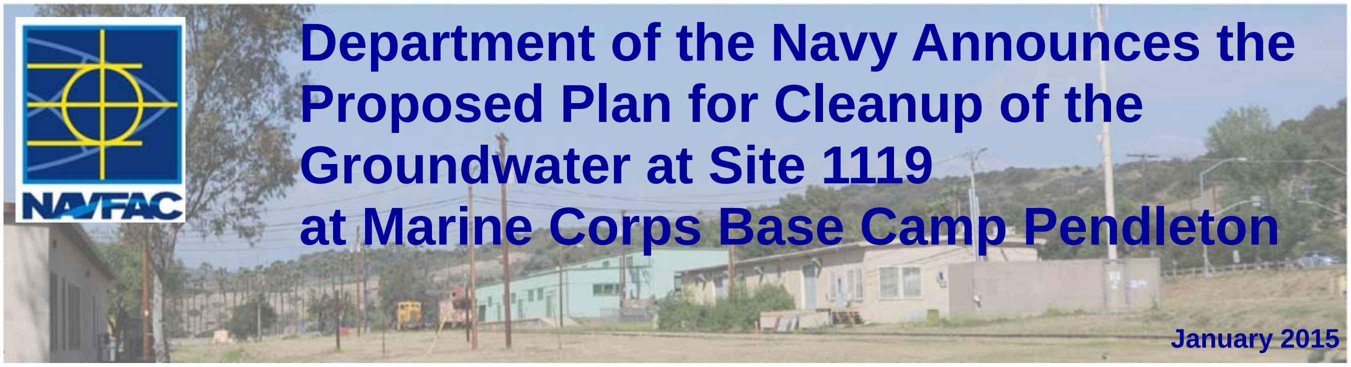


Department of the Navy Announces the Proposed Plan for Cleanup of the Groundwater at Site 1119 at Marine Corps Base Camp Pendleton

January 2015

The Department of the Navy (DON) (which includes both the Navy and the Marine Corps) invites you to comment on the proposed cleanup for contaminated groundwater at the Marine Corps Base (MCB) Camp Pendleton Site 1119.

The proposed cleanup is part of the DON's *Installation Restoration* (IR) program. The purpose of the IR program is to investigate and clean up hazardous substances from former activities at military installations.

This Proposed Plan summarizes the cleanup alternatives evaluated for groundwater at Site 1119 and identifies the preferred alternative.

This Plan also summarizes information that can be found in greater detail in the 2014 *Remedial Investigation/ Feasibility Study (RI/FS)* and other documents contained in the *Administrative Record* for MCB Camp Pendleton. The DON, the United States Environmental Protection Agency (USEPA), and the State of California encourage the public to review this document to better understand this site and other IR program activities that have been conducted at MCB Camp Pendleton.

Public Comment Period

January 27 to February 27, 2015

You are invited to review the cleanup proposal and send written comments during the comment period. See page 11 for information on where to find the documents and how to submit comments.

Public Meeting

6:00 to 7:00 p.m. Tuesday, February 10, 2015

Pacific View South Mesa Club, Compass Room

This meeting is an opportunity for you to hear more about the cleanup proposal, to ask questions, and to give verbal and written comments in person.

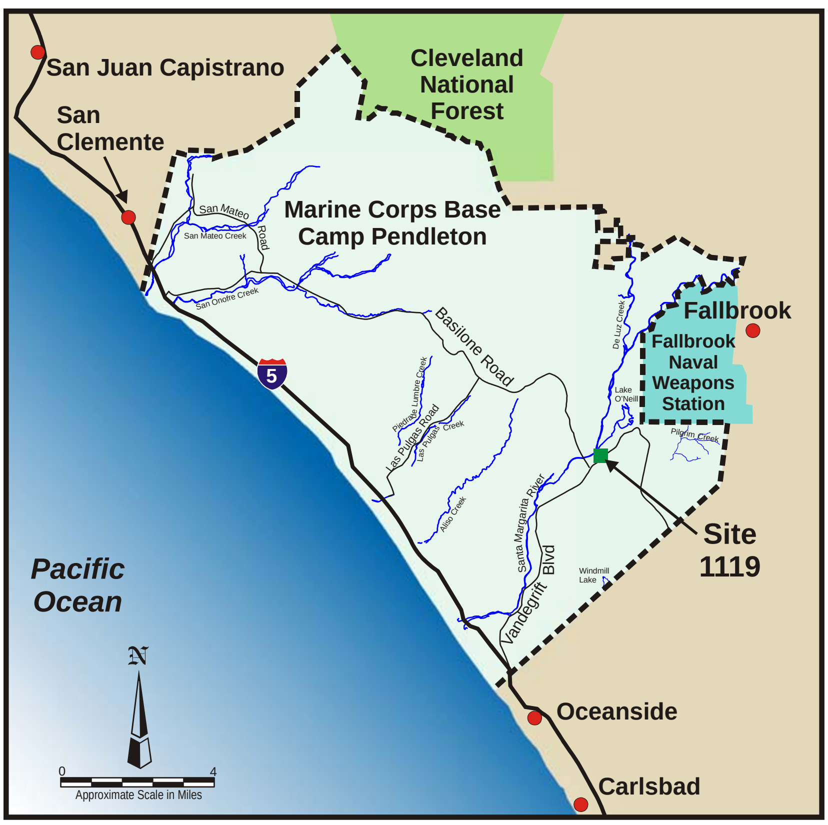


Figure 1: Base Location Map and Site 1119

MCB Camp Pendleton (the Base) is located in northern San Diego County, California. The Base occupies approximately 125,000 acres of land and is bordered on the west by the Pacific Ocean (Figure 1). The Base has a daytime population of approximately 70,000 military and civilian personnel, and approximately 38,000 military family members occupy Base housing complexes.

Table of Contents

THE CERCLA CLEANUP PROCESS

The environmental investigations and cleanup at Site 1119 follow the steps shown in Figure 2. These investigations are carried out in accordance with various environmental laws and regulations. These include CERCLA (*Comprehensive Environmental Response, Compensation, and Liability Act*), SARA (*Superfund Amendments and Reauthorization Act*), the NCP (*National Contingency Plan*), and Executive Order 12580 (which delegates the implementation of CERCLA to the DON). Steps 1 and 2 were completed for this site.

During step 1, the *Remedial Investigation*, an environmental study was conducted to identify the type and extent of contamination at the site and to determine the risk the site poses to human health and the environment. At this site, however, the RI was warranted since the Base found contamination in a drinking water aquifer. During step 2, the *Feasibility Study*, alternative methods for site cleanup were evaluated. The reports completed during the previous steps are available for review in the Administrative Record, at the Base, and at the Oceanside Public Library (see page 11).

This Proposed Plan is step 3 and is based on previous field investigation and reports. The Proposed Plan presents site information to the public, identifies the preferred alternative, and solicits public comments.

After step 3, the DON will review public comments and make a decision regarding the cleanup alternatives. The DON will summarize and respond to public comments in a Responsiveness Summary. They will then document the decision in the *Record of Decision* (ROD), which is step 4. Any cleanup action is in step 5. Once a site achieves remediation objectives, a closure report is written and approved by the regulatory agencies to document that the process is complete.

