Former NAS Alameda
IR Site 28 – Todd Shipyards

Alameda Point, California *September 2005*

U.S. NAVY ANNOUNCES PROPOSED PLAN

The U.S. Navy encourages the public to comment on its proposed plan for *Installation Restoration (IR)* Site 28 at Alameda Point (former Naval Air Station [NAS] Alameda) in Alameda, California.

This Proposed Plan* presents the Navy's preferred remedial (cleanup) alternatives for soil and groundwater contamination at Installation Restoration (IR) Site 28, known as Todd Shipyards, at Alameda Point. The Navy proposes to clean up contaminated soil and groundwater at IR Site 28 by:

- Removing the top layer of soil in areas where arsenic, lead, and polynuclear aromatic hydrocarbons (PAHs) exceed the levels considered safe for recreational visitors.
- Transporting the excavated soil to an appropriate disposal facility.
- Injecting a compound in groundwater to immobilize copper and prevent its discharge into the Oakland Inner Harbor where copper may harm aquatic organisms, which are considered to represent the most sensitive receptors likely to be present near IR Site 28.
- Prohibiting the extraction and use of groundwater at IR Site 28 for domestic, agricultural, and industrial use
- Implementing a groundwater monitoring program after contaminants are immobilized to ensure that cleanup has been completed according to the guidelines that will be established in the Record of Decision (ROD) for IR Site 28.
- Restricting land use at IR Site 28 to recreational activities.

This Proposed Plan summarizes the environmental investigations, risk assessments, and remedial alternatives evaluations that were conducted at Site 28 and describes the basis for choosing the preferred alternatives.

— Notice —

Public Comment Period

December 23, 2005
to January 23, 2006

Public Meeting

January 10, 2005

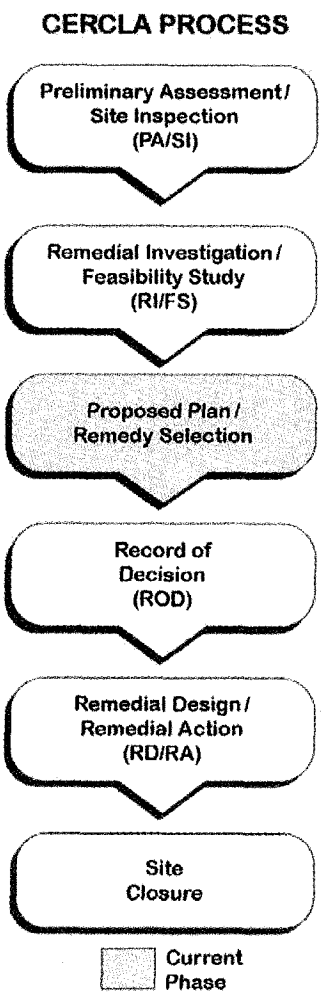
Alameda Point
Main Office Building
950 West Mall Square
Room 241
6:30 to 7:30 p.m.

Figure 1. Alameda Point

*A glossary of terms and definitions is provided on page 16.

THE CERCLA PROCESS

Since the mid-1980s, numerous investigations have been underway at Alameda Point as part of the Navy's IR Program, a comprehensive environmental investigation and cleanup program that complies with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act. 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 28 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 Site 28. The Navy encourages the public to review these documents to gain an understanding of Site 28 and the environmental investigations, risk assessments, and remedial alternative evaluations that have been conducted. The documents are available for public review at the location listed on page 16.

A public comment period will be held from December 23, 2005, to January 23, 2006, and public comments can be received via mail, fax, or e-mail throughout the period. A public meeting will be held on January 10, 2006, at the Alameda Point Main Office Building (Building 1) from 6:30 p.m. to 7:30 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 remedial alternatives or select other cleanup remedies based on feedback from the community or on new information. A final decision will not be incorporated into a ROD until all comments are considered.

SITE HISTORY

The former NAS Alameda, now known as Alameda Point, ceased operations in 1997. Alameda Point is located on the western tip of Alameda Island, which is on the eastern side of San Francisco Bay (see Figure 1 on page 1). Site 28 is located in the northeastern portion of Alameda Point on the Oakland Inner Harbor (see Figure 2) and is approximately 2.9 acres. During the early 1900s, construction of railroad causeways, dikes, and levees contributed to the formation of marshland in the area. Between 1930 and the late 1960s, Site 28 continued to be developed through a series of fill episodes. Site 28 was owned by the Navy from 1936 to 1970. The Todd Shipyards Corporation acquired the property in 1970, but it was transferred back to the Navy in 1995.

Site 28 is unpaved and currently houses a dog park and parking lot. Past uses included shipbuilding, repair and maintenance of commercial and military marine vessels, and equipment storage and staging. Railroad causeways, railroad tracks, and spurs existed on the site from 1883 to the mid-1960s. Approximately 12,000 square feet of Building 63 was located within the boundary of Site 28. Constructed in 1947 and demolished in 1988, this building most likely was used for storage of materials related to shipbuilding and maintenance.

