EXTENDED SITE ASSESSMENT OF FORMER UNDERGROUND STORAGE TANK SITE 229, NAVAL WEAPONS STATION SEAL BEACH, CALIFORNIA

RESTORATION ADVISORY BOARD (RAB) AND COMMUNITY MEETING
12 OCTOBER 2010

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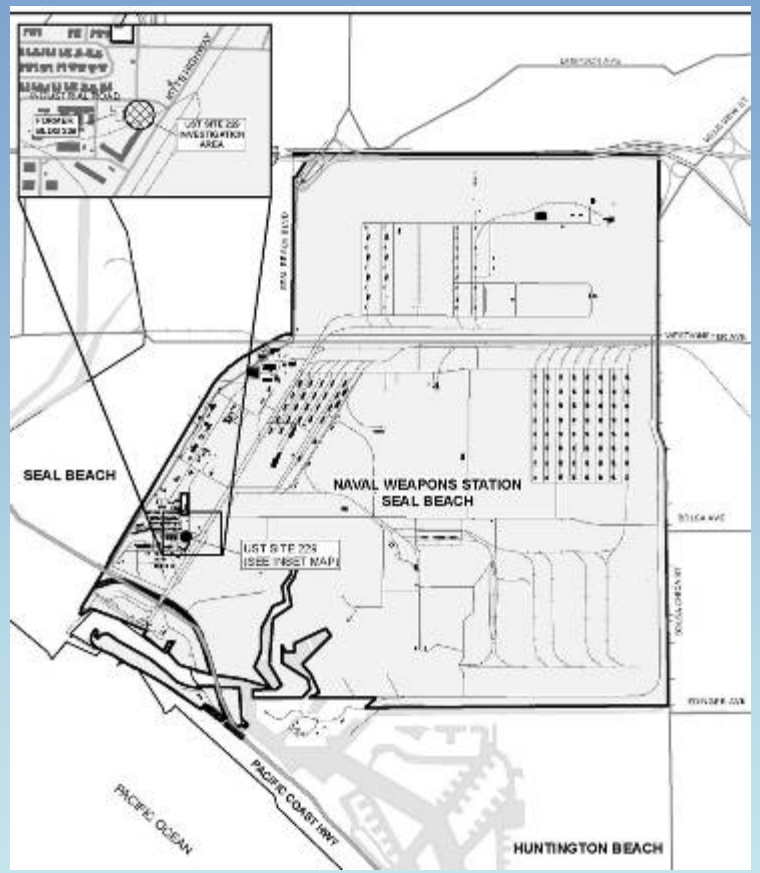
(858) 496-0500

Presentation Outline

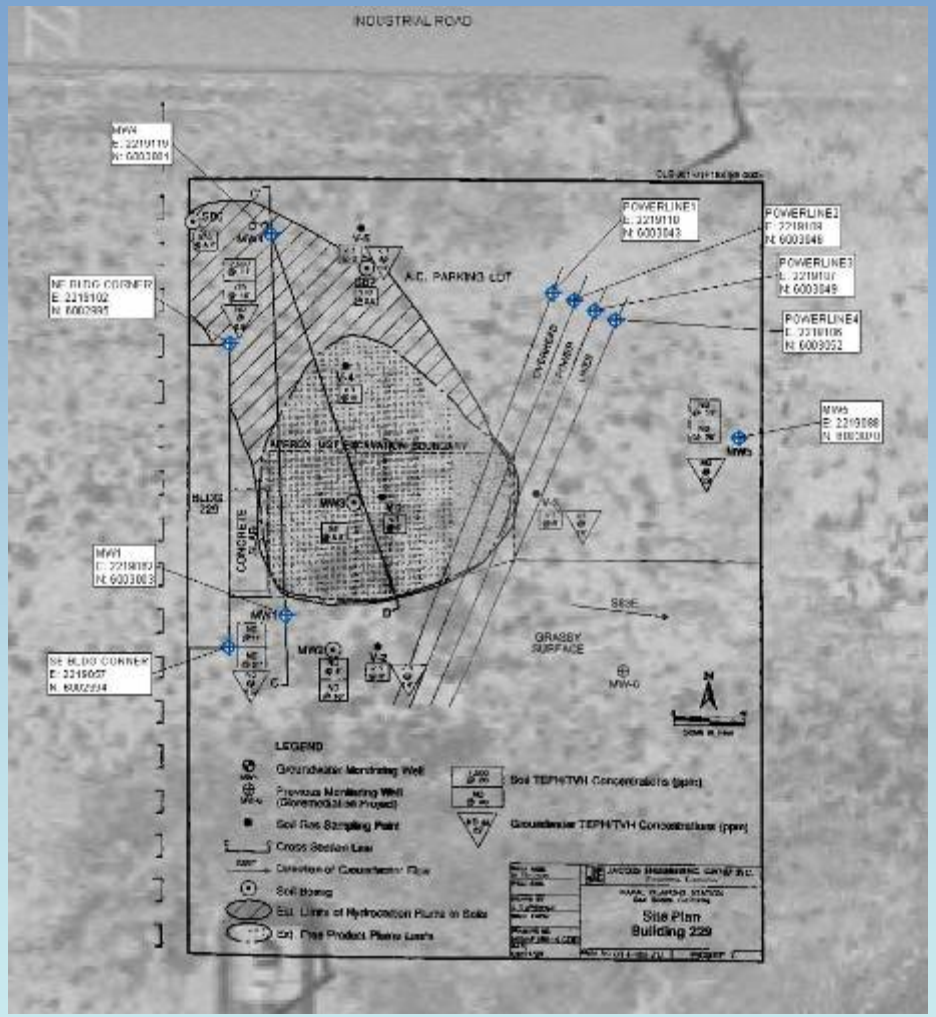
- UST Site 229 History
- SCAPS Technology Review
- SCAPS Investigation
- Groundwater Monitoring
- Project Schedule

UST Site 229 Site History



- Former Building 229 was the offices of NAVWPNSTA Seal Beach Comptroller/Controller.
- The two former 10,000-gallon USTs stored diesel fuel used to heat former Building 229.
- The two USTs were removed in 1991 and the excavation backfilled.

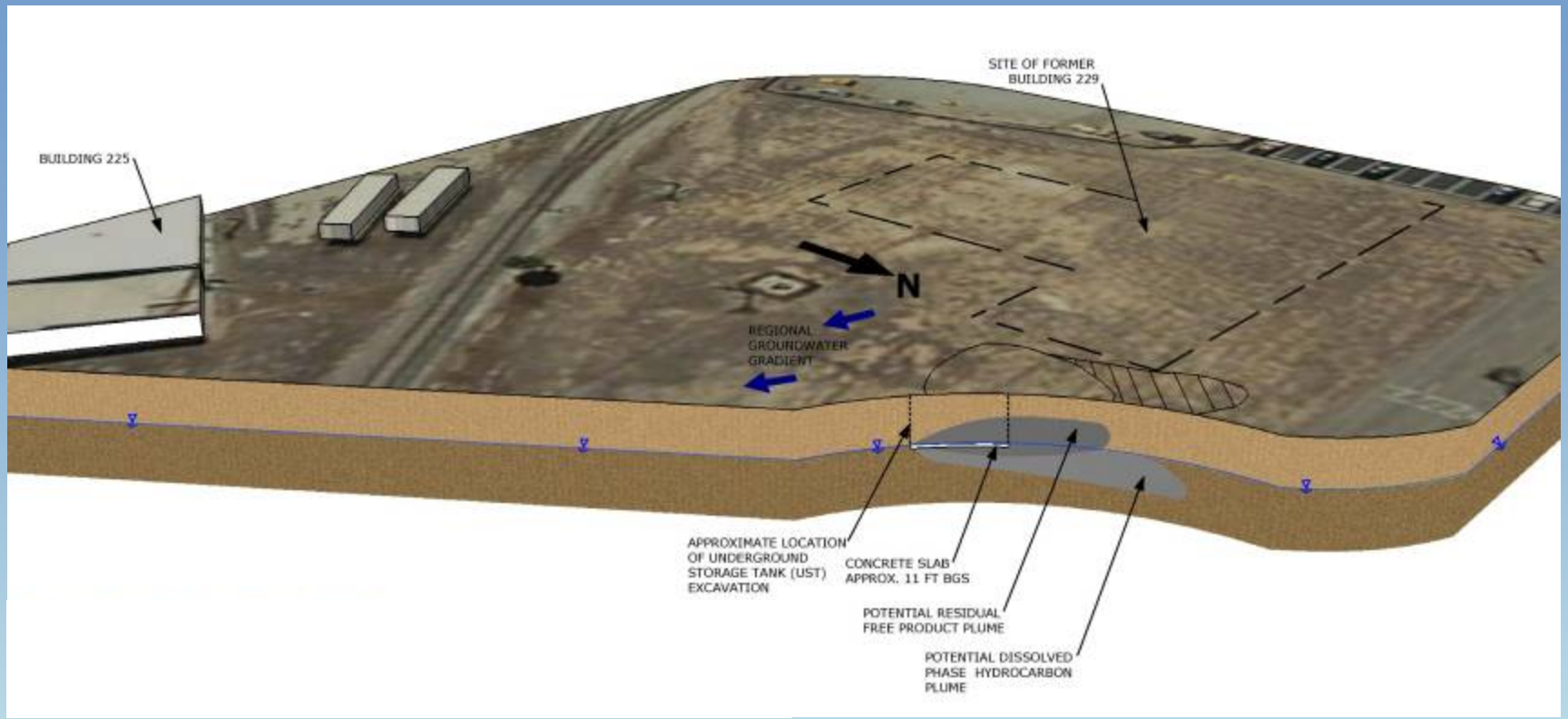
Site History (continued)



- A UST Study Site Assessment was conducted in 1992.
  - Concluded that free product potentially exists on the groundwater above the in-place UST anchor pad.
  - Hydrocarbons in groundwater appeared confined within approximately 10 feet north of the former excavation.
  - Hydrocarbons in soil were impacted above the groundwater table in the former excavation and approximately 25 feet northwest of the excavation.

