Final

Record of Decision for Operable Unit 2C - Anomaly Area 3

Former Marine Corps Air Station El Toro, California

August 9, 2010

Prepared for:
Base Realignment and Closure
Program Management Office West
San Diego, California

Prepared under:
Naval Facilities Engineering Command
Contract Number N68711-03-D-5106
Contract Task Order 006

BAI.5106.0006.0007

TABLE OF CONTENTS

ATTACHMENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

§	Section
AA 3	Anomaly Area 3
APHO	aerial photograph
ARAR	applicable or relevant and appropriate requirement
ARIC	Area Requiring Institutional Controls
bgs	below ground surface
BRAC	Base Realignment and Closure
Cal/EPA	California Environmental Protection Agency
CCR	California Code of Regulations
CDHS	California Department of Health Services
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CIWMB	California Integrated Waste Management Board
CO	carve-out
COC	chemical of concern
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
CSM	conceptual site model
CTE	central tendency exposure
DTSC	(Cal/EPA) Department of Toxic Substances Control
ESI	expanded site inspection
ET	evapotranspiration
FFA	Federal Facility Agreement
FOSL	Finding of Suitability to Lease
FS	feasibility study
GCL	geosynthetic clay liner
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
HRA	Historical Radiological Assessment
IC	institutional control
IRP	Installation Restoration Program
LIFOC	lease in furtherance of conveyance
LFG	landfill gas
LRA	Local Reuse Authority

ACRONYMS AND ABBREVIATIONS (Continued)

MCAS	Marine Corps Air Station
MCL	maximum contaminant level
MOA	Memorandum of Agreement
MSCR	miscellaneous refuse
Navy	Department of the Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priority List
O&M	operation and maintenance
OSWER	Office of Solid Waste and Emergency Response
OU	operable unit
PMO	Program Management Office
PRG	preliminary remediation goal
RAB	Restoration Advisory Board
Ra-226	Radium-226
RAO	remedial action objective
RD	remedial design
RI	remedial investigation
RME	reasonable maximum exposure
RSE	removal site evaluation
ROD	record of decision
RWQCB	(California) Regional Water Quality Control Board Santa Ana Region
SARA	Superfund Amendments and Reauthorization Act of 1986
SRA	screening risk assessment
SVOC	semivolatile organic compound
TPH	total petroleum hydrocarbons
U.S. EPA	United States Environmental Protection Agency
VOC	volatile organic compound

1. DECLARATION

This Record of Decision (ROD) presents the selected remedial action for Anomaly Area 3 (AA 3) at former Marine Corps Air Station (MCAS) El Toro, located in Orange County, California. MCAS El Toro was placed on the National Priority List (NPL) in 1990 (United States Enviornmental Protection Agency [U.S. EPA] ID: CA6170023208). The remedy for AA 3 was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) (Title 42 *United States Code* Section [§] 9601, et seq.), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (Title 40 *Code of Federal Regulations* [CFR] Part 300). This decision is based on information contained in the Administrative Record[1] (Attachment 1) for this site. Information not specifically summarized in this ROD or its references but contained in the Administrative Record File has been considered and is relevant to the selection of the remedy at AA 3. Therefore, this ROD is based on and relies on the entire Administrative Record File in making the decision.

The Department of the Navy (Navy) and U.S. EPA jointly selected the remedy for AA 3 and the California Environmental Protection Agency's (Cal/EPA's) Department of Toxic Substances Control (DTSC) and the Regional Water Quality Control Board, Santa Ana Region (RWQCB) concur on the remedy for AA 3. The Navy provides funding for site cleanups at former MCAS El Toro on behalf of the Marine Corps. The Federal Facility Agreement (FFA) for former MCAS El Toro was signed in 1990 and documents how the Navy and Marine Corps intend to meet and implement CERCLA in partnership with the U.S. EPA, DTSC, and the RWQCB.

The investigation of all media (air, soil, soil gas, groundwater, sediment, and surface water) and site characterization for contiguous areas associated with AA 3 are complete. Historical activities at AA 3 have not resulted in statistically significant releases of constituents to groundwater based on statistical evaluations of monitoring data. Human health and ecological risks have been quantified and are considered acceptable. AA 3 was also reclassified as non-impacted radiologically and was accepted for unrestricted release and considered to meet the radiological criteria for unrestricted use. California Department of Health Services (CDHS) concurred that AA 3 may be released for unrestricted use.

A total of 25 Installation Restoration Program (IRP) sites have been investigated at former MCAS El Toro. One site (IRP Site 23) was eliminated as an environmental concern; the remaining 24 sites were grouped into 6 operable units (OUs) including OU-1, OU-2A, OU-2B, OU-2C, OU-3A, and OU-3B. OU-2C encompasses IRP Sites 3, 5, and AA 3; AA 3 is administratively linked to IRP Site 3, since construction debris from IRP Site 3 was disposed at AA 3. Because the Remedial Investigation (RI)/ Feasibility Study (FS) for AA 3 was still underway, it could not be included in the OU-2C ROD for IRP Sites 3 and 5. This ROD documents the final remedial action for AA 3 and does not include or affect any other sites at the facility.

1.1 SELECTED REMEDY

The CERCLA remedial action selected in this ROD is necessary to protect the public health, welfare, and the environment from actual or threatened releases of hazardous substances into the environment. Remedial alternatives were developed to protect human health and the environment from potential landfill gas (LFG) in the central portion of the site and from semivolatile organic compounds (SVOCs), petroleum hydrocarbons, and metals in shallow soil at AA 3. The final Selected Remedy for AA 3 includes the following components which are described in more detail in Section 2.9.2.

[1] Regular blue text indicates an internal hyperlink (e.g., a link to a table, figure, or other section in the document).

- Limited grading of the existing cover and minor waste consolidation, constructing a finger dike, and placing riprap to prevent erosion of the cover and to control storm water in the vicinity of Agua Chinon Wash.

- Institutional controls (ICs) in the form of land-use restrictions to limit access and/or activities at the site to protect public health and the environment.

- A passive/active LFG venting and monitoring system which would be activated as necessary to minimize or control potential LFG migration within the 100-foot buffer zone surrounding the landfill.

- Long-term environmental monitoring for approximately 30 years or until monitoring data indicate that the waste no longer presents a risk to human health and the environment. Monitoring requirements will be reevaluated for appropriateness at five year intervals to ensure that waste materials (primarily construction debris) do not impact groundwater or release unacceptable levels of LFG beyond the 100-foot protective buffer zone surrounding the landfill.

- No action for groundwater at AA 3, although groundwater monitoring is included as a component of the Selected Remedy.

The Selected Remedy is protective of human health and the environment, complies with substantive federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The Selected Remedy is consistent with the presumptive remedy for landfills and uses permanent solutions and alternative remediation technologies to the maximum extent practicable. However, because treatment of the contaminants at AA 3 was not found to be practicable or necessary, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The heterogeneity and volume of buried wastes and the absence of on-site hot spots that would represent major sources of contamination preclude a remedy by which contaminants could be excavated and treated effectively. Because this remedy will result in landfill wastes remaining on-site, five-year reviews for AA 3 will be conducted as a component of ongoing five-year reviews at El Toro to ensure that the Selected Remedy remains protective of human health and the environment.

1.2 DATA CERTIFICATION CHECKLIST

Data	Section in ROD
Chemicals of concern (COCs) and their respective concentrations	2.3
Risk represented by the COCs	2.5
Cleanup goals established for COCs and the basis for these levels	2.7
How source materials constituting principal threats are addressed	2.6
Current and reasonably anticipated future land-use assumptions used in the risk assessment	2.4
Potential land and groundwater use that will be available at the sites as a result of the Selected Remedy	2.9.3
Estimated capital, annual operation and maintenance (O&M), and total present worth costs; discount rate; and the number of years over which the remedy cost estimates are projected	Table 2-2
Key factors that led to selecting the remedy	2.9.1

If previously unknown contamination resulting from Navy activities is discovered after execution of this ROD, the Navy will conduct any necessary actions to ensure continued protection of human health and the environment, consistent with CERCLA Section 120(h) (42 U.S.C. § 9620[h]).

1.3 AUTHORIZING SIGNATURES

This signature sheet documents the Navy and U.S. EPA's co-selection of the Selected Remedy in this ROD for Anomaly Area 3 at former MCAS El Toro. This signature sheet also documents the state of California's (DTSC and RWQCB) concurrence with this ROD. The respective parties may sign this sheet in counterparts.

James T. Callian — MAY 20, 2010

Mr. James T. Callian
BRAC Environmental Coordinator
Former MCAS El Toro

Date

Mr. Michael M. Montgomery — August 9, 2010
Assistant Director of Federal Facilities
and Site Cleanup Branch, Region 9
U.S. Environmental Protection Agency

Date

The State of California, Department of Toxic Substances Control and Regional Water Quality Control Board had an opportunity to review and comment on the Record of Decision and their comments were addressed.

Mr. John Geroch — 6/1/2010
Supervising Hazardous Substances Scientist
Brownfields and Environmental Restoration Program
Department of Toxic Substances Control

Date

Mr. Gerard Thibeault — 5/26/10
Executive Officer
California Regional Water Quality Control Board Santa Ana Region

Date

2. DECISION SUMMARY

2.1 SITE DESCRIPTION AND HISTORY

Former MCAS El Toro is located in Orange County, California, approximately 8 miles southeast of Santa Ana and 12 miles northeast of Laguna Beach (Figure 2-1). Former MCAS El Toro covers approximately 4,738 acres. Land use around MCAS El Toro includes commercial, light industrial, and residential. MCAS El Toro closed on 2 July 1999, as part of the Base Realignment and Closure (BRAC) Act.

AA 3 encompasses an area of approximately 5.14 acres (2.08 hectares) and is located in the northwestern section of the former MCAS El Toro facility near Pusan Way and adjacent to the Agua Chinon Wash (Figure 2-2). AA 3 has also been designated as Miscellaneous Refuse (MSCR) 1, a "former refuse disposal area" in the BRAC Business Plan update. MSCR AA 3 refers to seven aerial photograph (APHO) anomaly areas (APHOs 59, 60, 61, 62, 63, 64, and 65) identified during a review of aerial photographs taken between 1946 and 1992. The **APHO anomalies**$_{(1)}$ associated with AA 3 also include features that are not contiguous with the study boundary.

Historically, AA 3 was used as a source of borrow material. Records indicate that some of the borrow pits and trenches were backfilled with construction debris and later covered with five feet or more of fill soil. During previous investigations, it was confirmed that there is an average of approximately 4.5 feet of soil cover with isolated areas having as little as 2 feet of soil cover over the construction debris. Based on a review of historical aerial photographs and topographic maps, placement of construction debris occurred between 1972 and 1988. Interviews with former Station personnel indicate that construction debris generated during the construction of IRP Site 3 were placed at AA 3.

2.2 SITE CHARACTERISTICS

Former MCAS El Toro lies on the southeastern edge of the Tustin Plain, a gently sloping surface of alluvial fan deposits derived mainly from the Santa Ana Mountains. The local climate is characterized as temperate semiarid. Yearly rainfall averages 10 to 12 inches. Atmospheric humidity is usually low. Consistent light-to-moderate coastal onshore winds preclude stagnant air conditions over the area. These conditions result in minimal net infiltration during precipitation events as the result of rapid runoff and high evapotranspiration (ET) rates.

Silty and clayey sediments are predominant throughout the central and northwestern portion of former MCAS El Toro, and sandy sediments are predominant in areas near the foothills. Sandstone and siltstone bedrock outcrops in the foothills; the sands are generally well-graded and commonly contain clay lenses. Subsurface **stratigraphy**$_{(2)}$ at AA 3 consists of fine- to coarse-grained sediments (sandstone, siltstone, and claystone) overlying bedrock.

One part of the site, the head cut drainage way at the southeastern boundary, potentially meets federal criteria as waters of the United States and California criteria as a jurisdictional streambed (see Figure 2-2). The ordinary high-water marks, indicated by sediment deposits and small banks cut by running water, are less than 0.01-acre of potentially federal jurisdictional waters of the United States. No part of AA 3 meets all three federal criteria as a **wetland**$_{(3)}$.

Bold blue text identifies detailed site information available in the Administrative Record File and listed in the References Table (Attachment 2). This ROD is also available on CD whereby **bold blue text** serves as a hyperlink to reference information. The hyperlink will open a text box at the top of the screen. A blue box surrounds applicable information in the hyperlink. To the extent there may be inconsistencies between the referenced information attached to the ROD via hyperlinks and the information in the basic ROD itself, the language in the basic ROD controls.

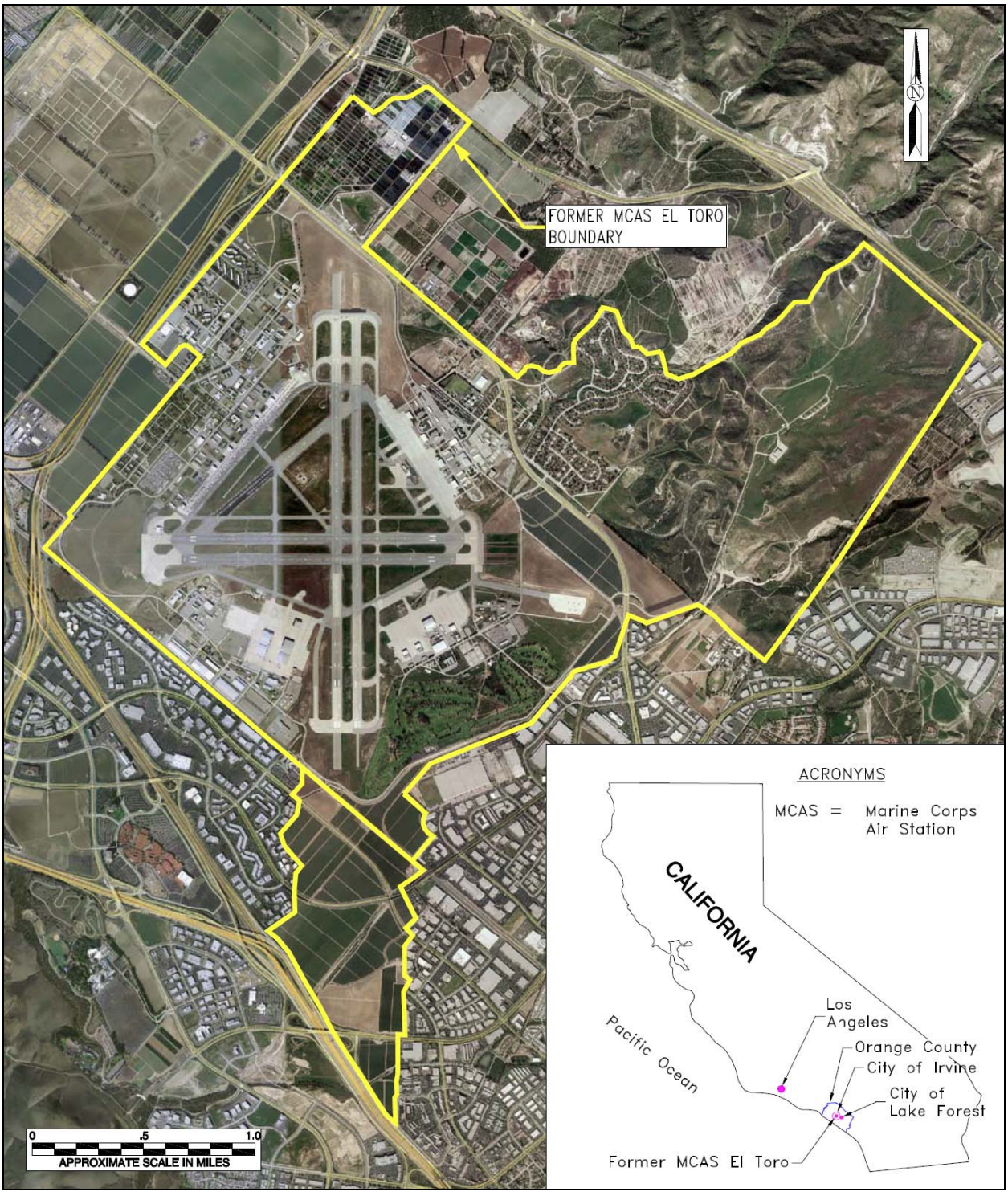


Figure 2-1 Site Vicinity Map

2.3 PREVIOUS INVESTIGATIONS

Previous investigations conducted at AA 3 include:

- 1993 – Aerial Photograph Assessment;
- 1999 to 2000 – Groundwater, soil, and soil vapor investigation, geophysical investigation, trenching, and **radiological screening**[4];
- 2000 – Final Historical Radiological Assessment (HRA)
- 2002 to 2005 – Removal Site Evaluation (RSE) (including eight rounds of groundwater monitoring);
- 2003 – Human Health and Ecological Screening Risk Assessments (SRAs);
- 2003 – Expanded Site Inspection (ESI);
- 2006 – Final Radiological Release Report
- 2007 to 2008 – Supplemental Groundwater Monitoring; and
- 2008 to 2009 – Remedial Investigation (RI)/Feasibility Study (FS).

The December 2006 Final Radiological Release Report provides **radiological final status survey**[5] information, with supporting data, for AA 3. No evidence of radiological materials was noted during previous investigations or during the radiological survey and soil sampling. Results from the radiological assessment indicate that the surface of AA 3 contains only radiation levels which are present as the result of natural radioactivity contained in ground surface materials (e.g., gravel, crushed rock, etc.) and that the level of Radium-226 (Ra-226) exposure at the surface of AA 3 is in the range of the Station background for a residential receptor. AA 3 was therefore considered to meet the radiological criteria for unrestricted use. CDHS concurred that AA 3 may be released for unrestricted use.

The July 2009 RI/FS Report presents a summary of all **previously collected data**[6] (air, soil gas, soil, groundwater, sediment, and surface water results) and **RSE findings**[7]. Significant findings are briefly summarized below.

- The area of waste placement at AA 3 is approximately 5.14 acres and the volume of waste within AA 3 is approximately 230,000 cubic yards. There is an average of 4.5 feet of soil cover with isolated areas having as little as 2 feet of soil cover over the construction debris.

- Air sampling results showed that surface air at AA 3 has not been impacted by wastes remaining at the site and results are consistent with ambient (background) air sample results.

- Soil gas results showed that methane is confined to the central portion of the site and is not migrating to the perimeter of the site.

- Surface soil (0 to 1 feet below ground surface [bgs]) results showed few exceedances (isolated SVOCs and dioxins) of residential U.S. EPA Region 9 preliminary remediation goals (PRGs).

- All surface soil analytical results indicated that metal concentrations are below PRGs or are within background concentrations.

- Subsurface soil analytical results indicated one isolated SVOC in exceedance of residential PRGs. Total petroleum hydrocarbons (TPH) as diesel was reported at low concentrations and metal exceedances of background and PRGs were isolated and likely attributable to natural conditions.

- Groundwater analytical results indicated no conclusive evidence of a release from AA 3; volatile organic compounds (VOCs) and TPH have not been reported in groundwater and no conclusive trends could be established to determine that historical activities at AA 3 have impacted groundwater.

- Sediment analytical results from Agua Chinon Wash indicated all metals concentrations were within the range typical of background concentrations.

- Surface water analytical results from upstream and downstream locations within Agua Chinon Wash indicated maximum contaminant level (MCL) exceedances for aluminum and chromium; however, the upstream and downstream concentrations were consistent, indicating that AA 3 has not impacted surface water in the wash.

- The surface of AA 3 contains only natural radioactivity (e.g. in gravel, crushed rock, etc.), and the level of exposure to Ra-226 for a potential residential receptor at AA 3 is within Station background. AA 3 was therefore reclassified as non-impacted radiologically and was accepted for unrestricted release.

- Based on the RSE findings as documented in the RI/FS Report, an adequate characterization of the nature and extent of releases has been completed. The human health and ecological risks have been quantified and are within acceptable risk management ranges. However, due to the presence of construction related debris at the site, the proximity of waste to groundwater, and the presence of elevated methane concentrations in the central portion of the site, an evaluation of response actions necessary for continued protection of human health and the environment was recommended.

As part of the RI/FS, groundwater sampling was conducted at AA 3 to further characterize groundwater and support the remedy selection process. **Supplemental groundwater monitoring**(8) is ongoing and the results have been consistent with previous monitoring data.

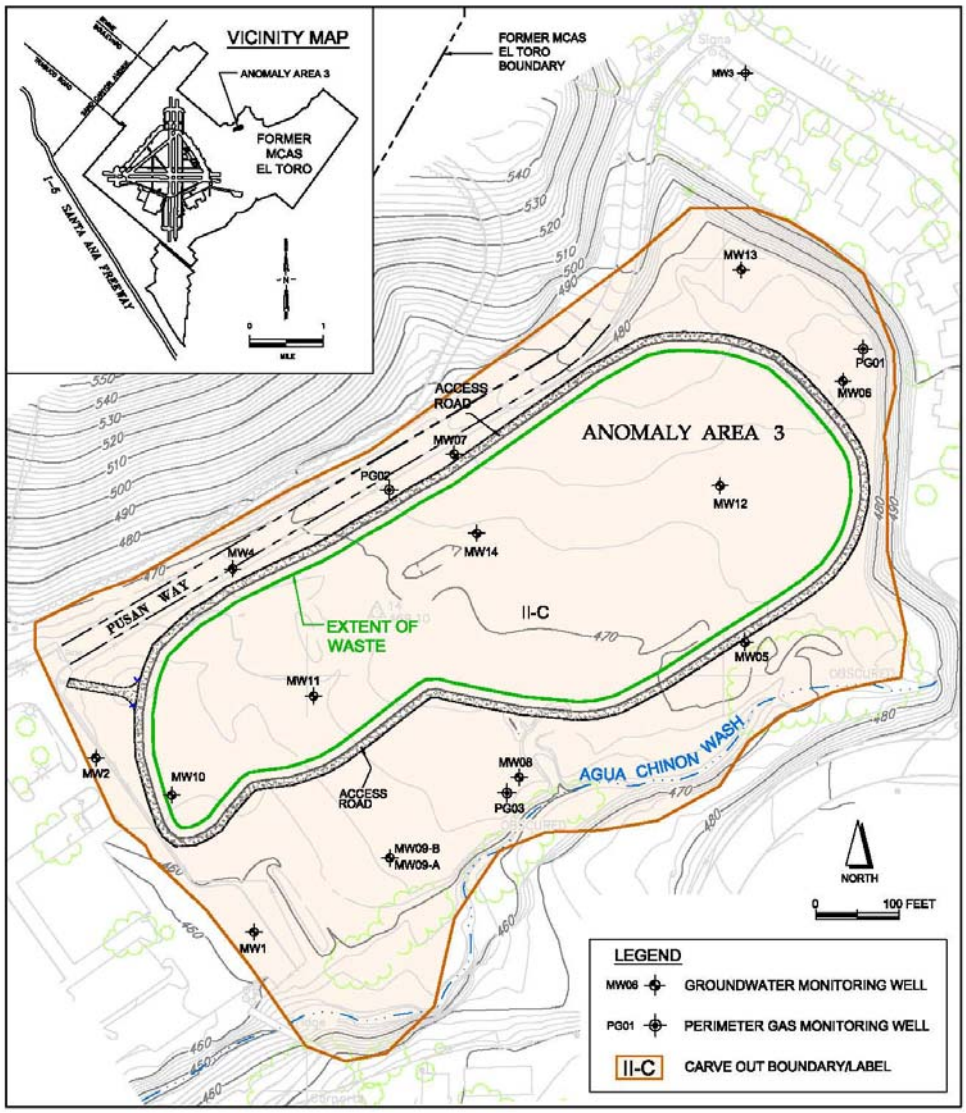


Figure 2-2 Site Plan

2.4 CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

Former MCAS El Toro was closed on 2 July 1999. From 1994 to 2002, the County of Orange, the designated Local Reuse Authority (LRA), proposed a commercial aviation reuse for former MCAS El Toro. This proposal was submitted as a BRAC Reuse Plan. In March 2002, County voters overturned those planning efforts with the passage of Measure W, a referendum that changed the Orange County General Plan for former MCAS El Toro to a non-aviation use and recreational theme, with limited development intensities. After the March 2002 vote, the LRA decided that it would not prepare another BRAC Reuse Plan for the property. Consequently, the Navy decided not to dispose of the property with any particular reuse or redevelopment plan and that reuse would ultimately be determined by local zoning applicable at the time of sale.

In November 2003, the City of Irvine annexed the former Station property. The City of Irvine has not prepared a BRAC Reuse Plan. However, a conceptual Reuse Plan titled the "Orange County Great Park" was prepared and approved by the City of Irvine; calling for mixed uses of residential, commercial, and recreational open space.

In July 2005, the Navy completed the process of conveying the former Station through public sale to a private developer. Although the sale resulted in a majority of the property being transfered by deed, areas that required further environmental investigation and/or response actions were retained by the Navy. These areas, known as carve-outs (COs), were leased to the developer in accordance with the Finding of Suitability to Lease (FOSL) under a Lease in Furtherance of Conveyance (LIFOC). Upon meeting the environmentally suitable for transfer requirments, the COs are deeded to the buyer. Based on the Orange County Great Park Plan as referenced above, AA 3 is zoned as low-density residential. AA 3 is located within CO II-C (Figure 2-2).

Former MCAS El Toro is located within the Irvine Management Zone (formally known as Irvine Groundwater Forebay), which has been designated by the RWQCB as a public water supply source. The aquifer located directly beneath former MCAS El Toro is not currently used for municipal water supply; however, the groundwater near the Station is used for agricultural purposes.

2.5 SUMMARY OF SITE RISKS

A **conceptual site model**(9) (CSM) was developed during previous investigations at AA 3 and refined during the RI/FS to guide the evaluation of potential exposures so that relevant pathways, exposure routes, and ultimately risk, could be evaluated in the human health and ecological SRAs discussed in Section 2.5.1 and Section 2.5.2, respectively. The primary purpose of the CSM in risk evaluation is to represent chemical sources and exposure pathways that may result in human health or ecological risks. Only potentially complete exposure pathways were evaluated quantitatively in these risk assessments, consistent with U.S. EPA guidance.

"Risk" is the likelihood or probability that a hazardous chemical, when released to the environment, will cause adverse effects on exposed humans or other ecological receptors. A human health risk assessment (HHRA) was conducted in accordance with federal and state guidelines as part of the RI/FS for AA 3. An ecological risk assessment was also conducted to evaluate potential effects on plants and animals from exposure to chemicals at the site.

2.5.1 Human Health Risk Assessment

A Tier 1 **human health SRA**(10) was conducted to identify chemicals of potential concern (COPCs) that may pose unacceptable risks to human health. To satisfy screening requirements of U.S. EPA Region 9, the SRA incorporated all elements identified as necessary for a Tier 1 screening assessment and some elements typically included in a Tier 2 assessment. These elements include evaluation of cumulative risks and risks under both a high-end level of exposure (reasonable maximum exposure [RME]) and an average level of exposure (central tendency exposure [CTE]), as well as a detailed qualitative evaluation of the uncertainty associated with these evaluations,. The human health SRA focused on the risk from potential human exposure to surface and subsurface soil and to groundwater that may have been impacted by contamination from past operations (e.g., excavation of soils for use as borrow material and/or placement of nonhazardous construction debris).

As a part of the risk assessment, different pathways were considered for which people might be exposed to chemicals, the possible concentrations of chemicals that could be encountered during exposures, and the potential frequencies and durations of exposures, based on various potential future uses. Risks were evaluated for several potential reuse scenarios: visitors to the site, construction workers, agricultural and

industrial workers, park users, and residents (the most conservative scenario). Risk calculations were based on "conservative" assumptions, which means that the assumptions tend to overestimate risk, resulting in cleanup goals that are more protective of human health. The residential scenario is considered the most conservative as it assumes that potential exposures to chemicals of concern (COCs) would be greater than those assumed under a commercial/industrial scenario.

The NCP requires that the baseline risk assessment provide risk managers with an understanding of the actual or potential risks to human health and the environment and the uncertainties associated with the assessment. The total risk using all the potential exposure pathways represents the total lifetime cancer risk, which includes ingestion of soil; dermal contact with soil; inhalation of particulates released from soil; inhalation of chemical vapors released from soil to indoor air; inhalation of chemical vapors released from groundwater to indoor air during household water use (showering, laundering, and dishwashing, etc.); ingestion of groundwater; and dermal contact with groundwater.

The NCP states that, for known or suspected carcinogens, acceptable exposure levels are those that represent an excess upper-bound lifetime cancer risk between 10^{-4} and 10^{-6}. The role of the U.S. EPA's Office of Solid Waste and Emergency Response (OSWER) Directive (9355.0-30) is to clarify risk management decisions. It points out that the upper boundary of the risk range (10^{-4}) is not a discrete line and risk estimates around this value may be considered acceptable based on site-specific conditions. The 10^{-6} value is used as the point of departure for determining cleanup goals when applicable or relevant and appropriate requirements (ARARs) are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple exposure pathways. The maximum acceptable exposure for noncancer risk corresponds to a hazard index (HI) less than 1.

Results from the human health SRA indicate potential risks to human health and the environment would continue to be present if actions are not taken at AA 3 to prevent exposures to wastes or to control infiltration. The cancer risk estimates for soil (for all chemicals except arsenic) are all within or below U.S. EPA's risk management range and non-cancer HIs are all less than or equal to 1 (see Table 2-1). Medium-specific cancer risks and HIs were considered separately for soil, groundwater, and indoor air to evaluate if further action was warranted at AA 3 (see Table 2-1). The results of the human health SRA are presented in the sections below.

2.5.1.1 *Soil*

The results for surface soil (0 to 1 foot bgs) and subsurface soil (0 to 10 feet bgs) indicated a generally acceptable risk for residential reuse scenarios, with an estimated incremental lifetime cancer risk of $4x10^{-5}$ for both surface and subsurface soil under an RME assumption. The noncancer HI was equal to 1 (see Table 2-1). Under an average or CTE assumption, risk estimates decreased by approximately an order of magnitude. Under the RME assumption, the risk estimates for other reuse scenarios (other than residential) range from less than $2x10^{-6}$ (escorted visitor - surface soil scenario) to a maximum of $3x10^{-5}$ (agricultural worker–subsurface soil scenario). Noncancer HIs did not exceed the threshold value of 1 for any exposure scenarios. The chemicals associated with the majority of the risk are SVOCs. A significant portion of the risk (between 66 percent and 78 percent) is attributable to benzo(a)pyrene. The metal arsenic contributes 20 percent of the risk. Arsenic concentrations are within the natural background concentrations reported at MCAS El Toro. The cumulative life time cancer risks remain within the risk management range of 10^{-6} to 10^{-4}. Therefore, based on the risk assessment, the site does not pose unacceptable threat to human health.

2.5.1.2 *Groundwater*

For the human health groundwater pathway evaluation, the RME and CTE cancer risk estimates were $3x10^{-4}$ and $5x10^{-5}$, respectively, for a residential receptor at the site (see Table 2-1). Arsenic accounted for approximately 75 percent of these estimated risks. The noncancer HIs ranged from 7 to 6 for the RME and CTE assumptions, respectively, with antimony, arsenic, chromium, thallium, and vanadium being the primary contributors. Arsenic concentrations reported in groundwater were within the natural background concentrations reported for former MCAS El Toro. Therefore, based on the risk assessment, groundwater at the site does not pose an unacceptable threat to human health.

2.5.1.3 *Indoor Air*

The evaluation of human health risks associated with potential soil vapor migration from subsurface soil into indoor air resulted a residential excess cancer risk of $4x10^{-6}$ for the RME assumption and $9x10^{-7}$ for the CTE assumption and a cumulative noncancer HI less than 1 (see Table 2-1). The residential excess cancer risk and noncancer HI associated with volatile chemicals emanating from groundwater into indoor air were below 10^{-6} and 1, respectively, regardless of the receptor or exposure assumption (RME or CTE). Additionally, risks for potential industrial exposures were lower. Therefore, based on the risk assessment, potential migration of vapors from soil and groundwater into indoor air does not pose an unacceptable threat to human health.

TABLE 2-1 TOTAL U.S. EPA LIFETIME CANCER RISK AND HAZARD INDEX FOR RESIDENTIAL USE

Exposure Medium	U.S. EPA Cancer Risk		Hazard Index	
	RME	CTE	RME	CTE
Soil[1]	4×10^{-5}	4×10^{-6}	1	0.1
Groundwater[2]	3×10^{-4}	5×10^{-5}	7	6
Indoor air	4×10^{-6}	9×10^{-7}	6×10^{-3}	$<1 \times 10^{-3}$
Total	3×10^{-4}	5×10^{-5}	8	6.1

Notes:
RME reasonable maximum exposure
CTE central tendency exposure
[1] For soil, a significant portion of the risk (between 66 percent and 78 percent) is attributable to Benzo(a)pyrene concentration and arsenic contributes 20 percent of the risk (arsenic concentrations are within background concentrations at former MCAS El Toro).
[2] For groundwater, arsenic accounted for approximately 75 percent of this potential risk. Arsenic concentrations in groundwater are within the natural background concentrations reported at former MCAS El Toro.

2.5.1.4 *Uncertainty Analysis*

Each component of the human health SRA (selection of COPCs, exposure assessment, toxicity assessment, and risk characterization) involves uncertainties that result from intrinsic measurement errors, the number of samples collected or their locations, literature-based exposure and toxicity values used to calculate risk, the use of models in lieu of actual data, and risk characterization across multiple media and exposure pathways. Uncertainties may cause the overestimation or underestimation to varying degrees of the actual cancer risk and HI. Accordingly, the risk estimates should not be taken as absolute indicators of whether adverse health effects could occur. In general, the risk assessment process is based on conservative (health-protective) assumptions that, when combined, are intended to overestimate the risk.

2.5.2 Ecological Risk Assessment

An ecological SRA and a Tier 2, Step 3 Baseline Risk Assessment were performed to assess the risks to ecological receptors from exposure to chemicals present at AA 3. The **ecological risk assessment**(11) suggested that activities at AA 3 have not had a negative effect on ecological receptors. Contaminant

concentrations reported in soil, sediment, and surface water samples collected from the site and from nearby locations were used in this assessment.

Five metals in soil: antimony, cadmium, nickel, selenium, and zinc; had hazard quotients (HQs) exceeding 1 based on the Tier 2, Step 3a risk calculations. However, maximim concentrations of four of the six metals in soil (0 to 6 feet bgs) were within their respective Station-wide background concentration ranges. The fifth metal (selenium) exceeded the Station-wide background concentration range; however selenium concentrations in western soils are variable and can be naturally elevated locally. Due to a lack of evidence for an anthropogenic source for the other metals in soil, it was concluded in the RI Report that activities at the site did not result in a release of these metals (including selenium) that would cause adverse effects to terrestrial wildlife at AA 3. Dioxin exposures were not expected to have an adverse effect on small mammal populations, although HQs for dioxin exceeded 1 for the Ornate Shrew and Deer Mouse.

Three metals in Agua Chinon Wash sediments had HQs exceeding 1 based on the Tier 2, Step 3a risk calculations, including nickel, vanadium, and zinc. However, the maximum concentrations of these metals in sediments were within the Station-wide background soil concentration ranges. Therefore, these metals were not considered to present a threat of adverse effect to wildlife that forages in Agua Chinon Wash.

Although potential risk to aquatic life in surface water at AA 3 was indicated for several chemicals of potential ecological concern (COPECs) in surface water which may cause adverse effects, these effects were not attributable to activities at AA 3 due to similar concentrations of COPECs in upgradient and downgradient samples. This suggests that the presence of AA 3 has had no effect on ecological receptors (plants and animals) at the site or on aquatic life (plants and fish) in surface water in Agua Chinon Wash.

2.5.3 Basis for Response Action

The response action selected in this ROD is necessary to protect the public health, welfare, and the environment from actual or potential releases of hazardous substances into the environment. Based on previous investigation findings, an adequate characterization of the nature and extent of releases has been completed. Human health and ecological risks have been quantified and are within acceptable risk management ranges. However, due to the presence of construction-related debris at the site, the proximity of waste to groundwater, and the presence of elevated methane concentrations in the central portion of the site, an evaluation of response actions was necessary for continued protection of human health and the environment. Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present a current or potential threat to public health and welfare and/or to the environment.

An agreement between the Navy and the FFA Signatories including the California Integrated Waste Management Board (CIWMB) requires that the Navy install LFG control components (e.g. LFG monitoring wells, gravel-filled interception trenches, extraction wells, and piping connections). These components will be used to monitor LFG and will be activated as necessary, to minimize and control potential LFG migration within 100 feet of the waste boundary (also known as the 100-foot buffer zone).

2.6 PRINCIPAL THREAT WASTE

Principal Threat and Low Level Threat Wastes(12) are hazardous or highly toxic source materials that result in ongoing contamination to surrounding media, generally cannot be reliably contained, or present a significant risk to human health or the environment should exposure occur. Soils at AA 3 were not identified as being a principal threat waste. Contaminated groundwater is not typically considered to be a source material unless there are "pools" of nonaqueous-phase liquids present or it has the potential to be

extremely mobile. COCs in groundwater at AA 3 are present at low concentrations or within the natural background concentrations and are not considered a principal threat waste.

2.7 REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are media-specific goals for protecting human health and the environment. The NCP requires that the RAOs address COCs, exposure pathways, and receptors; and that they establish an acceptable level or range of levels for exposure (i.e., remediation goals). Remediation goals should be consistent with exposure levels that are protective of human health and the environment (i.e., an excess cancer risk in the range of 10^{-4} to 10^{-6} or less, and a HI for exposure to non-carcinogenic contaminants of 1 or less). RAOs must also comply with the intent of federal or state regulations, statutes, or policies that may dictate the remedial action (i.e., ARARs). ARARs for AA 3 are detailed in Attachment 3.

RAOs(13) and associated remediation goals were developed early in the RI/FS process to provide a basis for screening remedial technologies and performing a detailed evaluation of remedial alternatives. In general, the RAOs which were developed for AA 3 during the RI/FS include:

- Minimize direct contact with the landfill wastes.
- Control run-on, runoff, and erosion; minimize infiltration and potential contaminant leaching to groundwater.
- Mitigate the LFG migration consistent with the Navy's agreement with FFA Signatories and the CIWMB.
- Minimize contact between surface water in Agua Chinon Wash and the landfill waste.

2.8 DESCRIPTION AND COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

AA 3 has been identified as a military landfill for which the CERCLA presumptive remedy approach is applicable. These presumptive remedies are designed to minimize the potential for exposure to buried wastes through various pathways and to streamline the selection of appropriate response actions. The presumptive remedy approach uses past experience to streamline site investigations and to expedite the selection of cleanup actions. Over time, presumptive remedies are expected to ensure consistency in remedy selection and reduce the cost and time required to clean up similar types of sites. Under the presumptive remedy approach, response actions selected for cleanup of military and municipal landfill sites may include only those remedies that are necessary based on site-specific conditions. Potential landfill site presumptive remedies include the following:

- landfill capping;
- source area groundwater control to contain plume;
- leachate collection and treatment;
- LFG collection and treatment; and/or
- ICs and access restrictions.

The presumptive remedy screening process was used to identify appropriate technologies to be combined into remedial alternatives. Four **remedial alternatives**(14) were developed for AA 3 and all four alternatives were retained for a detailed **comparative analysis**(15).

2.8.1 Description of Remedial Alternatives

The technologies and process options retained from the initial screening were assembled into four comprehensive remedial alternatives for AA 3. Table 2-2 provides a brief description of each alternative, along with costs and estimated time frames to achieve the RAOs for AA 3.

TABLE 2-2 REMEDIAL ALTERNATIVES FOR AA 3

Alternative	Description	Costs* (in millions) and Timeframe
Alternative 1 No Action	The NCP (40 CFR 300.430[e][6]) requires that a no-action alternative be evaluated. Under this option, existing contamination would be left in place and nothing would be done to clean up the groundwater, prevent land use, or limit contaminant movement.	- not applicable
Alternative 2 Limited Grading, Monitoring, and Institutional Controls (ICs)	Alternative 2 consists of limited site grading, minor waste consolidation, construction of a finger dike and placement of riprap, ICs, and long-term monitoring. During waste consolidation and site grading, areas with less than four feet of cover would be backfilled and compacted to ensure that there is a minimum of four feet of soil cover. The existing soil cover would minimize infiltration and leachate formation. The construction activities would minimize erosion of the cover and control storm water in the vicinity of AA 3. Passive/active LFG venting and monitoring systems would also be installed under Alternative 2. ICs would be implemented (as detailed in Section 2.9.2.1), and controls such as signs and/or fencing would restrict access to the site and prevent inadvertent contact with wastes. Long-term monitoring would be conducted over a period of 30 years including groundwater and LFG monitoring, land surveys to monitor potential settlement, and inspections and maintenance. Five-year reviews would also be conducted over the 30-year period to evaluate the protectiveness of the remedy.	- Capital: 1.46 - O&M: 2.97 - Total: 4.44$_{(16)}$ - NPV: 3.54 - Timeframe: 30 years
Alternative 3 Containment, Monitoring, and Institutional Controls (ICs)	Alternative 3 consists of an engineered landfill cap in addition to ICs and long-term monitoring which are described for Alternative 2. The waste would be consolidated in one area and covered with soil or another type of capping material. Four types of engineered landfill caps were considered as follows: ▪ Alternative 3a: Containment with Evapotranspiration (ET) Cover. ▪ Alternative 3b: Containment with Prescriptive Cap. ▪ Alternative 3c: Containment with Modified Prescriptive Cap with Geosynthetic Clay Liner (GCL). ▪ Alternative 3d: Containment with Modified Prescriptive Cap with Flexible Membrane Liner. Alternative 3a involves a single-layer cap (an ET system) which would consist of an approximate 4-foot native soil cover to prevent infiltration and leachate formation, and would be revegetated with annual grasses to minimize erosion. Alternative 3b involves a cover system as defined in Title 27 of the California Code of Regulations (CCR), also called a "prescriptive cap," which would consist of 2 feet of compacted soil, 1 foot of compacted clay to act as a barrier to infiltration, and 2 feet of clean soil on top of the barrier layer to protect the barrier layer, control surface erosion, and allow vegetation growth. Alternative 3c is similar to the prescriptive cap, but would use a manufactured GCL, rather than natural clay as an infiltration barrier. Alternative 3d would substitute a flexible membrane liner for the clay cap.	Alternative 3a - Capital: 3.16 - O&M: 3.29 - Total: 6.46$_{(17)}$ - NPV: 5.45 - Timeframe: 30 years Alternative 3b - Capital: 3.37 - O&M: 3.29 - Total: 6.67$_{(18)}$ - NPV: 5.66 - Timeframe: 30 years Alternative 3c - Capital: 2.77 - O&M: 3.29 - Total: 6.07$_{(19)}$ - NPV: 5.06 - Timeframe: 30 years Alternative 3d - Capital: 2.77 - O&M: 3.29 - Total: 6.07$_{(20)}$ - NPV: 5.06 - Timeframe: 30 years

TABLE 2-2 REMEDIAL ALTERNATIVES FOR AA 3

Alternative	Description	Costs* (in millions) and Timeframe
Alternative 4 Clean Closure and Groundwater Monitoring	Alternative 4, clean closure, includes excavation and removal of all buried construction debris at AA 3. Site contaminants would be removed, thereby removing concentrations posing a risk to human health and the environment. Alternative 4 would also include well abandonment, site revegetation, groundwater monitoring for 5 years, a 5-year site review, and site closeout.	- Capital: 24.8 to 36.8 - O&M: 0.526 - Total: 25.32 to 37.33$_{(21)}$ - NPV: 25.29 to 37.29 - Timeframe: 5 years

Notes: NPV – Net present value, O&M – Operation and Maintenance

* Total cost includes capital cost with markups, O&M cost with markups, and 20 percent contingency. A discount rate of 2.8 percent per year was used to calculate net present value.

2.8.2 Comparative Analysis of Alternatives

The remedy selection process involves the evaluation of alternative remedial actions using the following nine criteria [40 CFR § 300.430 (e) (9) (iii)]:

Threshold Criteria

- Overall Protection of Human Health and the Environment – assesses whether a remedy provides adequate public health protection and tells how health risks posed by the site will be eliminated, reduced, or controlled.

- Compliance with ARARs – addresses whether a remedy will meet all federal, state, and local environmental statutes or requirements.

Primary Balancing Criteria

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

- Reduction of Toxicity, Mobility, or Volume through Treatment – refers to the degree to which a remedy 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).

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

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

- Cost – evaluates the estimated capital costs and present value in today's dollars required for design and construction and long-term operation and maintenance (O&M) costs.

Modifying Criteria

- State/Support Agency Acceptance – reflects whether the state of California's environmental agencies agree with, oppose, or have no objection to or comment on the Navy's preferred alternative.

- Community Acceptance – evaluates whether community concerns are addressed by the remedy and if the community has an apparent preference for a remedy. Public comments are an important part of the final decision; however, the Navy is compelled by law to balance community concerns with the other criteria.

A comprehensive analysis of each alternative with respect to the NCP threshold and primary balancing criteria is presented in the *Final Remedial Investigation/Feasibility Study Report for AA 3 (July 2009)*, and summarized in Table 2-3. A summary of the findings of the comprehensive analysis, including modifying criteria, are discussed below.

Threshold Criteria

Overall Protection of Human Health and the Environment. Alternative 1 is not considered protective of human health and the environment because infiltration and potential leaching of wastes due to ponding on ungraded portions of the site would not be minimized. Alternative 2 is considered to be protective of human health and the environment; it includes limited grading to prevent surface water ponding and infiltration; constructing a finger dike; placing riprap to prevent erosion and control storm water flow in the vicinity of Agua Chinon Wash; ICs to prevent contact with wastes; and LFG and groundwater monitoring. Alternative 3 is considered to be protective of human health and the environment; it includes an engineered landfill cap. Through grading and cap construction, this alternative, including its options, would reduce risks due to potential surface water ponding and infiltration. For Alternatives 2 and 3, the installation of LFG controls in the form of vertical wells and horizontal trenches would prevent potential LFG from migrating beyond the 100-foot buffer zone. Alternative 4 is very effective in protecting human health and the environment by removing the wastes from the site, thus reducing contaminant concentrations to levels that eliminate unacceptable risks.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs). Alternative 1 would not trigger ARARs. Alternatives 2 and 3 would meet all identified potential ARARs including potential action-specific ARARs related to cover construction and groundwater monitoring, and potential location-specific ARARs. All remedial alternatives except Alternative 1 would comply with state requirements for LFG monitoring and controls in the form of vertical wells and horizontal trenches that would prevent potential LFG from migrating beyond the 100-foot buffer zone. Alternative 4 would comply with the federal requirements for clean closure of landfills.

Primary Balancing Criteria

Long-Term Effectiveness and Permanence. All of the alternatives except Alternative 4 would leave wastes in-place. Alternatives 2 and 3 would cap the wastes and land-use restrictions would minimize the potential for contact with the waste and potential migration of contaminants. Therefore, Alternatives 2 and 3 would be effective in the long-term protection of human health and the environment. Alternative 4 would provide the highest degree of long-term effectiveness because of the complete removal of the waste and waste residuals, including contaminated soils, which would eliminate the need for potential future response actions, inspections, and maintenance.

Reduction in Toxicity, Mobility, or Volume through Treatment. Mobility of contaminants by potential leaching and/or erosion would be prevented by Alternatives 2 and 3. In Alternative 4, reduction of contaminant toxicity would occur through the complete removal of all waste and waste residuals, including contaminated soils; contaminant mobility would also be eliminated. Alternative 1 would not minimize potential leaching of contaminants from the waste. None of the alternatives reduce the volume of waste materials.

Short-Term Effectiveness. Alternative 1 poses no additional risks to workers or to the general public under current site conditions because no response actions would be taken. Alternative 2 poses minimal risks to site workers during limited grading, construction, and environmental monitoring activities. Alternative 3 would result in higher short-term risks than Alternative 2 because it involves extensive cap construction activities. Alternative 4 involves more short-term risk because of the waste excavation and earthwork. Potential risk from exposure of site personnel to dust emissions and direct contact with impacted soil during excavation is high.

Implementability. Alternative 1 is the easiest to implement because no actions would be taken. Alternative 2 is readily implementable as it would only involve limited grading and construction activities, ICs, access restrictions, and monitoring. Alternative 3 would use proven remedial technologies and commercial services, but would be more complicated to implement than Alternative 2. Implementation of Alternative 4 is complicated and would involve site characterization to assess the extent and characteristics of wastes and any residual contamination at the site. It would require a significant amount of earthwork for removal of waste material.

Cost. No cost is associated with Alternative 1. The present value costs of the remedial alternatives evaluated for AA 3 range from approximately $3.54 million for Alternative 2 to approximately $37.29 million for Alternative 4 (see Table 2-3).

Modifying Criteria

State/Support Agency Acceptance. Regulatory involvement has been solicited throughout the CERCLA process. Review and State concurrence has been obtained on preceding documents including the RI/FS Report for AA 3. The state of California concurs with the Selected Remedy.

Community Acceptance. The Proposed Plan was issued for public review from August 12 to September 12, 2009 and was discussed at a public meeting on August 19, 2009. A summary of public comments and responses is included in the Responsiveness Summary presented as Attachment 4.

TABLE 2-3 COMPARATIVE ANALYSIS OF ALTERNATIVES

U.S. EPA Evaluation Criteria	1. No Action	2. Limited Grading, Monitoring, and ICs	3a. Containment with ET Cover	3b. Containment with Prescriptive Cap	3c. Containment with Geosynthetic Clay Liner	3d. Containment with Flexible Membrane Liner	4. Clean Closure and Groundwater Monitoring
1. Overall Protection of Human Health and the Environment	No	Yes	Yes	Yes	Yes	Yes	Yes
2. Compliance with Applicable or Relevant and Appropriate Requirements	N/A	Yes	Yes	Yes	Yes	Yes	Yes
3. Long-Term Effectiveness and Permanence	○	◑	●	◑	◕	◕	●
4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment	○	◑	◕	◕	◕	◕	●
5. Short-Term Effectiveness	●	●	◕	○	◑	◑	○

U.S. EPA Evaluation Criteria	1. No Action	2. Limited Grading, Monitoring, and ICs	3a. Containment with ET Cover	3b. Containment with Prescriptive Cap	3c. Containment with Geosynthetic Clay Liner	3d. Containment with Flexible Membrane Liner	4. Clean Closure and Groundwater Monitoring
6. Implementability[1]	●	●	◕	◔	◕	◕	◕
7. Cost[2]	$0	◕ $3.54	◔ $5.45	◔ $5.66	◑ $5.06	◔ $5.52	○ $25.29 to $37.29

Notes: Relative performance: ○ = Low ◔ = Low-Moderate ◑ = Moderate ◕ = Moderate-High ● = High

N/A=not applicable, ARARs would not be triggered under the "no action" alternative.

[1] Relative performance rating for implementability represents overall rating based on technical and administrative feasibility, and availability of services and materials.

[2] Present Value in millions of dollars (for comparison purposes only)

Under the cost criterion, a rating of "high" means that the alternative rated more favorably (i.e., lower cost), and a rating of "low" means that the alternative rated less favorably.

2.9 SELECTED REMEDY

The Proposed Plan, released for public comment on August 12, 2009, identified Alternative 2, Limited Grading, Monitoring, and ICs, as the preferred alternative for AA 3. The Navy reviewed all written and oral comments submitted during the public comment period. It was determined that no significant changes to the preferred alternative, as originally identified in the Proposed Plan, were necessary or appropriate. Accordingly, Alternative 2, Limited Grading, Monitoring, and ICs, was selected as the final remedy for AA 3. As discussed previously, no groundwater-specific response action is required for AA 3, although groundwater monitoring is included as a component of the Selected Remedy.

2.9.1 Rationale for Remedy Selection

Limited Grading, Monitoring, and ICs, Alternative 2, was selected for AA 3 because it meets the RAOs and the threshold criteria and provides the best balance of tradeoffs with respect to the balancing and modifying criteria. This remedy protects human health and the environment by (1) minimizing contact with the wastes by limiting access or activities at the site, (2) preventing erosion of the existing soil cover and minimizing ponding and infiltration of surface water, (3) maintaining the integrity of the remedial action by long-term environmental monitoring to ensure that waste materials (primarily construction debris) do not impact groundwater and demonstrate that LFG is not migrating off-site. This remedy includes limited site grading, minor waste consolidation, construction of a finger dike and placement of riprap to prevent erosion of the cover and to control storm water in the vicinity of Agua Chinon Wash.

2.9.2 Description of the Selected Remedy

The Selected Remedy for AA 3 is Alternative 2, Limited Grading, Monitoring, and ICs. This remedy includes ICs, monitoring, and maintenance to ensure the integrity of the landfill cover and associated components of the remedy. This remedy also includes passive/active LFG monitoring and venting systems in accordance with the agreement between the Navy and FFA Signatories, including the CIWMB, which requires that the Navy install LFG control components (e.g. LFG monitoring wells,

gravel-filled interception trenches, extraction wells, and piping connections). These components will be used to monitor LFG and will be activated as necessary to minimize and control potential LFG migration.

The Selected Remedy includes construction of a finger dike and riprap placement to prevent erosion and control storm water flow in the vicinity of AA 3. Waste consolidation will be completed to ensure a minimum buffer zone of 100 feet from the waste boundary to the CO boundary. During waste consolidation and site grading, areas with less than four feet of cover will be backfilled and compacted to ensure that there is a minimum of four feet of soil cover over the waste. These construction activities will be completed to minimize erosion of the cover and control storm water in the vicinity of AA 3. Access controls, such as fences and signs, will be used as appropriate to prevent inadvertent contact with wastes. ICs will restrict land-use that may lead to unacceptable risk to human health and the environment and prevent activities that could threaten the integrity of the cap.

In addition, the Selected Remedy also includes groundwater and LFG monitoring, and five-year reviews to assess the protectiveness of the remedy. Monitoring activities include LFG and groundwater monitoring which is currently planned to be performed for 30 years or until monitoring data indicate that the waste no longer presents a risk to human health and the environment. Monitoring requirements will be reevaluated for appropriateness at five-year intervals.

Environmental monitoring, including LFG and groundwater, for the Selected Remedy will be conducted at monitoring locations and frequencies in accordance with post-ROD documents. Any necessary, security measures (fences, signs, and locks) will be inspected and repaired as required.

- LFG monitoring for AA 3 will be performed using periodic gas sampling and analysis. An active LFG collection system or gas vent system will be installed in accordance with CIWMB monitoring protocols. Compliance LFG monitoring probes will be installed within 50 feet of the waste boundary. This will act as an early warning feature for the initiation of LFG collection and treatment to prevent migration of LFG above Title 27 California Code of Regulations (CCR) thresholds at the 100-foot buffer zone.

- Groundwater monitoring consistent with Title 27 CCR capping requirements will be performed to assess if groundwater quality is being degraded. Groundwater samples will be analyzed for VOCs, SVOCs, general minerals, total metals, and TPH; monitoring requirements will be reevaluated for appropriateness at 5-year intervals. Monitoring is currently planned to be performed for 30 years or until monitoring data indicate that the waste no longer presents a risk to human health and the environment. Once adequate data are collected, and with the concurrence of the FFA signatories, groundwater monitoring will be discontinued.

- The results of the RI for AA 3 indicated that soil gas was reported at relatively low concentrations and only at isolated sampling locations. Based on discussions with the regulatory agencies, an agreement was reached with the CIWMB and the FFA signatories pertaining to the LFG control measures at AA 3. The perimeter wells will be monitored to demonstrate that LFG is not migrating. Once adequate data are collected, and with CIWMB concurrence, monitoring will be discontinued and land use restrictions relating to LFG will be removed.

During the FS stage, preliminary designs were developed, as appropriate, for each alternative. These designs are included in the RI/FS Report. Modifications to the **preliminary design**(22) for the Selected Remedy may be necessary as a result of the remedial design (RD) and construction processes. Detailed design specifications, performance evaluations, and schedule will be determined during the RD phase.

2.9.2.1 *Institutional Controls*

ICs are legal and administrative mechanisms used to implement land use and access restrictions which limit the exposure of future landowner(s) and/or user(s) of the property to hazardous substances present on the property and to maintain the integrity of the remedial action. ICs are required on a property where the selected remedial action results in contamination remaining at the property at concentrations above levels that allow for unlimited use and unrestricted exposure. ICs will be maintained until the concentrations of hazardous substances in affected media are at such levels as to allow for unrestricted use and exposure. Implementation of ICs includes requirements for monitoring, inspections, and reporting to ensure compliance with land use and access restrictions.

Legal mechanisms include proprietary controls such as restrictive covenants, negative easements, equitable servitudes, lease restrictions, and/or deed notices. Administrative mechanisms include notices, adopted local land use plans and ordinances, construction permitting, or other existing land use management systems that may be used to ensure compliance with use restrictions.

Interim Land Use Restrictions

AA 3 lies in a portion of the former Station that has been leased to a private developer. The Navy has determined that it will rely upon proprietary controls in the form of lease restrictions contained in the "Lease in Furtherance of Conveyance Between the United States of America and Heritage Fields LLC, a Delaware Limited Liability Company for MCAS El Toro Parcel 2" (July 11, 2005) ("LIFOC"). These controls will continue in effect until the property containing AA 3 is conveyed with environmental restrictive covenants as provided in the "Memorandum of Agreement Between the United States Department of the Navy and the California Department of Toxic Substances Control" and attached covenant models (hereinafter referred to as the "**Navy/DTSC MOA**$_{(23)}$").

The LIFOC (Section 13.5) also includes provisions that guarantees continued access to leased property to the Government, U.S. EPA, DTSC, the State and their officers agents, employees, and contractor for purposes consistent with the environmental investigation and cleanup program.

As provided for in the LIFOC, the following land uses and activities are prohibited until AA 3 is transferred from the Navy to a new owner:

- Residential use of the site and/or construction of any day care centers (LIFOC Subsection 13.21.1).
- The following activities are prohibited without prior approval from the Navy:
  - Subsurface excavation, digging, drilling, or other disturbance of the ground surface (LIFOC Subsection 13.15).
  - Removal of or damage to security features (e.g., locks on wells), survey monuments, signs, or monitoring equipment and associated pipelines and appurtenances (LIFOC Subsections 13.19 and 13.21.3).
  - Construction of any structure, including placement of trailers (LIFOC Subsection 13.21.3).
  - Installation of new groundwater wells of any type and/or use of contaminated groundwater (LIFOC Subsection 13.16).
  - Alteration, disturbance, or removal of any wells, remedial action equipment (e.g., pumps), or associated utilities (LIFOC Subsection 13.18).

Final Land Use Restrictions

The Navy has determined that it will rely on proprietary controls in the form of environmental restrictive covenants as provided in the Navy/DTSC MOA at the time of conveyance of the property. More specifically, IC objectives will be achieved through land use and activity restrictions which will be incorporated into two separate legal instruments as provided in the Navy/DTSC MOA:

1) Restrictive covenants included in one or more "quitclaim deed(s)" from the Navy to the property recipient.

2) Restrictive covenants included in one or more "Covenant(s) to Restrict Use of Property" entered into by the Navy and DTSC as provided in the Navy/DTSC MOA and consistent with the substantive provisions of CCR Title 22 § 67391.1.

The "Covenant(s) to Restrict Use of Property" have incorporated or will incorporate the land use restrictions into environmental restrictive covenants that run with the land and that are enforceable by DTSC against future transferees. The "quitclaim deed(s)" will include the identical land use and activity restrictions in environmental restrictive covenants that run with the land and that will be enforceable by the Navy against future transferees.

The following are IC objectives to be achieved through land use and activity restrictions for this site within the "Area Requiring Institutional Controls" ("ARIC") to assure that any necessary measures to protect human health and the environment and the integrity of the remedy have been undertaken. The ARIC will be the entire area within CO II-C.

Restricted Land Uses

The following restricted land-uses for AA 3 are prohibited unless reviewed and approved in writing in advance by the FFA Signatories and CIWMB in accordance with the "Covenant(s) to Restrict Use of Property" and "quitclaim deed(s)":

- A residence, including any mobile home or factory built housing, constructed or installed for use as residential human habitation,
- A hospital for humans,
- A school for persons under 21 years of age,
- A day care facility for children, or
- Any permanently occupied human habitation including those used for commercial or industrial purposes.

Restricted Activities

The following restricted land-use activities are prohibited in accordance with the "Covenant(s) to Restrict Use of Property" and "quitclaim deed(s)", unless prior review and written approval is obtained from the FFA signatories and the CIWMB:

- Planting deep-rooted plants that have the potential to interfere with the performance of the cap in minimizing infiltration.
- Alteration, disturbance, or removal of any component of the response action including but not limited to the landfill cap, groundwater monitoring wells, and survey monuments.

- Removal or damage to security features including but not limited to fencing and signs.
- Construction of facilities, structures, or appurtenances within 100 feet of the waste boundary, or any other land-disturbing activity into or on the surface of the landfill that may involve adverse impacts upon the performance of the cap or affect the drainage and erosion controls developed for the cap.

2.9.2.1.1 Access

The deed(s) and covenant(s) shall provide that the Navy and FFA signatories and their authorized agents, employees, contractors, and subcontractors shall have the right to enter AA 3 to conduct investigations, tests, or surveys; inspect field activities; or construct, operate, and maintain any response or remedial action as required or necessary under the cleanup program, including but not limited to LFG and groundwater monitoring wells, pumping wells, and/or treatment facilities.

2.9.2.1.2 Implementation

The Navy shall address and describe IC implementation and maintenance actions including periodic inspections and reporting requirements in the draft and final RD Reports to be developed and submitted to the FFA signatories for review pursuant to the FFA (see "Navy Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions" attached to the January 16, 2004 Department of Defense memorandum titled "Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Record of Decision [ROD] and Post-ROD Policy").

The Navy is responsible for implementing, inspecting, maintaining, reporting on, and enforcing the land use restrictions selected in this ROD. Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for the remedy integrity. Should any of the IC objectives fail, the Navy shall ensure that appropriate actions are taken to reestablish the protectiveness of the remedy and may initiate legal action to either compel action by a third party(ies) and/or recover the Navy's costs for mitigating any discovered IC violations(s).

2.9.3 Estimated Outcomes of the Selected Remedy

The Selected Remedy is intended to prevent inadvertent contact with wastes, restrict land-use that may lead to unacceptable risk to human health and the environment, prevent activities that could threaten the integrity of the existing cover, prevent erosion of soil cover, and control storm water flow in the vicinity of AA 3. The Selected Remedy is intended to physically limit or prevent access to AA 3 using measures such as perimeter fences, gates, and signs as appropriate. It also includes limited site grading, inspection and maintenance, groundwater and LFG monitoring, five-year site reviews to assess the protectiveness of the remedy, and site close-out. Monitoring results for LFG and groundwater will be evaluated every five years to determine whether continued monitoring is needed and if there is any need for modification of the duration and/or frequency of the monitoring program.

2.9.4 Statutory Determinations

Under CERCLA and in accordance with the NCP, the Selected Remedy meets the following statutory determinations.

- Protection of Human Health and the Environment – The Selected Remedy will protect human health and the environment through preventing exposure by a soil cover protected by ICs that will prevent activities that may lead to inadvertent contact with landfill wastes and unacceptable risks

to human health and the environment. There are no short-term threats associated with the Selected Remedy that cannot be controlled. In addition, no adverse cross-media impacts are expected from the remedy.

- Compliance with ARARs – The Selected Remedy meets all federal or state standards, requirements, criteria, or limitations that have been determined to be ARARs (Attachment 3) for AA 3.

- Cost-Effectiveness – The Selected Remedy will provide overall protectiveness proportional to the cost and is therefore considered to be cost-effective.

- Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable – The Navy has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the site.

- Preference for Treatment as a Principal Element – Because treatment of the principal threats at the landfill sites was not found to be practicable, the Selected Remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The heterogeneity and volume of buried wastes and the absence of on-site hot spots that represent the major sources of contamination preclude a remedy by which contaminants could be excavated and treated effectively. However, minor waste consolidation will be performed prior to capping.

- Five-Year Review Requirements – Because the Selected Remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unrestricted use, five-year reviews for AA 3 will be conducted as a component of ongoing five-year reviews at former MCAS El Toro to ensure that the remedy is protective of human health and the environment.

2.10 COMMUNITY PARTICIPATION

A Community Relations Plan has been developed for former MCAS El Toro that outlines the community involvement program. Community participation is supplemented by the Restoration Advisory Board (RAB), which is composed of local citizens and government representatives involved in the environmental cleanup program at former MCAS El Toro. The purpose of the RAB is to promote efficient and effective cleanup that results in the protection of human health and the environment and the timely conversion of former MCAS El Toro. The RAB serves to increase community awareness by disseminating information about the IRP and to assure that opinions about the environmental restoration reflect the diverse interest of the community. The RAB functions in an advisory capacity to the Navy, U.S. EPA, and Cal/EPA by conducting regular and thorough reviews of environmental restoration plans and compiling constructive comments from these reviews for submittal to former MCAS El Toro.

Information on documents and relevant information relied upon in the remedy selection process are available for public review in the Administrative Record (Attachment 1) File. Community members can find key support documents that pertain to AA 3 and a complete index of all former MCAS El Toro Administrative Record File documents, at the Information Repository located at the Heritage Park Regional Library in Irvine, California. The telephone number is (949) 726-4040. The Administrative Record File for all of Former MCAS El Toro, including site-specific documents for AA 3, is available for review at BRAC Office Building 307, former MCAS El Toro. To schedule a review time at former MCAS El Toro, please contact the document coordinator at (949) 726-5398.

A Proposed Plan was developed to fulfill public participation requirements of CERCLA § 117 (a), which specifies that the lead agency (Navy) must publish a plan outlining remedial alternatives evaluated for each site and identify the preferred alternative. A significant and reasonable effort was made to inform the public of the proposed remedy outlined in this ROD. The public comment period for the AA 3 Proposed Plan was from August 12 to September 12, 2009. A Public Meeting was held on August 19, 2009 at the Irvine City Hall in Irvine, California. Public notices were placed in the newspapers (Orange County Register and Los Angeles Times, Orange County Edition) and posted on the BRAC Program Management Office (PMO) website (www.bracpmo.navy.mil). All interested parties were encouraged to attend to learn more about the alternatives for each site, and to submit comments on the Proposed Plan to the Navy.

3. RESPONSIVENESS SUMMARY

A Public Meeting for the AA 3 Proposed Plan was held on August 19, 2009 at the Irvine City Hall in Irvine, California. The participants in the Public Meeting included representatives of the Navy, U.S. EPA, DTSC, and the RWQCB. Questions and/or concerns that were received during the public meeting were documented in the **court reporter record**$_{(24)}$ of the Public Meeting. The public review period for the AA 3 Proposed Plan was from August 12 to September 12, 2009. Responses to Comments received at the Public Meeting and during the public comment period are included as Attachment 4.

