

Former NAS Moffett Field Site 27– Northern Channel



Moffett Field, California

April 2004

U.S. NAVY ANNOUNCES PROPOSED PLAN

The U.S. Navy is requesting public comments on proposed actions being considered to clean up Site 27, the Northern Channel, drainage ditches, berms, and an associated debris pile, at the former Naval Air Station (NAS) Moffett Field (also known as Moffett Field). The Navy is making this request in cooperation with the National Aeronautics and Space Administration (NASA), the U.S. Environmental Protection Agency, Region 9 (EPA), and the San Francisco Bay Regional Water Quality Control Board (RWQCB).

This Proposed Plan* announces the Navy's preferred cleanup alternative for the Northern Channel and associated areas, known as Site 27, at the former NAS Moffett Field. The Navy proposes to clean up contaminated sediments and soil at Site 27 by:

- Removing a layer of sediments and soil in areas where contaminants exceed the limits considered safe for birds, which are considered the most sensitive ecological receptors likely to be present at Site 27
- Transporting excavated sediments off site to an appropriate disposal facility
- Conducting confirmation sampling of sediments and surface soil after excavation to ensure that the remedy has been completed according to the guidelines established in a Record of Decision (ROD) and
- Re-establishing and improving the habitat by enhancing the drainage channels for water flow, backfilling excavated

* A glossary of terms and definitions is provided beginning on page 14

— Notice —
**Public
Comment Period**
May 4 to June 4, 2004

Public Meeting
May 20, 2004

**Mountain View
City Council Chambers**
500 Castro Street
6:30 to 7:15 p.m.
Open House
7:30 to 9 p.m.
Public Meeting

areas, and revegetating the disturbed areas where necessary.

This Proposed Plan summarizes the cleanup alternatives evaluated per the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and explains the basis for choosing the preferred alternative.

The Navy, NASA, EPA, and RWQCB participated in the evaluation.

FIGURE 1
LOCATION MAP



THE CERCLA PROCESS

The Navy is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of CERCLA and Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The flowchart to the right illustrates the current status of Site 27 in the CERCLA process.

This Proposed Plan summarizes information detailed in the Remedial Investigation (RI) and Feasibility Study (FS) reports and other documents contained in the administrative record file for this site. The Navy encourages the public to review these documents to gain an understanding of Site 27 and the environmental assessment and investigation activities that have been conducted. The documents are available for public review at the location listed on the last page.

A public comment period will be held from May 4 to June 4, 2004, and public comments can be received via mail, fax, or e-mail throughout the period. A public meeting will be held on May 20, 2004, at the Mountain View City Council Chambers with an open house between 6:30 and 7:15 p.m., followed by the meeting from 7:30 to 9 p.m. Members of the public may submit written and oral comments on this Proposed Plan at the public meeting.

In consultation with the regulatory agencies, the Navy may modify the preferred alternative or select another cleanup remedy based on feedback from the community or on new information. Therefore, the community is strongly encouraged to review and comment. A final decision will not be made until all comments are considered.

FACILITY HISTORY

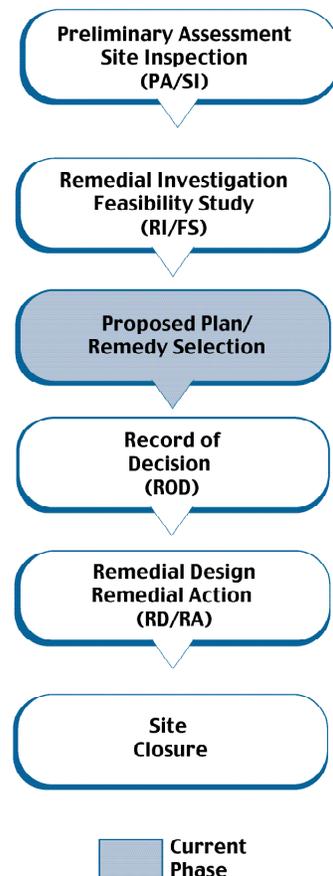
The former NAS Moffett Field is located 35 miles south of San Francisco, 10 miles north of San Jose, and approximately one mile south of San Francisco Bay (see Figure 1, Location Map, on page 1).

The facility encompasses about 2,200 acres in Santa Clara County, California. The Navy operated the facility as NAS Moffett Field from 1933 to 1935 and again from 1942 to 1994. The Army Air Corps operated the facility from 1935 to 1942. The facility initially supported the West Coast dirigibles (blimps) of the Lighter-Than-Air Program and later was used in a variety of aviation-related capacities, which included transport, training, and antisubmarine patrol activities.

NAS Moffett field was closed as an active military base and the majority of the property was transferred to NASA on July 1, 1994. The facility was renamed Moffett Federal Airfield. The military housing on the base was transferred to the U.S. Air Force and subsequently to the U.S. Army.

Moffett Field was placed on the National Priorities List in 1987. A Federal Facilities Agreement (FFA) signed by the Navy, EPA, and the State of California became effective on September 14, 1990. The FFA discusses the responsibilities of the Navy and other parties with respect to investigation of environmental impacts resulting from past and present activities at Moffett Field, and establishes a framework and schedule for appropriate action in response to such impacts. In 1984, the Navy began environmental assessments and investigations at Moffett Field. These activities identified various sites that posed potential risks to human health and the environment.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) PROCESS



SITE DESCRIPTION

This Proposed Plan pertains specifically to Site 27, which includes the Northern Channel, drainage ditches, and associated features located in the northeastern part of Moffett Field (see Figure 2 on the next page). These include:

- Patrol Road and North Patrol Road ditches
- Berms along the Northern Channel
- Marriage Road Ditch
- A debris pile located near the Building 191 lift station

Historically, the Northern Channel has received stormwater runoff from the former NAS Moffett Field and NASA Ames Research Center. Therefore, the Navy and NASA are both responsible for cleanup at the site. The portions of the Northern Channel owned by Lockheed Martin Space Systems Company (Lockheed) and Cargill Salt (Cargill) extend eastward approximately 5,500 feet beyond Moffett Field's boundary and are also included within this Proposed Plan (see Figure 2 on the next page). The areas that make up Site 27 are described below.

