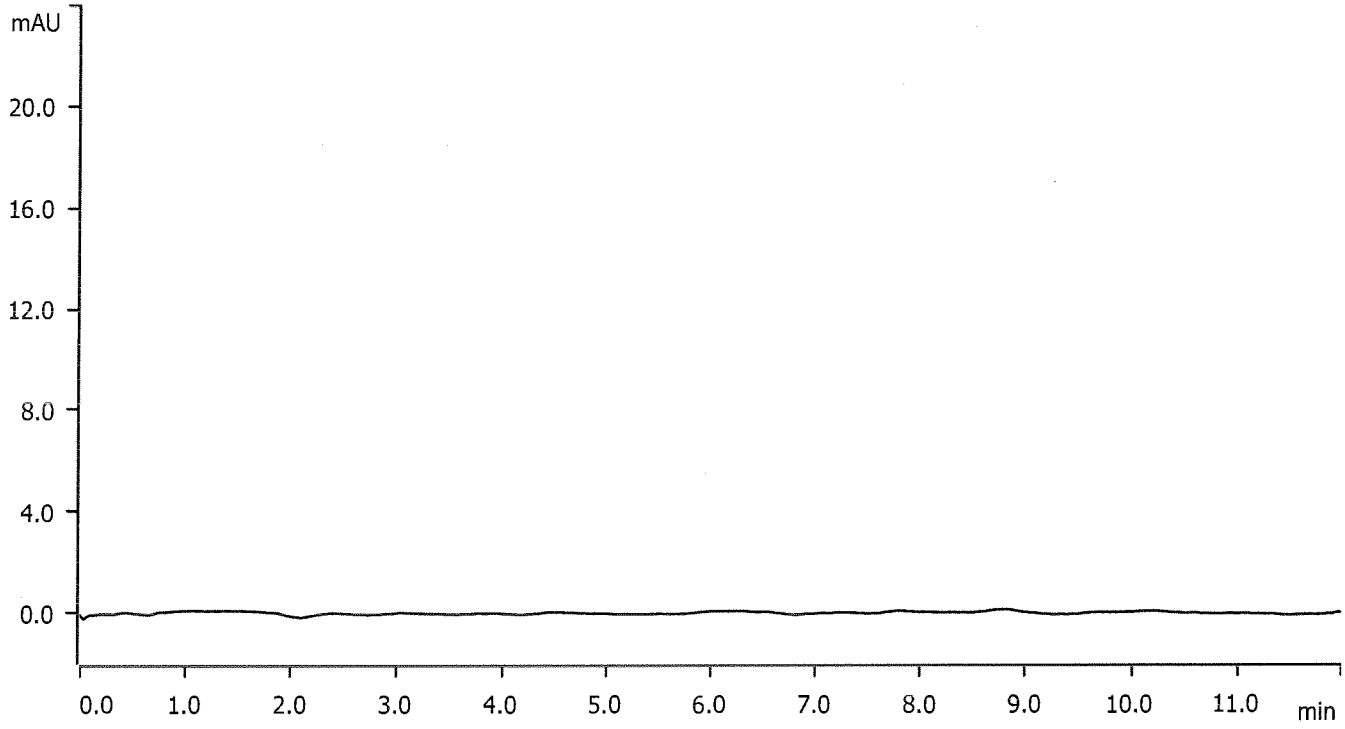
Hexavalent Chromium



Sample data

Sequence	DD24-31
Ident	D114-06 ✓
Determination start	2015-04-23 22:10:25 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

Hexavalent Chromium



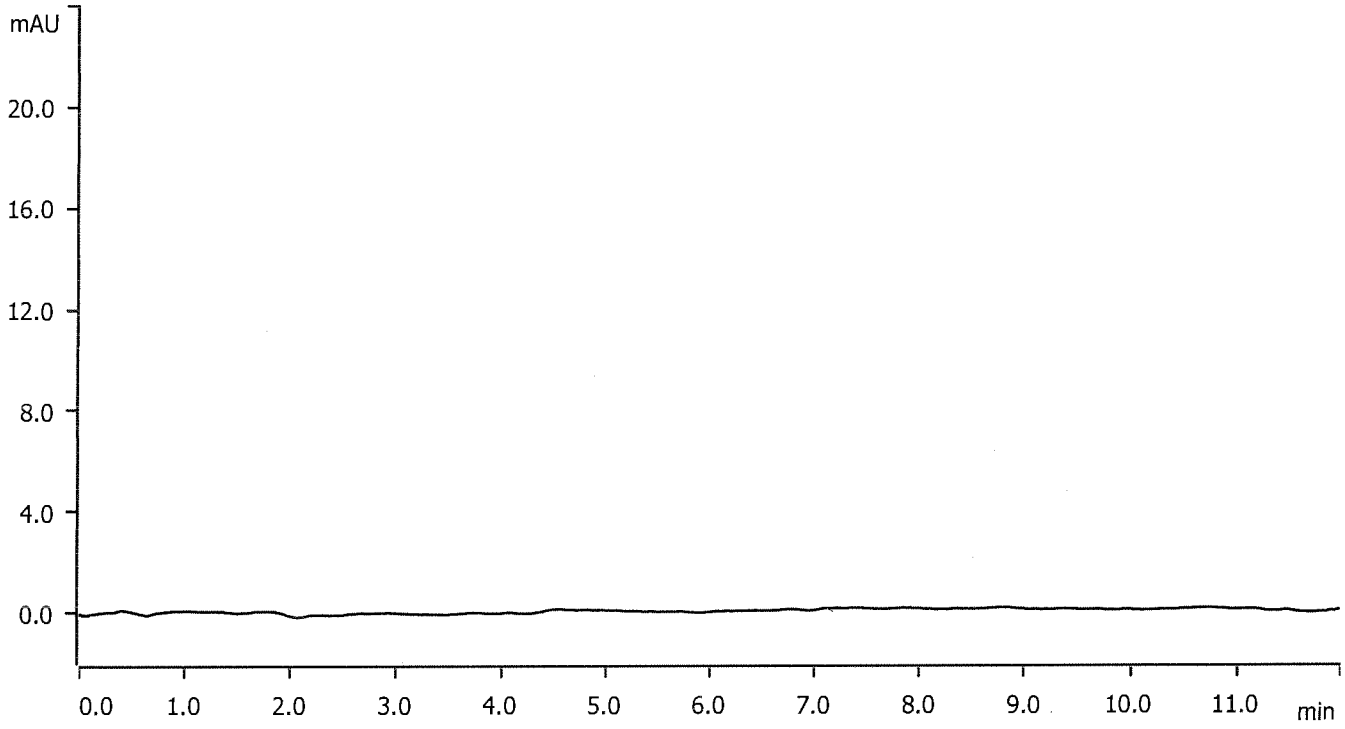
Metrohm

8158

Sample data

Sequence	DD24-33 ✓
Ident	D114-07
Determination start	2015-04-23 22:42:35 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

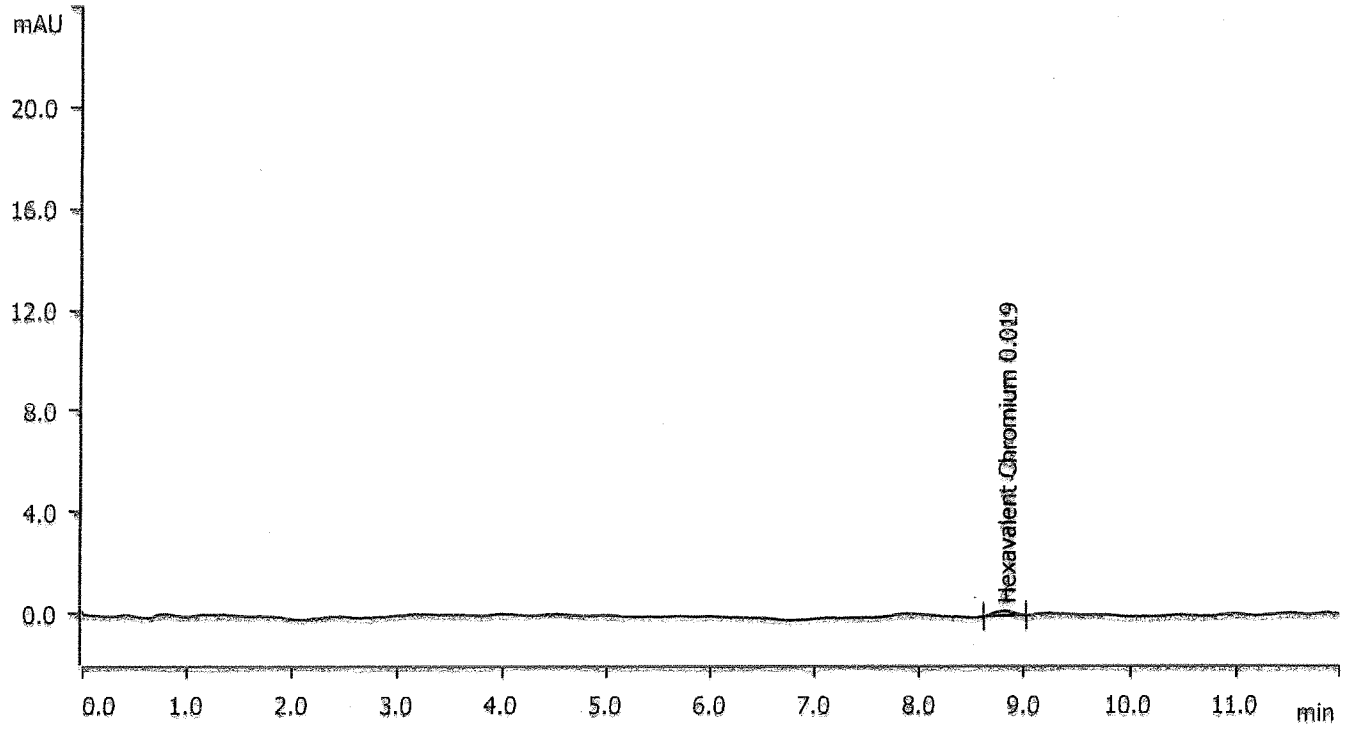
Hexavalent Chromium



Sample data

Sequence DD24-09
Ident D114-08
Determination start 2015-04-23 16:16:05 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.776	0.042008	0.173	Hexavalent Chromium	0.019

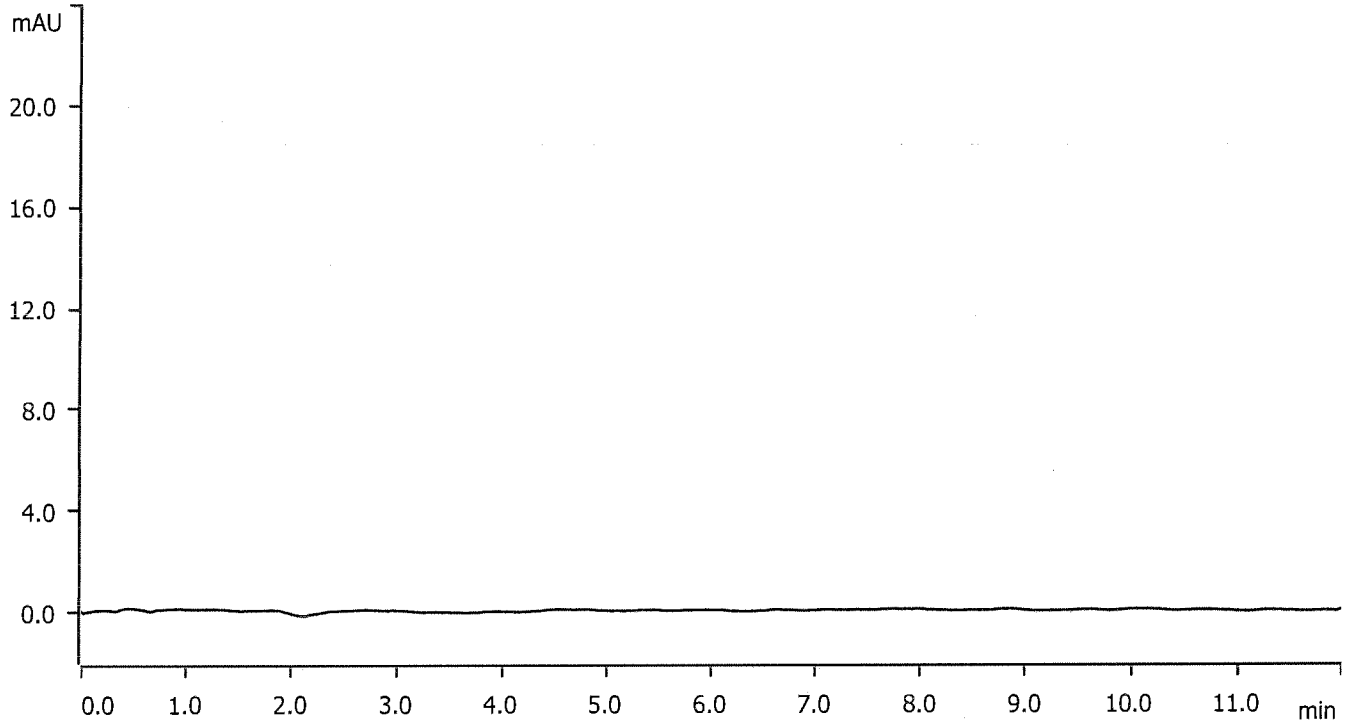
Metrohm

8160

Sample data

Sequence	DD24-35
Ident	D114-10
Determination start	2015-04-23 23:14:45 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

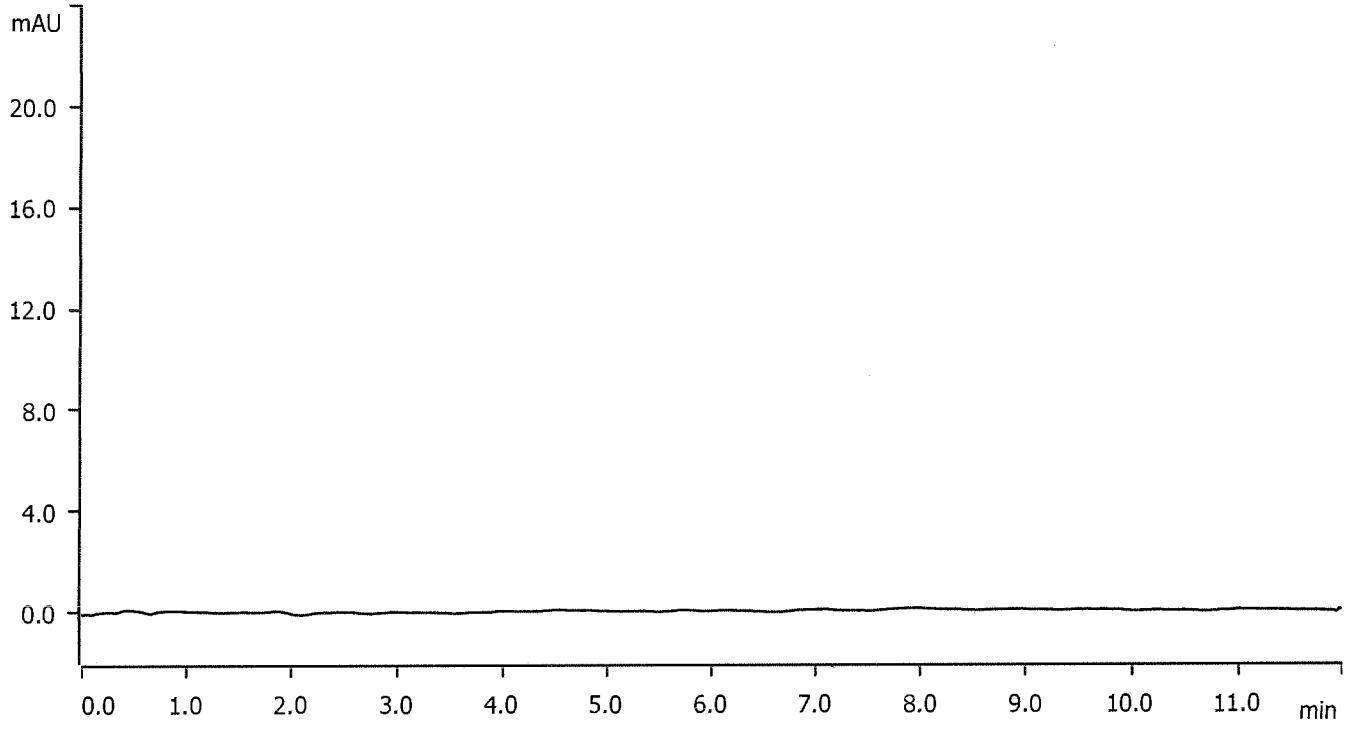
Hexavalent Chromium



Sample data

Sequence	DD24-39
Ident	D114-11
Determination start	2015-04-24 00:19:10 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

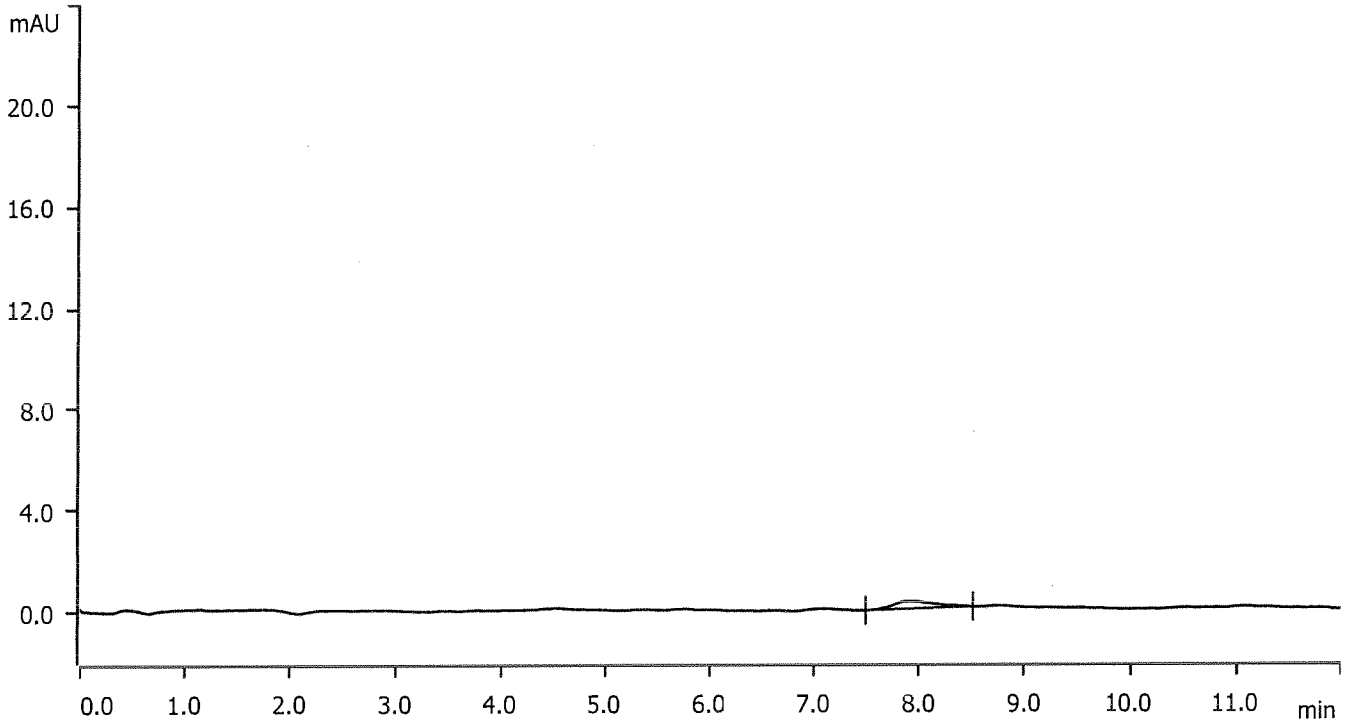
Hexavalent Chromium



Sample data

Sequence DD24-41
Ident D114-12
Determination start 2015-04-24 00:51:23 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1 (*)	7.938	0.137114	0.294		invalid

(*) out of RTW
AS 05/01/15

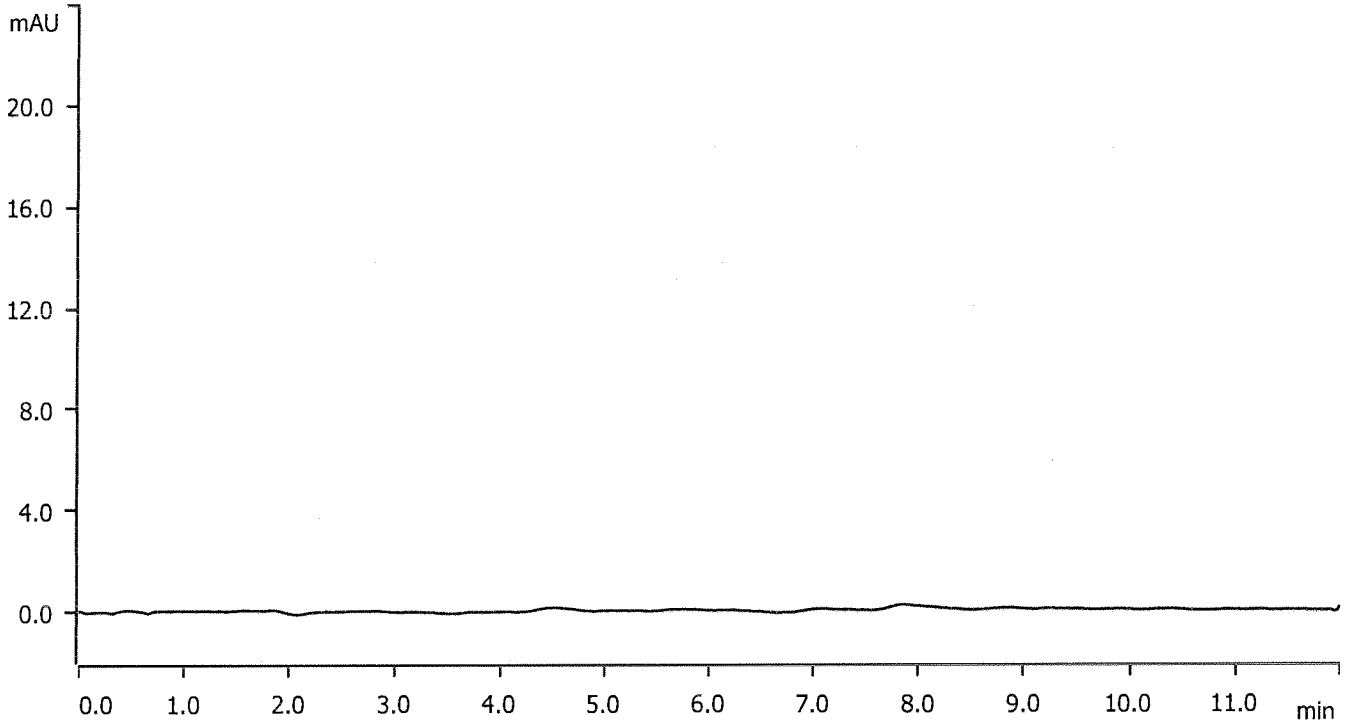
Metrohm

8163

Sample data

Sequence	DD24-43
Ident	D114-13 ✓
Determination start	2015-04-24 01:23:39 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

Hexavalent Chromium



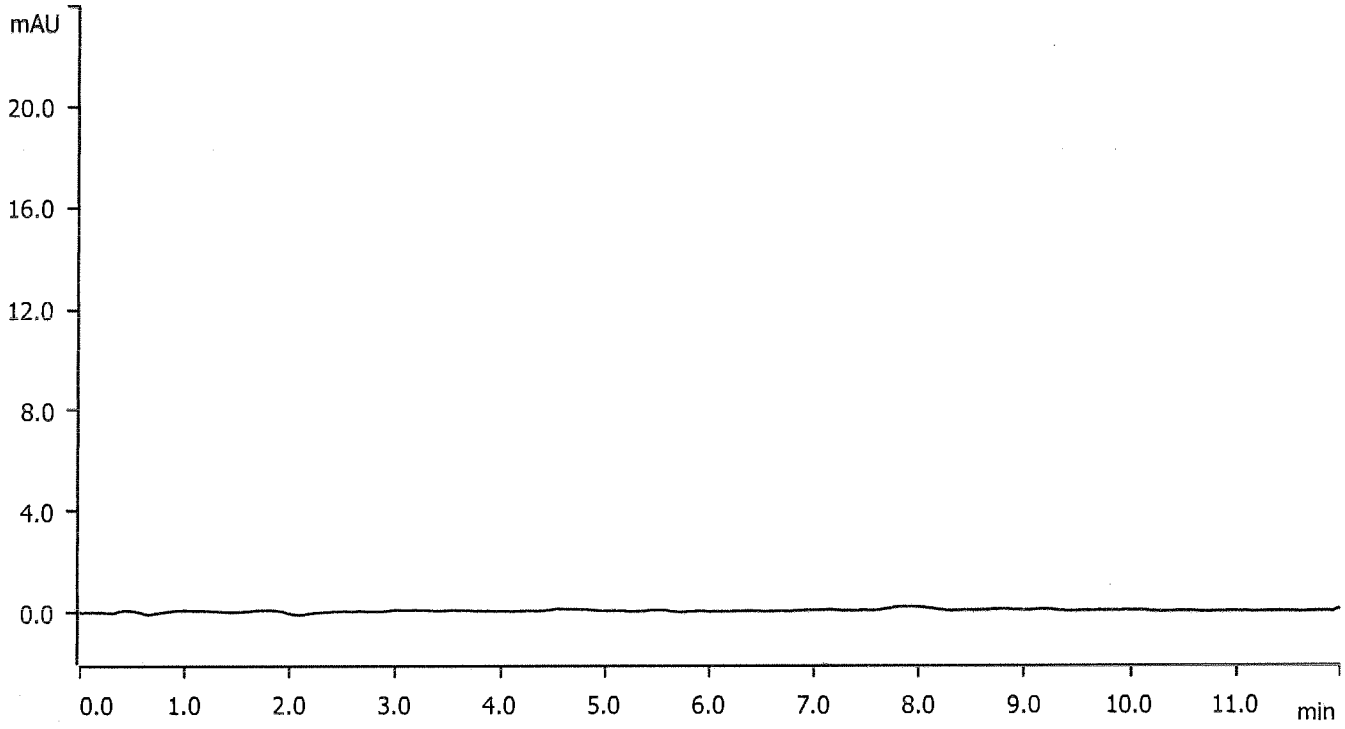
Metrohm

8164

Sample data

Sequence	DD24-53
Ident	D114-14
Determination start	2015-04-24 04:05:14 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

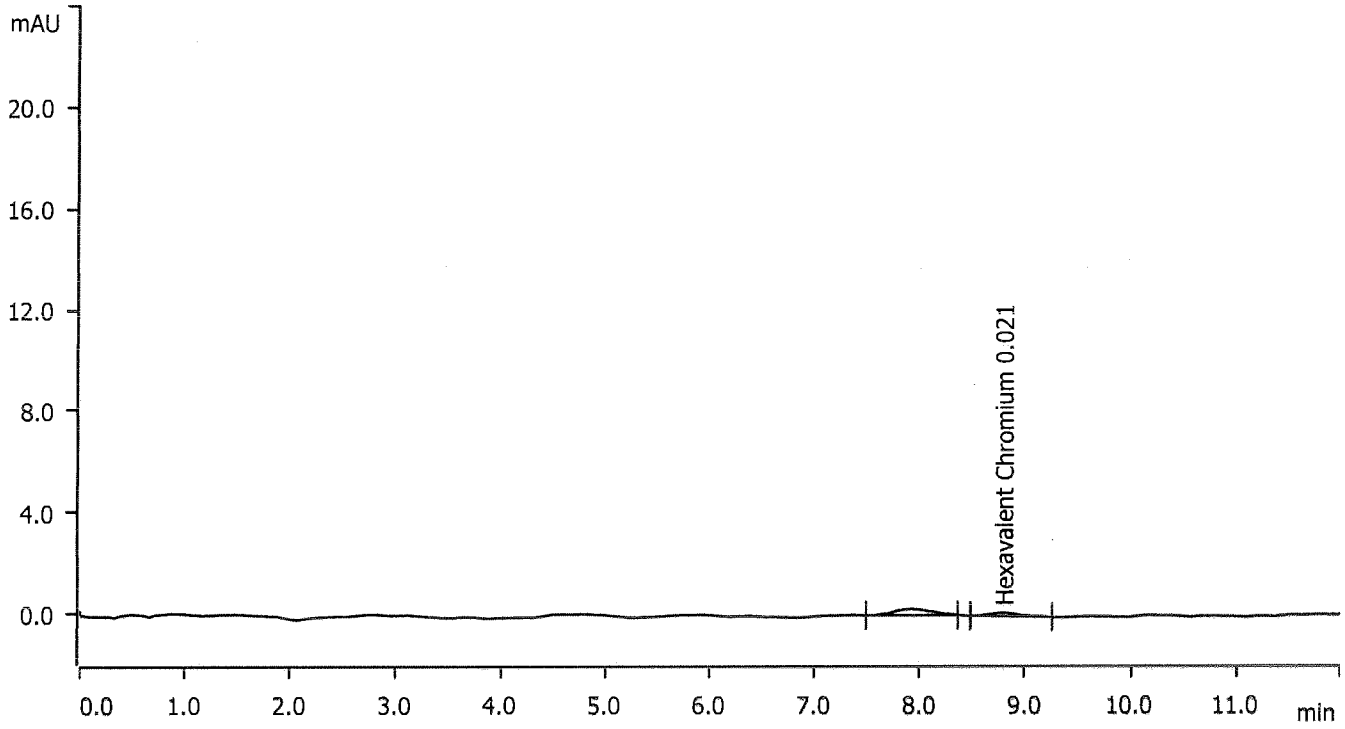
Hexavalent Chromium



Sample data

Sequence DD24-55
Ident . . . . . D114-15 ✓
Determination start 2015-04-24 04:37:31 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium

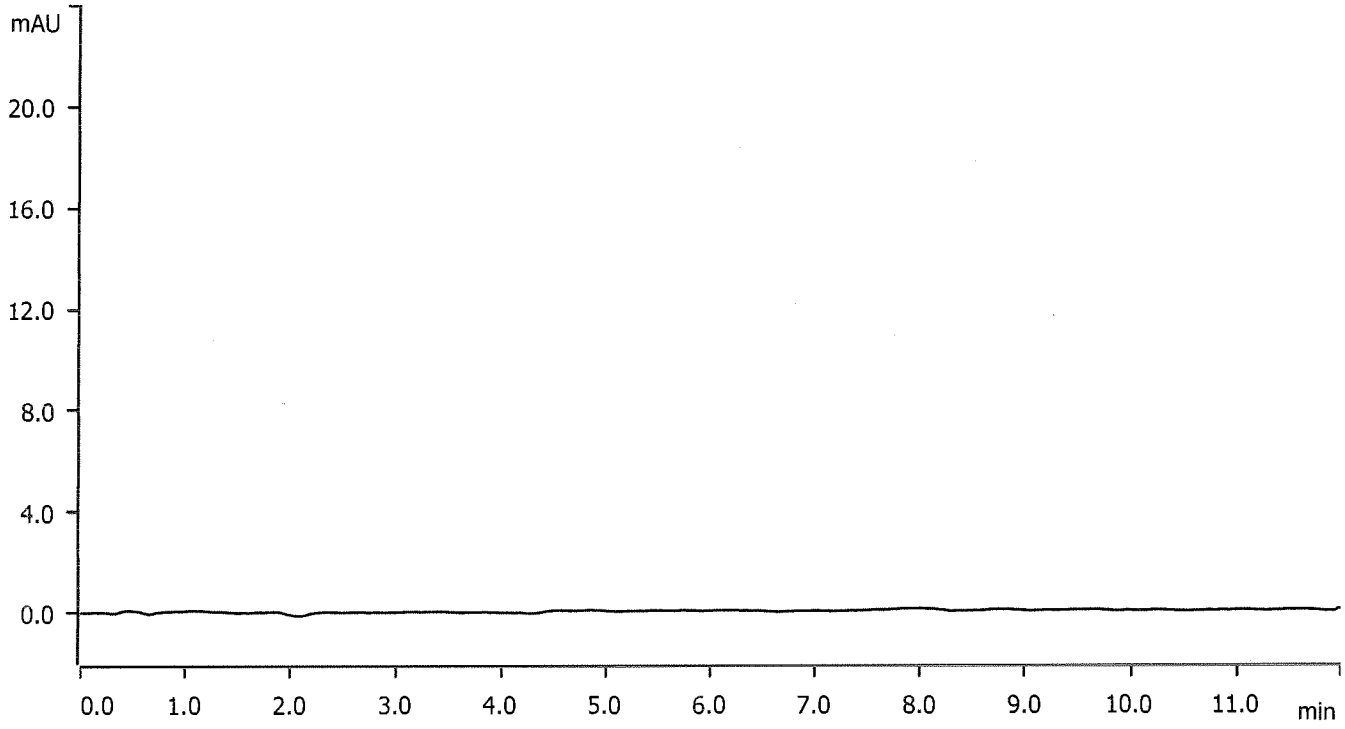


Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	7.938	0.101981	0.247		invalid
2	8.806	0.044686	0.137	Hexavalent Chromium	0.021 ✓

Sample data

Sequence	DD24-57
Ident	D114-16
Determination start	2015-04-24 05:09:47 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

Hexavalent Chromium



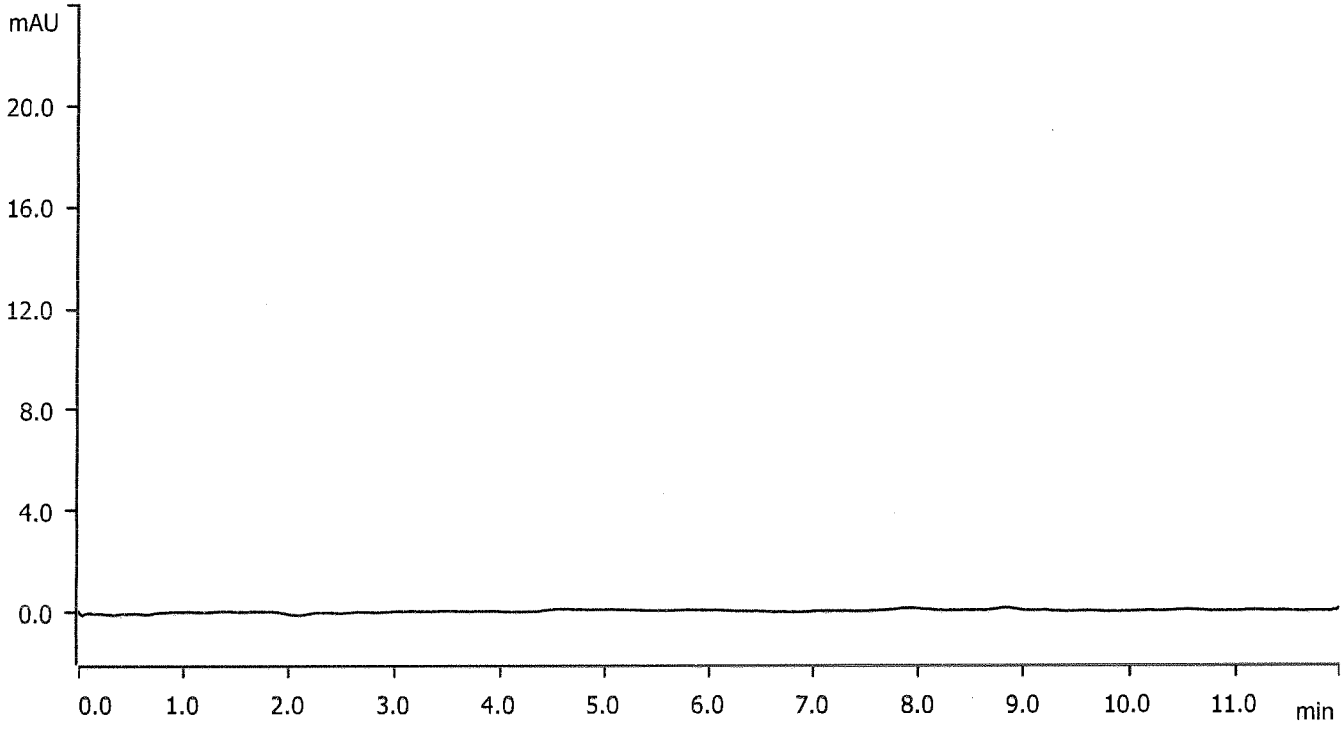
Metrohm

8167

Sample data

Sequence	DD24-59
Ident	D114-17
Determination start	2015-04-24 05:42:02 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

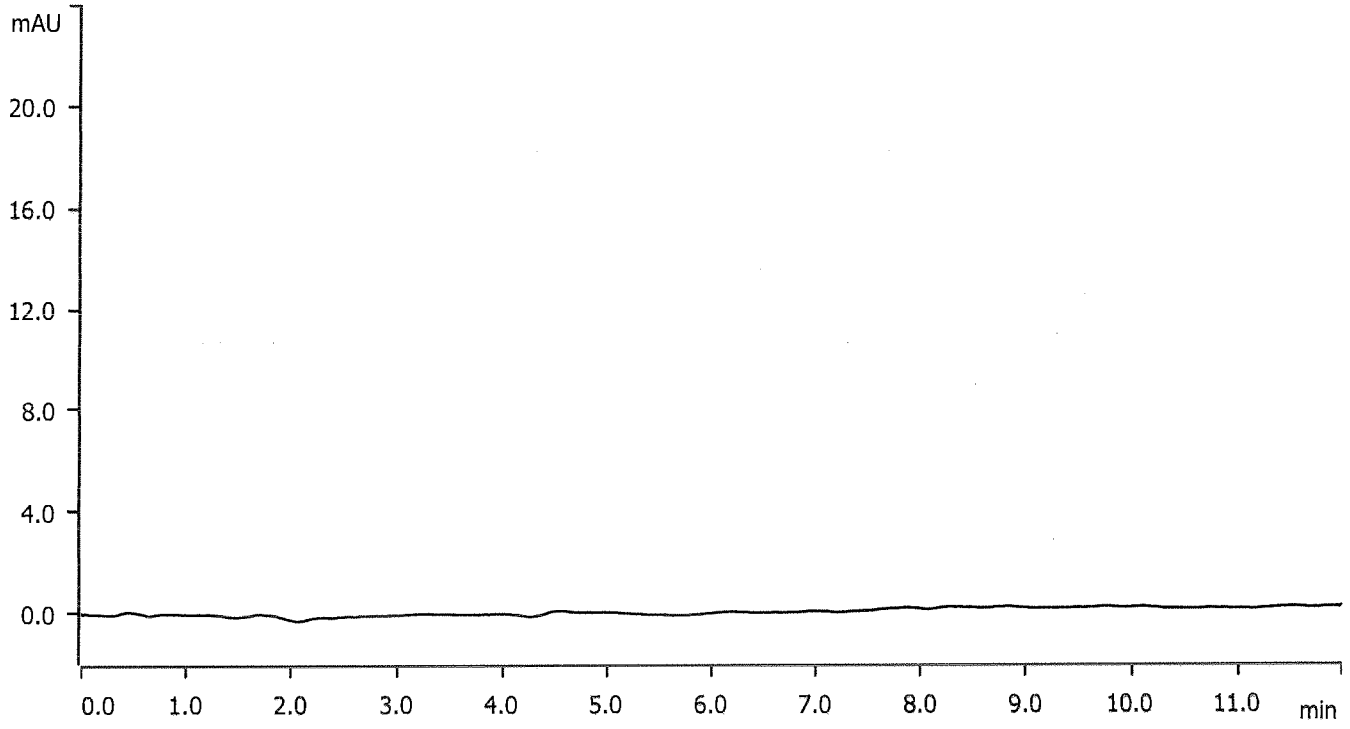
Hexavalent Chromium



Sample data

Sequence	DD24-63
Ident	D114-18
Determination start	2015-04-24 06:46:26 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

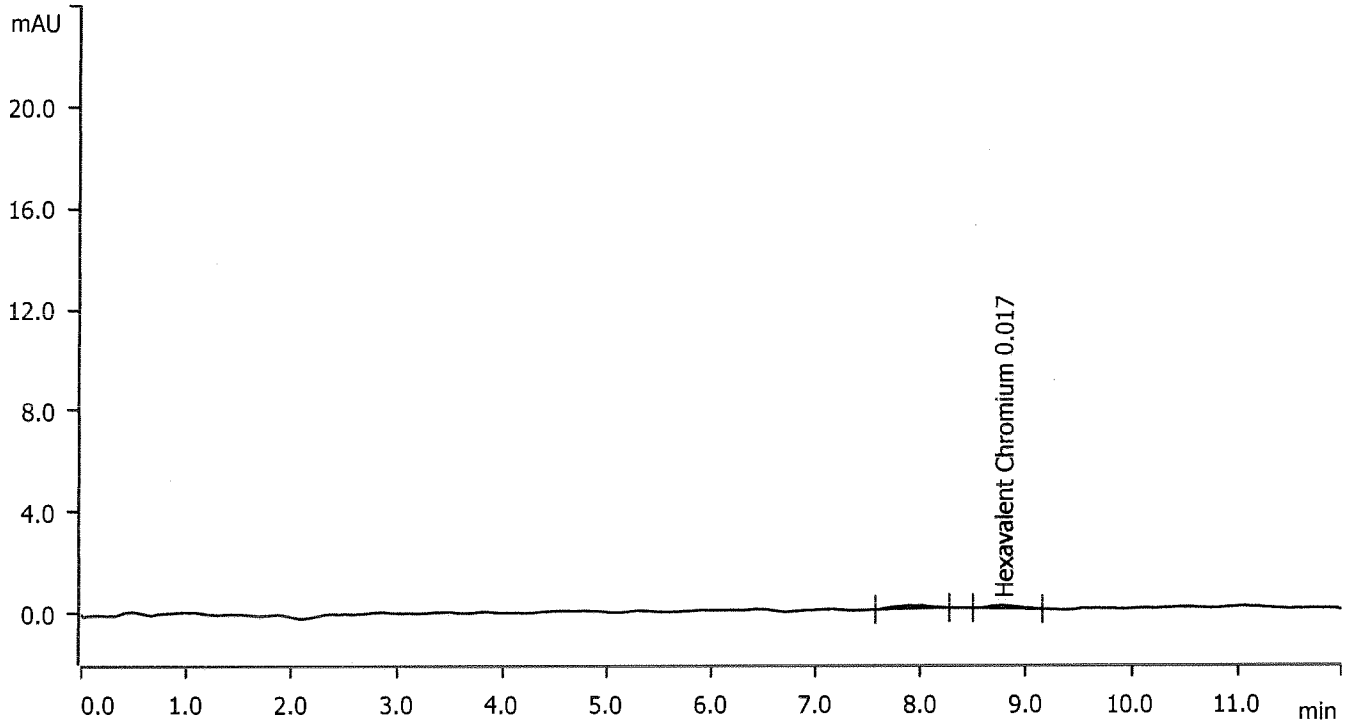
Hexavalent Chromium



Sample data

Sequence DD24-65
Ident D114-19
Determination start 2015-04-24 07:18:38 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	7.909	0.050331	0.128		invalid
2	8.791	0.038471	0.127	Hexavalent Chromium	0.017

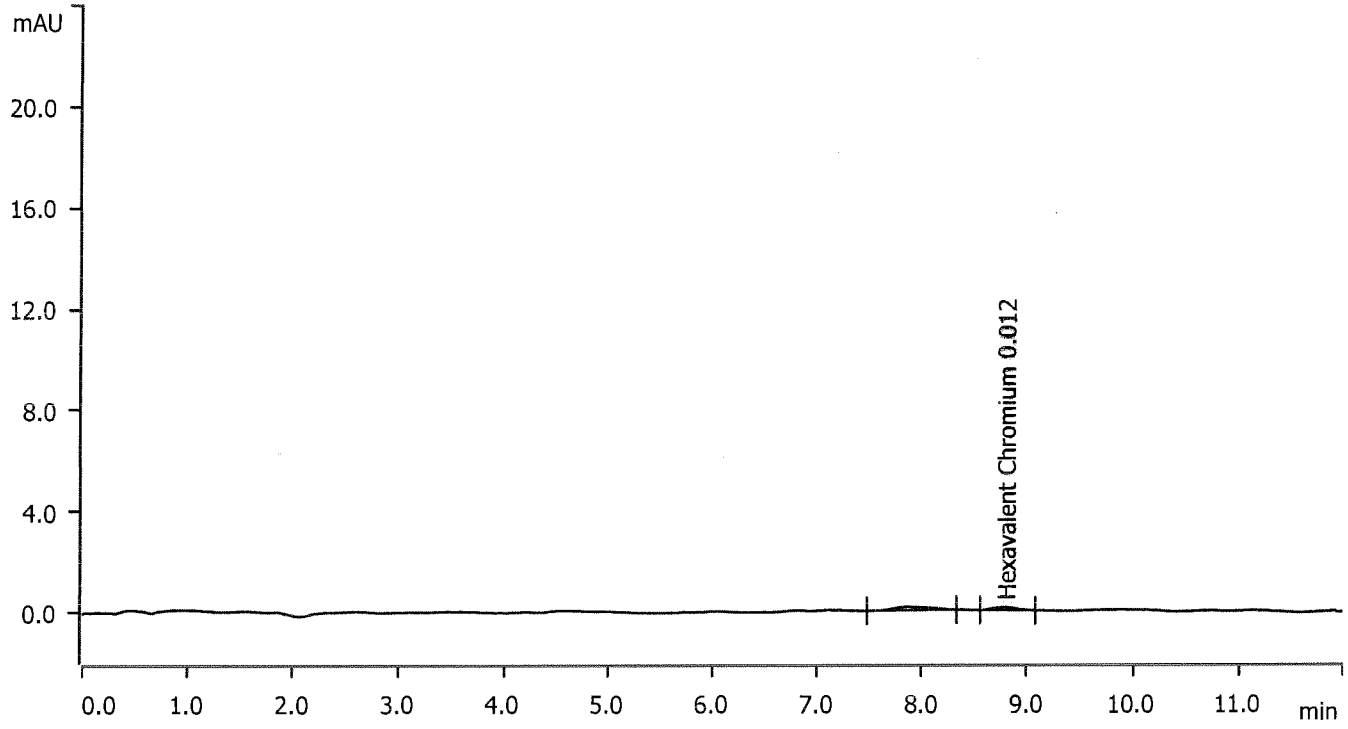
Metrohm

8170

Sample data

Sequence DD24-67
Ident D114-20
Determination start 2015-04-24 07:50:43 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium

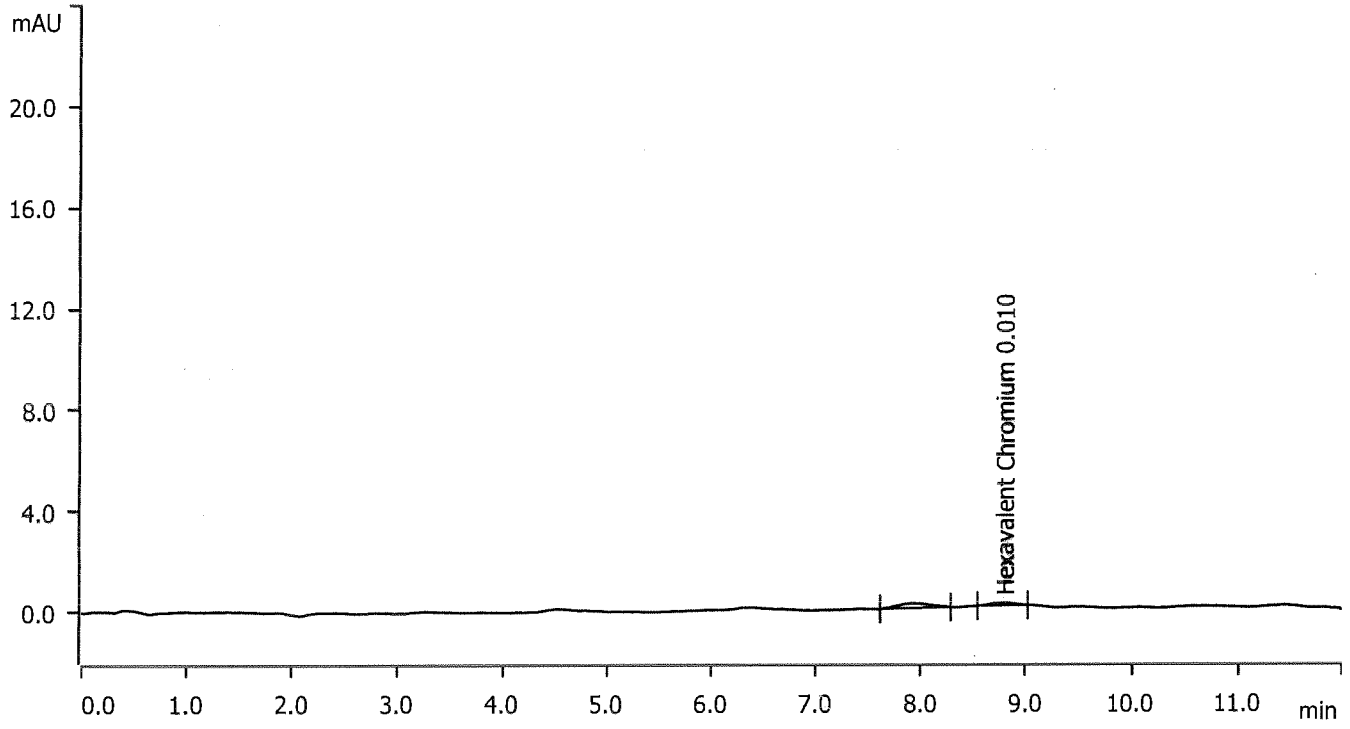


Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	7.879	0.057298	0.144		invalid
2	8.806	0.030604	0.123	Hexavalent Chromium	0.012

Sample data

Sequence DD24-69
Ident D114-21
Determination start 2015-04-24 08:22:51 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium

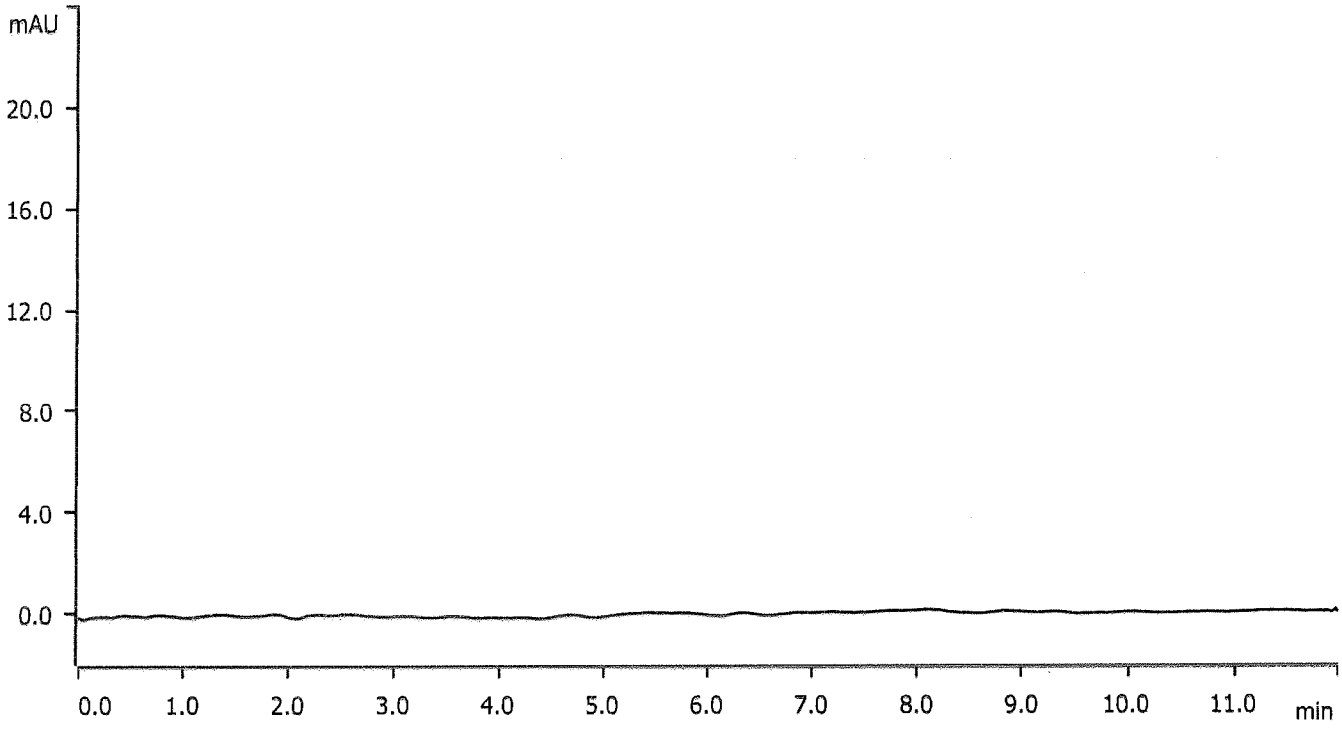


Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	7.924	0.069885	0.194		invalid
2	8.806	0.027743	0.118	Hexavalent Chromium	0.010

Sample data

Sequence	DD24-81
Ident	D114-22
Determination start	2015-04-24 11:36:05 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

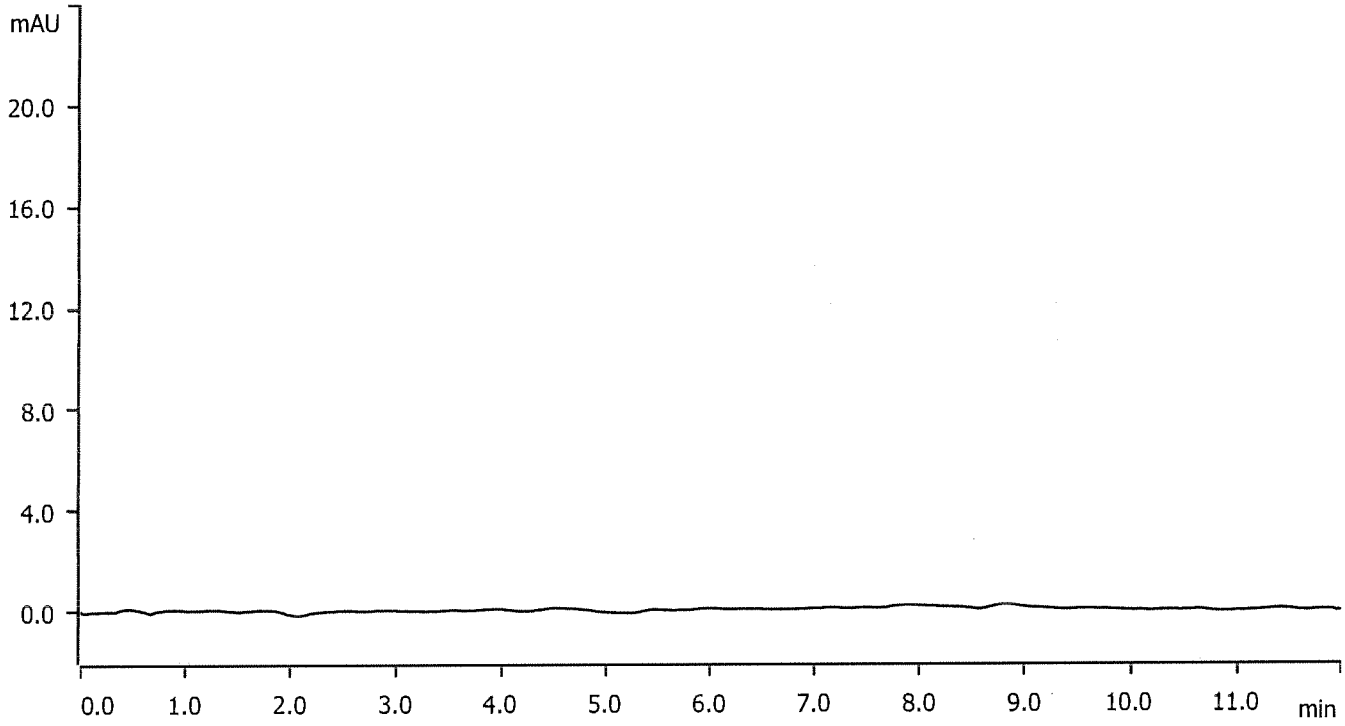
Hexavalent Chromium



Sample data

Sequence	DD24-71
Ident	D114-23
Determination start	2015-04-24 08:55:00 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

Hexavalent Chromium



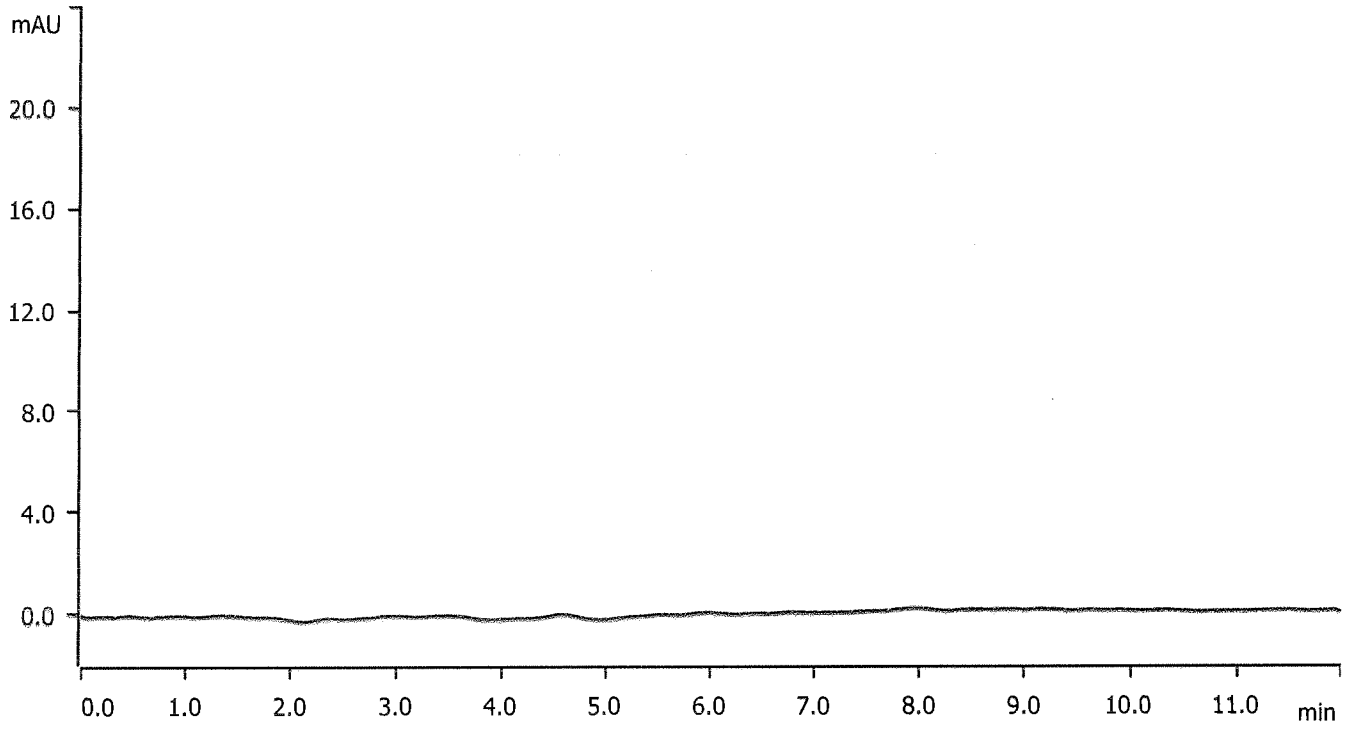
Metrohm

8174

Sample data

Sequence	DD24-75
Ident	D114-24
Determination start	2015-04-24 09:59:21 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

Hexavalent Chromium



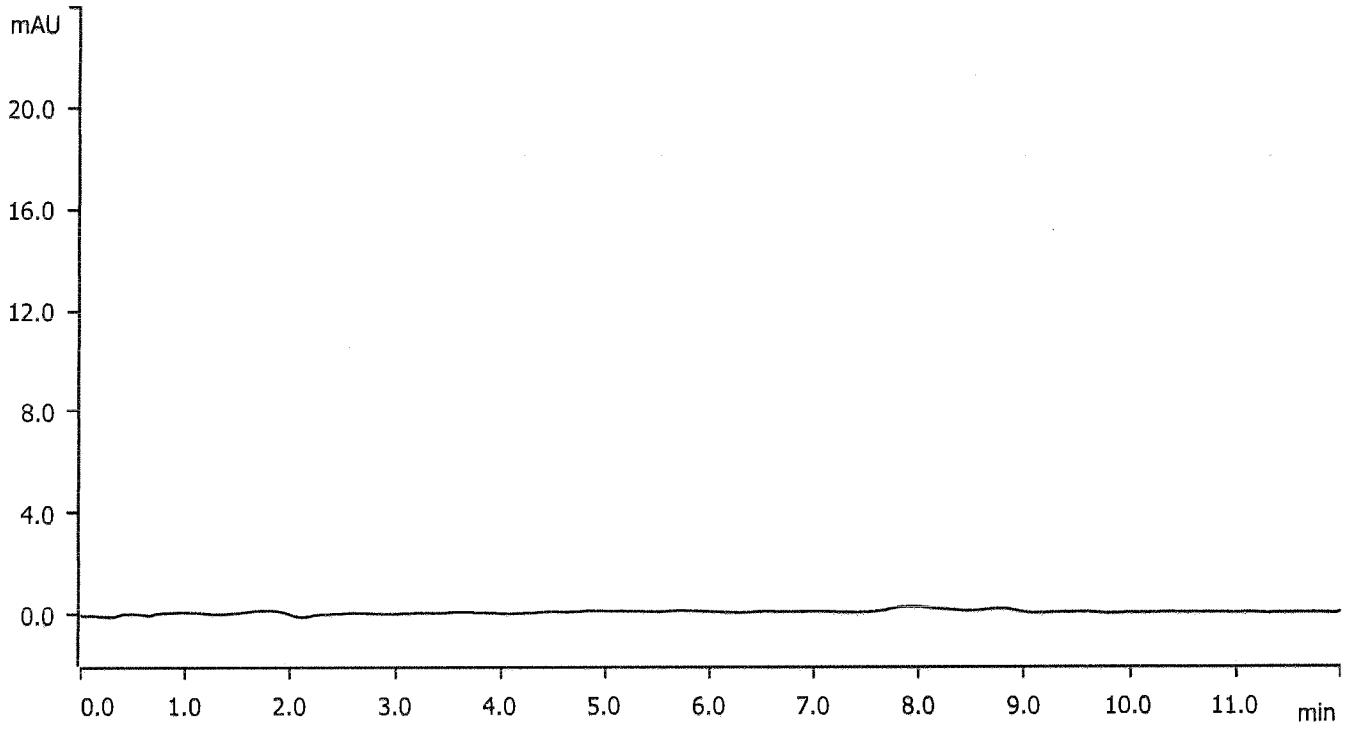
Metrohm

8175

Sample data

Sequence	DD24-77
Ident	D114-25
Determination start	2015-04-24 10:31:34 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

Hexavalent Chromium



QC SUMMARIES

EMAX QUALITY CONTROL DATA
LCS ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UX04, FALLBROOK
BATCH NO. : 15D114
METHOD : 7199

MATRIX : SOIL
DILUTION FACTOR: 1 1
SAMPLE ID : MBLK2S LCS1S
LAB SAMPLE ID : HCD013SB CSD012SL
LAB FILE ID : DD24-45 DD24-05
DATE PREPARED : 04/22/1511:36 04/22/1511:36
DATE ANALYZED : 04/24/1501:55 04/23/1515:11
PREP BATCH : HCD013S HCD013S
CALIBRATION REF: DD24-37 DD24-01

ACCESSION:

PARAMETER	MB RESULT (ug/kg)	SPIKE AMT (ug/kg)	BS RESULT (ug/kg)	BS REC (%)	QC LIMIT (%)
Hexavalent Chromium	ND	1000	982	98	80-120

EMAX QUALITY CONTROL DATA
LCS ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UXO4, FALLBROOK
BATCH NO. : 15D114
METHOD : 7199

MATRIX : SOIL
DILUTION FACTOR: 1 1
SAMPLE ID : MBLK2S LCS2S
LAB SAMPLE ID : HCD013SB CSD013SL
LAB FILE ID : DD24-45 DD24-47
DATE PREPARED : 04/22/1511:36 04/22/1511:36
DATE ANALYZED : 04/24/1501:55 04/24/1502:28
PREP BATCH : HCD013S HCD013S
CALIBRATION REF: DD24-37 DD24-37

ACCESSION:

PARAMETER	MB RESULT (ug/kg)	SPIKE AMT (ug/kg)	BS RESULT (ug/kg)	BS REC (%)	QC LIMIT (%)
Hexavalent Chromium	ND	1000	1010	101	80-120

EMAX QUALITY CONTROL DATA
MATRIX SPIKE ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UX04, FALLBROOK
BATCH NO. : 15D114
METHOD : 7199

MATRIX :	SOIL	% MOISTURE: 13.7
DILUTION FACTOR:	1	1
SAMPLE ID :	UX04-TR04-S02-3.0	UX04-TR04-S02-3.0MS
LAB SAMPLE ID :	D114-08	D114-08M
LAB FILE ID :	DD24-09	DD24-17
DATE PREPARED :	04/22/1511:36	04/22/1511:36
DATE ANALYZED :	04/23/1516:16	04/23/1518:25
PREP BATCH :	HCD013S	HCD013S
CALIBRATION REF:	DD24-01	DD24-13

ACCESSION:

PARAMETER	PARENT RESULT (ug/kg)	SPIKE AMT (ug/kg)	MS RESULT (ug/kg)	MS REC (%)	QC LIMIT (%)
Hexavalent Chromium	22.0J	2320	2690	115	75-125

EMAX QUALITY CONTROL DATA
SAMPLE DUPLICATE ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UX04, FALLBROOK
BATCH NO. : 15D114
METHOD : 7199

MATRIX :	SOIL	% MOISTURE: 1.3
DILUTION FACTOR:	1	1
SAMPLE ID :	UX04-TR04-S02-3.0	UX04-TR04-S02-3.0DUP
LAB SAMPLE ID :	D114-08	D114-08D
LAB FILE ID :	DD24-09	DD24-11
DATE PREPARED :	04/22/1511:36	04/22/1511:36
DATE ANALYZED :	04/23/1516:16	04/23/1516:48
PREP BATCH :	HCD012S	HCD012S
CALIBRATION REF:	DD24-01	DD24-01

ACCESSION:

PARAMETER	PARENT RESULT (ug/kg)	DUP RESULT (ug/kg)	RPD (%)	MAX RPD (%)
Hexavalent Chromium	22.0J	ND	NA	20

EMAX QUALITY CONTROL DATA
SAMPLE DUPLICATE ANALYSIS

CLIENT : KLEINFELDER
PROJECT : CTO 070, UX04, FALLBROOK
BATCH NO. : 15D114
METHOD : 7199

MATRIX	: SOIL	% MOISTURE: 1.3
DILUTION FACTOR	: 1	1
SAMPLE ID	: UX04-SB15-0.5	UX04-SB15-0.5DUP
LAB SAMPLE ID	: D114-22	D114-22D
LAB FILE ID	: DD24-81	DD24-83
DATE PREPARED	: 04/22/1511:36	04/22/1511:36
DATE ANALYZED	: 04/24/1511:36	04/24/1512:08
PREP BATCH	: HCD013S	HCD013S
CALIBRATION REF	: DD24-79	DD24-79

ACCESSION:

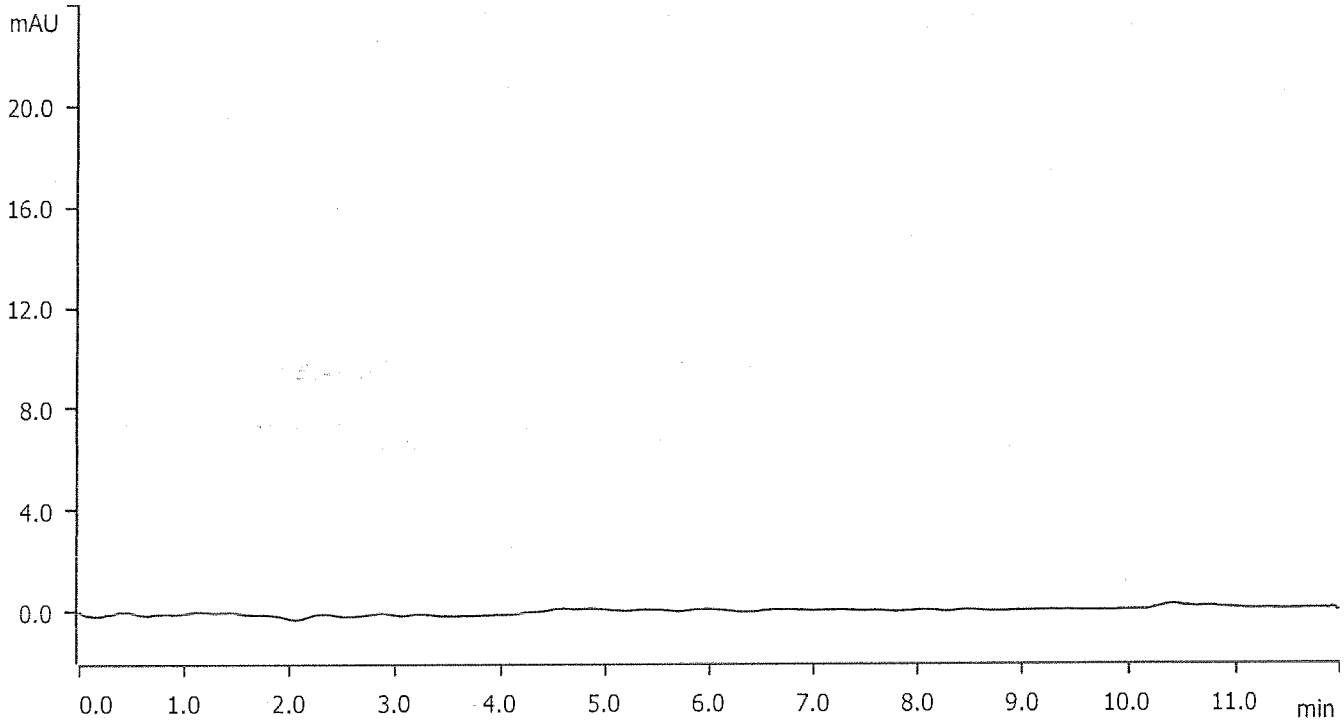
PARAMETER	PARENT RESULT (ug/kg)	DUP RESULT (ug/kg)	RPD (%)	MAX RPD (%)
Hexavalent Chromium	ND	ND	0	20

QC DATA

Sample data

Sequence	DD24-03
Ident	HCD012SB
Determination start	2015-04-23 14:06:45 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

Hexavalent Chromium



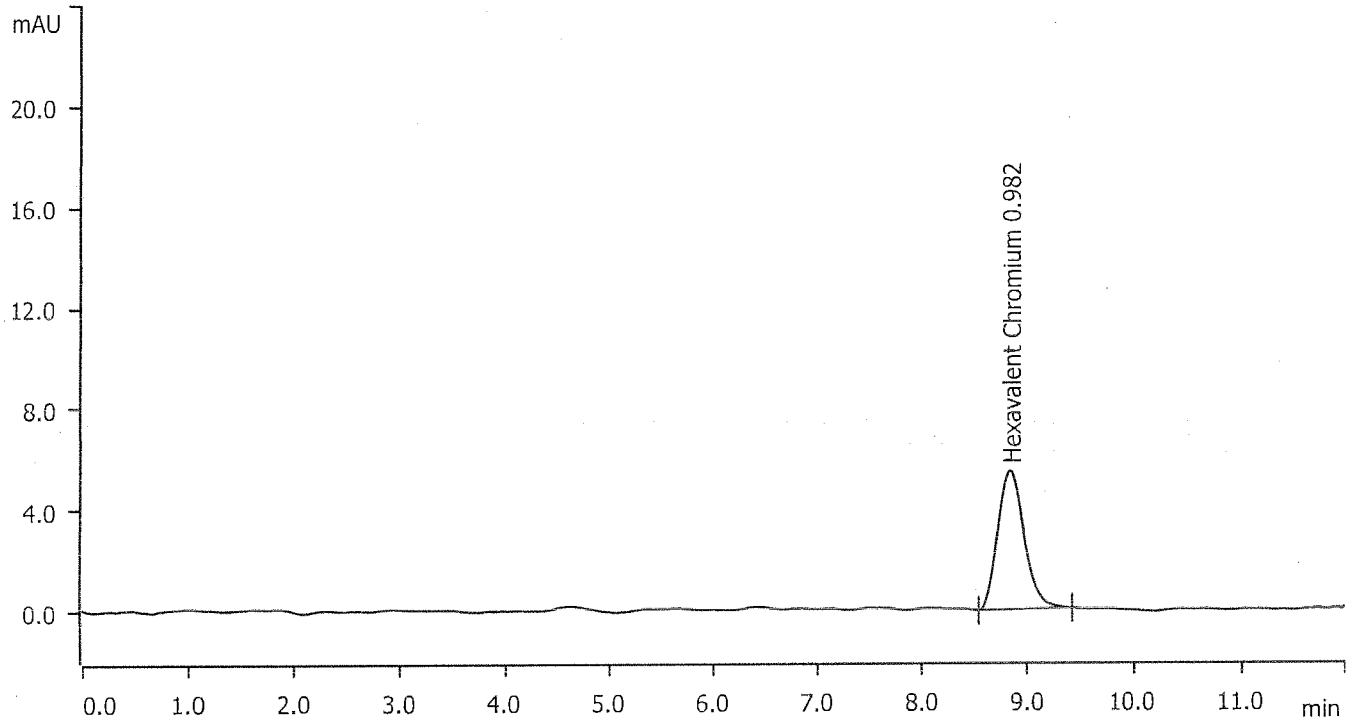
Metrohm

8184

Sample data

Sequence DD24-05
Ident CSD012SL
Determination start 2015-04-23 15:11:24 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.850	1.581858	5.465	Hexavalent Chromium	0.982

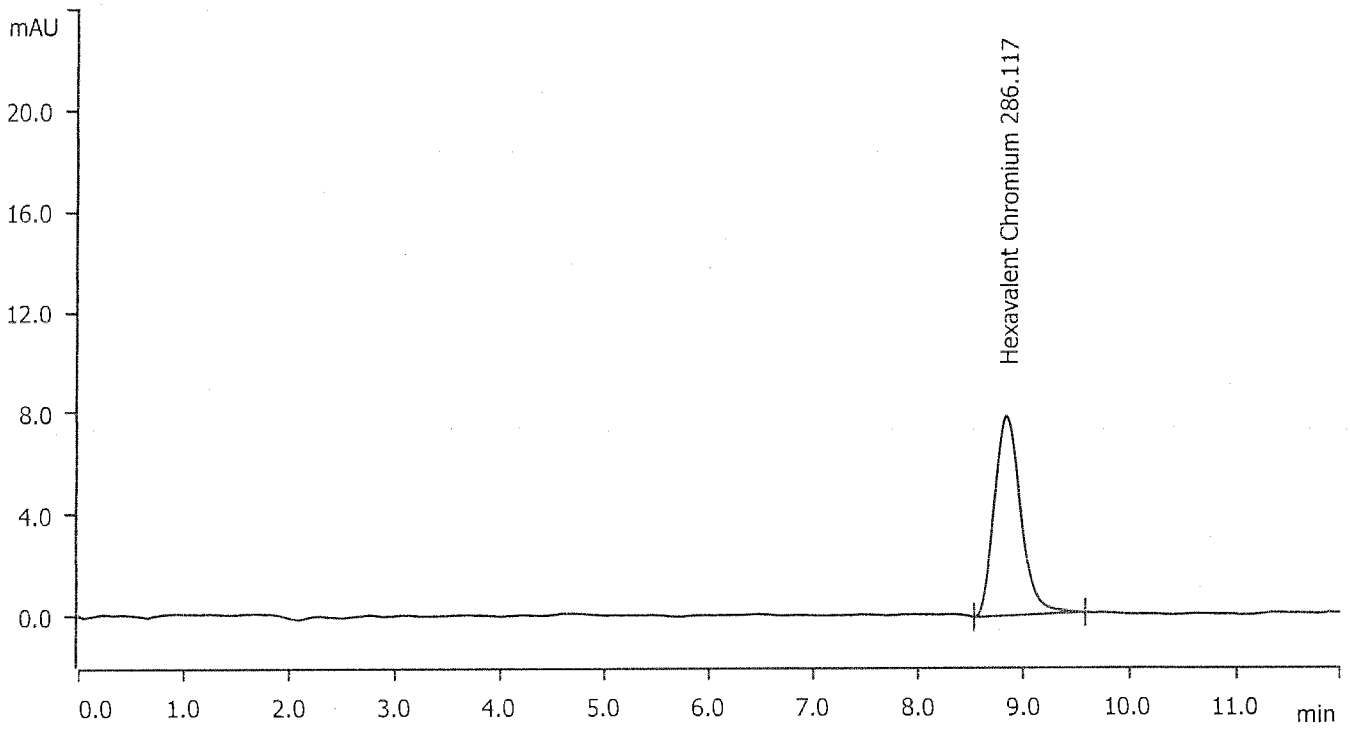
Metrohm

8185

Sample data

Sequence DD24-07
Ident CID012SL
Determination start 2015-04-23 15:43:45 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 200
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.850	2.298956	7.856	Hexavalent Chromium	286.117

24.4 mg = 314.079 ✓

= 91.1%

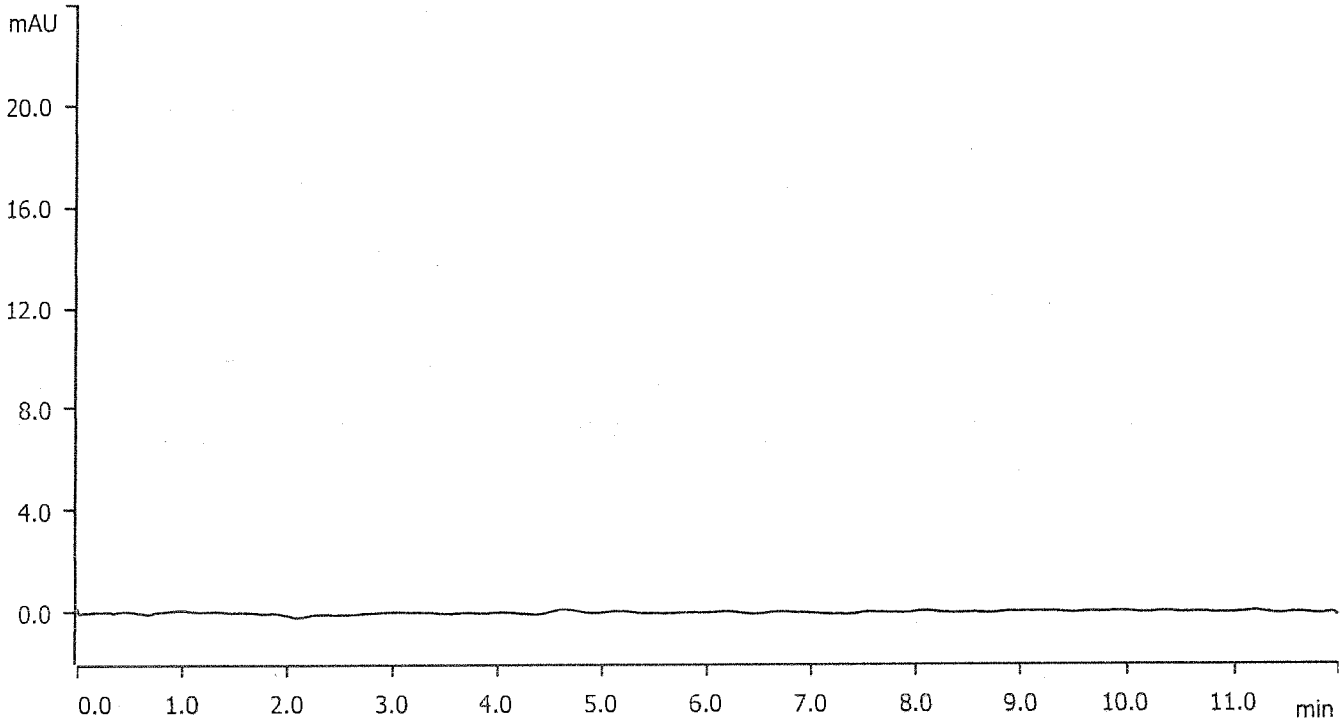
Metrohm

8186

Sample data

Sequence	DD24-45
Ident	HCD013SB
Determination start	2015-04-24 01:55:57 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