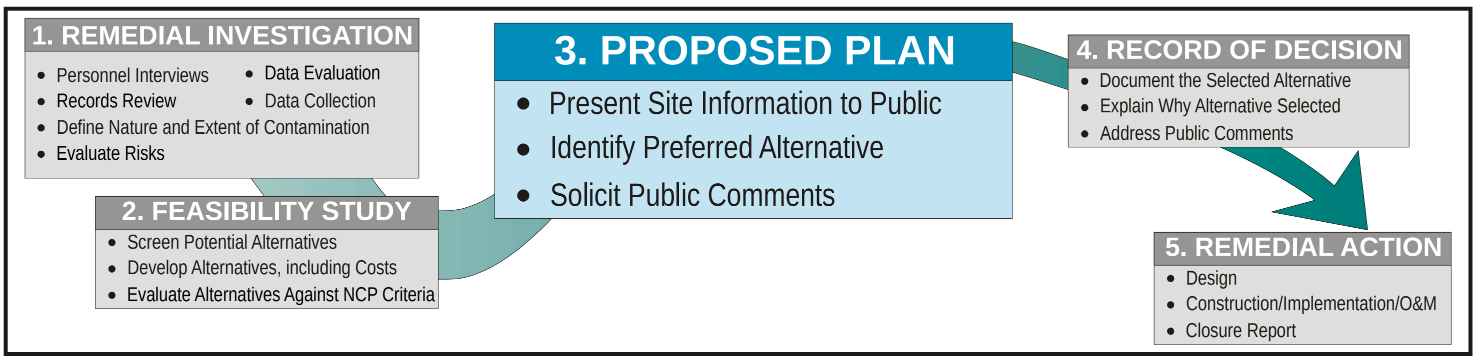


Figure 2: Steps of the CERCLA Process

SITE 1119 REMEDIAL INVESTIGATION

Site 1119 is near the southern boundary of the Base, north of Vandegrift Boulevard (Figure 3). Facilities within this area of the Base include various industrial operations, office buildings, and undeveloped land. The only chemical of concern (COC) found in groundwater above Federal and California *Maximum Contaminant Levels* (MCLs) was trichloroethene (TCE). The site is defined as a plume of TCE in groundwater exceeding the state and federal MCL of 5 micrograms per liter (µg/L). The plume area is approximately 30 acres, and measures approximately 2,500 feet long, 600 feet wide, and approximately 80 feet deep, starting from the group of buildings around Building 2611 and extending toward the southwest, which is the direction of groundwater flow. Building 2611 is one of seven remaining buildings grouped together along railroad tracks (Figure 3).

During World War II and in the years that followed, the area of these buildings served as a support facility adjacent to the rail line. The original group of nine buildings historically was used for storage, maintenance, and administrative facilities.

This site consists only of the contaminated groundwater, not the overlying soils. No contamination was discovered in Site 1119 soils, although the source area will be better defined as part of the remedial action alternatives. Figure 4 shows a conceptual site model in cross-section view illustrating the location of TCE concentrations, geology, and the groundwater flow direction relative to the area features.

Subsurface geology consists primarily of stream-deposited alluvium of the Santa Margarita River watershed, which overlies bedrock. The water table ranges from approximately 8 to 23 feet below ground surface (bgs), and groundwater flows generally toward the southwest, with flow direction following the topography of the Santa Margarita River.

The site is located within the Upper Ysidora groundwater subbasin. There are several Base production wells in the site vicinity, including the closest wells 2602 and 2603, which are approximately 950 feet northwest of the site. Well 26018 is located approximately 100 feet outside of the site boundary, as shown on Figure 3, but was not put into service due to concerns over chemicals in groundwater believed to be from Site 1119. A planned production well, identified as well 26016, is located 275 feet outside of the site boundary, but was never completed as a production well due to concerns over chemicals in groundwater at Site 1119.