ATTACHMENT 1
ADMINISTRATIVE RECORD

EL TORO MCAS

DRAFT ENVIRONMENTAL RESTORATION RECORD INDEX - UPDATE (SORTED BY RECORD DATE/RECORD NUMBER)

DOCUMENTS PERTAINING TO ANOMALY AREA 3 AT MCAS EL TORO

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)	
M60050 / 002507 SW7535 MISC N68711-93-D-1459 10	09-17-2001 **08-18-1999** DO 0112	NAVFAC - SOUTHWEST DIVISION HORNECKER, L. VARIOUS AGENCIES	SUPPLEMENTAL INFORMATION ANOMALY AREA 3 (ALSO KNOWN AS MSC R1) [POSSIBLE REFUSE AREA] FOR THE PLANNED SITE VISIT OF 25 AUGUST 1999. ***COMMENTS: PER RPM, LYNN HORNECKER ON 13 SEPTEMBER 2001, THIS DOCUMENT BELONGS TO THE RESTORATION RECORDS***	ADMIN RECORD BASE	024 AA 0000003 BLDG. 368 OU 2A OU 3 SITE 00001	FRC - PERRIS IMAGED TORO_020	181-06-0125 30090141	BOX 0057
M60050 / 002513 SW9312 MISC N68711-93-D-1459 1056	09-17-2001 **11-14-2000** DO 0112	OHM REMEDIATION SERVICES VARIOUS AGENCIES	TECHNICAL INFORMATION PACKAGE FOR ANOMALY AREA 3. ***COMMENTS: PER RPM, LYNN HORNECKER ON 13 SEPTEMBER 2001, THIS DOCUMENT BELONGS TO THE RESTORATION RECORDS***	ADMIN RECORD BASE	AA 0000003 APHO 59 APHO 60 APHO 61 APHO 62 APHO 63 APHO 64 APHO 65 MSC R1	FRC - PERRIS IMAGED TORO_019	181-06-0125 30090141	BOX 0058
M60050 / 000621 CTO-0200/0183 MINUTES N68711-92-D-4670 75	01-10-2001 **11-29-2000** CTO 0200	BECHTEL NATIONAL, INC. NAVFAC - SOUTHWEST DIVISION	FINAL MEETING MINUTES FROM THE BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) MEETING INCLUDES: AGENDA, OVERHEAD PROJECTIONS, PHOTOGRAPHS, AND VARIOUS ATTACHMENTS	ADMIN RECORD BASE	AA 0000003 BLDG 000307 SITE 00001 SITE 00003 SITE 00008 SITE 00011 SITE 00012 SITE 00016 SITE 00018 SITE 00024	FRC - PERRIS IMAGED TORO_015	181-06-0125 30090141	BOX 0014

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)	
M60050 / 000859 SWDIV SER 06CC.DG/0142 CORRESPONDENC NONE 331	03-27-2001 **01-29-2001** NONE	ROY F. WESTON, INC. CHRISTENSEN, B. NAVFAC - SOUTHWEST DIVISION	FINAL RADIOLOGICAL SURVEY PLAN, REV. 3 - INCLUDES RESPONSE TO AGENCY COMMENTS ON THE DRAFT FINAL RADIOLOGICAL SURVEY PLAN (DHS, US EPA & EL TORO LRA COMMENTS ON THE DRAFT FINAL) [INCLUDES SWDIV TRANSMITTAL LETTER] {PORTION OF MAILING LIST IS CONFIDENTIAL}. ***COMMENTS: (SEE RECORD #3018 - DRAFT AND 3049 - FINAL; AMENDMENT TO RADIOLOGICAL SURVEY PLAN) *NOTE: THIS IS THE ORIGINAL DOCUMENT, THERE IS NO REVISION 0, REVISION 1 OR REVISION 2 OF THE FINAL AS PER RPM (CONTRACTOR LABELED EACH DRAFT WITH A SUCCESSIVE REVISION NUMBER)***	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 APHO 38 BLDG. 1789 BLDG. 1803 BLDG. 242 BLDG. 243 BLDG. 244 BLDG. 295 BLDG. 319 BLDG. 360 BLDG. 787 SITE 00001 SITE 00002 SITE 00003 SITE 00005 SITE 00012 SITE 00017 SITE 00025	FRC - PERRIS IMAGED TORO_025	181-06-0125 30090141	BOX 0022
M60050 / 000978 CTO-0200/0208 MINUTES N68711-92-D-4670 60	03-29-2001 **01-31-2001** CTO 0200	BECHTEL NATIONAL, INC. NAVFAC - SOUTHWEST DIVISION	31 JANUARY 2001 BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) MEETING MINUTES	ADMIN RECORD BASE	005 007 011 014 016 017 018 024 AA 0000003 APHO 44 SITE 00001 SITE 00002 SITE 00003	FRC - PERRIS IMAGED TORO_018	181-06-0125 30090141	BOX 0024

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)	
M60050 / 003506 NONE CORRESPONDENC NONE 2	05-05-2006 **02-07-2001** NONE	US EPA - SAN FRANCISCO N. MOUTOUX BRAC PMO WEST D. GOULD	REVIEW AND COMMENTS ON THE DRAFT WORK PLAN (WP), REMOVAL SITE EVALUATION (RSE), ANOMALY AREA 3 (W/ ENCLOSURE)	ADMIN RECORD BASE	AREA 3	NAVFAC SOUTHWEST - BLDG. 1		
M60050 / 000981 NONE CORRESPONDENC NONE 2	03-29-2001 **02-26-2001** NONE	COUNTY OF ORANGE - LRA SIMON, G. MCAS EL TORO, CA GOULD, D.	LOCAL REDEVELOPMENT AUTHORITY DOES NOT BELIEVE THAT SUBMITTING FURTHER COMMENTS ON THE FINAL RADIOLOGICAL SURVEY PLAN WOULD BE PRODUCTIVE OR APPROPRIATE AT THIS TIME (SEE AR #613 - DRAFT FINAL SURVEY, #675 - COMMENTS ON DRAFT FINAL & #859 - FINAL SURVEY). ***COMMENTS: SUBSEQUENT TO IMAGING, DOCUMENT SUSTAINED WATER DAMAGE WHILE STORED IN ROOM B2-B, 1230 COLUMBIA, SAN DIEGO (WATER MAIN BREAK ON FLOOR 12). HARD COPY WAS RESTORED BY VISTA FLOOD RESTORATION.***	ADMIN RECORD BASE INFO REPOSITORY	005 012 017 025 AA 0000003 BLDG. 1789 BLDG. 1803 BLDG. 242 BLDG. 243 BLDG. 244 BLDG. 295 BLDG. 319 BLDG. 360 BLDG. 787 SITE 00001 SITE 00002 SITE 00003	FRC - PERRIS IMAGED TORO_018	181-06-0125 30090141	BOX 0024

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 002864 NONE CORRESPONDENC NONE 165	11-20-2002 **03-01-2001** NONE	NAVFAC - SOUTHWEST DIVISION NAVFAC - SOUTHWEST DIVISION	FINAL BASE REALIGNMENT AND CLOSURE (BRAC) BUSINESS PLAN	ADMIN RECORD	005 006 007 008 009 010 011 012 013 014 015 016 017 018 019 020 021 022 023 024 025 AA 0000003 APHO 38 BLDG. 243 BLDG. 296 BLDG. 297 BLDG. 319 BLDG. 360 BLDG. 656 BLDG. 791 BLDG. 83 BLDG. 839 BLDG. 873 MSC R1 OU 1	FRC - PERRIS IMAGED TORO_022	181-06-0125 BOX 0065 30090141

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)	
					OU 2A OU 2B OU 2C OU 3 SITE 00001 SITE 00002 SITE 00003 SITE 00004 TANK FARM 555 UST 364A UST GROUP 651			
M60050 / 000766 CTO-0200/0204 MISC N68711-92-D-4670 34	03-26-2001 **03-21-2001** CTO 0200	BECHTEL NATIONAL, INC. NAVFAC - SOUTHWEST DIVISION	RESTORATION ADVISORY BOARD (RAB) MEETING MAILER - INCLUDES AGENDA & PUBLIC NOTICE FOR 21 MAR 2001 MEETING, AND MINUTES & ATTACHMENTS FROM THE 31 JAN 2001 RAB MEETING (INCLUDES MAILING LIST AND SIGN-IN, PARTS OF WHICH SHOULD BE CONSIDERED CONFIDENTIAL)	ADMIN RECORD BASE SENSITIVE	AA 0000003 APHO 38 APHO 44 APHO 46 BLDG. 1789 BLDG. 1803 BLDG. 242 BLDG. 243 BLDG. 244 BLDG. 295 BLDG. 319 BLDG. 360 BLDG. 787 SITE 00001 SITE 00002 SITE 00003 SITE 00005 SITE 00016 SITE 00017 SITE 00018 SITE 00024	FRC - PERRIS IMAGED TORO_018	181-06-0125 30090141	BOX 0020

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)	
M60050 / 001521 CTO-0200/0224 MINUTES N68711-92-D-4670 44	04-26-2001 **03-21-2001** CTO 0200	BECHTEL NATIONAL, INC. COLEMAN, B. NAVFAC - SOUTHWEST DIVISION	BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) MEETING MINUTES. ***COMMENTS: SUBSEQUENT TO IMAGING, DOCUMENT SUSTAINED WATER DAMAGE WHILE STORED IN ROOM B2-B, 1230 COLUMBIA, SAN DIEGO (WATER MAIN BREAK ON FLOOR 12). HARD COPY WAS RESTORED BY VISTA FLOOD RESTORATION.***	ADMIN RECORD BASE	005 011 016 017 024 AA 0000003 BLDG. 307 OU 3 SITE 00001 SITE 00002 SITE 00003	FRC - PERRIS IMAGED TORO_018	181-06-0125 30090141	BOX 0036
M60050 / 002429 SWDIV SER 06CC.DG/0521 CORRESPONDENC NONE 4	06-20-2001 **05-15-2001** NONE	NAVFAC - SOUTHWEST DIVISION GOULD, D. VARIOUS AGENCIES	REQUEST FOR SIX MONTH EXTENSION TO THE FEDERAL FACILITY AGREEMENT FOR SUBMITTAL OF THE DRAFT FINAL ROD FOR THE ORIGINAL LANDFILL AND THE PERIMETER ROAD LANDFILL (SEE AR #2426 - RESPONSE TO THIS LETTER). ***COMMENTS: SUBSEQUENT TO IMAGING, DOCUMENT SUSTAINED WATER DAMAGE WHILE STORED IN ROOM B2-B, 1230 COLUMBIA, SAN DIEGO (WATER MAIN BREAK ON FLOOR 12). HARD COPY WAS RESTORED BY VISTA FLOOD RESTORATION.***	ADMIN RECORD	005 AA 0000003 APHO 46 OU 2C SITE 00003	FRC - PERRIS IMAGED TORO_017	181-06-0125 30090141	BOX 0055
M60050 / 002426 NONE CORRESPONDENC NONE 4	06-04-2001 **05-18-2001** NONE	DTSC - CYPRESS, CA SCANDURA, J. NAVFAC - SOUTHWEST DIVISION GOULD, D.	RESPONSE TO REQUEST FOR EXTENSION TO FEDERAL FACILITY AGREEMENT FOR A DRAFT FINAL RECORD OF DECISION FOR THE ORIGINAL AND PERIMETER ROAD LANDFILLS - DTSC GRANTS EXTENSION (SEE AR #2429 - ORIGINAL LETTER). ***COMMENTS: SUBSEQUENT TO IMAGING, DOCUMENT SUSTAINED WATER DAMAGE WHILE STORED IN ROOM B2-B, 1230 COLUMBIA, SAN DIEGO (WATER MAIN BREAK ON FLOOR 12). HARD COPY WAS RESTORED BY VISTA FLOOD RESTORATION.***	ADMIN RECORD BASE INFO REPOSITORY	005 AA 0000003 APHO 46 OU 2C SITE 00003	FRC - PERRIS IMAGED TORO_017	181-06-0125 30090141	BOX 0054

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 002438 CTO-0200/0245 MINUTES N68711-92-D-4670 86	06-25-2001 **05-30-2001** CTO 0200	BECHTEL NATIONAL, INC. NAVFAC - SOUTHWEST DIVISION	BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) MEETING MINUTES INCLUDING VARIOUS HANDOUTS AND SITE UPDATES. ***COMMENTS: SUBSEQUENT TO IMAGING, DOCUMENT SUSTAINED WATER DAMAGE WHILE STORED IN ROOM B2-B, 1230 COLUMBIA, SAN DIEGO (WATER MAIN BREAK ON FLOOR 12). HARD COPY WAS RESTORED BY VISTA FLOOD RESTORATION.***	ADMIN RECORD BASE	005 008 011 012 016 017 018 AA 0000003 BLDG. 307 OU 1 OU 2A OU 2B OU 2C OU 3 SITE 00001 SITE 00002 SITE 00003	FRC - PERRIS IMAGED TORO_017	181-06-0125 BOX 0055 30090141

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 002534 CTO-0200/0278 MISC N68711-92-D-4670 26	09-19-2001 **09-19-2001** CTO 0200	BECHTEL NATIONAL, INC. NAVFAC - SOUTHWEST DIVISION	RESTORATION ADVISORY BOARD (RAB) MEETING MAILER; INCLUDES: AGENDA & PUBLIC NOTICE FOR 19 SEP 2001 MEETING, AND MINUTES AND ATTACHMENTS FROM 25 JUL 2001 MEETING (CONTAINS MAILING LIST PARTS OF WHICH SHOULD BE CONSIDERED CONFIDENTIAL)	ADMIN RECORD BASE SENSITIVE	005 008 012 017 024 025 AA 0000003 BLDG. 1789 BLDG. 1803 BLDG. 242 BLDG. 243 BLDG. 244 BLDG. 319 BLDG. 360 BLDG. 787 HANGAR 295 OU 1 OU 2A OU 2B OU 2C OU 3 OU 3B SITE 00001 SITE 00002 SITE 00003 SITE 00004	FRC - PERRIS IMAGED TORO_020	181-06-0125 30090141 BOX 0059
M60050 / 002595 SWDIV SER 06CC.KO/1363 CORRESPONDENC N62742-94-D-0048 89	01-09-2002 **01-04-2002** 00078	EARTH TECH, INC. WANYOIKE, C. NAVFAC - SOUTHWEST DIVISION	DRAFT HEALTH AND SAFETY PLAN - REMOVAL SITE EVALUATION ANOMALY AREA 3 (INCLUDES SWDIV TRANSMITTAL LETTERS WITH SOME CONFIDENTIAL ADDRESSES)	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 OU 2C SITE 00003	FRC - PERRIS IMAGED TORO_023	181-06-0125 30090141 BOX 0060

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 002594 SWDIV SER 06CC.KO/1363 REPORT N62742-94-D-0048 122	01-09-2002 **01-07-2002** 00078	EARTH TECH, INC. VEDAGIRI, E. NAVFAC - SOUTHWEST DIVISION	DRAFT WORK PLAN REMOVAL SITE EVALUATION ANOMALY AREA 3 (INCLUDES SWDIV TRANSMITTAL LETTERS TO REGULATORS WITH A CONFIDENTIAL ADDRESS)	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 OU 2C SITE 00003	FRC - PERRIS IMAGED TORO_026	181-06-0125 BOX 0060 30090141
M60050 / 002601 CTO-0200/0343 MISC N68711-92-D-4670 34	01-17-2002 **01-30-2002** CTO 0200	BECHTEL NATIONAL, INC. NAVFAC - SOUTHWEST DIVISION	RESTORATION ADVISORY BOARD (RAB) MEETING MAILER - INCLUDES AGENDA AND PUBLIC NOTICE AND MINUTES AND ATTACHMENTS FROM THE 28 NOV 2001 RAB MEETING (CONTAINS MAILING LIST PARTS OF WHICH SHOULD BE CONSIDERED CONFIDENTIAL)	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	005 007 008 011 012 017 024 025 AA 0000003 BLDG. 307 OU 2A OU 2B OU 2C OU 3 OU 3B SITE 00001 SITE 00002 SITE 00003 SITE 00004	FRC - PERRIS IMAGED TORO_020	181-06-0125 BOX 0060 30090141

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 002607 CTO-0200/0360 MISC N68711-92-D-4670 188	03-07-2002 **01-30-2002** CTO 0200	BECHTEL NATIONAL, INC. NAVFAC - SOUTHWEST DIVISION	RESTORATION ADVISORY BOARD (RAB) PUBLIC INFORMATION MATERIALS - INCLUDES AGENDA, PUBLIC NOTICE AND MINUTES FROM 19 SEP 2001 MEETING, AGENCY COMMENTS & LETTERS, VARIOUS PRESENTATION AND INFORMATION MATERIALS. ***COMMENTS: SUBSEQUENT TO IMAGING, DOCUMENT SUSTAINED WATER DAMAGE WHILE STORED IN ROOM B2-B, 1230 COLUMBIA, SAN DIEGO (WATER MAIN BREAK ON FLOOR 12). HARD COPY WAS RESTORED BY VISTA FLOOD RESTORATION.***	ADMIN RECORD BASE INFO REPOSITORY	005 008 016 017 AA 0000003 BLDG. 1789 BLDG. 1803 BLDG. 307 BLDG. 319 BLDG. 360 BLDG. 787 OU 2B OU 2C OU 3 SITE 00001 SITE 00002 SITE 00003	FRC - PERRIS IMAGED TORO_020	181-06-0125 30090141 BOX 0060
M60050 / 002611 CTO-0200/0370 MINUTES N68711-92-D-4670 64	04-03-2002 **01-30-2002** CTO 0200	BECHTEL NATIONAL, INC. NAVFAC - SOUTHWEST DIVISION	30 JANUARY 2002 BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) MEETING MINUTES. ***COMMENTS: SUBSEQUENT TO IMAGING, DOCUMENT SUSTAINED WATER DAMAGE WHILE STORED IN ROOM B2-B, 1230 COLUMBIA, SAN DIEGO (WATER MAIN BREAK ON FLOOR 12). HARD COPY WAS RESTORED BY VISTA FLOOD RESTORATION.***	ADMIN RECORD	005 016 017 AA 0000003 BLDG. 307 OU 1 OU 2A OU 2B OU 2C OU 3 SITE 00001 SITE 00002 SITE 00003	FRC - PERRIS IMAGED TORO_020	181-06-0125 30090141 BOX 0061

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)	
M60050 / 003505 NONE CORRESPONDENC NONE 1	05-05-2006 **02-06-2002** NONE	CRWQCB - RIVERSIDE P. HANNON BRAC PMO WEST D. GOULD	REVIEW AND COMMENTS ON THE COMMENTS ON DRAFT WORK PLAN (WP), REMOVAL SITE EVALUATION (RSE), ANOMALY AREA 3	ADMIN RECORD BASE	AREA 3	NAVFAC SOUTHWEST - BLDG. 1		
M60050 / 003507 NONE CORRESPONDENC NONE 15	05-05-2006 **02-13-2002** NONE	DTSC - CYPRESS T. CHESNEY BRAC PMO WEST D. GOULD	REVIEW AND COMMENTS ON THE DRAFT WORK PLAN (WP) AND DRAFT HEALTH AND SAFETY PLAN (HASP), REMOVAL SITE EVALUATION (RSE) FOR ANOMALY AREA 3 (INCLUDES COMMENTS BY HSEG DATED 02/06/02 AND HERD DATED 01/30/02)	ADMIN RECORD BASE	AREA 3	NAVFAC SOUTHWEST - BLDG. 1		
M60050 / 002609 SWDIV SER 06CC.DG/0153 CORRESPONDENC NONE 14	03-07-2002 **02-15-2002** NONE	NAVFAC - SOUTHWEST DIVISION GOULD, D. VARIOUS AGENCIES	REQUEST FOR EIGHT MONTH EXTENSION TO THE FEDERAL FACILITY AGREEMENT FOR SUBMITTAL OF THE DRAFT FINAL RECORD OF DECISION FOR THE ORIGINAL LANDFILL AND THE PERIMETER ROAD LANDFILL (SEE AR #2773 - EPA RESPONSE). ***COMMENTS: SUBSEQUENT TO IMAGING, DOCUMENT SUSTAINED WATER DAMAGE WHILE STORED IN ROOM B2-B, 1230 COLUMBIA, SAN DIEGO (WATER MAIN BREAK ON FLOOR 12). HARD COPY WAS RESTORED BY VISTA FLOOD RESTORATION.***	ADMIN RECORD BASE INFO REPOSITORY	005 AA 0000003 OU 2C SITE 00003	FRC - PERRIS IMAGED TORO_020	181-06-0125 30090141	BOX 0061
M60050 / 002773 NONE CORRESPONDENC NONE 2	07-01-2002 **02-21-2002** NONE	U.S. EPA - SAN FRANCISCO, CA MOUTOUX, N. NAVFAC - SOUTHWEST DIVISION GOULD, D.	RESPONSE TO REQUEST FOR EIGHT MONTH EXTENSION FOR SUBMITTAL OF THE DRAFT FINAL RECORD OF DECISION FOR THE ORIGINAL LANDFILL AND THE PERIMETER ROAD LANDFILL - EPA WOULD LIKE TO DISCUSS CONCERNS REGARDING PROCESSES AND SCHEDULES BEFORE GRANTING REQUEST. ***COMMENTS: [SEE RECORD # 2609 - REQUEST]***	ADMIN RECORD BASE	005 AA 0000003 OU 2C SITE 00003	FRC - PERRIS IMAGED TORO_021	181-06-0125 30090141	BOX 0063

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)	
M60050 / 002834 NONE CORRESPONDENC NONE 4	11-19-2002 **02-22-2002** NONE	DTSC - CYPRESS, CA SCANDURA, J. NAVFAC - SOUTHWEST DIVISION GOULD, D.	RESPONSE TO REQUEST FOR EIGHT MONTH EXTENSION TO THE FEDERAL FACILITY AGREEMENT FOR SUBMITTAL OF THE DRAFT FINAL RECORD OF DECISION FOR THE ORIGINAL LANDFILL AND THE PERIMETER ROAD LANDFILL - DTSC DENIES REQUEST (SEE AR #2609 - REQUEST). ***COMMENTS: DISTRIBUTION LIST CONTAINS SOME CONFIDENTIAL ADDRESSES***	ADMIN RECORD BASE SENSITIVE	005 AA 0000003 APHO 46 MSCR 2 OU 2C SITE 00003	FRC - PERRIS IMAGED TORO_021	181-06-0125 30090141	BOX 0065
M60050 / 002614 CTO-0200/0371 MISC N68711-92-D-4670 35	04-04-2002 **03-27-2002** CTO 0200	BECHTEL NATIONAL, INC. NAVFAC - SOUTHWEST DIVISION	RESTORATION ADVISORY BOARD (RAB) MEETING MAILER - INCLUDES AGENDA AND PUBLIC NOTICE FOR THE 27 MAR 2002 MEETING WITH MINUTES AND ATTACHMENTS FROM THE 30 JAN 2002 RAB MEETING. ***COMMENTS: (CONTAINS MAILING LIST AND SIGN-IN SHEETS PARTS OF WHICH SHOULD BE CONSIDERED CONFIDENTIAL). SUBSEQUENT TO IMAGING, DOCUMENT SUSTAINED WATER DAMAGE WHILE STORED IN ROOM B2-B, 1230 COLUMBIA, SAN DIEGO (WATER MAIN BREAK ON FLOOR 12). DOCUMENT WAS RESTORED BY VISTA FLOOD RESTORATION.***	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	005 016 017 018 024 AA 0000003 BLDG. 307 OU 1 OU 2A OU 2B OU 2C OU 3 SITE 00002 SITE 00003	FRC - PERRIS IMAGED TORO_020	181-06-0125 30090141	BOX 0061
M60050 / 002798 SWDIV SER 06CH.DG/0424 CORRESPONDENC NONE 9	08-28-2002 **04-26-2002** NONE	NAVFAC - SOUTHWEST DIVISION GOULD, D. VARIOUS AGENCIES	REQUEST FOR A CHANGE TO THE FEDERAL FACILITY AGREEMENT (FFA) SCHEDULE WITH A 9-MONTH EXTENSION FOR SUBMITTAL OF THE DRAFT FINAL RECORD OF DECISION FOR OPERABLE UNIT 2C IN ORDER TO INCORPORATE FINDINGS FOR ANOMALY AREA 3, APHO 46, AND MSCR 2	ADMIN RECORD BASE	005 AA 0000003 APHO 46 MSCR 2 OU 2C SITE 00003	FRC - PERRIS IMAGED TORO_025	181-06-0125 30090141	BOX 0064

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)	
M60050 / 003551 NONE CORRESPONDENC NONE 12	05-30-2006 **04-30-2002** NONE	DTSC - CYPRESS, CA CHESNEY, T. BRAC PMO WEST GOULD, D.	REVIEW AND COMMENTS ON THE RESPONSE TO COMMENTS ON THE DRAFT WORK PLAN (WP) AND DRAFT HEALTH AND SAFETY PLAN (HASP), REMOVAL SITE EVALUATION (RSE) FOR ANOMALY AREA 3 - INCLUDES GEOLOGICAL SERVICES UNIT'S RESPONSES TO RESPONSES TO COMMENTS (SEE COMMENTS). ***COMMENTS: (ON THE DRAFT WORK PLAN, REMOVAL SITE EVALUATION ANOMALY AREA 3, DATED 29 APRIL 2002)***	ADMIN RECORD BASE	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1		
M60050 / 002891 NONE CORRESPONDENC NONE 2	12-12-2002 **05-07-2002** NONE	U.S. EPA - SAN FRANCISCO, CA MOUTOUX, N. NAVFAC - SOUTHWEST DIVISION GOULD, D.	RESPONSE TO REQUEST FOR A CHANGE TO THE FEDERAL FACILITY AGREEMENT (FFA) SCHEDULE WITH A 9-MONTH EXTENSION FOR SUBMITTAL OF THE DRAFT FINAL RECORD OF DECISION IN ORDER TO INCORPORATE FINDINGS	ADMIN RECORD BASE	005 AA 0000003 APHO 46 MSCR 2 OU 2C SITE 00003	FRC - PERRIS IMAGED TORO_022	181-06-0125 30090141	BOX 0065
M60050 / 002759 CTO-0038/0018 MINUTES N68711-95-D-7526 34	06-06-2002 **05-29-2002** CTO 0038	BECHTEL ENVIRONMENTAL, INC. NAVFAC - SOUTHWEST DIVISION	RESTORATION ADVISORY BOARD MEETING MAILER - RAB MEETING AGENDA AND PUBLIC NOTICE WITH MINUTES AND SIGN-IN SHEETS FROM THE 27 MARCH 2002 MEETING (CONTAINS MAILING LIST PARTS OF WHICH SHOULD BE CONSIDERED CONFIDENTIAL)	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	005 011 016 017 018 024 025 AA 0000003 BLDG. 307 OU 1 OU 2A OU 2B OU 2C OU 3 SITE 00001 SITE 00002 SITE 00003	FRC - PERRIS IMAGED TORO_021	181-06-0125 30090141	BOX 0063

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)	
M60050 / 002812 NONE CORRESPONDENC N62742-94-D-0048 88	09-11-2002 **08-26-2002** 00078	EARTH TECH, INC. WANYOIKE, C. NAVFAC - SOUTHWEST DIVISION	FINAL HEALTH AND SAFETY PLAN - REMOVAL SITE EVALUATION ANOMALY AREA 3	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 OU 2C SITE 00003	FRC - PERRIS IMAGED TORO_021	181-06-0125 30090141	BOX 0064
M60050 / 002811 NONE REPORT N62742-94-D-0048 162	09-11-2002 **08-27-2002** 00078	EARTH TECH, INC. VEDAGIRI, E. NAVFAC - SOUTHWEST DIVISION	FINAL WORK PLAN REMOVAL SITE EVALUATION ANOMALY AREA 3 - INCLUDES SAMPLING AND ANALYSIS PLAN	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 OU 2C SITE 00003	FRC - PERRIS IMAGED TORO_025	181-06-0125 30090141	BOX 0064
M60050 / 002861 CTO-0038/0083 & 0083-1 MINUTES N68711-95-D-7526 80	11-20-2002 **11-11-2002** CTO 0038	BECHTEL ENVIRONMENTAL, INC. NAVFAC - SOUTHWEST DIVISION	MINUTES FROM THE 31 JULY 2002 BASE REALIGNMENT AND CLOSURE CLEANUP TEAM MEETING W/ATTACHMENTS. ***COMMENTS: INCLUDES REPLACEMENT PAGE 5, DATED 26 NOVEMBER 2002***	ADMIN RECORD BASE	005 008 011 012 016 017 018 024 AA 0000003 OU 1 OU 2A OU 2B OU 2C OU 3 SITE 00001 SITE 00002 SITE 00003	FRC - PERRIS IMAGED TORO_021	181-06-0125 30090141	BOX 0065

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)	
M60050 / 002953 CTO-0038/0151 MINUTES NONE 121	04-08-2003 **01-29-2003** CTO 0038	BECHTEL ENVIRONMENTAL, INC. NAVFAC - SOUTHWEST DIVISION	29 AND 30 JANUARY 2003 BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) MEETING MINUTES	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00011 SITE 00018 SITE 00024	FRC - PERRIS IMAGED TORO_024	181-06-0125 30090141	BOX 0067
M60050 / 003612 NONE CORRESPONDENC NONE 2	07-14-2006 **05-20-2003** NONE	U.S. EPA - SAN FRANCISCO, CA MOUTOUX, N. BRAC PMO WEST PISZKIN, A.	COMMENTS ON THE DRAFT FINAL ENVIRONMENTAL BASELINE SURVEY (EBS)	ADMIN RECORD BASE	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1		
M60050 / 003180 NONE CORRESPONDENC NONE 3	10-15-2004 **06-17-2003** NONE	U.S. EPA - SAN FRANCISCO, CA MOUTOUX, N. NAVFAC - SOUTHWEST DIVISION PISZKIN, A.	COMMENTS ON THE DRAFT SCREENING ECOLOGICAL RISK ASSESSMENT, REMOVAL SITE EVALUATION (DOCUMENT WAS NOT SUBMITTED TO ADMINISTRATIVE RECORDS)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001	FRC - PERRIS IMAGED TORO_025	181-06-0125 30090141	BOX 0072
M60050 / 003181 NONE CORRESPONDENC NONE 1	10-15-2004 **07-09-2003** NONE	CRWQCB - RIVERSIDE, CA BRODERICK, J. NAVFAC - SOUTHWEST DIVISION PISZKIN, A.	NO COMMENTS ON THE DRAFT SCREENING ECOLOGICAL RISK ASSESSMENT, REMOVAL SITE EVALUATION (DOCUMENT WAS NOT SUBMITTED TO ADMINISTRATIVE RECORDS)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	FRC - PERRIS IMAGED TORO_025	181-06-0125 30090141	BOX 0072
M60050 / 003179 NONE CORRESPONDENC NONE 6	10-15-2004 **08-04-2003** NONE	DOI - CARLSBAD YUEN, A. NAVFAC - SOUTHWEST DIVISION PISZKIN, A.	COMMENTS ON THE DRAFT SCREENING ECOLOGICAL RISK ASSESSMENT (DOCUMENT WAS NOT SUBMITTED TO ADMINISTRATIVE RECORDS)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00003	FRC - PERRIS IMAGED TORO_025	181-06-0125 30090141	BOX 0072

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)	
M60050 / 003178 NONE CORRESPONDENC NONE 6	10-15-2004 **09-18-2003** NONE	U.S. EPA - SAN FRANCISCO, CA MOUTOUX, N. NAVFAC - SOUTHWEST DIVISION PISZKIN, A.	COMMENTS ON THE DRAFT SCREENING ECOLOGICAL RISK ASSESSMENT (ERA) (DRAFT ERA WAS NOT SUBMITTED TO ADMINISTRATIVE RECORDS)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001	FRC - PERRIS IMAGED TORO_025	181-06-0125 30090141	BOX 0072
M60050 / 003015 NONE REPORT N62742-94-D-0048 1500	11-06-2003 **11-01-2003** 00078	EARTH TECH, INC. NAVFAC - SOUTHWEST DIVISION	DRAFT EXPANDED SITE INSPECTION REPORT	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1 PROBLEM SHELVING		
M60050 / 003128 NONE CORRESPONDENC NONE 4	08-09-2004 **01-26-2004** NONE	CRWQCB - SANTA ANA, CA BRODERICK, J. BRAC PMO WEST PISZKIN, F.	COMMENTS ON DRAFT EXPANDED SITE INSPECITON REPORT	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	FRC - PERRIS IMAGED TORO_025	181-06-0125 30090141	BOX 0071
M60050 / 003814 NONE CORRESPONDENC NONE 12	11-21-2006 **02-11-2004** NONE	DTSC - CYPRESS, CA ALONZO, M. BRAC PMO WEST PISZKIN, A.	REVIEW AND COMMENTS ON THE DRAFT EXPANDED SITE INSPECTION (ESI) REPORT, ANOMALY AREA (INCLUDES COMMENTS BY HERD DATED, 02/11/04 AND GSU DATED 01/29/04)	ADMIN RECORD BASE	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1		
M60050 / 003131 NONE CORRESPONDENC NONE 10	08-09-2004 **02-12-2004** NONE	U.S. EPA - SAN FRANCISCO, CA MOUTOUX, N. BRAC PMO WEST PISZKIN, F.	COMMENTS AND NON CONCURRANCE ON THE NO FURTHER ACTION ON THE DRAFT EXPANDED SITE INSPECTION REPORT	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	FRC - PERRIS IMAGED TORO_025	181-06-0125 30090141	BOX 0071

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)	
M60050 / 003173 SER 06CC.AP/0665 CORRESPONDENC NONE 13	10-07-2004 **06-24-2004** NONE	NAVFAC - SOUTHWEST DIVISION PISZKIN, A. VARIOUS AGENCIES	PROPOSED LANDFILL GAS CONTROL MEASURES AND POSTCLOSURE LAND USE AT INSTALLATION RESTORATION SITE 3, SITE 5, AND ANOMALY AREA 3 {PORTION OF MAILING LIST IS CONFIDENTIAL}	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	005 AA 0000003 SITE 00003	FRC - PERRIS IMAGED TORO_025	181-06-0125 30090141	BOX 0071
M60050 / 003092 SWDIV SER 06CC.AP/0604 CORRESPONDENC N62742-94-D-0048 44	07-07-2004 **06-28-2004** 00078	NAVFAC - SOUTHWEST DIVISION PISZKIN, A. U.S. EPA - SAN FRANCISCO, CA MOUTOUX, N.	COMPILATION OF COMMENTS ON RESPONSE TO COMMENTS ON DRAFT EXPANDED SITE INSPECTION REPORT, ANOMALY AREA [INCLUDES SWDIV TRANSMITTAL LETTER BY A. PISZKIN] {PORTION OF MAILING LIST IS CONFIDENTIAL}	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003	FRC - PERRIS IMAGED TORO_027	181-06-0125 30090141	BOX 0070
M60050 / 003116 SWDIV SER 06CC.AP/0732 CORRESPONDENC NONE 3	07-21-2004 **07-14-2004** NONE	NAVFAC - SOUTHWEST DIVISION PISZKIN, A. DTSC - CYPRESS, CA MAHMOUD, T.	RESPONSE TO COMMENTS ON THE REQUESTED CLARIFICATIONS REGARDING PROPOSED LANDFILL GAS CONTROL MEASURES AND POSTCLOSURE LAND USE AT INSTALLATION RESTORATION PROGRAM (IRP) {PORTION OF MAILING LIST IS CONFIDENTIAL}	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	005 AA 0000003 SITE 00003	FRC - PERRIS IMAGED TORO_027	181-06-0125 30090141	BOX 0070
M60050 / 003152 NONE CORRESPONDENC NONE 2	08-09-2004 **07-26-2004** NONE	CRWQCB - SANTA ANA, CA BRODERICK, J. NAVFAC - SOUTHWEST DIVISION PISZKIN, F.	COMMENTS ON NAVY RESPONSE TO COMMENTS; EXPANDED SITE INSPECTION	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1 PROBLEM FILE CABINET		
M60050 / 003168 2014 & BRAC SER BPMOW.DAG/0239 REPORT N68711-01-D-6010 400	09-23-2004 **12-01-2004** DO 0002	WESTON SOLUTIONS, INC. NAVFAC - SOUTHWEST DIVISION	DRAFT RADIOLOGICAL RELEASE REPORT FOR INSTALLATION RESTORATION PROGRAM (IRP) SITES 3 AND 5 (INCLUDING AERIAL PHOTOGRAPH ANOMALY [APHO] 46), ANOMALY AREA 3, AND BUILDING 244	ADMIN RECORD BASE INFO REPOSITORY	005 AA 0000003 APHO 46 BLDG. 244 SITE 00003	NAVFAC SOUTHWEST - BLDG. 1		

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 003303 126463/002/2.7 MINUTES N68711-00-D-0004 25	08-15-2005 **12-09-2004** 00069	CDM FEDERAL PROGRAMS CORP. NAVFAC - SOUTHWEST DIVISION	09 DECEMBER 2004 FINAL BASE REALIGNMENT AND CLOSURE (BRAC) CLEAUNP TEAM (BCT) MEETING MINUTES - INCLUDES VARIOUS HANDOUTS	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 HANGAR 296 HANGAR 297 SITE 00001 SITE 00003 SITE 00005	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003709 NONE CORRESPONDENC NONE 1	08-29-2006 **01-31-2005** NONE	U.S. EPA - SAN FRANCISCO, CA MUZA, R. BRAC PMO WEST PISZKIN, A.	REVIEW AND NO COMMENTS ON THE DRAFT RADIOLOGICAL RELEASE REPORT	ADMIN RECORD BASE INFO REPOSITORY	005 AA 0000003 APHO 46 BLDG. 244 SITE 00003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003740 NONE CORRESPONDENC NONE 7	09-07-2006 **02-09-2005** NONE	DTSC - CYPRESS, CA MAHMOUD, T. BRAC PMO WEST PISZKIN, A.	REVIEW AND COMMENTS ON DRAFT RADIOLOGICAL RELEASE REPORT (INCLUDES COMMENTS BY D. BAILEY OF DHS - CA, DATED 8 FEBRUARY 2005)	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	005 AA 0000003 APHO 46 BLDG. 244 SITE 00003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003741 NONE CORRESPONDENC NONE 1	09-07-2006 **02-15-2005** NONE	CRWQCB - RIVERSIDE, CA BRODERICK, J. BRAC PMO WEST PISZKIN, A.	REVIEW AND NO COMMENTS ON DRAFT RADIOLOGICAL RELEASE REPORT	ADMIN RECORD BASE INFO REPOSITORY	005 AA 0000003 APHO 46 BLDG. 244 SITE 00003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003272 BRAC SER BPMOW.FAP/0600 CORRESPONDENC NONE 7	05-19-2005 **04-06-2005** NONE	NAVFAC - SOUTHWEST DIVISION PISZKIN, A. VARIOUS AGENCIES	REQUEST FOR AN EXTENSION ON THE REMEDIAL INVESTIGATION (RI) REPORT [INCLUDES AN UPDATED FEDERAL FACILITY AGREEMENT (FFA) APPENDIX A SCHEDULE AND AN UPDATED PROJECT SCHEDULE]{PORTION OF MAILING LIST IS CONFIDENTIAL}	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 003766 NONE CORRESPONDENC NONE 2	09-22-2006 **04-25-2005** NONE	U.S. EPA - SAN FRANCISCO, CA MUZA, R. BRAC PMO WEST PISZKIN, A.	REVIEW AND APPROVAL OF THE FEDERAL FACILITY AGREEMENT (FFA) APPENDIX A SCHEDULE UPDATE AND EXTENSION REQUEST	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003769 NONE CORRESPONDENC NONE 2	09-25-2006 **04-28-2005** NONE	DTSC - CYPRESS, CA SCANDURA, J. BRAC PMO WEST PISZKIN, A.	REVIEW AND CONCURRENCE WITH THE FEDERAL FACILITY AGREEMENT (FFA) EXTENSION REQUEST FOR THE REMEDIAL INVESTIGATION (RI) REPORT, ANOMALY AREA 3	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003307 BRAC SER BPMOW.CPA/0999 CORRESPONDENC NONE 4	08-17-2005 **07-25-2005** NONE	NAVFAC - SOUTHWEST DIVISION PISZKIN, A. VARIOUS AGENCIES	REQUEST FOR AN EXTENSION ON THE REMEDIAL INVESTIGATION (RI) REPORT [INCLUDES AN UPDATED FEDERAL FACILITY AGREEMENT (FFA) APPENDIX A SCHEDULE AND AN UPDATED PROJECT SCHEDULE]{PORTION OF MAILING LIST IS CONFIDENTIAL}	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003361 NONE CORRESPONDENC NONE 1	10-26-2005 **07-26-2005** NONE	U.S. EPA - SAN FRANCISCO, CA MUZA, R. BRAC PMO WEST PISZKIN, A.	REVIEW AND APPROVAL OF EXTENTION REQUEST AND UPDATE FEDERAL FACILITY AGREEMENT (FFA) APPENDIX A SCHEDUALES FOR ANOMALY AREA 3	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003358 NONE CORRESPONDENC NONE 5	10-26-2005 **08-01-2005** NONE	DTSC - CYPRESS, CA SCANDURA, J. BRAC PMO WEST PISZKIN, A.	CONCURRENCE TO REQUEST FOR EXTENSION TO THE FEDERAL FACILTY AGREEMENT (FFA) SCHEDULE FOR ANOMALY AREA 3	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 003362 NONE CORRESPONDENC NONE 2	10-26-2005 **08-01-2005** NONE	DTSC - CYPRESS, CA CHENG, F. VARIOUS AGENCIES	REQUEST FOR IDENTIFICATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR ANOMALY AREA 3. ***COMMENTS: ENCLOSED SUMMARY FROM THE NAVY WAS NOT PROVIDED***	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003324 NONE CORRESPONDENC NONE 25	09-21-2005 **09-08-2005** NONE	DTSC - CYPRESS, CA CHENG, F. NAVFAC - SOUTHWEST DIVISION NEWTON, D.	REQUESTED POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARAR) IN PREPARATION OF A REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS){PORTION OF MAILING LIST IS CONFIDENTIAL}	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003331 BRAC SER BPMOW.RJP/1238 CORRESPONDENC NONE 11	10-07-2005 **09-20-2005** NONE	BRAC PMO WEST NEWTON, D. VARIOUS AGENCIES	REQUEST FOR AN EXTENSION TO THE FEDERAL FACILITY AGREEMENT (FFA) APPENDIX A SCHEDULE FOR PRIMARY DOCUMENTS (W/ ENCLOSURES)	ADMIN RECORD BASE INFO REPOSITORY	005 AA 0000003 SITE 00001 SITE 00002 SITE 00003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003332 NONE CORRESPONDENC NONE 14	10-11-2005 **09-20-2005** NONE	DTSC - CYPRESS, CA CHENG, F. BRAC PMO WEST NEWTON, D.	TRANSMITTAL OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) FOR ANOMALY AREA 3 FROM THE CA DEPARTMENT OF FISH AND GAME (W/ ENCLOSURES) [PORTION OF MAILING LIST IS CONFIDENTIAL]	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003341 NONE CORRESPONDENC NONE 2	10-24-2005 **09-27-2005** NONE	U.S. EPA - SAN FRANCISCO, CA MUZA, R. BRAC PMO WEST NEWTON, D.	RESPONSE TO FEDERAL FACILITY AGREEMENT (FFA) APPENDIX A SCHEDULE AND EXTENSION REQUEST	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001 SITE 00002 SITE 00003 SITE 00005	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 003336 NONE CORRESPONDENC NONE 2	10-11-2005 **09-28-2005** NONE	CRWQCB - RIVERSIDE, CA BRODERICK, J. BRAC PMO WEST NEWTON, D.	RESPONSE TO REQUEST FOR IDENTIFICATION OF APPLICABLE OR RELEVANT AND OR APPROPRIATE REQUIREMENTS (ARARS) FOR ANOMALY AREA 3 (LANDFILL)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003346 NONE CORRESPONDENC NONE 3	10-24-2005 **10-06-2005** NONE	DTSC - CYPRESS, CA SCANDURA, J. BRAC PMO WEST NEWTON, D.	RESPONSE TO FEDERAL FACILITY AGREEMENT (FFA) SCHEDULE EXTENSION REQUEST (A PORTION OF THE MAILING LIST IS CONFIDENTIAL)	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 SITE 00001 SITE 00002 SITE 00003 SITE 00005	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003425 BRAC SER BPMOW.JC\1442 REPORT N62742-94-D-0048 & N68711-03-D-5106 500	12-15-2005 **12-01-2005** 0078 & 006	EARTH TECH, INC. BRAC PMO WEST	DRAFT REMEDIAL INVESTIGATION/FEASIBILITY STUDY REPORT (INCLUDES BRAC TRANSMITTAL LETTER BY D. NEWTON) [PORTION OF THE MAILING LIST IS CONFIDENTIAL]	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 OU 2C	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003484 NONE CORRESPONDENC NONE 2	04-03-2006 **02-16-2006** NONE	CRWQCB - RIVERSIDE, CA BRODERICK, J. BRAC PMO WEST NEWTON, D.	COMMENTS ON DRAFT REMEDIAL INVESTIGATION/FEASIBILITY STUDY REPORT	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 OU 2C	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003464 BRAC SER BPMOW.CA/0172 CORRESPONDENC NONE 12	03-14-2006 **02-27-2006** NONE	BRAC D. GOULD VARIOUS AGENCIES	UPDATE ON THE FEDERAL FACILITY AGREEMENT APPENDIX A SCHEDULE EXTENSION REQUEST FOR INSTALLATION RESTORATION PROGRAM (IRP) SITES AND ANOMALY AREA 3	ADMIN RECORD BASE INFO REPOSITORY	005 008 012 AREA 3 SITE 00001 SITE 00002 SITE 00003	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 003481 NONE CORRESPONDENC NONE 2	04-03-2006 **03-02-2006** NONE	U.S. EPA - SAN FRANCISCO, CA MUZA, R. BRAC PMO WEST NEWTON, D.	UPDATE AND COMMENTS ON THE FEDERAL FACILITY AGREEMENT (FFA) APPENDIX A SCHEDULE AND EXTENTION REQUEST	ADMIN RECORD BASE INFO REPOSITORY	005 008 012 AA 0000003 SITE 00001 SITE 00002 SITE 00003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003482 NONE CORRESPONDENC NONE 3	04-03-2006 **03-06-2006** NONE	DTSC - CYPRESS, CA SCANDURA, J. BRAC PMO WEST NEWTON, D.	COMMENTS ON FEDERAL FACILITY AGREEMENT (FFA) SCHEDULE EXTENSION REQUEST FOR INSTALLATION RESTORATION PROGRAM (IRP) SITES	ADMIN RECORD BASE INFO REPOSITORY	005 008 012 AA 0000003 SITE 00001 SITE 00002 SITE 00003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003472 NONE CORRESPONDENC NONE 12	04-03-2006 **03-21-2006** NONE	U.S. EPA - SAN FRANCISCO, CA MUZA, R. BRAC PMO WEST NEWTON, D.	COMMENTS ON DRAFT INVESTIGATION/FEASIBILITY STUDY (RI/FS) REPORT	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 OU 2C SITE 00001	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003473 NONE CORRESPONDENC NONE 15	04-03-2006 **03-21-2006** NONE	DTSC - CYPRESS, CA CHENG, F. BRAC PMO WEST NEWTON, D.	REVIEW AND COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) REPORT	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 OU 2C	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003652 NONE CORRESPONDENC NONE 2	07-17-2006 **06-12-2006** NONE	U.S. EPA - SAN FRANCISCO, CA MUZA, R. BRAC PMO WEST NEWTON, D.	REVIEW AND CONCURRENCE WITH THE FEDERAL FACILITY AGREEMENT (FFA) EXTENSTION REQUEST FOR THE DRAFT REMEDIAL INVESTIGATION REPORT	ADMIN RECORD BASE INFO REPOSITORY	005 017 AA 0000003 SITE 00001 SITE 00002 SITE 00003	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 003690 PROJECT NO. 2014 REPORT N68711-01-D-6010 250	08-07-2006 **08-01-2006** 00002	WESTON SOLUTIONS, INC. BRAC PMO WEST	DRAFT FINAL RADIOLOGICAL RELEASE REPORT (SEE AR #3689 - BRAC PMO WEST TRANSMITTAL LETTER BY D. NEWTON)	ADMIN RECORD BASE INFO REPOSITORY	005 APHO 46 AREA 3 BLDG. 244 SITE 00003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003689 BRAC SER BPMOW.JTC/0669 CORRESPONDENC NONE 3	08-07-2006 **08-02-2006** NONE	BRAC PMO WEST D. NEWTON VARIOUS AGENCIES	TRANSMITTAL OF DRAFT FINAL RADIOLOGICAL RELEASE REPORT FOR ORIGINAL LANDFILL, PERIMETER LANDFILL AND AERIAL PHOTOGRAPH ANOMALY (APHO) (W/OUT ENCLOSURE) [PORTION OF MAILING LIST IS CONFIDENTIAL] {SEE AR #3690 - DRAFT FINAL RADIOLOGICAL RELEASE REPORT}	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	005 APHO 46 AREA 3 BLDG. 244 SITE 00003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003742 NONE CORRESPONDENC NONE 1	09-07-2006 **08-24-2006** NONE	U.S. EPA - SAN FRANCISCO, CA MUZA, R. BRAC PMO WEST NEWTON, D.	REVIEW AND CONCURRENCE WITH DRAFT FINAL RADIOLOGICAL RELEASE REPORT	ADMIN RECORD BASE INFO REPOSITORY	005 AA 0000003 APHO 46 BLDG. 244 SITE 00003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004105 NONE CORRESPONDENC NONE 2	10-26-2007 **09-06-2006** NONE	DEPARTMENT OF HEALTH SERVICES LEINWANDER, P. DTSC - CYPRESS, CA HAKIM, S.	REVIEW AND COMMENTS ON THE DRAFT FINAL RADIOLOGICAL RELEASE REPORT	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 BLDG 00244 SITE 00003 SITE 00005	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003797 NONE CORRESPONDENC NONE 1	11-14-2006 **10-23-2006** NONE	CRWQCB - RIVERSIDE, CA BRODERICK, J. BRAC PMO WEST NEWTON, D.	REVIEW AND NO COMMENTS ON THE DRAFT FINAL RADIOLOGICAL RELEASE REPORT FOR SITES 3, 5, AERIAL PHOTOGRAPH ANOMALY SITE 46, ANOMALY AREA 3, AND BUILDING 244; CRWQCB CONCURS WITH THE CONCLUSIONS AND RECOMMENDATIONS	ADMIN RECORD BASE INFO REPOSITORY	005 AA 0000003 APHO 46 BLDG. 244 SITE 00003	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 003791 NONE REPORT N62474-94-D-0048 20	11-14-2006 **11-01-2006** 00068	EARTH TECH, INC. BRAC PMO WEST	DRAFT SAMPLING AND ANALYSIS PLAN (SAP) ADDENDUM # 1, REMOVAL SITE EVALUATION (RSE) - ANOMALY AREA 3 [SEE AR# 3790 - BRAC TRANSMITTAL LETTER BY D. NEWTON AND AR# 2811 - FINAL WORK PLAN REMOVAL SITE EVALUATION]	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 OU 2C	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003790 BRAC SER BPMOW.JTC/0121 CORRESPONDENC NONE 2	11-14-2006 **11-08-2006** NONE	BRAC PMO WEST NEWTON, D. VARIOUS AGENCIES	TRANSMITTAL OF DRAFT SAMPLING AND ANALYSIS PLAN ADDENDUM # 1, REMOVAL SITE EVALUATION - ANOMALY AREA 3 (W/OUT ENCLOSURE) [SEE AR# 3791 - DRAFT SAMPLING AND ANALYSIS PLAN ADDENDUM # 1]	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 OU 2C	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003869 NONE CORRESPONDENC NONE 1	01-11-2007 **11-21-2006** NONE	U.S. EPA - SAN FRANCISCO, CA MUZA, R. BRAC PMO WEST NEWTON, D.	REVIEW AND NO COMMENTS ON DRAFT SAMPLING AND ANALYSIS PLAN (SAP) ADDENDUM 1, REMOVAL SITE EVALUATION (RSE)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 OU 2C	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003858 2014 REPORT N68711-01-D-6010 165	12-14-2006 **12-01-2006** 00002	WESTON SOLUTIONS, INC. BRAC PMO WEST	FINAL RADIOLOGICAL RELEASE REPORT FOR INSTALLATION RESTORATION PROGRAM SITES 3 AND 5, AERIAL PHOTOGRAPH ANOMALY (APHO) SITE 46, ANOMALY AREA 3, AND BUILDING 244 (SEE AR #3857 - BRAC PMO WEST TRANSMITTAL LETTER BY D. NEWTON)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 APHO 46 BLDG. 244 SITE 00003 SITE 00005	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003857 BRAC SER BPMOW.JTC/0182 CORRESPONDENC NONE 2	12-14-2006 **12-05-2006** NONE	BRAC PMO WEST NEWTON, D. VARIOUS AGENCIES	TRANSMITTAL OF FINAL RADIOLOGICAL RELEASE REPORT FOR INSTALLATION RESTORATION PROGRAM (IRP) SITE 3, ORIGINAL LANDFILL; IRP SITE 5,PERIMETER ROAD LANDFILL; AERIAL PHOTOGRAPH ANOMALY (APHO)SITE 46; ANOMALY AREA 3; AND BUILDING 244 [SEE COMMENTS]. ***COMMENTS: {W/OUT ENCLOSURE} (PORTION OF THE MAILING LIST IS SENSITIVE) [SEE AR #3858 - FINAL RADIOLOGICAL RELEASE REPORT]***	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	005 AA 0000003 APHO 46 BLDG. 244 SITE 00003	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 003873 NONE CORRESPONDENC NONE 2	01-11-2007 **12-15-2006** NONE	DTSC - CYPRESS, CA THAN, Q. BRAC PMO WEST NEWTON, D.	REVIEW AND COMMENTS ON DRAFT SAMPLING AND ANALYSIS PLAN (SAP) ADDENDUM 1, REMOVAL SITE EVALUATION (RSE) [PORTION OF THE MAILING LIST IS SENSITIVE]	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 OU 2C	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003875 NONE CORRESPONDENC NONE 1	01-11-2007 **12-26-2006** NONE	CRWQCB - RIVERSIDE, CA BRODERICK, J. BRAC PMO WEST NEWTON, D.	REVIEW AND NO COMMENTS ON DRAFT SAMPLING AND ANALYSIS PLAN (SAP), ADDENDUM 1, REMOVAL SITE EVALUATION (RSE)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 OU 2C	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003890 NONE REPORT N62742-94-D-0048 10	01-25-2007 **01-15-2007** 00068	EARTH TECH, INC. BARR, C. BRAC PMO WEST	FINAL SAMPLING AND ANALYSIS PLAN (SAP), ADDENDUM #1, REMOVAL SITE EVALUATION (RSE), OPERABLE UNIT, ANOMALY AREA [SEE AR #3889 - BRAC PMO WEST TRANSMITTAL LETTER BY D. NEWTON AND AR #2811 - FINAL WORK PLAN RSE]	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 OU 2C	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 003889 BRAC SER BPMOW.JTC/0271 CORRESPONDENC NONE 2	01-25-2007 **01-23-2007** NONE	BRAC PMO WEST NEWTON, D. VARIOUS AGENCIES	TRANSMITTAL OF FINAL SAMPLING AND ANALYSIS PLAN (SAP) ADDENDUM #1, REMOVAL SITE EVALUATION (RSE), OPERABLE UNIT, ANOMALY AREA [W/OUT ENCLOSURE] {SEE AR #3890 - FINAL SAP ADDENDUM #1} (PORTION OF THE MAILING LIST IS SENSITIVE)	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 OU 2C	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004203 BRAC SER BPMOW.CPA/0287 CORRESPONDENC NONE 6	03-05-2008 **01-24-2007** NONE	BRAC PMO WEST NEWTON, D. VARIOUS AGENCIES	REQUEST FOR FEDERAL FACILITY AGREEMENT SCHEDULE EXTENSION FOR PRIMARY DOCUMENTS, OPERABLE UNIT, ANOMALY AREA (INCLUDES FEDERAL FACILITY AGREEMENT APPENDIX A SUBMITTAL MILESTONES AND ANOMALY AREA DETAILED PROJECT SCHEDULE)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 OU 00002C	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 003926 NONE CORRESPONDENC NONE 2	03-05-2007 **02-14-2007** NONE	DTSC - CYPRESS, CA SCANDURA, J. BRAC PMO WEST NEWTON, D.	AGREEMENT TO SCHEDULE EXTENSION REQUEST FOR PRIMARY DOCUMENT SUBMITTAL, ANOMALY AREA (AA), OPERABLE UNIT (OU) [PORTION OF THE MAILING LIST IS SENSITIVE]	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 OU 2C	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004019 CDM/0004/0069/002 MINUTES N68711-00-D-0004 25	08-02-2007 **05-30-2007** DO 0069	BROWN AND CALDWELL COLEMAN, B. BRAC PMO WEST	30 MAY 2007 FINAL BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) MEETING MINUTES (INCLUDES AGENDA, ATTACHMENTS AND VARIOUS HANDOUT MATERIALS)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001 SITE 00002 SITE 00024	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004176 NONE CORRESPONDENC N62741-94-D-0048 300	01-29-2008 **07-01-2007** 00068	EARTH TECH, INC. BRAC PMO WEST	DRAFT TECHNICAL MEMORANDUM, SUPPLEMENTAL GROUNDWATER MONITORING. ***COMMENTS: PER D. SILVA ON 11/09/2007, RECORD TO BE PROCESSED W/OUT DCN***	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004017 NONE CORRESPONDENC NONE 2	07-30-2007 **07-16-2007** NONE	U.S. EPA - SAN FRANCISCO, CA MUZA, R. BRAC PMO WEST WEISSENBORN, R.	REVIEW AND COMMENTS ON THE DRAFT WORK PLAN GROUNDWATER MONITORING	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001 SITE 00002	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004013 NONE CORRESPONDENC NONE 1	07-30-2007 **07-20-2007** NONE	CRWQCB - RIVERSIDE, CA BRODERICK, J. BRAC PMO WEST WEISSENBORN, R.	REVIEW AND COMMENTS ON THE DRAFT WORK PLAN, GROUNDWATER MONITORING	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001 SITE 00002	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 004183 BRAC SER BPMOW.JTC/0709 CORRESPONDENC NONE 36	02-07-2008 **07-24-2007** NONE	BRAC PMO WEST WEISSENBORN, R. VARIOUS AGENCIES	TRANSMITTAL OF 1) RESPONSES TO COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT; AND 2) DRAFT TECHNICAL MEMORANDUM SUPPLEMENTAL GROUNDWATER MONITORING (W/ OUT ENCLOSURE 2) [PORTION OF MAILING LIST IS SENSITIVE] {***SEE COMMENTS.}. ***COMMENTS: (SEE RECORD # 3425 - DRAFT REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT; AND RECORD # 4176 - DRAFT TECHNICAL MEMORANDUM)***	ADMIN RECORD BASE SENSITIVE	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004044 NONE CORRESPONDENC NONE 10	09-06-2007 **08-16-2007** NONE	DTSC - CYPRESS, CA THAN, Q. BRAC PMO WEST WEISSENBORN, R.	REVIEW AND COMMENTS ON THE DRAFT WORK PLAN, GROUNDWATER MONITORING AND INSTALLATION RESTORATION PROGRAM (IRP)	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 SITE 00001 SITE 00002	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004199 NONE CORRESPONDENC NONE 1	02-28-2008 **08-20-2007** NONE	U.S. EPA - SAN FRANCISCO, CA MUZA, R. BRAC PMO WEST WEISSENBORN, R.	NO COMMENTS ON DRAFT TECHNICAL MEMORANDUM SUPPLEMENTAL GROUNDWATER MONITORING. ***COMMENTS: (SEE RECORD # 4176 - DRAFT TECHNICAL MEMORANDUM)***	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004182 NONE CORRESPONDENC NONE 2	02-07-2008 **09-17-2007** NONE	CRWQCB - RIVERSIDE, CA BRODERICK, J. MCAS EL TORO, CA WEISSENBORN, R.	COMMENTS ON DRAFT TECHNICAL MEMORANDUM, SUPPLEMENTAL GROUNDWATER MONITORING. ***COMMENTS: (SEE RECORD # 4176 - DRAFT TECHNICAL MEMORANDUM)***	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004090 BRAC SER BPMOW.RLC/0013 CORRESPONDENC NONE 2	10-11-2007 **10-04-2007** NONE	BRAC PMO WEST WEISSENBORN, R VARIOUS AGENCIES	TRANSMITTAL OF FINAL GROUNDWATER MONITORING (W/ OUT ENCLOSURE) [SEE AR # 4091 - FINAL GROUNDWATER MONITORING]	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001 SITE 00002	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 004091 JNS.1110.0006.0119 REPORT N68711-04-D-1110 700	10-11-2007 **10-05-2007** 00006	CDM FEDERAL PROGRAMS CORP. DAVIDSON, L. BRAC PMO WEST	FINAL GROUNDWATER MONITORING (CD COPY IS INCLUDED) [SEE AR # 4090 - BRAC PMOW TRANSMITTAL LETTER BY R. WEISSENBORN]	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001 SITE 00002	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004233 JNS-1110-0006-011 REPORT N68711-04-D-1110 350	04-07-2008 **10-05-2007** DO 0006	CDM FEDERAL PROGRAMS CORP. DUNK, J. BRAC PMO WEST	FINAL WORK PLAN GROUNDWATER MONITORING (CD COPY ENCLOSED) [SEE AR # 4234 - REVISED FINAL WORK PLAN GROUNDWATER MONITORING]. ***COMMENTS: PREPARED BY CDM UNDER SUBCONTRACT TO JONAS AND ASSOCIATES, INC. PER RPM, L. CARDINALE, IR COPY NOT AVAILABLE***	ADMIN RECORD BASE	AA 0000003 SITE 00001 SITE 00002	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004234 JNS-1110-0006-012 REPORT N68711-04-D-1110 350	04-07-2008 **11-15-2007** 00006	CDM FEDERAL PROGRAMS CORP. DUNK, K. BRAC PMO WEST	REVISED FINAL WORK PLAN GROUNDWATER MONITORING (CD COPY ENCLOSED) [SEE AR # 4233 - FINAL WORK PLAN GROUNDWATER MONITORING, AND AR # 4345 - BRAC PMO WEST TRANSMITTAL LETTER]. ***COMMENTS: PREPARED BY CDM UNDER SUBCONTRACT TO JONAS AND ASSOCIATES, INC.***	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001 SITE 00002	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004345 BRAC SER BPMOW.RLC/0103 CORRESPONDENC NONE 3	08-01-2008 **11-15-2007** NONE	BRAC PMO WEST WEISSENBORN, R. VARIOUS AGENCIES	TRANSMITTAL OF REVISED FINAL WORK PLAN GROUNDWATER MONITORING [PORTION OF MAILING LIST IS SENSITIVE]. ***COMMENTS: (SEE RECORD # 4234 - REVISED FINAL WORK PLAN GROUNDWATER MONITORING) LETTER REFERS TO THE REVISED FINAL AS A REPLACEMENT FINAL.***	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 SITE 00001 SITE 00002	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004192 BRAC SER BPMOW.JC/0162 CORRESPONDENC NONE 7	02-28-2008 **12-17-2007** NONE	BRAC PMO WEST WEISSENBORN, R. VARIOUS AGENCIES	RESPONSE TO ADDITIONAL COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT (PORTION OF MAILING LIST IS SENSITIVE). ***COMMENTS: [SEE RECORD # 3425 - DRAFT RI/FS REPORT]***	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 OU 00002C	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 004280 BRAC SER BPMOW.CPA/0211 CORRESPONDENC NONE 4	04-23-2008 **01-22-2008** NONE	BRAC PMO WEST WEISSENBORN, R. VARIOUS AGENCIES	FEDERAL FACILITY AGREEMENT (FFA) SCHEDULE EXTENSION REQUEST FOR PRIMARY DOCUMENTS, REMEDIAL ACTION COMPLETION REPORT. ***COMMENTS: [SEE RECORD # 4434 - RESPONSE]***	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00002	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004284 CDM/0004/0069/004 MINUTES N68711-00-D-0004 45	05-05-2008 **02-07-2008** DO 0069	CDM FEDERAL PROGRAMS CORP. NAVFAC - SOUTHWEST	28 NOVEMBER 2007 FINAL BASE CLEANUP TEAM (BCT) MEETING MINUTES (INCLUDES VARIOUS HANDOUTS)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001 SITE 00002 SITE 00008 SITE 00012 SITE 00016 SITE 00017 SITE 00018 SITE 00024	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004303 BRAC SER BPMOW.CPA/0344 CORRESPONDENC NONE 7	05-30-2008 **03-19-2008** NONE	BRAC PMO WEST THEROUX, D. VARIOUS AGENCIES	FEDERAL FACILITY AGREEMENT APPENDIX A SCHEDULE EXTENSION REQUEST FOR PRIMARY DOCUMENTS, DRAFT FINAL SOIL FEASIBILITY STUDY, DRAFT PROPOSED PLAN, AND DRAFT RECORD OF DECISION [SEE AR # 4328 - APPROVAL OF REQUEST]	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001 SITE 00002 SITE 00003 SITE 00005 SITE 00008 SITE 00012 SITE 00016 SITE 00017 SITE 00018 SITE 00024	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 004286 CDM/0004/0069/018 MINUTES N68711-00-D-0004 20	05-05-2008 **04-16-2008** DO 0069	CDM FEDERAL PROGRAMS CORP. NAVFAC - SOUTHWEST	23 APRIL 2008 MEETING MAILER (INCLUDES AGENDA, PUBLIC NOTICE, AND 30 JANUARY 2008 RAB MEETING MINUTES AND SIGN-IN SHEETS) [PORTION OF THE MAILING LIST IS SENSITIVE]	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 SITE 00001 SITE 00002 SITE 00003 SITE 00005 SITE 00008 SITE 00012 SITE 00016 SITE 00017 SITE 00018 SITE 00024	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 004321 ET-0048-0068-0005 REPORT N62742-94-D-0048 9000	06-03-2008 **05-01-2008** 00068	EARTH TECH, INC. BRAC PMO WEST	DRAFT FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY REPORT {INCLUDES ANALYTICAL DATA} (CD COPY ENCLOSED) [SEE AR # 4320 - BRAC PMO WEST TRANSMITTAL LETTER]	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 APHO 00059 APHO 00060 APHO 00061 APHO 00062 APHO 00063 APHO 00064 APHO 00065 BLDG 00722 OU 0002C TRENCH 01E TRENCH 02E TRENCH 03E TRENCH 04E TRENCH 05E TRENCH 06E TRENCH 07E TRENCH 08E TRENCH 09E TRENCH H1 TRENCH H2 TRENCH H3 TRENCH H4 TRENCH H5 TRENCH H6 TRENCH H7 TRENCH H8 TRENCH H9 WELL MW01 WELL MW02 WELL MW03 WELL MW04 WELL PZ1 WELL PZ2 WELL PZ3	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 004320 BRAC SER BPMOW.JTC/0466 CORRESPONDENC NONE 2	06-03-2008 **05-21-2008** NONE	BRAC PMO WEST MEGLIOLA, A. VARIOUS AGENCIES	TRANSMITTAL OF THE DRAFT FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY REPORT {PORTION OF THE MAILING LIST IS SENSITIVE} (W/OUT ENCLOSURE) [SEE AR # 4321 - DRAFT FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY REPORT]	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 OU 0002C	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004337 BAI-5106-0006-0002 REPORT N68711-03-D-5106 15	06-27-2008 **06-01-2008** 00006	BARAJAS & ASSOCIATES, INC. BRAC PMO WEST	DRAFT PROPOSED PLAN FOR REMEDIAL ACTION (CD COPY ENCLOSED) [SEE AR # 4336 - BRAC PMO WEST TRANSMITTAL LETTER]	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004336 BRAC SER BPMOW.JC\0537 CORRESPONDENC NONE 2	06-27-2008 **06-24-2008** NONE	BRAC PMO WEST MEGLIOLA, A. VARIOUS AGENCIES	TRANSMITTAL OF THE DRAFT PROPOSED PLAN FOR REMEDIAL ACTION (W/OUT ENCLOSURE) [SEE AR # 4337 - DRAFT PROPOSED PLAN FOR REMEDIAL ACTION]	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004357 NONE CORRESPONDENC NONE 3	08-05-2008 **06-24-2008** NONE	U.S. EPA - SAN FRANCISCO, CA MUZA, R. BRAC PMO WEST MEGLIOLA, A.	REVIEW AND COMMENTS ON THE DRAFT FINAL REMEDIAL INVESTIGATION / FEASIBILITY STUDY (RI/FS) REPORT [SEE AR # 4321 - DRAFT FINAL RI/FS REPORT]	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004356 NONE CORRESPONDENC NONE 1	08-05-2008 **07-23-2008** NONE	DTSC - CYPRESS, CA THAN, Q. BRAC PMO WEST THEROUX, D.	REVIEW AND ACCEPTANCE OF THE DRAFT FINAL REMEDIAL INVESTIGATION / FEASIBILITY STUDY (RI/FS) REPORT [SEE AR # 4321 - DRAFT FINAL RI/FS REPORT]	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 004385 NONE CORRESPONDENC NONE 12	09-03-2008 **08-01-2008** NONE	CRWQCB - RIVERSIDE, CA BRODERICK, J. MCAS EL TORO, CA THEROUX, D.	COMMENTS ON THE DRAFT FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY REPORT (INCLUDES CRWQCB LETTERS DATED 26 JANUARY 2004, 26 JULY 2004, 16 FEBRUARY 2006, AND 17 SEPTEMBER 2007). ***COMMENTS: [SEE RECORD # 4321 - DRAFT FINAL RI/FS REPORT]***	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 OU 00002C	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004424 NONE CORRESPONDENC NONE 2	10-07-2008 **08-21-2008** NONE	U.S. EPA - SAN FRANCISCO, CA MUZA, R. BRAC PMO WEST THEROUX, D.	REVIEW AND NO COMMENTS ON THE DRAFT PROPOSED PLAN FOR REMEDIAL ACTION [SEE RECORD # DRAFT PROPOSED PLAN FOR REMEDIAL ACTION]	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004423 NONE CORRESPONDENC NONE 2	10-07-2008 **08-26-2008** NONE	CRWQCB - RIVERSIDE, CA BRODERICK, J. BRAC PMO WEST THEROUX, D.	REVIEW AND COMMENTS ON THE DRAFT PROPOSED PLAN FOR REMEDIAL ACTION [SEE RECORD # 4337 - DRAFT PROPOSED PLAN FOR REMEDIAL ACTION]	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004418 NONE CORRESPONDENC NONE 5	10-07-2008 **09-04-2008** NONE	DTSC - CYPRESS, CA THAN, Q. BRAC PMO WEST THEROUX, D.	REVIEW AND COMMENTS ON THE DRAFT PROPOSED PLAN FOR REMEDIAL ACTION (PORTION OF THE MAILING LIST SENSITIVE) [SEE RECORD # 4337 - DRAFT PROPOSED PLAN FOR REMEDIAL ACTION]	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004411 CDM-0004-0069-0197 MINUTES N68711-00-D-0004 60	09-12-2008 **09-05-2008** DO 0069	CDM FEDERAL PROGRAMS CORP. BRAC PMO WEST	20 AUGUST 2008 92ND RESTORATION ADVISORY BOARD (RAB) MEETING MATERIALS (INCLUDES AGENDA, PUBLIC NOTICE, 23 APRIL 2008 RAB MEETING MINUTES, AND VARIOUS HANDOUTS) [PORTION OF MEMBERSHIP LIST IS SENSITIVE]	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 BLDG 00297 SITE 00001 SITE 00002 SITE 00008 SITE 00012 SITE 00017 SITE 00018 SITE 00024	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 004451 CDM-0004-0069-0338 MINUTES N68711-00-D-00046	12-08-2008 **10-22-2008** DO 0069	CDM FEDERAL PROGRAMS CORP. RAB MEMBERS	22 OCTOBER 2008 FINAL BASE REALIGNMENT AND CLOSURE (BRAC) CLEAN-UP TEAM (BCT) MEETING MINUTES	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001 SITE 00002 SITE 00003 SITE 00005 SITE 00008 SITE 00012 SITE 00017	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004478 CDM-0004-0069-0340 MINUTES N68711-00-D-00044 0	01-21-2009 **12-03-2008** DO 0069	CDM FEDERAL PROGRAMS CORP. BRAC PMO WEST	03 DECEMBER 2008 FINAL BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) MEETING MINUTES (INCLUDES VARIOUS HANDOUTS)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001 SITE 00002 SITE 00003 SITE 00005 SITE 00008 SITE 00012 SITE 00016 SITE 00017 SITE 00018 SITE 00024	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004497 CDM-0004-0069-0357 MINUTES N68711-00-D-00043 0	02-03-2009 **01-13-2009** DO 0069	CDM FEDERAL PROGRAMS CORP. BRAC PMO WEST	13 JANUARY 2009 FINAL BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) MEETING MINUTES (INCLUDES VARIOUS COMMENTS AND RESPONSE TO COMMENTS ON THE DRAFT REMEDIAL DESIGN (RD) / REMEDIAL ACTION WORK PLAN (RAWP)). ***COMMENTS: [SEE RECORD # 4407 - DRAFT RD / RAWP]***	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00002 SITE 00003 SITE 00005 SITE 00017	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004475 CDM-0004-0069-0352 MINUTES N68711-00-D-00048 0	01-21-2009 **01-15-2009** DO 0069	CDM FEDERAL PROGRAMS CORP. RAB MEMBERS	28 JANUARY 2009 RESTORATION ADVISORY BOARD (RAB) MEETING MAILER (INCLUDES AGENDA, PUBLIC NOTICE, 03 DECEMBER 2008 DRAFT RAB MEETING MINUTES AND SIGN-IN SHEETS, AND 20 AUGUST 2008 FINAL RAB MEETING MINUTES) [PORTION OF THE MAILING LIST IS SENSITIVE]	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 SITE 00001 SITE 00002 SITE 00003 SITE 00005 SITE 00017 SITE 00018 SITE 00024	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 004572 CDM-0004-0069-0394 MINUTES N68711-00-D-0004 70	04-22-2009 **01-28-2009** DO 0069	CDM FEDERAL PROGRAMS CORP. BRAC PMO WEST	28 JANUARY 2009 FINAL BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) MEETING MINUTES (INCLUDES VARIOUS HANDOUTS)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 BLDG 00746 CARVE-OUT I-B CARVE-OUT I-E CARVE-OUT I-F CARVE-OUT I-G CARVE-OUT I-H CARVE-OUT I-I CARVE-OUT II-E CARVE-OUT II-G CARVE-OUT II-I CARVE-OUT III-D CARVE-OUT II-L CARVE-OUT II-M CARVE-OUT II-P CARVE-OUT II-R CARVE-OUT I-J CARVE-OUT I-K CARVE-OUT I-L CARVE-OUT I-M CARVE-OUT I-N CARVE-OUT I-O CARVE-OUT I-P CARVE-OUT I-S OU 00002C SITE 00001 SITE 00002 SITE 00003 SITE 00005 SITE 00008 SITE 00012 SITE 00016 SITE 00017 SITE 00024	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 004492 CDM-0004-0069-0366 MINUTES N68711-00-D-0004 65	02-02-2009 **01-29-2009** DO 0069	CDM FEDERAL PROGRAMS CORP. DAVIDSON, L. BRAC PMO WEST ARNOLD, C.	28 JANUARY 2009 94TH RESTORATION ADVISORY BOARD (RAB) MEETING MATERIALS (INCLUDES RAB MEETING MAILER, AGENDA, AND VARIOUS HANDOUTS)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001 SITE 00002 SITE 00003 SITE 00005 SITE 00008 SITE 00012 SITE 00016 SITE 00017 SITE 00018 SITE 00024	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004500 BRAC SER BPMOW.RLC/0060 CORRESPONDENC NONE 3	02-10-2009 **02-05-2009** NONE	BRAC PMO WEST MEGLIOLA, A. VARIOUS AGENCIES	TRANSMITTAL OF THE DRAFT 2007 ANNUAL GROUNDWATER REPORT (W/OUT ENCLOSURE) [PORTION OF THE MAILING LIST IS SENSITIVE]. ***COMMENTS: [SEE RECORD # 4501 - DRAFT 2007 ANNUAL GROUNDWATER REPORT]***	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 SITE 00001 SITE 00002	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004501 JNS-1110-0006-0369 REPORT N68711-04-D-1110 223	02-10-2009 **02-05-2009** DO 00006	JONAS & ASSOCIATES, INC. CHICHAKLI, R. BRAC PMO WEST	DRAFT 2007 ANNUAL GROUNDWATER REPORT (CD COPY ENCLOSED). ***COMMENTS: [SEE RECORD # 4500 - BRAC PMO WEST TRANSMITTAL LETTER] PREPARED UNDER BY CDM FEDERAL PROGRAMS UNDER SUBCONTRACT WITH JONAS & ASSOCIATES INC.***	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001 SITE 00002	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004535 BRAC SER BPMOW.CA/0095 CORRESPONDENC NONE 5	03-06-2009 **02-23-2009** NONE	BRAC PMO WEST MEGLIOLA, A. VARIOUS AGENCIES	FEDERAL FACILITY AGREEMENT (FFA) APPENDIX A SCHEDULE UPDATE (INCLUDES FFA APPENDIX A SCHEDULE AND COMPREHENSIVE SCHEDULE)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 OU 00002C	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 004564 NONE CORRESPONDENC NONE 1	04-17-2009 **03-20-2009** NONE	CRWQCB - RIVERSIDE, CA BRODERICK, J. MCAS EL TORO, CA THEROUX, D.	REVIEW AND NO COMMENTS ON THE DRAFT 2007 ANNUAL GROUNDWATER REPORT. ***COMMENTS: [SEE RECORD # 4501 - DRAFT 2007 ANNUAL GROUNDWATER REPORT]***	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001 SITE 00002	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004574 BRAC SER BPMOW.DMT/0162 CORRESPONDENC NONE 6	04-23-2009 **03-20-2009** NONE	BRAC PMO WEST MEGLIOLA, A. VARIOUS AGENCIES	FEDERAL FACILITY AGREEMENT (FFA) APPENDIX A SCHEDULE UPDATE (INCLUDES FFA APPENDIX A SCHEDULE AND COMPREHENSIVE SCHEDULE)	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 OU 0000002C	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004575 NONE CORRESPONDENC NONE 1	05-13-2009 **03-26-2009** NONE	CRWQCB - RIVERSIDE, CA BRODERICK, J. BRAC PMO WEST	REVIEW AND APPROVAL OF THE FEDERAL FACILITY AGREEMENT (FFA) APPENDIX A SCHEDULE UPDATE. ***COMMENTS: [SEE RECORD # 4574 - FFA APPENDIX A SCHEDULE UPDATE]***	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004567 NONE CORRESPONDENC NONE 1	04-17-2009 **03-31-2009** NONE	U.S. EPA - SAN FRANCISCO, CA MUZA, R. MCAS EL TORO, CA THEROUX, D.	REVIEW AND NO COMMENTS ON THE DRAFT 2007 ANNUAL GROUNDWATER REPORT. ***COMMENTS: [SEE RECORD # 4501 - DRAFT 2007 ANNUAL GROUNDWATER REPORT]***	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003 SITE 00001 SITE 00002	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 004558 CDM-0004-0069-0386 MINUTES N68711-00-D-0004 50	04-03-2009 **04-01-2009** DO 0069	CDM FEDERAL PROGRAMS CORP. RAB MEMBERS	15 APRIL 2009 RESTORATION ADVISORY BOARD (RAB) MEETING MAILER (INCLUDES AGENDA, PUBLIC NOTICE, 28 JANUARY 2009 DRAFT RAB MEETING MINUTES AND SIGN-IN SHEETS, AND 03 DECEMBER 2008 FINAL RAB MEETING MINUTES) [PORTION OF THE MAILING LIST IS SENSITIVE]	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003 SITE 00001 SITE 00002 SITE 00003 SITE 00005 SITE 00008 SITE 00012 SITE 00016 SITE 00017 SITE 00018 SITE 00024	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004576 NONE CORRESPONDENC NONE 1	05-13-2009 **04-07-2009** NONE	DTSC - CYPRESS, CA THA, Q. VARIOUS AGENCIES	REVIEW AND APPROVAL OF THE FEDERAL FACILITY AGREEMENT (FFA) APPENDIX A SCHEDULE UPDATE. ***COMMENTS: [SEE RECORD # 4574 - FFA APPENDIX A SCHEDULE UPDATE]***	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004583 BAI-5106-0006-0004 REPORT N68711-03-D-5106 20	06-10-2009 **06-01-2009** CTO 0006	BARAJAS & ASSOCIATES, INC. BRAC PMO WEST	DRAFT FINAL PROPOSED PLAN (INCLUDES RESPONSE TO COMMENTS ON THE DRAFT PROPOSED PLAN) [CD COPY ENCLOSED]. ***COMMENTS: {SEE RECORD # 4582 - BRAC PMOW TRANSMITTAL LETTER}***	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	
M60050 / 004582 BRAC SER BPMOW.JC/0354 CORRESPONDENC NONE 2	06-10-2009 **06-05-2009** NONE	BRAC PMO WEST CALLIAN, J. VARIOUS AGENCIES	TRANSMITTAL OF THE 1) DRAFT FINAL PROPOSED PLAN AND 2) RESPONSE TO COMMENTS ON THE DRAFT PROPOSED PLAN [W/OUT ENCLOSURES]. ***COMMENTS: {SEE RECORD # 4583 - ENCLOSURES 1 AND 2}***	ADMIN RECORD BASE INFO REPOSITORY SENSITIVE	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject/Comments	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
M60050 / 004608 NONE CORRESPONDENC NONE 1	07-30-2009 **06-26-2009** NONE	CRWQCB - RIVERSIDE, CA BRODERICK, J. MCAS EL TORO, CA CALLIAN, J.	REVIEW OF AND CONCURRENCE WITH THE DRAFT FINAL PROPOSED PLAN. ***COMMENTS: (SEE RECORD # 4583 - DRAFT FINAL PP)***	ADMIN RECORD BASE INFO REPOSITORY	AA 0000003	NAVFAC SOUTHWEST - BLDG. 1	

Total Estimated Record Page Count: 17,687

Total - Administrative Records: 135

[UIC NUMBER]='M60050'
No Keywords
Sites=AA 0000003;AREA 3
No Classification

ATTACHMENT 2
REFERENCES (Reference documents provided on CD only)

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
1	**APHO anomalies**	Section 2.1	Final Remedial Investigation (RI)/Feasibility Study (FS) Report for AA 3, Former MCAS El Toro, California. July 2009. Section 2.1 and Figure 2-1.
2	**stratigraphy**	Section 2.2	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 5, pages 5-1 to 5-2 and Figures 5-1 through 5-4.
3	**wetland**	Section 2.2	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 5, page 5-63 and Figure 5-14.
4	**radiological screening**	Section 2.3	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 3, pages 3-13 through 3-16.
5	**radiological final status survey**	Section 2.3	Final Radiological Release Report for IRP Sites 3 and 5, Aerial Photograph Anomaly Site 46, Anomaly Area 3, and Building 244 Former MCAS El Toro, California. December 2006. Section 8.2, page 52 and Appendix F, page 4 and 5.
6	**previously collected data**	Section 2.3	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 3, pages 3-1 through 3-5 and Figure 3-1.
7	**RSE findings**	Section 2.3	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 4, pages 4-1 through 4-25 and Figures 3-1 and 4-2.
8	**Supplemental groundwater monitoring**	Section 2.3	Spring 2008 Data Summary Report – AA 3 and IRP Sites 1 and 2, Former MCAS El Toro. Section 3, pages 3-1 through 3-2 and Figure 3.
9	**conceptual site model**	Section 2.5	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Figures 7-1 and 8-1.
10	**human health SRA**	Section 2.5.1	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 8, pages 8-79 through 8-83.
11	**ecological risk assessment**	Section 2.5.2	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 9, pages 9-49 through 9-54.
12	**Principal Threat and Low Level Threat Wastes**	Section 2.6	Guide to Principal Threat and Low level Threat Wastes. November 1991. U.S. EPA Office of Solid Waste and Emergency Response. OSWER Directive 9380.3-06FS.
13	**RAOs**	Section 2.7	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 11, pages 11-6 and 11-7.
14	**remedial alternatives**	Section 2.8	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 12, pages 12-1 through 12-10 and Figures 12-1 through 12-4.
15	**comparative analysis**	Section 2.8	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, pages 13-1 through 13-35.
16	**Total: 4.44**	Section 2.8.1 Table 2-2	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, page 13-8.
17	**Total: 6.46**	Section 2.8.1 Table 2-2	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, page 13-12.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
18	**Total: 6.67**	Section 2.8.1 Table 2-2	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, page 13-16.
19	**Total: 6.07**	Section 2.8.1 Table 2-2	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, page 13-19.
20	**Total: 6.07**	Section 2.8.1 Table 2-2	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, page 13-21.
21	**Total: 25.32 to 37.33**	Section 2.8.1 Table 2-2	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, page 13-23.
22	**preliminary design**	Section 2.9.2	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, pages 13-1 through 13-7.
23	**Navy/DTSC MOA**	Section 2.9.2.1	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Appendix N, pages 1 through 6.
24	**court reporter record**	Section 3	Installation Restoration Program (IRP), Former MCAS El Toro, California, Anomaly Area 3 (AA 3), Proposed Plan Summary, Transcript of Public Meeting, Irvine, California, August 19, 2009.