Northern Channel – Nearly two miles long, the Northern Channel receives stormwater from the eastern portion of Moffett Field. Water in the channel flows east approximately one mile beyond the Moffett Field boundary into the Lockheed Channel, where it is pumped into Moffett Channel, flows to Guadalupe Slough, and eventually reaches San Francisco Bay. The channel provides brackish surface water habitat of moderate value to wildlife. The bank slopes are partially eroded and support a moderate amount of shrubs. Wildlife surveys have detected the Western Pond Turtle, several species of plants, and a wide variety of shore birds and waterfowl in the area.

Marriage Road Ditch – Located east of the runways, Marriage Road Ditch divides the Moffett Field golf course. The ditch receives runoff year-round and drains into the North Patrol Road Ditch. The ditch provides habitat for insects, worms, snails, and the Western Pond Turtle. Several species of plants grow in and along the sides of the ditch.

Patrol Road Ditch – Patrol Road Ditch (also known as the East Patrol Road Ditch) is a surface drainage that runs 2,100 feet along the eastern boundary of Moffett Field. This ditch provides both open water and upland habitats. During the wet season, the northern end of the ditch provides open water and emergent vegetation. During the dry season, the southern end consists of habitat similar to upland areas. Several species of birds have been identified in the Patrol Road Ditch.

North Patrol Road Ditch – This ditch runs 4,300 feet along the North Patrol Road, parallel and south of the Northern Channel. The western portion of the ditch is lined with concrete and generally contains water year-round. It carries surface water runoff from the Marriage Road Ditch, Patrol Road Ditch, and the golf course west to the Building 191 lift station, where it is pumped into the Northern Channel. The ditch has defined banks made of fill material and emergent vegetation, but makes poor wetland habitat. Species observed here include ducks, doves, and squirrels. Burrowing owls use the habitat provided by the berm that separates the ditch from the Northern Channel.

Debris Pile – The debris pile is located north of the Building 191 lift station at the west end of the Northern Channel, between the north bank of the channel and south bank of the U.S. Fish and Wildlife Service (USFWS) ponds, formerly Cargill evaporation ponds. The pile consists of about 10,000 cubic yards of dredged sediments from the Northern Channel, construction debris, and riprap such as broken concrete, asphalt, and other debris left from the 1950s that may have been used to stabilize and prevent erosion of the berm on the west end of the Northern Channel.

Ownership of Site 27 is divided between NASA, Lockheed, and Cargill. Currently, actual property boundaries are being re-established in the field to clarify exact locations. Additional interested parties based on their proximity and/or use of the Northern Channel and the associated berms include the USFWS and the city of Sunnyvale. In 2003, USFWS purchased the saltwater evaporation ponds adjacent to Site 27 from Cargill. The city of Sunnyvale owns ponds and a public-owned treatment works facility located near the eastern end of the Northern Channel, and also leases a portion of the berms for hiking and biking trails.

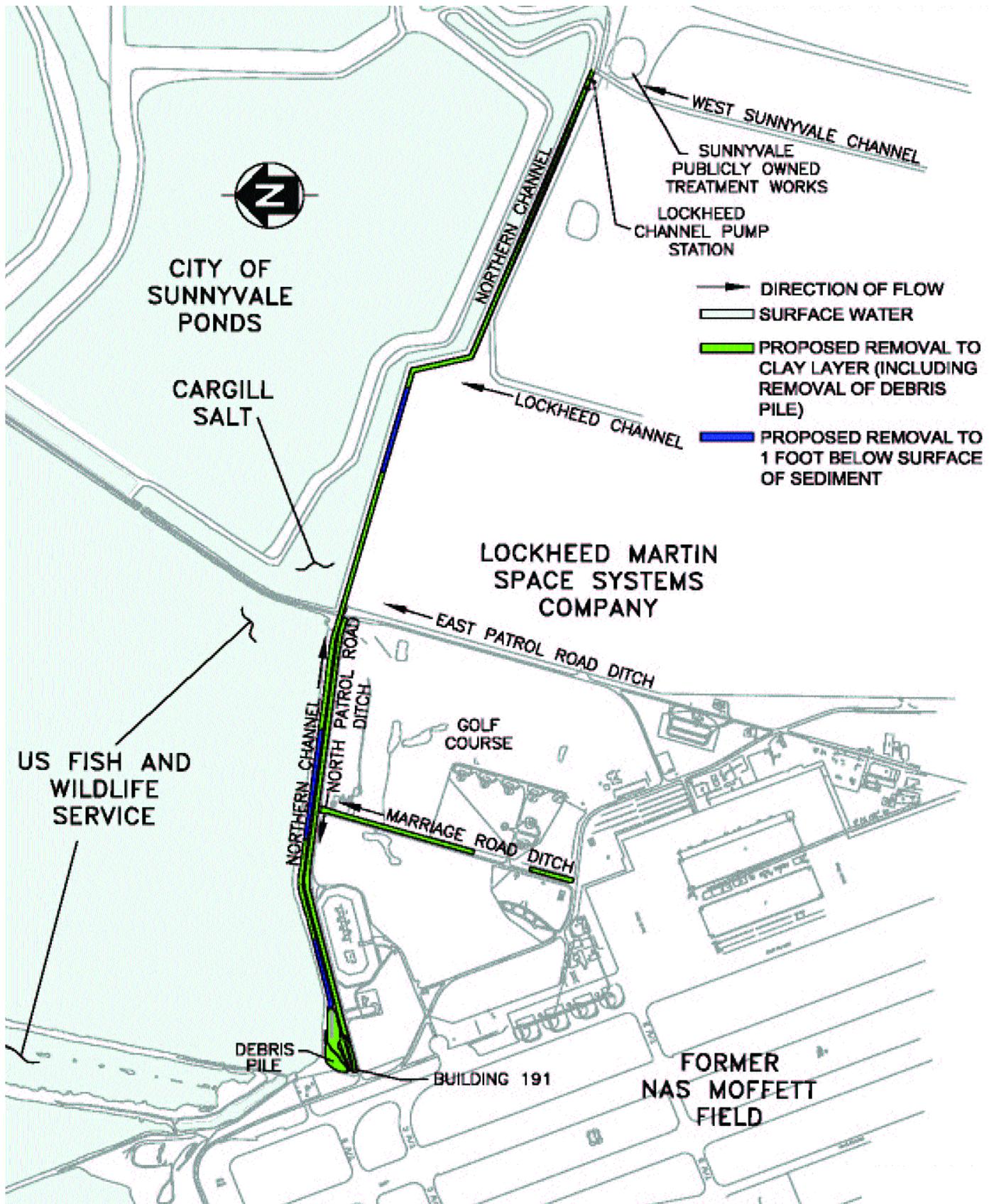


FIGURE 2
SITE PLAN

REMEDIAL INVESTIGATION SUMMARY

From 1995 to 2002, the Navy conducted a series of environmental studies, including a Station-Wide Ecological Risk Assessment, in conjunction with NASA, EPA, and RWQCB. During these investigations, the ecology and the nature and extent of contamination at Site 27 were evaluated. Preliminary ecological investigations showed that various types of plants and animals common to wetland habitats populate the Northern Channel, associated drainage ditches, and the debris pile. These include salt-tolerant plants, waterfowl, shorebirds, the Western Pond Turtle, rodents, and various types of invertebrates (insects, worms, etc.).