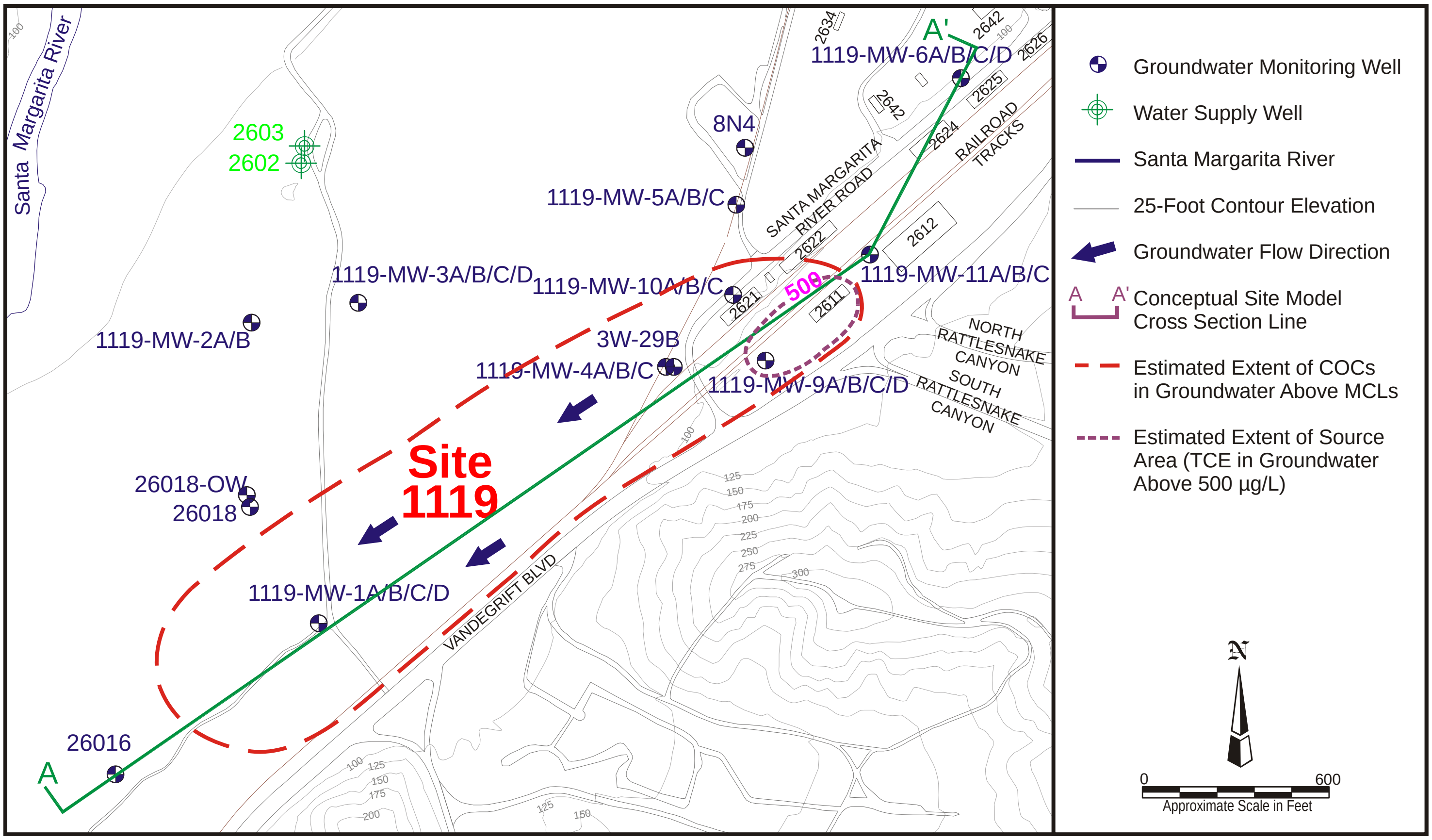


Figure 3: Location of Site 1119

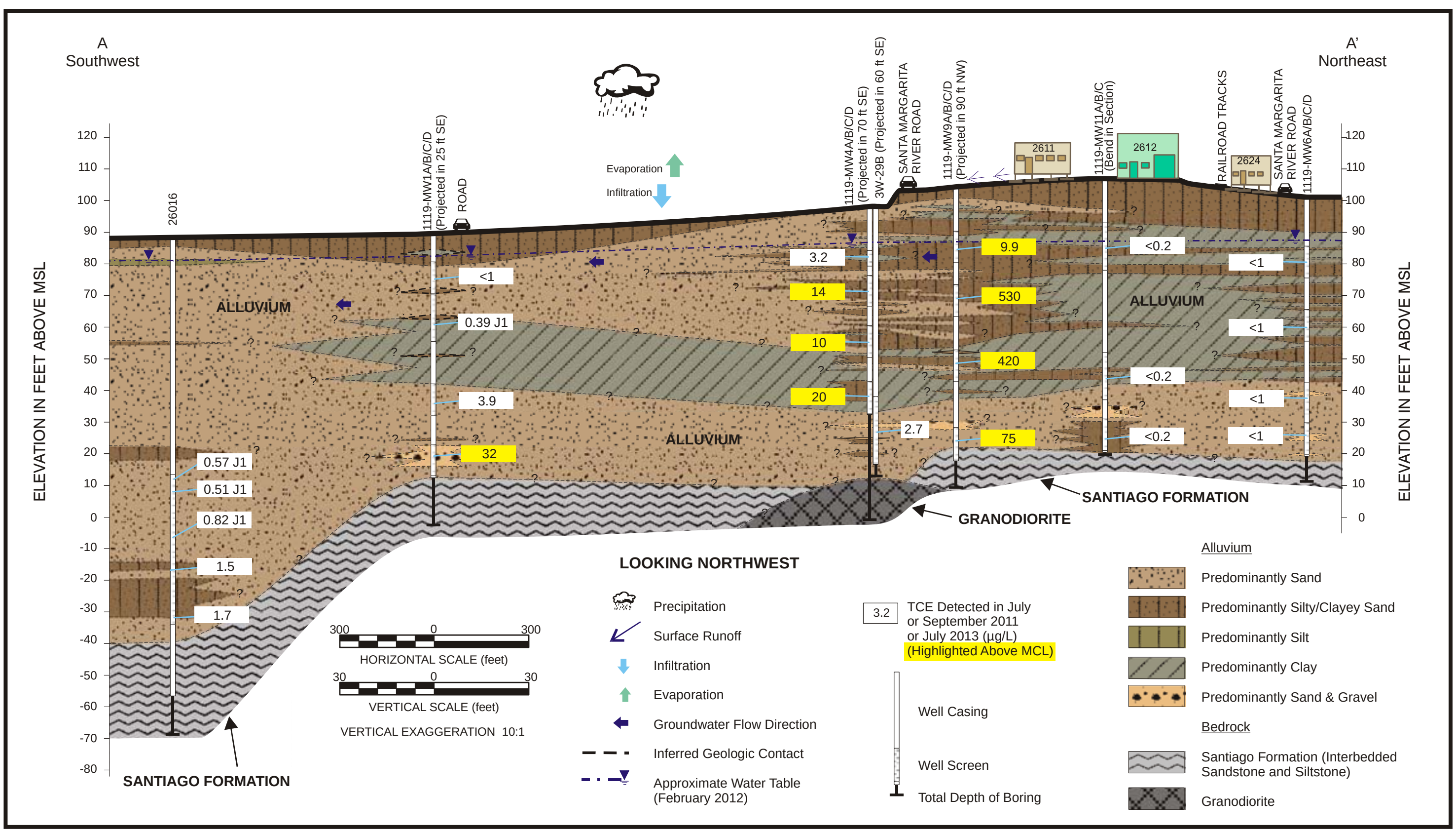


Figure 4: Site 1119 Conceptual Site Model

Investigation results identified *volatile organic compounds* (VOCs) in groundwater as COCs based on the potential risk to human health. The source of these VOCs is from past releases of solvents to the ground during industrial operations, which was common before the enactment of laws in the 1970s that regulated the use and management of such chemicals. Common uses for these chemicals included parts cleaning and paint stripping.

Three phases of investigation were conducted at the site, starting in 2009 when the US Geological Survey conducted a study of contaminants in Wells 26016 and 26018. In 2011, 78 groundwater samples were obtained throughout the groundwater basin. Based on those results, a soil gas survey was conducted and ten additional wells were installed and sampled in 2013.

Of the VOCs detected in groundwater, only TCE was detected above the state and federal MCL. Twenty-three other chemicals were reported in groundwater at concentrations below their state and federal MCLs or California *Notification Levels* (NLs) and *Response Levels* (RLs). The MCLs and RLs are the maximum concentrations permissible in drinking water after treatment. The NLs are concentrations established by the State for chemicals without MCLs at which consumers must be notified when detected in drinking water sources.

VOCs were also detected in soil gas at the site, but at concentrations that were below regulatory screening levels. Because no contaminants were found in site soils, the VOCs in soil gas are likely the result of contaminants in groundwater volatilizing into the vadose zone.

Because the TCE groundwater plume has been recently discovered, there is no long-term monitoring data that would allow for an estimate of contaminant concentration trends over time. Such monitoring would be part of a selected remedy for the site. The highest concentrations of TCE would take a very long time to degrade by natural processes, and it is therefore likely that VOC concentrations in site groundwater will remain above MCLs at Site 1119 indefinitely if left untreated. The area of groundwater contamination above the MCL is shown on Figure 3. The source area of the site has been defined as the area of the plume having TCE concentrations exceeding 500 µg/L. The estimated extent of this area is shown on Figure 3.

RISK ASSESSMENTS

The *human health risk assessment* for this site examined two types of negative or adverse health risk: cancer risk and noncancer hazard.

First, cancer risk is expressed in terms of the probability that an individual or a particular group of individuals would have an increased chance of developing cancer over a lifetime period of 70 years due to exposure to COCs. For example, a risk of 1 in a million means that an exposed person could have an increased likelihood of 1 in a million to develop cancer. If the increased cancer risk posed by a site is greater than 1 in a million, but less than 1 in 10,000, then the site falls within the range that the USEPA refers to as a risk management range. For risks in this range various factors are taken into consideration to determine if remedial action is necessary. If the site risk is greater than 1 in 10,000, then remedial action is generally warranted at a contaminated site.

Second, noncancer health effects are evaluated in terms of a hazard index that determines negative health effects caused by specific chemicals. If the HI is above 1, then there is a possibility that there might be negative health concerns caused by the site and remedial action may be warranted.

