



PROPOSED PLAN for Cleanup at Three Shallow Soil Sites at Marine Corps Air Station El Toro

Final—May 1999

Marine Corps Proposes Excavation and Recycling of Contaminated Soil

The Marine Corps is requesting comments from the public on alternatives for the remediation (cleanup) of Installation Restoration Program Sites 8, 11, and 12 at the Marine Corps Air Station (MCAS) El Toro.

This Proposed Plan notifies the public of the opportunities to comment on the remedial alternatives, summarizes the results of the remedial investigation (including the human health risk assessment), provides a brief overview of the remedial alternatives, and presents the Marine Corps' preferred remedy for Sites 8, 11, and 12. A more detailed description of the remedial investigation and the remedial alternatives can be found in the Draft Final Remedial Investigation Report and the Draft Final Feasibility Study Report, respectively. These reports are part of the MCAS El Toro Installation Restoration Program Administrative Record file (see page 13) and are available for public review and comment at the Heritage Park Regional Library in Irvine (see page 15). After all public comments on the Proposed Plan have been reviewed and considered, the final remedy for Sites 8, 11, and 12 will be selected and documented in the Record of Decision (ROD).

The Marine Corps' remedial objectives are to protect public health and the environment, remediate the sites to levels that allow for safe reuse of the property, and expedite property transfer. All applicable federal and state environmental laws and regulations are followed to achieve the remedial objectives.

Sites 8, 11, and 12 were divided into units based on physical characteristics and activities performed in each portion of the site (see map on page 3). Dividing the sites into units also allows the Marine Corps to evaluate the remedial alternatives that are the most appropriate for each part of the site.

Based on the risk to human health and the environment from the types and concentrations of chemicals discovered in the soil during the remedial investigation, the Marine Corps is recommending remedial action at portions of Site 8 (Units 3 and 5), Site 11 (Units 1 and 2), and Site 12 (Unit 3 and the catch basin).

The Marine Corps' preferred remedy for the units requiring remediation is excavation of the contaminated soil from each site and recycling the soil as foundation material for the landfill caps at two inactive on-Station landfills.

On-site recycling is feasible because laboratory results from the remedial investigation indicate that the chemicals found in the contaminated soil at Sites 8, 11, and 12 are not at high enough levels to classify the soil as a hazardous waste, therefore this soil is not hazardous. (Any soil discovered during excavation with hazardous levels of contamination would be properly manifested and transported off-Station to a state-permitted hazardous waste disposal facility). After excavation, sampling would be conducted to make sure that the excavated areas have been remediated. Each excavation would then be backfilled with clean fill material as appropriate. Once Sites 8, 11, and 12 have been remediated, no land use restrictions or monitoring would be required because the contaminated soil would be removed and would no longer present a threat to public health or the environment (see page 7 for a detailed description of the preferred remedy).

No further action is recommended at Site 8 (Units 1, 2, and 4), Site 11 (Unit 3), and Site 12 (Units 1, 2, and 4) because of the low concentrations of contaminants and risks to human health and the environment are within the range generally considered allowable by the U.S. Environmental Protection Agency (U.S. EPA).

Public Meeting – May 26, 1999 4:30-7:30 p.m.

Irvine City Hall, Conference and Training Center, One Civic Center Plaza, Harvard at Alton Parkway, Irvine

You are invited to attend a public meeting to discuss the information presented in this Proposed Plan regarding the cleanup at Installation Restoration Program Sites 8, 11, and 12, at MCAS El Toro. Marine Corps representatives will provide visual displays and information on the environmental investigations and the closure alternatives evaluated. You will have the opportunity to ask questions and formally comment on the alternatives.

Public Comment Period – May 8-June 7, 1999

We encourage you to comment on this Proposed Plan and site-related documents during the 30-day public comment period. You may submit written comments by mail **postmarked no later than June 7, 1999** to: Mr. Joseph Joyce, Base Realignment and Closure (BRAC) Environmental Coordinator, AC/S Environment (IAU), MCAS El Toro, P.O. Box 95001, Santa Ana, CA 92709-5001 or MCAS El Toro, Building 368, Santa Ana, CA 92709-5001 (for overnight delivery service). Comments may also be faxed to (949) 726-6586. Public comments received during this period, or in person at the public meeting mentioned above, will be considered in the final closure decision for these sites.

Environmental Investigation Overview

Site Background

Sites 8, 11, and 12 are located in industrialized areas in the southwest quadrant of the Station. None of the sites contain any significant ecological habitat, and portions of Sites 8 and 11 are covered with asphalt or concrete. The map on page 3 shows the locations of these sites. Definitions of chemical and technical terms are provided on page 9.

Site 8, Defense Reutilization and Marketing Office (DRMO) Storage Area, is a storage area for containerized liquids, scrap, and salvage material from MCAS El Toro and MCAF Tustin. The scrap materials stored include mechanical and electrical components and various types of liquids. The site consists of two distinct areas, a main storage yard (Units 1 through 4) and an old salvage yard (Unit 5). The old salvage yard was used as a materials storage area from the late 1940s through the 1970s, but by the mid-1980s, it had been elevated and regraded with approximately 5 feet of imported fill material. This area is currently used for vehicle parking.

The main storage yard has been used as a materials storage area since the late 1940s and remains operational. Today, the main storage yard is surrounded by a perimeter fence. One third of the yard is unpaved (Unit 1) and electrical transformers were stored there. Two-thirds of the yard (Unit 2) is paved. Photographs dating back to 1952 show a refuse pile (Unit 3) near the center of the main storage yard. The pile was removed and disposed prior to 1991. In December 1993, the top 2 feet of soil formerly beneath the refuse pile was excavated and removed and the area was then paved. Transformer oil containing polychlorinated biphenyls (PCBs) was reportedly spilled in a specific area (Unit 4) within Unit 1.

Site 11, Transformer Storage Area, is used for storage of equipment and scrap metal. The site is currently fenced. From approximately 1968 to 1983, between 50 and 75 electrical transformers were stored on a concrete pad and on a dirt lot (Unit 3) at the site. Reportedly, five transformers leaked and one spilled transformer oil containing PCBs onto the concrete pad. The transformer oil was believed to have migrated to the concrete pad edge (Unit 1) and flowed onto the unpaved surface of the storage yard or into an asphalt lined drainage ditch (Unit 2) adjacent to the concrete pad. In 1983, all transformers were removed and disposed off-site.

Site 12, Sludge Drying Beds, are situated at the location of a former sewage wastewater treatment plant. The plant operated between 1943 and 1972 and was demolished a few years later. The sludge produced at this facility was deposited in two areas (Units 1 and 2) to dry the material (drying beds). The sludge remaining in the drying beds was reportedly abandoned in place. Earthen berms surrounding the sludge beds were combined with imported fill material and graded in place. The final grade was

reportedly about 5 feet higher than the original surface.

An industrial wastewater treatment plant (Unit 4) was also present at Site 12 adjacent to the sewage treatment plant. This plant treated waste liquids generated during metal plating operations. Sludge lines ran from the plant to the sludge drying beds. The industrial wastewater treatment plant reportedly operated for only a brief period in 1945-1946. By 1961, the plant had been dismantled. Treatment plant facilities are no longer present at the site. This area is currently a grassy picnic area and park.

Although not an integral part of the wastewater treatment plant operations, an unlined drainage ditch (Unit 3) at Site 12 was visible in aerial photographs dating back to the mid-1940s. The ditch conveyed runoff from the wastewater treatment plant and surrounding areas to Bee Canyon Wash. In the late 1950s, approximately 150 feet of the upstream end of the ditch was enclosed in a concrete drain pipe and backfilled to the surrounding grade. Other than this, the ditch appears to have remained unchanged since 1946.

Site Investigations

The assessment of the nature and extent of contamination present at Sites 8, 11, and 12 was based on extensive soil sampling data collected during the environmental (remedial) investigation. The investigation focused on shallow soil (from 0 to 10 feet below ground surface [bgs]) but included soil sampling to depths of 100 feet bgs. Groundwater sampling was not required because soil sampling showed that contamination was localized in the shallow soil and did not extend to groundwater. The depth to groundwater is approximately 100 feet or more at these sites.

Each of the three sites was divided into units based on physical characteristics and activities performed in each portion of the site. Dividing the sites into units also allowed the Marine Corps to plan actions most appropriate for each part of the site. The diagrams on page 3 show each of the units at Sites 8, 11, and 12.

