Proposed Plan for Installation Restoration Program Site 27 Naval Weapons Station Seal Beach Detachment Fallbrook

February 2017

U.S. NAVY ANNOUNCES PROPOSED PLAN

The U.S. Navy requests public comments on the **Installation Restoration Program Site 27 (IRP Site 27)** Proposed Plan. IRP Site 27 is located on Naval Weapons Station Seal Beach Detachment Fallbrook (Detachment Fallbrook). The **San Diego Regional Water Quality Control Board (RWQCB)** and the California **Department of Toxic Substances Control (DTSC)** have worked with the Navy and concur with this Proposed Plan.

This Proposed Plan announces the preferred alternative to address waste material that was historically placed within the landfill at IRP Site 27 at Detachment Fallbrook. The preferred remedial alternative to achieve the **remedial action objectives (RAOs)** established for IRP Site 27 is **Institutional Controls (ICs)** and Long-Term Monitoring.

The Navy's Environmental Restoration (ER) Program was formed by the Department of Defense (DoD) to protect human health and the environment, and where possible, to restore sites impacted by past DoD operations. The ER Program provides funding for Navy installations to locate, investigate, and clean up contaminated sites, as is being done for IRP Site 27. Based on the **conceptual site model (CSM)** and results from the risk assessments, **contaminants of potential concern (COPCs)** do not currently pose an unacceptable risk to human health or the environment. However, IRP Site 27 served as an active landfill between the late 1960's and 1974; therefore, protective measures are needed to ensure that exposure to COPCs does not occur in the future.

IRP Site 27 is located within Detachment Fallbrook, between the northeastern border of Marine Corps Base (MCB) Camp Pendleton in northern San Diego County and the unincorporated area of Fallbrook to the east (Figure 1). A Site Inspection (SI) was conducted in 2006 to evaluate if COPCs were present in soil and groundwater at the landfill and to determine whether there is a possible release of the COPCs from the landfill. Based on the findings of the SI showing the presence of COPCs, an additional investigation was recommended to further refine the CSM to be able to determine what future activities are required for IRP Site 27. As such, a **Remedial Investigation (RI)** and a Supplemental RI were completed in 2012 and 2014, respectively. During these investigations, additional environmental samples were collected for analysis and geophysical surveys were conducted to evaluate the landfill characteristics.

A **Feasibility Study (FS)** was prepared in 2015 to evaluate remedial alternatives to address potential risk associated with the landfill at IRP Site 27. Based on the results from the SI, RI, and Supplemental RI, there is no unacceptable risk to human health or the environment; however, the FS determined that ICs and long-term monitoring are needed to achieve the RAOs and ensure that there continues to be no unacceptable risk.

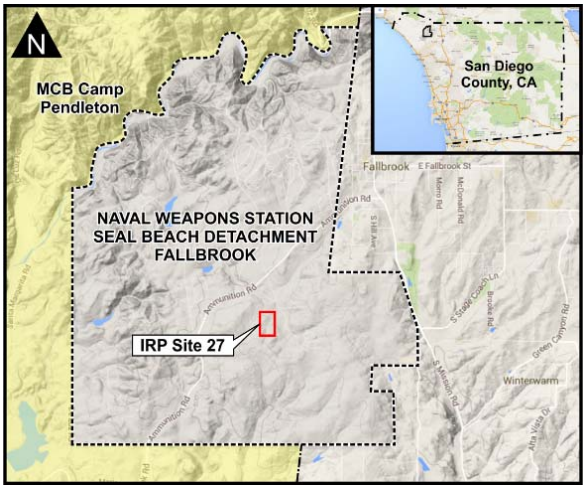


Figure 1. Location of Fallbrook and IRP Site 27

NOTICE

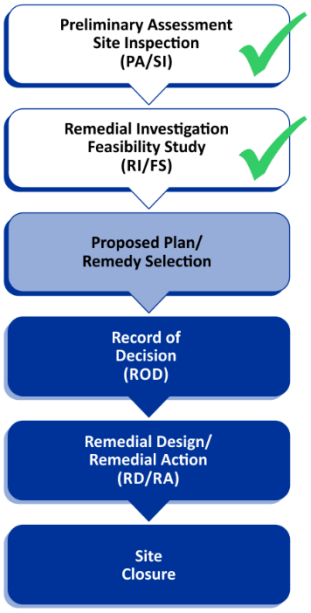
Public Comment Period:
February 24, 2017 through March 27, 2017

Public Meeting:
Wednesday March 8, 2017
Fallbrook Community Center, North Room
341 Heald Lane
Fallbrook, California
5:00 to 7:00 pm

Contents:

*Words in **bold** are defined in the glossary on pages 9 – 10. Un intérprete estará disponible durante la reunión pública para clarificar cualquier pregunta en relación al plan propuesto para el IRP Site 27.

THE CERCLA PROCESS



The Navy is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**, **Superfund Amendments and Reauthorization Act (SARA)**, Section 300.430(f)(2) of the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**, and Executive Order 12580 which delegates the implementation of CERCLA to the Department of the Navy. The flowchart to the right illustrates the phases of the CERCLA process. The SI, RI, and FS have been completed for IRP Site 27. The site is currently in the Proposed Plan/Remedy Selection phase of the CERCLA process.

This Proposed Plan summarizes information detailed in the SI Report (February 2009), the RI Report (September 2012), the Supplemental RI Report (July 2014), the FS Report (May 2015), and other relevant documents contained in the **Administrative Record (AR)** file for this site. The Navy encourages the public to review these documents to gain an understanding of the environmental investigation activities and risk assessments that have been conducted at the site. The documents are available for public review at the location listed on Page 8. Information about the AR, the public meeting for this Proposed Plan, and submitting comments during the 30-day public comment period is also presented on Page 8.