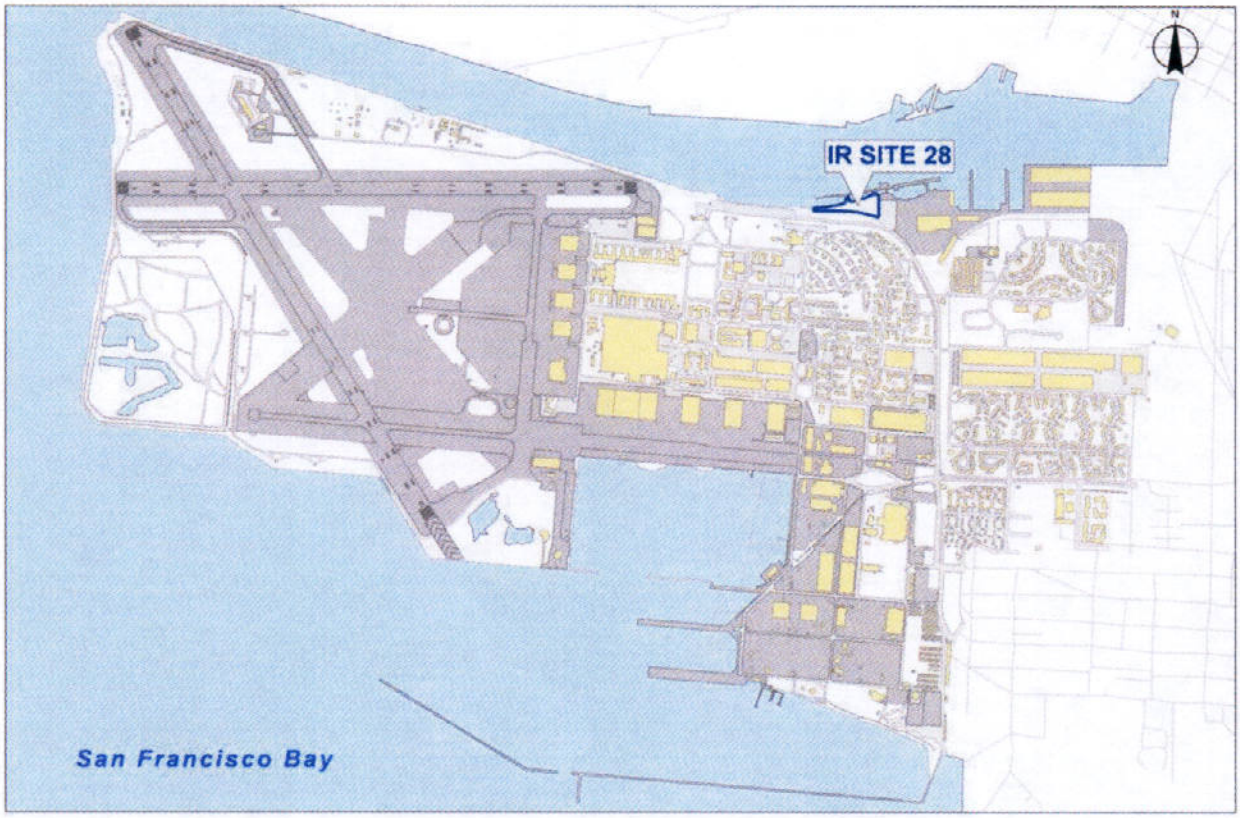


Figure 2. Site 28

REMEDIAL INVESTIGATION SUMMARY

Numerous investigations have been conducted at Site 28. In 1998 and 1999, elevated concentrations of PAHs, pesticides, polychlorinated biphenyls (PCBs), organotin compounds, and metals were detected in soil and elevated metal concentrations were detected in groundwater at Site 28. Further investigation was recommended through an RI to determine the nature and extent of soil and groundwater contamination at Site 28.

In 2002, a field investigation was conducted as part of the Site 28 RI to further characterize soil and groundwater contamination. The RI also evaluated human health and ecological risk. The RI report was finalized in 2004.

The RI identified two areas of concern: the shoreline area and the inland area. The shoreline area is a strip of land that lies within approximately 100 feet of the shoreline of Oakland Inner Harbor (see Figure 3). Soil In this area is contaminated with PAHs, pesticides, arsenic and lead to a depth of 8 feet below the ground surface (bgs), and groundwater is impacted with copper. In the inland area, the soil is impacted with PAHs, arsenic, and iron to a depth of 8 feet bgs, and groundwater is impacted with arsenic.

Potential sources of the contamination in both areas include historical shipyard activities such as welding, paint stripping, marine paint application, equipment storage, weed suppression, and pest control. In addition, activities associated with the former railroad tracks and historical dredging and filling operations are considered to be potential sources of soil contamination at Site 28.

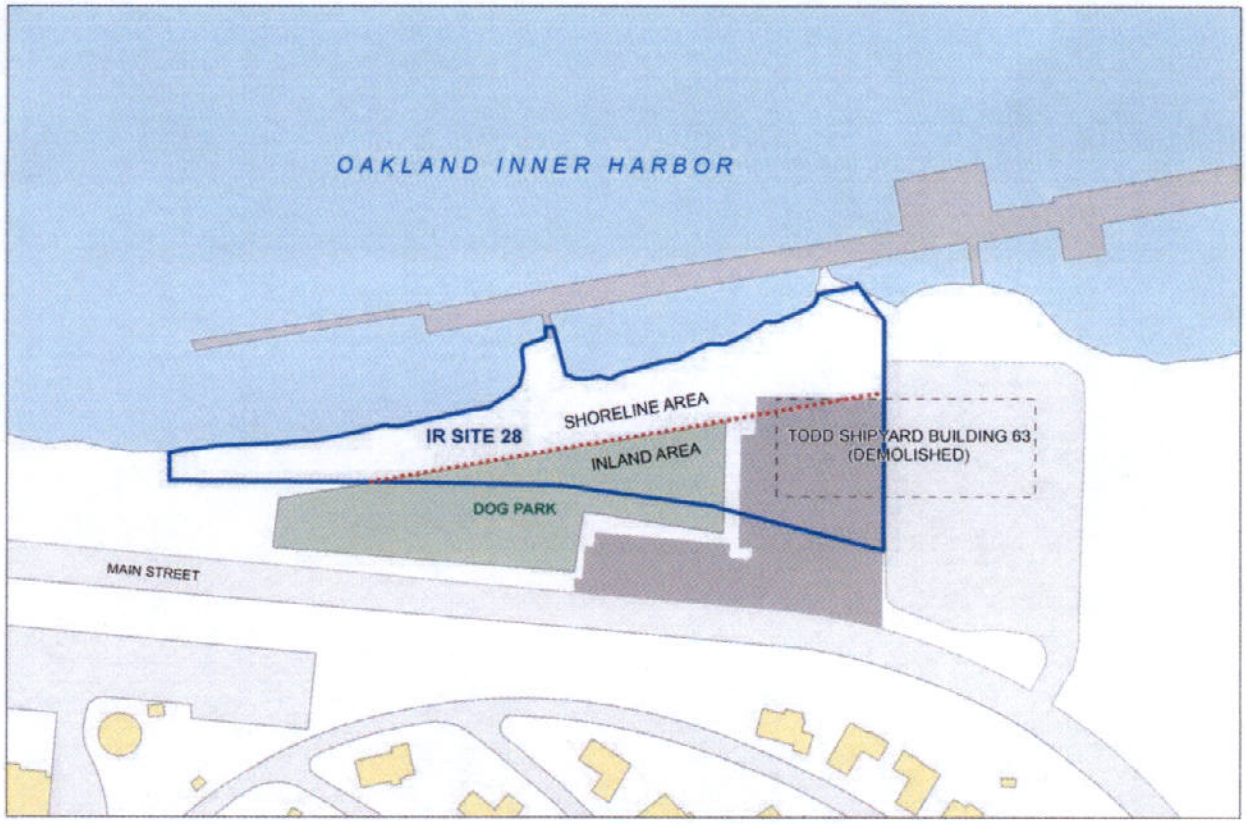


Figure 3. Site Detail

SITE-SPECIFIC RISK SUMMARY

"Risk" is the likelihood or probability that a hazardous chemical, when released to the environment, will have adverse effects on exposed humans and other biological receptors. As part of the RI, a site-specific HHRA and an ERA were conducted to assess risk to human and ecological receptors at Site 28. Results of the risk assessments concluded that areas within Site 28 may pose a risk to human and ecological receptors.