Site History (continued)

- Building 229 was demolished in the 1990s, and no surface expression of the building remains.
- No additional work was conducted after 1993 due to an experimental bioremedialtion study conducted by Stanford University at adjacent IR Site 14.
- The existing data set left uncertainty regarding the thickness and spatial distribution of diesel fuel released from the two former USTs.



- The Objective of this Assessment is to provide an up-to-date delineation of the extent of petroleum contamination, and to make recommendations for either future work or no further action (NFA).

Work Completed to Date

- SCAPS LIF screening of 22 locations
- Seven soil samples collected and analyzed by fixed base laboratory for fuel-related compounds
- Four new monitoring wells installed
- Two existing wells incorporated into monitoring program
- Three groundwater sampling events completed

Site Characterization and Analysis Penetrometer System

1994 - Present

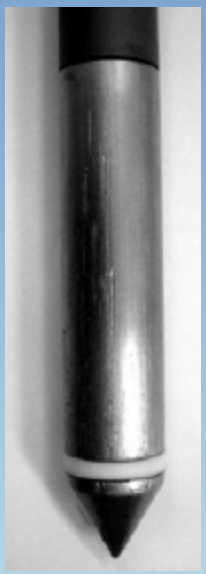
SCAPS in Action

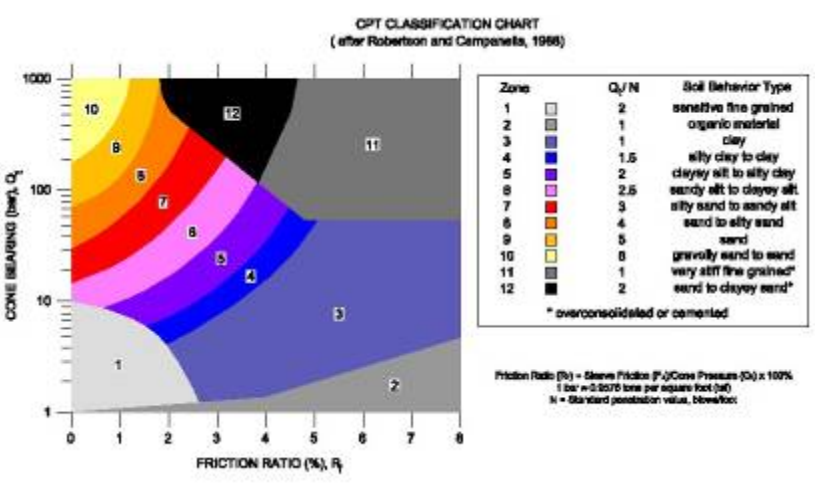
- Hydraulic rams grab the rod string and push it into the ground.
- The instrumented tool is at the bottom of the rod string.
- The investigator sees the data displayed immediately.

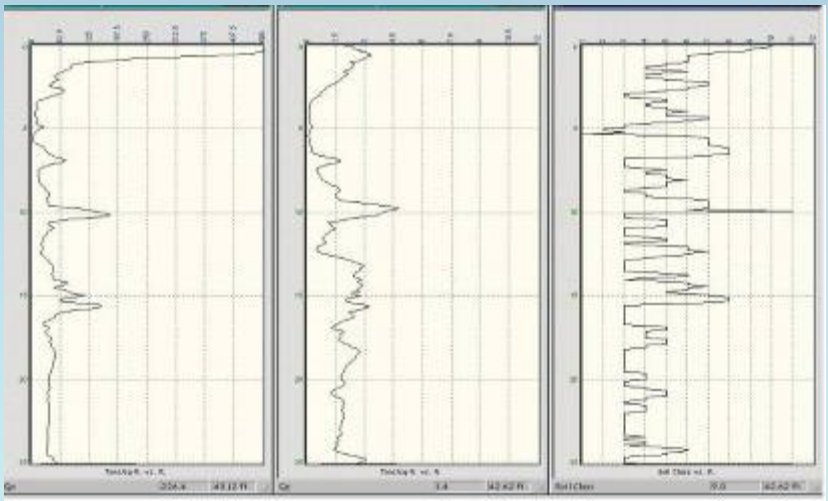
Cone Penetrometer Test

- Standard Cone Penetrometer Test (CPT) tip resistance and sleeve friction data are collected according to ASTM standards

- CPT data is analyzed by on-board computer, and soil classifications are displayed in real time with the contaminant sensor data



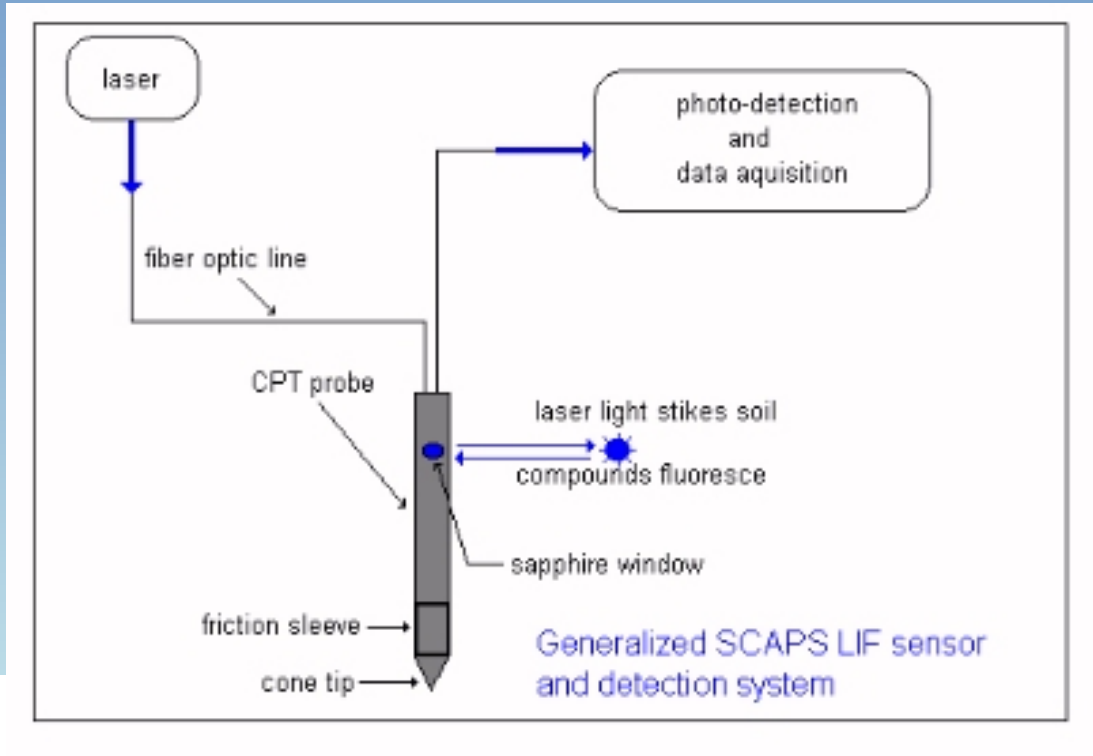


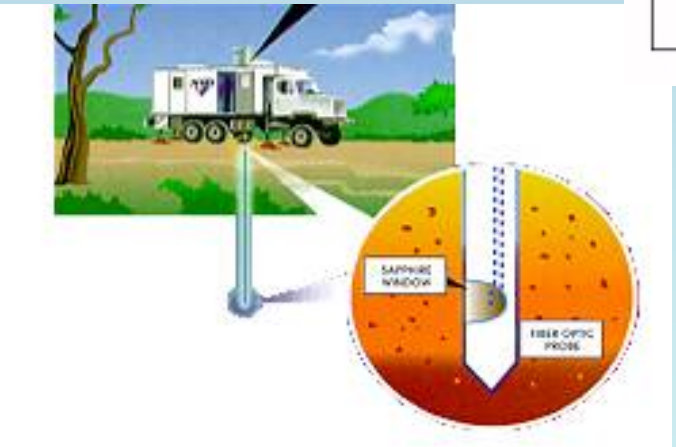


Petroleum Hydrocarbon Assessment

Using SCAPS Laser-Induced Fluorescence

- Laser Source: Ultraviolet (308 nm) Xenon Chloride Eximer laser
- Excites 2-ring and greater Polynuclear Aromatic Hydrocarbons (PAHs)