The risk assessment found that chemicals in groundwater represent a potential risk to human health based on possible domestic groundwater use. The site is in a groundwater basin that is currently used as a source for drinking water, and it is anticipated that the groundwater in this basin will continue to be used for that purpose in the future. If groundwater with the highest contaminant concentrations of TCE were consumed by people over a lifetime, the estimated cancer risk to human health is greater than 1 in a thousand. However, there is no actual significant risk to people drinking the water from this area because the Base only allows water that meets regulatory standards into the drinking water system. The hazard index for the groundwater exposure pathway was 204, significantly exceeding the threshold value of 1, which indicates that negative noncancer health effects may occur if there were actual exposures.

Based on the soil gas concentrations, the risk assessment found that the inhalation of VOCs that may migrate to indoor air would not pose a significant risk to people inside the buildings. Another approach was also used to estimate vapors that may migrate into indoor air from groundwater, and this method resulted in a potentially significant risk to people inside the buildings. However, the method based on actual soil gas data is considered more valid than an estimation based on groundwater volatilization.

Although the risk assessment found no significant risk to people indoors from the migration of TCE vapors, it should be noted that the existing buildings in the source area have open crawl spaces under the floors, which make the vapor intrusion pathway incomplete. This results in an added level of protection to people working indoors at the site.

The *ecological risk assessment* evaluates the potential for negative effects on plants and animals from exposure to site contaminants. Coordination between the Base and regulatory agency staff ensures that any action taken at the site in accordance with the Base's mission and with agency requirements.

For the types of plants or animals at a site, ecological hazard estimates, or hazard quotients, were computed. If the hazard quotient is greater than 1, then this indicates that the concentrations may pose an unacceptable risk to a particular plant or animal, and the site may need further evaluation and/or remedial action.

The ecological risk assessment determined the only potentially complete exposure pathway for ecological receptors was breathing TCE vapors in underground burrows, because groundwater does not come to the surface and occurs at approximately 7 to 14 feet bgs. Based on calculations using shallow groundwater results, it was determined that the inhalation of volatiles does not represent a risk to burrowing mammals at the site.

It is the DON's current judgment that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

In the Feasibility Study, potential cleanup alternatives were developed and evaluated. The first step in that process involved developing *Remedial Action Objectives (RAOs)*, which are cleanup objectives for the remedial alternatives. The RAOs are specific to the land use, receptors, and contaminant levels at the site. The RAOs are used to determine appropriate site remediation activities. Site-specific RAOs were established to identify and screen alternatives that protect human health and the environment.

The following *Remedial Action Objectives* (RAOs) were developed for the groundwater at Site 1119 to address the protection of human health and the environment:

- Prevent ingestion, dermal contact, and inhalation of vapors from contaminated groundwater containing COCs at concentrations in excess of cleanup standards.
- Preserve and protect the watershed of the lower Santa Margarita River Basin.

Remediation Goals (RGs) were developed to meet the objectives for the site. The RGs are chemical specific concentration goals set for groundwater that are protective of human health and the environment. The RGs were established for the chemicals that pose a significant risk to human health or ecological receptors, which were developed based on regulatory guidance.

The RGs are based on drinking water standards; specifically the more stringent of the federal and state MCLs and the California RLs. The regulatory agencies overseeing this project agreed to the RGs.

CHOOSING A PREFERRED ALTERNATIVE

Following the risk evaluation and establishing cleanup goals for the site, the lead agency develops and analyzes a number of alternative methods to achieve site cleanup, and then chooses a preferred alternative that is considered the best all-around cleanup choice. The cleanup choice is made based on standards that are spelled out in the *National Contingency Plan* (NCP). The NCP requires that each alternative be evaluated against each of nine criteria, which are divided into two threshold criteria, five balancing criteria, and two modifying criteria, as shown in Figure 5. The alternative that is selected must at minimum meet the two threshold criteria. The five balancing criteria are used to balance the alternatives against each other based on their effectiveness, difficulty to implement, and cost. State and community acceptance are factored into a final determination of the preferred alternative. Community concerns will be addressed following the 30-day public comment period on the Proposed Plan.

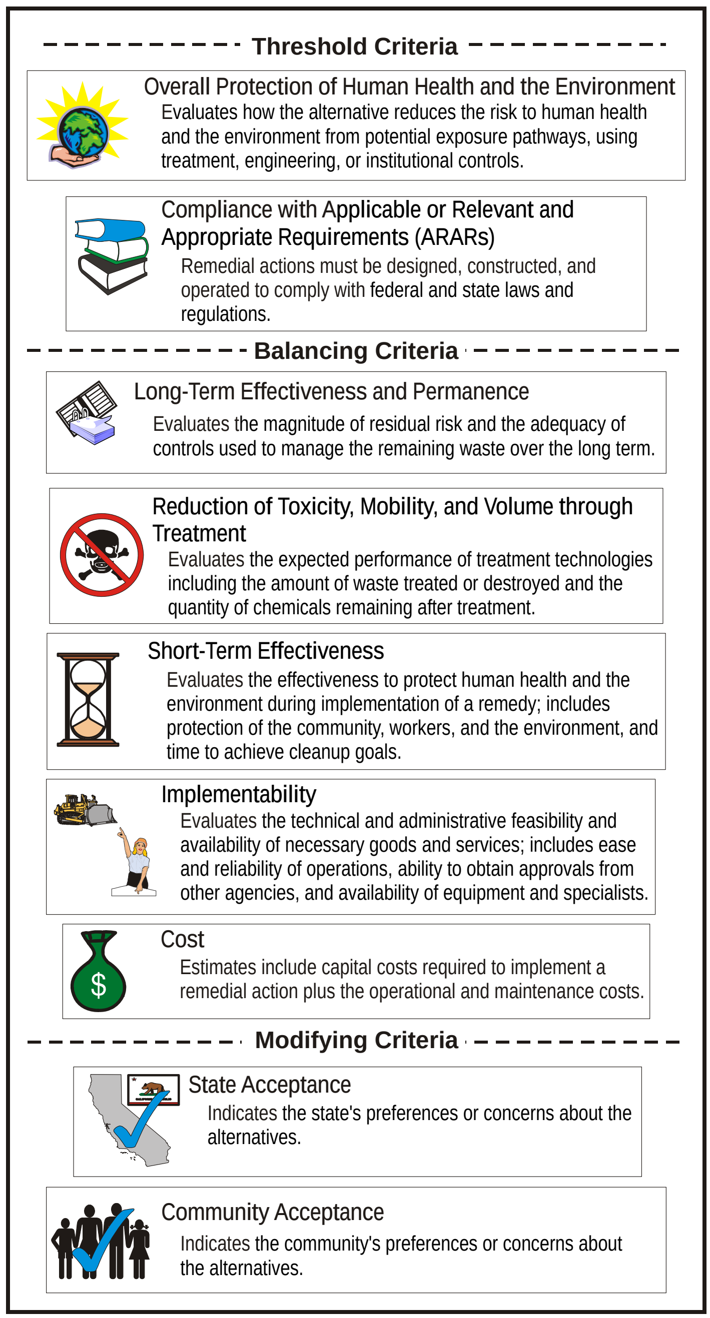


Figure 5: National Contingency Plan Criteria

CLEANUP OPTIONS

Alternatives were developed to lessen or eliminate the risks posed by groundwater at Site 1119. The DON looked at seven possible cleanup options as well as no action. These alternatives are listed in Table 1 and described in the following pages.