In response to feedback from the community, new information, and consultation with the regulatory agencies, the Navy may modify the preferred remedial alternative or select other cleanup remedies. Therefore, the community is encouraged to review and comment on this Proposed Plan. A final decision, documented in the **Record of Decision (ROD)**, will not be made until comments received during the public comment period and public meeting are considered. The ROD will include a Responsiveness Summary that explains how the Navy considered comments received during the public comment period and meeting. Based on the remedy selected in the ROD, the Navy will plan for and implement the final selected alternative during the **Remedial Design/Remedial Action (RD/RA)** phase of the CERCLA process. Ultimately, implementation of the RA will facilitate IRP Site 27 in achieving the RAOs.

SITE HISTORY AND DESCRIPTION

Since being commissioned in 1942, Detachment Fallbrook has functioned as a Naval weapons facility, supporting a variety of activities, including ordnance provision, inspection, maintenance, research, testing and storage for Navy and Marine Corps forces. IRP Site 27 is located within Detachment Fallbrook and is also referred to as the Eucalyptus Grove Landfill (see Figure 2) because of the eucalyptus trees planted in the cover after the landfill was closed. (Note that the eucalyptus trees serve to minimize erosion of the cover and prevent water from infiltrating the landfill.)

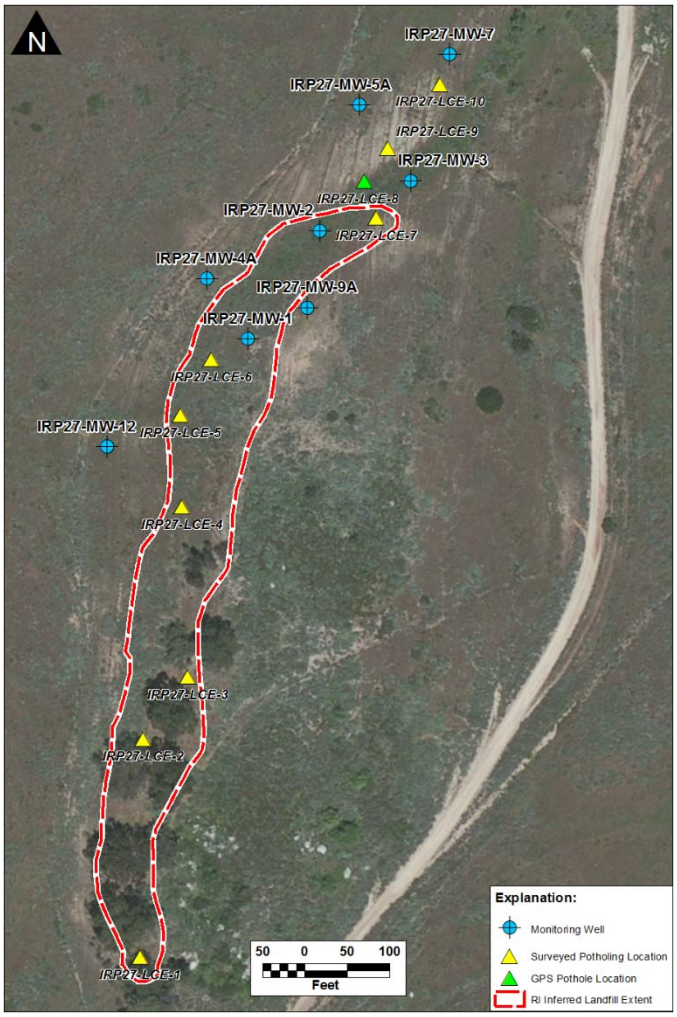


Figure 2. Map of the IRP Site 27 Landfill

The landfill operated from the late 1960's to 1974, when the Navy began transporting waste off site. During its operation, the landfill was used to collect municipal-type waste; however, it was reported that the landfill also contains small quantities of hazardous waste. Consequently, the landfill was included in the IRP as Site 27.

IRP Site 27 and the surrounding area is an undeveloped, open space area and is utilized in the cattle grazing program, which supports fire suppression efforts and habitat protection for endangered species. Because the site is within the calculated explosive safety arcs of area magazines, development or any type of inhabited building is prohibited.

The IRP Site 27 landfill is approximately 1.9 acres, 800 ft long, and located within a dry ravine that trends south to north. The elevation at the south end of the landfill is approximately 640 feet above mean sea level (ft amsl) and

the northern end of the landfill is approximately 580 ft amsl. Site geology consists of an upper layer of unconsolidated clays, silts, sands, and landfill waste. The unconsolidated sediments are underlain by an interval of moderately to highly weathered **bedrock**, which is then underlain by solid bedrock found at depths ranging from 5 to 41 ft below ground surface (bgs). Groundwater at the site is perched above the regional groundwater table and appears to migrate along the sediment-bedrock interface to the north-northeast and accumulates north of the landfill in a bedrock trough, in the lowest topographical area of the catchment basin.

The IRP Site 27 catchment basin is a relatively insignificant contributor of groundwater to the surrounding watershed because: 1) the groundwater is perched, limited, discontinuous and has a low recharge rate; 2) the monitoring wells at IRP Site 27 demonstrate relatively low yield (i.e., monitoring wells produce an average of 0.46 gallons per minute [gpm] compared to 600 to 1,800 gpm pumped from drinking water wells at MCB Camp Pendleton); and 3) the size of the catchment basin is relatively small compared to the drainage to the east for the upstream watershed (i.e., ~43 acres versus ~500 acres). Additionally, the IRP Site 27 landfill is 1.9 acres, a relatively insignificant recharge area compared to its entire catchment basin of 43 acres. Based on these aquifer characteristics and location, groundwater is not used for beneficial purposes and it is unlikely that it would be used in the future.