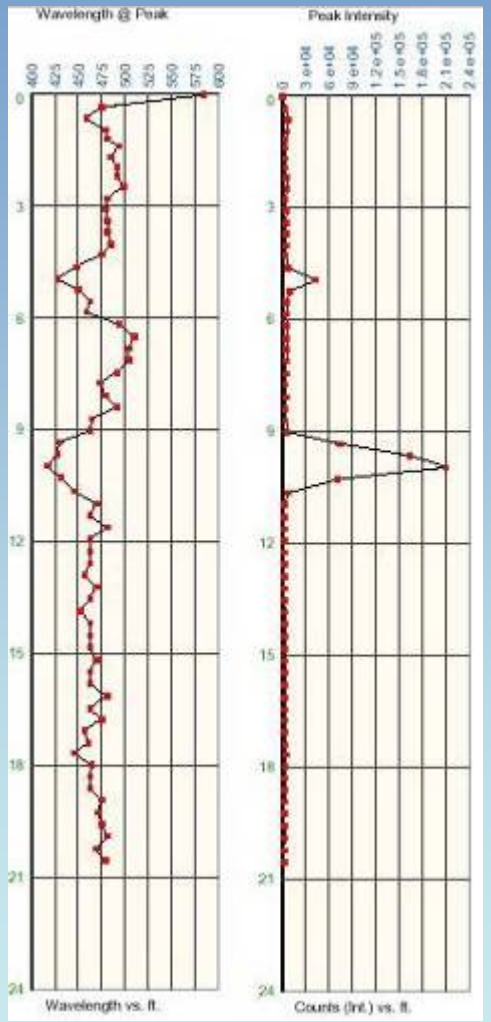


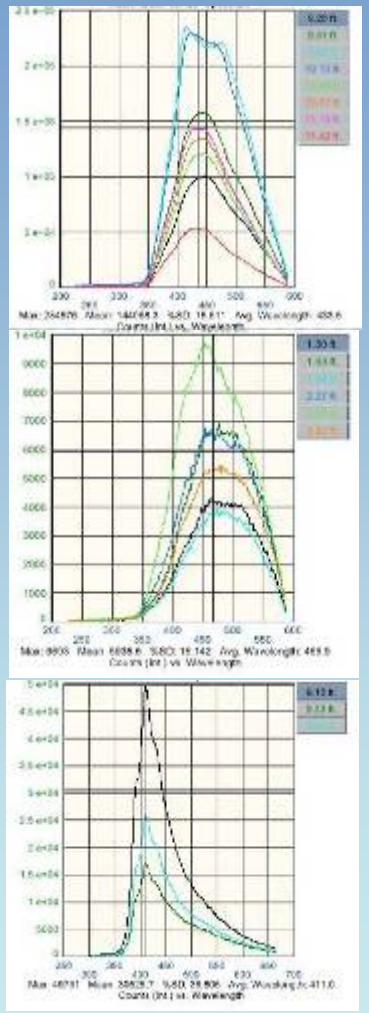
- LIF generally detects fuel concentrations greater than 100 ppm

LIF Data Interpretation

Factors to Evaluate Fuel (PAH) Detection by LIF

- Increase in Fluorescence Intensity
- Corresponding Change in Fluorescence Wavelength
- Spectral Curve Shape Consistent with Fuel or PAHs
- Significant Thickness of Interval
- Spatial Location Consistent with Expected Migration Patterns
- Comparison with Sample Analysis

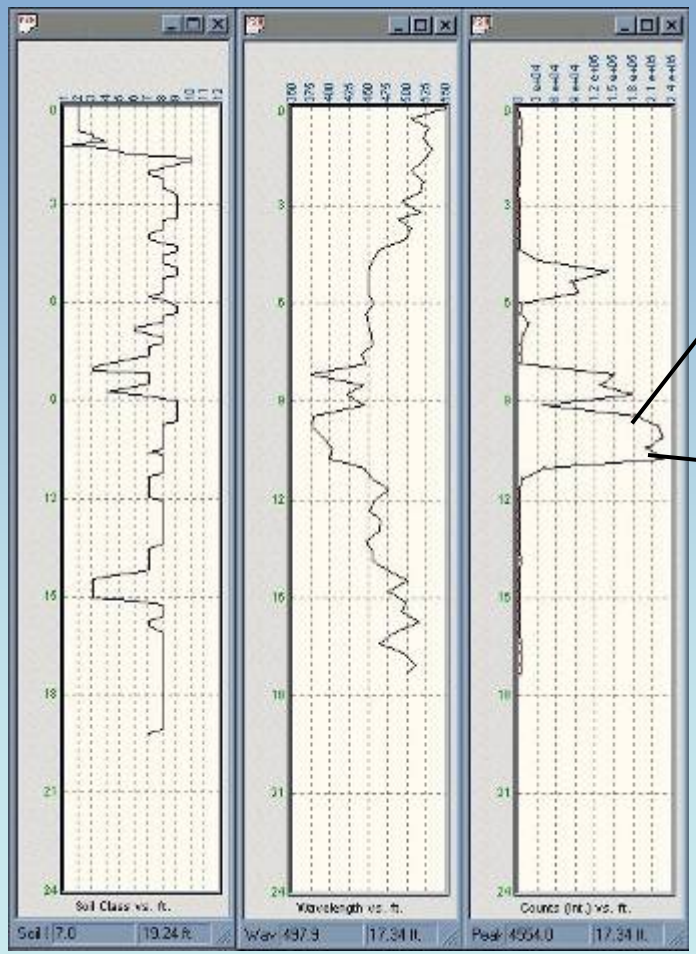




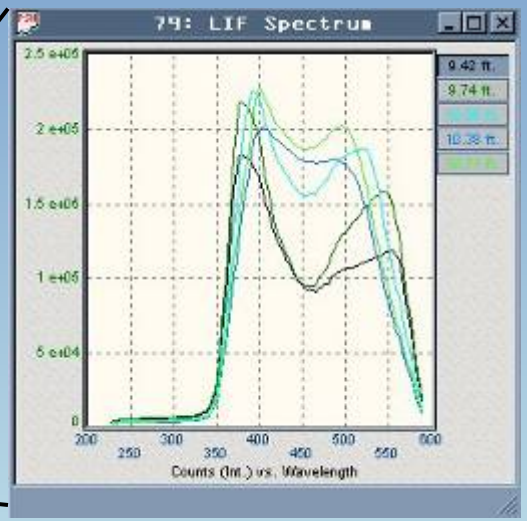
“Confirmation” Sampling and Small Scale Subsurface Heterogeneity

LIF Profiles

Soil *Wavelength* *Intensity*



LIF Spectra



- *LIF suggests free product*
- *TPH-gas = 953 mg/kg*
- *TPH-diesel = 2,920 mg/kg*
- ***Fuel saturation of 6-inch sample tube = 28.9 %***

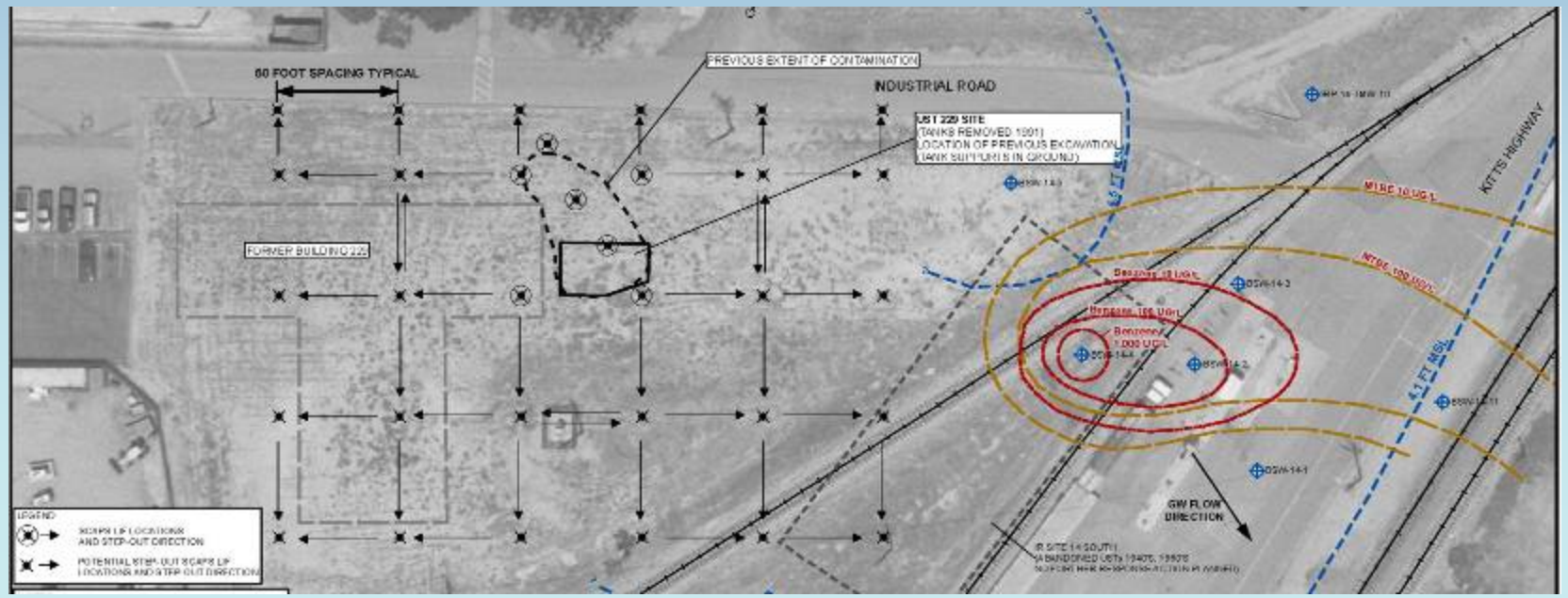
SCAPS Collects Samples to Corroborate Real-Time Sensor Data