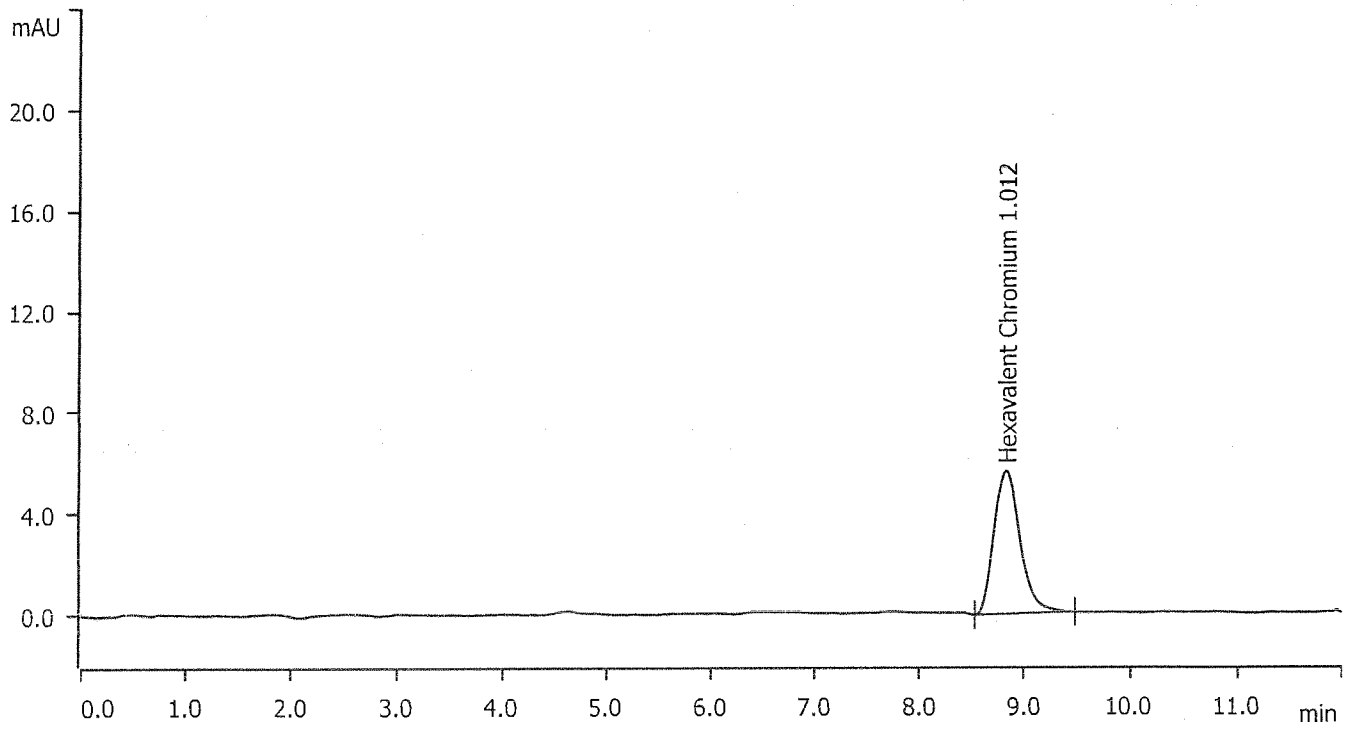
Hexavalent Chromium



Sample data

Sequence DD24-47
Ident CSD013SL
Determination start 2015-04-24 02:28:15 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.835	1.629958	5.651	Hexavalent Chromium	1.012

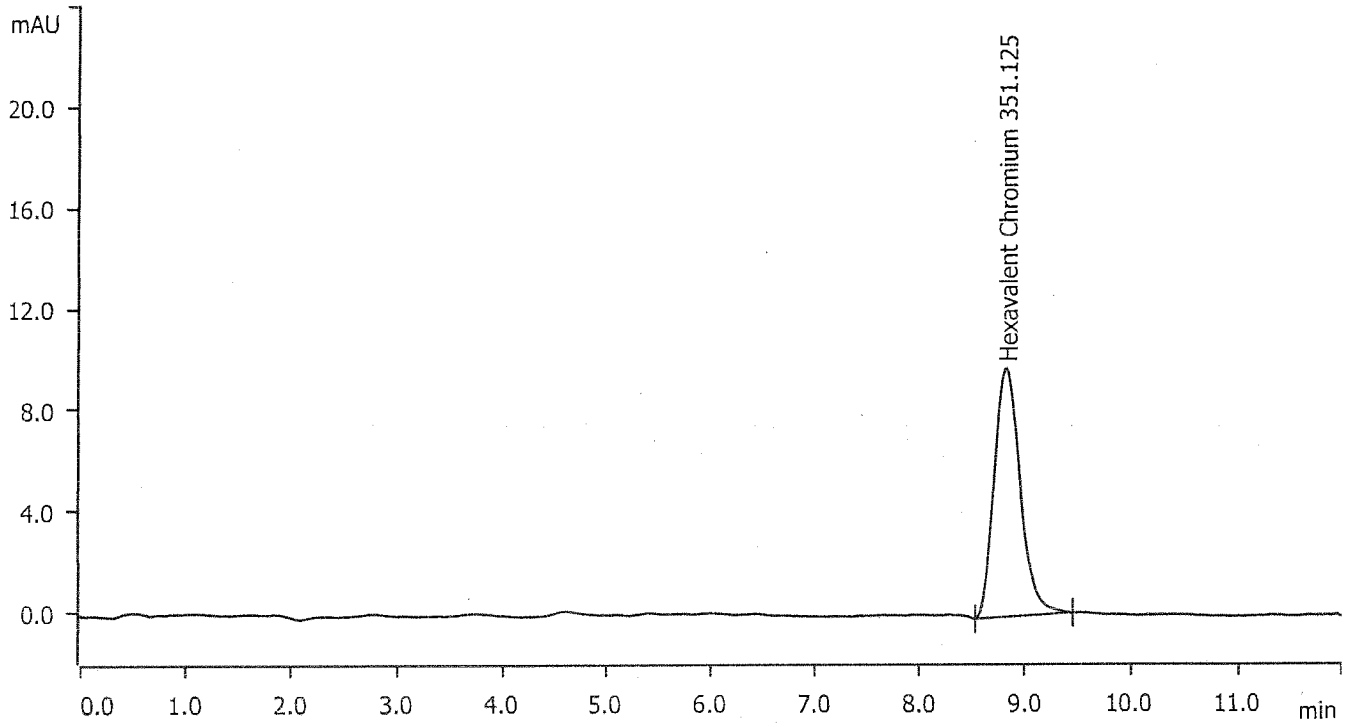
Metrohm

8188

Sample data

Sequence DD24-51
Ident CID013SL
Determination start 2015-04-24 03:32:56 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 200
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.835	2.818770	9.791	Hexavalent Chromium	351.125

31.0mg = 399.035 ✓

= 88.0%

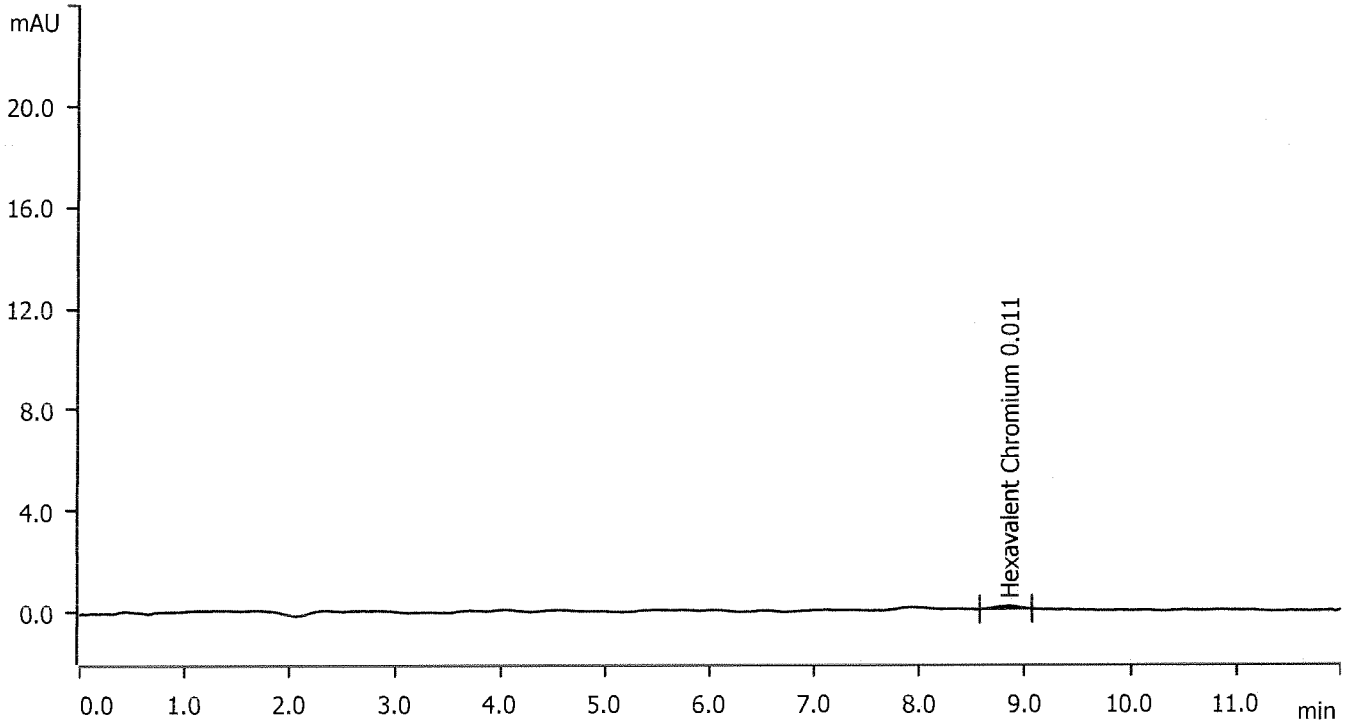
Metrohm

8189

Sample data

Sequence DD24-11
Ident D114-08D
Determination start 2015-04-23 16:48:24 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.850	0.029414	0.120	Hexavalent Chromium	0.011

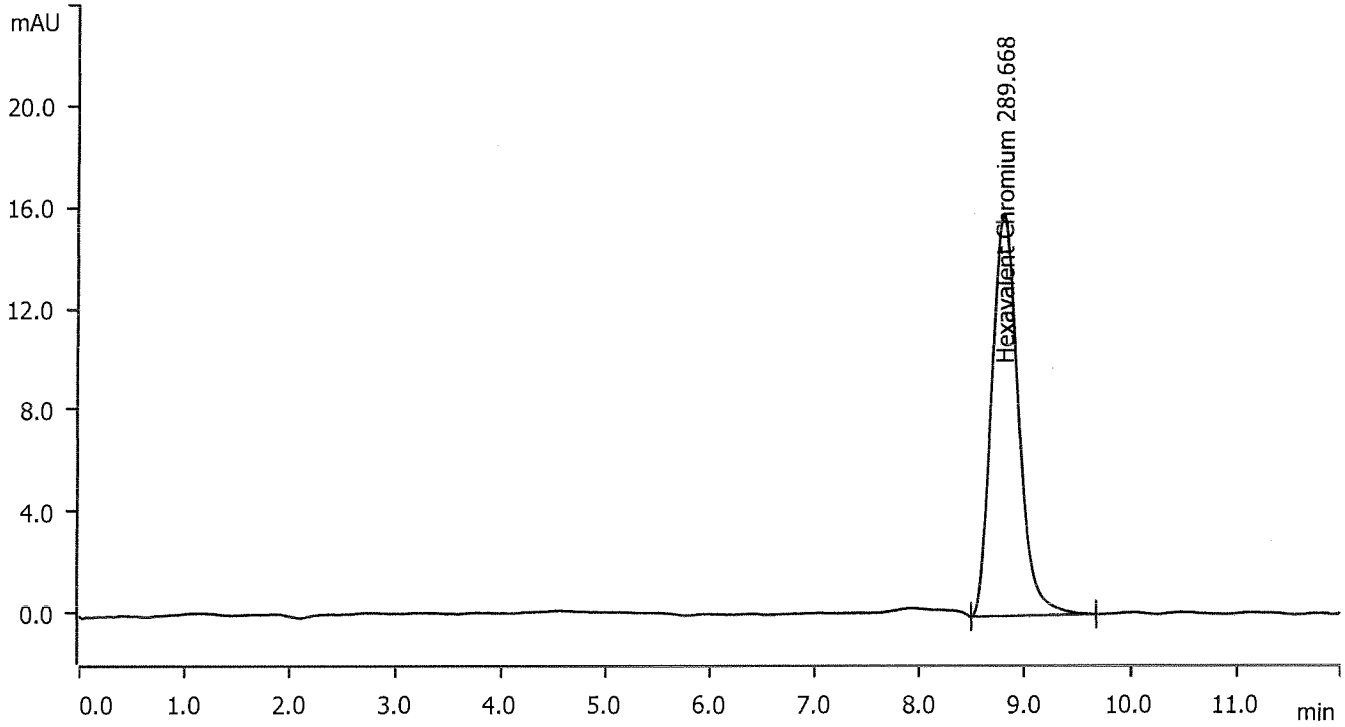
Metrohm

8190

Sample data

Sequence DD24-15
Ident D114-08M
Determination start 2015-04-23 17:53:00 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 100
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.806	4.643591	15.836	Hexavalent Chromium	289.668

24.2 mg : 311.504

= 93.0 %

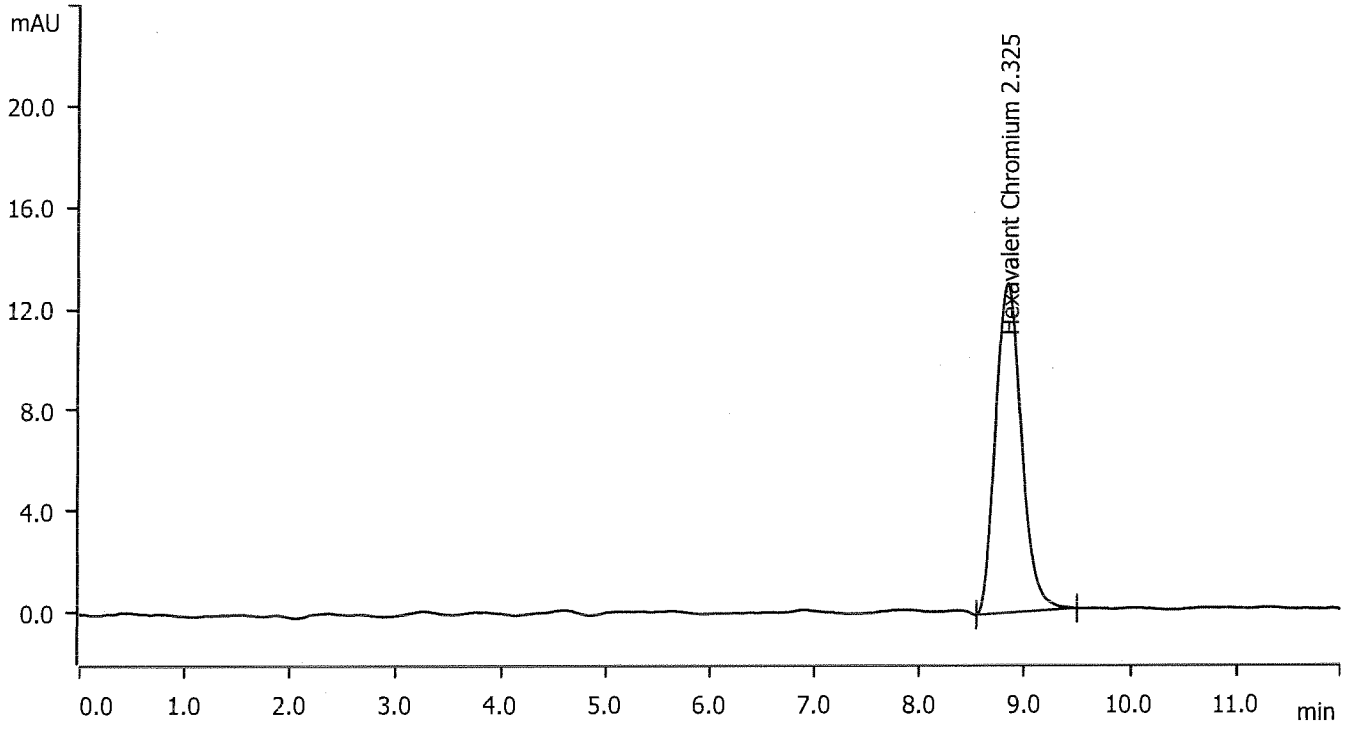
Metrohm

8191

Sample data

Sequence DD24-17
Ident D114-08M
Determination start 2015-04-23 18:25:16 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.850	3.729692	13.003	Hexavalent Chromium	2.325

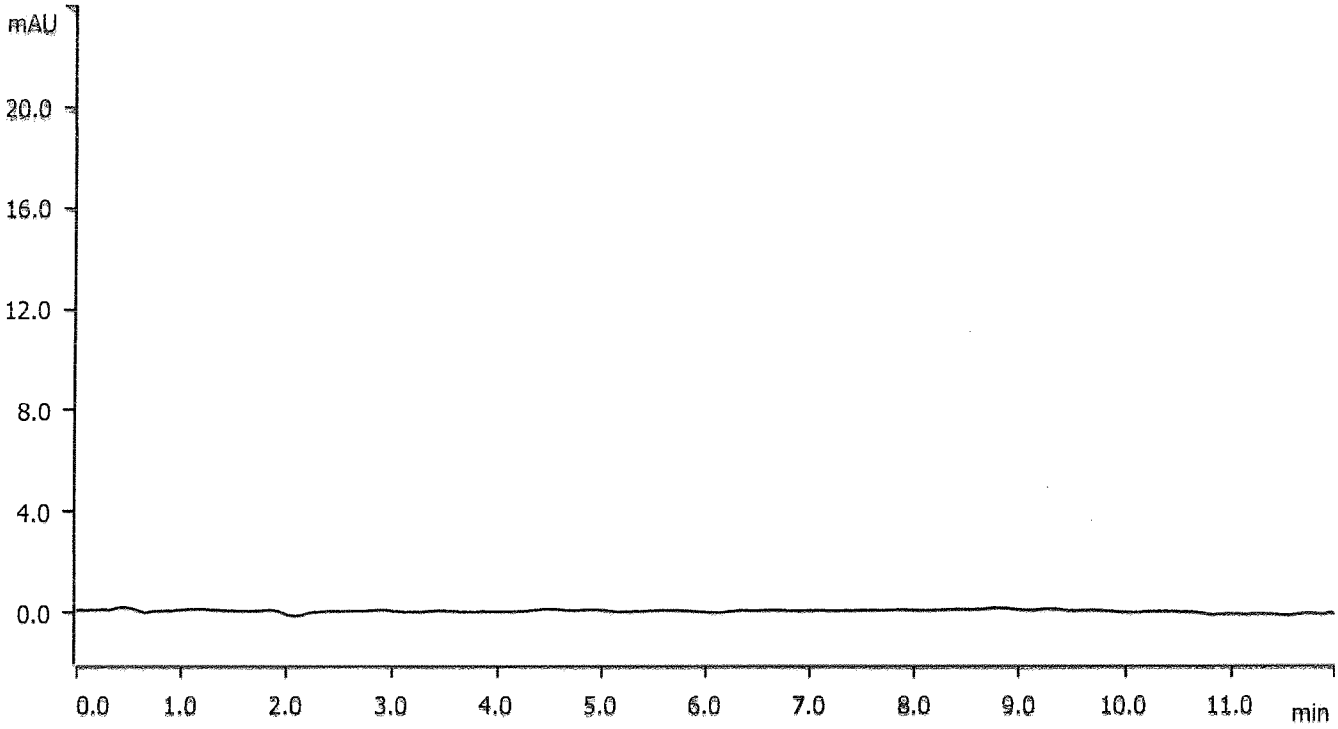
Metrohm

8192

Sample data

Sequence	DD24-83
Ident	D114-22D
Determination start	2015-04-24 12:08:22 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

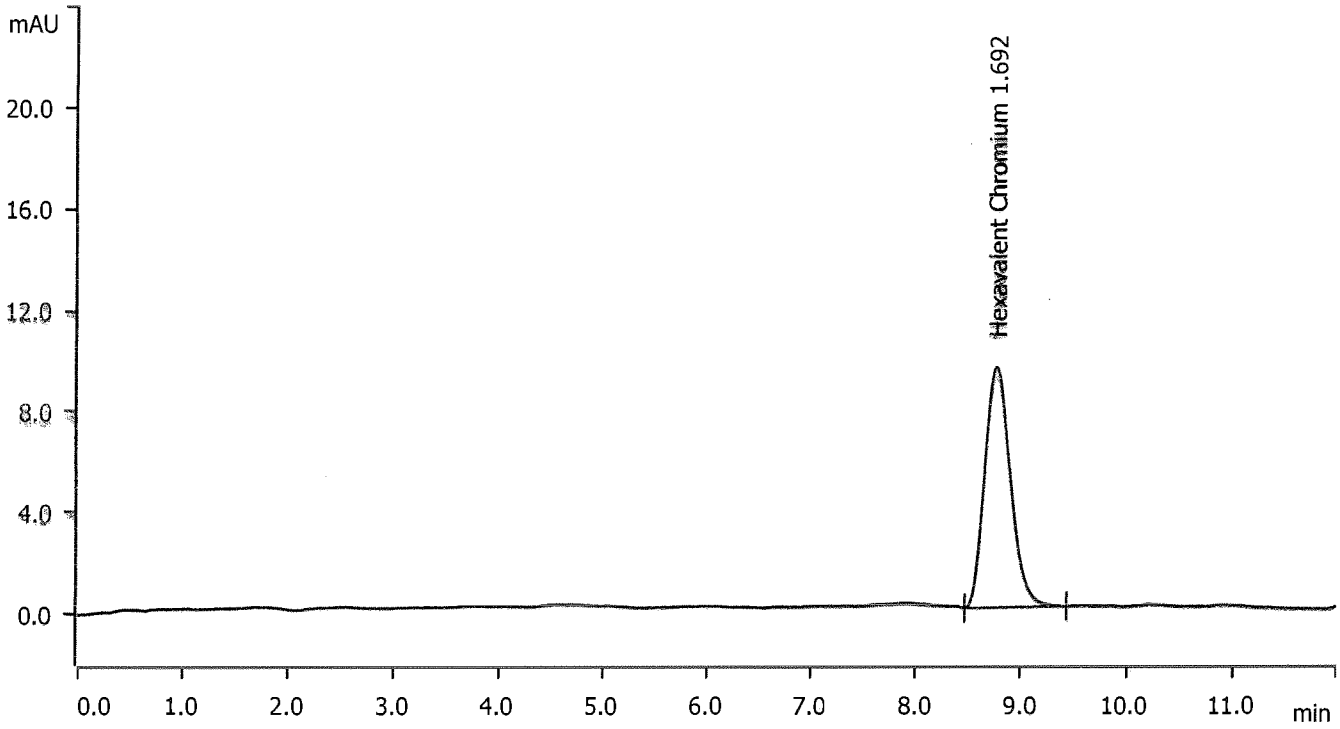
Hexavalent Chromium



Sample data

Sequence DD24-85
Ident D114-22M
Determination start 2015-04-24 12:40:42 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.776	2.717105	9.505	Hexavalent Chromium	1.692

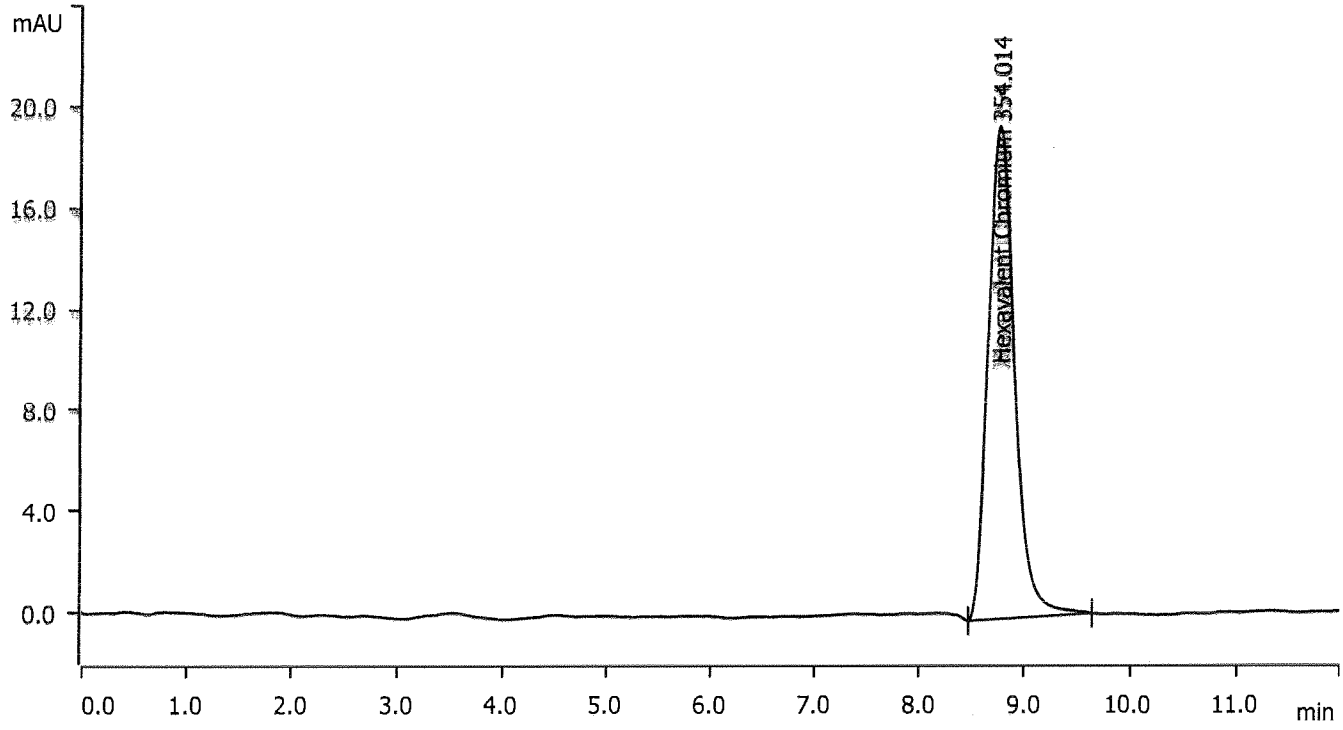
Metrohm

8194

Sample data

Sequence DD24-87
Ident D114-22M
Determination start 2015-04-24 13:13:03 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 100
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.776	5.672651	19.446	Hexavalent Chromium	354.014

33.1 mg = 426.066
= 83.1%

Metrohm

8195

INITIAL CALIBRATION(S)

IC Result Check FormVersion : P21/DD21 (2015)

LFID	LSID	Selection	Cr6	RawNetID	DF
DD21-01	IB	C	0	z4211457	1
DD21-02	S0	C	0	z4211513	1
DD21-03	S1	C	0.048	z4211529	1
DD21-04	S2	C	0.099	z4211546	1
DD21-05	S3	C	0.205	z4211602	1
DD21-06	S4	C	0.502	z4211618	1
DD21-07	S5	C	1.021	z4211634	1
DD21-08	S6	C	2.008	z4211650	1
DD21-09	S7	C	4.967	z4211706	1
DD21-10	ICV	C	101.9%	z4211728	1
DD21-11	ICB	C	0	z4211744	1

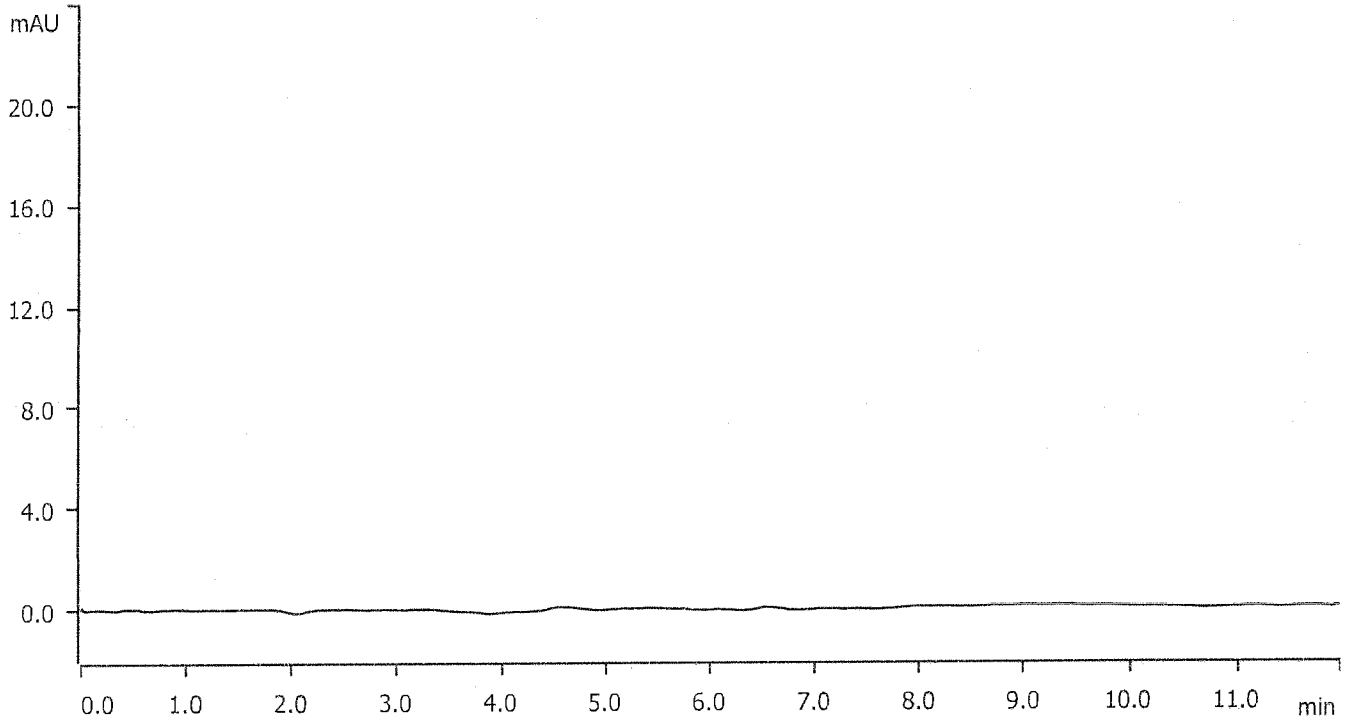
METHOD: G2D2115 METHOD
SOLVENT: pH ADJUSTED WATER (SW4-03-02-02)

RA
04/24/15

Sample data

Sequence	DD21-02
Ident	S0
Determination start	2015-04-21 15:13:47 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

Hexavalent Chromium



AA
04/24/15

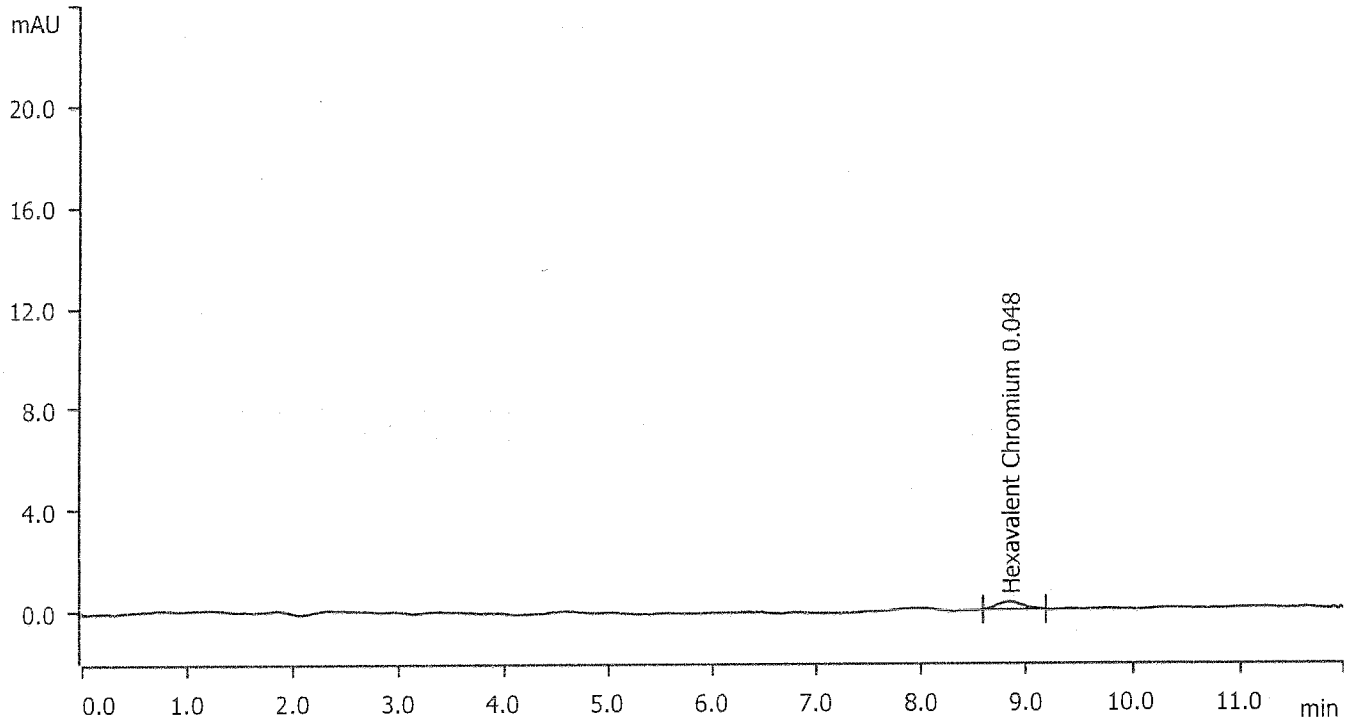
Metrohm

8198

Sample data

Sequence DD21-03
Ident S1
Determination start 2015-04-21 15:29:57 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Standard 1
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.850	0.089216	0.313	Hexavalent Chromium	0.048

AS
04/24/15

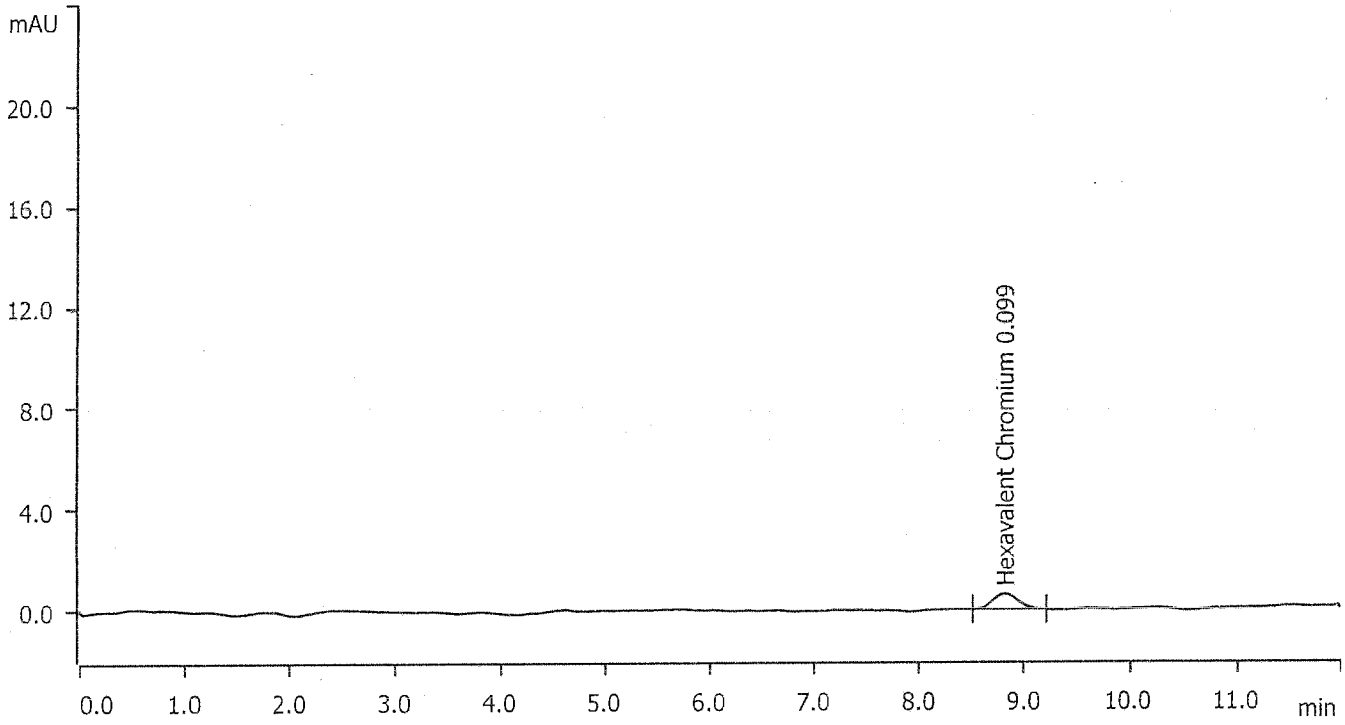
Metrohm

8199

Sample data

Sequence DD21-04
Ident S2
Determination start 2015-04-21 15:46:07 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Standard 2
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.821	0.170097	0.611	Hexavalent Chromium	0.099

AS 04/24/15

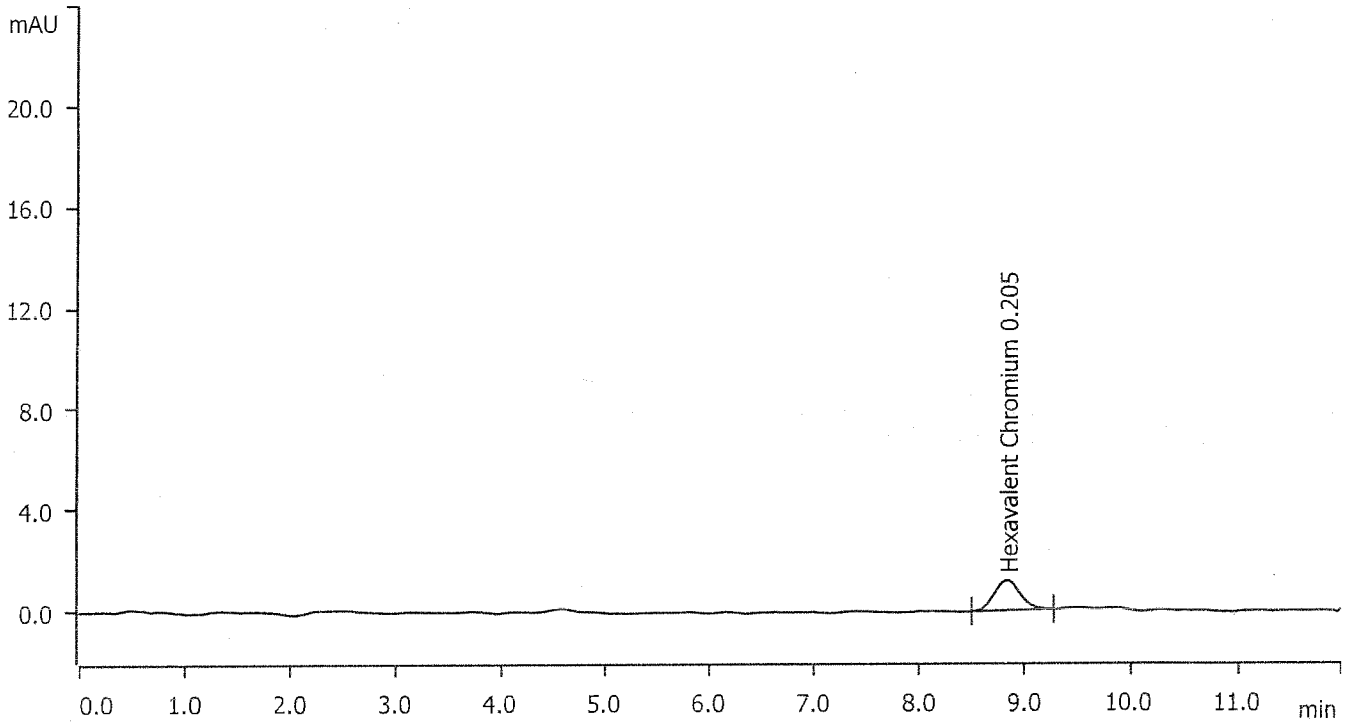
Metrohm

8200

Sample data

Sequence DD21-05
Ident S3
Determination start 2015-04-21 16:02:17 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Standard 3
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.850	0.337318	1.174	Hexavalent Chromium	0.205

AS
04/24/15

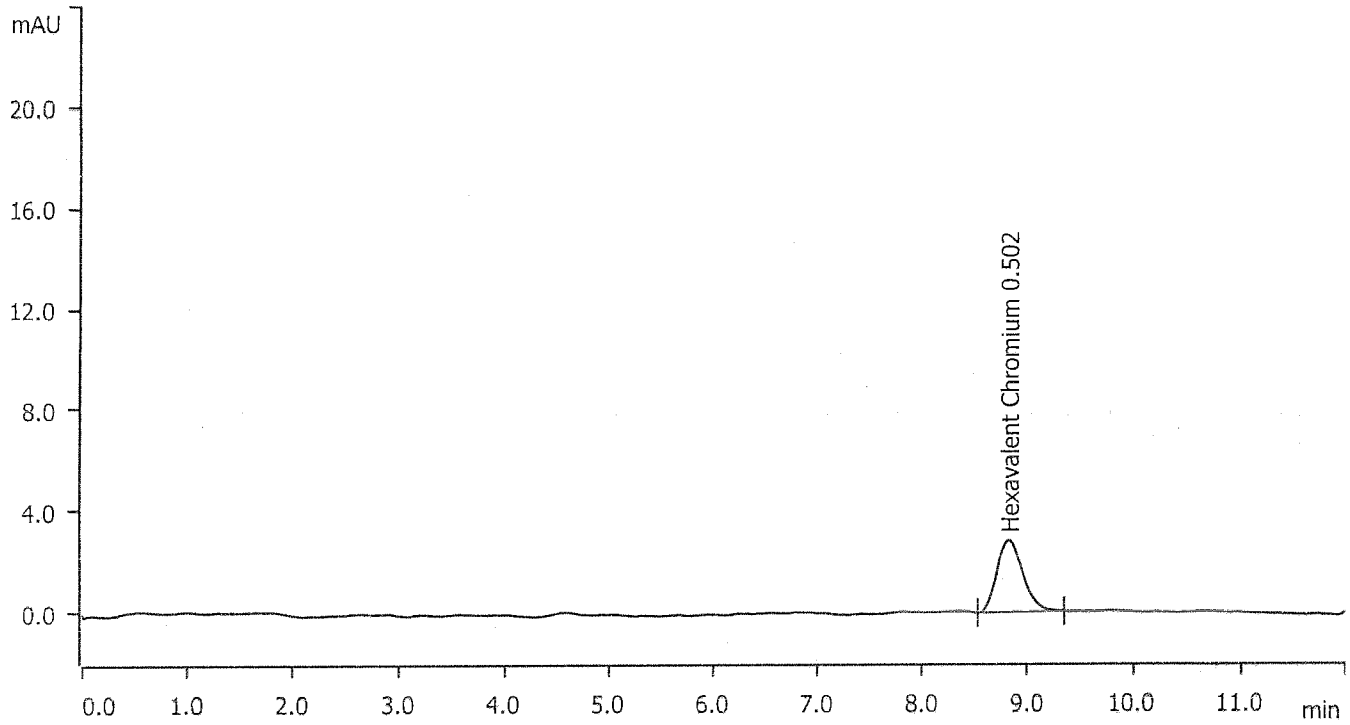
Metrohm

8201

Sample data

Sequence DD21-06
Ident S4
Determination start 2015-04-21 16:18:25 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Standard 4
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.835	0.806373	2.823	Hexavalent Chromium	0.502

DS 04/24/15

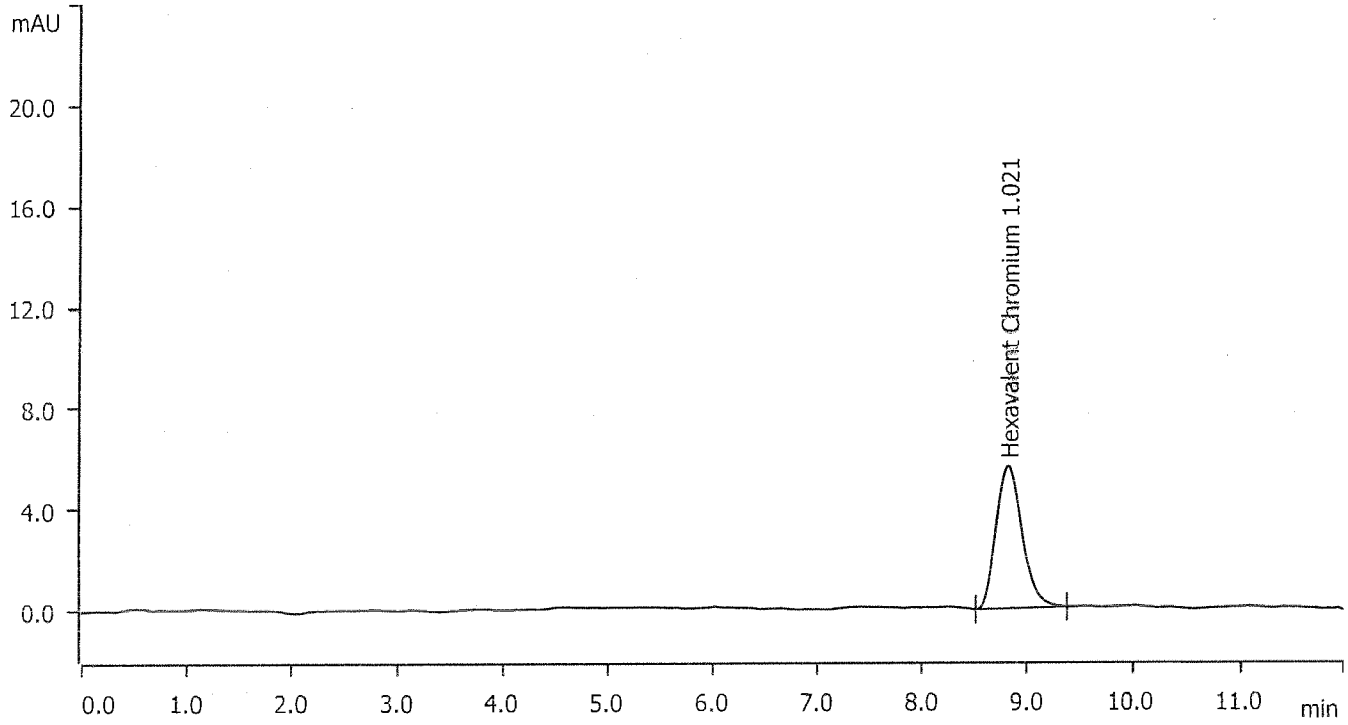
Metrohm

8202

Sample data

Sequence DD21-07
Ident S5
Determination start 2015-04-21 16:34:34 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Standard 5
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.835	1.626439	5.637	Hexavalent Chromium	1.021

AS
04/24/15

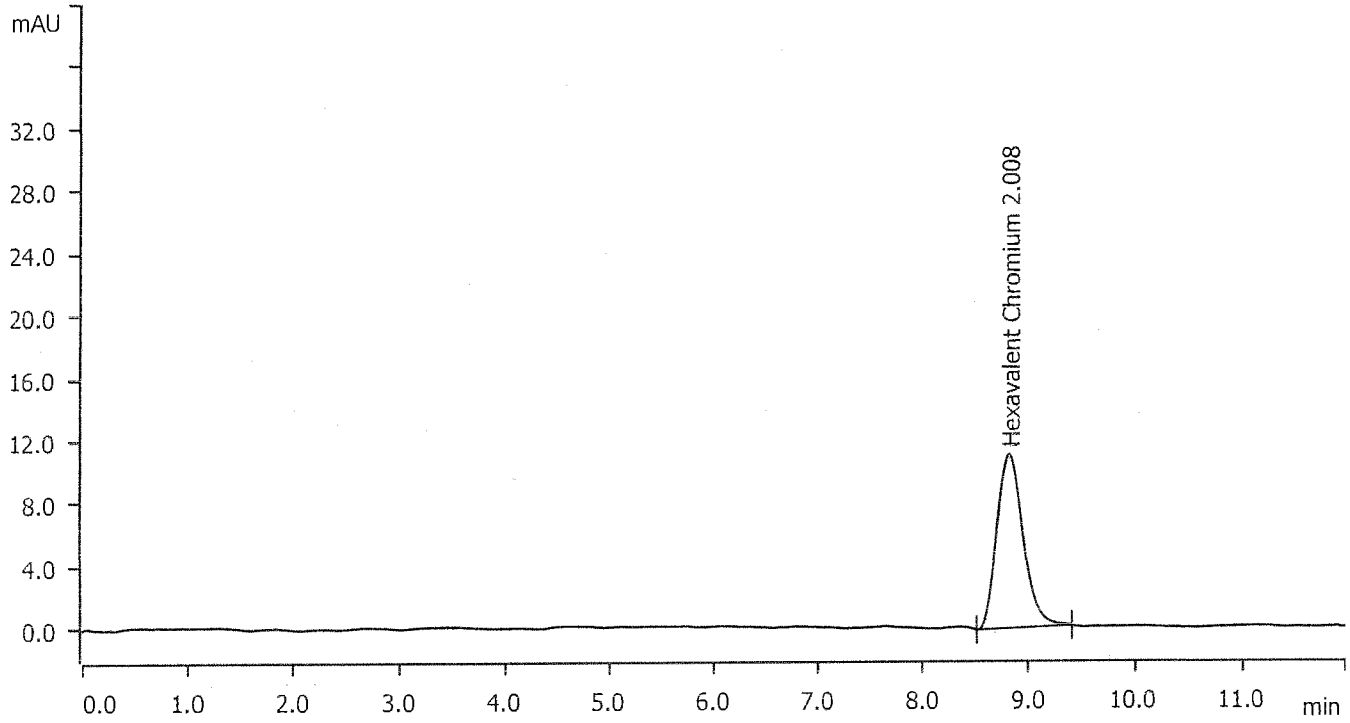
Metrohm

8203

Sample data

Sequence DD21-08
Ident S6
Determination start 2015-04-21 16:50:43 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Standard 6
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.835	3.187257	11.067	Hexavalent Chromium	2.008

AS
04/24/15

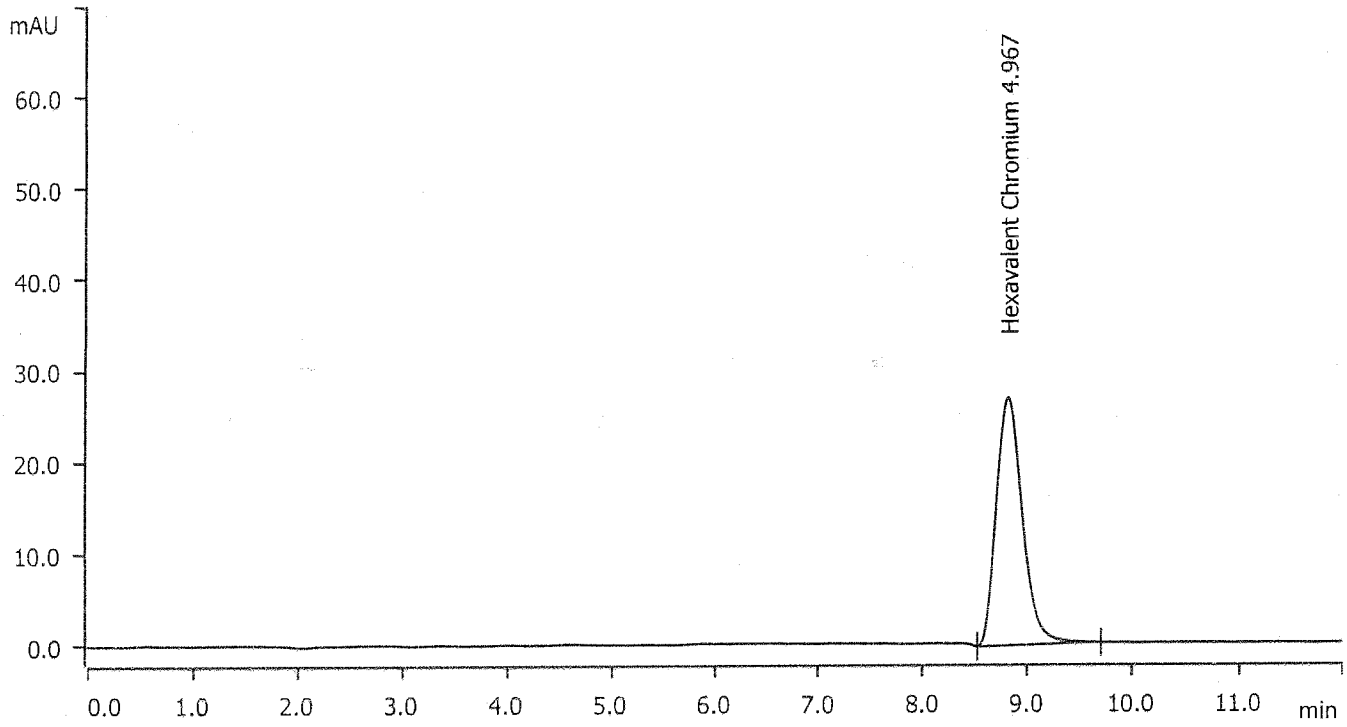
Metrohm

8204

Sample data

Sequence DD21-09
Ident S7
Determination start 2015-04-21 17:06:51 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Standard 7
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.835	7.862241	27.042	Hexavalent Chromium	4.967

04/24/15

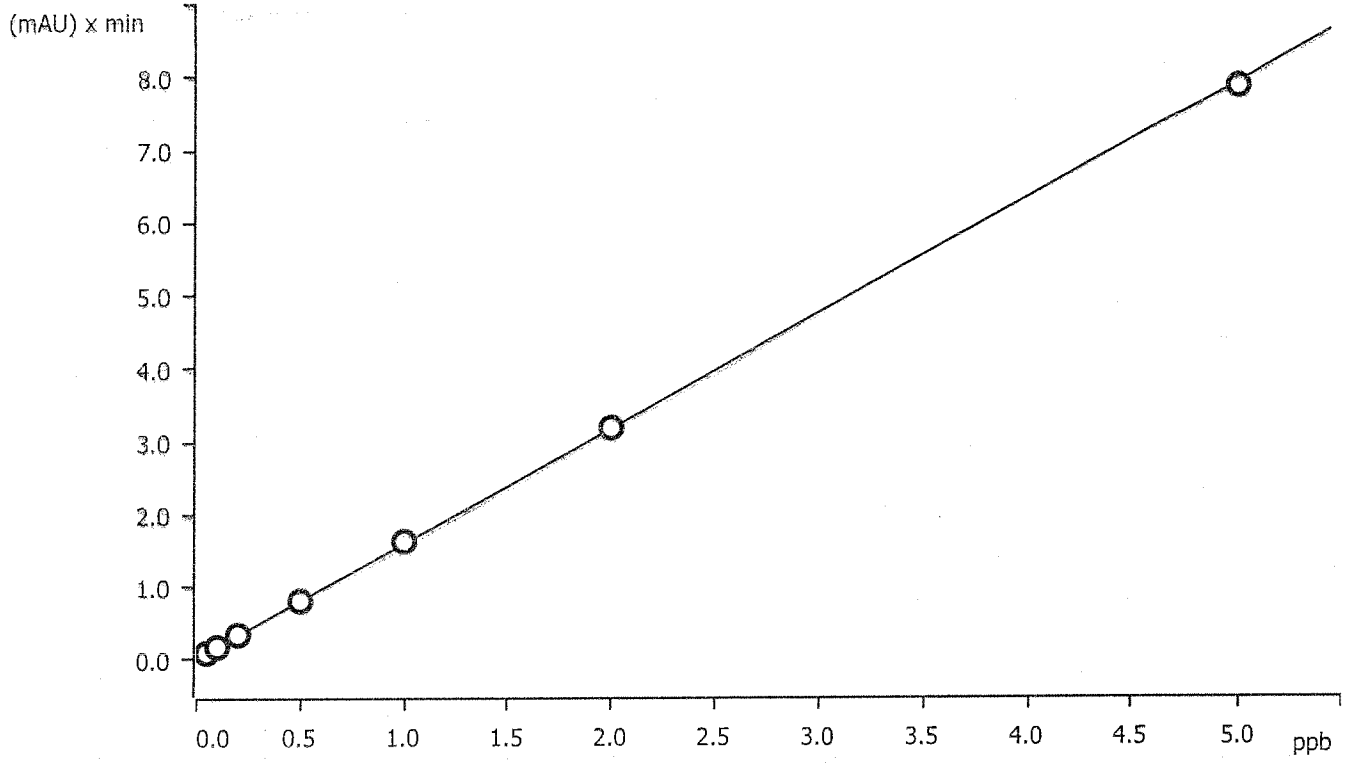
Metrohm

8205

Mag Net

2015-04-23 2:56:40 PM

Hexavalent Chromium (Hexavalent Chromium)



Function: . . . . . *A = 0.0133055 + 1.58032× Q*

Relative standard deviation . . . . . *1.425322 %*

Correlation coefficient *0.999956*

Sample type	Index	Conc.	Volume	Dilution	Sample amount	Area	Ident	Date	Used
Standard 1	1	0.050	1.0	1.0	1.0	0.089	S1	2015-04-21 15:29:57 UTC-7	used
Standard 2	1	0.100	1.0	1.0	1.0	0.170	S2	2015-04-21 15:46:07 UTC-7	used
Standard 3	1	0.200	1.0	1.0	1.0	0.337	S3	2015-04-21 16:02:17 UTC-7	used
Standard 4	1	0.500	1.0	1.0	1.0	0.806	S4	2015-04-21 16:18:25 UTC-7	used
Standard 5	1	1.000	1.0	1.0	1.0	1.626	S5	2015-04-21 16:34:34 UTC-7	used
Standard 6	1	2.000	1.0	1.0	1.0	3.187	S6	2015-04-21 16:50:43 UTC-7	used
Standard 7	1	5.000	1.0	1.0	1.0	7.862	S7	2015-04-21 17:06:51 UTC-7	used

Method Name . . . . . G2D2115 METHOD

AS 04/24/15

Metrohm

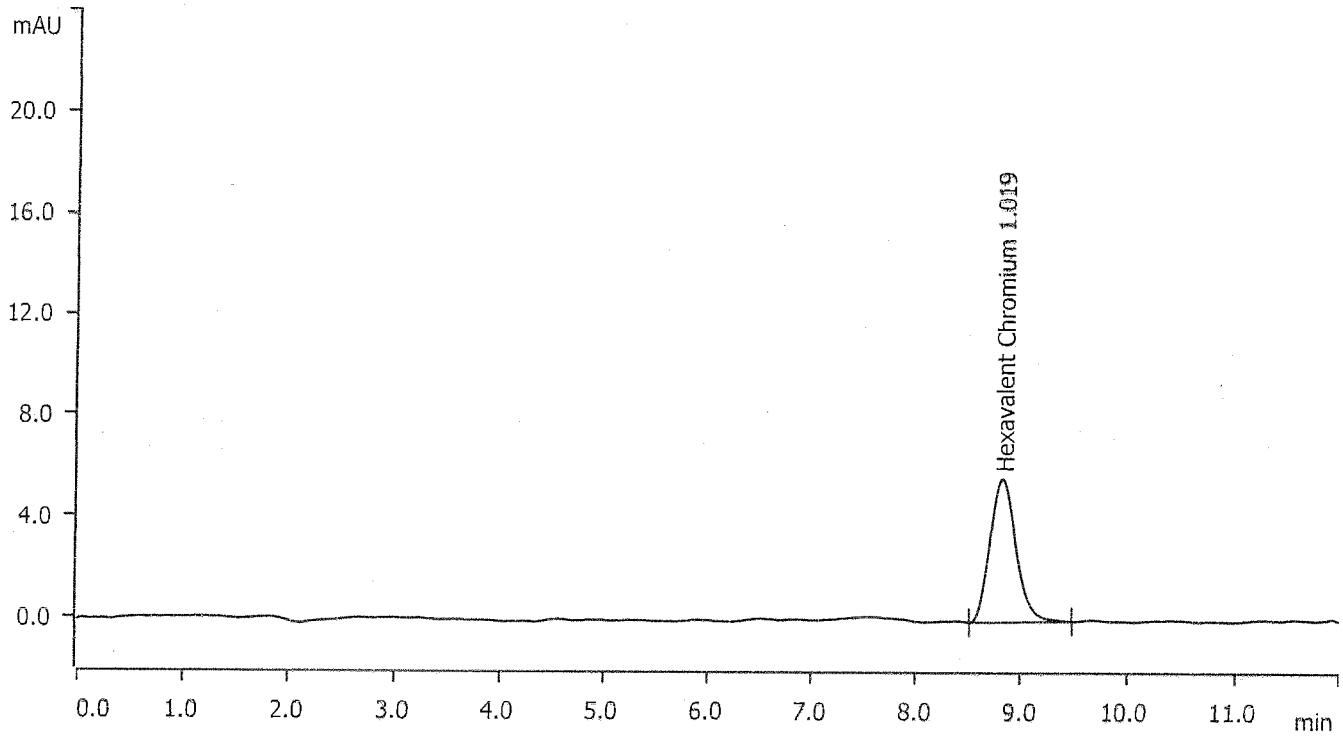
8206

SECOND SOURCE VERIFICATION

Sample data

Sequence DD21-10
Ident ICV
Determination start 2015-04-21 17:28:26 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.835	1.640156	5.649	Hexavalent Chromium	1.019

AA
04/24/15

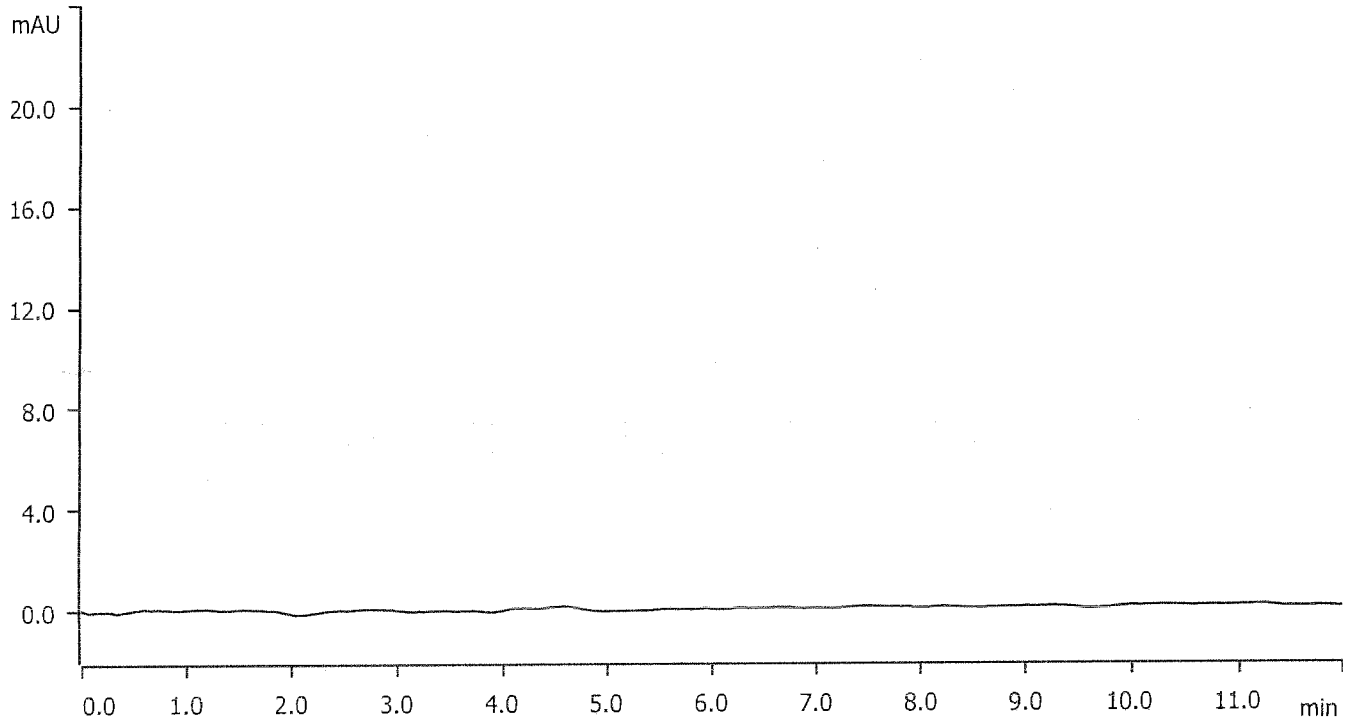
Metrohm

8208

Sample data

Sequence	DD21-11
Ident	ICB
Determination start	2015-04-21 17:44:34 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

Hexavalent Chromium



AA
04/24/15

Metrohm

8209

DAILY CALIBRATION(S)

Continuing Calibration Summary Form

Client : KLEINFELDER
Project : CTO 070, UXO4, FALLBROOK
SDG : 15D114
Method : 7199
QuantMethod : DD24
InstrumentID: G2
Parameter : Hexavalent Chromium

LFID	LSID	DF	Expected	Result	Unit	%Rec	AnalysisDateTime
DD24-01	CCV16	1	1	1.054	ug/L	105	04/23/1513:34
DD24-13	CCV18	1	1	0.964	ug/L	96	04/23/1517:20
DD24-25	CCV20	1	1	0.992	ug/L	99	04/23/1520:34
DD24-37	CCV22	1	1	0.980	ug/L	98	04/23/1523:46
DD24-49	CCV24	1	1	1.017	ug/L	102	04/24/1503:00
DD24-61	CCV26	1	1	1.012	ug/L	101	04/24/1506:14
DD24-73	CCV28	1	1	1.069	ug/L	107	04/24/1509:27
DD24-79	CCV30	1	1	1.044	ug/L	104	04/24/1511:03
DD24-89	CCV32	1	1	0.973	ug/L	97	04/24/1513:45
DD24-93	CCV34	1	1	0.994	ug/L	99	04/24/1515:54

CCV Acceptance Criteria: 90-110%

IC Result Check FormVersion : P21

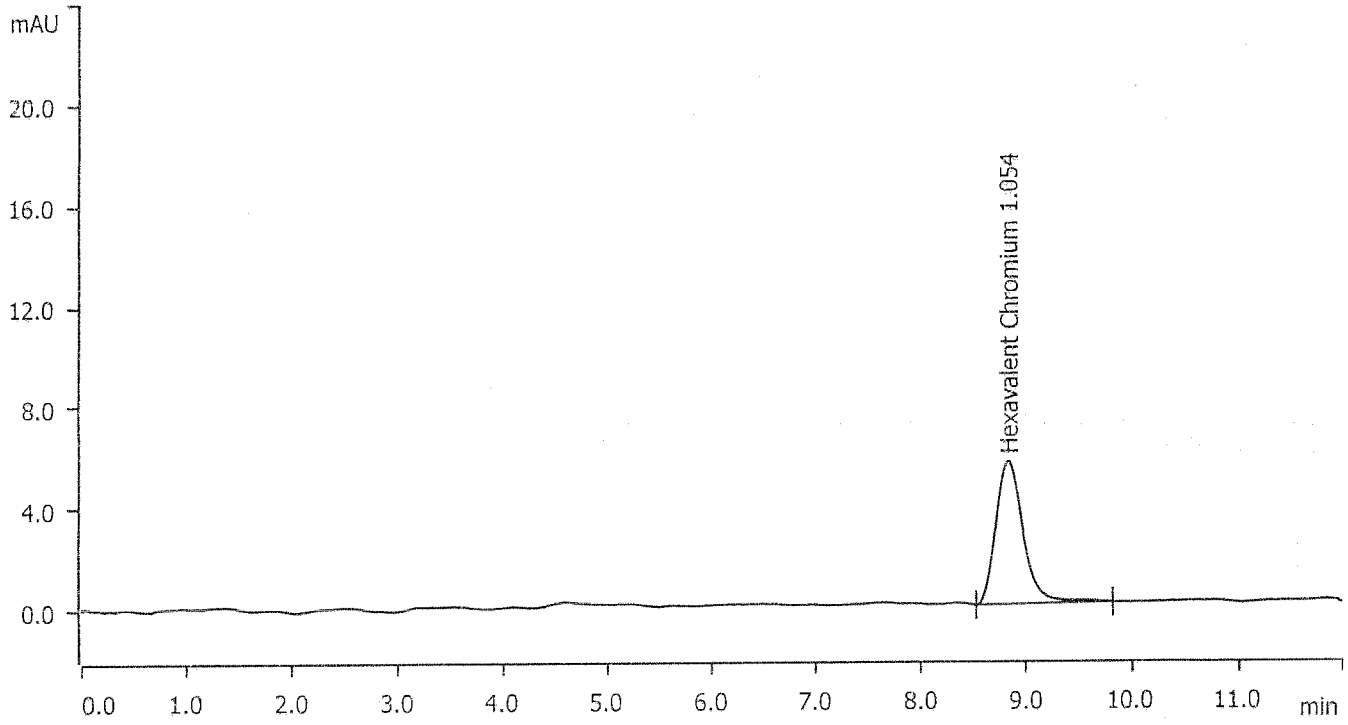
LFID	LSID	Selection	Cr6	RawNetID	DF
DD24-01	CCV16	C	105.4%	z4231334	1
DD24-02	CCB16	C	0	z4231350	1
DD24-03	HCD012SB	C	0	z4231406	1
DD24-04	HCD012SQ	C	0	z4231422	1
DD24-05	CSD012SL	C	0.982	z4231511	1
DD24-06	CSD012SX	C	0.981	z4231527	1
DD24-07	CID012SL	C	286.117	z4231543	200
DD24-08	CID012SX	C	267.680	z4231559	200
DD24-09	D114-08	C	0.019	z4231616	1
DD24-10	D114-08N	C	0.015	z4231632	1
DD24-11	D114-08D	C	0.011	z4231648	1
DD24-12	D114-08ND	C	0.011	z4231704	1
DD24-13	CCV18	C	96.4%	z4231720	1
DD24-14	CCB18	C	0	z4231736	1
DD24-15	D114-08M	C	289.668	z4231753	100
DD24-16	D114-08NM	C	287.096	z4231809	100
DD24-17	D114-08M	C	2.325	z4231825	1
DD24-18	D114-08NM	C	2.320	z4231841	1
DD24-19	D114-01	C	0	z4231857	1
DD24-20	D114-01N	C	0	z4231913	1
DD24-21	D114-02	C	0	z4231929	1
DD24-22	D114-02N	C	0	z4231945	1
DD24-23	D114-03	C	0	z4232001	1
DD24-24	D114-03N	C	0	z4232017	1
DD24-25	CCV20	C	99.2%	z4232034	1
DD24-26	CCB20	C	0	z4232050	1
DD24-27	D114-04	C	0	z4232106	1
DD24-28	D114-04N	C	0	z4232122	1
DD24-29	D114-05	C	0	z4232138	1
DD24-30	D114-05N	C	0	z4232154	1
DD24-31	D114-06	C	0	z4232210	1
DD24-32	D114-06N	C	0	z4232226	1
DD24-33	D114-07	C	0	z4232242	1
DD24-34	D114-07N	C	0	z4232258	1
DD24-35	D114-10	C	0	z4232314	1
DD24-36	D114-10N	C	0	z4232330	1
DD24-37	CCV22	C	98%	z4232346	1
DD24-38	CCB22	C	0	z4240003	1
DD24-39	D114-11	C	0	z4240019	1
DD24-40	D114-11N	C	0	z4240035	1
DD24-41	D114-12	C	0	z4240051	1
DD24-42	D114-12N	C	0	z4240107	1
DD24-43	D114-13	C	0	z4240123	1
DD24-44	D114-13N	C	0	z4240139	1
DD24-45	HCD013SB	C	0	z4240155	1
DD24-46	HCD013SQ	C	0	z4240212	1
DD24-47	CSD013SL	C	1.012	z4240228	1
DD24-48	CSD013SX	C	0.993	z4240244	1
DD24-49	CCV24	C	101.7%	z4240300	1
DD24-50	CCB24	C	0	z4240316	1
DD24-51	CID013SL	C	351.125	z4240332	200
DD24-52	CID013SX	C	356.746	z4240349	200
DD24-53	D114-14	C	0	z4240405	1
DD24-54	D114-14N	C	0	z4240421	1
DD24-55	D114-15	C	0.021	z4240437	1
DD24-56	D114-15N	C	0.010	z4240453	1
DD24-57	D114-16	C	0	z4240509	1
DD24-58	D114-16N	C	0	z4240525	1
DD24-59	D114-17	C	0	z4240542	1
DD24-60	D114-17N	C	0	z4240558	1
DD24-61	CCV26	C	101.2%	z4240614	1
DD24-62	CCB26	C	0	z4240630	1
DD24-63	D114-18	C	0	z4240646	1
DD24-64	D114-18N	C	0	z4240702	1
DD24-65	D114-19	C	0.017	z4240718	1
DD24-66	D114-19N	C	0.014	z4240734	1
DD24-67	D114-20	C	0.012	z4240750	1
DD24-68	D114-20N	C	0.015	z4240806	1
DD24-69	D114-21	C	0.010	z4240822	1
DD24-70	D114-21N	C	0.014	z4240838	1
DD24-71	D114-23	C	0	z4240855	1
DD24-72	D114-23N	C	0	z4240911	1
DD24-73	CCV28	C	106.9%	z4240927	1
DD24-74	CCB28	C	0	z4240943	1

DD24-75	D114-24	C	0	z4240959	1
DD24-76	D114-24N	C	0	z4241015	1
DD24-77	D114-25	C	0	z4241031	1
DD24-78	D114-25N	C	0	z4241047	1
DD24-79	CCV30	C	104.4%	z4241103	1
DD24-80	CCB30	C	0	z4241119	1
DD24-81	D114-22	C	0	z4241136	1
DD24-82	D114-22N	C	0	z4241152	1
DD24-83	D114-22D	C	0	z4241208	1
DD24-84	D114-22ND	C	0	z4241224	1
DD24-85	D114-22M	C	1.692	z4241240	1
DD24-86	D114-22NM	C	1.710	z4241256	1
DD24-87	D114-22M	C	354.014	z4241313	100
DD24-88	D114-22NM	C	344.842	z4241329	100
DD24-89	CCV32	C	97.3%	z4241345	1
DD24-90	CCB32	C	0	z4241401	1
DD24-91	D114-15	C	0.027	z4241417	1
DD24-92	D114-15A	C	0.503	z4241433	1
DD24-93	CCV34	C	99.4%	z4241554	1
DD24-94	CCB34	C	0	z4241610	1

Sample data

Sequence DD24-01
Ident CCV16
Determination start 2015-04-23 13:34:28 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.835	1.696976	5.620	Hexavalent Chromium	1.054

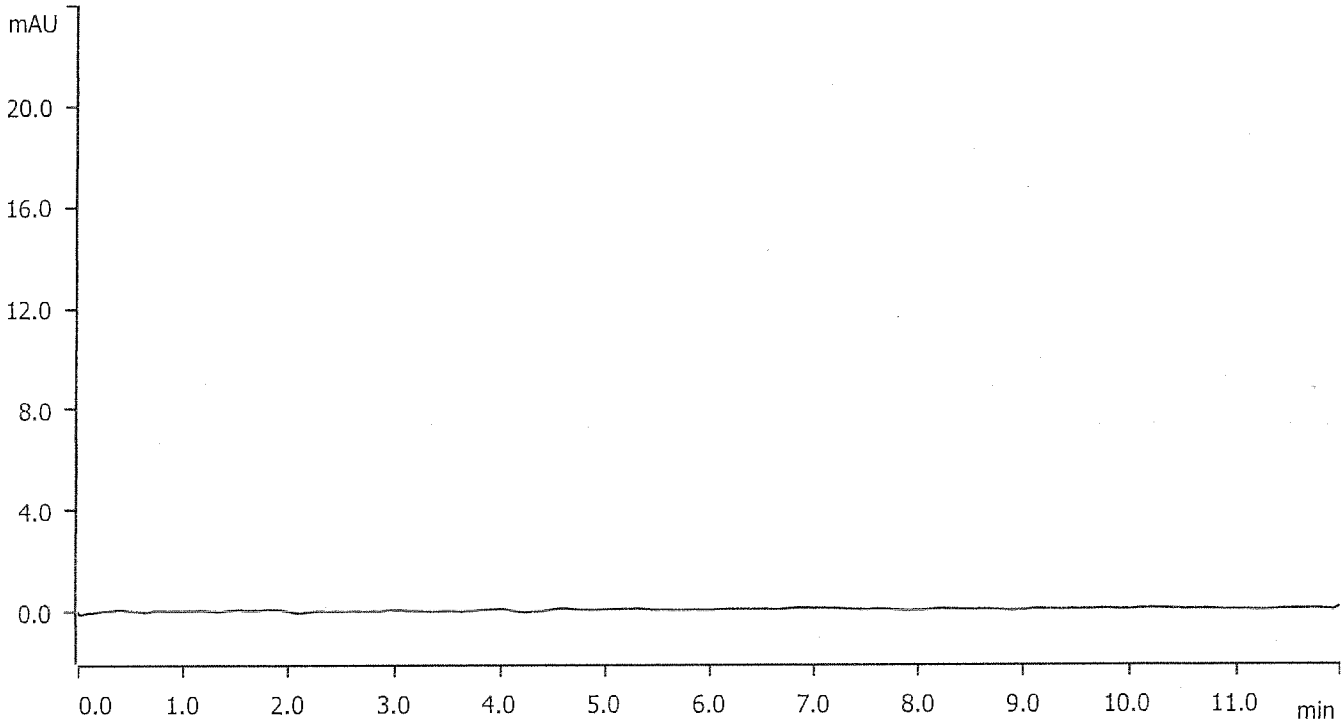
Metrohm

8214

Sample data

Sequence	DD24-02
Ident	CCB16
Determination start	2015-04-23 13:50:36 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

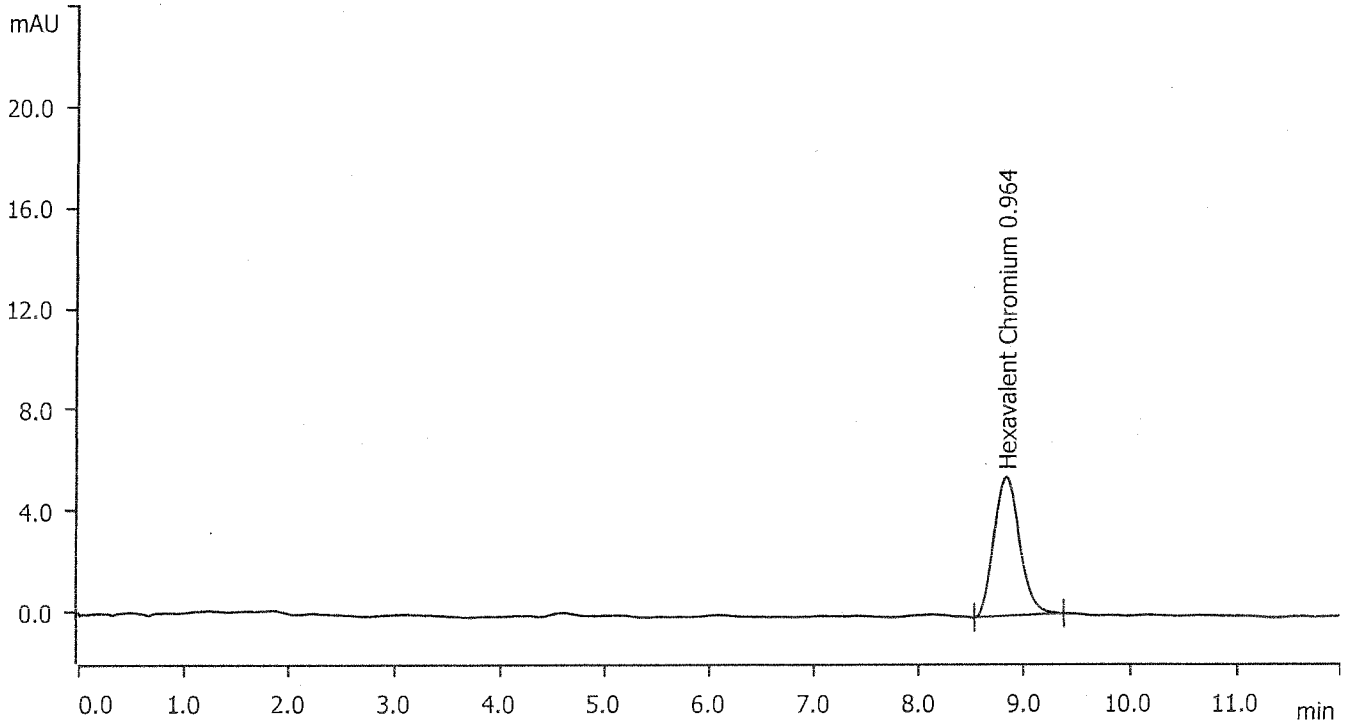
Hexavalent Chromium



Sample data

Sequence DD24-13
Ident CCV18
Determination start 2015-04-23 17:20:43 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.835	1.553217	5.476	Hexavalent Chromium	0.964

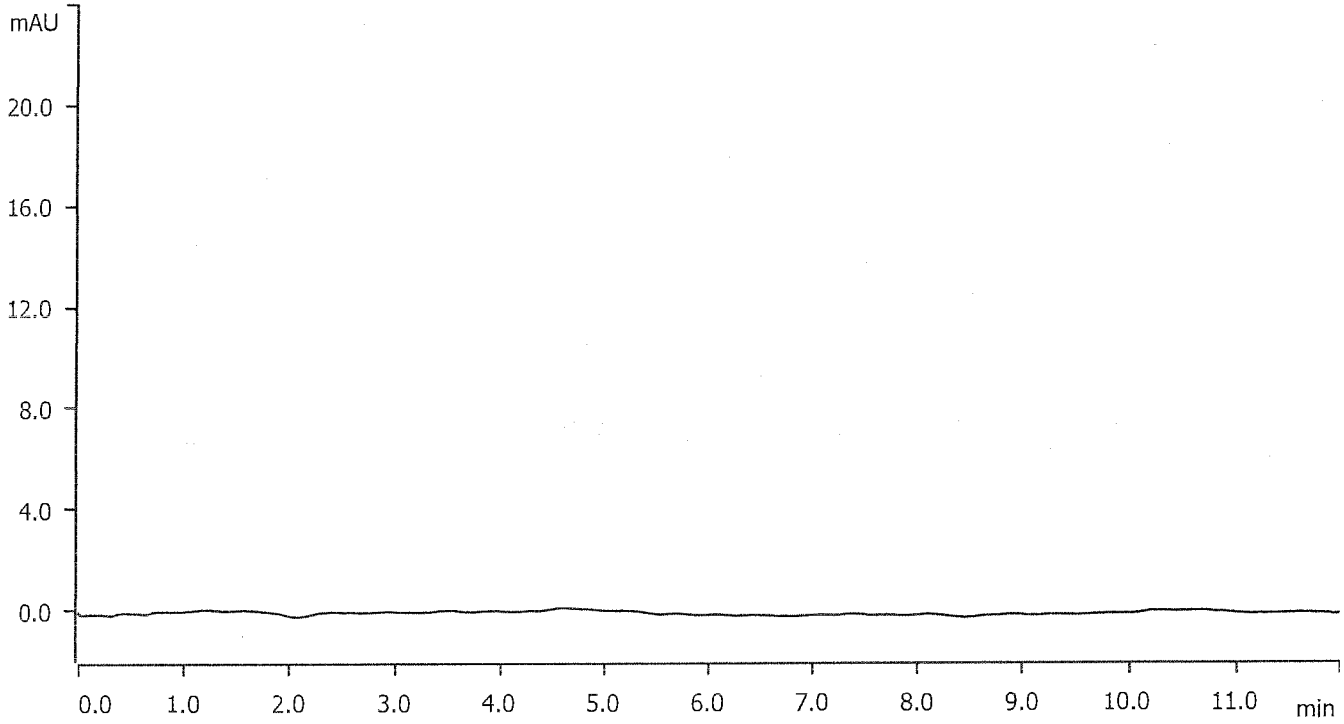
Metrohm

8216

Sample data

Sequence	DD24-14
Ident	CCB18
Determination start	2015-04-23 17:36:51 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