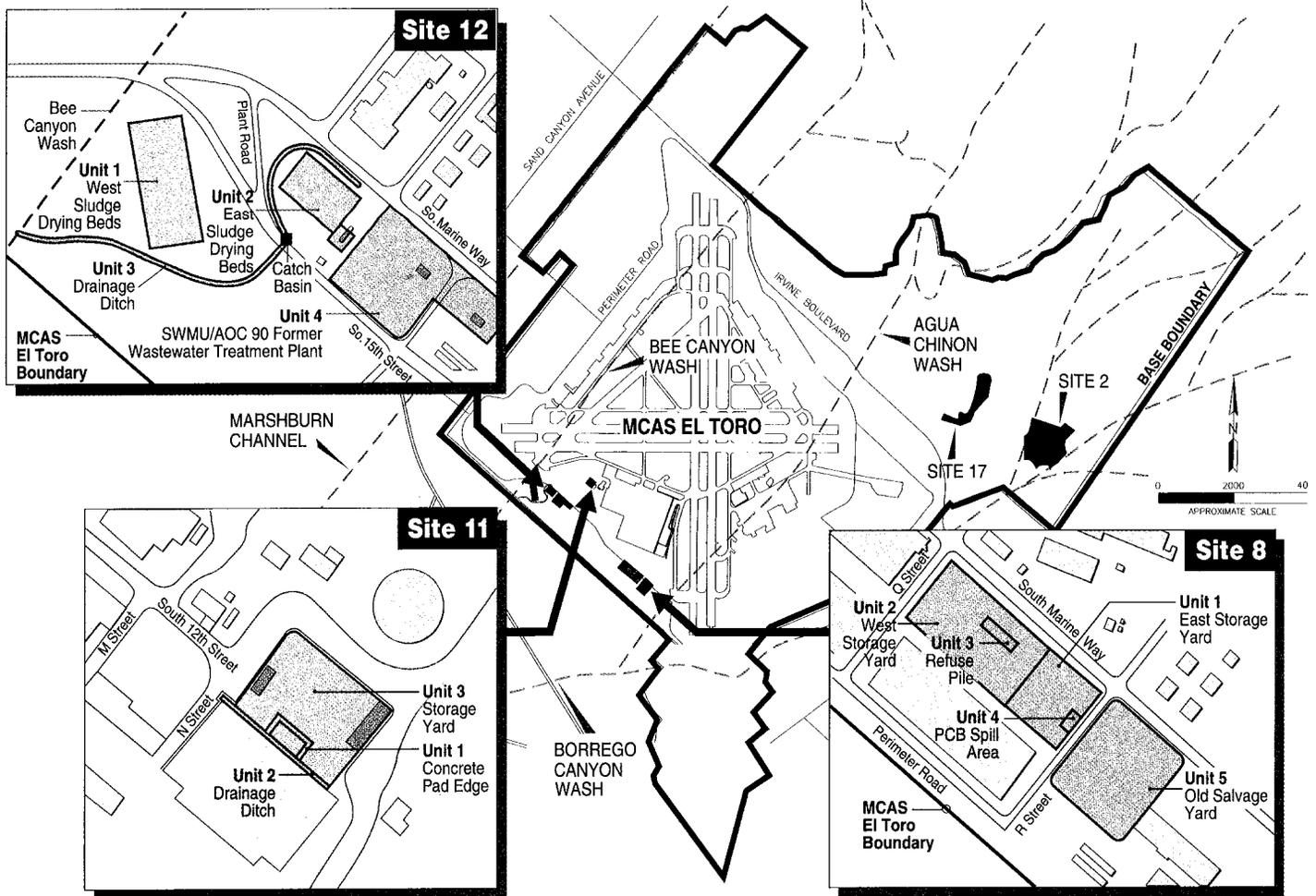
Investigation Results

The investigation of Sites 8, 11, and 12 showed low levels of contaminants present in shallow soil at each site. However, the highest contamination was generally limited to areas very near the surface, usually between 0 and 4 feet bgs.

Throughout this Proposed Plan, the term background levels (of metals) is used. It refers to the naturally occurring range of metals that are found in the native soil both on and off MCAS El Toro property (in the vicinity of the Station). These background levels are not the result of Station operations.

Site 8 – Defense Reutilization and Marketing Office Storage Area. Chemicals in soils identified at Site 8, Units 1 through 5, include volatile organic compounds (VOCs), semi-

MCAS El Toro Location Map – Installation Restoration Program Sites 8, 11, and 12



MCAS El Toro is shown along with the units that comprise Sites 8, 11, and 12.

volatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), PCBs, pesticides, petroleum hydrocarbons, and naturally occurring metals. These identified chemicals were present most frequently between depths of 0 to 4 feet bgs. In addition, the types and concentrations of these chemicals present in shallow soil and deeper subsurface soil (greater than 10 feet bgs) at Site 8 do not pose a threat to groundwater because the depth to groundwater is approximately 100 feet or more at this site. Most of the PCB-contaminated soil beneath the area of the former rubbish pile was removed prior to completion of the remedial investigation in conjunction with construction activities.

Site 11 – Transformer Storage Area. Soil samples at Site 11 were analyzed for PCBs and pesticides. PCBs were present only at Units 1 and 2 and were generally confined to surface soil (0 to 2 feet bgs). Pesticides were reported at Units 1, 2, and 3 and were generally confined in shallow soil to depths of less than 3 feet bgs. The PCBs and pesticides present at Site 11 do

not pose a threat to groundwater because the depth to groundwater is approximately 100 feet or more at this site.

Site 12 – Sludge Drying Beds. Chemicals present at Site 12 in shallow soils throughout Unit 1 include VOCs, PAHs, PCBs, pesticides, herbicides, and petroleum hydrocarbons. Most of this shallow soil contamination is confined to the upper 5 feet bgs interval. VOCs, SVOCs, PAHs, PCBs, pesticides, petroleum hydrocarbons, herbicides, cyanide, and metals above the naturally occurring background levels were reported in shallow soil throughout Units 2, 3, and 4. At Unit 3, chemicals were present at the highest concentrations from 0 to 5 feet bgs. A catch basin in the Unit 3 drainage ditch was also sampled. Results showed that the basin contained the same chemicals as those present in the drainage ditch, but at slightly lower concentrations.

For detailed information on investigation findings, the Draft Final Remedial Investigation Report for Sites 8, 11, and 12 is available for public review and comment (see page 13) or contact project representatives (see page 15).

Human Health Risk Assessments

As required by federal law set forth in the 1990 National Oil and Hazardous Substances Pollution Contingency Plan, a human health risk assessment was performed as part of the remedial investigation to determine if environmental cleanup or controls are necessary as a result of potential risks to human health. Results from the risk assessment indicate that action should be taken to mitigate risks at Site 8 (Units 3 and 5), Site 11 (Units 1 and 2), and Site 12 (Unit 3). Under current conditions, risks at the other portions of Sites 8, 11, and 12 are within the U.S. EPA generally allowable risk range. No further action is necessary to be protective of human health in these areas.

Identifying Exposure Pathways

To assess the potential human health risks, information on the types and amounts of chemicals at ground surface and in the shallow soil beneath Sites 8, 11, and 12 was collected during the remedial investigation. Possible exposure pathways, which show how people could come in contact with chemicals, were then identified. The risk assessment hypothetically assumes people are living at a site for a period of 30 years. It was assumed that children and adults could be exposed to shallow soil (0 to 10 feet bgs) through eating soil (ingestion), skin (dermal) contact, or breathing (inhalation) of vapors. Possible health effects from exposure to chemicals were evaluated and combined with other information to estimate potential health risks if chemicals remain at the sites.

Estimating Human Health Risks

Calculated risk levels are an indication of potential risks, and are not an absolute prediction that risk will occur at a certain level. Actual human exposures and risks are likely to be much less than those calculated for the risk assessment. The assumptions made during the risk assessment process lead to an overestimation of potential risk and provide a margin of safety to protect public health and the environment.

U.S. EPA guidance requires that the Marine Corps look at various ways the public could be exposed to chemicals and the health risks associated with exposures to the chemicals. Health risks associated with exposure to and toxicity of chemicals were estimated for cancer-causing (carcinogenic) and non-cancer-causing (noncarcinogenic) effects. The cancer risk is expressed in terms of the chances of humans contracting cancer as a result of living at the sites and being exposed to the various chemicals over a period of 30 years. This probability is expressed as the number of additional cancer cases that would occur within a population, and it is calculated assuming an individual has an extended exposure to the chemicals. The term "additional cancer cases" refers to cancer cases that could occur, in addition to those cases that otherwise occur, in a population not exposed to site chemicals.

To manage carcinogenic risk and protect human health, the U.S. EPA follows the protective risk ranges established by the National Contingency Plan: greater than one additional cancer case in a population of 10,000 is unacceptable; one additional cancer case in a population of 10,000 to one additional cancer case in a population of 1,000,000 can be generally considered allowable; and less than one additional cancer case in a population of 1,000,000 is allowable.

Noncarcinogenic risks are expressed as a hazard index. The U.S. EPA considers a hazard index of less than 1 as protective of human health. A hazard index of 1 indicates that the exposure to the chemicals has limited potential for causing adverse health effects (e.g., respiratory distress). A site with a hazard index greater than 1 does not by itself require remedial action, but indicates the need to take into account the types of chemicals, historical activities, and potential toxic effects of the chemicals of potential concern.

Risk Assessment Results

Soil

Site 8 – Defense Reutilization and Marketing Office Storage Area. Chemicals present in soil resulting from Marine Corps' activities that contribute to human health risks are PCBs at Unit 3 and PAHs at Unit 5.



Site 11 – Transformer Storage Area. PCBs identified in soil contribute to human health risks at Unit 1 and 2.

Site 12 – Sludge Drying Beds. Chemicals that contribute to human health risks are PCBs and PAHs at Unit 3.

Groundwater



Soil sampling showed that contamination was localized and did not extend to groundwater at any of these sites. A human health risk assessment was not conducted for groundwater because there are no site-specific contaminants in groundwater at Sites 8, 11, and 12.