Human Health Risk Assessment

In its human health risk evaluation, the Navy considered the different ways that people might be exposed to chemicals, the possible concentrations of chemicals that potentially could be encountered from those exposures, and the potential frequency and duration of exposure. In addition, the Navy evaluated the following four exposure scenarios: recreational, occupational, construction workers, and residential (Table 1 presents the potential exposure pathways for each scenario). Of these four scenarios, the residential scenario is the most conservative. The expected long-term and current use of Site 28 is recreational.

Risk calculations were based on conservative assumptions that are generally protective of human health. "Conservative" means the assumptions will tend to overestimate risk, which means that the remediation goals will be more protective. Human health risk is classified as cancer risk (from exposure to carcinogens) or noncancer risk (from exposure to noncarcinogens). Site specific factors are considered when making decisions about whether action is required.

Table 1: Exposure Pathways

Recreational, occupational, construction worker, and residential users may be exposed to chemicals through:

- Incidental ingestion and touching of soil,
- Breathing in soil dust, and
- Breathing in the vapors from chemicals in soil and groundwater.

Residents may also be exposed through:

- Ingestion of homegrown produce and groundwater, and
- Direct contact with groundwater and inhalation of vapors during showering.

The Human Health Risk Assessment results (see Table 2) indicate that cancer risks for the residential risk scenario were above the CERCLA risk management range (10^{-4} to 10^{-6}). However, under the recreational scenario, which is the current and planned future use for IR Site 28, the cancer risk is allowable. Non-cancer risk for the recreational scenario is allowable (the HI for this scenario is 1).

Table 2 Cancer and Noncancer Risks

Use	Cancer Risk	Noncancer Risk (Hazard Index)
Recreational *(current and planned use)*	2×10^{-5} 3×10^{-5}*	1
Occupational	2×10^{-5}	0.6
Construction	5×10^{-5}	2
Residential	1×10^{-2}	305

* Based on toxicity values provided by the California Department of Toxic Substances Control. Other risks are based on U.S. EPA toxicity values.

The federally established risk management range was used to determine whether site risks are significant enough to warrant further cleanup. For cancer risk (i.e. the likelihood of any kind of cancer resulting from exposure to chemicals) is generally expressed as a probability. For example, a cancer risk probability of 5 in 100,000 (5×10^{-5}) indicates that, out of 100,000 people, five cancer cases may occur as a result of exposure. For non-cancer health effects, EPA calculates a Hazard Index (HI). If the HI is less than or equal to 1, the non-cancer hazard is considered allowable. If the HI is greater than 1, the non-cancer hazard is considered unacceptable.

Table 2 presents the risk assessment results for soil and groundwater at Site 28. The risks presented in Table 2 are from PAHs, arsenic, and lead in the soil; and arsenic in the groundwater. These chemicals were identified as chemicals of concern (COCs) at Site 28. Risk levels for residential use are more protective than the other scenarios uses because it is assumed that people in the residential scenario will be exposed to the chemicals for longer time periods. Also, it is assumed that they could potentially ingest arsenic from groundwater and homegrown produce.

Ecological Risk Assessment

The ERA evaluated the potential risk to ecological receptors from exposure to chemicals in both soil and surface water. The ERA indicated a potential risk to terrestrial ecological receptors from exposure to pesticides, PCBs, and metals. Risk to these receptors may be overestimated because the current uses of the area include a parking lot, open space, and a dog park. Furthermore, future land use plans are not likely to create suitable habitat for ecological receptors.

Because groundwater in the shoreline area is tidally influenced, elevated concentrations of copper in groundwater may migrate to the sediment in the Oakland Inner Harbor. The ERA results indicated that such migration is a potential risk to benthic (sediment-dwelling) aquatic life.

FEASIBILITY STUDY

The FS report for Site 28 was finalized in June 2005. The FS report developed and evaluated remedial action objectives (RAOs); eight remedial alternatives for soil contamination, including two sub-alternatives; and four remedial alternatives for groundwater contamination. Remedial alternatives were evaluated using the nine criteria identified by the CERCLA process and specified in the NCP.

REMEDIAL ACTION OBJECTIVES

Site-specific remedial action objectives (RAOs) were identified to help develop and evaluate the remedial alternatives for soil and groundwater at Site 28. A RAO is a statement that contains a remediation goal for the protection of one or more specific receptors from one or more specific chemicals in a specific medium (e.g. soil, groundwater, or air). The remediation goals are usually chemical concentration limits that provide a quantitative means of: 1) identifying areas for potential remedial action, 2) screening the appropriate types of technologies, and 3) assessing a remedial action's potential to achieve the RAO. Ultimately, the success of a remedial response is measured by the response's ability to meet the respective RAOs. The groundwater at Site 28 is unlikely to be a drinking water source. As a result,, the Base Realignment and Closure (BRAC) Cleanup Team (BCT) concurs that the remediation goals for Site 28 groundwater should be less strict than maximum contaminant levels (MCLs), given that risk from groundwater vapors to residents is considered acceptable by EPA. Additionally, the remediation goals for the shoreline area groundwater are based on reducing the potential risk to offshore receptors from exposures to elevated copper concentrations in the groundwater that discharges to the Oakland Inner Harbor.

The RAOs for Site 28 are to reduce concentrations of PAHs, arsenic, and lead in soil, and arsenic and copper in groundwater to levels that are protective of recreational visitors, occupational workers, and aquatic life The remediation goals for soil are as follows:

- PAHs: 2.1 milligrams per kilogram (mg/kg)
- Arsenic: 9.1 mg/kg
- Lead: 800 mg/kg

The remediation goals for groundwater are as follows:

- Arsenic: 2,000 micrograms per liter (µg/L)
- Copper: 3.1 µg/L

Site 28 RAOs will be achieved through remediation of soil and groundwater in the shoreline and inland areas.

SUMMARY OF SOIL REMEDIAL ALTERNATIVES

Various available technologies and associated process options were screened based on their effectiveness, implementability, cost, compliance with EPA guidance and the NCP, and ability to meet Site 28 RAOs for soil. Those technologies and associated process options retained after screening were assembled into eight remedial alternatives for soil. These alternatives are summarized in Table 3.