To investigate the nature and extent of contamination, sediment and soil samples were taken. Surface water samples were also collected at different times at many of the sediment sampling locations. Samples were analyzed for a variety of chemicals of potential concern, including polychlorinated biphenyls (PCBs), organochlorine pesticides, metals, volatile organic compounds, semivolatile organic compounds, and total petroleum hydrocarbons. The investigations found chemicals including PCBs, pesticides, and metals in sediment samples from the Northern Channel at levels that require cleanup. The highest concentrations of chemicals were generally beneath the top 3 inches of sediment. In the deeper clay layer the levels of chemicals were much lower and did not exceed cleanup levels.

Chemical levels found in surface water samples for the site were generally acceptable. Additional studies were conducted that involved collecting fish and plants, as well as organisms from within the Northern Channel sediments. PCBs were detected in the organisms collected from within the sediments, and PCBs, pesticides, and metals were detected at low levels in most fish and in some plant tissue samples collected throughout the Northern Channel.

The Marriage Road Ditch, East Patrol Road Ditch, and North Patrol Road Ditch areas of Site 27 were systematically sampled in May 2002 to characterize the concentrations of chemicals in sediments and soil. Samples were analyzed for PCBs, pesticides, metals, and total organic carbon. Surface water samples were also collected and analyzed for PCBs, pesticides, total and dissolved metals, particulate organic carbon, and dissolved organic carbon.

PCBs were detected above cleanup levels in the upper sediment layers and soil of the Marriage Road Ditch and in the North Patrol Road Ditch. Concentrations of PCBs in the deeper clay layer samples from these areas were below the cleanup levels for total PCBs. Pesticides and metals were detected above the cleanup levels in the Marriage Road Ditch, but generally below cleanup levels in the other two ditches.

PCBs and pesticides were not detected in any surface water samples from the Marriage Road Ditch, East Patrol Road Ditch, or the North Patrol Road Ditch. A few metals were detected in surface water samples from the three ditches at levels slightly above EPA ambient water quality criteria values for freshwater.

Soil samples were collected along the entire length of the berm on the northern side of the Northern Channel and from the Building 191 lift station to the Fuel Pier Bridge along the berm on the south side. The remainder of the southern berm running to the east (Lockheed berm) was not sampled at this time. All samples were analyzed for PCBs, pesticides, and metals. PCBs, pesticides, and metals were detected at concentrations above cleanup levels at the western end of the Northern Channel and from the debris pile. While soil samples in the Lockheed berm area are no longer necessary for the remedial investigation at the Northern Channel, both the EPA and the RWQCB require the Navy to take soil samples as part of the remedial design and remedial action for the Northern Channel.

RISK SUMMARY

Chemical data was used to assess potential risks to both humans and ecological receptors (plants and animals). Site-specific human-health and ecological risk assessments were conducted and the following items were identified:

- Potential chemicals of concern (chemicals present at the site that may contribute to the majority of risk)
- Potential human and ecological receptors (who and what might be at risk)
- Exposure pathways (how the chemicals could reach human or ecological receptors)
- Potential health impacts (how the receptors might be affected if the chemicals reached them)

The risk evaluation concluded that there were areas within Site 27 that may pose a risk to human health and to ecological receptors. However, the cleanup requirements will be based on ecological receptors. The risks to ecological receptors were identified as the driving risks for the site and are, therefore, the focus of the cleanup action. Cleanup to ecological levels is also protective of human health.

Human-Health Risk

To be protective of human health, welfare, and the environment, conservative methods for estimating the potential human-health risks caused by exposure to chemicals are used. Risks are calculated based on the types and concentrations of chemicals present and on possible exposure pathways to these chemicals. Because Site 27 is not used for occupational or residential use, only a recreational risk scenario (hiking, canoeing, bird watching) was considered.

In accordance with EPA protocols, the human-health risk assessment for recreational receptors included evaluation of both carcinogenic (cancer-causing) and noncarcinogenic risks. Results from the human-health risk assessment indicated that risks associated with recreational use of Site 27 were within the range considered acceptable by EPA. The cleanup goals established to protect ecological receptors are expected to further reduce risks to recreational users.

Ecological Risks

Potential risks to ecological receptors were based on exposure to the chemical concentrations at the site and the reasonably anticipated future land use for stormwater drainage and management. The ecological risk assessment included evaluation of exposure to both surface water and sediments.

For the surface water evaluation, risks were calculated using EPA methodology, as well as laboratory tests. In the laboratory tests, laboratory organisms (algae, crustaceans, and fish) were exposed to surface water samples from the site and analyzed to see how they were affected. Based on the EPA methodology and the lab tests, it was concluded that surface water does not pose a risk to ecological receptors at Site 27.

For the sediments, the most sensitive ecological receptors are generally considered to be shore birds. Therefore, sediment risks were evaluated based on the Great Blue Heron and the Black-necked Stilt, the most sensitive receptors identified at the site. Chemical levels that would be protective of these indicator species would also be protective of other ecological receptors. The Western Pond Turtle could not be evaluated as a potential receptor because there is limited laboratory and research data available to evaluate the potential chemical effects.

The evaluation indicated that there is a potential for risks to ecological receptors, including the Great Blue Heron and the Black-necked Stilt, due to exposure to chemicals in sediments. The chemicals identified as being present in the sediments at levels that contributed to the majority of risk included total PCBs, cadmium, lead, mercury, selenium, silver, zinc, chlordane, and total DDT. Total DDT refers to a mixture of the chemical forms of DDT, as well as several breakdown products.