Notes:

- Text identified by **bold blue font** with a sequential number (1 through 24) as subscript indicates hyperlinks available on reference CD to excerpts from specific reports contained in the publicly available Administrative Record File.

  For access to information contained in the Administrative Record File for former MCAS El Toro, please contact:

  Diane Silva
  Code EVR-FISC Bldg. 1, 3rd Floor
  NAVFAC Southwest
  1220 Pacific Highway
  San Diego, CA 92312
  619-532-3676

- The RI/FS Report was finalized in July 2009 using new covers, spines, and replacement pages inserted into the Draft Final version of the document. The headers and footers on those pages of the Draft Final version remained the same with no changes.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
1	APHO anomalies	Section 2.1	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 2.1 and Figure 2-1.

2. SITE BACKGROUND

2.1 LOCATION

AA 3 encompasses an area of approximately 9 acres and is located in the northwestern section of former MCAS El Toro facility near Pusan Way, adjacent to the Agua Chinon Wash (Figure 2-1). AA 3 has also been designated as miscellaneous refuse (MSCR) 1, a "former refuse disposal area" in the *BRAC Business Plan* update (DON 2000). MSCR AA 3 refers to seven aerial photograph (APHO) anomaly areas (APHO 59, APHO 60, APHO 61, APHO 62, APHO 63, APHO 64, and APHO 65) identified by Science Applications International Corporation (SAIC) during a review of historical aerial photographs taken between 1946 and 1992 (SAIC 1993). These APHOs and their corresponding anomalies are listed in Table 2-1.

Table 2-1: APHO List

SAIC Photograph Year	APHO Anomaly ID	Description of the Anomaly
1946	APHO 59 (SAIC 20)	An area encompassing three areas of apparent extraction
1952	APHO 60 (SAIC 64)	Quarried extraction areas
1960	APHO 61 (SAIC 106)	Quarried extraction areas
1967	APHO 62 (SAIC 156)	An area of extraction near Agua Chinon Wash with possible refuse or liquid within the excavated area
1981	APHO 63 (SAIC 443)	An area of extraction near Agua Chinon Wash that has been revegetated
1988	APHO 64 (SAIC 536)	A former extraction area near Agua Chinon Wash that has been filled
1992	APHO 65 (SAIC 564)	A graded area

The APHO anomalies identified by SAIC are associated with AA 3 and include features that are not contiguous with the study boundary. These non-contiguous anomaly features are shown on Figure 2-1 and are discussed below.

These non-contiguous features include the following anomalies: APHO60-1952C, APHO60-1952D, APHO61-1960A, APHO61-1960B, APHO61-1960D, APHO61-1960E, APHO61-1960F, and APHO62-1967B. All other anomalies associated with these APHOs (APHO59-1946A, APHO59-1946B, APHO59-1946C, APHO60-1952A, APHO60-1952B, APHO61-1960C, APHO62-1967A, APHO63-1981A APHO64-1988A, and APHO65-1992A) lie within the AA 3 investigation boundary.

2.1.1 APHO 60

APHO 60 corresponds to anomaly SAIC 64 of the 1952 SAIC APHO (Table 2-1). APHO60 is associated with three anomalies; APHO60-1952A, APHO60-1952B, and APHO60-1952C, and were identified as extraction areas. These are presented in Figure 2-1.

APHO60-1952C, an extraction area, is located east of the currently demarcated AA 3 site. The Wherry Housing area presently occupies part of this area. Based on a review of APHOs taken through 1971, this area of apparent extraction remained unfilled. In addition, the 1972 Wherry Housing grading plans show this anomaly as requiring engineered backfill. Based on this evaluation,

it is unlikely that this area would contain construction debris. As a result no further investigation is recommended.

APHO60-1952D. A review of the 1952 SAIC photograph shows the presence of another anomaly identified as SAIC 66. The anomaly designated as APHO60-1952D is shown in Figure 2-1 and is located southwest of the current study boundary. The SAIC report identifies this anomaly as a 250-foot-long trench.

A review of subsequent APHOs and the 1978 grading plans for Building 722 show that this area had not been filled. This area was subsequently graded (cut) as part of asphalt paving around the building. Based on these observations it is unlikely that construction debris was placed within this trench and no further investigation of this area is recommended.

2.1.2 APHO 61

APHO 61 corresponds to the 1960 SAIC APHO anomaly SAIC 106 (Table 2-1). There are two anomalies associated with APHO 61 and these two areas are identified as APHO61-1960A and APHO61-1960B and are presented in the Figure 2-1.

APHO61-1960A, a quarry (extraction) area, is located outside the Station boundary to the west of AA 3 site. The SAIC report describes APHO61-1960A as an area probably used as a material source for the former MCAS El Toro construction activities. This anomaly is not within the general vicinity of AA 3 (see Figure 2-1). A review of the subsequent APHOs does not yield evidence of this feature persisting or any backfilling activities at this area. This area was not identified as an anomaly in any of the subsequent APHOs, and no further investigation is recommended.

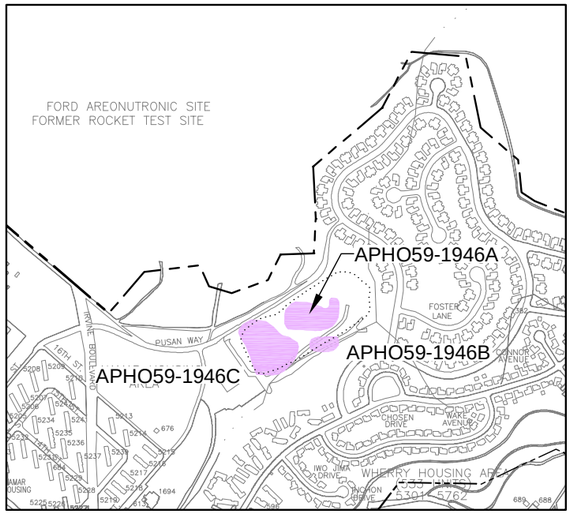
APHO61-1960B is described as a cleared area (grading) for cultivation and is located north of AA 3. This anomaly is not within the general vicinity of AA 3 (see Figure 2-1). Similar to APHO61-1960A, a review of the subsequent APHOs did not yield evidence of this feature persisting or any other activities conducted at this area. This area was not identified as an anomaly in any of the subsequent APHOs. This area was subsequently graded in 1972-1973 as part of the construction of Wherry Housing. Based on these observations, no further investigation of these areas is recommended.

APHO61-1960D, APHO61-1960E, and APHO61-1960F. These anomalies are part of SAIC Anomaly 107 and were identified in the 1960 APHO. These anomalies are located within the Wherry Housing area, and correspond to locations of cleared/disturbed ground. These areas appear to remain unfilled through to 1971. In addition, the 1973 construction drawings for Wherry Housing indicate that these areas were part of grading operations. It is unlikely that these areas would have been backfilled with construction debris or waste; therefore, no further investigation is recommended.

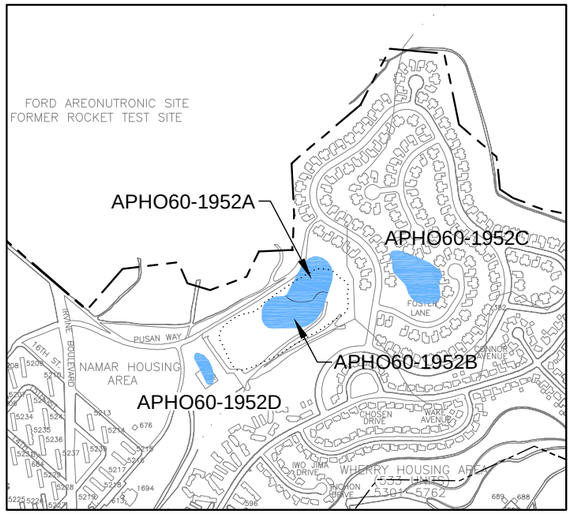
2.1.3 APHO 62

APHO 62 corresponds to the 1967 SAIC APHO anomaly SAIC 155 (APHO62-1967B in Figure 2-1).

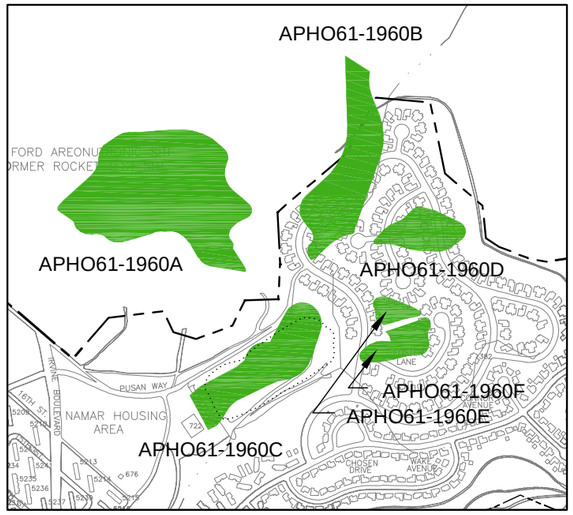
APHO62-1967B (SAIC 155). This area corresponds to anomalies APHO60-1952D and APHO61-1960D, and lies within the Wherry Housing area. This area was part of grading operations for the Wherry Housing; therefore, no further investigation is recommended for this area.



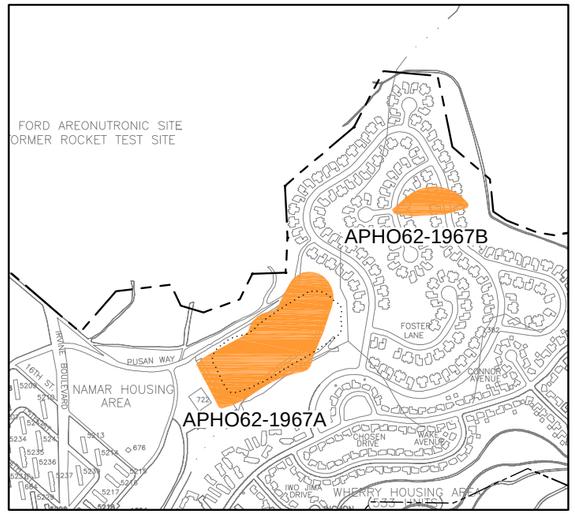
1946



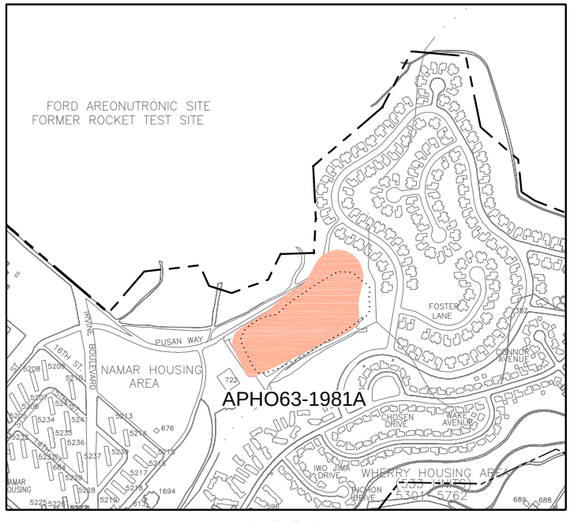
1952



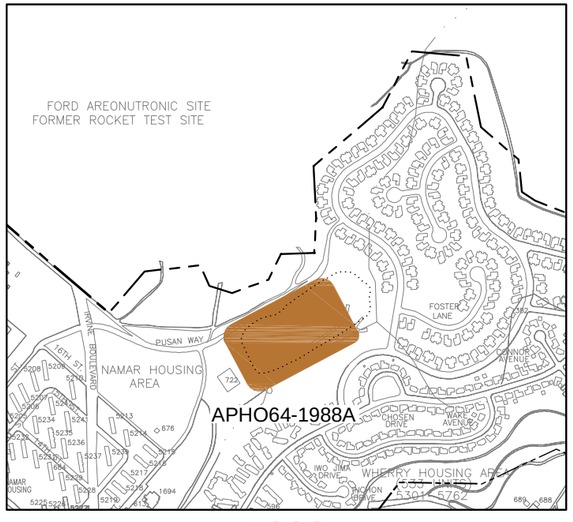
1960



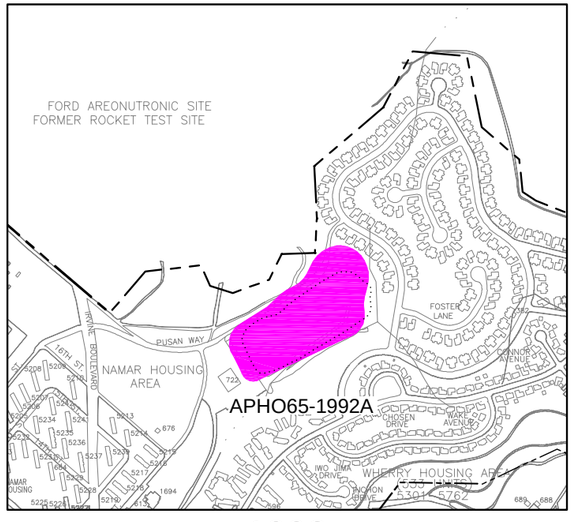
1967



1981



1988



1992

LEGEND:

- 1946
- 1952
- 1960
- 1967
- 1981
- 1988
- 1992
- FORMER MCAS EL TORO BOUNDARY
- Anomaly Area 3 Boundary (Approximate)

NOTES:

Anomalies depicted are approximate and based on aerial photographic interpretations from 1946 through 1992 (SAIC 1993)

NORTH

0 500' 1,000 FEET

SCALE: 1"= 1,000'

RI/FS Report — Draft Final

Site Location Map

Anomaly Area 3

Date 02-08	Former MCAS El Toro	Figure 2-1
Project No. 29307	EarthTech, A tyco International Ltd. Company	

File: L:\work\29307\work\AA3\CAD\In-Progress Draft Final RI FS\Figure 2-1.dwg Time: Feb 28, 2008 - 12:23pm

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
2	stratigraphy	Section 2.2	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 5, pages 5-1 to 5-2 and Figures 5-1 through 5-4.

5. PHYSICAL CHARACTERISTICS

5.1 SURFACE FEATURES

A geologist performed a site walk to verify the surface features. The results of the physical feature observations and geologic literature review are presented in this section. Surface deposits in the vicinity of the site are predominantly young alluvial fan deposits of Holocene/late Pliestocene age, consisting primarily of unconsolidated gravels, sand, and silt. Surface deposits to the immediate north of the site consist of interbedded marine sandstone, conglomerate sandstone, and siltstone from the Niguel Formation of Pliocene Age. Most of the surface is covered with vegetation and loose soil, but bedrock crops out near the summit on the south side of a hill adjacent to the site. This bedrock, identified as the Niguel Formation, consist of interbedded marine sandstone, conglomeratic sandstone and conglomerate of Pliocene age. The strata strike and dip in the vicinity of the Site are north 5 east and 22 north west, respectively. The bedrock appears indurated and competent, although highly weathered at the surface. Fractures were not observed.

The Niguel Formation is underlain by the Monterey Formation, consisting of marine siltstone and sandstone of Miocene age. The Niguel Formation has a maximum thickness of 350 feet. Deposits to the southwest of the site, across Agua Chinon Wash, consist of alluvial fan deposits of Mid-to-Early-Pleistocene age. The lithology is sandy, well indurated and well dissected by erosion.

However, a housing tract is currently located at that location and no outcrop was readily visible. A local geologic map (Figure 5-1) was created using the U.S. Geographical Survey digital geologic map database of the Santa Ana 30-foot by 60-foot quadrangle as the map source for former MCAS El Toro region showing the geologic formations, contact, fault, strike and dip information in standard notation. The topography in the immediate vicinity of AA 3 has a relief of 400 feet to 600 feet above mean sea level (msl) generally dipping to the south and southwest. The site is located at an elevation of approximately 460 feet above msl.

5.2 REFINED GEOLOGY

During drilling of boreholes for the installation of monitoring wells (as part of the RSE investigation), bedrock was encountered at 32 feet bgs in MW07 and 56 feet bgs in MW10. A figure showing a measured section of the subsurface lithology and equivalent measured section of the stratigraphy of the site was provided as part of the RSE Work Plan (Figures 2-4 and 2-5 of the Work Plan). A figure showing the plan view of these cross sections is presented in Figure 5-2. The cross sections were revised based on the information collected as part of this RSE investigation and are presented in Figures 5-3, 5-4, and 5-5. These cross sections provide sufficient alluvium and bedrock contact information.

Subsurface stratigraphy in this area was inferred from drilling logs provided in the AA 3 technical information package (IT/OHM 2000), CPT survey, and the boreholes drilled to install the groundwater and perimeter gas monitoring wells as part of this RSE investigation. Subsurface stratigraphy consists of fine-to-coarse-grained sediments overlying bedrock (sandstone, siltstone, and claystone). Unconsolidated sediments were identified as well-graded gravel, gravelly sand, well-graded and poorly graded sand, silty sand, and clayey sand. Sediments were generally brown, yellowish brown, olive-brown, and greyish brown, with local iron staining.

The depth to bedrock for the entire site can be inferred from extrapolated cross sections (see Figures 5-3, 5-4, and 5-5) of this Report. The drilling logs for the 10 monitoring wells identify the bedrock as Pliocene Niguel Formation. Sandstone is generally light to dark gray and light olive-brown with

yellowish mottling, with very fine- to medium-grained sand, poorly indurated, and dense to very dense. Siltstone bedrock is generally light brown, olive, or gray with local yellowish mottling. Claystone bedrock is generally brown to olive to very dark gray.

As shown in Figures 5-3 through 5-5, two topographic low areas were apparently present in the southwestern and northeastern portions of the site, prior to debris placement. A southwestern topographic low area was located along cross section AA 3-2-2', between cross sections AA 3-12-12' and AA 3-13-13' (see Figure 5-7). A northeastern topographic low area was located along cross section AA 3-14-14', between cross-sections AA 3-9-9' and AA 3-10-10'.

5.3 REFINED HYDROGEOLOGY

Ten groundwater gauging events (November 2002, December 2002, January 2003, March 2003, November 2003, March 2004, June 2004, October 2004, February 2005, and April 2005) were conducted after the installation the monitoring wells (MW05 through MW14). All AA 3 wells (MW01 through MW14) were gauged prior to groundwater sampling. Table 5-1 presents the historical depth to groundwater information (14 gauging events) at the site.

The April 2005 depth to water readings in these wells ranged from 26.56 feet below the top of casing (TOC) in Well MW01 to 40.58 feet below the TOC in Well MW02. Groundwater elevations were calculated based on well casing elevations and ranged from 423.16 feet above msl in Well MW02 to 447.84 feet above msl in Well MW06 (April 2005 gauging event). Figure 5-6 shows the groundwater elevation contours from April 2005 gauging event and its corresponding flow direction.

In order to verify if more than one water-bearing unit was present at AA 3, Well MW09 was to be installed as a dual nested well (with one screen in alluvium [MW09A] and the other screen in the bedrock [MW09B]), and Well MW10 was screened in bedrock. However, at the location of Well MW09, bedrock was not encountered; therefore, both the dual nested Wells MW09A and MW09B were installed in alluvium. Since the recent groundwater gauging events indicate that the bedrock and alluvial aquifers encountered appear to be fully hydraulically connected and can be considered a single water-bearing unit, all wells (MW01 through MW10) were used to infer the groundwater flow and gradient information in Figure 5-6.

In February 2005, groundwater Monitoring Wells MW11 through MW14, and an exploratory borehole (BH01) were installed in the AA 3 area. All of these penetrations were continuously cored. Wells MW11, MW12 and MW14 were installed within the filled area. Well MW13 was installed outside of the northern corner of the estimated waste placement area. During the installation of Well MW11, Niguel Formation sandstone was encountered at 55 feet bgs, with construction debris fill materials identified to a depth of 32 feet bgs. Native alluvial silty sands and well-graded sands were identified between the base of fill and bedrock. The borehole was plugged back to 40 feet bgs and the well screen placed from 22 feet to 37 feet bgs. Well MW-11 was therefore screened across fill and native alluvium with static groundwater gauged during the February 2005 event at 28.50 feet bgs, approximately 3.5 feet above the native alluvium within the fill.

Well MW12 was placed in the upgradient, northeast portion of the waste fill area. The well was bored to 60 feet bgs, encountering construction debris fill materials from the near surface to the bedrock contact at 40 feet bgs. The 20 feet of bedrock penetrated in this boring was logged as containing all three facies of the Niguel Formation; sandstone, siltstone and claystone. Well MW-12 was screened from 24 feet to 39 feet bgs with static water gauged at 30.14 feet bgs in the gauging event of February 2005.

Explanation:

Quaternary

- Qyf$_a$, Qyf$_{sa}$ — Young alluvial fan deposits (Holocene/Late Pleistocene). Gravel, sand, silt, unconsolidated
- Qvof$_a$ — Very old alluvial fan deposits (Middle to Late Pleistocene). Sandy alluvium, reddish brown, well indurated, fan surfaces well-dissected.

Tertiary

- Tn — Niguel Formation (Pliocene). Interbeded marine sandstone, conglomerate sandstone, conglomerate.
- Tco — Capistrano Formation, Oso Member (Miocene to Early Pliocene). Sandstone, medium to coarsegrained, massively bedded, friable.
- Tps — Puente Formation, Soquel Member (Miocene). Sandstone, siltstone.
- Tplv — Puente Formation, La Vida Member (Miocene). Sandstone, siltstone.
- Tm — Monterey Formation (Miocene). Marine siltstone, sandstone, siliceous, diatomaceous.
- Tt — Topanga Formation (Middle Miocene). Marine sandstone, siltstone, locally conglomerate.
- Tvs — Vacueros and Sespe Formations, undifferentiated (late Eocene, Oligocene, early Miocene). Interbedded sandstone and conglomerate, marine and nonmarine.

Cretaceous

- Kw — Williams Formation (Upper Cretaceous). Feldspathic sandstone, pebbly sandstone, conglomerate sandstone, white, brown, poorly sorted, massively bedded, resistant, cliff-forming, marine

Legend

- Fault, dotted where covered
- 22 — Strike and dip
- Syncline
- Anticline

Source:
Jacobs Engineering,
Bechtel Drawing No. 073H1214
OHM Drawing No. 18609043
USGS,
Open File Report 99-172
Santa Ana 30'x60' Quadrangle
Southern California, Version 1.0
D.M. Morlove

GN 0°17' 5 MILS — MN 14° 249 MILS

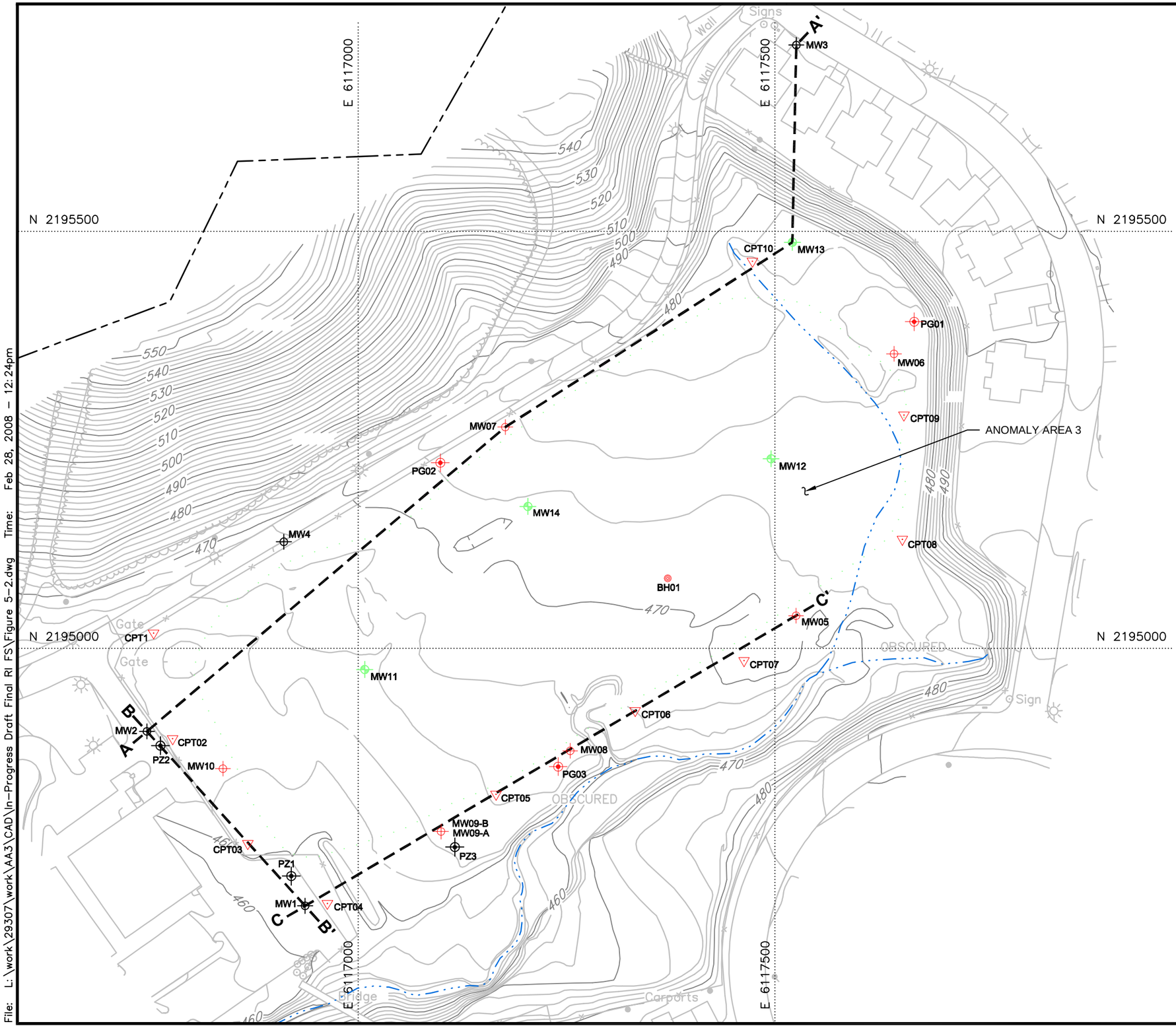
RI/FS Report — Draft Final

Map of Geologic Information

Anomaly Area 3

Date 02-08	Former MCAS El Toro	Figure 5-1
Project No. 29307	EarthTech, A Tyco International Ltd. Company	

37380.02.65.02 Fig. 5-1



LEGEND

- MINOR SURFACE ELEVATION: 2-FOOT INTERVALS
- 460 — MAJOR SURFACE ELEVATION: 10-FOOT INTERVALS
- MCAS EL TORO BOUNDARY
- EXISTING STREAM OR WASH
- ESTIMATED EXTENT OF WASTE PLACEMENT BEFORE RSE INVESTIGATION (EARTH TECH 2001)
- B– – –B' CROSS-SECTION LOCATION
- MW06 RSE GROUNDWATER MONITORING WELL LOCATION
- CPT01 RSE CONE PENETROMETER TEST LOCATION
- PG01 RSE PERIMETER GAS MONITORING WELL LOCATION
- MW4 EXISTING GROUNDWATER MONITORING WELL
- PZ3 EXISTING VADOSE ZONE WELL
- MW12 ADDITIONAL GROUNDWATER MONITORING WELL LOCATIONS
- BH01 ADDITIONAL BOREHOLE LOCATION FEBRUARY 2005

NOTES

1. TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHOD FROM AERIAL PHOTOGRAPHY DATED DECEMBER 2001 BY SAN-LO AERIAL SURVEYS.
2. COORDINATES ARE IN CALIFORNIA STATE PLANE COORDINATE SYSTEM, NAD 83, ZONE 6.
3. ELEVATIONS ARE IN FEET; BENCHMARK BASED ON NORTH AMERICAN VERTICAL DATUM 1988.

NORTH

60 0 60 120 FEET

SCALE: 1"=120'

RI/FS Report — Draft Final

Site Plan Showing Geologic Cross-Sections A-A' Through C-C'

Anomaly Area 3

Date: 02-08	Former MCAS El Toro	Figure
Project No. 29307	EarthTech, A tyco International Ltd. Company	5-2

File: L:\work\29307\work\AA3\CAD\In-Progress Draft Final RI FS\Figure 5-2.dwg Time: Feb 28, 2008 - 12:24pm

A
SOUTHWEST

A'
NORTHEAST

ELEVATION
(FEET ABOVE MEAN SEA LEVEL)

520
500
480
460
440
420
400

B-B'

FOLD LINE

FOLD LINE

ANOMALY AREA 3

MW02
MW04
PG02
MW07
MW13
MW03

SP-SM
SP
SW
SM
ML
GW

SILTSTONE BEDROCK
CLAYSTONE BEDROCK
SANDSTONE BEDROCK
SILTSTONE

TD=56'
TD=56.5'
TD=22'
TD=50.5'
TD=80'
TD=86.5'

0 60 120
SCALE IN FEET
0 10 20

LEGEND

MW4 PG02	DESIGNATION FOR GROUNDWATER MONITORING WELL OR PERIMETER GAS WELL
	SCREENED INTERVAL OF MONITORING WELL (RED DENOTES AN RSE WELL)
TD=56'	TOTAL DEPTH OF WELL BORING IN FEET BELOW GROUND SURFACE
	STRATIGRAPHIC CONTACT
	TOP OF GROUNDWATER (MEASURED APRIL 2005)
	INFERRED GROUNDWATER SURFACE (APRIL 2005)
	TOP OF GROUNDWATER (MEASURED NOVEMBER 2003)
	INFERRED GROUNDWATER SURFACE (NOVEMBER 2003)
	TOP OF SAPORLITE (DEEPLY WEATHERED BEDROCK) (SEE NOTE 5)
GW	WELL-GRADED GRAVEL
ML	LOW-PLASTICITY SILT
SW	WELL-GRADED SAND
SP	POORLY GRADED SAND
SP-SM	POORLY GRADED SAND WITH SILT
SM	SILTY SAND

NOTES

1. LITHOLOGIC CONTACTS ARE BASED ON REVIEW OF BOREHOLE LOGS.
2. GROUND SURFACE ELEVATIONS ARE BASED UPON AN AERIAL SURVEY PERFORMED BY SAN-LO AERIAL SURVEYS DECEMBER 2001.
3. ELEVATIONS ARE IN FEET; BENCHMARK BASED ON NORTH AMERICAN VERTICAL DATUM 1988.
4. MW03 ABANDONED ON 2003 GROUNDWATER ELEVATION BASED ON NOVEMBER 2003 MEASUREMENTS
5. AS BEDROCK WEATHERS IN PLACE IT DEVELOPS SOIL HORIZONS, WHICH OVER TIME CAN EXTEND QUITE DEEP INTO THE ORIGINAL FABRIC OF THE ROCK. BEDROCK, WHICH HAS UNDERGONE SUCH DEEP WEATHERING, IS REFERRED TO AS SAPROLITE. POROSITY AND PERMEABILITY OF SAPROLITES IS COMMONLY HIGHER THAN LESS WEATHERED BEDROCK.

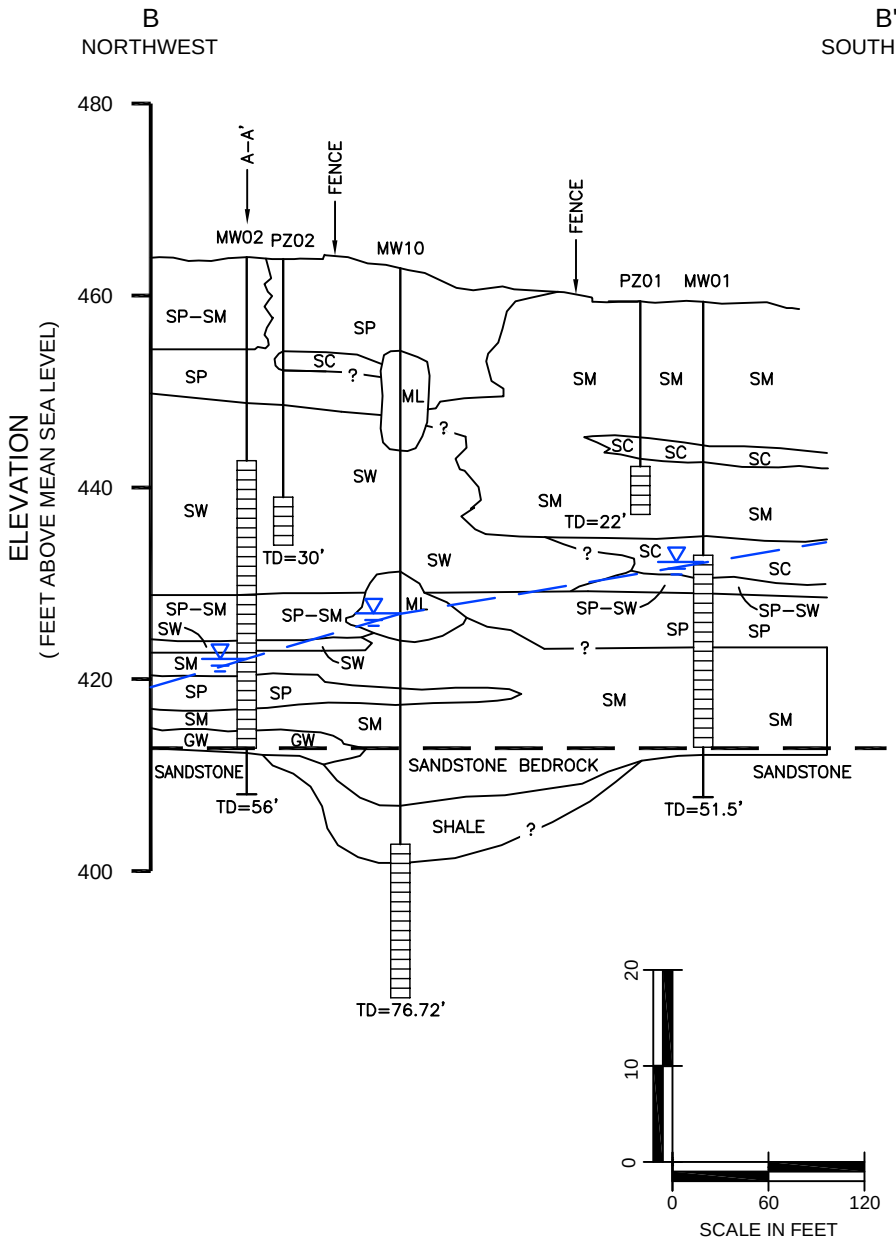
RI/FS Report — Draft Final

Geologic Cross Section A-A'

Anomaly Area 3

Date: 02-08	Former MCAS El Toro	Figure 5-3
Project No. 29307	EarthTech A tyco International Ltd. Company	

File: L:\work\29307\work\AA3\CAD\In-Progress Draft Final RI FS\Figure 5-3.dwg Time: Feb 28, 2008 - 12:25pm



LEGEND

MW4 PZ02	DESIGNATION FOR GROUNDWATER MONITORING WELL OR PIEZOMETER
	SCREENED INTERVAL OF MONITORING WELL (RED DENOTES AN RSE WELL)
TD=56'	TOTAL DEPTH OF WELL BORING IN FEET BELOW GROUND SURFACE
	STRATIGRAPHIC CONTACT
	TOP OF GROUNDWATER (MEASURED FEBRUARY 2005)
	INFERRED GROUNDWATER SURFACE (FEBRUARY 2005)
	TOP OF SAPORLITE (DEEPLY WEATHERED BEDROCK) (SEE NOTE 5)
GW	WELL-GRADED GRAVEL
SW	WELL-GRADED SAND
SP-SW	POORLY TO WELL-GRADED SAND
SP	POORLY GRADED SAND
SP-SM	POORLY GRADED SAND WITH SILT
SM	SILTY SAND
SC	CLAYEY SAND
ML	INORGANIC SILTS AND VERY FINE SANDS

NOTES

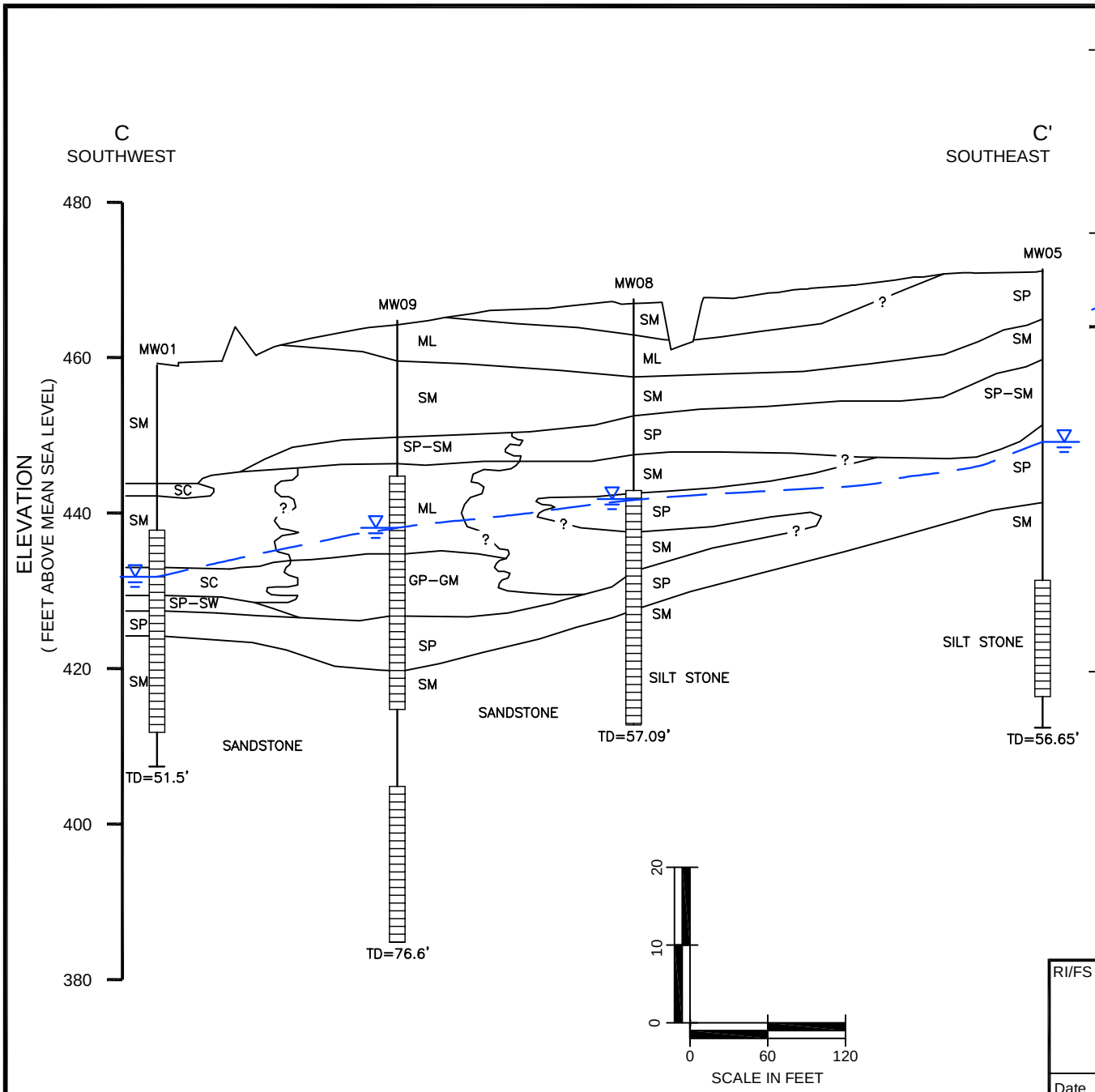
1. LITHOLOGIC CONTACTS ARE BASED ON REVIEW OF BOREHOLE LOGS.
2. GROUND SURFACE ELEVATIONS ARE BASED UPON AN AERIAL SURVEY PERFORMED BY SAN-LO AERIAL SURVEYS DECEMBER 2001.
3. ELEVATIONS ARE IN FEET; BENCHMARK BASED ON NORTH AMERICAN VERTICAL DATUM 1988.
4. AS BEDROCK WEATHERS IN PLACE IT DEVELOPS SOIL HORIZONS, WHICH OVER TIME CAN EXTEND QUITE DEEP INTO THE ORIGINAL FABRIC OF THE ROCK. BEDROCK, WHICH HAS UNDERGONE SUCH DEEP WEATHERING, IS REFERRED TO AS SAPROLITE. POROSITY AND PERMEABILITY OF SAPROLITES IS COMMONLY HIGHER THAN LESS WEATHERED BEDROCK.

RI/FS Report — Draft Final

Geologic Cross Section B-B'

Anomaly Area 3

Date 02-08	Former MCAS El Toro	Figure 5-4
Project No. 29307	EarthTech A tyco International Ltd. Company	



LEGEND

MW4	DESIGNATION FOR GROUNDWATER MONITORING WELL
	SCREENED INTERVAL OF MONITORING WELL (RED DENOTES AN RSE WELL)
TD=56'	TOTAL DEPTH OF WELL BORING IN FEET BELOW GROUND SURFACE
	STRATIGRAPHIC CONTACT
	TOP OF GROUNDWATER (MEASURED FEBRUARY 2005)
	INFERRED GROUNDWATER SURFACE (FEBRUARY 2005)
	TOP OF SAPORLITE (DEEPLY WEATHERED BEDROCK) (SEE NOTE 5)
GP-GM	POORLY-GRADED GRAVEL WITH SILT
GW	WELL-GRADED GRAVEL
ML	LOW-PLASTICITY SILT
SW	WELL-GRADED SAND
SP-SW	POORLY TO WELL-GRADED SAND
SP	POORLY GRADED SAND
SP-SM	POORLY GRADED SAND WITH SILT
SM	SILTY SAND
SC	CLAYEY SAND

NOTES

1. LITHOLOGIC CONTACTS ARE BASED ON REVIEW OF BOREHOLE LOGS.
2. GROUND SURFACE ELEVATIONS ARE BASED UPON AN AERIAL SURVEY PERFORMED BY SAN-LO AERIAL SURVEYS DECEMBER 2001.
3. ELEVATIONS ARE IN FEET; BENCHMARK BASED ON NORTH AMERICAN VERTICAL DATUM 1988.
4. AS BEDROCK WEATHERS IN PLACE IT DEVELOPS SOIL HORIZONS, WHICH OVER TIME CAN EXTEND QUITE DEEP INTO THE ORIGINAL FABRIC OF THE ROCK. BEDROCK, WHICH HAS UNDERGONE SUCH DEEP WEATHERING, IS REFERRED TO AS SAPROLITE. POROSITY AND PERMEABILITY OF SAPROLITES IS COMMONLY HIGHER THAN LESS WEATHERED BEDROCK.

RI/FS Report — Draft Final

Geologic Cross Section C-C'

Anomaly Area 3

Date 02-08	Former MCAS El Toro	Figure 5-5
Project No. 29307	EarthTech, A tyco International Ltd. Company	

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
3	wetland	Section 2.2	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 5, page 5-63 and Figure 5-14.

There is an intermittent stream channel parallel to, and inside, the northeastern site border and outside the southeastern boundary, the latter of which supports Mulefat Scrub (OCHCS 7.3) with scattered large black willows (Figure 5-14). These willow trees are in a few patches and do not cover enough of the area to match OCHCS descriptions of Southern Willow Scrub or Southern Black Willow forest. Open patches of Mulefat scrub extend onto the project site itself and in an eroded channel along the southeastern boundary (Figure 5-14). The area of Mulefat Scrub within AA 3 is 0.08-acre.

A form of coastal sage scrub (CSS) occurs on a hillside off-site to the northwest, and degraded CSS, mixed with non-native grassland, occurs on a fill slope to the east, crossing the northeastern corner of the site and extending off-site to the south and southeast. The CSS off-site to the north matches OCHCS description of Southern Cactus Scrub (OCHCS 2.4). Degraded CSS matches the mixed sage scrub grassland (OCHCS 2.8.5). There is no CSS habitat located within the landfill boundary.

5.5.5.4 WETLANDS AND WATERS OF THE U.S.

Hydrology. The field survey for this Report covered all low areas, swales, and drainage ways where water could pond or flow. One part of the site, the head cut drainage way at the southeastern boundary, potentially meets Federal criteria as waters of the U.S. and California criteria as a jurisdictional streambed (see Figure 5-14). The OHWM, indicated by sediment deposits and small banks cut by running water, are about 5 feet apart over a distance of about 70 feet, a total of 350 square feet (less than 0.01-acre) of potentially Federally jurisdictional waters of the U.S..

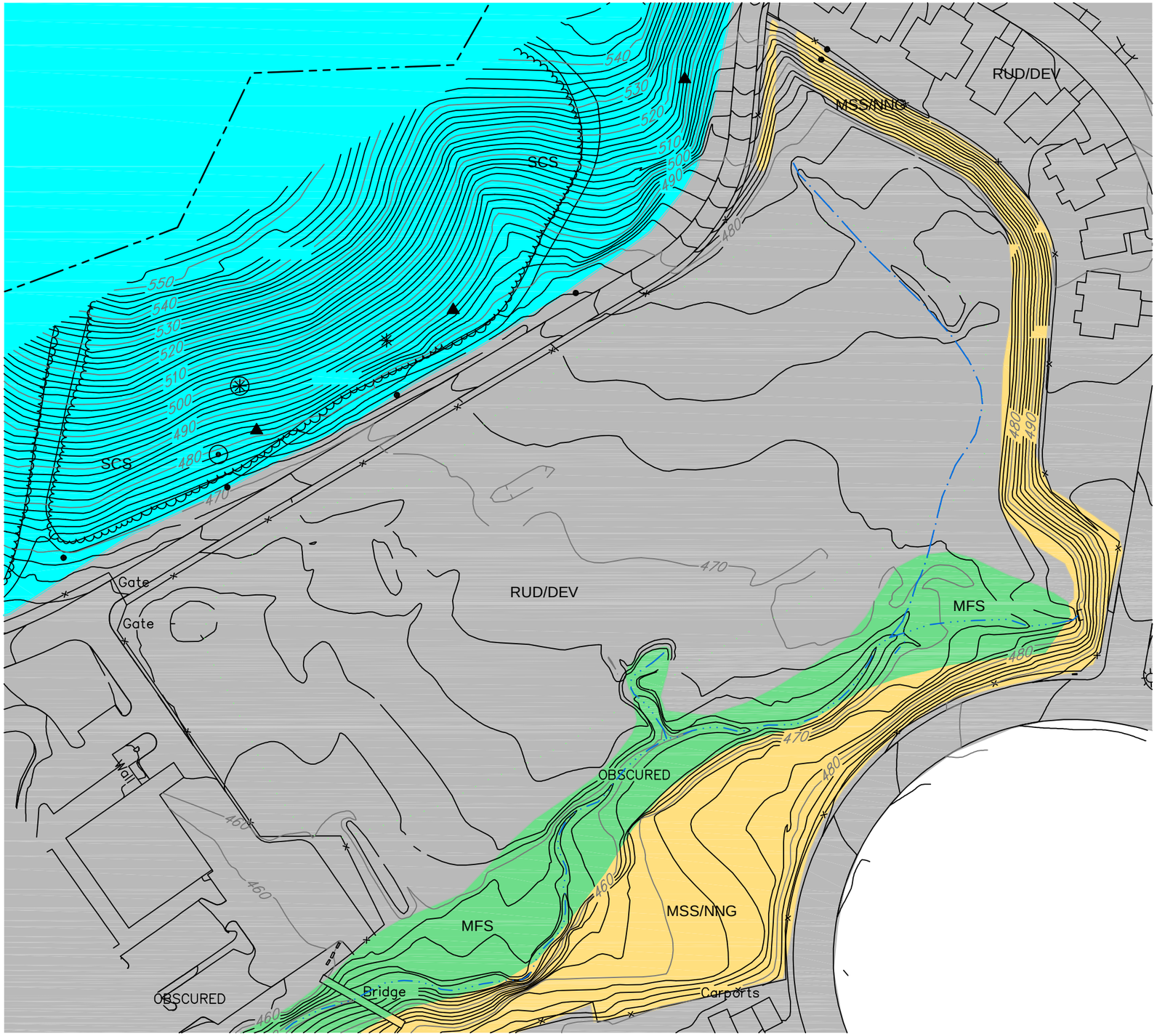
None of AA 3 meets all three Federal criteria as a wetland. The head cut drainage way meets the hydrology and vegetation wetland criteria. The soil criterion could not be evaluated due to the origin and texture of soil on the site. If involved in this Federal action, the CDFG, at its discretion, may consider the head cut drainage way a wetland, based on indicators of the hydrology criterion alone.

Soils. Soil on the anomaly area is fill material, and soil is composed of fine sand in the drainage way showing OHWMs (above). Sandy soil generally does not show hydric indicators even where it is native on a site. Because of the sandy soil texture and because the soil is not native to the site, an attempt to find indicators of hydric soil was not made.

Vegetation. Plants growing in the low-lying areas on the AA 3 surface are generally weedy native and non-native upland species, including red brome grass (*Bromus madritensis ssp. rubens*), tocalote (*Centaurea melitensis*), sweetclover (*Melilotus sp.*), and Spanish clover (*Lotus purshianus*). None of these species is ranked as facultative plant (FAC), FAC Wetlands (FACW), or obligate wetland plants (OBL); therefore, these depressions do not meet the criterion for hydrophytic vegetation. Garland daisy (*Chrysanthemum coronarium*) is overwhelmingly dominant along the swale near the northeastern boundary. This species also is not ranked as FAC, FACW, or OBL; therefore, the swale does not meet the criterion for hydrophytic vegetation.

The riparian habitat located along Agua Chinon Wash, adjacent to AA3, includes areas of mulefat scrub and scattered black willows. Mulefat has a wetland indicator status of "facultative wetland" meaning that it is usually associated with a wetland (67 percent to 99 percent probability). Black willow is an obligate wetland species and is almost always associated with wetlands. A small area (approximately 3,400 square feet) of Mulefat habitat extends onto the site from the wash along an erosion channel located at the southeast boundary (Figure 5-14 and Section 5.5.6).

MAPPING BY LINCER AND ASSOCIATES (2002)



LEGEND

- MINOR SURFACE ELEVATION: 2-FOOT INTERVALS
- 460 — MAJOR SURFACE ELEVATION: 10-FOOT INTERVALS
- MCAS EL TORO BOUNDARY
- EXISTING STREAM OR WASH
- ESTIMATED EXTENT OF WASTE PLACEMENT BEFORE RSE INVESTIGATION (EARTH TECH 2001)
- MSS/NNG — MIXED SAGE SCRUB/NON-NATIVE GRASSLAND
- MFS — MULE FAT SCRUB
- RUD/DEV — RUDERAL/DEVELOPED
- SCS — SOUTHERN CACTUS SCRUB
- ▲ COASTAL CALIFORNIA GNATCATCHER
- ✳ CACTUS WREN (PAIR)
- ✳ CACTUS WREN NEST
- ⊙ NEOTOMA NEST

NORTH

60 0 60 120 FEET

SCALE: 1"=120'

RI/FS Report — Draft Final

Habitat and Sensitive Natural Resources

Anomaly Area 3

Date: 02-08	Former MCAS El Toro	Figure 5-14
Project No. 29307	EarthTech — A tyco International Ltd. Company	

File: L:\work\29307\work\AA3\CAD\In-Progress Draft Final RI FS\Figure 5-14.dwg Time: Feb 28, 2008 - 12:27pm

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
4	radiological screening	Section 2.3	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 3, pages 3-13 through 3-16.

3.5.1 Radiological Screening During Trenching

Radiological screening was conducted as part of the trenching activity. The radiological screening was categorized as an initial characterization. The screening log indicates that the radiological readings of beta/gamma and alpha were within or equal to background concentrations. A detailed soil radiological evaluation of the site is presented in Section 3.7 as part of the Station-wide radiological survey.

3.6 DELINEATION OF WASTE PLACEMENT

The primary objective of the trenching in March 2000 was to supplement and verify the results of the geophysical survey conducted during February 2000. The results of trenching also provided information on the characteristics and delineation of the debris placed at the site. However, even though waste delineation was not the primary objective, a few of the trenches were excavated to the limits of waste placement (Table 3-3 and Figure 3-1).

In order to provide boundaries for the sampling design of the RSE investigation, tentative waste placement boundaries were estimated using the pre-waste placement and post-waste placement topographs. The record search revealed the existence of pre-waste placement (circa 1972, with 2-foot contour intervals) and post-waste placement (1990, with 2-foot contour intervals), (Figures 3-1 and 3-2, respectively, of the Work Plan). The pre- and post-waste placement topographic maps and the cross sections generated using these topographs were used to estimate the lateral extent of the waste placement, the interface of the fill material with the native soil, the volume of the fill, and depth of water relative to the fill material.

The lateral extent (boundary) was further verified by evaluating the borehole logs. A review of the borehole logs of the vadose zone wells (PZ1, PZ2, and PZ3) and the monitoring wells (MW01, MW02, and MW04) did not reveal any evidence of debris. Logs of Trenches H4, H5, H6, H7, H8, 7E, and 8E (which extended across the perimeter of AA 3) also defined the limits of waste placement. A detailed description of waste delineation is presented in the RSE Work Plan (Earth Tech 2002a).

As a result of this delineation activity, the maximum depth of waste was estimated at approximately 25 feet to 30 feet bgs. Figure 3-1 shows the lateral extent of waste. These cross sections and the tentative waste placement boundary were used in the decision-making process for the RSE sampling design. However, the waste placement boundaries were refined based on the RSE trenching activity and are presented in Section 6.1 of this Report.

3.7 EVALUATION OF RADIONUCLIDES

3.7.1 Groundwater

Investigations previously conducted at former MCAS El Toro identified radionuclides (gross alpha and gross beta emissions) in groundwater at concentrations exceeding Federal drinking water standards (Earth Tech 2001). Table 3-1 shows the radionuclide concentrations exceeding the drinking water standards in the groundwater collected from AA 3. The Phase I radionuclide evaluation at the former landfill sites (IRP Sites 2, 3, and 5) and the Explosive Ordnance Disposal (EOD) Range (IRP Site 1) concluded that the origin of the radionuclides in the groundwater is natural, and not anthropogenic. An additional Phase II investigation was conducted by Earth Tech in 2001 and was documented in a Technical Memorandum (Earth Tech 2001). The study confirmed that there was no evidence that the gross alpha and gross beta emissions detected at former MCAS El Toro were caused by Marine Corps activities. The report recommended that once the results of the

ongoing radiological survey are available, the current monitoring for radionuclides be reevaluated. In addition, no further evaluation of the origin of the radionuclides in groundwater was deemed necessary.

3.7.2 Soil

3.7.2.1 Historical Radiological Assessment

The Historical Radiological Assessment (HRA) was conducted to identify sources of radioactive material/contamination and assess the likelihood of contaminant migration, thereby identifying sites that needed further action. The HRA also provided initial classification (impacted or non-impacted) for former MCAS El Toro sites. The HRA included the review of the Navy, former MCAS El Toro, and NAVFAC SW correspondence, historical files and related reports, personnel interviews, site inspections, and limited informal surveys. The HRA for former MCAS El Toro was issued in May 2000 (Weston 2000a).

3.7.2.2 Radiological Survey Plan

Based on information provided in the HRA, a Radiological Survey Plan (Weston 2000b) was prepared to outline the specifications for additional radiological characterization of sites selected based on the HRA at former MCAS El Toro. The HRA and the Radiological Survey Plan identified the main radioisotopes of concern at former MCAS El Toro, as radium (Ra-226) and strontium (Sr-90), which were historically used in aircrafts stationed at the Station. Other radioisotopes that may have been present at former MCAS El Toro include thorium (Th-232), cobalt (Co-60), krypton (Kr-85), and tritium (Hydrogen [^{3}H]).

A Sampling Amendment to the Radiological Survey Plan was issued in February 2004 for final radiological characterization of the Station. The on-site radiological characterization and laboratory analyses were conducted in June 2001 through November 2001 and March 2004. Results of the surveys were presented in the Draft Radiological Release Report (Weston 2004) for IRP Sites 3 and 5, AA 3, and Building 244 at former MCAS El Toro.

The radiological surveys for the sites were performed using high-density techniques to detect surface radiation in accordance with the guidelines contained in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), Nuclear Regulatory Commission (NRC) and Regulatory Guide (NURGE 1575). The high-density survey electronically mapped all survey data using global positioning system (GPS) coordinates. Solid samples were collected from each outdoor site and analyzed for radionuclides of interest to augment the scan survey data.

The derived concentration guideline level (DCGL) for the sites was established. For outdoor sites, including AA 3, the property was acceptable for unrestricted use if residual radioactivity in soil distinguishable from background radiation met the following criteria:

- Radionuclide Concentration

  Based on the proposed reuse of AA 3 site, the DON established the residual radiological release criteria, $DCGL_w$ which is the DCLG for average areas over a wide area, used with statistical tests, for Ra-226 at 1 picocuries per gram (pCi/g) above former MCAS El Toro background. This level was established as a result of discussions with the EPA and the California DHS during the BCT meeting of 6 February 2003.

The radiological analyses performed on 15 reference soil samples collected throughout the Station, yielded a background soil concentration of Ra-226 at former MCAS El Toro of 1.05 pCi/g. Using a $DCGL_w$ of 1 pCi/g, the total Ra-226 DGCL for the Station was set at 2.05 pCi/g.

- Dose

  Residual radioactivity (due to Ra-226) distinguishable from background radiation results in a total effective dose equivalent (TEDE) to an average member of the residential receptor that does not exceed 25 millirem per year (mrem/y), as required by 10 Code of Federal Regulations (CFR) 20, Subpart E, and the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA) (10 CFR 20.1402).

  To ensure ALARA was met, the DON demonstrated that the radiological surveys and sampling results not only yielded a TEDE less than 25 mrem/y, but the average Ra-226 concentration did not exceed the "Interim Screening Value for soil surface contamination level" specified in Table 3 of the Federal Register Volume 64, Number 234, Page 68395.

- Risk

  Residual Ra-226 corresponds to the NCP defined risk range of 10^{-4} to 10^{-6} and consideration of uncertainties, including inherent spatial and measurement variability in Ra-226 concentration, and uncertainties in risk assessment, indicates that the level of Ra-226 exposure at the sites is in the range of the background for a residential receptor.

3.7.2.2.1 AA 3

A detailed description of the survey activities, results, analyses and recommendations are presented in the Draft Radiological Release Report for IRP Sites 3 and 5, AA 3 and Building 244 (Weston 2004).

A total of 56,270 survey readings were recorded over the survey area of approximately nine acres using the tractor-trailer eight-detector assembly and the single detector backpack GPS survey. The highest individual detector reading was 26,156 counts per minute (cpm).

A sample was collected from the area with the highest reading in contiguous homogenous locations that were representative of several areas in question. Subsequent to the sampling of the area containing the elevated readings, 21 additional random-systematic/judgmentally located samples were collected to ensure that sufficient solid samples were analyzed to fully characterize the site. The Ra-226 concentrations in the samples ranged from 0.97 pCi/g to 2.29 pCi/g (slightly above the DCGL of 2.05 pCi/g). Two of the 21 solid samples contained Ra-226 concentrations slightly above the DCGL of 2.05 pCi/g (2.17 pCi/g and 2.29 pCi/g). The survey and sampling data from the site resulted in an average Ra-226 concentration of 1.54 pCi/g, which is below the DCGL.

Using the two survey points that exceeded the DCGL, a Wilcoxon Rank Sum (WRS) test was performed for the high-density survey at AA 3. The results indicate that the site passed the statistical test and met the release criterion. The WRS test was performed on the solid sample results and it was determined that the alternate hypothesis was met and that the site meets the release criterion.

Based on the average solid sampling results, a NRC DandD Screening Code program calculation was performed. For a residual Ra-226 soil concentration of 0.49 pCi/g (1.54 pCi/g minus 1.05 pCi/g [background]), the DandD Screening Code Residential Scenario Program yielded a TEDE of

20.1 mrem/y. The 95 percent confidence interval for the 0.9 percentile value of the TEDE is 19 mrem/y to 20.9 mrem/y (i.e., within the annual limit of 25 mrem/y specified in the 10 CFR 20).

Based on the average incremental Ra-226 concentration of 0.49 pCi/g, the assessed risk to a residential receptor, using the residential scenario for the PRGs Superfund Risk Calculator, is 3.95×10^{-5}, within the NCP defined range of 10^{-4} to 10^{-6} to a residential receptor.

Based on the survey data, soil sample analyses results, statistical test results, and TEDE and risk calculations, it was concluded that the surface of AA 3 contains radiation levels which are present as a result of natural radioactivity contained in ground surface materials (e.g., gravel, crushed rock, etc.). The AA 3 surface is therefore considered to meet the radiological criteria for unrestricted use. It was also concluded that the level of Ra-226 exposure at AA 3 is in the range of the Station-wide background for a residential receptor. Therefore, it was recommended that Ra-226 be removed from the list of chemicals of potential concern (COPCs) for AA 3 and further evaluation under the CERCLA process. The California Department of Health services concurred with these conclusions and stated that historical documentation indicated that the sites could be reclassified as non-impacted and therefore are acceptable for unrestricted release (CDHS 2007). These findings will be presented in the AA 3 Record of Decision (ROD).

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
5	radiological final status survey	Section 2.3	Final Radiological Release Report for IRP Sites 3 and 5, Aerial Photograph Anomaly Site 46, Anomaly Area 3, and Building 244 Former MCAS El Toro, California. December 2006. Section 8.2, page 52 and Appendix F, page 4 and 5.

8.2 Conclusions:

In accordance with the NCP, Section 300.420, this report fulfills the requirement that radionuclides as COPCs, have been adequately investigated at each outdoor site. As has been documented in this report, statistical analyses conducted in accordance with MARSSIM, and applicable dose and risk assessments indicate that the occurrence and distribution of radionuclides on the surfaces of the Original Landfill – IRP Site 3, the Perimeter Road Landfill – IRP Site 5, APHO 46, Anomaly Area 3, and Building 244 are consistent with ambient (background) radioactivity concentrations at Former MCAS El Toro.

APHO 46, Anomaly Area 3, and Building 244 - Based on the discussion in Sections 8.1.1 and 8.1.2 above, there is no potential for radioactive contamination on the surfaces of these sites. In addition, based on the period of time during which Anomaly Area 3 operated; i.e., after the period during which Ra-226 waste may have been disposed of at the station, it is concluded that no radioactive materials are present in this site. Because the surface surveys and sampling confirmed that radiation levels were within the site-specific release limits, APHO 46 (excluding the portion overlapping IRP Site 5), Anomaly Area 3, and Building 244 may be radiologically released for unrestricted use (see regulatory concurrence for APHO 46 and Anomaly Area 3 in Appendix F, Part 2).

Landfills IRP Site 3 and IRP Site 5 –Because the radiological surveys and sampling performed at these sites were limited to the surfaces of the landfills, undetected materials may be present beyond 18 inches below the ground surface (see discussions in Sections 4.1, 7.1.1 and 7.1.2). Potential exposure to radiological materials that may be present at depth will be prevented and human health will be protected by institutional controls which are a part of the remedies proposed to be implemented at these sites. The results of the radiological surveys and sampling conducted at these sites confirmed that the radiation levels at the surfaces of the sites are consistent with ambient (background) concentrations and are within the site-specific release limits, therefore implementation of institutional controls as a part of the remedies proposed for this site will not pose a health or safety hazard to those performing the work.

8.3 Recommendations

Based on conclusions presented in Section 8.2 the following recommendations are provided:

- Radiologically release APHO 46, Anomaly Area 3, and Building 244 for unrestricted use
- Radiologically release IRP Sites 3 and 5 for the installation and implementation of institutional controls specified for these sites.

This report also makes a "Site Evaluation Accomplished (SEA)" recommendation for radionuclides at the Original Landfill; IRP Site 3, the Perimeter Road Landfill; IRP Site 5, APHO 46, Anomaly Area 3, and Building 244. The SEA recommendation denotes that the CERCLA requirement for the site evaluation for radionuclides has been accomplished.

Process Implementation - During subsequent high-density surveys of the 5.5 acre DRMO Scrapyard at ex-Mare Island Naval Shipyard, more than 30 Ra-226 anomalies in the micro-curie as well as the pico-curie range were retrieved. Soil samples identified during the high-density survey yielded elevated Ra-226 concentrations in the pico-curie per gram range. The majority of the soil excavations at the Scrapyard were 1 foot to 2 feet deep. After remediation of the site, a final high-density survey using the afore-mentioned equipment and accompanied by confirmation soil samples verified that the soil was free of residual Ra-226 concentrations greater than *5 pico-curies per gram (pCi/g).