As shown in Figure 3, IRP Site 27 is approximately 1 mile from the City of Fallbrook and approximately 3.6 miles from the nearest drinking water well located at MCB Camp Pendleton to the west.

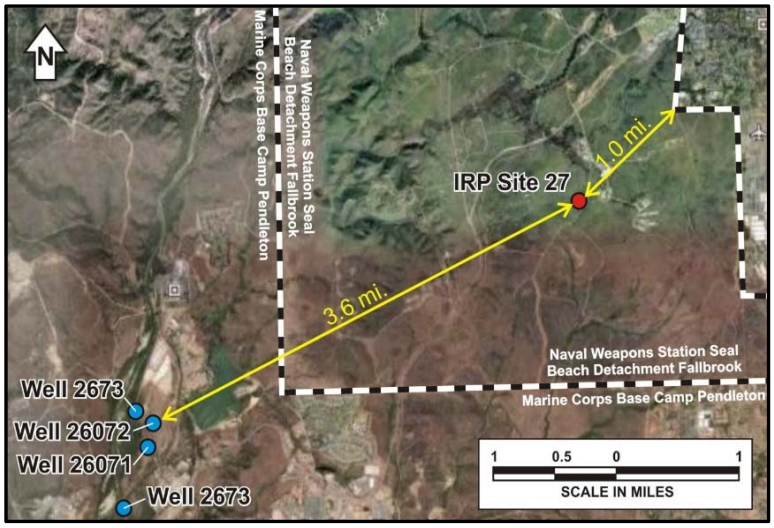


Figure 3. Proximity of IRP Site 27 to the City of Fallbrook and MCB Camp Pendleton Production Wells

SITE INVESTIGATIONS

During the SI conducted in 2006, it was estimated that the total volume of refuse placed in the landfill was approximately 24,000 cubic yards (yd^3) based on an estimated 20 to 30 dumpsters of refuse disposed of per week at the site. The SI also determined an approximate lateral and vertical extent of the landfill based on seismic refraction profiles and historical aerial photographs. The RI field activities conducted from 2010 to 2011 further refined the estimated extent of the landfill with the landfill volume including waste mixed with native soil. Based on exploratory excavations and drilling activities, the lateral extent was estimated to be 80,902 square feet (ft^2) with cover thickness ranging from approximately 1 to 2.5 ft, averaging approximately 2 ft. Three-dimensional modeling of the site geology and waste layer determined that the actual in situ volume of waste and soil containing waste was approximately 65,728 yd^3. The waste layer contains small quantities of potentially hazardous waste. The hazardous waste consists of empty paint cans with dried paint residues, fluorescent lights, fluorescent light ballasts, spent silica sandblast grit containing paint chips, paint booth residue, rags with solvent residue, used paint brushes, and asbestos, metal scrap, and pallets that were potentially treated with pentachlorophenol.

During the SI, both soil and groundwater samples were collected within IRP Site 27 to determine whether COPCs were present in the landfill and whether there was a possible release of the COPCs from the landfill area. Soil samples were collected from a total of 11 locations with samples being collected at various depths at each of these locations for a total of 38 samples. Groundwater samples were collected from three newly installed monitoring wells to determine potential contaminant releases into groundwater. All monitoring wells are located along the centerline of groundwater flow through the landfill with MW-1 and MW-2 within the landfill extent and MW-3 approximately 50 ft downgradient of the landfill extent. Samples were analyzed for **volatile organic compounds (VOCs)**, perchlorate, **semivolatile organic compounds (SVOCs)**, explosives (soil only), **hydrazine**, metals (including mercury and hexavalent chromium), **pesticides, polychlorinated biphenyls (PCBs)**, tributyltins (soil only), **total petroleum hydrocarbon (TPH)**, and general chemistry parameters.

In soil samples, detected analytes included hexavalent chromium, polybrominated diphenyl ether, SVOCs, pesticides, PCBs, and metals. Detected concentrations of these analytes in landfill soil were below risk screening levels, as documented in the SI Report. In groundwater, VOCs, pesticides, and PCBs were all non-detect. However, one SVOC (i.e., **N-nitrosodimethylamine [NDMA])** and TPHs were detected in groundwater, but below risk screening levels. **Aluminum, iron, and manganese** were detected above their respective MCLs.

During the RI, additional sampling for soil (**arsenic** analyses only), soil gas, groundwater, and surface water were conducted to address data gaps remaining from the SI and comments from the RWQCB. The analytical results from these additional sampling activities indicated that no further action is required for arsenic in soil since concentrations are consistent with naturally-occurring background levels and no further action is required for soil gas since results did not exceed screening levels. For surface water, hydrazine concentrations exceeded their tap water **Regional Screening Level (RSL)**, and manganese and sulfate concentrations exceeded their respective secondary MCLs. However, based on the risk

assessments, these surface water impacts do not pose a risk because potential receptors are unlikely to be exposed to any surface water or storm water at the site. In groundwater, nitrate, iron, manganese, and arsenic were detected above their respective MCLs.

A Supplemental RI was conducted for two reasons: 1) to install two additional soil borings to further delineate the extent of the landfill along the southwest boundary and 2) to address analytes previously detected in groundwater by conducting two additional rounds of groundwater monitoring; one in the wet season (November 2012) and one in the dry season (May 2013). The results of the RI show NDMA detected in downgradient monitoring well MW-3 slightly above the revised screening level of 3 ng/L in November 2012, but well below the revised screening level in the May 2013 sampling. Hydrazine was detected at concentrations ranging from 1.1 to 5.3 mg/L, above the tap water RSL of 0.022 mg/L. However, the highest concentration was detected in background monitoring well MW-12 and greater concentrations are detected upgradient compared to downgradient of the landfill, indicating that the landfill is not the source of hydrazine.