Table 3: Summary of Remedial Alternatives for Soil at Site 28

Remedial Alternatives	Description
Alternative 1	No Action.
Alternative 2	Implement institutional controls (ICs) to limit land use to recreational activities.
Alternative 3	Cap impacted soil with a soil or synthetic membrane, and implement ICs to restrict activities that may damage the cap and limit land use to recreational activities.
Alternative 4A	Remove impacted soil to a depth of 6 feet and transport soil off site for disposal.
Alternative 4B *(Navy's preferred alternative)*	Remove impacted soil to a depth of 2 feet, transport soil off site for disposal, and implement ICs to prevent possible exposure to the contaminated deeper soils and limit land use to recreational activities.
Alternative 5	Use plants to absorb contaminants from soil; the plants would be harvested and transported off site for disposal. Implement ICs to prevent exposure to contaminated soil and disturbance of the plants and limit land use for recreational activities.
Alternative 6A	Remove impacted soil to a depth of 6 feet, treat excavated soil through bioremediation and stabilization, and transport treated material off site for disposal.
Alternative 6B	Remove impacted soil to a depth of 2 feet, treat excavated soil through bioremediation and stabilization, transport treated material off site for disposal, and implement ICs to prevent possible exposure to contaminated deeper soils and limit land use to recreational activities.

Soil Remedial Alternative 1 – No Action.

Under this alternative, no actions would be performed. As a result, no costs are associated with this alternative.

Soil Remedial Alternative 2 – ICs.

This alternative implements ICs to limit land use to recreational activities and requires health and safety precautions for excavation. The ICs would be in place until the Navy and the regulatory agencies concur that unacceptable risk is no longer posed to human health and the environment. This alternative is estimated to cost $405,000.

Soil Remedial Alternative 3 – Soil/Synthetic Membrane Cover with ICs.

This alternative includes design and construction of a soil/synthetic membrane barrier to prevent human and ecological contact with impacted soils. In addition, ICs would limit land use to recreational activities and would restrict activities that may damage the soil/synthetic membrane. This alternative is estimated to cost $1,094,000.

Soil Remedial Alternative 4A – Removal and Disposal of Soil.

This alternative includes excavation and off-site disposal of contaminated soil from 0 to 6 feet bgs with no ICs. This alternative is estimated to cost $4,832,000.

Soil Remedial Alternative 4B – Removal and Disposal of Soil with ICs.

This alternative includes excavation and disposal of contaminated soil from 0 to 2 feet bgs. ICs would be established to limit land use to recreational activities and require health and safety precautions for

excavation into the deeper contaminated soil. The ICs would be in place for at least 30 years. The alternative is estimated to cost $1,768,000.

Soil Remedial Alternative 5 – Phytoremediation and ICs.

This alternative uses a phytoremediation technology, which involves the placement of plants to absorb toxic metals from soils followed by plant harvesting and disposal. Additionally, the plant roots could increase the microbial breakdown of PAHs in soil. ICs would be established to limit land use to recreational activities, protect the plants, and require health and safety precautions for any future excavations at the site. Phytoremediation is an innovative technology that has been proven effective at a limited number of remediation sites. Under this alternative, a bench-scale and pilot-scale test would be required to prepare the remedial design, and ICs would be in place for at least 30 years. This alternative is estimated to cost $1,587,000.

Remedial Alternative 6 – Ex Situ Solidification/Stabilization of Excavated Soil.

This alternative has two subalternatives, Alternative 6a, which includes excavation and disposal of soil from 0 to 6 feet bgs with no ICs, and Alternative 6b, which includes excavation and disposal of soil from 0 to 2 feet bgs with ICs to limit land use to recreational activities and require health and safety precautions for future excavations of soil to depths greater than 2 feet bgs. All soils excavated during remediation would be treated on-site prior to off-site disposal. ICs are expected to be in place for at least 30 years. Alternative 6a is estimated to cost $4,370,000, and Alternative 6b is estimated to cost $1,753,000.

INSTITUTIONAL CONTROLS

ICs described in this Proposed Plan include deed restrictions, which would be established to limit human exposure to contaminated soil and shallow groundwater. ICs are applicable to Soil Remedial Alternatives 2, 3, 4, 5, and 6 and Groundwater Remedial Alternatives 2, 3, and 4, and would be implemented through deed restrictions at the time of property transfer.

The Navy plans to use ICs to:

- Prevent exposure to contaminated soil and groundwater,
- Allow access to monitoring wells and other remedial action components,
- Protect wells installed as part of the remedy and other equipment installed at Site 28, and
- Restrict residential and occupational use of the property until remediation goals are met.

Provisions are needed to ensure that the Navy and the regulatory agencies have access to the site for the purpose of implementing the remedial action, performing maintenance activities, and conducting groundwater monitoring. The ICs will be incorporated and implemented through the following two separate legal instruments:

(1) A "Covenant Agreement" with DTSC pursuant to state laws, and

(2) A Quitclaim Deed from the Navy to the property recipient.

SUMMARY OF GROUNDWATER REMEDIAL ALTERNATIVES

Technologies and associated process options for groundwater that were retained after screening were assembled into four alternatives. These groundwater remedial alternatives are summarized in Table 4.

Table 4: Summary of Remedial Alternatives for Groundwater at Site 28

Remedial Alternatives	Description
Alternative 1	No Action.
Alternative 2	Install additional monitoring wells to further delineate groundwater contamination; continue groundwater monitoring at the site; and implement ICs to prohibit extraction and use of groundwater for domestic, agricultural, and industrial use.
Alternative 3 *(Navy's preferred alternative)*	Inject metal reduction compound (MRC) in groundwater in the shoreline area to reduce copper concentrations in groundwater; continue groundwater monitoring at the site; and implement ICs to prohibit extraction and use of groundwater for domestic, agricultural, and industrial use.
Alternative 4	Excavate soil in the shoreline area and mix it with MRC; use the mixture as backfill to reduce copper concentrations in groundwater; continue groundwater monitoring at the site; and implement ICs to prohibit extraction and use of groundwater for domestic, agricultural, and industrial use.

Groundwater Remedial Alternative 1 – No Action.

Under this alternative, no actions would be performed. No cost is associated with this alternative.

Groundwater Remedial Alternative 2 – Monitoring and ICs

This alternative uses groundwater monitoring and ICs to address arsenic-impacted groundwater in the inland area and copper-impacted groundwater in the shoreline area. Additionally, three off-site monitoring wells would be installed to further delineate the arsenic-impacted groundwater in the inland area. ICs would be established for the inland and shoreline areas prohibiting extraction and use of groundwater for domestic, agricultural, or industrial use. ICs would remain in place for at least 30 years. This alternative is estimated to cost $789,000.