- Soil Samples are Collected for Laboratory Analysis and Results Compared to LIF and CPT Data
- Groundwater Samples are Collected and Groundwater Elevations are Measured

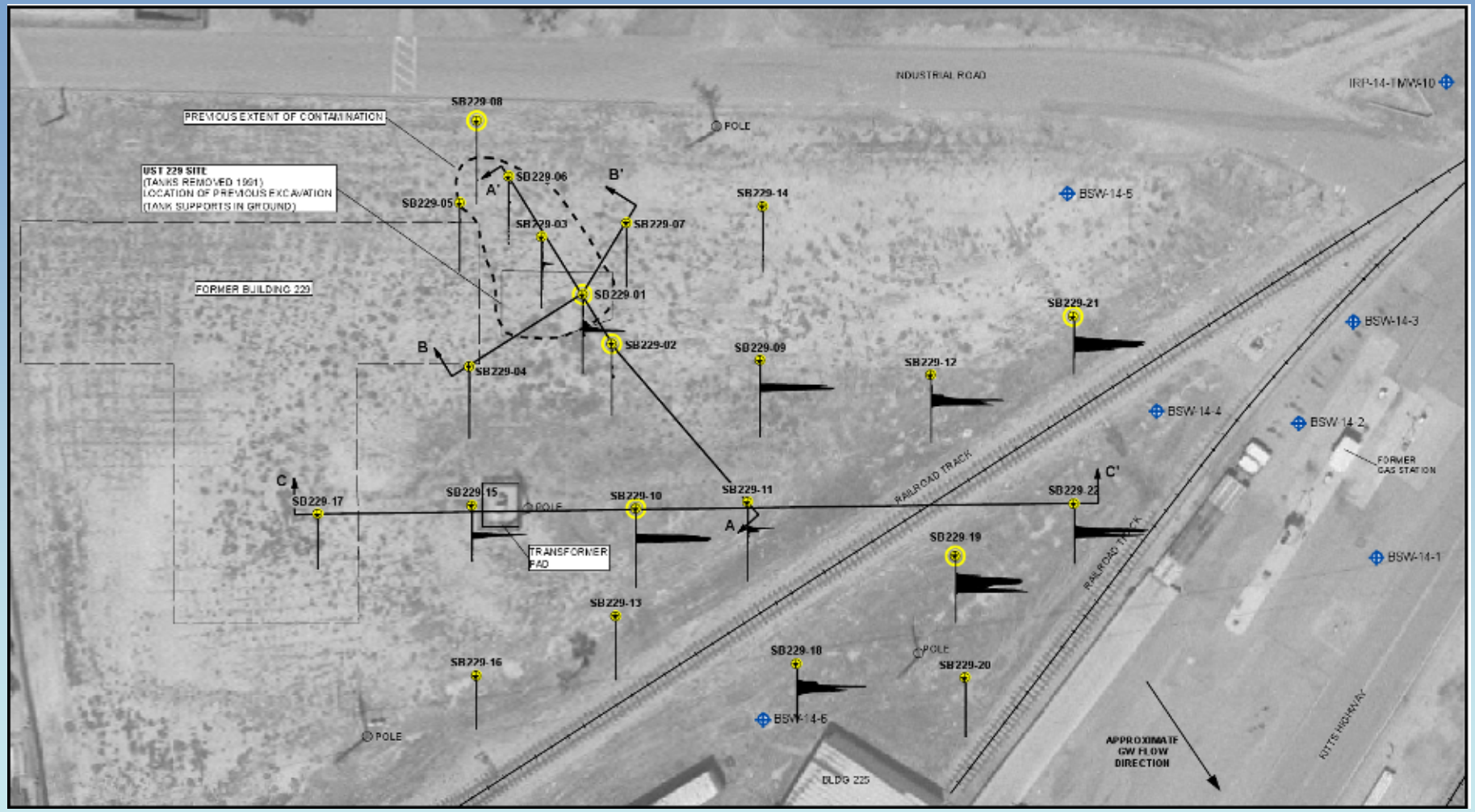
Site 229 Investigation

- The LIF investigation used dynamic work strategies and decision rules to determine step-out locations.

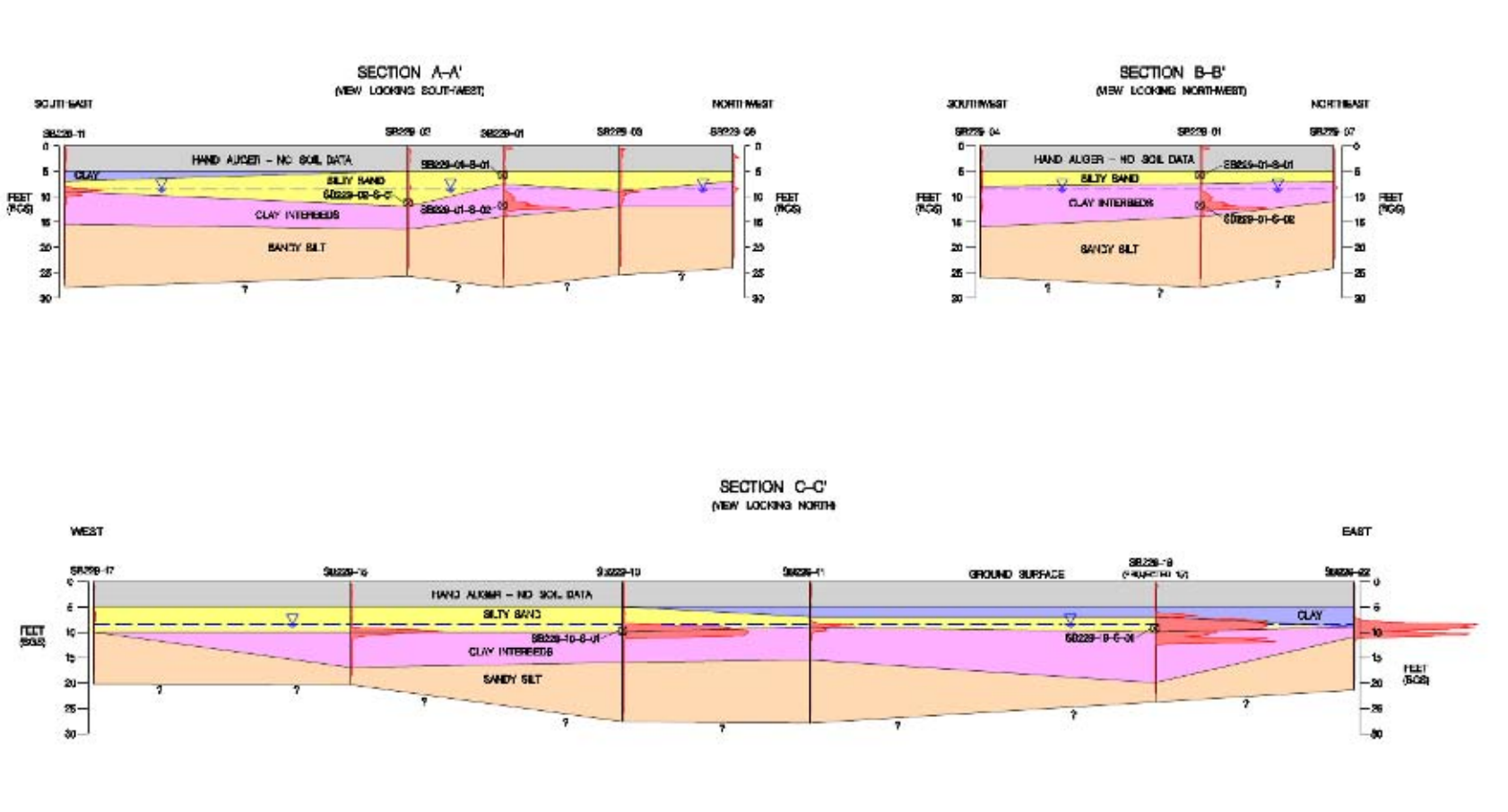
- Groundwater monitoring wells were installed and sampled based on the LIF data.