Arsenic, iron, and manganese were detected above their respective MCLs, but only in MW-2, which intersects the landfill waste layer. Based on the RI and Supplemental RI, changes in groundwater geochemistry are causing the mobilization of naturally-occurring metals into the groundwater directly underlying the landfill. The dissolution of the naturally-occurring metals into groundwater is due to the decomposition of waste in the landfill. The decomposition process consumes oxygen and therefore makes the groundwater more reduced (added electrons), and more likely to dissolve metals. This is a common occurrence underneath landfill sites. Groundwater sampling results from downgradient monitoring wells show that metals concentrations are near or below MCLs, indicating that the metals precipitate out of the groundwater within 200 ft of the landfill and are not released outside the area.

SUMMARY OF SITE RISKS

Within the context of environmental investigations and actions, **risk** is the likelihood or probability that a hazardous substance, when released to the environment, will cause adverse effects on exposed people and/or the environment. The Navy evaluated risks posed by COPCs in soil from the landfill area by completing a site-specific Human Health Risk Assessment (HHRA) and a Screening Level Ecological Risk Assessment (SLERA) during the SI. In addition, a supplemental screening level human health risk assessment (SLHHRA) and SLERA were performed as part of the RI. The RI SLHHRA and SLERA evaluated the groundwater, landfill gas, soil, storm water, and soil gas data collected for the RI. Based on the HHRA and the SLHHRA, no human health risks were identified for IRP Site 27. In addition, the SLERA concluded that IRP Site 27 does not pose an unacceptable risk to plants and wildlife.

Human Health Risk Assessments

For people, risk is further classified as carcinogenic (may cause cancer) or non-carcinogenic (may cause other illnesses). NCP indicates that lifetime incremental cancer risks posed by a site should not exceed a range of one in one million (1×10^{-6}) to one hundred in one million (1×10^{-4}). For non-carcinogenic substances, EPA established that the total hazard index (HI) for an individual or group of individuals should not exceed 1. (The HI is the sum of **hazard quotients (HQs)** for substances that affect the same target organ or organ system with the HQ equal to the ratio of the potential exposure to the substance and the level at which no adverse effects are expected.) Risk assessments are designed to provide a margin of safety to protect public health & environment by using conservative assumptions that ensure risks are not underestimated.

The receptors and **exposure pathways** identified for potential exposure to COPCs in soil are summarized in Table 1. Risk decisions are typically based on the **reasonable maximum exposure (RME),** but for IRP Site 27, both the RME and the **central tendency exposure (CTE)** were evaluated to describe the magnitude and range of exposure that might be experienced by the receptors. All of the RME risks fall within the risk range of 1×10^{-4} to 1×10^{-6} and all of the RME hazard indices are less than 1. For the CTE, estimated risks are less than 1×10^{-6} and hazard indices are less than 1. A summary of risks and hazards associated with COPCs in soil at IRP Site 27 is provided in Table 2.

Table 1. Exposure Pathways Associated with COPCs in Soil for Current and Potential Future Human Receptors

Receptor	Exposure Pathway
Industrial Worker	Direct contact (ingestion, inhalation of dust, and skin absorption) with surface soil (0-2 ft bgs) and mixed surface/subsurface soil (0-10 ft bgs)
Construction Worker	Direct contact (ingestion, inhalation of dust, and skin absorption) with mixed surface/subsurface soil (0-10 ft bgs)
Resident (adult & child)	Direct contact (ingestion, inhalation of dust, and skin absorption) with surface soil (0-2 ft bgs) and mixed surface/subsurface soil (0-10 ft bgs)
Off-site Farmer (adult &child)	consumption of animal tissue (beef) and milk from cattle that forage from surface soil (0-2 ft bgs) on site (uptake into plants from surface soil)

Table 2. Summary of Risks and Hazards Associated with COPCs in Soil

Receptors	RME		CTE	
	Risk	Hazard	Risk	Hazard
Industrial Worker (surface soil)	5×10^{-6}	<1	3×10^{-7}	<1
Industrial Worker (mixed surface/ subsurface soil)	7×10^{-6}	<1	4×10^{-7}	<1
Construction Worker	1×10^{-6}	<1	2×10^{-7}	<1
Resident (surface soil)	2×10^{-5}	<1*	4×10^{-6}	<1
Resident (mixed surface/ subsurface soil)	3×10^{-5}	<1*	5×10^{-6}	<1
Off-site Farmer (adult &child)	1×10^{-6}	<1	2×10^{-7}	<1

*Target organ-specific hazard estimates are less than 1.
RME – reasonable maximum exposure
CTE – central tendency exposure

At IRP Site 27, the majority of the estimated excess cancer risk from exposure to soil was attributed to arsenic and PCB-1248. Arsenic was the only metal analyzed for in soil during the RI because it was the only metal identified as a risk driver in the SI HHRA. Based on the soil sampling results from the RI, arsenic was ultimately discounted as a COPC because detected concentrations were consistent with background metals concentrations determined in the Basewide Background Metals Soil Study conducted for Detachment Fallbrook, and are also considered within regional background levels for southern California.