> *__Note__: 5 pCi/g was the Ra-226 concentration arrived at by Navy and the State at a February 1996 meeting wherein it was; "agreed to survey the yard and remove the "hot spots"……..identified by the surface scan and soil contaminated to levels greater than 5 pCi/g." The Scrapyard was finally remediated to average Ra-226 levels that were much less than 5 pCi/g and considered to be "indistinguishable from background."

Conclusion - The final radiological release report for the Mare Island DRMO Scrapyard dated March 1997, including change pages dated April 17 and April 28, 1997, concluded that the site could be released from all radiological controls. California DTSC letter dated October 23, 1997 indicated that the DRMO Scrapyard release report had been reviewed and approved by the US EPA and Cal/EPA.

Summary – Based on the high-density gamma survey field testing results and in-process implementation of the process as described above, similar processes have been utilized at other sites of concern within California and in other states to characterize those sites for radioactivity at depths up to 18-inches below ground surface.

3. The historical documentation of "Anomaly Area 3" or "APHO 46" provides a more compelling argument that there is no buried radiological contamination at these sites than the data provided. Based on the dates provided for the operation of APHO 46 and Anomaly Area 3, the CDHS concurs that these two areas may be released for unrestricted use.

Response: Navy will document the above CDHS concurrence in the Draft Final Radiological Release Report.

State of California **Department of Health Services**

M e m o r a n d u m

Date: April 19, 2006

To: Ms. Soad Hakim
Department of Toxic Substances Control (DTSC), Region 4
Office of Military Facilities
5796 Corporate Avenue
Cypress, California 90630

From: California Department of Health Services (DHS)
Environmental Management Branch
1616 Capitol Avenue, 2nd Floor
MS 7405
P.O. Box 997413
Sacramento, California 95899-7413

Subject: Review of the Navy's March 2006 Responses to CDHS' February 2005 comments RE: *Draft Radiological Release Report, IRP Sites 3 and 5 (including APHO 46), Anomaly Area 3, and Building 244, Marine Corps Air Station El Toro, California*, dated December 2004

This review was performed by Ms. Deirdre Dement, Associate Health Physicist, in support of the Interagency Agreement between DTSC and DHS. If you have any questions concerning this review, or if you need additional information, please contact Ms. Dement at (916) 449-5675.

Penny Leinwander
Senior Health Physicist

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
6	previously collected data	Section 2.3	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 3, pages 3-1 through 3-5 and Figure 3-1.

3. PREVIOUS INVESTIGATIONS

Previous investigations at AA 3 include the following:

- Literature and records search;
- Site visit and visual inspection;
- Installation of four groundwater monitoring wells and groundwater sampling;
- Installation of three vadose zone vapor wells and soil vapor sampling;
- Geophysical investigation; and,
- Exploratory trenching, including collection of subsurface soil samples for chemical laboratory analysis.

The sampling locations and other relevant information from previous investigations are presented on Figure 3-1. A literature and record search was conducted during early 1999, and the BCT conducted a site visit and visual inspection of the area during August 1999. IT/OHM was contracted to install monitoring wells and vadose zone wells, conduct a geophysical investigation of the area, advance exploratory trenches at the site, and conduct a radiological screening survey as part of the exploratory trenching activity. A technical information package (IT/OHM 2000) compiling the results of the data was submitted to the BCT.

3.1 WELL INSTALLATION

The *Technical Information Package* (IT/OHM 2000) refers to the monitoring and vadose zone wells at AA 3 with "MSCR1" preceding the well numbers; however, this prefix was dropped during the preparation of the RSE Work Plan. During October 1999, four monitoring wells were installed at the site (MW01, MW02, MW03, and MW04) to evaluate the groundwater elevations and flow direction. Wells MW01, MW02, and MW04 were installed as downgradient wells, and Well MW03 was installed as an upgradient well. Figure 3-1 shows the locations of these wells.

In October 1999, three vadose zone wells were also installed (PZ1, PZ2, and PZ3). Wells PZ1, PZ2, and PZ3 have total depths of 22 feet bgs (screened interval 17 feet to 22 feet bgs), 30 feet bgs (screened interval 25 feet to 30 feet bgs), and 26 feet bgs (screened interval 15 feet to 20 feet bgs), respectively.

3.2 GROUNDWATER SAMPLING

Two rounds of groundwater sampling were conducted (4 November 1999 and 20 April 2000) at the four monitoring wells located at AA 3 (MW01, MW02, MW03, and MW04). The groundwater samples were analyzed for total petroleum hydrocarbons (TPH), VOCs, metals, mercury, perchlorate, nitrate, lead, gross alpha and gross beta radiation, and the following radioisotopes: uranium isotopes, radium, thorium isotopes, americium, and lead^{210}.

None of the groundwater samples had concentrations exceeding the maximum contaminant levels (MCLs) for VOCs, metals, perchlorate, or radionuclides, except as indicated in Table 3-1. Further discussion on the radionuclides in groundwater at former MCAS El Toro is presented in Section 3.7 of this Report.

Table 3-1: Summary of Detected Analytes Exceeding MCLs – Groundwater Sampling – Previous Investigation

Well ID	Sample ID	Sampling Date	TDS Secondary MCL = 500 mg/L (mg/L)	Manganese Secondary MCL = 50 µg/L (µg/L)	Gross Alpha MCL = 15 pCi/L (pCi/L)	Total Uranium MCL = 20 pCi/L (pCi/L)
MW01	20242-987	11/4/1999	**1,760**	**80.2**	**34.6** ± 5.27	NA
	20242-1123	4/20/2000	NA	20 U	**27.6** ± 6.0	**38.4**
MW02	20242-984	11/4/1999	**1,920**	**259**	**23.5** ± 4.29	NA
	20242-1124[a]	4/20/2000	NA	43.3	**28.3** ± 6.0	**31.63**
MW03	20242-989[b]	11/4/1999	**1,740**	20.9	**35.5** ± 5.23	NA
	20242-1120	4/20/2000	NA	20 U	**35.7** ± 6.8	**50.02**
MW04	20242-981	11/4/1999	**2,290**	48.1	**45.9** ± 8.5	**56.01**
	20242-1122	4/20/2000	NA	20 U	Greater than 15	NA

Notes:
NA = not analyzed
µg/L = micrograms per liter
mg/L = milligrams per liter
ID = identification
MCL = maximum contaminant level
pCi/L = picocuries per liter
U = not detected
TDS = total dissolved solids
Values shown in bold text are above MCLs.
[a] Chromium was reported at 357 µg/L.
[b] Selenium was reported at 50.3 µg/L.

3.3 PERIMETER SOIL GAS SAMPLING

Two rounds of soil vapor sampling were conducted on 4 November 1999 and 24 July 2000 at each of the three wells (PZ-1 through PZ-3). The samples were analyzed for VOCs and fixed gases (carbon dioxide, carbon monoxide, methane, nitrogen, and oxygen).

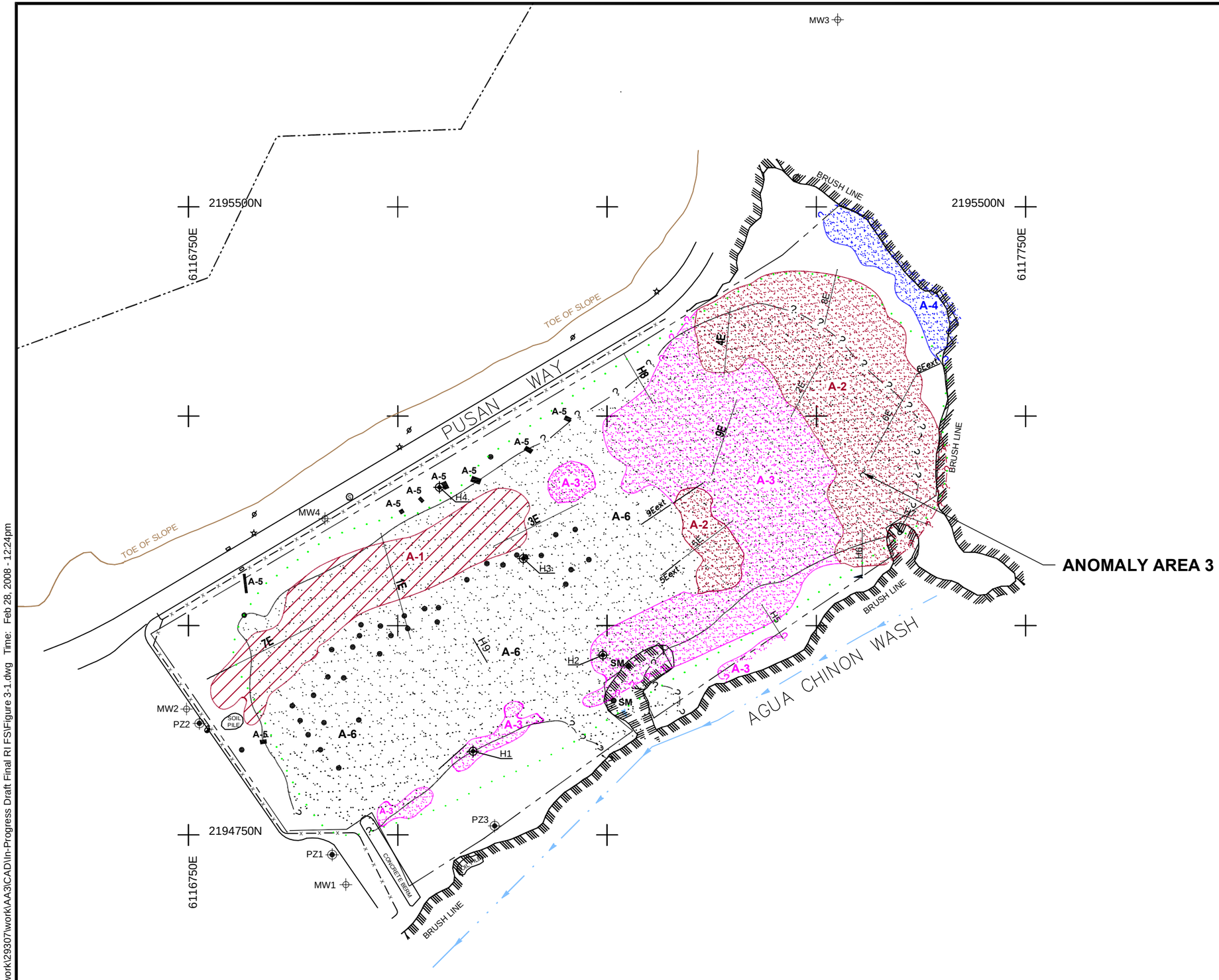
Methane was not detected in any of the samples; all VOCs that were detected were at concentrations below 1 microgram per liter (µg/L). The detected compounds for each vadose zone well for both sampling events are given in Table 3-2.

Table 3-2: Summary of Detected Analytes – Perimeter Soil Gas Sampling – Previous Investigation

Well ID	Sampling Date	Detected Compounds
PZ1	11/4/1999	Dichlorodifluoromethane
	7/24/2000	Chloromethane, m/p-xylene, toluene
PZ2	11/4/1999	Acetone, dichlorodifluoromethane, tetrachloroethene
	7/24/2000	1,2,4-trimethylbenzene, acetone, carbon disulfide, chloromethane, m/p-xylene, toluene
PZ3	11/4/1999	All sample results were below the reporting limit
	7/24/2000	1,1-dichloroethane, 4-ethyltoluene, 1,2,4-trimethylbenzene, acetone, benzene, carbon disulfide, chloromethane, chloroethane, chloroform, dichlorodifluoromethane, ethylbenzene, m/p-xylene, o-xylene, toluene, vinyl chloride

Notes:
ID = identification

PRIMARY SOURCE OF INFORMATION:
TECHNICAL INFORMATION PACKAGE (OHM 2000)



LEGEND

- BOUNDARY OF GEOPHYSICAL SURVEY AREA
- ESTIMATED EXTENT OF WASTE PLACEMENT BOUNDARY FOR RSE INVESTIGATION
- CHAIN-LINK FENCE
- AGUA CHINON WASH
- SEWER MANHOLE
- LIGHT POLE
- POWER POLE
- STORM DRAIN
- MW2 — GROUNDWATER MONITORING WELL
- PZ2 — VADOSE ZONE VAPOR WELL
- LINE INDICATES UNCERTAIN BOUNDARY

GEOPHYSICAL SURVEY RESULTS

- VERY SMALL BURIED METALLIC OBJECT/DEBRIS
- SM — SURFACE METALLIC OBJECT/DEBRIS
- 5E — TRENCH LOCATIONS
- H4 — TRENCH/POTHOLE LOCATIONS
- A-1 — LARGE TRENCH CONTAINING HIGH CONCENTRATION OF DEEP BURIED METALLIC/CONSTRUCTION DEBRIS
- A-2 — DISPOSAL AREA CONTAINING HIGH CONCENTRATION OF DEEP BURIED METALLIC/CONSTRUCTION DEBRIS
- A-3 — DISPOSAL AREA CONTAINING SCATTERED DEEP BURIED METALLIC/CONSTRUCTION DEBRIS
- A-4 — AREA CONTAINING SHALLOW BURIED METALLIC/ CONSTRUCTION DEBRIS
- A-5 — LARGE BURIED METALLIC OBJECT OR SMALL ACCUMULATION OF BURIED METALLIC DEBRIS
- A-6 — AREA CONTAINING POSSIBLE IMPORTED FILL

NOTES:

1. COORDINATES ARE IN CALIFORNIA STATE PLANE COORDINATE SYSTEM, NAD83, ZONE 6.
2. INTERPRETED BOUNDARIES OF SUBSURFACE ANOMALIES ARE APPROXIMATE, QUERIED WHERE INFERRED OR UNCERTAIN.

NORTH

60 0 60 120 FEET

SCALE: 1"=120'

RI/FS Report — Draft Final

Previous Investigation Sampling Location and Results

Anomaly Area 3

Date: 02-08	Former MCAS El Toro	Figure 3-1
Project No. 29307	EarthTech — A tyco International Ltd. Company	

File: L:\work\29307\work\AA3\CAD\In-Progress Draft Final RI FS\Figure 3-1.dwg Time: Feb 28, 2008 - 12:24pm

3.4 GEOPHYSICAL INVESTIGATION

A geophysical investigation was conducted between 9 and 18 February 2000, by IT/OHM to screen the site for buried metallic debris and fill soil. Geophysical techniques included magnetic and electromagnetic (EM) induction. The magnetic data revealed the presence of several large areas (indicative of the presence of buried metallic debris), including a large trench in the southwest portion of the survey area (anomaly A-1) and a large disposal area in the northeast portion of the survey area (anomalies A-2 and A-3) (Figure 3-1). Buried debris also appeared to have accumulated at the Station at a slope along the northeastern edge of the survey area (anomaly A-4). Additionally, several buried metallic objects or small accumulations of debris (anomaly A-5) were identified southwest of the trench (referred to as anomaly A-1), and numerous very small pieces of metallic debris were identified southeast of Trench A-1. The low magnitudes of the magnetic anomalies indicated that the metallic debris to be deeper than 5 feet in much of the site.

The EM-31 conductivity data revealed the presence of a large area of elevated electrical conductivity in the central portion of the survey area (Anomaly A-6). This area was interpreted as containing fine-grained, clayey soil near the surface. Because much of the native soil at the site appears to consist of low-conductivity, clean sands deposited by the Agua Chinon Wash, it is likely that the conductive soil in the middle of the site is imported fill material. The surface area over which geophysical surveys were conducted encompasses nine acres, and anomalies were identified over much of the surveyed area. Figure 3-1 shows the results of this geophysical investigation.

3.5 EXPLORATORY TRENCHING AND SUBSURFACE SOIL SAMPLING

Exploratory trenching was conducted during March 2000 and generally confirmed the results of the geophysical survey. Eighteen trenches/pits (1E to 8E, H1, H3 to H9, and, 9E and H2, each of which consists of two trenches) were excavated at the site. Subsurface soil sampling was conducted during trenching.

Twenty-two soil samples (plus two duplicates) were collected from the trenches at depths ranging from 4 feet to 35 feet bgs. One-third of the soil samples analyzed were collected from depths of 4 feet to 10 feet bgs, with all remaining samples collected from greater depths. These soil samples were analyzed for TPH (both gasoline and diesel ranges), VOCs, semivolatile organic compounds (SVOCs), and metals (including mercury). Two of the 24 soil samples were also analyzed for dioxins/furans, asbestos, and perchlorate.

The analytes that were detected in the samples were predominantly TPH and arsenic. Two of the 24 samples analyzed for arsenic exceeded both the background levels and the preliminary remediation goals (PRGs). The remaining detections of arsenic were within the Station-wide background levels. Lead and benzo[a]pyrene (B[a]P) were detected in a single sample each, and both analytes had concentrations that exceeded the residential PRGs (EPA 2004b). The two soil samples (Trench 4E at 6 feet bgs and Trench H3 at 4 feet bgs) that were analyzed for dioxins and furans had detected concentrations of 1,2,3,4,6,7,8-heptachlorodibenzodioxin (HPCDD), HPCDD (total), heptachlorodibenzofuran (HPCDF) (total), hexachlorodibenzofuran (HXCDF) (total), octachlorodibenzodioxin (OCDD), and octachlorodibenzofuran (OCDF). The calculated toxicity equivalency quotients (TEQs) for the samples (0.424 picograms per gram [pg/g] – 6 feet sample from Trench 4E and 0.0476 pg/g – 4 feet sample from Trench H3) were below the residential PRG of 3.9 pg/g for dioxins/furans. Table 3-3 presents the details of the subsurface soil sampling and Table-3-4 presents the summary of detected analytes of samples collected at various depths. Trench locations are shown on Figure 3-1.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
7	RSE findings	Section 2.3	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 4, pages 4-1 through 4-25 and Figures 3-1 and 4-2.

4. RSE INVESTIGATION

The field investigation program for AA 3 was developed using the EPA DQO process (EPA 2000a). The RSE field investigation program was designed to supplement the data gathered from previous investigations and also assist in providing enough information to evaluate future response action for the site.

This section describes the procedures employed to address the DQO questions identified in the RSE Work Plan (Earth Tech 2002a). All RSE investigation activities were performed in accordance with the Sampling and Analysis Plan (SAP), Appendix A (Earth Tech 2002a), quality assurance procedures listed in the Work Plan (Earth Tech 2002a) and the Final Health and Safety Plan (Earth Tech 2002b).

In addition, field activities were performed in general accordance with the following guidance documents: CLEAN Health and Safety Manual; CLEAN II Standard Operating Procedure (SOP) 3, *Borehole Logging*; CLEAN II SOP 4, *Soil Sampling*; CLEAN II SOP 5, *Monitoring Well Installation and Development*; CLEAN II SOP 6, *Instrument Calibration and Use*; CLEAN II SOP 7, *Water and Free-Product Level Measurements in Wells*; CLEAN II SOP 8, *Groundwater Sampling*; CLEAN II SOP 9, *Sample Containers, Preservation and Handling*; CLEAN II SOP 10, *Sample Custody, Transfer and Shipment*; CLEAN II SOP 11, *Decontamination of Equipment*; CLEAN II SOP 12, *Surface Water Sampling*; CLEAN II SOP 13, *Abandonment of Boreholes and Wells*; CLEAN II SOP 16, gINT System: *Boreholes and Wells*; CLEAN II SOP 17, *Logbook Protocols*; CLEAN II SOP 22, *IDW* (BNI 1999).

4.1 PURPOSE AND SCOPE OF RSE WORK

The purpose of the AA 3 RSE field investigation program was to collect data necessary for preparation and selection of the response action for the site. The scope of the Work Plan (Earth Tech 2002a) included the following:

- Collecting soil vapor, soil, groundwater, surface water, and sediment samples to evaluate the impact, if any, due to waste placement;
- Confirming the lateral limits of the waste placement;
- Evaluating human health and ecological risks; and,
- Collecting soil samples to conduct a geotechnical assessment of the existing soil cover.

The Work Plan was prepared in compliance with the requirements of CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, the NCP, Title 40 CFR Part 300, and the California Health and Safety Code, Section 6.8.

4.2 SAMPLING DESIGN

The sampling design for the AA 3 RSE investigation was based on the EPA DQO process. The principal questions for the RSE field investigation (Earth Tech 2002a) were the following:

6. Are adequate data available to complete an RSE, including the design of a cover system?
7. What is the risk posed by the site to human health and/or the environment?

The project decisions that were considered to resolve these principal study questions were the following (Earth Tech 2002a):

1. Have the waste boundaries been adequately delineated, or is further evaluation required?
2. Has the existing soil cover been adequately characterized (thickness and soil properties), or is further evaluation required?
3. Are adequate data available to characterize if the existing soil cover is sufficient to either protect human health and/or environment, or if not, to serve as a foundation layer for a soil cover system?
4. Has the impact to groundwater, surface water, and sediments been adequately characterized, or are additional data required?
5. Is soil vapor being produced within the waste, and if yes, does it exceed threshold levels listed as decision inputs and requires a waste placement gas collection system?
6. Does soil vapor migrate from the site to impact adjacent property?
7. Has the nature of the waste present been adequately characterized using soil vapor, soil, groundwater, surface water, and sediment data, or is further evaluation required to characterize risk and evaluate response actions?
8. Have potential human and ecological receptors been identified, and are they likely to be at risk for adverse health effects at this site?

4.2.1 Study Boundaries

The study boundary for the AA 3 site is approximately nine acres, bordered to the northeast by Pusan Way and to the southeast by Agua Chinon Wash (Figure 3-1); the former Wherry Housing Area is further to the southeast and northeast. Construction debris placement extends from near the surface to approximately 25 feet to 30 feet bgs. The construction debris placement boundary for AA 3 was a result of delineation activity as presented in Section 3.6. Groundwater at the site is found at approximately 20 feet to 40 feet bgs (approximately 60 feet bgs at abandoned Well MW03).

According to the Work Plan, the vertical extent of the investigation would progress to approximately the first encountered groundwater if the analytical results of the sample collected from the preceding depths indicated contamination.

4.2.2 Decision Inputs

All the physical and analytical data from previous investigations, including soil, soil vapor, groundwater, and results from geophysical and trenching investigations were used to develop the scope and served as decision inputs to resolve the project decision questions of the RSE investigation. Sampling performed at AA 3 as part of the RSE was also used to resolve the project decision questions. In addition, EPA Region 9 PRGs (EPA 2004b) (residential and industrial) were used as screening criteria for risk to human health. Results from the radiological survey (Weston 2000b) were also proposed as decision inputs in the Work Plan to assess if additional radiological sampling is required.

The following threshold levels were used as screening criteria for the assessment of detected analytes:

- Former MCAS El Toro area background metals and selected organic compound concentrations in soil (BNI 1996). Concentrations of analytes that exceeded the background threshold (95th quantile) were compared to the residential and industrial soil PRGs.

- EPA Region 9 (California [Cal]-EPA modified) PRGs and soil screening levels (SSLs) for industrial and residential use scenarios for analytes other than metals.

- For groundwater and surface water, federal and California MCLs or drinking water advisory thresholds for drinking water, where available. In the absence of MCLs, EPA Region 9 PRGs for tap water were used.

- Target compounds for dioxin and dioxin-like compounds were the analytes in the World Health Organization (WHO) list of compounds.

- California DHS action levels for perchlorate (4 µg/L) in groundwater and surface water.

- California Air Resources Board (CARB) study median concentrations that were proposed for the integrated and ambient air samples in the Phase II RI Work Plan (BNI 1995).

- Title 27 of the California Code of Regulations (CCR) stipulated the lower explosive limit (LEL) for methane (5 percent by volume or 50,000 parts per million by volume [ppm_v]) for soil vapor.

- Soil vapor hot spot threshold for total VOC concentration (300 µg/L) as established in the Phase II RI Work Plan (BNI 1995) for typical landfill sites.

4.2.3 Sampling Objectives

Figure 4-1 shows the sampling locations for the RSE investigation at AA 3. Data gathering objectives for the RSE investigation included the following:

- Verification of currently demarcated waste placement boundaries by trenching;

- Installation of perimeter vapor monitoring and groundwater wells;

- A cone penetrometer test (CPT) survey;

- Integrated and ambient air sampling to evaluate the impact of the waste on air quality;

- Shallow and subsurface soil vapor sampling to determine if soil vapor hot spots are present and to evaluate the need for a landfill gas collection system;

- Perimeter soil vapor sampling to verify whether soil vapor is migrating from the subsurface soil to the perimeter of the waste;

- Surface soil sampling and analysis for COPCs to aid in the evaluation of human health risk;

- Geotechnical soil testing to evaluate the engineering properties of the foundation soil;
- Groundwater sampling to evaluate impacts to groundwater and evaluation of the hydraulic gradient and direction of flow by water level measurements;
- Evaluation of the impact of the waste on Agua Chinon Wash by collecting sediment samples from the Wash;
- Surface water sample collection from Agua Chinon Wash to evaluate impact to surface water; and,
- Land survey of coordinates of trenches, soil vapor and soil sampling locations, and perimeter vapor and groundwater monitoring well locations.

4.3 EXPLORATORY TRENCHING

Decision Rule #1 of the project DQO process was formulated in response to Decision Question #1.

> **Decision Question #1:** Have the waste boundaries been adequately delineated, or is further evaluation required?

Decision Rule #1 stipulates that additional trenching be performed as part of the RSE investigation to define the debris placement boundaries if the debris placement boundary has not been adequately delineated previously. Since the debris delineation was performed using the pre- and post-waste placement aerial topographs and no physical delineation of boundaries was performed previously, exploratory trenching was performed as part of the RSE activity.

From 17 to 23 October 2002, 12 trenches (TR01 through TR12) were excavated to determine the limit of debris, if encountered, and the thickness of the soil cover. A project geologist recorded the trench descriptions and lithologic description of soils encountered in the trenches in accordance with CLEAN SOP 3, *Borehole Logging* (BNI 1999) and American Society of Testing and Materials (ASTM) D 2487 and 2488. Trench alignments were measured with a compass and a standard 100-foot tape, to a resolution of 0.5-foot. Field readings of a flame ionization detector (FID), dust and radiation measurements were recorded in the logbook. Trenches were backfilled upon completion of logging. None of the trenches was left unattended or open overnight.

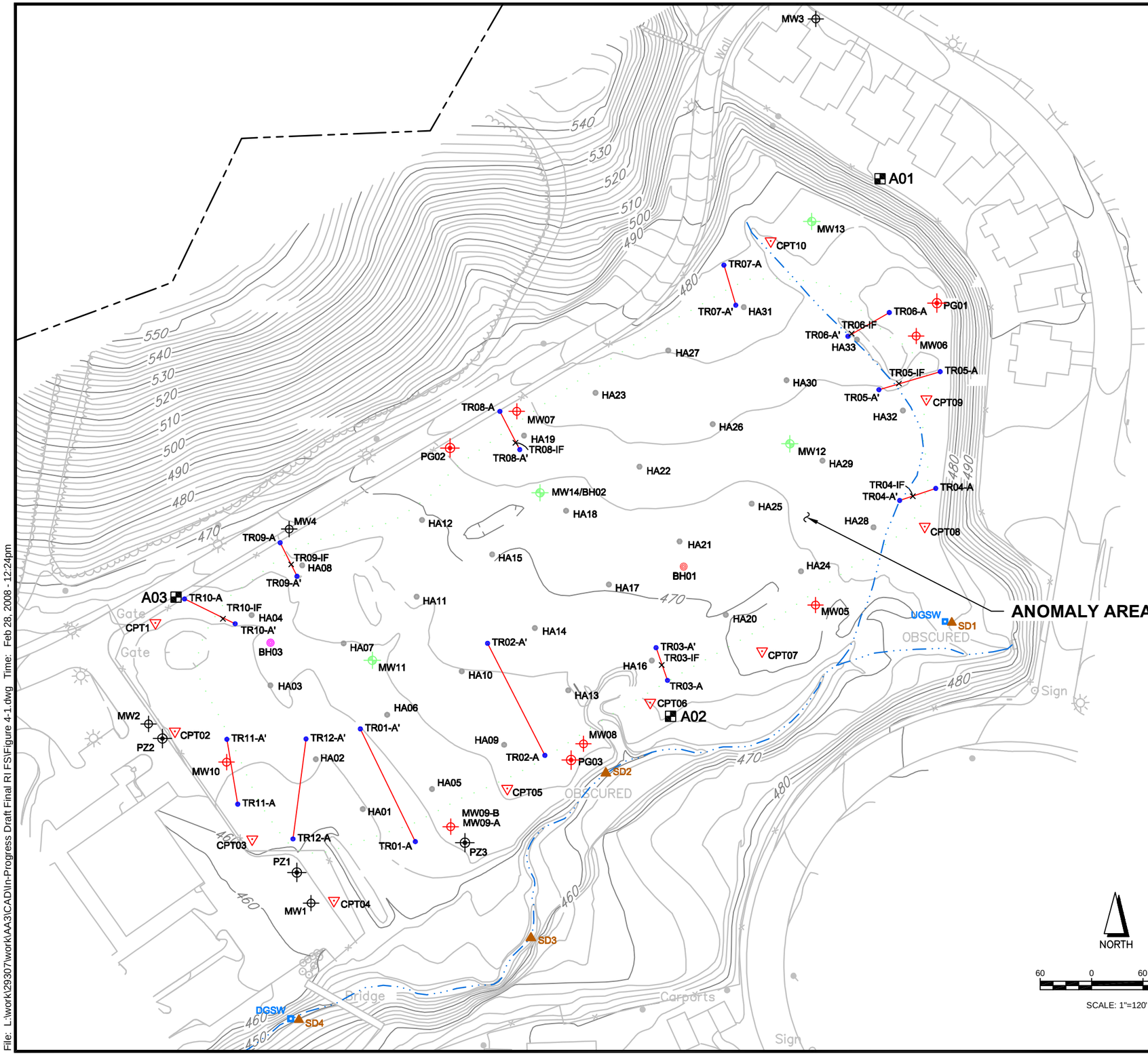
The trench excavation logs are presented in Appendix A of this Report. Some geotechnical soil samples were collected from the trenches based on the recommendations of the project geotechnical engineer and submitted to the laboratory for geotechnical analysis (for further details, see Section 4.7.3).

4.4 WELL INSTALLATION

4.4.1 Groundwater Monitoring Wells

The groundwater monitoring well installation was conducted to adequately respond to Decision Questions #4 and #7.

> **Decision Question #4:** Has the impact to groundwater, surface water, and sediments been adequately characterized, or are additional data required?



LEGEND

- MINOR SURFACE ELEVATION: 2-FOOT INTERVALS
- 460 — MAJOR SURFACE ELEVATION: 10-FOOT INTERVALS
- MCAS EL TORO BOUNDARY
- EXISTING STREAM OR WASH
- ESTIMATED EXTENT OF WASTE PLACEMENT BEFORE RSE INVESTIGATION (EARTH TECH 2001)
- HA31 — RSE DIRECT PUSH SOIL/SOIL VAPOR SAMPLING LOCATIONS
- TR08-A / TR08-A' / TR08-IF — RSE TRENCH LOCATION AND DESIGNATION
- INTERFACE OF DEBRIS AND FILL SOIL
- MW06 — RSE GROUNDWATER MONITORING WELL LOCATION
- CPT01 — RSE CONE PENETROMETER TEST LOCATION
- PG01 — RSE PERIMETER GAS MONITORING WELL LOCATION
- MW4 — EXISTING GROUNDWATER MONITORING WELL
- PZ3 — EXISTING VADOSE ZONE VAPOR WELL
- A03 — AMBIENT AIR SAMPLING LOCATIONS
- UGSW — SURFACE WATER SAMPLE LOCATION
- SD1 — SEDIMENT SAMPLE LOCATION
- MW12 — ADDITIONAL GROUNDWATER MONITORING WELL LOCATIONS - FEBRUARY 2005
- BH01 — ADDITIONAL BOREHOLE LOCATION FEBRUARY 2005
- BH03 — BOREHOLE LOCATION NOT DRILLED

NOTES

1. TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHOD FROM AERIAL PHOTOGRAPHY DATED DECEMBER 2001 BY SAN-LO AERIAL SURVEYS.
2. COORDINATES ARE IN CALIFORNIA STATE PLANE COORDINATE SYSTEM, NAD 83, ZONE 6.
3. ELEVATIONS IN FEET; BENCHMARK BASED ON NORTH AMERICAN VERTICAL DATUM 1988.

NORTH

60 0 60 120 FEET

SCALE: 1"=120'

RI/FS Report — Draft Final

Sampling Locations - RSE Investigation

Anomaly Area 3

Date: 02-08	Former MCAS El Toro	Figure
Project No. 29307	EarthTech, A tyco International Ltd. Company	4-1

File: L:\work\29307\work\AA3\CADIn-Progress Draft Final RI FS\Figure 4-1.dwg Time: Feb 28, 2008 - 12:24pm

Decision Question #7: Has the nature of the waste present been adequately characterized using soil vapor, soil, groundwater, surface water, and sediments data, or is further evaluation required to characterize risk and evaluate response actions?

In order to adequately respond to these questions, seven monitoring wells (MW05 through MW10) were installed during November 2002 at AA 3 in addition to existing Wells MW01, MW02, MW03, and MW04. These well installations were used to confirm the water levels, direction of groundwater flow and hydraulic gradient at the site, and also adequately characterize the groundwater quality at the site. None of the new groundwater monitoring wells that were installed during November 2002 was located within the limits of waste placement due to risk of creating a conduit for downward vertical migration of any potential contamination. These wells are located at the perimeter of the site so as to detect off-site migration of potential contaminants.

Groundwater Monitoring Wells MW05 through MW10, including MW09A and MW09B, were installed from 29 October to 6 November 2002. The locations of the newly installed monitoring wells are shown on Figure 4-1.

Groundwater Monitoring Well MW-06 was installed as an upgradient monitoring well, as was existing Well MW03. Groundwater sampling results from Wells MW02, MW04, and MW10 were used to characterize the groundwater from the deepest section of the fill (south and northeast of intersection of cross section lines AA 3-2 and AA 3-12 [presented in the Work Plan]). Dual-nested groundwater Monitoring Wells, MW09A and MW09B (initially proposed to be screened in alluvium and bedrock, respectively) was to be installed close to the debris, between existing Well MW01 and proposed Well MW08, to verify the groundwater flow regime (i.e., multiple water bearing zones) at the site. These wells were also designed to assess if there is any radial migration of the leachate from the lowest portion of the site. However, at the location of Well MW09, bedrock was not encountered; therefore, the dual nested Wells MW09A and MW09B were installed in alluvium.

Groundwater Monitoring Well MW10 was installed in bedrock between existing Wells MW01 and MW02. Since the presence of multiple water bearing zones beneath the site was not confirmed, the original intent to install new groundwater monitoring wells to assess groundwater gradient in alluvium and bedrock was not performed.

Air rotary drilling technology was used to drill boreholes to install wells screened in bedrock (MW09B and MW10). Boreholes for installing other wells (MW05 though MW08) were drilled using the hollow-stem auger (HSA) drilling technology. Soil samples were collected every 5 feet during drilling solely for field screening and lithologic description. Based on the recommendations of the geotechnical engineer, some soil samples were collected from the borehole at 5-foot intervals and submitted to the laboratory for geotechnical analysis (see Section 4.7.3 for further details).

Samples were collected in accordance with CLEAN SOP 4, *Soil Sampling* (BNI 1999). The lithology was described in accordance with the Unified Soil Classification System (USCS) as specified in CLEAN SOP 3, *Borehole Logging* (BNI 1999). The well installation procedures were in accordance with CLEAN SOP 5, *Monitoring Well Installation and Development* (BNI 1999) and Section A-2.2.3 of the Work Plan (Earth Tech 2002a). Borehole logs and monitoring well construction logs are presented in Appendix A of this Report. A summary of the well construction details is presented in Table 4-1.

These monitoring wells were developed from 11 through 15 November 2002, in accordance with CLEAN SOP 5, *Monitoring Well Installation and Development* (BNI 1999). Following installation,

measurements of total well depth and static water levels were recorded with a tape measure equipped with an electronic product/water interface detector to an accuracy of 0.01-foot. A minimum of four well-bore volumes were extracted to remove fine-grained materials and to promote the movement of formation waters into the wells. Specific conductivity, temperature, and negative log of hydrogen ion concentration (pH) were monitored during well development to demonstrate that these properties were stabilized. These data measurements and calculated total well volume were recorded in each well development log.

Table 4-1: Summary of Groundwater Monitoring Well Construction Details – RSE Investigation

Well Identification	Well Diameter (inches)	Total Well Depth (feet below ground surface)	Screen Interval (feet below ground surface)	Screen Height (feet)	Depth to Groundwater after Well Installation (feet below ground surface)
MW05	4	56.65	40–55	15	26.2
MW06	4	41.65	20–40	20	26.6
MW07	4	51.25	30–50	20	32.5
MW08	4	57.09	25–55	30	26.2
MW09A	2	51.70	20–50	30	26.7
MW09B	2	76.60	60–75	15	26.7
MW10	4	76.72	60–75	15	35.5
MW11	4	60.00	22-37	15	27.0
MW12	4	60.00	24-39	15	30.9
MW13	4	48.00	25-45	20	31.5
MW14	4	40.00	25-40	15	29.6

4.4.1.1 Additional Groundwater Monitoring Well Installation – February 2005

The results of seven groundwater sampling events (from December 2002 through October 2004 - groundwater samples collected from 10 AA 3 groundwater monitoring wells) conducted under the purview of the RSE investigation highlighted the need for installing additional groundwater monitoring wells within the waste placement area. These wells were proposed to be located within the waste placement area at the topographic lows (per the pre-waste placement topograph) to document impact to groundwater. Figure 4-1 presents the locations of the additional Wells MW11 through MW14. The proposal to install additional groundwater monitoring wells within the waste placement boundary was also intended to provide confirmation that the waste placed at the site was predominantly construction debris (continuous core photographs in Appendix A). The requirement for installing groundwater monitoring wells within the waste placement area was also highlighted by the regulatory agencies during their review of the RSE Work Plan (Earth Tech 2002a). The DQO process (project decision rules, input and threshold values) that was designed for the AA 3 RSE investigation was still valid for the installation of these additional groundwater monitoring wells.

A review of the pre-waste placement topograph yielded two locations of topographic lows within the waste placement area. These locations were also where the groundwater was suspected to be in contact with the waste. In order to verify if the waste at these locations is impacting the groundwater, two groundwater monitoring wells (MW11 and MW12), were proposed at these two locations. These two wells were proposed to be completed as 4-inch wells to facilitate any aquifer testing, if the

necessity arises. Installing an upgradient well (MW13; Figure 4-1) was also proposed as part of this additional drilling/well installation effort to provide upgradient groundwater characteristics. The previous upgradient Well MW03 was abandoned to facilitate transfer of property. This upgradient well was proposed to be located west of existing upgradient well, MW06, to supplement upgradient groundwater data.

The drilling methodology for installing wells was the HSA drilling. Previously, during borehole drilling, the lithology description was recorded by collecting soil samples every 5 feet bgs. Given the heterogeneity of the subsurface at the site, this resulted in significant data gaps. Therefore, as part of this additional groundwater monitoring well installation activity, continuous cores were extracted from the boreholes. The HSA drilling methodology facilitated the extraction of continuous soil cores. These continuous cores assisted in accurate lithology logging of the borehole.

The drilling crew was mobilized to drill boreholes and install three 4-inch groundwater monitoring wells (MW11, MW12, and MW13; upgradient). The boreholes for installing these additional wells were advanced until competent bedrock was encountered, i.e., to a depth of approximately 70 feet bgs, in order to evaluate the thickness of alluvium and to evaluate potential migration pathways. The boreholes were then grouted back and 4-inch groundwater wells installed and screened across the groundwater-waste interface. During the drilling activity, precautionary measures were employed so as to not provide a conduit for contamination during well installation.

However, the lithologic results gathered during the drilling of additional Wells MW 11 through MW13 indicated that the thickness of waste at MW 11 and MW12 was less than anticipated. In addition, the lithology logging at these locations indicated that there was a layer of fill material, classified as a silty clay, ranging in thickness from 5 feet to 10 feet between the bottom of the waste and the groundwater. Based on this observation, up to three additional boreholes were proposed by the DON to evaluate whether this fill material is present at other locations within the waste placement boundary and to install a groundwater monitoring well if the proposed drilling location has waste in contact with the groundwater.

A review of the pre-waste placement topograph, geophysical survey results and trenching performed within the waste yielded three additional locations characterized as having deep metallic/construction debris. A borehole at each of these three locations was proposed (AA 3-BH01, AA 3-BH02, AA 3-BH03) (Figure 4-1). These locations were also where there is a high probability of having groundwater in contact with the waste. If groundwater was in contact with the waste then the borehole was proposed to be completed as a 4-inch groundwater monitoring well at that location, with a screened interval 5 feet above and 10 feet below the water table. If a location met the conditions stated above, at that point, the investigation will be completed and no additional boreholes will be advanced.

The purpose of the boreholes was to either find groundwater in contact with waste or confirm a trend noted at groundwater Monitoring Wells MW11 and MW12, where fill was encountered between the waste and the groundwater. In addition, during the drilling of the borehole, methane monitoring was performed.. Consistent with the ongoing phase of groundwater monitoring well installation, continuous cores were extracted from the surface to the total depth. The first borehole to be drilled was located at AA 3-BH01. Continuous cores were collected from the ground surface to first groundwater encounter. However, waste-groundwater interface was not observed at this location. A groundwater monitoring well was not installed at this location. The drill crew moved to the second borehole location, AA 3-BH02. Continuous cores were collected from the ground surface to first groundwater encounter, and since waste-groundwater interface was observed at this location, a

groundwater monitoring well (MW14) was installed at this location. Borehole AA3-BH03 was not drilled.

After well installation, the wells were developed and subsequently sampled. These groundwater samples were analyzed for the same suite of analysis as proposed in the RSE Work Plan for groundwater samples. The analyses suite included VOCs, SVOCs, total metals, total petroleum hydrocarbons and perchlorate.

The analytical results from groundwater sampled collected from these wells (MW11, MW12, and MW14) installed within the waste placement area and screened below the waste results, verified if the waste is impacting groundwater.

4.4.2 Perimeter Gas Wells

The perimeter gas wells were installed to adequately respond to Decision Questions #5, #6, and #7 of RSE DQO process.

> **Decision Question #5:** Is soil vapor being produced within the waste, and if yes, does it exceed threshold levels listed as decision inputs and require a waste placement gas collection system?
>
> **Decision Question #6:** Does soil vapor migrate from the site to impact adjacent property?
>
> **Decision Question #7:** Has the nature of the waste present been adequately characterized using soil vapor, soil, groundwater, surface water, and sediments data, or is further evaluation required to characterize risk and evaluate response actions?

In order to adequately respond to these decision questions, three triple nested perimeter gas wells (PG01 through PG03) were installed at the site. The location, number, and installation of the vapor monitoring wells were designed to meet the CIWMB requirements of Title 27 CCR, Section 20925 and the South Coast Air Quality Management District (SCAQMD) Rule 1150 Compliance Plan.

The wells were drilled and installed from 6 to 8 November 2002. The boreholes were drilled using HSA drilling techniques prior to installing triple-nested 1-inch polyvinyl chloride (PVC) diameter gas Wells PG01 through PG03. At each location, the vapor monitoring wells were installed at depths to coincide with the shallow zone (5 feet to 7 feet bgs), intermediate zone (14 feet to 16 feet bgs), and the zone at or near the greatest depth of the debris (between 20 feet and 28 feet bgs). Soil samples were collected every 5 feet during drilling solely for field screening and lithologic description. Some of these soil samples were selected by the geotechnical engineer and submitted to the laboratory for geotechnical evaluation (see Section 4.7.3). Samples for lithologic logging were collected in accordance with CLEAN SOP 4, *Soil Sampling* (BNI 1999). The lithology was described in accordance with the USCS as specified in CLEAN SOP 3, *Borehole Logging* (BNI 1999).

Figure 4-1 shows locations of these gas wells. Table 4-2 shows the well construction details. Borehole logs and monitoring well construction logs are presented in Appendix A of this Report.

Table 4-2: Summary of Perimeter Gas Well Construction Details – RSE Investigation

Vapor Well Identification	Well Diameter (inches)	Total Well Depth (feet below ground surface)	Screen Interval (feet below ground surface)	Screen Height (feet)
PG01S	1	7	5–7	2
PG01I	1	16	14–16	2
PG01D	1	22	20–22	2
PG02S	1	7	5–7	2
PG02I	1	16	14–16	2
PG02D	1	30	28–30	2
PG03S	1	7	5–7	2
PG03I	1	16	14–16	2
PG03D	1	22	20–22	2

4.4.3 Cone Penetrometer Test Survey

The CPT was performed to respond to Principal Study Question # 1.

> **Principal Study Question #1:** Are adequate data available to complete an RSE, including the design of a cover system?

This survey was conducted to obtain stratigraphic information and depth-to-water information. Lithologic information was inferred from the CPT output based on correlations involving cone tip resistance, sleeve resistance, and pore-water pressure. These results also assisted in the geotechnical analysis (stability evaluation) of AA 3. The CPT survey was performed prior to drilling so that stratigraphy and depth-to-water information obtained from the survey could be used for designing the screened intervals for the monitoring wells. Pertinent information was used in refining the site conceptual model in regard to the groundwater hydrology and contaminant pathways.

Drilling for the CPT survey was conducted on 17 and 18 October 2002, to evaluate the properties of soil in and around AA 3. Up to eight CPT soundings were proposed in the Work Plan (Earth Tech 2002a). However, two more CPT locations (CPT01 through CPT10) were advanced based on the recommendations of the project geotechnical engineer. The CPT drilling locations are shown on Figure 4-1. The cross sectional graphical representation of the results of the CPT survey is presented in Section 5.4.

4.5 AIR SAMPLING

Air sampling was conducted to establish air quality conditions at the site in order to adequately respond to Decision Questions # 5 and #6.

> **Decision Question #5:** Is soil vapor being produced within the waste, and if yes, does it exceed threshold levels listed as decision inputs and require a waste placement gas collection system?

> **Decision Question #6:** Does soil vapor migrate from the site to impact adjacent property?

Air sampling was proposed for the site to assess the potential emissions from the surface of the waste and the potential impact of the waste emissions, if any, on the surrounding air quality. Integrated

surface air sampling and ambient air sampling were conducted at AA 3. Figure 4-2 shows the ambient air sampling and the walking pattern for integrated air sampling. Figure 4-2 also shows a wind rose diagram for October 2002 wind conditions.

Twenty-four hour ambient air sampling at the site perimeter and integrated surface air sampling from the surface was conducted on 8 and 9 October 2002. Air sampling was performed in accordance with the SCAQMD Rule 1150.1. Along with the air sampling, continuous meteorological measurements were collected prior to and during the sampling program to ensure that wind speed and direction patterns across the site on the sampling days were in compliance with the SCAQMD requirements.

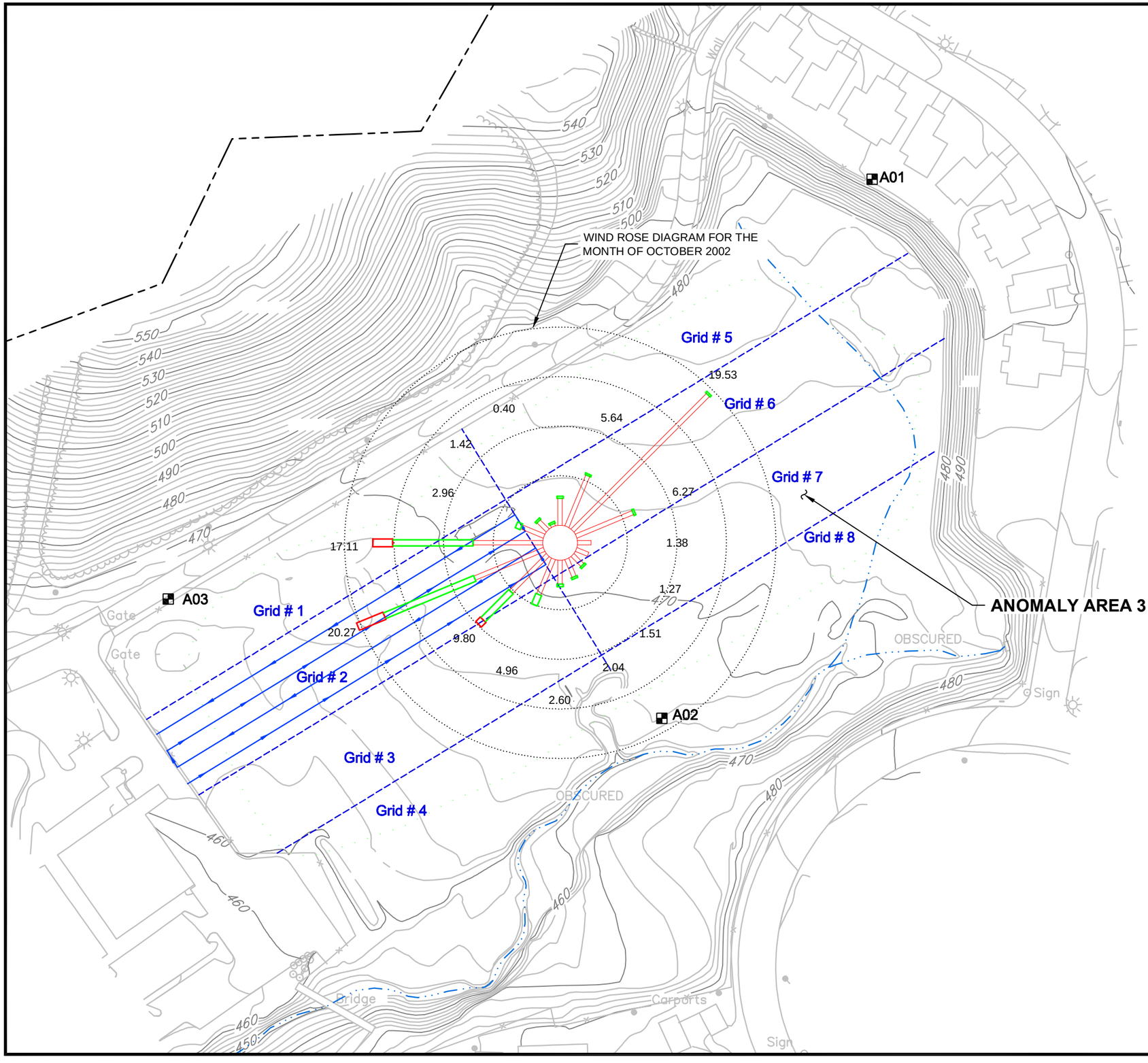
4.5.1 Meteorological Monitoring

Meteorological monitoring was conducted using the Vantage Pro 6150C semi-permanent meteorological monitoring station mounted onto a 3-foot-tall post at the center of the site (Figure 4-2). The weather station was located in an open area at the center of the site to obtain the most representative meteorological data possible. Meteorological data collected from 28 March through 30 April 2002 were also taken into consideration for determining the upgradient, downgradient, and general wind pattern conditions of the site. The instantaneous weather data were recorded at 5-minute intervals and later downloaded to a laptop using Weatherlink 5.1 software. Peak and average wind speed data were recorded during sample collection to confirm that meteorological conditions were consistent with sampling criteria specified in the SCAQMD Rule 1150.1. During ambient air sampling, the SCAQMD requires that the average wind speed does not exceed 15 miles per hour (mph), peak wind speed not to exceed 25 mph, and there is no measurable precipitation during sampling. During integrated surface air sampling, the SCAQMD requires that the average wind speed not to exceed 5 mph, peak wind speed not to exceed 10 mph, and there is no measurable precipitation in the 72 hours prior to sampling.

4.5.2 Ambient Air Sampling

Ambient air sampling was conducted at the perimeter of the debris to assess the potential impact of gas emissions on the surrounding air quality, and to assess the background levels of constituents in air and meet the requirements of the SCQAMD Rule 1150.1. Air samplers were placed at the perimeter of the debris at three locations (one upwind and two downwind), and operated for two 12-hour periods (three locations, times two events for a total of six samples). Ambient air sampling locations, designated A-1 through A-3 (Figure 4-2), were located near the perimeter of the site. Since the wind pattern during the day and night differed, Location A1 was designated as upwind, while Locations A2 and A3 were designated as downwind for samples collected during the day. However, for the samples collected during the night, Location A3 was designated as upwind and Locations A1 and A2 were designated as downwind. Prevailing wind directions were based on weather data collected from the fixed weather station located at the center of the site 24 hours prior to sampling. Samples were designated A1-S01: Ambient Air Location 1 - Sample 01. One-liter Summa™ canisters were placed in upwind (one canister) and downwind (two canisters) areas of the site based on observed wind patterns.

Meteorological parameters were measured during sampling to verify wind speed and direction. The first batch of two consecutive 12-hour periods of ambient air sampling was conducted on 8 August 2002 from 6:45 p.m. to 9 August 2002 until 6:39 a.m. The second batch was conducted on 9 August 2002 at 6:39 a.m. to 7:30 p.m. Summa™ canisters were placed near the site perimeter and sample inlets were placed approximately 6 feet above the ground surface.



LEGEND

- MINOR SURFACE ELEVATION: 2-FOOT INTERVALS
- 460 MAJOR SURFACE ELEVATION: 10-FOOT INTERVALS
- MCAS EL TORO BOUNDARY
- EXISTING STREAM OR WASH
- ESTIMATED EXTENT OF WASTE PLACEMENT BEFORE RSE INVESTIGATION (EARTH TECH 2001)
- GRID DIVISION
- WALK PATTERN FOR INTEGRATED AIR SAMPLING
- AMBIENT AIR SAMPLING LOCATIONS
- RINGS AT 5% OCCURRENCE INTERVAL

NOTES

1. TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHOD FROM AERIAL PHOTOGRAPHY DATED DECEMBER 2001 BY SAN-LO AERIAL SURVEYS.
2. COORDINATES ARE IN CALIFORNIA STATE PLANE COORDINATE SYSTEM, NAD 83, ZONE 6.
3. ELEVATIONS IN FEET; BENCHMARK BASED ON NORTH AMERICAN VERTICAL DATUM 1988.
4. FOR WIND ROSE, CALMS EXCLUDED. WIND FLOW IS FROM THE DIRECTIONS SHOWN. LENGTH OF SEGMENTS IN WIND ROSE INDICATES DISTRIBUTION OF OBSERVATIONS, WITH FREQUENCY IN PERCENT (E.G., 19.53)

0.1 3.5 6.9 11.5
Wind Speed (Miles per Hour)

NORTH

60 0 60 120 FEET
SCALE: 1"=120'

RI/FS Report — Draft Final

Ambient Air Sampling Locations and Integrated Air Sampling Walk Pattern

Anomaly Area 3

Date: 02-08	Former MCAS El Toro	Figure 4-2
Project No. 29307	EarthTech, A tyco International Ltd. Company	

File: L:\work\29307\work\AA3\CAD\In-Progress Draft Final RI FS\Figure 4-2.dwg Time: Feb 28, 2008 - 12:24pm

Sample collection was controlled with a laboratory-provided flow regulator at a rate of 1.44 cubic centimeter per minute (cc/min) and Summa™ canisters were supplied at a vacuum of 30 inches of mercury (in. Hg). One duplicate sample (LK004) was collected from Location A3 (southwest corner of the site).

Field measurements and sample collection details for this event are presented in Appendix B. Each sample was analyzed for fixed gases and VOCs using ASTM-D1946 and EPA Method TO-14, respectively. Complete data set for ambient air sampling are presented in Appendix B. A discussion and summary of the analytical results of ambient air samples is presented in Section 6.2.1.

4.5.3 Integrated Surface Air Sampling

Integrated surface sampling was conducted in accordance with the SCAQMD guidance for waste sampling (SCAQMD 1989). Integrated surface air samples, designated IN-1 through IN-8, were collected to assess potential emissions of VOCs and methane from the surface of AA 3. The walk pattern adopted for collecting the integrated air samples meets the requirements of the SCQAMD Rule 1150.1. Integrated surface samples were collected on 8 and 9 October 2002 from eight 50,000 square foot grids (approximately 500 feet by 100 feet), numbered Grid 1 through Grid 8 as shown on Figure 4-2.

Integrated air sampling consisted of traversing a grid over a 25-minute period with a 1-liter Summa™ canister while holding the sample inlet approximately 3 inches above AA 3 site surface. Sample collection was controlled with a laboratory-provided flow regulator at a rate of 40 cc/min Summa™ canisters were supplied at a vacuum of 30 in. Hg. Each grid was traversed one time during the sampling period. One duplicate integrated air sample (10 percent of integrated air samples) was collected at Grid 8 (LK013). All samples, including the duplicate sample, were analyzed for VOCs using EPA Method TO-14 and fixed gases using ASTM D1946. A discussion and summary of the analytical results of integrated air samples is presented in Section 6.2.2.

Surface air monitoring data were recorded using the portable weather station, multigas meter, and FID during sampling in Grids 1 through 4. Instantaneous data were collected using only the portable weather station during sampling at Grids 5 through 8. The SCAQMD Rule 1150.1 does not specify the use of a multigas meter and FID. However, the RSE sampling design specified that all samples containing more than 50 ppm_v as methane, as reported by a field instrument, should be submitted to the laboratory for analysis.

However, even though the FID readings from Grids 1 through 4 were less than 50 ppm_v, a field decision was made to submit all samples collected from 8 grids (~50,000 square foot grids) to the laboratory for analysis. Since a decision to submit all samples to the laboratory was made, field measurements were ceased after Grid 4. Field measurements and sample collection details for this event are presented in Appendix B along with complete data sets for ambient and integrated air sampling.

During sample collection, readings of wind speed were monitored and recorded every five minutes by a fixed weather station. The average wind speed did not exceed 5 mph, and the instantaneous wind speed exceeded 10 mph on one reading (11.8 mph) at IN-2 after 24 minutes.

4.6 SOIL GAS SAMPLING

The soil gas sampling (shallow and subsurface) resolved the Decision Questions #5 and #6, and was conducted in response to Decision Rule #6.

Decision Question #5: Is soil vapor being produced within the waste, and if yes, does it exceed threshold levels listed as decision inputs and require a waste placement gas collection system?

Decision Question #6: Does soil vapor migrate from the site to impact adjacent property?

The sampling design developed for the soil gas survey was based on a grid sampling approach. This approach used a centrally aligned grid to allow uniform coverage of the site and is based on common practice for investigations of typical former landfill sites. The site was divided into 33 grids measuring 100 feet by 100 feet and samples were collected from the center of each grid. A grid of this dimension was expected to identify a circular hot spot having a radius of 50 feet or greater. Figure 4-1 shows the proposed sampling locations at AA 3.

Direct Push Technology (DPT) was used to drill boreholes for collecting soil vapor samples. Shallow and subsurface soil gas sampling was conducted across AA 3 to characterize soil vapors within the debris, to determine whether soil hot spots were present and to check for the necessity of a landfill gas collection system at the site.

If a particular soil vapor sampling location at the center of a 100-foot by 100-foot grid showed evidence of contamination (VOC concentrations exceeding the threshold concentration of 300 µg/L, as established in the Phase II RI Work Plan [BNI 1995]), then additional soil vapor samples would be collected from centers of a 50-foot by 50-foot grid around the hot spot. This would result in adequate characterization of the hot spot.

Thirty-three boreholes (centers of the thirty-three 100-foot by 100-foot grid divisions – HA01 through HA33) were drilled using the DPT equipment. The soil vapor samples were collected at depths of 5 feet (shallow) and 15 feet (subsurface) bgs as proposed in the Work Plan, and as approved by the BCT. Only one vapor sample was collected at 25 feet bgs from the location HA11, based on results of field screening readings of methane. The RSE sampling was designed to collect soil gas samples at 10-foot intervals based on mobile laboratory VOC results of soil gas samples collected from the preceding depths. If the result indicated contamination, then sampling would continue to the estimated depth of debris placement or to the first groundwater encounter.

Samples were collected in accordance with the SOP developed for this project (Attachment 1 of the Work Plan [Earth Tech 2002a]), which was based on the CRWQCB, Los Angeles Region, Interim Guidance for Active Soil Gas Surveys (1997).

At each location, a soil gas sampling probe was advanced to the first soil gas sampling interval of 5 feet bgs. A bentonite seal was placed at the surface around the stainless steel probes and hydrated. The soil gas evacuation from the sampling interval was initiated and fixed gas readings were recorded using a landfill gas monitor - field instrument (GEM 500) during evacuation. Approximately 3 Tedlar™ bags of soil gas were evacuated from each borehole before sample collection. Carbon dioxide and oxygen values, as well as detectable concentrations of methane, were monitored to qualitatively evaluate whether the subsurface readings were affected by ambient air. After the readings stabilized and data suggested that the soil gas sample was not affected by ambient air, a soil gas sample was collected in a Tedlar™ bag for analysis.

Deeper soil gas samples were collected by advancing a probe adjacent to the first one to a particular sampling interval (i.e., 15 feet bgs or 25 feet bgs) and similar soil gas sampling procedures were employed.

The borehole logs detailing the field screening parameter (using landfill gas monitor and handheld FID) concentration details are presented in Appendix A of this Report. The soil gas survey report is presented in Appendix B of this Report.

Since none of the mobile laboratory VOC analytical results of 76 shallow and subsurface soil vapor samples exceeded the threshold concentration of 300 µg/L of total VOCs, additional sampling at centers of the 50-foot by 50-foot grid was not deemed necessary. A detailed discussion and summary of the analytical results of the shallow and subsurface soil gas survey are presented in Section 6.3 of this Report.

4.6.1 Shallow Soil Gas

Thirty-three shallow soil gas samples were collected at a depth of 5 feet bgs from the site and analyzed in a mobile analytical laboratory stationed at the site for VOCs (EPA Method 8260). Shallow soil gas sample details are presented in Appendix B along with complete data sets for shallow soil gas samples.

4.6.2 Subsurface Soil Gas

Forty-three subsurface soil gas samples were collected at a depth of 15 feet bgs (including 9 duplicate samples and one soil gas sample at 25 feet bgs). These samples were analyzed for VOCs (EPA Method 8260) in the field by using a mobile analytical laboratory. Subsurface soil gas sample details are presented in Appendix B along with complete data sets for subsurface soil gas samples.

In accordance with the Work Plan, approximately 10 percent of the total soil gas samples collected (33 shallow samples and 43 subsurface samples) were to be analyzed for fixed gases in a fixed laboratory based on the field screening results (methane) of the gas monitor. Since none of the shallow soil gas results showed an indication of methane, none was sent to the fixed laboratory. However, nine subsurface soil gas samples, including one duplicate sample that showed an indication of methane were sent to the fixed laboratory for methane analysis using ASTM D-1946.

4.6.3 Perimeter Soil Gas Sampling

Perimeter subsurface soil vapor sampling was conducted to verify if there were any vapors migrating to and beyond the boundaries of the debris. This perimeter vapor sampling results along with the results of the subsurface soil gas survey within the limits of waste placement assisted in resolving the Project Decision Question #6 (necessity of a soil vapor collection system for the site). Four quarterly sampling events were proposed in the Work Plan (Earth Tech 2002a). All samples collected during the first and the second rounds of soil vapor sampling were sent to the fixed laboratory for VOC and fixed gases analysis. However, the third and fourth round of soil gas samples were to be sent to the laboratory only if the field measurements of VOCs using a photoionization detector (PID) field instrument exceed the threshold of 25 ppm_v, in accordance with the SAP (Earth Tech 2002a).

The first and second round of the perimeter soil vapor samples were collected in December 2002 and March 2003, respectively, from the existing vadose zone probes (PZ1, PZ2, and PZ3) and from the newly constructed triple-nested perimeter soil vapor monitoring wells (PG01, PG02, and PG03). A single soil vapor sample was collected from each well and two duplicate samples were collected during each of these soil vapor sampling events. The third round of perimeter soil vapor sampling was conducted in July 2003. Since the field VOC measurements using a PID did not exceed 25 ppm_v threshold value, none of the samples was sent to the fixed laboratory for VOC and fixed gas analysis.

Field measurements of VOC concentrations with a PID and fixed gas monitor (GA-90) were recorded in the logbook. Round 1 and Round 2 sample collection details are presented in Appendix B. All perimeter soil gas samples were submitted to the laboratory for VOC analysis using EPA Method TO-14 and fixed gas analysis using ASTM-D1946. Complete data sets for Round 1 and Round 2 subsurface soil gas samples are presented in Appendix B. A detailed discussion and summary of the analytical results are presented in Section 6.3.3 of this Report.

4.7 SOIL SAMPLING

4.7.1 Soil Sampling for Risk Assessment

The principal objective of soil sampling was to resolve the Decision Questions #3 and #7 of the project.

> **Decision Question #3:** Are adequate data available to characterize if the existing soil cover is sufficient to either protect human health and environment, or if not, to serve as a foundation layer for a soil cover system?
>
> **Decision Question #7:** Has the nature of the waste present been adequately characterized using soil vapor, soil, groundwater, surface water, and sediments data, or is further evaluation required to characterize risk and evaluate response actions?

In accordance with Decision Rule #3 and since adequate data were not available to complete a screening-level human health and ecological risk evaluation for AA 3, surface soil samples were collected from the soil gas survey boreholes (centers of 100-foot by 100-foot grids).

Thirty-seven surface soil samples, including four duplicate samples, were collected from 0-foot to 1-foot depths using a macrocore sampler. Six trip blanks (one per cooler) and four equipment rinsate samples (one per day) were also collected during sampling activities. One field blank (source water) was also collected as part of this sampling event. Sample collection details are presented in Appendix B. The borehole logs for these 33 locations are presented in Appendix A and the complete results of surface soil sampling are presented in Appendix B. All samples collected were analyzed for Title 22 metals, VOCs, SVOCs, and petroleum hydrocarbons. Approximately 25 percent of the surface soil samples (10 soil samples, including 1 duplicate) collected were analyzed for dioxins/furans. The samples for dioxin analysis were based on the field PID readings and review of analytical results from previous investigations.

As per the Work Plan, subsurface soil samples (8 feet to 9 feet bgs) are collected only if the soil vapor sample at the 5-foot depth has detected concentrations of target analytes and that the soil sampling would continue to the base of the fill at 10-foot intervals if analysis of the preceding soil sample shows reportable concentrations of target analytes. Since the soil vapor samples collected at 5 feet bgs from all 33 locations had no detected concentrations of target analytes, soil sample collection beyond 1-foot bgs was not necessary.

4.7.2 Soil Cover Thickness Evaluation

This activity was conducted in response to Project Decision Question #2.

> **Decision Question #2:** Has the existing soil cover been adequately characterized (thickness and soil properties), or is further evaluation required?

Historically, the AA 3 site was used as a source of borrow material. Records indicate that some of the borrow pits and trenches were backfilled with construction debris and later covered with 5 feet or more of fill soil (IT/OHM 2000).

Even though the existing soil cover (fill soil) at AA 3 was physically characterized to some extent at the locations of previous trenching activity, a comprehensive soil cover thickness evaluation was not conducted. Therefore, during drilling of boreholes to collect soil gas and soil samples, continuous core soil samples were collected to evaluate the thickness of fill soil. Also, in order to resolve the Project Decision Question #2 of the Work Plan and in response to Decision Rule #2, continuous core samples were collected from locations HA02, HA03, HA07, HA10, HA12, HA15, HA17, HA20, HA22, HA25, HA27, HA28, and HA30 during DPT drilling (Figure 4-1). These locations provided coverage of the entire site. These continuous cores were collected from 0-foot to 4 feet bgs. This cover thickness evaluation from continuous core samples was also supplemented with the logs of the soil gas survey boreholes and trench logs.

The borehole logs for these continuous cores are presented in Appendix A of this Report. A summary of the soil cover lithology and thickness evaluation is presented in Table 4-3. Graphical presentation of this soil cover evaluation is presented in figures referenced in Section 6.1.

4.7.3 Soil Sampling for Geotechnical Analysis

Geotechnical analysis of the existing soil cover and the subsurface soil at the site was conducted in response to Project Decision Questions #2 and #3.

> **Decision Question #2:** Has the existing soil cover been adequately characterized (thickness and soil properties), or is further evaluation required?
>
> **Decision Question #3:** Are adequate data available to characterize if the existing soil cover is sufficient to either protect human health and the environment, or if not, to serve as a foundation layer for a soil cover system?

As part of the Work Plan (Earth Tech 2002a), five surface soil samples were to be collected from AA 3 for geotechnical characterization in order to support the design criteria for final static and seismic stability, settlement of the final cover system, and grading of the site. Shallow and subsurface soil samples were collected based on the recommendations of the geotechnical engineer for complete geotechnical evaluation. The geotechnical data at AA 3 were collected for the purpose of evaluating the following:

1. Near-surface (shallow) soil conditions, for the purpose of

- Evaluating existing cover (man-made fill) soil, near-surface native soil (such as alluvium, colluvium, outcropping bedrock, if any)

Near surface soil samples were collected during continuous core sampling and exploratory trenching. Details of shallow geotechnical soil sample collection are presented in Appendix F.

2. Subsurface (deep) soil, for the purpose of

- Understanding stratigraphic conditions under the site, including approximate depth, thickness, and nature of manmade fill, and native materials (namely, the Agua Chinon Wash alluvium and underlying bedrock), groundwater depth, and

- Collecting soil samples at selected locations for classification, index, and engineering property testing in the laboratory.

Geotechnical laboratory test reports are included in Appendix F. Subsurface geotechnical samples were collected during drilling for groundwater monitoring well and perimeter gas well installations. Details of geotechnical soil sample collection from the subsurface are also presented in Appendix F.

4.8 GROUNDWATER SAMPLING

To resolve RSE Project Decision Questions #4 and #7, Decision Rule #4 recommended additional groundwater sampling if the groundwater was not adequately characterized.

> **Decision Question #4:** Has the impact to groundwater, surface water, and sediments been adequately characterized, or are additional data required?
>
> **Decision Question #7:** Has the nature of the waste present been adequately characterized using soil vapor, soil, groundwater, surface water, and sediments data, or is further evaluation required to characterize risk and evaluate response actions?

New groundwater monitoring wells were proposed and installed at strategic locations. Groundwater sampling was performed and samples were collected from all four existing monitoring wells (MW01, MW02, MW03, and MW04) and the newly constructed wells (MW05, MW06, MW07, MW08, MW09A, MW09B, and MW10). Four additional groundwater monitoring wells (MW11 through MW14) were installed in February 2005. The well locations are presented on Figure 4-1.

Eight rounds (November 2002, March 2003, November 2003, March 2004, June 2004, October 2004, February 2005 and April 2005) of groundwater sampling were performed at the site as part of the RSE investigation.

All groundwater samples were analyzed for petroleum hydrocarbons, VOCs, SVOCs, and metals. Groundwater samples collected during the initial rounds were also analyzed for perchlorate. As part of these sampling events, trip blanks (one per cooler), equipment rinsate (one per day of sampling) and one field blank for each sampling event were also collected.

The individual target analytes for groundwater samples are presented in Appendix A of the Work Plan. Round 1 and Round 2 groundwater sample collection details are presented in Appendix B, along with complete data sets for all rounds.

Concurrently, water levels were recorded on the sampling logs during sampling. The recorded water levels assist in confirming the hydraulic gradient at the site. A detailed discussion of the groundwater levels and gradient (hydrogeology) at the site and a figure mapping the gradient are presented in Section 5.3 of this Report.

4.9 SEDIMENT SAMPLING

Sediment sampling was proposed at AA 3 in response to Decision Questions #4 and #7, and in accordance to Decision Rule #5 of the RSE investigation.

> **Decision Question #4:** Has the impact to groundwater, surface water, and sediments been adequately characterized, or are additional data required?