Hexavalent Chromium



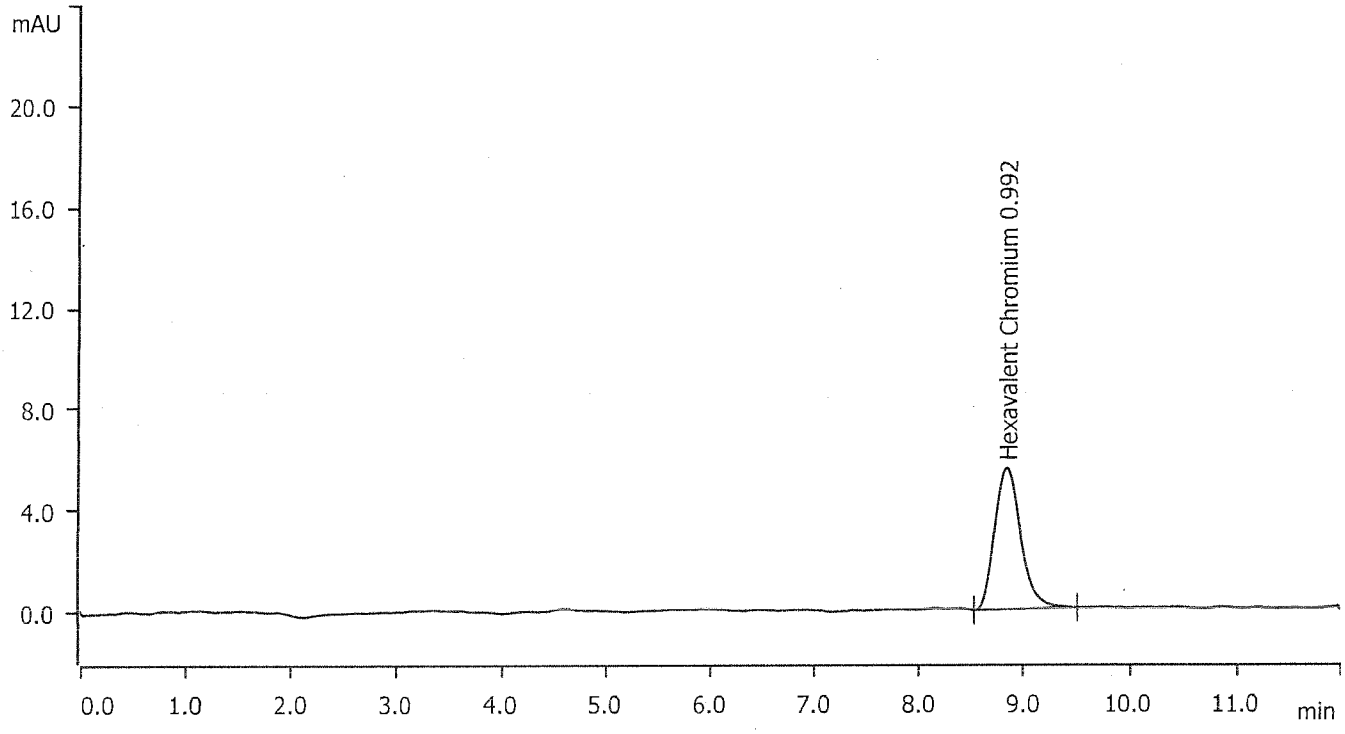
Metrohm

8217

Sample data

Sequence DD24-25
Ident CCV20
Determination start 2015-04-23 20:34:04 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.850	1.597030	5.544	Hexavalent Chromium	0.992

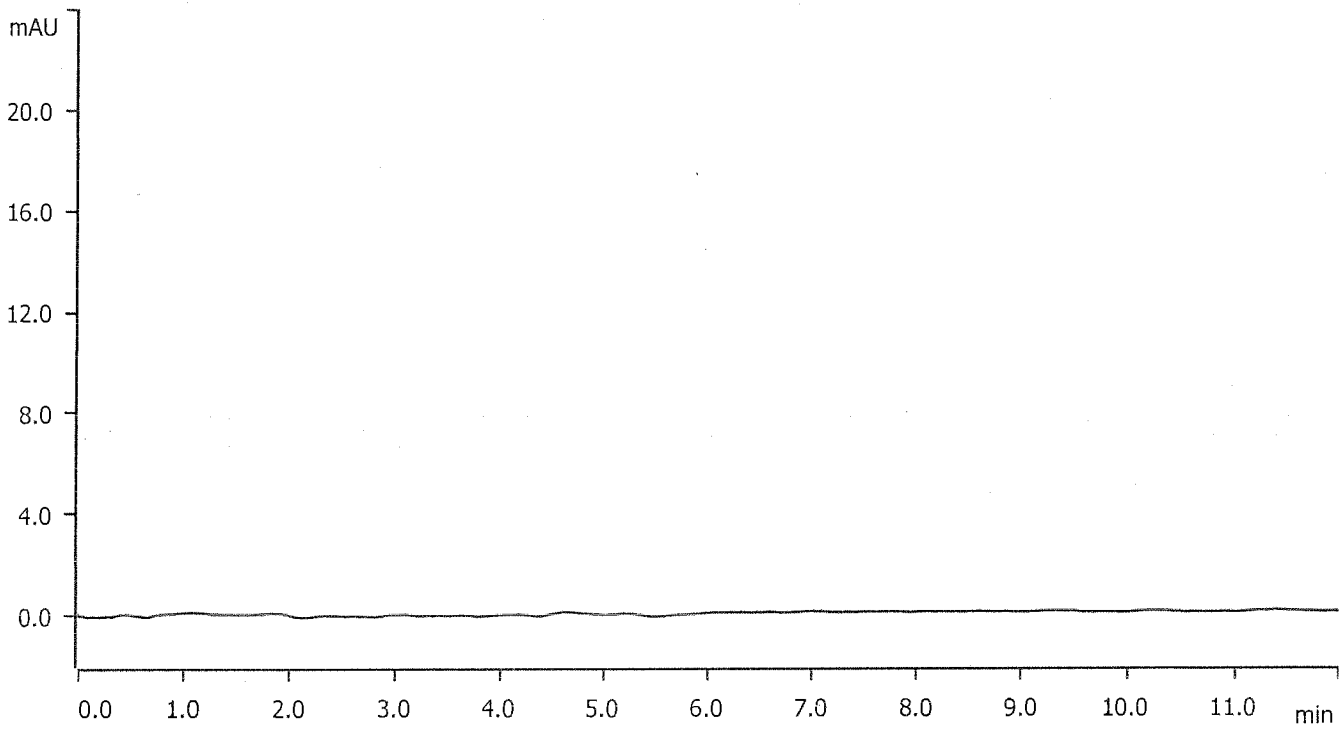
Metrohm

8218

Sample data

Sequence	DD24-26
Ident	CCB20
Determination start	2015-04-23 20:50:09 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

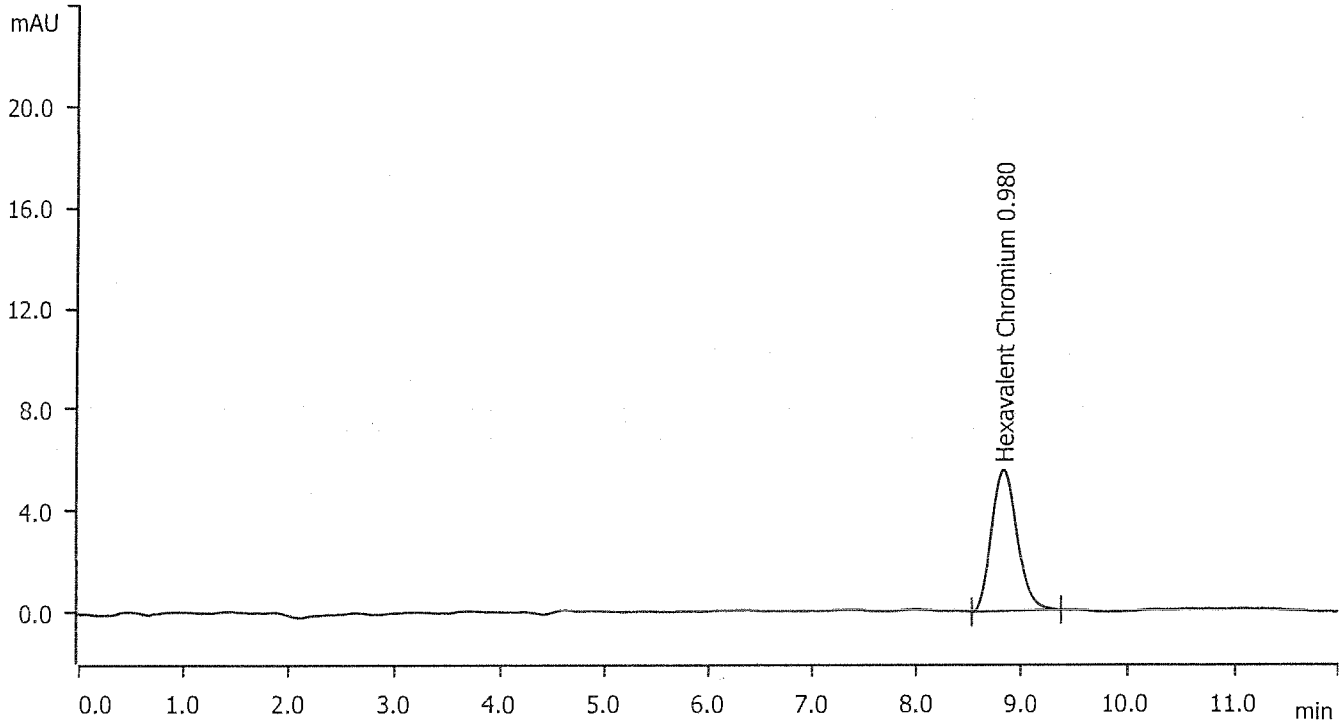
Hexavalent Chromium



Sample data

Sequence DD24-37
Ident CCV22
Determination start 2015-04-23 23:46:57 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.835	1.577953	5.550	Hexavalent Chromium	0.980

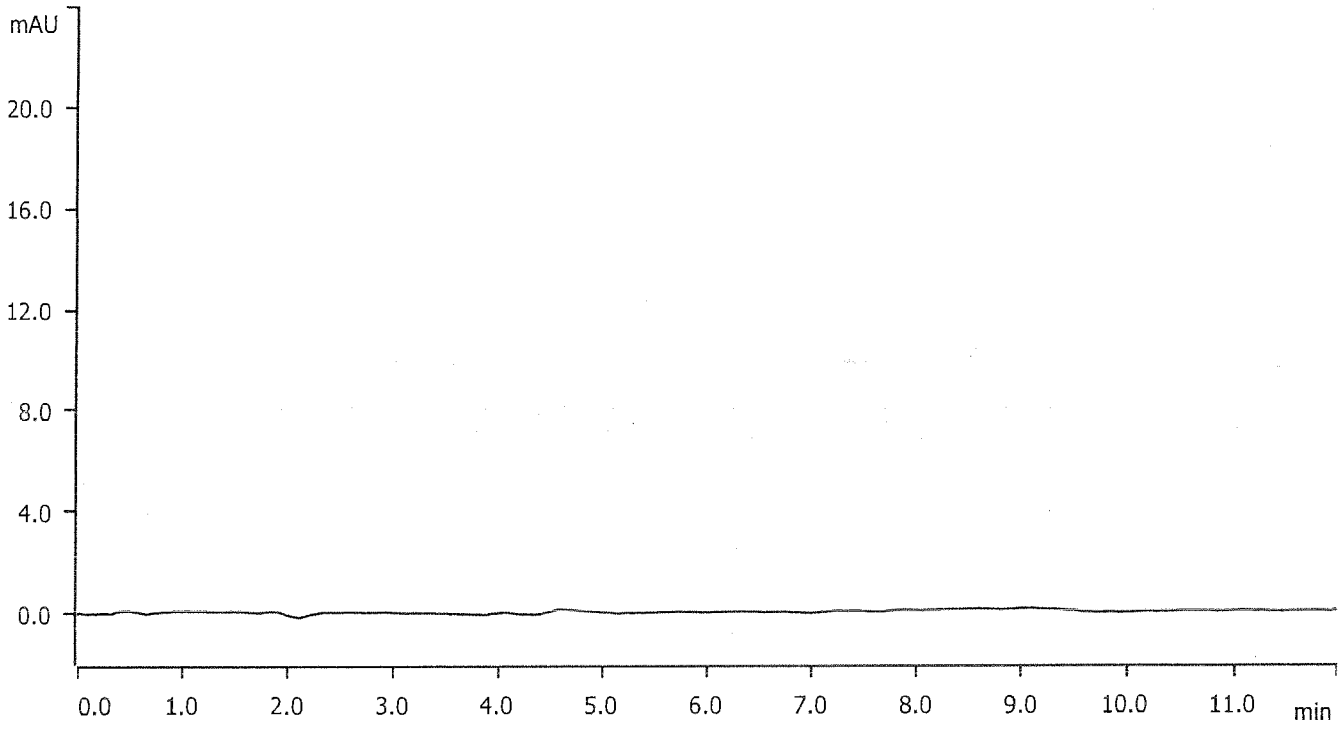
Metrohm

8220

Sample data

Sequence	DD24-38
Ident	CCB22
Determination start	2015-04-24 00:03:03 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

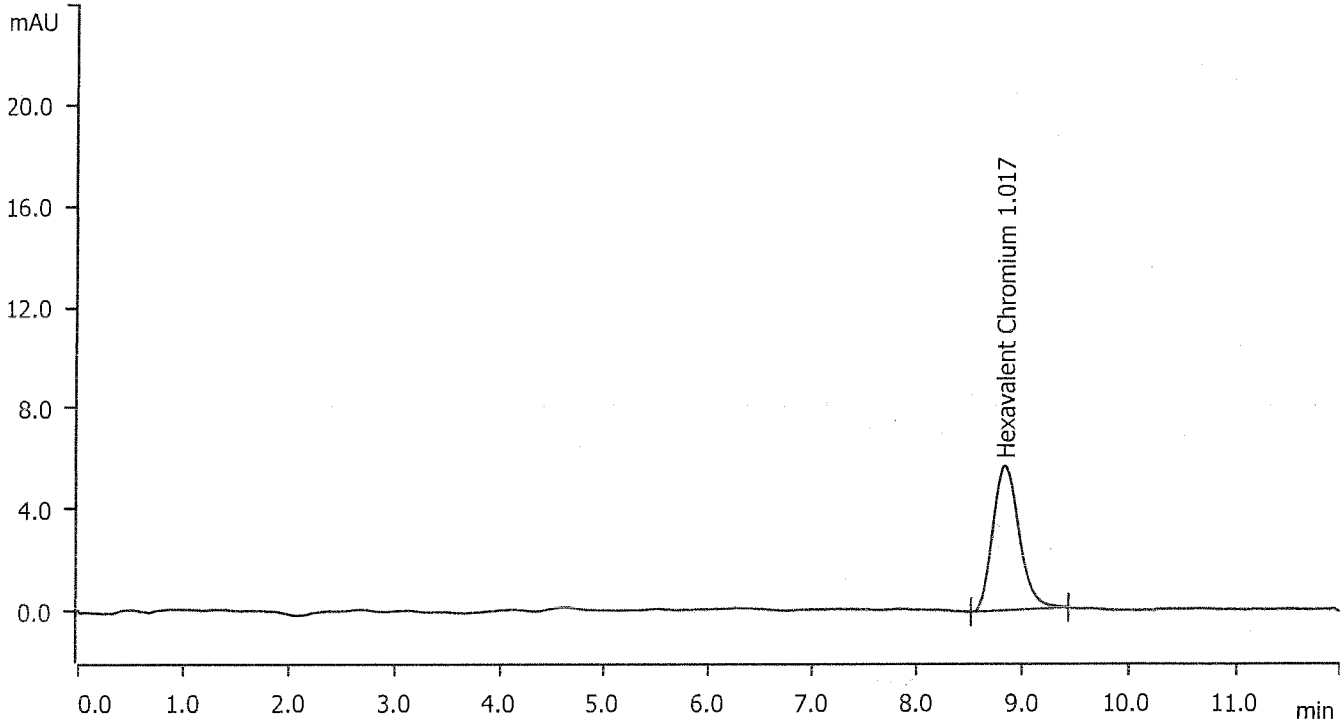
Hexavalent Chromium



Sample data

Sequence DD24-49
Ident CCV24
Determination start 2015-04-24 03:00:36 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium

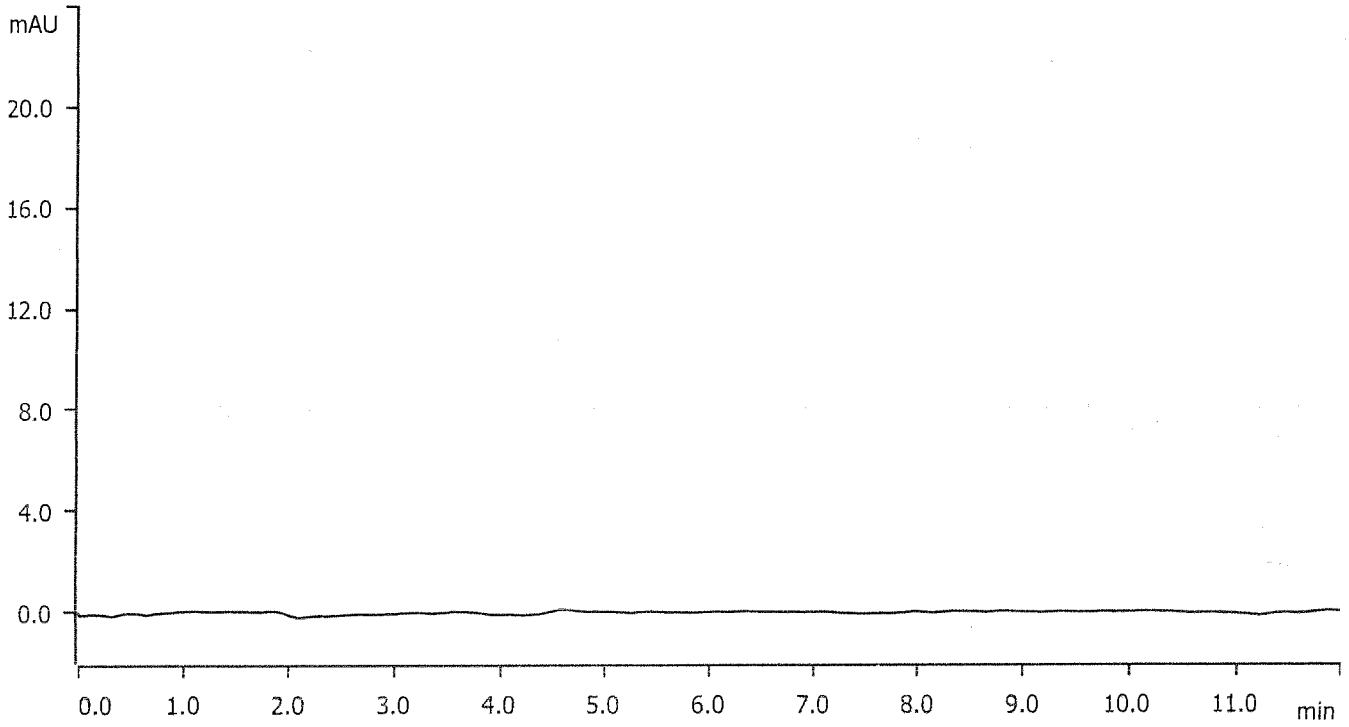


Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.835	1.636813	5.671	Hexavalent Chromium	1.017

Sample data

Sequence	DD24-50
Ident	CCB24
Determination start	2015-04-24 03:16:46 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

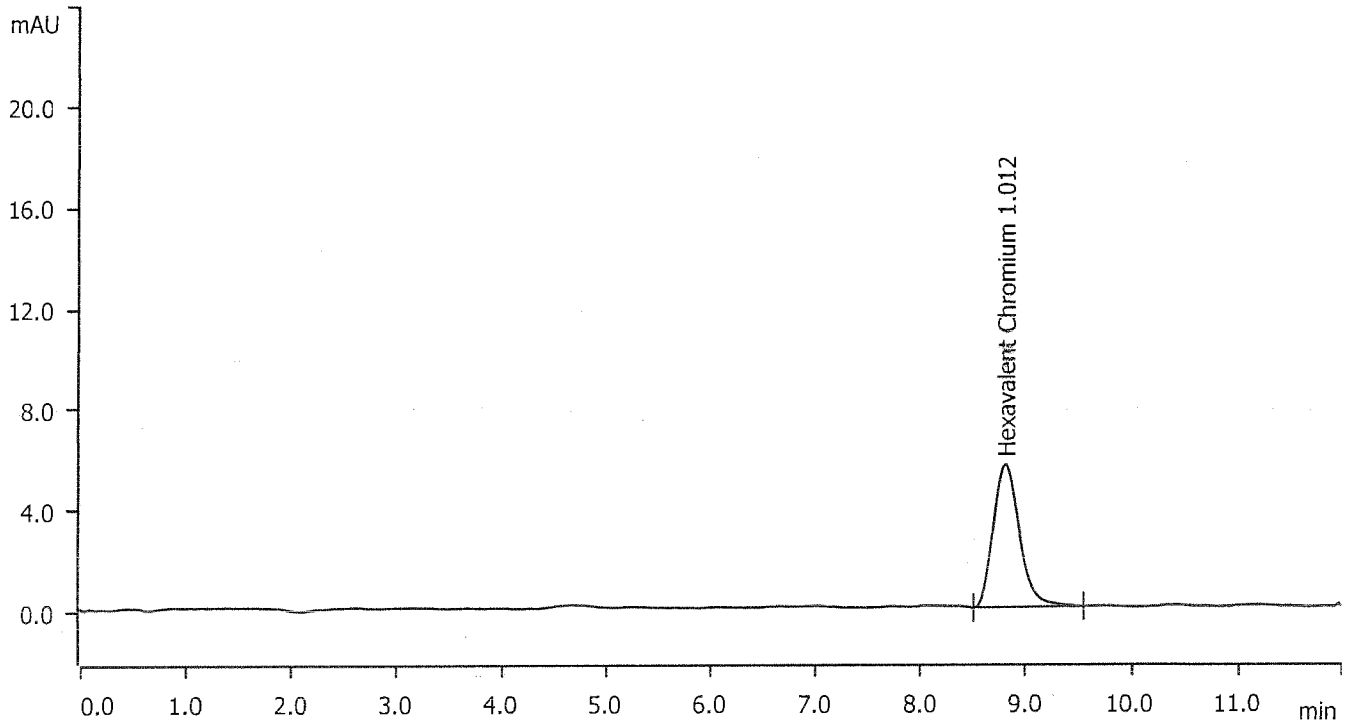
Hexavalent Chromium



Sample data

Sequence DD24-61
Ident CCV26
Determination start 2015-04-24 06:14:14 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.821	1.628844	5.623	Hexavalent Chromium	1.012

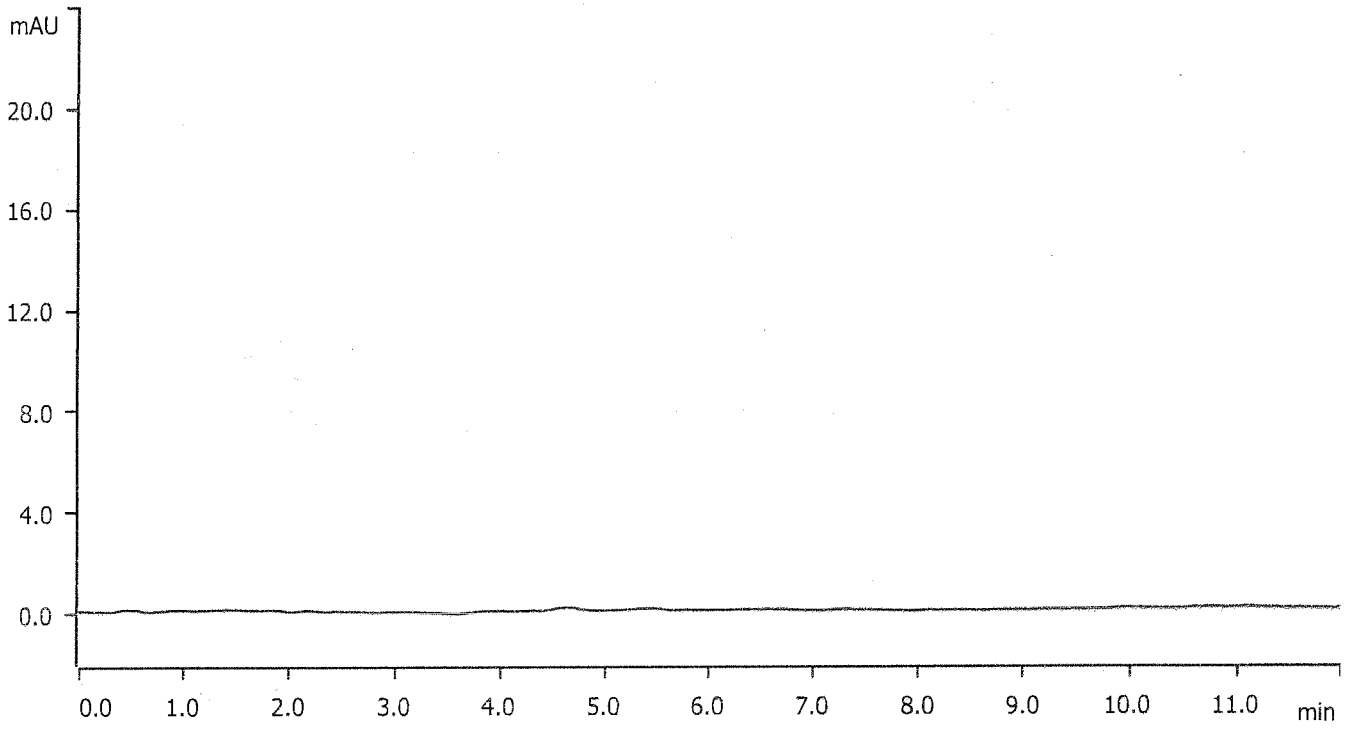
Metrohm

8224

Sample data

Sequence	DD24-62
Ident	CCB26
Determination start	2015-04-24 06:30:20 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

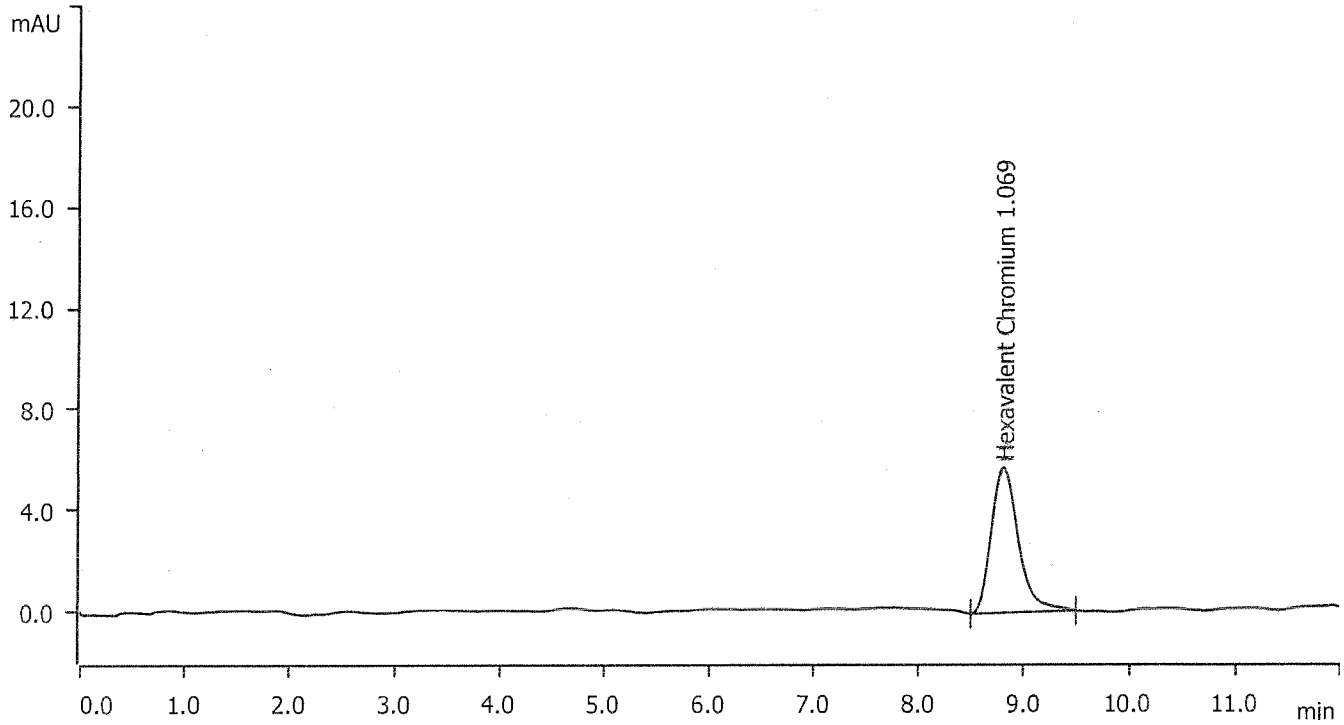
Hexavalent Chromium



Sample data

Sequence DD24-73
Ident CCV28
Determination start 2015-04-24 09:27:09 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.821	1.721084	5.736	Hexavalent Chromium	1.069

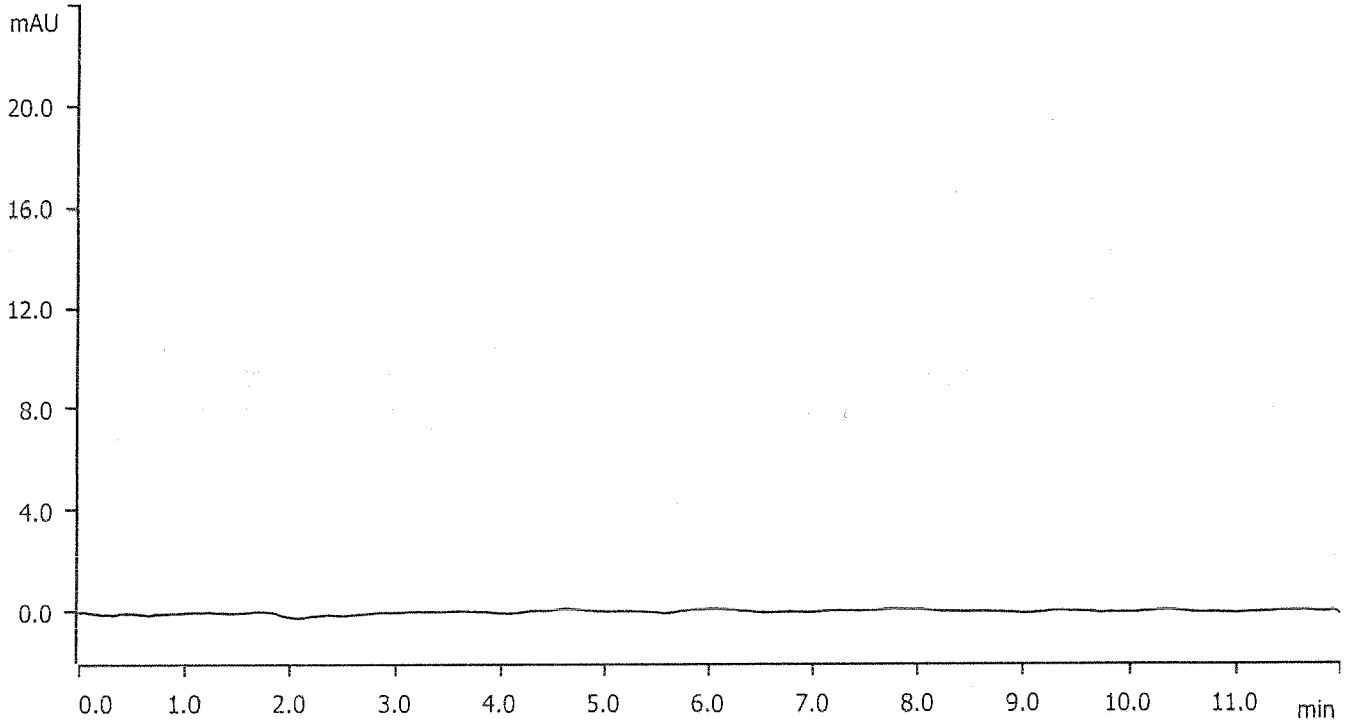
Metrohm

8226

Sample data

Sequence	DD24-74
Ident	CCB28
Determination start	2015-04-24 09:43:15 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

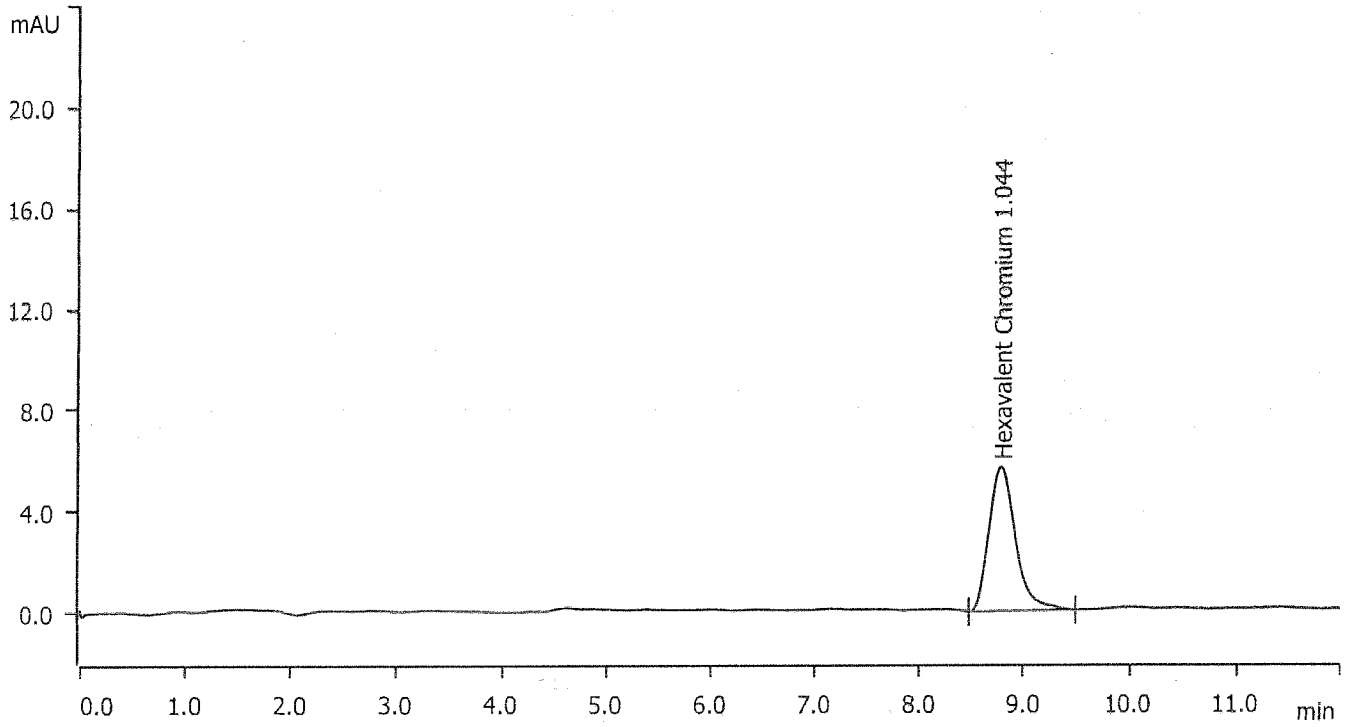
Hexavalent Chromium



Sample data

Sequence DD24-79
Ident CCV30
Determination start 2015-04-24 11:03:49 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.806	1.680216	5.685	Hexavalent Chromium	1.044

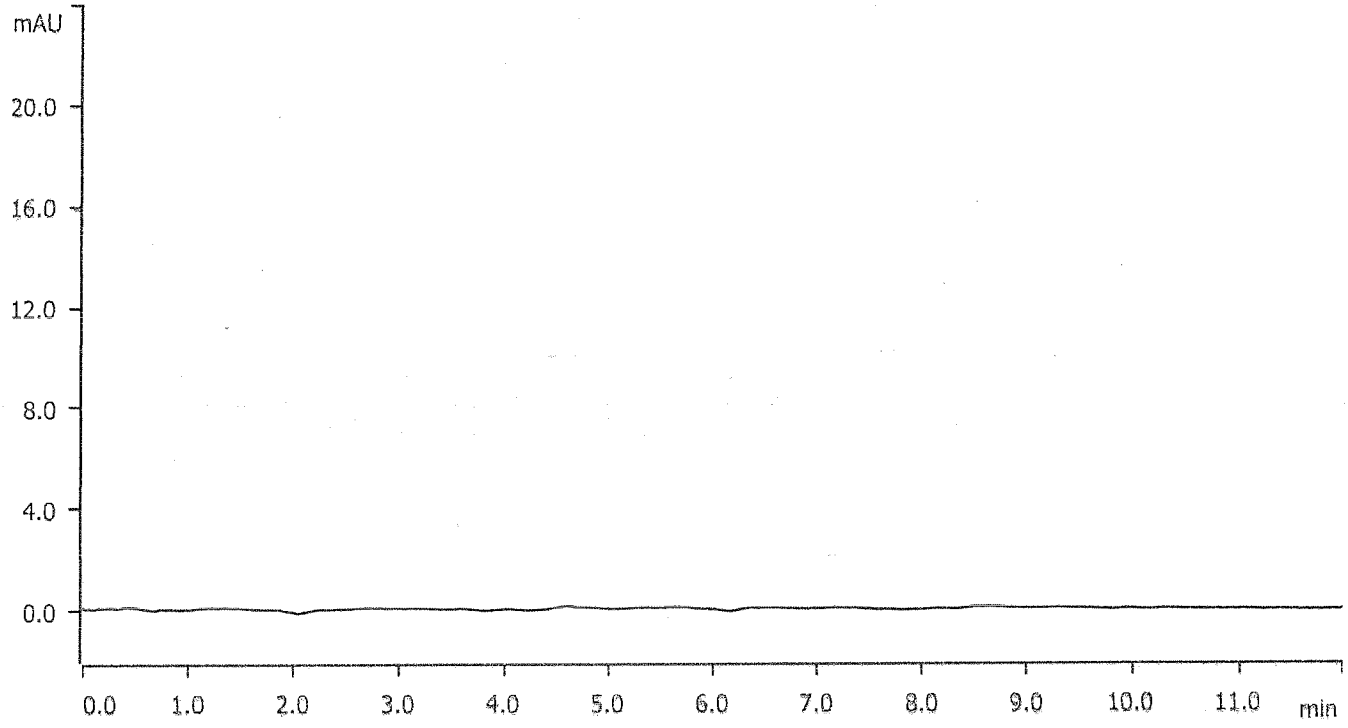
Metrohm

8228

Sample data

Sequence	DD24-80
Ident	CCB30
Determination start	2015-04-24 11:19:57 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

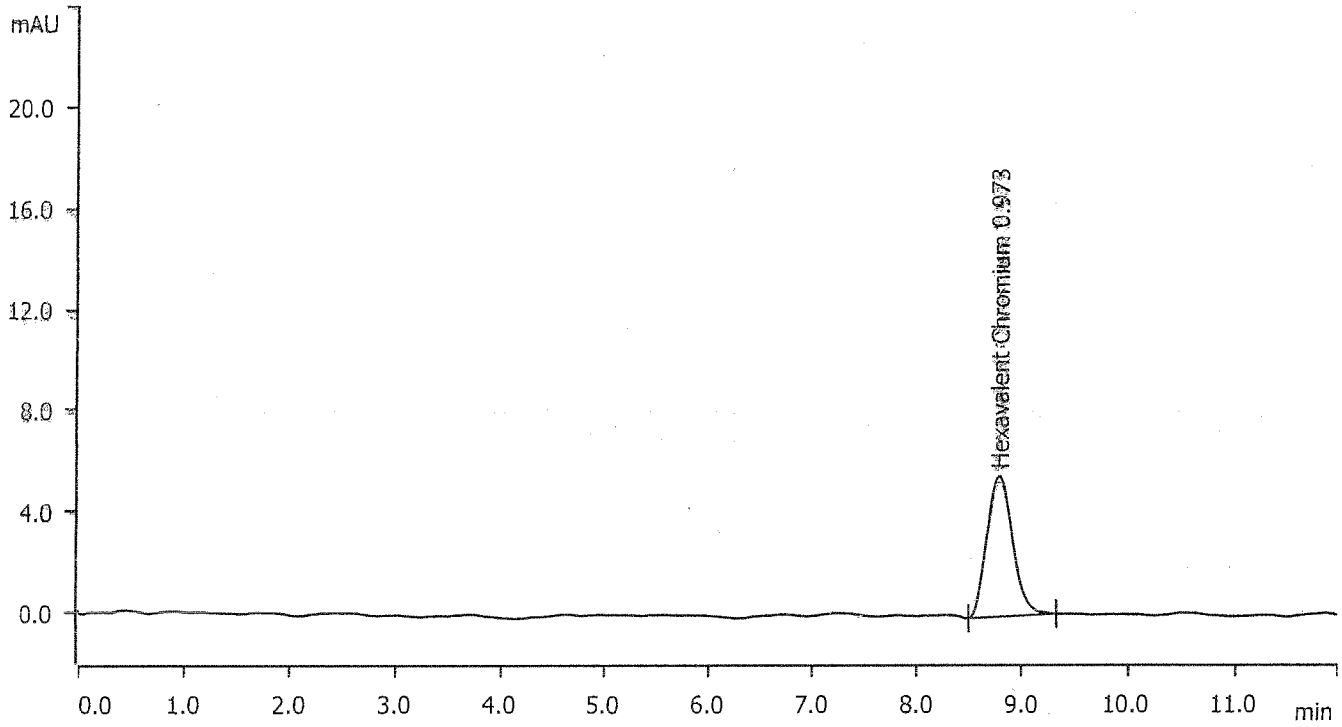
Hexavalent Chromium



Sample data

Sequence BD24-89
Ident CCV32
Determination start 2015-04-24 13:45:23 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.791	1.566832	5.544	Hexavalent Chromium	0.973

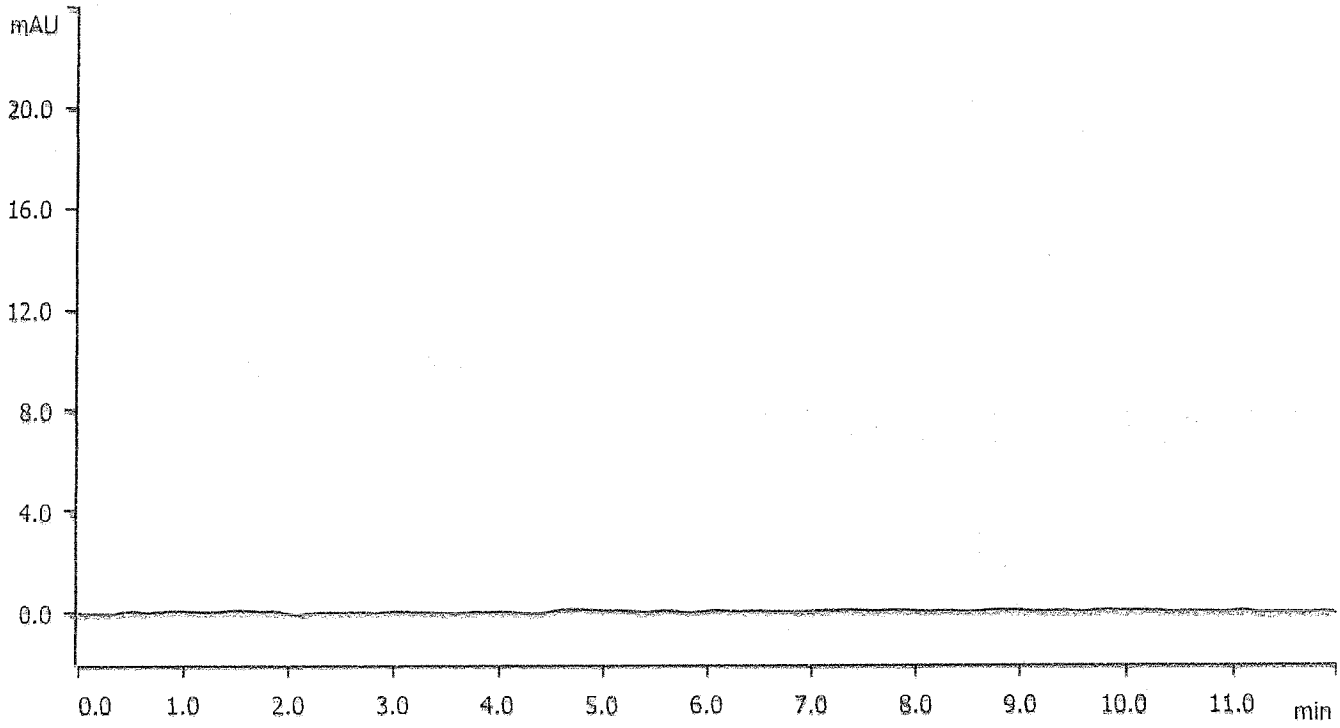
Metrohm

8230

Sample data

Sequence DD24-90
Ident CCB32
Determination start 2015-04-24 14:01:31 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

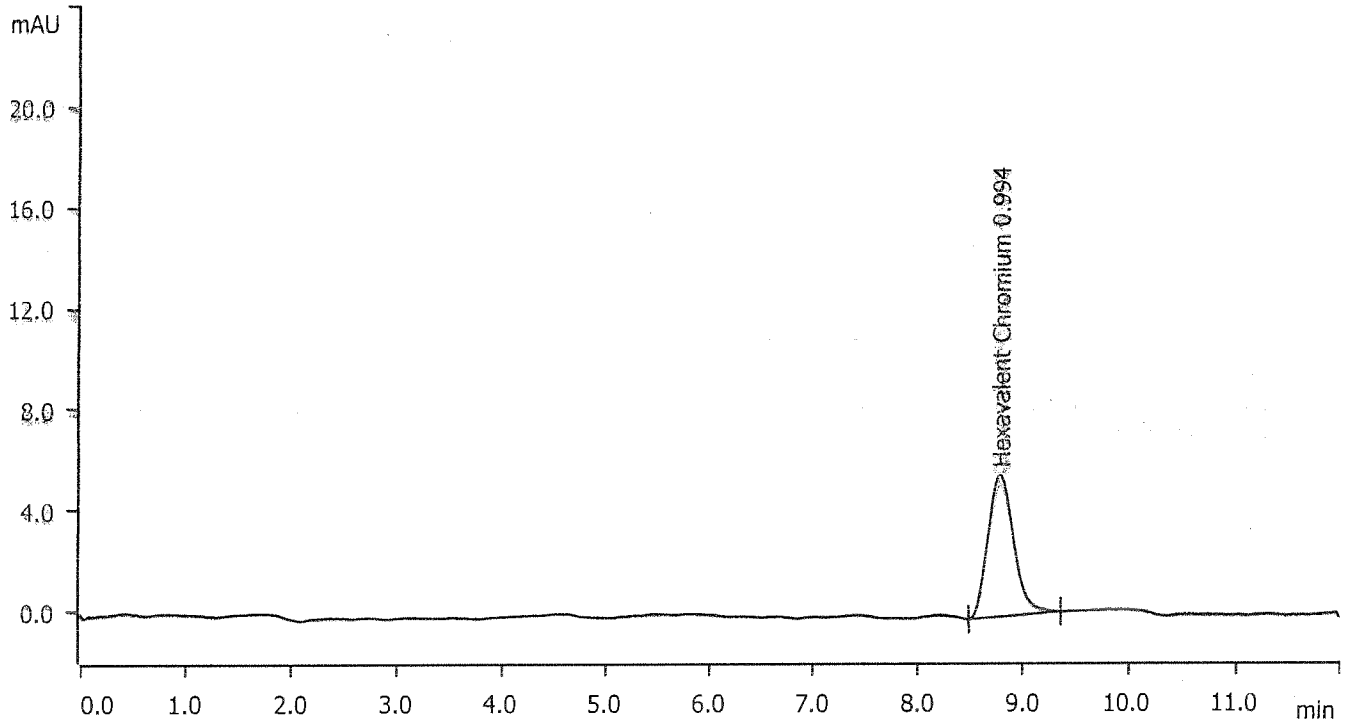
Hexavalent Chromium



Sample data

Sequence BD24-93
Ident CCV34
Determination start 2015-04-24 15:54:22 UTC-7
Method . . . . . G2D2115 METHOD
Sample type . . . . . Sample
Dilution Factor 1
Operator . . . . . VLe

Hexavalent Chromium



Peak number	Retention time min	Area (mAU) x min	Height mAU	Component name	Concentration ppb
1	8.791	1.600643	5.601	Hexavalent Chromium	0.994

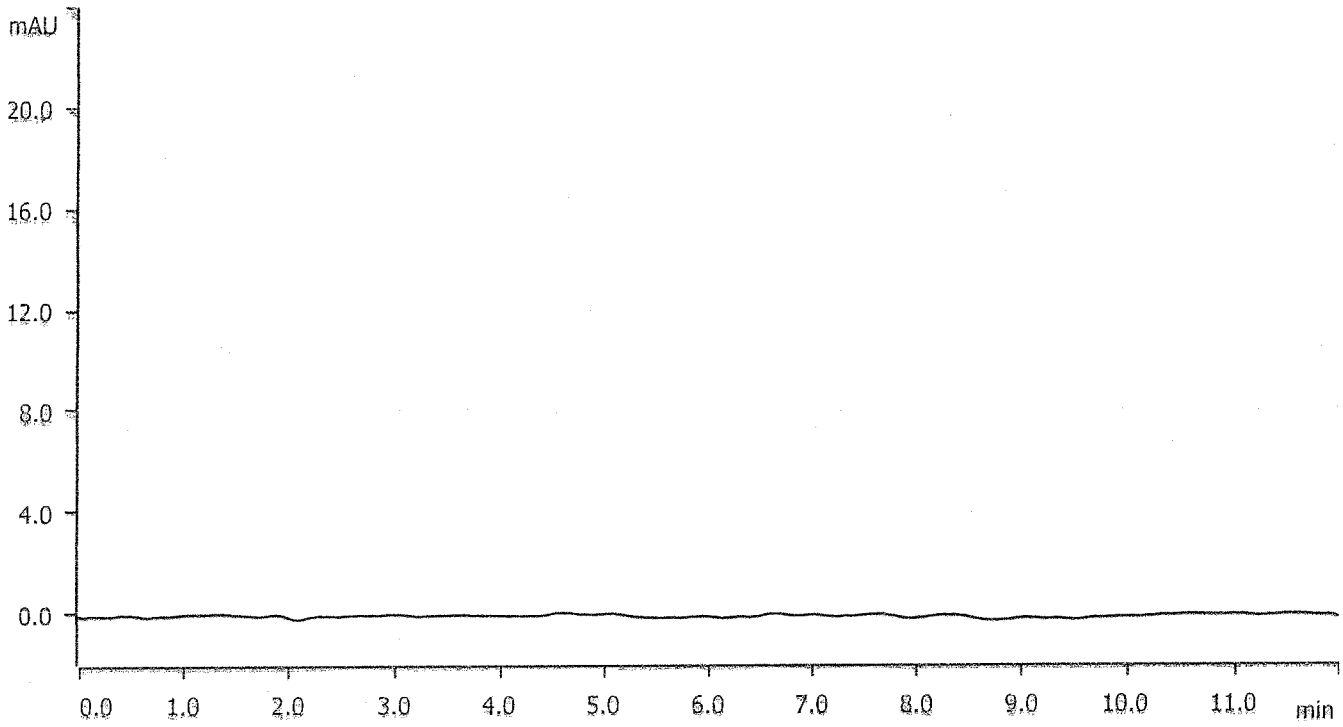
Metrohm

8232

Sample data

Sequence	DD24-94
Ident	CCB34
Determination start	2015-04-24 16:10:28 UTC-7
Method	G2D2115 METHOD
Sample type	Sample
Dilution Factor	1
Operator	VLe

Hexavalent Chromium



ANALYTICAL LOG(S)

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HEXAVALENT CHROMIUM BY IC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

Post Column Solution:

1,5 Diphenylcarbohydrozide : 0.5g — SW9B-04-028

MeOH : 100 mL — SW1A-005-08-12 } 1L

H_2SO_4 : 28 mL — ↓ -06-12

Eluent:

320 mM Na_2CO_3/100 mM $NaHCO_3$ — (80 mL → 2L) SW4-02-46-03

☑ pH adjusted water (range 9.3 - 9.5): ☐ Buffer (1 mL → 100 mL) SW4-03-02-02

Reagent Water: RW1-15-001

ICAL Concentrations (ppb)

S0 - 0	S5 - 1.0
S1 - 0.05	S6 - 2.0
S2 - 0.1	S7 - 5.0
S3 - 0.2	ICV - 1.0
S4 - 0.5	

Column : Metrosep A Supp 5-150/4 #7111505

Guard Column : Metrosep RP2 Guard #0067-1206

Column Temp : 45°C

Flow Rate = 0.8mL/min

Sample Loop : 2.0 mL

0.45 µm Filter Lot# — Snap Seal 4oz #19414007

0.2 µm Filter Lot# — 1.5oz # 20814007

Book #:	AG2-006
Instrument No.:	G2
Pipette ID:	SI1A-04-4
	SW3-01-33
	39380025
Balance ID:	10601202
Analytical Sequence:	D021
Method File:	G2 D2115 Method
Analytical Batch:	—

SOP #	Rev. #
☐ EMAX-218.6	5
☑ EMAX-7199	3
☐ EMAX-	

STANDARDS ID	
ICAL	SW9B-05-66-13
ICV	↓ 14
CCV	—
LCS	—
MS	—

ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ External Hard Drive	
☐	

Analyzed By: [illegible]

Date: 4/21/15

8235

Determination overview

	Determination start	Ident	Sample type	Dilution	Method name	User (short name)	Info 1
1	2015-04-21 14:57:35 UTC-7	IB	Sample	1	G2D2115 METHOD	VLe	DD21-01
2	2015-04-21 15:13:47 UTC-7	S0	Sample	1	G2D2115 METHOD	VLe	DD21-02
3	2015-04-21 15:29:57 UTC-7	S1	Standard 1	1	G2D2115 METHOD	VLe	DD21-03
4	2015-04-21 15:46:07 UTC-7	S2	Standard 2	1	G2D2115 METHOD	VLe	DD21-04
5	2015-04-21 16:02:17 UTC-7	S3	Standard 3	1	G2D2115 METHOD	VLe	DD21-05
6	2015-04-21 16:18:25 UTC-7	S4	Standard 4	1	G2D2115 METHOD	VLe	DD21-06
7	2015-04-21 16:34:34 UTC-7	S5	Standard 5	1	G2D2115 METHOD	VLe	DD21-07
8	2015-04-21 16:50:43 UTC-7	S6	Standard 6	1	G2D2115 METHOD	VLe	DD21-08
9	2015-04-21 17:06:51 UTC-7	S7	Standard 7	1	G2D2115 METHOD	VLe	DD21-09
10	2015-04-21 17:28:26 UTC-7	ICV	Sample	1	G2D2115 METHOD	VLe	DD21-10
11	2015-04-21 17:44:34 UTC-7	ICB	Sample	1	G2D2115 METHOD	VLe	DD21-11

VLe 4/23/15

FINAL
4/23/15

8286

EMAX LABORATORIES, INC.

ANALYSIS RUN LOG
for
HEXAVALENT CHROMIUM BY IC

Note: For samples and relevant QCs/Standards analyzed, refer to attached analytical sequence.

Comments:

Post Column Solution:

1,5 Diphenylcarbohydrozide : 0.5g SW9B-04-035

MeOH : 100 mL SW1A-005-08-12 } 1L

H_2SO_4 : 28 mL ↓ -06-12

Eluent:

320 mM Na_2CO_3/100 mM $NaHCO_3$ (80 mL → 2L)

SW4-02-46-05

☑ pH adjusted water (range 9.3 - 9.5): ☐ Buffer (1 mL → 100 mL) SW4-03-02-01

Reagent Water: RW1-15-001

HCD012S/13S*: D114

*: 0.8mL of digestate was volumed to 100mL to be calculated as preparation factor of 125x. ✓

Reporting limit for G2 is 0.05 ppb

0.45 µm Filter Lot# 21849757 Snapseal 4oz 19414007

0.2 µm Filter Lot# 21864678 1.5oz 20814007

Book #:	AG2-006
Instrument No.:	G2
Pipette ID:	SI1A-04-4
	SW3-01-33
	39380025
Balance ID:	10601202
Analytical Sequence:	DD24
Method File:	G2D2115 Method
Analytical Batch:	HCD012S/13S

SOP #	Rev. #
☐ EMAX-218.6	5
☑ EMAX-7199	3
☐ EMAX-	

STANDARDS ID	
ICAL	—
ICV	—
CCV	SW9B-05-67-05/06
LCS	—
MS	SW9B-05-66-12

ELECTRONIC DATA ARCHIVAL	
Location	Date
☐ External Hard Drive	
☐	

Analyzed By: VL

Date: 4/23/15 - 4/24/15

Determination overview

	Determination start	Ident	Sample type	Dilution	Method name	User (short name)	Info 1
1	2015-04-23 13:34:28 UTC-7	CCV16	Sample	1	G2D2115 METHOD	VLe	DD24-01
2	2015-04-23 13:50:36 UTC-7	CCB16	Sample	1	G2D2115 METHOD	VLe	DD24-02
3	2015-04-23 14:06:45 UTC-7	HCD012SB	Sample	1	G2D2115 METHOD	VLe	DD24-03
4	2015-04-23 14:22:55 UTC-7	HCD012SQ	Sample	1	G2D2115 METHOD	VLe	DD24-04
5	2015-04-23 15:11:24 UTC-7	CSD012SL	Sample	1	G2D2115 METHOD	VLe	DD24-05
6	2015-04-23 15:27:34 UTC-7	CSD012SX	Sample	1	G2D2115 METHOD	VLe	DD24-06
7	2015-04-23 15:43:45 UTC-7	CID012SL	Sample	200	G2D2115 METHOD	VLe	DD24-07
8	2015-04-23 15:59:56 UTC-7	CID012SX	Sample	200	G2D2115 METHOD	VLe	DD24-08
9	2015-04-23 16:16:05 UTC-7	D114-08	Sample	1	G2D2115 METHOD	VLe	DD24-09
10	2015-04-23 16:32:15 UTC-7	D114-08N	Sample	1	G2D2115 METHOD	VLe	DD24-10
11	2015-04-23 16:48:24 UTC-7	D114-08D	Sample	1	G2D2115 METHOD	VLe	DD24-11
12	2015-04-23 17:04:34 UTC-7	D114-08ND	Sample	1	G2D2115 METHOD	VLe	DD24-12
13	2015-04-23 17:20:43 UTC-7	CCV18	Sample	1	G2D2115 METHOD	VLe	DD24-13
14	2015-04-23 17:36:51 UTC-7	CCB18	Sample	1	G2D2115 METHOD	VLe	DD24-14
15	2015-04-23 17:53:00 UTC-7	D114-08M	Sample	100	G2D2115 METHOD	VLe	DD24-15
16	2015-04-23 18:09:08 UTC-7	D114-08NM	Sample	100	G2D2115 METHOD	VLe	DD24-16
17	2015-04-23 18:25:16 UTC-7	D114-08M	Sample	1	G2D2115 METHOD	VLe	DD24-17
18	2015-04-23 18:41:23 UTC-7	D114-08NM	Sample	1	G2D2115 METHOD	VLe	DD24-18
19	2015-04-23 18:57:29 UTC-7	D114-01	Sample	1	G2D2115 METHOD	VLe	DD24-19
20	2015-04-23 19:13:36 UTC-7	D114-01N	Sample	1	G2D2115 METHOD	VLe	DD24-20
21	2015-04-23 19:29:42 UTC-7	D114-02	Sample	1	G2D2115 METHOD	VLe	DD24-21
22	2015-04-23 19:45:49 UTC-7	D114-02N	Sample	1	G2D2115 METHOD	VLe	DD24-22
23	2015-04-23 20:01:54 UTC-7	D114-03	Sample	1	G2D2115 METHOD	VLe	DD24-23
24	2015-04-23 20:17:59 UTC-7	D114-03N	Sample	1	G2D2115 METHOD	VLe	DD24-24
25	2015-04-23 20:34:04 UTC-7	CCV20	Sample	1	G2D2115 METHOD	VLe	DD24-25
26	2015-04-23 20:50:09 UTC-7	CCB20	Sample	1	G2D2115 METHOD	VLe	DD24-26
27	2015-04-23 21:06:12 UTC-7	D114-04	Sample	1	G2D2115 METHOD	VLe	DD24-27
28	2015-04-23 21:22:14 UTC-7	D114-04N	Sample	1	G2D2115 METHOD	VLe	DD24-28
29	2015-04-23 21:38:18 UTC-7	D114-05	Sample	1	G2D2115 METHOD	VLe	DD24-29
30	2015-04-23 21:54:21 UTC-7	D114-05N	Sample	1	G2D2115 METHOD	VLe	DD24-30
31	2015-04-23 22:10:25 UTC-7	D114-06	Sample	1	G2D2115 METHOD	VLe	DD24-31
32	2015-04-23 22:26:30 UTC-7	D114-06N	Sample	1	G2D2115 METHOD	VLe	DD24-32
33	2015-04-23 22:42:35 UTC-7	D114-07	Sample	1	G2D2115 METHOD	VLe	DD24-33

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Determination overview

	Determination start	Ident	Sample type	Dilution	Method name	User (short name)	Info 1
34	2015-04-23 22:58:40 UTC-7	D114-07N	Sample	1	G2D2115 METHOD	VLe	DD24-34
35	2015-04-23 23:14:45 UTC-7	D114-10	Sample	1	G2D2115 METHOD	VLe	DD24-35
36	2015-04-23 23:30:50 UTC-7	D114-10N	Sample	1	G2D2115 METHOD	VLe	DD24-36
37	2015-04-23 23:46:57 UTC-7	CCV22	Sample	1	G2D2115 METHOD	VLe	DD24-37
38	2015-04-24 00:03:03 UTC-7	CCB22	Sample	1	G2D2115 METHOD	VLe	DD24-38
39	2015-04-24 00:19:10 UTC-7	D114-11	Sample	1	G2D2115 METHOD	VLe	DD24-39
40	2015-04-24 00:35:17 UTC-7	D114-11N	Sample	1	G2D2115 METHOD	VLe	DD24-40
41	2015-04-24 00:51:23 UTC-7	D114-12	Sample	1	G2D2115 METHOD	VLe	DD24-41
42	2015-04-24 01:07:32 UTC-7	D114-12N	Sample	1	G2D2115 METHOD	VLe	DD24-42
43	2015-04-24 01:23:39 UTC-7	D114-13	Sample	1	G2D2115 METHOD	VLe	DD24-43
44	2015-04-24 01:39:48 UTC-7	D114-13N	Sample	1	G2D2115 METHOD	VLe	DD24-44
45	2015-04-24 01:55:57 UTC-7	HCD013SB	Sample	1	G2D2115 METHOD	VLe	DD24-45
46	2015-04-24 02:12:06 UTC-7	HCD013SQ	Sample	1	G2D2115 METHOD	VLe	DD24-46
47	2015-04-24 02:28:15 UTC-7	CSD013SL	Sample	1	G2D2115 METHOD	VLe	DD24-47
48	2015-04-24 02:44:25 UTC-7	CSD013SX	Sample	1	G2D2115 METHOD	VLe	DD24-48
49	2015-04-24 03:00:36 UTC-7	CCV24	Sample	1	G2D2115 METHOD	VLe	DD24-49
50	2015-04-24 03:16:46 UTC-7	CCB24	Sample	1	G2D2115 METHOD	VLe	DD24-50
51	2015-04-24 03:32:56 UTC-7	CID013SL	Sample	200	G2D2115 METHOD	VLe	DD24-51
52	2015-04-24 03:49:06 UTC-7	CID013SX	Sample	200	G2D2115 METHOD	VLe	DD24-52
53	2015-04-24 04:05:14 UTC-7	D114-14	Sample	1	G2D2115 METHOD	VLe	DD24-53
54	2015-04-24 04:21:23 UTC-7	D114-14N	Sample	1	G2D2115 METHOD	VLe	DD24-54
55	2015-04-24 04:37:31 UTC-7	D114-15	Sample	1	G2D2115 METHOD	VLe	DD24-55
56	2015-04-24 04:53:39 UTC-7	D114-15N	Sample	1	G2D2115 METHOD	VLe	DD24-56
57	2015-04-24 05:09:47 UTC-7	D114-16	Sample	1	G2D2115 METHOD	VLe	DD24-57
58	2015-04-24 05:25:55 UTC-7	D114-16N	Sample	1	G2D2115 METHOD	VLe	DD24-58
59	2015-04-24 05:42:02 UTC-7	D114-17	Sample	1	G2D2115 METHOD	VLe	DD24-59
60	2015-04-24 05:58:08 UTC-7	D114-17N	Sample	1	G2D2115 METHOD	VLe	DD24-60
61	2015-04-24 06:14:14 UTC-7	CCV26	Sample	1	G2D2115 METHOD	VLe	DD24-61
62	2015-04-24 06:30:20 UTC-7	CCB26	Sample	1	G2D2115 METHOD	VLe	DD24-62
63	2015-04-24 06:46:26 UTC-7	D114-18	Sample	1	G2D2115 METHOD	VLe	DD24-63
64	2015-04-24 07:02:32 UTC-7	D114-18N	Sample	1	G2D2115 METHOD	VLe	DD24-64
65	2015-04-24 07:18:38 UTC-7	D114-19	Sample	1	G2D2115 METHOD	VLe	DD24-65
66	2015-04-24 07:34:41 UTC-7	D114-19N	Sample	1	G2D2115 METHOD	VLe	DD24-66

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Determination overview

	Determination start	Ident	Sample type	Dilution	Method name	User (short name)	Info 1
67	2015-04-24 07:50:43 UTC-7	D114-20	Sample	1	G2D2115 METHOD	VLe	DD24-67
68	2015-04-24 08:06:47 UTC-7	D114-20N	Sample	1	G2D2115 METHOD	VLe	DD24-68
69	2015-04-24 08:22:51 UTC-7	D114-21	Sample	1	G2D2115 METHOD	VLe	DD24-69
70	2015-04-24 08:38:56 UTC-7	D114-21N	Sample	1	G2D2115 METHOD	VLe	DD24-70
71	2015-04-24 08:55:00 UTC-7	D114-23	Sample	1	G2D2115 METHOD	VLe	DD24-71
72	2015-04-24 09:11:04 UTC-7	D114-23N	Sample	1	G2D2115 METHOD	VLe	DD24-72
73	2015-04-24 09:27:09 UTC-7	CCV28	Sample	1	G2D2115 METHOD	VLe	DD24-73
74	2015-04-24 09:43:15 UTC-7	CCB28	Sample	1	G2D2115 METHOD	VLe	DD24-74
75	2015-04-24 09:59:21 UTC-7	D114-24	Sample	1	G2D2115 METHOD	VLe	DD24-75
76	2015-04-24 10:15:27 UTC-7	D114-24N	Sample	1	G2D2115 METHOD	VLe	DD24-76
77	2015-04-24 10:31:34 UTC-7	D114-25	Sample	1	G2D2115 METHOD	VLe	DD24-77
78	2015-04-24 10:47:41 UTC-7	D114-25N	Sample	1	G2D2115 METHOD	VLe	DD24-78
79	2015-04-24 11:03:49 UTC-7	CCV30	Sample	1	G2D2115 METHOD	VLe	DD24-79
80	2015-04-24 11:19:57 UTC-7	CCB30	Sample	1	G2D2115 METHOD	VLe	DD24-80
81	2015-04-24 11:36:05 UTC-7	D114-22	Sample	1	G2D2115 METHOD	VLe	DD24-81
82	2015-04-24 11:52:14 UTC-7	D114-22N	Sample	1	G2D2115 METHOD	VLe	DD24-82
83	2015-04-24 12:08:22 UTC-7	D114-22D	Sample	1	G2D2115 METHOD	VLe	DD24-83
84	2015-04-24 12:24:32 UTC-7	D114-22ND	Sample	1	G2D2115 METHOD	VLe	DD24-84
85	2015-04-24 12:40:42 UTC-7	D114-22M	Sample	1	G2D2115 METHOD	VLe	DD24-85
86	2015-04-24 12:56:53 UTC-7	D114-22NM	Sample	1	G2D2115 METHOD	VLe	DD24-86
87	2015-04-24 13:13:03 UTC-7	D114-22M	Sample	100	G2D2115 METHOD	VLe	DD24-87
88	2015-04-24 13:29:13 UTC-7	D114-22NM	Sample	100	G2D2115 METHOD	VLe	DD24-88
89	2015-04-24 13:45:23 UTC-7	CCV32	Sample	1	G2D2115 METHOD	VLe	DD24-89
90	2015-04-24 14:01:31 UTC-7	CCB32	Sample	1	G2D2115 METHOD	VLe	DD24-90
91	2015-04-24 14:17:40 UTC-7	D114-15	Sample	1	G2D2115 METHOD	VLe	DD24-91
92	2015-04-24 14:33:48 UTC-7	D114-15A	Sample	1	G2D2115 METHOD	VLe	DD24-92
93	2015-04-24 15:54:22 UTC-7	CCV34	Sample	1	G2D2115 METHOD	VLe	DD24-93
94	2015-04-24 16:10:28 UTC-7	CCB34	Sample	1	G2D2115 METHOD	VLe	DD24-94

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RETENTION TIME WINDOW

RETENTION TIME WINDOW

METHOD 218.6/7199

Lab Name:	EMAX	**METHOD:**	EMAX-218.6/7199
Instrument ID:	G2 (881 IC)	**IC COLUMN:**	METROSEP A SUPP 5
		COLUMN SIZE:	150X4.0mm

Compound	Ical Mean RT	from	to	Retention Time Window
CHROMIUM VI	**8.84**	8.54	9.14	**0.298**

G2D2115.MET
WATER

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PREPARATION LOG(S)

EMAX LABORATORIES, INC.

FileID: HCD012S

IC HEXAVALENT CHROMIUM SOIL SAMPLE PREPARATION LOG

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	pHAdj	FinalVol(ml)	Notes
15HCD013S01	HCD012SB	12.491	g	4/22/15 10:37	9.31	100	
15HCD013S02	CSD012SL	12.501	g	4/22/15 10:38	9.34	100	**1.25mL
15HCD013S03	CID012SL	12.499	g	4/22/15 10:39	9.35	100	*31.0mg
15HCD013S04	D114-01	12.506	g	4/22/15 10:40	9.34	100	
15HCD013S05	D114-02	12.489	g	4/22/15 10:41	9.31	100	
15HCD013S06	D114-03	12.497	g	4/22/15 10:42	9.32	100	
15HCD013S07	D114-04	12.486	g	4/22/15 10:43	9.33	100	
15HCD013S08	D114-05	12.481	g	4/22/15 10:44	9.31	100	
15HCD013S09	D114-06	12.502	g	4/22/15 10:45	9.34	100	
15HCD013S10	D114-07	12.506	g	4/22/15 10:46	9.35	100	
15HCD013S11	D114-08	12.505	g	4/22/15 10:47	9.37	100	
15HCD013S12	D114-08D	12.521	g	4/22/15 10:48	9.38	100	
15HCD013S13	D114-08M	12.506	g	4/22/15 10:49	9.37	100	SOL; **2.5mL
15HCD013S14	D114-08M	12.508	g	4/22/15 10:50	9.39	100	INSOL; *24.2mg
15HCD013S15	D114-10	12.499	g	4/22/15 10:51	9.34	100	
15HCD013S16	D114-11	12.499	g	4/22/15 10:54	9.38	100	
15HCD013S17	D114-12	12.504	g	4/22/15 10:55	9.34	100	
15HCD013S18	D114-13	12.486	g	4/22/15 10:56	9.39	100	

Calibration of pH Meter — InstrumentID: F7

BufferID	Value	Reading	DateTime
SW1-01-644	4	4	4/23/15 11:43
SW1-01-667	7	7	4/23/15 11:43
SW1-01-627	10	10.01	4/23/15 11:43
SW1-01-656	CalVer 8	8.01	4/23/15 11:43

Standards	Desc	Amt. Added	Exp.Date
SW9B-05-61-15	Cr VI (soluble) 10 ppm	**SEE NOTES	8/5/2015
SW9A-03-002	Cr VI (insoluble) Lead Chromate	*SEE NOTES	4/3/2016
	Cr VI (insoluble)		
	Cr VI (insoluble)		

Reagents ID	Desc	Amt. Added	Exp.Date
SW4-02-39-02	Phosphate Buffer	0.5mL	5/20/2015
SWR1-01-502	$MgCl_2$	0.4g	2/1/2021
SW1A-005-08-14	HNO_3	~1mL	2/6/2016
SW4-03-03-03	Alkali Digestion Solution pH 11.9	50mL	5/20/2015
SW1B-002-20-23	Silica Sand	12.5g	9/21/2021
LOT # 9592070	Filter	NA	NA

Balance ID: 10601202. Calibration check was verified prior to use.

Digestor #: B — Temp. / Thermometer ID: 95C; 111859904

Micropipette ID: SW9A-04-025; SW9A-04-017

☑ EMAX-3060 Rev.0

☐ EMAX-7199 Rev.3

Prepared By: VLe

Checked By: NA

☑ DateTimeStarted 4/22/2015 11:36 ☑ DateTimeEnded 4/22/2015 12:40 Comment: DateTimeStarted and DateTimeEnded is the start and end time for alkali digestion.

Date 04/23/15

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EMAX LABORATORIES, INC.

FileID: HCD013S

IC HEXAVALENT CHROMIUM SOIL SAMPLE PREPARATION LOG

PrepBatchID	LabSampleID	Aliquot	Unit	DateTime	pHAdj	FinalVol(ml)	Notes
15HCD013S01	HCD013SB	12.489	g	4/22/15 10:57	9.34	100	
15HCD013S02	CSD013SL	12.512	g	4/22/15 10:59	9.36	100	**1.25mL
15HCD013S03	CID013SL	12.499	g	4/22/15 11:01	9.37	100	*24.4mg
15HCD013S04	D114-14	12.503	g	4/22/15 11:02	9.39	100	
15HCD013S05	D114-15	12.518	g	4/22/15 11:03	9.34	100	
15HCD013S06	D114-16	12.501	g	4/22/15 11:04	9.38	100	
15HCD013S07	D114-17	12.499	g	4/22/15 11:05	9.34	100	
15HCD013S08	D114-18	12.508	g	4/22/15 11:06	9.39	100	
15HCD013S09	D114-19	12.489	g	4/22/15 11:07	9.34	100	
15HCD013S10	D114-20	12.521	g	4/22/15 11:08	9.35	100	
15HCD013S11	D114-21	12.499	g	4/22/15 11:09	9.31	100	
15HCD013S12	D114-22	12.508	g	4/22/15 11:09	9.32	100	
15HCD013S13	D114-22D	12.481	g	4/22/15 11:10	9.35	100	
15HCD013S14	D114-22M	12.487	g	4/22/15 11:11	9.38	100	SOL; **2.5mL
15HCD013S15	D114-22M	12.479	g	4/22/15 11:12	9.34	100	INSOL; *33.1mg
15HCD013S16	D114-23	12.499	g	4/22/15 11:13	9.39	100	
15HCD013S17	D114-24	12.497	g	4/22/15 11:14	9.37	100	
15HCD013S18	D114-25	12.511	g	4/22/15 11:16	9.38	100	

Calibration of pH Meter — InstrumentID: F7

BufferID	Value	Reading	DateTime
SW1-01-644	4	4	4/23/15 11:43
SW1-01-667	7	7	4/23/15 11:43
SW1-01-627	10	10.01	4/23/15 11:43
SW1-01-656	CalVer 8	8.01	4/23/15 11:43

Standards	Desc	Amt. Added	Exp.Date
SW9B-05-61-15	Cr VI (soluble) 10 ppm	**SEE NOTES	8/5/2015
SW9A-03-002	Cr VI (insoluble) Lead Chromate	*SEE NOTES	4/3/2016
	Cr VI (insoluble)		
	Cr VI (insoluble)		

Reagents ID	Desc	Amt. Added	Exp.Date
SW4-02-39-02	Phosphate Buffer	0.5mL	5/20/2015
SWR1-01-502	$MgCl_2$	0.4g	2/1/2021
SW1A-005-08-14	HNO_3	~1mL	2/6/2016
SW4-03-03-03	Alkali Digestion Solution pH 11.9	50mL	5/20/2015
SW1B-002-20-23	Silica Sand	12.5g	9/21/2021
LOT # 9592070	Filter	NA	NA

Balance ID: 10601202. Calibration check was verified prior to use.

Digestor #: B — Temp. / Thermometer ID: 95C; 111859904

Micropipette ID: SW9A-04-025; SW9A-04-017

☑ EMAX-3060 Rev.0

☐ EMAX-7199 Rev.3

Prepared By: VLe

Checked By: RA

☑ DateTimeStarted 4/22/2015 11:36 ☑ DateTimeEnded 4/22/2015 12:40 Comment: DateTimeStarted and DateTimeEnded is the start and end time for alkali digestion. Date 04/23/15

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Appendix I
Data Quality Assessment

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Appendix I
Data Quality Assessment

This appendix contains the data quality assessment (DQA) for 31 soil samples and associated field quality control (QC) samples collected by CH2M HILL Kleinfelder, A Joint Venture (KCH) from April 2, 2015 through April 16, 2015 for the Remedial Investigation (RI) and Feasibility Study (FS) for Munitions Response Program (MRP) Site UXO4, Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California. The objective of the investigation was to assess the nature and extent of the hazard/threat of munitions and explosives of concern (MEC) and munitions constituents (MC) at MRP Site UXO4.

Soil samples were collected from four trenches (from two depth intervals to 3 feet below ground surface [bgs]) from April 10, 2015 through April 14, 2015. From April 2, 2015 through April 16, 2015, soil samples were collected from 16 discrete soil borings at depths ranging from ground surface to 8 feet bgs.

Soil samples were analyzed for:

- Explosive residues by United States Environmental Protection Agency (USEPA) Method 8330A
- Perchlorate by USEPA Method 6850
- Metals including mercury by USEPA Methods 6020A and 7471A
- Hexavalent chromium by USEPA Method 7199

KCH submitted the soil and associated field QC samples to EMAX Laboratories, Inc. (EMAX), located in Torrance, California.

Data Quality Assessment

The DQA process consists of a systematic review, verification, validation, and usability assessment of the data generated during this investigation. The purpose of the DQA is to evaluate and monitor the performance of the field sampling and analytical procedures, and assess the quality of the data. Data review and verification were performed by the KCH Project Chemist on 100 percent of the analytical data. MEC^{x} , located in Aurora, Colorado, performed the independent third-party data validation.

Data validation was performed on 100 percent of the data with approximately 90 percent undergoing standard (Level III) and 10 percent undergoing full (Level IV) data validation. 1,383 analytical results were evaluated by MEC^{x} during the data validation process. Of those analytical results, 25 metal results were flagged as not to be used in favor of more technically sound results for the same samples and target analytes (e.g., because of sample dilutions) for a total of 1,358 useable analytical results. The data were reviewed, verified, and validated consistent with the procedures presented in five documents:

- USEPA Contract Laboratory Program, *National Functional Guidelines for Superfund Organic Data Review*, June 2008
- USEPA Contract Laboratory Program, *National Functional Guidelines for Superfund Inorganics Data Review*, January 2010
- United States Department of Defense, *Quality Systems Manual for Environmental Laboratories*, Version 4.2, October 2010
- USEPA *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, Updates I, II, IIA, IIB, III, IIIA, IIIB, and IV, February 2007
- KCH, Final *Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Remedial Investigation and Feasibility Study for Munitions Response Program Site UXO4, Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California*, February 2015

The laboratory reported 220 analytical results qualified as estimated "J" for concentrations being reported between the detection limit and limit of quantitation.

A total of 238 of the 1,358 usable analytical results (or 17.5 percent) was qualified as either estimated detects ("J" qualifier); estimated nondetects ("UJ" qualifier); or not detected because of potential blank contamination and qualified as nondetects ("U" qualifier) because of the data validation process. Results qualified as estimated ("J" , "UJ", or "U" qualifier) are considered usable for all purposes.

Analytical results were qualified as estimated ("J" or "UJ" qualifier) or negated ("U" qualifier) for one or more reasons:

- Field blank contamination
- Laboratory blank contamination
- Matrix Spike (MS)/Matrix Spike Duplicate (MSD) percent recovery outliers
- MS/MSD relative percent difference (RPD) outside acceptable criteria
- Serial dilution outliers

As a result of the data validation process, no results were rejected, except in cases where multiple results were reported as a result of dilutions or reanalysis.