The SLHHRA conducted as part of the RI evaluated exposure pathways and COPCs not included in the SI HHRA. For the SLHHRA, maximum concentrations of chemicals detected in landfill gas, soil gas, groundwater, and storm water were compared to medium-specific risk-based screening levels (EPA's RSLs, California Human Health Screening Levels [CHHSLs], and EPA MCLs). Results of the SLHHRA were as follows:

- VOCs were detected at concentrations at or below residential soil gas CHHSLs. Cancer risk estimates do not exceed the NCP acceptable risk range of 1×10^{-6} to 1×10^{-4} nor the DTSC target risk level of 1×10^{-6} for unrestricted land use. Therefore, these VOCs are unlikely to present a human health risk for the vapor intrusion pathway.
- Groundwater is not used as a public water supply; therefore, ingestion of groundwater is not considered a complete exposure pathway and the chemicals detected are unlikely to pose a human health risk. In addition, naturally-occurring metals (i.e., arsenic, iron, and manganese), which are detected above their respective MCLs within the landfill, are detected at or below their MCL within 200 ft downgradient of the landfill; thus, not being released outside of the area.
- Ingestion of storm water is not considered a complete exposure pathway since the average annual precipitation is minimal, residence time of storm water is limited, and workers are seldom at the site; therefore, the chemicals detected are unlikely to pose a significant human health risk.

Based on the HHRA and the SLHHRA, no human health risks were identified for IRP Site 27.

Screening Level Ecological Risk Assessment

The SLERA in the SI evaluated risk to plants, invertebrates, birds, and mammals based on surface soil (0-1 ft bgs) sampling results obtained during the SI. An updated SLERA was prepared for the RI based on the additional data collected during the RI.

For the SLERA, the health of community level receptors was evaluated by visual observations and by comparing the data collected with published toxic effects data, also termed ecological benchmarks. In addition, a quantitative evaluation of upper trophic level receptors (e.g., mammals and birds) was incorporated using the HQ approach. The HQ is the ratio of the maximum concentration of the **contaminants of potential ecological concern (COPECs)** to the toxicity reference value (TRV) from a selected toxicity study. An HQ greater than 1.0 identifies a potential for risk. Results of the RI SLERA were as follows:

- The inhalation pathway from soil gas for ecological exposures is generally negligible relative to the ingestion pathway. Maximum detected concentrations of soil gas were one or more orders of magnitude below the calculated ecological screening levels.
- There are no surface water bodies, such as rivers, streams, or lakes, on or near IRP Site 27; therefore, the habitat is not suitable to support benthic or aquatic receptors.
- All HQs were estimated well below 1.0, indicating a limited potential for ecological risk from consumption of storm water.
- No source-related COPECs have been deposited at the landfill since the 1970s and no exposure pathways are expected because of the lack of surface water and the presence of vegetation cover over the landfill that reduces the mobility of detected constituents in soil.

The SLERA concluded that IRP Site 27 does not pose an unacceptable risk to plants and wildlife.

REMEDIAL ACTION OBJECTIVES

RAOs are site-specific goals for protecting human health and the environment. RAOs are formulated during the FS and provide a means of identifying and assessing potential remedial alternatives to achieve site cleanup. As described in the Summary of Site Risks, all of the risk assessments concluded that there are no current risks to humans or the environment; therefore, the RAOs were developed for protection from any *future* possible unacceptable exposure scenarios. The RAOs for IRP Site 27 are:

- Prevent exposure of human and ecological receptors to historically landfilled waste.
- Prevent future exposure of human receptors to impacted groundwater.
- Prevent potential off-site impacts from the mobilization of naturally-occurring metals in groundwater resulting from interactions between the aquifer and landfill waste.

REMEDIAL ALTERNATIVES

Remedial alternatives were developed and evaluated in the FS Report for IRP Site 27. The area for which the alternatives apply is delineated in Figure 2. The remedial alternatives were evaluated against the first seven of the nine criteria required by CERCLA and as specified in the NCP (Figure 4). The two final criteria are state acceptance and community acceptance. State acceptance is documented in this Proposed Plan. Community acceptance will be evaluated after the public comment period for this Proposed Plan and will be addressed in a Responsiveness Summary in the ROD. In response to feedback from the community during the public comment period or due to new information and in consultation with the regulatory agencies, the Navy may modify the preferred remedial alternative or select other cleanup remedies. Therefore, the community is strongly encouraged to review

and comment. A final decision will not be made until all comments are considered.

Figure 4. Description of the Nine NCP Evaluation Criteria

Three remedial alternatives for IRP Site 27 were developed for detailed analysis in the FS Report and are summarized in Table 3. The three remedial alternatives determined to be the most suitable for addressing the RAOs for IRP Site 27 are as follows:

- Alternative 1: No Action
- Alternative 2: Institutional Controls (ICs) and Long-Term Monitoring
- Alternative 3: Soil Cover Improvements with ICs and Long-Term Monitoring

Note that in accordance with the requirements of CERLCA and the NCP, Alternative 1 (i.e., the No Action alternative) is presented and carried through the entire FS to serve as the baseline condition from which to compare the other remedial alternatives. No actions are performed for this alternative.

Alternative 2 includes ICs and long-term monitoring. ICs are legal and administrative mechanisms used to implement land use and access restrictions to limit the exposure of future landowner(s) and/or user(s) of the property to hazardous substances and to maintain the integrity of the selected remedy. Legal mechanisms include proprietary controls such as restrictive covenants, negative easements, equitable servitudes, lease restrictions, and deed notices. Administrative mechanisms include notices, posting signs, adopted local land use plans and ordinances, construction permitting, or other existing land use management systems to ensure compliance with use restrictions. The Navy would be responsible for implementing, monitoring, maintaining, inspecting, reporting, and enforcing the necessary ICs in accordance with the approved RD. Should any of the ICs fail, the Navy would ensure that appropriate actions are taken to re-establish protectiveness of the remedy. The ICs would be maintained until such time as the Navy determines, in coordination with the state regulatory agencies, that they are no longer necessary. At IRP Site 27, ICs would ensure that future land use is consistent with current land use by restricting residential use of the property, including permanent residences, hospitals, schools, or daycare facilities. Due to the presence of the landfill, all land disturbing activities would also be prohibited.