The benefit of Alternatives 3 through 7 would be the significant reduction of contaminants in the treated area of the aquifer. With the reductions that would be achieved in the source area, the chemicals detected in the downgradient part of the plume would also then be able to decline over time.

Areas disturbed by implementing any alternative would be restored upon completion of the treatment system construction. A site-specific health and safety plan would be prepared and implemented to address the short-term risks to site workers during implementation of any alternative, such as exposure to dust and contaminated groundwater during field implementation and groundwater monitoring.

EVALUATION OF ALTERNATIVES

Based on the potential risks from the contaminated groundwater, the DON evaluated each alternative against the nine evaluation criteria in the NCP (Figure 5). The results of the evaluation are summarized in Table 1. After a thorough consideration of different technology approaches, the following remedial alternatives were retained for consideration.

Criteria	Alternative							
	1 No Action	**2 Land Use Controls and Long-Term Monitoring**	**3 Source Area Treatment via In Situ Reactive Metals**	**4 Source Area Treatment via In Situ Chemical Oxidation**	**5 Source Area Treatment via In Situ Enhanced Bioremediation**	**6 Source Area Treatment via In Situ Thermal Desorption with Chemical Oxidation**	**7 Source Area Treatment via In Situ Thermal Desorption with Enhanced Bioremediation**	**8 Reactive Barrier Installed via Injection Wells Downgradient of the Source Area**
Threshold Criteria								
Overall Protection of Human Health and the Environment	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Compliance with ARARs	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Balancing Criteria								
Long-Term Effectiveness and Permanence	○	◑	◑ to ●	◑ to ●	◑ to ●	◑ to ●	◑ to ●	◑
Reduction of Toxicity, Mobility, or Volume by Treatment	○	○	◑ to ●	◑ to ●	◑ to ●	◑ to ●	◑ to ●	○ to ◑
Short-Term Effectiveness	Not Applicable	◑	○ to ◑	◑	◑ to ●	◑	◑	○ to ◑
Implementability	Not Applicable	●	○ to ◑	◑	◑ to ●	◑	◑	◑
Total Cost*	$0	$2,875,000	$11,421,000	$7,343,000	$3,580,000	$8,422,000	$4,702,000	$6,302,000
Capital Cost*	$0	$991,000	$10,241,000	$6,168,000	$2,312,000	$7,247,000	$3,435,000	$3,661,000
Operation and Maintenance Cost*	$0	$1,883,000	$1,180,000	$1,174,000	$1,268,000	$1,174,000	$1,268,000	$2,641,000
Modifying Criteria								
State Acceptance	NR	NR	NR	NR	NR	NR	NR	NR
Community Acceptance	NR	NR	NR	NR	NR	NR	NR	NR

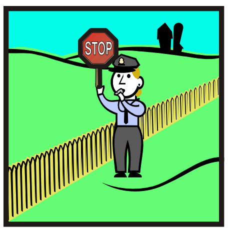
○ Low ◑ Moderate ● High NR = Not Rated

* = cost rounded to nearest 1,000

Table 1: Summary of Criteria Evaluation for Site 1119

Alternative 1: No Action is required to be evaluated under CERCLA and is included only as a point of comparison. Under this option, nothing is done to clean up the groundwater contamination, control land use, or limit contaminant movement. *Natural attenuation* processes would continue to degrade chemicals; however, there would be no groundwater monitoring data collected to document that natural attenuation is occurring or that the plume is not migrating.

This alternative does not protect human health or provide long-term effectiveness and permanence. It does not comply with *Applicable or Relevant and Appropriate Requirements* (ARARs) because chemicals remain in groundwater at concentrations that exceed federal and state requirements. Short-term effectiveness and implementability are not rated because no action is taken. There are no costs for this alternative.



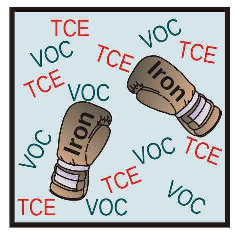
Alternative 2: Land Use Controls and Long-Term Monitoring prevent or limit exposure to hazardous chemicals left in place at a site. *Land use controls* can be physical barriers such as fences or signs or legally binding requirements to prevent groundwater use. This alternative includes implementing land use controls that would ensure that the affected groundwater will not be used while chemicals above RGs are present. Land use controls for this site would be implemented by MCB Camp Pendleton as part of the Base site approval process, which is required for all projects at the Base involving construction, acquisition, or modification. The site approval process involves reviewing all plans for environmental constraints at the Base, including wetlands, sensitive species, and IR sites. This process would ensure that any plans for new wells or buildings at the Base take into account the presence of the plume at Site 1119.

Long-term groundwater monitoring would be used to periodically assess groundwater quality, the extent of contamination, and to a allow a continuing evaluation of the need for additional actions. The source area would be better defined during a design study as part of this remedial alternative. The monitoring program would be used to document the trends in concentrations of contaminants in groundwater.

If Alternatives 3, 4, 5, 6, 7, or 8 are implemented, Alternative 2 would still be required to protect human health and the environment and meet ARARs, because exposure to contaminants is reduced by imposing use restrictions.

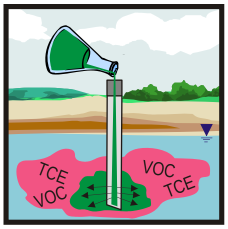
Long-term effectiveness is rated moderate for this alternative because this alternative relies on natural subsurface physical and biological processes to reduce VOC concentrations over time. However, these mechanisms alone may not significantly reduce chemical concentrations in a reasonable time, given the persistence of plumes at the site. Reduction of toxicity is rated low because it does not include active treatment of the contaminated groundwater.

Potential short-term risks to site workers would be associated with the installation of approximately 12 new wells and long-term monitoring of approximately 29 total wells. However, this alternative has a relatively higher environmental impact compared to other alternatives if implemented alone because it is assumed to be implemented for 30 years, which results in increased emissions and energy use due to the long timeframe. Therefore, short-term effectiveness is rated moderate. Limiting groundwater use is rated high for implementability because groundwater monitoring involves common, proven, and reliable methods and practices. The cost is approximately $2,875,000 ($991,000 capital costs and $1,883,000 operation and maintenance [O&M] costs), to implement this alternative for 30 years. As noted above, this alternative is required to be a part of any of the active alternatives (Alternatives 3 through 8) and therefore the cost for Alternative 2 would be added to any active alternative (Alternatives 3 through 8) chosen.