Quality Control Samples and Sample Receipt

QC samples collected during this investigation consisted of the following types:

- Equipment rinsate blank samples
- Source water blank samples (collected with MRP Site UXO5)
- MS/MSD samples
- Temperature blank samples

Upon sample receipt, the laboratory measured and documented each of the cooler temperatures. Temperatures were recorded to be below 6 degrees Celsius in the sample coolers submitted to EMAX for analysis.

Data Validation Findings

The data quality indicators, otherwise known as precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS), defined in the Sampling and Analysis Plan (SAP) (KCH, 2015), were met for the RI, and assessed:

- **Precision** was assessed by evaluating the RPDs of the MSD, laboratory control sample duplicates, field duplicates, serial dilutions, and laboratory sample duplicates for each applicable analytical method. Approximately 1.1 percent of the usable analytical results were qualified as a result of MS/MSD RPD outliers or serial dilutions, indicating that the analytical methods were consistently precise.
- **Accuracy** was assessed by evaluating percent recoveries of MS samples, laboratory control samples, internal standard, and surrogate recoveries for each applicable analytical method. Approximately 1.7 percent of the usable analytical results were qualified as a result of percent recovery outliers in the MS/MSD samples associated with this dataset, indicating that the methods were consistently accurate.
- **Representativeness** was assessed by the use of established field and laboratory procedures and their consistent application. Representativeness was maintained by using standard operating procedures (SOPs), including chain-of-custody protocol and documentation, soil sampling, sample labeling, sample packaging and transport, as well as maintaining good condition of the samples upon receipt at the laboratory.
- **Comparability** was assessed by evaluating the use of well-documented analytical methods and SOPs, standard reference materials, and QC samples, and by reporting each data type in consistent units. The use of USEPA-approved analytical methods, specified and well-documented analyses, a California State-certified and United States Department of Defense Environmental Laboratory Accreditation Program-accredited laboratory, and a standardized DQA process gives the data a high degree of analytical comparability**.**
- **Completeness** was assessed by evaluating the validity of data obtained as a result of the DQA process (i.e., amount of valid data obtained as compared to the amount that was expected to be obtained under normal conditions). Estimated data ("J" or "UJ" qualified) are considered valid and usable; however, rejected data ("R" qualified) are considered unusable. No results were rejected, except in cases where multiple results were reported as a result of dilutions or reanalyses. During data validation, the least technically appropriate results were rejected so that only one result per compound per sample was considered valid. Of the 1,358 analytical results considered in the analytical completeness calculation, 100 percent are considered usable, which meets the completeness goal of 90 percent defined in the SAP (KCH, 2015).
- **Sensitivity** was assessed by evaluating the use of project quantitation limits.
  - Dilutions were required for hexavalent chromium and metals analysis.
  - Sample UXO4-SB04-0.33 was diluted fivefold for hexavalent chromium by USEPA Method 7199 as a result of matrix interference. Though the reporting limits were elevated and the results were nondetect ("U" qualified), the result met the project action limit (300 micrograms per kilogram).

- Sample UXO5-TR04-S02-3.0 required a fivefold dilution as a result of the suppression of the analyte signal for a number of analytes (arsenic, barium, calcium, chromium, iron, lead, magnesium, nickel, potassium, sodium, strontium, vanadium, and zinc) and for analytes exceeding the upper calibration limit (cobalt, copper, and manganese).
- The reporting limits for octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) or 1,3,5-trinitroperhydro-1,3,5-triazine (RDX) (USEPA Method 8330A) for four samples were raised during the data validation process because of an early eluting unknown peak that had the potential to mask RDX and HMX peaks. The elevated reporting limits did not exceed the project action limits.

Based on a review of the data validation reports, the following data qualifiers were applied as a result of QC outliers:

- Contaminants reported in field samples with less than 10 times the concentrations detected in the source water blank or equipment rinsate blank samples were qualified as not detected and assigned a "U," with validation code "06." Sodium was reported at a concentration above the detection limit in the source blank and equipment rinsate blank samples, potentially affecting 23 soil samples.
- Potassium was reported in one of the bracketing continuing calibration blanks and the equipment rinsate blank; thus potassium was qualified as estimated ("J" qualified) with validation code "07" in the equipment rinsate, UXO4-EB-041615.
- A total of 23 results for aluminum, antimony, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, nickel, strontium, tin, vanadium, and zinc was qualified in four samples because of either MS or MSD percent-recovery outliers. During data validation, these results were qualified as estimated detect ("J" qualifier) with validation code "08."
- Antimony, copper, and vanadium were qualified in sample UXO4-SB07-2.0 because of high RPD between the MS and MSD results. Perchlorate was also qualified in sample UXO4-SB15-0.5 because of the high RPD. Results were qualified as estimated detect ("J" qualifier) or estimated nondetect ("UJ" qualifier) with validation code "09."
- The serial dilutions exceeded the 10 percent QC criteria in two samples (UXO-TR04-S02-3.0 and UXO4-SB01-1.0). Calcium, chromium, copper, iron, magnesium, manganese, nickel, potassium, or vanadium results were qualified as estimated detect ("J" qualifier) with reason code "16".
- In four samples, HMX or RDX reporting limits were elevated during data validation because of interfering peaks and qualified nondetect ("U" qualifier) with reason code "23."

As a result of the DQA process, it has been concluded that the data quality indicators (i.e., PARCCS) were either met or exceeded for the analytical data generated during this investigation. The data validation reports, which will include the sample summary results of qualified and unqualified data, will be provided on compact disc as Appendix J.

References

CH2M HILL Kleinfelder, A Joint Venture (KCH). 2015. *Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Remedial Investigation and Feasibility Study for Munitions Response Program Site UXO4, Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California*. Final. February.

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United States Environmental Protection Agency (USEPA). 2007. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, Updates I, II, IIA, IIB, III, IIIA, IIIB, and IV. February.

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Appendix J
Data Validation Reports

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MEC^X
12269 East Vassar Drive, Aurora, CO 80014
Phone (720) 535-5502 Fax (720) 535-7555

June 5, 2015

Scott Fleming
Email: SFleming@kleinfelder.com

Dear Scott:

Enclosed please find Revision 2 of the data validation report for CTO 0070 as follows:

	SDG		
Analysis	15D027	15D041	15D114
Explosives	X	X	X
Metals	X	X	X
Perchlorate	X	X	X
Hexavalent Chromium	X	X	X

The specific sample identifications are listed in the Sample Identification Tables. The data packages were reviewed according to the data validation procedures referenced in the introduction of the report. Revisions address text corrections.

Sincerely,

Elizabeth Wessling
Quality Assurance Manager

CTO 0070
Remedial Investigation for Site UX04 at Naval Station Weapons Station Seal Beach, Fallbrook, California

Data Validation Report

Prepared by

MEC^X
12269 East Vassar Drive
Aurora, CO 80014

Acronyms and Abbreviations

%D	percent difference
%R	percent recovery
µg/L	microgram per liter
mg/L	milligram per liter
mg/kg	milligram per kilogram
µg/kg	microgram per kilogram
4,4'-DDD	4,4'-dichlorodiphenyldichloroethane
4,4'-DDE	4,4'-dichlorodiphenyldichloroethylene
4,4'-DDT	4,4'-dichlorodiphenyltrichloroethane
BFB	bromofluorobenzene
BNA	base/neutral/acid compounds
CCB	continuing calibration blank
CCC	calibration check compound
CCV	continuing calibration verification
CLP	Contract Laboratory Program
COC	chain of custody record
CTO	contract task order
DCB	decachlorobiphenyl
DFTPP	decafluorotriphenylphosphine
DOD	Department Of Defense
DVP	data validation procedure
EPA	Environmental Protection Agency, United States
GC	gas chromatography
GC/MS	gas chromatography/mass spectrometry
ICB	initial calibration blank
ICP	inductively coupled plasma
ICS	interference check sample
ICV	initial calibration verification
IS	internal standards
LCS	laboratory control sample
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
QC	Quality Control
QA	quality assurance
r^2	coefficient of determination
RF	response factor
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RT	retention time
SDG	sample delivery group
SOW	statement of work
SPCC	system performance check compound
SVOC	semivolatile organic compound

TIC	tentatively identified compound
TOC	total organic carbon
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

Data Qualifier Reference Table

Validation Qualifier	Validation Qualifier Definition
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

Reason Code Reference Table

Reason Code	Reason Code Definition
01	Preparation/Analysis Holding Time
02	Sample Receipt Temperature/Sample Preservation
03	Sample Custody Protocol
04	Missing Deliverables
05	Initial Continuing Calibration
06	Field Blank Sample
07	Laboratory Blank Sample
08	Matrix Spike (MS)/ Matrix Spike Duplicate (MSD) or Matrix Duplicate (MD) Percent Recovery
09	MS/MSD or MD Relative Percent Difference (RPD)
10	Laboratory Control Sample/Laboratory Control Sample Duplicate Percent Recovery
11	Inductively Coupled Plasma (ICP) Interference Check
12	Percent Difference Between Columns
13	Surrogate Percent Recovery
14	Field Duplicate RPD
15	Furnace Quality Control
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blank Samples
19	Internal Standards
20	Linear Calibration Range Exceeded
21	Potential False Positive Results
22	Other Results More Technically Acceptable
23	Other

DATA VALIDATION REPORT

CTO 0070
Remedial Investigation for
Site UX04 at Naval Station Weapons Station Seal Beach, Fallbrook, California

SAMPLE DELIVERY GROUPS: 15D027, 15D041, 15D114

Prepared by

MEC^X
12269 East Vassar Drive
Aurora, CO 80014

I. INTRODUCTION

Task Order Title:	CTO 0070
Contract Task Order:	1405.001H.07 001
Sample Delivery Groups:	15D027, 15D041 and 15D114
Project Manager:	S. Fleming
Matrix:	Soil
QC Level:	Standard/Full
No. of Samples:	32
No. of Reanalyses/Dilutions:	0
Laboratory:	EMAX Laboratories, Inc.

Table 1. Sample Identification

Sample Identification	Laboratory Identification	Matrix	Validation Level	Analysis Methods
UXO4-SB01-1.0	D027-01	Soil	Full	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB02-0.83	D041-01	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB03-0.08	D041-02	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB04-0.33	D041-03	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB05-0.33	D041-04	Soil	Full	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB06-0.42	D041-05	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB07-2.0	D041-06	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-TR04-S02-3.0	D114-08	Soil	Full	6020A, 6850, 7199, 7471A, 8330A
UXO4-TR01-S01-1.0	D114-01	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-TR01-S02-3.0	D114-02	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-TR02-S01-2.0	D114-03	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-TR02-S02-3.0	D114-04	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-TR03-S01-1.5	D114-05	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-TR03-S02-3.0	D114-06	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-TR04-S01-2.0	D114-07	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB08-8.0	D114-10	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB09-6.6	D114-11	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB10-0.5	D114-12	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A

Sample Identification	Laboratory Identification	Matrix	Validation Level	Analysis Methods
UXO4-SB10-1.0	D114-13	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB11-0.5	D114-14	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB11-1.0	D114-15	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB12-0.5	D114-16	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB12-1.0	D114-17	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB13-0.5	D114-18	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB13-1.0	D114-19	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB14-0.5	D114-20	Soil	Full	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB14-1.0	D114-21	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB15-0.5	D114-22	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB15-1.0	D114-23	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB16-0.5	D114-24	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-SB16-1.0	D114-25	Soil	Standard	6020A, 6850, 7199, 7471A, 8330A
UXO4-EB-041615	D114-09	Water	Standard	6020A, 6850, 7199, 7470A, 8330A

II. Sample Management

The samples in these sample delivery groups (SDGs) were received at the laboratory within the temperature limits of <6°C and >0°C. According to the case narratives, the samples were received intact and on ice. The chains-of-custody (COCs) were appropriately signed and dated by field and laboratory personnel. Custody seals were not utilized for SDG 15D041. Custody seals for the remaining SDGs were intact upon receipt at the laboratory.

Corrections made to the sampling date on the COC for SDG 15D027 and the relinquished date on the COCs for SDG 15D114 were initialed but not dated.

III. Method Analyses

1. EPA METHOD 8330A—Explosives

Reviewed By: L. Calvin
Date Reviewed: June 3, 2015

The samples listed in Table 1 for this analysis were validated based on the guidelines outlined in the *Sampling and Analysis Plan (Chemical Field Sampling Plan and Quality Assurance Project Plan), Remedial Investigation, Munitions Response Program Site UXO4, Naval Station Weapons Station Seal Beach, Detachment Fallbrook, Fallbrook, California* (2015), *United States Department of Defense (DoD) Quality System Manual (QSM) for Environmental Laboratories, Version 4.2* (2010), *United States Department of the Navy Environmental Work Instruction No. 1: "Chemical Data Validation"* (2001), *National Functional Guidelines for Superfund Organic Methods Data Review* (2008), and *EPA SW-846 Method 8330A*.

Unless otherwise noted, control limits listed in the *Sampling and Analysis Plan* (SAP) were used to assess the data.

- Holding Times: The aqueous samples were extracted within seven days of collection and the soil samples were extracted within fourteen days of collection. The samples were analyzed within forty days of extraction.
- Calibration:
  - Initial calibration percent relative standard deviations (%RSDs) were within the control limit of ≤15%.
  - The initial calibration verification (ICV) recoveries were within the control limit of ±20%.
  - The continuing calibration verification (CCV) standard recoveries were within the control limit of ±20%.
- Blanks: Target compounds were not detected in the method blanks.
- Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD): The recoveries and RPDs were within the control limits listed in SAP Table 28a-1.
- Surrogate Recovery: Surrogate recoveries were within the control limits listed in SAP Table 28a-1 of 70-130%.

- Matrix Spike/Matrix Spike Duplicate (MS/MSD): MS/MSD analyses were performed on samples UXO4-SB02-0.83, UXO4-TR04-S02-3.0, and UXO4-SB15-0.5. The recoveries and RPDs were within the control limits listed in the control limits listed in SAP Table 28a-1.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

  - Field Blanks and Equipment Blanks: UXO5-SB-040715 (SDG 15D040, CTO 0063) was identified as the source water blank and UXO4-EB-041615 and was identified as the equipment blank for SDG 15D114. Neither field QC sample had detects.

  - Field Duplicates: These SDGs had no identified field duplicate samples.

- Compound Identification: Compound identification was verified for the Full validation samples. When target compounds were identified on the primary column, confirmation analyses were performed. No target compounds were confirmed.

- Compound Quantification and Reported Detection Limits: Compound quantification was verified for the Full validation samples and quality control (QC) samples. Detects below the limit of quantitation (LOQ) were qualified as estimated, "J." Nondetects are valid to the limit of detection (LOD).

  During the review of the raw data for the Full validation samples, the reviewer noted several samples with an early eluting mass that had the potential to mask RDX and/or HMX peaks. The reviewer compared the height of the mass to the height of the calibration standards and raised the sample result, LOD and detection limit (DL) of the affected samples to the concentration of the equivalent calibration standard. When the raised result exceeded the LOQ, the LOQ was also raised to the same value. The changed results are listed in the table below.

Sample	Compound	Calibration Standard (µg/L)	Raised Values (µg/kg)
UXO4-SB04-0.33	HMX	50	500
	RDX	20	200
UXO4-SB11-0.5	HMX	20	200
UXO4-SB13-0.5	HMX	50	500
	RDX	20	200
UXO4-SB16-0.5	HMX	20	200

- System Performance: No issues with system performance were identified.

- Manual Integration: No manual integrations were identified in the raw data.

2. EPA METHODS 6020 & 7471A—Metals and Mercury

Reviewed By: P. Meeks
Date Reviewed: June 3, 2015

The samples listed in Table 1 for these analyses were validated based on the guidelines outlined in the *Sampling and Analysis Plan (Chemical Field Sampling Plan and Quality Assurance Project Plan), Remedial Investigation, Munitions Response Program Site UXO5, Naval Station Weapons Station Seal Beach, Detachment Fallbrook, Fallbrook, California* (2015), *United States Department of Defense (DoD) Quality System Manual (QSM) for Environmental Laboratories, Version 4.2* (2010), *United States Department of the Navy Environmental Work Instruction No. 1: "Chemical Data Validation"* (2001), *National Functional Guidelines for Inorganic Superfund Data Review* (2010), and *EPA SW-846 Methods 6020 and 7471A*.

Unless otherwise noted, control limits listed in the *Sampling and Analysis Plan* (SAP) were used to assess the data.

- Holding Times: The analytical holding time, 28 days for mercury and 180 days for the remaining metals, were met.

- Tune: As per the DoD QSM, the mass calibrations were ≤0.1 atomic mass unit (amu) of the true value, resolution was <0.9 amu full width at 10% peak height, and %RSDs were ≤5%.

- Calibration: Correlation coefficients were ≥0.995. ICV recoveries were within 90-110%. Mercury CCV recoveries were within 80-120% and CCV recoveries for the remaining metals were within 90-110%. A low-level calibration check standard is required. The laboratory analyzed samples identified as "MRL" but recoveries were not reported on the summary form and true values were not listed in the raw data.

- Blanks: Potassium was reported in a bracketing CCB at -13.7 µg/L; therefore, potassium detected in UX04-EB-041615 was qualified as estimated, "J." Target analytes were not detected in the method blank, initial calibration blank (ICB) or continuing calibration blanks (CCBs).

- Interference Check Samples (ICSA/B): The laboratory did not provide a certificate of analysis for the ICSA solution. Some analytes were detected above the LOD in the ICSAs. As these analytes were detected in the site samples at concentrations >10× the ICSA detects, no

qualifications were applied. ICS solution A and AB recoveries were within the control limits of 80-120%.

- Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD): Recoveries and RPDs were within the control limits listed in Worksheet#28b of 80-120% and ≤20%, respectively.

- Laboratory Duplicates: No laboratory duplicate analyses were performed on a sample in these SDGs.

- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were performed on sample UX04-SB01-1.0, UX04-SB07-2.0, UX04-TR04-SO2-3.0, and UX04-SB15-0.5 for the 6020A analytes and on UX04-TR04-SO2-3.0 and UX04-SB15-0.5 for mercury. Results were not assessed with the native concentration exceeded the spike amount by more than 4×. Except as noted below, the recoveries and RPDs were within the control limits of 80-120% and ≤20%, respectively. Parent sample results listed in the table below were qualified as estimated, "J," for detects and, "UJ," for nondetects.

Parent Sample	Analyte	MS %R	MSD %R	RPD
UX04-SB01-1.0	Antimony	69%	72%	Acceptable
	Barium	Acceptable	74%	Acceptable
UX04-SB07-2.0	Antimony	Acceptable	40%	68%
	Copper	24%	74%	21%
	Chromium	Acceptable	79%	Acceptable
	Lead	Acceptable	149%	Acceptable
	Vanadium	73%	10%	21%
	Zinc	71%	Acceptable	Acceptable
UX04-TR04-SO2-3.0	Antimony	76%	78%	Acceptable
	Barium	29%	14%	Acceptable
	Calcium	71%	66%	Acceptable
	Cobalt	70%	67%	Acceptable
	Copper	73%	61%	Acceptable
	Lead	55%	49%	Acceptable
	Magnesium	62%	58%	Acceptable
	Strontium	71%	73%	Acceptable

Parent Sample	Analyte	MS %R	MSD %R	RPD
	Tin	68%	67%	Acceptable
	Nickel	Acceptable	77%	Acceptable
	Vanadium	Acceptable	78%	Acceptable
UX04-SB15-0.5	Aluminum	162%	156%	Acceptable
	Antimony	79%	79%	Acceptable
	Iron	133%	Acceptable	Acceptable
	Barium	Acceptable	137%	Acceptable

- Post Digestion Spike (PDS): PDS analyses were performed on sample UX04-SB01-1.0, UX04-SB07-2.0, UX04-TR04-SO2-3.0, and UX04-SB15-0.5 for the 6020A analytes. The PDS is only applicable to analytes with serial dilution results outside the control limit. The recoveries were within the control limits of 75-125%.

- Serial Dilution: A serial dilution analyses were performed on sample UX04-SB01-1.0, UX04-SB07-2.0, UX04-TR04-SO2-3.0, and UX04-SB15-0.5 for the 6020A analytes. Results were not assessed when the native concentration was less than 50× the detection limit (DL). The percent differences were within the control limit of ≤10%. Except as noted below, the %Ds were within the control limit of ≤10%. Parent sample results listed in the table below were qualified as estimated, “J,” for detects and, “UJ,” for nondetects.

Parent Sample	Analyte	%D
UX04-SB01-1.0	Copper	12%
	Nickel	11%
UX04-TR04-SO2-3.0	Calcium	13%
	Chromium	13%
	Copper	12%
	Iron	12%
	Magnesium	12%
	Manganese	11%
	Nickel	15%
	Potassium	12%
	Vanadium	13%

- Internal Standards: Internal standard (IS) intensities were reviewed for Full validation samples. As per the DoD QSM, the remaining intensities were within 30-120% of intensity of the IS in the initial calibration.

- Sample Result Verification: Calculations were verified and the sample results reported on the sample result summary were verified against the raw data for Full validation samples and QC samples. No transcription errors or calculation errors were noted. Sample result verification is not applicable for Standard validation samples. Detects below the LOQ were qualified as estimated, "J." Nondetects are valid to the LOD.

  Sample UX04-TR04-S02-3.0 was analyzed undiluted and at a 5× dilution. The reason for the dilution was not noted in the case narrative. Based on the results of the serial dilution of this sample, which indicated suppression of analyte signal, the reviewer rejected, “R,” all results above the LOQ in the undiluted sample, in favor of the diluted results. All nondetected results and results below the reporting limit were retained in the undiluted sample, and those analytes were rejected, “R,” in the diluted sample.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

  - Field Blanks and Equipment Rinsates: Sample UX05-SB-040715 (SDG 15D040, CTO 0063) was the source water blank and sample UX04-EB-041615 was identified as the equipment blank associated with the site samples in SDG 15D114. The field QC samples had numerous detects, only one of which affected site sample results. Sodium was detected above the LOQ in the source water blank and equipment blank at 1760 and 1720 µg/L, respectively; therefore, sodium detected within 10× the amount in the source water blank was qualified as nondetected, “U,” at the levels of contamination. All samples in SDG 15D114 except UX04-SB10-1.0 were qualified.

  - Field Duplicates: There were no field duplicate samples identified in this SDG.

3. EPA METHODS 6850 and 7199—Perchlorate and Hexavalent Chromium

Reviewed By: P. Meeks
Date Reviewed: June 3, 2015

The samples listed in Table 1 for these analyses were validated based on the guidelines outlined in the *Sampling and Analysis Plan (Chemical Field Sampling Plan and Quality Assurance Project*

Plan), Remedial Investigation, Munitions Response Program Site UXO4, Naval Station Weapons Station Seal Beach, Detachment Fallbrook, Fallbrook, California (2015), *United States Department of Defense (DoD) Quality System Manual (QSM) for Environmental Laboratories, Version 4.2* (2010), *United States Department of the Navy Environmental Work Instruction No. 1: "Chemical Data Validation"* (2001), *National Functional Guidelines for Inorganic Superfund Data Review* (2010), *EPA SW-846 Methods 6850* and *7199*.

Unless otherwise noted, control limits listed in the *Sampling and Analysis Plan* (SAP) were used to assess the data.

- Holding Times: The analytical holding times, 28 days for perchlorate and 30 days for soil hexavalent chromium, were met. The aqueous hexavalent chromium sample was analyzed with the 24-hour analytical holding time.

- Perchlorate Mass Calibration: As per the DoD QSM, the mass calibration of the perchlorate quantitation ion was within ±0.3 mass-to-charge ratio.

- Calibration: The correlation coefficients (r) were ≥0.995. ICV and the CCV recoveries were within the control limits of 80-120%. As per the DoD QSM the perchlorate interference check sample recoveries and the limit of detection standard recoveries were within ±30%.

- Blanks: Target compounds were not detected in the method blanks or CCBs.

- Laboratory Control Sample/Laboratory Control Sample Duplicate: Perchlorate recoveries and RPD were within the control limits of 80-120% and ≤15%, respectively. Hexavalent chromium recoveries were within the control limits of 80-120%.

- Laboratory Duplicates: Laboratory duplicate analyses were performed on samples UX04-TR04-S02-3.0 and UX04-SB15-0.5 for hexavalent chromium. Hexavalent chromium was not detected in UX04-SB15-0.5 or its laboratory duplicate. Hexavalent chromium was detected below the LOD in UX04-TR04-SO203.0, but was not detected in the laboratory duplicate. These results were considered acceptable.

- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were performed on samples UX04-TR04-S02-3.0 and UX04-SB15-0.5 for perchlorate. Matrix spike analyses were performed on the same samples for hexavalent chromium. Perchlorate recoveries for both MS/MSD pairs and the RPD for UX04-TR04-SO2-3.0 were within the control limits of 80-120% and ≤15%, respectively. The RPD for UX04-SB15-0.5 nominally exceeded the control limit at 16%; therefore, nondetected perchlorate in the parent sample was qualified as estimated, "UJ." Hexavalent chromium recoveries were within the control limits of 75-125%. Although the laboratory analyzed both soluble and insoluble hexavalent chromium MS/MSDs, only the soluble results were reported.

- Perchlorate Internal Standard: The internal standard results were reviewed for Full validation samples. As per the DoD QSM, the intensities were within ±50% of the average initial calibration area counts and the relative retention times were within 0.98 - 1.02.

- Perchlorate Isotope Ratios: The isotope ratios were reviewed for Full validation samples; however, as perchlorate was not detected in the Full validation samples, review of the isotope ratio was not applicable. The ratio was checked for the MS/MSDs and, as per the DoD QSM, the $^{35}Cl/^{37}Cl$ ratios were within 2.3 - 3.8.

- Sample Result Verification: Calculations were verified and the sample results reported on the sample result summary were verified against the raw data for Full validation and QC samples. No transcription or calculation errors were noted. Verification is not applicable to Standard validation samples. Detects below the LOQ were qualified as estimated, "J." Nondetects are valid to the LOD.

  Due to its dark color, hexavalent chromium for sample UX04-SB04-0.33 was analyzed at a 5× dilution.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

  - Field Blanks and Equipment Rinsates: Sample UX05-SB-040715 (SDG 15D040, CTO 0063) was the source water blank and sample UX04-EB-041615 was identified as the equipment blank associated with the site samples in SDG 15D114. There were no detects in the field QC samples.

  - Field Duplicates: There were no field duplicate samples identified in this SDG.

Validated Sample Result Forms: 15D027

Analysis Method SW6020A

Sample Name UXO4-SB01-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/10

Analysis Time 17:21:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	14700	108	10.8	21.7	mg/kg			
ANTIMONY	7440-36-0	0.134	0.541	0.108	0.217	mg/kg	J	J	08
ARSENIC	7440-38-2	1.97	0.541	0.0541	0.108	mg/kg			
BARIUM	7440-39-3	96.1	0.541	0.0780	0.108	mg/kg		J	08
BERYLLIUM	7440-41-7	0.265	0.541	0.0541	0.108	mg/kg	J	J	
CADMIUM	7440-43-9	0.151	0.541	0.0617	0.108	mg/kg	J	J	
CALCIUM	7440-70-2	2190	108	18.4	21.7	mg/kg			
CHROMIUM	7440-47-3	11.6	0.541	0.0541	0.108	mg/kg			
COBALT	7440-48-4	5.39	0.541	0.0541	0.108	mg/kg			
COPPER	7440-50-8	8.13	0.541	0.108	0.217	mg/kg		J	16
IRON	7439-89-6	19600	108	5.41	10.8	mg/kg			
LEAD	7439-92-1	6.72	0.541	0.0541	0.108	mg/kg			
MAGNESIUM	7439-95-4	3620	108	10.8	21.7	mg/kg			
MANGANESE	7439-96-5	181	0.541	0.166	0.217	mg/kg			
MOLYBDENUM	7439-98-7	0.321	0.541	0.108	0.217	mg/kg	J	J	
NICKEL	7440-02-0	4.48	0.541	0.0682	0.108	mg/kg		J	16
POTASSIUM	7440-09-7	2450	108	10.8	21.7	mg/kg			
SELENIUM	7782-49-2	0.0715	0.541	0.0541	0.108	mg/kg	J	J	
SILVER	7440-22-4	0.108	0.541	0.0541	0.108	mg/kg	U	U	
SODIUM	7440-23-5	159	108	10.8	21.7	mg/kg			
STRONTIUM	7440-24-6	17.3	0.541	0.0541	0.108	mg/kg			
THALLIUM	7440-28-0	0.270	0.541	0.0541	0.108	mg/kg	J	J	
TIN	7440-31-5	10.8	21.7	5.41	10.8	mg/kg	U	U	
VANADIUM	7440-62-2	47.7	0.541	0.206	0.271	mg/kg			
ZINC	7440-66-6	34.3	2.17	0.740	1.08	mg/kg			

Analysis Method SW6850

Sample Name UXO4-SB01-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/08

Analysis Time 14:45:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
PERCHLORATE	14797-73-0	2.21	4.42	0.552	2.21	ug/kg	U	U	

Analysis Method SW7199

Sample Name UXO4-SB01-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/08

Analysis Time 18:20:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
HEXAVALENT CHROMIUM	18540-29-9	144	110	14.4	44.2	ug/kg			

Analysis Method SW7471A

Sample Name UXO4-SB01-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/06

Analysis Time 17:12:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
MERCURY	7439-97-6	0.0171	0.11	0.011	0.022	mg/kg	J	J	

Analysis Method SW8330A

Sample Name UXO4-SB01-1.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/09

Analysis Time 23:06:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Validated Sample Result Forms: 15D041

Analysis Method SW6020A

Sample Name UXO4-SB02-0.83 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/13

Analysis Time 17:51:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	8570	99.1	9.91	19.8	mg/kg			
ANTIMONY	7440-36-0	0.178	0.495	0.0991	0.198	mg/kg	J	J	
ARSENIC	7440-38-2	1.46	0.495	0.0495	0.0991	mg/kg			
BARIUM	7440-39-3	72.4	0.495	0.0713	0.0991	mg/kg			
BERYLLIUM	7440-41-7	0.200	0.495	0.0495	0.0991	mg/kg	J	J	
CADMIUM	7440-43-9	0.166	0.495	0.0565	0.0991	mg/kg	J	J	
CALCIUM	7440-70-2	1000	99.1	16.8	19.8	mg/kg			
CHROMIUM	7440-47-3	9.12	0.495	0.0495	0.0991	mg/kg			
COBALT	7440-48-4	5.30	0.495	0.0495	0.0991	mg/kg			
COPPER	7440-50-8	8.34	0.495	0.0991	0.198	mg/kg			
IRON	7439-89-6	13500	99.1	4.95	9.91	mg/kg			
LEAD	7439-92-1	10.6	0.495	0.0495	0.0991	mg/kg			
MAGNESIUM	7439-95-4	2570	99.1	9.91	19.8	mg/kg			
MANGANESE	7439-96-5	233	0.495	0.152	0.198	mg/kg			
MOLYBDENUM	7439-98-7	0.416	0.495	0.0991	0.198	mg/kg	J	J	
NICKEL	7440-02-0	3.83	0.495	0.0624	0.0991	mg/kg			
POTASSIUM	7440-09-7	2230	99.1	9.91	19.8	mg/kg			
SELENIUM	7782-49-2	0.111	0.495	0.0495	0.0991	mg/kg	J	J	
SILVER	7440-22-4	0.0991	0.495	0.0495	0.0991	mg/kg	U	U	
SODIUM	7440-23-5	110	99.1	9.91	19.8	mg/kg			
STRONTIUM	7440-24-6	9.14	0.495	0.0495	0.0991	mg/kg			
THALLIUM	7440-28-0	0.247	0.495	0.0495	0.0991	mg/kg	J	J	
TIN	7440-31-5	9.91	19.8	4.95	9.91	mg/kg	U	U	
VANADIUM	7440-62-2	35.2	0.495	0.188	0.248	mg/kg			
ZINC	7440-66-6	25.9	1.98	0.677	0.991	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB03-0.08 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/13

Analysis Time 17:55:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	8510	99.4	9.94	19.9	mg/kg			
ANTIMONY	7440-36-0	0.126	0.497	0.0994	0.199	mg/kg	J	J	
ARSENIC	7440-38-2	1.53	0.497	0.0497	0.0994	mg/kg			
BARIUM	7440-39-3	67.3	0.497	0.0716	0.0994	mg/kg			
BERYLLIUM	7440-41-7	0.172	0.497	0.0497	0.0994	mg/kg	J	J	
CADMIUM	7440-43-9	0.152	0.497	0.0566	0.0994	mg/kg	J	J	
CALCIUM	7440-70-2	1460	99.4	16.9	19.9	mg/kg			
CHROMIUM	7440-47-3	9.78	0.497	0.0497	0.0994	mg/kg			
COBALT	7440-48-4	5.22	0.497	0.0497	0.0994	mg/kg			
COPPER	7440-50-8	24.1	0.497	0.0994	0.199	mg/kg			
IRON	7439-89-6	15800	99.4	4.97	9.94	mg/kg			
LEAD	7439-92-1	21.8	0.497	0.0497	0.0994	mg/kg			
MAGNESIUM	7439-95-4	2420	99.4	9.94	19.9	mg/kg			
MANGANESE	7439-96-5	178	0.497	0.152	0.199	mg/kg			
MOLYBDENUM	7439-98-7	0.230	0.497	0.0994	0.199	mg/kg	J	J	
NICKEL	7440-02-0	3.40	0.497	0.0626	0.0994	mg/kg			
POTASSIUM	7440-09-7	1800	99.4	9.94	19.9	mg/kg			
SELENIUM	7782-49-2	0.0736	0.497	0.0497	0.0994	mg/kg	J	J	
SILVER	7440-22-4	0.0994	0.497	0.0497	0.0994	mg/kg	U	U	
SODIUM	7440-23-5	102	99.4	9.94	19.9	mg/kg			
STRONTIUM	7440-24-6	11.2	0.497	0.0497	0.0994	mg/kg			
THALLIUM	7440-28-0	0.181	0.497	0.0497	0.0994	mg/kg	J	J	
TIN	7440-31-5	6.98	19.9	4.97	9.94	mg/kg	J	J	
VANADIUM	7440-62-2	41.2	0.497	0.189	0.248	mg/kg			
ZINC	7440-66-6	47.6	1.99	0.679	0.994	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB04-0.33 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/13

Analysis Time 18:00:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	9880	101	10.1	20.2	mg/kg			
ANTIMONY	7440-36-0	0.135	0.506	0.101	0.202	mg/kg	J	J	
ARSENIC	7440-38-2	1.42	0.506	0.0506	0.101	mg/kg			
BARIUM	7440-39-3	125	0.506	0.0728	0.101	mg/kg			
BERYLLIUM	7440-41-7	0.208	0.506	0.0506	0.101	mg/kg	J	J	
CADMIUM	7440-43-9	0.282	0.506	0.0576	0.101	mg/kg	J	J	
CALCIUM	7440-70-2	3600	101	17.2	20.2	mg/kg			
CHROMIUM	7440-47-3	9.62	0.506	0.0506	0.101	mg/kg			
COBALT	7440-48-4	7.70	0.506	0.0506	0.101	mg/kg			
COPPER	7440-50-8	11.6	0.506	0.101	0.202	mg/kg			
IRON	7439-89-6	16600	101	5.06	10.1	mg/kg			
LEAD	7439-92-1	6.02	0.506	0.0506	0.101	mg/kg			
MAGNESIUM	7439-95-4	3430	101	10.1	20.2	mg/kg			
MANGANESE	7439-96-5	451	0.506	0.155	0.202	mg/kg			
MOLYBDENUM	7439-98-7	0.541	0.506	0.101	0.202	mg/kg			
NICKEL	7440-02-0	4.03	0.506	0.0637	0.101	mg/kg			
POTASSIUM	7440-09-7	2720	101	10.1	20.2	mg/kg			
SELENIUM	7782-49-2	0.122	0.506	0.0506	0.101	mg/kg	J	J	
SILVER	7440-22-4	0.101	0.506	0.0506	0.101	mg/kg	U	U	
SODIUM	7440-23-5	129	101	10.1	20.2	mg/kg			
STRONTIUM	7440-24-6	24.7	0.506	0.0506	0.101	mg/kg			
THALLIUM	7440-28-0	0.207	0.506	0.0506	0.101	mg/kg	J	J	
TIN	7440-31-5	10.1	20.2	5.06	10.1	mg/kg	U	U	
VANADIUM	7440-62-2	49.5	0.506	0.192	0.253	mg/kg			
ZINC	7440-66-6	44.2	2.02	0.691	1.01	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB05-0.33 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/13

Analysis Time 18:04:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	8790	102	10.2	20.4	mg/kg			
ANTIMONY	7440-36-0	0.274	0.509	0.102	0.204	mg/kg	J	J	
ARSENIC	7440-38-2	1.61	0.509	0.0509	0.102	mg/kg			
BARIUM	7440-39-3	62.0	0.509	0.0733	0.102	mg/kg			
BERYLLIUM	7440-41-7	0.160	0.509	0.0509	0.102	mg/kg	J	J	
CADMIUM	7440-43-9	0.145	0.509	0.0580	0.102	mg/kg	J	J	
CALCIUM	7440-70-2	1260	102	17.3	20.4	mg/kg			
CHROMIUM	7440-47-3	10.8	0.509	0.0509	0.102	mg/kg			
COBALT	7440-48-4	4.80	0.509	0.0509	0.102	mg/kg			
COPPER	7440-50-8	18.7	0.509	0.102	0.204	mg/kg			
IRON	7439-89-6	20800	102	5.09	10.2	mg/kg			
LEAD	7439-92-1	45.7	0.509	0.0509	0.102	mg/kg			
MAGNESIUM	7439-95-4	2290	102	10.2	20.4	mg/kg			
MANGANESE	7439-96-5	159	0.509	0.156	0.204	mg/kg			
MOLYBDENUM	7439-98-7	0.336	0.509	0.102	0.204	mg/kg	J	J	
NICKEL	7440-02-0	3.96	0.509	0.0641	0.102	mg/kg			
POTASSIUM	7440-09-7	1480	102	10.2	20.4	mg/kg			
SELENIUM	7782-49-2	0.0720	0.509	0.0509	0.102	mg/kg	J	J	
SILVER	7440-22-4	0.102	0.509	0.0509	0.102	mg/kg	U	U	
SODIUM	7440-23-5	94.4	102	10.2	20.4	mg/kg	J	J	
STRONTIUM	7440-24-6	9.04	0.509	0.0509	0.102	mg/kg			
THALLIUM	7440-28-0	0.154	0.509	0.0509	0.102	mg/kg	J	J	
TIN	7440-31-5	14.3	20.4	5.09	10.2	mg/kg	J	J	
VANADIUM	7440-62-2	53.6	0.509	0.193	0.254	mg/kg			
ZINC	7440-66-6	44.6	2.04	0.695	1.02	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB06-0.42 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/13

Analysis Time 18:08:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	7360	97.6	9.76	19.5	mg/kg			
ANTIMONY	7440-36-0	0.137	0.488	0.0976	0.195	mg/kg	J	J	
ARSENIC	7440-38-2	1.23	0.488	0.0488	0.0976	mg/kg			
BARIUM	7440-39-3	66.8	0.488	0.0703	0.0976	mg/kg			
BERYLLIUM	7440-41-7	0.142	0.488	0.0488	0.0976	mg/kg	J	J	
CADMIUM	7440-43-9	0.139	0.488	0.0556	0.0976	mg/kg	J	J	
CALCIUM	7440-70-2	1160	97.6	16.6	19.5	mg/kg			
CHROMIUM	7440-47-3	9.04	0.488	0.0488	0.0976	mg/kg			
COBALT	7440-48-4	4.76	0.488	0.0488	0.0976	mg/kg			
COPPER	7440-50-8	58.4	0.488	0.0976	0.195	mg/kg			
IRON	7439-89-6	15900	97.6	4.88	9.76	mg/kg			
LEAD	7439-92-1	18.2	0.488	0.0488	0.0976	mg/kg			
MAGNESIUM	7439-95-4	2240	97.6	9.76	19.5	mg/kg			
MANGANESE	7439-96-5	197	0.488	0.149	0.195	mg/kg			
MOLYBDENUM	7439-98-7	0.396	0.488	0.0976	0.195	mg/kg	J	J	
NICKEL	7440-02-0	3.08	0.488	0.0615	0.0976	mg/kg			
POTASSIUM	7440-09-7	2020	97.6	9.76	19.5	mg/kg			
SELENIUM	7782-49-2	0.0615	0.488	0.0488	0.0976	mg/kg	J	J	
SILVER	7440-22-4	0.0976	0.488	0.0488	0.0976	mg/kg	U	U	
SODIUM	7440-23-5	71.6	97.6	9.76	19.5	mg/kg	J	J	
STRONTIUM	7440-24-6	8.65	0.488	0.0488	0.0976	mg/kg			
THALLIUM	7440-28-0	0.161	0.488	0.0488	0.0976	mg/kg	J	J	
TIN	7440-31-5	5.87	19.5	4.88	9.76	mg/kg	J	J	
VANADIUM	7440-62-2	38.9	0.488	0.185	0.244	mg/kg			
ZINC	7440-66-6	36.3	1.95	0.666	0.976	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB07-2.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/13

Analysis Time 18:38:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	11900	106	10.6	21.2	mg/kg			
ANTIMONY	7440-36-0	0.309	0.530	0.106	0.212	mg/kg	J	J	08; 09
ARSENIC	7440-38-2	1.56	0.530	0.0530	0.106	mg/kg			
BARIUM	7440-39-3	110	0.530	0.0764	0.106	mg/kg			
BERYLLIUM	7440-41-7	0.108	0.530	0.0530	0.106	mg/kg	J	J	
CADMIUM	7440-43-9	0.157	0.530	0.0605	0.106	mg/kg	J	J	
CALCIUM	7440-70-2	2400	106	18.0	21.2	mg/kg			
CHROMIUM	7440-47-3	11.4	0.530	0.0530	0.106	mg/kg		J	08
COBALT	7440-48-4	7.05	0.530	0.0530	0.106	mg/kg			
COPPER	7440-50-8	53.0	0.530	0.106	0.212	mg/kg		J	08; 09
IRON	7439-89-6	34400	106	5.30	10.6	mg/kg			
LEAD	7439-92-1	51.2	0.530	0.0530	0.106	mg/kg		J	08
MAGNESIUM	7439-95-4	4100	106	10.6	21.2	mg/kg			
MANGANESE	7439-96-5	198	0.530	0.162	0.212	mg/kg			
MOLYBDENUM	7439-98-7	0.395	0.530	0.106	0.212	mg/kg	J	J	
NICKEL	7440-02-0	4.00	0.530	0.0668	0.106	mg/kg			
POTASSIUM	7440-09-7	1940	106	10.6	21.2	mg/kg			
SELENIUM	7782-49-2	0.0669	0.530	0.0530	0.106	mg/kg	J	J	
SILVER	7440-22-4	0.106	0.530	0.0530	0.106	mg/kg	U	U	
SODIUM	7440-23-5	183	106	10.6	21.2	mg/kg			
STRONTIUM	7440-24-6	13.0	0.530	0.0530	0.106	mg/kg			
THALLIUM	7440-28-0	0.0965	0.530	0.0530	0.106	mg/kg	J	J	
TIN	7440-31-5	6.86	21.2	5.30	10.6	mg/kg	J	J	
VANADIUM	7440-62-2	71.4	0.530	0.202	0.265	mg/kg		J	08; 09
ZINC	7440-66-6	81.2	2.12	0.724	1.06	mg/kg		J	08

Analysis Method SW6850

Sample Name UXO4-SB02-0.83 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/16									
Analysis Time 12:12:00									
PERCHLORATE	14797-73-0	2.02	4.04	0.506	2.02	ug/kg	U	U	

Sample Name UXO4-SB03-0.08 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/16									
Analysis Time 12:26:00									
PERCHLORATE	14797-73-0	2.05	4.09	0.512	2.05	ug/kg	U	U	

Sample Name UXO4-SB04-0.33 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/16									
Analysis Time 12:41:00									
PERCHLORATE	14797-73-0	2.04	4.09	0.511	2.04	ug/kg	U	U	

Sample Name UXO4-SB05-0.33 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/16									
Analysis Time 12:55:00									
PERCHLORATE	14797-73-0	2.1	4.19	0.524	2.1	ug/kg	U	U	

Sample Name UXO4-SB06-0.42 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/16									
Analysis Time 01:10:00									
PERCHLORATE	14797-73-0	2.02	4.04	0.505	2.02	ug/kg	U	U	

Sample Name UXO4-SB07-2.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/16									
Analysis Time 01:24:00									
PERCHLORATE	14797-73-0	2.16	4.33	0.541	2.16	ug/kg	U	U	

Analysis Method SW7199

Sample Name UXO4-SB02-0.83 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/15									
Analysis Time 00:47:00									
HEXAVALENT CHROMIUM	18540-29-9	40.4	101	13.1	40.4	ug/kg	U	U	

Sample Name UXO4-SB03-0.08 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/15									
Analysis Time 01:08:00									
HEXAVALENT CHROMIUM	18540-29-9	40.9	102	13.3	40.9	ug/kg	U	U	

Sample Name UXO4-SB04-0.33 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/15									
Analysis Time 03:03:00									
HEXAVALENT CHROMIUM	18540-29-9	204	511	66.4	204	ug/kg	U	U	

Sample Name UXO4-SB05-0.33 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/15									
Analysis Time 02:00:00									
HEXAVALENT CHROMIUM	18540-29-9	41.9	105	13.6	41.9	ug/kg	U	U	

Sample Name UXO4-SB06-0.42 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/15									
Analysis Time 02:21:00									
HEXAVALENT CHROMIUM	18540-29-9	40.4	101	13.1	40.4	ug/kg	U	U	

Sample Name UXO4-SB07-2.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/15									
Analysis Time 02:42:00									
HEXAVALENT CHROMIUM	18540-29-9	43.3	108	14.1	43.3	ug/kg	U	U	

Analysis Method SW7471A

Sample Name UXO4-SB02-0.83 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/09

Analysis Time 16:25:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
MERCURY	7439-97-6	0.0185	0.101	0.0101	0.0202	mg/kg	J	J	

Sample Name UXO4-SB03-0.08 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/09

Analysis Time 16:27:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
MERCURY	7439-97-6	0.0202	0.101	0.0101	0.0202	mg/kg	U	U	

Sample Name UXO4-SB04-0.33 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/09

Analysis Time 16:30:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
MERCURY	7439-97-6	0.0204	0.102	0.0102	0.0204	mg/kg	U	U	

Sample Name UXO4-SB05-0.33 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/09

Analysis Time 16:32:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
MERCURY	7439-97-6	0.0111	0.104	0.0104	0.0208	mg/kg	J	J	

Sample Name UXO4-SB06-0.42 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/09

Analysis Time 16:40:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
MERCURY	7439-97-6	0.0132	0.1	0.01	0.0201	mg/kg	J	J	

Sample Name UXO4-SB07-2.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/09

Analysis Time 16:42:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
MERCURY	7439-97-6	0.0425	0.108	0.0108	0.0215	mg/kg	J	J	

Analysis Method SW8330A

Sample Name UXO4-SB02-0.83 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/14

Analysis Time 23:19:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Sample Name UXO4-SB03-0.08 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/15

Analysis Time 01:04:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Analysis Method SW8330A

Sample Name UXO4-SB04-0.33 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/15

Analysis Time 01:39:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	500	500	500	500	ug/kg	U	U	23
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	200	400	200	200	ug/kg	U	U	23
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Sample Name UXO4-SB05-0.33 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/15

Analysis Time 02:49:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Analysis Method SW8330A

Sample Name UXO4-SB06-0.42 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/15

Analysis Time 03:24:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Sample Name UXO4-SB07-2.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/15

Analysis Time 03:59:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Validated Sample Result Forms: 15D114

Analysis Method SW6020A

Sample Name UXO4-EB-041615 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 16:17:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	20.0	100	10.0	20.0	ug/L	U	U	
ANTIMONY	7440-36-0	0.500	1.00	0.250	0.500	ug/L	U	U	
ARSENIC	7440-38-2	0.200	1.00	0.100	0.200	ug/L	U	U	
BARIUM	7440-39-3	0.807	1.00	0.250	0.500	ug/L	J	J	
BERYLLIUM	7440-41-7	0.100	1.00	0.0500	0.100	ug/L	U	U	
CADMIUM	7440-43-9	0.200	1.00	0.100	0.200	ug/L	U	U	
CALCIUM	7440-70-2	441	100	13.0	25.0	ug/L			
CHROMIUM	7440-47-3	0.326	1.00	0.100	0.200	ug/L	J	J	
COBALT	7440-48-4	0.200	1.00	0.100	0.200	ug/L	U	U	
COPPER	7440-50-8	0.360	1.00	0.250	0.500	ug/L	J	J	
IRON	7439-89-6	21.9	100	5.00	10.0	ug/L	J	J	
LEAD	7439-92-1	0.0623	1.00	0.0500	0.100	ug/L	J	J	
MAGNESIUM	7439-95-4	185	100	5.00	10.0	ug/L			
MANGANESE	7439-96-5	0.553	1.00	0.100	0.200	ug/L	J	J	
MOLYBDENUM	7439-98-7	0.500	2.00	0.250	0.500	ug/L	U	U	
NICKEL	7440-02-0	0.344	1.00	0.100	0.200	ug/L	J	J	
POTASSIUM	7440-09-7	41.5	100	10.0	20.0	ug/L	J	J	07
SELENIUM	7782-49-2	0.300	1.00	0.150	0.300	ug/L	U	U	
SILVER	7440-22-4	0.200	1.00	0.100	0.200	ug/L	U	U	
SODIUM	7440-23-5	1720	100	25.0	50.0	ug/L			
STRONTIUM	7440-24-6	2.53	2.00	0.500	1.00	ug/L			
THALLIUM	7440-28-0	0.200	1.00	0.100	0.200	ug/L	U	U	
TIN	7440-31-5	0.200	1.00	0.100	0.200	ug/L	U	U	
VANADIUM	7440-62-2	0.500	1.00	0.250	0.500	ug/L	U	U	
ZINC	7440-66-6	6.30	20.0	5.00	10.0	ug/L	J	J	

Analysis Method SW6020A

Sample Name UXO4-SB08-8.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 14:49:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	11500	108	10.8	21.6	mg/kg			
ANTIMONY	7440-36-0	0.216	0.539	0.108	0.216	mg/kg	U	U	
ARSENIC	7440-38-2	1.51	0.539	0.0539	0.108	mg/kg			
BARIUM	7440-39-3	95.8	0.539	0.0777	0.108	mg/kg			
BERYLLIUM	7440-41-7	0.195	0.539	0.0539	0.108	mg/kg	J	J	
CADMIUM	7440-43-9	0.193	0.539	0.0615	0.108	mg/kg	J	J	
CALCIUM	7440-70-2	1580	108	18.3	21.6	mg/kg			
CHROMIUM	7440-47-3	11.6	0.539	0.0539	0.108	mg/kg			
COBALT	7440-48-4	6.40	0.539	0.0539	0.108	mg/kg			
COPPER	7440-50-8	6.51	0.539	0.108	0.216	mg/kg			
IRON	7439-89-6	19400	108	5.39	10.8	mg/kg			
LEAD	7439-92-1	2.69	0.539	0.0539	0.108	mg/kg			
MAGNESIUM	7439-95-4	4060	108	10.8	21.6	mg/kg			
MANGANESE	7439-96-5	162	0.539	0.165	0.216	mg/kg			
MOLYBDENUM	7439-98-7	0.131	0.539	0.108	0.216	mg/kg	J	J	
NICKEL	7440-02-0	3.78	0.539	0.0679	0.108	mg/kg			
POTASSIUM	7440-09-7	2140	108	10.8	21.6	mg/kg			
SELENIUM	7782-49-2	0.0674	0.539	0.0539	0.108	mg/kg	J	J	
SILVER	7440-22-4	0.108	0.539	0.0539	0.108	mg/kg	U	U	
SODIUM	7440-23-5	137	108	10.8	21.6	mg/kg		U	06
STRONTIUM	7440-24-6	11.2	0.539	0.0539	0.108	mg/kg			
THALLIUM	7440-28-0	0.299	0.539	0.0539	0.108	mg/kg	J	J	
TIN	7440-31-5	10.8	21.6	5.39	10.8	mg/kg	U	U	
VANADIUM	7440-62-2	46.1	0.539	0.205	0.270	mg/kg			
ZINC	7440-66-6	26.4	2.16	0.737	1.08	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB09-6.6 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 14:53:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	16100	124	12.4	24.8	mg/kg			
ANTIMONY	7440-36-0	0.283	0.620	0.124	0.248	mg/kg	J	J	
ARSENIC	7440-38-2	2.57	0.620	0.0620	0.124	mg/kg			
BARIUM	7440-39-3	124	0.620	0.0893	0.124	mg/kg			
BERYLLIUM	7440-41-7	0.288	0.620	0.0620	0.124	mg/kg	J	J	
CADMIUM	7440-43-9	0.246	0.620	0.0707	0.124	mg/kg	J	J	
CALCIUM	7440-70-2	1900	124	21.1	24.8	mg/kg			
CHROMIUM	7440-47-3	16.4	0.620	0.0620	0.124	mg/kg			
COBALT	7440-48-4	7.80	0.620	0.0620	0.124	mg/kg			
COPPER	7440-50-8	11.1	0.620	0.124	0.248	mg/kg			
IRON	7439-89-6	29300	124	6.20	12.4	mg/kg			
LEAD	7439-92-1	27.7	0.620	0.0620	0.124	mg/kg			
MAGNESIUM	7439-95-4	4890	124	12.4	24.8	mg/kg			
MANGANESE	7439-96-5	219	0.620	0.190	0.248	mg/kg			
MOLYBDENUM	7439-98-7	0.355	0.620	0.124	0.248	mg/kg	J	J	
NICKEL	7440-02-0	5.46	0.620	0.0781	0.124	mg/kg			
POTASSIUM	7440-09-7	2090	124	12.4	24.8	mg/kg			
SELENIUM	7782-49-2	0.110	0.620	0.0620	0.124	mg/kg	J	J	
SILVER	7440-22-4	0.124	0.620	0.0620	0.124	mg/kg	U	U	
SODIUM	7440-23-5	156	124	12.4	24.8	mg/kg		U	06
STRONTIUM	7440-24-6	14.3	0.620	0.0620	0.124	mg/kg			
THALLIUM	7440-28-0	0.316	0.620	0.0620	0.124	mg/kg	J	J	
TIN	7440-31-5	10.9	24.8	6.20	12.4	mg/kg	J	J	
VANADIUM	7440-62-2	68.3	0.620	0.236	0.310	mg/kg			
ZINC	7440-66-6	72.0	2.48	0.847	1.24	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB10-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 14:57:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	17700	103	10.3	20.7	mg/kg			
ANTIMONY	7440-36-0	0.108	0.517	0.103	0.207	mg/kg	J	J	
ARSENIC	7440-38-2	2.78	0.517	0.0517	0.103	mg/kg			
BARIUM	7440-39-3	175	0.517	0.0745	0.103	mg/kg			
BERYLLIUM	7440-41-7	0.338	0.517	0.0517	0.103	mg/kg	J	J	
CADMIUM	7440-43-9	0.251	0.517	0.0590	0.103	mg/kg	J	J	
CALCIUM	7440-70-2	6960	103	17.6	20.7	mg/kg			
CHROMIUM	7440-47-3	15.7	0.517	0.0517	0.103	mg/kg			
COBALT	7440-48-4	5.89	0.517	0.0517	0.103	mg/kg			
COPPER	7440-50-8	5.34	0.517	0.103	0.207	mg/kg			
IRON	7439-89-6	21200	103	5.17	10.3	mg/kg			
LEAD	7439-92-1	3.60	0.517	0.0517	0.103	mg/kg			
MAGNESIUM	7439-95-4	5090	103	10.3	20.7	mg/kg			
MANGANESE	7439-96-5	94.4	0.517	0.158	0.207	mg/kg			
MOLYBDENUM	7439-98-7	0.108	0.517	0.103	0.207	mg/kg	J	J	
NICKEL	7440-02-0	5.65	0.517	0.0652	0.103	mg/kg			
POTASSIUM	7440-09-7	1440	103	10.3	20.7	mg/kg			
SELENIUM	7782-49-2	0.106	0.517	0.0517	0.103	mg/kg	J	J	
SILVER	7440-22-4	0.103	0.517	0.0517	0.103	mg/kg	U	U	
SODIUM	7440-23-5	474	103	10.3	20.7	mg/kg		U	06
STRONTIUM	7440-24-6	25.8	0.517	0.0517	0.103	mg/kg			
THALLIUM	7440-28-0	0.305	0.517	0.0517	0.103	mg/kg	J	J	
TIN	7440-31-5	10.3	20.7	5.17	10.3	mg/kg	U	U	
VANADIUM	7440-62-2	56.0	0.517	0.197	0.259	mg/kg			
ZINC	7440-66-6	23.5	2.07	0.706	1.03	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB10-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 15:15:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	21200	107	10.7	21.3	mg/kg			
ANTIMONY	7440-36-0	0.123	0.534	0.107	0.213	mg/kg	J	J	
ARSENIC	7440-38-2	3.99	0.534	0.0534	0.107	mg/kg			
BARIUM	7440-39-3	91.3	0.534	0.0769	0.107	mg/kg			
BERYLLIUM	7440-41-7	0.388	0.534	0.0534	0.107	mg/kg	J	J	
CADMIUM	7440-43-9	0.366	0.534	0.0608	0.107	mg/kg	J	J	
CALCIUM	7440-70-2	2150	107	18.1	21.3	mg/kg			
CHROMIUM	7440-47-3	17.7	0.534	0.0534	0.107	mg/kg			
COBALT	7440-48-4	7.98	0.534	0.0534	0.107	mg/kg			
COPPER	7440-50-8	7.12	0.534	0.107	0.213	mg/kg			
IRON	7439-89-6	24900	107	5.34	10.7	mg/kg			
LEAD	7439-92-1	3.30	0.534	0.0534	0.107	mg/kg			
MAGNESIUM	7439-95-4	5930	107	10.7	21.3	mg/kg			
MANGANESE	7439-96-5	89.9	0.534	0.163	0.213	mg/kg			
MOLYBDENUM	7439-98-7	0.213	0.534	0.107	0.213	mg/kg	U	U	
NICKEL	7440-02-0	5.93	0.534	0.0672	0.107	mg/kg			
POTASSIUM	7440-09-7	1340	107	10.7	21.3	mg/kg			
SELENIUM	7782-49-2	0.131	0.534	0.0534	0.107	mg/kg	J	J	
SILVER	7440-22-4	0.107	0.534	0.0534	0.107	mg/kg	U	U	
SODIUM	7440-23-5	1050	107	10.7	21.3	mg/kg			
STRONTIUM	7440-24-6	25.0	0.534	0.0534	0.107	mg/kg			
THALLIUM	7440-28-0	0.314	0.534	0.0534	0.107	mg/kg	J	J	
TIN	7440-31-5	10.7	21.3	5.34	10.7	mg/kg	U	U	
VANADIUM	7440-62-2	75.6	0.534	0.203	0.267	mg/kg			
ZINC	7440-66-6	25.9	2.13	0.729	1.07	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB11-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 15:19:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	9540	98.9	9.89	19.8	mg/kg			
ANTIMONY	7440-36-0	0.109	0.494	0.0989	0.198	mg/kg	J	J	
ARSENIC	7440-38-2	1.50	0.494	0.0494	0.0989	mg/kg			
BARIUM	7440-39-3	82.2	0.494	0.0712	0.0989	mg/kg			
BERYLLIUM	7440-41-7	0.196	0.494	0.0494	0.0989	mg/kg	J	J	
CADMIUM	7440-43-9	0.144	0.494	0.0564	0.0989	mg/kg	J	J	
CALCIUM	7440-70-2	1020	98.9	16.8	19.8	mg/kg			
CHROMIUM	7440-47-3	12.0	0.494	0.0494	0.0989	mg/kg			
COBALT	7440-48-4	6.05	0.494	0.0494	0.0989	mg/kg			
COPPER	7440-50-8	5.30	0.494	0.0989	0.198	mg/kg			
IRON	7439-89-6	16300	98.9	4.94	9.89	mg/kg			
LEAD	7439-92-1	3.54	0.494	0.0494	0.0989	mg/kg			
MAGNESIUM	7439-95-4	3030	98.9	9.89	19.8	mg/kg			
MANGANESE	7439-96-5	209	0.494	0.151	0.198	mg/kg			
MOLYBDENUM	7439-98-7	0.359	0.494	0.0989	0.198	mg/kg	J	J	
NICKEL	7440-02-0	4.54	0.494	0.0623	0.0989	mg/kg			
POTASSIUM	7440-09-7	2620	98.9	9.89	19.8	mg/kg			
SELENIUM	7782-49-2	0.116	0.494	0.0494	0.0989	mg/kg	J	J	
SILVER	7440-22-4	0.0989	0.494	0.0494	0.0989	mg/kg	U	U	
SODIUM	7440-23-5	94.0	98.9	9.89	19.8	mg/kg	J	U	06
STRONTIUM	7440-24-6	9.58	0.494	0.0494	0.0989	mg/kg			
THALLIUM	7440-28-0	0.275	0.494	0.0494	0.0989	mg/kg	J	J	
TIN	7440-31-5	9.89	19.8	4.94	9.89	mg/kg	U	U	
VANADIUM	7440-62-2	45.8	0.494	0.188	0.247	mg/kg			
ZINC	7440-66-6	23.8	1.98	0.675	0.989	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB11-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 15:23:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	15400	104	10.4	20.8	mg/kg			
ANTIMONY	7440-36-0	0.111	0.521	0.104	0.208	mg/kg	J	J	
ARSENIC	7440-38-2	2.09	0.521	0.0521	0.104	mg/kg			
BARIUM	7440-39-3	106	0.521	0.0750	0.104	mg/kg			
BERYLLIUM	7440-41-7	0.263	0.521	0.0521	0.104	mg/kg	J	J	
CADMIUM	7440-43-9	0.177	0.521	0.0594	0.104	mg/kg	J	J	
CALCIUM	7440-70-2	1410	104	17.7	20.8	mg/kg			
CHROMIUM	7440-47-3	15.2	0.521	0.0521	0.104	mg/kg			
COBALT	7440-48-4	6.62	0.521	0.0521	0.104	mg/kg			
COPPER	7440-50-8	5.17	0.521	0.104	0.208	mg/kg			
IRON	7439-89-6	22900	104	5.21	10.4	mg/kg			
LEAD	7439-92-1	3.29	0.521	0.0521	0.104	mg/kg			
MAGNESIUM	7439-95-4	4330	104	10.4	20.8	mg/kg			
MANGANESE	7439-96-5	184	0.521	0.159	0.208	mg/kg			
MOLYBDENUM	7439-98-7	0.429	0.521	0.104	0.208	mg/kg	J	J	
NICKEL	7440-02-0	5.36	0.521	0.0657	0.104	mg/kg			
POTASSIUM	7440-09-7	2300	104	10.4	20.8	mg/kg			
SELENIUM	7782-49-2	0.122	0.521	0.0521	0.104	mg/kg	J	J	
SILVER	7440-22-4	0.104	0.521	0.0521	0.104	mg/kg	U	U	
SODIUM	7440-23-5	159	104	10.4	20.8	mg/kg		U	06
STRONTIUM	7440-24-6	12.3	0.521	0.0521	0.104	mg/kg			
THALLIUM	7440-28-0	0.366	0.521	0.0521	0.104	mg/kg	J	J	
TIN	7440-31-5	10.4	20.8	5.21	10.4	mg/kg	U	U	
VANADIUM	7440-62-2	64.5	0.521	0.198	0.261	mg/kg			
ZINC	7440-66-6	28.9	2.08	0.712	1.04	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB12-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 15:27:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	7180	98.6	9.86	19.7	mg/kg			
ANTIMONY	7440-36-0	0.109	0.493	0.0986	0.197	mg/kg	J	J	
ARSENIC	7440-38-2	1.12	0.493	0.0493	0.0986	mg/kg			
BARIUM	7440-39-3	73.3	0.493	0.0710	0.0986	mg/kg			
BERYLLIUM	7440-41-7	0.166	0.493	0.0493	0.0986	mg/kg	J	J	
CADMIUM	7440-43-9	0.131	0.493	0.0562	0.0986	mg/kg	J	J	
CALCIUM	7440-70-2	1190	98.6	16.8	19.7	mg/kg			
CHROMIUM	7440-47-3	8.38	0.493	0.0493	0.0986	mg/kg			
COBALT	7440-48-4	4.95	0.493	0.0493	0.0986	mg/kg			
COPPER	7440-50-8	6.16	0.493	0.0986	0.197	mg/kg			
IRON	7439-89-6	11000	98.6	4.93	9.86	mg/kg			
LEAD	7439-92-1	5.28	0.493	0.0493	0.0986	mg/kg			
MAGNESIUM	7439-95-4	1930	98.6	9.86	19.7	mg/kg			
MANGANESE	7439-96-5	297	0.493	0.151	0.197	mg/kg			
MOLYBDENUM	7439-98-7	0.388	0.493	0.0986	0.197	mg/kg	J	J	
NICKEL	7440-02-0	3.60	0.493	0.0621	0.0986	mg/kg			
POTASSIUM	7440-09-7	2060	98.6	9.86	19.7	mg/kg			
SELENIUM	7782-49-2	0.114	0.493	0.0493	0.0986	mg/kg	J	J	
SILVER	7440-22-4	0.0986	0.493	0.0493	0.0986	mg/kg	U	U	
SODIUM	7440-23-5	60.0	98.6	9.86	19.7	mg/kg	J	U	06
STRONTIUM	7440-24-6	10.4	0.493	0.0493	0.0986	mg/kg			
THALLIUM	7440-28-0	0.202	0.493	0.0493	0.0986	mg/kg	J	J	
TIN	7440-31-5	9.86	19.7	4.93	9.86	mg/kg	U	U	
VANADIUM	7440-62-2	28.6	0.493	0.187	0.246	mg/kg			
ZINC	7440-66-6	20.9	1.97	0.673	0.986	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB12-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 15:31:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	7860	99.9	9.99	20.0	mg/kg			
ANTIMONY	7440-36-0	0.200	0.499	0.0999	0.200	mg/kg	U	U	
ARSENIC	7440-38-2	1.13	0.499	0.0499	0.0999	mg/kg			
BARIUM	7440-39-3	73.8	0.499	0.0719	0.0999	mg/kg			
BERYLLIUM	7440-41-7	0.188	0.499	0.0499	0.0999	mg/kg	J	J	
CADMIUM	7440-43-9	0.129	0.499	0.0569	0.0999	mg/kg	J	J	
CALCIUM	7440-70-2	1050	99.9	17.0	20.0	mg/kg			
CHROMIUM	7440-47-3	9.09	0.499	0.0499	0.0999	mg/kg			
COBALT	7440-48-4	5.09	0.499	0.0499	0.0999	mg/kg			
COPPER	7440-50-8	5.99	0.499	0.0999	0.200	mg/kg			
IRON	7439-89-6	12100	99.9	4.99	9.99	mg/kg			
LEAD	7439-92-1	2.55	0.499	0.0499	0.0999	mg/kg			
MAGNESIUM	7439-95-4	2130	99.9	9.99	20.0	mg/kg			
MANGANESE	7439-96-5	266	0.499	0.153	0.200	mg/kg			
MOLYBDENUM	7439-98-7	0.278	0.499	0.0999	0.200	mg/kg	J	J	
NICKEL	7440-02-0	3.63	0.499	0.0629	0.0999	mg/kg			
POTASSIUM	7440-09-7	2050	99.9	9.99	20.0	mg/kg			
SELENIUM	7782-49-2	0.110	0.499	0.0499	0.0999	mg/kg	J	J	
SILVER	7440-22-4	0.0999	0.499	0.0499	0.0999	mg/kg	U	U	
SODIUM	7440-23-5	65.4	99.9	9.99	20.0	mg/kg	J	U	06
STRONTIUM	7440-24-6	9.41	0.499	0.0499	0.0999	mg/kg			
THALLIUM	7440-28-0	0.227	0.499	0.0499	0.0999	mg/kg	J	J	
TIN	7440-31-5	9.99	20.0	4.99	9.99	mg/kg	U	U	
VANADIUM	7440-62-2	31.9	0.499	0.190	0.250	mg/kg			
ZINC	7440-66-6	19.0	2.00	0.682	0.999	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB13-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 15:36:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	8820	100	10.0	20.0	mg/kg			
ANTIMONY	7440-36-0	0.119	0.501	0.100	0.200	mg/kg	J	J	
ARSENIC	7440-38-2	1.28	0.501	0.0501	0.100	mg/kg			
BARIUM	7440-39-3	77.6	0.501	0.0721	0.100	mg/kg			
BERYLLIUM	7440-41-7	0.179	0.501	0.0501	0.100	mg/kg	J	J	
CADMIUM	7440-43-9	0.151	0.501	0.0571	0.100	mg/kg	J	J	
CALCIUM	7440-70-2	1130	100	17.0	20.0	mg/kg			
CHROMIUM	7440-47-3	9.32	0.501	0.0501	0.100	mg/kg			
COBALT	7440-48-4	6.74	0.501	0.0501	0.100	mg/kg			
COPPER	7440-50-8	5.87	0.501	0.100	0.200	mg/kg			
IRON	7439-89-6	12800	100	5.01	10.0	mg/kg			
LEAD	7439-92-1	5.67	0.501	0.0501	0.100	mg/kg			
MAGNESIUM	7439-95-4	2170	100	10.0	20.0	mg/kg			
MANGANESE	7439-96-5	335	0.501	0.153	0.200	mg/kg			
MOLYBDENUM	7439-98-7	0.346	0.501	0.100	0.200	mg/kg	J	J	
NICKEL	7440-02-0	4.05	0.501	0.0631	0.100	mg/kg			
POTASSIUM	7440-09-7	2110	100	10.0	20.0	mg/kg			
SELENIUM	7782-49-2	0.111	0.501	0.0501	0.100	mg/kg	J	J	
SILVER	7440-22-4	0.100	0.501	0.0501	0.100	mg/kg	U	U	
SODIUM	7440-23-5	83.2	100	10.0	20.0	mg/kg	J	U	06
STRONTIUM	7440-24-6	9.87	0.501	0.0501	0.100	mg/kg			
THALLIUM	7440-28-0	0.220	0.501	0.0501	0.100	mg/kg	J	J	
TIN	7440-31-5	10.0	20.0	5.01	10.0	mg/kg	U	U	
VANADIUM	7440-62-2	32.8	0.501	0.190	0.251	mg/kg			
ZINC	7440-66-6	20.8	2.00	0.684	1.00	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB13-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 15:40:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	11600	103	10.3	20.7	mg/kg			
ANTIMONY	7440-36-0	0.207	0.517	0.103	0.207	mg/kg	U	U	
ARSENIC	7440-38-2	1.59	0.517	0.0517	0.103	mg/kg			
BARIUM	7440-39-3	79.3	0.517	0.0744	0.103	mg/kg			
BERYLLIUM	7440-41-7	0.222	0.517	0.0517	0.103	mg/kg	J	J	
CADMIUM	7440-43-9	0.120	0.517	0.0589	0.103	mg/kg	J	J	
CALCIUM	7440-70-2	1160	103	17.6	20.7	mg/kg			
CHROMIUM	7440-47-3	12.0	0.517	0.0517	0.103	mg/kg			
COBALT	7440-48-4	6.40	0.517	0.0517	0.103	mg/kg			
COPPER	7440-50-8	5.51	0.517	0.103	0.207	mg/kg			
IRON	7439-89-6	17700	103	5.17	10.3	mg/kg			
LEAD	7439-92-1	2.97	0.517	0.0517	0.103	mg/kg			
MAGNESIUM	7439-95-4	3120	103	10.3	20.7	mg/kg			
MANGANESE	7439-96-5	244	0.517	0.158	0.207	mg/kg			
MOLYBDENUM	7439-98-7	0.292	0.517	0.103	0.207	mg/kg	J	J	
NICKEL	7440-02-0	4.61	0.517	0.0651	0.103	mg/kg			
POTASSIUM	7440-09-7	2010	103	10.3	20.7	mg/kg			
SELENIUM	7782-49-2	0.106	0.517	0.0517	0.103	mg/kg	J	J	
SILVER	7440-22-4	0.103	0.517	0.0517	0.103	mg/kg	U	U	
SODIUM	7440-23-5	120	103	10.3	20.7	mg/kg		U	06
STRONTIUM	7440-24-6	10.3	0.517	0.0517	0.103	mg/kg			
THALLIUM	7440-28-0	0.285	0.517	0.0517	0.103	mg/kg	J	J	
TIN	7440-31-5	10.3	20.7	5.17	10.3	mg/kg	U	U	
VANADIUM	7440-62-2	46.5	0.517	0.196	0.258	mg/kg			
ZINC	7440-66-6	23.6	2.07	0.706	1.03	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB14-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 15:44:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	18500	104	10.4	20.7	mg/kg			
ANTIMONY	7440-36-0	0.207	0.518	0.104	0.207	mg/kg	U	U	
ARSENIC	7440-38-2	1.84	0.518	0.0518	0.104	mg/kg			
BARIUM	7440-39-3	117	0.518	0.0746	0.104	mg/kg			
BERYLLIUM	7440-41-7	0.345	0.518	0.0518	0.104	mg/kg	J	J	
CADMIUM	7440-43-9	0.207	0.518	0.0590	0.104	mg/kg	J	J	
CALCIUM	7440-70-2	2250	104	17.6	20.7	mg/kg			
CHROMIUM	7440-47-3	14.4	0.518	0.0518	0.104	mg/kg			
COBALT	7440-48-4	8.39	0.518	0.0518	0.104	mg/kg			
COPPER	7440-50-8	5.72	0.518	0.104	0.207	mg/kg			
IRON	7439-89-6	20400	104	5.18	10.4	mg/kg			
LEAD	7439-92-1	3.66	0.518	0.0518	0.104	mg/kg			
MAGNESIUM	7439-95-4	3760	104	10.4	20.7	mg/kg			
MANGANESE	7439-96-5	306	0.518	0.158	0.207	mg/kg			
MOLYBDENUM	7439-98-7	0.281	0.518	0.104	0.207	mg/kg	J	J	
NICKEL	7440-02-0	5.51	0.518	0.0653	0.104	mg/kg			
POTASSIUM	7440-09-7	1980	104	10.4	20.7	mg/kg			
SELENIUM	7782-49-2	0.104	0.518	0.0518	0.104	mg/kg	J	J	
SILVER	7440-22-4	0.104	0.518	0.0518	0.104	mg/kg	U	U	
SODIUM	7440-23-5	580	104	10.4	20.7	mg/kg		U	06
STRONTIUM	7440-24-6	18.0	0.518	0.0518	0.104	mg/kg			
THALLIUM	7440-28-0	0.322	0.518	0.0518	0.104	mg/kg	J	J	
TIN	7440-31-5	10.4	20.7	5.18	10.4	mg/kg	U	U	
VANADIUM	7440-62-2	50.7	0.518	0.197	0.259	mg/kg			
ZINC	7440-66-6	27.5	2.07	0.707	1.04	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB14-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 16:47:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	12600	107	10.7	21.3	mg/kg			
ANTIMONY	7440-36-0	0.213	0.533	0.107	0.213	mg/kg	U	U	
ARSENIC	7440-38-2	1.52	0.533	0.0533	0.107	mg/kg			
BARIUM	7440-39-3	91.7	0.533	0.0768	0.107	mg/kg			
BERYLLIUM	7440-41-7	0.304	0.533	0.0533	0.107	mg/kg	J	J	
CADMIUM	7440-43-9	0.199	0.533	0.0608	0.107	mg/kg	J	J	
CALCIUM	7440-70-2	1430	107	18.1	21.3	mg/kg			
CHROMIUM	7440-47-3	12.1	0.533	0.0533	0.107	mg/kg			
COBALT	7440-48-4	5.63	0.533	0.0533	0.107	mg/kg			
COPPER	7440-50-8	4.88	0.533	0.107	0.213	mg/kg			
IRON	7439-89-6	17800	107	5.33	10.7	mg/kg			
LEAD	7439-92-1	2.97	0.533	0.0533	0.107	mg/kg			
MAGNESIUM	7439-95-4	3320	107	10.7	21.3	mg/kg			
MANGANESE	7439-96-5	197	0.533	0.163	0.213	mg/kg			
MOLYBDENUM	7439-98-7	0.175	0.533	0.107	0.213	mg/kg	J	J	
NICKEL	7440-02-0	4.64	0.533	0.0672	0.107	mg/kg			
POTASSIUM	7440-09-7	1630	107	10.7	21.3	mg/kg			
SELENIUM	7782-49-2	0.0962	0.533	0.0533	0.107	mg/kg	J	J	
SILVER	7440-22-4	0.107	0.533	0.0533	0.107	mg/kg	U	U	
SODIUM	7440-23-5	467	107	10.7	21.3	mg/kg		U	06
STRONTIUM	7440-24-6	14.3	0.533	0.0533	0.107	mg/kg			
THALLIUM	7440-28-0	0.296	0.533	0.0533	0.107	mg/kg	J	J	
TIN	7440-31-5	10.7	21.3	5.33	10.7	mg/kg	U	U	
VANADIUM	7440-62-2	46.1	0.533	0.203	0.267	mg/kg			
ZINC	7440-66-6	21.3	2.13	0.728	1.07	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB15-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 17:03:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	5940	98.4	9.84	19.7	mg/kg		J	08
ANTIMONY	7440-36-0	0.123	0.492	0.0984	0.197	mg/kg	J	J	08
ARSENIC	7440-38-2	1.01	0.492	0.0492	0.0984	mg/kg			
BARIUM	7440-39-3	59.9	0.492	0.0708	0.0984	mg/kg		J	08
BERYLLIUM	7440-41-7	0.147	0.492	0.0492	0.0984	mg/kg	J	J	
CADMIUM	7440-43-9	0.108	0.492	0.0561	0.0984	mg/kg	J	J	
CALCIUM	7440-70-2	856	98.4	16.7	19.7	mg/kg			
CHROMIUM	7440-47-3	7.50	0.492	0.0492	0.0984	mg/kg			
COBALT	7440-48-4	4.61	0.492	0.0492	0.0984	mg/kg			
COPPER	7440-50-8	4.72	0.492	0.0984	0.197	mg/kg			
IRON	7439-89-6	10500	98.4	4.92	9.84	mg/kg		J	08
LEAD	7439-92-1	4.33	0.492	0.0492	0.0984	mg/kg			
MAGNESIUM	7439-95-4	1880	98.4	9.84	19.7	mg/kg			
MANGANESE	7439-96-5	215	0.492	0.151	0.197	mg/kg			
MOLYBDENUM	7439-98-7	0.291	0.492	0.0984	0.197	mg/kg	J	J	
NICKEL	7440-02-0	2.85	0.492	0.0620	0.0984	mg/kg			
POTASSIUM	7440-09-7	2130	98.4	9.84	19.7	mg/kg			
SELENIUM	7782-49-2	0.0950	0.492	0.0492	0.0984	mg/kg	J	J	
SILVER	7440-22-4	0.0984	0.492	0.0492	0.0984	mg/kg	U	U	
SODIUM	7440-23-5	70.5	98.4	9.84	19.7	mg/kg	J	U	06
STRONTIUM	7440-24-6	7.62	0.492	0.0492	0.0984	mg/kg			
THALLIUM	7440-28-0	0.175	0.492	0.0492	0.0984	mg/kg	J	J	
TIN	7440-31-5	9.84	19.7	4.92	9.84	mg/kg	U	U	
VANADIUM	7440-62-2	29.0	0.492	0.187	0.246	mg/kg			
ZINC	7440-66-6	17.3	1.97	0.672	0.984	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB15-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 17:33:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	6390	101	10.1	20.1	mg/kg			
ANTIMONY	7440-36-0	0.201	0.504	0.101	0.201	mg/kg	U	U	
ARSENIC	7440-38-2	1.13	0.504	0.0504	0.101	mg/kg			
BARIUM	7440-39-3	78.8	0.504	0.0725	0.101	mg/kg			
BERYLLIUM	7440-41-7	0.185	0.504	0.0504	0.101	mg/kg	J	J	
CADMIUM	7440-43-9	0.126	0.504	0.0574	0.101	mg/kg	J	J	
CALCIUM	7440-70-2	1000	101	17.1	20.1	mg/kg			
CHROMIUM	7440-47-3	8.30	0.504	0.0504	0.101	mg/kg			
COBALT	7440-48-4	5.53	0.504	0.0504	0.101	mg/kg			
COPPER	7440-50-8	6.19	0.504	0.101	0.201	mg/kg			
IRON	7439-89-6	10800	101	5.04	10.1	mg/kg			
LEAD	7439-92-1	2.76	0.504	0.0504	0.101	mg/kg			
MAGNESIUM	7439-95-4	1920	101	10.1	20.1	mg/kg			
MANGANESE	7439-96-5	343	0.504	0.154	0.201	mg/kg			
MOLYBDENUM	7439-98-7	0.327	0.504	0.101	0.201	mg/kg	J	J	
NICKEL	7440-02-0	3.72	0.504	0.0635	0.101	mg/kg			
POTASSIUM	7440-09-7	1960	101	10.1	20.1	mg/kg			
SELENIUM	7782-49-2	0.132	0.504	0.0504	0.101	mg/kg	J	J	
SILVER	7440-22-4	0.101	0.504	0.0504	0.101	mg/kg	U	U	
SODIUM	7440-23-5	83.0	101	10.1	20.1	mg/kg	J	U	06
STRONTIUM	7440-24-6	9.69	0.504	0.0504	0.101	mg/kg			
THALLIUM	7440-28-0	0.203	0.504	0.0504	0.101	mg/kg	J	J	
TIN	7440-31-5	10.1	20.1	5.04	10.1	mg/kg	U	U	
VANADIUM	7440-62-2	28.8	0.504	0.191	0.252	mg/kg			
ZINC	7440-66-6	17.7	2.01	0.688	1.01	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB16-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 17:37:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	9840	102	10.2	20.3	mg/kg			
ANTIMONY	7440-36-0	0.117	0.508	0.102	0.203	mg/kg	J	J	
ARSENIC	7440-38-2	0.932	0.508	0.0508	0.102	mg/kg			
BARIUM	7440-39-3	153	0.508	0.0732	0.102	mg/kg			
BERYLLIUM	7440-41-7	0.198	0.508	0.0508	0.102	mg/kg	J	J	
CADMIUM	7440-43-9	0.220	0.508	0.0579	0.102	mg/kg	J	J	
CALCIUM	7440-70-2	2110	102	17.3	20.3	mg/kg			
CHROMIUM	7440-47-3	10.8	0.508	0.0508	0.102	mg/kg			
COBALT	7440-48-4	6.95	0.508	0.0508	0.102	mg/kg			
COPPER	7440-50-8	11.1	0.508	0.102	0.203	mg/kg			
IRON	7439-89-6	20600	102	5.08	10.2	mg/kg			
LEAD	7439-92-1	5.09	0.508	0.0508	0.102	mg/kg			
MAGNESIUM	7439-95-4	3770	102	10.2	20.3	mg/kg			
MANGANESE	7439-96-5	312	0.508	0.156	0.203	mg/kg			
MOLYBDENUM	7439-98-7	0.914	0.508	0.102	0.203	mg/kg			
NICKEL	7440-02-0	4.21	0.508	0.0641	0.102	mg/kg			
POTASSIUM	7440-09-7	4920	102	10.2	20.3	mg/kg			
SELENIUM	7782-49-2	0.189	0.508	0.0508	0.102	mg/kg	J	J	
SILVER	7440-22-4	0.102	0.508	0.0508	0.102	mg/kg	U	U	
SODIUM	7440-23-5	129	102	10.2	20.3	mg/kg		U	06
STRONTIUM	7440-24-6	14.9	0.508	0.0508	0.102	mg/kg			
THALLIUM	7440-28-0	0.257	0.508	0.0508	0.102	mg/kg	J	J	
TIN	7440-31-5	10.2	20.3	5.08	10.2	mg/kg	U	U	
VANADIUM	7440-62-2	59.4	0.508	0.193	0.254	mg/kg			
ZINC	7440-66-6	32.7	2.03	0.694	1.02	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-SB16-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 17:41:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	10600	106	10.6	21.2	mg/kg			
ANTIMONY	7440-36-0	0.212	0.529	0.106	0.212	mg/kg	U	U	
ARSENIC	7440-38-2	0.973	0.529	0.0529	0.106	mg/kg			
BARIUM	7440-39-3	162	0.529	0.0762	0.106	mg/kg			
BERYLLIUM	7440-41-7	0.213	0.529	0.0529	0.106	mg/kg	J	J	
CADMIUM	7440-43-9	0.221	0.529	0.0603	0.106	mg/kg	J	J	
CALCIUM	7440-70-2	2040	106	18.0	21.2	mg/kg			
CHROMIUM	7440-47-3	10.6	0.529	0.0529	0.106	mg/kg			
COBALT	7440-48-4	7.01	0.529	0.0529	0.106	mg/kg			
COPPER	7440-50-8	11.1	0.529	0.106	0.212	mg/kg			
IRON	7439-89-6	21400	106	5.29	10.6	mg/kg			
LEAD	7439-92-1	2.99	0.529	0.0529	0.106	mg/kg			
MAGNESIUM	7439-95-4	3940	106	10.6	21.2	mg/kg			
MANGANESE	7439-96-5	301	0.529	0.162	0.212	mg/kg			
MOLYBDENUM	7439-98-7	0.771	0.529	0.106	0.212	mg/kg			
NICKEL	7440-02-0	4.21	0.529	0.0666	0.106	mg/kg			
POTASSIUM	7440-09-7	4360	106	10.6	21.2	mg/kg			
SELENIUM	7782-49-2	0.205	0.529	0.0529	0.106	mg/kg	J	J	
SILVER	7440-22-4	0.106	0.529	0.0529	0.106	mg/kg	U	U	
SODIUM	7440-23-5	148	106	10.6	21.2	mg/kg		U	06
STRONTIUM	7440-24-6	15.4	0.529	0.0529	0.106	mg/kg			
THALLIUM	7440-28-0	0.262	0.529	0.0529	0.106	mg/kg	J	J	
TIN	7440-31-5	10.6	21.2	5.29	10.6	mg/kg	U	U	
VANADIUM	7440-62-2	62.0	0.529	0.201	0.264	mg/kg			
ZINC	7440-66-6	30.9	2.12	0.722	1.06	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-TR01-S01-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 13:46:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	14900	105	10.5	21.0	mg/kg			
ANTIMONY	7440-36-0	0.210	0.524	0.105	0.210	mg/kg	U	U	
ARSENIC	7440-38-2	1.41	0.524	0.0524	0.105	mg/kg			
BARIUM	7440-39-3	94.8	0.524	0.0755	0.105	mg/kg			
BERYLLIUM	7440-41-7	0.314	0.524	0.0524	0.105	mg/kg	J	J	
CADMIUM	7440-43-9	0.197	0.524	0.0598	0.105	mg/kg	J	J	
CALCIUM	7440-70-2	1440	105	17.8	21.0	mg/kg			
CHROMIUM	7440-47-3	12.2	0.524	0.0524	0.105	mg/kg			
COBALT	7440-48-4	5.61	0.524	0.0524	0.105	mg/kg			
COPPER	7440-50-8	5.94	0.524	0.105	0.210	mg/kg			
IRON	7439-89-6	18800	105	5.24	10.5	mg/kg			
LEAD	7439-92-1	4.18	0.524	0.0524	0.105	mg/kg			
MAGNESIUM	7439-95-4	3350	105	10.5	21.0	mg/kg			
MANGANESE	7439-96-5	245	0.524	0.160	0.210	mg/kg			
MOLYBDENUM	7439-98-7	0.211	0.524	0.105	0.210	mg/kg	J	J	
NICKEL	7440-02-0	4.75	0.524	0.0660	0.105	mg/kg			
POTASSIUM	7440-09-7	1550	105	10.5	21.0	mg/kg			
SELENIUM	7782-49-2	0.0749	0.524	0.0524	0.105	mg/kg	J	J	
SILVER	7440-22-4	0.105	0.524	0.0524	0.105	mg/kg	U	U	
SODIUM	7440-23-5	234	105	10.5	21.0	mg/kg		U	06
STRONTIUM	7440-24-6	12.5	0.524	0.0524	0.105	mg/kg			
THALLIUM	7440-28-0	0.277	0.524	0.0524	0.105	mg/kg	J	J	
TIN	7440-31-5	10.5	21.0	5.24	10.5	mg/kg	U	U	
VANADIUM	7440-62-2	43.6	0.524	0.199	0.262	mg/kg			
ZINC	7440-66-6	26.6	2.10	0.716	1.05	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-TR01-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 13:50:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	14800	107	10.7	21.4	mg/kg			
ANTIMONY	7440-36-0	0.254	0.535	0.107	0.214	mg/kg	J	J	
ARSENIC	7440-38-2	2.48	0.535	0.0535	0.107	mg/kg			
BARIUM	7440-39-3	116	0.535	0.0771	0.107	mg/kg			
BERYLLIUM	7440-41-7	0.310	0.535	0.0535	0.107	mg/kg	J	J	
CADMIUM	7440-43-9	0.222	0.535	0.0610	0.107	mg/kg	J	J	
CALCIUM	7440-70-2	1630	107	18.2	21.4	mg/kg			
CHROMIUM	7440-47-3	15.3	0.535	0.0535	0.107	mg/kg			
COBALT	7440-48-4	7.58	0.535	0.0535	0.107	mg/kg			
COPPER	7440-50-8	11.8	0.535	0.107	0.214	mg/kg			
IRON	7439-89-6	28000	107	5.35	10.7	mg/kg			
LEAD	7439-92-1	39.9	0.535	0.0535	0.107	mg/kg			
MAGNESIUM	7439-95-4	3870	107	10.7	21.4	mg/kg			
MANGANESE	7439-96-5	347	0.535	0.164	0.214	mg/kg			
MOLYBDENUM	7439-98-7	0.485	0.535	0.107	0.214	mg/kg	J	J	
NICKEL	7440-02-0	6.91	0.535	0.0674	0.107	mg/kg			
POTASSIUM	7440-09-7	2120	107	10.7	21.4	mg/kg			
SELENIUM	7782-49-2	0.0871	0.535	0.0535	0.107	mg/kg	J	J	
SILVER	7440-22-4	0.107	0.535	0.0535	0.107	mg/kg	U	U	
SODIUM	7440-23-5	258	107	10.7	21.4	mg/kg		U	06
STRONTIUM	7440-24-6	13.7	0.535	0.0535	0.107	mg/kg			
THALLIUM	7440-28-0	0.318	0.535	0.0535	0.107	mg/kg	J	J	
TIN	7440-31-5	12.6	21.4	5.35	10.7	mg/kg	J	J	
VANADIUM	7440-62-2	50.4	0.535	0.203	0.268	mg/kg			
ZINC	7440-66-6	91.0	2.14	0.731	1.07	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-TR02-S01-2.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 13:54:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	17200	106	10.6	21.3	mg/kg			
ANTIMONY	7440-36-0	0.215	0.532	0.106	0.213	mg/kg	J	J	
ARSENIC	7440-38-2	2.07	0.532	0.0532	0.106	mg/kg			
BARIUM	7440-39-3	85.1	0.532	0.0766	0.106	mg/kg			
BERYLLIUM	7440-41-7	0.249	0.532	0.0532	0.106	mg/kg	J	J	
CADMIUM	7440-43-9	0.173	0.532	0.0607	0.106	mg/kg	J	J	
CALCIUM	7440-70-2	1210	106	18.1	21.3	mg/kg			
CHROMIUM	7440-47-3	13.2	0.532	0.0532	0.106	mg/kg			
COBALT	7440-48-4	5.67	0.532	0.0532	0.106	mg/kg			
COPPER	7440-50-8	11.5	0.532	0.106	0.213	mg/kg			
IRON	7439-89-6	23800	106	5.32	10.6	mg/kg			
LEAD	7439-92-1	6.94	0.532	0.0532	0.106	mg/kg			
MAGNESIUM	7439-95-4	2890	106	10.6	21.3	mg/kg			
MANGANESE	7439-96-5	279	0.532	0.163	0.213	mg/kg			
MOLYBDENUM	7439-98-7	0.484	0.532	0.106	0.213	mg/kg	J	J	
NICKEL	7440-02-0	6.12	0.532	0.0670	0.106	mg/kg			
POTASSIUM	7440-09-7	1400	106	10.6	21.3	mg/kg			
SELENIUM	7782-49-2	0.0677	0.532	0.0532	0.106	mg/kg	J	J	
SILVER	7440-22-4	0.106	0.532	0.0532	0.106	mg/kg	U	U	
SODIUM	7440-23-5	203	106	10.6	21.3	mg/kg		U	06
STRONTIUM	7440-24-6	10.2	0.532	0.0532	0.106	mg/kg			
THALLIUM	7440-28-0	0.231	0.532	0.0532	0.106	mg/kg	J	J	
TIN	7440-31-5	10.6	21.3	5.32	10.6	mg/kg	U	U	
VANADIUM	7440-62-2	42.4	0.532	0.202	0.266	mg/kg			
ZINC	7440-66-6	40.6	2.13	0.727	1.06	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-TR02-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 13:59:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	23500	105	10.5	21.1	mg/kg			
ANTIMONY	7440-36-0	0.237	0.527	0.105	0.211	mg/kg	J	J	
ARSENIC	7440-38-2	1.82	0.527	0.0527	0.105	mg/kg			
BARIUM	7440-39-3	82.6	0.527	0.0758	0.105	mg/kg			
BERYLLIUM	7440-41-7	0.212	0.527	0.0527	0.105	mg/kg	J	J	
CADMIUM	7440-43-9	0.214	0.527	0.0600	0.105	mg/kg	J	J	
CALCIUM	7440-70-2	1070	105	17.9	21.1	mg/kg			
CHROMIUM	7440-47-3	10.9	0.527	0.0527	0.105	mg/kg			
COBALT	7440-48-4	5.31	0.527	0.0527	0.105	mg/kg			
COPPER	7440-50-8	17.7	0.527	0.105	0.211	mg/kg			
IRON	7439-89-6	20400	105	5.27	10.5	mg/kg			
LEAD	7439-92-1	9.83	0.527	0.0527	0.105	mg/kg			
MAGNESIUM	7439-95-4	2670	105	10.5	21.1	mg/kg			
MANGANESE	7439-96-5	174	0.527	0.161	0.211	mg/kg			
MOLYBDENUM	7439-98-7	0.389	0.527	0.105	0.211	mg/kg	J	J	
NICKEL	7440-02-0	4.83	0.527	0.0663	0.105	mg/kg			
POTASSIUM	7440-09-7	1420	105	10.5	21.1	mg/kg			
SELENIUM	7782-49-2	0.0923	0.527	0.0527	0.105	mg/kg	J	J	
SILVER	7440-22-4	0.0552	0.527	0.0527	0.105	mg/kg	J	J	
SODIUM	7440-23-5	193	105	10.5	21.1	mg/kg		U	06
STRONTIUM	7440-24-6	11.2	0.527	0.0527	0.105	mg/kg			
THALLIUM	7440-28-0	0.215	0.527	0.0527	0.105	mg/kg	J	J	
TIN	7440-31-5	10.5	21.1	5.27	10.5	mg/kg	U	U	
VANADIUM	7440-62-2	41.0	0.527	0.200	0.263	mg/kg			
ZINC	7440-66-6	54.0	2.11	0.719	1.05	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-TR03-S01-1.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 14:03:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	14200	111	11.1	22.2	mg/kg			
ANTIMONY	7440-36-0	0.116	0.554	0.111	0.222	mg/kg	J	J	
ARSENIC	7440-38-2	1.80	0.554	0.0554	0.111	mg/kg			
BARIUM	7440-39-3	78.8	0.554	0.0798	0.111	mg/kg			
BERYLLIUM	7440-41-7	0.249	0.554	0.0554	0.111	mg/kg	J	J	
CADMIUM	7440-43-9	0.209	0.554	0.0632	0.111	mg/kg	J	J	
CALCIUM	7440-70-2	1230	111	18.8	22.2	mg/kg			
CHROMIUM	7440-47-3	11.2	0.554	0.0554	0.111	mg/kg			
COBALT	7440-48-4	6.43	0.554	0.0554	0.111	mg/kg			
COPPER	7440-50-8	5.54	0.554	0.111	0.222	mg/kg			
IRON	7439-89-6	19400	111	5.54	11.1	mg/kg			
LEAD	7439-92-1	3.23	0.554	0.0554	0.111	mg/kg			
MAGNESIUM	7439-95-4	3670	111	11.1	22.2	mg/kg			
MANGANESE	7439-96-5	210	0.554	0.170	0.222	mg/kg			
MOLYBDENUM	7439-98-7	0.233	0.554	0.111	0.222	mg/kg	J	J	
NICKEL	7440-02-0	3.85	0.554	0.0698	0.111	mg/kg			
POTASSIUM	7440-09-7	2140	111	11.1	22.2	mg/kg			
SELENIUM	7782-49-2	0.0769	0.554	0.0554	0.111	mg/kg	J	J	
SILVER	7440-22-4	0.111	0.554	0.0554	0.111	mg/kg	U	U	
SODIUM	7440-23-5	149	111	11.1	22.2	mg/kg		U	06
STRONTIUM	7440-24-6	11.3	0.554	0.0554	0.111	mg/kg			
THALLIUM	7440-28-0	0.308	0.554	0.0554	0.111	mg/kg	J	J	
TIN	7440-31-5	11.1	22.2	5.54	11.1	mg/kg	U	U	
VANADIUM	7440-62-2	51.6	0.554	0.211	0.277	mg/kg			
ZINC	7440-66-6	26.0	2.22	0.757	1.11	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-TR03-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 14:07:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	16900	117	11.7	23.3	mg/kg			
ANTIMONY	7440-36-0	0.139	0.584	0.117	0.233	mg/kg	J	J	
ARSENIC	7440-38-2	1.96	0.584	0.0584	0.117	mg/kg			
BARIUM	7440-39-3	99.0	0.584	0.0841	0.117	mg/kg			
BERYLLIUM	7440-41-7	0.345	0.584	0.0584	0.117	mg/kg	J	J	
CADMIUM	7440-43-9	0.229	0.584	0.0665	0.117	mg/kg	J	J	
CALCIUM	7440-70-2	1500	117	19.8	23.3	mg/kg			
CHROMIUM	7440-47-3	14.1	0.584	0.0584	0.117	mg/kg			
COBALT	7440-48-4	7.23	0.584	0.0584	0.117	mg/kg			
COPPER	7440-50-8	5.82	0.584	0.117	0.233	mg/kg			
IRON	7439-89-6	23200	117	5.84	11.7	mg/kg			
LEAD	7439-92-1	3.91	0.584	0.0584	0.117	mg/kg			
MAGNESIUM	7439-95-4	4400	117	11.7	23.3	mg/kg			
MANGANESE	7439-96-5	240	0.584	0.179	0.233	mg/kg			
MOLYBDENUM	7439-98-7	0.265	0.584	0.117	0.233	mg/kg	J	J	
NICKEL	7440-02-0	4.76	0.584	0.0735	0.117	mg/kg			
POTASSIUM	7440-09-7	2470	117	11.7	23.3	mg/kg			
SELENIUM	7782-49-2	0.0925	0.584	0.0584	0.117	mg/kg	J	J	
SILVER	7440-22-4	0.117	0.584	0.0584	0.117	mg/kg	U	U	
SODIUM	7440-23-5	240	117	11.7	23.3	mg/kg		U	06
STRONTIUM	7440-24-6	13.7	0.584	0.0584	0.117	mg/kg			
THALLIUM	7440-28-0	0.388	0.584	0.0584	0.117	mg/kg	J	J	
TIN	7440-31-5	11.7	23.3	5.84	11.7	mg/kg	U	U	
VANADIUM	7440-62-2	60.1	0.584	0.222	0.292	mg/kg			
ZINC	7440-66-6	31.3	2.33	0.797	1.17	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-TR04-S01-2.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 14:24:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	13900	110	11.0	21.9	mg/kg			
ANTIMONY	7440-36-0	0.201	0.549	0.110	0.219	mg/kg	J	J	
ARSENIC	7440-38-2	1.91	0.549	0.0549	0.110	mg/kg			
BARIUM	7440-39-3	87.3	0.549	0.0790	0.110	mg/kg			
BERYLLIUM	7440-41-7	0.227	0.549	0.0549	0.110	mg/kg	J	J	
CADMIUM	7440-43-9	0.190	0.549	0.0625	0.110	mg/kg	J	J	
CALCIUM	7440-70-2	1190	110	18.6	21.9	mg/kg			
CHROMIUM	7440-47-3	16.4	0.549	0.0549	0.110	mg/kg			
COBALT	7440-48-4	6.43	0.549	0.0549	0.110	mg/kg			
COPPER	7440-50-8	61.3	0.549	0.110	0.219	mg/kg			
IRON	7439-89-6	25200	110	5.49	11.0	mg/kg			
LEAD	7439-92-1	9.91	0.549	0.0549	0.110	mg/kg			
MAGNESIUM	7439-95-4	3540	110	11.0	21.9	mg/kg			
MANGANESE	7439-96-5	213	0.549	0.168	0.219	mg/kg			
MOLYBDENUM	7439-98-7	0.341	0.549	0.110	0.219	mg/kg	J	J	
NICKEL	7440-02-0	4.78	0.549	0.0691	0.110	mg/kg			
POTASSIUM	7440-09-7	2230	110	11.0	21.9	mg/kg			
SELENIUM	7782-49-2	0.0780	0.549	0.0549	0.110	mg/kg	J	J	
SILVER	7440-22-4	0.110	0.549	0.0549	0.110	mg/kg	U	U	
SODIUM	7440-23-5	142	110	11.0	21.9	mg/kg		U	06
STRONTIUM	7440-24-6	10.3	0.549	0.0549	0.110	mg/kg			
THALLIUM	7440-28-0	0.284	0.549	0.0549	0.110	mg/kg	J	J	
TIN	7440-31-5	11.0	21.9	5.49	11.0	mg/kg	U	U	
VANADIUM	7440-62-2	66.0	0.549	0.208	0.274	mg/kg			
ZINC	7440-66-6	39.0	2.19	0.749	1.10	mg/kg			