Recommended Action

The Marine Corps' recommendations for the specific units at Sites 8, 11, and 12 are based on the results of the remedial investigation and the human health risk assessment, and the assumption of future residential use of these properties. The site-by-site summary on page 5 presents risk assessment results and recommended actions for each site unit. A summary of potential alternatives developed for cleanup at Sites 8, 11, and 12 are presented beginning on page 6. Units at these sites recommended for Remedial Action are shown in the site diagrams on pages 8 and 9.

Site-by-Site Summary: Risk Assessment Results and Recommended Actions

Site/Unit	Cancer Risk ^a	Noncancer Risk ^a	Risk Management Considerations	Recommended Actions
> Site 8				
Units 1 and 4 (Evaluated as one area)	2 additional cases in 100,000	0.79	PCB-contaminated soil is present in various locations at these units. Based on human health risk factors calculated for Units 1 and 4: concentrations of PCBs are significantly less than 10 parts per million (typical cleanup level for PCBs in a residential area); and the nearest groundwater is located 145 feet below ground surface (bgs).	No Further Action
Units 2 and 3 (Evaluated as one area)	4 additional cases in 100,000	2.3	At Unit 2, the only risk drivers present are arsenic and manganese. No site-related activities involved use of these metals. Arsenic and manganese occur naturally in native soil on and off MCAS El Toro property. At Unit 3, soil beneath the refuse pile formerly located at this unit was contaminated with PCBs. During construction activities, prior to the remedial investigation, most of the PCB-contaminated soil was removed. Sampling performed during the remedial investigation indicates that not all of the PCB-contaminated soil was removed.	No Further Action Proposed Remedial Action – remove remaining PCB-contaminated soil (approx. 365 cubic yards)
Unit 5	1 additional case in 10,000	1.1	PAH-contaminated soil is present throughout the unpaved portion of this unit.	Proposed Remedial Action – remove PAH-contaminated soil from unpaved area (approx. 18,580 cubic yards)
> Site 11				
Unit 1	9 additional cases in 100,000	4.5	Small volume of PCB-contaminated soil is present in this localized area.	Proposed Remedial Action – remove up to six feet of soil (approx. 133 cubic yards).
Unit 2	6 additional cases in 1,000,000	0.3	Small volume of PCB-contaminated soil is present in this localized area.	Proposed Remedial Action – remove up to six feet of soil (approx. 100 cubic yards).
Unit 3	3 additional cases in 10,000,000	0.017	Both the cancer and noncancer risk values are allowable.	No Further Action
> Site 12				
Unit 1	8 additional cases in 100,000	4.6 ^b	Based on the following factors a remedial action at Unit 1 is not appropriate: Conservative nature of risk assessment calculations (using maximum concentrations of chemicals of potential concern [COPC] when most of the COPCs were only reported once); no site related activities involved the use of arsenic or manganese; and the fact that concentrations of PAHs, pesticides, PCBs and metals are confined to the upper 5-foot-bgs soil interval, are not mobile, and do not present a risk to groundwater.	No Further Action
Units 2 and 4 (Evaluated as one area)	3 additional cases in 100,000	2.1	The cancer risk value is within the allowable range. Although the noncancer risk value is slightly above the allowable range, most of this risk is associated with the metals manganese and arsenic. No site related activities involved the use of arsenic or manganese. These metals occur naturally in native soil on and off MCAS El Toro property.	No Further Action
Unit 3	5 additional cases in 100,000	5.9	The concentrations and type of contaminants are similar to those at Site 12 Unit 1; however this unit is a drainage ditch that conveys surface water runoff into Bee Canyon Wash approximately 50 feet upstream of the Station boundary. PCB and PAH-contaminated soil in this unit may be transported off-site and eventually off-Station.	Proposed Remedial Action – remove contaminated soil to prevent migration of contaminants offsite (approx. 6,165 cubic yards).
Catch basin	1 additional case in 1,000,000	0.18	Both the cancer and noncancer risk values are below the allowable range.	No Further Action

Notes:

a See "Estimating Human Health Risks on page 4 for explanation of U.S. EPA's generally allowable range of cancer risk and the hazard index for noncancer risk.

b Noncancer risk generally considered allowable because value is associated with a pesticide that was only present in one sample.

Summary of Site Cleanup Alternatives

The Marine Corps' remedial objective for Site 8, 11, and 12 is to protect public health and the environment by preventing exposure to soil and reducing the potential for threats to the environment. For Site 12, an additional remedial objective is to prevent off-site or off-Station migration of contaminated surface water or sediment. Five alternatives were developed to achieve these objectives. Descriptions of the alternatives are presented below. Key supporting information from the feasibility study includes:

- cost comparison estimate of remedial alternatives (page 6).
- evaluation of the preferred remedy (page 10).
- comparative analysis of remedial alternatives (page 11).
- potential federal and state applicable or relevant appropriate requirements (ARARs) for cleanup at Sites 8, 11, and 12 (page 12).

The Marine Corps' preferred remedy for those units at all three sites that require remediation is Alternative 3, Excavation with Recycling of the Excavated Soil as Cover

Material. Contaminated soil that is not hazardous would be recycled and used as foundation layer material beneath the landfill caps at Installation Restoration Program Site 2, Magazine Road Landfill, and Site 17, Communication Station Landfill.

Alternative 1 – No Action

By law, the No Action alternative is evaluated to provide a basis from which to develop and evaluate other remedial alternatives. Under the No Action alternative, the Marine Corps would not implement any cleanup actions and there would be no change to the existing site conditions.

Alternative 2 – Asphalt Cap or Monolithic Soil Cap with Vegetative Cover, Plus Restrictive Covenant

Under Alternative 2, Site 8 (Units 3 and 5) and Site 11 (Units 1 and 2) would be covered by an asphalt cap. Site 12 (Unit 3) would be covered by a monolithic (single-layer) soil cap with a grass cover to prevent erosion. A storm drain would be installed

MCAS El Toro Remedial Alternatives Cost Estimate Comparison
(For Comparison Purposes Only)

Remedial Alternatives Evaluated	Estimated Cost in \$ Millions		
	Site 8 (Units 3 and 5)	Site 11 (Units 1 and 2)	Site 12 (Unit 3)
Alternative 1 No Action	0	0	0
Alternative 2 Capping and Restrictive Covenant	1.58	0.06	0.35
*Alternative 3—Preferred Remedy for Sites 8, 11, and 12 Excavation and Recycling	1.20	0.07	0.75
Alternative 4 Excavation, Soil Washing, and Thermal Destruction	8.64	0.43	7.08
Alternative 5 Excavation, Soil Washing, and Off-Station Disposal	6.28	0.13	2.72

*Alternative 3 includes excavation of contaminated soil and hauling the soil to Site 2 and/or Site 17, sampling to ensure that human-health risks have been reduced to allowable levels, and backfilling the excavated area with clean soil. There are no maintenance costs associated with this alternative. (The Marine Corps may choose to dispose contaminated soil at an appropriate off-Station disposal facility.)

beneath the Site 12 cap to allow surface water to be conveyed across the site without eroding the cap or coming in contact with contaminated soil. The asphalt and soil caps would reduce human health risks by preventing exposure to contaminated soil. A restrictive covenant (deed restrictions or lease conditions) would be placed on the property at all three sites. The covenant would prohibit future owners from performing activities such as subsurface excavation that could damage the cap. The covenant would limit use at the site to industrial activities that are protective of the cap and also allow Marine Corps and regulatory personnel access to the site to maintain or inspect the cap.

Alternative 3 - Preferred Remedy - Excavation with Recycling of the Excavated Soil as Cover Material)

Under this alternative, an estimated 25,000 cubic yards of contaminated soil from Sites 8, 11, and 12 would be excavated for use as foundation layer material for on-Station landfills. Once the soil has been excavated, soil sampling would be performed to confirm that all of the contaminated soil that could cause an unacceptable risk to human health has been removed. Upon completion of the removal operations, the excavated areas would be backfilled using clean, compacted fill material as appropriate. Restrictive covenants and monitoring would not be necessary because contamination would be removed from the sites.

Upon completion of remedial activities, the backfilled soil at Site 12 would be graded to facilitate proper drainage of the surrounding area.

Recycling of Excavated Soil. The Marine Corps is currently taking action to cap and close four inactive landfills at the Station. Alternative 3, the preferred remedy, for Sites 8, 11, and 12, would recycle all the contaminated soil excavated from these sites that is not hazardous. Based on remedial investigation results, hazardous levels of contaminants are not expected to be present. However, if hazardous wastes are identified during excavation they would be disposed off-Station at a state-permitted hazardous waste disposal facility. Soil that is not hazardous would then be used as part of the foundation layer beneath the landfill caps at Installation Restoration Program Site 2, Magazine Road Landfill, and Site 17, Communication Station Landfill. Recycling of this soil as landfill foundation layer material would be done during construction of the caps. This procedure would eliminate the long-term risks to human health and the environment at Sites 8, 11, and 12. No exposure pathway to the recycled soil by people or animals and wildlife would exist after the landfill is capped. (The Marine Corps may choose to dispose contaminated soil at an appropriate off-Station disposal facility.)