Table 4-3: Lithology of Continuous Core Soil Samples–RSE Investigation

Location	Logging Date	Depth (feet bgs)	Lithology
HA02	10/15/2002	0–4	**0-foot–2 feet:** Sand (SP); pale yellow fine-grained sand, poorly graded, dense, compacted, and dry. No debris. **2 feet–4 feet:** Sand (SP); pale yellow fine-grained sand, poorly graded, dense, compacted, and dry. No debris.
HA03	10/15/2002	0–4	**0-foot–2 feet:** Silty sand (SM); light olive brown, medium to fine sand, low plasticity fines, trace sub-angular gravel, compacted, and dry. No debris. **2 feet–4 feet:** Silty sand (SM); light olive brown, medium to fine sand, low plasticity fines, trace sub-angular gravel, compacted, and dry. No debris.
HA07	10/15/2002	0–5	**0-foot–2 feet:** Silty sand (SM); light olive brown, fine-grained sand, low plasticity fines, compacted, and dry. No debris. **2 feet–5 feet:** Clayey sand to sandy clay (SC/CLs); greenish olive gray, medium plasticity clay, slightly moist. No debris.
HA10	10/15/2002	0–4	**0-foot–2 feet:** Silty sand (SM); light olive brown, fine-grained sand with low plasticity fines, dry, trace of sub-angular gravel. No debris. **2 feet–4 feet:** Silty sand (SM); light olive brown, fine-grained sand with low plasticity fines, dry, trace of sub-angular gravel. No debris.
HA12	10/15/2002	0–5	**0-foot–2 feet:** Silty sand (SM); light yellowish brown fine-grained sand with low plasticity fines, loose and dry. No debris. **2 feet–5 feet:** Silt to silty sand (MLs/SM); brown, low plasticity silt, slightly moist. No debris.
HA15	10/15/2002	0–4	**0-foot–2 feet:** Silty sand (SM); olive brown fine-grained sand with low plasticity fines, dry. No debris. **2 feet–4 feet:** Silty sand (SM); olive brown fine-grained sand with low plasticity fines, slightly moist. No debris.
HA17	10/15/2002	0–4.5	**0-foot–2 feet:** Silty sand (SM); light olive brown fine-grained sand with low plasticity fines, medium compacted, and dry. No debris. **2 feet–4.5 feet:** Sandy silt to silty sand (MLs/SM); brown, low plasticity silty with fine- grained sand, slightly moist. No debris.
HA20	10/15/2002	0–4.5	**0-foot–2 feet:** Silty sand (SM); light yellowish brown fine-grained sand, low plasticity fines, loose, and dry. Trace gravel. No debris. **2 feet–4.5 feet:** Poorly graded sand (SP); light yellowish brown, medium to fine grained sand with some low plasticity silt, slightly moist. No debris.
HA22	10/15/2002	0–4	**0-foot–2 feet:** Silty sand (SM); light olive brown, fine-grained sand with low plasticity fines, medium compacted, and dry. No debris. **2 feet–4 feet:** Sandy silt (MLs), light olive brown, non-plasticity silt, slightly moist. No debris. **8 feet:** Refusal
HA25	10/15/2002	0–4.5	**0-foot –2 feet:** Silty sand (SM); yellowish brown fine-grained sand with low plasticity fines, compacted, and dry. No debris. **2 feet–4 feet:** Sandy silt to silty sand (MLs/SM); light yellowish brown. No debris. **9 feet:** Refusal
HA27	10/15/2002	0–4	**0-foot–2 feet:** Silty sand (SM); dark yellow-brown fine-grained sand with low plasticity fines, compacted, and dry. No debris. **2 feet–4 feet:** Silty sand to sandy silt (MLs/SM); brown low plasticity silt, slightly moist. No debris.
HA28	10/15/2002	0–4	**0-foot–2 feet:** Silty sand (SM); light olive brown fine-grained sand with low plasticity fines, and dry. Traces of sub-angular gravel. No debris.

Table 4-3: Lithology of Continuous Core Soil Samples–RSE Investigation

Location	Logging Date	Depth (feet bgs)	Lithology
			2 feet–4 feet: Silt (ML); light yellowish brown, medium plasticity silt, slightly moist. No debris.
HA30	10/15/2002	0–4	**0-foot–2 feet:** Poorly graded sand (SP-SM); light yellowish brown fine-grained with some low plasticity fines, medium compacted, and dry. No debris. **2 feet–4 feet:** Sandy silt (MLs); light yellowish brown, medium plasticity silt with medium to fine grained sand, slightly moist. No debris.

Notes:
bgs = below ground surface

> **Decision Question #7:** Has the nature of the waste present been adequately characterized using soil vapor, soil, groundwater, surface water, and sediment data, or is further evaluation required to characterize risk and evaluate response actions?

Four sediment samples (upstream and downstream locations) were collected on 23 February 2003. These were analyzed for the same suite of analyses (Title 22 metals, VOCs, SVOCs, and petroleum hydrocarbons) as the surface soil samples. Any impact to the Agua Chinon Wash sediments was determined by comparing the upstream sediment analyte concentrations with the downstream analyte concentrations, as well as by comparing the sediment analyte concentrations with the surface soil analyte concentrations from within the waste placement boundaries. The sediment sample collection details are presented in Appendix B, along with complete data sets for both of these rounds.

4.10 SURFACE WATER SAMPLING

Surface water soil sampling was proposed at AA 3 in response to Decision Questions #4 and #7, and in accordance to Decision Rule #5 of the RSE investigation.

> **Decision Question #4:** Has the impact to groundwater, surface water, and sediments been adequately characterized, or are additional data required?

> **Decision Question #7:** Has the nature of the waste present been adequately characterized using soil vapor, soil, groundwater, surface water, and sediments data, or is further evaluation required to characterize risk and evaluate response actions?

The proposed sampling locations for surface water runoff were designed to evaluate analyte concentrations in surface water at the upstream location and at a downstream location within the Agua Chinon Wash; samples were analyzed for the full suite of analyses (petroleum hydrocarbons, VOCs, SVOCs, metals, and perchlorate) similar to the groundwater samples. These surface water sample results were evaluated based on comparison to groundwater quality criteria.

The analytical results of these samples help in evaluating whether the debris placed at the site has impacted Agua Chinon Wash. The surface water sample collection details are presented in Appendix B, along with complete data sets for both these rounds.

4.11 ANALYTICAL LABORATORY DATA VALIDATION

Laboratory data were validated by Laboratory Data Consultants of Carlsbad, California, in accordance with the cited method, and:

- EPA Contract Laboratory National Functional Guidelines for Organic Data Review, October 1999c

- EPA Contract Laboratory National Functional Guidelines for Inorganic Data Review, February 1999d

- EPA SW 846 Third Edition, Test Methods for Evaluating Solid Waste, update I, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996)

- EPA Method TO-14A, January 1999

Laboratory data were validated as specified in the NAVFAC SW, Environmental Work Instruction EW#1. Level IV validation was performed on 20 percent or more of the samples, with the balance validated at Level III. The data validation reports for all samples collected during the RSE investigation are presented in Appendix D. The data validation findings are summarized, indicating the findings of the review process. Data are reported flagged with appropriate qualifiers to indicate their usability.

Data were assigned the following qualifiers as appropriate:

J estimated concentration

U not detected (including not present or adjusted detection limit because of blank contamination)

R Data are not usable

Combinations of qualifiers such as UJ are possible.

The field duplicate pairs were compared and the results were within the acceptance criteria except as noted in the data validation reports. The results that are significantly different are believed to be a result of variability inherent in the sampling procedures and the media sampled, and do not appear to represent consistent or systematic errors.

The following specific issues were identified for the groundwater and perimeter soil gas, sediment and surface water samples in the validation process.

- Some results were flagged as estimated (J) based on the quality control analysis performed with the samples. However, the qualifiers do not alter the use of the data.

- In specific cases, in accordance with Contract Laboratory Program guidance and Navy procedures, analyte reporting limits were adjusted due to the presence of the target analyte in the laboratory method blank or the field blank and the values qualified as estimated non-detect (UJ). The guidance indicates that if concentrations detected in the sample are less than 5 times the concentration in the blank (10 times for common laboratory contaminants), the sample is reported as non-detect. In general, this occurred when the laboratory reported detectable values above the Method Detection Limit in both the field sample and the associated laboratory or field blank. The findings were reviewed during the data assessment and the qualification was warranted in light of the concentrations reported.

All data were found usable for the purposes intended and no data were rejected. The qualification assigned to data was incorporated into the conclusions or recommendations of the investigation.

4.12 INVESTIGATION DERIVED WASTE MANAGEMENT AND DISPOSAL

During the initial RSE investigation activities that included drilling of boreholes for the installation of perimeter gas wells and groundwater monitoring wells, and the corresponding decontamination activities, approximately 5 cubic yards of soil cuttings and 23 drums of water were generated as IDW. The soil cuttings were placed in a 5-yard roll-off bin, water was placed in 55-gallon drums, and miscellaneous debris was placed in a containerized 2-cubic-yard trash bin. The IDW solid waste personal protective equipment (PPE), plastic sheeting, paper towels, and field test kit waste were stored in plastic bags.

4.12.1 IDW Soil

Soil samples from different locations of the roll-off bin were collected and composited to form a single composite soil sample (LK167). This composite sample was submitted to the analytical laboratory for VOCs, petroleum hydrocarbons and metals analyses.

No VOCs were detected in the roll-off bin composite soil sample. With the exception of selenium that was detected at 1.7 milligrams per kilogram (mg/kg), all other metals were within the former MCAS El Toro background concentrations (Table 4-4). With the exception of arsenic, all metals were also less than the regulatory threshold concentrations. The analytical results of the composite soil sample indicated very low detection of petroleum hydrocarbons.

The IDW soil was classified as nonhazardous based on the knowledge that IDW soil was a result of installing wells outside the debris placement perimeter and the comparison of composite soil sample analytical results with regulatory thresholds (PRGs, total threshold limit concentrations [TTLCs], toxicity characteristic leaching potential [TCLP] and soluble threshold limit concentration [STLC] criteria values). Therefore, based on this evaluation and consistent with the Station-wide IDW Management Plan (CDM 1995), soil cuttings were placed at AA 3.

4.12.2 IDW Water

Since the IDW water stored in the drums was produced during the installation and development of perimeter soil gas and groundwater monitoring wells, and during the sampling of groundwater monitoring wells, the analytical results of the groundwater samples collected during December 2002 groundwater sampling event were used to characterize the IDW water drums. The groundwater samples were analyzed for VOCs, SVOCs, metals and petroleum hydrocarbons. Based on the comparisons, the IDW water was classified as nonhazardous waste. It was proposed that the IDW water be transported and disposed at an appropriate facility as nonhazardous waste.

4.12.3 IDW Disposal

A memo detailing the IDW disposal plan for the management of IDW generated at AA 3 during the RSE field activities was presented to the BCT members on 7 May 2003. The BCT members concurred with recommendations of the memorandum (Earth Tech 2003b) and on 4 August 2003, IDW soil was placed at the site and IDW water was shipped for treatment at the D/K Environmental recycling facility in Los Angeles, California. All other solid wastes were disposed of as municipal waste.

Table 4-4: Summary of Detected Analytes and Comparison With Regulatory Threshold Concentrations–Composite Soil Sampling–RSE Investigation

Analyte	Concentration (Composite Sample LK167)	Former MCAS El Toro Background Concentrations (95th quantile)	Residential PRGs	Total Threshold Limit Concentrations (TTLC)	Toxicity Characteristic Leaching Potential (TCLP) x 20*	Soluble Threshold Limit Concentration (STLC) x 10
METALS (mg/kg)						
Aluminum	4,260	14,800	76,000	-	-	-
Arsenic	3.3	6.86	0.39	500	100	50
Barium	60.6	173	5,400	10,000	2,000	1000
Cadmium	0.38	2.35	37	100	20	10
Calcium	4,290	46,000	-	-	-	-
Chromium	11.3	26.9	211	500	100	50
Cobalt	2.8	6.98	903	8,000	-	-
Copper	4.8	10.5	3,129	2,500	-	-
Iron	7,070	18,400	23,463	-	-	-
Lead	1.6	15.1	150	1,000	100	50
Magnesium	2,590	8,370	-	-	-	-
Manganese	78.2	291	1,762	-	-	-
Mercury	0.039 J	0.22	23.5	20	4	2
Nickel	5.0	15.3	1,564	2,000	-	-
Potassium	884	4,890	-	-	-	-
Selenium	1.7	0.32	391	100	20	10
Vanadium	16.7	71.8	547	2,400	-	-
Zinc	18.2	77.9	23,463	5,000	-	-
PETROLEUM HYDROCARBONS (PHC) (µg/kg)						
PHC as diesel	5 J	-	-	-	-	-
Motor Oils	23	-	-	-	-	-

Notes:
- = not established
J = indicates an estimated value
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
PRGs = preliminary remediation goals
RSE = removal site evaluation
* = Criteria for IDW soil based on the extraction methodology for the TCLP, where the weight of the extraction fluid is equal to 20 times the weight of the solid sample. Therefore, the derived criterion for waste is equivalent to 20 times the regulatory level for TCLP.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
8	supplemental groundwater monitoring	Section 2.3	Spring 2008 Data Summary Report – AA 3 and IRP Sites 1 and 2, Former MCAS El Toro. Section 3, pages 3-1 through 3-2 and Figure 3.

Section 3
Summary of Monitoring Results

Groundwater monitoring activities at AA 3 and IRP Sites 1 and 2 at the former MCAS El Toro for the Spring 2008 monitoring round included measurement of groundwater elevations and collection of groundwater samples at 37 monitoring wells between 26 March 2008 and 2 April 2008. This section presents the results from the Spring 2008 monitoring round.

3.1 Water Level Elevations, Groundwater Flow Direction, and Gradient

Water level elevations, groundwater flow directions, and hydraulic gradients for each site based on the Spring 2008 measurements are presented below. Groundwater elevations are presented in Table 4, groundwater elevation contours are presented in Figures 3, 4, and 5, and the field gauging log is provided in Appendix A.

AA 3

Groundwater elevations at AA 3 during the Spring 2008 monitoring round ranged from 420.45 to 445.11 feet above mean sea level (amsl) and indicate an average rise in the local (AA 3) water table of 0.3 feet since the Fall 2007 monitoring round. The groundwater flow direction and gradient is consistent with previous monitoring rounds. Measurements continue to indicate local groundwater flow at AA 3 to the southwest (Figure 3) at a horizontal hydraulic gradient (vertical change in feet over a horizontal distance in feet) of 0.02.

IRP Site 1

Groundwater elevations at IRP Site 1 during the Spring 2008 round ranged from 507.97 to 688.73 feet amsl and indicate an average drop in the local (IRP Site 1) water table of 0.1 feet since the Fall 2007 monitoring round. The groundwater flow direction and gradient is consistent with previous monitoring rounds. Measurements continue to indicate local groundwater flow at IRP Site 1 to the southwest (Figure 4) at a horizontal hydraulic gradient of 0.06.

IRP Site 2

Groundwater elevations at IRP Site 2 during the Spring 2008 monitoring round ranged from 351.96 to 494.77 feet amsl and indicate an average rise in the local (IRP Site 2) water table of 0.4 feet since the Fall 2007 monitoring round. The groundwater flow direction and gradient is consistent with previous monitoring rounds. Measurements continue to indicate local groundwater flow at IRP Site 2 to the southwest (Figures 4 and 5) at a hydraulic gradient of 0.06. Due to a malfunction with the water level meter, the water level measurement for 02_NEW16 recorded during the Spring 2008 monitoring round was determined to be grossly incorrect and is not included in Table 4 and was not used to determine groundwater elevation contours (Figures 4 and 5).

3.2 Groundwater Analysis

The following subsections present a summary of the analytical results from the groundwater monitoring conducted in Spring 2008. Analytical results for all reported VOCs are presented in Table 6 and complete general chemistry, metals, perchlorate, and TPH analytical results are presented in Tables 7, 8, 9, and 10, respectively. Level D laboratory analytical data packages and Level IV data validation reports are provided on compact disc in Appendix C. A database summary of all validated analytical results is presented in Appendix B.

3.2.1 AA 3

Groundwater samples from all six monitoring wells at AA 3 were analyzed for VOCs, dissolved metals, and general chemistry parameters. Historical and Spring 2008 AA 3 analytical results are presented in Tables 6 through 10.

VOCs

During the Spring 2008 monitoring round, VOCs were not reported in any groundwater samples from AA 3 monitoring wells, except acetone and bromoform. Acetone was reported in two of the six samples at estimated concentrations of 5.1J and 5.5J µg/L and bromoform was reported in two samples at estimated concentrations of 0.56J and 0.63J µg/L. Both analytes are common laboratory contaminants. VOC results are summarized in Table 6.

Metals

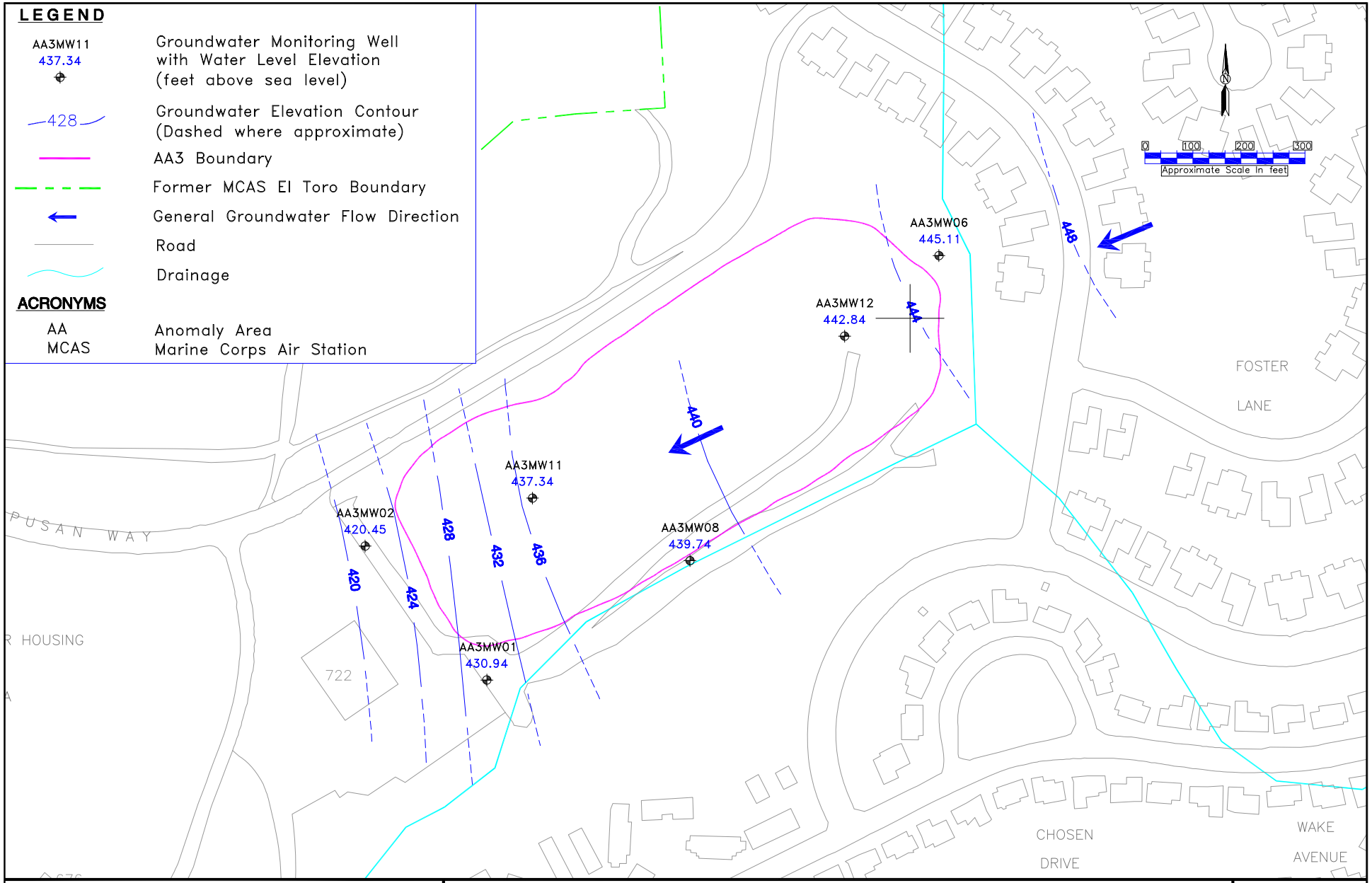
During the Spring 2008 monitoring round, reported concentrations of metals were comparable to previous monitoring rounds. AA3MW12 was the only monitoring well with an analyte (arsenic) exceeding a primary federal MCL. The MCL for arsenic is 10 µg/L and groundwater samples from AA3MW12 contained 14 µg/L of arsenic. This well is located within the AA 3 waste placement area. Table 8 provides a summary of all metal analytical results.

General Chemistry Parameters

The groundwater samples collected from all six AA 3 wells were analyzed for general chemistry parameters (TDS, chloride, sulfate, nitrate, and alkalinity) to provide general information about water quality trends at AA 3. General chemistry parameters were not reported at concentrations exceeding a primary MCL in any AA 3 groundwater samples. Concentrations of general chemistry parameters reported during the Spring 2008 monitoring round at AA 3 are comparable to previous monitoring rounds. Table 7 provides a summary of all general chemistry results.

3.2.2 IRP Site 1

Groundwater samples were collected from 20 IRP Site 1 wells in Spring 2008. All 20 samples were analyzed for perchlorate and general chemistry parameters. Select samples were also analyzed for cations (calcium, magnesium, potassium, and



FORMER MCAS EL TORO
IRVINE, CALIFORNIA

CDM

MODIFIED BY: J. Brown

DATE: 04/2009

FN: 003_2008 REPRT-C

PROJECT NO.: 6228-003

AA 3 Groundwater Elevations, Spring 2008

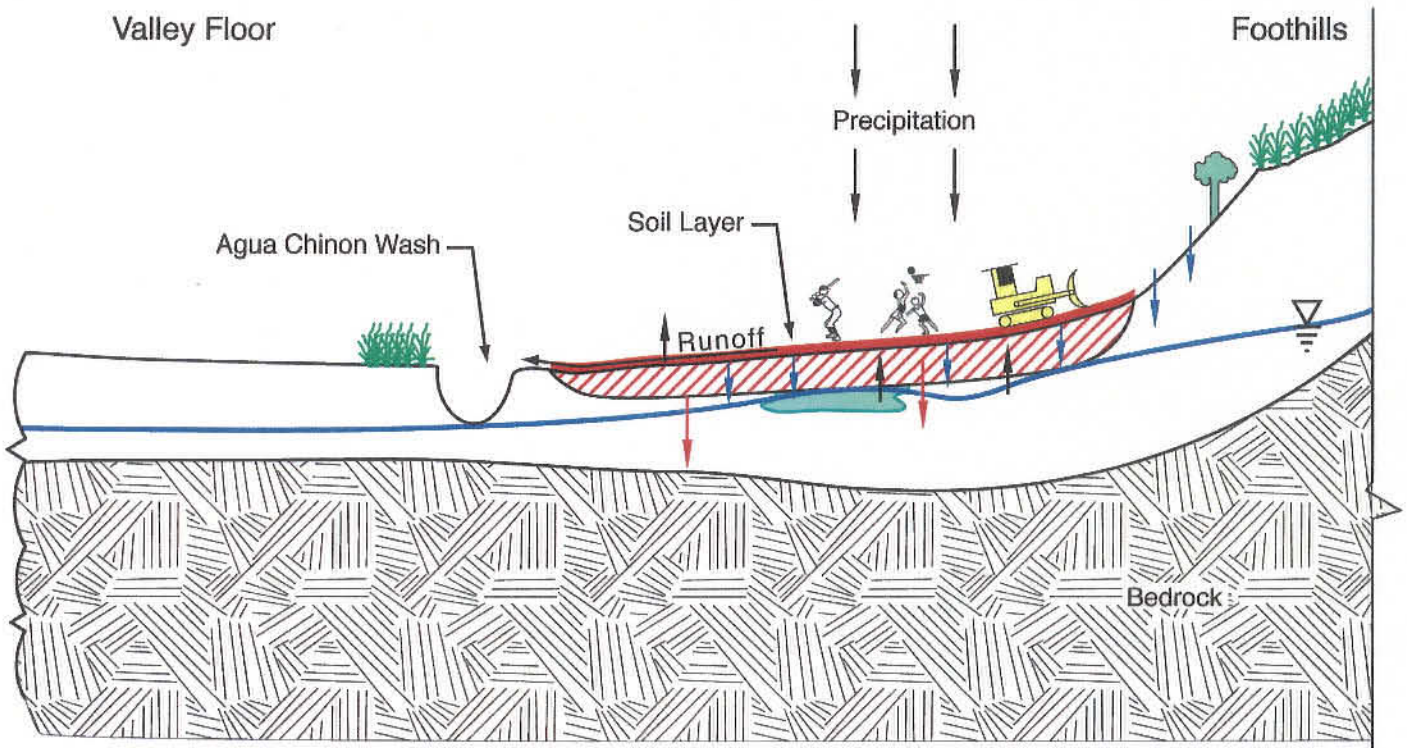
Spring 2008 Monitoring Round Data Summary Report,
Former MCAS El Toro, Irvine, California

FIGURE

3

C:\cad\6228-003\w26\reprt\IR SITES 1,2,AA3\003_2008 REPRT-C.dwg, 3, 7/2/2009 2:45:47 PM

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
9	conceptual site model	Section 2.5	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Figures 7-1 and 8-1.



Explanation

Receptors

- Workers
- Recreation Users
- Habitats
- Tree

Pathways

- Infiltration
- Groundwater
- Wastes
- Leaching
- Dissolved-Phase Contaminants

Not to Scale

RI/FS Report — Draft Final

Conceptual Site Model

Anomaly Area 3

Date 02/08 | MCAS El Toro | Figure 7-1

Project No. 29307 | EarthTech, A tyco International Ltd. Company

37380.02.22.02 CTO-78

FIGURE 8-1: Conceptual Site Model for Anomaly Area 3

Pathway	Contributing Sources	Transport Mechanisms	Exposure Route	Receptors: Current Land Use — On-site Escorted Visitors (Adult/Juvenile)	Current Land Use — Off-site Residents and Agricultural Workers	Future Land Use — Off-site Residents and Workers	Future Land Use — On-Site Residents (Adult/Child)	Future Land Use — On-site Industrial Workers	Future Land Use — On-site Construction Workers	Future Land Use — On-site Escorted Visitors (Adult/Juvenile)	Future Land Use — On-site Agricultural Worker	Future Land Use — On-site Recreational User (Adult/Juvenile)	Rationale
Air		Windborne Particulates	Inhalation of Fugitive Particulates	Potentially Complete	Insignificant	Insignificant	Potentially Complete	Potentially Complete	Potentially Complete	Potentially Complete	Potentially Complete	Potentially Complete	
		Volatilization	Inhalation of VOCs	Potentially Complete	Insignificant	Insignificant	Potentially Complete	Potentially Complete	Potentially Complete	Potentially Complete	Potentially Complete	Potentially Complete	Inhalation of contaminated dust and VOCs is potentially complete for all on-site receptors, but is insignificant for off-site receptors because of dispersion.
Surface Soil	Surface Soil	Direct Contact	Dermal Contact with Soil	Potentially Complete	Incomplete	Incomplete	Potentially Complete	Potentially Complete	Potentially Complete	Potentially Complete	Potentially Complete	Potentially Complete	Direct contact with surface soil is potentially complete for on-site receptors including current and future escorted visitors, future industrial workers, construction workers, residents, agricultural workers and recreational users. Pathway is incomplete for any off-site receptor.
			Incidental Ingestion of Soil	Potentially Complete	Incomplete	Incomplete	Potentially Complete	Potentially Complete	Potentially Complete	Potentially Complete	Potentially Complete	Potentially Complete	
			Ingestion of Plants/Animals (bio-uptake)	Incomplete	Incomplete	Incomplete	Insignificant	Incomplete	Incomplete	Incomplete	Insignificant	Incomplete	There are no current agricultural activities on-site. Exposure is insignificant relative to other pathways for future residents and agricultural workers but incomplete for future visitors, industrial workers, construction workers and recreational users as they are not expected to engage in gardening or other agricultural activities.
		Surface Water Runoff	Dermal Absorption	Incomplete	Incomplete	Insignificant	Insignificant	Insignificant	Insignificant	Incomplete	Insignificant	Insignificant	Direct contact with surface water is incomplete for escorted visitors and off-site receptors as they are not expected to directly contact surface water. This exposure pathway is insignificant relative to other exposure pathways for all other receptors. The inhalation of VOCs from surface water is insignificant relative to other pathways for all receptors. The consumption of food irrigated with surface water is insignificant relative to other exposure pathways for off-site receptors, future on-site residents and agricultural workers and incomplete for all other receptors who are not expected to engage in gardening or other agricultural activities.
			Incidental Ingestion	Incomplete	Incomplete	Insignificant	Insignificant	Insignificant	Insignificant	Incomplete	Insignificant	Insignificant	
			Inhalation of VOCs	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	
	Continued on Next Page		Ingestion of Plants/Animals (bio-uptake)	Incomplete	Insignificant	Insignificant	Insignificant	Incomplete	Incomplete	Incomplete	Insignificant	Incomplete	
	Figure 8-1 Continued	Windborne Particulates	Inhalation of Fugitive Particulates	Incomplete	Incomplete	Insignificant	Potentially Complete	Potentially Complete	Potentially Complete	Incomplete	Potentially Complete	Incomplete	Inhalation of contaminated particulates is incomplete for current receptors and future escorted visitors and future recreational visiotrs since these receptors are not (or would not be) exposed to subsurface soil. Exposure pathway is potentially complete for future on-site residents, industrial workers and construction workers. Due to the expected degree of dispersion, exposure for future off-site receptors is insignificant.
		Volatilization	Inhalation of ambient VOCs	Potentially Complete	Insignificant	Insignificant	Potentially Complete	Potentially Complete	Potentially Complete	Potentially Complete	Potentially Complete	Potentially Complete	Inhalation of VOCs is insignificant for current off-site receptors due to dispersion of airborne contaminants. Exposure is potentially complete for current visitors and all future on-site receptors due to soil vapor migration.

FIGURE 8-1: Conceptual Site Model for Anomaly Area 3

Pathway	Contributing Sources	Transport Mechanisms	Exposure Route	Receptors: Current Land Use: On-site Escorted Visitors (Adult/Juvenile)	Current Land Use: Off-site Residents and Agricultural Workers	Future Land Use: Off-site Residents and Workers	Future Land Use: On-Site Residents (Adult/Child)	Future Land Use: On-site Industrial Workers	Future Land Use: On-site Construction Workers	Future Land Use: On-site Escorted Visitors (Adult/Juvenile)	Future Land Use: On-site Agricultural Worker	Future Land Use: On-site Recreational User (Adult/Juvenile)	Rationale
Vapor Intrusion	Unsaturated Zone Transport to Subsurface Soil		Inhalation of Indoor VOCs	Incomplete	Incomplete	Insignificant	Potentially Complete	Potentially Complete	Incomplete	Incomplete	Incomplete	Incomplete	Exposure to VOCs in indoor air is limited to those receptors who spend time indoors, namely future on-site residents and future on-site industrial workers. off-site migration of VOCs in soil vapor and subsequent exposure for off-site receptors is likely insignificant.
			Dermal Absorption	Incomplete	Incomplete	Incomplete	Potentially Complete	Potentially Complete	Potentially Complete	Incomplete	Potentially Complete	Incomplete	Direct contact with subsurface soil is potentially complete for future construction workers, residents, industrial workers and agricultural workers as excavation or digging activities below 2 feet is possible. Pathway is considered incomplete for current and future escorted visitors and future recreational users since these receptors cannot directly interface subsurface soil.
			Ingestion of Subsurface Soil	Incomplete	Incomplete	Incomplete	Potentially Complete	Potentially Complete	Potentially Complete	Incomplete	Potentially Complete	Incomplete	
			Ingestion of Plants/Animals (bio-uptake)	Incomplete	Incomplete	Incomplete	Insignificant	Incomplete	Incomplete	Incomplete	Insignificant	Incomplete	There are no current agricultural activities on-site. Exposure is insignificant relative to other pathways for future residents and agricultural workers but incomplete for future visitors, industrial workers, construction workers and recreational users as they are not expected to engage in gardening or other agricultural activities.
Groundwater	Unsaturated/Saturated Zone Transport to Groundwater		Dermal Absorption	Incomplete	Incomplete	Incomplete	Potentially Complete	Potentially Complete	Incomplete	Incomplete	Potentially Complete	Incomplete	Current and future escorted visitor and future recreational user are not expected to contact groundwater such that exposure pathway is incomplete. Future construction workers are also not expected to contact groundwater since the depth to groundwater is over 25 feet. Impacted groundwater on-site has not migrated to current off-site receptors. Future exposure to groundwater is potentially complete for future on-site residents, future on-site industrial workers and future on-site agricultural workers; however, groundwater is only evaluated for its most beneficial (residential) use.
			Inhalation of VOCs from Groundwater	Insignificant	Insignificant	Insignificant	Potentially Complete	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Inhalation of VOCs in ambient air that have migrated from groundwater is insignificant relative to other pathways for all current and future receptors except future on-site residents. Future exposure to groundwater may lead to significant inhalation of VOCs in ambient air by future on-site residents during showering events.
			Ingestion of Plants/ Animals (bio-uptake)	Incomplete	Incomplete	Incomplete	Insignificant	Incomplete	Incomplete	Incomplete	Insignificant	Incomplete	Groundwater may potentially be used for irrigation purposes. While exposure is possible for future on-site agricutural worker and future on-site residents, the pathway is considered insignificant relative to other exposure pathways. off-site receptors are not potentially exposed via this exposure pathwy since impacted groundwater has not migrated to offiste wells. No other receptor is expected to engage in gardening or other agricultural activity.
			Drinking Water	Incomplete	Incomplete	Incomplete	Potentially Complete	Potentially Complete	Incomplete	Incomplete	Potentially Complete	Incomplete	Ingestion is currently incomplete for off-site residents and agricultural workers since impacted groundwater from the site has not migrated to off-site wells. Pathway is potentially complete for future on-site residents, industrial workers and on-site agricutural workers, however, groundwater is only evaluated for its most beneficial (residential) use. Current and future escorted visitors, future construction workers and future recreational users are not expected to contact groundwater or use groundwater as a source for drinking water.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
10	human health SRA	Section 2.5.1	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 8, pages 8-79 through 8-83.

Noncarcinogenic Hazard. The cumulative noncancer hazard associated with potential exposure to the EPC in groundwater is expressed as HIs of 7 and 6 under the RME and CTE scenarios, respectively. The primary contributors to the noncancer hazard estimate are the metals thallium (44 percent), arsenic (14 percent), antimony (11 percent), and vanadium (11 percent).

Eight chemicals detected in groundwater, namely antimony, arsenic, chromium, manganese, thallium, vanadium, chloroform and B[a]P equivalent had maximum detected concentrations that exceeded the Region 9 tap water PRGs for residential use.

Soil Vapor Migration of VOCs from Groundwater. The evaluation of potential soil vapor migration of VOCs emanating from groundwater into indoor air resulted in estimated ILCR under the assumed residential land use of $4x10^{-7}$ for the RME scenario and $1x10^{-7}$ for the CTE scenario (Table 8-20). Most of the potential carcinogenic risk (98 percent) is due to chloroform, which was detected in only 2 of 111 groundwater samples. Noncancer hazard estimates from the potential exposure to VOCs in indoor air are below 0.001 for both RME and CTE scenarios.

For the industrial worker potentially exposed to VOCs in an indoor setting, the estimated ILCR under the assumed industrial use is $9x10^{-8}$ for the RME scenario and $2x10^{-8}$ for the CTE scenario (Table 8-21). Noncancer hazard estimates from the potential exposure to VOCs in indoor air are below 0.001 for both RME and CTE scenarios.

8.5.7.4 Risk-Based Screening Summary

The risk-based screening assessment of AA 3 evaluated surface soil, subsurface soil and groundwater for potential residential exposure, and evaluated surface soil and subsurface soil for potential industrial exposure. Risks were evaluated under RME and CTE scenarios. In addition, potential risks associated with the inhalation of volatile chemicals that have migrated from subsurface soil or groundwater into buildings were evaluated for both the residential and industrial exposure scenarios. A summary of those risks is presented in Table 8-22.

The evaluation of surface soil scenarios under the RME scenario resulted in potential ILCRs that exceeded the target incremental cancer risk level of 10^{-6} for both the future resident (ILCR = $4x10^{-5}$) and industrial worker (ILCR = $1x10^{-5}$). Under the CTE assumption, these risk estimates decrease to $4x10^{-6}$ for the resident and $5x10^{-7}$ for the industrial worker. The incremental cancer risk estimates for subsurface soil remains the same for both residential and industrial exposure scenarios. Without the contribution of background metals, the ILCRs decrease approximately 20 percent because arsenic is present at background levels and is not included in the cancer risk estimates. Regardless of the soil interval or receptor, B[a]P equivalent concentrations contribute most to these risk estimates.

Estimated non-cancer HI for the resident exposed to surface soil under the RME scenario is approximately 1, with iron and vanadium each contributing significantly (25 percent or more) to the hazard. Using the CTE assumption, the HI is reduced to less than 1. The HI for exposure to the subsurface by future potential residents under the RME scenario remains at 1, while the HI under the CTE scenario remains below the target hazard of 1. For the industrial worker, hazard estimates are below 1 for both surface and subsurface soil.

Risks/hazards associated with potential soil vapor migration into indoor air from subsurface soil were evaluated for both the residential and industrial land uses. Assuming the RME scenario, the ILCRs is estimated as $4x10^{-6}$ for the residential land use and $8x10^{-7}$ for the industrial land use. Under the CTE scenario, these estimates decrease to $9x10^{-7}$ and $1x10^{-7}$, respectively. Most of the potential carcinogenic risk (98 percent) is due to hexachlorobenzene, which was detected in only one of nine

subsurface soil samples. Noncancer hazard estimates from the potential exposure to VOCs in indoor air are less than 0.01 for both residential and industrial land use scenarios.

The evaluation of groundwater resulted in a potential ILCR for the future on-site resident under the RME scenario (ILCR = $3x10^{-4}$) that exceeded the target incremental cancer risk level of 10^{-6}. Under the CTE scenario, this risk estimate is reduced to $5x10^{-5}$. Most of this risk is due to arsenic, which was detected in 40 percent of the groundwater samples. The EPC of 11.0 µg/L for arsenic is based on the 95 percent UCL and exceeds the current EPA MCL of 10 µg/L. Fifteen of the 46 detections exceeded this MCL.

Evaluation of non-cancer hazards associated with on-site exposure to groundwater resulted in an estimated HI of 7, which was due to the presence of thallium, vanadium, arsenic and antimony. Under the CTE scenario, the estimated HI is reduced to 6. As the maximum detected concentrations and EPCs for arsenic and thallium exceed respective PRGs, target organ segregation was considered unnecessary since the resulting HIs would not significantly change and would remain above the target hazard of 1 for certain target organs. Because groundwater is evaluated for its most beneficial use (i.e., residential use as a drinking water source), it was not further evaluated for industrial use.

Attenuation processes including groundwater mixing, biodegradation and chemical retardation will expectedly reduce chemical concentrations in groundwater as it moves away from the site. Because chemical concentrations are lower in groundwater moving away from the source area, risks associated with exposure to groundwater for potential future off-site residents would be less. The likelihood of groundwater in the vicinity to be used for residential drinking water is unknown but expected to be low.

Potential cancer risks associated with potential vapor emission from groundwater into indoor air were evaluated for residential and industrial land uses. Regardless of the receptor or exposure assumption (RME or CTE), ILCR estimates were below $1x10^{-6}$ and non-cancer HIs were below 1.

California-Approved Toxicity Information

Toxicity information from the California Environmental Protection Agency (Cal-EPA), OEHHA, was substituted into the various PRG equations to derive a second set of receptor-specific PRGs for each medium. Those chemicals with different toxicity criteria, which produce different PRGs are incorporated into each risk table (Tables E1-5 through E1-13 in Appendix E1). A summary of the ILCRs and noncancer HIs that use the Cal-EPA toxicity information is presented in Table 8-23.

Incorporating California-modified toxicity values, the evaluation of surface soil exposure under the RME scenario resulted in ILCRs of $9x10^{-5}$ for the resident and $2x10^{-5}$ for the industrial worker. ILCR from subsurface soil exposure remains approximately the same as that for surface soil for both the resident and industrial worker. Risk estimates that utilize California-modified toxicity values are approximately 2½ times higher than when estimated using EPA Region 9 PRGs. The main reason for this increase is that California assigns a higher (i.e., more toxic) slope factor for arsenic. Without the contribution of background metals, the ILCRs decrease approximately 50 percent because arsenic is present at background levels and is not included in the cancer risk estimates.

The California-approved screening value for lead is 150 mg/kg. Despite this value being lower than the Federal screening value of 400 mg/kg, lead concentrations in soil at AA 3 (including the maximum detected concentration of 20.7 mg/kg) remain below this screening value.

Table 8-22: Summary of Incremental Lifetime Cancer Risks and Cumulative Noncancer Hazard Indices for Default Receptors Under RME and CTE Evaluations

Type	Residential		Industrial	
	RME	CTE	RME	CTE
Surface Soil - Including Background				
ILCR	4E-05	4E-06	1E-05	5E-07
B(a)P equiv.	68%	66%	73%	68%
arsenic	23%	24%	19%	23%
TCDD TEQ	9%	10%	8%	9%
HI	1	0.09	0.06	0.01
arsenic	10%	0%	21%	20%
iron	38%	--[a]	--[a]	--[a]
manganese	8%	24%	17%	16%
vanadium	25%	72%	46%	50%
Surface Soil - Excluding Background				
ILCR	3E-05	3E-06	8E-06	4E-07
B(a)P equiv.	88%	87%	90%	88%
arsenic	--	--	--	--
TCDD TEQ	12%	13%	10%	12%
HI	0.7	0.003	0.003	<0.001
arsenic	--	--	--	--
iron	76%	--[a]	--[a]	--[a]
manganese	--	--	--	--
vanadium	--	--	--	--
Subsurface Soil - Including Background				
ILCR	4E-05	4E-06	1E-05	5E-07
B(a)P equiv.	66%	65%	71%	67%
arsenic	23%	24%	19%	22%
TCDD TEQ	9%	10%	8%	9%
HI	1	0.1	0.06	0.01
arsenic	10%	19%	20%	20%
iron	37%	--[a]	--[a]	--[a]
manganese	8%	16%	16%	16%
vanadium	25%	49%	46%	49%
Subsurface Soil - Excluding Background				
ILCR	3E-05	3E-06	8E-06	4E-07
B(a)P equiv.	86%	85%	89%	87%
arsenic	--	--	--	--
TCDD TEQ	12%	13%	10%	12%
HI	0.7	0.004	0.003	<0.001
arsenic	--	--	--	--
iron	75%	--[a]	--[a]	--[a]
manganese	--	--	--	--
vanadium	--	--	--	--
Indoor Air - Vapor Emission from Soil				
ILCR	4E-06	9E-07	8E-07	1E-07
Hexachlorobenzene	98%	98%	98%	98%
HI	0.006	<0.001	<0.001	<0.001
Hexachlorobenzene	85%	--	--	--
Groundwater				
ILCR	3E-04	5E-05	Not Evaluated	Not Evaluated
arsenic	76%	77%		
HI	7	6	Not Evaluated	Not Evaluated
antimony	11%	12%		
arsenic	14%	14%		
thallium	44%	44%		
vanadium	11%	10%		
Indoor Air - Vapor Emission from Groundwater				
ILCR	4E-07	1E-07	9E-08	2E-08
Chloroform	98%	98%	98%	98%
HI	<0.001	<0.001	<0.001	<0.001

NOTES:

[a] Noncancer from iron cannot be estimated as the PRG is the maximum concentration of 100,000 mg/kg and not risk-based.

B(a)P = benzo(a)pyrene
CTE = central tendency exposure
EPC = exposure point concentration
HI = hazard index
ILCR = incremental lifetime cancer risk
mg/kg = milligrams per kilogram
PRG = preliminary remediation goal
RME = reasonable maximum exposure
TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin
TEQ = toxicity equivalency quotient
-- = not evaluated
< = less than
% = percent

Using California-modified toxicity values, the evaluation of potential soil vapor migration from subsurface soil into buildings resulted in ILCRs of $4x10^{-6}$ for the resident and $1x10^{-6}$ for the industrial worker. Under the CTE scenario, these estimates decrease approximately 75 percent. Hexachlorobenzene represents most of the ILCR and noncancer hazard.

The evaluation of direct groundwater exposure using California-modified toxicity values resulted in an increase in the estimated cancer risk to $1x10^{-3}$ under the RME scenario. This increase is also due to the higher cancer slope factor for arsenic. While no site-specific background value of arsenic in groundwater has been determined, the levels detected are likely naturally occurring and not due to activities of the site.

The evaluation of potential soil vapor migration from groundwater into buildings resulted in ILCRs of $1x10^{-7}$ for the resident and $2x10^{-8}$ for the industrial worker. Under the CTE scenario, these estimates decrease approximately 75 percent. Chloroform represents most of the ILCR and noncancer hazard associated with the indoor inhalation of volatile chemicals from groundwater.

8.6 SITE-SPECIFIC RISK-BASED EVALUATION

This section presents the process for conducting site-specific risk-based evaluations (or screening PREs under the EPA Region 9 terminology) for site-specific receptors exposed to chemicals in surface soil and subsurface soil. The SSRBE presents risks for the future on-site construction worker, on-site escorted visitor, on-site agricultural worker and on-site recreational user potentially exposed to COPCs in surface soil and subsurface soil at AA 3. Residential and industrial workers are also site-specific receptors, but because the risks for them were previously presented in the RBS, risks are not completely re-evaluated in the SSRBE to avoid redundancy. In the SSRBE, site-specific RBCs (i.e., PRGs) were developed for site-specific land use and exposure conditions not addressed during PRG development for EPA Region 9.

8.6.1 Selection of COPCs

For the SSRBE, COPCs were identified as those chemicals in the RBS evaluation with maximum detected concentrations in surface soil or subsurface soil that exceeded their respective soil PRG. Because groundwater was only evaluated for its most beneficial (i.e., residential) use, groundwater is not evaluated in the SSRBE. The COPCs associated with surface and subsurface soil are arsenic, B[a]P equivalents, and 2,3,7,8-TCDD TEQ.

Where the maximum detected concentration for an inorganic constituent was within background levels, the presence of this inorganic COPC was not considered attributable to site-related activities. ILCRs and noncancer HIs were estimated both with and without contribution from naturally-occurring inorganic constituents. Derivation of the soil background concentrations is presented in the *Final Technical Memorandum, Background and Reference Levels, Remedial Investigations, Marine Corps Air Station, El Toro, California* (BNI 1996).

8.6.2 Receptor Selection and Exposure Factors

The site is located in a semi-urban setting and corresponding mix of land uses. Such uses include residential, industrial, and agricultural use. Future use plans for the site may include residential use. As noted in Section 8.4, because reuse has not been defined, several receptors were also evaluated to provide risk managers with risk estimates for alternate receptor scenarios. These receptors consist of visitors to the site, construction workers, agricultural workers, and individuals engaging in recreational activities. Activities that receptors may engage in are discussed below and a summary of the exposure factors used in deriving the site-specific, receptor PRGs is presented in Table 8-24.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
11	Ecological risk assessment	Section 2.5.2	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 9, pages 9-49 through 9-54.

Table 9-13: Summary of BERA Species-Specific Exposure Factors

Factor	Value	Reference
Water intake (mL/day)	14.2 [b]	EPA (1993)
Diet Partition Factor	0.093 (soil)	Beyer et al., (1994), turkey as surrogate
	0.907 (plants) 0.00 (animal)	Derived from Erlich et al., (1988)
Red-Shouldered Hawk		
Mean body weight (kg)	0.559	Hartman (1961)
Mean foraging area (ha)	36.8	McCrary (1982)
Mean Food intake (mg/d, dry wt)	56,291 [a]	Nagy (2001)
Water intake (mL/day)	40 [b]	EPA (1993)
Diet Partition Factor	0.02 (soil)	Derived from Beyer et al. (1994)
	0.00 (plants) 0.98 (animal)	Derived from Polite (2003)

Notes:

[a] Dry weight food intake estimated based on algorithm given in Nagy (2001).
[b] Water intake estimated based on algorithm given in EPA (1993).
BERA = baseline ecological risk assessment
ha = hectare
kg = kilograms
mg/d = milligrams per day
mL = milliliter
wt = weight

9.3.4 Risk Calculations

9.3.4.1 SOIL

The HQ results of risk calculations based on more realistic exposure assumptions for soil COPECs are presented in Appendix E2 Tables 8-1 to 8-6 and summarized in Table 9-14 for receptors with HQs greater than 1.

Antimony, cadmium, chromium, lead, mercury, nickel, selenium, silver vanadium, zinc, diethylphthalate, and total 2,3,7,8-TCDD (mammal and bird) were further evaluated for potential risk because their HQ values were 1 or greater in Tier 1, Step 2 risk calculations.

The HQ values for antimony, cadmium, nickel, selenium, zinc, and 2,3,7,8-TCDD (mammal) in soil are greater than 1 for at least one receptor. Chromium, lead, mercury, silver, vanadium, diethylphthalate, and 2,3,7,8-TCDD (bird) have HQ values that do not exceed 1 with respect to all receptors.

Molybdenum, thallium, 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 2,4-dinitrophenol, 4-nitrophenol, hexachlorocyclopentadiene, and pentachlorophenol were also carried through to Tier 2, Step 3a because their respective maximum reporting limit ranges exceeded the soil screening value for ecological risk and could be underestimated. However, these COPECs were not detected in surface soil at the site; therefore, they cannot be further evaluated in Tier 2, Step 3a. The lack of lower reporting limits for these chemicals may underestimate risk to terrestrial receptors at AA 3.

Table 9-14: Tier 2, Step 3a, Hazard Quotient Values Greater than 1 for Soil COPECs after Tier 2, Step 3a BERA Calculations

COPEC	Ornate Shrew	Deer Mouse	Long-Tailed Weasel	Mourning Dove	Western Meadowlark	Red-Shouldered Hawk
Metals						
Antimony	2E+00	–	–	6E+00	8E+00	–
Cadmium	2E+00	–	–	–	–	–
Chromium	–	–	–	–	–	–
Lead	–	–	–	–	–	–
Mercury	–	–	–	–	–	–
Nickel	9E+00	5E+00	–	–	–	–
Selenium	2E+00	2E+00	–	–	–	–
Silver	–	–	–	–	–	–
Vanadium	–	–	–	–	–	–
Zinc	4E+00	3E+00	–	–	–	–
SVOCs						
Diethylphthalate	–	–	–	–	–	–
Dioxins/Furans						
Total 2,3,7,8-TCDD (mammal)	7E+00	3E+00	–	NA	NA	NA
Total 2,3,7,8-TCDD (bird)	NA	NA	NA	–	–	–

Notes:
— = HQ does not exceed 1 for this receptor
BERA = baseline ecological risk assessment
COPEC = chemical of potential ecological concern
NA = Analyte is not a COPEC in this medium (not applicable)
SVOC = semivolatile organic compound
TCDD = tetrachlorodibenzodioxin

9.3.4.2 SEDIMENT (MULEFAT SCRUB HABITAT)

HQ results of risk calculations based on more realistic exposure assumptions for sediment COPECs are presented in Appendix E2.9. Table 9-15 presents the receptors with HQs greater than 1.

Cadmium, mercury, nickel, vanadium, and zinc were further characterized for potential risk because their HQ values were 1 or greater in Tier 1, Step 2 risk calculations.

The HQ values for nickel, and zinc in sediment are greater than 1 for at least one receptor. Two Tier 2 metals in sediment, mercury, and vanadium, have an HQ value that do not exceed 1 with respect to all receptors.

Table 9-9-15: Hazard Quotient Values Greater than 1 for Sediment COPECs after Tier 2, Step 3a BERA Calculations

COPEC	Ornate Shrew	Deer Mouse	Long-Tailed Weasel	Mourning Dove	Spotted Towhee	Red-Shouldered Hawk
Metals						
Nickel	3E+00	2E+00	–	–	–	–
Zinc	3E+00	2E+00	–	–	–	–

Notes:
— = HQ does not exceed 1 for this receptor

BERA = baseline ecological risk assessment
COPEC = chemical of potential ecological concern

9.3.4.3 SURFACE WATER

Surface water risk calculations for Tier 2, Step 3a could not be refined because 95 percent UCL values were not available and more realistic exposure assumptions are not available.

Copper was also carried through to Tier 2, Step 3a because its respective maximum reporting limit range exceeded the surface water screening value for the protection of aquatic life and could be underestimated. However, this COPEC was not detected in surface water at the site; therefore, it cannot be further evaluated in Tier 2, Step 3a.

9.3.4.4 GROUNDWATER

The HQ results of risk estimates for herbivorous terrestrial wildlife that eat plant material from phreatophytes taking up COPCs from groundwater are presented in Appendix E2, Part 5. The Tier 1 HQ value for selenium consumed in phreatophytes by representative mammals was 2, assuming that they eat nothing but phreatophytes. The exposure to phreatophyte food is reduced using Tier 2 exposure assumptions. Therefore, there is minimal potential for adverse effects to terrestrial birds and mammals from eating phreatophytes that have taken up site groundwater.

9.3.5 Background Screening

This step eliminates inorganic COPECs (inorganic COPECs retained after Tier 2, Step 3a [if HQ greater than 1]) that are detected at concentrations within or equal to background concentrations (BNI 1996) typical of uncontaminated soil. No organic preliminary COPECs in any medium, regardless of whether or not they may occur naturally, were screened out by this method; all were retained for further screening. Background screening was used only for inorganic COPECs in soil by first comparing each COPEC maximum concentration from site soil to background concentrations. Five inorganic chemicals in surface soil, including antimony, cadmium, nickel, vanadium, and zinc, were within the Station-wide background concentrations (see Table 9-16).

Selenium has a maximum detected soil concentrations that exceeds the Station-wide background concentrations. The 95 percent UCL for selenium also exceeds its background concentration at AA 3 (Table 9-16).

Table 9-16: Comparison of Maximum and 95% UCL COPEC Concentrations in Soil to Background Concentrations – Inorganic COPECs only

Metals	Maximum Detected Concentration (mg/kg dw)	95% UCL of the Mean (mg/kg dw)	Surface Soil Background Concentration* (mg/kg dw)	Maximum Detected Soil Concentration Exceeds Background?	95% UCL Concentration Exceeds Background?
Antimony	2.1	n/a	3.06	No	n/a
Cadmium	1	0.699	2.35	No	No
Nickel	13.7	8.28	15.3	No	No
Selenium	1.1	0.543	0.32	**Yes**	**Yes**
Vanadium	44.1	28.1	71.8	No	No
Zinc	57.1	38.2	77.9	No	No

Notes:

* BNI 1996. Final Technical Memorandum, Background and Reference Levels, Remedial Investigations. San Diego, CA.
% = percent
COPEC = chemical of potential ecological concern
dw = concentration listed on a dry weight basis
mg/kg = milligrams per kilogram
n/a = Only one detection above reporting limit for this data set; therefore, the 95% UCL could not be computed and compared to the background concentration.
UCL = upper confidence limit

Background screening was also used for inorganic COPEC exceedances (nickel and zinc) in sediment by comparing each COPEC maximum concentration from site sediment to site soil background concentrations. Ninety-five percent UCL values were not available for sediment, so this comparison could not be made. Both chemicals (nickel and zinc) were within the Station-wide soil background concentrations (Table 9-17).

Table 9-17: Comparison of Maximum and 95% UCL COPEC Concentrations in Sediment to Background Concentrations – Inorganic COPECs only

Metals	Maximum Detected Concentration (mg/kg dw)	Surface Soil Background Concentration* (mg/kg dw)	Maximum Detected Sediment Concentration Exceeds Background?
Nickel	2.8	15.3	No
Zinc	13.5	77.9	No

Notes:
* BNI 1996. Final Technical Memorandum, Background and Reference Levels, Remedial Investigations. San Diego, CA.
% = percent
COPEC = chemical of potential ecological concern
dw = concentration listed on a dry weight basis
mg/kg = milligrams per kilogram
UCL = upper confidence limit

9.3.6 Risk Characterization

9.3.6.1 SOIL

The following five metals in soil, antimony, cadmium, nickel, selenium, and zinc, have HQ values greater than 1 after the Tier 2, Step 3a risk calculations. However, four COPC maximum soil concentrations (0-foot to 6 feet bgs) were within the Station-wide background concentrations. Therefore, site activities did not result in a release of these metals that would cause adverse effects to terrestrial wildlife at AA 3.

Uncertainty exists in the bioavailability of selenium. Risk (HQ=2) from selenium is being driven by invertebrate ingestion, which accounts for 81 percent of the total ingested dose for the deer mouse and 98 percent of the total ingested dose for the ornate shrew. The concentration of selenium in the soil invertebrates is estimated from soil concentration using a regression equation developed by Sample et al. (1998). The fit of the 13 data points to the line shows some variability, resulting in uncertainty of the predicted BCF. This may over-estimate or under-estimate exposure and risk. Although, the maximum concentration and 95 percent UCL of selenium exceed the Station-wide background concentration, in the western part of the U.S., soil has naturally high levels of selenium compounds (ATSDR 1994). In addition, since the background determination is a statistically based approach, it is not unexpected that a certain number of samples will exceed the 95th percentile yet still be within the true population or, in other words, still be indicative of naturally occurring concentrations. Since other metals at the site do not show signs of anthropogenic influence, the Station-wide background concentrations may underestimate naturally high levels of selenium in soil at AA 3.

The selenium HQ of 2 is also based on comparison to a NOAEL-based TRV which is a no-effect dose that is protective at the individual level. A LOAEL-based TRV would be expected to be approximately 1 order of magnitude higher with a resulting HQ = 0.2 and is protective at the population level.

For 2,3,7,8-TCDD TEQ (mammal), the BERA risk calculations for the ornate shrew (HQ=7) and the deer mouse (HQ=3) are based on NOAEL-based TRVs. Since no endangered mammals are known from the area, a LOAEL-based TRV can be used to estimate a low-effect HQ to assess risk at the population level. The LOAEL-based HQ for the ornate shrew (HQ = 0.7) and the deer mouse (HQ = 0.3) are both below the point of departure of 1. This suggests that small mammal populations are not at risk from site dioxins/furans, although certain individuals may be.

The bioavailability of dioxins/furans in soil may also be overestimated. Large organic molecules such as dioxins/furans bind tightly with organic matter found in natural soil and may not be generally bioavailable.

Finally, the BERA risk calculations of dioxins/furans for the ornate shrew (HQ=7) and the deer mouse (HQ=3) are based on the 95 percent UCL (9.99 pg/g) soil concentration. This value is driven by a high variance caused by elevated concentrations detected in 2 out of 11 surface soil samples analyzed for dioxins/furans, HA31 and HA26, located in the northwest corner of AA 3. Because of the 2 elevated sample values, the estimated exposure of mammals to 2,3,7,8-TCDD is likely overestimated resulting in an overestimation of estimated risk.

The HQ values for lead, mercury, and 2,3,7,8-TCDD (bird) in soil were 1 or less for all receptors; therefore, these COPECs do not present significant threats of adverse effects to wildlife at AA 3.

9.3.6.2 SEDIMENT

Three metals in sediment of the Agua Chinon Wash had HQ values greater than 1 after the Tier 2, Step 3a risk calculations (Appendix E2.9), including, nickel, vanadium, and zinc. However, the maximum sediment concentrations of these metals were within the Station-wide background soil concentrations. Therefore, these metals do not present a threat of adverse effect to wildlife that forage in the Agua Chinon Wash.

The HQ values for cadmium, and mercury, in sediment was 1 or less for all receptors; therefore, these COPECs do not present a significant threat of adverse effects to wildlife at AA 3.

9.3.6.3 SURFACE WATER

Potential risk to aquatic life in surface water at AA 3 is indicated for several COPECs in surface water. Aluminum, barium, beryllium, cadmium, chromium, cobalt, lead, manganese, nickel, vanadium, and zinc have HQs of 1 or greater. These were detected in the downgradient Surface Water Sample LK287. The maximum concentration of aluminum (HQ>1) in surface water was detected in the upgradient Surface Water Sample LK286. Beryllium was detected at the same concentration at downgradient (LK287) and upgradient location (LK286). Copper was not detected in surface water, but its reporting limit exceded the CTR chronic water quality criteria, thus the risk to aquatic organisms from copper exposure cannot be estimated quantitatively.

However, evaluation of the ecological risk from other media suggests that anthropogenic activities have not had a negative effect on ecological receptors. In general, the concentrations of inorganic chemicals in the Agua Chinon Wash, where it enters the site via a culvert, are nearly the same as

concentrations in surface water leaving the site (at the foot bridge). This suggests that the presence of AA 3 has no effect on the water quality of the Wash.

9.3.7 Conclusions of Tier 2, Step 3a BERA Process

In reevaluating ecological risk based on refined exposure assumptions, the exposure of ecological receptors to 2,3,7,8-TCDD TEQ (mammal), the LOAEL-based HQ for the ornate shrew (HQ = 0.7) and the deer mouse (HQ = 0.3) are both below the point of departure of 1. This suggests that small mammal populations are not at risk from site dioxins/furans, although certain individuals may be. The bioavailability of dioxins/furans in soil may also be overestimated. Large organic molecules such as dioxins/furans bind tightly with organic matter found in natural soil and may not be generally bioavailable. Risk Managers should consider the risk range (HQ = 2 to 0.2 for the shrew and deer mouse in making decisions regarding further action regarding surface soil at the site.

Ecological risk from exposure to sediment at AA 3 does not present a significant threat of adverse effects to wildlife (based on refined exposure assumptions for sediment). Although potential risk to aquatic life in surface water at AA 3 is indicated for several COPECs in surface water, concentrations in COPECs in the upgradient and downgradient samples were similar, so AA 3 has not had an adverse impact on water quality in the Agua Chinon Wash. Therefore, evaluation of the ecological risk from other media suggests that anthropogenic activities have not had a negative effect on ecological receptors.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
12	Principal Threat and Low Level Threat Wastes	Section 2.6	Guide to Principal Threat and Low level Threat Wastes. November 1991. U.S. EPA Office of Solid Waste and Emergency Response. OSWER Directive 9380.3-06FS.

EPA

A Guide to Principal Threat and Low Level Threat Wastes

Office of Emergency and Remedial Response
Hazardous Site Control Division OS-220W

Quick Reference Fact Sheet

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) promulgated on March 8, 1990 states that EPA expects to use "treatment to address the principal threats posed by a site, wherever practicable" and "engineering controls, such as containment, for waste that poses a relatively low long-term threat." (40 CFR Section 300.430(a)(1)(iii).) These expectations, derived from the mandates of CERCLA §121 and based on previous Superfund experience, were developed as guidelines to communicate the types of remedies that the EPA generally anticipates to find appropriate for specific types of wastes. Although remedy selection decisions are ultimately site-specific determinations based on an analysis of remedial alternatives using the nine evaluation criteria, these expectations help to streamline and focus the remedial investigation/feasibility study (RI/FS) on appropriate waste management options. **This guide explains considerations that should be taken into account in categorizing waste for which treatment or containment generally will be suitable and provides definitions, examples, and ROD documentation requirements related to waste that constitute a principal or low level threat.** EPA makes this categorization of waste as principal or low level threat waste after deciding whether to take remedial action at a site. The "Interim Final Guidance on Preparing Superfund Decision Documents," (EPA/624/1-87/90, October 1990) and "A Guide to Developing Superfund Records of Decision" (Publication 9335.3-02FS-1, May 1990) provide additional information on ROD documentation.

NCP Expectations

EPA established general expectations in the NCP (40 CFR 300.430(a)(1)(iii)) to inform the public of the types of remedies that EPA has found to be appropriate for certain types of waste in the past and anticipates selecting in the future. These expectations (see Highlight 1) provide a means of sharing collected experience to guide the development of cleanup options. They reflect EPA's belief that certain source materials are addressed best through treatment because of technical limitations to the long-term reliability of containment technologies, or the serious consequences of exposure should a release occur. Conversely, these expectations also reflect the fact that other source materials can be safely contained and that treatment for all waste will not be appropriate or necessary to ensure protection of human health and the environment, nor cost effective.

Identifying Principal and Low Level Threat Wastes

The concept of principal threat waste and low level threat waste as developed by EPA in the NCP is to be applied on a site-specific basis when characterizing source material. "Source material" is defined as material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, to surface water, to air, or acts as a source for direct exposure.

HIGHLIGHT 1: NCP Expectations Involving Principal and Low Level Threat Wastes

EPA expects to:

1. Use treatment to address the principal threats posed by a site, wherever practicable.
2. Use engineering controls, such as containment, for wastes that pose a relatively low long-term threat or where treatment is impracticable.
3. Use a combination of methods, as appropriate, to achieve protection of human health and the environment. In appropriate site situations, treatment of principal threats posed by a site, with priority placed on treating waste that is liquid, highly toxic or highly mobile, will be combined with engineering controls (such as containment) and institutional controls, as appropriate, for treatment residuals and untreated waste.
4. Use institutional controls such as water use and deed restrictions to supplement engineering controls as appropriate for short- and long-term management to prevent or limit exposure to hazardous substances.

Contaminated ground water generally is not considered to be a source material although non-aqueous phase liquids (NAPLs) may be viewed as source materials. The NCP establishes a different expectation for remediating contaminated ground water (i.e., to return usable ground waters to their beneficial uses in a time frame that is reasonable given the particular circumstances of the site). Examples of source and non-source materials are provided in Highlight 2.

HIGHLIGHT 2: Examples of Source and Non-Source Materials

Source Materials

- Drummed wastes
- Contaminated soil and debris
- "Pools" of dense non-aqueous phase liquids (NAPLs) submerged beneath ground water or in fractured bedrock
- NAPLs floating on ground water
- Contaminated sediments and sludges

Non-Source Materials

- Ground water
- Surface water
- Residuals resulting from treatment of site materials

Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. They include liquids and other highly mobile materials (e.g., solvents) or materials having high concentrations of toxic compounds. No "threshold level" of toxicity/risk has been established to equate to "principal threat." However, where toxicity and mobility of source material combine to pose a potential risk of 10^{-3} or greater, generally treatment alternatives should be evaluated.

Low level threat wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of release. They include source materials that exhibit low toxicity, low mobility in the environment, or are near health-based levels.

Determinations as to whether a source material is a principal or low level threat waste should be based on the inherent toxicity as well as a consideration of the physical state of the material (e.g., liquid), the potential mobility of the wastes in the particular environmental setting, and the lability and degradation products of the material. However, this concept of principal and low level threat waste should not necessarily be equated with the risks posed by site contaminants via various exposure pathways. Although the characterization of some material as principal or low level threats takes into account toxicity (and is thus related to degree of risk posed assuming exposure occurs), characterizing a waste as a principal threat does not mean that the waste poses the primary risk at the site. For example, buried drums leaking solvents into ground water would be considered a principal threat waste, yet the primary risk at the site (assuming little or no direct contact threat) could be ingestion of contaminated ground water, which as discussed above is not considered to be a source material, and thus would not be categorized as a principal threat.

The identification of principal and low level threats is made on a site-specific basis. In some situations site wastes will not be readily classifiable as either a principal or low level threat waste, and thus no general expectations on how best to manage these source materials of moderate toxicity and mobility will necessarily apply. [NOTE: In these situations wastes do not have to be characterized as either one or the other. The principal threat/low level threat waste concept and the NCP expectations were established to help streamline and focus the remedy selection process, not as a mandatory waste classification requirement.]

HIGHLIGHT 3: Examples of Principal and Low Level Threat Wastes

Wastes that generally will be considered to constitute principal threats include, but are not limited to:

- Liquids - waste contained in drums, lagoons or tanks, free product (NAPLs) floating on or under ground water (generally excluding ground water) containing contaminants of concern.
- Mobile source material - surface soil or subsurface soil containing high concentrations of contaminants of concern that are (or potentially are) mobile due to wind entrainment, volatilization (e.g., VOCs), surface runoff, or sub-surface transport.
- Highly-toxic source material - buried drummed non-liquid wastes, buried tanks containing non-liquid wastes, or soils containing significant concentrations of highly toxic materials.

Waste that generally will be considered to constitute low level threat wastes include, but are not limited to:

- Non-mobile contaminated source material of low to moderate toxicity - Surface soil containing contaminants of concern that generally are relatively immobile in air or ground water (i.e., non-liquid, low volatility, low leachability contaminants such as high molecular weight compounds) in the specific environmental setting.
- Low toxicity source material - soil and subsurface soil concentrations not greatly above reference dose levels or that present an excess cancer risk near the acceptable risk range.

Examples of principal and low level threat wastes are provided in Highlight 3.

Risk Management Decisions fo. Principal and Low Level Threat Wastes

The categorization of source material as a principal threat or low level threat waste, and the expectations regarding the use of treatment and containment technologies follows the fundamental decision as to whether any remedial action is required at a site. These determinations, and the application of the expectations, serve as general guidelines and do not dictate the selection of a particular remedial alternative. For example, EPA's experience has demonstrated that highly mobile wastes (e.g., liquids) are difficult to reliably contain and thus generally need to be treated. As such, EPA expects alternatives developed to address highly mobile material to focus on treatment options rather that containment approaches.

However, as stated in the preamble to the NCP (55 FR at 8703, March 8, 1990), there may be situations where wastes identified as constituting a principal threat may be contained rather than treated due to difficulties in treating the wastes. Specific situations that may limit the use of treatment include:

- Treatment technologies are not technically feasible or are not available within a reasonable time frame;
- The extraordinary volume of materials or complexity of the site make implementation of treatment technologies impracticable;
- Implementation of a treatment-based remedy would result in greater overall risk to human health and the environment due to risks posed to workers or the surrounding community during implementation; or
- Severe effects across environmental media resulting from implementation would occur.

Conversely, there may be situations where treatment will be selected for both principal threat wastes and low level threat wastes. For example, once a decision has been made to treat some wastes (e.g., in an onsite incinerator) economies of scale may make it cost effective to treat all materials including low level threat wastes to alleviate or minimize the need for engineering/institutional controls.

While these expectations may guide the development of appropriate alternatives, the fact that a remedy is consistent with the expectations does not constitute sufficient grounds for the selection of that remedial alternative. The selection of an appropriate waste management strategy is determined solely through the remedy selection process outlined in the NCP (i.e., all remedy selection decisions are site-specific and must be based on a comparative analysis of the alternatives using the nine criteria in accordance with the NCP). Independent of the expectations, selected remedies must be protective, ARAR-compliant, cost-effective, and use permanent solutions or treatment to the maximum extent practicable. Once the final remedy is selected, consistency with the NCP expectations should be discussed as part of the documented rationale for the decision.

ROD Documentation

Declaration

The "Description of the Selected Remedy" section should note whether the remedy is addressing any source materials that constitute "principal" or "low level" threat wastes, or both.

The "Statutory Determinations" section should discuss how the selected remedy satisfies the statutory preference stated in CERCLA §121 to select remedial actions "in which treatment which permanently and significantly reduces the volume, toxicity or mobility of the hazardous substances, pollutants, and contaminants is a principal element." In evaluating this statutory preference, the site manager needs to decide whether treatment selected in the ROD constitutes treatment as a major component of the remedy for that site. Remedies which involve treatment of principal threat wastes likely will satisfy the statutory preference for treatment as a principal element, although this will not necessarily be true in all cases (e.g., when principal threat wastes that are treated represent only a small fraction of the wastes managed through containment). Ground water treatment remedies also may satisfy the statutory preference, even though contaminated ground water is not considered a principal threat waste and even though principal threat source material may not be treated.

Decision Summary

The "Decision Summary" of the ROD should identify those source materials that have been identified as principal threat and/or low level threat wastes, and the basis for these designations. These designations should be provided in the "Summary of Site Characteristics" section as part of the discussion focusing on these source materials that pose or potentially pose a risk to human health and the environment. In addition, the "Description of Alternatives" and the "Selection of Remedy" sections should briefly note how principal and/or low level threat wastes that may have been identified are being managed.

The "Statutory Determinations" section of the ROD should include a discussion of how the statutory preference for treatment as a principal element is satisfied or explain why it is not satisfied, stating reasons in terms of the nine evaluation criteria.

NOTICE: The policies set out in this memorandum are intended solely as guidance. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this memorandum, or to act at variance with the guidance, based on an analysis of specific site circumstances. The Agency also reserves the right to change this guidance at any time without public notice.

United States
Environmental Protection
Agency (OS-220W)
Washington, DC 20460

Official Business
Penalty for Private Use
$300

First Class Mail
Postage and Fees Paid
EPA
Permit No. G-35

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
13	RAOs	Section 2.7	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 11, pages 11-6 and 11-7.

11.4 DEVELOPMENT OF REMEDIAL ACTION OBJECTIVES

RAOs are media-specific goals for protecting human health and the environment. The NCP requires that the RAOs address contaminants of concern, exposure pathways, and receptors; and that they establish an acceptable level or range of levels for exposure (i.e., remediation goals). Remediation goals should be consistent with exposure levels that are protective of human health and the environment (i.e., an excess cancer risk in the range of 10^{-4} to 10^{-6} or less, and a hazard quotient for exposure to non-carcinogenic contaminants of 1 or less). RAOs must also comply with the intent of federal or state regulations, statutes or policies that may dictate the remedial action (ARARs).