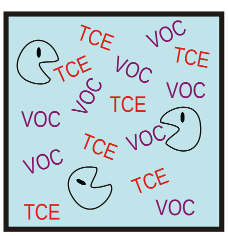
Alternative 3: Source Area Treatment via In Situ Reactive Metals involves the installation and operation of an in situ (in place) remediation system to destroy contamination in the area of groundwater having the highest contaminant concentrations at the site. The system would involve injection of a liquid solution composed of controlled-release carbon, zero valent iron (ZVI) particles, and nutrients designed to stimulate chemical and biological activity that degrade the contaminants in groundwater. ZVI is a reactive form of iron particles that are effective destroying VOCs in groundwater. This alternative includes the installation of 690 injection wells spaced approximately 10 feet apart, which will involve working around existing buildings and utilities. The liquid solution would be injected at high pressure to ensure that the ZVI is distributed adequately throughout the intended treatment zones. Multiple injections and associated monitoring would be conducted for 12 years.

Long-term effectiveness and reduction of toxicity are both rated moderate to high because contaminant reduction would be achieved. However, short-term effectiveness and implementability are rated low to moderate because of the much higher number of injection wells that would be needed relative to other technologies to achieve similar contaminant reduction. This alternative is also less favorable than the others from a sustainability perspective, particularly greenhouse gas emissions, energy use, and use of landfill space for soil and waste material generated during the drilling and installation of monitoring wells. The cost to implement Alternative 3 is approximately $11,421,000($10,241,000 capital costs and $1,180,000 O&M costs).



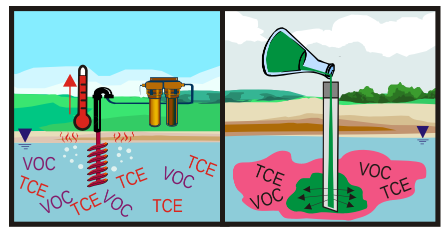
Alternative 4: Source Area Treatment via In Situ Chemical Oxidation involves the installation and operation of an in situ (in place) remediation system to destroy contamination in the area of groundwater having the highest contaminant concentrations at the site. The system would involve injection of chemical oxidants into the subsurface in order to destroy contaminants in groundwater. Chemical oxidants create reactions that can change contaminants into less toxic or harmless compounds. There are various process options for in situ chemical oxidation, and it was determined that the most effective method for this site would be the injection of soluble sodium persulfate with activated iron. This alternative includes the installation of 188 wells spaced approximately 20 feet apart, which will involve working around existing buildings and utilities. Multiple injections and associated monitoring would be conducted for 10 years.

Long-term effectiveness and reduction of toxicity are both rated moderate to high for this alternative because contaminant reduction would be achieved, which also would accelerate the timeframe for achieving remedial objectives. This alternative would require less injection wells than Alternative 3, but still more than other alternatives, therefore short-term effectiveness and implementability are both rated moderate to deliver the oxidation solution into the groundwater. The cost to implement Alternative 4 is approximately $7,343,000 ($6,168,000 capital costs and $1,174,000 O&M costs).



Alternative 5: Source Area Treatment via In Situ Enhanced Bioremediation involves the installation and operation of an in situ (in place) remediation system to destroy contamination in the area of groundwater having the highest contaminant concentrations at the site. The system would involve injection of a mixture of organic materials such as whey, lactate, and soybean oil in order to create the proper chemical conditions that will stimulate microbial activity that will, in turn, degrade the contaminants in groundwater. The injected solution will be designed to maintain neutral pH conditions that will allow the beneficial microbes to remain effective in degrading the contamination. This alternative includes the installation of 58 wells at 29 locations arranged in a series of three injection lines spaced approximately 100 feet apart, which will involve working around existing buildings and utilities. The arrangement of wells in a line perpendicular to groundwater flow will result in three zones through which the source area groundwater will pass and be treated. Multiple injections and associated monitoring would be conducted for 10 years.

Long-term effectiveness and reduction of toxicity are both rated moderate to high for this alternative because contaminant reduction would be achieved, which also would accelerate the timeframe for achieving remedial objectives. This alternative uses significantly less wells than Alternatives 3 or 4, and is more favorable than the others from a sustainability perspective, particularly greenhouse gas emissions, energy use, and use of landfill space for soil and waste material generated during the drilling and installation of monitoring wells. Therefore, short -term effectiveness and implementability are both rated moderate to high to deliver the liquid solution into the groundwater. The cost to implement Alternative 5 is approximately $3,580,000 ($2,312,000 capital costs and $1,268,000 O&M costs).

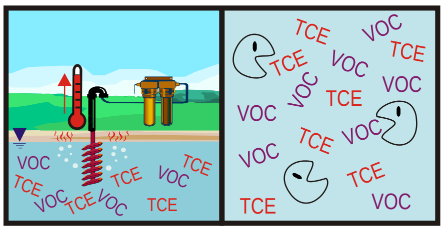


Alternative 6: Source Area Treatment via In Situ Thermal Desorption with Chemical Oxidation involves use of two technologies. Thermal desorption would be used to heat a portion of the groundwater aquifer in the source area to boiling temperatures, which would vaporize the water and contaminants into steam. The extracted groundwater and vapor would then be routed to an above-ground treatment system. Thermal desorption would be applied to the portion of the source area that has the highest contaminant concentrations in shallow groundwater. This alternative includes the installation of 70 treatment wells in an area approximately 50 feet long by 100 feet wide, at a depth of 10 to 30 feet below ground surface The well installation and treatment will involve working around existing buildings and utilities. Treatment, vapor extraction, and monitoring would last less than one year.

This alternative also includes the use of in situ chemical oxidation as described in Alternative 4. Chemical oxidation would be applied to the remaining portion of the source area in deeper groundwater (approximately 350 feet long by 200 feet wide, at a depth of 30 to 50 feet below ground surface), outside of where thermal desorption would be applied. By using thermal treatment in shallow groundwater, the amount of injection wells would be reduced from 188 to 175 wells, and the multiple injections and associated monitoring would be conducted for 10 years.

Long-term effectiveness and reduction of toxicity are rated moderate to high for this alternative because contaminant reduction would be achieved. Although reductions would likely be at a faster rate in shallow groundwater than for

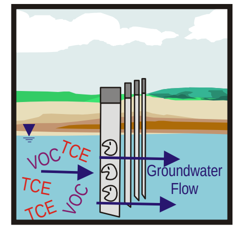
Alternatives 3, 4, or 5, deeper groundwater would still require approximately the same timeframe for Alternatives 3 through 7. Short-term effectiveness and implementability are rated moderate for this alternative because of the need for borings and wells to deliver heat to the subsurface soils and groundwater. The number of thermal and injection wells required also make this alternative less favorable than the others from a sustainability perspective, particularly greenhouse gas emissions, energy use, and use of landfill space for soil and waste material generated during the drilling and installation of monitoring wells. The cost to implement Alternative 6 is approximately $8,422,000 ($7,247,000 capital costs and $1,174,000 O&M costs).



Alternative 7: Source Area Treatment via In Situ Thermal Desorption with Enhanced Bioremediation includes the same in situ thermal desorption for treating shallow groundwater as Alternative 6. Thermal treatment would require 70 treatment wells to cover an area approximately 50 feet long by 100 feet wide, at a depth of 10 to 30 feet below ground surface. However, enhanced bioremediation, as described in Alternative 5, would be applied to deeper groundwater (approximately 350 feet long by 200 feet wide, at a depth of 30 to 50 feet below ground surface). By using thermal treatment in shallow groundwater, the amount of injection wells for the enhanced bioremediation portion of the treatment would be reduced from 29 to 21 wells and would be arranged in a two injection lines spaced approximately 100 feet apart. Multiple injections and associated monitoring would be conducted for 10 years.