Alternative 4 - Excavation with On-Site Treatment by Soil Washing and Thermal Destruction or Excavation with Low-Temperature Thermal Desorption

Under this alternative, an estimated 25,000 cubic yards of contaminated soil from Sites 8, 11, and 12 would be excavated and treated to remove contaminants. At Site 8 (Unit 3), the contaminated soil would be treated with an on-site soil washing system. As a result of soil washing, fine-grained material (silt and clay) becomes separated from coarse-grained material (sand and gravel). Soil washing would successfully treat (clean) the coarse-grained material. However, contaminants would continue to bind, chemically or physically, to the fine-grained materials. Therefore, additional treatment for the fine-grained material is required. The fine-grained material would be further treated on-site with a mobile thermal destruction unit that destroys organic contaminants (mainly PCBs). After thermal destruction, the residual material (ash) would be transported to an off-Station, state-permitted disposal facility. The washed (clean) coarse-grained material would be reused to partially backfill the excavated areas. This soil would be supplemented with clean fill material. Soil from Sites 11 and 12 would also be hauled to Site 8 for treatment. The cleaned coarse-grained material would be hauled back to Sites 11 and 12 and reused to partially backfill the excavated areas.

Contaminants in the soil at Site 8 (Unit 5) are PAHs. The excavated soil would be treated on-site using low-temperature thermal desorption (a less costly treatment method than thermal destruction), followed by thermal oxidation (afterburning). This two-step process separates the PAHs from the soils and destroys them. The treated soil, which is then clean, would be reused to backfill the excavated area at Unit 5.

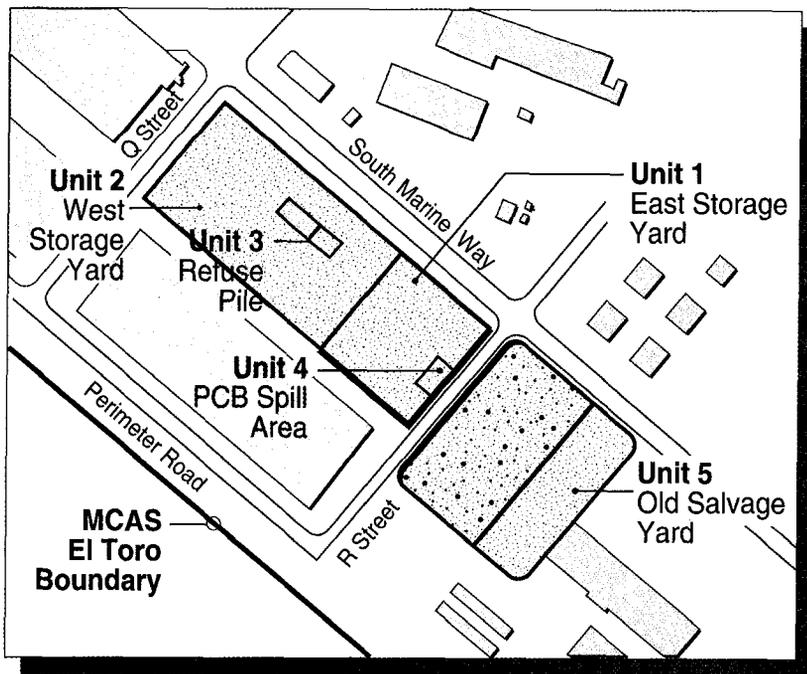
Alternative 5 - Excavation, On-Site Soil Washing, and Off-Station Disposal at a Class I Landfill

Under Alternative 5, an estimated 25,000 cubic yards of contaminated soil from Sites 8, 11, and 12 would be excavated and treated with an on-site soil-washing system to separate the fine-grained soil from the coarser material. The finer material would then be transported to an off-Station disposal facility. The treated (clean) coarser material would be reused to partially backfill the excavated areas. This soil would be supplemented with clean fill material.

- Diagrams that show areas recommended for remedial action are on pages 8 and 9.
- For more information on the remedial action alternatives for Sites 8, 11 and 12 consult the Draft Final Feasibility Study Report (see page 13) or contact project representatives (see page 15).

Units at Sites 8, 11, and 12 Recommended for Remedial Action

Site 8 - DRMO Storage Yard

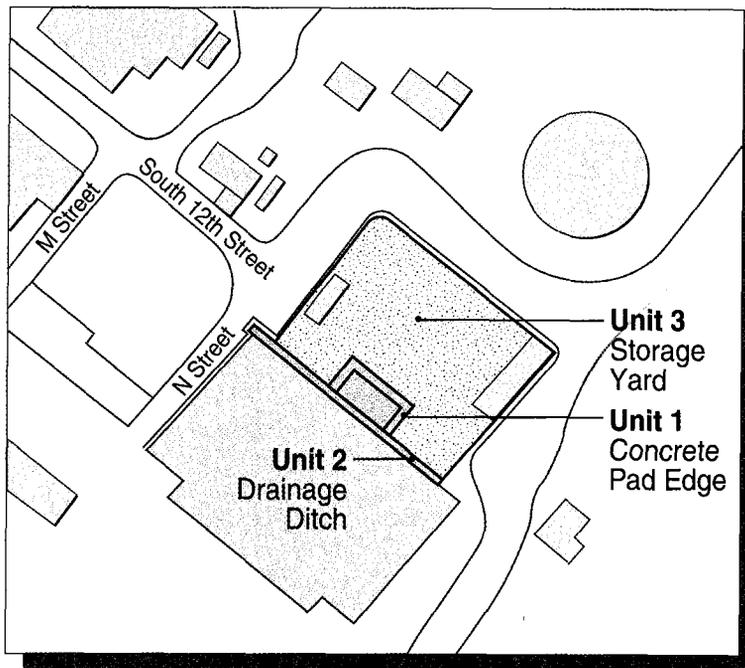


Portions of Units 3 and 5 are recommended for remedial action.

Site 11 - Transformer Storage Area

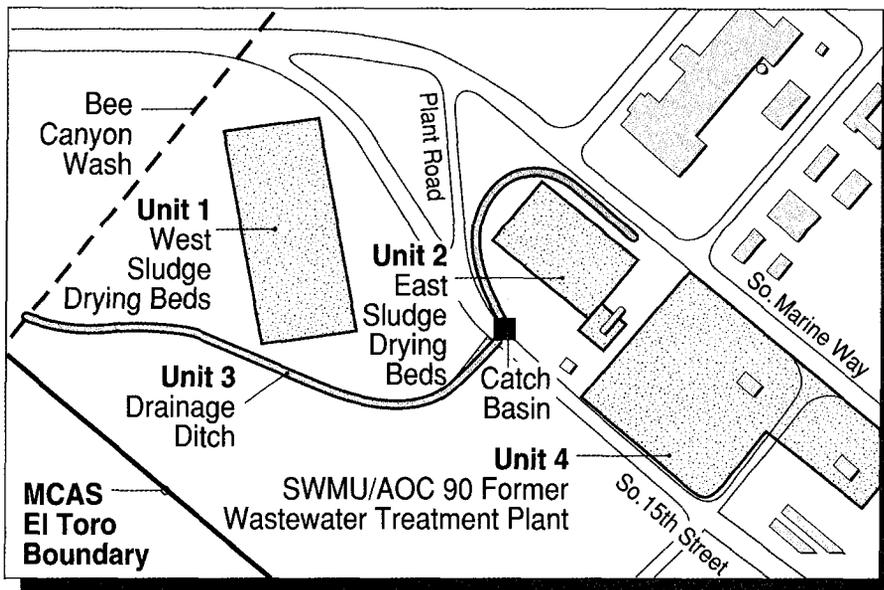
Legend

-  Area Recommended for Remedial Action
-  Area Recommended for No Further Action
-  Building or Pad
-  Unit Boundary
-  Improved Roads
-  Base Boundary



Units 1 and 2 are recommended for remedial action.

Site 12 - Sludge Drying Beds



Unit 3 is recommended for remedial action.

Definitions of Chemical and Technical Terms

- **VOCs** (volatile organic compounds) make up a general category of organic (carbon-containing) compounds that evaporate easily at room temperature. They are commonly used for machinery and parts degreasing, paint stripping, and other industrial operations. At MCAS El Toro, historical activities have included more than 40 years of aircraft maintenance that used industrial solvents, like trichloroethene (TCE), that are categorized as VOCs. Within the category of VOCs, there are possible cancer-causing compounds.
- **SVOCs** (semivolatle organic compounds), another general category of organic compounds, evaporate at a slower rate than VOCs. There are suspected cancer-causing compounds within the category of SVOCs.
- **PCBs** (polychlorinated biphenyls) are a specific class or group of SVOCs and are suspected as cancer-causing compounds. They were commonly contained in transformer oil up to the late 1970s. At MCAS El Toro, several areas were used to store transformers.
- **Petroleum hydrocarbons** are chemical components of fuels. The individual compounds (e.g., VOCs, SVOCs) that make up petroleum hydrocarbons are evaluated for potential health effects. Petroleum hydrocarbon compounds are managed outside the CERCLA program.
- **PAHs** (polynuclear aromatic hydrocarbons) are a specific class or group of SVOCs, and some are suspected as cancer-causing compounds. They are commonly associated with fuels and waste oil. At MCAS El Toro, historical activities included spraying waste oil on the ground surface to control dust.
- **Metals** found at the sites include aluminum, arsenic, beryllium, and manganese. Arsenic and beryllium are known to cause cancer. Aluminum and manganese are noncancer causing chemicals that can affect the nervous system (aluminum and manganese) and the respiratory system (manganese). Aluminum, arsenic, beryllium, and manganese naturally occur in the soils native to areas on and off MCAS El Toro property.
- **Pesticides and herbicides** were used to control insects and vegetation. Depending on the specific chemicals used for this purpose, they could be cancer-causing or noncancer causing.
- **Thermal destruction** is a treatment method that uses high heat (up to 2000 degrees Fahrenheit) to destroy organic compounds (VOCs, PCBs).
- **Thermal desorption** is a proven technology that uses relatively low temperatures (about 500 to 700 degrees Fahrenheit) to vaporize and thermally eliminate PAHs.