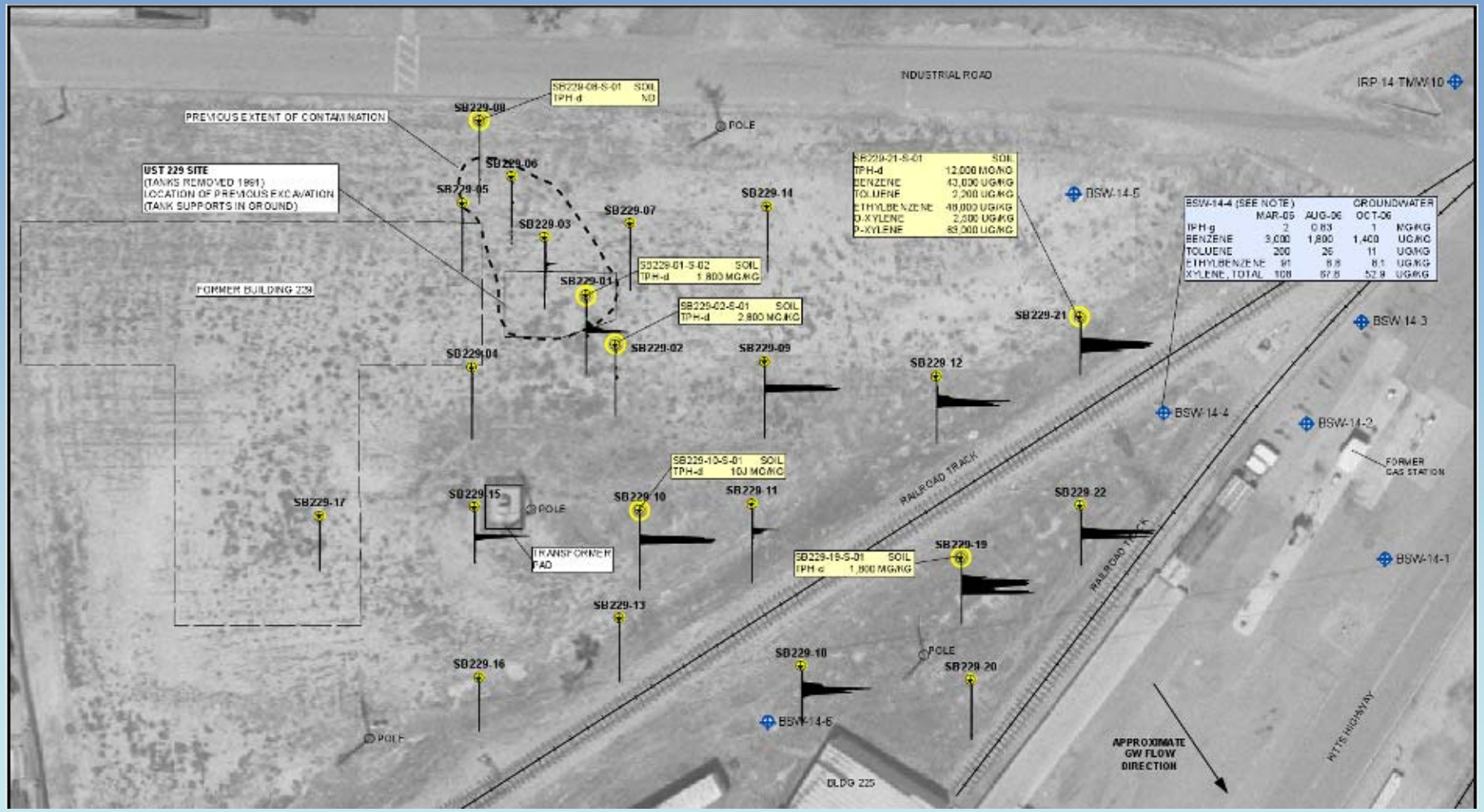
LIF Investigation



Cross Sections

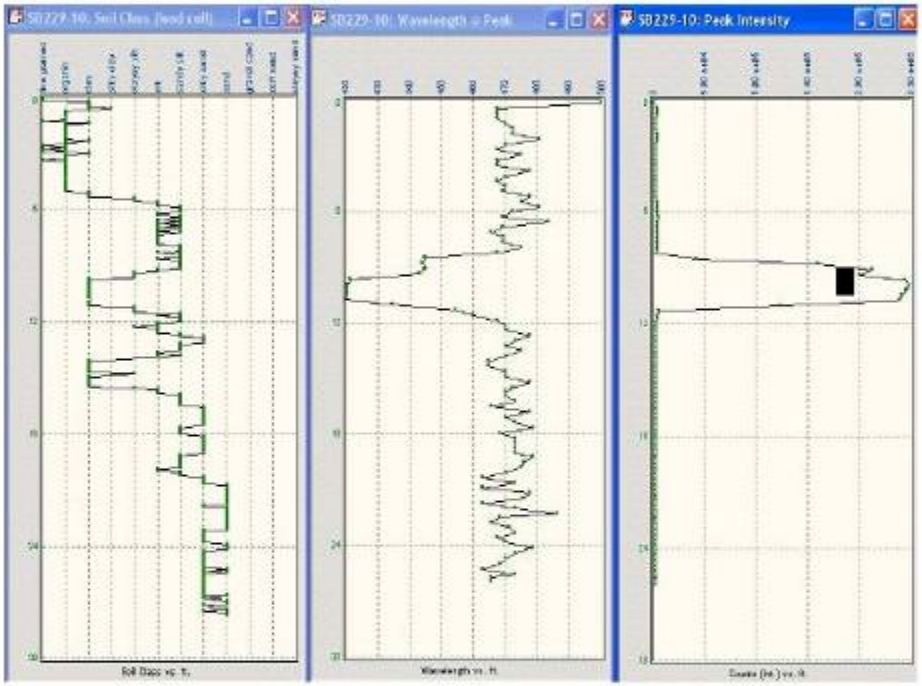


Soil Sampling



SCAPS Soil Sample Log
Former UST Site 229
NWS Seal Beach, California

Sample ID: **SB229-10-S-01**	Sample Date: **04-29-09**	Logged By: **H. Butler**
Sample Interval: **9.0-10.5'**	Percent Recovery: **100**	



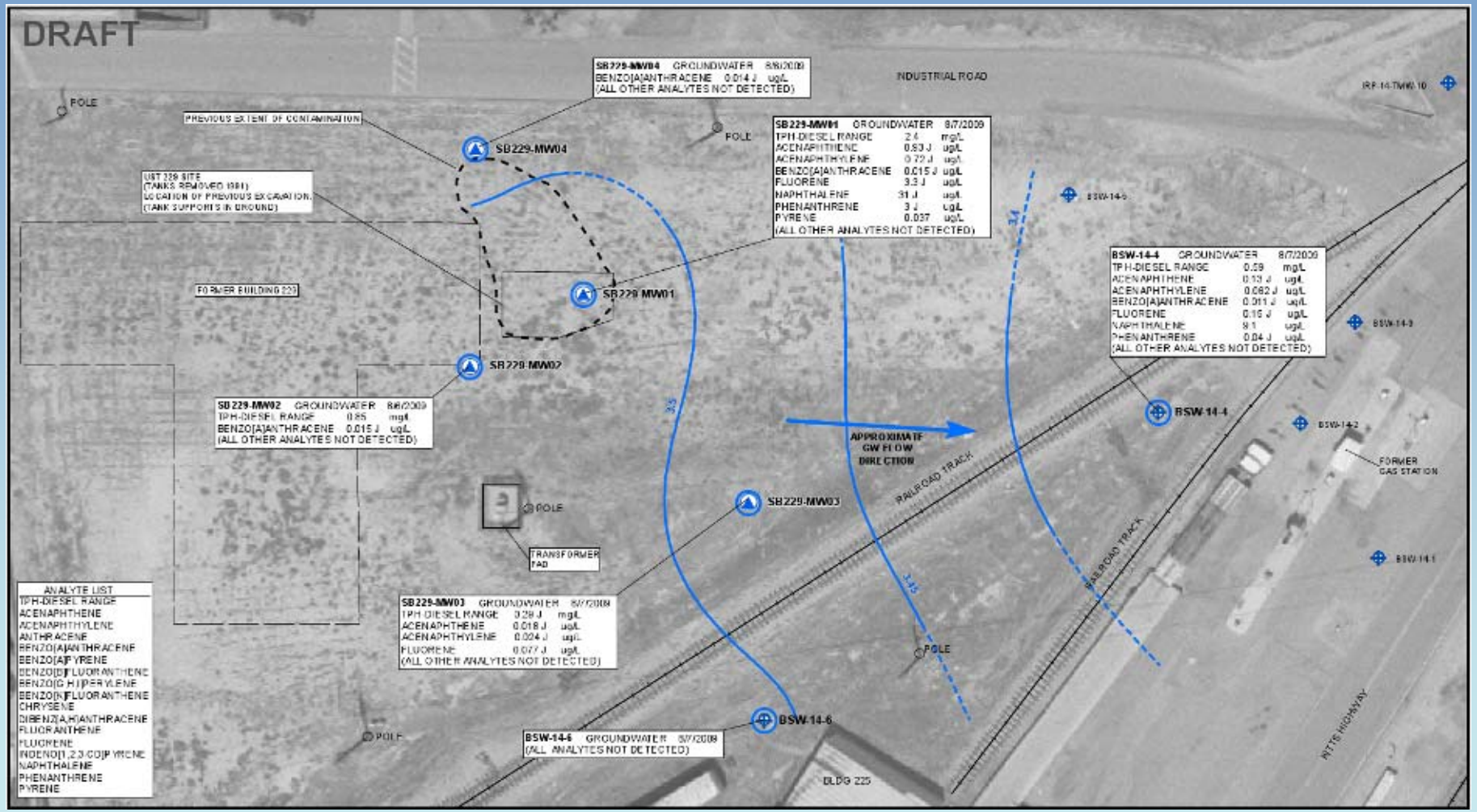
Description of Data and Sampling Rational–
The sample targeted an interval of elevated fluorescence intensity response that showed a wavelength typical of fuel contamination. The sample was analyzed for TPH as diesel, VOC's, SVOC's, and PAH's.