Final remediation goals are not determined for a site until the final remedy has been selected. Nevertheless, RAOs and associated remediation goals must be developed early in the RI/FS process to provide a basis for screening remedial technologies and performing a detailed evaluation of remedial alternatives.

11.4.1 Remedial Action Objectives

The DON reached an agreement with FFA signatories and the CIWMB regarding the ICs and access restrictions pertaining to the landfill gas control measures at AA 3 in a letter dated 24 June 2004, as presented in Appendix L. This agreement was based on the results of the following: landfill gas investigations; anticipated post-closure land use; the DON's consultation with the representatives of CIWMB and the DTSC at a meeting on 4 December 2003; and, subsequent discussions with CIWMB and other FFA signatories via email, letter, and telephone conferences on 5 February and 18 February 2004.

The CIWMB along with the FFA signatories concurred on the following measures proposed by the DON to address the underlying concern of potential landfill gas migration at AA 3:

1. Implementation of an appropriate response action at AA 3.
2. Installation of an active landfill gas collection system or gas vent system during remedy implementation at AA 3. The system will remain inactive or vent passively unless a contingency for active gas extractions is triggered based on monitoring results. While inactive, wells/pipes installed within the waste will be used to monitor landfill gas within the waste itself, providing an early warning feature.
3. As an additional safety feature, construction of passive gas-control gravel trenches within the compliance monitoring zone during remedy implementation.
4. Implementation of CIWMB monitoring protocol with compliance landfill gas monitoring probes within 50 feet of the waste boundary. The perimeter will be monitored to demonstrate that landfill gas is not migrating off-site. Once adequate data are collected, and with CIWMB concurrence, monitoring would be discontinued and associated ICs/access restrictions would be removed.
5. Implementation of ICs/access restrictions within approximately 100 feet of the waste boundary (including the 50-foot wide compliance monitoring zone plus another 50 feet as an additional safety buffer zone). Within this 100-foot land-use restriction buffer zone, any future construction of structures would require obtaining approval from the DON and the CIWMB.

In general, the RAOs developed for AA 3 as part of this FS are:

- Minimize direct contact with the landfill wastes.

- Control run-on, runoff, and erosion; minimize infiltration and potential contaminant leaching to groundwater.

- Mitigate the landfill gas migration consistent with DON's agreement with FFA Signatories and CIWMB.

- Minimize contact between surface water in Agua Chinon Wash and the landfill waste.

11.5 GENERAL RESPONSE ACTIONS

The next step of the FS process is to identify and develop general response actions that may be taken to meet the RAOs. Response actions represent general action that may be performed through the use of various technologies or combinations of technologies. Response actions for AA 3 were selected from a comprehensive list of general response actions that typically are considered for hazardous waste sites with similar contamination. The following response actions were considered applicable for conditions at AA 3.

- No Action – involves no remedial activity for the environmental media.

- ICs and access restrictions – physical access controls/restrictions (e.g., signs, fencing) and/or administrative/institutional controls (e.g., deed or access restrictions) designed to limit exposure to contaminants present at the site.

- Containment – containment technologies isolate the landfill contents and mitigate off-site migration by implementing engineered measures such as drainage controls and capping.

In addition to these presumptive remedies for municipal landfills, general response actions for removal and disposal of all wastes at AA 3 ("clean closure") were evaluated.

11.6 IDENTIFICATION AND SCREENING OF TECHNOLOGY TYPES AND PROCESS OPTIONS

Using information on the COPCs, potential receptors, and pathways, as well as ARARs, the presumptive remedies for containment of contaminants were screened to identify those that are applicable to AA 3. The presumptive remedies introduced and screened in this section include:

- landfill capping,

- ICs and access restrictions.

Screening criteria include effectiveness in accomplishing the RAOs, compliance with ARARs, and implementability.

11.6.1 Identification and Screening of Technologies

Landfill Capping. Landfill capping is a containment technology used for minimizing leachate by preventing infiltration of precipitation and surface water through the landfill mass. The primary function of the landfill cap is to provide a barrier to protect humans, animals, and plants from exposure to the contents of the landfill.

Capping technologies may be designed to reduce erosion, control emission of gas and odors, and improve aesthetics. Capping technologies also provide a stable outside surface that prevents direct

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
14	remedial alternatives	Section 2.8	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 12, pages 12-1 through 12-10 and Figures 12-1 through 12-4.

12. DEVELOPMENT AND SCREENING OF ALTERNATIVES

12.1 DEVELOPMENT OF ALTERNATIVES

This section of the FS report combines presumptive remedy technologies into alternatives capable of meeting the RAOs for AA 3. This presentation provides the basis for the detailed evaluation of alternatives presented in Section 13.

Four remedial alternatives have been developed for AA 3. These alternatives are as follows:

- Alternative 1: No Action
- Alternative 2: Limited Grading, Monitoring, and Institutional Controls
- Alternative 3: Containment, Monitoring, and Institutional Controls
    - Alternative 3a: Containment with Evapotranspiration (ET) Cover
    - Alternative 3b: Containment with Title 27 Prescriptive Cap
    - Alternative 3c: Containment with Modified Title 27 Prescriptive Cap with Geosynthetic Clay Liner (GCL)
    - Alternative 3d: Containment with Modified Title 27 Prescriptive Cap with Flexible Membrane Liner (FML)
- Alternative 4: Clean Closure and Groundwater Monitoring

12.2 SCREENING OF ALTERNATIVES

12.2.1 Alternative 1 - No Action

The NCP (40 CFR 300.430[e][6]) requires that a no-action alternative (Alternative 1) be evaluated in the FS to provide a baseline condition if no remedial action is taken. The baseline conditions are those described by the RI. Under Alternative 1, no actions are taken to reduce potential risks to human health or the environment including : ICs, access controls, monitoring, removal, disposal, *in situ* treatment, or *ex situ* treatment of the contaminated soil or groundwater. Under Alternative 1, landfill contents would remain under the existing cover and infiltration would continue to have the potential to migrate to groundwater. Natural processes would be the only mechanism acting to reduce the concentration of contaminants in the environment.

12.2.2 Alternative 2 – Limited Grading, Monitoring, and Institutional Controls

Alternative 2 implements limited site grading, drainage improvements, ICs, and long term monitoring. Specifically, Alternative 2 includes ICs and existing access restrictions, construction of a finger dike to control stormwater flow in the vicinity of AA 3, monitoring well abandonments and replacements, debris relocation, construction of a landfill gas collection system, long-term groundwater and soil gas monitoring, 5-year site reviews, limited site grading, survey monument installation, facility inspection and maintenance, and site closeout. Alternative 2 would physically limit or prevent access to AA 3 using measures such as perimeter fences, gates, and signs. In addition, monitoring wells would be locked and maintained to restrict unauthorized access.

ICs are non-engineered legal mechanisms established to limit human exposure to on site contamination. The ICs fall into two broad categories: 1) restrictions on existing and future land use,

and 2) provision for access for potential future inspection and maintenance activities. The ICs would be supplemented with access restrictions (e.g., physical controls) such as fencing and signs that would restrict access to the site. The Navy LUC guidance outlines Principles and Procedures for Specifying, Monitoring and Enforcement of Land-use controls (LUCs) and Other Post-ROD Actions for specifying and implementing ICs. A detailed discussion of ICs and their implementation procedures at AA 3 are discussed in Sections 12.2.2.1 and 12.2.2.2.

Alternative 2 proposes construction of a finger dike that is approximately 350 linear and riprap placement to prevent erosion and control stormwater flow in the vicinity of AA 3.

In addition, five monitoring wells (four inside [MW10, MW11, MW12, and MW 14] and one outside [MW08] the debris limits) would be abandoned in conjunction with remedial construction activities (see Figure 6-11). Five existing groundwater monitoring wells and three existing soil gas monitoring wells would be abandoned and replaced with new ones after ten and twenty years, respectively.

Alternative 2 would also include monitoring of landfill gas and groundwater. Monitoring, inspection, and maintenance of existing conditions would be conducted periodically.

Landfill gas monitoring for AA 3 includes performing periodic gas sampling and analysis of three existing triple-nested perimeter gas wells (PG1 through PG3) and three existing vadose zone wells (PZ1 through PZ3). Per the DON's agreement with the FFA signatories and the CIWMB (DON 2004), an active landfill gas collection system or gas vent system is proposed to be installed in accordance with CIWMB monitoring protocol. Compliance landfill gas monitoring probes will be installed within 50 feet of the waste boundary at AA 3. The results of the sampling and analysis will be evaluated periodically to assess whether a landfill gas-control system and continued monitoring are needed. As an additional safety feature, construction of passive gas control gravel trenches within the compliance monitoring zone during remedy implementation is proposed. The perimeter gas wells will be monitored at the landfill and can be used to detect off-site migration of landfill gases. The samples would be analyzed for fixed gases and VOCs. The results of the sampling and analysis over a 5-year period would be evaluated to determine whether a landfill gas-control system and/or continued monitoring are needed.

As discussed previously, no groundwater-specific response action is planned for AA 3. However, groundwater monitoring would be conducted as a result of potential action-specific ARARs for soil for capping alternatives where landfill closure and postclosure requirements may be potentially relevant and appropriate. The monitoring will involve collecting samples from monitoring wells MW01, MW02, MW04, MW06, MW07, MW09A, MW09B, and MW13 semiannually for 5 years and annually thereafter for a total of 25 years. The results of the groundwater monitoring would be reevaluated every 5 years, and the duration and/or frequency would be further modified based on the results of the reevaluation. These wells were installed as part of the groundwater investigation at AA 3. Groundwater samples will be analyzed for VOCs, SVOCs, general minerals, total metals and total petroleum hydrocarbons.

For cost-estimating purposes, it is assumed that the results of the first 5 years of semiannual groundwater monitoring, as well as data gathered during the RI for AA 3, will provide adequate trend data for the groundwater so that the sampling events may be reduced to an annual frequency for the next 25 years. The results of the groundwater monitoring will be reevaluated every 5 years, and the duration and the frequency of the groundwater monitoring may be further modified based on the results of the reevaluations.

Alternative 2 also includes a 5-year review which consists of a review of site-specific documents such as monitoring reports and decision documents after 5, 10, 15, 20, 25, and 30 years. As part of this review, an inspection would be conducted to assess site conditions. Each 5-year review would include a report providing conclusions and recommendations for future activities. After 30 years, site close-out activities would commence to include meetings, closure reports and decision documents, a monitoring well abandonment work plan and abandonment of five groundwater and three soil gas monitoring wells.

12.2.2.1 INSTITUTIONAL CONTROLS

ICs are legal mechanisms that implement land use and access restrictions to (1) limit the exposure of future landowners and/or users of the property to hazardous substances and (2) maintain the integrity of the remedial action until remediation is complete and remediation goals have been achieved. Monitoring and inspections are conducted to assure that the land-use restrictions are being followed.

Legal mechanisms include proprietary controls such as lease restrictions, restrictive covenants, negative easements, equitable servitudes, and deed notices. Administrative mechanisms include notices, adopted local land use plans and ordinances, construction permitting, or other existing land use management systems that may be used to ensure compliance with use restrictions.

AA 3 lies in the portion of the Station that has been leased to a private developer through a LIFOC, which includes interim land-use restrictions in its terms and conditions. (DON 2005). These interim restrictions will remain in effect until the leased property encompassing AA 3 is conveyed by deed to the Lessee. The Navy will rely upon proprietary controls in the form of land-use restrictions incorporated into environmental restriction convenants when the AA3 property is conveyed by deed as provided in the "Memorandum of Agreement Between the United States Department of the Navy and the California Department of Toxic Substances Control" and attached covenant models (DON and DTSC 2000). Appendix N contains the DON/DTSC MOA.

More specifically, the Navy proposes to rely upon land-use restrictions (set forth in Section 12.2.2.2) incorporated into environmental restriction covenants that will run with the land and that will be included in and implemented through two separate legal instruments when title to the AA 3 property is conveyed:

- Environmental restriction covenants included in a "Covenant to Restrict Use of Property" entered into by the DON and DTSC as provided in the DON/DTSC 2000 MOA and consistent with the substantive provisions of tit. 22 Cal. Code Regs. Section 67391.1, and

- Environmental restriction covenants incorporated into one or more Quitclaim Deeds from the DON to the property recipient.

Institutional controls under Alternative 2 will comply with substantive provisions of the California Civil Code Section 1471; California Code of Regulations, Title 22, Section 67391.1 (a) and (e)(1); and California Health and Safety Code Sections 25202.5, 25222.1, 25232(b)(1)(A)–(E), 25233(c), 25234, and 25355.5(a)(1)(C).

The following sections describe the land-use restrictions at AA 3 to protect human health and the environment.

12.2.2.2 LAND-USE RESTRICTIONS

Interim Land-Use Restrictions

Some of the activities and land uses prohibited at AA 3 per the LIFOC (DON 2005) include but are not limited to:

- Subsurface excavation, digging, drilling, or other disturbance of the ground surface without prior Government approval (LIFOC Section 13.15).
- Removal of or damage to security features (e.g., locks on monitoring wells), survey monuments, signs, or monitoring equipment and associated pipelines and appurtenances is prohibited without prior written Government approval (LIFOC Sections 13.19 and 13.21.3).
- Residential use of the sites and construction of day care centers (LIFOC Section 13.21.1).
- Construction of any structure, including placement of trailers without the prior written approval of the Navy and FFA signatories (LIFOC Section 13.21.2).

These restrictions are implemented in accordance with the LIFOC until the AA 3 property is conveyed by deed to the Lessee.

Proposed Land-Use Restrictions

This section identifies the land use restrictions proposed for the AA 3 property when title to the property is conveyed. The following restricted land uses for AA 3 must be reviewed and approved in writing in advance by the FFA Signatories and CIWMB in accordance with the "Covenant(s) to Restrict Use of the Property" and Quitclaim Deed(s) prior to use of the property for any of the restricted uses:

- A residence, including any mobile home or factory built housing, constructed or installed for use as residential human habitation,
- A hospital for humans,
- A school for persons under 21 years of age,
- A day care facility for children, or
- Any permanently occupied human habitation including those used for commercial or industrial purposes

The land use restrictions would prohibit following activities in accordance with the "Covenant(s) to Restrict Use of the Property" and Quitclaim Deed(s):

- Planting deep-rooted plants that have the potential to interfere with the performance of the cap (if constructed) in minimizing infiltration without prior review and written approval of the FFA signatories and CIWMB.

- Alteration, disturbance, or removal of any component of a response action including but not limited to landfill cap (if constructed), groundwater monitoring wells, and survey monuments without prior review and written approval of the FFA signatories and CIWMB.

- Removal or damage to security features including but not limited to fencing and signs without prior review and written approval of the FFA signatories and CIWMB.

- Construction of facilities, structures, or appurtenances, excavation, or any other land-disturbing activity into or on the surface of the landfills that may involve adverse impacts upon the performance of the cap or affect the drainage and erosion controls developed for the cap unless prior concurrence of the FFA signatories and CIWMB.

- Construction of structures within 100 feet of the edge of the landfill without prior concurrence of the FFA signatories and CIWMB. CIWMB monitoring protocol will be implemented using landfill gas monitoring probes within 50 feet of the waste boundary. The perimeter will be monitored to demonstrate that landfill gas is not migrating. Once adequate data are collected, and with CIWMB concurrence, monitoring would be discontinued and land-use restrictions would be removed.

The actual land-use restrictions, and the process and criteria required for getting concurrence for restricted activities will be discussed in the property transfer documents including FOST.

Access

The Deed and Covenant will provide that the Navy and FFA Signatories and their authorized agents, employees, contractors and subcontractors shall have the right to enter upon AA 3 to conduct investigations, tests, or surveys; inspect field activities; or construct, operate, and maintain any response or remedial action as required or necessary under the cleanup program, including but not limited to monitoring wells, pumping wells, treatment facilities, and cap/containment systems.

Implementation

The Navy will address/describe ICs implementation and maintenance actions including periodic inspections and reporting requirements in the preliminary and final remedial design (RD) reports to be developed and submitted to the FFA Signatories for review pursuant to the FFA (see "Navy Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions" attached to January 16, 2004 DoD memorandum titled "Comprehensive Environmental Response, Compensation and Liability Act [CERCLA] Record of Decision [ROD] and Post-ROD Policy"). The preliminary and final RD reports are primary documents as provided in the FFA.

12.2.3 Alternative 3 - Containment, Monitoring, and Institutional Controls

12.2.3.1 Alternative 3a - Containment with Evapotranspiration Cover

Alternative 3a includes the construction of a single layer cap (otherwise known as an evapotranspiration [ET] landfill cover system), stormwater control system construction, the implementation of ICs and existing access restrictions, monitoring well abandonments and installations, debris relocation, construction of a landfill gas collection system, long-term groundwater and soil gas monitoring, access road construction, 5-year site reviews, facility inspection and maintenance, and site closeout.

Landfill capping for Alternative 3a would consist of the following:

- installation of a landfill monitoring and passive gas system;
- grading and compacting the material within the landfill and under the cap area;
- constructing a single layer cover using native soil to prevent infiltration and leachate formation (ET cap);
- providing for surface drainage control;
- revegetating the surface with annual grasses to prevent erosion; and
- groundwater monitoring to assess effectiveness of cover system.

The ET landfill cover design consists of a two-foot-thick foundation layer, a monolithic soil layer consisting of off-base borrow soil, and a vegetative layer. The foundation layer would be composed of existing cover soils required to be compacted to a relative density of 90 percent. The thickness of the monolithic soil layer will be determined by unsaturated soil water flow modeling results. A typical cross section of the existing native soil cover is shown in Figure 12-1. The use of native soil as a cover for containment of wastes may be appropriate in arid climates where surface water infiltration (and subsequent leachate generation) is not a controlling factor.

Native soil caps are used when the primary objective is to control erosion and prevent direct contact. In regions having greater evapotranspiration potential than rainfall, native soil covers can be engineered to reduce infiltration. Use of a native soil cap under the current (non-irrigated) condition and under irrigated conditions must be justified by demonstrating equivalence with a Title 27 prescription (clay) cap.

The single-layer cap proposed in Alternative 3a would consist of a minimum 4-foot native soil cover over AA 3. Although this area is approximately 9 acres, the cap itself would occupy approximately 9.7 acres. This is because the 3:1 side slopes of the cap will extend the area of the landfill by approximately 12 feet all around. This cap would be composed of clean soil imported from the surrounding areas near the site that would be excavated and hauled by conventional, commercially available equipment (e.g., bulldozers, track loaders, off-road trucks, and scrapers or similar equipment). The native soil cover would be placed over the top of the landfill. The cap would be graded to provide 3-percent slopes on top of the landfill and 3:1 (horizontal: vertical) slopes on the sides.

The soils proposed for use in the monolithic cap (Alternative 3a) and much of the foundation and vegetative layers of the alternatives for the barrier covers are derived from the proposed borrow source. These soils in the proposed borrow source are marine siltstones and sandstones of the Topanga Formation. Prior to detailed design of the covers, soil samples from the borrow source should be collected and assessed for geotechnical properties, especially hydraulic conductivities.

The existing top of the landfill is currently graded and flush with the adjacent surface. Therefore, the landfill does not have any side slopes. The native soil cover material will be hauled to the site from locally available sources for placement of the 4-foot-thick cover. Consequently, the top surface of the landfill would rise 4 feet higher than the immediate surrounding ground surface. Although the

current existing landfill cover is believed to be no more than 1 foot thick in some areas, the existing cover would not be disturbed as a result of clearing, stripping, and grading activities.

Surface settlement is a potentially important issue in evaluating the implementability, effectiveness, and cost of cap installation. In general, waste in landfills or trenches consolidates over time, increasing the density of the waste as the weight of the waste and overlying soil presses the mass into a smaller volume. This consolidation process usually shows on the surface soil as surface subsidence or differential settlement. Typical surface indicators are fissures, cracks, foundation movement, and utility or road failures. The amount of settlement is usually dependent on the type, density, and depth of waste; the initial compaction effort used to place the waste; and climate. The additional weight of the landfill closure cap could increase the surface settlement. The potential impact of surface settlement on the cap installation will be addressed in the remedial design phase, and therefore is not discussed in this FS.

Alternative 3a includes monitoring well abandonment and replacement, and long term monitoring of groundwater as proposed in Alternative 2. Casing extensions would be required for four existing monitoring wells to accommodate surface elevation changes associated with the landfill cap construction and site grading.

In addition, Alternative 3a will include the construction of an active and passive landfill gas collection system and associated monitoring and construction of a stormwater control system, as described in Alternative 2.

The ICs and the implementation of the ICs for Alternative 3a will be similar to Alternative 2 (Section 12.2.2.1 and 12.2.2.2). There are no utility easements crossing AA 3, however there are stormwater conveyance structures within 50 feet of the waste placement boundary that may require repair or maintenance. Therefore, ICs and access restrictions will require coordination with the DON prior to allowing repair of utility lines. It does appear that it will be necessary to move utility lines in order to implement this alternative. However, utilities may eventually be placed at the site to support future reuse.

12.2.3.2 ALTERNATIVE 3B - CONTAINMENT WITH TITLE 27 PRESCRIPTIVE CAP

Alternative 3b involves installing a state prescriptive landfill cover system, stormwater control system construction, the implementation of ICs and existing access restrictions, monitoring well abandonments and installations, debris relocation, construction of a landfill gas collection system, long-term groundwater and soil gas monitoring, access road construction, 5-year site reviews, facility inspection and maintenance, and site close-out.

The prescriptive landfill cap would consist of the following layers.

- Foundation Layer – 2 feet of appropriate material. According to Title 27 CCR 21090 (a)(1), the prescribed foundation shall consist of a minimum 2-foot-thick layer of soil over the waste, compacted to provide an adequate structural substrata for successive layers. No permeability specification is given for this layer.

- Barrier Layer – 1 foot of compacted clay with permeability of no greater than 1 x 10^{-6} cm/s or less (or equal to the permeability of any bottom liner system or underlying natural geologic materials, whichever is less). This layer is intended to act as a barrier to infiltration.

- Protective Soil Layer – 2 feet of clean soil on top of the barrier layer. According to Title 27 CCR 21090 (a)(3), the prescribed protective soil layer consists of a minimum 1-foot-thick soil cover intended to protect the barrier layer, control surface erosion, and provide a medium for vegetation. No permeability specification is given for this layer.

The top two feet of the existing approximately 4-foot-thick soil cover would be removed and stockpiled prior to compaction of the foundation layer and placement of the clay barrier layer. The removed soil will be used for vegetative soil cover. The foundation layer would be composed of the remaining 2 feet of existing cover soil, which would be compacted to a relative density of 90 percent.

Implementation of this alternative would involve importing clay from off-site sources because suitable clayey materials are not available on-site. The material for the clay layer would be obtained from off-site clay deposits around the Former MCAS El Toro area. For cost-estimating purposes, it is assumed that potential clay borrow sources may be available within 20 miles of the site. The clay would be excavated, transported to AA 3, and graded and compacted to achieve a permeability of 1 x 10^{-6} cm/s or less. A cross section of the cap is shown on Figure 12-2.

The cap would be revegetated with annual grasses. The purpose of the vegetative layer is to protect the clay layer from erosion, desiccation and cracking, and traffic. Although the regulations only require 1 foot of vegetative cover, the proposed vegetative soil cover in Alternative 3b is 2-foot-thick to support the rooting depth of annual grasses and to enhance its effectiveness in protecting the barrier layer. This layer would be designed to maximize runoff with minimal surface erosion.

The cap would be designed and constructed in accordance with commonly practiced industry standards and would require minimal maintenance. Standard and readily available construction equipment would be used.

Alternative 3b also includes ICs, access restrictions, monitoring well abandonment, replacement and casing extensions and long term monitoring as proposed in Alternative 3a. The ICs and the implementation of the ICs for Alternative 3b will be similar to Alternative 2 (Section 12.2.2.1 and 12.2.2.2). In addition, Alternative 3b will include the construction of an active and passive landfill gas collection system and associated monitoring and construction of a stormwater control system, as described in Alternative 2 and also implemented in Alternative 3a.

12.2.3.3 ALTERNATIVE 3C - CONTAINMENT WITH MODIFIED TITLE 27 PRESCRIPTIVE CAP WITH GEOSYNTHETIC CLAY LINER

Alternative 3c includes the construction of a GCL cover system, stormwater control system construction, the implementation of ICs, existing access restrictions, monitoring well abandonments and installations, debris relocation, construction of a landfill gas collection system, long-term groundwater and soil gas monitoring, access road construction, 5-year reviews, facility inspection and maintenance, and site closeout.

Alternative 3c is a variation of Alternative 3b – State Prescriptive Landfill Cover, but uses a GCL, rather than a clay barrier layer as an infiltration barrier. Given the potentially high cost of importing clay or processing/mixing of soil/bentonite for the prescribed 1-foot-thick barrier layer, it may be cost-effective to use a GCL for the barrier layer. GCL is a manufactured hydraulic barrier consisting of sodium-bentonite clay sandwiched between two layers of geotextile that are held together by needling, stitching, or adhesives. The GCL provides a permeability of significantly less than 10^{-6} cm/s, and is simpler to construct than a geomembrane or clay liner. The GCL material is brought to the site in 15-foot-wide rolls. Sheets vary in length and are approximately 150 feet long. The

material is unrolled and placed over the surface that needs to be covered. Sheets are overlapped by 1 foot on each side. A layer of bentonite powder is placed between the overlapping areas. Anchoring may be required on the steep slopes.

The GCL landfill cover design consists of a two-foot-thick foundation layer composed of existing cover soils, a GCL barrier layer, and a two-foot thick vegetative cover layer. The foundation layer would be composed of existing cover soils required to be compacted to a relative density of 90 percent. The vegetative cover layer would be composed of the top two feet of existing soil cover, which would be removed and stockpiled prior to compaction of the foundation layer and placement of the GCL. A cross section of this cap is shown in Figure 12-3. Other components of Alternative 3c are identical to the corresponding components of Alternative 3b. Installation of the GCL does not require a specialty contractor or specialized equipment.

Alternative 3c also includes ICs, access restrictions, monitoring well abandonment, replacement, and casing extensions and long term monitoring of groundwater as proposed in Alternatives 3a and 3b. The ICs and the implementation of the ICs for Alternative 3c will be similar to Alternative 2 (Section 12.2.2.1 and 12.2.2.2). In addition, Alternative 3c will include the construction of an active and passive landfill gas collection system and associated monitoring and construction of a stormwater control system, as described in Alternative 2 and also implemented in Alternatives 3a and 3b.

12.2.3.4 ALTERNATIVE 3D - CONTAINMENT WITH MODIFIED TITLE 27 PRESCRIPTIVE CAP WITH FLEXIBLE MEMBRANE LINER

Gradual desiccation of the low-permeability layers used in Alternative 3a is a strong possibility in arid and semiarid climates. This desiccation might compromise the effectiveness of the Title 27 CCR prescriptive cap for minimizing infiltration. Alternative 3d addresses this issue by replacing the clay layer with a 40 mil (or thicker) FML.

Alternative 3d includes the construction of a FML landfill cover system, stormwater control system construction, the implementation of ICs and existing access restrictions, monitoring well modifications, abandonments, and replacements, debris relocation, construction of a landfill gas collection system, long-term groundwater and soil gas monitoring, access road construction, 5-year site reviews, facility inspection and maintenance, and site closeout.

The FML landfill cover design consists of a two-foot-thick foundation layer, a FML, and a two-foot thick vegetative cover layer. The foundation layer would be composed of existing cover soils required to be compacted to a relative density of 90 percent. The vegetative cover layer is composed of the top one to two feet of existing soil cover, which would be removed and stockpiled prior to compaction of the foundation layer and placement of the FML. All other components of this option are identical to those for Alternatives 3a, 3b, and 3c. A typical cross section of the cap system for Alternative 3d is shown in Figure 12-4.

The design and construction of the FML will be according to commonly-practiced industry standards. Examples of FMLs include HDPE or LDPE. The specific membrane material will be selected during remedial design. After compaction, grading, and surface preparation of the foundation layer, sheets of FML would be placed and fusion-welded together, followed by weld testing to assure the integrity of welded seams. The FML is available in rolls 22 or 34 feet wide and up to 450 feet in length. The material is unrolled on-site and placed over the areas to be lined. FML can easily be cut to fit corners and areas with any unusual size and shape. When placed on steep slopes, the FML requires anchoring (in anchor trenches) at the top of the slope to prevent the liner and the overlying soils from slipping and sliding. A layer of geotextile material with sufficient

thickness would be placed under and over the FML to provide additional protection to the liner against puncture or tearing resulting from the underlying foundation layer or the overlying protective soil cover.

Alternative 3d also includes ICs, access restrictions, monitoring well abandonment, replacement, and casing extensions and long term monitoring as proposed in Alternatives 3a, 3b, and 3c. The ICs and the implementation of the ICs for Alternative 3d will be similar to Alternative 2 (Section 12.2.2.1 and 12.2.2.2). In addition, Alternative 3d will include the construction of an active and passive landfill gas collection system and associated monitoring and construction of a stormwater control system, as described in Alternative 2 and also implemented in Alternatives 3a, 3b, and 3c.

12.2.4 Alternative 4 - Clean Closure and Groundwater Monitoring

Alternative 4 (clean closure) includes excavation and removal of all buried construction debris at AA 3, groundwater and soil gas monitoring well abandonment, site revegetation, long term groundwater monitoring for 5 years, a 5 year site review, and site closeout.

Clean closure may be an appropriate alternative to closing a landfill site in place. According to the CIWMB guidelines (CIWMB 1994), sites that generally lend themselves to clean closure include:

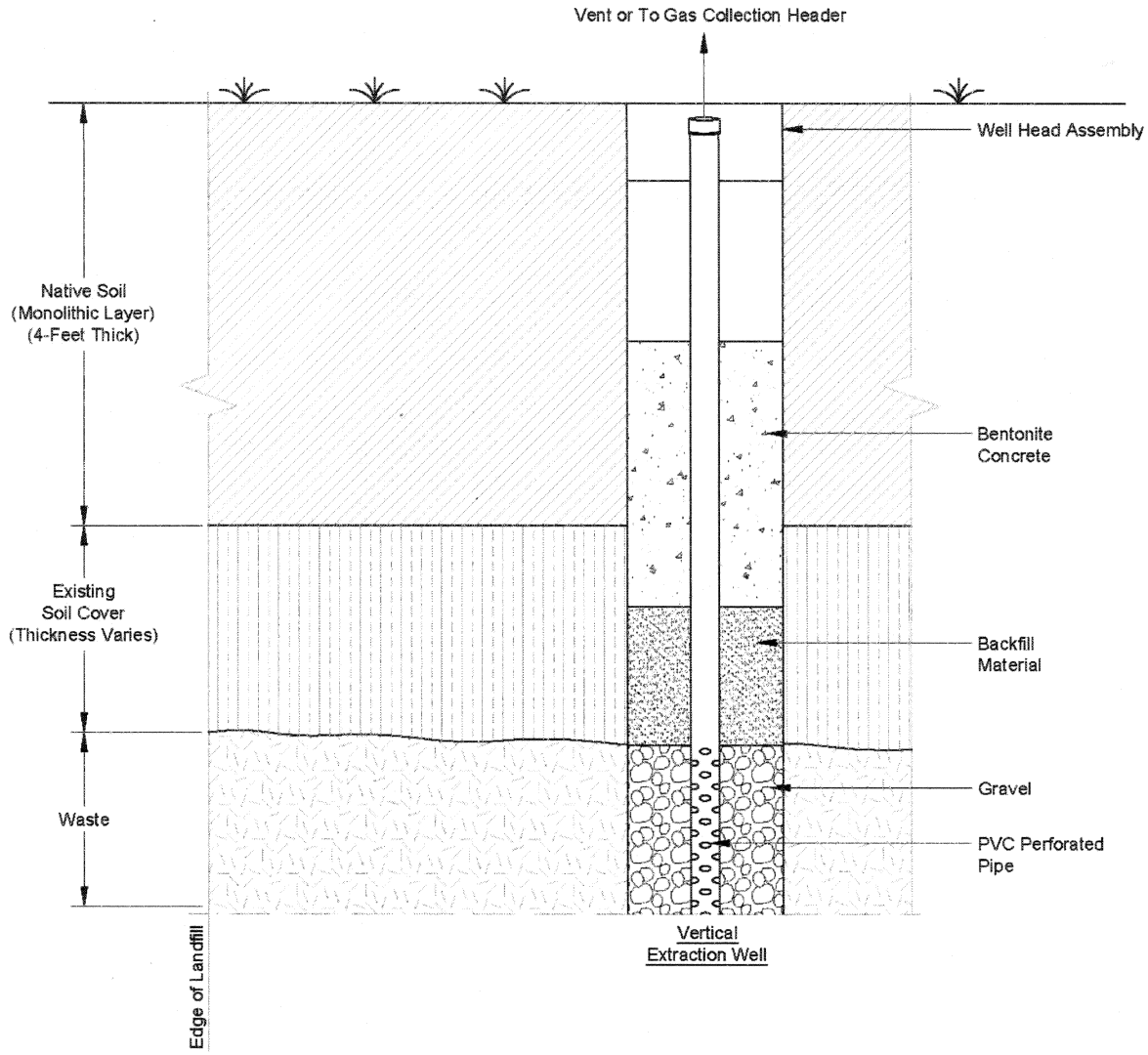
- small landfills and burn dumps;
- nonhazardous wood waste disposal sites;
- solid and liquid waste treatment and processing units; and
- sites where the cost of clean closure would be less than or equal to the costs of long-term monitoring and postclosure maintenance of the site.

The advantages of clean closure include elimination of the need for 30 years of postclosure maintenance, potential future corrective actions, regulatory agency inspections of the site, and an increase in potential future land uses of the site.

Clean closure of AA 3 was considered. To prepare a cost estimate for clean closure, three scenarios were developed:

1. 50% of the buried debris would be disposed of as RCRA hazardous waste requiring stabilization, and 50% of the buried debris would be disposed of as non-hazardous waste.
2. 25% of the buried debris would be disposed of as RCRA hazardous waste requiring stabilization, and 75% of the buried debris would be disposed of as non-hazardous waste.
3. 100% of the buried debris would be disposed of as non-hazardous waste.

Clean closure would involve removal of site contaminants to concentrations protective of human health and the environment.

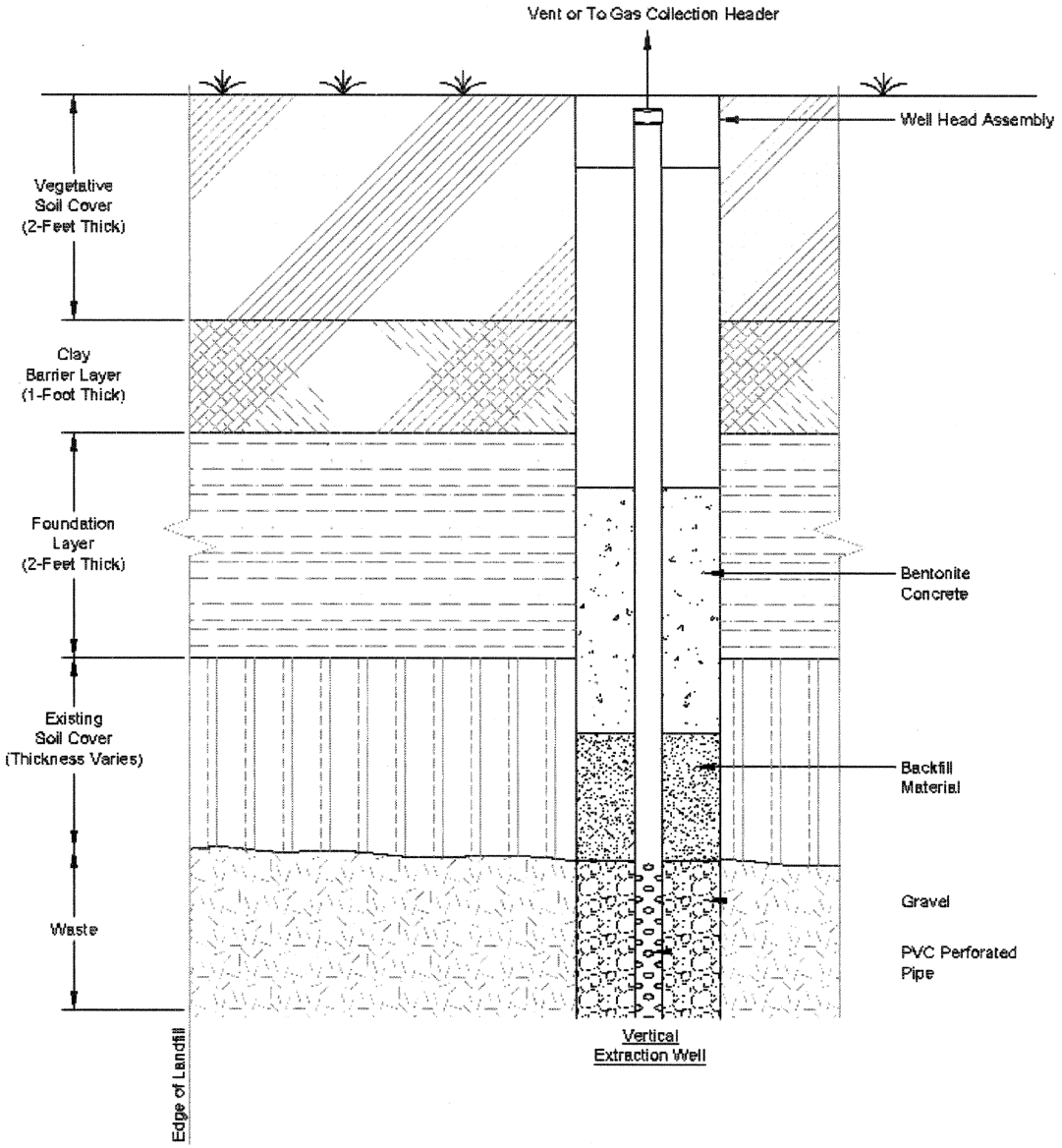


Alternative 3a - Evapotranspiration Cover
Typical Landfill Cross Section

Not to Scale

RI/FS Report	Draft Final
Alternative 3a - Typical Cross-Section	
Anomaly Area 3	
Date: 04-08	Former MCAS El Toro
Project No. 04.1107.006/ 29307	**Barajas & Associates, Inc.**
	Figure 12-1

File: L:\work\...\work\AA3\CAD\In-Progress Draft Final RI FS\FS Figures\CADD Source Files\Figure ...2-1 to 12-4\Figure 12-1.dwg Time: Apr 02, 2008 - 2:13pm

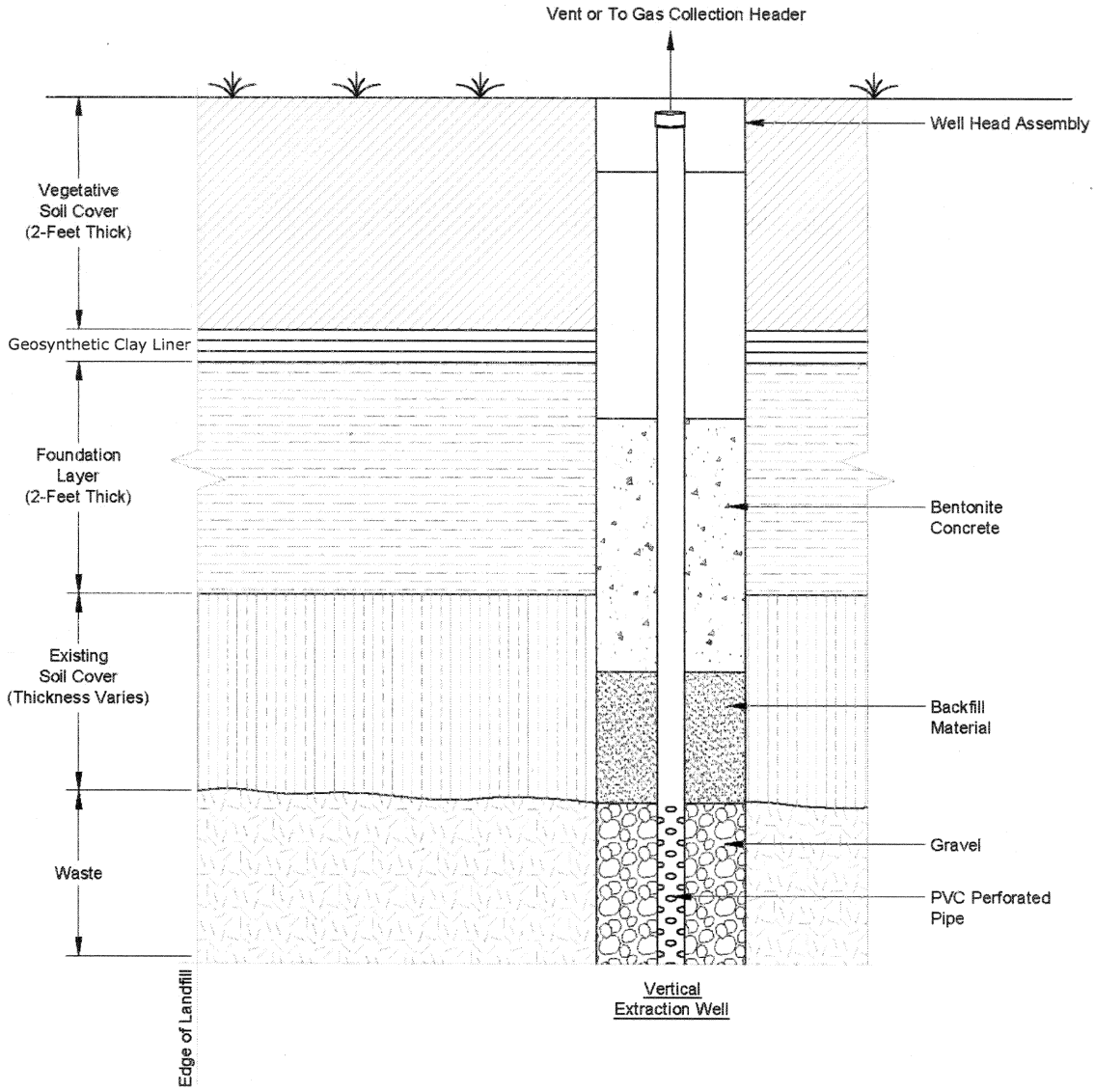


Alternative 3b - Title 27 Prescriptive Cap with Clay Barrier
Typical Landfill Cross Section

Not to Scale

RI/FS Report	Draft Final
Alternative 3b - Typical Cross-Section	
Anomaly Area 3	
Date: 04-08	Former MCAS El Toro
Project No. 04.1107.006/ 29307	Barajas & Associates, Inc.
	Figure 12-2

File: L:\work\29307\work\AA3\CAD\In-Progress Draft Final RI FS\FS Figures\CADD Source Files\Figures 12-1 to 12-4\Figure 12-2.dwg Time: Apr 02, 2008 - 2:13pm

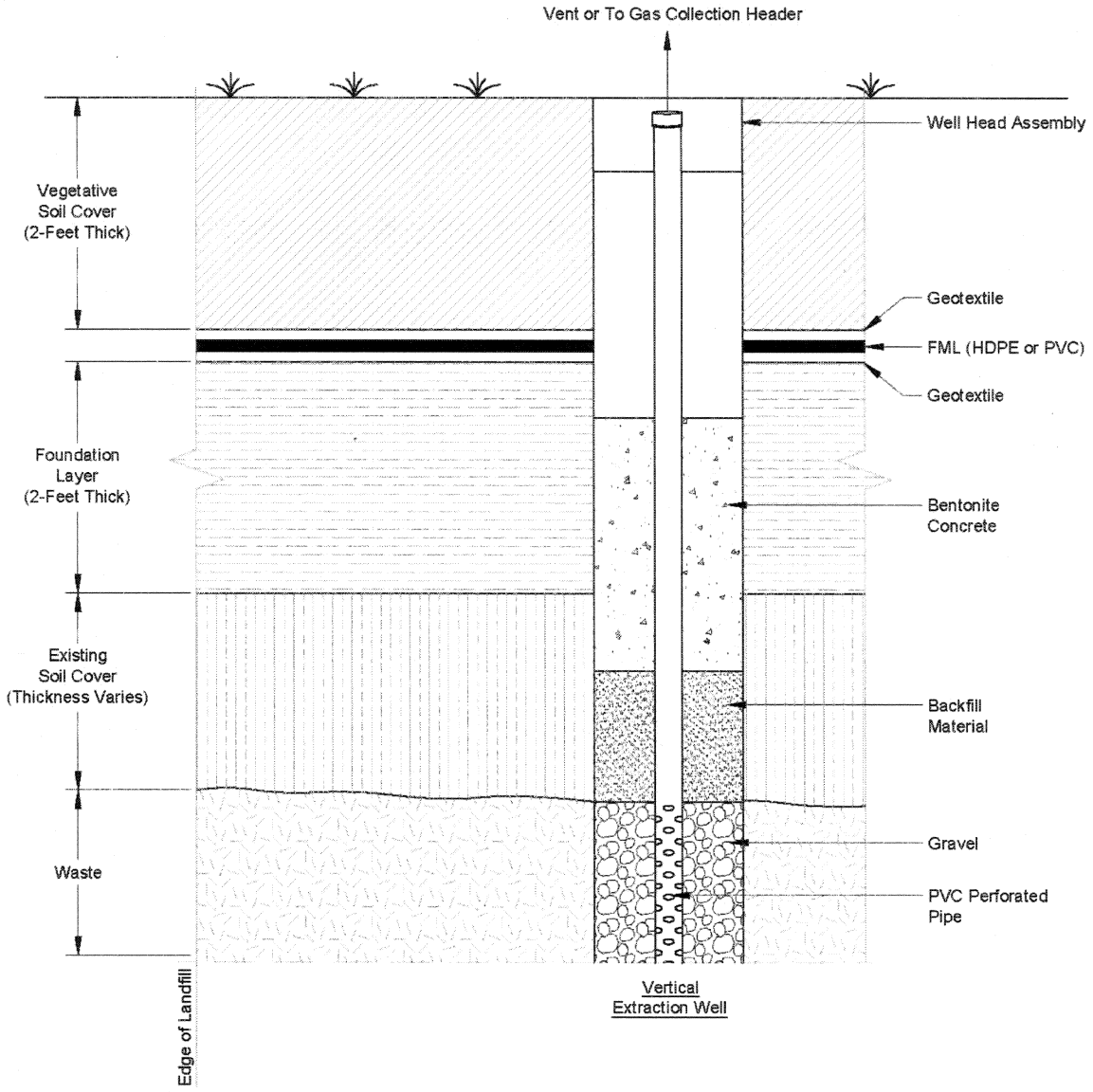


Alternative 3c - Title 27 Prescriptive Cap with Geosynthetic Clay Liner Typical Landfill Cross Section

Not to Scale

RI/FS Report	Draft Final
Alternative 3c - Typical Cross-Section	
Anomaly Area 3	
Date: 04-08	Former MCAS El Toro
Project No. 04.1107.006/ 29307	**Barajas & Associates, Inc.**
Figure	12-3

File: L:\work\...\work\AA3\CAD\In-Progress Draft Final RI FS\FS Figures\CADD Source Files\Figures 2-1 to 12-4\Figure 12-3.dwg Time: Apr 02, 2008 - 2:13pm



Alternative 3d - Title 27 Prescriptive Cap with Flexible Membrane Liner Typical Landfill Cross Section

Not to Scale

RI/FS Report	Draft Final
Alternative 3d - Typical Cross-Section	
Anomaly Area 3	
Date: 04-08	Former MCAS El Toro
Project No. 04.1107.006/ 29307	Barajas & Associates, Inc.
	Figure 12-4

File: L:\work\[illegible]\work\AA3\CAD\In-Progress Draft Final RI FS\FS Figures\CADD Source Files\Figures 12-1 to 12-4\Figure 12-4.dwg Time: Apr 02, 2008 - 2:13pm

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
15	comparative analysis	Section 2.8	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, pages 13-1 through 13-35.

13. DETAILED ANALYSIS OF ALTERNATIVES

13.1 INTRODUCTION

The detailed analyses of the remedial alternatives (described in Section 12) retained for the FS evaluation are presented below. The remedial action alternatives developed for AA 3 were evaluated using the NCP Part 300.430(e)(99)(iii) criteria. A brief introduction to these nine NCP criteria under the grouping of threshold, primary balancing, and modifying criteria is presented below.

Threshold Criteria

1. Overall Protection of Human Health and the Environment. This criterion is an assessment of how each alternative protects human health and the environment, in the short term and long term, from acceptable risks posed by hazardous substances, pollutants, or contaminants present at the site. This criterion assesses whether risks are reduced as a result of the remedial action alternative.
2. Compliance with ARARs. This criterion assesses the compliance of each alternative with ARARs under the federal environmental laws and state environmental and facility siting laws.

Primary Balancing Criteria

1. Long-term Effectiveness and Permanence. This criterion assesses long-term effectiveness and permanence of the alternatives and the degree of certainty that the alternative will prove successful. According to the U.S. EPA (U.S. EPA 1991a), the long-term effectiveness and permanence of presumptive remedies for landfills include: (1) the degree to which the cap inhibits mobility of landfill contents, and (2) the ability of the landfill cap to maintain its integrity. The effectiveness of the cap in inhibiting the mobility of the landfill contents is related to the amount by which the cap reduces infiltration into landfill materials.
2. Reduction in Toxicity, Mobility, or Volume through Treatment. This criterion assesses the degree to which the alternatives employ recycling or treatment that reduces toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the site.
3. Short-term Effectiveness. The short-term effectiveness criterion assesses short-term risk to the community during implementation of an alternative including: (1) potential impacts on workers during the remedial action and the effectiveness and reliability of protective measures, and (2) potential environmental impacts of the remedial action and the effectiveness and reliability of mitigative measures during the implementation. This criterion also assesses the time required to achieve cleanup objectives until the cleanup objectives are achieved.
4. Implementability. This criterion assesses: (1) technical feasibility, (2) availability of services and materials, and (3) administrative feasibility.
5. Cost. The evaluation of the costs involves the development of the following components: (1) capital costs, including both direct and indirect costs, (2) annual operation and maintenance (O&M) costs, and (3) the grand total of capital and O&M costs including a contingency of 20%. These cost estimates are order-of-magnitude estimates that are intended to be used for comparative purposes only. These cost estimates should not be used for budget or funding purposes.

Modifying Criteria

1. State Acceptance. This criterion assesses the state acceptance of the alternative with respect to the following issues: (1) state agencies' position and key concerns related to the preferred alternative and other alternatives, and (2) state agencies' comments on ARARs.
2. Community Acceptance. This criterion assesses the general community support, reservations, or opposition to the alternatives.

13.2 INDIVIDUAL ANALYSIS OF ALTERNATIVES

The remedial alternatives developed for AA 3 were formulated in Section 12. Each of the alternatives, including options, is evaluated relative to the nine NCP criteria. This evaluation is intended to highlight the strengths and weaknesses of the alternatives and provide adequate information for decision makers to select the most appropriate alternative for AA 3. A conceptual landfill cover design drawing is presented in Figure 13-1.

13.2.1 Alternative 1 – No Action

Alternative 1 includes no action for AA 3. In evaluating this alternative, the following assumptions are made:

- the DON does not provide any ICs or access restrictions or construct any containment systems for the landfill; and
- no monitoring of the various media is conducted.

Description. Alternative 1 assumes that current conditions of the site would remain in place. Therefore, no further action will be taken to prevent direct contact with the landfill wastes, control surface water run-on and runoff, control erosion, or control infiltration and potential contaminant leaching to groundwater.

Although there is no designed landfill cap, most of the waste mass is currently covered by an approximately 2 to 5 feet thick layer of soil (Earth Tech 2005a).

Evaluation. Individual evaluation of Alternative 1 with respect to the nine NCP criteria is provided in the following subsections.

1. Overall Protection of Human-Health and the Environment. Alternative 1 includes no treatment, containment, or ICs and access restrictions. The baseline human-health risk assessment performed for AA 3 indicates that current site conditions pose an excess lifetime cancer risk greater than 1×10^{-5} due to surface soils and a risk greater than 1×10^{-4} due to groundwater; however a significant portion of the risk is attributable to background levels of arsenic. The ecological risk assessment concluded that contamination at the site is not likely to impact wildlife receptors. These values indicate that the risk due to soil and groundwater at AA 3 is within the NCP-defined risk management range. By taking no action, the possibility will remain that humans could inadvertently come directly in contact with wastes. Because Alternative 1 does not actively mitigate infiltration, take action to prevent direct contact with landfill materials, or monitor for the presence of contaminants, no risk reduction occurs.
2. Compliance with ARARs. By taking no action to contain the landfill, infiltration into the landfill could continue, and direct contact could be made with landfill contents, therefore,

Alternative 1 will not comply with the Title 27 CCR requirements for closure (engineered cover alternative) and postclosure of landfills in California.

3. Long-Term Effectiveness and Permanence. Alternative 1 would have little long-term effectiveness at reducing risks associated with the landfill. Potential impacts to groundwater through infiltration still would be present. Because of the existing small cover thickness and potential for erosion of Agua Chinon Wash, risk of exposure to contaminants through direct contact with the waste would still continue to exist.

   Because Alternative 1 is meant to serve as a baseline against which the other alternatives may be compared, the Unsaturated Soil Water and Heat Flow Model (UNSAT-H) (presented in Appendix K), was used to estimate drainage (the amount of water infiltrated through the base of the landfill cover) that would occur if no action were taken. The results indicated that if no action is implemented at AA 3, drainage over a 10-year period is estimated to be within 10 percent of the predicted drainage for a state-prescriptive cap.

4. Reduction in Toxicity, Mobility, or Volume through Treatment. The reduction of volume of landfill material would not be achieved. UNSAT-H modeling indicates comparable performance to a state-prescriptive cap if a vegetative soil cover were maintained. The existing cover would not be maintained, therefore the effectiveness could not be maintained and the resulting potential for leachate production would not be reduced.

5. Short-Term Effectiveness. There is no short-term effectiveness associated with Alternative 1 since no active remedial activities are performed.

6. Implementation. There are no implementation factors associated with Alternative 1.

7. Cost. There are no costs associated with Alternative 1.

8. State Acceptance. The review of Alternative 1 as part of this FS effort is pending.

9. Community Acceptance. Community acceptance of Alternative 1 will be assessed following the public review process.

13.2.2 Alternative 2 – Limited Grading, Monitoring, and Institutional Controls

Alternative 2 includes ICs and access restrictions and limited grading at AA 3. Environmental monitoring would be performed utilizing existing monitoring networks. ICs, access restrictions, and monitoring are some of the presumptive remedies available for municipal landfills.

Description. ICs and access restrictions restrict the use of a landfill site, thus reducing exposure to on-site contamination (see Section 12.2.2.1 and 12.2.2.2 for details). Alternative 2 would physically limit or prevent access to AA 3 using measures such as perimeter fences, gates, and signs. In addition, Alternative 2 would include construction of a finger dike and placement of riprap to prevent erosion of the soil cover and control stormwater flow in the vicinity of AA 3, long-term groundwater and soil gas monitoring, 5-year site reviews, limited site grading, survey monument installation, facility inspection and maintenance, and site closeout

Monitoring activities included in Alternative 2 are landfill gas monitoring beneath the site and groundwater monitoring from existing probes and wells. Monitoring is currently planned to be performed for 30 years or until monitoring data indicate that the waste no longer presents a risk to

human health and the environment. Monitoring requirements will be reevaluated for appropriateness at 5-year intervals.

Environmental monitoring for Alternative 2 would be conducted at currently existing monitoring locations. Landfill gas and groundwater would be monitored. Security measures (fences, signs, and locks) would be inspected and repaired as required.

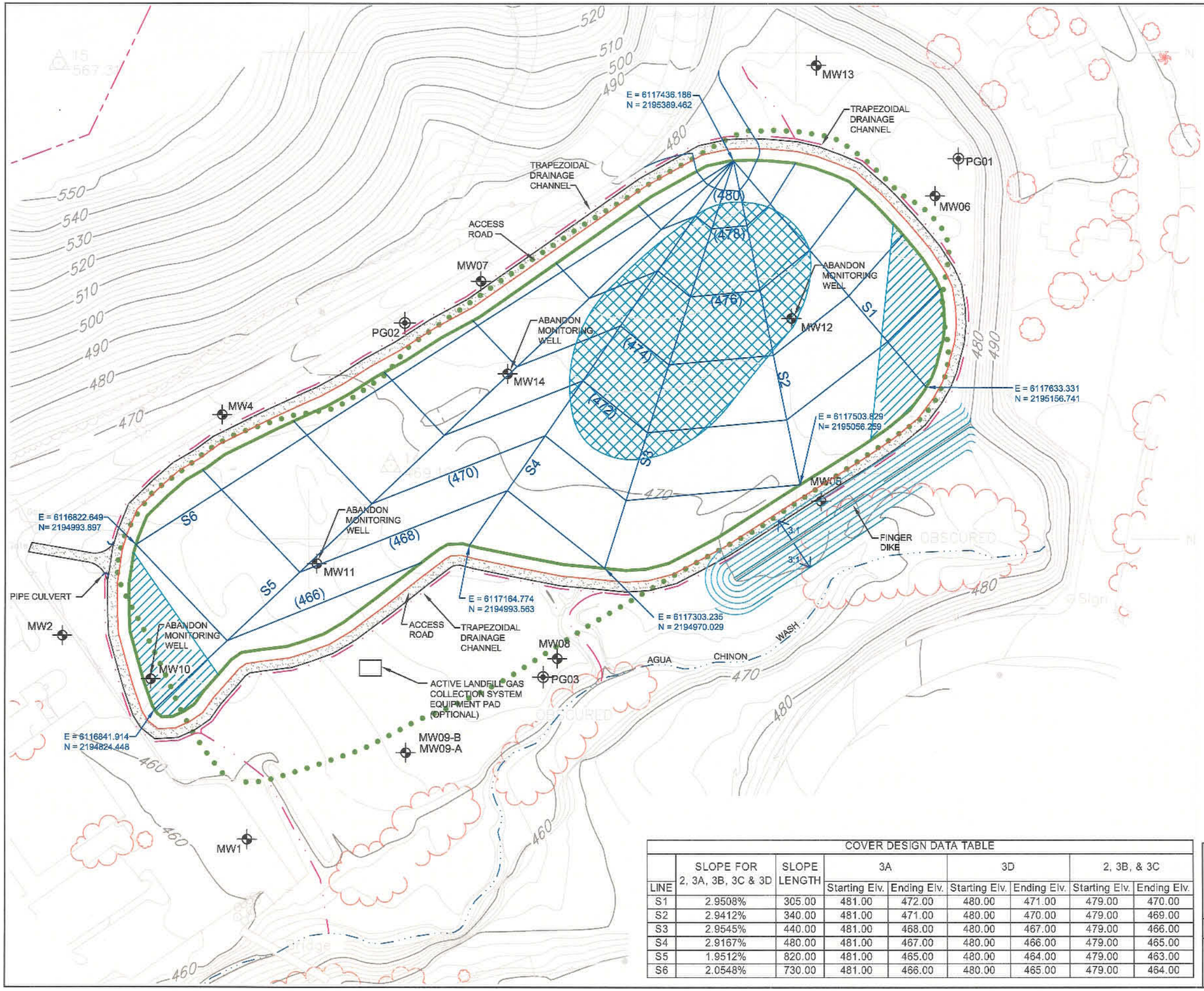
- Landfill gas monitoring for AA 3 would be performed using periodic gas sampling and analysis at three existing triple nested perimeter gas wells (PG1 through PG3). An active landfill gas collection system or gas vent system is proposed to be installed in accordance with CIWMB monitoring protocol. Compliance landfill gas monitoring probes will be installed within 50 feet of the waste boundary. This will act as an early warning feature for the initiation of landfill gas collection and treatment to prevent migration of landfill gas above Title 27 CCR thresholds at the 100-foot compliance point.

- Groundwater monitoring consistent with Title 27 CCR capping requirements would be performed from five existing monitoring wells to assess if groundwater quality is being degraded.

The results of the RI for AA 3 indicate that soil gas was detected at relatively low concentrations and only at isolated sampling locations. Therefore, the landfill gas-closure requirements are limited to monitoring. However in subsequent discussions with the regulatory agencies, an agreement was reached with the CIWMB and the FFA signatories pertaining to the landfill gas control measures at AA 3. The agreement was based on the results of the landfill gas investigations at AA 3, anticipated post-closure land use, and the DON's consultation with FFA representatives and CIWMB.

Evaluation. Individual evaluation of Alternative 2 with respect to the nine NCP criteria is provided in the following subsections.

1. Overall Protection of Human Health and the Environment. Current site conditions do not pose potential risks to human health. Alternative 2 includes limited grading and construction of a finger dike and placement of riprap to prevent erosion and control stormwater flow in the vicinity of AA 3. Access controls, such as fences and signs, should prevent inadvertent contact with wastes. ICs would restrict land-use that may lead to unacceptable risk to human health and the environmental and prevent activities that could threaten the integrity of the existing cover. For these reasons, Alternative 2 is considered protective of human health and the environment.
2. Compliance with ARARs. Certain provisions of Title 27 CCR were identified as ARARs that identify closure and post-closure requirements for landfills. Results from UNSAT-H modeling indicate that the existing soil cover offers equivalent performance as the state–prescriptive cap. Monitoring, ICs, and access restrictions satisfy the groundwater monitoring and security requirements of these ARARs..
3. Long-Term Effectiveness and Permanence. Annual drainage into the landfill has been estimated using UNSAT-H evaluations. The predicted water balance is provided for each year of the 10-yr simulation period, based on climatic conditions for the site from 1980 through 1989. The predicted annual drainage for the existing soil cover with an assumed 80 percent compaction ranges from 0.002 inches to 8.702 inches (0.005 cm to 22.103 cm). It should be noted that the assumed compaction value of 80 percent used for modeling purposes, represents the natural condition of the existing soil cover, and is not intended to be



LEGEND

- MINOR SURFACE ELEVATION: 2-FOOT INTERVALS
- 460 — MAJOR SURFACE ELEVATION: 10-FOOT INTERVALS
- MCAS EL TORO BOUNDARY
- AGUA CHINON WASH
- TRAPEZOIDAL DRANAGE CHANNEL
- REVISED EXTENT OF WASTE PLACEMENT BASED ON TRENCHING ACTIVITY(MARCH 2000 AND OCTOBER 2002)
- MW06 — GROUNDWATER MONITORING WELL
- PG01 — PERIMETER GAS MONITORING WELL
- DEBRIS REMOVAL AREA
- DEBRIS CONSOLIDATION AREA

NOTES

1. TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHOD FROM AERIAL PHOTOGRAPHY DATED DECEMBER 2001 BY SAN-LO AERIAL SURVEYS.
2. ELEVATIONS IN FEET; BENCHMARK BASED ONNORTHAMERICAN VERTICAL DATUM 1988.
3. COVER CONTOUR LINES WITH ELEVATIONS PRESENTED IN PARENTHESES ARE APPROXIMATE. FINAL LOCATION OF CONTOUR LINES ARE TO BE ESTABLISHED WITH THE SELECTION OF THE "FINAL DESIGN CROSS-SECTION." SEE "COVER DESIGN DATA TABLE" FOR DESIGN INFORMATION RELATED TO EACH ALTERNATIVE COVER DESIGN.

NORTH

0 100 FEET

SCALE: 1"= 100'

COVER DESIGN DATA TABLE

LINE	SLOPE FOR 2, 3A, 3B, 3C & 3D	SLOPE LENGTH	3A		3D		2, 3B, & 3C	
			Starting Elv.	Ending Elv.	Starting Elv.	Ending Elv.	Starting Elv.	Ending Elv.
S1	2.9508%	305.00	481.00	472.00	480.00	471.00	479.00	470.00
S2	2.9412%	340.00	481.00	471.00	480.00	470.00	479.00	469.00
S3	2.9545%	440.00	481.00	468.00	480.00	467.00	479.00	466.00
S4	2.9167%	480.00	481.00	467.00	480.00	466.00	479.00	465.00
S5	1.9512%	820.00	481.00	465.00	480.00	464.00	479.00	463.00
S6	2.0548%	730.00	481.00	466.00	480.00	465.00	479.00	464.00

RI/FS REPORT — DRAFT FINAL

CONCEPTUAL LANDFILL COVER DESIGN

ANOMALY AREA 3 FEASIBILITY STUDY

FORMER MCAS EL TORO

PROJECT NO. 04.1107.006/ 29307

BARAJAS & ASSOCIATES, INC.

FIGURE 13-1

the design criteria for the cover. The design criteria for the cover will be developed in the remedial design phase. Results from UNSAT-H modeling indicate that the existing soil cover offers better performance than the state–prescriptive cap (see Appendix K).

4. Reduction of Toxicity, Mobility, or Volume through Treatment. The reduction of toxicity, mobility, and volume through treatment will not occur. However, the predicted drainage is comparable to a state–prescriptive cap, therefore the leaching potential will be reduced at a rate comparable to the state prescriptive cap.

5. Short-Term Effectiveness. Field activities associated with this alternative include limited grading, construction of a finger dike, placement of riprap, and monitoring of landfill gas and groundwater. A site-specific sampling plan as well as a site-specific health and safety plan (HSP) would be prepared and implemented. Because the contaminant concentrations in groundwater and landfill gas concentrations in air are low, the potential short-term risk to the community and site workers through inhalation pathways is considered insignificant. Site workers participating in monitoring activities would wear the necessary personal protective equipment (PPE), as specified in the HSP.

6. Implementability. Standard equipment and procedures would be used for grading, construction of a finger dike, placement of riprap, and to monitor landfill gas and groundwater. No significant delays or difficulties in obtaining material and services are anticipated. Interim ICs are currently being administratively handled through an existing LIFOC. The implementation of final ICs including land-use restrictions incorporated into environmental restriction covenants is an administrative process and relatively easy to implement.

7. Cost. The cost estimate for Alternative 2 was developed using the Remedial Action Cost Engineering Requirements™ (RACER™) 2005 system developed by the U.S. Air Force. RACER cost models are based on generic engineering solutions for environmental projects, technologies, and processes. These solutions are derived from historical project information, government laboratories, construction management agencies, vendors, contractors, and engineering analysis. RACER cost estimates are made site-specific through modifications of the geographic and project specific factors.

   Table 13-1 presents cost associated with the implementation of Alternative 2. Alternative 2 costs include ICs and existing access restrictions, construction of a finger dike and placement of riprap, monitoring well abandonment and replacements, debris relocation, construction of a landfill gas collection system, long-term groundwater and soil gas monitoring, 5-year site reviews, limited site grading, survey monument installation, facility inspection and maintenance, and site closeout. These costs are intended to be used for comparative purposes in this FS and not for budgeting or planning purposes. Appendix J presents a more detailed discussion of the costs associated with Alternative 2.

   The present worth for Alternative 2 is estimated to be $3,539,475.

8. State Acceptance. The review of Alternative 2 as part of this FS effort is pending.

9. Community Acceptance. Community acceptance of this alternative will be assessed following the public review process.

Table 13-1: Alternative 2 - Cost Estimate Summary

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$79,087	
Land Use Controls (Capital)	$50,940	-
Site Grading (Capital)	$77,257	-
Drainage Improvements (Capital)	$107.836	-
SG Well Installs/Monitoring Well Abandonments (Capital)	$68,046	-
Debris Relocations (Capital)	$538,703	
Active Landfill Gas Collection System (Capital)	$234,853	-
Passive Landfill Gas Collection System (Capital)	$81,879	-
Operation and Maintenance Costs		
Long Term Monitoring (Years 1-5)	-	$512,671
Long Term Monitoring (Years 6-30)	-	$1,432,987
Monitoring Well Replacements (10 years)	-	$138,484
Monitoring Well Replacements (20 years)		$138,484
5-Year Review	-	$182,229
Site Closeout	-	$75,185
Subtotal Costs	$1,238,601	$2,480,039
Contingency (20%)[b]	$221,715	$496,008
Total Costs	$1,460,316	$2,976,047
Grand Total Alternative 2	$4,436,363	
Present Worth[c]	$3,539,475	

Notes:
[a] Individual costs presented in this table for each line item do not constitute present value costs. Present value costs for each line item are presented in Appendix J.
[b] Contingency of 20% was added to cover cost increases that may occur as a result of unforeseen conditions and changes that typically occur on remediation projects. Contingency was not applied on cost estimates for design and land use controls.
[c] Base year of 2008.

13.2.3 Alternative 3 – Containment, Monitoring, and Institutional Controls

13.2.3.1 Alternative 3a – Containment with Evapotranspiration Cover

Alternative 3a is a combination of landfill capping, ICs, access restrictions and monitoring. The ICs, access restrictions, and monitoring are similar to those associated with Alternative 2, but with provisions for protecting the integrity of the landfill cap and erosion control features. Monitoring will be used to assess the effectiveness of the remedy. A typical cross-section of Alternative 3a is shown in Figure 12-1.

Description

Monitoring and Inspections. Environmental monitoring for Alternative 3a would be conducted at currently existing monitoring locations. At AA 3, landfill gas and groundwater would be monitored. Security measures (fences, signs, and locks) would be inspected and repaired as required.

- Landfill gas monitoring for AA 3 would be performed using periodic gas sampling and analysis of three existing triple nested perimeter gas wells (PG1 through PG3). An active landfill gas collection system or gas vent system is proposed to be installed in accordance with CIWMB monitoring protocol. Compliance landfill gas monitoring probes will be installed within 50 feet of the waste boundary. This will act as an early warning feature for the initiation of the landfill gas collection and treatment to prevent migration of landfill gas above Title 27 CCR thresholds at the 100-foot compliance point.

- Groundwater monitoring, consistent with Title 27 CCR capping requirements, would be performed from five existing monitoring wells to assess if groundwater quality is being degraded.

This alternative includes minimal consolidation of waste, placement of a single layer of native-soil cap over the landfill, construction of surface-water drainage control, and construction of run-on and runoff structures. Existing soil cover over the landfill would be excavated, backfilled, compacted and graded making it unnecessary to import large quantities of additional soil from off-site. However, clean soils from borrow sources will be used for constructing some of the foundation layer and the vegetative cover.

The landfill cap will consist of a 4-foot-thick single layer ET soil cap designed to prevent exposure and reduce infiltration through the cover. The cover would be graded to prevent ponding. The soil cover will be clean imported fill that will be compacted to achieve a permeability that would offer equivalent protection as a state-prescribed cover as specified in Title 27 CCR.

Evaluation. Individual evaluation of Alternative 3a with respect to the nine NCP criteria is provided in the following subsections.

1. Overall Protection of Human Health and the Environment. The ET soil cover in Alternative 3a would be constructed using clean off-site soil. Consequently, Alternative 3a will eliminate soil-related risks by removing the pathway for inhalation, ingestion, and dermal contact with soils. Grading of the cap provides added assurance that ponding would not occur and prevents potential future impacts to groundwater.
2. Compliance with ARARs. Data collected to date do not indicate that groundwater has been impacted due to waste placement. In addition, construction of a landfill cover will prevent infiltration and will significantly reduce the potential for groundwater to be degraded. Monitoring will be conducted as part of this alternative to assess the effectiveness of this alternative.

   Dust suppression would be used during grading activities to control dust and comply with visible emissions nuisance and fugitive-dust standards regulated by SCAQMD rules and are identified as chemical-specific ARARs for air.

   Potential action-specific ARARs for this alternative relate to construction of an engineered alternative to the prescriptive final cover for municipal landfills, groundwater monitoring, landfill gas control and monitoring, waste excavation during consolidation, and post-closure maintenance. Since the landfill gas concentrations at AA 3 are relatively low, the landfill gas-closure requirements are limited to monitoring. Appendix H lists the substantive provision of Titles 22, 23, and 27 CCR, and 40 CFR 258 pertaining to landfill closure and post-closure and identifies the most stringent (or controlling) potential ARARs.

The UNSAT-H modeling was performed to demonstrate that the ET soil cover would meet Title 27 CCR final cover requirements and would be an acceptable engineered alternative to the prescriptive cap. Results from the UNSAT-H modeling are provided in Appendix K.