Evaluation of Alternative 3—the Preferred Remedy

Each alternative has undergone detailed evaluation and analysis, using evaluation criteria developed by the U.S. EPA. The nine criteria are categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria. The threshold criteria must be satisfied in order for an alternative to be eligible for selection. The primary balancing criteria are used to weigh major tradeoffs among alternatives. Generally, the modifying criteria are taken into account after public comment is received on the Proposed Plan and reviewed with the various State regulatory agencies to determine if the preferred alternative remains as the most appropriate remedial action. The nine criteria are defined below and are accompanied by the key points from the evaluation of the five alternatives with emphasis on Alternative 3, the preferred remedy. A chart that summarizes evaluation of the five alternatives is shown on page 11.

A. Threshold Criteria

1. Overall Protection of Human Health and the Environment – *assesses whether a cleanup remedy provides adequate public health protection and describes how health risks posed by the site will be eliminated, reduced, or controlled through treatment, engineering controls, or institutional and regulatory controls.*

Alternative 1 is not protective of human health and the environment because it does not reduce risk associated with contaminants in shallow soil. Alternative 2 is only protective as long as the cap is maintained. Alternatives 3, 4, and 5 result in the same significant reduction of risk because all three alternatives permanently remove the contaminated soil from the site.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) – *addresses whether a cleanup remedy will meet all federal, state, and local environmental statutes or requirements.*

Alternative 1 does not comply with potential ARARs for Sites 8, 11, and 12. Alternative 3 complies with the potential ARARs (see pages 12 and 13).

B. Primary Balancing Criteria

3. Long-Term Effectiveness and Permanence – *refers to the ability of a remedy to continue protecting human health and the environment over time after the cleanup action is completed.*

Alternative 1 is not effective in protecting human health and the environment. Alternative 2 is protective, but only if the asphalt caps at Sites 8 and 11 and the soil cap at Site 12 are properly inspected and maintained. Alternatives 3, 4, and 5 are effective, permanent solutions for contamination at Sites 8, 11, and 12.

4. Reduction of Toxicity, Mobility, and Volume – *refers to the degree to which a cleanup alternative uses treatment technologies to reduce: 1) harmful effects to human health and the environment (toxicity), 2) the contaminant's ability to move (mobility), and 3) the amount of contamination (volume).*

Only Alternatives 4 and 5 reduce the toxicity, mobility, and/or volume of contaminated soil **through treatment**. Although no treatment is involved, Alternative 2 effectively achieves a reduction in mobility of the contaminated soil at each site by preventing wind erosion and minimizing sediment transport in surface water runoff through capping, while Alternative 3 effectively achieves a reduction in the volume of contaminated soil at each site by removing the soil and recycling it as foundation layer material beneath the landfill caps at Sites 2 and 17. Recycling of the contaminated soil, that is not hazardous, as landfill

foundation layer material would reduce the risks to human health and the environment at Sites 8, 11, and 12 (see page 7 “Recycling of Excavated Soil”).

5. Short-Term Effectiveness – *assesses how well human health and the environment will be protected from impacts due to construction and implementation of a remedy.*

Alternative 1 does not have any short-term impacts on health and safety because this alternative involves no action. Alternative 2 minimizes short-term impacts because the soils do not need to be displaced. Alternatives 3, 4, and 5 involve short-term impacts to health and safety as a result of potential dust emissions from excavation, treating, and transporting of soils. Of these alternatives involving excavation, Alternative 3 has the least impact on health and safety because it involves only excavation and transport and does not require treatment of contaminated soil. Alternative 3 also requires the shortest time to implement.

6. Implementability – *refers to the technical feasibility (how difficult the alternative is to construct and operate) and administrative feasibility (coordination with other agencies) of a remedy. Factors such as availability of materials and services needed are considered.*

All of the action alternatives developed for remediation of Sites 8, 11, and 12 use proven, reliable technologies. However, the alternatives differ significantly in implementability. Alternative 3 involves excavation, hauling of soil, and backfilling the excavated area with clean imported soil. Alternative 2 is more complex because it requires construction of an asphalt or single-layer soil cap which must be designed, built, and maintained for a period of approximately 30 years. Alternatives 4 and 5 do not require maintenance, but do involve using the more complex technologies of soil washing and/or thermal destruction/thermal desorption. In addition, for Alternative 4, a significant amount of resources are expected to be expended in the effort to permit a thermal destruction unit at Site 8.

7. Cost – *evaluates the estimated capital costs and present worth in today's dollars required for design and construction and long-term operation and maintenance costs of a remedy.*

There is no cost associated with Alternative 1. Alternatives 2 and 3 are the least costly of the protective alternatives. Alternatives 4 and 5 are significantly more expensive and do not achieve a higher degree of protection than the preferred remedy at the sites. Alternatives 4 and 5 do reduce concentrations of contaminants in soil through treatment.

C. Modifying Criteria

8. State Acceptance – reflects whether the State of California's environmental agencies agree with, oppose, or have no objection to or comment on the Marine Corps' preferred alternative.

State of California representatives on the MCAS El Toro Base Realignment and Closure Cleanup Team (including California EPA's Department of Toxic Substances Control and Regional Water Quality Control Board) can accept the Marine Corps' preferred remedy, Alternative 3.

9. Community Acceptance – evaluates whether community concerns are addressed by the remedy and if the community has an apparent preference for a remedy. Although public comment is an important part of the final decision, the Marine Corps is compelled by law to balance community concerns with the other criteria.

This Proposed Plan is the Marine Corps' request to the community to comment on the remedial alternatives, the preferred remedy, and the Draft Final Remedial Investigation and Feasibility Study Reports.

Comparative Analysis of Remedial Alternatives

U.S. EPA Criteria	REMEDIAL ALTERNATIVES				
	1	2	3 <i>Preferred Remedy</i>	4	5
1 Overall Protection of Human Health and the Environment	No Does not prevent exposure to contaminated soil.	Yes Provides protection if cap is not disturbed.	Yes Provides protection by removing contaminated soil.	Yes Provides protection by removing and treating contaminated soil.	Yes Provides protection by removing and treating contaminated soil.
2 Compliance with Applicable or Relevant and Appropriate Requirements	N/A ARARs are only applicable when remedial action is taken.	Yes Complies with all ARARs for this alternative.	Yes Complies with all ARARs for this alternative.	Yes Complies with all ARARs for this alternative.	Yes Complies with all ARARs for this alternative.
3 Long-Term Effectiveness and Permanence	Low No reduction in risk.	Moderate Does not treat soil. Reduces mobility.	High Permanently reduces risks by removing contaminated soil.	High Permanently reduces risks by removing and treating contaminated soil.	High Permanently reduces risks by removing and treating contaminated soil.
4 Reduction of Toxicity, Mobility, or Volume through Treatment	Low No reduction in toxicity, mobility, or volume.	Low Does not treat soil. Capping reduces mobility at the sites.	Low Does not treat soil. Reduces volume at the sites by recycling soil at landfills.	High Reduces volume and toxicity by soil washing and thermal processes.	High Reduces volume by soil washing.
5 Short-Term Effectiveness	High No additional exposure to workers or public.	Moderate Contaminated soil is not removed.	Low Excavation may expose workers to contaminants.	Low Excavation, stockpiling, and treatment may expose workers to contaminants.	Low Excavation, stockpiling, and treatment may expose workers to contaminants.
6 Implementability	High No construction activities.	Moderate Capping uses proven technologies. Institutional controls will require administrative effort.	Moderate Excavation and hauling use proven technologies. Recycling will require administrative effort.	Low Significant technical and administrative effort to treat soil and allow various thermal units.	Low Significant technical effort to wash soil. Significant administrative effort to dispose of soil.
7 Total Cost – Sites 8, 11, and 12	None	\$1,990,000	\$2,020,000	\$16,150,000	\$9,130,000
8 State Acceptance	The State cannot accept this alternative.	The State can accept this alternative.	The State can accept this alternative.	The State can accept this alternative.	The State can accept this alternative.

9 Community Acceptance – This criteria will be evaluated following the public comment period and addressed in the Record of Decision.

Applicable or Relevant and Appropriate Requirements for Cleanup at Sites 8, 11, and 12

The federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) states that remedial actions at sites listed on the National Priorities List must meet federal or state (if more stringent) environmental standards, requirements, criteria, or limitations that are determined to be legal applicable or relevant and appropriate requirements (ARARs). MCAS El Toro was listed on the National Priorities List in 1990. The intent of meeting ARARs is to select and implement cleanup or remedial actions that are protective of human health and the environment in accordance with regulatory requirements. Requirements of potential ARARs are divided into three categories:

- **Chemical-specific** – are health- or risk-based numerical values for various environmental media, specified in federal or state statutes or regulations.
- **Location-specific** – addresses regulations that may require actions to preserve or protect aspects of environmental or cultural resources that may be threatened by remedial actions to be undertaken at the site.
- **Action-specific** – are regulations that apply to specific activities or technologies used to remediate a site, including design criteria and performance requirements.