Sample Description –
Multiple soil contacts over sampling interval.
9.0-9.5: SAND (SW); medium to very fine grained; trace coarse sand; poorly sorted; dark olive gray (5Y 3/2); loose, compactable; wet/saturated; diesel fuel odor.
9.5-10.0: SILT (ML); trace fine sand; firm; plastic; dark greenish gray (5GY 4/1); moist; diesel fuel odor.
10.0-10.5: SAND w/ fines (SM); medium to very fine grained; little fines; moderately sorted; dark yellow brown (10YR 3/4); loose, compactable; wet; no stains; slight fuel odor.

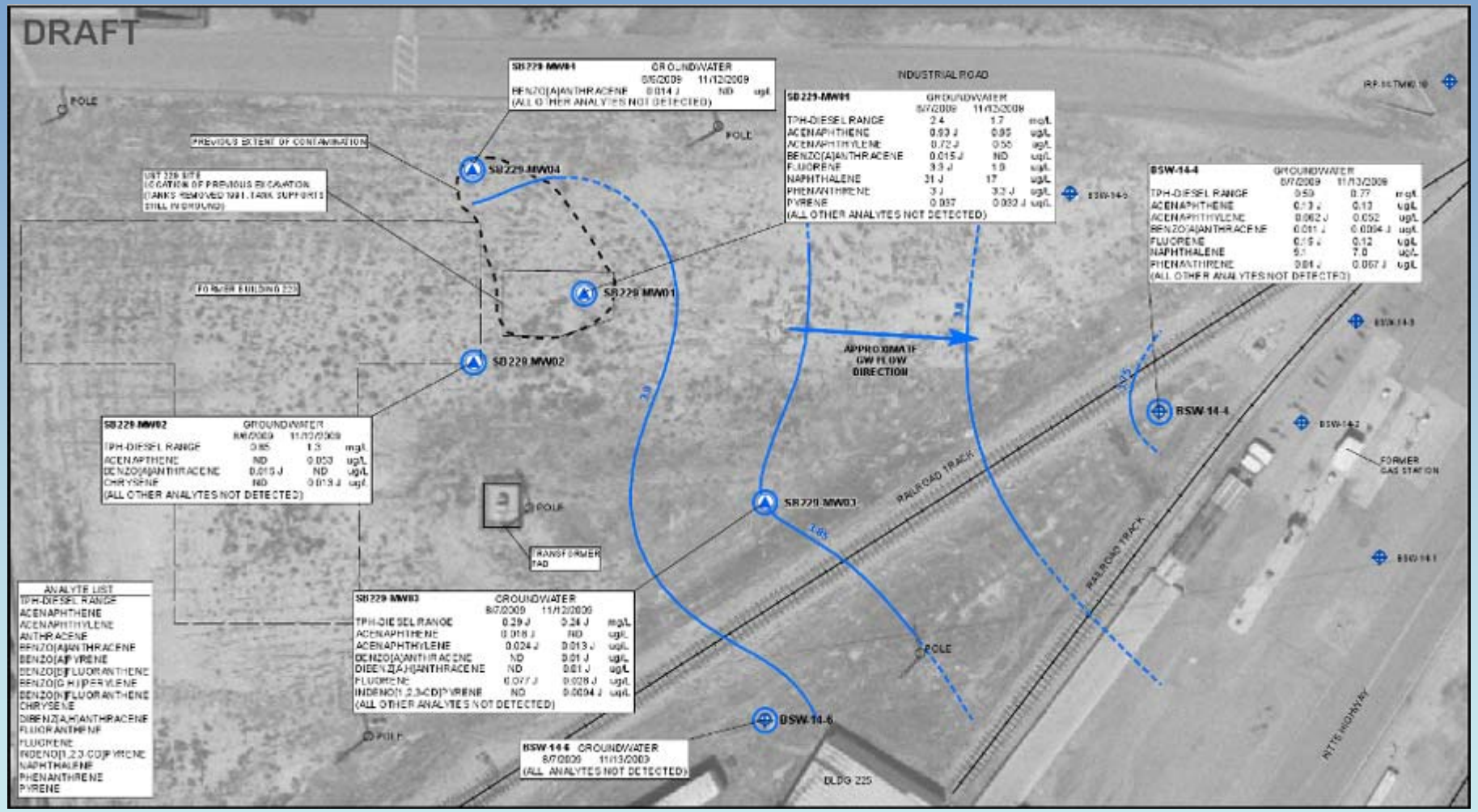
Discussion of Results –
The CPT log and visual sample observations indicate heterogeneous soils consisting of interbedded Sandy Silt grading to Clay through the sample interval. LIF results indicate fuel fluorescence. Laboratory analytical results of the bottom of the 10 – 10.5 bgs sample tube indicate a very low estimated detection of diesel range petroleum hydrocarbons, suggesting heterogeneous distribution of fuel impact consistent with the visual and olfactory observations. All other constituents were not detected.