Alternative 3a involves excavation, relocation, and consolidation of waste. The U.S. EPA has determined that disposal occurs when waste is placed in a land-based unit. However, movement within a unit does not constitute disposal or placement, and at CERCLA sites, an area of contamination can be considered comparable to a unit. Therefore, movement or consolidation within the landfill site does not constitute placement, and RCRA land-disposal restrictions are not triggered (U.S. EPA 1989b).

In summary, Alternative 3a is expected to meet all ARARs and provide protection equivalent to Title 27 CCR prescriptive cap.

3. Long-Term Effectiveness and Permanence. Consolidation and capping are reliable remedial technologies for a landfill provided that the cap is properly designed, constructed, and maintained. Capping is designed to prevent infiltration and potential future impact to groundwater.

   The native soil cap in Alternative 3a is resistant to desiccation and resultant cracking. Typically, deeply rooted plants negatively impact other landfill covers by breaching the barrier layer. However, they are an integral part of the ET soil cover because the roots of these plants tend to increase the depth of the evapotranspiration zone and reduce infiltration into the landfill.

   The ET cover meets the requirements of the land reuse, as AA 3 is to be part of low-density residential.

   The UNSAT-H modeling has been performed to evaluate if the ET soil cover would meet CCR Title 27 CCR final cover requirements and would be an acceptable engineered alternative to the prescriptive cap. The predicted water balance is provided for each year of the 10-yr simulation period, which is based on climatic conditions for the site from 1980 through 1989. Based on this, the predicted annual drainage ranges from less than 0.001 inches to 1.685 inches (0.002 cm to 4.282 cm). Results from the UNSAT-H modeling are provided in Appendix K.

   Groundwater and landfill gas monitoring would be conducted to comply with the controlling ARARs noted in Appendix H. The base transfer considerations have necessitated the design and installation of a landfill gas-collection and treatment system. However, the landfill gas collection and treatment will be triggered only if soil-gas concentrations exceed thresholds at the 100-ft buffer boundary, at perimeter soil-gas monitoring locations or at any facilities at the site.

   The long-term effectiveness of the landfill cap itself is dependent upon maintenance and the continued application of ICs and access restrictions. The following measures are included in Alternative 3a to assure long-term effectiveness and permanence:

   - Continued inspection and maintenance of the cap (including surface water run-on and runoff controls, final cover grades, settlement, erosion, and vegetative cover).

   - Enforcement of limited future land use at AA 3.

- Landfill gas and groundwater monitoring.

- A 5-year review of this alternative is required under the NCP because wastes remain on site.

4. Reduction in Toxicity, Mobility, or Volume through Treatment. There would not be an appreciable reduction in the volume of landfill materials as a result of implementation of this alternative. However, mobility in the form of infiltration and leaching through the landfill would be prevented and controlled by capping.

5. Short-term Effectiveness. Alternative 3a involves excavation, consolidation, grading, construction of a landfill cap, and construction of surface-water drainage controls. Risks associated with exposure of site personnel to dust emissions and direct contact with impacted soil/waste during excavation would be minimized using dust suppressants and PPE. PPE would also be used during groundwater sampling to prevent direct contact with the impacted groundwater. Exposure of the community or to site construction workers may occur through inhalation of fugitive dust that is windborne over a distance of 1/4 mile south or west of the site.

   Exposure of the community is expected to be minimal due to the short time required to excavate and consolidate landfill materials and the use of dust suppressants and vapor monitoring to prevent off-site releases of contaminants. Heavy equipment will conform to the specifications of the California Occupational Safety and Health Administration (Cal-OSHA). Only authorized personnel will perform heavy-equipment operation.

   Safety devices provided with the machinery, including seat belts, would be used at all times. Personnel not trained or not directly involved in the work area would keep a safe distance. Trained personnel directly involved in the operation would avoid moving into the path of the operating equipment or into blind spots of the operator.

   The time required for completion of the remedial response objectives is approximately 3 months and includes site preparation, cap placement, drainage controls, erosion controls, installation of active landfill gas collection system, passive trenches and perimeter gas monitoring wells, and contract closeout.

6. Implementability. Excavation, consolidation, and capping are reliable and well-established technologies that can be readily implemented using widely available commercial services, materials, and equipment. The standard equipment and machinery used for excavation, loading, and transportation, as well as the installation of the native cap, would be readily available. Should any technical problems occur with the equipment or machinery, a minimum delay in schedule would result from equipment/machinery substitution. ICs and access restrictions for land and groundwater use are also readily implementable.

   Fugitive dust and potential (but unlikely) VOC emissions would be monitored using portable emission monitors during construction activities. Long-term landfill gas and groundwater monitoring would be conducted using commercially available equipment.

7. Cost. The cost estimate for Alternative 3a includes the construction of a single layer cap otherwise known as an ET landfill cover system, stormwater control system construction, the implementation of ICs and existing access restrictions, monitoring well abandonments and installations, debris relocation, construction of a landfill gas collection system, long-term groundwater and soil gas monitoring, access road construction, 5-year site reviews, facility

inspection and maintenance, and site closeout. A summary of the costs for Alternative 3a is provided in Table 13-2. Cost-estimating details, including assumptions and RACER input parameters, are provided in Appendix J.

The present worth for Alternative 3a is estimated to be $5,448,664.

8. State Acceptance. The review of Alternative 3a as part of this FS effort is pending.

9. Community Acceptance. Community acceptance of this alternative will be assessed following the public review process.

Table 13-2: Alternative 3a - Cost Estimate Summary

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$110,381	-
ET Cover (Capital)_	$1,566,972	
Monitoring Well Abandonments/Install SGMWs/Casing Extensions (Capital)	$80,400	-
Active Landfill Gas Collection System (Capital)	$234,853	-
Passive Landfill Gas Collection System (Capital)	$81,879	-
Land Use Controls (Capital)	$50,940	
Debris Relocation (Capital)	$538,703	
Operation and Maintenance Costs		
Long Term Monitoring (Years 1-5)	-	$534,293
Long Term Monitoring (Years 6-30)	-	$1,541,071
5-Year Review		$292,943
Monitoring Well Replacements (10 years)	-	$138,484
Monitoring Well Replacements (20 years)		$138,484
Site Closeout	-	$100,529
Subtotal Costs	$2,664,127	$2,745,804
Contingency (20%)[b]	$500,561	$549,161
Total Costs	$3,164,689	$3,294,965
Grand Total Alternative 3a	$6,459,654	
Present Worth[c]	$5,448,664	

Notes:
[a] Individual costs presented in this table for each line item do not constitute present value costs. Present value costs for each line item are presented in Appendix J.
[b] Contingency of 20% was added to cover cost increases that may occur as a result of unforeseen conditions and changes that typically occur on remediation projects. Contingency was not applied on cost estimates for design and land use controls.
[c] Base year of 2008.

13.2.3.2 ALTERNATIVE 3B – CONTAINMENT WITH TITLE 27 PRESCRIPTIVE CAP

Alternative 3b uses three layers required for a Title 27 CCR prescriptive cap. These layers include a minimum 2-foot-thick foundation layer, a barrier layer (consisting of a minimum 1-foot-thick

compacted clay), and a 2-foot-thick soil cover layer for vegetation. A typical cross section of Alternative 3b is presented in Figure 12-2.

Description

Monitoring and Inspections. Environmental monitoring for Alternative 3b would be conducted at currently existing monitoring locations. Landfill gas and groundwater would be monitored. Security measures (fences, signs, and locks) would be inspected and repaired as required.

- Landfill gas monitoring for AA 3 would be performed using periodic gas sampling and analysis of three existing triple-nested perimeter gas wells (PG1 through PG3). An active landfill gas collection system or gas vent system is proposed to be installed in accordance with CIWMB monitoring protocol. Compliance landfill gas monitoring probes would be installed within 50 feet of the waste boundary. This would act as an early warning feature for the initiation of the landfill gas collection and treatment to prevent migration of landfill gas above Title 27 CCR thresholds at the 100-foot compliance point.

- Groundwater monitoring, consistent with Title 27 CCR capping requirements, would be performed from five existing monitoring wells to assess if groundwater quality is being degraded.

Evaluation. Individual evaluation of Alternative 3b with respect to the nine NCP criteria is provided in the following subsections.

1. Overall Protection of Human Health and the Environment. Since the vegetative soil cover in Alternative 3b would be constructed using clean off-site soil, this alternative will eliminate soil-related risks by removing the pathway for inhalation, ingestion, and dermal contact with soils. With the consolidation of wastes, Alternative 3b will eliminate long-term risk associated with these waste areas. Grading of the cap provides added assurance that ponding would not occur and prevents potential future impacts to groundwater. Alternative 3b also prevents infiltration into landfill contents, thus reducing potential impacts for revegetation with annual grasses resulting in low maintenance.

   Annual inspection and maintenance would be performed to identify and remove plants with deep root systems that could compromise the integrity of the barrier. Monitoring and maintenance would be used to assure continued integrity of the landfill cap. ICs and access restrictions will be used to protect the cap and to prevent exposure to groundwater. Because the wastes would remain on site, a 5-year reevaluation would be required under the NCP. Monitoring of landfill gas from perimeter monitoring probes, active landfill gas collection wells and passive trenches, and groundwater will be used to assess the effectiveness of the remedy.

2. Compliance with ARARs. Data collected to date do not indicate that groundwater has been impacted due to waste placement. In addition, construction of a landfill cover will minimize infiltration and will significantly reduce the potential for groundwater to be degraded. Monitoring will be conducted as part of this alternative to assess the effectiveness of this alternative.

   Alternative 3b meets chemical-specific, location-specific, and action-specific ARARs, as discussed for Alternative 3a. In addition, the installation of the Title 27 CCR landfill cap meets the prescriptive design requirements, in contrast to the engineered alternative discussed

for Alternative 3a. Groundwater and landfill gas monitoring will be conducted to comply with the substantive requirements Titles 22 and 27 CCR respectively, identified as potential ARARs (see Appendix H). Former MCAS El Toro transfer considerations have necessitated the design and installation of a landfill gas-collection and treatment system. However, the landfill gas collection and treatment will be triggered only if soil-gas concentrations exceed thresholds at perimeter soil-gas monitoring locations or at any facilities at the site.

3. Long-Term Effectiveness and Permanence. In general, installation of the Title 27 CCR prescriptive landfill cap provides an adequate and reliable long-term remedial response. The effectiveness, reliability, and adequacy of this remedial technology have resulted in its selection as the presumptive remedy for landfills. However, there are three anticipated concerns with a clay cap: (1) potential to crack when desiccated, (2) its low resistance to cracking from differential settlement, and (3) the difficulty of repairing the cap if it becomes damaged. Although a 2-foot soil cover and revegetation are used to protect the clay barrier, the semiarid climate at Former MCAS El Toro could cause drying and cracking of the clay barrier if prolonged number of dry years occur. Differential settlement is common as wastes in a landfill consolidate over time and could result in breaches in the clay barrier. Monitoring and inspection would need to be used to assure the continued integrity of the clay barrier.

   Following completion of construction, the cap would be inspected quarterly for signs of erosion, settlement, subsidence, or invasion by burrowing animals or deep-rooted vegetation. Quarterly inspections will continue until site conditions stabilize and complete revegetation occurs. The frequency of monitoring would be reevaluated at 5-year intervals. Signs of unexpected settling or subsidence would be addressed immediately by repairing the affected areas.

   The UNSAT-H modeling has been performed to evaluate the effectiveness of the Alternative 3b cap in preventing infiltration. The predicted water balance is provided for each year of the 10-yr simulation period, which is based on climatic conditions for the site from 1980 through 1989. The predicted annual drainage for Alternative 3b ranges from less than 0.606 inches to 6.031 inches (less than 1.540 cm to 15.319 cm). Results on the UNSAT-H modeling are presented in Appendix K.

   Alternative 3b involves excavation, relocation, and consolidation of waste within the revised landfill footprint. The U.S. EPA has determined that disposal occurs when waste is placed in a land-based unit. However, movement within a unit does not constitute disposal or placement, and at CERCLA sites, an area of contamination can be considered comparable to a unit. Therefore, movement or consolidation within the landfill site does not constitute placement, and RCRA land-disposal restrictions are not triggered (U.S. EPA 1989b).

   The installation of an active landfill gas collection system (serving in an inactive or passive venting mode until triggered) and the passive trenches within the compliance zone would assist in monitoring for landfill gas inside the waste itself, providing an early warning feature. These landfill gas control measures would eliminate potential risks to human health. However, once adequate landfill gas data are collected from the compliance landfill gas monitoring probes at the perimeter, and with the concurrence of the CIWMB, monitoring would be discontinued and ICs and access restrictions would be removed.

4. Reduction in Toxicity, Mobility, or Volume through Treatment. Mobility, in the form of infiltration through the landfill, would be prevented and controlled by capping. There would not be an appreciable reduction in the volume of landfill materials.

5. Short-Term Effectiveness. Alternative 3b involves excavation of waste, construction of a landfill cap, construction of surface-water drainage controls, a landfill gas-collection system consisting of active vertical extraction wells and passive trenches and migration monitoring well system. Risks associated with exposure of site personnel to dust emissions and direct contact with impacted soil/waste during excavation would be minimized using dust suppressants and PPE. PPE would also be used during the groundwater sampling to prevent direct contact with any potentially impacted groundwater.

   Exposure of the community or personnel at Former MCAS El Toro to site construction activities may occur through inhalation of fugitive dust that is windborne over a distance of 1/4 mile south or west of the site. Exposure of the community is expected to be minimal due to the short time required to excavate and consolidate landfill materials and the use of dust suppressants and vapor monitoring to prevent off-site releases of contaminants.

   Heavy equipment will conform to Cal-OSHA specifications. Only authorized personnel will perform heavy-equipment operation. Safety devices provided with the machinery, including seat belts, would be used at all times. Personnel not trained or not directly involved in the work area would keep a safe distance. Trained personnel directly involved in the operation would avoid moving into the path of the operating equipment or into blind spots of the operator.

   The time required for completion of the remedial response objectives is approximately 3.9 months and includes site preparation, cap placement, drainage controls, gas collection and monitoring system controls, erosion controls, revegetation, and contract closeout.

6. Implementability. Consolidation and capping are reliable and well-established technologies that can be readily implemented using widely available commercial services, materials and equipment. The standard equipment and machinery used for excavation, loading, and transportation, as well as the installation of the cap, would be readily available. Should any technical problems occur with the equipment or machinery, a minimum delay in schedule would result from equipment/machinery substitution. ICs and access restrictions for land and groundwater use are also readily implementable.

   Some of the existing soil cover material would be used for the foundation of the landfill cap. Clean soil for the remaining foundation layer and the vegetative layer is available from an on-site borrow source. This borrow source is readily accessible. However, clay material would have to be imported to the site from off-site borrow areas. Importing clay material would increase the costs of this alternative, particularly as the distance of the potential off-site borrow sources from the site increases.

   Fugitive dust and potential (but unlikely) VOC emissions would be monitored using portable emission monitors during construction activities. Long-term landfill gas and groundwater monitoring would be conducted using commercially available equipment.

7. Cost. The estimated costs for the implementation of Alternative 3b includes a state-prescriptive landfill cover system, stormwater control system construction, the implementation of ICs and existing access restrictions, monitoring well abandonments and installations, debris

relocation, construction of a landfill gas collection system, long-term groundwater and soil gas monitoring, access road construction, 5-year site reviews, facility inspection and maintenance, and site close-out. A summary of the costs for Alternative 3b is provided in Table 13-3. Cost-estimating details, including assumptions and RACER input parameters, are provided in Appendix J.

The present worth for Alternative 3b is estimated to be $5,660,178.

8. State Acceptance. The review of Alternative 3b as part of this FS effort is pending.

9. Community Acceptance. Community acceptance of this alternative will be assessed following the public review process.

Table 13-3: Alternative 3b - Cost Estimate Summary

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$110,556	
Prescriptive Cover (Capital)	$1,743,087	
Monitoring Well Abandonments/Install SGMWs/Casing Extensions (Capital)	$80,400	
Active Landfill Gas Collection System (Capital)	$234,853	
Passive Landfill Gas Collection System (Capital)	$81,879	
Land Use Controls (Capital)	$50,940	
Debris Relocation (Capital)	$538,703	
Operation and Maintenance Costs		
Long Term Monitoring (Years 1-5)		$534,293
Long Term Monitoring (Years 6-30)		$1,541,071
5-Year Review		$292,943
Monitoring Well Replacements (10 years)		$138,484
Monitoring Well Replacements (20 years)		$138,484
Site Closeout		$100,529
Subtotal Costs	$2,840,418	$2,745,804
Contingency (20%) [b]	$535,784	$549,161
Total Costs	$3,376,202	3,294,965
Grand Total Alternative 3b	**$6,671,167**	
Present Worth[c]	**$5,660,178**	

Notes:
[a] Individual costs presented in this table for each line item do not constitute present value costs. Present value costs for each line item are presented in Appendix J.
[b] Contingency of 20% was added to cover cost increases that may occur as a result of unforeseen conditions and changes that typically occur on remediation projects. Contingency was not applied on cost estimates for design and land use controls.
[c] Base year of 2008.

13.2.3.3 ALTERNATIVE 3C – CONTAINMENT WITH MODIFIED TITLE 27 PRESCRIPTIVE CAP WITH GEOSYNTHETIC CLAY LINER

Alternative 3c is a variation of Alternative 3b that replaces the low-permeability clay layer with a GCL. Individual evaluation of Alternative 3c with respect to the nine NCP criteria follows.

1. Overall Protection of Human Health and the Environment. Alternative 3c renders the exposure pathways for human health and the environment due to direct exposure, inhalation, and ingestion of soils incomplete. Soils-related risks are removed if the alternative is implemented. The cap also provides protection for human health by reducing infiltration into landfill contents, thus minimizing further impacts to groundwater. The 2-foot-thick native soil cover will also provide sufficient soil thickness for revegetation of the cover with annual grasses. Inspection and annual maintenance will be used to identify and remove plants with deep root systems that could impact the integrity of the GCL. Monitoring and maintenance will be used to assure continued integrity of the landfill cap. Because the wastes will remain on-site, a 5-year reevaluation is required under the NCP.
2. Compliance with ARARs. Alternative 3c meets chemical-specific, location-specific, and action-specific potential ARARs as discussed for Alternative 3a. In addition, the installation of the modified Title 27 CCR prescriptive landfill cap meets the potential action-specific ARARs for the landfill final cover construction. Groundwater and landfill gas monitoring will be conducted to comply with requirements of Titles 22 and 27 CCR that have been determined to be potential ARARs (see Appendix H).
3. Long-Term Effectiveness. The GCL is resistant to desiccation, can withstand large differential movement, and provides a permeability significantly less than 10^{-6} cm/s. Thus Alternative 3c is both reliable and an adequate option for long-term effectiveness and permanence, including O&M and management.

   Because dry bentonite in the GCL is more permeable to landfill gas, landfill gases could continue to be released to the atmosphere above the landfill. This is considered to be acceptable due to very low concentrations of gases being emitted. Former MCAS El Toro transfer considerations have necessitated the design and installation of a landfill gas-collection and treatment (serving in an inactive or passive venting mode until triggered) and the passive trenches within the compliance zone. This would assist in monitoring for landfill gas inside the waste itself, providing an early warning feature. However, once adequate landfill gas data are collected from the compliance landfill gas monitoring probes at the perimeter, and with the concurrence of the CIWMB, monitoring would be discontinued and ICs and access restrictions would be removed.
4. Reduction of Toxicity, Mobility, or Volume through Treatment. Reduction of inorganic landfill contaminant toxicity in groundwater is expected to occur through precipitation. In addition, contaminant mobility, in the form of infiltration and leaching of the landfill material, will be prevented and controlled by capping. There would not be an appreciable reduction in volume.
5. Short-Term Effectiveness. Alternative 3c involves waste consolidation; grading, and compaction; constructing a landfill cap; and constructing surface-water drainage controls. Potential exposure and protection procedures for workers engaged in construction activities at AA 3 will be addressed in the site-specific HSP. Risks associated with exposure of site personnel to dust emissions and direct contact with impacted soil/waste during consolidation activities will be minimized using dust suppressants and PPE. The PPE will also be used

during groundwater sampling to prevent direct contact with any potentially impacted groundwater.

Exposure of the community or personnel at Former MCAS El Toro to site construction activities may occur through inhalation of fugitive dust that is windborne over a distance of 1/4 mile south or west of the site.

Field activity associated with the installation of the GCL in Alternative 3c is less extensive than that required for installation of clay or soil/bentonite mix barrier layers. GCL is simple to construct and can be rapidly installed. GCL is a manufactured hydraulic barrier consisting of sodium/bentonite clay sandwiched between two layers of geotextile that are held together by needling, stitching, or adhesives. The GCL rolls can be placed immediately over the completed and prepared foundation layer and can be unrolled, thus requiring very little specialized equipment or labor. No welding for the installation of the GCL is needed. The GCL layer edges are overlapped with a bentonite layer between the overlaps.

Heavy equipment will conform to Cal-OSHA specifications. Only authorized personnel will perform heavy-equipment operation. Safety devices provided with the machinery, including seat belts, would be used at all times. Personnel not trained or not directly involved in the work area would keep a safe distance. Trained Personnel directly involved in the operation would avoid moving into the path of the operating equipment or into blind spots of the operator.

The time required for completion of the remedial response objectives is approximately 3.4 months and includes capping, and construction of drainage controls, erosion controls, and gas migration monitoring well system.

6. Implementability. GCL as a low-permeability layer in a landfill cap is a proven and reliable technology. The material is readily available and easily installed by contractors. Specialty equipment is not required.

7. Cost. The cost estimate for Alternative 3c includes the construction of a GCL cover system, stormwater control system construction, the implementation of ICs and existing access restrictions, monitoring well abandonments and installations, debris relocation, construction of a landfill gas collection system, long-term groundwater and soil gas monitoring, access road construction, 5-year reviews, facility inspection and maintenance, and site closeout. A summary of the costs for Alternative 3c is provided in Table 13-4. Cost-estimating details, including assumptions and RACER input parameters, are provided in Appendix J.

   The present worth for Alternative 3c is estimated to be $5,056,891.

8. State Acceptance. The review of Alternative 3c as part of this FS is pending.

9. Community Acceptance. Community acceptance of this alternative will be assessed following the public review process.

Table 13-4: Alternative 3c - Cost Estimate Summary

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$97,679	
GCL Cover (Capital)	$1,251,079	
Monitoring Well Abandonments/Install SGMWs/Casing Extensions (Capital)	$80,400	
Active Landfill Gas Collection System (Capital)	$234,853	
Passive Landfill Gas Collection System (Capital)	$81,879	
Land Use Controls (Capital)	$50,940	
Debris Relocation (Capital)	$538,703	
Operation and Maintenance Costs		
Long Term Monitoring (Years 1-5)		$534,293
Long Term Monitoring (Years 6-30)		$1,541,071
5-Year Review		$292,943
Monitoring Well Replacements (10 years)		$138,484
Monitoring Well Replacements (20 years)		$138,484
Site Closeout		$100,529
Subtotal Costs	2,335,533	$2,745,804
Contingency (20%)	$437,383	$549,161
Total Costs	$2,772,916	$3,294,965
Grand Total Alternative 3c	**$6,067,881**	
Present Worth[c]	**$5,056,891**	

Notes:
[a] Individual costs presented in this table for each line item do not constitute present value costs. Present value costs for each line item are presented in Appendix J.
[b] Contingency of 20% was added to cover cost increases that may occur as a result of unforeseen conditions and changes that typically occur on remediation projects. Contingency was not applied on cost estimates for design and land use controls.
[c] Base year of 2008.

13.2.3.4 Alternative 3d – Containment with Modified Title 27 Prescriptive Cap with Flexible Membrane Liner

Alternative 3d is a variation of Alternative 3a that replaces the low-permeability clay layer with an FML. Individual evaluation of Alternative 3d with respect to the nine NCP criteria follows.

1. Overall Protection of Human Health and the Environment. Alternative 3d renders the exposure pathways incomplete for human health and the environment due to direct exposure, inhalation, and ingestion of soils. Soils-related risks are removed if the alternative is implemented. The cap will also reduce infiltration into landfill contents, thus minimizing further impacts to groundwater. The 2-foot- thick soil cover will also provide sufficient soil thickness for revegetation with annual grasses. Inspection and annual maintenance will be used to identify and remove plants with deep root systems that could compromise the integrity of the FML barrier. Monitoring and maintenance will be used to assure continued integrity of the landfill cap. Because the wastes will remain on-site, a 5-year reevaluation is required under the NCP.
2. Compliance with ARARs. Alternative 3d meets chemical-specific, location-specific, and action-specific ARARs as discussed for Alternative 3a. In addition, the installation of the modified Title 27 CCR prescriptive landfill cap meets the potential action-specific ARARs for

the landfill final cover construction. Groundwater and landfill gas monitoring will be conducted to comply with the requirements of Titles 22 and 23 CCR determined to be potential ARARs (see Appendix H).

3. Long-Term Effectiveness. The FML is virtually impermeable to water. It will provide a permeability significantly less than $1x10^{-6}$ cm/s for extended periods of time if properly designed, constructed, and maintained.

   In addition, FML is not subject to desiccation in semiarid to arid climates and can withstand large tensile strains resulting from stretching and settlements. Thus, FML is both reliable and an adequate option for long-term effectiveness and permanence.

4. Reduction of Toxicity, Mobility, or Volume through Treatment. Contaminant mobility, in the form of infiltration and leaching of the landfill, will be prevented and controlled by capping. There would not be an appreciable reduction in volume.

5. Short-Term Effectiveness. Alternative 3d involves construction of a landfill cap, surface-water drainage controls and a landfill gas-migration monitoring well system. Risks associated with exposure of site personnel to dust emissions and direct contact with impacted soil or waste during excavation would be minimized using dust suppressants and PPE. PPE would also be used during the groundwater sampling to prevent direct contact with any potentially impacted groundwater.

   Exposure of the community or personnel at Former MCAS El Toro to site construction activities may occur through inhalation of fugitive dust that is windborne over a distance of 1/4 mile south or west of the site.

   Heavy equipment will conform to Cal-OSHA specifications. Only authorized personnel will perform heavy-equipment operation. Safety devices provided with the machinery, including seat belts, would be used at all times. Personnel not trained or not directly involved in the work area would keep a safe distance. Trained personnel directly involved in the operation would avoid moving into the path of the operating equipment or into blind spots of the operator.

   The FML is expected to require less time to construct than clay or soil/bentonite liner and approximately the same time to construct as a GCL liner. The time required for completion of the remedial response objectives is approximately 3.7 months and includes capping, and construction of drainage controls, erosion controls, and gas migration monitoring well system.

6. Implementability. Use of FML as a low-permeability layer in a landfill cap is a proven and reliable technology, and it is readily available and easily installed by contractors. The FML will be transported and installed using standard construction procedures. Specialized equipment will be required for welding the geomembrane sheets. A quality assurance/quality control program is required to ensure proper installation.

7. Cost. Cost estimates for Alternative 3d include the construction of a FML landfill cover system, stormwater control system construction, the implementation of ICs and existing access restrictions, monitoring well modifications, abandonments, and replacements, debris relocation, construction of a landfill gas collection system, long-term groundwater and soil gas monitoring, access road construction, 5-year site reviews, facility inspection and maintenance, and site closeout. A summary of costs for Alternative 3d is provided in Table 13-5. Cost-

estimating details, including assumptions and RACER input parameters are provided in Appendix J.

The present worth for Alternative 3d is estimated to be $5,515,928.

8. State Acceptance. The review of Alternative 3d as part of this FS is pending.

9. Community Acceptance. Community acceptance of this alternative will be assessed following the public review process.

Table 13-5: Alternative 3d - Cost Estimate Summary

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$106,345	
FML Cover (Capital)	$1,626,389	
Monitoring Well Abandonments/Install SGMWs/Casing Extensions (Capital)	$80,400	
Active Landfill Gas Collection System (Capital)	$234,853	
Passive Landfill Gas Collection System (Capital)	$81,879	
Land Use Controls (Capital)	$50,940	
Debris Relocation (Capital)	$538,703	
Operation and Maintenance Costs		
Long Term Monitoring (Years 1-5)		$534,293
Long Term Monitoring (Years 6-30)		$1,541,071
5-Year Review		$292,943
Monitoring Well Replacements (10 years)		$138,484
Monitoring Well Replacements (20 years)		$138,484
Site Closeout		$100,529
Subtotal Costs	$2,719,508	$2,745,804
Contingency (20%)	$512,445	$549,161
Total Costs	$3,231,953	$3,294,965
Grand Total Alternative 3d	**$6,526,918**	
Present Worth[c]	**$5,515,928**	

Notes:
[a] Individual costs presented in this table for each line item do not constitute present value costs. Present value costs for each line item are presented in Appendix J.
[b] Contingency of 20% was added to cover cost increases that may occur as a result of unforeseen conditions and changes that typically occur on remediation projects. Contingency was not applied on cost estimates for design and land use controls.
[c] Base year of 2008.

13.2.4 Alternative 4 – Clean Closure and Groundwater Monitoring

Individual evaluation of Alternative 4 with respect to the nine NCP criteria is as follows.

1. Overall Protection of Human Health and the Environment. Alternative 4 renders the exposure pathways incomplete for human health and the environment due to direct exposure, inhalation, and ingestion of soils. Soils-related risks are removed if the alternative is implemented. Clean Closure will reduce contaminant concentrations to levels that eliminate unacceptable risk.

2. Compliance with ARARs. Alternative 4 would include excavation of debris from AA 3 and disposal at an off-site disposal facility. The excavated debris from AA 3 is proposed to be stored in staging piles in accordance with the requirements at 40 CFR §264.554 identified as potential ARARs in Appendix H. If the debris exhibits the characteristics of the RCRA hazardous waste, substantive provisions of 40 CFR §264.554(d)(1)(i-ii), (d)(2), (e), (f), (h), (i), (j), and (k) are potentially "applicable" ARARs for design, operation, and closure of the staging pile. However, if the debris does not meet the definition of RCRA or non-RCRA hazardous waste, the staging pile requirements would be potentially relevant and appropriate federal ARARs since COPCs in the debris are same or similar to the contaminants found in RCRA hazardous waste. In addition, Alternative 4 would comply with the requirements of Title 22 § 66264.114 as relevant and appropriate ARARs. Title 22 § 66264.114 requires that all contaminated equipment, structures and soils be properly disposed or decontaminated by removing all hazardous waste and residues during partial and final closure periods.

3. Long-Term Effectiveness. Alternative 4 may require total dismantlement and removal of facilities. This may include removal of all buildings, vaults, tanks, transfer piping, and contaminated soil. This alternative would require a large quantity of soil for backfilling and would also require topsoil for revegetation. Use of the facilities (or the facility sites) after Clean Closure would present no risk to workers or the public from hazardous constituents. Since the landfill is clean closed, concerns about the long-term performance of landfill waste containment system components are also eliminated.

   Alternative 4 would also eliminate the need for potential future corrective actions, inspections and post-closure maintenance of the site. The chances of possible postclosure land uses of the facility are also increased.

4. Reduction of Toxicity, Mobility, or Volume through Treatment. Alternative 4 involves the removal of the contaminant source and beneficial use of waste materials. Reduction of landfill contaminant toxicity occurs through the complete removal of all waste and waste residuals, including contaminated soils.

5. Short-Term Effectiveness. Alternative 4 involves removal of all wastes and waste residuals, including contaminated soils. Risks associated with exposure of site personnel to dust emissions and direct contact with impacted soil and IDWs during excavation would be minimized using dust suppressants and PPE. The PPE would also be used during the groundwater sampling to prevent direct contact with the impacted groundwater.

   Exposure of the community to site construction activities may occur through inhalation of fugitive dust that is windborne over a distance of 1/4 mile south or west of the site.

   Heavy equipment will conform to Cal-OSHA specifications. Only authorized personnel will perform heavy-equipment operation. Safety devices provided with the machinery, including seat belts, would be used at all times. Personnel not trained or not directly involved in the work area would keep a safe distance. Trained personnel directly involved in the operation would avoid moving into the path of the operating equipment or into blind spots of the operator.

6. Implementability. Use of Clean Closure alternative is a proven and reliable technology, and requires the characterization of the site including (1) the extent and character of the wastes present and (2) the levels and extent of any contamination remaining on site after waste

removal and disposal. A quality assurance/quality control program is required to assure proper completion of the process.

7. Cost. The cost estimate for Alternative 4 (clean closure) includes excavation and removal of all buried construction debris at AA 3, groundwater and soil gas monitoring well abandonments, site revegetation, long term groundwater monitoring for 5 years, a 5-year site review, and site closeout. Costs for clean closure were estimated using three scenarios; 50% hazardous waste/50% non-hazardous waste, 25% hazardous waste/75% non-hazardous waste, and 100% non-hazardous waste. A summary of costs for Alternative 4 is provided in Table 13-6. Cost-estimating details, including assumptions and RACER input parameters are provided in Appendix J.

   Costs for Alternative 4 are estimated at the following:

   Scenario 1 (50%/50%): The present worth for Alternative 4 under Scenario 1 is $37,292,950.

   Scenario 2 (25%/75%): The present worth for Alternative 4 under Scenario 2 is $31,139,872.

   Scenario 3 (100%): The present worth for Alternative 4 under Scenario 3 is $25,286,065.

8. State Acceptance. The review of Alternative 4 as part of this FS is pending.

9. Community Acceptance. Community acceptance of this alternative will be assessed following the public review process.

Table 13-6: Alternative 4 - Cost Estimate Summary

Clean Closure Scenario 1 (50% Hazardous Waste/50% Non-Hazardous Waste)

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$103,732	
Dig and Haul (Capital)	$30,488,543	
Revegetation (Capital)	$34,233	
Monitoring Well Abandonments/Casing Extensions (Capital)	$61,026	
Operation and Maintenance Costs		
Long Term Monitoring (5 Years)		$336,526
5-Year Review		$26,450
Site Closeout		$75,185
Subtotal Costs	$30,687,534	$438,160
Contingency (20%)[b]	$6,116,760	$87,632
Total Costs	$36,804,294	$525,792
Grand Total Alternative 4 (Scenario 1)	**$37,330,087**	
Present Worth[c]	**$37,292,950**	

Clean Closure Scenario 2 (25% Hazardous Waste/75% Non-Hazardous Waste)

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$104,577	
Dig and Haul (Capital)	$25,360,274	
Revegetation (Capital)	$61,026	
Monitoring Well Abandonments/Casing Extensions (Capital)	$34,233	
Operation and Maintenance Costs		
Long Term Monitoring (5 Years)		$336,526
5-Year Review		$26,450
Site Closeout		$75,185
Subtotal Costs	$25,560,109	$438,160
Contingency (20%) [b]	$5,091,107	$87,632
Total Costs	$30,651,216	$525,792
Grand Total Alternative 4 (Scenario 2)	**$31,177,008**	
Present Worth[c]	**$31,139,872**	

Clean Closure Scenario 3 (100% Non-Hazardous Waste)

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$99,602	
Dig and Haul (Capital)	$20,486,247	
Revegetation (Capital)	$61,026	
Monitoring Well Abandonments/Casing Extensions (Capital)	$34,233	
Operation and Maintenance Costs		
Long Term Monitoring (5 Years)		$336,526
5-Year Review		$26,450
Site Closeout		$75,185
Subtotal Costs	$20,681,108	$438,160
Contingency (20%) [b]	$4,116,301	$87,632
Total Costs	$24,797,409	$525,792
Grand Total Alternative 4 (Scenario 3)	**$25,323,201**	
Present Worth[c]	**$25,286,065**	

Notes:
[a] Individual costs presented in this table for each line item do not constitute present value costs. Present value costs for each line item are presented in Appendix J.
[b] Contingency of 20% was added to cover cost increases that may occur as a result of unforeseen conditions and changes that typically occur on remediation projects. Contingency was not applied on cost estimates for design and land use controls.
[c] Base year of 2008.

13.3 COMPARATIVE ANALYSIS OF ALTERNATIVES

The purpose of the comparative evaluation is to contrast the advantages and disadvantages of each alternative relative to the others. The remedial action alternatives (Alternative 2, 3, and 4) are based on the selected presumptive remedies, capping and ICs and access restrictions. These presumptive remedies achieve RAOs in the following manner:

Landfill capping uses engineered designs to:

- Prevent contact with landfill wastes;
- Control run-on and runoff and erosion;
- Prevent infiltration and potential leaching;
- Prevent the landfill gas from migrating to and beyond the 100-foot buffer zone established for AA 3;
- Prevent surface water from contacting wastes; and
- Prevent contaminated sediments from washing off-site.

ICs and access restrictions restrict access by fencing and signs and prevent development by deed restrictions (negotiated during BRAC property transfer). Long-term monitoring of soil-gas, groundwater, erosion controls and revegetation will be used to confirm the effectiveness of the remedy.

Table 13-7 provides a summary of the effectiveness of the remedial alternatives with respect to the 9 NCP criteria for AA 3, respectively. Table 13-8 compares costs for each alternative evaluated within the FS for AA 3, respectively. Table 13-9 presents the advantages and disadvantages of barrier covers evaluated within the FS for AA 3. Table 13-10 presents technical comparison of each alternative evaluated within the FS for AA 3, respectively.

13.3.1 Overall Protection of Human Health and the Environment

Alternative 1 would not lower the risks that currently exist at AA 3; however, Alternative 2 would use limited grading, ICs and access restrictions to assure that exposure pathways remain incomplete. Alternative 1 is not considered protective of human health and the environment because infiltration and leaching of landfill wastes due to ponding on ungraded portions of the landfill are not minimized. Alternative 2 would include limited grading, construction of a finger dike and placement or riprap for controlling stormwater erosion, and monitoring of landfill gas and groundwater. Therefore Alternative 2 is protective of human health and the environment.

Alternative 3 includes construction of a landfill cap. These alternatives eliminate risks due to dermal exposure, ingestion, and inhalation of surface soils. In addition, through grading and cap construction, these alternatives are expected to reduce risks due to direct contact with landfill material and the potential for ponding and resultant infiltration into the landfill.

Alternative 3 provides protection of human health and the environment by preventing contact with landfill mass, mitigating erosion of landfill materials, and reducing the potential for infiltration and

transport of contaminants off-site. However, certain cap designs appear to be more effective than others in terms of preventing infiltration.

In addition, for Alternatives 2 and 3, the installation of landfill gas controls in the form of vertical wells and horizontal trenches prevents potential landfill gases from migrating beyond the 100-foot buffer zone.

In general, the existing soil and the evapotranspirative clay caps (Alternative 1, 2, 3a, and 3b) had comparable drainage estimates. The GCL and FML barriers (Alternative 3c and 3d) generally allow the least drainage, however, these liners are susceptible to puncture and damage due to rodents.

Alternative 4 is very effective in protecting human health and the environment. This alternative eliminates unacceptable risks due to dermal exposure, ingestion, and inhalation of surface soils. Alternative 4 reduces contaminant concentrations values to levels that eliminate unacceptable risk. Alternative 4 includes excavation of debris from AA 3 and disposal at an off-site disposal facility. After implementation of this alternative, the site would not present unacceptable risk to workers or the public from hazardous constituents.

13.3.2 Compliance with ARARs

Alternative 1 does not trigger ARARs. Alternative 2 meets location-specific and groundwater monitoring action-specific requirements identified as potential ARARs (see Appendix H). Alternative 3 meets all identified potential ARARs. Alternatives 3a, 3c, and 3d meet all potential ARARs including Title 22 and Title 27 CCR, because these alternatives reduce infiltration into the landfill as effectively as the Title 27 CCR prescriptive standard (clay) cap. Alternatives 3b, 3c, and 3d include construction of a Title 27 CCR prescriptive cap.

All remedial alternatives except Alternative 1 would comply with the 27 CCR §20921 (a)(1), (2) and (3) and 27 CCR §21160 (b) requirements for landfill gas monitoring and controls, thereby meeting the requirement of not exceeding 5 percent by volume in air at the facility property boundary. In addition, all remedial alternatives (except Alternative 1) include installation of landfill gas controls in the form of vertical wells and horizontal trenches preventing potential landfill gases from migrating beyond the 100-foot buffer zone. Alternative 4 complies with the requirements of 40 CFR §264.554(d)(1)(i-ii), (d)(2), (e), (f), (h), (i), (j), and (k) for design, operation, and closure of the staging pile.

13.3.3 Long-Term Effectiveness and Permanence

Each of the alternatives, except Alternative 4, leaves wastes in place. Alternative 3 consolidates waste but does not move wastes off-site. Comparison of annual drainage into the landfill has been determined using UNSAT-H modeling evaluations. The results of this model are provided in Appendix K.

The native soil cap in Alternative 3a is resistant to desiccation and resultant cracking. Alternative 3b has a barrier layer that is subject to desiccation in arid and semiarid climates such as El Toro. The clay utilized in this alternative also has low resistance to cracking from differential settlement. The GCL and FML liners used in Alternatives 3c and 3d have an advantage over a clay barrier layer because they are not subject to desiccation and can withstand large tensile strains. However, the greater thickness of the clay and soil barrier layers used in Alternative 3a and 3b make these barriers more resistant to puncture root systems or burrowing animals than the thinner barrier layers used in Alternatives 3c and 3d.

Table 13-7: Comparative Analysis of Remedial Alternatives

Criteria	Alternative 1	Alternative 2	Alternative 3a	Alternative 3b	Alternative 3c	Alternative 3d	Alternative 4
Overall Protection of Human Health and the Environment[a]	**Low.** Does not prevent direct contact with landfill wastes.	**Low-Moderate.** Prevents direct human contact with wastes. Installation of landfill gas controls in the form of vertical wells and horizontal trenches prevents potential landfill gases from migrating beyond the 100-foot buffer zone.	**Moderate.** Eliminates risks due to dermal contact, inhalation, and ingestion of surface soil. Installation of landfill gas controls in the form of vertical wells and horizontal trenches prevents potential landfill gases from migrating beyond the 100-foot buffer zone.	**Moderate.** Eliminates risks due to dermal contact, inhalation, and ingestion of surface soil. Installation of landfill gas controls in the form of vertical wells and horizontal trenches prevents potential landfill gases from migrating beyond the 100-foot buffer zone.	**Moderate-High.** Eliminates risks due to dermal contact, inhalation, and ingestion of surface soil. Installation of landfill gas controls in the form of vertical wells and horizontal trenches prevents potential landfill gases from migrating beyond the 100-foot buffer zone.	**Moderate-High.** Eliminates risks due to dermal contact, inhalation, and ingestion of surface soil. Installation of landfill gas controls in the form of vertical wells and horizontal trenches prevents potential landfill gases from migrating beyond the 100-foot buffer zone.	**High** Eliminates risks due to dermal contact, inhalation, and ingestion of surface soil due to complete removal of waste and waste residuals.
Compliance with ARARs[b]	**Low.** Does not trigger ARARs.	**High.** Meets ARARs.	**High.** Meets ARARs. Equivalent to a Title 27 CCR prescriptive cap.	**High.** Meets ARARs. Title 27 CCR prescriptive cap.	**High.** Meets ARARs. Title 27 CCR prescriptive cap.	**High.** Meets ARARs. Title 27 CCR prescriptive cap.	**High.** Meets ARARs.
Long-term Effectiveness and Permanence[c]	**Low.** The existing cover with assumed 80% compaction prevents most drainage (predicted annual drainage ranges from 0.002 inches per year to 8.702 inches per year)	**Moderate** The existing cover with assumed 80% compaction prevents most drainage (predicted annual drainage ranges from 0.001 inches per year to 8.702 inches per year).	**High.** Prevents direct contact with wastes. Prevents most drainage (predicted annual drainage ranges from 0.001 inches per year to 1.685 inches per year). Resistant to desiccation cracking and cracking from settlement.	**Moderate** Clay barrier is subject to desiccation and cracking from settlement. Prevents most drainage if intact (predicted annual drainage ranges from 0.606 inches per year to 6.031 inches per year).	**Moderate-High** Geosynthetic clay liner is resistant to desiccation. Easily punctured. Not impermeable to gases.	**Moderate-High.** Flexible membrane liner is flexible, resistant to desiccation. Can be punctured.	**High.** High degree of long term effectiveness due to complete removal of waste and waste residuals.

Table 13-7: Comparative Analysis of Remedial Alternatives

Criteria	Alternative 1	Alternative 2	Alternative 3a	Alternative 3b	Alternative 3c	Alternative 3d	Alternative 4
Reduction of Toxicity, Mobility, or Volume through Treatment[d]	**Low.** Does not significantly reduce infiltration or production of leachate. No reduction in the volume of landfill materials.	**Moderate.** Reduces infiltration and potential production of leachate. No reduction in the volume of landfill materials. Installation of landfill gas controls in the form of vertical wells and horizontal trenches prevents potential landfill gases from migrating beyond the 100-foot buffer zone.	**Moderate-High.** Prevents most infiltration. No reduction in the volume of landfill materials. Installation of landfill gas controls in the form of vertical wells and horizontal trenches prevents potential landfill gases from migrating beyond the 100-foot buffer zone.	**Moderate-High.** Prevents almost all of the infiltration. No reduction in the volume of landfill materials. Installation of landfill gas controls in the form of vertical wells and horizontal trenches prevents potential landfill gases from migrating beyond the 100-foot buffer zone.	**Moderate-High.** Prevents almost all of the infiltration. No reduction in the volume of landfill materials. Installation of landfill gas controls in the form of vertical wells and horizontal trenches prevents potential landfill gases from migrating beyond the 100-foot buffer zone.	**Moderate-High.** Prevents almost all of the infiltration. No reduction in the volume of landfill materials. Installation of landfill gas controls in the form of vertical wells and horizontal trenches prevents potential landfill gases from migrating beyond the 100-foot buffer zone.	**High.** High degree of reduction in toxicity, mobility, and/or volume of debris at the site due to the complete removal of debris.
Short-term Effectiveness[e]	**High.** No construction activities to increase risk to workers or general public.	**High.** No construction activities in areas that increase risk to workers or general public.	**Moderate-High.** Moderate earthwork. Shortest time to construct of all the landfill cap options (3 months).	**Low.** Most earthwork. Longest time to construct (3.9 months).	**Moderate.** Moderate earthwork.Intermediate time to construct (3.3 months).	**Moderate.** Moderate earthwork.Intermediate time to construct (3.3 months).	**Low.** Most earthwork and excavation of wastes.
Implementability[f]	**High.** No construction activities.	**High.** No construction activities. ICs are readily implementable.	**Moderate-High.** Materials are readily available. No specialized equipment involved.	**Low-Moderate.** Suitable clay will have to be imported from off-site sources. Slow construction.	**Moderate-High.** Materials are readily available. No specialized equipment involved. Geosynthetic clay liner can be rapidly installed.	**Moderate-High.** Materials are readily available. Requires specialty contractor to weld and seam the liner. Extensive quality assurance/quality control.	**Moderate-High.** Requires Site characterization to know the level, extent and character of the wastes.
Cost[g]	**High.** No cost.	**Moderate-High.** Minimal cost for fencing, monitoring, and deed restrictions ($3.54 million)	**Low-Moderate.** Costly due to specialized equipment, quality assurance/quality control. ($5.45 million)	**Low – Moderate.** Costly due to import of clay ($5.66 million).	**Moderate.** Least costly of Alternative 3 landfill cap designs ($5.06 million).	**Low-Moderate.** Costly due to specialized materials, equipment and quality assurance/quality control ($5.52 million).	**Low.** Very costly due to dig and haul tasks for a large volume of waste. ($25.29 - 37.29 million[i]).

Table 13-7: Comparative Analysis of Remedial Alternatives

Criteria	Alternative 1	Alternative 2	Alternative 3a	Alternative 3b	Alternative 3c	Alternative 3d	Alternative 4
State Acceptance[h]	The review of this alternative as part of this FS effort is pending.	The review of this alternative as part of this FS effort is pending.	The review of this alternative as part of this FS effort is pending.	The review of this alternative as part of this FS effort is pending.	The review of this alternative as part of this FS effort is pending.	The review of this alternative as part of this FS effort is pending.	The review of this alternative as part of this FS effort is pending.
Community Acceptance[h]	To be discussed.	To be discussed.	To be discussed.	To be discussed.	To be discussed.	To be discussed.	To be discussed.

Notes:

a This assessment focuses on how the alternative, as a whole, achieves and maintains protection of human health and the environment. Among the factors considered are how well the alternative reduces risk by preventing contact with wastes or mitigating waste migration.

b ARARs - Applicable or relevant and appropriate requirements. The assessment against this criterion considers whether the alternative complies with the ARARs for AA 3.

c This criterion focuses on long-term effectiveness in maintaining protection of human health and the environment after the response objectives have been met. Among factors considered are how well the alternatives prevent infiltration and erosion and maintain their integrity over time.

d None of the AA 3 alternatives treat landfill wastes. Alternatives that reduce mobility of landfill wastes are rated slightly higher than those that do not attempt to reduce mobility.

e The assessment against this criterion focuses on how well the alternative protects human health and the environment during the construction and implementation of the remedy until response objectives have been met. Alternatives that take longer to implement and require exposing/moving large amounts of landfill wastes are rated the lowest.

f This assessment evaluates the technical and administrative feasibility of alternatives and availability of required goods and services. Alternatives that are easy to construct using readily available materials and no specialized equipment are rated the highest.

g This assessment is based on the present worth of alternatives. Alternatives that cost the least or have no cost are rated highest, due to high favorability within the cost category

h State and community acceptance will be assessed following the California Department of Toxic Substances and public review process.

I Three scenarios were developed for Alternative 4 costs: Scenario 1 (50%/50%) = $37.29 million, Scenario 2 (25%/75%) = $31.14 million, and Scenario 3 (100%) = $25.29 million.

Table 13-8: Cost Comparison of Remedial Alternatives

Alternative	Capital Cost (millions) [a]	Operation and Maintenance Costs (millions) [a]	Grand Total Costs (millions) [a]	Present Worth (millions)	Remedial Construction Duration (Months)	Monitoring and Maintenance Period (years)
Alternative 1	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Alternative 2	1.46	2.98	4.44	3.54	Not Applicable	30
Alternative 3						
Alternative 3a	3.16	3.29	6.46	5.45	3.0	30
Alternative 3b	3.38	3.29	6.67	5.66	3.9	30
Alternative 3c	2.77	3.29	6.07	5.06	3.4	30
Alternative 3d	3.23	3.29	6.53	5.52	3.7	30
Alternative 4 [b]	Scenario 1: 36.80 Scenario 2: 30.65 Scenario 3: 24.80	Scenario 1: 0.52 Scenario 2: 0.52 Scenario 3: 0.52	Scenario 1: 37.33 Scenario 2: 31.18 Scenario 3: 25.32	Scenario 1: 37.29 Scenario 2: 31.14 Scenario 3: 25.29	Not Applicable	5

Notes:
a Costs do not include the Present Value Discount Factor (2.8 %).
b Three scenarios were developed for Alternative 4 costs: Scenario 1 (50% hazardous waste/50% non-hazardous waste, Scenario 2 (25% hazardous waste/75% non-hazardous waste), and Scenario 3 (100% non-hazardous waste).

Table 13-9: Advantages and Disadvantages of Barrier Covers

Material	Advantages	Disadvantages
Clay	1. Long history of use. 2. Greater thickness assures layer will not be breached by puncture.	1. Barrier can desiccate and crack in arid climates. 2. Low resistance to cracking from differential settlement. 3. Difficult to compact soil above compressible waste. 4. Suitable material not always locally available. 5. Difficult to repair if damaged. 6. Slow construction.
Geosynthetic Clay Liner	1. Rapid Installation. 2. Very low hydraulic conductivity if properly installed. 3. Low cost. 4. Can withstand large differential settlement. 5. Excellent self-healing characteristics. 6. Not dependent on availability of local soils. 7. Easy to repair.	1. Low shear strength of hydrated bentonite. 2. Can be punctured during or after installation. 3. Dry bentonite is not impermeable to gas. 4. Difficult to install than the other alternatives. 5. Potential strength problem at interfaces with other materials.
Flexible Membrane Liner	1. Rapid Installation. 2. Virtually impermeable to water if properly installed. 3. Low cost. 4. Can withstand large tensile strains. 5. Easy to repair. 6. Available in a large range of sizes, thicknesses, and densities.	1. Potential shear strength problems at interfaces with other materials. 2. Relatively resistant to puncture during or after installation. 3. Extensive construction quality assurance/quality control required.

Notes:
Source: Adapted from Dunn and Singh 1995

Table 13-10: Technical Comparison of Remedial Alternatives

Alternative	Technical Specifications					ICs, Access Restrictions, and Monitoring					
	Total Cap Thickness (feet)	Barrier Layer	Annual Drainage (inches)	Re-vegetate with Annual Grasses	Drainage Controls	Deed Restrictions	Fencing and Signs	Landfill Gas Monitoring	Groundwater Monitoring	Cap and Runoff Monitoring	Revegetation Monitoring
Alternative 1	NA	NA	0.002 – 8.702	NA	None	None	None	None	None	None	None
Alternative 2	NA	NA	0.002 – 8.702	NA	Finger Dike and Riprap,	Yes	Yes	Yes	Yes	NA	NA
Alternative 3 Alternative 3a	4	Soil	0.001 – 1.685	Yes	Finger Dike, Ditches and Riprap	Yes	Yes	Yes	Yes	Yes	Yes
Alternative 3b	5	Clay	0.606 – 6.031	Yes	Finger Dike, Ditches and Riprap	Yes	Yes	Yes	Yes	Yes	Yes
Alternative 3c	4	GCL	NA	Yes	Finger Dike, Ditches and Riprap	Yes	Yes	Yes	Yes	Yes	Yes
Alternative 3d	4	FML	NA	Yes	Finger Dike, Ditches and Riprap	Yes	Yes	Yes	Yes	Yes	Yes
Alternative 4	NA	NA	NA	Yes	None	None	None	None	Yes	NA	Yes

Notes:
The annual drainage has been determined using the Unsaturated Soil Water and Heat Flow Model (UNSAT-H) and provided in Appendix K.
FML – flexible membrane liner
GCL – geosynthetic clay liner
ICs – institutional controls
NA – not applicable

Alternative 4 provides the highest degree of long-term effectiveness because of the complete removal of the waste and waste residuals including contaminated soils. Alternative 4 eliminates the need for potential future corrective actions, inspections and post-closure maintenance of the site.

13.3.4 Reduction of Toxicity, Mobility, or Volume through Treatment

Mobility of potential contaminants by leaching and erosion of the landfill would be prevented and controlled by capping in Alternatives 3a, 3b, 3c and 3d. In Alternative 4, reduction of landfill contaminant toxicity occurs through the complete removal of all waste and waste residuals, including contaminated soils. In addition, contaminant mobility, in the form of infiltration and leaching of the landfill, will be eliminated. Alternatives 1 and 2 do not minimize potential leaching of the landfill. None of the alternatives in this FS are intended to reduce the volume of landfill materials.

13.3.5 Short-term Effectiveness

Alternative 1 poses no additional risks to workers or general public over current site conditions because no response actions are taken.

Alternative 2 poses minimal risk to site workers during limited grading, and groundwater and landfill gas sampling.

Alternatives 3a, 3b, 3c, and 3d present more short-term risks because these alternatives involve construction activities associated with consolidation and capping.

Alternatives 3b presents the most risk to the community because these alternatives involve the most extensive field construction operations due to placement of clay and soil. Alternative 3a requires the shortest amount of time to complete.

Alternative 4 involves greater risk because of the excavation of wastes and earthwork. Risks associated with exposure of site personnel to dust emissions and direct contact with impacted soil during excavation is high.

13.3.6 Implementability

Alternative 1 is the easiest to implement because no actions are being taken. Alternative 2 is also readily implementable because it involves limited grading, ICs, access restrictions, and monitoring. Alternatives 3a, 3b, 3c, and 3d use proven remedial technologies and commercial services for implementation and are generally comparable in implementability. They are also comparable in terms of ability to monitor effectiveness. The GCL barrier used in Alternative 3c can be rapidly installed and is easier to install than the FML used in Alternative 3d; however, the primary difference in installation is that specialized equipment and trained labor are needed to install the FML. This is not necessary for the GCL landfill cap. The installation of the clay layer in Alternative 3b is also more time consuming than the installation of the GCL barrier.

Implementation of Alternative 3 (all options) is also more complicated than Alternatives 1 and 2 because of the activities associated with waste consolidation at AA 3.

Alternative 3a is the easiest capping alternative to implement because this alternative does not involve importing materials from off-station.

ICs and access restrictions associated with Alternatives 2, 3a, 3b, 3c, and 3d are also readily implementable.

Implementation of Alternative 4 is complicated and involves site characterization that would provide an idea of the extent and character of the wastes and the levels and extent of any contamination remaining at the site. It requires a significant amount of earthwork, excavation, and removal of waste material.

13.3.7 Cost

No cost is associated with Alternative 1. The costs associated with the implementation of the other alternatives are presented in Table 13-8 for AA 3. The present-worth of remedial alternatives for AA 3 range from approximately $3.54 million to approximately $37.29 million. Of the remedial action alternatives, the least costly is Alternative 2 and the most costly is Alternative 4.

13.3.8 State Acceptance

State regulatory agencies will have the chance to comment on the draft FS for AA 3.

13.3.9 Community Acceptance

Community acceptance of the FS re-evaluated alternatives will be assessed following the public review process.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
16	Total: 4.44	Section 2.8.1 Table 2-2	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, page 13-8.

Table 13-1: Alternative 2 - Cost Estimate Summary

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$79,087	
Land Use Controls (Capital)	$50,940	-
Site Grading (Capital)	$77,257	-
Drainage Improvements (Capital)	$107.836	-
SG Well Installs/Monitoring Well Abandonments (Capital)	$68,046	-
Debris Relocations (Capital)	$538,703	
Active Landfill Gas Collection System (Capital)	$234,853	-
Passive Landfill Gas Collection System (Capital)	$81,879	-
Operation and Maintenance Costs		
Long Term Monitoring (Years 1-5)	-	$512,671
Long Term Monitoring (Years 6-30)	-	$1,432,987
Monitoring Well Replacements (10 years)	-	$138,484
Monitoring Well Replacements (20 years)		$138,484
5-Year Review	-	$182,229
Site Closeout	-	$75,185
Subtotal Costs	$1,238,601	$2,480,039
Contingency (20%)[b]	$221,715	$496,008
Total Costs	$1,460,316	$2,976,047
Grand Total Alternative 2	$4,436,363	
Present Worth[c]	$3,539,475	

Notes:
[a] Individual costs presented in this table for each line item do not constitute present value costs. Present value costs for each line item are presented in Appendix J.
[b] Contingency of 20% was added to cover cost increases that may occur as a result of unforeseen conditions and changes that typically occur on remediation projects. Contingency was not applied on cost estimates for design and land use controls.
[c] Base year of 2008.

13.2.3 Alternative 3 – Containment, Monitoring, and Institutional Controls

13.2.3.1 Alternative 3a – Containment with Evapotranspiration Cover

Alternative 3a is a combination of landfill capping, ICs, access restrictions and monitoring. The ICs, access restrictions, and monitoring are similar to those associated with Alternative 2, but with provisions for protecting the integrity of the landfill cap and erosion control features. Monitoring will be used to assess the effectiveness of the remedy. A typical cross-section of Alternative 3a is shown in Figure 12-1.

Description

Monitoring and Inspections. Environmental monitoring for Alternative 3a would be conducted at currently existing monitoring locations. At AA 3, landfill gas and groundwater would be monitored. Security measures (fences, signs, and locks) would be inspected and repaired as required.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
17	Total: 6.46	Section 2.8.1 Table 2-2	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, page 13-12.

inspection and maintenance, and site closeout. A summary of the costs for Alternative 3a is provided in Table 13-2. Cost-estimating details, including assumptions and RACER input parameters, are provided in Appendix J.

The present worth for Alternative 3a is estimated to be $5,448,664.

8. State Acceptance. The review of Alternative 3a as part of this FS effort is pending.

9. Community Acceptance. Community acceptance of this alternative will be assessed following the public review process.

Table 13-2: Alternative 3a - Cost Estimate Summary

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$110,381	-
ET Cover (Capital)_	$1,566,972	
Monitoring Well Abandonments/Install SGMWs/Casing Extensions (Capital)	$80,400	-
Active Landfill Gas Collection System (Capital)	$234,853	-
Passive Landfill Gas Collection System (Capital)	$81,879	-
Land Use Controls (Capital)	$50,940	
Debris Relocation (Capital)	$538,703	
Operation and Maintenance Costs		
Long Term Monitoring (Years 1-5)	-	$534,293
Long Term Monitoring (Years 6-30)	-	$1,541,071
5-Year Review		$292,943
Monitoring Well Replacements (10 years)	-	$138,484
Monitoring Well Replacements (20 years)		$138,484
Site Closeout	-	$100,529
Subtotal Costs	$2,664,127	$2,745,804
Contingency (20%) [b]	$500,561	$549,161
Total Costs	$3,164,689	$3,294,965
Grand Total Alternative 3a	$6,459,654	
Present Worth[c]	$5,448,664	

Notes:
[a] Individual costs presented in this table for each line item do not constitute present value costs. Present value costs for each line item are presented in Appendix J.
[b] Contingency of 20% was added to cover cost increases that may occur as a result of unforeseen conditions and changes that typically occur on remediation projects. Contingency was not applied on cost estimates for design and land use controls.
[c] Base year of 2008.

13.2.3.2 ALTERNATIVE 3B – CONTAINMENT WITH TITLE 27 PRESCRIPTIVE CAP

Alternative 3b uses three layers required for a Title 27 CCR prescriptive cap. These layers include a minimum 2-foot-thick foundation layer, a barrier layer (consisting of a minimum 1-foot-thick

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
18	Total: 6.67	Section 2.8.1 Table 2-2	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, page 13-16.

relocation, construction of a landfill gas collection system, long-term groundwater and soil gas monitoring, access road construction, 5-year site reviews, facility inspection and maintenance, and site close-out. A summary of the costs for Alternative 3b is provided in Table 13-3. Cost-estimating details, including assumptions and RACER input parameters, are provided in Appendix J.

The present worth for Alternative 3b is estimated to be $5,660,178.

8. State Acceptance. The review of Alternative 3b as part of this FS effort is pending.

9. Community Acceptance. Community acceptance of this alternative will be assessed following the public review process.

Table 13-3: Alternative 3b - Cost Estimate Summary

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$110,556	
Prescriptive Cover (Capital)	$1,743,087	
Monitoring Well Abandonments/Install SGMWs/Casing Extensions (Capital)	$80,400	
Active Landfill Gas Collection System (Capital)	$234,853	
Passive Landfill Gas Collection System (Capital)	$81,879	
Land Use Controls (Capital)	$50,940	
Debris Relocation (Capital)	$538,703	
Operation and Maintenance Costs		
Long Term Monitoring (Years 1-5)		$534,293
Long Term Monitoring (Years 6-30)		$1,541,071
5-Year Review		$292,943
Monitoring Well Replacements (10 years)		$138,484
Monitoring Well Replacements (20 years)		$138,484
Site Closeout		$100,529
Subtotal Costs	$2,840,418	$2,745,804
Contingency (20%)[b]	$535,784	$549,161
Total Costs	$3,376,202	3,294,965
Grand Total Alternative 3b	**$6,671,167**	
Present Worth[c]	**$5,660,178**	

Notes:
[a] Individual costs presented in this table for each line item do not constitute present value costs. Present value costs for each line item are presented in Appendix J.
[b] Contingency of 20% was added to cover cost increases that may occur as a result of unforeseen conditions and changes that typically occur on remediation projects. Contingency was not applied on cost estimates for design and land use controls.
[c] Base year of 2008.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
19	Total: 6.07	Section 2.8.1 Table 2-2	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, page 13-19.

Table 13-4: Alternative 3c - Cost Estimate Summary

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$97,679	
GCL Cover (Capital)	$1,251,079	
Monitoring Well Abandonments/Install SGMWs/Casing Extensions (Capital)	$80,400	
Active Landfill Gas Collection System (Capital)	$234,853	
Passive Landfill Gas Collection System (Capital)	$81,879	
Land Use Controls (Capital)	$50,940	
Debris Relocation (Capital)	$538,703	
Operation and Maintenance Costs		
Long Term Monitoring (Years 1-5)		$534,293
Long Term Monitoring (Years 6-30)		$1,541,071
5-Year Review		$292,943
Monitoring Well Replacements (10 years)		$138,484
Monitoring Well Replacements (20 years)		$138,484
Site Closeout		$100,529
Subtotal Costs	2,335,533	$2,745,804
Contingency (20%)	$437,383	$549,161
Total Costs	$2,772,916	$3,294,965
Grand Total Alternative 3c	**$6,067,881**	
Present Worth[c]	**$5,056,891**	

Notes:
[a] Individual costs presented in this table for each line item do not constitute present value costs. Present value costs for each line item are presented in Appendix J.
[b] Contingency of 20% was added to cover cost increases that may occur as a result of unforeseen conditions and changes that typically occur on remediation projects. Contingency was not applied on cost estimates for design and land use controls.
[c] Base year of 2008.

13.2.3.4 Alternative 3d – Containment with Modified Title 27 Prescriptive Cap with Flexible Membrane Liner

Alternative 3d is a variation of Alternative 3a that replaces the low-permeability clay layer with an FML. Individual evaluation of Alternative 3d with respect to the nine NCP criteria follows.

1. Overall Protection of Human Health and the Environment. Alternative 3d renders the exposure pathways incomplete for human health and the environment due to direct exposure, inhalation, and ingestion of soils. Soils-related risks are removed if the alternative is implemented. The cap will also reduce infiltration into landfill contents, thus minimizing further impacts to groundwater. The 2-foot- thick soil cover will also provide sufficient soil thickness for revegetation with annual grasses. Inspection and annual maintenance will be used to identify and remove plants with deep root systems that could compromise the integrity of the FML barrier. Monitoring and maintenance will be used to assure continued integrity of the landfill cap. Because the wastes will remain on-site, a 5-year reevaluation is required under the NCP.
2. Compliance with ARARs. Alternative 3d meets chemical-specific, location-specific, and action-specific ARARs as discussed for Alternative 3a. In addition, the installation of the modified Title 27 CCR prescriptive landfill cap meets the potential action-specific ARARs for

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
20	Total: 6.07	Section 2.8.1 Table 2-2	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, page 13-21.

estimating details, including assumptions and RACER input parameters are provided in Appendix J.

The present worth for Alternative 3d is estimated to be $5,515,928.

8. State Acceptance. The review of Alternative 3d as part of this FS is pending.

9. Community Acceptance. Community acceptance of this alternative will be assessed following the public review process.

Table 13-5: Alternative 3d - Cost Estimate Summary

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$106,345	
FML Cover (Capital)	$1,626,389	
Monitoring Well Abandonments/Install SGMWs/Casing Extensions (Capital)	$80,400	
Active Landfill Gas Collection System (Capital)	$234,853	
Passive Landfill Gas Collection System (Capital)	$81,879	
Land Use Controls (Capital)	$50,940	
Debris Relocation (Capital)	$538,703	
Operation and Maintenance Costs		
Long Term Monitoring (Years 1-5)		$534,293
Long Term Monitoring (Years 6-30)		$1,541,071
5-Year Review		$292,943
Monitoring Well Replacements (10 years)		$138,484
Monitoring Well Replacements (20 years)		$138,484
Site Closeout		$100,529
Subtotal Costs	$2,719,508	$2,745,804
Contingency (20%)	$512,445	$549,161
Total Costs	$3,231,953	$3,294,965
Grand Total Alternative 3d	**$6,526,918**	
Present Worth[c]	**$5,515,928**	

Notes:
[a] Individual costs presented in this table for each line item do not constitute present value costs. Present value costs for each line item are presented in Appendix J.
[b] Contingency of 20% was added to cover cost increases that may occur as a result of unforeseen conditions and changes that typically occur on remediation projects. Contingency was not applied on cost estimates for design and land use controls.
[c] Base year of 2008.

13.2.4 Alternative 4 – Clean Closure and Groundwater Monitoring

Individual evaluation of Alternative 4 with respect to the nine NCP criteria is as follows.

1. Overall Protection of Human Health and the Environment. Alternative 4 renders the exposure pathways incomplete for human health and the environment due to direct exposure, inhalation, and ingestion of soils. Soils-related risks are removed if the alternative is implemented. Clean Closure will reduce contaminant concentrations to levels that eliminate unacceptable risk.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
21	Total: 25.32 to 37.33	Section 2.8.1 Table 2-2	Final Remedial Investigation/Feasibility Study Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, page 13-23.

removal and disposal. A quality assurance/quality control program is required to assure proper completion of the process.

7. Cost. The cost estimate for Alternative 4 (clean closure) includes excavation and removal of all buried construction debris at AA 3, groundwater and soil gas monitoring well abandonments, site revegetation, long term groundwater monitoring for 5 years, a 5-year site review, and site closeout. Costs for clean closure were estimated using three scenarios; 50% hazardous waste/50% non-hazardous waste, 25% hazardous waste/75% non-hazardous waste, and 100% non-hazardous waste. A summary of costs for Alternative 4 is provided in Table 13-6. Cost-estimating details, including assumptions and RACER input parameters are provided in Appendix J.

   Costs for Alternative 4 are estimated at the following:

   Scenario 1 (50%/50%): The present worth for Alternative 4 under Scenario 1 is $37,292,950.

   Scenario 2 (25%/75%): The present worth for Alternative 4 under Scenario 2 is $31,139,872.

   Scenario 3 (100%): The present worth for Alternative 4 under Scenario 3 is $25,286,065.

8. State Acceptance. The review of Alternative 4 as part of this FS is pending.

9. Community Acceptance. Community acceptance of this alternative will be assessed following the public review process.

Table 13-6: Alternative 4 - Cost Estimate Summary

Clean Closure Scenario 1 (50% Hazardous Waste/50% Non-Hazardous Waste)

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$103,732	
Dig and Haul (Capital)	$30,488,543	
Revegetation (Capital)	$34,233	
Monitoring Well Abandonments/Casing Extensions (Capital)	$61,026	
Operation and Maintenance Costs		
Long Term Monitoring (5 Years)		$336,526
5-Year Review		$26,450
Site Closeout		$75,185
Subtotal Costs	$30,687,534	$438,160
Contingency (20%)[b]	$6,116,760	$87,632
Total Costs	$36,804,294	$525,792
Grand Total Alternative 4 (Scenario 1)	**$37,330,087**	
Present Worth[c]	**$37,292,950**	

Clean Closure Scenario 2 (25% Hazardous Waste/75% Non-Hazardous Waste)

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$104,577	
Dig and Haul (Capital)	$25,360,274	
Revegetation (Capital)	$61,026	
Monitoring Well Abandonments/Casing Extensions (Capital)	$34,233	
Operation and Maintenance Costs		
Long Term Monitoring (5 Years)		$336,526
5-Year Review		$26,450
Site Closeout		$75,185
Subtotal Costs	$25,560,109	$438,160
Contingency (20%) [b]	$5,091,107	$87,632
Total Costs	$30,651,216	$525,792
Grand Total Alternative 4 (Scenario 2)	**$31,177,008**	
Present Worth[c]	**$31,139,872**	

Clean Closure Scenario 3 (100% Non-Hazardous Waste)

Cost Category	Capital Costs[a]	Operation and Maintenance Costs[a]
Direct Costs		
Design	$99,602	
Dig and Haul (Capital)	$20,486,247	
Revegetation (Capital)	$61,026	
Monitoring Well Abandonments/Casing Extensions (Capital)	$34,233	
Operation and Maintenance Costs		
Long Term Monitoring (5 Years)		$336,526
5-Year Review		$26,450
Site Closeout		$75,185
Subtotal Costs	$20,681,108	$438,160
Contingency (20%) [b]	$4,116,301	$87,632
Total Costs	$24,797,409	$525,792
Grand Total Alternative 4 (Scenario 3)	**$25,323,201**	
Present Worth[c]	**$25,286,065**	

Notes:
[a] Individual costs presented in this table for each line item do not constitute present value costs. Present value costs for each line item are presented in Appendix J.
[b] Contingency of 20% was added to cover cost increases that may occur as a result of unforeseen conditions and changes that typically occur on remediation projects. Contingency was not applied on cost estimates for design and land use controls.
[c] Base year of 2008.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
22	preliminary design	Section 2.9.2	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Section 13, pages 13-1 through 13-7.

Alternative 1 will not comply with the Title 27 CCR requirements for closure (engineered cover alternative) and postclosure of landfills in California.