Groundwater Remedial Alternative 3 – Monitoring, ICs, and Metal Reducing Compound (MRC)

This alternative uses groundwater monitoring and ICs to address arsenic-impacted water in the inland area, and includes injection of MRC into saturated soils to address copper-impacted groundwater in the shoreline area in conjunction with a 10-year monitoring program. ICs would be established for the inland and shoreline areas prohibiting the extraction and use of the groundwater for domestic, agricultural, or industrial use. ICs would remain in place for at least 30 years. This alternative is estimated to cost $1,436,000.

Groundwater Remedial Alternative 4 – Monitoring, ICs, MRC, and Soil Removal

This alternative uses groundwater monitoring and ICs to address arsenic-impacted groundwater in the inland area, and includes excavation and disposal of copper-impacted soil in the shoreline area. Additionally, MRC would be mixed with backfill soil to help remove dissolved copper from the groundwater. ICs would be established for the inland and shoreline areas prohibiting extraction and use of groundwater for domestic, agricultural, or industrial purposes. ICs would remain in place for at least 30 years. This alternative is estimated to cost $1,745,000.

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

CERCLA requires that remedial actions meet federal or state environmental standards, requirements, criteria, or limitations that are determined to be applicable or relevant and appropriate requirements (ARARs). The following ARARs apply to the remediation of PAHs and metals in soil and arsenic and copper in groundwater at Site 28.

FEDERAL ARARs

▶ The substantive requirements of *United States Code* (USC) Title 42, Chapter 103, Sections (§§) 9621 and 121(d)(2)(B)(ii). Known or potential entry points of groundwater to surface water will use alternative concentration limits.

▶ The substantive requirements of *Code of Federal Regulation* (CFR) Title 40, §§ 131.36(b) and 131.38. Water quality standards apply to discharges that are made to the Oakland Inner Harbor, which is connected to San Francisco Bay.

▶ The substantive requirements of CFR Title 40 §§ 761.61(a)(4)(i)(A) and (B) and (c)(2). Regulates the storage and disposal of PCB remediation waste, including soils, debris, sludge, or dredged materials contaminated with PCBs at a concentrations greater than 50 parts per million.

▶ The following state regulations that are a component of a federally authorized or delegated state program are considered federal ARARs.

- Substantive applicable requirements of the *California Code of Regulations* (CCR) Title 22 pertaining to the potential characterization and accumulation of waste generated during monitoring and construction of monitoring wells:
- On-site waste generation [§§ 66262.10(a), 66262.11, and 66264.13(a) and (b)]
- Hazardous waste accumulation [§ 66262.34]
- The substantive requirements of hazardous waste contain storage regulations [§§ 66264.171, 66264.172, 66264.173, 66264.174, 66264.175(a) and (b), and 66264.178]

▶ Substantive relevant and appropriate requirements of CCR Title 22 pertaining to the identification of constituents of concern that are reasonably expected during groundwater sampling and analysis:

- Groundwater Monitoring [§ 66264.93]

▶ The substantive requirements of CCR Title 22, §§ 66264.94(a)(1), (a)(3), (b), (c), and (e) [groundwater protection standards for owners and operators of Resource Conservation and Recovery Act treatment, storage, and disposal facilities] have been determined to be potential ARARs.

STATE OF CALIFORNIA ARARS

Substantive requirements of the following requirements of the *California Civil Code* (CCC) and the *Health and Safety Code* (HSC) have been determined to be state action-specific ARARs for implementation of ICs for property that will be transferred to a nonfederal entity:

▶ CCC § 1471, Transfer of Obligations

▶ CCR Title 22, § 67391.1, Land Use Covenants

▶ HSC §§ 25202.5, 25222.1, and 25233(c)

Substantive provisions of the following requirements have been determined to be applicable state chemical- or action-specific ARARs:

▶ Water Quality Control Plan for the San Francisco Bay Basin, 1995, Chapter 2 through 3

▶ State Water Resources Control Board (SWRCB) Resolution No. 88-63

- California Water Code, Division 7, §§ 13241, 13243, 13360, and 13263(a) (Porter-Cologne Water Quality Act)
- Inland Surface Water Plan for Surface Waters, Enclosed Bays, and Estuaries of California, SWRCB 2000, §§ 1.3 and 1.4
- Bay Area Air Quality Management District Regulation 6, §§ 6-301, 302, and 305

COMPARISON OF REMEDIAL ALTERNATIVES

In selecting the preferred remedial alternative, the Navy evaluated each of the proposed alternatives separately against the nine NCP criteria that are described in Table 5, compared the evaluation results across all proposed alternatives for each NCP criterion, and evaluated all of the proposed alternatives to determine which alternative is best suited for implementation at the site.

Table 5: Evaluation Criteria

The Navy uses the nine NCP criteria[1] 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** addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled.
2. **Compliance with ARARs** addresses whether or not a remedy will meet applicable or relevant and appropriate federal and state environmental laws and regulations or provide grounds for a waiver.
3. **Long-term effectiveness and permanence** refers to the ability of a remedy to provide reliable protection of human health and the environment over time.
4. **Reduction of toxicity, mobility, or volume through treatment** refers to the ability of a remedy to reduce health hazards, the movement of contaminants, or the quantity of contaminants at the site through treatment.
5. **Short-term effectiveness** addresses the period of time needed to complete the remedy and any adverse effects to human health and the environment that may be caused during construction and implementation of the remedy.
6. **Implementability** refers to the technical and administrative feasibility of the remedy, including availability of materials and services needed to carry out the remedy and coordination of federal, state, and local governments to work together to clean up the site.
7. **Cost** evaluates estimated capital and operation and maintenance costs over the life cycle of each alternative in comparison to other equally protective measures.
8. **State acceptance** indicates whether the state agrees with, opposes, or has no comment on the alternative.
9. **Community acceptance** includes determining which components of the alternatives interested persons in the community support, have reservations about, or oppose (not complete until public comments on Proposed Plan are received).

1. **Threshold:** These criteria (1 and 2) must be satisfied for an alternative to be eligible.
2. **Primary Balancing:** These criteria (3, 4, 5, 6, and 7) are used to weigh major tradeoffs among alternatives.
3. **Modifying:** Once all comments are evaluated, state and community acceptance (8 and 9) may prompt modifications to the preferred remedy and are thus designated modifying criteria.