FEASIBILITY STUDY

The Final Northern Channel FS Report was prepared in November 2003. The remedial action objectives, or cleanup goals, and the four remedial alternatives, including two sub-alternatives for Alternatives 3 and 4, identified for the site were presented in the FS and are summarized below. The cleanup alternatives were evaluated against seven of the nine criteria as required by CERCLA and as specified in the NCP. The final two criteria, state acceptance and community acceptance will be evaluated after the public comment period and addressed in the ROD. A description of the nine evaluation criteria is provided in Table 1 (see next page). The following section provides a summary of the cleanup goals and the cleanup alternatives that were evaluated for their ability to meet the cleanup goals and address impacted sediments and soil at Site 27.

REMEDIAL ACTION OBJECTIVES (CLEANUP GOALS)

The overall cleanup goal of this response action is to reduce the concentrations of total PCBs, total DDT, chlordane, cadmium, lead, mercury, selenium, and zinc in shallow sediments to levels that are protective of sensitive ecological receptors. These levels will also be protective of human health. The Remedial Action Objectives (RAOs) are as follows:

- Total PCBs: 350 parts per billion (ppb)
- Total DDT: 64.8 ppb
- Total chlordane: 931 ppb
- Cadmium: 184 parts per million (ppm)
- Lead: 173 ppm
- Mercury: 1.52 ppm
- Selenium: 926 ppb
- Silver: 13.7 ppm
- Zinc: 720 ppm

TABLE 1. Superfund Criteria for Remedial Alternatives

The Navy uses the nine criteria identified in the CERCLA process to evaluate alternatives for cleaning up a hazardous waste site. The nine criteria are as follows:

1. Overall Protection of Human Health and the Environment

determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

3. Long-term Effectiveness and Permanence

considers the ability of an alternative to maintain protection of human health and the environment over time at the site.

4. Short-term Effectiveness

considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.

5. Reduction of Toxicity, Mobility, or Volume through Treatment

evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

6. Implementability

considers the technical and administrative feasibility of implementing the alternative, including factors such as relative availability of equipment and labor.

7. Cost

includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

8. State Acceptance

considers whether the State agrees with the Navy's analysis and recommendations, as described in the RI/FS and Proposed Plan (this criterion is evaluated after receiving agency comments on this Proposed Plan).

9. Community Acceptance

considers whether the local community agrees with the Navy's analysis and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance (this criterion is evaluated after receiving public comments on this Proposed Plan).

In order to achieve RAOs, remediation of either the sediments and/or soil will take place in the following areas (see Figure 2 on page 4):

- Sediments throughout the length of the Northern Channel, but only to that depth where the sediment and clay layer meet
- Sediments from the entire length of the North Patrol Road Ditch, but only down to the clay layer or concrete lining along the western portion of the ditch
- Most of the Marriage Road Ditch, but only down to the clay layer
- The Northern Channel berms on both sides of Building 191 (at the west end of the Northern Channel), including the debris pile on the northern berm

DESCRIPTION OF CLEANUP ALTERNATIVES

All possible remedial options were considered and the reasonable options were refined into the four alternatives presented in the FS. The four alternatives were evaluated using seven of the nine criteria as required by CERCLA and as specified in the NCP. The final two criteria, state acceptance and community acceptance, will be evaluated after the public comment period and addressed in the ROD. Each of these alternatives is summarized below in Table 2.

TABLE 2. Summary of Cleanup Alternatives for Site 27, Northern Channel and Associated Areas

RI/FS Designation	Description
Alternative 1	No action.
Alternative 2	Removing impacted sediments, soil and the debris pile, dewatering sediment, transporting excavated sediments and soil and debris off site for disposal, and re-establishing habitat.
Alternative 3A	Removing impacted sediments, soil and the debris pile, treating excavated material through bioremediation and stabilization, transporting treated material off site for disposal, and re-establishing habitat.
Alternative 3B	Removing impacted sediments, soil and the debris pile, treating excavated material through stabilization, transporting treated material off site for disposal, and re-establishing habitat.
Alternative 4A	Capping impacted sediments, soil and the debris pile in place, enacting institutional controls to maintain the cap, re-establishing habitat, and conducting a five-year review to ensure the remedy is functioning as intended and remains protective of human health and the environment.
Alternative 4B	Capping a portion of the impacted soil and the debris pile, excavating a portion of the impacted sediments, transporting excavated material off site for disposal, enacting institutional controls to maintain the cap, re-establishing habitat, and conducting a five-year review to ensure the remedy is functioning as intended and remains protective of human health and the environment.

Alternative 1 — No Action

Estimated Capital Cost: \$0

Estimated Total Operations & Maintenance (O&M) Cost: \$0

Estimated 30-Year Total Cost: \$0

Estimated Time to Complete Remediation: Not applicable

Under Alternative 1, no cleanup action or monitoring would be conducted. Regulations governing CERCLA require that the “no action” alternative be evaluated to establish a baseline for comparison with other alternatives involving cleanup action. Under Alternative 1, the site would be left in its current condition and there would be no associated costs.

Alternative 2 — Excavation and Off-Site Disposal (Preferred Alternative)

Estimated Capital Cost: \$6,705,100

Estimated Total O&M Cost: \$0

Estimated 30-Year Total Cost: \$6,705,100

Estimated Time to Complete Remediation: 7 months

Alternative 2 would involve excavation and off-site disposal of contaminated sediments from the Northern Channel and drainage ditches, and contaminated soil from the berm and the debris pile where chemical levels are higher than cleanup goals. No treatment of the sediments or soil would be conducted before disposal. Areas that may require excavation are shown in Figure 2 on page 4. The approximate total volume of sediments and soil to be excavated is 64,113 cubic yards, which would be disposed of properly in an appropriate landfill.

Before excavation, a complete biological assessment of the area would be completed to identify threatened and/or endangered species, and appropriate measures would be taken to minimize impact. A Stormwater Pollution Prevention Plan (SWPPP) specific to the construction activities would be developed before cleanup begins. Water would be diverted, the channel and ditches would be dewatered, and the contaminated sediments would be excavated.

Following excavation, samples would be collected to confirm that the impacted sediments and soil have been removed and that cleanup goals have been met. Excavated sediments and soil would be tested, transported, and disposed of off site at an appropriately permitted facility.

All sediments would be dewatered, as required, prior to transport off site utilizing best management practices to minimize impacts to the area. Sediments would be placed on an elevated platform inside a bermed and lined containment cell that would allow the sediments to drain. The drained liquid would be transferred into appropriate storage containers, sampled, and disposed of as required by law.