Analytical Results	
TPH-d	10.0J mg/kg
VOC's	ND
SVOC's	ND

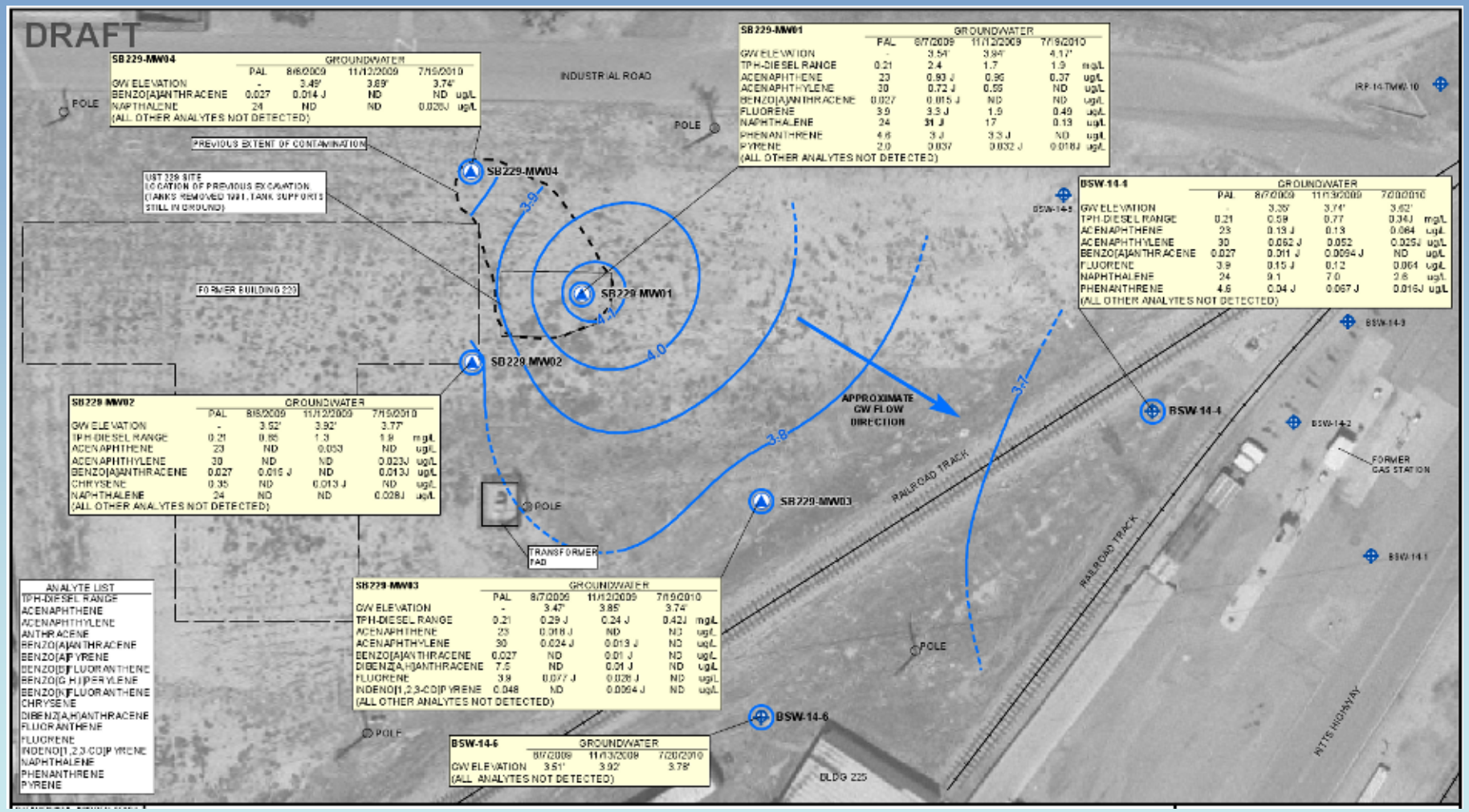
Groundwater Sampling
August 7, 2009



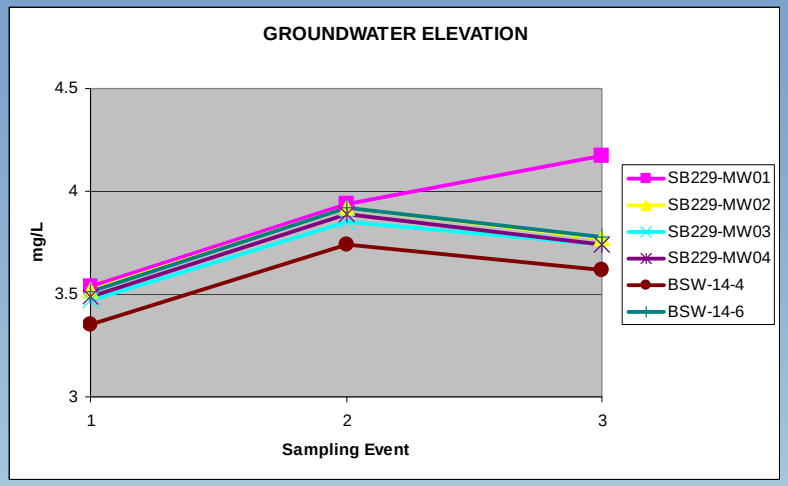
Groundwater Sampling
November 13, 2009

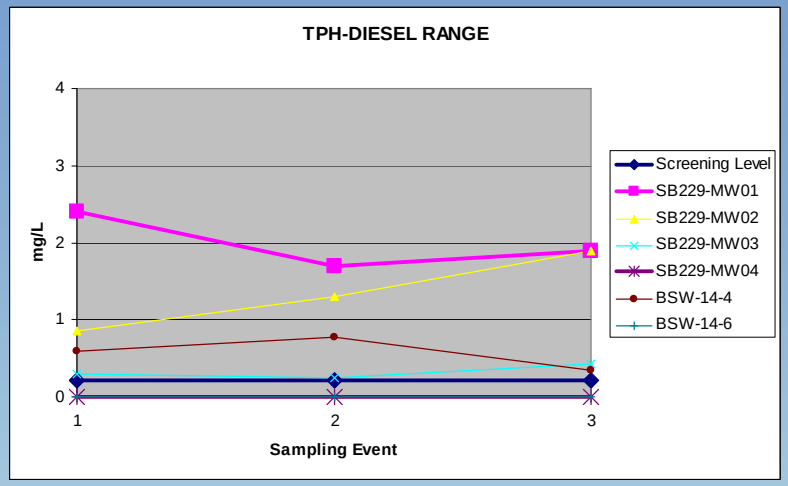


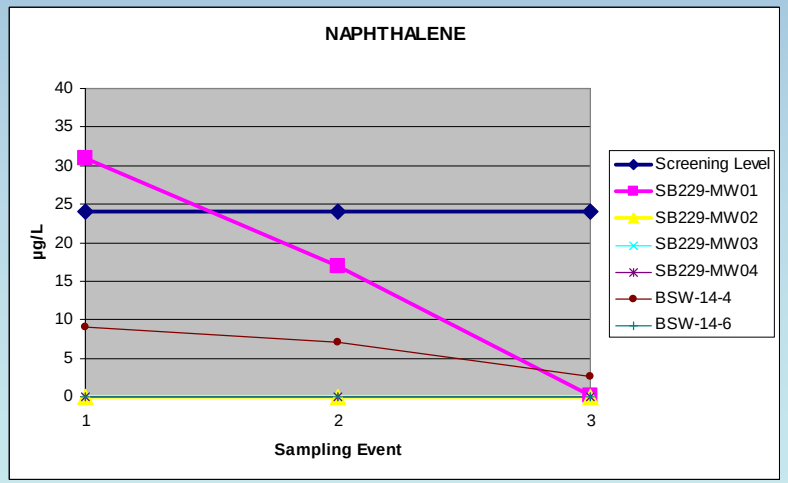
Groundwater Sampling
July 20, 2010

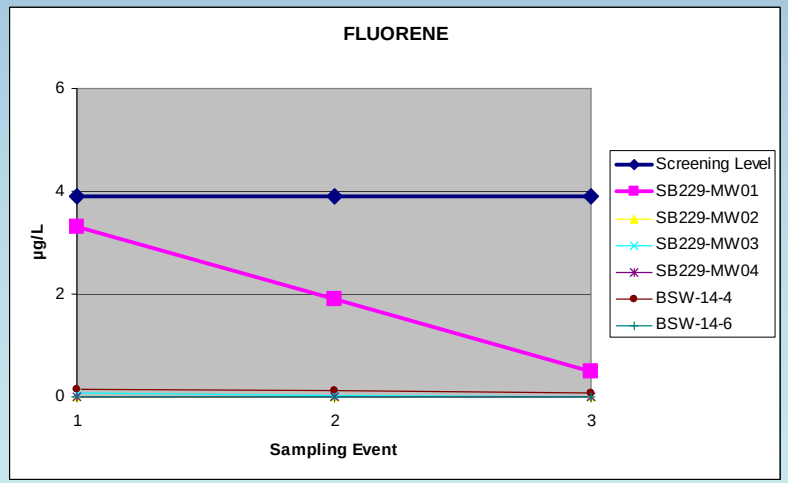


Groundwater Monitoring Results









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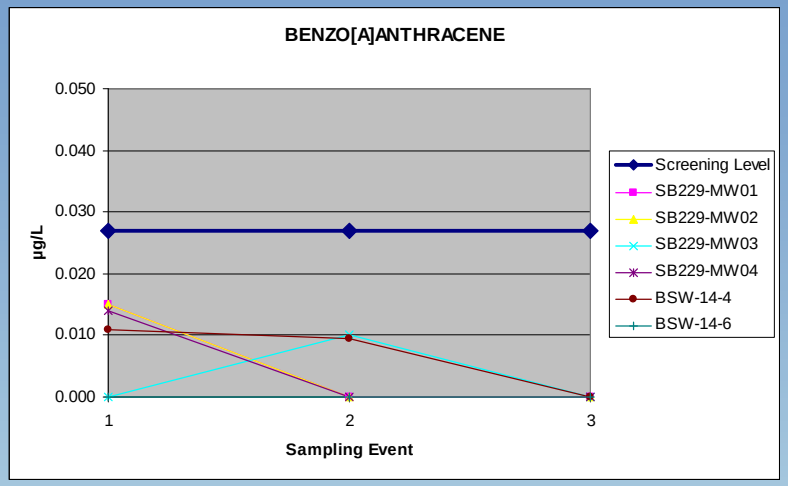
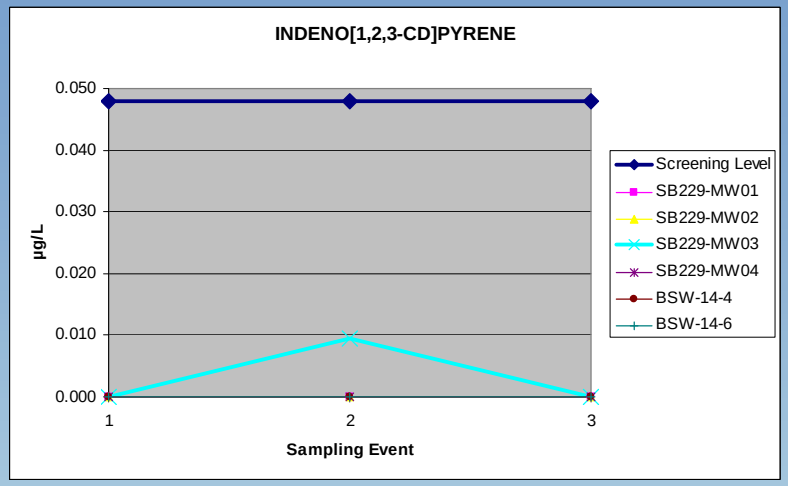
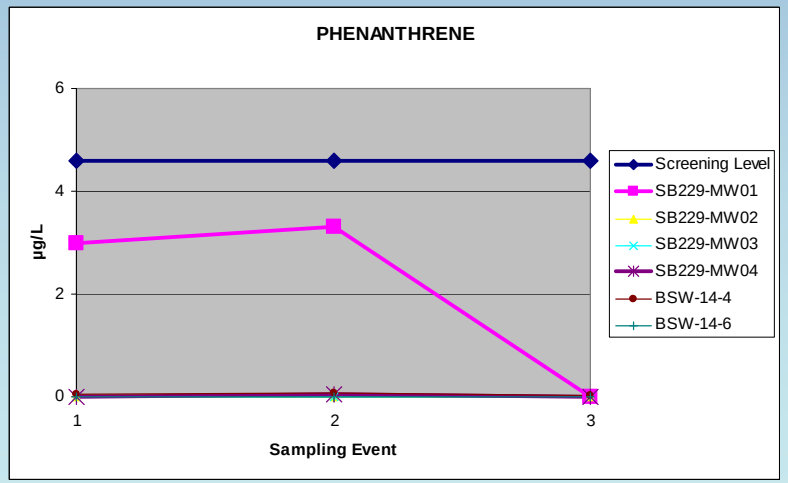
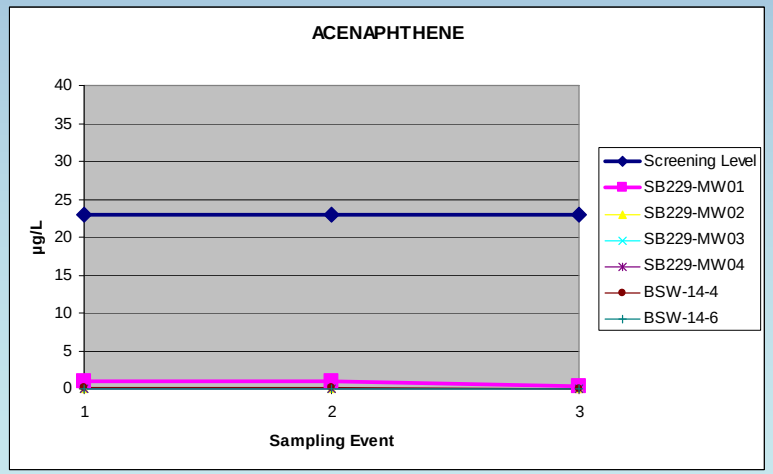
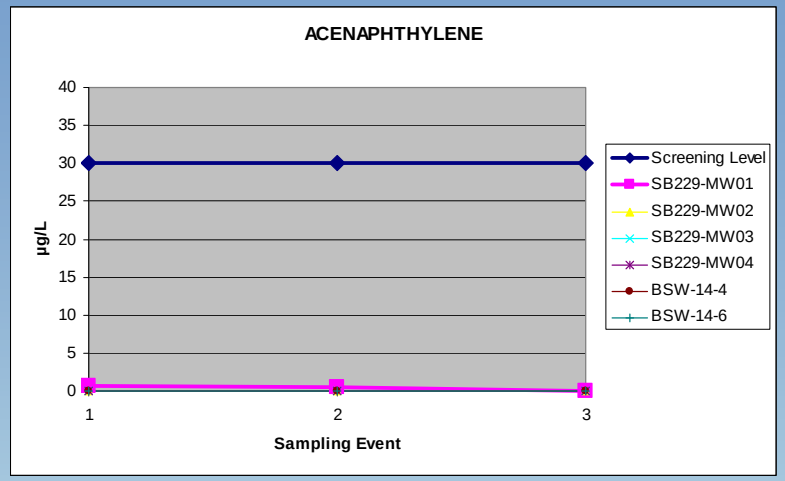


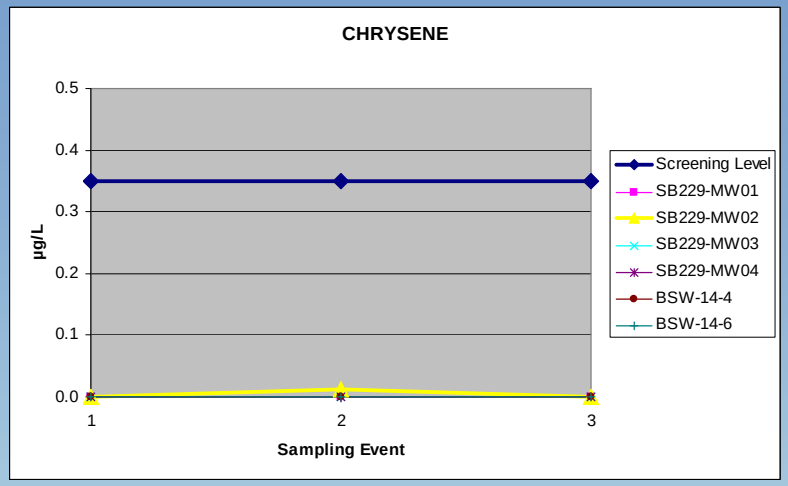


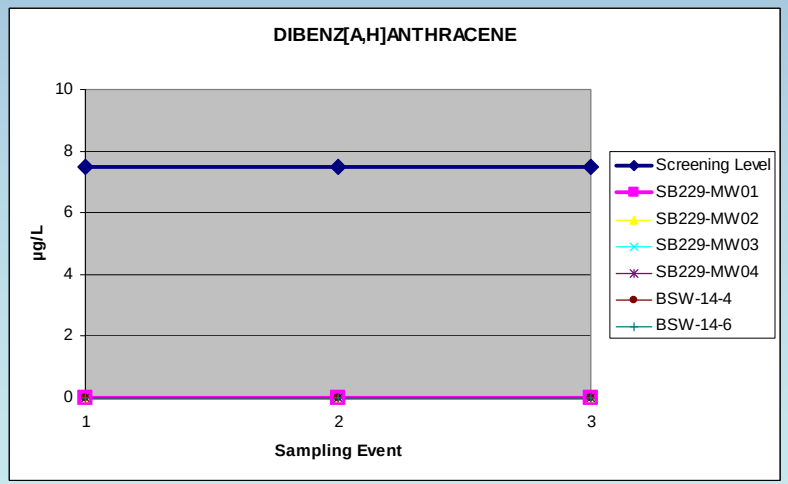