Analysis Method SW6020A

Sample Name UXO4-TR04-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 17:49:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
ALUMINUM	7429-90-5	19300	565	56.5	113	mg/kg			
ANTIMONY	7440-36-0	0.178	0.565	0.113	0.226	mg/kg	J	J	08
ARSENIC	7440-38-2	1.72	2.83	0.283	0.565	mg/kg	J	J	
BARIUM	7440-39-3	96.8	2.83	0.407	0.565	mg/kg		J	08
BERYLLIUM	7440-41-7	0.368	0.565	0.0565	0.113	mg/kg	J	J	
CADMIUM	7440-43-9	0.278	0.565	0.0645	0.113	mg/kg	J	J	
CALCIUM	7440-70-2	2050	565	96.1	113	mg/kg		J	08; 16
CHROMIUM	7440-47-3	16.3	2.83	0.283	0.565	mg/kg		J	16
COBALT	7440-48-4	8.24	2.83	0.283	0.565	mg/kg		J	08
COPPER	7440-50-8	14.7	2.83	0.565	1.13	mg/kg		J	08; 16
IRON	7439-89-6	28600	565	28.3	56.5	mg/kg		J	16
LEAD	7439-92-1	18.5	2.83	0.283	0.565	mg/kg		J	08
MAGNESIUM	7439-95-4	4090	565	56.5	113	mg/kg		J	08; 16
MANGANESE	7439-96-5	190	2.83	0.865	1.13	mg/kg		J	16
MOLYBDENUM	7439-98-7	0.249	0.565	0.113	0.226	mg/kg	J	J	
NICKEL	7440-02-0	7.27	2.83	0.356	0.565	mg/kg		J	08; 16
POTASSIUM	7440-09-7	1940	565	56.5	113	mg/kg		J	16
SELENIUM	7782-49-2	0.0909	0.565	0.0565	0.113	mg/kg	J	J	
SILVER	7440-22-4	0.113	0.565	0.0565	0.113	mg/kg	U	U	
SODIUM	7440-23-5	196	565	56.5	113	mg/kg	J	U	06
STRONTIUM	7440-24-6	15.8	2.83	0.283	0.565	mg/kg		J	08
THALLIUM	7440-28-0	0.307	0.565	0.0565	0.113	mg/kg	J	J	
TIN	7440-31-5	12.6	22.6	5.65	11.3	mg/kg	J	J	08
VANADIUM	7440-62-2	47.6	2.83	1.07	1.41	mg/kg		J	08; 16
ZINC	7440-66-6	42.3	11.3	3.86	5.65	mg/kg			

Analysis Method SW6850

Sample Name UXO4-EB-041615 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/28									
Analysis Time 14:25:00									
PERCHLORATE	14797-73-0	0.2	0.5	0.1	0.2	ug/L	U	U	

Sample Name UXO4-SB08-8.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/24									
Analysis Time 18:09:00									
PERCHLORATE	14797-73-0	2.24	4.48	0.561	2.24	ug/kg	U	U	

Sample Name UXO4-SB09-6.6 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/24									
Analysis Time 18:24:00									
PERCHLORATE	14797-73-0	2.54	5.08	0.635	2.54	ug/kg	U	U	

Sample Name UXO4-SB10-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/24									
Analysis Time 18:41:00									
PERCHLORATE	14797-73-0	2.08	4.16	0.52	2.08	ug/kg	U	U	

Sample Name UXO4-SB10-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/24									
Analysis Time 18:57:00									
PERCHLORATE	14797-73-0	2.21	4.42	0.552	2.21	ug/kg	U	U	

Sample Name UXO4-SB11-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/24									
Analysis Time 19:11:00									
PERCHLORATE	14797-73-0	2.04	4.07	0.509	2.04	ug/kg	U	U	

Analysis Method SW6850

Sample Name UXO4-SB11-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 19:26:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
PERCHLORATE	14797-73-0	2.11	4.21	0.526	2.11	ug/kg	U	U	

Sample Name UXO4-SB12-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 19:40:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
PERCHLORATE	14797-73-0	2.02	4.04	0.505	2.02	ug/kg	U	U	

Sample Name UXO4-SB12-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 20:09:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
PERCHLORATE	14797-73-0	2.05	4.09	0.512	2.05	ug/kg	U	U	

Sample Name UXO4-SB13-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 20:24:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
PERCHLORATE	14797-73-0	2.02	4.05	0.506	2.02	ug/kg	U	U	

Sample Name UXO4-SB13-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 20:38:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
PERCHLORATE	14797-73-0	2.09	4.18	0.522	2.09	ug/kg	U	U	

Sample Name UXO4-SB14-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 20:53:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
PERCHLORATE	14797-73-0	3.76	4.21	0.526	2.1	ug/kg	J	J	

Analysis Method SW6850

Sample Name UXO4-SB14-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/24									
Analysis Time 22:06:00									
PERCHLORATE	14797-73-0	2.29	4.33	0.541	2.16	ug/kg	J	J	

Sample Name UXO4-SB15-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/24									
Analysis Time 22:50:00									
PERCHLORATE	14797-73-0	2.03	4.05	0.507	2.03	ug/kg	U	UJ	09

Sample Name UXO4-SB15-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/24									
Analysis Time 22:21:00									
PERCHLORATE	14797-73-0	2.06	4.11	0.514	2.06	ug/kg	U	U	

Sample Name UXO4-SB16-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/25									
Analysis Time 01:30:00									
PERCHLORATE	14797-73-0	2.08	4.17	0.521	2.08	ug/kg	U	U	

Sample Name UXO4-SB16-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/24									
Analysis Time 23:33:00									
PERCHLORATE	14797-73-0	2.14	4.27	0.534	2.14	ug/kg	U	U	

Sample Name UXO4-TR01-S01-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/24									
Analysis Time 13:23:00									
PERCHLORATE	14797-73-0	2.15	4.3	0.537	2.15	ug/kg	U	U	

Analysis Method SW6850

Sample Name UXO4-TR01-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 13:38:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
PERCHLORATE	14797-73-0	2.19	4.39	0.548	2.19	ug/kg	U	U	

Sample Name UXO4-TR02-S01-2.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 13:53:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
PERCHLORATE	14797-73-0	2.14	4.28	0.535	2.14	ug/kg	U	U	

Sample Name UXO4-TR02-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 15:27:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
PERCHLORATE	14797-73-0	2.17	4.34	0.542	2.17	ug/kg	U	U	

Sample Name UXO4-TR03-S01-1.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 15:42:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
PERCHLORATE	14797-73-0	2.23	4.45	0.557	2.23	ug/kg	U	U	

Sample Name UXO4-TR03-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 15:57:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
PERCHLORATE	14797-73-0	2.36	4.72	0.59	2.36	ug/kg	U	U	

Sample Name UXO4-TR04-S01-2.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 16:11:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
PERCHLORATE	14797-73-0	2.21	4.41	0.551	2.21	ug/kg	U	U	

Analysis Method SW6850

Sample Name UXO4-TR04-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 17:05:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
PERCHLORATE	14797-73-0	2.32	4.63	0.579	2.32	ug/kg	U	U	

Analysis Method SW7199

Sample Name UXO4-EB-041615 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/17

Analysis Time 13:21:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
HEXAVALENT CHROMIUM	18540-29-9	0.1	0.2	0.05	0.1	ug/L	U	U	

Sample Name UXO4-SB08-8.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/23

Analysis Time 23:14:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
HEXAVALENT CHROMIUM	18540-29-9	44.8	112	14.6	44.8	ug/kg	U	U	

Sample Name UXO4-SB09-6.6 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 00:19:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
HEXAVALENT CHROMIUM	18540-29-9	50.8	127	16.5	50.8	ug/kg	U	U	

Sample Name UXO4-SB10-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 00:51:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
HEXAVALENT CHROMIUM	18540-29-9	41.6	104	13.5	41.6	ug/kg	U	U	

Sample Name UXO4-SB10-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 01:23:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
HEXAVALENT CHROMIUM	18540-29-9	44.2	110	14.4	44.2	ug/kg	U	U	

Sample Name UXO4-SB11-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 04:05:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
HEXAVALENT CHROMIUM	18540-29-9	40.7	102	13.2	40.7	ug/kg	U	U	

Analysis Method SW7199

Sample Name UXO4-SB11-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 04:37:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
HEXAVALENT CHROMIUM	18540-29-9	22.1	105	13.7	42.1	ug/kg	J	J	

Sample Name UXO4-SB12-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 05:09:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
HEXAVALENT CHROMIUM	18540-29-9	40.4	101	13.1	40.4	ug/kg	U	U	

Sample Name UXO4-SB12-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 05:42:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
HEXAVALENT CHROMIUM	18540-29-9	40.9	102	13.3	40.9	ug/kg	U	U	

Sample Name UXO4-SB13-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 06:46:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
HEXAVALENT CHROMIUM	18540-29-9	40.5	101	13.2	40.5	ug/kg	U	U	

Sample Name UXO4-SB13-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 07:18:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
HEXAVALENT CHROMIUM	18540-29-9	17.7	104	13.6	41.8	ug/kg	J	J	

Sample Name UXO4-SB14-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/24

Analysis Time 07:50:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
HEXAVALENT CHROMIUM	18540-29-9	42.1	105	13.7	42.1	ug/kg	U	U	

Analysis Method SW7199

Sample Name UXO4-SB14-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/24									
Analysis Time 08:22:00									
HEXAVALENT CHROMIUM	18540-29-9	43.3	108	14.1	43.3	ug/kg	U	U	

Sample Name UXO4-SB15-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/24									
Analysis Time 11:36:00									
HEXAVALENT CHROMIUM	18540-29-9	40.5	101	13.2	40.5	ug/kg	U	U	

Sample Name UXO4-SB15-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/24									
Analysis Time 08:55:00									
HEXAVALENT CHROMIUM	18540-29-9	41.1	103	13.4	41.1	ug/kg	U	U	

Sample Name UXO4-SB16-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/24									
Analysis Time 09:59:00									
HEXAVALENT CHROMIUM	18540-29-9	41.7	104	13.5	41.7	ug/kg	U	U	

Sample Name UXO4-SB16-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/24									
Analysis Time 10:31:00									
HEXAVALENT CHROMIUM	18540-29-9	42.7	107	13.9	42.7	ug/kg	U	U	

Sample Name UXO4-TR01-S01-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 18:57:00									
HEXAVALENT CHROMIUM	18540-29-9	43	107	14	43	ug/kg	U	U	

Analysis Method SW7199

Sample Name UXO4-TR01-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 19:29:00									
HEXAVALENT CHROMIUM	18540-29-9	43.9	110	14.3	43.9	ug/kg	U	U	

Sample Name UXO4-TR02-S01-2.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 20:01:00									
HEXAVALENT CHROMIUM	18540-29-9	42.8	107	13.9	42.8	ug/kg	U	U	

Sample Name UXO4-TR02-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 21:06:00									
HEXAVALENT CHROMIUM	18540-29-9	43.4	108	14.1	43.4	ug/kg	U	U	

Sample Name UXO4-TR03-S01-1.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 21:38:00									
HEXAVALENT CHROMIUM	18540-29-9	44.5	111	14.5	44.5	ug/kg	U	U	

Sample Name UXO4-TR03-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 22:10:00									
HEXAVALENT CHROMIUM	18540-29-9	47.2	118	15.3	47.2	ug/kg	U	U	

Sample Name UXO4-TR04-S01-2.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 22:42:00									
HEXAVALENT CHROMIUM	18540-29-9	44.1	110	14.3	44.1	ug/kg	U	U	

Analysis Method SW7199

Sample Name UXO4-TR04-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/23

Analysis Time 16:16:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
HEXAVALENT CHROMIUM	18540-29-9	22.0	116	15.1	46.3	ug/kg	J	J	

Analysis Method SW7470A

Sample Name UXO4-EB-041615 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/27

Analysis Time 18:40:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
MERCURY	7439-97-6	0.1	0.2	0.054	0.1	ug/L	U	U	

Analysis Method SW7471A

Sample Name UXO4-SB08-8.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/23

Analysis Time 11:38:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
MERCURY	7439-97-6	0.0224	0.112	0.0112	0.0224	mg/kg	U	U	

Sample Name UXO4-SB09-6.6 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/23

Analysis Time 11:41:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
MERCURY	7439-97-6	0.0173	0.126	0.0126	0.0253	mg/kg	J	J	

Sample Name UXO4-SB10-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/23

Analysis Time 11:43:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
MERCURY	7439-97-6	0.0204	0.102	0.0102	0.0204	mg/kg	U	U	

Sample Name UXO4-SB10-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/23

Analysis Time 11:45:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
MERCURY	7439-97-6	0.0125	0.11	0.011	0.022	mg/kg	J	J	

Sample Name UXO4-SB11-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/23

Analysis Time 11:47:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
MERCURY	7439-97-6	0.0201	0.101	0.0101	0.0201	mg/kg	U	U	

Sample Name UXO4-SB11-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analysis Date: 2015/04/23

Analysis Time 11:53:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
MERCURY	7439-97-6	0.0211	0.105	0.0105	0.0211	mg/kg	U	U	

Analysis Method SW7471A

Sample Name UXO4-SB12-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 11:55:00									
MERCURY	7439-97-6	0.0202	0.101	0.0101	0.0202	mg/kg	U	U	

Sample Name UXO4-SB12-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 11:57:00									
MERCURY	7439-97-6	0.0204	0.102	0.0102	0.0204	mg/kg	U	U	

Sample Name UXO4-SB13-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 12:00:00									
MERCURY	7439-97-6	0.0201	0.101	0.0101	0.0201	mg/kg	U	U	

Sample Name UXO4-SB13-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 12:02:00									
MERCURY	7439-97-6	0.0209	0.104	0.0104	0.0209	mg/kg	U	U	

Sample Name UXO4-SB14-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 12:04:00									
MERCURY	7439-97-6	0.0120	0.103	0.0103	0.0207	mg/kg	J	J	

Sample Name UXO4-SB14-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 12:28:00									
MERCURY	7439-97-6	0.0216	0.108	0.0108	0.0216	mg/kg	U	U	

Analysis Method SW7471A

Sample Name UXO4-SB15-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 12:20:00									
MERCURY	7439-97-6	0.0202	0.101	0.0101	0.0202	mg/kg	U	U	

Sample Name UXO4-SB15-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 12:31:00									
MERCURY	7439-97-6	0.0204	0.102	0.0102	0.0204	mg/kg	U	U	

Sample Name UXO4-SB16-0.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 12:33:00									
MERCURY	7439-97-6	0.0207	0.103	0.0103	0.0207	mg/kg	U	U	

Sample Name UXO4-SB16-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 12:35:00									
MERCURY	7439-97-6	0.0213	0.107	0.0107	0.0213	mg/kg	U	U	

Sample Name UXO4-TR01-S01-1.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 11:19:00									
MERCURY	7439-97-6	0.0214	0.107	0.0107	0.0214	mg/kg	U	U	

Sample Name UXO4-TR01-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 11:21:00									
MERCURY	7439-97-6	0.0437	0.108	0.0108	0.0217	mg/kg	J	J	

Analysis Method SW7471A

Sample Name UXO4-TR02-S01-2.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 11:27:00									
MERCURY	7439-97-6	0.0247	0.106	0.0106	0.0213	mg/kg	J	J	

Sample Name UXO4-TR02-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 11:29:00									
MERCURY	7439-97-6	0.0334	0.107	0.0107	0.0213	mg/kg	J	J	

Sample Name UXO4-TR03-S01-1.5 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 11:31:00									
MERCURY	7439-97-6	0.0120	0.111	0.0111	0.0222	mg/kg	J	J	

Sample Name UXO4-TR03-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 11:34:00									
MERCURY	7439-97-6	0.023	0.115	0.0115	0.023	mg/kg	U	U	

Sample Name UXO4-TR04-S01-2.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 11:36:00									
MERCURY	7439-97-6	0.0356	0.109	0.0109	0.0219	mg/kg	J	J	

Sample Name UXO4-TR04-S02-3.0 **Result Type:** TRG

Validators Initials: PM **Validation Date:** 06/03/2015

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
Analysis Date: 2015/04/23									
Analysis Time 11:10:00									
MERCURY	7439-97-6	0.0598	0.114	0.0114	0.0229	mg/kg	J	J	

Analysis Method SW8330A

Sample Name UXO4-EB-041615 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/27

Analysis Time 21:27:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	0.20	1.0	0.10	0.20	ug/L	U	U	
1,3-DNB	99-65-0	0.20	1.0	0.10	0.20	ug/L	U	U	
2,4,6-TNT	118-96-7	0.40	1.0	0.16	0.40	ug/L	U	U	
2,4-DNT	121-14-2	0.20	1.0	0.12	0.20	ug/L	U	U	
2,6-DNT	606-20-2	0.20	1.0	0.10	0.20	ug/L	U	U	
2-AM-4,6-DNT	35572-78-2	0.20	1.0	0.10	0.20	ug/L	U	U	
2-NITROTOLUENE	88-72-2	0.20	1.0	0.11	0.20	ug/L	U	U	
3-NITROTOLUENE	99-08-1	0.40	1.0	0.16	0.40	ug/L	U	U	
4-AM-2,6-DNT	19406-51-0	0.20	1.0	0.20	0.20	ug/L	U	U	
4-NITROTOLUENE	99-99-0	0.20	1.0	0.10	0.20	ug/L	U	U	
HMX	2691-41-0	0.20	1.0	0.10	0.20	ug/L	U	U	
NITROBENZENE	98-95-3	0.20	1.0	0.10	0.20	ug/L	U	U	
RDX	121-82-4	0.40	1.0	0.16	0.40	ug/L	U	U	
TETRYL	479-45-8	0.20	1.0	0.10	0.20	ug/L	U	U	

Sample Name UXO4-SB08-8.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 00:55:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Analysis Method SW8330A

Sample Name UXO4-SB09-6.6 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 01:30:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Sample Name UXO4-SB10-0.5 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 02:04:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Analysis Method SW8330A

Sample Name UXO4-SB10-1.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 02:38:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Sample Name UXO4-SB11-0.5 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 03:12:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	200	400	200,	200	ug/kg	U	U	23
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Analysis Method SW8330A

Sample Name UXO4-SB11-1.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 04:55:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Sample Name UXO4-SB12-0.5 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 05:29:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Analysis Method SW8330A

Sample Name UXO4-SB12-1.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 06:03:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Sample Name UXO4-SB13-0.5 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 06:37:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	500	500	500	500	ug/kg	U	U	23
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	200	400	200	200	ug/kg	U	U	23
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Analysis Method SW8330A

Sample Name UXO4-SB13-1.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 07:11:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Sample Name UXO4-SB14-0.5 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 07:45:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Analysis Method SW8330A

Sample Name UXO4-SB14-1.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 08:19:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Analysis Method SW8330A

Sample Name UXO4-SB15-0.5 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 08:54:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Analysis Method SW8330A

Sample Name UXO4-SB15-1.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 09:28:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Sample Name UXO4-SB16-0.5 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 10:02:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	200	400	200	200	ug/kg	U	U	23
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Analysis Method SW8330A

Sample Name UXO4-SB16-1.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/29

Analysis Time 11:10:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Sample Name UXO4-TR01-S01-1.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/28

Analysis Time 16:57:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Analysis Method SW8330A

Sample Name UXO4-TR01-S02-3.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/28

Analysis Time 17:32:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Sample Name UXO4-TR02-S01-2.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/28

Analysis Time 18:06:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Analysis Method SW8330A

Sample Name UXO4-TR02-S02-3.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/28

Analysis Time 18:40:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Sample Name UXO4-TR03-S01-1.5 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/28

Analysis Time 19:14:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Analysis Method SW8330A

Sample Name UXO4-TR03-S02-3.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/28

Analysis Time 19:48:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Sample Name UXO4-TR04-S01-2.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/28

Analysis Time 22:39:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

Analysis Method SW8330A

Sample Name UXO4-TR04-S02-3.0 **Result Type:** TRG

Validators Initials: LC **Validation Date:** 06/03/2015

Analysis Date: 2015/04/28

Analysis Time 23:13:00

Analyte	CAS No	Result Value	LOQ	DL	LOD	Result Units	Lab Qualifier	Validation Qualifier	Approval Code
1,3,5-TNB	99-35-4	100	400	50	100	ug/kg	U	U	
1,3-DNB	99-65-0	100	400	50	100	ug/kg	U	U	
2,4,6-TNT	118-96-7	100	400	50	100	ug/kg	U	U	
2,4-DNT	121-14-2	100	400	55	100	ug/kg	U	U	
2,6-DNT	606-20-2	100	400	56	100	ug/kg	U	U	
2-AM-4,6-DNT	35572-78-2	100	400	50	100	ug/kg	U	U	
2-NITROTOLUENE	88-72-2	200	400	76	200	ug/kg	U	U	
3-NITROTOLUENE	99-08-1	200	400	95	200	ug/kg	U	U	
4-AM-2,6-DNT	19406-51-0	100	400	50	100	ug/kg	U	U	
4-NITROTOLUENE	99-99-0	200	400	99	200	ug/kg	U	U	
HMX	2691-41-0	100	400	50	100	ug/kg	U	U	
NITROBENZENE	98-95-3	100	400	50	100	ug/kg	U	U	
RDX	121-82-4	100	400	50	100	ug/kg	U	U	
TETRYL	479-45-8	100	400	57	100	ug/kg	U	U	

MEC^X

Explosives Analysis Checklist

Project Name: CTO 0070 Site UX04 Seal Beach

Laboratory Name: BMAX

Batch Numbers: BXD003, BXD010, -013, -014, -015, -016

Sample Delivery Group: 15D027, 15D041, 15D114

Date Reviewed: 06.03.2015

Reviewed By(print or type name): L.S. Calvin

Reviewed By Signature: LSCalvin

Analysis Method: 8330A

	Yes	No	N/A
Holding Times			
Were samples extracted within holding time?	✓		
Were samples analyzed within holding time?	✓		
Initial Calibration			
Did the initial calibration consist of at least five standards?	✓		
Are the RSDs for all target compounds ≤15% or r^2 >0.99?	✓		
Was manual integration "M" performed?		✓	
If the answer is "Yes", check for supporting documents.			
Was the manual integration necessary?			✓
If the answer is "No", contact the laboratory about the reason for the manual integration.			
Initial Calibration Verification(ICV)			
Is the mid level (2nd source) recovery within 80-120%?	✓		
Continuing Calibration Verification (CCV)	Yes	No	N/A
Was CCV conducted before and after every 10 field samples?	✓		
Was the average %Drift or %D ≤20% from the initial calibration?	✓		

		Yes	No	N/A
Sample Analysis	Was the RRT of an identified component within the method retention time window?	✓		
	Were samples with levels higher than the calibration range diluted and reanalyzed?			✓
	Were identified target compounds confirmed on a second column?	✓		
	Was RPD of target analyte confirmation ≤40%?			✓
Sample Quality Control				
	Method Blanks: Were target analytes ≤1/2 LOQ?	✓		
	LCS: Were the percent recoveries within the control limits?	✓		
	Were the RPDs ≤20%?	✓		
	MS/MSD: Were the percent recoveries within the control limits?	✓		
	Were the RPDs ≤20%?	✓		
	System Monitoring Compounds (Surrogates): Are surrogate recoveries within control limits?	✓		

Comments:

MS/MSDs: UX04-SB02-0.83
UX04-TR04-S02-3.0
UX04-SB15-0.5

– Several RDX and/or HMX DL, LOD, LOQs raised due to early-eluting mass (see attached)

During the review of the raw data for the Full validation samples, the reviewer noted several samples with an early eluting mass that had the potential to mask RDX and/or HMX peaks. The reviewer compared the height of the mass to the height of the calibration standards and raised the sample result, LOD and detection limit (DL) of the affected samples to the concentration of the equivalent calibration standard. When the raised result exceeded the LOQ, the LOQ was also raised to the same value. The changed results are listed in the table below.

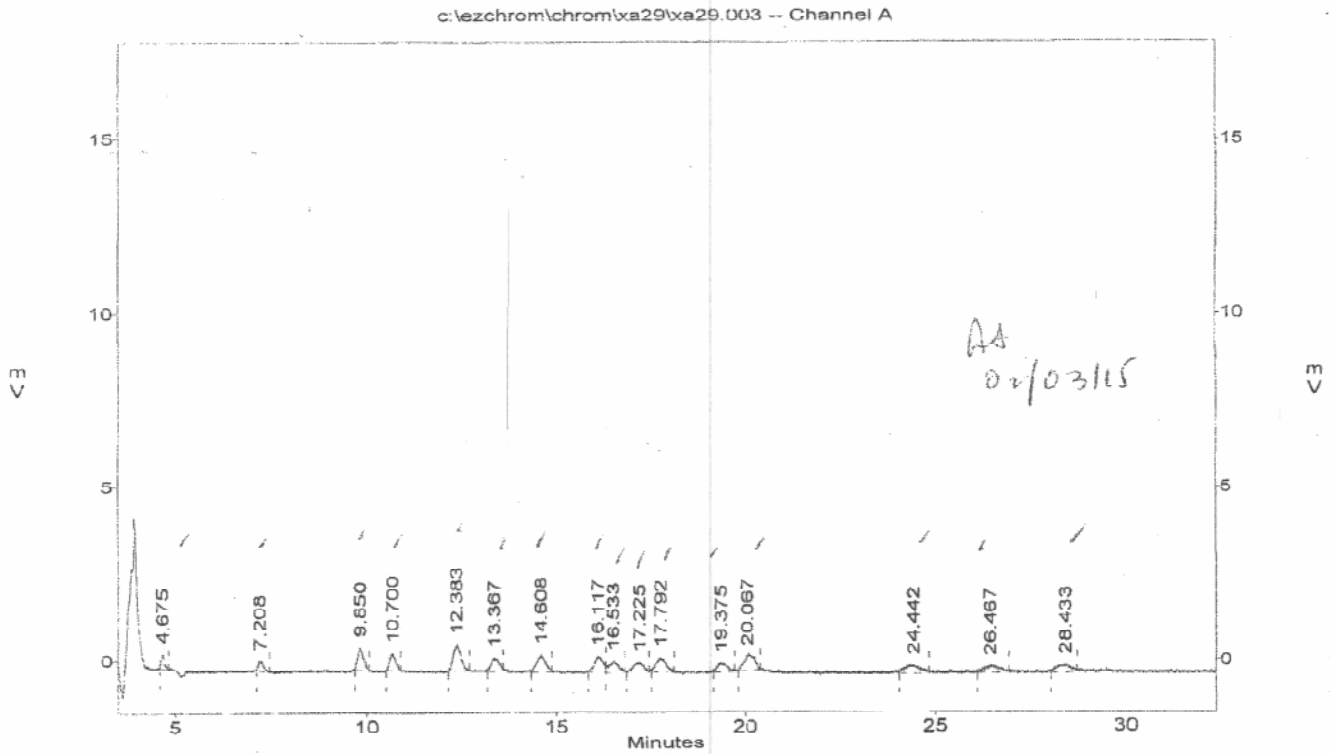
Sample	Compound	Calibration Standard (µg/L)	Raised Values (µg/kg)
UXO4-SB04-0.33	HMX	50	500
	RDX	20	200
UXO4-SB11-0.5	HMX	20	200
UXO4-SB13-0.5	HMX	50	500
	RDX	20	200
UXO4-SB16-0.5	HMX	20	200

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

std. 20

File : c:\ezchrom\chrom\xa29\xa29.003
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2902 20 ppb
Acquired : Jan 29, 2015 18:36:39
Printed : Jan 30, 2015 16:03:22
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.675	2614	142.1	20.0
2	RDX	7.208	3154	177.4	20.0
3	1,3,5-TNB	9.850	7276	418.4	20.0
4	1,2-Dinitrobenzene	10.700	6002	289.8	20.0
5	1,3-DNB	12.383	11096	571.5	20.0
6	Tetryl	13.367	5243	303.8	20.0
7	Nitrobenzene	14.608	8479	420.8	20.0
8	2,4,6-TNT	16.117	7609	395.8	20.0
9	3,4-DNT	16.533	5808	266.7	20.0
10	4-Am-2,6-DNT	17.225	5808	287.5	20.0
11	2-Am-4,6-DNT	17.792	7504	439.2	20.0
12	2,6-DNT	19.375	4707	269.2	20.0
13	2,4-DNT	20.067	9166	548.5	20.0
14	2-Nitrotoluene	24.442	6687	269.4	20.0
15	4-Nitrotoluene	26.467	5518	233.7	20.0
16	3-Nitrotoluene	28.433	5693	277.1	20.0



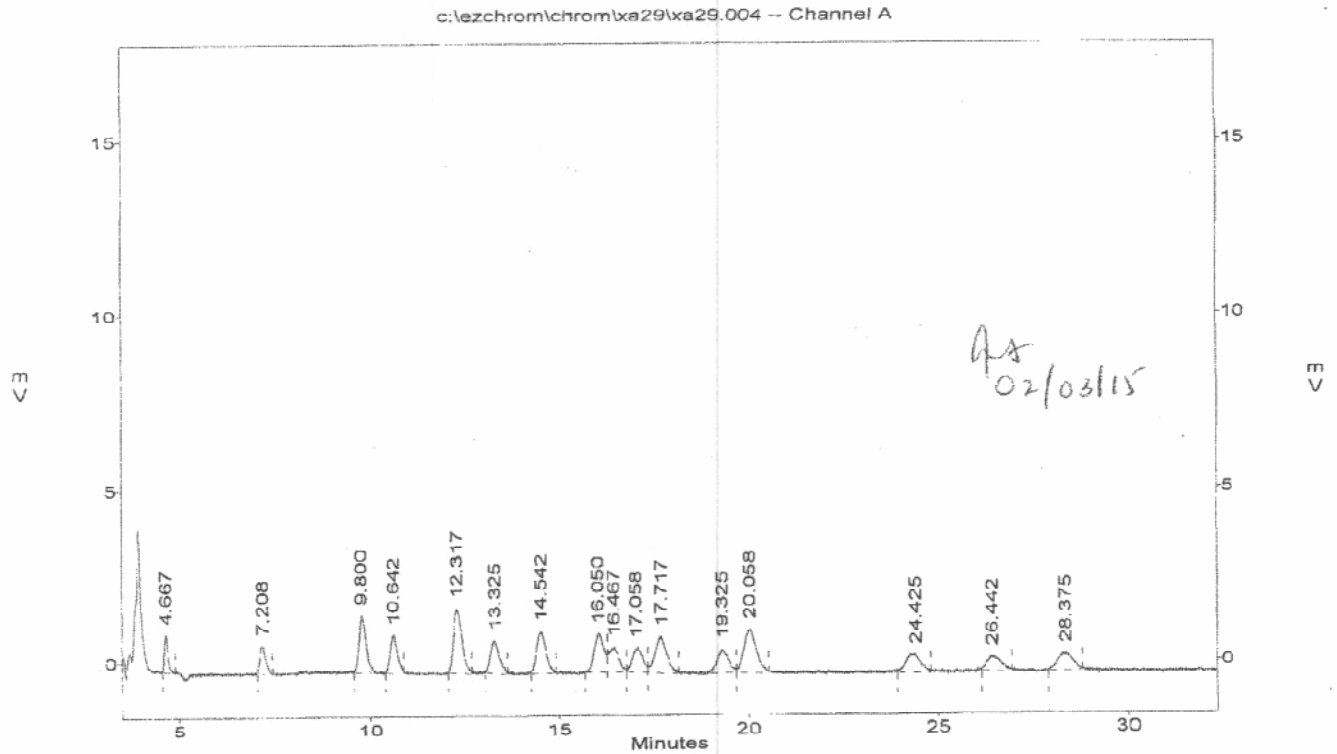
6017

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

50 std.

File : c:\ezchrom\chrom\xa29\xa29.004
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : EX81A2903 50 ppb
Acquired : Jan 29, 2015 19:10:52
Printed : Jan 30, 2015 16:03:32
User : LErmol
Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
1	HMX	4.667	7031	142.1	50.0
2	RDX	7.208	8935	177.4	50.0
3	1,3,5-TNB	9.800	21036	418.4	50.0
4	1,2-Dinitrobenzene	10.642	15221	289.8	50.0
5	1,3-DNB	12.317	29337	571.5	50.0
6	Tetryl	13.325	15301	303.8	50.0
7	Nitrobenzene	14.542	21303	420.8	50.0
8	2,4,6-TNT	16.050	19491	395.8	50.0
9	3,4-DNT	16.467	12912	266.7	50.0
10	4-Am-2,6-DNT	17.058	13066	287.5	50.0
11	2-Am-4,6-DNT	17.717	22556	439.2	50.0
12	2,6-DNT	19.325	14473	269.2	50.0
13	2,4-DNT	20.058	29431	548.5	50.0
14	2-Nitrotoluene	24.425	14609	269.4	50.0
15	4-Nitrotoluene	26.442	11628	233.7	50.0
16	3-Nitrotoluene	28.375	14376	277.1	50.0



6031

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

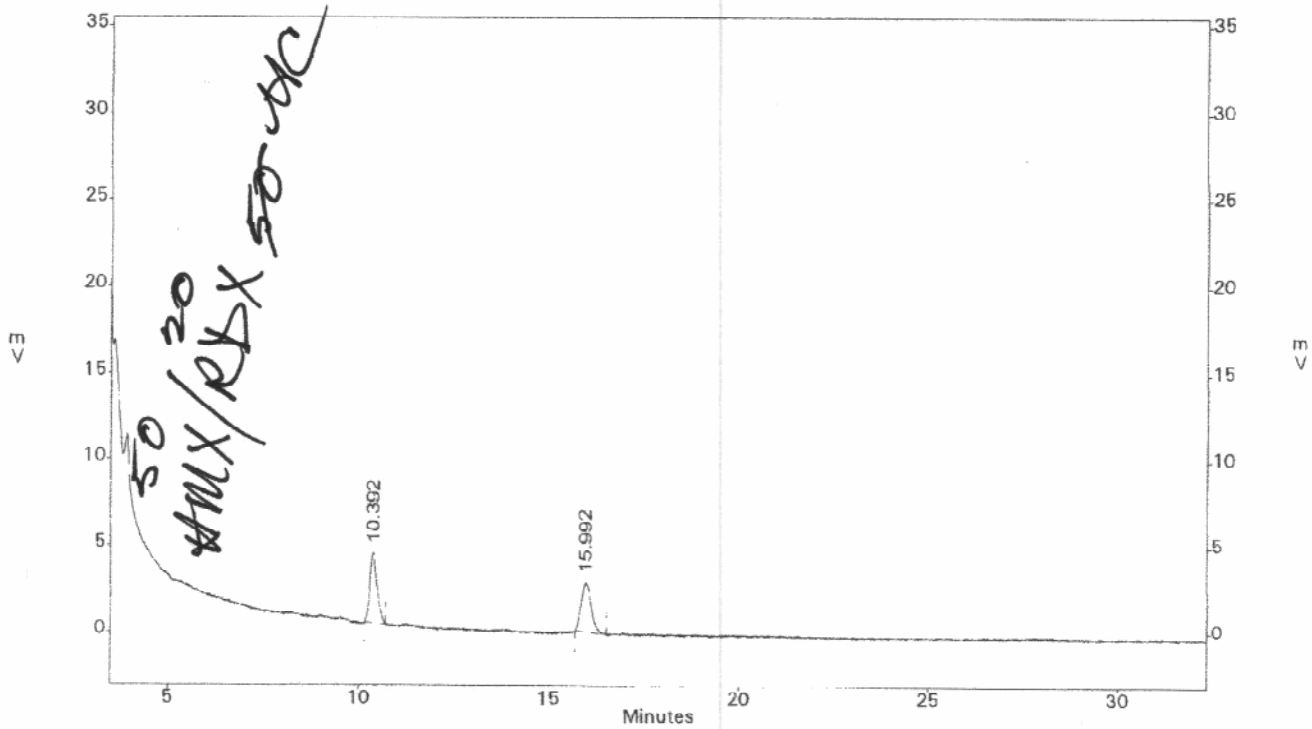
File : c:\ezchrom\chrom\xd14\xd14.023
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D041-03
Acquired : Apr 15, 2015 01:39:10
Printed : Apr 15, 2015 12:25:10
User : LErmol

50

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.633	0	0.0	0.0
--	RDX	7.108	0	0.0	0.0
--	1,3,5-TNB	9.650	0	0.0	0.0
1	1,2-Dinitrobenzene	10.392	53744	289.8	185.4
--	1,3-DNB	12.075	0	0.0	0.0
--	Tetryl	13.050	0	0.0	0.0
--	Nitrobenzene	14.208	0	0.0	0.0
--	2,4,6-TNT	15.700	0	0.0	0.0
2	3,4-DNT	15.992	53270	266.7	199.8
--	4-Am-2,6-DNT	16.642	0	0.0	0.0
--	2-Am-4,6-DNT	17.242	0	0.0	0.0
--	2,6-DNT	18.833	0	0.0	0.0
--	2,4-DNT	19.500	0	0.0	0.0
--	2-Nitrotoluene	23.642	0	0.0	0.0
--	4-Nitrotoluene	25.600	0	0.0	0.0
--	3-Nitrotoluene	27.458	0	0.0	0.0

c:\czchrom\chrom\xd14\xd14.023 -- Channel A



6009

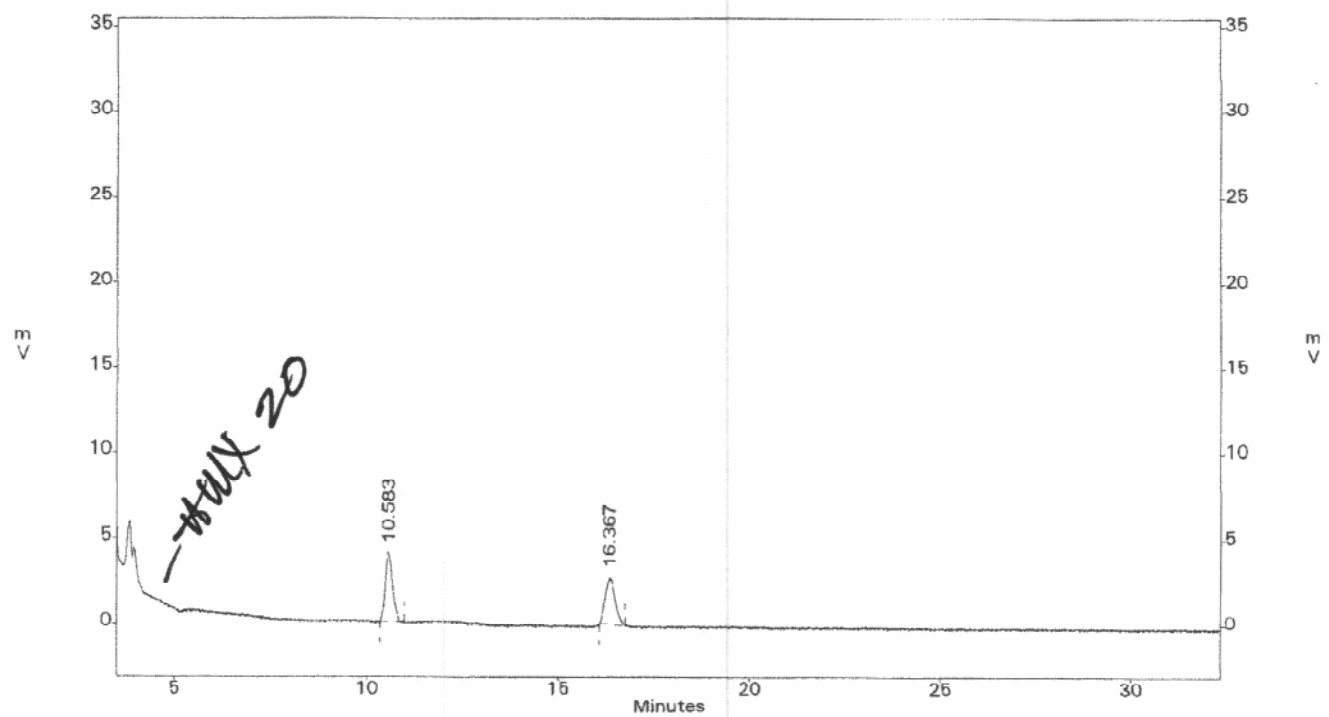
EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.068
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-14
Acquired : Apr 29, 2015 03:12:31
Printed : Apr 29, 2015 09:59:02
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.658	0	0.0	0.0
--	RDX	7.167	0	0.0	0.0
--	1,3,5-TNB	9.725	0	0.0	0.0
1	1,2-Dinitrobenzene	10.583	54333	289.8	187.5
--	1,3-DNB	12.192	0	0.0	0.0
--	Tetryl	13.192	0	0.0	0.0
--	Nitrobenzene	14.350	0	0.0	0.0
--	2,4,6-TNT	15.867	0	0.0	0.0
2	3,4-DNT	16.367	50120	266.7	187.9
--	4-Am-2,6-DNT	16.883	0	0.0	0.0
--	2-Am-4,6-DNT	17.492	0	0.0	0.0
--	2,6-DNT	19.075	0	0.0	0.0
--	2,4-DNT	19.750	0	0.0	0.0
--	2-Nitrotoluene	23.967	0	0.0	0.0
--	4-Nitrotoluene	25.967	0	0.0	0.0
--	3-Nitrotoluene	27.833	0	0.0	0.0

c:\ezchrom\chrom\xd27\xd27.068 -- Channel A



6034

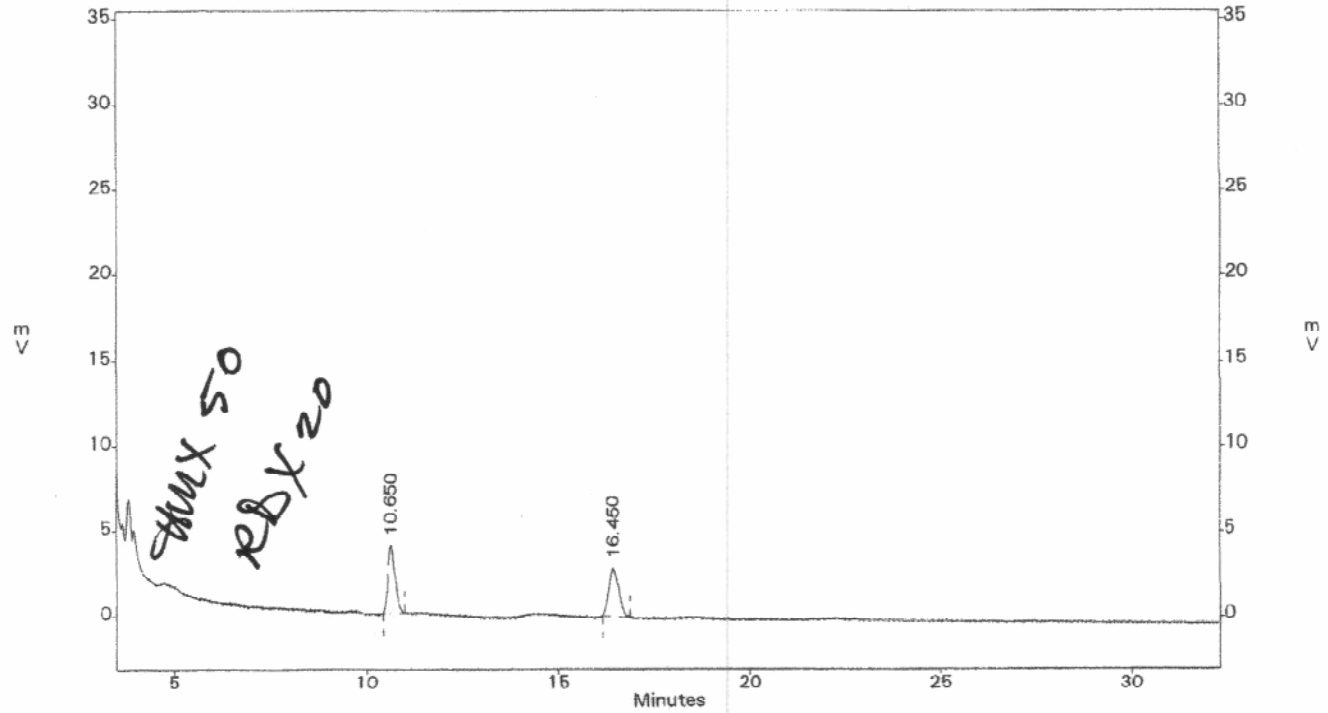
EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.074
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-18
Acquired : Apr 29, 2015 06:37:27
Printed : Apr 29, 2015 10:16:01
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.675	0	0.0	0.0
--	RDX	7.217	0	0.0	0.0
--	1,3,5-TNB	9.783	0	0.0	0.0
1	1,2-Dinitrobenzene	10.650	52609	289.8	181.5
--	1,3-DNB	12.300	0	0.0	0.0
--	Tetryl	13.333	0	0.0	0.0
--	Nitrobenzene	14.483	0	0.0	0.0
--	2,4,6-TNT	16.008	0	0.0	0.0
2	3,4-DNT	16.450	51307	266.7	192.4
--	4-Am-2,6-DNT	17.125	0	0.0	0.0
--	2-Am-4,6-DNT	17.733	0	0.0	0.0
--	2,6-DNT	19.283	0	0.0	0.0
--	2,4-DNT	19.975	0	0.0	0.0
--	2-Nitrotoluene	24.242	0	0.0	0.0
--	4-Nitrotoluene	26.317	0	0.0	0.0
--	3-Nitrotoluene	28.217	0	0.0	0.0

c:\ezchrom\chrom\xd27\xd27.074 -- Channel A



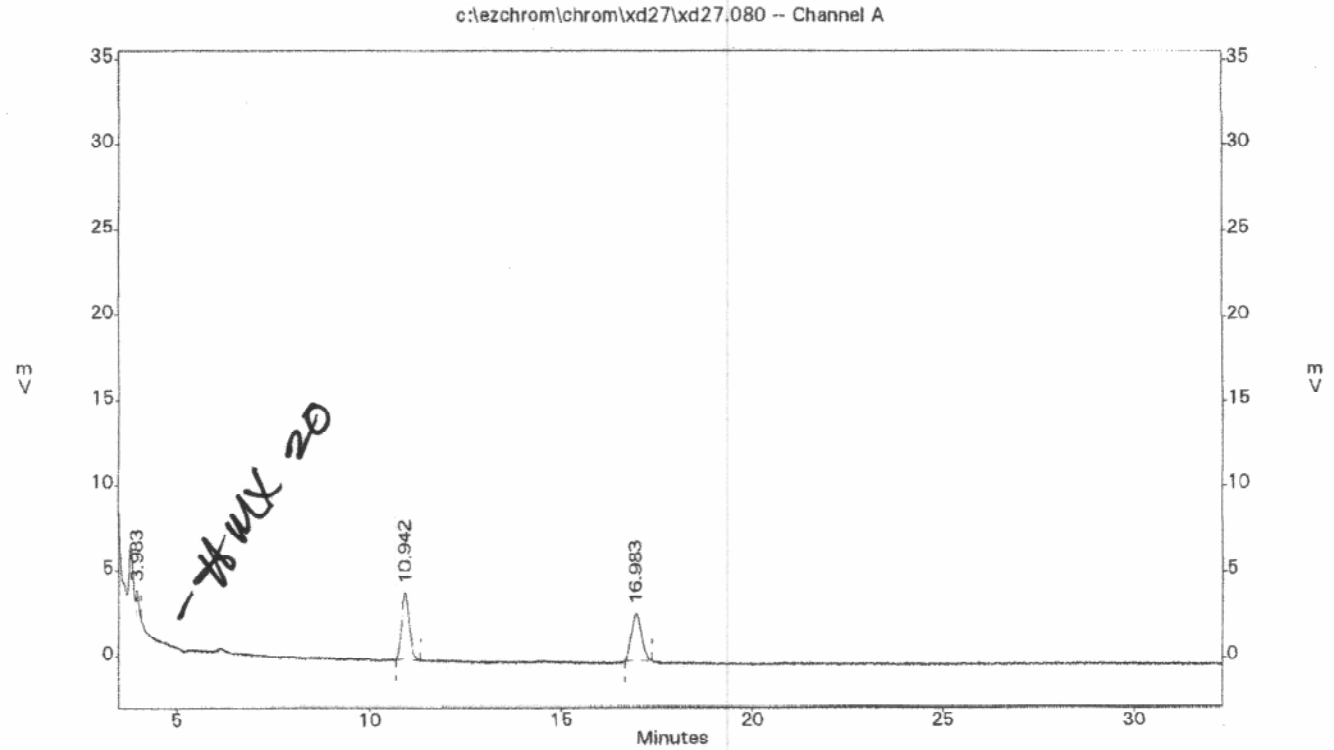
6042

EPA 8330 Primary Column: Microsorb-MV C-18
EMAX Analytical Laboratories, Inc.

File : c:\ezchrom\chrom\xd27\xd27.080
Method : c:\ezchrom\methods\ex81a29.met
Sample ID : 15D114-24
Acquired : Apr 29, 2015 10:02:18
Printed : Apr 29, 2015 11:03:31
User : LErmol

Channel A Results

#	Peak Name	Ret.Time(min)	Area	Ave. RF	ESTD Conc.(ppb)
--	HMX	4.675	0	0.0	0.0
--	RDX	7.217	0	0.0	0.0
--	1,3,5-TNB	9.783	0	0.0	0.0
2	1,2-Dinitrobenzene	10.942	54849	289.8	189.2
--	1,3-DNB	12.300	0	0.0	0.0
--	Tetryl	13.333	0	0.0	0.0
--	Nitrobenzene	14.483	0	0.0	0.0
--	2,4,6-TNT	16.008	0	0.0	0.0
3	3,4-DNT	16.983	50476	266.7	189.3
--	4-Am-2,6-DNT	17.125	0	0.0	0.0
--	2-Am-4,6-DNT	17.733	0	0.0	0.0
--	2,6-DNT	19.283	0	0.0	0.0
--	2,4-DNT	19.975	0	0.0	0.0
--	2-Nitrotoluene	24.242	0	0.0	0.0
--	4-Nitrotoluene	26.317	0	0.0	0.0
--	3-Nitrotoluene	28.217	0	0.0	0.0



6056

MEC^X

ICPMS Metals Analysis Checklist

Project Name: CTO 70 UX04

Laboratory Name: EMAX

Batch Numbers:

Sample Delivery Group: 15D027, 15D041, 15D114

Date Reviewed: 6/3/2015

Reviewed By(print or type name): P. Meeks

Reviewed By Signature P. Meeks

Analysis Method: 6020

		Yes	No	N/A
Tune	Mass calibrations were ≤0.1 atomic mass unit	✓		
	Resolution <0.9 amu full width/10% height	✓		
	%RSDs were ≤5%	✓		
Holding Times	Were samples analyzed within holding time?	✓		
Initial Calibration	Did the initial calibration consist of at least one calibration standard and a blank?	✓		
	Was r≥ 0.995?	✓		
Initial Calibration Verification (ICV)	Is the mid level (2nd source) recovery within 90-110%?	✓		
Initial Calibration Blank (ICP)	Were analytes in the blank < DL?	✓		
Continuing Calibration Blank (CCB)	Was CCB conducted every 10 samples?	✓		
	Was CCB onducted at the end of the analytical sequence?	✓		
	Were analytes < DL?	✓		

027
~~correction~~ to yes
~~reting date initial~~
not dated
041
no custody seals

41-4 4.6%

Continuing Calibration Verification (CCV)

	Yes	No	N/A
Was CCV conducted every 10 samples?	✓		
Was CCV conducted at the end of the analytical sequence?	✓		
Was the %R between 90-110%?	✓		

CRDL

	Yes	No	N/A
Were %Rs within 80-120%?			

none

ICSA/B

	Yes	No	N/A
Any detects above the LOD in the ICSA?		✓	
Were all ICSA/C %Rs within 80-120%?	✓		

Internal Standards

	Yes	No	N/A
Were IS intensities w/in 30-120% of the ICAL	✓		

Sample Analysis

	Yes	No	N/A
Were samples with levels above calibration range, diluted and re-analyzed?			✓

Sample Quality Control

	Yes	No	N/A
Method Blanks: Were target analytes ≤ 1/2 LOQ or 10% of sample detect?	✓		
LCS: Were the %Rs within 80-120% for Fe and Mn?	✓		
MS/MSD: Were %Rs within 80-120% for Fe and Mn?	~~✓~~	✓	
PSD: Were %Rs wihtin 75-125%?	✓		
MD: Were the RPDs ≤10%?		✓	
Serial Dilution: Were %Ds <10% for detects >50x DL?		✓	

CCB
K = -13.7
J EB

Comments

MS/D
UX04 - SB01-1.0
Sb (69,72)
Ba (-,174)
UX04 - SB07-2.0
Cu (24,74) 21
V (73,102) 21
Zn (71,-) -
Sb (-,140) 68
Cr (-,179)
Pb (-,149)
UX04 - TR04 - S02-3.0
Sb (76,78) Co (70,67)
Ba (29,14) Cu (73,61)
Ca (71,66) Pb (55,49)

SD
SB01-1.0
Cu (12)
not 50x LOQ
Ni (11)
not 50x LOQ
SB07-7.0
OK
TR04-S02-3.0
Ca (13) Mn (11)
Cr (13) Ni (15)
Cu (12) K (12)
Fe (12) V (13)
Mg (12)
Mg (62,58) Ni (-,177)
Sr (71,73) V (-,178)
Sn (68,67)

PDS
SB01-1.0
OK
SB07-2.0
OK
TR04 - OK
SB15 - OK
SB15-0.5
OK

EB
~~Ca > RL~~
Na > RL
All but
SB10-1.0
U/F

UX04 - SB15-0.5
Al (162,156)
Sb (79,79)
Fe (133,-)
Ba (-,137)

MECX

Perchlorate Analyses Checklist

Project Name: CTO 70 UX04

Laboratory Name: EMAX

Batch Numbers: —

Sample Delivery Group: 15D027, 15D041, 15D0114

Date Reviewed: 6/3/2015

Reviewed By(print or type name): P. Meeks

Reviewed By Signature P. Meeks

Analysis Method: 6850

		Yes	No	N/A
Holding Times	Were samples analyzed within holding time?	☒	☐	☐
Mass Calibration	Was quantitation ion wihtin ±0.3 m/Z?	☒	☐	☐
Initial Calibration		Yes	No	N/A
	Did the initial calibration consist of at least 5 calibration standards?	☒	☐	☐
	Was r≥ 0.995 or %RSD ≤20%?	☒	☐	☐
Initial Calibration Verification (ICV)		Yes	No	N/A
	Is the mid level (2nd source) recovery within 85-115%?	☒	☐	☐
	Was the interference check sample recovery within 70-130%?	☒	☐	☐
Initial Calibration Blank		Yes	No	N/A
	Were analytes in the blank < DL?	☒	☐	☐

	Yes	No	N/A	
Continuing Calibration Blank (CCB) for 314.0 only				
Was CCB conducted every 10 samples?	RM			multiple MBs & equip blank ~20
Was CCB onducted at the end of the analytical sequence?				
Were analytes < DL?				
Continuing Calibration Verification (CCV)				
Was CCV conducted every 10 samples?				
Was CCV conducted at the end of the analytical sequence?				
Was the %R between 85-115%				
Sample Analysis				
Were samples with levels above calibration range, diluted and re-analyzed?				
Sample Quality Control				
Method Blanks: Were target analytes ≤ 1/2 LOQ or 10% of sample detect?				
LCS: Were %Rs within 80-120%? RPD ≤15%?				
MS/MSD: Were %Rs within 80-120%? RPD ≤15%?				
Lab Duplicate: Were RPDs ≤15%?				
Internal Standards: Were intensities within ±50% and RRTs within 0.98-1.02?				
Isotope Ratio: Were the $^{35}Cl/^{37}Cl$ ratios within 2.3-3.8?				

Comments

MS/D

TR04-S02-3.0

SB15-0.5 - RPD = 16%

MEC^X

Wet Chemistry Analyses Checklist

Project Name: CTO 70 UX04

Laboratory Name: EMAX

Batch Numbers:

Sample Delivery Group: 15D027, 041, 114

Date Reviewed: 6/3/2015

Reviewed By(print or type name): P. Meeks

Reviewed By Signature P. MO

Analysis Method: 7199

	Yes	No	N/A
Holding Times			
Were samples analyzed within holding time?	✓		
Initial Calibration	Yes	No	N/A
Did the initial calibration consist of at least three calibration standards and a blank?	✓		
Was r≥ 0.995?	✓		
Initial Calibration Verification (ICV)	Yes	No	N/A
Is the mid level (2nd source) recovery within 90-110%?	✓		
Initial Calibration Blank	Yes	No	N/A
Were analytes in the blank < DL?	✓		
Continuing Calibration Blank (CCB)	Yes	No	N/A
Was CCB conducted every 10 samples?	✓		
Was CCB onducted at the end of the analytical sequence?	✓		
Were analytes < DL?	✓		

08 12.505: 100
20 12.521
27 12.504 62.5x

Continuing Calibration Verification (CCV)

	Yes	No	N/A
Was CCV conducted every 10 samples?	✓		
Was CCV conducted at the end of the analytical sequence?	✓		
Was the %R between 90-110% for chloride and sulfate?			
85-115% for nitrate/nitrite 80-120	✓		

Sample Analysis

	Yes	No	N/A
Were samples with levels above calibration range, diluted and re-analyzed?			✓

Sample Quality Control

	Yes	No	N/A
Method Blanks: Were target analytes ≤ 1/2 LOQ or 10% of sample detect?	✓		
LCS: Were %Rs within 85-115% for sulfide? ~~75-125~~ 80-120%	✓		
75-125% for all others?			
MS/MSD: Were %Rs within 85-115% for sulfide? ~~75-120~~ ~~85-115~~ 75-125	✓		
75-125% for all others? QSM			
MS/MSD: Were the RPDs ≤25% for alkalinity?			✓
≤20% for all others?			✓
Lab Duplicate: Were ~~Cl-/SO4 RPDs ≤10%~~? acceptable	✓		

Comments

Appendix K
MEC Hazard Assessments

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MEC HA Workbook v1.02

December-07

Overview

This workbook is a tool for project teams to assess explosive hazards to human receptors at munitions response sites (MRSs) following the Munitions and Explosives of Concern Hazard Assessment (MEC HA) methodology. The MEC HA allows a project team to evaluate potential explosive hazard associated with a site, given current site conditions, under various cleanup, land use activities, and land use control alternatives. A complete description of the methodology can be found in the MEC HA Guidance (Public Review Draft, November 2006). Please reference this guidance when completing the worksheets.

Instructions

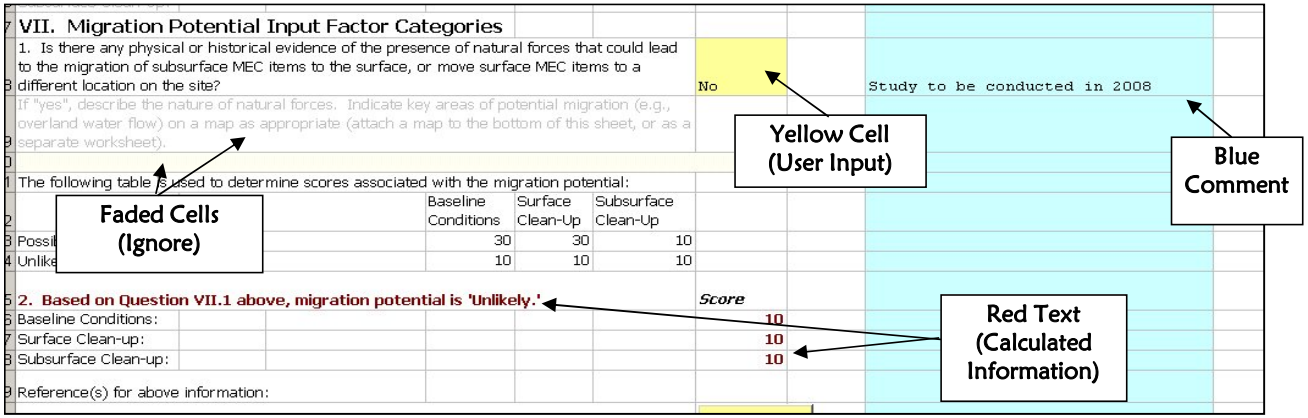
1. Open this file. Enable macros if prompted to do so. This spreadsheet will not work if your security setting is set to 'high' or 'very high'. To change your security level, go to the menu bar and select Tools/Macro/Security. Then close and reopen this spreadsheet.
2. This MS Excel workbook contains 9 worksheets, designed to be used in order. After the '***Instructions***' sheet, the first 5 sheets ask for information about the following topics:

Summary Info - General information regarding the site.
Munitions/Explosive Info - MECs and bulk explosives present at the site.
Current and Future Activities - Current land use activites as well as planned future activities, if any.
Remedial-Removal Action - General information regarding remediation/removal alternatives being considered for the site.
Post-Response Land Use - Land use activities associated with the alternatives listed in the 'Remedial-Removal Action' sheet.

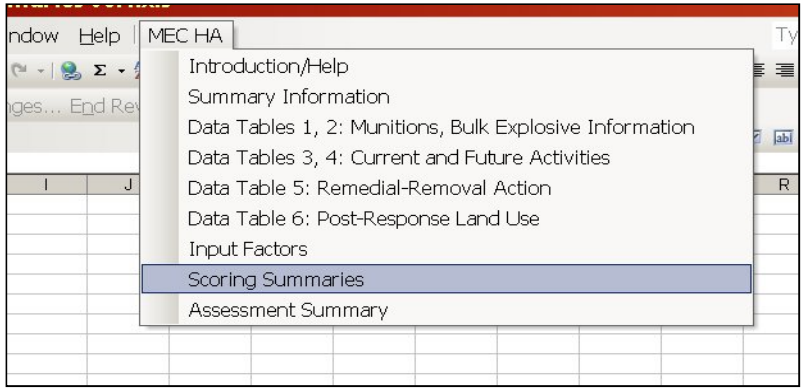
The remaining 3 sheets calculate and summarize the scores. The ***Input Factors*** sheet performs the Input Factor Score calculations, which are summarized in the ***Scoring Summaries*** sheet. The ***Hazard Level*** sheet presents the Hazard Level Category for current use activities, future use activities, and each response alternative based on the respective scores.