Once the excavation is complete, habitat would be re-established where necessary. Clean soil brought on site as backfill would be carefully selected to be similar to the existing soil. Efforts would be made to obtain soil that was generally free from noxious weeds. The clean backfill would be transported in trucks in accordance with a transportation plan to be developed as part of the cleanup design. Wetland plant species would then be reintroduced, where necessary, based on a revegetation plan that will be prepared. A trained wetlands biologist would be present to monitor all on site construction activities.

This work would also require that NASA continue use of an SWPPP. NASA currently conducts stormwater sampling under a National Pollutant Discharge Elimination System (NPDES) permit and uses best management practices to control stormwater that enters the Northern Channel. These measures would help ensure that the cleanup remains effective and the habitat remains suitable for birds, turtles, and other wildlife.

Alternative 3 — Excavation, Ex-Situ Bioremediation and/or Stabilization, and Off-Site Disposal

Alternative 3 includes two options:

- Alternative 3A would involve excavation of contaminated sediments and soil above the cleanup goals, treatment using ex-situ bioremediation and stabilization, and off-site disposal.
- Alternative 3B would involve excavation of contaminated sediments and soil above the cleanup goals, treatment using stabilization only, and off-site disposal.

Estimated Capital Cost:	3A: \$6,496,500	3B: \$6,339,400
Estimated Total O&M Cost:	3A: \$0	3B: \$0
Estimated 30-Year Total Cost:	3A: \$6,496,500	3B: \$6,339,400
Estimated Time to Complete Remediation:	3A: 9 months	3B: 7 months

Alternative 3 would involve excavation, treatment, and off-site disposal of contaminated sediments from the Northern Channel and drainage ditches and contaminated soil from the berm and the debris pile where chemical levels exceed cleanup goals. Water would be diverted, the channel and ditches would be dewatered, and the contaminated sediments would be excavated in the same manner as for Alternative 2. The excavated material would then be treated by one or two different treatment options depending on the chemical levels in the material.

After treatment the sediments and soil would be disposed of in an appropriate landfill. An estimated 64,113 cubic yards of sediments and soil would be removed from Site 27.

Before excavation, the area would be evaluated for threatened and/or endangered species and appropriate measures would be taken to minimize the impact. Samples collected after excavation would be used to confirm that the impacted sediments and soil have been removed and that cleanup goals have been met. An SWPPP specific to the construction activities would be developed before cleanup begins.

Some sediments and soil would be treated biologically in a temporary on-site treatment unit using naturally occurring microorganisms. These organisms "eat" PCBs and DDT and would reduce concentrations. However, biological treatment would not lower metal concentrations. Therefore, following the biological treatment of sediments and soil, as required, sediments/soil containing metals would be stabilized.

Stabilization would involve the addition and mixing of phosphate-based materials to the excavated sediments/soil. These additives fixate the metals to prevent them from leaching from the sediments/soil. Following these processes, the sediments/soil would be tested to determine appropriate off-site disposal locations.

Once the excavation is complete, habitat would be re-established where necessary. Clean soil brought in as backfill would be carefully selected to be similar to the existing soil. Efforts would be made to obtain soil that was generally free from noxious weeds. The clean backfill would be transported in trucks in accordance with a transportation plan to be developed as part of the cleanup design. Wetland plant species would then be reintroduced, where necessary, based on a revegetation plan that will be prepared. A trained wetlands biologist would be present to monitor all on-site construction activities. This work would also require that NASA continue to implement an SWPPP.

Alternative 4 — Placement of a Concrete Cap and Geomembrane Cover (4A) or Placement of a Geosynthetic Clay Liner, and Excavation (4B)

Alternative 4 includes two options:

- Alternative 4A involves placement of a concrete cap and geomembrane cover over impacted sediments (in the Northern Channel and drainage ditches) and soil (in the berm and debris pile).
- Alternative 4B involves excavation and off-site disposal of impacted sediments (in the Northern Channel and ditches) and placement of a geosynthetic clay liner (GCL) over impacted soil (in the berm and debris pile) above the cleanup goals.

Estimated Capital Cost: 4A: \$9,037,000 4B: \$6,116,000

Estimated Total O&M Cost: 4A: \$288,000 4B: \$212,000

(This includes costs for monitoring institutional controls, cap maintenance, and preparation of a 5-year review every five years that the waste remains on site.)

Estimated 30-Year Total Cost: 4A: \$9,325,000 4B: \$6,328,000

Estimated Time to Complete Remediation: 4A: 3 months 4B: 7 months

Alternative 4A involves construction and placement of a 4-inch-thick concrete cap along the bottom of the Northern Channel and drainage ditches. This could be conducted without dewatering the channels. However, roads on top of the berms would be constructed to support heavy equipment. The concrete would be placed so as to minimize the opportunity for the concrete cap to slide down the slopes. After the cap is completed, institutional controls would be employed to limit activities (such as dredging of the channel or ditches) that might impair the integrity of the cap.

Alternative 4B involves capping the impacted soil above cleanup goals along the Northern Channel berm and within the debris pile using a GCL, as well as excavating and disposing the impacted sediments above cleanup goals from the Northern Channel and the associated drainage ditches. The total volume of sediments and soil to be excavated would be about 53,525 cubic yards (less than options 2 and 3, because soil from the berm and debris pile, about 11,000 cubic yards, would not be excavated). Excavated sediments and soil will be disposed of properly in an appropriate landfill. Following excavation, samples would be collected to ensure proper disposal and to confirm that cleanup goals have been met.

An SWPPP specific to the construction activities would be developed prior to implementation of the remedy. Before construction, the area would be evaluated for threatened and/or endangered species, and appropriate measures would be taken to minimize the impact. Following construction, the habitat would be re-established, and wetland plant species would then be reintroduced, where necessary, based on a revegetation plan that will be prepared. A trained wetlands biologist would be present to monitor all on-site construction activities. This work would also require that NASA continue to implement an SWPPP.

After the cap is completed, institutional controls would be developed to limit activities that might impair the integrity of the cap. A 5-year review process would be used to address performance of the remedy, including maintenance, monitoring, and evaluation. The review would focus on assessing whether the remedy is continuing to protect human health and the environment and is functioning as intended. A review would be conducted every five years as long as the waste remains on site.