Table 3. Summary of Remedial Alternatives Evaluated for IRP Site 27

Alternative	Description	Total Cost
Alternative 1: No Action	The No Action Alternative is required by CERCLA and the NCP to be evaluated as an alternative to serve as the baseline condition from which to compare the other alternatives. No actions are performed for this alternative.	$0
Alternative 2: Institutional Controls and Long-term Monitoring	ICs would ensure that future land use is consistent with current land use by restricting residential use of the property, including permanent residences, hospitals, schools, or daycare facilities. Due to the presence of the landfill, all land disturbing activities would also be prohibited. Long-term monitoring would consist of: 1) annual inspections of the existing soil cover (with quantitative land surveys every five years) and the IC mechanisms to ensure future cover integrity and effectiveness and 2) limited groundwater sampling to monitor site conditions and ensure off-site migration of elevated COPC concentrations is not occurring.	$489,034
Alternative 3: Soil Cover Improvements with Institutional Controls and Long-term Monitoring	The cover improvements included in Alternative 3 would serve to augment the existing cover material in preventing site receptors from contacting buried waste. The soil cover improvements would be implemented in conjunction with the ICs and long-term monitoring for Alternative 2.	$765,888

As part of Alternative 2, long-term monitoring would also be conducted and consist of: 1) annual inspections of the existing soil cover (with quantitative land surveys every five years) and the IC mechanisms to ensure future cover integrity and effectiveness and 2) limited groundwater sampling to monitor site conditions and ensure off-site migration of elevated naturally-occurring metals concentrations is not occurring. Annual inspection of the soil cover would include a site visit by a qualified professional engineer to make direct observations of any issues pertaining to cover integrity or effectiveness (e.g., erosion channels). In addition to the annual inspection, quantitative land surveys of the landfill cover would be conducted by a licensed professional land surveyor. A baseline survey would be conducted to document conditions at the time of the ROD and monitoring surveys would be conducted every five years (in addition to direct observations conducted annually) to provide a quantitative measure of cover stability and determine whether erosion is occurring on the landfill. The results of these surveys would be presented in the five-year review, which would provide a mechanism to revisit the remedy, if future erosion is observed.

As part of the long-term monitoring, limited groundwater monitoring would also be conducted. Up to four monitoring wells would be sampled during each monitoring event. Groundwater monitoring would consist of annual monitoring for five years followed by monitoring every five years for 25 years. Groundwater samples would be analyzed for metals and geochemical field parameters. Based on three-dimensional modeling of the IRP Site 27 landfill, the Navy has determined that one monitoring well, MW-2, intersects the waste layer. Thus, MW-2 would be abandoned and replaced with a nearby well that could serve to monitor site conditions in the downgradient area of the landfill. The replacement well would be isolated from the waste layer. The final monitoring well network (of up to four wells, including the replacement well) would be selected to produce data that are suitable and appropriate to monitor site conditions and ensure off-site migration of elevated naturally-occurring metals concentrations is not occurring.

Alternative 3 includes improvements to the soil cover in conjunction with the ICs and long-term monitoring for Alternative 2. Implementation of the soil cover improvements would include increasing the minimum cover thickness to 1.5 ft in all areas of the former landfill extent, which will serve to augment the existing cover material in preventing site receptors from contacting buried waste.

COMPARISON OF ALTERNATIVES

Identification of the preferred alternative is based on the NCP criteria, as shown in Figure 4. Alternatives are rated “high”, “moderate”, or “low”, based on their performance under each criterion. For example, an alternative that is substantially easier to implement than other alternatives is rated high in implementability. Similarly, an alternative that would be significantly lower in cost than the other alternatives is considered to have a more favorable cost rating. The alternatives are ranked based on their protectiveness and on their ability to meet the RAOs. Table 4 provides a comparative summary of the three remedial alternatives in relation to the nine NCP evaluation criteria.

PREFERRED ALTERNATIVE

The preferred remedial alternative to achieve the RAOs established for IRP Site 27 is Alternative 2, ICs and Long-Term Monitoring. This alternative meets the threshold

Table 4. Comparative Analysis of IRP Site 27 Remedial Alternatives Based on the NCP Evaluation Criteria

NCP Criteria	Alternative 1: No Action[a]	Alternative 2: ICs and Long-Term Monitoring[b]	Alternative 3: Improved Soil Cover with ICs and Long-Term Monitoring
1. Overall protection of human health and the environment	NO	YES	YES
2. Compliance with ARARs	NO	YES	YES
3. Long-Term effectiveness and performance	○	●	●
4. Reduction of toxicity, mobility, or volume through treatment	○	○	○
5. Short-Term effectiveness	●	●	◑
6. Implementability	●	●	●
7. Cost[c]	$0	$489,034	$765,888
8. State agency acceptance	To be considered during finalization of this Proposed Plan and during the ROD		
9. Community acceptance	To be evaluated after the Public Comment Period		

(a) Alternative 1 does not meet the protectiveness criterion; therefore, an evaluation against the ARARs criterion was not performed.
(b) Alternative 2 is the preferred alternative.
(c) Cost estimates are shown as total cost.

NA – not applicable

○ = low; ◑ = moderate; ● = high

criteria for overall protection of human health and the environment and for compliance with **Applicable or Relevant and Appropriate Requirements (ARARs;** Table 4) and is rated the highest overall for all NCP criteria except for "reduction of toxicity, mobility, or volume through treatment" insofar as the alternative does not include any specifically treatment-based component. The alternative is protective of human health and the environment, and would achieve the project RAOs. Under this alternative, ICs will be established to ensure that future land use is consistent with current land use by restricting residential use of the property, including permanent residences, hospitals, schools, or daycare facilities and to prohibit all land disturbing activities due to the presence of the landfill. Long-term monitoring will be conducted and consist of 1) annual inspections of the existing soil cover (with quantitative land surveys every five years) and the IC mechanisms to ensure future cover integrity and effectiveness and 2) limited groundwater sampling to monitor site conditions and ensure off-site migration of elevated naturally-occuring metals concentrations is not occurring.