Potential ARARs that will be met by Alternative 3 (preferred remedy) for cleanup and closure at MCAS El Toro Installation Restoration Program Sites 8, 11, and 12 are described below. Also included (on page 13) are key state To Be Considered guidelines that pertain to recycling of wastes that are not hazardous.

Chemical-specific ARARs

■ Federal – U.S. Environmental Protection Agency (U.S. EPA)

The preferred remedial action could potentially involve the generation of hazardous waste (e.g. excavated contaminated soil) during the construction phase of the remedial action. Substantive provisions of the federally authorized (Resource Conservation and Recovery Act) RCRA program implemented in the state of California require that these wastes be characterized to determine if they are hazardous. Potential federal ARARs for waste characterization include Title 22 *California Code of Regulations* [CCR] 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100. If based on the above determination, wastes are determined to be RCRA hazardous waste, hazardous waste accumulation requirements would be applicable.

■ State

State of California regulations related to the identification of non-RCRA hazardous waste are potentially applicable to the preferred remedial action. These regulations include Title 22 CCR 66261.22(a)(3), and (4), 66261.24(a)(2) to (a)(8), 66261.101, 66261.3(a)(2)(C) or 66261.3(a)(2)(F).

Location-specific ARARs

- No potential federal or state location-specific ARARs were identified for Sites 8, 11, and 12.

Action-specific ARARs

■ Federal – U.S. EPA

The preferred remedial action will involve generation of on-site waste. Substantive portions of the federally authorized RCRA program in the state of California for on-site waste generation are potentially applicable. These include Title 22 CCR 66262.10(a) and 66262.11. The determination of whether waste generated during remedial actions is hazardous will be made as wastes are excavated. Excavated waste which is classified as RCRA hazardous waste will be accumulated in accordance with Title 22 CCR 66264.34 and be containerized for storage or transport in compliance with Title 22 CCR 66264.171-174 and 175(a) and (b). At closure, storage containers will be decontaminated in accordance to Title 22 CCR 66264.178. The remedial action will also comply with clean closure regulations to the extent necessary to protect human health and the environment in accordance with Title 22 CCR 66264.111.

■ **State - South Coast Air Quality Management District (SCAQMD)**

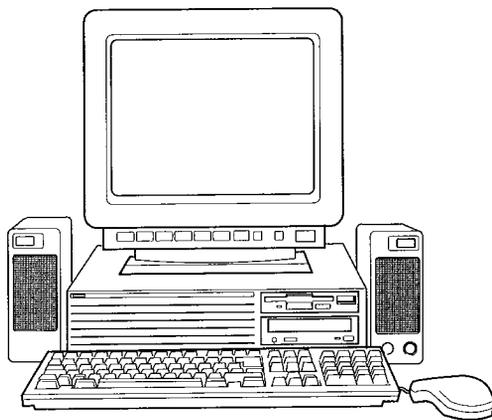
Certain SCAQMD Rules and Regulations are potential state ARARs for air emissions. Fugitive dust emissions are expected for the soil excavation and storage as part of the remedial action alternatives. The substantive provisions of SCAQMD Rules 401 and 403 may be potential ARARs for these fugitive dust emissions.

Guidelines To Be Considered

■ **State - California EPA Department of Toxic Substances Control (DTSC)**

DTSC has published a Management Memo (EO-95-010-MM) that offers guidelines for recycling materials that are non-RCRA hazardous wastes. The "use constituting disposal" restriction affects the eligibility of recyclable materials for the exclusions and exemptions provided under Health and Safety Code 25143.2. These guidelines are To Be Considered for on-Station use of contaminated soil as landfill cover material.

**Internet Connection
Environmental Web Sites**



For access to information on MCAS El Toro (Restoration Advisory Board meeting minutes, proposed plans, and fact sheets), check out the *Southwest Division Naval Facilities Engineering Command Web Site* at:

www.efdswest.navy.mil/pages/envrnmntl.htm

Other environmental web sites include:

Dept. of Defense Environmental Web Site

www.dtic.mil/environdad/envbrac.html

U.S. EPA Superfund Web Site

www.epa.gov/superfund/index.htm

**Reports Available for
Review and Comment**

The collection of reports and documents used by the Marine Corps in the selection of cleanup or environmental management alternatives is the Administrative Record (AR). A site-specific AR file has been compiled for Sites 8, 11, and 12 discussed in this Proposed Plan. It includes the Phase I Remedial Investigation Draft Technical Memorandum (May 1993); the Draft Final Phase II Remedial Investigation Report for all three sites (June 1997); and the Draft Final Phase II Feasibility Study for all three sites (January 1998); the Technical Memorandum on Risk Management Considerations for OU-3A Sites 8, 11, and 12 (November 1998); and the Revised Cost Estimates for the OU-3A Proposed Plan - Site 8 (Unit 3, Alternatives 2 through 5), Sites 11 and 12 (Alternative 4) (February 1999).

The Remedial Investigation and Feasibility Study Reports, other relevant documents that pertain to these sites, and a complete index of all MCAS El Toro documents are housed in the Information Repository at the Heritage Park Regional Library, 14361 Yale Avenue in Irvine, (949) 551-7151.

The complete collection of documents listed in the AR index is also available for review at MCAS El Toro. To schedule a time to review documents at the Station during the public comment period, contact Joseph Joyce at (949) 726-3470 or 726-2840.

Cleanup at Sites 8, 11, and 12 Plays Key Role in Restoration Program

Cleanup of Installation Restoration Program (IRP) Sites 8, 11, and 12 represents one component of the comprehensive environmental investigation and cleanup program underway at MCAS El Toro. Designed to protect public health and the environment, the IRP provides a structure for the Marine Corps to identify, investigate, and implement remedies for contamination that resulted from past operations and waste disposal activities. This effort is being coordinated with the scheduled operational closure of the Station in July 1999. Shown below is the IRP process and the current status of Sites 8, 11, and 12.

To effectively manage the overall cleanup effort, the Marine Corps organized the IRP sites into Operable Units or OUs.

- OU-1 addresses the TCE contamination in the regional groundwater that extends 3 miles west of the Station.
- OU-2A includes Site 24, the VOC Source Area, and Site 25, the Major Drainage Channels.
- OU-2B (Sites 2 and 17) and OU-2C (Sites 3 and 5) address landfill sites that contain a variety of waste materials.
- OU-3 includes the remaining sites at the Station.

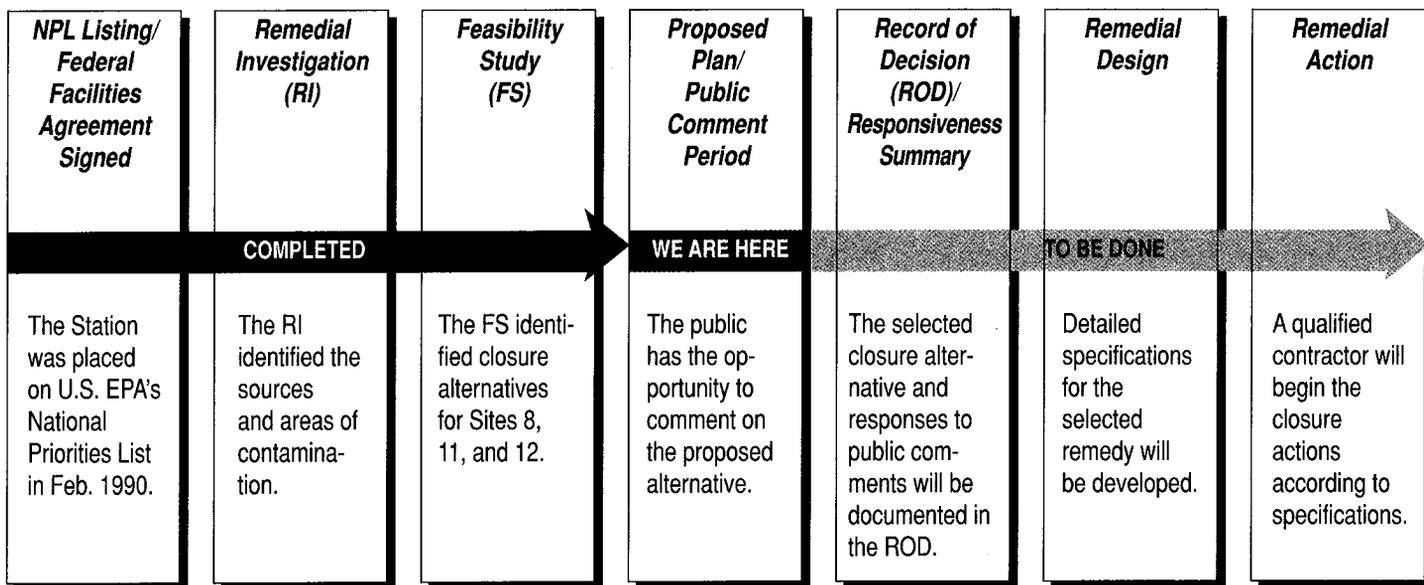
In 1997, the Marine Corps issued Proposed Plans and established public comment periods for: the Site 24 VOC Source Area for soil cleanup using soil vapor extraction technology (SVE); and for the Marine Corps' recommendation for No Fur-

ther Action for OU-3 Sites 4, 6, 9, 10, 13, 15, 19, 20, 21, 22, and OU-2A Site 25. After consideration of public comments on the proposed alternatives, Records of Decision that formally document the remedial actions planned for these sites were issued in September 1997. The Remedial Design for the SVE system at Site 24 was finalized in January 1999. The Interim Remedial Action began in March 1999.