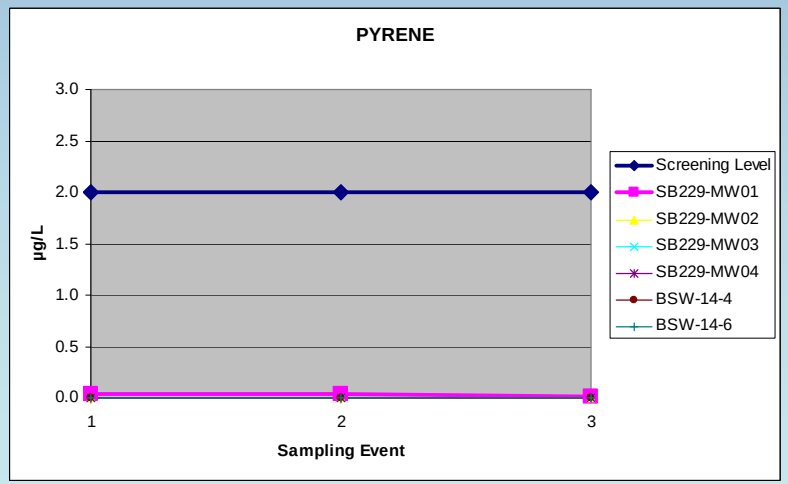


Groundwater Monitoring Results









Summary

- Project screening levels were set for Maximum Contaminant Levels (MCLs) when available, otherwise used San Francisco Bay RWQCB Environmental Screening Levels (ESLs) based on Aquatic Habitat Goals
- MCLs not exceeded
- TPH slightly above ESLs
- Napthalene exceeded ESLs in source area well during first sampling round
- No other compounds detected above ESLs
- One more groundwater sampling event scheduled.

Proposed Schedule

- December 8 and 9, 2010 – Fourth Groundwater Sampling Event
- May 11 through June 25, 2011 – RWQCB review of the Draft Site Characterization Report
- July 31, 2011 - Submittal of the Final Site Characterization Report.

Questions?