Multi-Agency Environmental Team Concurs with Preferred Remedy

The environmental team, which has been working cooperatively to address remedial decisions for Detachment Fallbrook and will sign the ROD, consists of:

- Navy
- DTSC
- RWQCB

SITE CONTACTS

Community involvement in the decision-making process is encouraged. If you have any questions or concerns about environmental activities at IRP Site 27, please contact any of the following project representatives:

- **Navy Remedial Project Manager**
  Naval Facilities Engineering Command Southwest
  1220 Pacific Highway
  San Diego, California
  (619) 532-1156
- **Installation Restoration Coordinator**
  Department of the Navy
  Naval Weapons Station Seal Beach
  800 Seal Beach Blvd., B230
  Seal Beach, California
  (562) 626-7897
- **Project Manager**
  Site Mitigation Program
  Department of Toxic Substances Control
  5796 Corporate Avenue
  Cypress, California
  (714) 484-5458
- **Project Manager**
  Northern Cleanup Unit
  San Diego Regional Water Quality Control Board
  2375 Northside Dr., Suite 100
  San Diego, California
  (619) 521-3342

OPPORTUNITIES FOR PUBLIC INVOLVEMENT

Information Repository

Individuals interested in the full technical details beyond the scope of this Proposed Plan can visit Fallbrook's website at:

http://www.cnic.navy.mil/regions/cnrsw/installations/nws_seal_beach/om/environmental_support/environmental_cleanup/fallbrook/documents.html

Supporting documents include the SI Report, the RI Report, the Supplemental RI Report, and the FS Report for IRP Site 27.

Administrative Record

The Administrative Record (AR) is the collection of reports and historical documents used by the decision-making team in the selection of the cleanup or environmental management alternatives for a site. The AR file includes the SI Report, RI Report, Supplemental RI Report, and FS Report for IRP Site 27. These documents can be viewed at the Fallbrook Public Library during regular business hours.

Administrative Record File
Public Holding Room
Fallbrook Public Library
124 S. Mission Road
Fallbrook, California 92028
(760) 731-4650

PUBLIC COMMENT PERIOD

The 30-day comment period is from February 24, 2017 through March 27, 2017.

Submit Comments
Provide comments by mail or e-mail (mailed comments are to be postmarked no later than the last day of the public comment period, which ends on March 27, 2017).

Public Meeting

A public meeting to present the Proposed Plan and receive public comments will be held on Wednesday March 8, 2017 in the North Room at the Fallbrook Community Center. The Fallbrook Community Center is located at 341 Heald Lane between S. Mission Rd and S. Stage Coach Ln to the north off of E. Fallbrook St in Fallbrook, California.

Or you can send comments to:
Ms. Ann Colt
Navy Remedial Project Manager
Naval Facilities Engineering Command Southwest
1220 Pacific Highway
San Diego, California 92132
(619) 532-1156
Ann.colt@navy.mil

Administrative Record (AR) – The reports and historical documents used in selection of cleanup or environmental management alternatives.

aluminum – An abundant, naturally occurring silvery-white metallic element.

arsenic – A naturally occurring element considered to be a toxic and carcinogenic compound.

Applicable or Relevant and Appropriate Requirements (ARARs) – A Federal or State law or regulation that is required to be protective of human health and the environment during remedial actions at a site.

bedrock – Consolidated rock underlying the alluvial surface of the earth.

central tendency exposure (CTE) – A measure of the middle or the center of an exposure distribution. The mean is the most commonly used measure of central tendency.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – Also known as Superfund, this federal law regulates environmental investigations and cleanup of sites in a manner that is protective of both human health and the environment.

conceptual site model (CSM) – The planning tool serves to conceptualize the relationship between contaminant sources and receptors through consideration of potential or actual migration and exposure pathways. It presents the current understanding of the site, helps to identify data gaps, and helps to focus the data collection efforts.

contaminants of potential concern (COPCs) – A chemical that has been detected at the site at a concentration that is greater than background, such that its presence in the environment may be related to a release of contamination.

contaminants of potential ecological concern (COPECs) – Any contaminant that is shown to pose possible ecological risk to a site. Generally, a contaminant which may or may not be causing risk or adverse effects to the plants and animals at a site.

Department of Toxic Substances Control (DTSC) – A department within the California Environmental Protection Agency charged with overseeing the investigations and cleanup of hazardous waste sites.

exposure pathway – Route of contaminants from the source of contamination to potential contact with a medium (air, soil, surface water, or groundwater) that represents a potential threat to human health or the environment.

feasibility study (FS) – The mechanism for the development, screening, and detailed evaluation of alternative remedial actions.

hazard index (HI) – The sum of **HQs** for substances that affect the same target organ or organ system.

hazard quotient (HQ) – The ratio of the potential exposure to the substance and the level at which no adverse effects are expected. If the HQ is calculated to be equal to or less than 1, then no adverse health effects are expected as a result of exposure. If the HQ is greater than 1, then adverse health effects are possible.

hydrazine – A highly reactive base and reducing agent used in many industrial and medical applications.

Installation Restoration Program (IRP) Site 27 – Site 27 is the designation of the subject site within the Department of Defense's comprehensive program to investigate and clean up environmental contamination at military facilities in full compliance with CERCLA.