The following text presents the results from separate comparisons among the eight remedial alternatives soil and the four remedial alternatives for groundwater according to each NCP criterion. Table 6 presents an overall summary of these comparisons.

1. **Overall Protection of Human Health and the Environment.**

   Soil Remedial Alternatives: Alternative 1 does not protect human health and the environment because impacted soil would be left in place without land use restrictions. Alternatives 2, 3, 4A, 4B, 5, 6A, and 6B meet the threshold criterion for overall protection of human health and the environment.

   Groundwater Remedial Alternatives: Alternative 1 does not protect human health and the environment because groundwater will not be treated nor will ICs be in place to prohibit the use of shallow groundwater. Alternatives 2, 3, and 4 meet the threshold criterion for overall protection of human health and the environment.

2. **Compliance with ARARs.**

   Soil Remedial Alternatives: ARARs are not applicable to Alternative 1. Alternatives 2, 4A, 4B, 5, 6A, and 6B meet the threshold criteria of compliance with ARARs.

   Groundwater Remedial Alternatives: ARARs are not applicable to Alternative 1. Alternatives 2, 3, and 4 meet the threshold criterion for compliance with ARARs.

3. **Long-Term Effectiveness and Permanence.**

   Soil Remedial Alternatives: Alternative 1 does have long-term effectiveness of permanence since the soil is left in place. The long-term effectiveness of Alternatives 2, 3, 4B, 5, and 6B depends only on ICs. Alternative 3 provides additional long-term effectiveness by placing a cap over contaminated soil to prevent exposure to contaminants. Alternatives 4A and 6A are considered the most effective and permanent over the long-term because they remove contaminated soil and do not requiring land use restrictions. Alternatives 4B and 6B provide long-term effectiveness and permanence by removing soils with concentrations above RAOs and backfilling with clean fill material to prevent exposure to underlying contaminated soil. Alternative 5 would require bench-scale and pilot-scale testing to determine its effectiveness. Alternatives 3, 4A, 4B, 6A, and 6B are considered favorable for providing long-term effectiveness and permanence at Site 28.

   Groundwater Remedial Alternatives: Alternative 1 does have long-term effectiveness of permanence because the groundwater will not be treated. Long-term effectiveness of Alternatives 2, 3, and 4 depends on adherence to ICs that restrict extraction and use of groundwater for domestic, agricultural, or industrial use. Long-term effectiveness and permanence of Alternatives 3 and 4 would also depend on the effectiveness of the remedial technology to reduce copper concentrations in groundwater. Alternatives 3 and 4 are considered favorable for providing long-term effectiveness and permanence at Site 28.

Reduction of Toxicity, Mobility, or Volume through Treatment.

Soil Remedial Alternatives: Alternative 1 does not reduce the toxicity, mobility, or volume of the soil contamination because it does not include treatment of the soil. Alternative 2 would not decrease the toxicity, mobility, or volume of contaminated soil at Site 28. Alternative 3 would reduce the mobility of contaminated soil. Alternatives 4A, 4B, 6A, and 6B would reduce the mobility and volume of contaminated soil by excavating it and transporting it to an off-site disposal facility. Alternatives 4A and 6A would remove more contaminated soil from the site than Alternatives 4B and 6B. Alternative 5 would reduce the mobility of contaminated soil by using plants to extract contaminants from the soil and transporting these plants to an off site-disposal facility. Alternatives 4A, 4B, 5, 6A, and 6B are considered favorable at reducing the toxicity, mobility, and volume of contaminated soil at Site 28.

Groundwater Remedial Alternatives: Alternative 1 does not reduce the toxicity, mobility, or volume of the groundwater contamination because it does not include treatment of the groundwater.

Alternative 2 does not include treatment of groundwater; therefore, it would not reduce the toxicity, mobility, or volume of contaminated groundwater. Alternatives 3 and 4 would use MRC to reduce the mobility of copper in groundwater and are considered favorable at reducing the mobility of copper in groundwater at Site 28.

4. **Short-Term Effectiveness**

   Soil Remedial Alternatives: Alternative 1 will not have short-term effectiveness because the contaminated soil will be left in place. Alternative 2 would be effective in the short-term because the time required to achieve RAOs is relatively short and risks to the community and construction workers are low because there are no plans for construction or soil disturbance. Alternative 3 would be effective in the short-term because the time required to achieve RAOs is relatively short and risks to the community and construction workers are lower than Alternatives 4A, 4B, 6A, and 6B. Alternatives 4A, 4B, 6A, and 6B would involve excavation, off-site disposal, and backfilling, which all have the potential to create significant contaminated dust and track contaminated soil off site. Alternative 5 would require the disturbance of shallow soil to plant seeds, which has the potential to create contaminated dust. In order to make Alternatives 4A, 4B, 5, 6A, and 6B viable options, engineering controls would need to be implemented to control dust during excavation and planting activities.

   Groundwater Remedial Alternatives: Alternative 1 will not have short-term effectiveness because the contaminated groundwater will not be treated. Alternative 2 would be effective in the short-term because it will take a relatively short amount of time to implement ICs. Alternatives 3 and 4 would require the transportation of the MRC to the site. Alternative 4 has a greater potential for short-term risk to site workers, the surrounding community, and the environment because it involves the transportation of contaminated soil. Alternatives 2 and 3 are considered effective in the short-term.

5. **Implementability**. Although there are varying degrees of implementability, all of the alternatives are implementable (see Figure 6).

6. **Cost.**

   Soil Remedial Alternatives: Alternative 1 has no cost. To implement Alternative 2 it is estimated to cost $789,000, Alternative 3 estimated to cost $1,436,000, and Alternative 4 estimated to cost $1,745,000.

   Groundwater Remedial Alternatives: Alternative 1 has no cost. To implement Alternative 2 it is estimated to cost $590,000, Alternative 3 estimated to cost $1,263,000, Alternative 4A estimated to cost $5,191,000, Alternative 4B is estimated to cost $1,768,000, Alternative 5 is estimated to cost $1,768,000, Alternative 6A is estimated to cost $5,189,000, and Alternative 6B is estimated to cost $2,030,000.

   State Agency Acceptance. The state of California has concurred with the Navy's proposed remedial alternatives (Soil Alternative 4B and Groundwater Alternative 3).

7. **Community Acceptance.** This criterion will be evaluated after the public comment period ends. A responsiveness summary will be included in the ROD to document the responses to public comments.