Long-term effectiveness and reduction of toxicity are rated moderate to high for this alternative because contaminant reduction would be achieved. Although reductions would likely be at a faster rate in shallow groundwater than for Alternatives 3, 4, or 5, deeper groundwater would still require approximately the same timeframe for Alternatives 3 through 7. This would accelerate the timeframe for achieving remedial objectives.

Short-term effectiveness and implementability are rated moderate for this alternative because of the need for 70 treatment wells to deliver heat to the subsurface soils and groundwater. Drilling 70 thermal wells makes this alternative less favorable than the others from a sustainability perspective, particularly greenhouse gas emissions, energy use, and use of landfill space for disposal of soil. The cost to implement Alternative 7 is approximately $4,702,000 ($3,435,000 capital costs and $1,268,000 O&M costs).



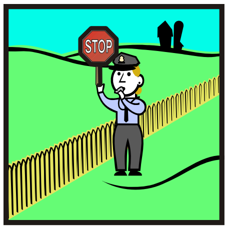
Alternative 8: Reactive Barrier Installed via Injection Wells Downgradient of the Source Area

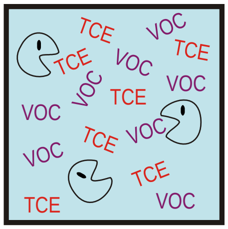
Alternative 8 involves the installation and operation of an in situ bioremediation system designed to destroy contaminants in groundwater that leave the source area and travel in a downgradient direction (southwest). The system would consist of a mixture of organic materials such as whey, lactate, and soybean oil to create the proper chemical conditions to stimulate microbes that degrade contaminants in groundwater. This alternative includes the installation of 36 injection wells (9 locations with 4 depths each) arranged in an line downgradient of the source area, which will involve working around existing buildings and utilities. The reactive barrier would be oriented perpendicular to groundwater flow such that the contaminant plume would flow through the reactive zone. The contaminated groundwater that passes through the reactive barrier would be treated and would emerge from the downgradient side of the barrier. Rather than directly treating the source area, this alternative would serve as a type of "wall" downgradient of the source area intended to prevent downgradient migration of any contaminants that escape from the source area.

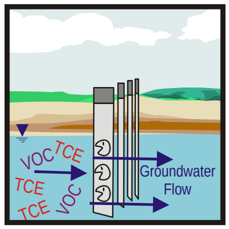
As with Alternative 5, the system would involve injection of a mixture of organic materials such as whey, lactate, and soybean oil in order to create the proper chemical conditions that will stimulate microbial activity that will, in turn, degrade the contaminants in groundwater. The injected solution will be designed to maintain neutral pH conditions that will allow the beneficial microbes to remain effective in degrading the contamination.

Long-term effectiveness is rated moderate for this alternative because although contaminants would be removed from the groundwater downgradient of the source, there would be no treatment conducted in the source area. Reduction of toxicity is rated low to moderate because the source area of the site would remain untreated, unless another alternative were used together with this alternative, such as Alternatives 3, 4, 5, 6, or 7.

This alternative involves installing fewer wells than other alternatives, but this alternative has a relatively higher environmental impact because it is assumed to be implemented for 30 years, which results in increased emissions and energy use due to the long timeframe. Therefore, short-term effectiveness is rated low to moderate. Implementability is also rated moderate because although the technology is widely employed and proven, there are some logistical constraints that would need to be addressed such as working in an area with existing roads, utilities, and structures. The cost to implement Alternative 8 is approximately $6,302,000 ($3,661,000 capital costs and $2,641,000 O&M costs).







RECOMMENDED CLEANUP ALTERNATIVE

The DON recommends combining Alternatives 2, 5, and 8 (Land Use Controls and Long-Term Monitoring, Source Area Treatment via In Situ Enhanced Bioremediation, and Reactive Barrier Installed via Injection Wells Down-gradient of the Source Area). Combining these alternatives achieves substantial risk reduction and addresses RAOs by actively reducing contamination within a reasonable timeframe, and is intended to prevent existing contamination from migrating to Base water supply wells. An evaluation of the NCP criteria for the combined alternatives is presented below.

Overall Protection of Human Health and the Environment

The combined Alternatives 2, 5, and 8 are considered protective of human health and the environment because of the continued restrictions on groundwater use. Alternative 5 would also provide additional protection of human health and the environment by treating the contaminants in the VOC source area, which would clean the groundwater faster.

Compliance with ARARs

Alternative 2 would comply with ARARs, and RGs would be attained in groundwater over time through natural attenuation processes. Alternatives 5 and 8 would comply with ARARs, and RGs would be attained through groundwater treatment.

Long-Term Effectiveness and Permanence

The combined Alternatives 2, 5, and 8 provide the best balance of tradeoffs with respect to the balancing criteria. The long-term effectiveness of Alternative 2 depends on continued enforcement of use restrictions and monitoring. Alternative 5 improves long-term effectiveness and permanence through the direct treatment of VOCs in groundwater. Alternative 8 also improves long-term effectiveness and permanence by removing the chemical mass from the groundwater plume leaving the source area and reducing the plume migration downgradient from the site. Both Alternatives 5 and 8 would accelerate the time frame for attaining the remedial objectives.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternative 2 does not provide active reduction of toxicity, mobility, and volume through treatment of the contaminated groundwater. However, the in situ technologies in Alternatives 5 and 8 would reduce the chemical mass and the volume of contaminated groundwater as treatment proceeds.

Short-Term Effectiveness

Alternatives 2, 5, and 8 pose minimal risk to site workers in the short-term, during groundwater sampling and analysis, but some additional risk during implementation and operation and maintenance (O&M). Potential exposure and protection procedures for workers would be addressed in a site health and safety plan. Alternatives 2 and 8 have a greater adverse environmental impact to implement than Alternative 5, such as greater emissions of greenhouse gasses and energy use. However, this is because of the long duration assumed for these alternatives (30 years), not because of the properties of the technology itself.

Implementability

Alternative 2 is an administrative process already used for activities at the Base and, therefore, is readily implementable. The construction activities associated with Alternatives 5 and 8 are common techniques and are easily implemented.

Cost

The cost to implement Alternative 2 is approximately $2,875,000 and to implement Alternative 8 is approximately $6,302,000. Both of these estimates were based on implementing the remedy for 30 years, which may be reduced by implementing in situ remediation in the source area (Alternative 5) and will be determined through long-term groundwater monitoring. The cost to implement Alternative 5 is approximately $3,580,000. The combined total for Alternatives 2, 5, and 8 would be approximately $12,757,000.

State Acceptance

The USEPA and the State of California concur with the preferred combined Alternatives 2, 5, and 8. Copies of the regulatory comments can be viewed at the information repositories shown on page 11.

Community Acceptance

The public is encouraged to participate and provide comments. Details on the public comment period and the public meeting are provided on page 11.

CONCLUSION

Based on information currently available, the DON recommends the Preferred Alternative because it meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The DON expects the Preferred Alternative to satisfy the statutory requirements of CERCLA by being protective of human health and the environment, complying with ARARs, being cost-effective, using permanent solutions, and satisfying the preference for treatment as a principal element. The Preferred Alternative can change in response to public comment or new information.