Institutional Controls (ICs) – Actions, such as legal controls, that help minimize the potential for exposure to contamination by ensuring appropriate land or resource use. They are used when contamination is first discovered, when remedies are ongoing, and when residual contamination remains onsite at a level that does not allow for unrestricted use and unlimited exposure after cleanup.

iron – A naturally occurring silvery-gray metallic element.

manganese – A hard, gray, naturally occurring metallic element.

maximum contaminant level (MCL) – Legally enforceable standards that apply to public water systems and specify the maximum concentration of a specific contaminant that is allowed in public drinking water systems.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP) – The federal regulation that guides the CERCLA (Superfund) program.

n-nitrosodimethylamine (NDMA) – Manufactured chemical formerly used in the production of liquid rocket fuel, antioxidants, and softeners for copolymers. NDMA is also an unintended byproduct of the chlorination of wastewater and drinking water at treatment plants that use chloramines for disinfection.

pesticides – A class of toxic chemicals that are or were formerly used to control nuisance organisms.

polychlorinated biphenyl (PCB) – Category of organic compounds in which a biphenyl molecule has been chlorinated to varying degrees. In the past, PCBs were often used in industry in electrical transformers because of their insulating properties.

reasonable maximum exposure (RME) – The highest exposure that is reasonably expected to occur at a site and is estimated for individual pathways.

Record of Decision (ROD) – A legal document that identifies the selected site remedy. It is signed by the Navy and regulatory agencies and is a binding agreement regarding the final remedy.

regional screening levels (RSLs) – Risk-based concentrations for chemical contaminants that can be used as a screening tool to evaluate residential and commercial/industrial exposures to soil, air, and tapwater (drinking water).

remedial action objective (RAO) – Medium-specific (e.g., soil, groundwater, or air) or site-specific goals for protecting

human health and the environment. These objectives focus the FS and define the scope of potential remedial activities, thereby guiding the development and evaluation of remedial alternatives that are consistent with anticipated future use.

remedial design/remedial action (RD/RA) – RD is the phase in Superfund site cleanup where the technical specifications for cleanup remedies and technologies are designed. RA follows the RD phase and involves the actual construction or implementation phase of Superfund site cleanup. The RD/RA is based on the specifications described in the ROD.

remedial investigation (RI) – The first of two major studies that must be completed before a decision can be made about how to clean up a site. The RI is conducted to determine the nature and extent of contamination at the site and the associated risk. (The feasibility study is a second study that is only conducted when the RI recommends development of cleanup options for a site.)

risk – Likelihood or probability that a hazardous substance released to the environment will cause adverse effects on exposed human or biological receptors. Risk is classified as carcinogenic or non-carcinogenic.

San Diego Regional Water Quality Control Board (RWQCB) – The California water quality authority; a department within the California Environmental Protection Agency.

Superfund Amendments and Reauthorization Act (SARA) – Amended CERCLA on October 17, 1986 with several changes and additions to the program after its first six years.

semivolatile organic compound (SVOC) – An organic (carbon containing) compound that does not readily evaporate at room temperature. SVOCs include certain oils, pesticides, and PAHs.

total petroleum hydrocarbon (TPH) – A family of several hundred chemical compounds in crude oil, such as benzene, hexane, toluene, and others. TPH includes motor oil-, diesel-, and gasoline-range hydrocarbons.

United States Environmental Protection Agency (EPA) – The Federal agency established to protect human health and the environment.

volatile organic compound (VOC) – An organic (carbon containing) compound that evaporates readily at room temperature. VOCs are found in industrial solvents commonly used in dry cleaning, metal plating, and machinery degreasing operations.

KEY REFERENCES

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Enviro Compliance Solutions and Battelle. 2015. *Final Feasibility Study for Installation Restoration Program Site 27, Naval Weapons Station Seal Beach Detachment Fallbrook, California*. May 5.

Hunter, P.M., B.K. Davis, and F. Roach. 2005. *Inorganic Chemicals in Groundwater and Soil: Background Concentrations at California Air Force Bases*. Paper presented at 44th Annual Meeting, Society of Toxicology, New Orleans, LA. March 10.

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SES-Tech. 2012a. *Basewide Metals Background Soil Study Report, Naval Weapon Station Seal Beach Det. Fallbrook, Fallbrook, CA.* July.

University of California Riverside, Kearney Foundation of Soil Science (UCR Kearney). 1996. *Background Concentrations of Trace and Major Elements in California Soils*. March

Proposed Plan Comment Form

Installation Restoration Program Site 27, Naval Weapons Station Seal Beach Detachment Fallbrook

The public comment period for the Proposed Plan for IRP Site 27, Naval Weapons Station Seal Beach Detachment Fallbrook is from February 24, 2017 through March 27, 2017. A public meeting to present the Proposed Plan and receive public comments will be held on Wednesday, March 8, 2017 at the Fallbrook Community Center in Fallbrook, California. You may provide your comments in the space provided below or on your own stationery. Comments submitted by mail must be postmarked no later than March 27, 2017. Comments are also being accepted by e-mail. Please e-mail comments to: Ann.colt@navy.mil.

Name: _____

Representing:
(if applicable) _____

Phone Number:
(optional) _____

Address:
(optional) _____

☐ Please check here if you would like to be added to the Navy's Environmental Mailing List for Naval Weapons Station Seal Beach, Detachment Fallbrook.

Comments:

Mail to:

Ms. Ann Colt
Navy Remedial Project Manager
Naval Facilities Engineering Command Southwest
1220 Pacific Highway
San Diego, California 92132
(619) 532-1156
Ann.colt@navy.mil

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Proposed Plan for Installation Restoration Program Site 27, Naval Weapons Station Seal Beach, Detachment Fallbrook