3. Starting with the ***Summary Info*** sheet, fill in any yellow cells. Some cells have drop-down lists from which you can select an answer. Select the cell. A down arrow to the right indicates that a drop-down list is available. Yellow buttons can be used to enter reference information. Blue cells can be used for any general comments you wish to make. Any faded cells can be ignored--these are questions that the spreadsheet has determined are not relevant for your situation.

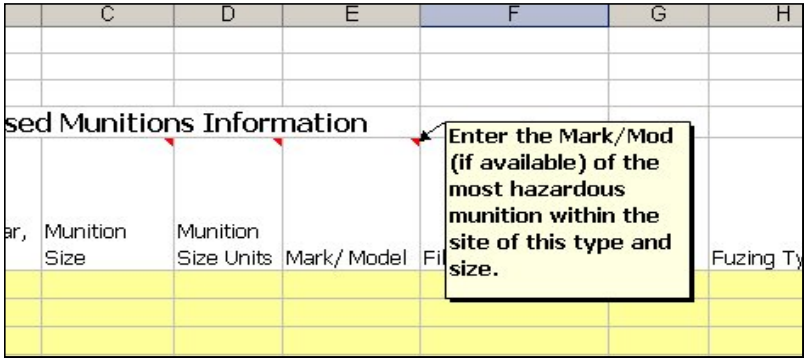
The computer will calculate information based on your inputs. Calculated information will appear as red text.



4. The MEC HA menu bar can be used to navigate to different worksheets.



5. Small red triangles in the upper-right corners indicate that help text is available by putting the mouse cursor on that cell.



MEC HA Summary Information

Comments

Site ID: MRP Site UXO4
Date: 8/31/2015

Please identify the single specific area to be assessed in this hazard assessment. From this point forward, all references to "site" or "MRS" refer to the specific area that you have defined.

A. Enter a unique identifier for the site:

MRP Site UXO4

Provide a list of information sources used for this hazard assessment. As you are completing the worksheets, use the "Select Ref(s)" buttons at the ends of each subsection to select the applicable information sources from the list below.

Ref. No.	Title (include version, publication date)
1	2015a)
2	MRP Site UXO4, After Action Report (KCH 2015b)
3	MRP Site UXO4 RI Work Plan (KCH 2015c)
4	Site Inspection Report (Chadux Tt, 2010)
5	
6	
7	
8	
9	
10	
11	
12	

B. Briefly describe the site:

1. Area (include units): 1.8 acres
2. Past munitions-related use:

Burial Pit

3. Current land-use activities (list all that occur):

Grazing, natural resources management, routine maintenance

4. Are changes to the future land-use planned? Yes
5. What is the basis for the site boundaries?

Delineated during PA and SI.

6. How certain are the site boundaries?

Confirmed during RI field activities.

Reference(s) for Part B:

Explosives Safety Submission, MRP Site UXO4 (KCH, 2015a)
MRP Site UXO4, After Action Report (KCH 2015b)
Site Inspection Report (Chadux Tt, 2010)

[redacted]

C. Historical Clearances

1. Have there been any historical clearances at the site? Yes, surface clearance
2. If a clearance occurred:
   a. What year was the clearance performed? 2015
   b. Provide a description of the clearance activity (e.g., extent, depth, amount of munitions-related items removed, types and sizes of removed items, and whether metal detectors were used):

A detector-aided visual surface clearance was completed in the DGM survey areas on February 24-27, 2015. Surface clearance was conducted at the 100 foot by-100-foot grid cells designated for 100 percent DGM surveys.No MEC or MDEH was discovered during the surface clearance of grid cell areas. The MDAS consisted entirely of M31 practice grenades.

Reference(s) for Part C:

MRP Site UXO4, After Action Report (KCH 2015b) [redacted]

D. Attach maps of the site below (select 'Insert/Picture' on the menu bar.)

Site ID: **MRP Site UXO4**
Date: **8/31/2015**

Cased Munitions Information

Item No.	Munition Type (e.g., mortar, projectile, etc.)	Munition Size	Munition Size Units	Mark/ Model	Energetic Material Type	Is Munition Fuzed?	Fuzing Type	Fuze Condition	Minimum Depth for Munition (ft)	Location of Munitions	Comments (include rationale for munitions that are "subsurface only")
1	Mortars	60	mm	M720	High Explosive	UNK			0.5	Subsurface Only	Surface clearance in 2015 for all items listed.
2	Rockets	3.5	inches	M29	Spotting Charge	No			0.5	Subsurface Only	
3	Grenades			M31	Spotting Charge	No			0.5	Subsurface Only	
4	Grenades			M11	Spotting Charge	No			0.5	Subsurface Only	
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

Reference(s) for table above:

[redacted]

Bulk Explosive Information

Item No.	Explosive Type	Comments
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Reference(s) for table above:

[redacted]

Site ID: **MRP Site UXO4**
Date: **8/31/2015**

Activities Currently Occurring at the Site

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours per year a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1	Ranching	8	80	**640**	0	
2	Natural Resource Studies	5	50	**250**	0	
3	Routine Maintenance	5	40	**200**	0	No intrusive
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr): **1,090**
Maximum intrusive depth at site (ft): **0**

Reference(s) for table above:

[redacted]

Activities Planned for the Future at the Site (If any are planned: see 'Summary Info' Worksheet, Question 4)

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours per year a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1	Ranching for Cattle Grazing	8	80	**640**	0	
2	Natural Resouce Studies	5	50	**250**	0	
3	Routine Maintenance	5	40	**200**	0	
4						
5						
6						
7						
8						
9						
10						
11						
12						
			Total Potential Contact Time (receptor hrs/yr):	**1,090**		
			Maximum intrusive depth at site (ft):		**0**	

Reference(s) for table above:

MRP Site UXO4, After Action Report (KCH 2015b)

[redacted]

Site ID: **MRP Site UXO4**
Date: **8/31/2015**

Planned Remedial or Removal Actions

Response Action No.	Response Action Description	Expected Resulting Minimum MEC Depth (ft)	Expected Resulting Site Accessibility	Will land use activities change if this response action is implemented?	What is the expected scope of cleanup?	Comments
1	Land Use Controls	0.5	Limited Accessibility	Yes	No MEC cleanup	Land use controls for access and monitor site conditions
2						
3						
4						
5						
6						

For those alternatives where you answered 'No' in Column E, are land-use activities to be assessed against current or future land uses?		

Reference(s) for table above:

[redacted]

MRP Site UXO4, After Action Report (KCH 2015b)

Site ID: **MRP Site UXO4**
Date: **8/31/2015**

This worksheet needs to be completed for each remedial/removal action alternative listed in the 'Remedial-Removal Action' worksheet that will cause a change in land use.

Land Use Activities Planned After Response Alternative #1: Land Use Controls

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1	Ranching	8	80	**640**	0	No intrusive
2	Natural Resource Studies	5	50	**250**	0	No intrusive
3	Routine Maintenance	4	50	**200**	0	No intrusive
4						
5						
6						
7						
8						
9						
10						
11						
12						
			Total Potential Contact Time (receptor hrs/yr):	**1,090**		
			Maximum intrusive depth at site (ft):		**0**	

Reference(s) for table above:

MRP Site UXO4, After Action Report (KCH 2015b)

[redacted]

Land Use Activities Planned After Response Alternative #2:

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr):

Maximum intrusive depth at site (ft):

Reference(s) for table above:

[redacted]

Land Use Activities Planned After Response Alternative #3:

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr):

Maximum intrusive depth at site (ft):

Reference(s) for table above:

[redacted]

Land Use Activities Planned After Response Alternative #4:

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr):

Maximum intrusive depth at site (ft):

Reference(s) for table above:

[redacted]

Land Use Activities Planned After Response Alternative #5:

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr):

Maximum intrusive depth at site (ft):

Reference(s) for table above:

[redacted]

Land Use Activities Planned After Response Alternative #6:

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr):

Maximum intrusive depth at site (ft):

Reference(s) for table above:

[redacted]

Site ID: **MRP Site UXO4**

Date: ######

Energetic Material Type Input Factor Categories

The following table is used to determine scores associated with the energetic materials. Materials are listed in order from most hazardous to least hazardous.

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
High Explosive and Low Explosive Filler in Fragmenting Rounds	100	100	100
White Phosphorus	70	70	70
Pyrotechnic	60	60	60
Propellant	50	50	50
Spotting Charge	40	40	40
Incendiary	30	30	30

The most hazardous type of energetic material listed in the 'Munitions, Bulk Explosive Info' Worksheet falls under the category 'High Explosive and Low Explosive Filler in Fragmenting Rounds'.

	Score
Baseline Conditions:	**100**
Surface Cleanup:	**100**
Subsurface Cleanup:	**100**

Location of Additional Human Receptors Input Factor Categories

1. What is the Explosive Safety Quantity Distance (ESQD) from the Explosive Siting Plan or the Explosive Safety Submission for the MRS? 186 feet
2. Are there currently any features or facilities where people may congregate within the MRS, or within the ESQD arc? No
3. Please describe the facility or feature.

MEC Item(s) used to calculate the ESQD for current use activities

Item #1. Mortars (60mm, High Explosive)

The following table is used to determine scores associated with the location of additional human receptors (current use activities):

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Inside the MRS or inside the ESQD arc	30	30	30
Outside of the ESQD arc	0	0	0

4. Current use activities are 'Outside of the ESQD arc', based on Question 2.'

	Score
Baseline Conditions:	**0**
Surface Cleanup:	**0**
Subsurface Cleanup:	**0**

5. Are there future plans to locate or construct features or facilities where people may congregate within the MRS, or within the ESQD arc? No
6. Please describe the facility or feature.

MEC Item(s) used to calculate the ESQD for future use activities

Item #1. Mortars (60mm, High Explosive)
Item #3. Grenades (Spotting Charge)
Item #4. Grenades (Spotting Charge)

The following table is used to determine scores associated with the location of additional human receptors (future use activities):

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Inside the MRS or inside the ESQD arc	30	30	30
Outside of the ESQD arc	0	0	0

7. Future use activities are 'Outside of the ESQD arc', based on Question 5.'

	Score
Baseline Conditions:	**0**
Surface Cleanup:	**0**
Subsurface Cleanup:	**0**

Comments

Site Accessibility Input Factor Categories

The following table is used to determine scores associated with site accessibility:

	Description	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Full Accessibility	No barriers to entry, including signage but no fencing	80	80	80
Moderate Accessibility	Some barriers to entry, such as barbed wire fencing or rough terrain	55	55	55
Limited Accessibility	Significant barriers to entry, such as unguarded chain link fence or requirements for special transportation to reach the site	15	15	15
Very Limited Accessibility	A site with guarded chain link fence or terrain that requires special equipment and skills (e.g., rock climbing) to access	5	5	5

Current Use Activities

Select the category that best describes the site accessibility under the current use scenario:

Moderate Accessibility

	Score
Baseline Conditions:	**55**
Surface Cleanup:	**55**
Subsurface Cleanup:	**55**

Future Use Activities

Select the category that best describes the site accessibility under the future use scenario:

Moderate Accessibility

Baseline Conditions:	**55**
Surface Cleanup:	**55**
Subsurface Cleanup:	**55**

Reference(s) for above information:

Explosives Safety Submission, MRP Site UXO4 (KCH, 2015a)
MRP Site UXO4, After Action Report (KCH 2015b)
Site Inspection Report (Chadux Tt, 2010)

[redacted]

Response Alternative No. 1: Land Use Controls

Based on the 'Planned Remedial or Removal Actions' Worksheet, this alternative will lead to 'Limited Accessibility'.

Baseline Conditions:	**15**
Surface Cleanup:	**15**
Subsurface Cleanup:	**15**

Response Alternative No. 2:

Please enter site accessibility information in the 'Planned Remedial or Removal Actions' Worksheet to continue.

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 3:

Please enter site accessibility information in the 'Planned Remedial or Removal Actions' Worksheet to continue.

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 4:

Please enter site accessibility information in the 'Planned Remedial or Removal Actions' Worksheet to continue.

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 5:

Please enter site accessibility information in the 'Planned Remedial or Removal Actions' Worksheet to continue.

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 6:

Please enter site accessibility information in the 'Planned Remedial or Removal Actions' Worksheet to continue.

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Potential Contact Hours Input Factor Categories

The following table is used to determine scores associated with the total potential contact time:

	Description	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Many Hours	≥1,000,000 receptor-hrs/yr	120	90	30
Some Hours	100,000 to 999,999 receptor hrs/yr	70	50	20
Few Hours	10,000 to 99,999 receptor-hrs/yr	40	20	10
Very Few Hours	<10,000 receptor-hrs/yr	15	10	5

Current Use Activities:

Input factors are only determined for baseline conditions for current use activities. Based on the 'Current and Future Activities' Worksheet, the Total Potential Contact Time is: **1,090** tor hrs/yr

Based on the table above, this corresponds to a input factor score for baseline conditions of: **15** Score

Future Use Activities:

Input factors are only determined for baseline conditions for future use activities. Based on the 'Current and Future Activities' Worksheet, the Total Potential Contact Time is: **1,090** tor hrs/yr

Based on the table above, this corresponds to a input factor score of: **15** Score

Response Alternative No. 1: Land Use Controls

Based on the 'Planned Remedial or Removal Actions' Worksheet, land use activities will change if this alternative is implemented.
Total Potential Contact Time, based on the contact time listed for this alternative (see 'Post-Response Land Use' Worksheet) **1,090**

Based on the table above, this corresponds to input factor scores of: ***Score***
Baseline Conditions: **15**
Surface Cleanup: **10**
Subsurface Cleanup: **5**

Response Alternative No. 2:

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Total Potential Contact Time
Based on the table above, this corresponds to input factor scores of: ***Score***
Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 3:

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Total Potential Contact Time
Based on the table above, this corresponds to input factor scores of: ***Score***
Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 4:

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Total Potential Contact Time
Based on the table above, this corresponds to input factor scores of: ***Score***
Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 5:

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Total Potential Contact Time
Based on the table above, this corresponds to input factor scores of: **Score**
Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 6:

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Total Potential Contact Time
Based on the table above, this corresponds to input factor scores of: **Score**
Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Amount of MEC Input Factor Categories

The following table is used to determine scores associated with the Amount of MEC:

	Description	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Target Area	Areas at which munitions fire was directed	180	120	30
OB/OD Area	Sites where munitions were disposed of by open burn or open detonation methods. This category refers to the core activity area of an OB/OD area. See the "Safety Buffer Areas" category for safety fans and kick-outs.	180	110	30
Function Test Range	Areas where the serviceability of stored munitions or weapons systems are tested. Testing may include components, partial functioning or complete functioning of stockpile or developmental items.	165	90	25
Burial Pit	The location of a burial of large quantities of MEC items.	140	140	10
Maneuver Areas	Areas used for conducting military exercises in a simulated conflict area or war zone	115	15	5
Firing Points	The location from which a projectile, grenade, ground signal, rocket, guided missile, or other device is to be ignited, propelled, or released.	75	10	5
Safety Buffer Areas	Areas outside of target areas, test ranges, or OB/OD areas that were designed to act as a safety zone to contain munitions that do not hit targets or to contain kick-outs from OB/OD areas.	30	10	5
Storage	Any facility used for the storage of military munitions, such as earth-covered magazines, above-ground magazines, and open-air storage areas.	25	10	5
Explosive-Related Industrial Facility	Former munitions manufacturing or demilitarization sites and TNT production plants	20	10	5

Select the category that best describes the ***most hazardous*** amount of MEC: ***Score***

Burial Pit

Baseline Conditions: **140**
Surface Cleanup: **140**
Subsurface Cleanup: **10**

Minimum MEC Depth Relative to the Maximum Intrusive Depth Input Factor Categories

Current Use Activities

The shallowest minimum MEC depth, based on the 'Cased Munitions Information' Worksheet: **0.5** ft
The deepest intrusive depth: **0** ft

The table below is used to determine scores associated with the minimum MEC depth relative to the maximum intrusive depth:

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.	240	150	95
Baseline Condition: MEC located surface and subsurface, After Cleanup: Intrusive depth does not overlap with subsurface MEC.	240	50	25
Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth overlaps with minimum MEC depth.	150	N/A	95
Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC depth.	50	N/A	25

depth, the intrusive depth will not overlap after cleanup. MECs are located only subsurface, based on the 'Munitions, Bulk Explosive Info' Worksheet. Therefore, the category for this input factor is 'Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC depth.' For 'Current Use Activities', only Baseline Conditions are considered. ***Score*** **50**

Future Use Activities

Deepest intrusive depth: **0** ft

Because the shallowest minimum MEC depth is greater than the deepest intrusive depth, the intrusive depth does not overlap. MECs are located only subsurface, based on the 'Munitions, Bulk Explosive Info' Worksheet. Therefore, the category for this input factor is 'Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC depth.'. For 'Future Use Activities', only Baseline Conditions are considered.

Score **50**

Response Alternative No. 1: Land Use Controls

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet): **0.5** ft

Based on the 'Planned Remedial or Removal Actions' Worksheet, land use activities will change if this alternative is implemented.

Maximum Intrusive Depth, based on the maximum intrusive depth listed for this alternative (see 'Post-Response Land Use' Worksheet) **0** ft

Because the shallowest minimum MEC depth is greater than the deepest intrusive depth, the intrusive depth does not overlap. MECs are located only subsurface, based on the 'Munitions, Bulk Explosive Info' Worksheet. Therefore, the category for this input factor is 'Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC

Score

Baseline Conditions: **50**

Surface Cleanup:

Subsurface Cleanup:

Response Alternative No. 2:

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet): ft

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Maximum Intrusive Depth ft

Not enough information has been entered to calculate this input factor.

Score

Baseline Conditions:

Surface Cleanup:

Subsurface Cleanup:

Response Alternative No. 3:

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet): ft

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Maximum Intrusive Depth ft

Not enough information has been entered to calculate this input factor.

Score

Baseline Conditions:

Surface Cleanup:

Subsurface Cleanup:

Response Alternative No. 4:

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet): ft

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Maximum Intrusive Depth ft

Not enough information has been entered to calculate this input factor.

Score

Baseline Conditions:

Surface Cleanup:

Subsurface Cleanup:

Response Alternative No. 5:

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet): ft

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Maximum Intrusive Depth ft

Not enough information has been entered to calculate this input factor.

Score

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 6:

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet): ft

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Maximum Intrusive Depth ft

Not enough information has been entered to calculate this input factor.

Score

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Migration Potential Input Factor Categories

Is there any physical or historical evidence that indicates it is possible for natural physical forces in the area (e.g., frost heave, erosion) to expose subsurface MEC items, or move surface or subsurface MEC items? Yes

If "yes", describe the nature of natural forces. Indicate key areas of potential migration (e.g., overland water flow) on a map as appropriate (attach a map to the bottom of this sheet, or as a separate worksheet).

Shallow swale that directs surface water runoff offsite.

The following table is used to determine scores associated with the migration potential:

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Possible	30	30	10
Unlikely	10	10	10

Based on the question above, migration potential is 'Possible.' ***Score***

Baseline Conditions: **30**
Surface Cleanup: **30**
Subsurface Cleanup: **10**

Reference(s) for above information:
Explosives Safety Submission, MRP Site UXO4 (KCH, 2015a)
MRP Site UXO4, After Action Report (KCH 2015b)
Site Inspection Report (Chadux Tt, 2010)

[redacted]

MEC Classification Input Factor Categories

Cased munitions information has been inputed into the 'Munitions, Bulk Explosive Info' Worksheet; therefore, bulk explosives do not comprise all MECs for this MRS.

The 'Amount of MEC' category is 'Burial Pit'. It is assumed that the MEC items in this MRS are DMM.

Has a technical assessment shown that MEC in the OB/OD Area is DMM?

Are any of the munitions listed in the 'Munitions, Bulk Explosive Info' Worksheet: Yes

- Submunitions
- Rifle-propelled 40mm projectiles (often called 40mm grenades)
- Munitions with white phosphorus filler
- High explosive anti-tank (HEAT) rounds
- Hand grenades
- Fuzes
- Mortars

None of the items listed in the 'Munitions, Bulk Explosive Info' Worksheet were identified as 'fuzed'.

The following table is used to determine scores associated with MEC classification categories:

Fuzed DMM Special Case	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
UXO Special Case	180	180	180
UXO	110	110	110
Fuzed DMM Special Case	105	105	105
Fuzed DMM	55	55	55
Unfuzed DMM	45	45	45
Bulk Explosives	45	45	45

Based on your answers above, the MEC classification is 'Fuzed DMM Special Case'. ***Score***

Baseline Conditions: **105**
Surface Cleanup: **105**
Subsurface Cleanup: **105**

MEC Size Input Factor Categories

The following table is used to determine scores associated with MEC Size:

	Description	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Small	Any munitions (from the 'Munitions, Bulk Explosive Info' Worksheet) weigh less than 90 lbs; small enough for a receptor to be able to move and initiate a detonation	40	40	40
Large	All munitions weigh more than 90 lbs; too large to move without equipment	0	0	0

Based on the definitions above and the types of munitions at the site (see 'Munitions, Bulk Explosive Info' Worksheet), the MEC Size Input Factor is: Small

	Score
Baseline Conditions:	**40**
Surface Cleanup:	**40**
Subsurface Cleanup:	**40**

Scoring Summary

Site ID:	MRP Site UXO4	a. Scoring Summary for Current Use Activities	
Date:	8/31/2015	Response Action Cleanup:	No Response Action
Input Factor		Input Factor Category	Score
I. Energetic Material Type		High Explosive and Low Explosive Filler in Fragmenting Rounds	100
II. Location of Additional Human Receptors		Outside of the ESQD arc	0
III. Site Accessibility		Moderate Accessibility	55
IV. Potential Contact Hours		<10,000 receptor-hrs/yr	15
V. Amount of MEC		Burial Pit	140
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth		Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC depth.	50
VII. Migration Potential		Possible	30
VIII. MEC Classification		Fuzed DMM Special Case	105
IX. MEC Size		Small	40
		Total Score	535
		Hazard Level Category	3

Site ID:	MRP Site UXO4	b. Scoring Summary for Future Use Activities	
Date:	8/31/2015	Response Action Cleanup:	No Response Action
Input Factor		Input Factor Category	Score
I. Energetic Material Type		High Explosive and Low Explosive Filler in Fragmenting Rounds	100
II. Location of Additional Human Receptors		Outside of the ESQD arc	0
III. Site Accessibility		Moderate Accessibility	55
IV. Potential Contact Hours		<10,000 receptor-hrs/yr	15
V. Amount of MEC		Burial Pit	140
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth		Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC depth.	50
VII. Migration Potential		Possible	30
VIII. MEC Classification		Fuzed DMM Special Case	105
IX. MEC Size		Small	40
		Total Score	535
		Hazard Level Category	3

Site ID:	MRP Site UXO4	c. Scoring Summary for Response Alternative 1: Land Use Controls	
Date:	8/31/2015	Response Action Cleanup:	No MEC cleanup
Input Factor		Input Factor Category	Score
I. Energetic Material Type		High Explosive and Low Explosive Filler in Fragmenting Rounds	100
II. Location of Additional Human Receptors		Outside of the ESQD arc	0
III. Site Accessibility		Limited Accessibility	15
IV. Potential Contact Hours		<10,000 receptor-hrs/yr	15
V. Amount of MEC		Burial Pit	140
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth		Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC depth.	50
VII. Migration Potential		Possible	30
VIII. MEC Classification		Fuzed DMM Special Case	105
IX. MEC Size		Small	40
		Total Score	495
		Hazard Level Category	4

MEC HA Hazard Level Determination		
Site ID: MRP Site UXO4		
Date: 8/31/2015		
	Hazard Level Category	**Score**
a. Current Use Activities	3	535
b. Future Use Activities	3	535
c. Response Alternative 1: Land Use Controls	4	495
d. Response Alternative 2:		
e. Response Alternative 3:		
f. Response Alternative 4:		
g. Response Alternative 5:		
h. Response Alternative 6:		

Characteristics of the MRS	
Is critical infrastructure located within the MRS or within the ESQD arc?	
Are cultural resources located within the MRS or within the ESQD arc?	
Are significant ecological resources located within the MRS or within the ESQD arc?	

MEC HA Workbook v1.02

December-07

Overview

This workbook is a tool for project teams to assess explosive hazards to human receptors at munitions response sites (MRSs) following the Munitions and Explosives of Concern Hazard Assessment (MEC HA) methodology. The MEC HA allows a project team to evaluate potential explosive hazard associated with a site, given current site conditions, under various cleanup, land use activities, and land use control alternatives. A complete description of the methodology can be found in the MEC HA Guidance (Public Review Draft, November 2006). Please reference this guidance when completing the worksheets.

Instructions

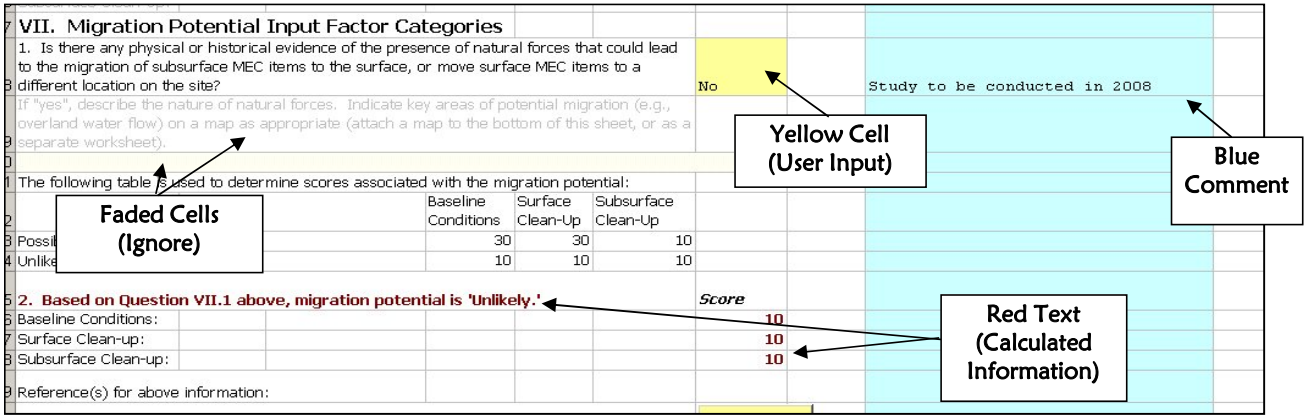
1. Open this file. Enable macros if prompted to do so. This spreadsheet will not work if your security setting is set to 'high' or 'very high'. To change your security level, go to the menu bar and select Tools/Macro/Security. Then close and reopen this spreadsheet.
2. This MS Excel workbook contains 9 worksheets, designed to be used in order. After the '***Instructions***' sheet, the first 5 sheets ask for information about the following topics:

Summary Info - General information regarding the site.
Munitions/Explosive Info - MECs and bulk explosives present at the site.
Current and Future Activities - Current land use activites as well as planned future activities, if any.
Remedial-Removal Action - General information regarding remediation/removal alternatives being considered for the site.
Post-Response Land Use - Land use activities associated with the alternatives listed in the 'Remedial-Removal Action' sheet.

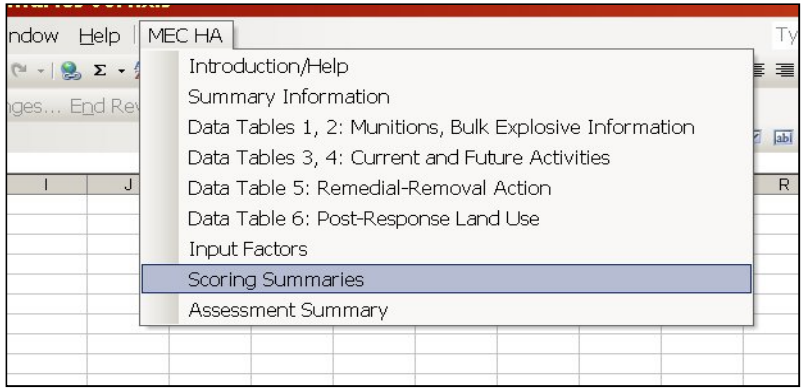
The remaining 3 sheets calculate and summarize the scores. The ***Input Factors*** sheet performs the Input Factor Score calculations, which are summarized in the ***Scoring Summaries*** sheet. The ***Hazard Level*** sheet presents the Hazard Level Category for current use activities, future use activities, and each response alternative based on the respective scores.

3. Starting with the ***Summary Info*** sheet, fill in any yellow cells. Some cells have drop-down lists from which you can select an answer. Select the cell. A down arrow to the right indicates that a drop-down list is available. Yellow buttons can be used to enter reference information. Blue cells can be used for any general comments you wish to make. Any faded cells can be ignored--these are questions that the spreadsheet has determined are not relevant for your situation.

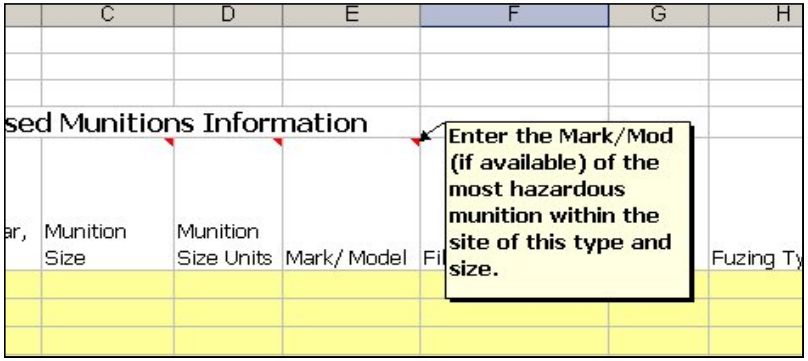
The computer will calculate information based on your inputs. Calculated information will appear as red text.



4. The MEC HA menu bar can be used to navigate to different worksheets.



5. Small red triangles in the upper-right corners indicate that help text is available by putting the mouse cursor on that cell.



MEC HA Summary Information

Comments

Site ID: MRP UXO4 Additional Work Area
Date: 8/31/2015

Please identify the single specific area to be assessed in this hazard assessment. From this point forward, all references to "site" or "MRS" refer to the specific area that you have defined.

A. Enter a unique identifier for the site:

MRP Site UXO4 Additional Work Area

Provide a list of information sources used for this hazard assessment. As you are completing the worksheets, use the "Select Ref(s)" buttons at the ends of each subsection to select the applicable information sources from the list below.

Ref. No.	Title (include version, publication date)
1	2015a)
2	MRP Site UXO4, After Action Report (KCH 2015b)
3	MRP Site UXO4 RI Work Plan (KCH 2015c)
4	Site Inspection Report (Chadux Tt, 2010)
5	
6	
7	
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11	
12	

B. Briefly describe the site:

1. Area (include units): 2.16 acres
2. Past munitions-related use:

Safety Buffer Areas

3. Current land-use activities (list all that occur):

Grazing, natural resources management, routine maintenance

4. Are changes to the future land-use planned? Yes
5. What is the basis for the site boundaries?

Natural boundaries delineated by installation roads.

6. How certain are the site boundaries?

Confirmed during RI field activities.

Reference(s) for Part B:

Explosives Safety Submission, MRP Site UXO4 (KCH, 2015a)
MRP Site UXO4, After Action Report (KCH 2015b)
Site Inspection Report (Chadux Tt, 2010)

[redacted]

C. Historical Clearances

1. Have there been any historical clearances at the site? Yes, surface clearance
2. If a clearance occurred:
   a. What year was the clearance performed? 2015
   b. Provide a description of the clearance activity (e.g., extent, depth, amount of munitions-related items removed, types and sizes of removed items, and whether metal detectors were used):

A detector-aided visual surface clearance was completed in the DGM survey areas on February 24-27, 2015. Surface clearance was conducted at the 100 foot by-100-foot grid cells designated for 100 percent DGM surveys.No MEC or MDEH was discovered during the surface clearance of grid cell areas. The MDAS consisted entirely of M31 practice grenades.

Reference(s) for Part C:

MRP Site UXO4, After Action Report (KCH 2015b) [redacted]

D. Attach maps of the site below (select 'Insert/Picture' on the menu bar.)

Site ID: **MRP UXO4 Additional Work Area**
Date: **8/31/2015**

Cased Munitions Information

Item No.	Munition Type (e.g., mortar, projectile, etc.)	Munition Size	Munition Size Units	Mark/ Model	Energetic Material Type	Is Munition Fuzed?	Fuzing Type	Fuze Condition	Minimum Depth for Munition (ft)	Location of Munitions	Comments (include rationale for munitions that are "subsurface only")
1	Grenades			M31	Spotting Charge	No			0.5	Subsurface Only	Surface clearance in 2015
2	Mortars	60	mm	M720	High Explosive	UNK			0.5	Subsurface Only	Surface clearance in 2015
3	Rockets			M29	Spotting Charge	No			0.5	Surface and Subsurface	Surface clearance in 2015
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

Reference(s) for table above:
Explosives Safety Submission, MRP Site UXO4 (KCH, 2015a)
MRP Site UXO4, After Action Report (KCH 2015b)
[redacted]

Bulk Explosive Information

Item No.	Explosive Type	Comments
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Reference(s) for table above:
[redacted]

Site ID: **MRP UXO4 Additional Work Area**
Date: **8/31/2015**

Activities Currently Occurring at the Site

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours per year a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1	Ranching for cattle grazing	8	80	**640**	0	No intrusive
2	Natural Resource Studies	5	50	**250**	0	No intrusive
3	Routine Maintenance	5	40	**200**	0	No intrusive
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr): **1,090**

Maximum intrusive depth at site (ft): **0**

Reference(s) for table above:

[redacted]

Activities Planned for the Future at the Site (If any are planned: see 'Summary Info' Worksheet, Question 4)

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours per year a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1	Ranching for cattle grazing	8	80	**640**	0	No intrusive
2	Natural Resouce Studies	5	50	**250**	0	No intrusive
3	Routine Maintenance	5	40	**200**	0	No intrusive
4						
5						
6						
7						
8						
9						
10						
11						
12						
			Total Potential Contact Time (receptor hrs/yr):	**1,090**		
			Maximum intrusive depth at site (ft):		**0**	

Reference(s) for table above:

MRP Site UXO4, After Action Report (KCH 2015b)

[redacted]

Site ID: **MRP UXO4 Additional Work Area**
Date: **8/31/2015**

Planned Remedial or Removal Actions

Response Action No.	Response Action Description	Expected Resulting Minimum MEC Depth (ft)	Expected Resulting Site Accessibility	Will land use activities change if this response action is implemented?	What is the expected scope of cleanup?	Comments
1	Land Use Controls	0.5	Limited Accessibility	Yes	No MEC cleanup	Land use controls for access and monitor site conditions
2						
3						
4						
5						
6						

For those alternatives where you answered 'No' in Column E, are land-use activities to be assessed against current or future land uses?		

Reference(s) for table above:

MRP Site UXO4, After Action Report (KCH 2015b)

[redacted]

Site ID: **MRP UXO4 Additional Work Area**
Date: **8/31/2015**

This worksheet needs to be completed for each remedial/removal action alternative listed in the 'Remedial-Removal Action' worksheet that will cause a change in land use.

Land Use Activities Planned After Response Alternative #1: Land Use Controls

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1	Ranching for cattle grazing	8	80	**640**	0	No intrusive
2	Natural Resource Studies	5	50	**250**	0	No intrusive
3	Routine Maintenance	4	50	**200**	0	No intrusive
4						
5						
6						
7						
8						
9						
10						
11						
12						
			Total Potential Contact Time (receptor hrs/yr):	**1,090**		
			Maximum intrusive depth at site (ft):		**0**	

Reference(s) for table above:

MRP Site UXO4, After Action Report (KCH 2015b)

[redacted]

Land Use Activities Planned After Response Alternative #2:

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr):

Maximum intrusive depth at site (ft):

Reference(s) for table above:

[redacted]

Land Use Activities Planned After Response Alternative #3:

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr):

Maximum intrusive depth at site (ft):

Reference(s) for table above:

[redacted]

Land Use Activities Planned After Response Alternative #4:

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr):

Maximum intrusive depth at site (ft):

Reference(s) for table above:

[redacted]

Land Use Activities Planned After Response Alternative #5:

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr):

Maximum intrusive depth at site (ft):

Reference(s) for table above:

[redacted]

Land Use Activities Planned After Response Alternative #6:

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr):

Maximum intrusive depth at site (ft):

Reference(s) for table above:

[redacted]

Site ID: **MRP UXO4 Additional Work Area**

Date: **8/31/2015**

Energetic Material Type Input Factor Categories

The following table is used to determine scores associated with the energetic materials. Materials are listed in order from most hazardous to least hazardous.

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
High Explosive and Low Explosive Filler in Fragmenting Rounds	100	100	100
White Phosphorus	70	70	70
Pyrotechnic	60	60	60
Propellant	50	50	50
Spotting Charge	40	40	40
Incendiary	30	30	30

The most hazardous type of energetic material listed in the 'Munitions, Bulk Explosive Info' Worksheet falls under the category 'High Explosive and Low Explosive Filler in Fragmenting Rounds'.

	Score
Baseline Conditions:	**100**
Surface Cleanup:	**100**
Subsurface Cleanup:	**100**

Location of Additional Human Receptors Input Factor Categories

1. What is the Explosive Safety Quantity Distance (ESQD) from the Explosive Siting Plan or the Explosive Safety Submission for the MRS? 186 feet
2. Are there currently any features or facilities where people may congregate within the MRS, or within the ESQD arc? No
3. Please describe the facility or feature.

MEC Item(s) used to calculate the ESQD for current use activities

[redacted]

Item #2. Mortars (60mm, High Explosive)

The following table is used to determine scores associated with the location of additional human receptors (current use activities):

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Inside the MRS or inside the ESQD arc	30	30	30
Outside of the ESQD arc	0	0	0

4. Current use activities are 'Outside of the ESQD arc', based on Question 2.'

	Score
Baseline Conditions:	**0**
Surface Cleanup:	**0**
Subsurface Cleanup:	**0**

5. Are there future plans to locate or construct features or facilities where people may congregate within the MRS, or within the ESQD arc? No
6. Please describe the facility or feature.

MEC Item(s) used to calculate the ESQD for future use activities

[redacted]

Item #2. Mortars (60mm, High Explosive)

The following table is used to determine scores associated with the location of additional human receptors (future use activities):

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Inside the MRS or inside the ESQD arc	30	30	30
Outside of the ESQD arc	0	0	0

7. Future use activities are 'Outside of the ESQD arc', based on Question 5.'

	Score
Baseline Conditions:	**0**
Surface Cleanup:	**0**
Subsurface Cleanup:	**0**

Comments

based on finding at MRP Site UXO4. The items at the Additional Work Area are suspected to have migrated from MRP Site

Site Accessibility Input Factor Categories

The following table is used to determine scores associated with site accessibility:

	Description	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Full Accessibility	No barriers to entry, including signage but no fencing	80	80	80
Moderate Accessibility	Some barriers to entry, such as barbed wire fencing or rough terrain	55	55	55
Limited Accessibility	Significant barriers to entry, such as unguarded chain link fence or requirements for special transportation to reach the site	15	15	15
Very Limited Accessibility	A site with guarded chain link fence or terrain that requires special equipment and skills (e.g., rock climbing) to access	5	5	5

Current Use Activities — ***Score***

Select the category that best describes the site accessibility under the current use scenario

Moderate Accessibility

Baseline Conditions: **55**
Surface Cleanup: **55**
Subsurface Cleanup: **55**

Future Use Activities

Select the category that best describes the site accessibility under the future use scenario

Moderate Accessibility

Baseline Conditions: **55**
Surface Cleanup: **55**
Subsurface Cleanup: **55**

Reference(s) for above information:

[redacted]

Response Alternative No. 1: Land Use Controls

Based on the 'Planned Remedial or Removal Actions' Worksheet, this alternative will lead to 'Limited Accessibility'.

Baseline Conditions: **15**
Surface Cleanup: **15**
Subsurface Cleanup: **15**

Response Alternative No. 2:

Please enter site accessibility information in the 'Planned Remedial or Removal Actions' Worksheet to continue.

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 3:

Please enter site accessibility information in the 'Planned Remedial or Removal Actions' Worksheet to continue.

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 4:

Please enter site accessibility information in the 'Planned Remedial or Removal Actions' Worksheet to continue.

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 5:

Please enter site accessibility information in the 'Planned Remedial or Removal Actions' Worksheet to continue.

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 6:
Please enter site accessibility information in the 'Planned Remedial or Removal Actions' Worksheet to continue.
Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Potential Contact Hours Input Factor Categories

The following table is used to determine scores associated with the total potential contact time:

	Description	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Many Hours	≥1,000,000 receptor-hrs/yr	120	90	30
Some Hours	100,000 to 999,999 receptor hrs/yr	70	50	20
Few Hours	10,000 to 99,999 receptor-hrs/yr	40	20	10
Very Few Hours	<10,000 receptor-hrs/yr	15	10	5

Current Use Activities:

Input factors are only determined for baseline conditions for current use activities. Based on the 'Current and Future Activities' Worksheet, the Total Potential Contact Time is: **1,090** receptor hrs/yr
Based on the table above, this corresponds to a input factor score for baseline conditions of **15** Score

Future Use Activities:

Input factors are only determined for baseline conditions for future use activities. Based on the 'Current and Future Activities' Worksheet, the Total Potential Contact Time is: **1,090** receptor hrs/yr
Based on the table above, this corresponds to a input factor score of: **15** Score

Response Alternative No. 1: Land Use Controls

Based on the 'Planned Remedial or Removal Actions' Worksheet, land use activities will change if this alternative is implemented.
Total Potential Contact Time, based on the contact time listed for this alternative (see 'Post-Response Land Use' Worksheet) **1,090**
Based on the table above, this corresponds to input factor scores of: ***Score***
Baseline Conditions: **15**
Surface Cleanup: **10**
Subsurface Cleanup: **5**

Response Alternative No. 2:

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Total Potential Contact Time
Based on the table above, this corresponds to input factor scores of: ***Score***
Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 3:

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Total Potential Contact Time
Based on the table above, this corresponds to input factor scores of: ***Score***
Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 4:

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Total Potential Contact Time
Based on the table above, this corresponds to input factor scores of: ***Score***
Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 5:

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Total Potential Contact Time
Based on the table above, this corresponds to input factor scores of: **Score**
Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:
Response Alternative No. 6:

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Total Potential Contact Time
Based on the table above, this corresponds to input factor scores of: **Score**
Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Amount of MEC Input Factor Categories

The following table is used to determine scores associated with the Amount of MEC:

	Description	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Target Area	Areas at which munitions fire was directed	180	120	30
OB/OD Area	Sites where munitions were disposed of by open burn or open detonation methods. This category refers to the core activity area of an OB/OD area. See the "Safety Buffer Areas" category for safety fans and kick-outs.	180	110	30
Function Test Range	Areas where the serviceability of stored munitions or weapons systems are tested. Testing may include components, partial functioning or complete functioning of stockpile or developmental items.	165	90	25
Burial Pit	The location of a burial of large quantities of MEC items.	140	140	10
Maneuver Areas	Areas used for conducting military exercises in a simulated conflict area or war zone	115	15	5
Firing Points	The location from which a projectile, grenade, ground signal, rocket, guided missile, or other device is to be ignited, propelled, or released.	75	10	5
Safety Buffer Areas	Areas outside of target areas, test ranges, or OB/OD areas that were designed to act as a safety zone to contain munitions that do not hit targets or to contain kick-outs from OB/OD areas.	30	10	5
Storage	Any facility used for the storage of military munitions, such as earth-covered magazines, above-ground magazines, and open-air storage areas.	25	10	5
Explosive-Related Industrial Facility	Former munitions manufacturing or demilitarization sites and TNT production plants	20	10	5

Select the category that best describes the ***most hazardous*** amount of MEC: ***Score***

Safety Buffer Areas

Baseline Conditions: **30**
Surface Cleanup: **10**
Subsurface Cleanup: **5**

Minimum MEC Depth Relative to the Maximum Intrusive Depth Input Factor Categories

Current Use Activities

The shallowest minimum MEC depth, based on the 'Cased Munitions Information' Worksheet: **0.5** ft
The deepest intrusive depth: **0** ft
The table below is used to determine scores associated with the minimum MEC depth relative to the maximum intrusive depth:

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.	240	150	95
Baseline Condition: MEC located surface and subsurface, After Cleanup: Intrusive depth does not overlap with subsurface MEC.	240	50	25
Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth overlaps with minimum MEC depth.	150	N/A	95
Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC depth.	50	N/A	25

Because the shallowest minimum MEC depth is greater than the deepest intrusive depth, the intrusive depth will not overlap after cleanup. MECs are located only subsurface, based on the 'Munitions, Bulk Explosive Info' Worksheet. Therefore, the category for this input factor is 'Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC depth.' For 'Current Use Activities', only Baseline Conditions are considered. **50** ***Score***

Future Use Activities

Deepest intrusive depth: **0** ft

Because the shallowest minimum MEC depth is greater than the deepest intrusive depth, the intrusive depth does not overlap. MECs are located only subsurface, based on the 'Munitions, Bulk Explosive Info' Worksheet. Therefore, the category for this input factor is 'Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC depth.'. For 'Future Use Activities', only Baseline Conditions are considered. **50** ***Score***

Response Alternative No. 1: Land Use Controls

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet): **0.5** ft

Based on the 'Planned Remedial or Removal Actions' Worksheet, land use activities will change if this alternative is implemented.

Maximum Intrusive Depth, based on the maximum intrusive depth listed for this alternative (see 'Post-Response Land Use' Worksheet) **0** ft

Because the shallowest minimum MEC depth is greater than the deepest intrusive depth, the intrusive depth does not overlap. MECs are located only subsurface, based on the 'Munitions, Bulk Explosive Info' Worksheet. Therefore, the category for this input factor is 'Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC depth.'

Score

Baseline Conditions: **50**
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 2:

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet): ft

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Maximum Intrusive Depth ft

Not enough information has been entered to calculate this input factor.

Score

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 3:

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet): ft

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Maximum Intrusive Depth ft

Not enough information has been entered to calculate this input factor.

Score

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 4:

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet): ft

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Maximum Intrusive Depth ft

Not enough information has been entered to calculate this input factor.

Score

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 5:

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet): ft

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Maximum Intrusive Depth ft

Not enough information has been entered to calculate this input factor.

Score

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Response Alternative No. 6:

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet): ft

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet. Please complete the table before returning to this section.

Maximum Intrusive Depth ft

Not enough information has been entered to calculate this input factor.

Score

Baseline Conditions:
Surface Cleanup:
Subsurface Cleanup:

Migration Potential Input Factor Categories

Is there any physical or historical evidence that indicates it is possible for natural physical forces in the area (e.g., frost heave, erosion) to expose subsurface MEC items, or move surface or subsurface MEC items? Yes

If "yes", describe the nature of natural forces. Indicate key areas of potential migration (e.g., overland water flow) on a map as appropriate (attach a map to the bottom of this sheet, or as a separate worksheet).

Shallow swale that directs surface water runoff.

The following table is used to determine scores associated with the migration potential

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Possible	30	30	10
Unlikely	10	10	10

Based on the question above, migration potential is 'Possible.'

Score

Baseline Conditions: **30**
Surface Cleanup: **30**
Subsurface Cleanup: **10**

Reference(s) for above information:

Explosives Safety Submission, MRP Site UXO4 (KCH, 2015a)
MRP Site UXO4, After Action Report (KCH 2015b)

[redacted]

MEC Classification Input Factor Categories

Cased munitions information has been inputed into the 'Munitions, Bulk Explosive Info' Worksheet; therefore, bulk explosives do not comprise all MECs for this MRS.

The 'Amount of MEC' category is 'Safety Buffer Areas'. It cannot be automatically assumed that the MEC items from this category are DMM. Therefore, the conservative assumption is that the MEC items in this MRS are UXO.

Has a technical assessment shown that MEC in the OB/OD Area is DMM?

Are any of the munitions listed in the 'Munitions, Bulk Explosive Info' Worksheet: Yes

- Submunitions
- Rifle-propelled 40mm projectiles (often called 40mm grenades)
- Munitions with white phosphorus filler
- High explosive anti-tank (HEAT) rounds
- Hand grenades
- Fuzes
- Mortars

None of the items listed in the 'Munitions, Bulk Explosive Info' Worksheet were identified as 'fuzed'.

The following table is used to determine scores associated with MEC classification categories

UXO Special Case	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
UXO Special Case	180	180	180
UXO	110	110	110
Fuzed DMM Special Case	105	105	105
Fuzed DMM	55	55	55
Unfuzed DMM	45	45	45
Bulk Explosives	45	45	45

Based on your answers above, the MEC classification is 'UXO Special Case'.

	Score
Baseline Conditions:	**180**
Surface Cleanup:	**180**
Subsurface Cleanup:	**180**

MEC Size Input Factor Categories

The following table is used to determine scores associated with MEC Size:

	Description	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Small	Any munitions (from the 'Munitions, Bulk Explosive Info' Worksheet) weigh less than 90 lbs; small enough for a receptor to be able to move and initiate a detonation	40	40	40
Large	All munitions weigh more than 90 lbs; too large to move without equipment	0	0	0

Based on the definitions above and the types of munitions at the site (see 'Munitions, Bulk Explosive Info' Worksheet), the MEC Size Input Factor is: Small

	Score
Baseline Conditions:	**40**
Surface Cleanup:	**40**
Subsurface Cleanup:	**40**

Scoring Summary

Site ID:	MRP UXO4 Additional Work Area	a. Scoring Summary for Current Use Activities	
Date:	8/31/2015	Response Action Cleanup:	No Response Action
Input Factor		**Input Factor Category**	**Score**
I. Energetic Material Type		High Explosive and Low Explosive Filler in Fragmenting Rounds	100
II. Location of Additional Human Receptors		Outside of the ESQD arc	0
III. Site Accessibility		Moderate Accessibility	55
IV. Potential Contact Hours		<10,000 receptor-hrs/yr	15
V. Amount of MEC		Safety Buffer Areas	30
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth		Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC depth.	50
VII. Migration Potential		Possible	30
VIII. MEC Classification		UXO Special Case	180
IX. MEC Size		Small	40
		Total Score	**500**
		Hazard Level Category	**4**

Site ID:	MRP UXO4 Additional Work Area	b. Scoring Summary for Future Use Activities	
Date:	8/31/2015	Response Action Cleanup:	No Response Action
Input Factor		**Input Factor Category**	**Score**
I. Energetic Material Type		High Explosive and Low Explosive Filler in Fragmenting Rounds	100
II. Location of Additional Human Receptors		Outside of the ESQD arc	0
III. Site Accessibility		Moderate Accessibility	55
IV. Potential Contact Hours		<10,000 receptor-hrs/yr	15
V. Amount of MEC		Safety Buffer Areas	30
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth		Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC depth.	50
VII. Migration Potential		Possible	30
VIII. MEC Classification		UXO Special Case	180
IX. MEC Size		Small	40
		Total Score	**500**
		Hazard Level Category	**4**

Site ID:	MRP UXO4 Additional Work Area	c. Scoring Summary for Response Alternative 1: Land Use Controls	
Date:	8/31/2015	Response Action Cleanup:	No MEC cleanup
Input Factor		**Input Factor Category**	**Score**
I. Energetic Material Type		High Explosive and Low Explosive Filler in Fragmenting Rounds	100
II. Location of Additional Human Receptors		Outside of the ESQD arc	0
III. Site Accessibility		Limited Accessibility	15
IV. Potential Contact Hours		<10,000 receptor-hrs/yr	15
V. Amount of MEC		Safety Buffer Areas	30
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth		Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC depth.	50
VII. Migration Potential		Possible	30
VIII. MEC Classification		UXO Special Case	180
IX. MEC Size		Small	40
		Total Score	**460**
		Hazard Level Category	**4**

MEC HA Hazard Level Determination		
Site ID: Area		
Date: 8/31/2015		
	Hazard Level Category	**Score**
a. Current Use Activities	4	500
b. Future Use Activities	4	500
c. Response Alternative 1: Land Use Controls	4	460
d. Response Alternative 2:		
e. Response Alternative 3:		
f. Response Alternative 4:		
g. Response Alternative 5:		
h. Response Alternative 6:		

Characteristics of the MRS	
Is critical infrastructure located within the MRS or within the ESQD arc?	
Are cultural resources located within the MRS or within the ESQD arc?	
Are significant ecological resources located within the MRS or within the ESQD arc?	

Appendix L
Human Health Risk Assessment

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Appendix L

Baseline Human Health Risk Assessment

Remedial Investigation for Munitions Response Program Site UXO4

Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070
Document Control Number: KCH-2622-0070-0055

July 2016

Prepared for

Department of the Navy
Naval Facilities Engineering Command Southwest

Prepared by

CH2M HILL Kleinfelder, A Joint Venture (KCH)

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L-1 MC Conceptual Site Exposure Model for Potential Human Receptors

Acronyms and Abbreviations

95UCL	95 percent upper confidence limit of the mean
bgs	below ground surface
BTV	background threshold value
Cal-EPA	California Environmental Protection Agency
COPC	chemical of potential concern
CSEM	conceptual site exposure model
DGM	digital geophysical mapping
DTSC	California Department of Toxic Substances Control
EPC	exposure point concentration
GI	gastrointestinal
HHRA	human health risk assessment
HI	hazard index
IUR	inhalation unit risk
J	estimated concentration (data qualifier)
KCH	CH2M HILL Kleinfelder, A Joint Venture
Kgt	Tonalite (parent rock type)
Kjm	Metavolcanic/Metasedimentary (parent rock type)
m^3/kg	cubic meter per kilogram
MC	munitions constituents
MEC	munitions and explosives of concern
mg/kg	milligram per kilogram
MPPEH	material potentially presenting an explosive hazard
MRP	Munitions Response Program
NAVWPNSTA	Naval Weapons Station
Navy	United States Department of the Navy
NCP	National Contingency Plan
PEF	particulate emission factor
R	rejected (data qualifier)
RAGS	Risk Assessment Guidance for Superfund

RBC	risk-based concentration
RfC	reference concentration
RfD	reference dose
RI	remedial investigation
RSL	regional screening level
SF	slope factor
SI	site inspection
SVOC	semivolatile organic compound
U	not detected (data qualifier)
UJ	estimated not detected (data qualifier)
USEPA	United States Environmental Protection Agency
UXO	unexploded ordnance
VOC	volatile organic compound

1.0 Introduction

This appendix presents the baseline human health risk assessment (HHRA) for Munitions Response Program (MRP) Site Unexploded Ordnance (UXO) 4 at Naval Weapons Station (NAVWPNSTA) Seal Beach Detachment Fallbrook (Detachment Fallbrook), Fallbrook, California. The HHRA was prepared as part of the remedial investigation (RI) report for MRP Site UXO4.

HHRAs are prepared to evaluate potential health risks under current and future land use conditions. This HHRA includes the following information:

- Estimates the magnitude of potential human health risks associated with current site conditions and potential future land use scenarios.
- Identifies the environmental media and chemicals that pose the primary health concerns.
- Identifies the environmental media and chemicals that pose little or no threat to human health.
- Provides a foundation for assessing the need for further consideration or response under the MRP.

The HHRA incorporates guidance issued by the United States Department of the Navy (Navy), the United States Environmental Protection Agency (USEPA), and the California Environmental Protection Agency's (Cal-EPA's) Department of Toxic Substances Control (DTSC).

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2.0 Site Description and Background

Detachment Fallbrook is located approximately 53 miles north of San Diego in northern San Diego County, California, approximately 9 miles inland from the Pacific Coast. MRP Site UXO4 is triangular in shape and occupies approximately 1.8 acres. MRP Site UXO4 is located approximately 4,500 feet from Ammunition Road, a well-used commuter route within the base boundary (see Figure 1-2 of the RI report). There are no buildings within MRP Site UXO4 boundaries. Detachment Fallbrook leases cattle-grazing rights as part of the fire suppression program. The land surrounding MRP Site UXO4 is within the grazing program. MRP Site UXO4 is fenced with a four-strand wire fence to exclude the site from grazing activities.

The 2.16-acre Additional Work Area is located along a shallow drainage west and downgradient from MRP Site UXO4 (see Figure 1-2 of the RI report). No buildings are within the Additional Work Area.

MRP Site UXO4 was reported to be a burial area for munitions and munitions-related dunnage. The site was reportedly used between 1942 and 1978. A 1978 memorandum from a former Commanding Officer at Detachment Fallbrook states that numerous cases of inert rifle-propelled grenades were buried in the area. Interviews and documentation relating to MRP Site UXO4 indicated that only inert ordnance was buried at the site (Malcolm Pirnie, 2006). As discussed in Section 2.1 of the RI report, the Additional Work Area is included in the RI investigation for MRP Site UXO4. Subsequent discussion in this appendix to MRP Site UXO4 includes the Additional Work Area.

MRP Site UXO4 is currently not in use and is completely fenced. Likewise, the Additional Work Area is not in use; however, this area is not fenced.

Sections 2.0, 3.0, and 5.0 of the RI Report provide further details on the history of Detachment Fallbrook, the historical operations at MRP Site UXO4, physical characteristics of the site and areas surrounding the site, and the nature and results of the environmental investigations for MRP Site UXO4.

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3.0 HHRA Methodology

The methods used to conduct the HHRA are based on the risk assessment framework developed by USEPA. The framework is documented in *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)* (USEPA, 1989). The USEPA framework consists of six basic steps:

- **Step 1: Conceptual Site Exposure Model (CSEM).** This step involves identifying potential exposure pathways to the chemicals of potential concern (COPC) and human populations that might be exposed to COPCs under current or future site conditions.
- **Step 2: Data Evaluation and Selection of COPCs.** This step consists of evaluating the analytical data for usability in the HHRA, grouping analytical data by site and by medium, and selecting COPCs in site media.
- **Step 3: Exposure Assessment.** This step involves (a) estimating exposure point concentrations (EPCs) for the selected COPCs and (b) using the EPCs to estimate pathway-specific intakes (doses) for hypothetical human receptors in the subsequent risk characterization.
- **Step 4: Toxicity Assessment.** This step consists of compiling toxicity values that characterize potential health effects from exposure to COPCs.
- **Step 5: Risk Characterization.** This step combines the results of the previous steps to quantitatively characterize potential risks to human health associated with exposure to COPCs at the area evaluated. Both potential cancer risks and noncancer hazard indices (HIs), a measure of the potential for adverse health effects other than cancer, are evaluated. Chemicals identified as primary risk contributors are evaluated in this HHRA to assess whether detections are attributable to Navy- or non-Navy-related conditions.
- **Step 6: Uncertainty Analysis.** This step discusses the major uncertainties associated with the HHRA.

Human health risks for MRP Site UXO4 are estimated using a risk-based concentration (RBC) approach, rather than the traditional forward risk calculation approach outlined in the *Risk Assessment Guidance for Superfund* (RAGS) Part A framework (USEPA, 1989). The RBC approach is a streamlined approach that combines step 3(b) through step 5. The RBC approach uses the ratio of EPCs calculated in step 3(a) to receptor- and pathway-specific RBCs to estimate health risks. The resulting health risks estimates are numerically equivalent to the estimates obtained using the forward risk calculation methodology outlined in the USEPA (1989) RAGS Part A framework. This RBC approach, also known as the risk-ratio or ratiometric approach, follows the DTSC guidelines for risk assessments (DTSC, 2015; DTSC, 2016).

The remainder of this appendix presents the CSEM (Section 4.0), data evaluation and selection of COPCs (Section 5.0), estimation of EPCs (Section 6.0), risk characterization methodology (Section 7.0), HHRA findings (Section 8.0), and uncertainty analysis (Section 9.0). References are provided in Section 10.0 and tables are provided following the references.

4.0 Conceptual Site Exposure Model

This section presents the HHRA CSEM. The CSEM summarizes information on sources of chemicals at the site, affected environmental media, chemical release and transport mechanisms that may occur at the site, potentially exposed human receptors, and potential exposure pathways for each receptor. The CSEM is shown in Figure L-1. Components of the CSEM are discussed below.

4.1 Sources of Site Chemicals

Potential contaminant sources at MRP Site UXO4 are summarized in Section 2.0 of this appendix. The potential contaminant source at MRP Site UXO4 is munitions constituents (MC) in munitions and munitions-related dunnage that were deposited at the site.

4.2 Affected Environmental Media

Three types of investigations were completed at MRP Site UXO4 and the Additional Work Area during the RI. The first type was targeted anomaly investigation of selected subsurface anomalies identified during digital geophysical mapping (DGM) of transects and 100-percent DGM coverage areas. The second type was targeted excavation of four trenches in elevated anomaly density areas to characterize potential munitions and explosives of concern (MEC)/material potentially presenting an explosive hazard (MPPEH) and MC contamination. The third type was nonbiased soil sampling to assess the nature and extent of MC in soil.

The investigation activities identified chemical impacts in surface soil (0 to 0.5 foot below ground surface [bgs]) and subsurface soil (0 to 8 feet bgs) at MRP Site UXO4 (see Sections 3.0 and 5.0 of the RI report). Note that within the subsurface soil depth interval, the deepest RI soil sample was collected at 8 feet bgs, which corresponded to the maximum depth of targeted anomaly investigation based on DGM.

Because of the inferred depth to groundwater (greater than 100 feet), groundwater is not considered a medium of concern at MRP Site UXO4 and is not addressed by this RI (KCH, 2015). Surface water is likewise not a medium of concern because no permanent surface water bodies are present at the site.

4.3 Chemical Release and Transport Mechanisms

Potential chemical release and transport mechanisms for MRP Site UXO4 are shown on Figure L-1. Based on these transport mechanisms, chemicals detected in surface soil may migrate to ambient (outdoor) air. Outdoor air is therefore considered an additional medium of exposure for site chemicals. Wind erosion was identified as the sole mechanism for release of chemicals to outdoor air. No volatile chemicals were detected in soil; therefore, volatilization to outdoor and indoor air is not a transport mechanism for chemicals at MRP Site UXO4.

4.4 Potentially Exposed Human Receptors

MRP Site UXO4 is not currently used and fencing prevents access. Therefore, no current potential receptors were evaluated in the HHRA.

The planned future use of Detachment Fallbrook is continued military industrial use. Therefore, an industrial worker was selected as a potential future receptor for evaluation in the HHRA. In addition, a hypothetical future resident was also evaluated as a potential future receptor. An unrestricted (residential) land use scenario generally represents the greatest potential for exposure to site chemicals and is evaluated to provide additional information to support risk management decisions for a site. The future scenarios evaluated in the HHRA assume that development of the site (excavating and regrading soils, including potential distribution of subsurface soils to the surface) would occur during future use. Therefore, a future construction worker was also evaluated. In summary, the following three potentially exposed receptors were evaluated in the HHRA:

- Future industrial worker
- Future construction worker
- Hypothetical future resident

4.5 Potentially Complete Exposure Pathways

A complete exposure pathway consists of the following four elements (USEPA, 1989):

- A source and mechanism of chemical release
- A retention or transport medium (or media in cases involving transfer of chemicals)
- A point of potential human contact with the contaminated medium (referred to as the exposure point)
- An exposure route (such as ingestion) at the contact point

If any of these elements is missing (except in a case where the source itself is the point of exposure), then the exposure pathway is considered incomplete. For example, if human contact with the source or transport medium does not occur, then the exposure pathway is incomplete and is not quantitatively evaluated for risk. Similarly, if human contact with an exposure medium is not possible, the exposure pathway is considered incomplete and is not evaluated.

The CSEM summarizes the information on sources of COPCs, affected environmental media, COPC release and transport mechanisms that may occur at the site, potentially exposed receptors, and potential exposure pathways for each receptor (see Figure L-1). Potentially complete exposure pathways are designated by "C" in the CSEM. Incomplete exposure pathways are designated by "I." Health risks were estimated for exposure pathways identified in the CSEM as potentially complete.

Exposure to surface soil (0 to 0.5 foot bgs), which assumes minimal development of the site during future use, was evaluated for future industrial worker and hypothetical future resident.

Exposure to subsurface soil (0 to 10 feet bgs) was also evaluated for the future industrial worker, future resident, and future construction worker. Exposure to subsurface soil assumes intrusive development of the site during future use and excavation of site soil, thereby mixing soils throughout the soil column and making deeper soils available at the surface for contact. As discussed in Section 4.2, sampling of soil at MRP Site UXO4 extended to 8 feet bgs based on the depths of investigated anomalies.

The following exposure pathways were identified as potentially complete for surface soil and subsurface soil:

- Incidental ingestion of soil
- Dermal contact with soil
- Inhalation of particulate chemicals released to outdoor air from wind erosion

Exposure to surface and subsurface soil from these potentially complete exposure pathways are evaluated in the HHRA for the future industrial worker and the future resident. Evaluation of potential soil exposure to the future construction worker is limited to subsurface soil exposure pathways because it is assumed this receptor is involved with intrusive excavation activities.

Outdoor and indoor vapor inhalation exposure pathways associated with soil are incomplete because no volatile chemicals were detected.

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5.0 Data Evaluation and Identification of Chemicals of Potential Concern

This section discusses the process used to evaluate, reduce, and group the analytical data for soil that were collected for MRP Site UXO4, and identify COPCs for quantitative evaluation in the HHRA. The data for soil were collected during 2008 for the site inspection (SI) and during 2015 for this RI. Sections 3.0 through 5.0 of this RI report detail these sampling investigations.

5.1 Data Evaluation

Validated data for soil were initially considered for evaluation in the HHRA. As part of the data evaluation process, 90 percent of analytical data underwent standard (Level III) validation, and a minimum of 10 percent of the data underwent full (Level IV) validation to verify that they met USEPA data quality criteria for use in risk assessment (USEPA, 1992a). The laboratory analytical data were evaluated by an independent validation contractor using USEPA Contract Laboratory Program National Functional Guidelines for Inorganic and Organic Data Review (USEPA, 2008; USEPA, 2010) and the associated analytical methods.

The Level III validation evaluated key quality assurance and quality control information such as holding times, calibration requirements, and spiking accuracy. The Level IV validation evaluated additional quality assurance and quality control criteria and used the raw data to check calculations and chemical identifications. The overall objective was to verify that the analytical data met USEPA guidelines for adequacy based on precision, accuracy, representativeness, comparability, and completeness parameters. At each stage of the validation, qualifiers were assigned to the results according to USEPA guidelines (2008; 2010) and associated analytical methods.

Validated data without qualifiers and validated data qualified as estimated (J) were considered detected in the HHRA. Data validated as not detected (U) or estimated not detected (UJ) were considered not detected. Validated data qualified as rejected (R) were excluded from the HHRA. Following evaluation, the data were reduced (Section 5.2) and grouped (Section 5.3).

5.2 Data Reduction

In addition to the quality evaluation, additional reduction processes were implemented for the data used in the HHRA. Other, nonvalidated data (e.g., field screening data, investigation-derived waste data) were collected to aid in evaluating the nature and extent of contamination and for waste characterization. These data were not used in the HHRA because they do not represent an environmental medium in a human exposure pathway set forth in the exposure assessment or do not meet data quality criteria for risk assessment.

5.3 Data Grouping

Following the data reduction process, data for soil were grouped by the soil depth intervals selected for evaluation in the HHRA: surface soil (0 to 0.5 foot bgs) and subsurface soil (0 to 10 feet bgs). The HHRA data for MRP Site UXO4 consist of 11 RI samples collected from 0 to 0.5 foot (included in both the surface soil and subsurface soil data groupings), 20 RI samples collected at multiple depth intervals between 0.5 and 8 feet bgs (included in the subsurface soil data grouping), and 16 SI samples collected at multiple depth intervals between 0 and 4 feet bgs, but not the top 0.5 foot of soil (included in the subsurface soil data grouping). Samples were analyzed for explosives, metals, and perchlorate. In addition, a subset of the samples were analyzed for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

Tables 5-1 and 5-2 of the RI Report provide the individual analytical results for surface and subsurface soil samples collected during the RI. Appendix A of the RI Report provides the analytical data tables for surface soil samples collected during the SI. Tables L-1 and L-2 summarize the analytical data for chemicals detected in one or more samples in surface soil (0 to 0.5 foot bgs) and subsurface soil (0 to 10 feet bgs). Tables L-1 and L-2 show the range of detected concentrations, sample locations associated with the maximum detected concentration, detection frequency, range of laboratory reporting limits, risk-based residential and industrial screening levels, and the number of detected results that exceed screening levels. Comparisons to residential and industrial screening levels are provided for informational purposes only; the screening levels were not used to screen or exclude chemicals from the HHRA.

Background data for Detachment Fallbrook are available for metals in soil and were developed for four parent rock types (SES-TECH, 2012). The Tonalite (Kgt) and Metavolcanic/Metasedimentary (Kjm) parent rock types are applicable to MRP Site UXO4, based on its location (see Figure 2-1 of SES-TECH, 2012). Background threshold values (BTVs) for Kgt soils were used to evaluate data for the HHRA because concentrations for metals in Kgt soil are generally lower than concentrations of metals in Kjm soils and therefore are more conservative for evaluating data. BTVs for Kgt soils are shown in Tables L-1 and L-2; the number of detected results for metals in soil that exceed BTVs are also shown in these tables.

5.4 Identifying Chemicals of Potential Concern

COPCs are chemicals that are carried through the quantitative risk characterization portions of the HHRA.

COPCs were identified separately for surface soil and subsurface soil using three steps:

- **Step 1 —** The validated analytical data were tabulated and a preliminary list was developed of chemicals detected in one or more samples of surface soil and subsurface soil, regardless of concentration. Chemicals not detected in samples in each data grouping (surface soil, subsurface soil) were excluded from the HHRA.
- **Step 2 —** Inorganic chemicals considered to be essential human nutrients (i.e., calcium, magnesium, potassium, and sodium) were excluded as COPCs. USEPA

guidance states that these nutrients may be deleted because of their low toxicities when they are detected at environmental concentrations (USEPA, 1989). Essential human nutrients are not shown on Tables L-1 and L-2.

- **Step 3 —** Metals considered naturally occurring (i.e., present at background levels) were excluded as COPCs in surface soil and subsurface soil on the basis of threshold comparisons with BTVs. BTVs are shown in Tables L-1 and L-2. Metals with one or more detections above BTVs or for which BTVs are not available were identified as COPCs. Metals for which no detections were above BTVs were excluded as COPCs.

Chemicals identified as COPCs are indicated with a "Yes" in Tables L-1 and L-2. Chemicals identified as COPCs in surface and subsurface soil were limited to perchlorate and metals. No explosives, VOCs, or SVOCs were detected in soil samples.

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6.0 Exposure Point Concentrations

Potential exposure points are identified on the basis of present and anticipated future population activity patterns and the relationship of the activities to the presence of contaminated media. A location is identified as an exposure point if a human might contact (e.g., ingest) a contaminated medium (e.g., surface soil) at that location. MRP Site UXO4 is considered an exposure point for this HHRA. Potential exposure to COPCs in soil is assumed to occur randomly throughout the exposure point over the duration of exposure.

The concentration of a COPC in a medium (e.g., surface soil) that a receptor may be exposed to is called the EPC. The EPC for each COPC is represented by the 95 percent upper confidence limit (95UCL) of the mean or the maximum detected concentration. USEPA considers the 95UCL concentration as a conservative upper-bound estimate that is not likely to underestimate the mean concentration (USEPA, 1989: USEPA, 1992b; USEPA, 2002). 95UCLs were calculated for each COPC in surface soil and subsurface soil using the stochastic methods in the USEPA ProUCL software (USEPA, 2013).

The procedures in ProUCL identify the statistical distribution type (i.e., normal, lognormal, or nonparametric) for each COPC and data grouping (e.g., surface soil), and compute the corresponding 95UCL for the identified distribution type. The 95UCL is used as the EPC unless the calculated 95UCL is greater than the maximum detected concentration or unless the number of samples or number of detected results in the data grouping is too small (fewer than five total results or fewer than four detected results) to permit estimation of a 95UCL. If this occurs, then the maximum detected concentration is used as the EPC. Use of maximum detected concentrations for EPCs may contribute to overestimation of risk.

The EPCs calculated using ProUCL are summarized in Table L-3. For each COPC, Table L-3 shows the detection frequency, number of high censored results, arithmetic mean, distribution of the data determined by ProUCL (i.e., normal, lognormal, or gamma; data not fitting these distributions were treated as nonparametric), maximum detected concentration, and resulting EPC. Censored results that exceeded maximum detected concentrations (i.e., high censored results) were excluded from the 95UCL calculations.

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7.0 Risk Characterization

This section discusses the process used to characterize potential risks associated with exposure to detected chemicals. Cancer risks and noncancer health hazards are characterized separately. As discussed in Section 3.0, this HHRA uses an RBC approach (i.e., risk ratio approach) to calculate risks. Section 7.1 identifies the RBCs used to estimate risks. The methodology for estimating cancer risks and HIs is presented in Sections 7.2 and 7.3. The methodology used to characterize risks for lead is presented in Section 7.4.

7.1 Risk-Based Concentrations

As discussed in Section 3.0, this baseline HHRA estimates health risks using a streamlined RBC approach. The resulting health risks estimates are numerically equivalent to the estimates obtained using the "forward risk calculation methodology" outlined in the USEPA (1989) RAGS Part A framework.

USEPA (2015) industrial and residential regional screening levels (RSLs) for soil were used as RBCs to evaluate future industrial worker and hypothetical future residential exposure to surface and subsurface soil. When available, DTSC (2016)-preferred risk-based screening levels for soil as RBCs in lieu of USEPA RSLs. The soil RBCs used for this HHRA are summarized in Table L-4.

Both the USEPA (2015) RSLs and DTSC (2016)-preferred screening levels are RBCs for individual chemicals that correspond to a cancer risk of 1×10^{-6} (for carcinogens) or a hazard quotient of 1 (for noncarcinogens). The RBCs are derived from equations that combine exposure assumptions with chemical-specific toxicity values. The USEPA (2015) RSLs are derived using USEPA default assumptions for industrial and residential exposure and the USEPA-preferred hierarchy for toxicity values. The DTSC (2016)-preferred screening levels are similarly derived; DTSC uses California assumptions for residential and industrial exposure and California toxicity values, when available, to calculate the screening levels. The final list of DTSC screening levels only includes those chemicals for which the resulting screening level is at least three times more stringent than the corresponding USEPA RSL value (DTSC, 2015).

Exposure pathways that incorporated the USEPA (2015) soil RSLs and DTSC (2015)-preferred soil screening levels include incidental ingestion, dermal contact, and inhalation of chemicals released from soil to outdoor air as particulates. These pathways are consistent with the soil exposure pathways identified as potentially complete for MRP Site UXO4 (see Section 4.5).

7.1.1 Construction Worker RBCs

Neither USEPA nor DTSC has established soil RBCs for construction worker exposure. Therefore, soil RBCs for construction worker exposure were calculated for this HHRA to evaluate this receptor. The construction worker RBCs were derived for carcinogenic COPCs based on a target cancer risk of 1×10^{-6} and for noncarcinogenic COPCs based on a target noncancer HI of 1. Cancer-based and noncancer-based RBCs were calculated for COPCs

associated with both cancer and noncancer effects. Table L-5 shows the equations and exposure assumptions for calculating RBCs for construction worker exposure to soil. Exposure assumptions were based on DTSC (2014) when available; otherwise, exposure assumptions were based on USEPA (2015). The toxicity values used to calculate the construction worker RBCs are shown in Table L-6. The hierarchy used for toxicity values follows the hierarchy that USEPA uses to calculate soil RSLs, except that California toxicity values were used when more stringent than non-California values.

Toxicity criteria are not available for the dermal exposure route. USEPA (2004) guidance recommends that oral toxicity criteria be adjusted for evaluation of dermal exposures so that criteria are based on an absorbed dose. Toxicity value adjustments are only needed when the gastrointestinal (GI) absorption fraction is less than 50 percent (USEPA, 2004). The GI absorption fractions used to adjust the oral toxicity criteria and the resulting dermal toxicity criteria are also shown on Table L-6. The GI absorption fractions were taken from USEPA (2015).

The calculated soil RBCs for construction worker exposure are summarized in Table L-7.

7.2 Characterization of Cancer Risks

The cancer risk estimate associated with exposure to a carcinogenic COPC is calculated as follows:

$$\textit{Cancer risk} = (EPC/RBCc) \times 10^{-6}$$

where:

EPC = Exposure point concentration in for soil in milligram per kilogram (mg/kg)

RBCc = Risk-based concentration for carcinogens (mg/kg)

Individuals may be exposed to more than one COPC at a site. The cancer risks for individual COPCs are summed by exposure pathway to calculate the cumulative cancer risk as follows:

$$\textit{Cumulative risk} = 10^{-6} \times \{EPC_1/RBCc_1 + EPC_2/RBCc_2 + \ldots + EPC_n/RBCc_n\}$$

where:

Cumulative risk = Cumulative cancer risk from exposure to carcinogenic COPCs (unitless)

USEPA guidance on exposure levels considered protective of human health is presented to aid in the interpretation of the results of the risk assessment. In the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), USEPA defined general remedial action goals for sites on the National Priorities List (Title 40 of the Code of Federal Regulations Section 300.430). The goals include a range for residual cancer risk, which is "an excess upper-bound lifetime cancer risk to an individual of between 1E-04 [10^{-4}] and 1E-06 [10^{-6}] or 1 in 10,000 to 1 in 1,000,000." The goals set out in the NCP are applied once a decision to remediate a site has been made. A subsequent USEPA directive provides additional guidance on the role of the HHRA in supporting risk management decisions and,

in particular, evaluating whether a response action is necessary (USEPA, 1991). Specifically, the guidance states the following:

> Where cumulative carcinogenic risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10^{-4}, and the noncancer hazard quotient (HQ) is less than 1, action generally is not warranted unless there are adverse environmental impacts.

This HHRA compares cumulative cancer risks with the USEPA range of 10^{-4} to 10^{-6} for management of cancer risk, referred to as the risk management range. Cumulative cancer risks are also compared to the lower end of the range, 1×10^{-6}, which is the DTSC point of departure for management of cancer risks. Risks that do not exceed the point of departure (1×10^{-6}) are considered negligible and do not require action.

7.3 Characterization of Noncancer Hazards

The potential for receptors to develop adverse health effects from inhalation exposure to COPCs that are not classified as carcinogens and for carcinogens known to cause adverse health effects other than cancer is calculated as follows:

$$Hazard\ Index\ (HI) = EPC/RBCnc$$

where:

EPC = Exposure point concentration in soil (mg/kg)

RBCnc = Risk-based concentration for soil (mg/kg)

The HIs for individual COPCs are summed to evaluate the cumulative potential for noncancer effects from exposure to multiple COPCs, yielding a cumulative HI as shown below:

$$Cumulative\ HI = EPC_1/RBCnc_1 + EPC_2/RBCnc_2 + \ldots + EPC_n/RBCnc_n$$

where:

HI = Cumulative noncancer hazard index from exposure to noncarcinogenic COPCs (unitless)

An HI of less than 1 indicates that adverse noncancer health effects are not expected. If the total HI exceeds 1, further evaluation in the form of a segregation of the HI via a target organ analysis may be performed to assess whether the noncancer HIs are a concern (USEPA, 1989). Target organ HIs greater than 1 may indicate a potential adverse effect; target organ HIs that do not exceed 1 indicate that adverse noncancer effects are not expected.

7.4 Characterization of Risks from Lead

Lead was identified as a COPC in surface and subsurface soil. The HHRA evaluated the potential for health effects from exposure to lead in soil by comparing the EPC with the California-recommended screening concentration for lead of 80 mg/kg for residential exposure and 320 mg/kg for industrial exposure (DTSC, 2016). These screening concentrations are based on a biomarker (blood lead levels); for this reason, the risks from exposure to lead were characterized separately and were not included in cumulative risk calculations.

8.0 Results of the HHRA

This section presents the risk characterization results for the HHRA. The risks estimated in this HHRA are considered site-related risks because estimates of risks are limited to chemicals identified as COPCs (i.e., chemicals present above naturally occurring background concentrations) rather than detected chemicals. Tables L-8 and L-9 show the chemical-specific and cumulative risks and HIs for surface soil and subsurface soil for the future industrial and residential scenarios. Table L-10 shows the chemical-specific and cumulative risks and HIs for subsurface soil for the future construction worker scenario.

This HHRA identifies a COPC as a primary risk contributor for MRP Site UXO4 if the COPC-specific risk exceeds the DTSC point of departure for cancer risks of 1×10^{-6} or if the COPC-specific HI exceeds the noncancer threshold level of 1.

Consistent with USEPA (1989), the cumulative risk and HI results are shown to one significant figure in this section. HI results that exceed 1 are expressed as whole numbers. However, the risk calculations in Tables L-8 through L-10 are presented to two significant figures to aid review of calculations.

Lead was identified as a COPC in surface and subsurface soil. As indicated in Section 7.4, risks from exposure to lead are characterized separately by comparing the EPC for lead to screening concentrations. The risk characterization for lead is in Section 8.3.

Each of the COPCs identified as primary risk contributors was evaluated further to assess whether detections could be attributed to non-Navy-related conditions. Primary risk contributors that could be attributed to Navy site-use-related conditions are recommended for further consideration or response under the MRP. Primary risk contributors that are not be attributed to Navy site-use-related conditions are not recommended for additional evaluation. The evaluation of primary risk contributors is provided in Section 8.4.

8.1 Surface Soil

8.1.1 Future Industrial Worker

The cumulative cancer risk for future industrial worker exposure to surface soil is 7×10^{-6} (Table L-8). The cancer risk exceeds the DTSC point of departure of 1×10^{-6}, but is within the USEPA risk management range of 10^{-4} to 10^{-6}. Arsenic is the primary risk contributor and accounts for nearly 100 percent of the cancer risk.

The cumulative noncancer HI for future industrial worker exposure to surface soil is 0.7 (Table L-8), which is less than the noncancer threshold of 1.

8.1.2 Future Resident

The cumulative cancer risk for future residential exposure to surface soil is 3×10^{-5} (Table L-8). The cancer risk exceeds the DTSC point of departure of 1×10^{-6}, but is within the USEPA risk management range of 10^{-4} to 10^{-6}. Arsenic is the primary risk contributor, and accounts for nearly 100 percent of the cancer risk.

The cumulative noncancer HI for future residential exposure to surface soil is 7 (Table L-8), which exceeds the noncancer threshold of 1. Arsenic is also a primary risk contributor for noncancer effects, and accounts for 97 percent of the cumulative noncancer hazard. Segregation of the HI by target organ was not done for the residential scenario because, other than arsenic, the sum of the HIs for other COPCs in surface soil does not exceed 1.