Table 6: Comparative Analysis of Soil and Groundwater Alternatives						
Alternative	Protective Overall?	Compliant w/ARARs?	Long-Term Effectiveness/ Permanence	Reduction of Toxicity, Mobility, or Volume via Treatment	Short-Term Effectiveness	Implementability
Soil						
1. No Action	No	None	None	None	None	None
2. ICs	Yes	Yes	●	○	●	●
3. Soil/Synthetic Cover and ICs	Yes	Yes	●	○	◒	◒
4A. Removal and disposal of soil	Yes	Yes	●	●	○	○
4B. Removal and disposal of soil (upper 2 feet) and ICs	Yes	Yes	◒	◒	◒	◒
5. Phytoremediation and ICs	Yes	Yes	◒	●	◒	○
6A. Removal, on-site treatment, and disposal of soil	Yes	Yes	●	●	○	○
6B. Removal and disposal of soil (upper 2 feet), on-site treatment, and ICs	Yes	Yes	◒	◒	◒	○
Groundwater						
1. No Action	No	None	None	None	None	None
2. Monitoring and ICs	Yes	Yes	◒	○	●	●
3. Monitoring, ICs, and MRC	Yes	Yes	◒	◒	◒	◒
4. Monitoring, ICs, MRC, and Soil Removal	Yes	Yes	◒	○	○	○

*To be determined after public comment period.
IC – Institutional Controls
MRC – Metal reduction compound
○ low ◒ mod ● high

PREFERRED ALTERNATIVES

The Navy prefers the following alternatives for soil and groundwater remediation.

Soil

The preferred soil alternative is 4B, which includes removal of soil from 0 to 2 feet bgs. Clean backfill will prevent exposure to the underlying contaminated soil remaining after the excavation. Under this alternative, ICs would be established that would restrict future land use to recreational activities and require health and safety precautions during excavation. The ICs are expected to be in place for at least 30 years or until the Navy, EPA, DTSC, and San Francisco Bay Regional Water Quality Control Board (Water Board) concur that there is no longer unacceptable risk from exposure to chemicals in the soil.

Soil Alternative 4B is fully protective of human health and the environment and complies with environmental regulations and laws. This alternative reduces the mobility, toxicity, and volume of PAHs and metals in soil by implementing an expedient and aggressive treatment strategy. The Navy's prefers Soil Alternative 4B following the following reasons:

- Protective of human health and the environment by implementing ICs that prevent exposure to contaminated soil.
- Provides long-term protection by significantly reducing concentrations of PAHs and metals and their associated risk.
- Permanently removes a portion of contaminant mass and prevents further migration.
- Places clean fill over remaining contaminated soil.
- Falls into the medium-cost group of options and is considered to be the most cost-effective at achieving RAOs.

Groundwater

The Navy prefers Groundwater Alternative 3, which includes the injection of MRC to reduce copper concentrations in groundwater that is discharged into the Oakland Inner Harbor. ICs would be established for the inland and shoreline areas prohibiting the extraction and use of the groundwater for domestic, agricultural, or industrial use. The ICs would be in place for at least 30 years or until the Navy, EPA, DTSC, and Water Board concur there is no longer unacceptable risk from exposure to chemicals in groundwater. Groundwater Alternative 3 is fully protective of human health and the environment and complies with environmental regulations and laws. This alternative would reduce the mobility, toxicity, and volume of copper in groundwater by implementing an expedient treatment strategy. Key points that support the Navy's preference for Groundwater Alternative 4 are listed below:

- Protective of human health and the environment by implementing ICs that prevent exposure to contaminated groundwater.
- Provides long-term protection by significantly reducing concentrations of copper and its associated risk.
- Protects offshore receptors by immobilizing copper in groundwater and preventing its migration into the Oakland Inner Harbor.
- Falls into the medium-cost group of options and is considered to be the most cost-effective at achieving RAOs.

The Alameda Point BCT, which comprises representatives from the Navy, EPA, DTSC, and the Water Board concur with the preferred alternatives for soil and groundwater presented in this Proposed Plan.

OPPORTUNITIES FOR PUBLIC INVOLVEMENT

The Navy provides information on the cleanup of Site 28 to the public through public meetings, the administrative record file for the site, and media announcements published in the local newspapers.

The Navy, EPA, DTSC, and the Water Board encourage the public to gain a more thorough understanding of Site 28 and CERCLA activities conducted at Alameda Point by visiting the information repository, reviewing the administrative record file, and attending public meetings. Restoration Advisory Board meetings are held every month and are open to the public.

The collection of reports and historical documents used by the BCT in the selection of cleanup or environmental alternatives is the administrative record. The administrative record includes such documents as the final RI report and final FS report, as well as other supporting documents and data for Site 28. Administrative record files are located at the following address:

Administrative Record File

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

Community members interested in the full technical details beyond the scope of this Proposed Plan can also find key supporting documents that pertain to Site 28 and a complete index of all Navy Alameda Point documents at the following information repositories located in Alameda:

Information Repository Locations

- ▶Alameda Point, 950 West Mall Square, Building 1, Rooms 240 and 24, (510) 747-7777
- ▶Alameda Public Library, 2200A Central Avenue, (510) 749-5800

There are two ways to provide comments during the public comment period (December 23, 2005 to January 23, 2006):

- ▶Offer oral comments during the public meeting
- ▶Provide written comments by mail, fax, or email no later than January 23, 2006

The public meeting will be held on January 10, 2005, at Building 1, Room 201 at Alameda Point from 6:30 pm to 7:30 pm. Navy representatives will provide visual displays and information on the environmental investigations and the remedial alternatives at Site 28. You will have an opportunity to ask questions and formally comment on the remedial alternatives summarized in this Proposed Plan.

Please send all written comments to:

Mr. Thomas Macchiarella
BRAC Environmental Coordinator
BRAC Program Management Office West
1455 Frazee Road, Suite 900
San Diego, CA 92108
Telephone: (619) 532-0907
Fax: (619) 532-0940

If you have any questions or concerns about environmental activities at Alameda Point, feel free to contact any of the following project representatives:

U.S. EPA
Ms. Anna-Marie Cook
Project Manager
U.S. EPA, Region 9
75 Hawthorne Street
San Francisco, CA 94105
(415) 972-3029

DTSC
Ms. Marcia Y. Liao
Project Manager
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, CA 94710
(510) 540-3767

WATER BOARD
Ms. Judy Huang
Project Manager
San Francisco Bay RWQCB
1515 Clay Street, Suite 1400
Oakland, CA 94612
(510) 622-2363

NAVY
Mr. Thomas Macchiarella
BRAC Environmental Coordinator
BRAC Program Management Office West
1455 Frazee Road, Suite 900
San Diego, CA 92108
(619) 532-0907

Internet Connection

For more information on the closure of Alameda Point Site 28, and the Installation Restoration Program, check out the Navy Base Realignment and Closure (BRAC) Program Management Office website at:

http://www.navybracpmo.org/

Glossary of Technical Terms, Abbreviations, and Acronyms Used in This Proposed Plan

Applicable or Relevant and Appropriate Requirement (ARAR): The federal, state, and local environmental standards, requirements, criteria, or limitations that have been determined to be legally applicable or relevant and appropriate to remedial actions on a CERCLA site.