In May 1998, the Marine Corps issued a Proposed Plan for closure of inactive landfills at the Station OU-2B (Sites 2 and 17) and OU-2C (Sites 3 and 5) and established a public comment period. Completion of the ROD for closure of the four landfills is anticipated to occur in 1999. The Marine Corps currently anticipates issuing the Proposed Plan for VOC groundwater cleanup at OU-1 and OU-2A in 1999. The Proposed Plan for remaining OU-3 sites is expected to be released in 2001.

What are the Proposed Reuses for Sites 8, 11, and 12?

Reuse planning for MCAS El Toro is still in the preliminary stages. The preferred reuse option selected in the December 1996 Community Reuse Plan was a major commercial airport with a variety of potential future uses for MCAS El Toro sites. According to this plan, Sites 8, 11, and 12 are located within areas designated for industrial use. The proposed reuse in the area of Site 8 is Institutional (Distribution Center). The proposed reuse in the area of Sites 11 and 12 is Airport Support.



Where to Get More Information

Copies of Remedial Investigation and Feasibility Studies Reports, including the human health risk assessments and other key documents relating to environmental activities at MCAS El Toro, are available for public review at this Information Repository: **Heritage Park Regional Library, 14361 Yale Avenue, Irvine, California 92714; (949) 551-7151**. Current hours of operation: Monday – Thursday 10 a.m. to 9 p.m.; Friday – Saturday 10 a.m. to 5 p.m.; and Sunday 12 p.m. to 5 p.m.

The Marine Corps encourages community involvement in the decision-making process of the environmental restoration program at MCAS El Toro. If you have any questions or concerns about environmental activities at the Station, please feel free to contact any of the following project representatives:

Mr. Joseph Joyce
BRAC Environmental Coordinator
Commanding Officer
AC/S, Environment (1AU)
MCAS El Toro
P.O. Box 95001
Santa Ana, CA 92709-5001
(949) 726-3470

Captain Adrienne Dewey
BRAC Public Affairs Officer
Marine Corps Air Bases,
Western Area (1AS)
MCAS El Toro
P.O. Box 95001
Santa Ana, CA 92709-5001
(949) 726-3853

Mr. Andrew Bain
Community Involvement Coordinator
Superfund Division
U.S. EPA
75 Hawthorne St. (SFD-3)
San Francisco, CA 94105
(800) 231-3075

Ms. Marsha Mingay
Public Participation Specialist
California EPA
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630
(714) 484-5416

MAILING LIST COUPON

If you would like to be on the mailing list to receive information about environmental restoration activities at MCAS El Toro, please complete the coupon below and mail to: Commanding Officer, AC/S, Environment, (1AU), Attn: Mr. Joseph Joyce, IRP Department, MCAS El Toro, P.O. Box 95001, Santa Ana, CA 92709-5001.

Add me to the MCAS El Toro Installation Restoration Program mailing list.

Send me information on Restoration Advisory Board membership.

Name _____

Street _____

City _____ State _____ Zip Code _____

Affiliation (optional) _____ Telephone _____



See Inside

PROPOSED PLAN for Cleanup at Three Shallow Soil Sites

- Environmental Investigation Overview
- Human Health Risk Assessments
- Summary of Site Cleanup Alternatives
- Evaluation of the Preferred Remedy
- Applicable or Relevant and Appropriate Requirements for Cleanup
- Where to Get More Information

Commanding Officer
Attn: Mr. Joseph Joyce
BRAC Environmental Coordinator
AC/S, Environment (1AU)
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Contract No. N68711-92-D-4670
File Code: 02164/02141

IN REPLY REFERENCE: CTO-0155/0482

May 6, 1999

Contracting Officer
Naval Facilities Engineering Command
Southwest Division
Mr. Richard Selby, Code 02R.RS
Building 127, Room 112
1220 Pacific Highway
San Diego, CA 92132-5190

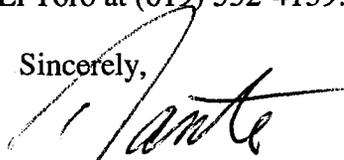
Subject: Final Proposed Plan for Cleanup at Three Shallow Soil Sites, Operable Unit 3,
Sites 8, 11, and 12 – DTD May 1999

Dear Mr. Selby:

It is our pleasure to submit the Final Proposed Plan for cleanup at three shallow soil sites, Operable Unit 3, Sites 8, 11, and 12, for the Marine Corps Air Station (MCAS) El Toro, California, prepared under Contract Task Order (CTO) 0155 and Contract No. N68711-92-D-4670 on behalf of the Department of the Navy. This document has been completed and printed and is being issued to the individuals listed on the transmittal sheet and to the public. The public mailing includes those individuals and organizations included on the MCAS El Toro Community Relations mailing list. Additional copies are being stored by CLEAN II.

If you have any questions or would like further information, please contact Andy Piszkin, the Lead Remedial Project Manager for MCAS El Toro at (619) 532-4159.

Sincerely,



Dante J. Tedaldi, Ph.D., P.E.
Project Manager

DJT/sp

Enclosure: Final Proposed Plan for Cleanup at Three Shallow Soil Sites, Operable Unit 3, Sites 8,
11, and 12, for MCAS El Toro



Bechtel National, Inc. Systems Engineers-Constructors

Bechtel

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San Diego, CA 92101-8502

CLEAN II Program
Bechtel Job No. 22214
Contract No. N68711-92-D-4670
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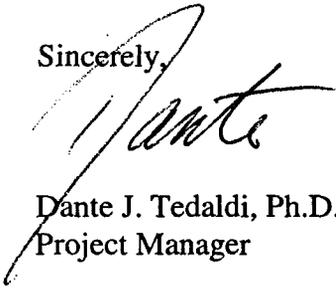
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If you have any questions or would like further information, please contact Bob Coleman at (619) 744-3016, or myself at (619) 744-3080.

Sincerely,


Dante J. Tedaldi, Ph.D., P.E.
Project Manager

DJT/sp

Enclosure: Final Proposed Plan for Cleanup at Three Shallow Soil Sites, Operable Unit 3, Sites 8,
11, and 12, for MCAS El Toro



Bechtel National, Inc. Systems Engineers-Constructors



BECHTEL NATIONAL INC.

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Contract No. N-68711-92-D-4670

Document Control No.: CTO-0155/0482

File Code: 02164/02141

TO: Contracting Officer
Naval Facilities Engineering Command
Southwest Division
Mr. Richard Selby, Code 02R.RS
Building 127, Room 112
1220 Pacific Highway
San Diego, CA. 92132-5190

DATE: May 6, 1999
CTO #: 155
LOCATION: MCAS El Toro

FROM: [Signature]
Project Manager

Program Manager

DESCRIPTION: Final Proposed Plan for Cleanup at Three Shallow Soil Sites, Operable Unit 3, Sites 8, 11, and 12 - DTD May 1999

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VERSION: Final REVISION #: []

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13690 IWO JIMA DR
IRVINE, 92618