8.2 Subsurface Soil

8.2.1 Future Industrial Worker

The cumulative cancer risk for future industrial worker exposure to subsurface soil is 8×10^{-6} (Table L-9). The cancer risk exceeds the DTSC point of departure of 1×10^{-6}, but is within the USEPA risk management range of 10^{-4} to 10^{-6}. Arsenic is the primary risk contributor, and accounts for nearly 100 percent of the cancer risk.

The cumulative noncancer HI for future industrial worker exposure to subsurface soil is 0.7 (Table L-9), which is less than the noncancer threshold of 1.

8.2.2 Future Resident

The cumulative cancer risk for future residential exposure to subsurface soil is 3×10^{-5} (Table L-9). The cancer risk exceeds the DTSC point of departure of 1×10^{-6}, but is within the USEPA risk management range of 1×10^{-6}. Arsenic is the primary risk contributor, and accounts for nearly 100 percent of the cancer risk.

The cumulative noncancer HI for future residential exposure to subsurface soil is 8 (Table L-9), which exceeds the noncancer threshold of 1. Arsenic is also a primary risk contributor for noncancer effects, and accounts for 93 percent of the cumulative noncancer hazard. Segregation of the HI by target organ was not done for the residential scenario because the other than arsenic, the sum of the HIs for other COPCs in subsurface soil does not exceed 1.

8.2.3 Future Construction Worker

The cumulative cancer risk for future construction worker exposure to subsurface soil is 1×10^{-6} (Table L-10). The cancer risk is equal to, but does not exceed the DTSC point of departure of 1×10^{-6}. No primary risk contributors for the construction worker scenario were identified based on cancer risk. That is, no chemical-specific cancer risks exceed 1×10^{-6}; however, the chemical-specific cancer risk for arsenic is equal to 1×10^{-6}.

The cumulative noncancer HI for future construction worker exposure to subsurface soil is 4 (Table L-10), which exceeds the noncancer threshold of 1.

Segregation of the HI in the form of a target organ evaluation was completed for the construction worker scenario because the cumulative HI exceeded the threshold of 1. The analysis was limited to arsenic, cadmium, cobalt, and manganese because these four chemicals contribute to nearly all of the HI for the construction worker scenario. The HI associated with the remaining COPCs (perchlorate, antimony, beryllium, hexavalent chromium, copper, mercury, molybdenum, tin, and zinc) is minimal (0.096).

The target organs for arsenic, cadmium, cobalt, and manganese are listed in the following table. Target organ information was obtained from the sources used to identify the noncancer toxicity values for these chemicals (Table L-6).

COPC	Oral Chronic Reference Dose Target Organ(s)	Inhalation Chronic Reference Concentration Target Organ(s)
Arsenic	Reproductive/development, cardiovascular, nervous, respiratory, dermal[a]	Reproductive/development, cardiovascular, nervous, respiratory, dermal[a]
Beryllium	Gastrointestinal[a]	Respiratory, immune[a]
Cadmium	Urinary[a]	Urinary[b]
Cobalt	Endocrine[b]	Respiratory[b]
Manganese	Nervous[b]	Nervous[b]

Notes:
[a] Source: Cal-EPA, 2016
[b] Source: ORNL, 2016

Based on the corresponding target organs, segregated HIs were calculated by target organ for the future construction worker scenario. More than one target organ is indicated for some metals (i.e., arsenic, cobalt, and nickel). When this occurs, the HI is applied to each target organ equally. The segregated HIs are shown in the following table.

Target Organ	Exposure Route and COPC		Segregated Hazard Index		
	Oral/Dermal[a]	Inhalation	Oral/Dermal[a,b]	Inhalation[b]	Total[c]
Reproductive/ development	Arsenic	Arsenic	1.7	0.030	**2**
Cardiovascular	Arsenic	Arsenic	1.7	0.030	**2**
Nervous	Arsenic, Manganese	Arsenic, Manganese	1.8	1.2	**3**
Respiratory	Arsenic	Arsenic, Cobalt	1.7	0.32	**2**
Dermal	Arsenic	Arsenic	1.7	0.030	**2**
Urinary	Cadmium	Cadmium	0.14	0.0045	**0.1**
Endocrine	Cobalt	--	0.083	--	**0.08**

-- = not applicable or not available
[a] Target organs for the oral route of exposure are used to assess the oral and dermal routes of exposure because dermal HIs are estimated using oral reference doses (adjusted by GI absorption fraction; see Section 7.1).
[b] See Table L-10.
[c] The total segregated HI is calculated by summing the segregated HIs for the oral/dermal and inhalation exposure routes. Total HIs are rounded to one significant figure (USEPA, 1989).

This evaluation shows a slight decrease in total, nonchemical-specific HI when the HI is segregated by target organ. While the total, nonchemical-specific HI is 4, the highest segregated HI is 3, which likewise exceeds the threshold HI of 1. The segregated HI of 3 is associated with effects on the nervous system, and is based on exposure to arsenic and manganese. In addition, a segregated HI of 2 is calculated for the reproductive/ development, cardiovascular, respiratory, and dermal systems. The segregated HI of 2 for each of these target organs was based on exposure to arsenic; cobalt also contributes to the segregated HI for the respiratory system. No other HIs segregated by target organ exceed the threshold HI of 1. Based on these results, arsenic, cobalt, and manganese are identified as primary risk contributors based on noncancer effects.

8.3 Lead

Lead was identified as a COPC in surface and subsurface soil. EPCs for lead are based on 95UCL concentrations and are 28.32 mg/kg in surface soil and 15.65 mg/kg in subsurface soil. EPCs for lead in surface and subsurface soil are less than the residential screening criterion of 80 mg/kg and the industrial screening criterion of 320 mg/kg.

Use of 95UCL concentrations for evaluation lead is appropriate provided geographically collocated areas of elevated concentrations or individual samples with elevated concentrations are not present (DTSC, 2016). Maximum detected concentrations of lead in surface soil (45.7 mg/kg) and subsurface soil (51.2 J mg/kg) likewise do not exceed screening concentrations for lead. Therefore, further evaluation is not needed for lead.

8.4 Evaluation of Primary Risk Contributors

Arsenic, cobalt, and manganese were identified in the HHRA as a primary risk contributors. These chemicals were evaluated further to assess whether detections could be attributed to Navy-related conditions. Primary risk contributors that are not attributed to Navy site-use-related conditions are not recommended for additional evaluation. Primary risk contributors that could be attributed to Navy site-use-related conditions are recommended for further consideration or response under the MRP.

8.4.1 Arsenic

Arsenic was identified as a primary risk contributor for surface and subsurface soil based on cancer risks that exceed 1×10^{-6} for the future industrial and residential scenarios. In addition, arsenic contributes to a segregated HI of 3 (based on effects to the nervous system) and to multiple segregated HIs of 2 (based on effects to the reproductive/ development, cardiovascular, respiratory, and dermal systems) for the future construction worker scenario. Arsenic was detected in all 11 surface soil (0 to 0.5 foot bgs) samples and in all 47 subsurface soil (0 to 10 feet bgs) samples at concentrations ranging from 0.932 to 3.99 mg/kg.

Arsenic was selected as a COPC for surface and subsurface soil because the maximum detected concentration (3.99 mg/kg) exceeds the BTV for Kgt soils of 1.681 mg/kg. However, as discussed in Section 5.3, both Kgt and Kjm background soils are applicable to MRP Site UXO4 based on its location. Background concentrations for arsenic in Kgt and Kjm soils range from 0.43 to 8.2 mg/kg. Detected arsenic concentrations at MRP Site UXO4 (0.932 to 3.99 mg/kg) are well within the range of naturally occurring background arsenic concentrations. This comparison indicates that site concentration of arsenic at MRP Site UXO4 are likely naturally occurring, rather than site-related.

In addition, arsenic is not associated with munitions or munitions dunnage, and historical use of the MRP Site UXO4 does not indicate use or disposal of arsenic. Based on comparability to background arsenic concentrations for Detachment Fallbrook, arsenic concentrations measured at MRP Site UXO4 are likely to be naturally occurring.

For these reasons, arsenic is not recommended for further evaluation.

8.4.2 Cobalt

Cobalt was identified as a primary risk contributor for subsurface soil for the future construction worker scenario. Cobalt was detected in all 47 subsurface soil (0 to 10 feet bgs) samples at concentrations ranging from 4.34 to 23.9 mg/kg. The subsurface soil EPC for cobalt (7.693 mg/kg; Table L-4) does not exceed the DTSC (2016) residential noncancer RBC for cobalt of 23 mg/kg or the construction worker noncancer RBC for cobalt calculated for this HHRA of 20 mg/kg. The lower noncancer RBC for the construction worker compared with the RBC for the residential receptor is based on use of the more stringent DTSC (2014)-

recommended particulate emission factor (PEF) to estimate soil-to-outdoor air concentrations from construction-related soil activities (1×10^6 cubic meters per kilogram [m^3/kg]) rather than the DTSC (2014)-recommended PEF to estimate outdoor air concentrations from non-construction activities (1.36×10^9 m^3/kg).

Cobalt was identified as a primary risk contributor because it contributes to a segregated HI of 2 for the future construction worker scenario, based on a target organ analysis. The segregated HI of 2 exceeds the threshold HI of 1 and is based on effects to the respiratory system. However, the chemical-specific noncancer HI for cobalt for the future construction worker scenario is 0.4; that is, the chemical-specific HI for cobalt does not exceed the threshold HI of 1. The noncancer HI for arsenic composes the remainder of the segregated HI calculated for the respiratory system.

Cobalt was selected as a COPC for subsurface soil because the maximum detected concentration (23.9 mg/kg) exceeds the BTV for Kgt soils of 23.81 mg/kg. However, the maximum detection only negligibly exceeds the BTV for Kgt soils (by 0.01 mg/kg). That is, the maximum concentration is essentially equivalent to the BTV. In addition, the location of the maximum detection (UXO4-SB05) is not associated with an investigation trench with geophysical anomalies.

Based on this information – relatively low chemical-specific construction worker HI for cobalt (0.5) compared to the respective segregated HI (2), EPC for cobalt less than the residential and construction worker cobalt RBCs, and comparability between site cobalt concentrations and background cobalt concentrations for Detachment Fallbrook with only one of 47 samples exceeding the BTV but only by a negligible amount of 0.01 mg/kg – cobalt is not recommended for further evaluation.

8.4.3 Manganese

Manganese was identified as a primary risk contributor for subsurface soil (future construction worker scenario). Manganese was detected in all 47 subsurface soil (0 to 10 feet bgs) samples at concentrations ranging from 89.9 to 627 mg/kg. These concentrations are well below than the USEPA (2015) residential RBC for manganese of 1,800 mg/kg. Although the EPC for manganese (259.9 mg/kg) is also less than the residential RBC for manganese, it exceeds the construction worker RBC for manganese calculated for this HHRA of 200 mg/kg. The lower manganese RBC for the construction worker compared with the RBC for the residential receptor is based on use of the more stringent DTSC (2014)-recommended PEF to estimate soil-to-outdoor air concentrations from construction-related soil activities (1×10^6 m^3/kg) rather than the DTSC (2014)-recommended PEF to estimate outdoor air concentrations from non-construction activities (1.36×10^9 m^3/kg).

Manganese was identified as a primary risk contributor because it contributes to a segregated HI of 3 for the future construction worker scenario, based on a target organ analysis. The segregated HI of 2 exceeds the threshold HI of 1 and is based on effects to the nervous system. The chemical-specific noncancer HI for manganese for the future construction worker scenario is 1; this chemical-specific HI is equal to, but does not exceed, the threshold HI of 1. The noncancer HI for arsenic composes the remainder of the segregated HI calculated for the nervous system.

Manganese was selected as a COPC for subsurface soil because the maximum detected concentration (627 mg/kg) exceeds the manganese BTV for Kgt soils of 432.1 mg/kg. The maximum background concentration for manganese for Detachment Fallbrook, regardless of parent rock type, is 438 mg/kg. Evaluation of site results for manganese shows that only two of the 47 samples for manganese (451 mg/kg at KCH-UXO-SB04 and 627 mg/kg at UXO4-SB05) exceed the BTV for Kgt soils. Likewise, these two samples exceed the maximum background concentration for manganese for Detachment Fallbrook. However, these two samples are neither collocated nor located in an investigation trench with geophysical anomalies. Concentrations for the remaining 45 samples for manganese are less than the BTV for manganese and the maximum background concentration for manganese.

Based on this information – chemical-specific construction worker HI for manganese is equal to, but does not exceed the threshold HI of 1, concentrations are well below the residential RBC for manganese, and general comparability between site manganese concentrations and background manganese concentrations with only two of 47 samples exceeding the manganese BTV and maximum manganese background concentration – manganese is not recommended for further evaluation.

9.0 Uncertainty Analysis

Varying degrees of uncertainty at each stage of the HHRA arise from assumptions made in the risk assessment and the limitations of the data used to calculate risk estimates. Uncertainty and variability are inherent in the exposure assessment, toxicity values, and risk characterization. USEPA guidance (1989) states the following:

> There are several categories of uncertainties associated with risk assessments. One is the initial selection of substances used to characterize exposures and risk on the basis of the sampling data and available toxicity information. Other sources of uncertainty are inherent in the toxicity values for each substance used to characterize risk. Additional uncertainties are inherent in the exposure assessment for individual substances and individual exposures. These uncertainties are usually driven by uncertainty in the chemical monitoring data and the models used to estimate exposure concentrations in the absence of monitoring data, but can also be driven by population intake parameters. Finally, additional uncertainties are incorporated in the risk characterization when exposures to several substances across multiple pathways are summed.

USEPA defines uncertainty as a "lack of knowledge about specific factors, parameters or models," including "parameter uncertainty (measurement errors, sampling errors, and systematic errors), model uncertainty (uncertainty that results from necessary simplification of real-world processes, mis-specification of the model structure, model misuse, or use of inappropriate surrogate variables), and scenario uncertainty (descriptive errors, aggregation errors, errors in professional judgment, or incomplete analysis)." Variability is defined as "observed differences attributable to true heterogeneity or diversity in a population or exposure parameter." Variability is the result of natural random processes, such as variations in body weight, breathing rate, or drinking water consumption. Variability cannot be reduced by further study, but may be better characterized through further measurements. The following sections describe the key sources of uncertainty in the HHRA process.

9.1 Sampling Data and Selection of Chemicals of Potential Concern

Key uncertainties associated with identifying COPCs are associated with sampling data used to identify COPCs. These uncertainties involve errors in chemical analysis, sample size sufficiency, and laboratory reporting limits. Systematic or random errors in the chemical analysis may yield erroneous data. These errors can result in an underestimate of risk because data may be viewed as nondetected or estimated as a result of laboratory errors or assumptions in the chemical analysis. This error could also result in fewer detected results or estimated results for specific samples or analyses. The data validation (see Appendix J of the RI report) found no major problems or errors with the laboratory chemical analysis;

therefore, no under- or over-estimates of risk are expected based on laboratory errors or assumptions in chemical analysis.

Lack of sufficient samples to characterize soil can result in an underestimate of risk because calculated risks for an exposure area may be based on few samples, which may or may not be representative of the area at large. However, biased soil and nonbiased soil samples were collected to address this potential uncertainty at MRP Site UXO4, which covers approximately 4 acres (including the Additional Work Area). Three types of soil sampling were performed at MRP Site UXO4 during the RI. The first type was biased sampling beneath MPPEH identified by the targeted anomaly investigation that was performed based on the findings of the DGM surveys. The second type was biased sampling associated with targeted excavation of four trenches in elevated anomaly density areas to characterize potential MEC/MPPEH and MC contamination. The third type was nonbiased soil sampling to assess the nature and extent of MC in surface and subsurface soil. A total of 17 biased samples was collected beneath MPPEH and from trenches excavated into elevated anomaly density areas based on the findings of MEC investigation activities. In addition, 14 soil samples were collected from nonbiased locations. The three types of soil sampling performed at MRP Site UXO4 reduce the likelihood that risks are underestimated based on lack of sufficient sampling.

Selection of COPCs for evaluation in the HHRA was based on comparison of detected sample results for metals to BTVs established for Detachment Fallbrook. Metals with one or more detected results that exceeded respective BTVs were selected as COPCs. Based on the location of UXO4, BTVs for Kgt soils were used. Use of a single parent rock type (Kgt) to represent background soils does not account for the potential for mixed soils at the site, which may occur from natural geological processes, storm water runoff, or windblown erosion; that is, actual background concentrations may be higher or lower than the established BTVs for Kgt soils. In addition, BTVs were not established for hexavalent chromium and molybdenum; these metals were detected in site soils and selected as COPCs based on lack of BTVs.

9.2 Exposure Assessment

Uncertainties were identified in association with three areas of the exposure assessment process: (1) the selection of exposure scenarios and pathways, (2) the estimation of EPCs, and (3) the selection of exposure variables used to estimate chemical intake. Uncertainties in each of these areas are discussed in the following sections.

9.2.1 Exposure Scenarios and Pathways

Exposure scenarios were identified based on observed and assumed land use and activity that may occur. Uncertainties are introduced to the degree that actual land use and activity patterns are not represented by those assumed. Exposure estimates developed under the future land use scenarios (e.g., residential) may overestimate risks if the site is not used for the scenarios evaluated.

Because of the restricted military use of Detachment Fallbrook, it is unlikely that offsite receptors (e.g., offsite industrial workers or offsite residents) may be exposed to contaminated onsite soil (via wind dispersion) and groundwater (via ingestion or vapor

intrusion) if onsite contaminated media are transported offsite. Offsite receptors were not evaluated in this risk assessment because current offsite exposure to potential receptors is considered unlikely.

9.2.2 Estimating Exposure Point Concentrations

The sample collection strategy was designed as a purposive investigation so that soil sampling included samples collected in areas of suspected or known contamination. EPCs based on nonrandom sample locations are likely to overestimate the concentrations at the exposure point, as well as the actual dose to the receptor.

Recommendations in USEPA (2013) were followed for calculating 95UCLs for COPCs detected in at least four samples. In some cases, the dataset for a COPC is composed of both detected and censored results. The USEPA recommendations for calculation of 95UCLs include use of censored results; although stochastic methods are used, these methods are not expected to have a significant effect on the HHRA results.

Nondetected results that exceeded maximum detected concentrations for COPCs were excluded from 95UCL calculations; these nondetected results are indicated as high censored results in Table L-3. High censored results were limited to 15 samples of perchlorate, three samples of antimony, eight samples of cadmium, one sample of hexavalent chromium, and 15 samples of mercury; exclusion of these results from the 95UCL calculations is not expected to result in an underestimate of risks.

The maximum detected concentration is used as the EPC for cases where the dataset for a COPC is composed of fewer than four detected results. This approach is used because current methods are considered unreliable for calculating 95UCLs when a limited number of results are detected (USEPA, 2013). This approach may result in an overestimate of risks because use of the maximum concentration as the EPC assumes that the COPC is detected at the maximum concentration throughout the exposure point, even though analytical results show that the maximum concentration was measured in only one location and that concentrations in remaining sample locations are either lower than the maximum or are not detected. Maximum concentrations were used as EPCs for perchlorate and tin in surface soil and perchlorate in subsurface soil (see Table L-3). Use of maximum concentrations for these chemicals is not expected to result in an overestimate of risks; these chemicals were not identified as a primary risk contributor.

9.2.3 Selecting Exposure Variables

The exposure assumptions used in the HHRA were standard, default upper-bound assumptions for most scenarios. Default assumptions are intended to provide a conservative estimate of risks, rather than to underestimate risks. However, it is possible that the exposure variables used in this evaluation do not represent actual future exposure conditions.

9.3 Toxicity Assessment

The primary uncertainties associated with the toxicity assessment are related to derivation of toxicity values for COPCs. Standard reference doses (RfDs), reference concentrations (RfCs), slope factors (SFs), and inhalation unit risks (IURs) developed by USEPA (2015) and

Cal-EPA (2016) were used to estimate potential cancer and noncancer health effects from exposure to COPCs. RfDs, RfCs, SFs, and IURs are derived by applying conservative (health-protective) assumptions and are intended to protect the most sensitive potentially exposed individuals. These toxicity values were incorporated into the USEPA RSLs and DTSC-preferred screening levels used as RBCs to estimate risks for the future industrial and residential scenarios; toxicity values were identified in Table L-6 to derive RBCs for the future construction worker scenario.

USEPA (2015) and Cal-EPA (2015) make several assumptions to derive the toxicity values that tend to overestimate the actual hazard or risk to human health. RfDs and RfCs are typically derived from animal studies adjusted with uncertainty and modifying factors to ensure adequate protection of human health because data from human studies are generally unavailable. This approach is anticipated to result in an overestimated potential for noncancer adverse health effects for many chemicals.

SFs and IURs used to estimate cancer risk are also typically derived based on data from animal studies. These data are taken from studies that administered high doses of a test chemical to laboratory animals; the reported response is extrapolated to the much lower doses that are likely for human exposure. Little experimental data are available on the nature of the dose-response relationship at low doses. Because of this uncertainty, USEPA has selected a conservative model to estimate the low-dose relationship, and USEPA uses an upper-bound estimate (typically a 95UCL of the slope predicted by the extrapolation model) as the SF or IUR. Therefore, cancer risks calculated using SFs and IURs are upper-bound estimates.

Chronic RfDs and RfCs are developed for evaluating exposures that occur over periods of more than 7 years, and subchronic RfDs and RfCs are for exposures of less than 7 years. Although the potential exposures considered in this HHRA are for periods of 1 to 26 years, chronic RfDs and RfCs were used to evaluate both chronic (future industrial and residential) and subchronic (future construction worker) exposures. Few subchronic RfDs and RfCs are available, and the use of only one set of criteria based on chronic exposures simplifies the analysis. Using chronic RfDs and RfCs results in conservative estimates of potential hazards and is unlikely to affect the interpretation or conclusions of the assessment.

9.4 Risk Characterization

Standard USEPA (1989) methodologies were used for the risk characterization step. Using these methods, the risks from exposure to multiple carcinogens were added to estimate the total cancer risk associated with exposures. The underlying assumption with this approach is that the risks from carcinogens with different target organs are additive. This assumption contributes to the uncertainty in the risk assessment and may result in underestimated or overestimated risks, depending on whether the interactions among the COPCs are synergistic or antagonistic. Most possible interactions were not evaluated in this HHRA because information on these interactions is generally not available.

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Tables

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TABLE L-1

Summary of Analytical Results for Surface Soil (0 to 0.5 foot bgs)

Remedial Investigation for MRP Site UXO4, NAVWPNSTA Seal Beach Detachment Fallbrook, Fallbrook, California

Analytical Group	CAS Number	Chemical	Minimum Detected Concentration (Qualifier)		Maximum Detected Concentration (Qualifier)		Location of Maximum Detected Concentration	Detection Frequency	Range of Detection Limits	BTV (a)	Number of Detections Above BTV	Industrial Screening Criteria (b)	Number of Detections Above Industrial Screening Criteria	Residential Screening Criteria (b)	Number of Detections Above Residential Screening Criteria	Identify Chemical as a COPC? (c)
ANION	14797-73-0	Perchlorate	0.0038	J	0.0038	J	KCH-UXO4-SB14	1 / 11	0.002 - 0.0021	--	--	820	0	55	0	Yes
TMETAL	7429-90-5	Aluminum	5,940	J	18,500		KCH-UXO4-SB14	11 / 11	NA - NA	32,152	0	1,100,000	0	77,000	0	No
TMETAL	7440-36-0	Antimony	0.108	J	0.274	J	KCH-UXO4-SB05	10 / 11	0.207 - 0.207	--	--	470	0	31	0	Yes
TMETAL	7440-38-2	Arsenic	0.932		2.78		KCH-UXO4-SB10	11 / 11	NA - NA	1.681	2	0.25	11	0.067	11	Yes
TMETAL	7440-39-3	Barium	59.9	J	175		KCH-UXO4-SB10	11 / 11	NA - NA	266.1	0	220,000	0	15,000	0	No
TMETAL	7440-41-7	Beryllium	0.142	J	0.345	J	KCH-UXO4-SB14	11 / 11	NA - NA	0.382	0	210	0	15	0	No
TMETAL	7440-43-9	Cadmium	0.108	J	0.282	J	KCH-UXO4-SB04	11 / 11	NA - NA	0.19	4	7.3	0	5.2	0	Yes
TMETAL	7440-47-3	Chromium	7.5		15.7		KCH-UXO4-SB10	11 / 11	NA - NA	97.06	0	170,000	0	36,000	0	No
TMETAL	7440-48-4	Cobalt	4.61		8.39		KCH-UXO4-SB14	11 / 11	NA - NA	23.81	0	350	0	23	0	No
TMETAL	7440-50-8	Copper	4.72		58.4		KCH-UXO4-SB06	11 / 11	NA - NA	29.51	1	47,000	0	3100	0	Yes
TMETAL	7439-89-6	Iron	10,500	J	21,200		KCH-UXO4-SB10	11 / 11	NA - NA	35,630	0	820,000	0	55,000	0	No
TMETAL	7439-92-1	Lead	3.54		45.7		KCH-UXO4-SB05	11 / 11	NA - NA	4.597	7	320	0	80	0	Yes
TMETAL	7439-96-5	Manganese	94.4		451		KCH-UXO4-SB04	11 / 11	NA - NA	432.1	1	6,900	0	1,800	0	Yes
TMETAL	7439-97-6	Mercury	0.0111	J	0.0132	J	KCH-UXO4-SB06	3 / 11	0.0201 - 0.0207	0.0203	0	69	0	23	0	No
TMETAL	7439-98-7	Molybdenum	0.108	J	0.914		KCH-UXO4-SB16	11 / 11	NA - NA	--	--	5,800	0	390	0	Yes
TMETAL	7440-02-0	Nickel	2.85		5.65		KCH-UXO4-SB10	11 / 11	NA - NA	21.28	0	3,100	0	490	0	No
TMETAL	7782-49-2	Selenium	0.0615	J	0.189	J	KCH-UXO4-SB16	11 / 11	NA - NA	0.707	0	5,800	0	390	0	No
TMETAL	7440-24-6	Strontium	7.62		25.8		KCH-UXO4-SB10	11 / 11	NA - NA	57.73	0	700,000	0	47,000	0	No
TMETAL	7440-28-0	Thallium	0.154	J	0.322	J	KCH-UXO4-SB14	11 / 11	NA - NA	0.621	0	12	0	0.78	0	No
TMETAL	7440-31-5	Tin	5.87	J	14.3	J	KCH-UXO4-SB05	3 / 11	9.84 - 10.4	--	--	700,000	0	47,000	0	Yes
TMETAL	7440-62-2	Vanadium	28.6		59.4		KCH-UXO4-SB16	11 / 11	NA - NA	116.4	0	1,000	0	390	0	No
TMETAL	7440-66-6	Zinc	17.3		47.6		KCH-UXO4-SB03	11 / 11	NA - NA	35.31	4	350,000	0	23,000	0	Yes

Notes:

Concentrations in milligram per kilogram.

(a) BTVs are installation-specific upper tolerance limits developed in SES-TECH (2012). BTVs for the Kgt (Tonalite) parent rock type are used, based on the prevalence of this rock type where MRP Site UXO4 is located.

(b) Residential and industrial screening criteria based on USEPA (2015), unless otherwise indicated in DTSC (2016). See Table L-3 for basis of criteria (lowest between cancer and noncancer values are shown on this table). Screening criteria are provided for informational purposes only, and are not used to identify COPCs.

(c) Chemicals are identified as COPCs if one or more detections are above the BTV or if a BTV is not available.

--	not applicable or not available		
bgs	below ground surface	MRP	Munitions Response Program
BTV	background threshold value	NA	not applicable
CAS	Chemical Abstracts Service	NAVWPNSTA	Naval Weapons Station
COPC	chemical of potential concern	TMETAL	total metal
DTSC	California Department of Toxic Substances Control	USEPA	United States Environmental Protection Agency
J	estimated concentration	UXO	unexploded ordnance

Sources:

California Department of Toxic Substances Control (DTSC). 2016. *DTSC-Modified Screening Levels (DTSC SLs)* . Human and Ecological Risk Office (HERO). HERO HHRA Note Number 3. January.

SES-TECH. 2012. *Final Basewide Metals Background Soil Study Report, Naval Weapons Stations Seal Beach, Detachment Fallbrook, Fallbrook, California.* November.

United States Environmental Protection Agency (USEPA). 2015. *Regional Screening Levels for Chemical Contaminants at Superfund Sites.* November.

TABLE L-2

Summary of Analytical Results for Subsurface Soil (0 to 10 feet bgs)

Remedial Investigation for MRP Site UXO4, NAVWPNSTA Seal Beach Detachment Fallbrook, Fallbrook, California

Analytical Group	CAS Number	Chemical	Minimum Detected Concentration (Qualifier)		Maximum Detected Concentration (Qualifier)		Location of Maximum Detected Concentration	Detection Frequency	Range of Detection Limits	Background Threshold Value (BTV) (a)	Number of Detections Above BTV	Industrial Screening Criteria (b)	Number of Detections Above Industrial Screening Criteria	Residential Screening Criteria (b)	Number of Detections Above Residential Screening Criteria	Identify Chemical as a COPC? (c)
ANION	14797-73-0	Perchlorate	0.0011		0.0038	J	KCH-UXO4-SB14	3 / 47	0.002 - 0.0061	--	--	820	0	55	0	Yes
TMETAL	7429-90-5	Aluminum	5,940	J	23,500		KCH-UXO4-TR02	47 / 47	NA - NA	32,152	0	1,100,000	0	77,000	0	No
TMETAL	7440-36-0	Antimony	0.108	J	0.309	J	KCH-UXO4-SB07	23 / 47	0.142 - 0.572	--	--	470	0	31	0	Yes
TMETAL	7440-38-2	Arsenic	0.932		3.99		KCH-UXO4-SB10	47 / 47	NA - NA	1.681	25	0.25	47	0.067	47	Yes
TMETAL	7440-39-3	Barium	51.8		175		KCH-UXO4-SB10	47 / 47	NA - NA	266.1	0	220,000	0	15,000	0	No
TMETAL	7440-41-7	Beryllium	0.108	J	0.388	J	KCH-UXO4-SB10	47 / 47	NA - NA	0.382	1	210	0	15	0	Yes
TMETAL	7440-43-9	Cadmium	0.108	J	0.366	J	KCH-UXO4-SB10	39 / 47	0.542 - 0.601	0.19	15	7.3	0	5.2	0	Yes
TMETAL	7440-47-3	Chromium	7.44		30.3		UXO4-SB02	47 / 47	NA - NA	97.06	0	170,000	0	36,000	0	No
TMETAL	18540-29-9	Chromium VI	0.0177	J	0.144		KCH-UXO4-SB01	4 / 31	0.04 - 0.204	--	--	6.3	0	0.30	0	Yes
TMETAL	7440-48-4	Cobalt	4.34		23.9		UXO4-SB05	47 / 47	NA - NA	23.81	1	350	0	23	1	Yes
TMETAL	7440-50-8	Copper	4.65		61.3		KCH-UXO4-TR04	47 / 47	NA - NA	29.51	3	47,000	0	3,100	0	Yes
TMETAL	7439-89-6	Iron	10,500	J	34,400		KCH-UXO4-SB07	47 / 47	NA - NA	35,630	0	820,000	0	55,000	0	No
TMETAL	7439-92-1	Lead	2.55		51.2	J	KCH-UXO4-SB07	47 / 47	NA - NA	4.597	19	320	0	80	0	Yes
TMETAL	7439-96-5	Manganese	89.9		627		UXO4-SB05	47 / 47	NA - NA	432.1	2	6,900	0	1,800	0	Yes
TMETAL	7439-97-6	Mercury	0.0111	J	0.0598	J	KCH-UXO4-TR04	15 / 47	0.02 - 0.121	0.0203	7	69	0	23	0	Yes
TMETAL	7439-98-7	Molybdenum	0.108	J	0.914		KCH-UXO4-SB16	30 / 31	0.213 - 0.213	--	--	5,800	0	390	0	Yes
TMETAL	7440-02-0	Nickel	2.72		10.8		UXO4-SB02	47 / 47	NA - NA	21.28	0	3,100	0	490	0	No
TMETAL	7782-49-2	Selenium	0.0615	J	0.205	J	KCH-UXO4-SB16	37 / 47	0.529 - 0.601	0.707	0	5,800	0	390	0	No
TMETAL	7440-22-4	Silver	0.0552	J	0.0552	J	KCH-UXO4-TR02	1 / 47	0.098 - 0.607	0.0876	0	1,500	0	390	0	No
TMETAL	7440-24-6	Strontium	7.62		30.4		UXO4-SB02	47 / 47	NA - NA	57.73	0	700,000	0	47,000	0	No
TMETAL	7440-28-0	Thallium	0.0965	J	0.421	J	UXO4-SS01	47 / 47	NA - NA	0.621	0	12	0	0.78	0	No
TMETAL	7440-31-5	Tin	5.87	J	14.3	J	KCH-UXO4-SB05	7 / 31	9.84 - 11.7	--	--	700,000	0	47,000	0	Yes
TMETAL	7440-62-2	Vanadium	28.6		80.1		UXO4-SB05	47 / 47	NA - NA	116.4	0	1,000	0	390	0	No
TMETAL	7440-66-6	Zinc	17.3		91		KCH-UXO4-TR01	47 / 47	NA - NA	35.31	14	350,000	0	23,000	0	Yes

Notes:

Concentrations in milligram per kilogram.

(a) BTVs are installation-specific upper tolerance limits developed in SES-TECH (2012). BTVs for the Kgt (Tonalite) parent rock type are used, based on the prevalence of this rock type where MRP Site UXO4 is located.

(b) Residential and industrial screening criteria based on USEPA (2015), unless otherwise indicated in DTSC (2015). See Table L-3 for basis of criteria (lowest between cancer and noncancer values are shown on this table). Screening criteria are provided for informational purposes only, and are not used to identify COPCs.

(c) Chemicals are identified as COPCs if one or more detections are above the BTV or if a BTV is not available.

--	not applicable or not available	MRP	Munitions Response Program
bgs	below ground surface	NA	not applicable
BTV	background threshold value	NAVWPNSTA	Naval Weapons Station
CAS	Chemical Abstracts Service	TMETAL	total metal
COPC	chemical of potential concern	USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control	UXO	unexploded ordnance
J	estimated concentration		

Sources:

California Department of Toxic Substances Control (DTSC). 2016. *DTSC-Modified Screening Levels (DTSC SLs)*. Human and Ecological Risk Office (HERO). HERO HHRA Note Number 3. January.

SES-TECH. 2012. *Final Basewide Metals Background Soil Study Report, Naval Weapons Stations Seal Beach, Detachment Fallbrook, Fallbrook, California.* November.

United States Environmental Protection Agency (USEPA). 2015. *Regional Screening Levels for Chemical Contaminants at Superfund Sites.* November.

TABLE L-3

Risk-Based Concentrations for Soil

Remedial Investigation for MRP Site UXO4, NAVWPNSTA Seal Beach Detachment Fallbrook, Fallbrook, California

Analytical Group	CAS Number	Chemical		Residential						Industrial					
				Cancer		Noncancer		Lowest		Cancer		Noncancer		Lowest	
ANION	14797-73-0	Perchlorate		--	--	5.5E+01	b	5.5E+01	b	--	--	8.2E+02	b	8.2E+02	b
TMETAL	7429-90-5	Aluminum		--	--	7.7E+04	b	7.7E+04	b	--	--	1.1E+06	b	1.1E+06	b
TMETAL	7440-36-0	Antimony		--	--	3.1E+01	b	3.1E+01	b	--	--	4.7E+02	b	4.7E+02	b
TMETAL	7440-38-2	Arsenic		6.7E-02	c	2.5E-01	c	6.7E-02	c	2.5E-01	c	3.0E+00	c	2.5E-01	c
TMETAL	7440-39-3	Barium		--	--	1.5E+04	b	1.5E+04	b	--	--	2.2E+05	b	2.2E+05	b
TMETAL	7440-41-7	Beryllium		1.6E+03	b	1.5E+01	c	1.5E+01	c	6.9E+03	b	2.1E+02	c	2.1E+02	c
TMETAL	7440-43-9	Cadmium		2.1E+03	b	5.2E+00	c	5.2E+00	c	9.3E+03	b	7.3E+00	c	7.3E+00	c
TMETAL	7440-47-3	Chromium	a	--	--	3.6E+04	c	3.6E+04	c	--	--	1.7E+05	c	1.7E+05	c
TMETAL	18540-29-9	Chromium VI		3.0E-01	b	2.3E+02	b	3.0E-01	b	6.3E+00	b	3.5E+03	b	6.3E+00	b
TMETAL	7440-48-4	Cobalt		4.2E+02	b	2.3E+01	b	2.3E+01	b	1.9E+03	b	3.5E+02	b	3.5E+02	b
TMETAL	7440-50-8	Copper		--	--	3.1E+03	b	3.1E+03	b	--	--	4.7E+04	b	4.7E+04	b
TMETAL	7439-89-6	Iron		--	--	5.5E+04	b	5.5E+04	b	--	--	8.2E+05	b	8.2E+05	b
TMETAL	7439-92-1	Lead		--	--	8.0E+01	c	8.0E+01	c	--	--	3.2E+02	c	3.2E+02	c
TMETAL	7439-96-5	Manganese		--	--	1.8E+03	b	1.8E+03	b	--	--	6.9E+03	c	6.9E+03	c
TMETAL	7439-97-6	Mercury	a	--	--	2.3E+01	b	2.3E+01	b	--	--	6.9E+01	c	6.9E+01	c
TMETAL	7439-98-7	Molybdenum		--	--	3.9E+02	b	3.9E+02	b	--	--	5.8E+03	b	5.8E+03	b
TMETAL	7440-02-0	Nickel		1.5E+04	b	4.9E+02	c	4.9E+02	c	6.4E+04	b	3.1E+03	c	3.1E+03	c
TMETAL	7782-49-2	Selenium		--	--	3.9E+02	b	3.9E+02	b	--	--	5.8E+03	b	5.8E+03	b
TMETAL	7440-22-4	Silver		--	--	3.9E+02	b	3.9E+02	b	--	--	1.5E+03	c	1.5E+03	c
TMETAL	7440-28-0	Thallium		--	--	7.8E-01	b	7.8E-01	b	--	--	1.2E+01	b	1.2E+01	b
TMETAL	7440-62-2	Vanadium		--	--	3.9E+02	b	3.9E+02	b	--	--	1.0E+03	c	1.0E+03	c
TMETAL	7440-66-6	Zinc		--	--	2.3E+04	b	2.3E+04	b	--	--	3.5E+05	b	3.5E+05	b
TMETAL	7440-24-6	Strontium		--	--	4.7E+04	b	4.7E+04	b	--	--	7.0E+05	b	7.0E+05	b
TMETAL	7440-31-5	Tin		--	--	4.7E+04	b	4.7E+04	b	--	--	7.0E+05	b	7.0E+05	b

Notes:

Units are in milligram per kilogram.

a The following chemicals were used as surrogate chemicals for risk-based concentrations:

Trivalent chromium for chromium

Mercuric chloride for mercury

b USEPA, 2015

c DTSC, 2016

-- not available or not applicable

DTSC California Department of Toxic Substances Control

MRP Munitions Response Program

NAVWPNSTA Naval Weapons Station

TMETAL total metal

USEPA United States Environmental Protection Agency

UXO unexploded ordnance

Sources:

California Department of Toxic Substances Control (DTSC). 2016. *DTSC-Modified Screening Levels (DTSC SLs)* . Human and Ecological Risk Office (HERO). HERO HHRA Note Number 3. January.

United States Environmental Protection Agency (USEPA). 2015. Regional Screening Levels for Chemical Contaminants at Superfund Sites. November.

TABLE L-4

Exposure Point Concentrations for Soil

Remedial Investigation for MRP Site UXO4, NAVWPNSTA Seal Beach Detachment Fallbrook, Fallbrook, California

Soil Depth Interval	Analytical Group	COPC (a)	Detection Frequency	Number of High Censored Results (b)	Arithmetic Mean of Detected Results	95 UCL (Distribution) (c)		Maximum Concentration (Qualifier)		Exposure Point Concentration (d)		
										Value	Statistic	Method (e)
Surface (0 to 0.5 feet bgs)	ANION	Perchlorate	1 / 11	0	NA	NA		0.00376	J	0.00376	Max	(1)
	TMETAL	Antimony	10 / 11	0	1.36E-01	0.197	NP	0.274	J	0.197	95 UCL	(2)
	TMETAL	Arsenic	11 / 11	0	1.48E+00	1.756	N	2.78		1.756	95 UCL	(3)
	TMETAL	Cadmium	11 / 11	0	1.75E-01	0.206	N	0.282	J	0.206	95 UCL	(3)
	TMETAL	Copper	11 / 11	0	1.43E+01	35.23	NP	58.4		35.23	95 UCL	(4)
	TMETAL	Lead	11 / 11	0	1.12E+01	28.32	NP	45.7		28.32	95 UCL	(4)
	TMETAL	Manganese	11 / 11	0	2.50E+02	305	N	451		305	95 UCL	(3)
	TMETAL	Molybdenum	11 / 11	0	3.81E-01	0.542	G	0.914		0.542	95 UCL	(5)
	TMETAL	Tin	3 / 11	0	NA	NA		14.3	J	14.3	Max	(1)
	TMETAL	Zinc	11 / 11	0	3.08E+01	36.77	N	47.6		36.77	95 UCL	(3)
Subsurface (0 to 10 feet bgs)	ANION	Perchlorate	3 / 47	15	NA	NA		0.00376	J	0.00376	Max	(1)
	TMETAL	Antimony	23 / 47	3	1.67E-01	0.165	NP	0.309	J	0.165	95 UCL	(6)
	TMETAL	Arsenic	47 / 47	0	1.82E+00	1.968	N	3.99		1.968	95 UCL	(3)
	TMETAL	Beryllium	47 / 47	0	2.49E-01	0.268	N	0.388	J	0.268	95 UCL	(3)
	TMETAL	Cadmium	39 / 47	8	1.82E-01	0.197	G	0.366	J	0.197	95 UCL	(5)
	TMETAL	Chromium VI	4 / 31	1	5.15E-02	0.033	NP	0.144		0.033	95 UCL	(6)
	TMETAL	Cobalt	47 / 47	0	6.90E+00	7.693	N	23.9		7.693	95 UCL	(7)
	TMETAL	Copper	47 / 47	0	1.13E+01	25.71	NP	61.3		25.71	95 UCL	(4)
	TMETAL	Lead	47 / 47	0	8.54E+00	15.65	NP	51.2	J	15.65	95 UCL	(4)
	TMETAL	Manganese	47 / 47	0	2.38E+02	259.9	G	627		259.9	95 UCL	(5)
	TMETAL	Mercury	15 / 47	15	2.75E-02	0.0253	G	0.0598	J	0.0253	95 UCL	(8)
	TMETAL	Molybdenum	30 / 31	0	3.58E-01	0.409	G	0.914		0.409	95 UCL	(8)
	TMETAL	Tin	7 / 31	0	1.00E+01	8.514	NP	14.3	J	8.514	95 UCL	(9)
	TMETAL	Zinc	47 / 47	0	3.30E+01	36.87	N	91		36.87	95 UCL	(7)

Notes:

Concentrations are in milligram per kilogram.

(a) The COPCs listed are those for whose maximum concentrations exceed BTVs or those for which a BTV is not available.

(b) Number of censored (nondetect) results that exceeded the maximum detected concentration. These results were excluded from the statistical calculations.

(c) The three data distributions considered in ProUCL 5.0 include the normal, lognormal, and the gamma distributions. Shapiro-Wilk (n ≤ 50) and Lilliefors (n > 50) test statistics are used to test for normality or lognormality of a dataset. A 5 percent level of significance was used in all tests. Distribution tests were only conducted for samples with at least four detected results. Distributions not confirmed as normal, lognormal, or gamma, or not tested, were treated as nonparametric in all statistical calculations.

Distribution Codes: G = gamma, LN = lognormal, N = normal, NP = nonparametric

TABLE L-4

Exposure Point Concentrations for Soil

Remedial Investigation for MRP Site UXO4, NAVWPNSTA Seal Beach Detachment Fallbrook, Fallbrook, California

(d) The 95UCL is not calculated when there are fewer than five total results or four detected results. If this occurs, then the maximum detected concentration is used as the EPC. The maximum concentration is also used as the EPC if the 95UCL exceeds the maximum.

(e) All methods follow USEPA (2002, 2013).

Method (Statistic) Codes are defined as follows, and indicated the basis for the EPC:

(1) Maximum detected concentration

(2) 95% KM (Chebyshev) UCL

(3) 95% Student's-t UCL

(4) 95% Chebyshev(Mean, Sd) UCL

(5) 95% Adjusted Gamma UCL

(6) 95% KM (t) UCL

(7) 95% Modified-t UCL

(8) 95% Gamma Adjusted KM-UCL

(9) 95% KM (Percentile Bootstrap) UCL

95UCL One-sided 95 percent upper confidence limit of the mean. Following USEPA (2002, 2013), this may be estimated by either a 95, 97.5, or 99 percent UCL depending on sample size, skewness, and degree of censorship.

bgs	below ground surface	MRP	Munitions Response Program
BTV	background threshold value	NA	not applicable
COPC	chemical of potential concern	NAVWPNSTA	Naval Weapons Station
EPC	exposure point concentration	Sd	standard deviation
J	estimated concentration below the laboratory reporting limit	TMETAL	total metal
KM	Kaplan-Meier	UCL	upper confidence limit
Max	maximum detected concentration	UXO	unexploded ordnance

Sources:

United States Environmental Protection Agency (USEPA). 2002. *Calculating Exposure Point Concentrations at Hazardous Waste Sites* . OSWER 9285.6-10. Office of Emergency and Remedial Response. Washington, DC. December.

United States Environmental Protection Agency (USEPA). 2013. *ProUCL Version 5.0.00 Technical Guide* . Prepared by Singh, A. and R. Maichle for USEPA Office of Research and Development. EPA/600/R-07/041. September.

TABLE L-5
Risk-Based Concentration Equations for Soil – Construction Worker Scenario
Remedial Investigation for Munitions Response Program Site UXO4, NAVWPNSTA Seal Beach Detachment Fallbrook, California

Incidental Ingestion Exposure	
Cancer Effects	**Noncancer Effects**
$RBC_C\text{ - INGESTION} = \dfrac{TR \times ATC_{ING} \times BW}{SFO \times IRS \times RBA \times EF \times ED \times CFS}$	$RBC_{nc}\text{ - INGESTION} = \dfrac{THQ \times BW \times ATNC_{ING} \times RFD}{IRS \times RBA \times EF \times ED \times CFS}$
Inhalation Exposure	
Cancer Effects	**Noncancer Effects**
$RBC_C\text{ - INHALATION} = \dfrac{TR \times ATC_{INH}}{IUR \times EF \times ED \times ET \times MCF \times \frac{1}{PEF}}$	$RBC_{nc}\text{ - INHALATION} = \dfrac{THQ \times ATNC_{INH} \times RFC}{EF \times ED \times ET \times \frac{1}{PEF}}$
Dermal Exposure	
Cancer Effects	**Noncancer Effects**
$RBC_C\text{ - DERMAL} = \dfrac{TR \times ATC_D \times BW}{SFO \times SA \times EF \times ED \times CFS \times ABS \times AF}$	$RBC_{nc}\text{ - DERMAL} = \dfrac{THQ \times BW \times ATNC_D \times RFD}{SA \times EF \times ED \times CFS \times ABS \times AF}$
$Multi\text{-}Pathway\ RBC = \dfrac{1}{\frac{1}{RBC_{ingestion}} + \frac{1}{RBC_{inhalation}} + \frac{1}{RBC_{dermal}}}$	

Definitions and Values for Equation Parameters

Parameter	Value	Basis
RBC_c - INGESTION = Risk-based concentration for soil, carcinogens (mg/kg)	Chemical-specific	Calculated; see Table L-7
RBC_{nc} - INGESTION = Risk-based concentration for soil, noncarcinogens (mg/kg)	Chemical-specific	Calculated; see Table L-7
RBC_c - INHALATION = Risk-based concentration for soil, carcinogens (mg/kg)	Chemical-specific	Calculated; see Table L-7
RBC_{nc} - INHALATION = Risk-based concentration for soil, noncarcinogens (mg/kg)	Chemical-specific	Calculated; see Table L-7
RBC_c - DERMAL = Risk-based concentration for soil, carcinogens (mg/kg)	Chemical-specific	Calculated; see Table L-7
RBC_{nc} - DERMAL = Risk-based concentration for soil, noncarcinogens (mg/kg)	Chemical-specific	Calculated; see Table L-7
TR = Target cancer risk	10^{-6}	USEPA, 2015
THQ = Target hazard quotient	1	USEPA, 2015
IUR = Inhalation unit risk $(\mu g/m^3)^{-1}$	Chemical-specific	See Table L-6
RFC = Inhalation reference concentration (mg/m^3)	Chemical-specific	See Table L-6
SFO = Oral slope factor $(mg/kg\text{-}day)^{-1}$	Chemical-specific	See Table L-6
RFD = Oral reference dose (mg/kg-day)	Chemical-specific	See Table L-6
RBA = Relative bioavailability, ingestion route only (unitless)	0.6 = arsenic, 1 = all other chemicals	USEPA, 2015
ATC_{ING} = Averaging time - ingestion, carcinogens (days)	25,500	70 years x 365 days/year (USEPA, 2015)
$ATNC_{ING}$ = Averaging time - ingestion, noncancer (days)	365	ED x 365 days/year (USEPA, 2015)

TABLE I-5
Risk-Based Concentration Equations for Soil – Construction Worker Scenario
Remedial Investigation for Munitions Response Program Site UXO4, NAVWPNSTA Seal Beach, Detachment Fallbrook, California

ATC_{INH}	=	Averaging time - inhalation, carcinogens (hours)	613,200	70 years x 365 days/year x 24 hours/day (USEPA, 2009)
$ATNC_{INH}$	=	Averaging time - inhalation, noncancer (hours)	8,760	ED x 365 days/year x 24 hours/day (USEPA, 2009)
ATC_D	=	Averaging time - dermal, carcinogens (days)	25,500	70 years x 365 days/year (USEPA, 2015)
$ATNC_D$	=	Averaging time - dermal, noncancer (days)	365	ED x 365 days/year (USEPA, 2015)
IRS	=	Ingestion rate, soil (mg/day)	330	DTSC, 2014
PEF	=	Particulate emission factor, soil (m^3/kg)	$1x10^6$	DTSC, 2014
SA	=	Exposed surface area (cm^2)	6,032	DTSC, 2014
ABS	=	Chemical-absorption factor (unitless)	Chemical-specific	See Table L-6
AF	=	Soil adherence factor (mg/cm^2)	0.8	DTSC, 2014
EF	=	Exposure frequency (days/year)	250	DTSC, 2014
ED	=	Exposure duration (year)	1	DTSC, 2014
ET	=	Exposure time (hours/day)	8	DTSC, 2014
BW	=	Body weight, adult (kg)	80	DTSC, 2014
MCF	=	Mass conversion factor, air (µg/mg)	1,000	Not applicable
CFS	=	Conversion factor, soil (kg/mg)	$1x10^{-6}$	Not applicable

Notes:

µg/m^3	microgram per cubic meter
µg/mg	microgram per milligram
cm^2	square centimeter
DTSC	California Department of Toxic Substances Control
kg	kilogram
kg/mg	kilogram per milligram
m^3/kg	cubic meter per kilogram
mg/cm^2	milligram per square centimeter
mg/day	milligram per day
mg/kg	milligram per kilogram
mg/kg-day	milligram per kilogram per day
mg/m^3	milligram per cubic meter
RBC	risk-based concentration
USEPA	United States Environmental Protection Agency

Sources:

California Department of Toxic Substances Control (DTSC). 2014. *Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and Permitted Facilities*. Office of Human and Ecological Risk (HERO) HERO HHRA Note Number 1. September 30.

United States Environmental Protection Agency (USEPA). 2009. *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manua*l (Part F, Supplemental Guidance for Inhalation Risk Assessment). January. http://www.epa.gov/oswer/riskassessment/ragsf/.

United States Environmental Protection Agency (USEPA). 2015. *Regional Screening Levels for Chemical Contaminants at Superfund Sites.* November.

TABLE L-6

Toxicity Criteria Used to Calculate Construction Worker Soil Risk-Based Concentrations

Remedial Investigation for MRP Site UXO4, NAVWPNSTA Seal Beach Detachment Fallbrook, Fallbrook, California

			Cancer Toxicity Criteria				Noncancer Toxicity Criteria - Chronic Exposure					Cancer Toxicity Criteria	Noncancer Cancer Toxicity Criteria
Analytical Group	**CAS Number**	**Chemical of Potential Concern**	**Oral Slope Factor (mg/kg-day)-1**	**Source**	**Inhalation Unit Risk (µg/m^3)-1**	**Source**	**Oral Reference Dose (mg/kg-day)**	**Source**	**Inhalation Reference Concentration (mg/m^3)**	**Source**	**Gastrointestinal Absorption Fraction (GIABS) (a)**	**Dermal Slope Factor (mg/kg-day)-1 (b)**	**Dermal Reference Dose (mg/kg-day) (c)**
ANION	14797-73-0	Perchlorate	--		--		7.0E-04	I	--		1	--	7.0E-04
TMETAL	7440-36-0	Antimony	--		--		4.0E-04	I	--		0.15	--	6.0E-05
TMETAL	7440-38-2	Arsenic	9.5E+00	C	4.3E-03	I	3.5E-06	C	1.5E-05	C	1	9.5E+00	3.5E-06
TMETAL	7440-41-7	Beryllium	--		2.4E-03	I	2.0E-04	C	7.0E-06	C	0.007	--	1.4E-06
TMETAL	7440-43-9	Cadmium	1.5E+01	C	4.2E-03	C	6.3E-06	C	1.0E-05	A	0.025	6.0E+02	1.6E-07
TMETAL	18540-29-9	Chromium VI	5.0E-01	J	1.5E-01	C	3.0E-03	I	1.0E-04	I	0.025	2.0E+01	7.5E-05
TMETAL	7440-48-4	Cobalt	--		9.0E-03	P	3.0E-04	P	6.0E-06	P	1	--	3.0E-04
TMETAL	7440-50-8	Copper	--		--		4.0E-02	H	--		1	--	4.0E-02
TMETAL	7439-96-5	Manganese	--		--		2.4E-02	I	5.0E-05	I	0.04	--	9.6E-04
TMETAL	7439-97-6	Mercury	--		--		1.6E-04	C	3.0E-05	C	0.07	--	1.1E-05
TMETAL	7439-98-7	Molybdenum	--		--		5.0E-03	I	--		1	--	5.0E-03
TMETAL	7440-31-5	Tin	--		--		6.0E-01	H	--		1	--	6.0E-01
TMETAL	7440-66-6	Zinc	--		--		3.0E-01	I	--		1	--	3.0E-01

Notes:

a USEPA, 2015

b Dermal slope factor = Oral slope factor/GIABS

c Dermal reference dose = Oral reference dose x GIABS

-- Not available or not applicable

A = Agency for Toxic Substances and Disease Registry (as cited in USEPA, 2015)

C = California Environmental Protection Agency (Cal-EPA, 2016)

CAS = Chemical Abstracts Service

GIABS = gastrointestinal absorption fraction

H = Health Effects Assessment Summary Tables (as cited in USEPA, 2015)

I = Integrated Risk Information System (as cited in USEPA, 2015)

J = New Jersey Department of Environmental Protection (as cited in USEPA, 2015)

mg/kg-day = milligram per kilogram per day

mg/m^3 = milligram per cubic meter

MRP = Munitions Response Program

NAVWPNSTA = Naval Weapons Station

P = Provisional Peer-Reviewed Toxicity Value (as cited in USEPA, 2015)

RfD = reference dose

TMETAL = total metal

µg/m^3 = microgram per cubic meter

USEPA = United States Environmental Protection Agency

UXO = unexploded ordnance

Sources:

California Environmental Protection Agency (Cal-EPA). 2016. Office of Environmental and Health Hazard Assessment (OEHHA). OEHHA On-Line Toxicity Criteria Database. Accessed January 16.

United States Environmental Protection Agency (USEPA). 2015. *Regional Screening Levels for Chemical Contaminants at Superfund Sites* . November.

TABLE L-7

Risk-Based Concentrations for Soil - Construction Worker Scenario

Remedial Investigation for MRP Site UXO4, NAVWPNSTA Seal Beach Detachment Fallbrook, Fallbrook, California

Analytical Group	CAS Number	Chemical	Risk-Based Concentration (mg/kg) - Construction Worker Soil Exposure							
			Ingestion		Dermal		Inhalation		Multi-Pathway RBC (Combined Ingestion, Dermal, and Inhalation)	
			Cancer	Noncancer	Cancer	Noncancer	Cancer	Noncancer	Cancer	Noncancer
ANION	14797-73-0	Perchlorate	--	2.5E+02	--	1.7E+03	--	--	--	2.2E+02
TMETAL	7440-36-0	Antimony	--	1.4E+02	--	1.5E+02	--	--	--	7.2E+01
TMETAL	7440-38-2	Arsenic	4.3E+00	2.1E+00	5.9E+00	2.8E+00	9.3E+01	6.6E+01	2.4E+00	1.2E+00
TMETAL	7440-41-7	Beryllium	--	7.1E+01	--	3.4E+00	1.3E+02	3.1E+01	1.3E+02	2.9E+00
TMETAL	7440-43-9	Cadmium	1.7E+00	2.2E+00	2.8E+00	3.8E+00	7.3E+01	4.4E+01	1.0E+00	1.4E+00
TMETAL	18540-29-9	Chromium VI	5.0E+01	1.1E+03	--	--	2.0E+00	4.4E+02	2.0E+00	3.1E+02
TMETAL	7440-48-4	Cobalt	--	1.1E+02	--	7.3E+02	3.4E+01	2.6E+01	3.4E+01	2.0E+01
TMETAL	7440-50-8	Copper	--	1.4E+04	--	9.7E+04	--	--	--	1.2E+04
TMETAL	7439-96-5	Manganese	--	8.5E+03	--	2.3E+03	--	2.2E+02	--	2.0E+02
TMETAL	7439-97-6	Mercury	--	5.7E+01	--	2.7E+01	--	1.3E+02	--	1.6E+01
TMETAL	7439-98-7	Molybdenum	--	1.8E+03	--	1.2E+04	--	--	--	1.5E+03
TMETAL	7440-31-5	Tin	--	2.1E+05	--	1.5E+06	--	--	--	1.9E+05
TMETAL	7440-66-6	Zinc	--	1.1E+05	--	7.3E+05	--	--	--	9.3E+04

Notes:

Concentrations are in milligrams per kilogram.

--	not applicable
CAS	Chemical Abstracts Service
mg/kg	milligram per kilogram
MRP	Munitions Response Program
NAVWPNSTA	Naval Weapons Station
RBC	risk-based concentration
TMETAL	total metal
UXO	unexploded ordnance

TABLE L-8

Cancer Risks and Noncancer Hazards for Surface Soil (0 to 0.5 foot bgs) - Future Industrial and Residential Exposure Scenarios

Remedial Investigation for MRP Site UXO4, NAVWPNSTA Seal Beach Detachment Fallbrook, Fallbrook, California

Analytical Group	CAS Number	COPC	EPC (mg/kg) (a)	Future Industrial Exposure Scenario				Future Residential Exposure Scenario			
				RBC (mg/kg) (b)		Cancer Risk	Noncancer Hazard	RBC (mg/kg) (b)		Cancer Risk	Noncancer Hazard
				Cancer	Noncancer			Cancer	Noncancer		
ANION	14797-73-0	Perchlorate	0.00376	--	8.2E+02	--	4.6E-06	--	5.5E+01	--	6.8E-05
TMETAL	7440-36-0	Antimony	0.197	--	4.7E+02	--	4.2E-04	--	3.1E+01	--	6.4E-03
TMETAL	7440-38-2	Arsenic	1.756	2.5E-01	3.0E+00	7.0E-06	5.9E-01	6.7E-02	2.5E-01	2.6E-05	7.0E+00
TMETAL	7440-43-9	Cadmium	0.206	9.3E+03	7.3E+00	2.2E-11	2.8E-02	2.1E+03	5.2E+00	9.8E-11	4.0E-02
TMETAL	7440-50-8	Copper	35.23	--	4.7E+04	--	7.5E-04	--	3.1E+03	--	1.1E-02
TMETAL	7439-92-1	Lead	28.32	--	3.2E+02	--	(c)	--	8.0E+01	--	(c)
TMETAL	7439-96-5	Manganese	305	--	6.9E+03	--	4.4E-02	--	1.8E+03	--	1.7E-01
TMETAL	7439-98-7	Molybdenum	0.542	--	5.8E+03	--	9.3E-05	--	3.9E+02	--	1.4E-03
TMETAL	7440-31-5	Tin	14.3	--	7.0E+05	--	2.0E-05	--	4.7E+04	--	3.0E-04
TMETAL	7440-66-6	Zinc	36.77	--	3.5E+05	--	1.1E-04	--	2.3E+04	--	1.6E-03
Cumulative Cancer Risk and Noncancer Hazard				**Future Industrial**		7E-06	7E-01	**Future Residential**		3E-05	7E+00

Notes:

Concentrations are in milligram per kilogram.

a	See Table L-3 for basis of EPCs.
b	See Table L-4 for basis of RBCs.
c	See Section 8.3 of Appendix L for evaluation of lead.
--	not applicable
bgs	below ground surface
CAS	Chemical Abstracts Service
COPC	chemical of potential concern
EPC	exposure point concentration
mg/kg	milligram per kilogram
MRP	Munitions Response Program
NAVWPNSTA	Naval Weapons Station
RBC	risk-based concentration
TMETAL	total metal
UXO	unexploded ordnance

TABLE L-9

Cancer Risks and Noncancer Hazards for Subsurface Soil (0 to 10 feet bgs) - Future Industrial and Residential Exposure Scenarios

Remedial Investigation for MRP Site UXO4, NAVWPNSTA Seal Beach Detachment Fallbrook, Fallbrook, California

Analytical Group	CAS Number	COPC	EPC (mg/kg) (a)	Future Industrial Exposure Scenario				Future Residential Exposure Scenario			
				RBC (mg/kg) (b)		Cancer Risk	Noncancer Hazard	RBC (mg/kg) (b)		Cancer Risk	Noncancer Hazard
				Cancer	Noncancer			Cancer	Noncancer		
ANION	14797-73-0	Perchlorate	0.00376	--	8.2E+02	--	4.6E-06	--	5.5E+01	--	6.8E-05
TMETAL	7440-36-0	Antimony	0.165	--	4.7E+02	--	3.5E-04	--	3.1E+01	--	5.3E-03
TMETAL	7440-38-2	Arsenic	1.968	2.5E-01	3.0E+00	7.9E-06	6.6E-01	6.7E-02	2.5E-01	2.9E-05	7.9E+00
TMETAL	7440-41-7	Beryllium	0.268	6.9E+03	2.1E+02	3.9E-11	1.3E-03	1.6E+03	1.5E+01	1.7E-10	1.8E-02
TMETAL	7440-43-9	Cadmium	0.197	9.3E+03	7.3E+00	2.1E-11	2.7E-02	2.1E+03	5.2E+00	9.4E-11	3.8E-02
TMETAL	18540-29-9	Chromium VI	0.033	6.3E+00	3.5E+03	5.2E-09	9.4E-06	3.0E-01	2.3E+02	1.1E-07	1.4E-04
TMETAL	7440-48-4	Cobalt	7.693	1.9E+03	3.5E+02	4.0E-09	2.2E-02	4.2E+02	2.3E+01	1.8E-08	3.3E-01
TMETAL	7440-50-8	Copper	25.71	--	4.7E+04	--	5.5E-04	--	3.1E+03	--	8.3E-03
TMETAL	7439-92-1	Lead	15.65	--	3.2E+02	--	(c)	--	8.0E+01	--	(c)
TMETAL	7439-96-5	Manganese	259.9	--	6.9E+03	--	3.8E-02	--	1.8E+03	--	1.4E-01
TMETAL	7439-97-6	Mercury	0.0253	--	6.9E+01	--	3.7E-04	--	2.3E+01	--	1.1E-03
TMETAL	7439-98-7	Molybdenum	0.409	--	5.8E+03	--	7.1E-05	--	3.9E+02	--	1.0E-03
TMETAL	7440-31-5	Tin	8.514	--	7.0E+05	--	1.2E-05	--	4.7E+04	--	1.8E-04
TMETAL	7440-66-6	Zinc	36.87	--	3.5E+05	--	1.1E-04	--	2.3E+04	--	1.6E-03
Cumulative Cancer Risk and Noncancer Hazard				**Future Industrial**		8E-06	7E-01	**Future Residential**		3E-05	8E+00

Notes:

Concentrations are in milligram per kilogram.

(a) See Table L-3 for basis of EPCs.

(b) See Table L-4 for basis of RBCs.

(c) See Section 8.3 of Appendix L for evaluation of lead.

-- not applicable

bgs below ground surface

CAS Chemical Abstracts Service

COPC chemical of potential concern

EPC exposure point concentration

mg/kg milligram per kilogram

MRP Munitions Response Program

NAVWPNSTA Naval Weapons Station

RBC risk-based concentration

TMETAL total metal

UXO unexploded ordnance

TABLE L-10

Cancer Risks and Noncancer Hazards for Subsurface Soil (0 to 10 feet bgs) - Future Construction Worker Scenario

Remedial Investigation for MRP Site UXO4, NAVWPNSTA Seal Beach Detachment Fallbrook, Fallbrook, California

Analytical Group	CAS Number	COPC	EPC (mg/kg) (a)	Risk-Based Concentrations								Cancer Risks and Noncancer Hazards - Future Construction Worker Exposure Scenario							
				Ingestion		Dermal		Inhalation		Multi-Pathway (Combined Ingestion, Dermal, and Inhalation)		Ingestion		Dermal		Inhalation		Multi-Pathway (Combined Ingestion, Dermal, and Inhalation)	
				Cancer	Noncancer	Cancer	Noncancer	Cancer	Noncancer	Cancer	Noncancer	Cancer Risk	Noncancer HI	Cancer Risk	Noncancer HI	Cancer Risk	Noncancer HI	Cancer Risk	Noncancer HI
ANION	14797-73-0	Perchlorate	0.00376	--	2.5E+02	--	1.7E+03	--	--	--	2.2E+02	--	1.5E-05	--	2.2E-06	--	--	--	1.7E-05
TMETAL	7440-36-0	Antimony	0.165	--	1.4E+02	--	1.5E+02	--	--	--	7.2E+01	--	1.2E-03	--	1.1E-03	--	--	--	2.3E-03
TMETAL	7440-38-2	Arsenic	1.968	4.3E+00	2.1E+00	5.9E+00	2.8E+00	9.3E+01	6.6E+01	2.4E+00	1.2E+00	4.5E-07	9.5E-01	3.3E-07	7.0E-01	2.1E-08	3.0E-02	8.0E-07	1.7E+00
TMETAL	7440-41-7	Beryllium	0.268	--	7.1E+01	--	3.4E+00	1.3E+02	3.1E+01	1.3E+02	2.9E+00	--	3.8E-03	--	7.9E-02	2.1E-09	8.7E-03	2.1E-09	9.2E-02
TMETAL	7440-43-9	Cadmium	0.197	1.7E+00	2.2E+00	2.8E+00	3.8E+00	7.3E+01	4.4E+01	1.0E+00	1.4E+00	1.2E-07	8.8E-02	7.0E-08	5.2E-02	2.7E-09	4.5E-03	1.9E-07	1.4E-01
TMETAL	18540-29-9	Chromium VI	0.033	5.0E+01	1.1E+03	--	--	2.0E+00	4.4E+02	2.0E+00	3.1E+02	6.7E-10	3.1E-05	--	--	1.6E-08	7.5E-05	1.7E-08	1.1E-04
TMETAL	7440-48-4	Cobalt	7.693	--	1.1E+02	--	7.3E+02	3.4E+01	2.6E+01	3.4E+01	2.0E+01	--	7.2E-02	--	1.1E-02	2.3E-07	2.9E-01	2.3E-07	3.8E-01
TMETAL	7440-50-8	Copper	25.71	--	1.4E+04	--	9.7E+04	--	--	--	1.2E+04	--	1.8E-03	--	2.7E-04	--	--	--	2.1E-03
TMETAL	7439-92-1	Lead	15.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TMETAL	7439-96-5	Manganese	259.9	--	8.5E+03	--	2.3E+03	--	2.2E+02	--	2.0E+02	--	3.1E-02	--	1.1E-01	--	1.2E+00	--	1.3E+00
TMETAL	7439-97-6	Mercury	0.0253	--	5.7E+01	--	2.7E+01	--	1.3E+02	--	1.6E+01	--	4.5E-04	--	9.3E-04	--	1.9E-04	--	1.6E-03
TMETAL	7439-98-7	Molybdenum	0.409	--	1.8E+03	--	1.2E+04	--	--	--	1.5E+03	--	2.3E-04	--	3.4E-05	--	--	--	2.6E-04
TMETAL	7440-31-5	Tin	8.514	--	2.1E+05	--	1.5E+06	--	--	--	1.9E+05	--	4.0E-05	--	5.9E-06	--	--	--	4.6E-05
TMETAL	7440-66-6	Zinc	36.87	--	1.1E+05	--	7.3E+05	--	--	--	9.3E+04	--	3.5E-04	--	5.1E-05	--	--	--	4.0E-04
Cumulative Cancer Risk and Noncancer Hazard												5.7E-07	1.2E+00	4.0E-07	9.5E-01	2.7E-07	1.5E+00	1E-06	4E+00

Notes:

Concentrations are in milligram per kilogram.

(a) See Table L-3 for basis of EPCs.

(b) See Table L-7 for basis of RBCs.

(c) See Section 8.3 of Appendix L for evaluation of lead.

--	not applicable	mg/kg	milligram per kilogram
bgs	below ground surface	MRP	Munitions Response Program
CAS	Chemical Abstracts Service	NAVWPNSTA	Naval Weapons Station
COPC	chemical of potential concern	RBC	risk-based concentration
EPC	exposure point concentration	TMETAL	total metal
HI	hazard index	UXO	unexploded ordnance

Figure

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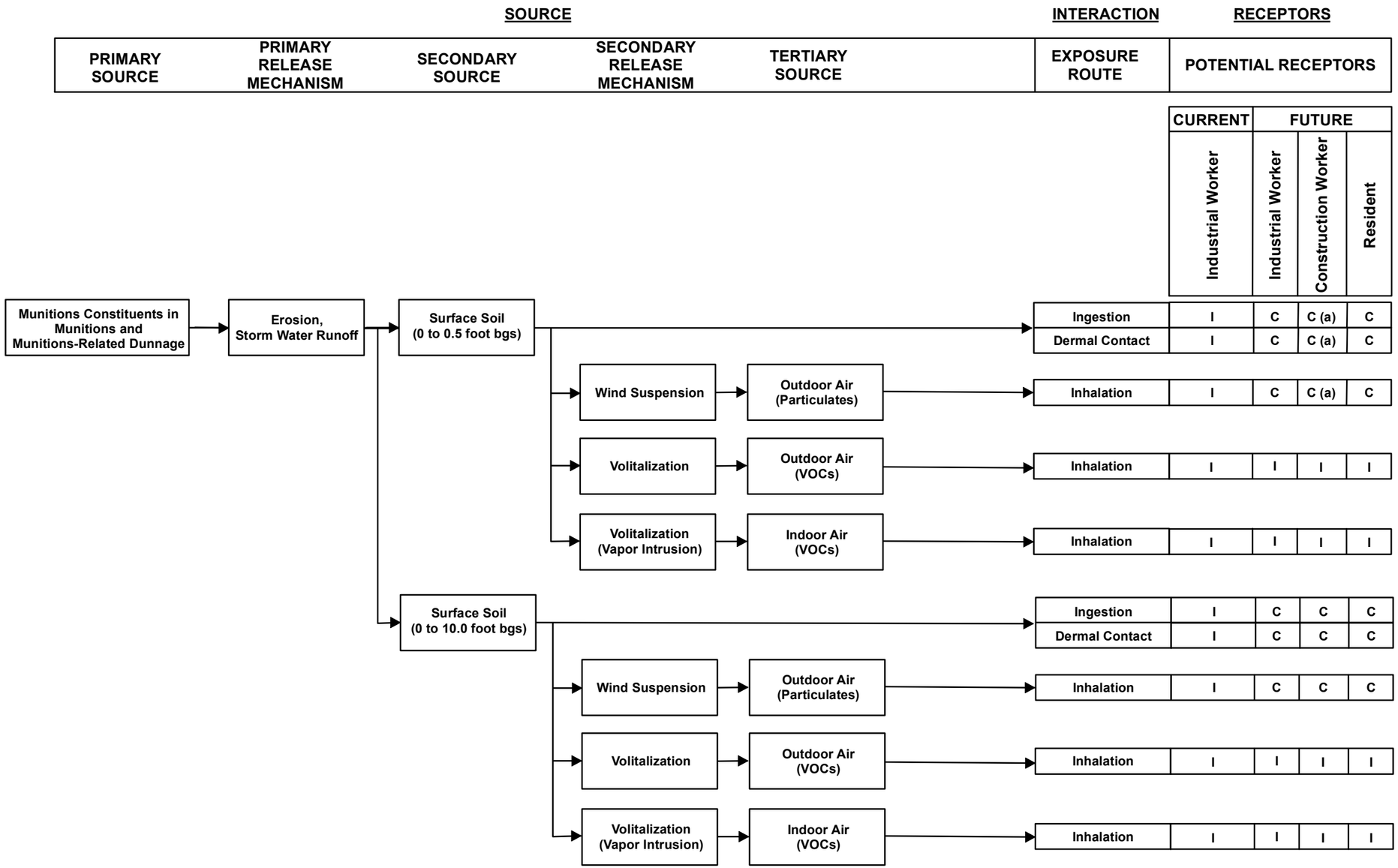

LEGEND

C POTENTIALLY COMPLETE EXPOSURE PATHWAY
I INCOMPLETE OR NEGLIGIBLE EXPOSURE PATHWAY

NOTES:
(a) = Included in the evaluation of subsurface soil exposure pathways (not evaluated separately from subsurface soil).
bgs = below ground surface
HHRA = Human Health Risk Assessment
VOC = Volatile Organic Compound
MC = Munitions Constituents
MRP = Munitions Response Program
UXO = Unexploded Ordnance
NAVWPNSTA = Naval Weapons Station

MC Conceptual Site Exposure Model for Potential Human Receptors

Remedial Investigation for MRP Site UXO4
NAVWPNSTA Seal Beach Detachment Fallbrook, California

FIGURE
L-1

Date: 10/12/2015 User: lmoussa Path: \\kadc3-ssfs2.kleinfelder.com\drawings_clients\Navy_CLEAN\FALLBROOK\CTO_070\MXD\MRP4_RI_FS\RI_REPORT\070_4244.mxd

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Appendix M
Ecological Risk Assessment

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Appendix M

Ecological Risk Assessment

Remedial Investigation for Munitions Response Program Site UXO4

Naval Weapons Station Seal Beach
Detachment Fallbrook
Fallbrook, California

Contract Number: N62473-09-D-2622
Contract Task Order: 0070
Document Control Number: KCH-2622-0070-0055

July 2016

Prepared for

Department of the Navy
Naval Facilities Engineering Command Southwest

Prepared by

CH2M HILL Kleinfelder, A Joint Venture (KCH)
1320 Columbia Street, Suite 310
San Diego, California 92101

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Acronyms and Abbreviations

95UCL	95 percent upper confidence limit
BAF	bioaccumulation factor
BERA	baseline ecological risk assessment
bgs	below ground surface
BTAG	Biological Technical Assistance Group
CAGN	California gnatcatcher
Cal-EPA	California Environmental Protection Agency
COPEC	chemical of potential ecological concern
CSEM	conceptual site exposure model
DTSC	California Department of Toxic Substances Control
EcoSSL	USEPA Ecological Soil Screening Level
EPC	exposure point concentration
ERA	ecological risk assessment
ESV	ecological screening value
Kgt	tonalite
Kjm	metasedimentary
LOAEL	lowest observed adverse effect level
mg/kg	milligram per kilogram
MRP	Munitions Response Program
Navy	United States Department of the Navy
NOAEL	no observed adverse effect level
RI	remedial investigation
SKR	Stephens' kangaroo rat
SLERA	screening-level ecological risk assessment
SVOC	semivolatile organic compound
TRV	toxicity reference value
USEPA	United States Environmental Protection Agency
UXO	unexploded ordnance
VOC	volatile organic compound

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1.0 Introduction

This appendix provides the results of the ecological risk assessment (ERA) for Munitions Response Program (MRP) Site Unexploded Ordnance (UXO) 4 at Naval Weapons Station Seal Beach Detachment Fallbrook (Detachment Fallbrook), Fallbrook, California. This ERA is prepared as part of the remedial investigation (RI) report for MRP Site UXO4. The ERA seeks to determine the nature, magnitude, and probability of actual or potential harm to the environment by the threatened or actual release of hazardous substances. The assessment identifies and characterizes the toxicity of the chemicals of potential ecological concern (COPECs), the potential exposure pathways, the potential ecological receptors, and the likelihood and extent of impact or threat under current and reasonably anticipated future land use conditions.

This ERA was conducted in accordance with the guidelines published by the United States Environmental Protection Agency (USEPA) and the California Environmental Protection Agency (Cal-EPA). The overall objective of this ERA is to quantitatively and qualitatively evaluate baseline or existing exposure and risks to ecological receptors, and to provide risk managers with information needed to achieve their ecological management goals and help determine remedial decisions, if necessary.

1.1 Approach

This ERA was conducted in phases as recommended by the United States Department of the Navy (Navy) policy for conducting ERAs (Navy, 1999; Navy, 2003) and is consistent with USEPA (1997; 1998) and California Department of Toxic Substances Control (DTSC) (1996) guidance for conducting ERAs. Each phase is more detailed and focused than the preceding phase, and data from one phase are used to determine whether further studies are needed to meet the objectives of the assessment. There are three phases:

- **Tier 1 Screening-level ERA (SLERA).** The Tier 1 SLERA represents Steps 1 and 2 of the Navy policy (Navy, 1999; Navy, 2003). It is analogous to Steps 1 and 2 of the Superfund guidance (USEPA, 1997) and the Scoping and Phase I Predictive Assessments of the DTSC (1996) guidance. The Tier 1 SLERA employs existing data and conservative assumptions regarding contaminant exposure to develop a screening-level problem formulation, ecological conceptual model, exposure evaluation, toxicity evaluation, and risk calculations.

- **Tier 2 Baseline ERA (BERA).** The Tier 2 BERA consists of several steps designed to refine exposure and risk estimates in a scientifically defensible manner. Steps may include refinement of conservative exposure assumptions and considerations such as background, bioavailability, and data distribution (Step 3a), or collection and evaluation of additional data (Steps 3b through 7).

- **Tier 3 Evaluation of Remedial Alternatives.** Tier 3 is initiated when the results of the Tier 2 BERA indicate that site-related chemicals of ecological concern pose potentially unacceptable risks to one or more assessment endpoints. Remedial alternatives,

including a no-action alternative, are developed and evaluated with the goal of reducing ecological risks to an acceptable level. A preferred remedy is selected based on effectiveness in reducing risks, potential ecological impacts related to the remedy, and residual risks. The preferred remedy also will be selected to balance both human health and ecological concerns.

At the conclusion of each tier, a risk management decision is made regarding site status. The decision criteria identify three possible outcomes for the site:

- The site does not pose an unacceptable risk and no further action is warranted.
- The site poses a potentially unacceptable risk that requires additional evaluation.
- The site poses a potentially unacceptable risk and accelerated site remediation is warranted. The evaluation of remedial alternatives is completed in a Tier 3 ERA.

This ERA for MRP Site UXO4 includes both a Tier 1 SLERA (hereafter referred to as the Tier 1 assessment) and Step 3a of the Tier 2 BERA (refinement of conservative exposure assumptions; hereafter referred to as the Tier 2 assessment). Analyte/receptor pairs that show potential risks in the Tier 1 assessment (SLERA) are automatically carried forth and evaluated in the Tier 2 assessment (BERA, Step 3a).

1.2 Guidance

This ERA was performed in general accordance with the following guidance documents:

- *Chief of Naval Operations. Memorandum: Navy Policy for Conducting Ecological Risk Assessments* (Navy, 1999)
- *Navy Guidance for Conducting Ecological Risk Assessments* (Navy, 2003)
- *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments*, Interim Final (USEPA, 1997)
- *Final Guidelines for Ecological Risk Assessment* (USEPA, 1998)
- *Ecological Risk Assessment and Risk Management Principles for Superfund Sites* (USEPA, 1999)
- *The Role of Screening-level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments* (USEPA, 2001)
- USEPA Ecological Update (EcoUpdate) Series (USEPA, 1991a; 1991b; 1992a; 1992b, 1992c; 1994a; 1994b; 1994c; 1994d; 1996a; 1996b; 2001)
- *Guidance for Data Usability in Risk Assessment* (USEPA, 1992d)
- *Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities* (DTSC, 1996)
- Cal-EPA, Department of Toxic Substances Control Human and Ecological Risk Division (HERD) Ecological Risk Assessment Notes (Cal-EPA, 2000; Cal-EPA, 2002)

1.3 Assumptions

The MRP Site UXO4 ERA was conducted under the following assumptions and constraints, which are typical for the current state-of-practice:

- Evaluation of current exposures is derived from existing conditions.
- Future land use at MRP Site UXO4 is assumed to remain the same as current land use.
- Medium of potential concern is soil.
- Current chemical concentrations in the source media are present at a steady state and will not change over time.
- Chemicals not detected or analyzed are not present or evaluated.
- Each chemical is as bioavailable as the chemical on which the toxicity information is based when used for estimating direct exposure.
- Bioaccumulation of chemicals is estimated using bioaccumulation factors (BAFs) or models available from literature.
- Toxicological information used represents information currently available from literature and database searches.

The uncertainties associated with the ERA conclusions are discussed in Section 5.0.

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2.0 Tier 1 Screening-Level Ecological Risk Assessment

This section provides the results of Tier 1 of the ERA process, the SLERA. The SLERA consists of two steps: Step 1, the screening-level problem formulation (Section 2.1), and Step 2, the screening-level ecological effects characterization (Section 2.2) and screening-level risk characterization (Section 2.3).