The USEPA and State of California have provided comments throughout the CERCLA process for this site, including this Proposed Plan. Those comments have been incorporated, and the agencies concur with the preferred alternatives outlined in this Proposed Plan.

PUBLIC PARTICIPATION

Public input is important in the decision-making process. Nearby residents and interested parties are encouraged to use the comment period to ask questions about the preferred remedial alternative for groundwater at Site 1119. The DON will summarize and respond to public comments in a Responsiveness Summary, which will become part of the official Record of Decision.

This Proposed Plan fulfills public participation requirements of CERCLA Section 117 (a), which specifies that the lead Agency (Navy) must publish a plan outlining remedial alternatives evaluated for each site and identify the preferred alternative. The remedial alternatives were presented in detail in the Site 1119 RI/FS. The RI/FS and other documents referenced in this Proposed Plan are available for public review in the Administrative Record at the Information Repositories.

WHERE YOU CAN FIND THE CLEANUP PLAN AND OTHER DOCUMENTS

Documents relating to the IR program and this Proposed Plan can be found for public review and comment at the following information repositories:

Administrative Record
Naval Facilities Engineering Command Southwest
1220 Pacific Highway (NBSD Bldg. 3519)
San Diego, CA 92132
Monday through Friday 8 am to 4:30 pm
Please call (619) 556-1280 for appointment.

MCB Camp Pendleton Environmental Security Office
Building 22165
MCB Camp Pendleton, CA 92055-5008
Monday through Thursday 9 am to 4 pm
Please contact luis.ledesma@usmc.mil for appointment.

Oceanside Public Library
330 N Coast Hwy, Oceanside, CA 92054
Monday through Wednesday 10 am to 7 pm and Thursday through Saturday 10 am to 6 pm
(760) 435-5600

WHO TO CONTACT FOR MORE INFORMATION

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Naval Facilities Engineering Command Southwest
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Martin Hausladen
USEPA, Region 9
Federal Facilities Branch
75 Hawthorne Street
San Francisco, CA 94105
(415) 972-3007

Tayseer Mahmoud
Dept. of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630
(714) 484-5419

Beatrice Griffey
California Regional Water Quality Control Board
2375 Northside Drive
San Diego, CA 92108
(619) 521-3342

If you have comments on this Proposed Plan or questions about the IR program, contents, or issues discussed in the Proposed Plan, please contact any of the above individuals.

COMMENT PERIOD AND PUBLIC MEETING

The public comment period for this Proposed Plan offers you an opportunity to provide input to the process for controlling contamination and risks at MCB Camp Pendleton. The public comment period will begin on January 27, 2015 and end on February 27, 2015, and a public meeting will be held on February 10, 2015 from 6:00 to 7:00 pm in the Pacific View South Mesa Club, Compass Room (Building 202850). To attend the public meeting, enter the main gate, and turn right at the first stop light, which is Wire Mountain Road. Drive up the hill to the first stop sign and make a left onto San Jacinto Road. The Club is located at the end of the street on the left side.

All interested parties are encouraged to attend the meeting to learn more about the alternatives developed for the site. The meeting will provide an additional opportunity for the public to submit comments on this Proposed Plan to the DON.

RECORD OF DECISION

Following the public comment period, the USEPA, the State of California, and the DON will sign a Record of Decision. It will detail the approach chosen for the site and include the DON’s responses to comments received during the public comment period.

Administrative Record – All documents that have a legal bearing and were used to make decisions on cleanup actions.

ARAR (Applicable or Relevant and Appropriate Requirement) – This is a federal or state law that must be considered in choosing a remedial action. Remedial actions must be designed, constructed, and operated to comply with all ARARs.

CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) – This federal law outlines a series of steps to address the cleanup of hazardous waste disposal and spill sites. CERCLA requires the cleanup, or remediation, of hazardous waste sites created by historical disposal practices. Congress gave the USEPA responsibility for overseeing compliance with this law.

Ecological Risk Assessment – A qualitative or quantitative estimate of the potential impact on local plants and animals exposed to chemicals detected in the environment.

Feasibility Study (FS) – A cost and engineering study that looks at all of the possible cleanup options that are available and evaluates their ability to clean up contamination at a site.

Human Health Risk Assessment – A qualitative or quantitative estimate of the potential impact on the human population exposed to chemicals detected in the environment.

Installation Restoration (IR) – The IR program provides guidance and funding for the investigation and remediation of hazardous waste sites caused by historical disposal activities at military installations.

Land Use Controls – These are measures designed to prevent or limit exposure to hazardous substances left in place at a site, or to assure the effectiveness of a chosen remedy. Land Use Controls can be physical barriers such as fences or signs or legally binding requirements to prevent ground disturbance at a site.

Maximum Contaminant Levels (MCLs) – These standards are set by the USEPA for drinking water quality. An MCL is the legal threshold limit on the amount of a substance that is allowed in public water systems under the Safe Drinking Water Act. The limit is usually expressed in milligrams or micrograms per liter of water.

National Contingency Plan (NCP) – The NCP establishes the regulatory requirements for CERCLA decision documents, such as this Proposed Plan.

Notification Levels (NLs) – These are levels set by the State for chemicals in drinking water that lack MCLs. If the concentration is greater than those set by the State, timely notification of the local governing bodies (e.g., city council, county board of supervisors, or both) is required. In the case of MCB Camp Pendleton, timely notification is also provided to consumers using the annual Consumer Confidence Report.

Natural Attenuation - Reduction in contaminant concentrations in groundwater over time due to naturally occurring physical, chemical, and biological processes, such as biodegradation, dispersion, dilution, adsorption, and volatilization.

Remedial Action Objective (RAO) – Describes what the site cleanup is expected to accomplish.

Remediation Goal (RG) – The acceptable level of a chemical to protect human health and ecological receptors based on regulatory guidance at a specific site. Development of these goals is based on scientific studies and are agreed to by the agencies.

Remedial Investigation (RI) – An environmental study that identifies the nature and extent of contamination at a site.

Response Levels (RLs) – These are levels set by the State for chemicals in drinking water that lack MCLs. If the level is greater than those set by the State, then the drinking water source is removed from service.

Record of Decision (ROD) – A public document that explains which cleanup alternatives will be used at NPL sites. The ROD is based on information and technical analysis generated during the remedial investigation/ feasibility study and consideration of public comments and community concerns.

SARA (Superfund Amendments and Reauthorization Act) – The Superfund Amendments and Reauthorization Act of 1986 reauthorized CERCLA to continue cleanup activities around the country. Several site-specific amendments, definitions clarifications, and technical requirements were added to the legislation, including additional enforcement authorities. Title III of SARA also authorized the Emergency Planning and Community Right-to-Know Act.

Volatile Organic Compounds (VOCs) - refers to organic chemical compounds that have high vapor pressures and easily form vapors at normal temperatures and pressure. The term is generally applied to organic solvents, paint additives, aerosol spray can propellants, fuels, petroleum distillates, dry cleaning products and many other industrial and consumer products ranging from office supplies to building materials. VOCs are also naturally emitted by a number of plants and trees.