EVALUATION OF ALTERNATIVES

As specified in the NCP, nine criteria will be used to select the final cleanup remedy (see Table 1). This section compares the relative performance of each alternative against seven of the nine criteria and the other alternatives under consideration (see Table 3 on page 12). The other two criteria, state and community acceptance, will be evaluated after the public comment period and then addressed in the ROD. For this reason, the Navy encourages the public to comment on all alternatives. The “Detailed Analysis of Alternatives” can be found in the final FS report and other site documents in the administrative record file and information repository (see last page for location).

1. Overall Protection of Human Health and the Environment

Alternative 1 (No Action) would not protect human health and the environment because impacted sediments and soil would remain in place and the potential for exposure would not be reduced. For this reason, Alternative 1 was not considered further.

Alternatives 2, 3, and 4 would all protect human health and the environment because they remove (or isolate) the contaminants and eliminate the potential for direct contact with the contamination. Removal of sediments and soil is ecologically protective based on the general reduction in chemical concentrations with depth and the elimination of potential ecological exposure pathways. These alternatives would meet the cleanup goals identified for the site; that is, each would limit the exposure of ecological receptors to impacted sediments and soil by reducing or isolating the chemicals in shallow sediments and soil to protective levels. Alternatives 2, 3, and 4 are therefore considered acceptable in the overall protection of human health and the environment.

TABLE 3. Comparative Evaluation of the Cleanup Alternatives

Evaluation Criteria	Alt 1 No Action	Alt 2 Excavation and Off-Site Disposal	Alt 3A Excavation, Ex-Situ Bioremediation/ Stabilization, and Disposal	Alt 3B Excavation, Stabilization, and Disposal	Alt 4A Concrete Cap and Geomembrane Cover	Alt 4B Geosynthetic Clay Liner, Excavation, and Disposal
Overall Protection of Human Health and the Environment	Not Protective	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
Compliance with ARARs	Not Evaluated	Most Favorable	Acceptable	Acceptable	Most Favorable	Most Favorable
Long-Term Effectiveness and Permanence	Not Evaluated	Most Favorable	Most Favorable	Most Favorable	Least Favorable	Acceptable
Short-Term Effectiveness	Not Evaluated	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
Reduction of Toxicity, Mobility, or Volume through Treatment	Not Evaluated	Acceptable	Most Favorable	Acceptable	Least Favorable	Acceptable
Implementability	Not Evaluated	Most Favorable	Acceptable	Acceptable	Least Favorable	Acceptable
Cost	Not Evaluated	Acceptable	Acceptable	Acceptable	Least Favorable	Most Favorable
State AcceptanceTo be evaluated after the Public Comment Period					
Community AcceptanceTo be evaluated after the Public Comment Period					

2. Compliance with ARARs

Applicable or relevant and appropriate requirements (ARARs) of federal and state laws and regulations were evaluated for each alternative, except Alternative 1, No Action. As presented below, Alternatives 2, 3, and 4 comply with ARARs.

In designing excavation activities for Alternatives 2, 3, and 4, the substantive requirements of the Rivers and Harbors Act, the Coastal Zone Management Act, the federal Endangered Species Act, the California Endangered Species Act, the Toxic Substances Control Act (TSCA), the Clean Water Act, the National Historic Preservation Act, and the California Fish and Game Code were considered. Best management practices would be used to prevent construction pollutants from contacting stormwater and to minimize erosion products moving off site in accordance with the substantive requirements of State Water Resources Control Board Order 97-08 and Title 40 of the Code of Federal Regulations (CFR), Parts 122, 123, and 124. NPDES permit requirements may also be applicable to the dewatering and subsequent discharge of water from the Northern Channel and the drainage ditches prior to excavation activities proposed in Alternatives 2, 3, and 4B. The channel and drainage ditch excavation and capping activities proposed in the three alternatives would also need to be conducted in accordance with the Clean Water Act, Section 404 provisions, which regulate work in wetland areas.

Appropriate controls would also be taken to control dust during excavation in accordance with Bay Area Air Quality Management District Regulation 6-301, 6-302, and 6-305. Once excavated, the sediments and soil would be sampled and analyzed to evaluate whether the material should be managed as a TSCA PCB remediation waste and/or as hazardous waste pursuant to California Code of Regulation (CCR) Title 22, Section 66261-66268, and CCR Title 23, Section 2521, or as a designated waste as defined in CCR Title 27, Section 20210. For materials intended for off-site disposal under Alternatives 2, 3, and 4, an appropriate off-site disposal facility would be selected based on this analysis.

NASA will be responsible both financially and legally to maintain the storm water drainage system within Site 27 (portions of Northern Channel and associated drainage ditches) in accordance with the NPDES permit issued by the RWQCB.

For Alternative 3, consideration of additional ARARs would be required since the alternative could involve treatment of a hazardous waste. Sediments would be temporarily contained in a corrective action management unit, as described in CCR Title 22, Section 66264.552. Treatment of sediments would be conducted in a temporary treatment unit, and the substantive

requirements of CCR Title 22, Division 4.5, Section 66264.553 for the design, operation, and closure of the temporary unit would be followed. After treatment, the treated sediments would be analyzed to determine appropriate off-site disposal facilities.

Alternatives 2, 3, and 4 are considered acceptable in compliance with ARARs.

3. Long-Term Effectiveness and Permanence

Alternatives 2, 3A, and 3B would all provide the same level of permanence because the contaminants would be removed, thereby permanently eliminating risks associated with contaminated sediments and soil to both human health and ecological receptors. Alternatives 3A and 3B would take this action one step further, destroying or immobilizing some of the contaminants through the application of a treatment technology. Alternative 4A provides long-term effectiveness by isolating the contaminants, but the integrity of the cap must be maintained indefinitely. Alternative 4B provides a greater level of permanence than Alternative 4A because most of the contaminants would be removed. Alternative 4B has a lower level of permanence than Alternatives 2 and 3 because the integrity of the cap on the berm area must be maintained. Therefore, Alternative 4 is the least favorable and Alternatives 2 and 3 are the most favorable in providing long-term effectiveness and permanence.

4. Short-Term Effectiveness

Alternatives 2, 3, and 4 would be effective in the short term at reducing the level of contaminants in the Northern Channel and drainage ditches, with minimal negative effects to workers or the community. Alternative 3A would take the longest time to implement, and the risk to workers might be greater due to additional sediment handling during treatment. Alternatives 2, 3, and 4 are readily implementable and, therefore, are equally favorable.

5. Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternatives 2, 3A, 3B, and 4B would remove contaminated sediments from the Northern Channel and drainage ditches and, therefore, would reduce the volume at the site and the mobility of the contaminants by eliminating the potential for contaminant transport – that is, its ability to leave the site. Alternative 3A would also reduce the toxicity and volume of the organic contaminants and the toxicity of the metal contaminants. The level of reduction of toxicity and volume of organic contaminants would likely achieve the minimal reduction needed for Class II landfill disposal. Alternative 3B, stabilization, would not reduce the volume or toxicity of organic contaminants and would only reduce toxicity of metal contaminants. Alternative 4A would not reduce either the toxicity or the volume of contaminants, but reduces only the mobility of the contaminants and exposure of contaminants to receptors. Therefore, both Alternatives 2 and 3 are considered acceptable, but Alternative 3A is regarded as the most favorable.

6. Implementability

All the action alternatives provide engineering challenges, but can be readily implemented. The areas to be excavated are the same for Alternatives 2, 3A, and 3B. Alternatives 2, 3A, 3B, and 4B would increase the capacity of the Northern Channel. In addition, operation and maintenance for these alternatives is much easier and economical than for Alternative 4A. Implementation of Alternative 4A would slightly decrease the capacity of the Northern Channel. Alternatives 2, 3A, 3B, and 4B are favored over Alternative 4A in terms of operations and maintenance, and channel capacity.

With regard to engineering and execution, Alternative 2, excavation and off-site disposal, would be the easiest to implement because it requires no treatment. Alternatives 3A and 3B, bioremediation or stabilization would not be equipment intensive and would not present any major engineering difficulties. However, bioremediation is not a proven technology for treating the PCBs and pesticides for sediments and soil unique to Moffett Field. Although stabilization would reduce the toxicity and mobility of the contaminants, it would not reduce the volume, and the sediments would still have to be disposed of off site. The concrete capping alternative (4A) would be equipment

intensive and may present more engineering difficulties than biotreatment. Overall, Alternative 2 is the most favorable to implement.

7. Cost

The estimated cost of Alternative 2 is \$6,705,100. The majority of costs are in the excavation and disposal of sediments and soil. The estimated costs of Alternatives 3A and 3B are \$6,496,500 and \$6,339,400, respectively. These costs mainly involve sediment excavation, stabilization, and biological treatment and/or disposal. Depending on the success of the bioremediation, some of the disposal costs for Alternative 3 could potentially be reduced. The estimated costs of Alternatives 4A and 4B are \$9,325,000 and \$6,271,400, respectively. In addition to excavation, disposal, and capping costs, Alternatives 4A and 4B also include cap maintenance, monitoring of institutional controls, and five-year reviews.

Alternative 4B is the least costly of the alternatives that meet the established criteria. However, the difference in cost among Alternatives 2, 3A, 3B, and 4B is somewhat negligible. Alternative 4A is the most expensive alternative. Therefore, Alternative 4B is regarded as the most cost effective alternative.

THE PREFERRED ALTERNATIVE

The Navy has proposed Alternative 2 as the preferred alternative because it meets the overall cleanup goals — to limit exposure of ecological receptors to impacted sediment and soil. This will be accomplished by permanently removing sediment and soil with chemical concentrations above RAOs, to protect birds that are the most sensitive ecological receptors at the site. By protecting sensitive ecological receptors this remedy is also protecting human health.

Alternative 2 was selected because:

- 1) It is easier to construct.
- 2) It uses proven technology, while the Alternative 3 remediation strategies are not proven methods for treating the types of contamination at the site.
- 3) It removes sediment and soil with chemical concentrations above established clean up levels from the site, while Alternative 4 would leave a portion of the contamination on site and only immobilize it in place.
- 4) It has no O&M or long-term costs associated with it.
- 5) It meets federal and state ARARs.

Cost and time were similar for all but the No Further Action Alternative; therefore cost and time were not an issue in selection.

Based on the information available at this time, the Navy, EPA, RWQCB, NASA, Lockheed, and the city of Sunnyvale believe that Alternative 2 would be protective of human health and the environment and would provide permanent solutions to the maximum extent practicable. The preferred alternative may be modified in response to State and public comments or new information.

GLOSSARY OF TERMS AND ACRONYMS

Specialized terms and abbreviations used in the Proposed Plan are defined in this section.

Administrative Record – all documents relied upon that lead to a cleanup decision.

Applicable or Relevant and Appropriate Requirements (ARARs) – the federal, state, and local regulations and standards that must be used at this site for this cleanup action.

Berm – an earthen embankment.

Bioremediation – biological treatment of contaminated soil (or groundwater) using microorganisms to break down contaminants or convert them to forms that are less toxic and/or mobile.

CCR – California Code of Regulations.

CFR – Code of Federal Regulations.

Cleanup – actions taken to deal with a release or threat of release of a hazardous substance that could affect people or the environment. The term “cleanup” is sometimes used interchangeably with the terms remedial action, remedy or remediation.

Chlordane – an insecticide used for termite control on lawns and on a variety of crops.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) – a law that establishes a program to identify hazardous waste sites and procedures for cleaning up sites to be protective of human health and the environment, and evaluate damages to natural resources.

Corrective Action Management Unit – a specialized facility constructed on site for temporary consolidation, characterization,

and storage of excavated sediments prior to treatment or disposal.

Cost-Effective Alternative – an alternative control or corrective method identified after analysis as the best available in terms of reliability, permanence, and economics. Although costs are an important consideration when regulatory and compliance methods are being considered, the analysis does not require the U.S. Navy, EPA, and RWQCB to choose the least expensive alternative.

DDT (p,p-dichlorodiphenyltrichloroethane) – historically one of the most widely used chemicals for controlling insect pests on agricultural crops. Total DDT refers to a mixture of chemical forms of DDT, as well as several breakdown products. DDT can no longer be used as a pesticide in the United States except in cases of public health emergency.

Dissolved Metals – metal constituents that are dissolved in water and are not filterable.

Dissolved Organic Carbon – organic carbon (typically from decaying organic matter) that is dissolved in water.

Driving Risk – the most significant or conservative risk at a site. It is assumed that elimination of the driving risk will also address any other risk that may be present.

Environmental Protection Agency (EPA) – a federal regulatory agency providing oversight of the environmental activities at Moffett Field.

Excavation – the physical removal of contaminated sediments and soil.

Exposure Pathways – the way a chemical or physical agent comes in contact with living organisms.

Ex-situ Bioremediation – ex-situ is Latin for “out of place.” Bioremediation generally refers to the use of naturally occurring bacteria to break down or degrade organic contaminants such as fuel products or solvents. Therefore, ex-situ bioremediation involves the excavation or moving of soil from one place to another for cleanup through biological treatment.