2.1 Screening-Level Problem Formulation (Step 1)

The screening-level problem formulation is part of Step 1 of the SLERA and evaluates available site information to focus the assessment on the most relevant exposures. The end product of this problem formulation is the ecological conceptual site exposure model (CSEM) that describes the site location and ecological setting (habitats, potential receptors, and threatened and endangered species); identifies contaminant sources, transport mechanisms, and COPECs; evaluates potential exposure pathways and routes; and identifies the representative species that were used to assess potential ecological risk to site-related receptors.

2.1.1 Site Location and Description

Detachment Fallbrook is located approximately 53 miles north of San Diego in northern San Diego County, California, approximately 9 miles inland from the Pacific Coast (see Figure 1-1 of the RI Report). Detachment Fallbrook is bordered on the west by Marine Corps Base Camp Pendleton and is south of the Santa Margarita River. The base currently occupies 8,852 acres, but only 274 acres are developed. The remaining acreage is mostly open space that falls within Explosive Safety Quantity Distance arcs required for the storage magazines.

MRP Site UXO4 is triangular in shape and occupies approximately 1.8 acres (see Figures 1-2 and 1-3 of the RI Report). There are no occupied buildings on or adjacent to the site. The closest occupied building is at least 1 mile away. The site is roughly 4,500 feet from Ammunition Road, a well-used commuter route within the base boundary. Detachment Fallbrook leases cattle-grazing rights as part of the fire suppression program. The land surrounding MRP Site UXO4 is within the grazing program. The site is fenced with a four-strand wire fence to exclude the site from grazing activities. The 2.16-acre Additional Work Area is located along a shallow drainage west and downgradient from MRP Site UXO4.

2.1.1.1 Ecological Habitats

Detachment Fallbrook is composed mainly of open space where plant communities, habitats, and federally listed as threatened or endangered species are able to thrive due the low-intensity land use requirement. Fourteen primary vegetation communities occur and generally correspond to seven wildlife habitat types: coastal sage scrub, mixed chaparral, chamise chaparral, valley foothill riparian, annual grassland, fresh emergent wetlands, and eucalyptus. The vegetation in the area of MRP Site UXO4 is considered to be mostly mixed grassland. Common species in mixed grassland habitat include native, perennial bunch

grasses such as *Nassella* spp., mixed with non-native annual grasses. However, the site contains coastal sage scrub, which is considered to be critical habitat for special-status bird species. Prior to the May 2014 Tomahawk fire at Detachment Fallbrook, the shallow ravine that traverses MRP Site UXO4 was covered with thick grassland and coastal scrub vegetation. Much of that vegetation was destroyed during the fire.

2.1.1.2 Special-Status Species

Special-status species are those plant and animal species that are classified as threatened, endangered, or of-concern by state or federal agencies, and that are known to occur or have the potential to occur in the terrestrial or aquatic habitats in the general vicinity of Detachment Fallbrook. Federally listed species that have a potential to occur at the site include: California gnatcatcher (CAGN) (*Polioptila californica*), Stephens' kangaroo rat (SKR) (*Dipodomys stephensi*), arroyo toad (*Bufo californicus*), and Least Bell's Vireo (*Verio bellii pusillus*). Of these species, only two have been potentially recorded within the project area; the threatened CAGN was positively sighted. Suspected kangaroo rat burrows have been positively sighted at MRP Site UXO4; it is unconfirmed whether the burrows belonged to an SKR or the Dulzura kangaroo rat that is known to be at Detachment Fallbrook and is not endangered. The site contained suitable habitat for SKR in 2009, when the last phase of fieldwork took place. SKR prefer sparsely vegetated grassy areas. During the site inspection (ChaduxTt, 2010), MRP Site UXO4 was monitored for CAGN and SKR. Neither of these species were observed at the time. However, there remains the possibility that both of these species could be present at the site, and the planning phases and fieldwork phases of the project will take this into account by performing field surveys. Special-status species were not found to occupy the site; therefore, mitigation measures were not required.

The results of previous SKR trapping events and CAGN surveys were detailed in the biological avoidance and minimization plan that was an appendix to the RI workplan (KCH, 2015). Prior to the May 2014 Tomahawk Fire, the CAGN habitat within MRP Site UXO4 was of low to moderate quality, with sparse, patchy vegetation that ranging in size from 1 to 2 feet in height. Currently (post-fire), some scattered stems of various shrubs and herbs remain. However, the overall density of both shrub and herbaceous vegetation cover is severely reduced and bare ground is abundant throughout. CAGN were not observed or heard during the protocol surveys conducted at MRP Site UXO4 between September 2013 and February 2014. CAGN are considerably less likely to use MRP Site UXO4 now that the site vegetation was burned as a result of the May 2014 Tomahawk Fire.

An initial check of the site for habitat suitable for the endangered SKR, as well as for kangaroo rat signs (burrows, scat, tracks), was conducted during December 2013 by SJM Biological Consultants (KCH, 2015). Open grassland potentially occupied by SKR, as well as occasional signs of kangaroo rat activity, were confirmed in a portion of the eastern part of the site. However, because there is no way to determine the species responsible for such signs, it was necessary to conduct a trapping survey to confirm the species creating the signs. A trapping survey to determine the species of kangaroo rat creating the signs observed at the site was conducted on five nights between December 6 and 12, 2013. The trapping survey confirmed that no SKR were present in the project area, and therefore no impacts to SKR would occur during RI field activities.

A follow-up nontrapping survey was conducted at MRP Site UXO4 on August 18, 2014 to assess the potential for SKR occurrence following the May 2014 Tomahawk Fire. The visual survey was conducted to evaluate if the more open vegetation conditions caused by the fire resulted in more suitable conditions for SKR than existed prior to the fire. At the time of the RI field activities, MRP Site UXO4 was open (i.e., exhibited abundant bare ground) compared to before the fire because of the razing of numerous shrubs and sub-trees, and to a lesser degree herbaceous vegetation cover. Rodent burrows were observed to be rare throughout with no evidence of kangaroo rat activity observed at MRP Site UXO4, nor in the immediate vicinity.

Areas surrounding MRP Site UXO4 also burned to varying degrees. The area outside the western entry gate burned, but still exhibited some shrubs that were only partly burned. The hill to the south of MRP Site UXO4 and across Sidewinder Road, which was known to harbor a scattered population of SKR in late 2013, also burned. Thus, bare ground is abundant in both of these areas adjacent and in close proximity to MRP Site UXO4.

Based on observations made during the August 18, 2014 survey, there was no evidence that would suggest incursion by SKR (i.e., burrows, diggings, or tracks) into MRP Site UXO4 or the immediate vicinity and no reason to suspect SKR have entered MRP Site UXO4 since the December 2013 trapping survey.

Other species that are federally listed as endangered or threatened that could potentially occur at MRP Site UXO4 (based on their presence in similar areas in San Diego County and initial surveys conducted by the United States Fish and Wildlife Service on Detachment Fallbrook in March and April 1990) include the quino checkerspot butterfly (*Euphydryas editha quino*), and thread-leaved brodiaea (*Brodiaea filifolia*). These species have never been documented on Detachment Fallbrook and are considered unlikely to be present at the site.

Several unlisted, yet sensitive, bird species are also known to occur in Detachment Fallbrook and include the rufus-crowned sparrow (*Aimophila ruficeps*), grasshopper sparrow (*Ammodramus savannarum*), and protected raptors, such as the Cooper's hawk (*Accipter cooperii*) and Golden Eagle (*Aquila chrysaetos*). These species are known to occur on Detachment Fallbrook but have not been specifically recorded at MRP Site UXO4. These species were not observed at the site at the time of field activities.

2.1.2 Source Evaluation

MRP Site UXO4 was reported to be a burial area for dunnage and munitions. The site was reportedly used between 1942 and 1978. A 1978 memorandum from a former Commanding Officer at Detachment Fallbrook states that numerous cases of inert rifle-propelled grenades were buried in the area. Interviews and documentation relating to the site indicated that only inert ordnance was buried there (Malcolm Pirnie, 2006).

Sample data evaluated for this ERA are those collected in 2008 for the site inspection and in 2015 for this RI. These data are considered representative of current conditions at this site. Soil data from 0 to 0.5 foot below ground surface (bgs) and 0 to 6 feet bgs were included because these depth intervals are considered relevant for typical surface and fossorial ecological receptors, respectively, at MRP Site UXO4. Samples were analyzed for explosives, metals, and perchlorate. In addition, a subset of the samples were analyzed for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

2.1.3 Exposure Pathway Analysis

Exposure pathway analysis evaluates the potential for contact between the chemical compounds reported in soil at MRP Site UXO4 and the ecological receptors that are present or have the potential to occur at the site. Potential exposure pathways must meet specific criteria for an exposure to occur. Aside from necessary habitat for ecological receptors, a complete exposure pathway must include the following elements:

- Contaminant source (e.g., disposed plating waste or sandblast grit)
- Primary or secondary mechanisms for contaminant release and transport
- Exposure point (e.g., soil)
- Feasible route of exposure (e.g., ingestion)
- Receptor (e.g., bird or mammal)

2.1.3.1 Soil Pathways

Exposure to plants and soil invertebrates occurs by direct contact with contaminated soil. Exposure of birds and mammals by direct ingestion of soil and forage or prey that have accumulated COPECs is assumed to be most significant, whereas dermal contact and inhalation are expected to be minor exposure routes for these receptor types.

The direct exposure to soil and indirect exposure through food web exposure via consumption of contaminated prey/forage were quantitatively evaluated pathways. These pathways were assumed to be potentially complete for this ERA and are depicted in the CSEM (see Figure 8-2 of the RI Report).

2.1.3.2 Identification of COPECs

Analytical data used for this ERA were collected at the locations identified in Figure 4-1 of this RI Report. Data processing was completed using standard protocols (USEPA, 1992d; USEPA, 2000) and included standardization of analyte names, matrices, and units; removal of duplicated data; resolution of native/field duplicate pairs; and reduction of analytes reported under multiple methods.

Native and field duplicates and results from multiple methods were resolved so that only one result per sample was retained:

- If both results were detects, the higher value was retained.
- If one result was a detect and one was a nondetect, the detected value was retained.
- If both results were nondetect, the lower nondetected value (the method detection limit) was retained.

COPECs were identified as chemicals meeting three criteria:

- Those chemicals detected at least once in soil samples.
- Metals detected at maximum levels exceeding background levels (defined below).
- Chemicals detected at maximum levels exceeding the most conservative USEPA Ecological Soil Screening Level (EcoSSLs) (USEPA, 2007a).

DTSC guidance indicates that chemicals present in soil at concentrations elevated with respect to local background conditions become COPECs and should be carried forward into a risk evaluation (DTSC, 1997). Background data for Detachment Fallbrook are available for metals in soil and were developed for four parent rock types (SES-TECH, 2012). The Tonalite (Kgt) and Metavolcanic/Metasedimentary (Kjm) parent rock types are applicable to MRP Site UXO4, based on its location (see Figure 2-1 of SES-TECH, 2012). Background threshold values for Kgt soils were used to evaluate data for the ERA because concentrations for metals in Kgt soil are generally lower than concentrations of metals in Kjm soils and therefore are more conservative for evaluating data.

0 to 0.5 Foot bgs Soil: As indicated in Table M-1, a comparison of maximum soil concentrations for soil 0 to 0.5 foot bgs at MRP Site UXO4 with corresponding background levels indicates that levels of antimony, arsenic, cadmium, copper, lead, manganese, molybdenum, tin, and zinc have been found present at levels exceeding their respective soil background, or do not have available background levels (such that exceedance of background is conservatively assumed), whereas other metals are below background. Further screening against the most conservative EcoSSLs (when available) as the third step in the COPEC selection process indicates that antimony, arsenic, and cadmium are below respective screening levels. The COPECs identified for 0 to 0.5 foot bgs soil include copper, lead, manganese, molybdenum, perchlorate, tin, and zinc.

0 to 6 Feet bgs Soil: A comparison of maximum soil concentrations for soil 0 to 6 feet bgs with corresponding background levels indicates that levels of antimony, arsenic, beryllium, cadmium, cobalt, copper, lead, manganese, mercury, molybdenum, tin, and zinc have been found present at levels exceeding their respective soil background, or do not have available background levels (such that exceedance of background is conservatively assumed), whereas other metals are below background. Further screening against the most conservative EcoSSLs (when available) as the third step in the COPEC selection process indicates that arsenic, beryllium, and hexavalent chromium are below respective screening levels. The COPECs identified for 0 to 6 feet bgs soil include antimony, cadmium, cobalt, copper, lead, manganese, mercury, molybdenum, perchlorate, tin, and zinc.

Table M-1 provides the results of the selection of COPECs for MRP Site UXO4. A total of seven of the 22 chemicals detected in 0 to 0.5 foot bgs soil and a total of 11 of the 24 chemicals detected in 0 to 6 feet bgs soil was identified as COPECs. No explosives, VOCs, or SVOCs were detected in soil samples.

2.1.4 Assessment and Measurement Endpoints

Assessment endpoints are an expression of the important ecological values that should be protected at a site (USEPA, 1997). The assessment endpoints are developed according to known information concerning the contaminants present, the study area, and the ecological management goals. The assessment endpoints for this site are adverse effects on receptor populations and communities for nonthreatened and nonendangered species, and individuals for threatened and endangered species, when applicable.

Adverse effects on these assessment endpoints are predicted from measurement endpoints. Measurement endpoints were selected for each assessment endpoint. Assessment and measurement endpoints are listed in Table M-2. The measurement endpoint evaluations for this site are the effects of chemical exposure on reproduction, survival, and growth, which

can be used to predict effects at individual, population, and community levels of organization for each bird and mammal receptor group. These factors were considered in the identification and evaluation of appropriate toxicity information.

2.1.5 Ecological Conceptual Site Exposure Model

The ecological CSEM integrates the component evaluations of the screening-level problem formulation. Investigations at MRP Site UXO4 have identified the presence of COPECs in soil. Ecological habitats at the site are of sufficient quality to support wildlife use. Thus, it is plausible that ecological receptors may be present or occur intermittently at the site.

MRP Site UXO4 investigations show that the constituents reported in remaining soil include metals and perchlorate. Transfer of COPECs to wildlife (e.g., birds and mammals) occurs through incidental ingestion of soil and through ingestion of food (forage or prey) that has accumulated COPECs from the site.

Representative terrestrial receptors for MRP Site UXO4 were selected based on a conservative review of current site conditions and potential habitat. These receptors are common across California and are anticipated to be representative of other birds and mammals of the same feeding guild that typically forage in upland areas. Generally, the same mammal or bird toxicity information (from literature) is used irrespective of the specific species selected. Six representative species were evaluated:

- Insectivorous mammals are represented by the deer mouse (*Peromyscus maniculatus*).
- Herbivorous mammals are represented by the California ground squirrel (*Spermophilus beecheyi*).
- Carnivorous mammals are represented by the American badger (*Taxidea taxus*).
- Insectivorous birds are represented by the American robin (*Turdus migratorius*).
- Herbivorous birds are represented by the mourning dove (*Zenaida macrocura*).
- Carnivorous birds (raptors) are represented by the red-tailed hawk (*Buteo jamaicensis*).

The ecological CSEM is shown in Figure 8-2 of the RI report.

2.2 Screening-Level Ecological Effects Characterization (Step 2)

The screening-level ecological effects characterization is part of Step 2 of the SLERA and consists of an evaluation of available toxicity or other effects information that can be used to link the exposure estimates to a likelihood of adverse effects. Stressor-response (i.e., effects) data that can be used to evaluate ecological risks resulting from chemical exposures comprise three general categories: literature-derived or site-specific single-chemical toxicity data, site-specific ambient media toxicity tests, and site-specific field surveys (Suter et al., 2000). Site-specific toxicity studies or quantitative field surveys were not conducted for this ERA. Therefore, single-chemical toxicity data found in the literature were used as the basis for deriving ecological screening values (ESVs). ESVs are concentrations of chemicals in media (soil) corresponding to reported effects levels, and are reported in milligrams per kilogram (mg/kg).

2.2.1 Toxicity Values for Birds and Mammals

Toxicity values for birds and mammals are typically represented as a dosage (the amount of an analyte per unit body weight per day) that has been reported to result in an adverse effect (i.e., toxicity reference values [TRVs]). The TRVs for birds and mammals were selected using the following hierarchy of sources:

- Region 9 Navy Biological Technical Assistance Group (BTAG) bird and mammal TRVs (Cal-EPA, 2009)
- USEPA EcoSSLs (USEPA, 2003a; 2003b; 2005a; 2005b; 2005c; 2005d; 2005e; 2005f; 2005g; 2005h; 2007b; 2007c; 2007d; 2007e; 2007f; 2008)
- *Toxicological Benchmarks for Wildlife: 1996 Revision* (Sample et al., 1996)
- Peer-reviewed literature

TRVs were classified into two categories: Low TRVs and High TRVs. Low TRVs include no observed adverse effect levels (NOAELs) and Low BTAG values. These values reflect the highest exposure that has been demonstrated to exert no adverse effect. High TRVs reflect a mid-range at which adverse effects may occur to a segment of the test population from chronic or subchronic exposure. High TRVs include lowest observed adverse effect levels (LOAELs) and High BTAG values. Other toxicity endpoints may be used such as the lethal dose to 50 percent of a test population (LD_{50}), but they are only used in the absence of other more appropriate endpoints. TRVs selected for birds and mammals are provided in Table M-3 and Table M-4, respectively.

2.2.2 Derivation of Ecological Screening Values

For each of the COPECs identified for 0 to 6 feet bgs soil, site-specific ESVs were derived for those ecological receptors considered representative at Detachment Fallbrook. The ESVs were derived using food-chain models that consider transfer of COPECs to upper tropic levels (e.g., birds and mammals) through incidental ingestion of soil and through ingestion of food (forage or prey) that has accumulated COPECs from the site. Food-chain uptake models for birds and mammals require input of species-specific exposure factors and chemical-specific bioaccumulation/bioconcentration factors. Species-specific life history factors include body weight, food, and abiotic media ingestion rates; dietary composition; and respective proportion of each dietary component.

2.2.2.1 Exposure Model for Birds and Mammals

The food-chain uptake model for terrestrial birds and mammals uses dosage-based TRVs and includes ingestion of soil and food (forage/prey). The food-chain uptake exposure estimates for terrestrial birds and mammals are generated using the following generalized exposure model, modified from Suter et al. (2000):

$$E = [Soil \bullet P_s \bullet FIR] + [\sum_{i=1}^{N} B_i \bullet P_i \bullet FIR]$$

$$Where:$$

$$Bi \quad = \quad Soil \bullet BAF$$

Where:

E	=	total exposure (milligrams per kilogram per day)
Soil	=	concentration of chemical in soil (mg/kg)
P_s	=	proportion of diet that is soil (unitless)
FIR	=	food ingestion rate normalized to body weight (kilograms per kilogram per day)
B_i	=	concentration of chemical in biota type (i) (mg/kg)
P_i	=	proportion of diet that is biota type (i)
BAF	=	bioaccumulation factor (liters per kilogram, dry weight)

2.2.2.2 Bioaccumulation Factors

The measurement or estimation of concentrations of COPECs in wildlife food is necessary to evaluate how much of a receptor's exposure is through food versus direct uptake of contaminated media. Although the preferred data are direct measurements of concentrations in biota samples collected from the site, such data were not available for MRP Site UXO4. Therefore, literature-reported values or uptake models are used to estimate bioaccumulation. BAFs reported in the open literature were used to model uptake of COPECs from soil to forage/prey items.

The wildlife exposure assumptions and TRVs, and the calculated site-specific ESVs based on the Low TRVs and High TRVs are provided in Table M-5. The site-specific ESVs used for this ERA are considered conservative for larger home-range receptors, because the screening levels assume that these receptors obtain their forage entirely from the site.

2.2.3 Exposure Point Concentrations

The exposure point concentrations (EPCs) used for this ERA were dependent on the tier of assessment being performed. For the Tier 1 SLERA, the maximum detected concentrations were used. For the Tier 2 (BERA, Step 3a), the 95 percent upper confidence limit (95UCL) on the mean was used. The 95UCLs were computed using the process described in Appendix L, Section 6.0.

2.3 Screening-Level Risk Characterization (Step 2)

The risk characterization is part of Step 2 of the SLERA and evaluates the evidence linking exposures to COPECs with their potential for ecological effects on the representative species identified for MRP Site UXO4. For each COPEC and receptor, maximum concentrations in soil are compared with the Low TRV-based ESVs (referred to as Low ESVs). COPECs with maximum concentrations exceeding the Low ESV in the Tier 1 assessment were retained for further evaluation in the Tier 2 assessment. COPECs with EPCs less than the Low ESV were considered to not pose a risk to ecological receptors and were not carried forward to Tier 2.

2.3.1 Tier 1 Ecological Risk Characterization Results

The results of the ecological screening evaluation are provided in Table M-6. The results indicate that maximum concentrations exceed Low ESVs for at least one of the receptors for cadmium (for the deer mouse), copper (for the deer mouse and American robin), lead (for the deer mouse, American robin, mourning dove, and red-tailed hawk), and zinc (for the deer mouse and American robin). These COPECs were retained for further evaluation in the Tier 2 assessment.

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3.0 Tier 2 Baseline Ecological Risk Assessment (Step 3a)

This section constitutes Step 3a of Tier 2 (BERA), providing a refinement of the screening-level, conservative exposure assumptions included in the SLERA (Section 2.0). The use of refined exposure assumptions provides added reality to the exposure and risk estimates for ecological receptors, allowing for more informed risk management decisions for MRP Site UXO4. The Tier 2 assessment included the following refinements, when compared with the Tier 1 assessment:

- Use of the 95UCL to estimate exposure (EPC)
- Consideration of both Low ESVs and High ESVs

The results of Tier 2 Step 3a for terrestrial birds and mammals potentially using MRP Site UXO4 are provided in Table M-6 and summarized as follows:

0 to 0.5 Foot bgs Soil Interval – Using the sitewide 95UCL from the 0 to 0.5 foot bgs soil interval to estimate exposure, Low TRV-based ESVs are exceeded for four receptors:

- Deer mouse – lead and zinc
- American robin – copper, lead, and zinc
- Mourning dove – lead
- Red-tailed hawk – lead

There were no individual COPECs present in 0 to 0.5 foot bgs soil with a sitewide 95UCL exceeding the High TRV-based ESVs.

0 to 6 Feet bgs Soil Interval – Using the sitewide 95UCL from the 0 to 6 feet bgs soil interval to estimate exposure, Low TRV-based ESVs are exceeded for four receptors:

- Deer mouse – cadmium and zinc
- American robin – lead, and zinc
- Mourning dove – lead
- Red-tailed hawk – lead

There were no individual COPECs present in 0 to 6 feet bgs soil with a sitewide 95UCL exceeding the High TRV-based ESVs.

The results of this ERA indicate that concentrations of COPECs found in MRP Site UXO4 soil during the Site Inspection and RI sampling are below levels that might be expected to pose ecological risk (as indicated by the High TRV-based ESVs).

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4.0 Summary and Conclusions from the ERA

In accordance with Navy, USEPA, and Cal-EPA guidance, this ERA used a tiered approach designed to focus the evaluation on those receptor types and COPECs considered of greatest concern. The Tier 1 SLERA used conservative assumptions to determine the chemicals, receptors, and exposure pathways to carry forward to the site-specific Tier 2 assessment and included the maximum detected concentration and Low ESVs. Tier 2 included use of refined exposure assumptions (e.g., use of areal average concentrations as represented by the 95UCL and consideration of High TRV-based ESVs) to provide more realistic estimates of exposure and risk.

Risks were estimated for terrestrial birds and mammals. These estimates were conducted under the hypothetical assumption that soil at MRP Site UXO4 is readily accessible for exposure by these receptors. Potential risks to terrestrial birds and mammals were estimated using the dosage-based food-chain uptake model and Low and High TRVs to derive ESVs.

Low TRV-based ESVs are used to estimate potential risks to special-status species. Prior to conducting the RI sampling, MRP Site UXO4 was monitored for CAGN and SKR and neither of these species were found to be present at the site. Given the lack of documented special-status birds or mammals using the site, the results using the High TRV-based ESVs are considered most appropriate for assessing the potential for adverse effects on receptor populations and communities for nonthreatened and nonendangered species.

The results of this ERA indicate that concentrations of COPECs found in MRP Site UXO4 soil during the RI sampling are below levels that might be expected to pose ecological risk (as indicated by the High TRV-based ESVs). The overall conclusion of the ERA is that the concentrations in soil do not pose unacceptable risk to ecological receptors.

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5.0 Uncertainty Analysis

Full characterization of ecological risks requires that numerical estimates of ecological health risks be accompanied by a discussion of the uncertainties inherent in the assumptions used to estimate risks. Uncertainties in risk assessment methods may result in understating or overstating the ecological risks.

Risk estimates are subject to uncertainty from a variety of sources, including the following:

- Sampling, analysis, and data evaluation
- Fate and transport estimation
- Exposure estimation
- Toxicological data

These uncertainties are discussed in more detail in the following sections.

5.1 Sampling, Analysis, and Data Evaluation

Uncertainty associated with sampling and analysis includes the inherent variability (standard error) in the analysis, representativeness of the samples, sampling errors, and heterogeneity of the sample matrix. The quality assurance/quality control program used in the investigation serves to reduce these errors, but it cannot eliminate all errors associated with sampling and analysis. The degree to which sample collection and analyses reflect real EPCs partly determines the reliability of the risk estimates.

5.2 Fate and Transport

This ERA makes simplifying assumptions about environmental fate and transport of COPECs; specifically, it assumes that no chemical loss or transformation occurs and that the chemical concentrations detected in site media remain constant. However, in the case of MRP Site UXO4, the COPECs in soil are metals. Therefore, natural attenuation processes are not expected to be important relative to typical wildlife exposure durations, and the analytical data chosen to represent EPCs are not likely to overstate actual long-term exposure levels.

5.3 Exposure

The estimation of exposure requires many assumptions that describe potential exposure situations. There are uncertainties regarding the likelihood of exposure, frequency of contact with contaminated media, the concentration of contaminants at exposure points, and the time period of exposure. The assumptions used tend to simplify and approximate actual site conditions and may overestimate or underestimate the actual risks. In general, these assumptions are intended to be conservative and yield an overestimate of the true risk or hazard.

The process for estimation of ecological exposure to birds and mammals assumes that the majority of exposure occurs via oral intake of contaminated abiotic media and from uptake

through the food web. Other routes such as dermal contact and inhalation are anticipated to contribute a smaller portion of the total overall exposure, compared to the oral route.

Bioaccumulation factors used to estimate exposure from soil are generally based on available literature-based animal studies where both collocated tissue and soil concentrations have been measured. The extent to which these studies represent the types of receptors evaluated in the ERA will affect the reliability of resulting exposure estimates.

5.4 Toxicological Data

Uncertainties in toxicological data can also influence the reliability of risk management decisions. Data on contaminants and their toxicity to wildlife are limited. In addition, the usefulness of existing toxicity information in assessing ecological impacts is constrained by several factors. Most wildlife toxicity information is generated by laboratory studies with selected test species. These studies frequently evaluate domestic animals under controlled laboratory conditions, with few tests involving native wildlife. Basic toxicity information can be extrapolated to native species in the wild, but consideration must be given to the species involved and specific site conditions. Where toxicity information on a particular contaminant is available for a species found onsite, consideration was given to the type of data available. In addition, because the toxicity of many elements is greatly influenced by the chemical state in which they occur in an animal's food, total concentrations of these elements in soil may not be accurate indicators of potentially toxic exposure.

The toxicity values used for quantifying risk in this assessment have varying levels of confidence that will affect how useful the resulting risk estimates are. Uncertainty factors were used for extrapolation between toxicity endpoints (for example, NOAELs and LOAELs) during the derivation of BTAG toxicity factors and EcoSSLs. The use of uncertainty factors in the derivation of final screening levels while striving for protectiveness may result in an overestimation of risk.

This ERA included use of both Low TRVs and High TRVs. Per DTSC guidance, exposures at or below the Low TRV dose would not be expected to produce an adverse effect and are protective of an individual special-status species or a wildlife population, while exposures above the High TRV dose would be expected to produce an adverse effect to an individual or a population of organisms. Exposures occurring within the "gray area" between the Low and High TRVs represent an area of some uncertainty. However, based on the results of this ERA, wildlife populations are considered within the regulatory limits (and remedial actions are therefore not warranted) because (1) wildlife exposure levels do not exceed the DTSC- and BTAG-recommended High TRVs, (2) no threatened or endangered species were identified at these sites during biological surveys, and (3) the Tier 2 ERA uses conservative assumptions like 100-percent bioavailability and 95UCLs.

Site-specific bioavailability data were unavailable for detected chemicals. This assessment conservatively assumes that bioavailability from soil is the same as that in the toxicological studies from which the toxicity values were derived. Depending on whether the chemical form at the site is less or more bioavailable than assumed, actual risk would be proportionately lower or higher, respectively.

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Tables

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TABLE M-1

Selection of Chemicals of Potential Ecological Concern

RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

Analyte	0 to 0.5 foot bgs Maximum Concentration (mg/kg)	0 to 6 feet bgs Maximum Concentration (mg/kg)	Background Threshold Value[a]	Ecological Soil Screening Level (Eco-SSL) Plant (mg/kg)	Soil Invert. (mg/kg)	Birds (mg/kg)	Mammals (mg/kg)	Source	Selected as COPEC? 0 to 0.5 foot bgs	0 to 6 feet bgs
Aluminum	18,500	23,500	32,152	Narrative statement[b]				USEPA, 2003a	No	No
Antimony	0.27 J	0.31 J	N/A	N/A	78	N/A	0.27	USEPA, 2005a	No	**Yes**
Arsenic	2.78	3.99	1.68	18	N/A	43	46	USEPA, 2005b	No	No
Barium	175	175	266	N/A	330	N/A	2,000	USEPA, 2005c	No	No
Beryllium	0.35 J	0.39 J	0.38	N/A	40	N/A	21	USEPA, 2005d	No	No
Cadmium	0.28 J	0.37 J	0.19	32	140	0.77	0.36	USEPA, 2005e	No	**Yes**
Chromium	15.7	30.3	97.1	N/A	N/A	26	34	USEPA, 2008	No	No
Chromium VI	ND	0.14	N/A	N/A	N/A	N/A	130	USEPA, 2008	No	No
Cobalt	8.4	23.9	23.8	13	N/A	120	230	USEPA, 2005f	No	**Yes**
Copper	58.4	61.3	29.5	70	80	28	49	USEPA, 2007b	**Yes**	**Yes**
Iron	21,200	34,400	35,630	Narrative statement[b]				USEPA, 2003b	No	No
Lead	45.7	51.2 J	4.60	120	1,700	11	56	USEPA, 2005g	**Yes**	**Yes**
Manganese	451	627	432	220	450	4,300	4,000	USEPA, 2007c	**Yes**	**Yes**
Mercury	0.013 J	0.060 J	0.020	N/A	N/A	N/A	N/A	N/A	No	**Yes**
Molybdenum	0.91	0.91	N/A	N/A	N/A	N/A	N/A	N/A	**Yes**	**Yes**
Nickel	5.7	10.8	21.3	38	280	210	130	USEPA, 2007d	No	No
Perchlorate	0.0038 J	0.0038 J	N/A	N/A	N/A	N/A	N/A	N/A	**Yes**	**Yes**
Selenium	0.19 J	0.21 J	0.71	0.52	4.1	1.2	0.63	USEPA, 2007e	No	No
Silver	ND	0.055 J	0.088	560	N/A	4.2	14.0	USEPA, 2006	No	No
Strontium	25.8	30.4	57.7	N/A	N/A	N/A	N/A	N/A	No	No
Thallium	0.32 J	0.42 J	0.62	N/A	N/A	N/A	N/A	N/A	No	No
Tin	14.3 J	14.3 J	N/A	N/A	N/A	N/A	N/A	N/A	**Yes**	**Yes**
Vanadium	59.4	80.1	116	N/A	N/A	7.8	280	USEPA, 2005h	No	No
Zinc	47.6	91.0	35.3	160	120	46	79	USEPA, 2007f	**Yes**	**Yes**

Notes:

[a] BTVs are installation-specific upper tolerance limits developed in SES-TECH (2012). BTVs for the Kgt (Tonalite) parent rock type are used, based on the prevalence of this rock type where MRP Site UXO4 is located.

[b] Soil pH conditions at the site make ecological exposure and risk from these metals unlikely.

bgs = below ground surface

BTV = background threshold value

COPEC = constituent of potential ecological concern

ECO-SSL = Ecological Soil Screening Level

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

mg/kg = milligram per kilogram

MRP = Munitions Response Program

ND = not detected

N/A = not available

NAVWPNSTA = Naval Weapons Station

Shaded = below background

USEPA = United States Environmental Protection Agency

UXO = unexploded ordnance

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Selection of Chemicals of Potential Ecological Concern

RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

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TABLE M-2

Ecological Endpoints and Measures of Exposure and Effect for the Ecological Risk Assessment

RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

Functional Group	Assessment Endpoint	Representative Endpoints	Measure of Exposure	Measure of Effect
Herbivorous Birds	Survival and health of herbivorous birds using areas with suitable habitat, and potentially exposed to constituents in soil and forage items	Mourning dove (*Zenaida macrocura*)	Measured constituent levels in soil; modeled constituent levels in food items	Literature-based chronic LOAEL for bird populations and NOAEL for T&E species
Insectivorous/ Omnivorous Birds	Survival and health of insectivorous/omnivorous birds using areas with suitable habitat, and potentially exposed to constituents in soil and forage/prey items	American robin (*Turdus migratorius*)	Measured constituent levels in soil; modeled constituent levels in food items	Literature-based chronic LOAEL for bird populations and NOAEL for T&E species
Upland Raptors	Survival and health of raptors using onsite areas with suitable habitat, and potentially exposed to constituents in soil and prey items	Red-tailed hawk (*Buteo jamaicensis*)	Measured constituent levels in soil; modeled constituent levels in food items	Literature-based chronic LOAEL for bird populations and NOAEL for T&E species
Small Herbivorous Mammals (fossorial)	Survival and health of herbivorous mammals using onsite areas with suitable habitat, and potentially exposed to constituents in soil and forage items	California ground squirrel (*Spermophilus beecheyi*)	Measured constituent levels in soil; modeled constituent levels in food items	Literature-based chronic LOAEL for mammal populations and NOAEL for T&E species
Small Insectivorous/ Omnivorous Mammals	Survival and health of insectivorous/omnivorous mammals using onsite areas with suitable habitat, and potentially exposed to constituents in soil and prey/forage items	Deer mouse (*Peromyscus maniculatus*)	Measured constituent levels in soil; modeled constituent levels in food items	Literature-based chronic LOAEL for mammal populations and NOAEL for T&E species
Carnivorous Mammals (fossorial)	Survival and health of carnivorous mammals using onsite areas with suitable habitat, and potentially exposed to constituents in soil and prey items	American badger (*Taxidea taxus*)	Measured constituent levels in soil; modeled constituent levels in food items	Literature-based chronic LOAEL for mammal populations and NOAEL for T&E species

Notes:

LOAEL = lowest observed adverse effect level

MRP = Munitions Response Program

NAVWPNSTA = Naval Weapons Station

NOAEL = no observed adverse effect level

T&E = threatened and endangered

UXO = unexploded ordnance

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TABLE M-3

Toxicity Reference Values for Birds - Ingestion of Soil and Food Chain Uptake

RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

		Derivation of Low TRV												Derivation of High TRV										
		Toxicity Information								Conversion Factors				Toxicity Information								Conversion Factors		
Chemical	**CAS#**	**Test Species**	**Exposure Duration**	**Toxicity Value (mg/kg-d)**	**Endpoint**	**Type**	**Effects**	**Comments**	**Citation**	**Acute LD_{50} to chronic NOAEL UF**	**LOAEL to NOAEL UF**	**Subchronic-to-Chronic UF**	**Final Low TRV (mg/kg-d)**	**Test Species**	**Exposure Duration**	**Toxicity Value (mg/kg-d)**	**Study Endpoint**	**Type**	**Effects**	**Comments**	**Citation**	**LD_{50} to LOAEL UF**	**Subchronic-to-Chronic UF**	**Final High TRV (mg/kg-d)**
Antimony	7440360	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	7440439	Wood Duck	--	0.7	Low TRV	--	Kidney histology	--	Cal-EPA, 2009	1	1	1	0.70	Mallard Duck	--	10.4	High TRV	--	Kidney histology	--	Cal-EPA, 2009	1	1	10.4
Cobalt	7440484	Chicken and duck	Various	7.61	NOAEL	--	Growth	geometric mean of 5 studies	USEPA Eco-SSLs for Cobalt (USEPA, 2005f)	1	1	1	7.61	chicken/ duck	Various	18.00	LOAEL	--	Growth and Reproduction	Geometric mean of LOAEL for reproduction and growth	USEPA Eco-SSLs for Cobalt (USEPA, 2005f)	1	1	18
Copper	7440508	Chicken	--	2.3	Low TRV	--	Growth	--	Cal-EPA, 2009	1	1	1	2.3	Chicken	--	52.3	High TRV	--	Growth, gizzard erosion	--	Cal-EPA, 2009	1	1	52.3
Lead	7439921	Quail	--	0.014	Low TRV	--	Reproduction	--	Cal-EPA, 2009	1	1	1	0.014	Chicken	--	8.75	High TRV	--	Reproduction	--	Cal-EPA, 2009	1	1	8.75
Manganese	7439965	Quail	--	77.6	Low TRV	--	Neurobehavioral	--	Cal-EPA, 2009	1	1	1	77.6	Quail	--	776	High TRV	--	Neurobehavioral	--	Cal-EPA, 2009	1	1	776
Mercury	7439976	Mallard Duck	--	0.039	NOAEL	--	Reproductive	--	Cal-EPA, 2009	1	1	1	0.039	Mallard duck	--	0.18	LOAEL	--	Mortality, neurological	--	Cal-EPA, 2009	1	1	0.18
Molybdenum	7439987	Chicken	21 days	3.5	NOAEL	chronic	Reproduction - embryonic viability	during critical lifestage	Sample et al., 1996	1	1	1	3.53	Chicken	21 days	35.3	LOAEL	chronic	Reproduction - embryonic viability	critical lifestage	Sample et al., 1996	1	1	35.3
Perchlorate	1.5E+07	Bob White Quail	8 weeks	13	NOAEL	subchronic	Decreased tibia length	UF of 10 applied to 130 mg/kg-d since only one species from a single taxonomic order are represented in study selected to derive the recommended TRV-low value.	USACHPPM, 2007	1	1	1	13	Bob White Quail	8 weeks	26	LOAEL	subchronic	Decreased tibia length	UF of 10 applied to 261 mg/kg-d since only one species from a single taxonomic order are represented in study selected to derive the recommended TRV-low value.	USACHPPM, 2007	1	1	26
Tin	7440315	Japanese Quail	6 weeks	6.8	NOAEL	chronic	Reproduction	during critical lifestage	Sample et al., 1996	1	1	1	6.8	Japanese Quail	6 weeks	16.9	LOAEL	chronic	Reproduction	critical lifestage	Sample et al., 1996	1	1	16.9
Zinc	7440666	Mallard Duck	--	17.2	Low TRV	--	Growth, reproduction, multiple organs	--	Cal-EPA, 2009	1	1	1	17.2	Mallard Duck	--	172	High TRV	--	Growth, reproduction, multiple organs	--	Cal-EPA, 2009	1	1	172

Notes:

-- not available, could not be located, or not applicable

Cal-EPA = California Environmental Protection Agency

CAS = Chemical Abstracts Service

Eco-SSL = ecological soil screening level

LOAEL = lowest observed adverse effect level

LD_{50} = lethal dose to 50 percent of a test population

mg/kg-d = milligrams per kilogram body weight per day

MRP = Munitions Response Program

NAVWPNSTA = Naval Weapons Station

NOAEL = no observed adverse effect level

TRV = toxicity reference value

UF = uncertainty factor

USEPA = United States Environmental Protection Agency

UXO = unexploded ordnance

Sources:

California Environmental Protection Agency (Cal-EPA). 2009. Currently Recommended United States Environmental Protection Agency Region 9 Biological Technical Assistance Group Mammalian and Avian Toxicity Reference Values. State of California, California Environmental Protection Agency, Department of Toxic Substances Control. February 24.

Sample, B.E., C.M., Opresko, and G.W. Suter II. 1996. Toxicological Benchmarks for Wildlife: 1996 Revision. Oak Ridge National Laboratory, Oak Ridge, TN. 227 pp., ES/ER/TM-86/R3.

United States Environmental Protection Agency (USEPA). 2005f. Ecological Soil Screening Levels for Cobalt. Interim Final. OSWER Directive 92857-67, Revised. Office of Solid Waste and Emergency Response. March.

TABLE M-4

Toxicity Reference Values for Mammals - Ingestion of Soil and Food Chain Uptake

RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

		Derivation of Low TRV												Derivation of High TRV											
		Toxicity Information								Conversion Factors				Toxicity Information									Conversion Factors		
Chemical	CAS#	Test Species	Exposure Duration	Low Toxicity Value (mg/kg-d)	Endpoint	Type	Effects	Comments	Citation	LD_{50} to Chronic NOAEL	LOAEL-to-NOAEL UF	Subchronic-to-Chronic UF	Final Low TRV (mg/kg-d)	Test Species	Body Weight	Duration	High Toxicity Value (mg/kg-d)	Endpoint	Type	Effects	Additional Comments	Citation	LD_{50} to LOAEL	Subchronic-to-Chronic UF	Final High TRV (mg/kg-d)
Antimony	7440360	Rat	31 days gestation	0.0590	NOAEL	Chronic	Reproduction - progeny weight	--	USEPA Eco-SSLs for Antimony (USEPA, 2005a)	1	1	1	0.0590	Rat/mouse	--	various	2.8	LOAEL	--	Growth and Reproduction	Geometric mean of LOAEL for reproduction and growth	USEPA Eco-SSLs for Antimony (USEPA, 2005a)	1	1	2.8
Cadmium	7440439	Mouse	--	0.06	Low TRV	--	Reproduction	--	Cal-EPA, 2009	1	1	1	0.06	Mouse	--	--	2.64	High TRV	--	Reproductive	--	Cal-EPA, 2009	1	1	2.64
Cobalt	7440484	Rat	--	1.2	Low TRV	--	reproduction	--	Cal-EPA, 2009	1	1	1	1.2	Rat	--	--	20	High TRV	--	Reproductive	--	Cal-EPA, 2009	1	1	20
Copper	7440508	Mouse	--	2.67	Low TRV	--	Immunotoxicity	--	Cal-EPA, 2009	1	1	1	2.67	Mouse	--	--	632	High TRV	--	Mortality, growth, water consumption	--	Cal-EPA, 2009	1	1	632
Lead	7439921	Rat	--	1.0	Low TRV	--	Kidney	--	Cal-EPA, 2009	1	1	1	1	Mouse	--	--	241	High TRV	--	Growth, liver, kidney	--	Cal-EPA, 2009	1	1	241
Manganese	7439965	Mouse	--	13.7	Low TRV	--	Reproductive	--	Cal-EPA, 2009	1	1	1	13.7	Mouse	--	--	159	High TRV	--	Reproductive	--	Cal-EPA, 2009	1	1	159
Mercury	7439976	Rat	--	0.25	Low TRV	--	Reproductive, developmental	--	Cal-EPA, 2009	1	1	1	0.25	Rat	--	--	4	LOAEL	--	Reproductive, developmental	--	Cal-EPA, 2009	1	1	4
Molybdenum	7439987	Mouse	3 generations	0.26	NOAEL	Chronic	Reduced reproductive success	NOAEL not determined in study; LOAEL adjusted to NOAEL in Sample et al.	Sample et al., 1996	1	1	1	0.26	Mouse	0.03	3 generations	2.6	LOAEL	Chronic	Reduced reproductive success	--	Sample et al., 1996	1	1	2.6
Perchlorate	1.5E+07	Rabbit	3 months	6.4	NOAEL	Chronic	Nervous system effects	UF of 100 applied (due to lack of details in original study) within USACHPPM 2007.	USACHPPM, 2007	1	1	1	6.4	Rabbit	--	3 months	32	LOAEL	Chronic	Nervous system effects	UF of 20 applied (due to lack of details in original study) within US CHPPM 2007.	USACHPPM, 2007	1	1	32
Tin	7440315	Mouse	10 days; gestation	23.4	NOAEL	Chronic	Reproduction - reduced fetal weight and survival; increased litter resorption	--	Sample et al., 1996	1	1	1	23.4	Mouse	0.03	10 days; gestation	35	LOAEL	Chronic	Reproduction - reduced fetal weight and survival; increased litter resorption	--	Sample et al., 1996	1	1	35
Zinc	7440666	Mouse	--	9.60	Low TRV	--	Pancreatic, adrenal cortex	--	Cal-EPA, 2009	1	1	1	9.6	Rat	--	--	411	High TRV	--	Developmental	--	Cal-EPA, 2009	1	1	411

Notes:

-- not available, could not be located, or not applicable

Cal-EPA = California Environmental Protection Agency

CAS = Chemical Abstracts Service

Eco-SSL = ecological soil screening level

LOAEL = lowest observed adverse effect level

LD_{50} = lethal dose to 50 percent of a test population

mg/kg-d = milligrams per kilogram body weight per day

MRP = Munitions Response Program

NAVWPNSTA = Naval Weapons Station

NOAEL = no observed adverse effect level

TRV = toxicity reference value

UF = uncertainty factor

USEPA = United States Environmental Protection Agency

UXO = unexploded ordnance

Sources:

California Environmental Protection Agency (Cal-EPA). 2009. Currently Recommended United States Environmental Protection Agency Region 9 Biological Technical Assistance Group Mammalian and Avian Toxicity Reference Values. State of California, California Environmental Protection Agency, Department of Toxic Substances Control. February 24.

Sample, B.E., C.M., Opresko, and G.W. Suter II. 1996. Toxicological Benchmarks for Wildlife: 1996 Revision. Oak Ridge National Laboratory, Oak Ridge, TN. 227 pp., ES/ER/TM-86/R3.

United States Environmental Protection Agency (USEPA). 2005a. Ecological Soil Screening Levels for Antimony. Interim Final. OSWER Directive 92857-61, Revised. Office of Solid Waste and Emergency Response. February.

TABLE M-5
TRV-Based Ecological Screening Values for Chemicals of Potential Ecological Concern
RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

		Life History Parameters			Exposure and Uptake Values										Uptake by Plants		Uptake by Invertebrates		Uptake by Small Mammals		Incidental Soil Ingestion			TRVs		Target HQ		Receptor-specific ESVs (mg/kg)	
Analyte	Receptor	Body Weight (kg)	Food Intake (kg/kg-day)[a]	Area Use Factor	Plant BAF/ Regression	Source	Plant Concentration Estimated from BAF	Invertebrate BAF/ Regression	LogKow	Source	Estimated Invertebrate Concentration	Small mammal BAF/ Regression	Source	Estimated Small Mammal Concentration	Diet Proportion	Dosage from Plants (mg/kg-day)	Diet Proportion	Dosage from Invertebrates (mg/kg-day)	Diet Proportion	Dosage from Small Mammals (mg/kg-day)	Diet Proportion	Incidental Soil Dosage (mg/kg-day)	Total Daily Dosage (mg/kg-day)	Low TRV (mg/kg-day)	High TRV (mg/kg-day)	Low TRV-based HQ	High TRV-based HQ	Low ESV	High ESV
Antimony	American badger	4	0.033	1	=EXP(-3.233+0.938*LN(Cs))	USEPA, 2007a	1.1E+00	1.0	0.73	Default	3.4E+01	0.05x[diet]	USEPA, 2005a	3.5E-02	--	--	--	--	1.0	1.15E-03	0.052	5.79E-02	5.90E-02	0.059	2.8	1.0	1.0	33.7	1,020
	Deer mouse	0.0193	0.170	1	=EXP(-3.233+0.938*LN(Cs))	USEPA, 2007a	2.2E-02	1.0	0.73	Default	5.5E-01	0.05x[diet]	USEPA, 2005a	9.2E-06	0.4	1.52E-03	0.6	5.56E-02	--	--	0.02	1.85E-03	5.90E-02	0.059	2.8	1.0	1.0	0.55	26.0
	Ground squirrel	0.16	0.034	1	=EXP(-3.233+0.938*LN(Cs))	USEPA, 2007a	6.8E-01	1.0	0.73	Default	2.1E+01	0.05x[diet]	USEPA, 2005a	1.3E-02	1.0	2.28E-02	--	--	--	--	0.052	3.62E-02	5.90E-02	0.059	2.8	1.0	1.0	20.8	1,076
	American robin	0.079	0.149	1	=EXP(-3.233+0.938*LN(Cs))	USEPA, 2007a	3.2E-03	1.0	0.73	Default	6.9E-02	0.05x[diet]	USEPA, 2005a	1.5E-07	--	--	1.0	1.02E-02	--	--	0.021	2.13E-04	1.04E-02	--	--	--	--	--	--
	Mourning dove	0.091	0.054	1	=EXP(-3.233+0.938*LN(Cs))	USEPA, 2007a	2.5E-02	1.0	0.73	Default	6.2E-01	0.05x[diet]	USEPA, 2005a	1.2E-05	1.0	1.35E-03	--	--	--	--	0.061	2.03E-03	3.39E-03	--	--	--	--	--	--
	Red-tailed hawk	0.96	0.084	1	=EXP(-3.233+0.938*LN(Cs))	USEPA, 2007a	7.5E-04	1.0	0.73	Default	1.5E-02	0.05x[diet]	USEPA, 2005a	6.7E-09	--	--	--	--	1.0	5.59E-10	0.024	2.95E-05	2.95E-05	--	--	--	--	--	--
Cadmium	American badger	4	0.033	1	=EXP(-0.475+0.546*LN(Cs))	USEPA, 2007a	2.7E+00	=EXP(2.114+0.795*LN(Cs))	-0.07	USEPA, 2007a	7.2E+01	=EXP(-1.2571+0.4723*LN(Cs))	USEPA, 2007a	1.0E+00	--	--	--	--	1.0	3.39E-02	0.052	2.61E-02	6.00E-02	0.06	2.64	1.0	1.0	15.2	1,372
	Deer mouse	0.0193	0.170	1	=EXP(-0.475+0.546*LN(Cs))	USEPA, 2007a	9.4E-02	=EXP(2.114+0.795*LN(Cs))	-0.07	USEPA, 2007a	5.2E-01	=EXP(-1.2571+0.4723*LN(Cs))	USEPA, 2007a	5.5E-02	0.4	6.36E-03	0.6	5.36E-02	--	--	0.02	1.06E-04	6.00E-02	0.06	2.64	1.0	1.0	0.031	3.99
	Ground squirrel	0.16	0.034	1	=EXP(-0.475+0.546*LN(Cs))	USEPA, 2007a	1.5E+00	=EXP(2.114+0.795*LN(Cs))	-0.07	USEPA, 2007a	3.0E+01	=EXP(-1.2571+0.4723*LN(Cs))	USEPA, 2007a	6.2E-01	1.0	5.10E-02	--	--	--	--	0.052	8.98E-03	6.00E-02	0.06	2.64	1.0	1.0	5.15	997
	American robin	0.079	0.149	1	=EXP(-0.475+0.546*LN(Cs))	USEPA, 2007a	4.2E-01	=EXP(2.114+0.795*LN(Cs))	-0.07	USEPA, 2007a	4.7E+00	=EXP(-1.2571+0.4723*LN(Cs))	USEPA, 2007a	2.0E-01	--	--	1.0	6.98E-01	--	--	0.021	1.52E-03	7.00E-01	0.7	10.4	1.0	1.0	0.49	14.5
	Mourning dove	0.091	0.054	1	=EXP(-0.475+0.546*LN(Cs))	USEPA, 2007a	7.4E+00	=EXP(2.114+0.795*LN(Cs))	-0.07	USEPA, 2007a	3.0E+02	=EXP(-1.2571+0.4723*LN(Cs))	USEPA, 2007a	2.4E+00	1.0	3.96E-01	--	--	--	--	0.061	3.04E-01	7.00E-01	0.7	10.4	1.0	1.0	92.5	2,445
	Red-tailed hawk	0.96	0.084	1	=EXP(-0.475+0.546*LN(Cs))	USEPA, 2007a	1.1E+01	=EXP(2.114+0.795*LN(Cs))	-0.07	USEPA, 2007a	5.6E+02	=EXP(-1.2571+0.4723*LN(Cs))	USEPA, 2007a	3.5E+00	--	--	--	--	1.0	2.93E-01	0.024	4.07E-01	7.00E-01	0.7	10.4	1.0	1.0	202	4,531
Cobalt	American badger	4	0.033	1	0.0075	USEPA, 2007a	2.3E+00	0.122	0.23	USEPA, 2007a	3.7E+01	=EXP(-4.4669+1.307*LN(Cs))	USEPA, 2007a	2.0E+01	--	--	--	--	1.0	6.74E-01	0.052	5.26E-01	1.20E+00	1.2	20	1.0	1.0	306	3,207
	Deer mouse	0.0193	0.170	1	0.0075	USEPA, 2007a	5.5E-01	0.122	0.23	USEPA, 2007a	8.9E+00	=EXP(-4.4669+1.307*LN(Cs))	USEPA, 2007a	3.1E+00	0.4	3.74E-02	0.6	9.13E-01	--	--	0.02	2.49E-01	1.20E+00	1.2	20	1.0	1.0	73.4	1,223
	Ground squirrel	0.16	0.034	1	0.0075	USEPA, 2007a	4.5E+00	0.122	0.23	USEPA, 2007a	7.3E+01	=EXP(-4.4669+1.307*LN(Cs))	USEPA, 2007a	4.9E+01	1.0	1.51E-01	--	--	--	--	0.052	1.05E+00	1.20E+00	1.2	20	1.0	1.0	602	10,033
	American robin	0.079	0.149	1	0.0075	USEPA, 2007a	2.7E+00	0.122	0.23	USEPA, 2007a	4.4E+01	=EXP(-4.4669+1.307*LN(Cs))	USEPA, 2007a	2.5E+01	--	--	1.0	6.50E+00	--	--	0.021	1.11E+00	7.61E+00	7.61	18	1.0	1.0	358	847
	Mourning dove	0.091	0.054	1	0.0075	USEPA, 2007a	1.5E+01	0.122	0.23	USEPA, 2007a	2.5E+02	=EXP(-4.4669+1.307*LN(Cs))	USEPA, 2007a	2.5E+02	1.0	8.33E-01	--	--	--	--	0.061	6.78E+00	7.61E+00	7.61	18	1.0	1.0	2,064	4,882
	Red-tailed hawk	0.96	0.084	1	0.0075	USEPA, 2007a	6.0E+00	0.122	0.23	USEPA, 2007a	9.8E+01	=EXP(-4.4669+1.307*LN(Cs))	USEPA, 2007a	7.1E+01	--	--	--	--	1.0	6.00E+00	0.024	1.61E+00	7.61E+00	7.61	18	1.0	1.0	800	1,595
Copper	American badger	4	0.033	1	=EXP(0.668+0.394*LN(Cs))	USEPA, 2007a	3.1E+01	0.515	-0.57	USEPA, 2007a	5.9E+02	=EXP(2.042+0.1444*LN(Cs))	USEPA, 2007a	2.1E+01	--	--	--	--	1.0	7.04E-01	0.052	1.97E+00	2.67E+00	2.67	632	1.0	1.0	1,146	366,935
	Deer mouse	0.0193	0.170	1	=EXP(0.668+0.394*LN(Cs))	USEPA, 2007a	8.2E+00	0.515	-0.57	USEPA, 2007a	1.9E+01	=EXP(2.042+0.1444*LN(Cs))	USEPA, 2007a	1.3E+01	0.4	5.55E-01	0.6	1.99E+00	--	--	0.02	1.29E-01	2.67E+00	2.67	632	1.0	1.0	37.8	11,195
	Ground squirrel	0.16	0.034	1	=EXP(0.668+0.394*LN(Cs))	USEPA, 2007a	2.9E+01	0.515	-0.57	USEPA, 2007a	5.0E+02	=EXP(2.042+0.1444*LN(Cs))	USEPA, 2007a	2.1E+01	1.0	9.81E-01	--	--	--	--	0.052	1.69E+00	2.67E+00	2.67	632	1.0	1.0	969	356,693
	American robin	0.079	0.149	1	=EXP(0.668+0.394*LN(Cs))	USEPA, 2007a	7.3E+00	0.515	-0.57	USEPA, 2007a	1.5E+01	=EXP(2.042+0.1444*LN(Cs))	USEPA, 2007a	1.3E+01	--	--	1.0	2.21E+00	--	--	0.021	8.93E-02	2.30E+00	2.3	52.3	1.0	1.0	28.8	656
	Mourning dove	0.091	0.054	1	=EXP(0.668+0.394*LN(Cs))	USEPA, 2007a	2.0E+01	0.515	-0.57	USEPA, 2007a	1.9E+02	=EXP(2.042+0.1444*LN(Cs))	USEPA, 2007a	1.8E+01	1.0	1.08E+00	--	--	--	--	0.061	1.22E+00	2.30E+00	2.3	52.3	1.0	1.0	371	14,516
	Red-tailed hawk	0.96	0.084	1	=EXP(0.668+0.394*LN(Cs))	USEPA, 2007a	2.0E+01	0.515	-0.57	USEPA, 2007a	2.0E+02	=EXP(2.042+0.1444*LN(Cs))	USEPA, 2007a	1.8E+01	--	--	--	--	1.0	1.53E+00	0.024	7.72E-01	2.30E+00	2.3	52.3	1.0	1.0	383	24,564
Lead	American badger	4	0.033	1	=EXP(-1.328+0.561*LN(Cs))	USEPA, 2007a	6.7E+00	=EXP(-0.218+0.807*LN(Cs))	0.73	USEPA, 2007a	8.4E+01	=EXP(0.0761+0.4422*LN(Cs))	USEPA, 2007a	1.4E+01	--	--	--	--	1.0	4.55E-01	0.052	5.44E-01	9.99E-01	1.0	241	1.0	1.0	317	136,498
	Deer mouse	0.0193	0.170	1	=EXP(-1.328+0.561*LN(Cs))	USEPA, 2007a	1.3E+00	=EXP(-0.218+0.807*LN(Cs))	0.73	USEPA, 2007a	8.3E+00	=EXP(0.0761+0.4422*LN(Cs))	USEPA, 2007a	3.9E+00	0.4	9.13E-02	0.6	8.47E-01	--	--	0.02	6.14E-02	1.00E+00	1.0	241	1.0	1.0	18.0	14,540
	Ground squirrel	0.16	0.034	1	=EXP(-1.328+0.561*LN(Cs))	USEPA, 2007a	7.9E+00	=EXP(-0.218+0.807*LN(Cs))	0.73	USEPA, 2007a	1.1E+02	=EXP(0.0761+0.4422*LN(Cs))	USEPA, 2007a	1.6E+01	1.0	2.64E-01	--	--	--	--	0.052	7.36E-01	1.00E+00	1.0	241	1.0	1.0	423	134,451
	American robin	0.079	0.149	1	=EXP(-1.328+0.561*LN(Cs))	USEPA, 2007a	5.9E-02	=EXP(-0.218+0.807*LN(Cs))	0.73	USEPA, 2007a	9.3E-02	=EXP(0.0761+0.4422*LN(Cs))	USEPA, 2007a	3.3E-01	--	--	1.0	1.38E-02	--	--	0.021	2.13E-04	1.40E-02	0.014	8.75	1.0	1.0	0.069	187
	Mourning dove	0.091	0.054	1	=EXP(-1.328+0.561*LN(Cs))	USEPA, 2007a	2.2E-01	=EXP(-0.218+0.807*LN(Cs))	0.73	USEPA, 2007a	6.0E-01	=EXP(0.0761+0.4422*LN(Cs))	USEPA, 2007a	9.2E-01	1.0	1.17E-02	--	--	--	--	0.061	2.30E-03	1.40E-02	0.014	8.75	1.0	1.0	0.70	2,327
	Red-tailed hawk	0.96	0.084	1	=EXP(-1.328+0.561*LN(Cs))	USEPA, 2007a	2.5E-02	=EXP(-0.218+0.807*LN(Cs))	0.73	USEPA, 2007a	2.7E-02	=EXP(0.0761+0.4422*LN(Cs))	USEPA, 2007a	1.7E-01	--	--	--	--	1.0	1.40E-02	0.024	2.94E-05	1.40E-02	0.014	8.75	1.0	1.0	0.015	2,835
Manganese	American badger	4	0.033	1	0.079	USEPA, 2007a	4.5E+02	=EXP(-0.809+0.682*LN(Cs))	0.23	USEPA, 2007a	1.6E+02	0.0205	USEPA, 2007a	1.2E+02	--	--	--	--	1.0	3.87E+00	0.052	9.83E+00	1.37E+01	13.7	159	1.0	1.0	5,724	66,426
	Deer mouse	0.0193	0.170	1	0.079	USEPA, 2007a	7.8E+01	=EXP(-0.809+0.682*LN(Cs))	0.23	USEPA, 2007a	4.9E+01	0.0205	USEPA, 2007a	2.0E+01	0.4	5.32E+00	0.6	5.02E+00	--	--	0.02	3.37E+00	1.37E+01	13.7	159	1.0	1.0	990	14,544
	Ground squirrel	0.16	0.034	1	0.079	USEPA, 2007a	2.5E+02	=EXP(-0.809+0.682*LN(Cs))	0.23	USEPA, 2007a	1.1E+02	0.0205	USEPA, 2007a	6.4E+01	1.0	8.26E+00	--	--	--	--	0.052	5.44E+00	1.37E+01	13.7	159	1.0	1.0	3,122	36,229
	American robin	0.079	0.149	1	0.079	USEPA, 2007a	9.5E+02	=EXP(-0.809+0.682*LN(Cs))	0.23	USEPA, 2007a	2.7E+02	0.0205	USEPA, 2007a	2.5E+02	--	--	1.0	4.03E+01	--	--	0.021	3.73E+01	7.76E+01	77.6	776	1.0	1.0	12,065	171,282
	Mourning dove	0.091	0.054	1	0.079	USEPA, 2007a	8.1E+02	=EXP(-0.809+0.682*LN(Cs))	0.23	USEPA, 2007a	2.4E+02	0.0205	USEPA, 2007a	2.1E+02	1.0	4.38E+01	--	--	--	--	0.061	3.38E+01	7.76E+01	77.6	776	1.0	1.0	10,299	102,988
	Red-tailed hawk	0.96	0.084	1	0.079	USEPA, 2007a	1.6E+03	=EXP(-0.809+0.682*LN(Cs))	0.23	USEPA, 2007a	3.9E+02	0.0205	USEPA, 2007a	4.3E+02	--	--	--	--	1.0	3.57E+01	0.024	4.19E+01	7.76E+01	77.6	776	1.0	1.0	20,779	207,788
Mercury	American badger	4	0.033	1	=EXP(-0.966+0.544*LN(Cs))	Bechtel, 1998	3.9E+00	1.69	0.62	Sample et al., 1998a	1.2E+02	0.0543	Sample et al., 1998b	3.9E+00	--	--	--	--	1.0	1.28E-01	0.052	1.22E-01	2.50E-01	0.25	4	1.0	1.0	71.2	1,140
	Deer mouse	0.0193	0.170	1	=EXP(-0.966+0.544*LN(Cs))	Bechtel, 1998	4.3E-01	1.69	0.62	Sample et al., 1998a	2.1E+00	0.0543	Sample et al., 1998b	6.8E-02	0.4	2.93E-02	0.6	2.16E-01	--	--	0.02	4.26E-03	2.50E-01	0.25	4	1.0	1.0	1.25	21.9
	Ground squirrel	0.16	0.034	1	=EXP(-0.966+0.544*LN(Cs))	Bechtel, 1998	3.8E+00	1.69	0.62	Sample et al., 1998a	1.2E+02	0.0543	Sample et al., 1998b	3.8E+00	1.0	1.28E-01	--	--	--	--	0.052	1.22E-01	2.50E-01	0.25	4	1.0	1.0	69.8	1,856
	American robin	0.079	0.149	1	=EXP(-0.966+0.544*LN(Cs))	Bechtel, 1998	1.4E-01	1.69	0.62	Sample et al., 1998a	2.6E-01	0.0543	Sample et al., 1998b	8.3E-03	--	--	1.0	3.85E-02	--	--	0.021	4.73E-04	3.90E-02	0.039	0.18	1.0	1.0	0.15	0.71
	Mourning dove	0.091	0.054	1	=EXP(-0.966+0.544*LN(Cs))	Bechtel, 1998	5.9E-01	1.69	0.62	Sample et al., 1998a	3.8E+00	0.0543	Sample et al., 1998b	1.2E-01	1.0	3.17E-02	--	--	--	--	0.061	7.32E-03	3.90E-02	0.039	0.18	1.0	1.0	2.23	21.6
	Red-tailed hawk	0.96	0.084	1	=EXP(-0.966+0.544*LN(Cs))	Bechtel, 1998	1.0E+00	1.69	0.62	Sample et al., 1998a	1.0E+01	0.0543	Sample et al., 1998b	3.2E-01	--	--	--	--	1.0	2.70E-02	0.024	1.20E-02	3.90E-02	0.039	0.18	1.0	1.0	5.93	27.4
Molybdenum	American badger	4	0.033	1	0.25	Baes et al., 1984	1.9E+00	0.95	0.23	Sample et al., 1998a	7.1E+00	1.0	Default	7.5E+00	--	--	--	--	1.0	2.47E-01	0.052	1.29E-02	2.60E-01	0.26	2.6	1.0	1.0	7.49	74.9
	Deer mouse	0.0193	0.170	1	0.25	Baes et al., 1984	5.5E-01	0.95	0.23	Sample et al., 1998a	2.1E+00	1.0	Default	2.2E+00	0.4	3.77E-02	0.6	2.15E-01	--	--	0.02	7.54E-03	2.60E-01	0.26	2.6	1.0	1.0	2.22	22.2
	Ground squirrel	0.16	0.034	1	0.25	Baes et al., 1984	6.4E+00	0.95	0.23	Sample et al., 1998a	2.4E+01	1.0	Default	2.6E+01	1.0	2.15E-01	--	--	--	--	0.052	4.48E-02	2.60E-01	0.26	2.6	1.0	1.0	25.7	257
	American robin	0.079	0.149	1	0.25	Baes et al., 1984	6.1E+00	0.95	0.23	Sample et al., 1998a	2.3E+01	1.0	Default	2.4E+01	--	--	1.0	3.45E+00	--	--	0.021	7.56E-02	3.53E+00	3.53	35.3	1.0	1.0	24.4	245
	Mourning dove	0.091	0.054	1	0.25	Baes et al., 1984	5.3E+01	0.95	0.23	Sample et al., 1998a	2.0E+02	1.0	Default	2.1E+02	1.0	2.84E+00	--	--	--	--	0.061	6.92E-01	3.53E+00	3.53	35.3	1.0	1.0	211	2,111
	Red-tailed hawk	0.96	0.084	1	0.25	Baes et al., 1984	1.0E+01	0.95	0.23	Sample et al., 1998a	3.9E+01	1.0	Default	4.1E+01	--	--	--	--	1.0	3.45E+00	0.024	8.27E-02	3.53E+00	3.53	35.3	1.0	1.0	41.1	411
Perchlorate	American badger	4	0.033	1	=EXP(2.41+0.5891*LN(Cs))	Tsao and Sample, 2005	1.4E+03	8.46	-7.18	Tsao and Sample, 2005	3.2E+04	0	Ionic	0.0E+00	--	--	--	--	1.0	0.00E+00	0.052	6.40E+00	6.40E+00	6.4	32	1.0	1.0	3,728	18,639
	Deer mouse	0.0193	0.170	1	=EXP(2.41+0.5891*LN(Cs))	Tsao and Sample, 2005	2.9E+01	8.46	-7.18	Tsao and Sample, 2005	4.3E+01	0	Ionic	0.0E+00	0.4	1.98E+00	0.6	4.41E+00	--	--	0.02	1.74E-02	6.41E+00	6.4	32	1.0	1.0	5.11	30.4
	Ground squirrel	0.16	0.034	1	=EXP(2.41+0.5891*LN(Cs))	Tsao and Sample, 2005	1.8E+02	8.46	-7.18	Tsao and Sample, 2005	1.0E+03	0	Ionic	0.0E+00	1.0	6.19E+00	--	--	--	--	0.052	2.05E-01	6.40E+00	6.4	32	1.0	1.0	118	1,632
	American robin	0.079	0.149	1	=EXP(2.41+0.5891*LN(Cs))	Tsao and Sample, 2005	4.4E+01	8.46	-7.18	Tsao and Sample, 2005	8.7E+01	0	Ionic	0.0E+00	--	--	1.0	1.30E+01	--	--	0.021	3.19E-02	1.30E+01	13	26	1.0	1.0	10.3	20.6
	Mourning dove	0.091	0.054	1	=EXP(2.41+0.5891*LN(Cs))	Tsao and Sample, 2005	2.3E+02	8.46	-7.18	Tsao and Sample, 2005	1.5E+03	0	Ionic	0.0E+00	1.0	1.24E+01	--	--	--	--	0.061	5.65E-01	1.30E+01	13	26	1.0	1.0	172	534
	Red-tailed hawk	0.96	0.084	1	=EXP(2.41+0.5891*LN(Cs))	Tsao and Sample, 2005	2.0E+03	8.46	-7.18	Tsao and Sample, 2005	5.5E+04	0	Ionic	0.0E+00	--	--	--	--	1.0	0.00E+00	0.024	1.30E+01	1.30E+01	13	26	1.0	1.0	6,454	12,909
Tin	American badger	4	0.033	1	1.0	Default	5.4E+03	0.08	1.29	Baes et al., 1984	4.3E+02	0.08	Baes et al., 1984	4.3E+02	--	--	--	--	1.0	1.42E+01	0.052	9.22E+00	2.34E+01	23.4	35	1.0	1.0	5,369	8,031
	Deer mouse	0.0193	0.170	1	1.0	Default	2.9E+02	0.08	1.29	Baes et al., 1984	2.4E+01	0.08	Baes et al., 1984	2.4E+01	0.4	2.00E+01	0.6	2.40E+00	--	--	0.02	1.00E+00	2.34E+01	23.4	35	1.0	1.0	294	440
	Ground squirrel	0.16	0.034	1	1.0	Default	6.6E+02	0.08	1.29	Baes et al., 1984	5.3E+01	0.08	Baes et al., 1984	5.3E+01	1.0	2.22E+01	--	--	--	--	0.052	1.16E+00	2.34E+01	23.4	35	1.0	1.0	664	993
	American robin	0.079	0.149	1	1.0	Default	4.5E+02	0.08	1.29	Baes et al., 1984	3.6E+01	0.08	Baes et al., 1984	3.6E+01	--	--	1.0	5.40E+00	--	--	0.021	1.40E+00	6.80E+00	6.8	16.9	1.0	1.0	453	1,127
	Mourning dove	0.091	0.054	1	1.0	Default	1.2E+02	0.08	1.29	Baes et al., 1984	9.5E+00	0.08	Baes et al., 1984	9.5E+00	1.0	6.41E+00	--	--	--	--	0.061	3.91E-01	6.80E+00	6.8	16.9	1.0	1.0	119	296
	Red-tailed hawk	0.96	0.084	1	1.0	Default	7.8E+02	0.08	1.29	Baes et al., 1984	6.2E+01	0.08	Baes et al., 1984	6.2E+01	--	--	--	--	1.0	5.23E+00	0.024	1.57E+00	6.80E+00	6.8	16.9	1.0	1.0	779	1,936
Zinc	American badger	4	0.033	1	=EXP(1.575+0.554*LN(Cs))	USEPA, 2007a	4.0E+02	=EXP(4.449+0.328*LN(Cs))	-0.47	USEPA, 2007a	1.2E+03	=EXP(4.3632+0.0706*LN(Cs))	USEPA, 2007a	1.4E+02	--	--	--	--	1.0	4.55E+00	0.052	5.05E+00	9.60E+00	9.6	411	1.0	1.0	2,939	236,012
	Deer mouse	0.0193	0.170	1	=EXP(1.575+0.554*LN(Cs))	USEPA, 2007a	5.3E+00	=EXP(4.449+0.328*LN(Cs))	-0.47	USEPA, 2007a	9.0E+01	=EXP(4.3632+0.0706*LN(Cs))	USEPA, 2007a	7.9E+01	0.4	3.61E-01	0.6	9.23E+00	--	--	0.02	4.04E-03	9.60E+00	9.6	411	1.0	1.0	1.19	24,375
	Ground squirrel	0.16	0.034	1	=EXP(1.575+0.554*LN(Cs))	USEPA, 2007a	2.3E+02	=EXP(4.449+0.328*LN(Cs))	-0.47	USEPA, 2007a	8.4E+02	=EXP(4.3632+0.0706*LN(Cs))	USEPA, 2007a	1.3E+02	1.0	7.73E+00	--	--	--	--	0.052	1.87E+00	9.60E+00	9.6	411	1.0	1.0	1,073	164,013
	American robin	0.079	0.149	1	=EXP(1.575+0.554*LN(Cs))	USEPA, 2007a	8.0E+00	=EXP(4.449+0.328*LN(Cs))	-0.47	USEPA, 2007a	1.2E+02	=EXP(4.3632+0.0706*LN(Cs))	USEPA, 2007a	8.4E+01	--	--	1.0	1.72E+01	--	--	0.021	7.76E-03	1.72E+01	17.2	172	1.0	1.0	2.51	2,437
	Mourning dove	0.091	0.054	1	=EXP(1.575+0.554*LN(Cs))	USEPA, 2007a	2.5E+02	=EXP(4.449+0.328*LN(Cs))	-0.47	USEPA, 2007a	8.8E+02	=EXP(4.3632+0.0706*LN(Cs))	USEPA, 2007a	1.3E+02	1.0	1.32E+01	--	--	--	--	0.061	3.96E+00	1.72E+01	17.2	172	1.0	1.0	1,205	28,919
	Red-tailed hawk	0.96	0.084	1	=EXP(1.575+0.554*LN(Cs))	USEPA, 2007a	3.9E+02	=EXP(4.449+0.328*LN(Cs))	-0.47	USEPA, 2007a	1.2E+03	=EXP(4.3632+0.0706*LN(Cs))	USEPA, 2007a	1.4E+02	--	--	--	--	1.0	1.15E+01	0.024	5.66E+00	1.72E+01	17.2	172	1.0	1.0	2,810	78,149

TABLE M-5

TRV-Based Ecological Screening Values for Chemicals of Potential Ecological Concern

RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

Notes:

Parameters presented in terms of dry weight

[a] Source: Allometric relationship for receptor group (Nagy, 2001) normalized to body weight and adjusted to units of kg/kg-bw/d. Nagy (2001) regression equation for food ingestion rate (grams dry matter ingested/day/gram body weight = (a x BW ^{b})/BW.

Where:	***Group***	***a***	***b***	***Receptor***
	carnivorous birds	0.849	0.663	hawk
	insectivorous birds	0.54	0.705	robin
	herbivorous birds	0.088	0.891	dove
	rodentia	0.332	0.774	mouse
	carnivorous mammals	0.102	0.864	badger
	granivorous mammals	0.659	0.413	squirrel

Soil to plant: BAF for organics with log Kows between 3 and 8 derived using log BAF = -0.229*(logKow)+1.0237 (unrinsed plants, USEPA, 2007a)

Soil to invertebrate: Concentration in worm calculated for organics with LogKows (2 to 8) using model from USEPA (2007a), where Koc is estimated from Kow using general chemical model from Gerstl (1990) and Foc = 0.01. worm=10^((0.87*logKow)-2)*(Csoil/(foc*10^((0.679*logKow)+0.663)).

	Soil ingestion %	
Badger	5.2%	Data regarding soil ingestion of badgers are unavailable. Because the badger is a burrowing mammal, soil ingestion may be similar to that of the prairie dog. It was assumed that the median soil ingestion of the two prairie dog species with available data (2.7 and 7.7 percent) would be representative of the badger.
Deer mouse	2.0%	Value for white-footed mouse from Beyer et al., 1994.
Ground squirrel	5.2%	Data regarding soil ingestion of ground squirrels are unavailable. Because the squirrel is a burrowing mammal, soil ingestion may be similar to that of the prairie dog. It was assumed that the median soil ingestion of the two prairie dog species with available data (2.7 and 7.7 percent) would be representative of the ground squirrel.
American Robin	2.1%	Assume that soil consumption is proportional to earthworm consumption. If the diet of woodcock is 99% earthworms and 10.4% of their diet is soil (Beyer et al. 1994), then a robin consuming 20% earthworms will consume 2.08% soil (p. 22 of Sample and Suter, 1994).
Mourning dove	6.1%	Median soil ingestion rate estimated for mourning dove in Table 3 of the Eco-SSL guidance. The median was selected as the best measure of central tendency that is unbiased by outliners.
Red-tailed hawk	2.4%	Median soil ingestion rate estimated for red-tailed hawk in Table 3 of the Eco-SSL guidance. The median was selected as the best measure of central tendency that is unbiased by outliners.

-- not available, could not be located, or not applicable

BAF = bioaccumulation factor

Cs = concentration in soil

ESV = ecological screening value

HQ = hazard quotient

kg = kilogram

mg/kg-d = milligram per kilogram body weight per day

MRP = Munitions Response Program

NAVWPNSTA = Naval Weapons Station

TRV = wildlife toxicity reference value

UXO = unexploded ordnance

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TABLE M-6

Summary of Ecological Screening Results for Soil

RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

		Receptor-specific ESVs (mg/kg)		0 to 0.5 foot bgs		0 to 6 feet bgs		
Analyte	**Receptor**	**Low ESV**	**High ESV**	**Site Maximum**	**Site 95UCL**	**Site Maximum**	**Site 95UCL**	**Weight of Evidence**
Antimony	American badger	33.7	1,020	Not COEC	Not COEC	0.31 J	0.16	--
	Deer mouse	0.55	26.0					
	Ground squirrel	20.8	1,076					
	American robin	--	--					
	Mourning dove	--	--					
	Red-tailed hawk	--	--					
Cadmium	American badger	15.2	1,372	Not COEC	Not COEC	**0.37 J**	**0.20**	95UCL does not exceed High ESV for any receptors
	Deer mouse	***0.031***	3.99					
	Ground squirrel	5.15	997					
	American robin	0.49	14.5					
	Mourning dove	92.5	2,445					
	Red-tailed hawk	202	4,531					
Cobalt	American badger	306	3,207	Not COEC	Not COEC	23.9	7.72	--
	Deer mouse	73.4	1,223					
	Ground squirrel	602	10,033					
	American robin	358	847					
	Mourning dove	2,064	4,882					
	Red-tailed hawk	800	1,595					
Copper	American badger	1,146	366,935	**58.4**	**35.2**	**61.3**	**20.0**	95UCL does not exceed High ESV for any receptors
	Deer mouse	***37.8***	11,195					
	Ground squirrel	969	356,693					
	American robin	***28.8***	656					
	Mourning dove	371	14,516					
	Red-tailed hawk	383	24,564					
Lead	American badger	317	136,498	**45.7**	**28.3**	**51.2 J**	**15.4**	95UCL does not exceed High ESV for any receptors
	Deer mouse	***18.0***	14,540					
	Ground squirrel	423	134,451					
	American robin	***0.069***	187					
	Mourning dove	***0.70***	2,327					
	Red-tailed hawk	***0.015***	2,835					
Manganese	American badger	5,724	66,426	451	305	627	263	--
	Deer mouse	990	14,544					
	Ground squirrel	3,122	36,229					
	American robin	12,065	171,282					
	Mourning dove	10,299	102,988					
	Red-tailed hawk	20,779	207,788					
Mercury	American badger	71.2	1,140	Not COEC	Not COEC	0.060 J	0.025	--
	Deer mouse	1.25	21.9					
	Ground squirrel	69.8	1,856					
	American robin	0.15	0.71					
	Mourning dove	2.23	21.6					
	Red-tailed hawk	5.93	27.4					

TABLE M-6

Summary of Ecological Screening Results for Soil

RI for MRP Site UXO4 Detachment Fallbrook, Fallbrook, California

Analyte	Receptor	Receptor-specific ESVs (mg/kg)		0 to 0.5 foot bgs		0 to 6 feet bgs		Weight of Evidence
		Low ESV	High ESV	Site Maximum	Site 95UCL	Site Maximum	Site 95UCL	
Molybdenum	American badger	7.49	74.9	0.91	0.54	0.91	0.42	--
	Deer mouse	2.22	22.2					
	Ground squirrel	25.7	257					
	American robin	24.4	245					
	Mourning dove	211	2,111					
	Red-tailed hawk	41.1	411					
Perchlorate	American badger	3,728	18,639	0.0038 J	0.0038 J	0.0038 J	0.0038 J	--
	Deer mouse	5.11	30.4					
	Ground squirrel	117.9	1,632					
	American robin	10.3	20.6					
	Mourning dove	172	534					
	Red-tailed hawk	6,454	12,909					
Tin	American badger	5,369	8,031	14.3 J	14.30	14.3 J	8.47	--
	Deer mouse	294	440					
	Ground squirrel	664	993					
	American robin	453	1,127					
	Mourning dove	119	296					
	Red-tailed hawk	779	1,936					
Zinc	American badger	2,939	236,012	**47.6**	**36.8**	**91.0**	**35.7**	95UCL does not exceed High ESV for any receptors
	Deer mouse	***1.19***	24,375					
	Ground squirrel	1,073	164,013					
	American robin	***2.51***	2,437					
	Mourning dove	1,205	28,919					
	Red-tailed hawk	2,810	78,149					

Notes:

Bold and italics = ESV for this receptor is exceeded by MRP Site UXO4 soil concentration.

Bold only = Soil concentration exceeds Low ESV for at least one receptor.

-- not available, could not be located, or not applicable

95UCL = 95 percent upper confidence limit on the mean concentration

bgs = below ground surface

COEC = constituent of ecological concern

ESV = ecological screening value

mg/kg = milligram per kilogram

MRP = Munitions Response Program

NAVWPNSTA = Naval Weapons Station

UXO = unexploded ordnance

KCH Program Management Office
402 West Broadway, Suite 1450
San Diego, CA 92101
office (619) 272-7271
fax (619) 687-0111