13692 IWO JIMA DR
IRVINE, 92618

13686 IWO JIMA DR
IRVINE, 92618

13552 IWO JIMA DR
IRVINE, 92618

13592 IWO JIMA DR
IRVINE, 92618

13612 IWO JIMA DR
IRVINE, 92618

100 JENKINS PL
IRVINE, 92618

101 JENKINS PL
IRVINE, 92618

102 A JENKINS PL
IRVINE, 92618

103 A JENKINS PL
IRVINE, 92618

105 A JENKINS PL
IRVINE, 92618

108 JOHNSON LN
IRVINE, 92618

124 B JOHNSON LN
IRVINE, 92618

121 JOHNSON LN
IRVINE, 92618

116 A JOHNSON LN
IRVINE, 92618

111 A JOHNSON LN
IRVINE, 92618

100 JOHNSON LN
IRVINE, 92618

113 JOHNSON LN
IRVINE, 92618

8601 1/2 MIDWAY DR
IRVINE, 92618

8528 1/2 MIDWAY DR
IRVINE, 92618

8531 1/2 MIDWAY DR
IRVINE, 92618

8541 1/2 MIDWAY DR
IRVINE, 92618

8545 1/2 MIDWAY DR
IRVINE, 92618

8754 1/2 MIDWAY DR
IRVINE, 92618

8562 MIDWAY DR
IRVINE, 92618

8762 1/2 MIDWAY DR
IRVINE, 92618

8756 MIDWAY DR
IRVINE, 92618

8754 MIDWAY DR
IRVINE, 92618

8746 3/4 MIDWAY DR
IRVINE, 92618

8746 1/4 MIDWAY DR
IRVINE, 92618

8742 1/4 MIDWAY DR
IRVINE, 92618

8726 MIDWAY DR
IRVINE, 92618

8645 1/2 MIDWAY DR
IRVINE, 92618

8642 1/2 MIDWAY DR
IRVINE, 92618

8596 MIDWAY DR
IRVINE, 92618

8756 1/2 MIDWAY DR
IRVINE, 92618

8732 MIDWAY PL
IRVINE, 92618

8714 1/2 MIDWAY PL
IRVINE, 92618

8746 1/2 MIDWAY PL
IRVINE, 92618

8743 MIDWAY PL
IRVINE, 92618

8742 1/2 MIDWAY PL
IRVINE, 92618

8739 MIDWAY PL
IRVINE, 92618

8715 MIDWAY PL
IRVINE, 92618

8641 MIDWAY PL
IRVINE, 92618

8591 1/2 MIDWAY PL
IRVINE, 92618

8591 MIDWAY PL
IRVINE, 92618

8572 1/2 MIDWAY PL
IRVINE, 92618

8531 1/4 MIDWAY PL
IRVINE, 92618

8501 1/2 MIDWAY PL
IRVINE, 92618

8742 MIDWAY PL
IRVINE, 92618

8701 MIDWAY PL
IRVINE, 92618

5004 B N 10TH ST
IRVINE, 92618

5013 B N 10TH ST
IRVINE, 92618

5017 B N 11TH ST
IRVINE, 92618

5025 A N 11TH ST
IRVINE, 92618

5023 A N 11TH ST
IRVINE, 92618

5016 B N 11TH ST
IRVINE, 92618

5015 B N 11TH ST
IRVINE, 92618

5024 B N 11TH ST
IRVINE, 92618

13962 1/2 PUSAN AVE
IRVINE, 92618

106 REASONER LN
IRVINE, 92618

108 REASONER LN
IRVINE, 92618

113 REASONER LN
IRVINE, 92618

119 REASONER LN
IRVINE, 92618

121 REASONER LN
IRVINE, 92618

5116 S 2ND ST
IRVINE, 92618

5125 S 3RD ST
IRVINE, 92618

5168 S 3RD ST
IRVINE, 92618

5157 S 5TH PLACE
IRVINE, 92618

5152 S 5TH ST
IRVINE, 92618

5156 S 5TH ST
IRVINE, 92618

8621 SAIPAN PL
IRVINE, 92618

8602 SAIPAN PL
IRVINE, 92618

8711 1/2 TRABUCO RD
IRVINE, 92618

8721 3/4 TRABUCO RD
IRVINE, 92618

8713 1/2 TRABUCO RD
IRVINE, 92618

8731 1/2 TRABUCO RD
IRVINE, 92618

8705 TRABUCO RD
IRVINE, 92618

8701 TRABUCO RD
IRVINE, 92618

8591 1/2 TRABUCO RD
IRVINE, 92618

8581 1/2 TRABUCO RD
IRVINE, 92618

8561 TRABUCO RD
IRVINE, 92618

8515 1/2 TRABUCO RD
IRVINE, 92618

8501 1/2 TRABUCO RD
IRVINE, 92618

8431 1/2 TRABUCO RD
IRVINE, 92618

8721 1/4 TRABUCO RD
IRVINE, 92618

13773 WAKE AVE
IRVINE, 92618

13775 WAKE AVE
IRVINE, 92618

13791 3/4 WAKE AVE
IRVINE, 92618

13801 1/2 WAKE AVE
IRVINE, 92618

13831 WAKE AVE
IRVINE, 92618

13831 1/2 WAKE AVE
IRVINE, 92618

13831 3/4 WAKE AVE
IRVINE, 92618

13851 3/4 WAKE AVE
IRVINE, 92618

13861 WAKE AVE
IRVINE, 92618

13921 WAKE AVE
IRVINE, 92618

13941 1/4 WAKE AVE
IRVINE, 92618

13771 1/4 WAKE AVE
IRVINE, 92618

13951 WAKE AVE
IRVINE, 92618

13462 WAKE AVE
IRVINE, 92618

13961 1/2 WAKE AVE
IRVINE, 92618

13711 1/2 WAKE AVE
IRVINE, 92618

13681 WAKE AVE
IRVINE, 92618

13662 WAKE AVE
IRVINE, 92618

13536 WAKE AVE
IRVINE, 92618

13522 WAKE AVE
IRVINE, 92618

13502 WAKE AVE
IRVINE, 92618

13466 WAKE AVE
IRVINE, 92618

13452 WAKE AVE
IRVINE, 92618

13441 WAKE AVE
IRVINE, 92618

13362 WAKE AVE
IRVINE, 92618

13352 WAKE AVE
IRVINE, 92618

13325 WAKE AVE
IRVINE, 92618

13312 WAKE AVE
IRVINE, 92618

13295 WAKE AVE
IRVINE, 92618

13471 WAKE AVE
IRVINE, 92618

Dan Avera, Chief
Division of Environmental Health
San Diego County
P.O. Box 85261
San Diego, CA. 92138

Jane Williams
Desert Citizens Against Pollution
3813 West 50th Street
Rosamond, CA. 93560

Mr. Arturo Aguirre, Deputy
Department of Health Services
Los Angeles County
2525 Corporate Place, Suite 150
Monterey Park, CA. 91754

Mr. David C. Nunenkamp, Chief
Department of Toxic Substances Control
Public & Regulatory Assistance
P.O. Box 806 MS/HQ-6
Sacramento, CA. 95812-0806

Mr. Jim Marxen
Department of Toxic Substances Control
Public Participation & Education
M/S HQ-15 P.O. Box 806
Sacramento, CA. 95812-0806

Mr. John M. Fanning
Environmental Health
4065 County Circle Drive
Riverside, CA. 92503

Mr. Paul J. Scrivner
Alton Geoscience
25 Technology Drive, A
Irvine, CA. 92718

Mr. Stan Phillippe, Division Chief
Department of Toxic Substances Control
Office of Military Facilities
P.O. Box 806
Sacramento, CA. 95812-0806

Mr. Victor Weisser
California Council for
Environmental and Economic Balance
100 Spear Street, Suite 805
San Francisco, CA. 94105

Ms. Diane Takvorian
Environmental Health Coalition
1717 Kettner Blvd., Suite 100
San Diego, CA. 92101

David Roe
Rockridge Market Mall
Environmental Defense Fund
5655 College Avenue, Suite 304
Oakland, CA. 94618

Jody Sparks
Toxics Assessment Group
P.O. Box 73620
Davis, CA. 95617

Mr. Bradley Angel
Greenaction
915 Cole Street Box 249
San Francisco, CA. 94117

Mr. Donald D. Cillay
Dept. of Health & Human Services
City of Long Beach
2525 Grand Avenue
Long Beach, CA. 90815

Mr. John Bors
Morrison Knudson Corporation
1 Market Plaza Steuart Tower Suite 400
San Francisco, CA. 94105

Mr. John Scandura, Chief
Office of Military Facilities
Dept. of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA. 90630

Mr. Robert Merryman, Director
Orange Cnty. Health Care Agency
Environmental Health Division
2009 East Edinger
Santa Ana, CA. 92705

Mr. Suwan Sonkprasha
Duty Officer
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA. 90630

Ms. Ann Coombs
League of Women Voters
65 Avalon Drive
Los Altos, CA. 94022

Ms. Gwendolyn Eng
Regional Representative
U.S. EPA Region IX
75 Hawthorne Street
San Francisco, CA. 94105

Gary Orso, Assessor
Riverside County
P.O. Box 12004
Riverside, CA. 92502-2204

Mr. Anthony Landis, Chief
Office of Military Facilities
Department of Toxic Substances Control
10151 Croydon Way, Suite 3
Sacramento, CA. 95827

Mr. Chuck White
Waste Mgmt. of N. America Govt. Affairs
915 L Street, Suite 1430
Sacramento, CA. 95814

Mr. Gary Patton
Planning and Conservation League
926 J Street, Suite 612
Sacramento, CA. 95814

Mr. John Hinton, Ombudsman
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA. 90630

Mr. Mike Belliveau
Communities For a Better Environmenta
500 Howard Street Suite 506
San Francisco, CA. 94105

Mr. Robert Yelin
Roy Weston & Associates
23682 Sandalwood Street
West Hills, CA. 91307

Mr. Thomas L. Wolf, Director
Division of Environmental Health
Imperial County
939 Main Street
El Centro, CA. 92243

Ms. Bonnie Holmes
Sierra Club
1414 K Street, Suite 300
Sacramento, CA. 95814

Ms. Jennifer Rich
Department of Toxic Substances Control
Office of Military Facilities
5796 Corporate Avenue
Cypress, CA. 90630

Ms. Liz Allen
Sierra Club
394 Blaisdell
Claremont, CA. 91711

Ms. Marsha Mingay
Department of Toxic Substances Control
Public Participation Specialist
5796 Corporate Avenue
Cypress, CA. 90630

Ms. Mary Raftery
Legislative Advocate
CALPIRG
926 J Street, Suite 713
Sacramento, CA. 95814

Ms. Pamela Bennett, Director
Environmental Health Services
San Bernardino County
385 North Arrowhead
San Bernardino, CA. 92415

Ms. Suzy Moraes
ENACT
League of Women Voters
26009 Blascos
Mission Viejo, CA. 92691