BCT: BRAC Cleanup Team

bgs: Below ground surface

BRAC: Base Realignment and Closure

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act — 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 that evaluate damages to natural resources.

COC: Chemical of Concern — A chemical present at a site in soil, groundwater, or surface water at concentrations that may potentially pose a threat to human health or the environment.

DTSC: California Department of Toxic Substances Control

EPA: U.S. Environmental Protection Agency

ERA: Ecological Risk Assessment

Feasibility Study (FS): A study to identify, screen, compare, and choose remedial alternatives for a site.

Groundwater: Water in the subsurface that fills pores in soil or openings in rocks.

Hazard Index (HI): A calculated value used to represent a potential non-cancer health risk. An HI value of less than 1 is considered protective of human health.

HHRA: Human Health Risk Assessment

Institutional Controls (IC): Non-engineered mechanisms established to limit human exposure to contaminated waste, soil, or groundwater. These mechanisms may include deed restrictions, covenants, easements, laws, and regulations.

IR: Installation Restoration

Installation Restoration Program (IR Program): Designated to identify, investigate, assess, characterize, and clean up or control releases of hazardous substances from past Navy activities.

Metal Reduction Compound (MRC): A compound used to immobilize metals in groundwater.

NAS: Naval Air Station

NCP: National Oil and Hazardous Substances Pollution Contingency Plan

Remedial Investigation (RI): The first of two major studies that must be completed before a decision can be made about how to clean up a site (the FS is the second study). The RI is designed to assess the nature and extent of contamination and to estimate the risks presented by contamination at a site.

PAHs: Polynuclear Aromatic Hydrocarbons

PCBs: Polychlorinated Biphenyls

Preferred Alternative: The remedial alternative selected by the Navy, in conjunction with the regulatory agencies, that best satisfies the remediation goals, based on the evaluation of alternatives presented in the FS report.

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

Receptor: A living organism (human, animal or plant) that may be exposed to chemicals at a site.

Remedial Action Objectives (RAOs): A set of statements that each contains a remediation goal for the protection of one or more specific receptors from one or more specific chemicals in a specific medium (soil, groundwater, or air) at a site.

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

Remediation Goals: Usually chemical concentration limits that provide a quantitative means of identifying areas for potential remedial action, screening the types of appropriate technologies, and assessing a remedial action's potential for achievement of the RAO.

Water Board: San Francisco Bay Regional Water Quality Control Board (RWQCB)

Proposed Plan Comment Form
Installation Restoration Site 28 Alameda

The public comment period for the Proposed Plan for Installation Restoration Site 28 at Alameda Point, Alameda, California is from December 23, 2005 though January 23, 2006. A public meeting to present the Proposed Plan will be held at the Alameda Point Main Office, 950 West Mall Square, Bldg. 1, Alameda, California on January 10, 2006 at 6:30 pm. You may provide your comments verbally at the public meeting where your comments will be recorded by a court reporter. Alternatively, you may provide written comments in the space provided below or on your own stationary. After completing your comments and your contact information, please fold and mail this form to the address provided on the reverse. All written comments must be postmarked no later than January 23, 2005. You may also submit this form to a Navy representative at the public meeting. Comments are also being accepted by e-mail; please address e-mail messages to thomas.macchiarella@navy.mil.

Name: _____

Representing: _____

Phone Number: _____

Address: _____

_____

Comments:

Thomas Macchiarella, BRAC Environmental Coordinator
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, CA 92108

Don't forget to attend the Public Meeting for the IR Site 28 Proposed Plan; January 10, 2006 Alameda Point Main Office

Attn: Mr. Thomas Macchiarella,

Base Realignment and Closure (BRAC) Environmental Coordinator
BRAC Program Management Office West
1455 Frazee Road, Suite 900
San Diego, CA 92108

Proposed Plan for
Site 28 – Todd Shipyard
Alameda Point, California

DEPARTMENT OF THE NAVY
BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
1230 COLUMBIA STREET, SUITE 1100
SAN DIEGO, CA 92101-8571

5090
Ser 06CM.KE\1224
September 15, 2005

Ms. Anna-Marie Cook
Project Manager
US EPA
Region IX
75 Hawthorne Street, (SFD-8-2)
San Francisco, CA 94105-3901

Dear Ms. Cook

Subj: DRAFT PROPOSED PLAN FOR IR SITE 28, TODD SHIPYARD, ALAMEDA POINT, ALAMEDA, CALIFORNIA

Enclosed is a copy of the Draft Proposed Plan for Site 28. Please note that this draft version of the PP is not suitable for public release. We look forward to receiving your comments by October 24, 2005.

Please contact the Navy Remedial Project Manager, Mr. Keith Elliot, at (619) 532-0974 or me at (619) 532-0907 if you have any questions.

Sincerely,

THOMAS L. MACCHIARELLA
BRAC Environmental Coordinator
By direction of the Director

Encl: (1) Draft Proposed Plan for IR Site 28, Todd Shipyards, Alameda Point, Alameda, California

5090
Ser 06CM.KE\1224
September 15, 2005

Distribution:
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Ms. Judy Huang
Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

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Ser 06CM.KE\1224
September 15, 2005

Ms. Diane Silva (3 copies)
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San Diego, CA 92132-5190

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440 Nova Albion Way, Suite 1
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410 Palm Avenue, Room 161
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Ms. Elizabeth Johnson
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950 West mall Square, Building 1
Alameda, CA 94501

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Contract No. N68711-03-D-5104 Document Control No. DS.B093.20361

TO: Contracting Officer
Karen Rooney, Code 02RE
Naval Facilities Engineering Command
Southwest Division
1230 Columbia Street, Suite 870
San Diego, CA 92101-8517

DATE: 09/21/05
CTO: 0093
LOCATION:
Alameda Point, Alameda, California

FROM: _____

Steven Bradley, Contract Manager

DOCUMENT TITLE AND DATE:

Draft Proposed Plan (Site 28) with Response to Comments

September 2005

TYPE: ☐ Contractual Deliverable ☒ Technical Deliverable (DS) ☐ Other (TC)

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