Feasibility Study (FS) – a study to identify, screen, and compare cleanup alternatives for a site.

Federal Facility Agreement (FFA) – the agreement signed by the U.S. Navy, EPA, the RWQCB, and the California Department of Health Services that sets forth the actions and schedule under which the Navy will address environmental contamination at Moffett Field.

GCL – geosynthetic clay liner.

Institutional Controls – restrictions on land use that limit activities, such as building or drilling wells. Institutional controls are implemented through codes, regulations, and legal documents that follow ownership of land (like deed restrictions for privately owned property).

NAS – Naval Air Station.

NASA – National Aeronautics and Space Administration.

National Oil and Hazardous Substance Pollution Contingency Plan (NCP) – the basic regulatory directive for federal response actions under CERCLA.

NPDES – National Pollutant Discharge Elimination System.

National Priorities List (NPL) – EPA’s list of the top priority hazardous waste sites in the country.

O&M – operations and maintenance.

Organochlorine Pesticides – a unique class of pesticides, such as DDT, with chlorine atoms.

Particulate Organic Carbon – organic carbon (typically from decaying organic matter) that is suspended in water and can be readily filtered.

Pesticide – substances used to prevent, destroy, repel or mitigate pests.

Polychlorinated biphenyls (PCBs) – a chemical formerly used as a

dielectric fluid in transformers and capacitors to keep them cool.

Potentially Responsible Party (PRP) – Any individual or company potentially responsible for, or contributing to contamination at a Superfund site. Whenever possible, through administrative and legal actions, EPA requires PRPs to clean up hazardous sites they have contaminated. The Navy and NASA are two PRPs at Moffett Field.

ppb – parts per billion.

ppm – parts per million.

Preferred Alternative – the remedial alternative selected by the lead agency, in conjunction with the support agencies, that best satisfies the cleanup goal, based on the evaluation of alternatives presented in the FS.

Proposed Plan – a document that reviews the cleanup alternatives presented in the FS, summarizes the recommended cleanup actions, explains the reasons for recommending them, and solicits comments from the community.

Receptors – representative human or animal that is used in evaluating health risks. For example, when evaluating the human health risks for an occupational scenario, a construction worker is the hypothetical receptor.

Record of Decision (ROD) – a decision document that identifies the cleanup alternative chosen for implementation at a Superfund site. The ROD is based on information from the RI and FS, and on public comments and community concerns.

Regional Water Quality Control Board (RWQCB) – a State of California environmental regulatory agency supporting EPA with oversight of environmental activities at Moffett Field.

Remedial Action Objective (RAO) – the cleanup goal that the proposed site cleanup is expected to accomplish.

Remedial Investigation (RI) – an investigation during which the types, amounts, and locations of contamination at a site are identified.

Risk Assessment – an analysis of the potential negative human health and environmental effects caused by hazardous substances released from a site without environmental controls.

Semivolatile Organic Compound – organic compounds (carbon containing), such as certain oils and pesticides, that do not evaporate readily at room temperature.

Stabilization – a process of binding or fixating metals in soil to prevent them from leaching out.

Superfund – the common name for CERCLA, which was a law passed in 1980 that set forth the process for investigation and cleanup of environmentally contaminated sites. Refers to a fund of dollars via a tax on oil and gas industries.

SWPPP – Stormwater Pollution Prevention Plan.

Threatened and Endangered Species – as defined by the Endangered Species Act, an “endangered” species is one that is in danger of extinction throughout all or a significant portion of its range. A “threatened” species is one that is likely to become endangered in the foreseeable future.

Total Metals – the total mass of metal constituents within a measured sample. Samples analyzed for total metals will provide the amount of the individual metal constituents within the sample.

Total Organic Carbon – includes both particulate and dissolved organic carbon.

Total Petroleum Hydrocarbons – organic compounds that are either fuel or components of fuel.

TSCA – Toxic Substances Control Act.

USFWS – U.S. Fish and Wildlife Service.

Volatile Organic Compound – organic compounds, such as dry-cleaning solutions or degreasing solvents, that evaporate readily at room temperature.

COMMUNITY PARTICIPATION

The Navy, NASA, EPA, and RWQCB provide information regarding the cleanup of Site 27, the Northern Channel and associated areas, to the public through public meetings, the administrative record file for the site and media announcements published in the local newspapers.

The Navy, NASA, EPA, and RWQCB encourage the public to gain a more thorough understanding of the site and the CERCLA activities that have been conducted at Moffett Field by visiting the information repository, reviewing the administrative record file, attending the public meetings, and getting on the mailing list to receive regular project information. Restoration Advisory Board meetings are held every other month and are open to the public.

Administrative Record File

Contact: Ms. Diane Silva
Administrative Records Coordinator
Southwest Division, Bldg. 129
Naval Facilities Engineering Command
1220 Pacific Highway
San Diego, CA 92132-5190
Telephone: (619) 532-3676

Please call in advance for an appointment
Monday through Friday between 8:30 a.m.
and 4:30 p.m.

There are two ways for you to provide your comments on this Proposed Plan:

1. Public Comment Period - During the public comment period from **May 4 through June 4, 2004**, you may use the comment form included with this Proposed Plan to send written comments to Ms. Andrea Espinoza at the address listed below.

2. Public Meeting - You may also provide written or oral comments during the public meeting on **May 20, 2004**, that will be held in the Mountain View City Council Chambers. A stenographer will be at the meeting to record all public comments.

After the public comment period is over, the Navy, NASA, EPA, and RWQCB will review and consider the comments before making a final decision on the remedial action alternative to be used at Site 27. All site-related documents are available for review in the information repository and administrative record file as listed below.

Information Repository

Mountain View Public Library
585 Franklin Street
Mountain View, CA 94041

Hours:

Monday - Thursday 10 a.m. to 9 p.m.
Friday and Saturday 10 a.m. to 6 p.m.
Sunday 1 to 5 p.m.

RESPONSIVENESS SUMMARY

The Navy will respond to all formal comments received on this Proposed Plan in a document called a Responsiveness Summary. The Responsiveness Summary will be mailed to all individuals who provide comments during the public comment period. It will also be placed in the information repository and administrative record file.

FOR MORE INFORMATION

If you have any questions about Moffett Field or Site 27, Northern Channel and associated areas, please contact :

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