3. Long-Term Effectiveness and Permanence. Alternative 1 would have little long-term effectiveness at reducing risks associated with the landfill. Potential impacts to groundwater through infiltration still would be present. Because of the existing small cover thickness and potential for erosion of Agua Chinon Wash, risk of exposure to contaminants through direct contact with the waste would still continue to exist.

   Because Alternative 1 is meant to serve as a baseline against which the other alternatives may be compared, the Unsaturated Soil Water and Heat Flow Model (UNSAT-H) (presented in Appendix K), was used to estimate drainage (the amount of water infiltrated through the base of the landfill cover) that would occur if no action were taken. The results indicated that if no action is implemented at AA 3, drainage over a 10-year period is estimated to be within 10 percent of the predicted drainage for a state-prescriptive cap.

4. Reduction in Toxicity, Mobility, or Volume through Treatment. The reduction of volume of landfill material would not be achieved. UNSAT-H modeling indicates comparable performance to a state-prescriptive cap if a vegetative soil cover were maintained. The existing cover would not be maintained, therefore the effectiveness could not be maintained and the resulting potential for leachate production would not be reduced.

5. Short-Term Effectiveness. There is no short-term effectiveness associated with Alternative 1 since no active remedial activities are performed.

6. Implementation. There are no implementation factors associated with Alternative 1.

7. Cost. There are no costs associated with Alternative 1.

8. State Acceptance. The review of Alternative 1 as part of this FS effort is pending.

9. Community Acceptance. Community acceptance of Alternative 1 will be assessed following the public review process.

13.2.2 Alternative 2 – Limited Grading, Monitoring, and Institutional Controls

Alternative 2 includes ICs and access restrictions and limited grading at AA 3. Environmental monitoring would be performed utilizing existing monitoring networks. ICs, access restrictions, and monitoring are some of the presumptive remedies available for municipal landfills.

Description. ICs and access restrictions restrict the use of a landfill site, thus reducing exposure to on-site contamination (see Section 12.2.2.1 and 12.2.2.2 for details). Alternative 2 would physically limit or prevent access to AA 3 using measures such as perimeter fences, gates, and signs. In addition, Alternative 2 would include construction of a finger dike and placement of riprap to prevent erosion of the soil cover and control stormwater flow in the vicinity of AA 3, long-term groundwater and soil gas monitoring, 5-year site reviews, limited site grading, survey monument installation, facility inspection and maintenance, and site closeout

Monitoring activities included in Alternative 2 are landfill gas monitoring beneath the site and groundwater monitoring from existing probes and wells. Monitoring is currently planned to be performed for 30 years or until monitoring data indicate that the waste no longer presents a risk to

human health and the environment. Monitoring requirements will be reevaluated for appropriateness at 5-year intervals.

Environmental monitoring for Alternative 2 would be conducted at currently existing monitoring locations. Landfill gas and groundwater would be monitored. Security measures (fences, signs, and locks) would be inspected and repaired as required.

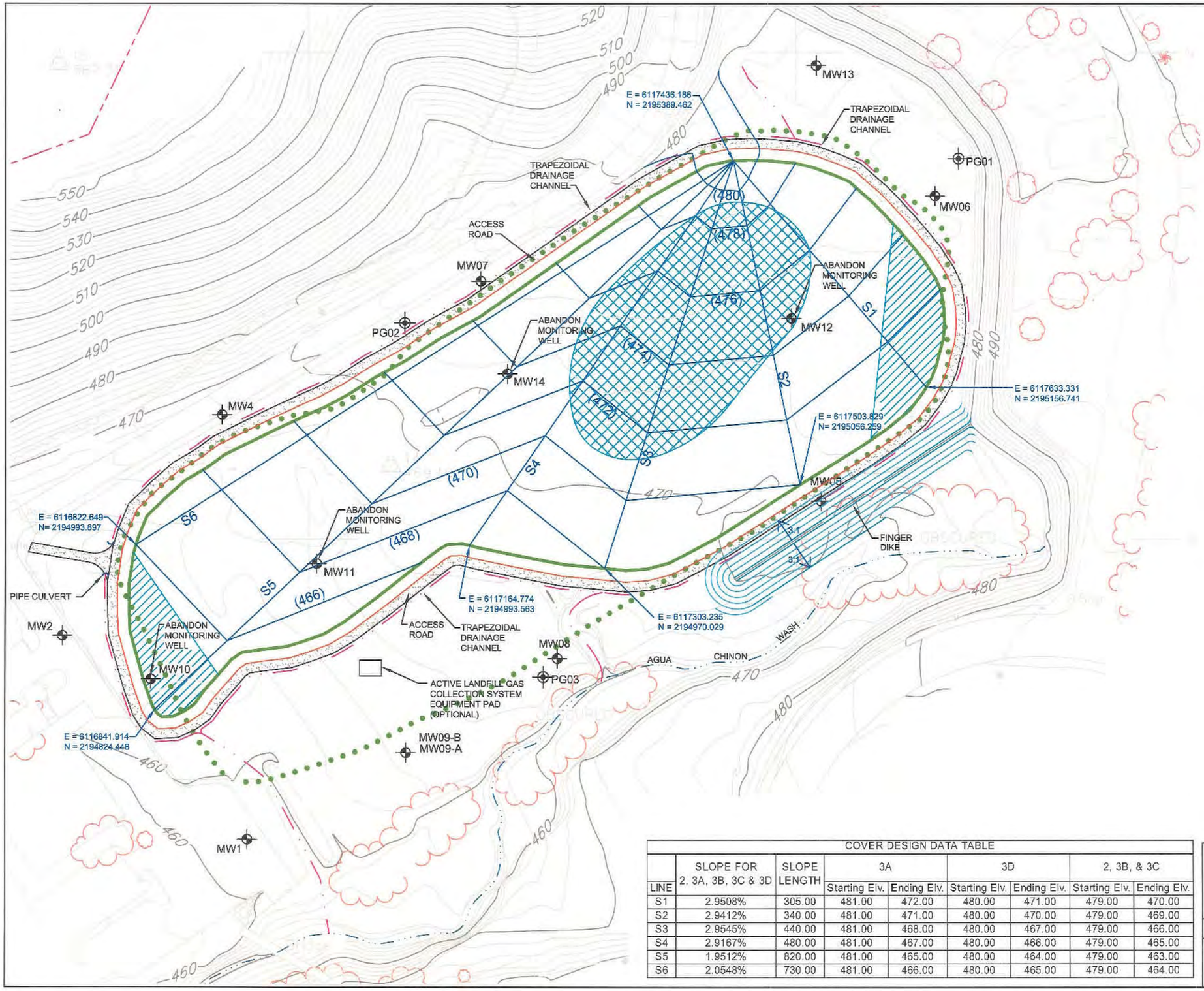
- Landfill gas monitoring for AA 3 would be performed using periodic gas sampling and analysis at three existing triple nested perimeter gas wells (PG1 through PG3). An active landfill gas collection system or gas vent system is proposed to be installed in accordance with CIWMB monitoring protocol. Compliance landfill gas monitoring probes will be installed within 50 feet of the waste boundary. This will act as an early warning feature for the initiation of landfill gas collection and treatment to prevent migration of landfill gas above Title 27 CCR thresholds at the 100-foot compliance point.

- Groundwater monitoring consistent with Title 27 CCR capping requirements would be performed from five existing monitoring wells to assess if groundwater quality is being degraded.

The results of the RI for AA 3 indicate that soil gas was detected at relatively low concentrations and only at isolated sampling locations. Therefore, the landfill gas-closure requirements are limited to monitoring. However in subsequent discussions with the regulatory agencies, an agreement was reached with the CIWMB and the FFA signatories pertaining to the landfill gas control measures at AA 3. The agreement was based on the results of the landfill gas investigations at AA 3, anticipated post-closure land use, and the DON's consultation with FFA representatives and CIWMB.

Evaluation. Individual evaluation of Alternative 2 with respect to the nine NCP criteria is provided in the following subsections.

1. Overall Protection of Human Health and the Environment. Current site conditions do not pose potential risks to human health. Alternative 2 includes limited grading and construction of a finger dike and placement of riprap to prevent erosion and control stormwater flow in the vicinity of AA 3. Access controls, such as fences and signs, should prevent inadvertent contact with wastes. ICs would restrict land-use that may lead to unacceptable risk to human health and the environmental and prevent activities that could threaten the integrity of the existing cover. For these reasons, Alternative 2 is considered protective of human health and the environment.
2. Compliance with ARARs. Certain provisions of Title 27 CCR were identified as ARARs that identify closure and post-closure requirements for landfills. Results from UNSAT-H modeling indicate that the existing soil cover offers equivalent performance as the state–prescriptive cap. Monitoring, ICs, and access restrictions satisfy the groundwater monitoring and security requirements of these ARARs..
3. Long-Term Effectiveness and Permanence. Annual drainage into the landfill has been estimated using UNSAT-H evaluations. The predicted water balance is provided for each year of the 10-yr simulation period, based on climatic conditions for the site from 1980 through 1989. The predicted annual drainage for the existing soil cover with an assumed 80 percent compaction ranges from 0.002 inches to 8.702 inches (0.005 cm to 22.103 cm). It should be noted that the assumed compaction value of 80 percent used for modeling purposes, represents the natural condition of the existing soil cover, and is not intended to be



LEGEND

- MINOR SURFACE ELEVATION: 2-FOOT INTERVALS
- 460 — MAJOR SURFACE ELEVATION: 10-FOOT INTERVALS
- MCAS EL TORO BOUNDARY
- AGUA CHINON WASH
- TRAPEZOIDAL DRANAGE CHANNEL
- REVISED EXTENT OF WASTE PLACEMENT BASED ON TRENCHING ACTIVITY(MARCH 2000 AND OCTOBER 2002)
- MW06 — GROUNDWATER MONITORING WELL
- PG01 — PERIMETER GAS MONITORING WELL
- DEBRIS REMOVAL AREA
- DEBRIS CONSOLIDATION AREA

NOTES

1. TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHOD FROM AERIAL PHOTOGRAPHY DATED DECEMBER 2001 BY SAN-LO AERIAL SURVEYS.
2. ELEVATIONS IN FEET; BENCHMARK BASED ONNORTHAMERICAN VERTICAL DATUM 1988.
3. COVER CONTOUR LINES WITH ELEVATIONS PRESENTED IN PARENTHESES ARE APPROXIMATE. FINAL LOCATION OF CONTOUR LINES ARE TO BE ESTABLISHED WITH THE SELECTION OF THE "FINAL DESIGN CROSS-SECTION." SEE "COVER DESIGN DATA TABLE" FOR DESIGN INFORMATION RELATED TO EACH ALTERNATIVE COVER DESIGN.

NORTH

0 100 FEET

SCALE: 1"= 100'

COVER DESIGN DATA TABLE

LINE	SLOPE FOR 2, 3A, 3B, 3C & 3D	SLOPE LENGTH	3A		3D		2, 3B, & 3C	
			Starting Elv.	Ending Elv.	Starting Elv.	Ending Elv.	Starting Elv.	Ending Elv.
S1	2.9508%	305.00	481.00	472.00	480.00	471.00	479.00	470.00
S2	2.9412%	340.00	481.00	471.00	480.00	470.00	479.00	469.00
S3	2.9545%	440.00	481.00	468.00	480.00	467.00	479.00	466.00
S4	2.9167%	480.00	481.00	467.00	480.00	466.00	479.00	465.00
S5	1.9512%	820.00	481.00	465.00	480.00	464.00	479.00	463.00
S6	2.0548%	730.00	481.00	466.00	480.00	465.00	479.00	464.00

RI/FS REPORT — DRAFT FINAL

CONCEPTUAL LANDFILL COVER DESIGN

ANOMALY AREA 3 FEASIBILITY STUDY

FORMER MCAS EL TORO

PROJECT NO. 04.1107.006/ 29307

BARAJAS & ASSOCIATES, INC.

FIGURE 13-1

the design criteria for the cover. The design criteria for the cover will be developed in the remedial design phase. Results from UNSAT-H modeling indicate that the existing soil cover offers better performance than the state–prescriptive cap (see Appendix K).

4. Reduction of Toxicity, Mobility, or Volume through Treatment. The reduction of toxicity, mobility, and volume through treatment will not occur. However, the predicted drainage is comparable to a state–prescriptive cap, therefore the leaching potential will be reduced at a rate comparable to the state prescriptive cap.

5. Short-Term Effectiveness. Field activities associated with this alternative include limited grading, construction of a finger dike, placement of riprap, and monitoring of landfill gas and groundwater. A site-specific sampling plan as well as a site-specific health and safety plan (HSP) would be prepared and implemented. Because the contaminant concentrations in groundwater and landfill gas concentrations in air are low, the potential short-term risk to the community and site workers through inhalation pathways is considered insignificant. Site workers participating in monitoring activities would wear the necessary personal protective equipment (PPE), as specified in the HSP.

6. Implementability. Standard equipment and procedures would be used for grading, construction of a finger dike, placement of riprap, and to monitor landfill gas and groundwater. No significant delays or difficulties in obtaining material and services are anticipated. Interim ICs are currently being administratively handled through an existing LIFOC. The implementation of final ICs including land-use restrictions incorporated into environmental restriction covenants is an administrative process and relatively easy to implement.

7. Cost. The cost estimate for Alternative 2 was developed using the Remedial Action Cost Engineering Requirements™ (RACER™) 2005 system developed by the U.S. Air Force. RACER cost models are based on generic engineering solutions for environmental projects, technologies, and processes. These solutions are derived from historical project information, government laboratories, construction management agencies, vendors, contractors, and engineering analysis. RACER cost estimates are made site-specific through modifications of the geographic and project specific factors.

   Table 13-1 presents cost associated with the implementation of Alternative 2. Alternative 2 costs include ICs and existing access restrictions, construction of a finger dike and placement of riprap, monitoring well abandonment and replacements, debris relocation, construction of a landfill gas collection system, long-term groundwater and soil gas monitoring, 5-year site reviews, limited site grading, survey monument installation, facility inspection and maintenance, and site closeout. These costs are intended to be used for comparative purposes in this FS and not for budgeting or planning purposes. Appendix J presents a more detailed discussion of the costs associated with Alternative 2.

   The present worth for Alternative 2 is estimated to be $3,539,475.

8. State Acceptance. The review of Alternative 2 as part of this FS effort is pending.

9. Community Acceptance. Community acceptance of this alternative will be assessed following the public review process.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
23	Navy/DTSC MOA	Section 2.9.2.1	Final RI/FS Report for AA 3, Former MCAS El Toro, California. July 2009. Appendix N, pages 1 through 6.

The United States Department of the Navy and The California Department of Toxic Substances Control

Use of Model "Covenant to Restrict Use of Property" at Installations Being Closed and Transferred by the United States Department of the Navy

1. Background

a. The purpose of this Memorandum of Agreement (MOA) is to formalize the use of two model environmental restriction covenants (attached) that have been drafted during negotiations between representatives of the United States Department of the Navy (DON) and the California Department of Toxic Substances Control (DTSC).

b. Under CERCLA Sec. 104, as delegated to DON by E.O. 12580, and implemented pursuant to the National Contingency Plan (NCP – 40 CFR Sec. 300 et seq.) and 10 USC Sec. 2701, et seq., the cleanup of hazardous substances, pollutants and contaminants is required to be at a level that protects human health and the environment. As a result, this protection can be achieved at certain sites by the imposition of "institutional controls" (i.e., ICs – legal mechanisms to protect human health and the environment by restricting access or exposure to the contaminants in question) with or without underlying "engineering controls" (i.e., ECs -- engineered mechanisms such as a cap on a landfill, designed to physically insure access or exposure to the contaminants in question is prevented). Collectively these ICs and ECs are called "land use controls" (LUCs).

c. In the case of property being closed and transferred by DON to a nonfederal entity, it is necessary to insure that these LUCs stay in place and are honored by all future owners and occupants of the property in question, for as long as contamination is present at levels that do not permit unrestricted use. One key way such LUCs can be maintained is by DON's retention of sufficient legal title and interest to insure continuing enforcement of the terms of the LUCs. This retention would entail burdening such conveyances of title with deed covenants insuring that the deed transferring such property contain a formal restriction – a restrictive covenant – on the use of the property that will "run with the land," and is enforceable against the "servient estate" (i.e., all future owners of the land) and is retained by the United States, as represented by DON, acting as holder of the "dominant estate." In addition, DON can convey a separate and similar restrictive covenant to DTSC as provided in

Section 2 below.

d. In the State of California, such a restriction on the use of land, to protect human health and the environment is recognized by Section 1471 of the California Civil Code. This statute characterizes such a restrictive covenant as an "environmental restriction" and requires such words to be placed in the title of the document creating such an interest. DON has agreed to include such restrictive language in the deeds it executes where it imposes LUCs as a remedy under applicable law.

e. Similar to CERCLA, State environmental protection laws recognize the availability of using LUCs as remedies to protect human health and the environment. Currently, DTSC's authority under Chapter 6.5 and 6.8 of Division 20 of the California Health and Safety Code, provides statutory avenues to impose LUCs at a cleanup site to insure that the LUCs are honored by future owners. Chapter 6.5 is generally used when the cleanup site in question is one subject to the State's authorities under the hazardous waste facilities law, and Chapter 6.8 is generally used when the cleanup site in question is one subject to the State's equivalent to the federal CERCLA program.

f. In the case of property being closed and transferred to a nonfederal entity by DON where a cleanup remedy has used LUCs as a remedy as described above, DON and DTSC have a mutual interest in insuring that the "environmental restriction" imposed on the land is enforced for however long the protection of public health and the environment requires such restrictions.

g. As a result, DON and DTSC agree that it is in both parties' and the public's interests, that DTSC be in a position to enforce the "environmental restrictions" that the DON will be imposing on these transferring parcels of property. To this end, in addition to retaining the power to enforce protective covenants, DON agrees to convey a separate power to enforce such restrictive covenants to DTSC equivalent to DON's power to enforce any "environmental restrictions" burdening the transferring property by entering into a "Covenant to Restrict Use of Property." Under both Chapter 6.5 and Chapter 6.8, DTSC has the authority to monitor and enforce such "environmental restrictions" conveyed to it by the owner of property on which such an "environmental restriction" has been found necessary. Therefore, in consideration of DON's conveying such an interest, DTSC may implement as appropriate the various statutory authorities it possesses under Chapter 6.5 and Chapter 6.8 (as applicable) to insure these "environmental restrictions" are honored by all future owners and occupants.

2. Terms of Understanding:

a. DON and DTSC agree that in all future property transfers to a nonfederal agency, where DON is acting on behalf of the United States as the transferring or disposing agent, the applicable model "Covenant to Restrict Use of Property" attached to this MOU will be used throughout California when the proposed remedy involves imposing an IC (except those "early transfers" where 1) the transferee will perform the cleanup, and 2) the cleanup includes an IC in the remedy, and 3) has executed an order or enforceable agreement with DTSC or has entered into a Sec. 25222.1 agreement with DTSC, that calls for the transferee entering into a "Covenant to Restrict Use of Property" directly with DTSC).

b. DON and DTSC have entered into a number of Federal Facility Agreements and Federal Site Remediation Agreements for DON property. These Agreements generally call for coordination of the DON's satisfaction of its corrective action obligations under the Resource Conservation and Recovery Act (RCRA) and Health and Safety Code section 25200.10 with its responsibilities under CERCLA section 120(i), EO 12580, the Defense Environmental Restoration Program and the NCP. The Agreements recognize that the DON may satisfy some or all of its corrective action obligations through CERCLA response actions. Where such corrective action at hazardous waste management units is being satisfied through CERCLA, Attachment A shall be used. Attachment B is the model which will be used for hazardous waste management facilities not addressed in Federal Site Remediation or Federal Facility Agreements.

c. When issuing Proposed Plans for public comment, DON will attach a copy of this MOU and the appropriate model "Covenant to Restrict Use of Property" so as to assure the public that the specific LUC being proposed will be enforced, in part, by DON's retained power to enforce the deed covenants and conveyance of the power to enforce protective deed covenants to DTSC contemporaneously with the execution of the deed transferring DON's interests to the new owner.

d. In using these models to draft the appropriate "Covenant to Restrict Use of Property," DON's and DTSC's personnel will work collaboratively to develop the specific information applicable to the given site called for by Articles I (Statement of Facts) and IV (Restrictions) of the attached models. A final "Covenant to Restrict Use of Property" that is ready for signature for a given site, will be prepared in time to allow it to be

executed contemporaneously with the execution of the deed transferring DON's non-retained interests in the property to the new owner. In the case of "early transfers" where DON is performing the cleanup after the transfer, and is imposing an LUC at the time of the "early transfer" in support of its ongoing cleanup activities, the Parties recognize that the contents of Articles I and IV of the model covenants for such sites will likely not be as detailed as that suggested in the attached models. The degree of detail contained within the model covenant will be the information available as to the cleanup site, although the covenants must be adequate to protect human health and the environment to allow an early transfer. The form of remedy and any additional associated IC will be more fully developed once the remedy is selected and implemented.

e. The Parties recognize that given the need to tailor the terms of the "environmental restriction" to the remedy that is finally selected after seeking public comment on the Proposed Plan, the terms of the final "Covenant to Restrict Use of Property" may vary greatly from the draft proposal. The Parties recognize that the public should be given specific notice of this fact in the Proposed Plan.

f. The Parties recognize that remedies proposed by the DON will be submitted to DTSC for concurrence. However, there may be unresolved disagreements at some cleanup sites concerning the remedy being proposed by DON including, in particular, the scope and nature of the LUCs, and the terms of any underlying, proposed "Covenant to Restrict Use of Property." In such situations the Parties will use their best efforts to resolve all disputes informally. If the Parties are ultimately unable to resolve the issue in dispute, DON and DTSC reserve any rights they might have to take any action available under applicable state or federal law.

g. Either Party may terminate its involvement in this Agreement by giving thirty (30) days written notice to the other Party. Upon receipt of notice and the expiration of thirty days termination shall occur by operation of law.

Signed: _____ 10 MARCH 2000

F.R. Ruehe
Rear Admiral
United States Navy
Commander Navy Region Southwest

Date

Signed: Edwin F. Lowry 3/10/00

Edwin F. Lowry
Director
Department of Toxic Substances Control

Date

Attachment A: Model Site Mitigation Program "Environmental Restriction Covenant and Agreement"

Attachment B: Model Hazardous Waste Management Program/State Regulated Unit "Environmental Restriction Covenant and Agreement"

Approved as to form:

Date: 9 March 00 By: Mary Kay Lamyn

Approved as to form:

Date: March 16, 2000 By:

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record[1]
24	court reporter record	Section 3	Installation Restoration Program (IRP), Former MCAS El Toro, California, Anomaly Area 3 (AA 3), Proposed Plan Summary, Transcript of Public Meeting, Irvine, California, August 19, 2009.

INSTALLATION RESTORATION PROGRAM (IRP)

FORMER MCAS EL TORO, CALIFORNIA

ANOMALY AREA 3 (AA 3)

PROPOSED PLAN SUMMARY

JAMES CALLIAN, PG, CHG, CEG

BRAC ENVIRONMENTAL COORDINATOR

NAVY BRAC PROGRAM MANAGEMENT OFFICE WEST

TRANSCRIPT OF PUBLIC MEETING

IRVINE, CALIFORNIA

AUGUST 19, 2009

Reported by:
Bonnie G. Breen,
CSR No. 5582

TABLE OF CONTENTS PAGE

TRANSCRIPT OF PUBLIC MEETING

held at Irvine City Hall, One Civic Center Plaza, Irvine, California commencing at 6:30 p.m. and ending at 7:15 p.m.

INSTALLATION RESTORATION PROGRAM

FORMER MCAS EL TORO, CALIFORNIA

ANOMALY AREA 3 (AA3)

PROPOSED PLAN SUMMARY

PRESENTED BY: JAMES CALLIAN, PG, CHG, CEG

BRAC ENVIRONMENTAL COORDINATOR

NAVY BRAC PROGRAM MANAGEMENT OFFICE WEST

MR. CALLIAN: All right. Good evening and welcome. My name is Jim Callian. I'm the BRAC Environmental Coordinator and Resident Remedial Project Manager responsible for this project under the Navy's BRAC program at the BRAC PMO, Program Management Office, West, in San Diego, California.

Tonight, I'm presenting a summary of the Navy's proposed plan for remedial action at Anomaly Area 3, part of the Installation Restoration Program, or IRP, at MCAS El Toro, or Marine Corps Air Station El Toro.

Please hold all of your questions and comments until the end of this presentation. We will accept your comments during the final formal portion of this public meeting. At that time, we will only address clarifying questions, for example, the meaning of an acronym. However, all questions and comments will be formally

addressed and presented in the responsiveness summary section of the Record of Decision for Anomaly Area 3.

I would like to point out that we'll be using a lot of acronyms tonight, and you'll find a listing of them at the back of your presentation or handouts. If you want to pull those off and follow along as we continue, that would be great.

We are here tonight to present the Navy's preferred alternative for protection of human health and the environment at Anomaly Area 3, or AA 3; and to invite the public to review and comment on this preferred alternative, which includes limited grading of the existing soil cover, construction of a finger dike, and placing rip-rap to prevent erosion and control storm water; implementing institutional controls, or ICs; installing a passive/active landfill gas, or LFG, venting and monitoring system; and long-term environmental monitoring for approximately 30 years.

I would like to point out that the cleanup of groundwater at Anomaly Area 3 is not required; although, groundwater monitoring is included as a component of the preferred alternative.

This is a site map of Anomaly Area 3, a landfill, which contains predominantly construction debris, located in the northeast central portion of the

former station, north of Irvine Boulevard and south of Pusan Way. Here it is in relation to the station. Here is Pusan Way; and Irvine Boulevard passes down here in this direction. The map is located on page 3 of your proposed plan.

Anomaly Area 3 encompasses approximately 5.1 acres and is located adjacent to Agua Chinon Wash, which is the wash on the southeastern side of the site right here. You'll see a number of groundwater monitoring wells and landfill gas monitoring wells, as well as an access road surrounding the site on this map.

Historically, Anomaly Area 3 was used as a source of borrow material or clean fill soil. The borrow pits and trenches were later backfilled with construction debris and covered with fill soil. There is an average of approximately 4-1/2 feet of soil that covers the site, with isolated areas having about 2 feet of soil cover. Aerial photos and topographic maps indicate that construction debris backfill took place between 1972 and 1988.

As far as the regulatory framework goes, MCAS El Toro was listed on the National Priorities List, or NPL, in 1990. The Navy, on behalf of the Marine Corps, entered into a Federal Facility Agreement, or FFA; with the United States Environmental Protection Agency, or

U.S. EPA; the California Department of Toxic Substances Control, or DTSC; and the California Regional Water Quality Control Board, Santa Ana Region, or RWQCB, to establish protocols for the investigation and cleanup of sites at MCAS El Toro.

The Base Realignment and Closure (BRAC) Cleanup Team, or BCT, was established in 1993. It is composed of the Navy and these agencies that play a key role in the coordination and review of environmental investigations and cleanup, and were involved in the review of all major documents and activities associated with Anomaly Area 3.

Anomaly Area 3 was investigated under the Navy's IRP, or Installation Restoration Program, which identifies, investigates, and remediates chemical releases to soil and groundwater that resulted from past Navy activities.

The IRP complies with the Comprehensive Environmental Response, Compensation, and Liability Act, or CERCLA; the Resource Conservation and Recovery Act, known as RCRA; with the National Oil and Hazardous Substances Pollution Contingency Plan, or the NCP; and all other federal and state laws that govern environmental cleanups.

I'd like to encourage you to go to either of these locations to peruse the investigation reports,

including the Remedial Investigation and Feasibility Study reports, which are summarized in your proposed plan, and I will be discussing further tonight.

The information repository is located at the Heritage Park Regional Library in Irvine, or you can go to the Administrative Record File at the BRAC office in Building 307 at the former station. These locations are listed on pages 10 and 11 of your proposed plan, as well as information on how to submit your comments.

Previous investigations of Anomaly Area 3 included an historical radiological assessment, or HRA, which was conducted station-wide in 2000 to identify potential, likely, or known radioactive source material or contamination.

Radium-226 was identified as a chemical of potential concern, or COPC, due to its use as a component in luminescent paint, in gauges, dials, and other equipment in aircraft at the Station.

The surface area at AA 3 was subsequently radiologically scanned, and soil samples were collected and analyzed. Based on results from site-specific surveys, soil sampling, statistical tests, and risk calculations, it was concluded that the surface contained only naturally occurring radioactivity, for example, in the crushed rock and gravel on the surface of the site.

The level of exposure to potential radium for residential receptors was within background.

The California Department of Public Health concurred with these conclusions and stated that, based on historical documentation, the site could be reclassified as non-impacted and was therefore acceptable for unrestricted radiological release.

The remedial investigation, or RI, conducted at Anomaly 3 area involved extensive analyses of air, soil gas, soil, surface water, and groundwater. Air sampling results showed that volatile organic compounds, or VOCS, and landfill gas are present at low concentrations.

Methane is a common landfill gas and results from the breakdown of organic matter, like vegetation in landfills. It is present at elevated concentrations in a central portion of the site. Results from air and soil gas sampling confirmed that controls are not presently needed to contain landfill gasses due to their low concentrations.

Results from surface water indicated only two metals, aluminum and chromium, were present at concentrations exceeding screening values. However, up and downstream concentrations were similar, and indicated that surface water in Agua Chinon Wash is not impacted by the wastes.

Results from shallow soil indicated the presence of semivolatile organic compounds, or SVOCs; petroleum hydrocarbons; and metals. Results from groundwater sampling indicated very low concentrations of VOCs, SVOCs, petroleum hydrocarbons, and metals.

Human health risk assessments, or HHRAs, and ecological risk assessments were conducted to evaluate risks from potential exposure to chemicals in soil gas, shallow soil, and in groundwater at the site.

At this time, I will run through an overview of the human health risk assessments, or HHRAs, that were performed to evaluate potential cancer and non-cancer health effects at Anomaly Area 3; although, I will be focusing on the cancer risk in this presentation, and I will be referring to the non-cancer risks as hazard indices or HIs.

Risk calculations were based upon conservative assumptions, which means that they tend to overestimate risk, resulting in cleanup goals that are more protective of human health. The Navy evaluated risks for several potential reuse scenarios, including visitors to the site, construction workers, agricultural and industrial workers, park users and residents.

The residential scenario was used as the most conservative. It assumes that shallow groundwater would

be used for domestic purposes, like drinking and bathing, over a period of 30 years, six years as a child and 24 years as an adult.

This is a chart that looks at the U.S. Environmental Protection Agency's risk range. As you can see, risk goes up as you move up the chart in the direction of the arrow on the left.

The green area on the chart that ends with 10 to the minus 6 represents a statistical probability that less than one additional cancer case in a population of 1 million would result due to exposure. This is considered allowable or acceptable risks.

The yellow area between 10 to the minus 6 and 10 to the minus 4 represents a statistical probability that between one additional cancer case in a population of 1 million to one additional cancer case in a population of 10,000 would result due to exposure. This represents the U.S. EPA's generally allowable or risk management range. That is the yellow portion in the central portion of the figure.

The orange area above, 10 to the minus 4th, represents a statistical probability that more than one additional case, one additional cancer case in a population of 10,000 would result due to exposure. This is considered unacceptable risk.

Risk assessment results from Anomaly Area 3 indicate that risks from potential residential exposure to surface and subsurface soil was within the generally allowable risk range, at 4-in-100,000 additional cancer cases. The non-cancer hazard index, HI, was less and/or equal to 1.

Risks from other potential exposure scenarios ranged from less than 2-in-1,000,000 additional cancer cases for an escorted visitor's exposure to surface soil to 3-in-100,000 additional cancer cases for an agricultural worker's exposure to subsurface soil. Non-cancer HIs, or hazard indices, were all less than 1. The chemicals associated with the majority of risks from exposure to soil are SVOCs, or semivolatile organic compounds.

Risk from potential exposure to VOCs in indoor air was within the allowable risk range, 1-in-1,000,000 additional cancer cases. The non-cancer hazard index was less than one.

Risks from potential residential exposure to groundwater, for example, drinking, bathing, cooking, et cetera, over a period of 30 years were above the generally allowable range, at 3-in-10,000. However, this risk was driven by arsenic, which accounts for about three-quarters of the total risks. These arsenic

concentrations are within the background or ambient concentrations at MCAS El Toro.

Ecological risk assessment results indicated that activities at Anomaly Area 3 have not had negative effects on ecological receptors, plants and animals, at the site or on aquatic life, plants and fish, in surface water in Agua Chinon Wash.

THE REPORTER: You went too far ahead.

MR. CALLIAN: I did? Strike that, would you.

I will start off with the second bullet point. Risk assessment results indicate that potential risks -- No, let me go back. I will do the first one over.

Ecological risk assessment results indicated that activities at Anomaly Area 3 have not had negative effects on ecological receptors, plants and animals, at the site or on aquatic life, plants and fish, in surface water in nearby Agua Chinon Wash.

Risk assessment results indicate that potential risks to human health and the environment would continue to be present if actions are not taken at Anomaly Area 3 to prevent exposures to wastes or to control infiltration.

Cancer risk estimates for potential exposure to soil are all within or below U.S. EPA's generally allowable risk range; and non-cancer HIs are all less

than or equal to 1, which means that the risk to human health and the environment at Anomaly Area 3 can be managed by engineering or other controls.

Remedial alternatives for Anomaly Area 3 were developed and evaluated in the Feasibility Study, or FS, to meet these four remedial action objectives, with the overall objective of protecting human health and the environment.

The first RAO was minimize direct contact with landfill wastes; the second, control runoff, run-on, and erosion; minimize infiltration and potential contaminant leaching to groundwater; mitigate landfill gas migration consistent with the Navy's agreement with the FFA Signatories and the California Integrated Waste Management Board, or CIWMB; and fourth, minimize contact between surface water in the Agua Chinon Wash and the landfill waste.

This is a listing of the four remedial alternatives developed and evaluated for Anomaly Area 3 in the Feasibility Study. I will present more detail on each of these in the successive slides.

The first alternative, Alternative 1, no action, by law, this alternative is evaluated to provide a basis from which to develop and evaluate other remedial alternatives. Under no action, the cleanup actions would

not be implemented, and there would be no change in site conditions.

Alternative 2, limited grading, monitoring, and institutional controls, the preferred remedy, consists of limited site grading, waste consolidation, construction of a finger dike, and placement of rip-rap; passive/active landfill gas venting and monitoring system; institutional controls; and long-term environmental monitoring.

The soil cover would prevent infiltration of surface water and formation of leachate. Construction activities would minimize erosion of the soil cover and control storm water in the vicinity of Anomaly Area 3. ICs would be implemented to restrict land use and prevent inadvertent exposure to wastes at the site.

Long-term environmental monitoring would be conducted over a period of 30 years, including groundwater and landfill gas monitoring, land surveys to monitor potential differential settlement, and inspections and maintenance. Five-year reviews would also be used to track the continued effectiveness of the remedy.

Alternative 3, containment, monitoring, and institutional controls, consists of waste consolidation, an engineered landfill cap, institutional controls, and

long-term environmental monitoring. Wastes would be consolidated in one area and covered with soil or another type of capping material.

Four types of engineered landfill caps were considered in the feasibility study: Alternative 3a, containment with an Evapotranspiration Cover, or ET Cover; Alternative 3b, containment with a Prescriptive Cap; Alternative 3c, containment with a Modified Prescriptive Cap with a Geosynthetic Clay Liner; Alternative 3d, containment with Modified Prescriptive Cap with a Flexible Membrane Liner.

ICs, long-term environmental monitoring, and five-year reviews would be implemented similar to Alternative 2.

The last alternative, Alternative 4, clean closure and groundwater monitoring, consists of excavation and removal of all buried construction debris at Anomaly Area 3, revegetation, groundwater monitoring for five years, a five-year review, well abandonment, and site close-out. Site contaminants would be removed, thereby removing concentrations posing potential risk to human health and the environment.

Each alternative underwent a detailed evaluation and analysis in the FS using nine criteria developed by the U.S. EPA, which are divided into three

groups.

The first group are threshold criteria, two criteria that by law must be satisfied. They include, one, overall protection of human health and the environment, which tells how risks posed by the site will be eliminated, reduced, or controlled; and two, compliance with ARARS, or applicable or relevant and appropriate requirements, which addresses whether a remedy will meet all federal, state, and local environmental statutes or requirements.

The second group are the five primary balancing criteria. They include long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementabillity; and cost.

The third group are modifying criteria. These two criteria include state acceptance, which is evaluated through the proposed plan process, and is documented in the responsiveness summary section in the Record of Decision.

And Number 9, community acceptance, this proposed plan is the Navy's invitation to the community to comment on the proposed alternative for Anomaly Area 3. Community acceptance will be determined after the conclusion of the public comment period and will also be

documented in the responsiveness summary section of the ROD or Record of Decision.

This line presents a summary of the comparative analysis of the remedial alternatives developed for Anomaly Area 3 with respect to the nine EPA criteria. This evaluation is presented on page 7 of the proposed plan.

According to the comparative analysis presented in the FS, Alternative 2, the shaded alternative in that second column over, is protective of human health and the environment; would comply with ARARS; ranks moderate with respect to long-term effectiveness and permanence; moderate with respect to reduction of toxicity, mobility, or volume through treatment; and it ranks high with respect to short-term effectiveness; and high with respect to implementability; and ranks moderately high with respect to costs.

By comparison, Alternative 3a, the column right next to it, for containment with Evapotranspiration Cover, or ET cover, is protective of human and health and the environment; would comply with ARARS; ranks high with respect to long-term effectiveness and permanence; ranks moderately high with respect to reduction of toxicity, mobility, or volume through treatment; high with respect to short-term effectiveness; and high with respect to

implementability; and moderate high with respect to cost.

In review, the preferred alternative for Anomaly Area 3 is Alternative 2: Limited grating, monitoring, and institutional controls.

The BRAC cleanup team, or ECT, is composed of representatives of the Navy, the U.S. EPA, the DTSC, and the Regional Water Quality Control Board. They have evaluated environmental data, technical information, and remedial alternatives for Anomaly Area 3. They concur with the Navy's recommendation for the preferred alternative.

Based on results from investigations and risk assessments conducted to date, the Navy and its regulatory agency partners concluded that groundwater at Anomaly Area 3 requires no further action or NFA. However, long-term groundwater monitoring is included as a part of the preferred remedy.

At this time, I would like to invite input from the agencies on the preferred alternative.

REMARKS BY: MARY T. AYCOCK, REMEDIAL PROJECT MANAGER, U.S. EPA

MS. AYCOCK: Thank you, Jim. Hi, I'm Mary Aycock. I represent Region IX, EPA, and I'm the new

remedial project manager on this site. I have actually worked on the RA sites for about 25 years. So I just wanted to speak on behalf of the DTSC and the Regional Water Quality Board when I say that we as agencies have looked at the alternatives over the last few years; and we concur with the preferred alternative that the Navy has selected; and there has been numerous meetings over the last few years discussing these alternatives. So I guess I would turn it back then to you, Jim, for questions or anything you might have.

MR. CALLIAN: Thank you.

MS. AYCOCK: You are welcome.

FLOOR OPENS TO QUESTIONS AND PUBLIC COMMENT

MR. CALLIAN: So what is next? Submitted public comments. You can make oral comments tonight during the public comment portion of this meeting, which will directly follow this presentation. You can make individual oral comments to the court reporter sitting to my right.

You can submit your comments in writing, and you can use the comment forms provided on the table, and you can submit those tonight, or you can send your written comments via mail postmarked no later than

September 12th to me, James Callian, at the BRAC environmental office at 7040 Trabuco Road in Irvine, or you can e-mail them to me at my address there: james.callian@navy.mil. You can fax your comments to me at (949) 726-6586. All written comments must be sent no later than September 12th, 2009.

Before we open up for formal comments, are there any clarifying questions on the proposed plan summary that was presented, for example, with any of the terms involved? Please hold other questions or comments for the formal comment portion of this meeting.

So seeing none, I will move on. If there are no more clarifying questions, I will open the meeting to public comment. Anybody that wishes to make a public comment, if you would please come up and take the microphone, state your name, your affiliation, and provide your comment or question.

All right. Well, seeing no comments, I appreciate your attendance here tonight; and that will close out this presentation portion. And we'll move on to the comment period where you can submit your comments in writing for the next 15 minutes. Thank you very much.

(Conclusion of Public hearing at 7:15 p.m.)

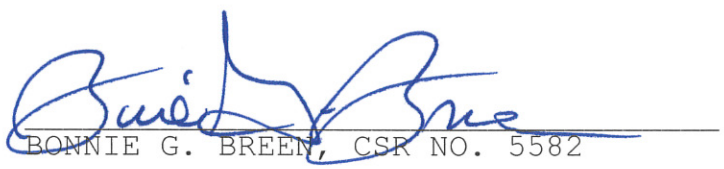
STATE OF CALIFORNIA)
) ss
COUNTY OF SAN DIEGO)

I, Bonnie Breen, CSR No. 5582, a Certified Shorthand Reporter in and for the County of San Diego, State of California, do hereby certify:

That the foregoing Public Hearing was taken before me at the time and place set forth and was taken down by me in shorthand and thereafter reduced to computerized transcription by me; and I hereby certify the foregoing Public Hearing is a full, true, and correct transcript of my shorthand notes so taken.

I further certify that I am neither counsel for nor related to any party to said action nor in anywise interested in the outcome thereof.

IN WITNESS WHEREOF, I have hereunto subscribed my name this 8th day of September, 2009 at San Diego, California.



BONNIE G. BREEN, CSR NO. 5582

ATTACHMENT 3
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Table 1: Federal Chemical-Specific[a] ARARs for Remedial Action at AA 3

Requirement	Prerequisite	Citation [b]	ARAR Determination	Comments
SOIL AND GROUNDWATER				
Resource Conservation and Recovery Act (42 U.S.C., ch. 82, §§ 6901–6991[i])[c]				
Defines RCRA hazardous waste. A solid waste is characterized as toxic, based on the TCLP, if the waste exceeds the TCLP maximum concentrations.	Waste.	Cal. Code Regs. tit. 22, § 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100	Applicable	Applicable for determining whether waste is hazardous. If wastes (e.g., drill cuttings from monitoring well installation) are generated during the remedial action, generator requirements (i.e., hazardous waste determinations) will be applicable.
The POC is a vertical surface located at the hydraulically downgradient limit of the waste management area that extends through the uppermost aquifer underlying the regulated unit	Hazardous waste treatment or disposal.	Cal. Code Regs. tit. 22, § 66264.95	Relevant and appropriate	The point of compliance is designated at the downgradient edge of AA 3. The concentration limits established for the constituents of concern for groundwater monitoring as a part of landfill closure and postclosure requirements would apply downgradient from the points of compliance.
Provides definition of "Waste."		Cal. Code Regs. tit. 22 § 66261.2 (a), (b)(1), and (c)(1) and (3)	Applicable	The soil cuttings, groundwater, and other materials generated during the remedial action at AA 3 would be classified as waste. These wastes would be properly characterized and disposed in accordance with federal and state regulations for waste characterization identified as ARARs.

Notes:
[a] Many action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARAR tables
[b] Only the substantive provisions of the requirements cited in this table are ARARs
[c] Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the DON accepts the entire statutes or policies as ARARs; specific ARARs are addressed in the table below each general heading; only pertinent substantive requirements of the specific citations are considered ARARs.

Acronyms/Abbreviations:

§	section	RCRA	Resource Conservation and Recovery Act
ARAR	applicable or relevant and appropriate requirement	TCLP	toxicity characteristic leaching procedure
Cal. Code Regs.	*California Code of Regulations*	tit.	title
ch.	chapter	U.S.C.	*United States Code*

Table 2: State Chemical-Specific[a] ARARs for Remedial Action at AA 3

Requirement	Prerequisite	Citation[b]	ARAR Determination	Comments
GROUNDWATER, SURFACE WATER, SOIL, SEDIMENTS, AND AIR				
Cal/EPA Department of Toxic Substances Control[c]				
Defines "non-RCRA hazardous waste"	Waste	Cal. Code Regs. tit. 22 § 66261.22(a)(3) and (4), § 66261.24(a)(2)–(a)(8), § 66261.101, § 66261.3(a)(2)(C), and § 66261.3(a)(2) (F)	Applicable	While it is not anticipated that any hazardous waste will be generated as a result of this remedial action, in the event that wastes are generated (e.g., drill cuttings from monitoring well construction) generator requirements (i.e., hazardous waste determinations) will be applicable.
State and Regional Water Quality Control Boards[c]				

Notes:

[a] Many action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARAR tables

[b] Only the substantive provisions of the requirements cited in this table are ARARs

[c] Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the DON accepts the entire statutes or policies as ARARs; specific ARARs are addressed in the table below each general heading; only pertinent substantive requirements of specific citations are considered ARARs.

Acronyms/Abbreviations:

§	section
ARAR	applicable or relevant and appropriate requirement
Cal. Code Regs.	*California Code of Regulations*
Cal/EPA	California Environmental Protection Agency
RCRA	Resource Conservation and Recovery Act
tit.	title

Table 3: Federal Location-Specific[a] ARARs for Remedial Action at AA 3

Location	Requirement	Prerequisite	Citation [b]	ARAR Determination	Comments
Archaeological and Historic Preservation Act (16 U.S.C. § 469–469c-1)[c]					
Within area where action may cause irreparable harm, loss, or destruction of significant artifacts	Construction on previously undisturbed land would require an archaeological survey of the area. Data recovery and preservation would be required if significant archaeological or historical data were found on site. The responsible official or Secretary of the Interior is authorized to undertake data recovery and preservation.	Regulated alteration of terrain caused as a result of a federal construction project or federally licensed activity or program where action may cause irreparable harm, loss, or destruction of significant artifacts.	16 U.S.C. § 469–469c-1 40 C.F.R. § 6.301(c)	Applicable.	No prehistoric or historic sites were identified during the cultural resources investigations (including Phase I archeological survey) conducted in conjunction with base closure for the on-Station area that could be potentially impacted by the remedial action (DON 2002). However, if archeological resources are identified during the course of remedial action, this act may be applicable.
Archaeological Resources Protection Act of 1979, as Amended (16 U.S.C. § 470aa–470mm)[c]					
Archaeological resources on federal land	Prohibits unauthorized excavation, removal, damage, alteration, or defacement of archaeological resources located on public lands unless such action is conducted pursuant to a permit.	Archaeological resources on federal land.	Pub. L. No. 96-95 16 U.S.C. § 470aa–470mm	Applicable.	Based on the scope of the proposed remedial action at AA 3 and results of cultural resources investigations conducted in conjunction with base closure (DON 2002), it is not expected that any archeological resources would be impacted. However, if archeological resources are identified during the course of remedial action, this act may be applicable.
Exec. Order No. 11988, Floodplain Management[c]					
Within floodplain	Evaluate potential effects of actions in a floodplain to avoid, to the extent possible, adverse effects associated with direct and indirect development of a floodplain.	Action that will occur in a floodplain (i.e., lowlands) and relatively flat areas adjoining inland and coastal waters and other flood-prone areas.	40 C.F.R. § 6.302(b) and 40 C.F.R. pt. 6, app. A, § 6(a)(1), (3), and (5) (at the end of § 6.1007)	Applicable.	The HEC-RAS modeling indicated that the southeastern portion of AA 3 adjacent to the Agua Chinon Wash is within the 100-year flood plain. Therefore the substantive requirements of the cited regulations are applicable federal ARARs.
Resource Conservation and Recovery Act (42 U.S.C. §§ 6901–6991[i])[c]					
Within 100-year floodplain	Facility must be designed, constructed, operated, and maintained to avoid washout.	RCRA hazardous waste; treatment, storage, or disposal of hazardous waste.	Cal. Code Regs. tit. 22, § 66264.18(b)	Relevant and appropriate.	The HEC-RAS modeling indicated that the southeastern portion of AA 3 adjacent to the Agua Chinon Wash is within the 100-year flood plain. AA 3 is not a hazardous waste TSD facility; however since the constituents similar to those present in RCRA hazardous waste may be present at few locations at AA 3, the substantive requirements of Cal. Code Regs. tit. 22, § 66264.18(b) are relevant and appropriate federal ARARs for the remedial action.

Table 3: Federal Location-Specific[a] ARARs for Remedial Action at AA 3

Location	Requirement	Prerequisite	Citation [b]	ARAR Determination	Comments
Fish and Wildlife Coordination Act (16 U.S.C. §§ 661–666c)[c]					
Area affecting stream or other water body	Action taken should protect fish or wildlife.	Diversion, channeling, or other activity that modifies a stream or other water body and affects fish or wildlife.	16 U.S.C. § 662	Applicable	The remedial action at AA 3 would include limited modifications to the stream bed of the Aqua Chinon Wash in the northeastern portion of the site. Therefore substantive requirements of 16 U.S.C. §§ 661–666c are ARARs. However, since no significant fish and wildlife is present in the Aqua Chinon Wash in the vicinity of AA 3, the modifications to the stream are not expected to have adverse effects on fish and wildlife.

Notes:
[a] Many action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARAR tables
[b] Only the substantive provisions of the requirements cited in this table are ARARs
[c] Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the DON accepts the entire statutes or policies as ARARs; specific ARARs are addressed in the table below each general heading; only pertinent substantive requirements of the specific citations are considered ARARs.

Acronyms/Abbreviations:
ARAR – applicable or relevant and appropriate requirement
Cal. Code Regs. – *California Code of Regulations*
DON – Department of the Navy
§ – section

Table 4: State Location-Specific[a] ARARs for Remedial Action at AA 3

Location	Requirement	Prerequisite	Citation [b]	ARAR Determination	Comments
California Endangered Species Act (Cal. Fish & Game Code §§ 2050–2116)[b]					
Fully protected mammals	Actions must be taken to assure that the following fully protected mammals are not taken or possessed at any time: (1) Morro Bay kangaroo rat (2) Bighorn sheep except Nelson bighorn sheep (3) Northern elephant seal (4) Guadalupe fur seal (5) Ring-tailed cat (6) Pacific right whale (7) Salt-marsh harvest mouse (8) Southern sea otter (9) Wolverine.		Cal Fish & Game Code § 4700	Relevant and appropriate	Substantive requirements are ARARs if fully protected mammals are identified at AA 3 during remedial action. Measures will be taken to avoid the take of these mammals during remedial action implementation.
Aquatic habitat/species	Prohibits the passage of enumerated substances or materials into waters of the state deleterious to fish, plant life, or birds.		Cal. Fish & Game Code § 5650(a)	Relevant and Appropriate	The substantive requirements of the Cal. Fish and Game Code § 5650(a) are ARARs for remedial action at AA 3.

Notes:
[a] Many action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARAR tables
[b] Only the substantive provisions of the requirements cited in this table are ARARs
[c] Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the DON accepts the entire statutes or policies as ARARs; specific ARARs are addressed in the table below each general heading; only pertinent substantive requirements of the specific citations are considered ARARs.

Acronyms/Abbreviations:
ARAR – applicable or relevant and appropriate requirement
Cal. Code Regs. – *California Code of Regulations*
Cal. Fish & Game Code – *California Fish and Game Code*
§ – section

Table 5: Federal Action-Specific ARARs for Remedial Action at AA 3

Alternative 2: Limited Grading, Monitoring and Institutional Controls.

Action/ Requirement	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Resource Conservation and Recovery Act (42 U.S.C. §§ 6901–6991[i])*					
Onsite waste generation	Person who generates waste shall determine if that waste is a hazardous waste.	Generator of waste	Cal. Code Regs. tit. 22 § 66262.10(a), 66262.11	Applicable	Applicable for any operation where waste is generated. The determination of whether wastes generated during remedial activities (e.g., soil cuttings from well installations) are hazardous will be made at the time the wastes are generated.
	Requirements for analyzing waste for determining whether waste is hazardous.	Generator of waste.	Cal. Code Regs. tit. 22, § 66264.13(a) and (b)	Applicable	Applicable for any operation where waste is generated. The determination of whether wastes generated during remedial activities (e.g., soil cuttings from well installations) are hazardous will be made at the time the wastes are generated.
Hazardous waste accumulation	Onsite hazardous waste accumulation is allowed for up to 90 days as long as the waste is stored in containers in accordance with § 66262.171–178 or in tanks, on drip pads, inside buildings, and is labeled and dated, etc.	Accumulate hazardous waste	Cal. Code Regs. tit. 22 § 66262.34	Applicable	Substantive requirements are applicable for accumulation of waste for less than 90 days if the waste is hazardous waste and is stored on site. Wastes will not be stored on site for greater than 90 days.
Site closure	Minimize the need for further maintenance controls and minimize or eliminate, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated rainfall or runoff, or waste decomposition products to groundwater or surface water or to the atmosphere.	Hazardous waste management facility	Cal. Code Regs. tit. 22 § 66264.111(a) and (b)	Relevant and Appropriate	Substantive requirements are relevant and appropriate for closure determination for AA 3.
Container storage	Containers of RCRA hazardous waste must be - maintained in good condition, - compatible with hazardous waste to be stored, and - closed during storage except to add or remove waste.	Storage of RCRA hazardous waste not meeting small-quantity generator criteria before treatment, disposal, or storage elsewhere, in a container.	Cal. Code Regs. tit. 22 § 66264.171, .172, .173	Relevant and Appropriate	Substantive requirements are relevant and appropriate for accumulation of waste for less than 90 days if the waste is hazardous waste and is stored on site. Wastes will not be stored on site for greater than 90 days.
	Inspect container storage areas weekly for deterioration.		Cal. Code Regs. tit. 22 § 66264.174	Relevant and Appropriate	Substantive requirements for inspection of container storage areas are relevant and appropriate if the wastes are determined to be hazardous and are stored on site for less than 90 days.
	Place containers on a sloped, crack-free base, and protect from contact with accumulated liquid. Provide containment system with a capacity of 10 percent of the volume of containers of free liquids. Remove spilled or leaked waste in a timely manner to prevent overflow of the containment system.	Storage in a container of RCRA hazardous waste not meeting small-quantity generator criteria before treatment, disposal, or storage elsewhere.	Cal. Code Regs. tit. 22 § 66264.175(a) and (b)	Relevant and Appropriate	Substantive requirements are relevant and appropriate for accumulation of waste for less than 90 days if the waste is hazardous waste and is stored on site. Wastes will not be stored on site for greater than 90 days.

Table 5: Federal Action-Specific ARARs for Remedial Action at AA 3

Alternative 2: Limited Grading, Monitoring and Institutional Controls.

Action/ Requirement	Requirement	Prerequisite	Citation	ARAR Determination	Comments
	At closure, remove all hazardous waste and residues from the containment system, and decontaminate or remove all containers and liners.		Cal. Code Regs. tit. 22 § 66264.178	Relevant and Appropriate	Substantive requirements are relevant and appropriate for accumulation of waste for less than 90 days if the waste is hazardous waste and is stored on site. Wastes will not be stored on site for greater than 90 days.
Location of the landfill	A map must be prepared showing the exact location and dimensions, including depth, of each cell with respect to permanently surveyed benchmarks with horizontal and vertical controls.	Disposal of hazardous waste in landfills except as provided in Cal. Code Regs. tit. 22, § 66264.1	Cal. Code Regs. tit. 22, § 66264.309(a)	Relevant and Appropriate	The substantive requirements are ARARs for surveying of the closed landfills to show topography.
Postclosure care	Maintain the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events throughout the postclosure period.	Disposal of hazardous waste in landfills except as provided in Cal. Code Regs. tit. 22, § 66264.1	Cal. Code Regs. tit. 22, § 66264.310(b)(1)	Relevant and Appropriate	Substantive requirements are relevant and appropriate for postclosure care of landfill covers.
Benchmark maintenance	Protect and maintain surveyed benchmarks throughout the postclosure period.	Disposal of hazardous waste in landfills except as provided in Cal. Code Regs. tit. 22, § 66264.1	Cal. Code Regs. tit. 22, § 66264.310(b)(5)	Relevant and Appropriate	Substantive requirements are relevant and appropriate for surveying the final cover.
Monitoring	Owners/operators of RCRA surface impoundment, waste pile, land treatment unit, or landfill shall conduct a monitoring and response program for each regulated unit.	Surface impoundment, waste pile, land treatment unit, or landfill for which constituents in or derived from waste in the unit may pose a threat to human health or the environment.	Cal. Code Regs. tit. 22, § 66264.91(a)(1), except as it cross-references permit requirements	Relevant and Appropriate	Substantive requirements for detection monitoring program at Cal. Code Regs. tit. 22, § 66264.91(a)(1) are relevant and appropriate.
Point of compliance	The POC is a vertical surface, located at the hydraulically downgradient limit of the waste management area that extends through the uppermost aquifer underlying the regulated unit	Hazardous waste treatment, storage, or disposal facility.	Cal. Code Regs. tit. 22, § 66264.95(a) and (b)	Relevant and Appropriate	Substantive requirements are relevant and appropriate for all alternatives including groundwater monitoring.
Monitoring	Requirements for monitoring groundwater.	Hazardous waste treatment, storage, or disposal facility.	Cal. Code Regs. tit. 22, § 66264.97 (b)(1)(A), (b)(1)(B), (b)(4-7), (e)(6), (12)(A) and (B), (13), and (15)	Relevant and Appropriate	Substantive requirements are relevant and appropriate for detection monitoring program.

Table 5: Federal Action-Specific ARARs for Remedial Action at AA 3

Alternative 2: Limited Grading, Monitoring and Institutional Controls.

Action/ Requirement	Requirement	Prerequisite	Citation	ARAR Determination	Comments
	Requirements for a detection monitoring program.	Hazardous waste treatment, storage, or disposal facility.	Cal. Code Regs. tit. 22, § 66264.98(e)(1-5), (i), (j), (k)(1-3), (4)(A) and (D), (7)(C) and (D)	Relevant and Appropriate	Substantive requirements are relevant and appropriate for detection monitoring program.
Corrective Action Management Unit	Establishes requirements for submission of a survey plat indicating the location and dimensions of landfill cells or other hazardous waste disposal units with respect to permanently surveyed vertical and horizontal benchmarks.	Hazardous waste management facility	Cal. Code Regs. tit. 22, § 66264.116	Relevant and Appropriate	The requirements for submission of a survey plat are procedural in nature and do not constitute ARARs. Substantive requirements pertaining for preparation of a survey plat indicating location and dimensions of landfill cells are relevant and appropriate.
	Postclosure use of the property shall never be allowed to disturb the integrity of the final cover and any other components of the containment system unless such disturbance will not increase the potential hazard or is necessary to reduce threat to human health or the environment.	Hazardous waste management facility where hazardous wastes, waste residues, contaminated materials and contaminated soils will not be removed during closure.	Cal. Code Regs. tit. 22, § 66264.117(d)	Relevant and Appropriate	Institutional controls would be implemented for the alternatives in which the waste will be left in place to maintain the integrity of the cover at AA 3.
South Coast Air Quality Management District (SCAQMD)*					
	Prohibits emissions of fugitive dust such that the presence of such dust remains visible in the atmosphere beyond the property line of the emission source and shall not cause or allow PM_{10} levels to exceed 50 micrograms per cubic meter when determined, by simultaneous sampling, as the difference between upwind and downwind samples		SCAQMD Rule 403	Applicable	Fugitive dust emissions of particulate matter are expected from the excavation, grading, and earth-moving activities. Measures such as applying water to minimize fugitive dust emissions may be required.
	Limits equipment from discharging particulate emissions in excess of 0.01 to 0.196 grain per cubic foot based on a given volumetric (dry standard cubic feet per minute) exhaust gas flow rate averaged over one hour or on cycle of operation. It excludes steam generators or gas turbines.		SCAQMD Rule 404	Applicable	The equipment used will comply with substantive requirements of this rule.
	Limits equipment from discharging particulate emissions in excess of 0.99 to 30 pounds per hour based on a given process weight.		SCAQMD Rule 405	Applicable	The equipment used will comply with substantive requirements of this rule.

Table 5: Federal Action-Specific ARARs for Remedial Action at AA 3

Alternative 2: Limited Grading, Monitoring and Institutional Controls.

Action/ Requirement	Requirement	Prerequisite	Citation	ARAR Determination	Comments
	Establishes design and operational requirements for landfill gas collection and control systems for active and inactive municipal solid waste landfills. Also establishes landfill gas sampling and monitoring requirements.	Active or inactive municipal solid waste landfill	SCAQMD Rule 1150.1	Relevant and Appropriate	AA 3 is not an active or inactive municipal solid waste landfill, therefore the requirements of SCAQMD Rule 1150.1 are not applicable. However, since AA 3 is a former military landfill, substantive provisions of SCAQMD Rule 1150.1 are relevant and appropriate for the landfill gas collection, control and monitoring systems to be installed at AA 3. The landfill gas collection and control system, and landfill gas monitoring network at AA 3 will be designed and operated based on an agreement between FFA signatories documented in the letter from DON dated 24 June 2004. The details of the design and operation of the landfill gas systems and landfill gas monitoring will be presented in remedial design work plan.

Note:

* Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the DON accepts the entire statutes or policies as ARARs; specific ARARs are addressed in the table below each general heading; only substantive requirements of specific citations are considered ARARs.

Acronyms/Abbreviations:

§	section	DON	Department of the Navy
ARAR	Applicable or relevant and appropriate requirement	RCRA	Resource Conservation and Recovery Act
Cal. Code Regs.	California Code of Regulations	SCAQMD	South Coast Air Quality Management District
C.F.R	Code of Federal Regulations		

Table 6: State Action-Specific ARARs for Remedial Action at AA 3

Alternative 2: Limited Grading, Monitoring and Institutional Controls.					
Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
State Water Resources Control Board (SWRCB) and Regional Water Quality Control Board (RWQCB)*					
Closure of a waste management unit	General closure and postclosure maintenance standards	Waste discharged after 18 July 1997.	Cal. Code Regs. tit. 27, § 20950(a)(2)(A)	Relevant and Appropriate	Substantive requirements of Cal. Code Regs. tit. 27, § 20950(a)(2)(A) are relevant and appropriate.
Landfill capping	Alternatives to construction or prescriptive standards.	Waste discharged after 18 July 1997.	Cal. Code Regs. tit. 27, §§ 20080 (b) and (c) and 21090	Relevant and Appropriate	Substantive requirements pertaining to criteria for justifying alternative means of meeting prescriptive standards are relevant and appropriate. Alternative 3a meets the requirements as an engineered alternative to the prescriptive standard because it is as effective as the prescriptive cap in reducing infiltration into the landfill materials (see Section 4.3 for details and Appendix K).
Post-closure erosion control	Requires prevention of erosion and related damage of the final cover due to drainage throughout the postclosure maintenance period.	Waste discharged after 18 July 1997.	Cal. Code Regs. tit. 27, 21090 (c)(4)	Relevant and Appropriate	Substantive provisions are relevant and appropriate for design and post-closure maintenance of final cover.
Landfill Gas Monitoring	Establishes requirements for control of trace gases and concentration limits for methane generated at a disposal site.	Solid waste disposal sites that did not commence complete closure prior to 18 August 1989, which was fully implemented by 18 November 1990; and new postclosure activities with potential to jeopardize the integrity of the previously closed sites.	Cal. Code Regs. tit. 27, § 20921(a)(1), (2), and (3)	Relevant and Appropriate	Since closure of AA 3 did not commence prior to 18 August 1989, and is not expected to be fully implemented until 2006, the substantive requirements of the cited regulations are not applicable but are relevant and appropriate. These substantive requirements include limits on concentrations of methane and trace gases from the generated at the sites.
	Requires that gas monitoring and control program (pursuant to §§ 20921 – 20937) shall continue for the period of 30 years or until the operator receives written authorization to discontinue by the Enforcement Authority with concurrence from the CIWMB.	Solid waste disposal sites that did not commence complete closure prior to 18 August 1989, which was fully implemented by 18 November 1990; and new postclosure activities with potential to jeopardize the integrity of the previously closed sites.	Cal. Code Regs. tit. 27, § 20921(b) except procedural requirements	Relevant and Appropriate	The gas monitoring will be conducted for a period of 30 years or until monitoring data indicates that landfill gas does not present a risk to human health. The requirement for receiving written authorization from the Enforcement Authority is procedural in nature and does not constitute an ARAR for the remedial action.
	Requires gas monitoring and control systems be modified during closure and postclosure maintenance period to reflect changing on-site and adjacent land uses. Also states that postclosure land use shall not interfere with the function of gas monitoring and control systems.	Solid waste disposal sites that did not commence complete closure prior to 18 August 1989, which was fully implemented by 18 November 1990; and new postclosure activities with potential to jeopardize the integrity of the previously closed sites.	Cal. Code Regs. tit. 27, § 20921(d)	Relevant and Appropriate	Substantive requirements are relevant and appropriate for design and implementation of gas monitoring and control systems.

Table 6: State Action-Specific ARARs for Remedial Action at AA 3

Alternative 2: Limited Grading, Monitoring and Institutional Controls.					
Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Landfill Gas Monitoring (continued)	Establishes requirements for implementation of gas monitoring program to ensure that the concentration limits for landfill gases prescribed in Cal. Code Regs. tit. 27, § 20921 are met.	Solid waste disposal sites that did not commence complete closure prior to 18 August 1989, which was fully implemented by 18 November 1990; and new postclosure activities with potential to jeopardize the integrity of the previously closed sites.	Cal. Code Regs. tit. 27, § 20923 except procedural requirements	Relevant and Appropriate	The design of the gas monitoring network will take into account factors such as local geological and hydrogeological, conditions, and adjacent land-use. The requirement that the gas monitoring network be designed by a registered civil engineer or certified engineering geologist is procedural in nature and does not constitute an ARAR.
	Establishes requirements for location, spacing, and depth of gas monitoring wells.	Solid waste disposal sites that did not commence complete closure prior to 18 August 1989, which was fully implemented by 18 November 1990; and new postclosure activities with potential to jeopardize the integrity of the previously closed sites.	Cal. Code Regs. tit. 27, § 20925 (a), (b), and (c)	Relevant and Appropriate	The design of the landfill gas monitoring network will be based on the agreement between FFA signatories documented in the letter from DON dated 24 June 2004. The details of the design of the landfill gas monitoring will be presented in the post-ROD deliverables and will be based on the conceptual design presented in this RI/FS.
	Establishes requirements for monitoring well construction for gas monitoring.	Solid waste disposal sites that did not commence complete closure prior to 18 August 1989, which was fully implemented by 18 November 1990; and new postclosure activities with potential to jeopardize the integrity of the previously closed sites.	Cal. Code Regs. tit. 27, § 20925 (d)(1) and (3) except procedural requirements	Relevant and Appropriate	Substantive requirements are relevant and appropriate for monitoring well drilling and construction. The requirements that the drilling be conducted by a licensed drilling contractor or under the supervision of the design engineer or engineering geologist are procedural in nature and do not constitute ARARs.
	Requires all monitoring probes and on-site structures be sampled for methane during monitoring period. Sampling for other trace gases may be required by the Enforcement Agency if there is possibility of acute or chronic exposure due to carcinogenic or toxic compounds.	Solid waste disposal sites that did not commence complete closure prior to 18 August 1989, which was fully implemented by 18 November 1990; and new postclosure activities with potential to jeopardize the integrity of the previously closed sites.	Cal. Code Regs. tit. 27, § 20932	Relevant and Appropriate	Substantive requirements are relevant and appropriate for landfill gas monitoring design.
	Establishes requirements for monitoring frequency for landfill gas. Stipulates that at a minimum, quarterly monitoring is required. A more frequent monitoring may be required by the Enforcement Authority based upon site-specific factors.	Solid waste disposal sites that did not commence complete closure prior to 18 August 1989, which was fully implemented by 18 November 1990; and new postclosure activities with potential to jeopardize the integrity of the previously closed sites.	Cal. Code Regs. tit. 27, § 20933	Relevant and Appropriate	The landfill gas will be monitored quarterly until stabilized.

Table 6: State Action-Specific ARARs for Remedial Action at AA 3

Alternative 2: Limited Grading, Monitoring and Institutional Controls.					
Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
	Establishes control measures if monitoring results indicate concentration of methane in excess of the compliance levels established in § 20921 (a).		Cal. Code Regs. tit. 27, § 20937 except procedural requirements of 20937 (a)(2), (a)(4), (a)(5), and (f)(1) through (3)	Relevant and Appropriate	The substantive provisions are relevant and appropriate if gas monitoring results indicate methane concentrations exceeding the compliance levels established in § 20921 (a).
Postclosure care period	The landfill shall be maintained and monitored for a period of not less than 30 years after completion of closure of the entire solid waste landfill.	Discharge of waste to land after 18 July 1997.	Cal. Code Regs. tit. 27, § 21180 (a) and (b)	Relevant and Appropriate	Substantive provisions related to post closure care period are relevant and appropriate.
Postclosure land use	Establishes requirements for design and maintenance of proposed postclosure land uses. Also stipulates that site closure design should show one or more proposed uses of the closed site or show development that is compatible with open space.	Discharge of waste to land after 18 July 1997.	Cal. Code Regs. tit. 27, § 21190 (a) and (b)	Relevant and Appropriate	Substantive provisions are relevant and appropriate for design and maintenance of postclosure land use.
	Requires that all proposed land uses be submitted to the Enforcement Authority, RWQCB, local air district, and local land use agency for review and/or approval. Requires that any construction on the site maintain the integrity of the cover system.	Discharge of waste to land after 18 July 1997.	Cal. Code Regs. tit. 27, § 21190 (c) and (d)	Relevant and Appropriate	Substantive provisions are relevant and appropriate for future land use and proposed construction within the buffer zone associated with AA 3. The Navy has reached an agreement with the CIWMB (see Appendix L) regarding buffer zone around AA 3. In accordance with this agreement, a 100-foot buffer zone is proposed around the final waste boundary. The ICs proposed for AA 3 prohibit land uses that may lead to unacceptable risk to human health and stipulate that any proposed construction at AA 3 including the buffer zone will require approval from the Federal Facility Agreement (FFA) signatories and CIWMB (see Section 12.2.2 of the main text).
California Civil Code*					
Institutional controls	Provides conditions under which landuse restrictions will apply to successive owners of land.	Transfer property from the DON to a nonfederal agency.	Cal. Civ. Code § 1471	Applicable	Generally, Cal. Civ. Code § 1471 allows an owner of land to make a covenant to restrict the use of land for the benefit of a covenantee. The covenant runs with the land to bind successive owners, and the restrictions must be reasonably necessary to protect present or future human health or safety or the environment as a result of the presence on the land of hazardous materials, as defined in Cal. Health & Safety Code § 25260. Substantive provisions are the following general narrative standard: "to do or refrain from doing some act on his or her own land . . . where (c) Each such act relates to the use of land and each such act is reasonably necessary to protect present or future human health or safety or the environment as a result of the presence of hazardous materials, as defined in Section 25260 of the California Health and Safety Code." This

Table 6: State Action-Specific ARARs for Remedial Action at AA 3

Alternative 2: Limited Grading, Monitoring and Institutional Controls.					
Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
					narrative standard would be implemented through incorporation of restrictive covenants in the deed and Environmental Restriction and Covenant Agreement at the time of transfer.
California Health and Safety Code*					
Institutional controls	Allows DTSC to enter into an agreement with the owner of a hazardous waste facility to restrict present and future land uses.	Transfer property from the DON to a nonfederal agency.	Cal. Health & Safety Code § 25202.5	Applicable	The substantive provisions of Cal. Health & Safety Code § 25202.5 are the general narrative standards to restrict "present and future uses of all or part of the land on which the . . . facility . . . is located . . ."
	Provides a streamlined process to be used to enter into an agreement to restrict specific use of property in order to implement the substantive use restrictions of Cal. Health & Safety Code § 25232(b)(1)(A)–(E).	Transfer property from the DON to a nonfederal agency.	Cal. Health & Safety Code §§ 25222.1 and 25355.5(a)(1) (C)	Applicable	Generally, Cal. Health & Safety Code §§ 25222.1 and 25355.5(a)(1)(C) provide the authority for the DTSC to enter into voluntary agreements with land owners to restrict the use of property. The agreements run with the land restricting present and future uses of the land. The substantive requirements of the following Cal. Health & Safety Code § 25222.1 provisions are "relevant and appropriate": (1) the general narrative standard: "restricting specified uses of the property…" and (2) "…the agreement is irrevocable, and shall be recorded by the owner, …as a hazardous waste easement, covenant, restriction or servitude, or any combination thereof, as appropriate, upon the present and future uses of the land." The substantive requirements of the following Cal. Health & Safety Code § 25355.5(a)(1)(C) provisions are "relevant and appropriate": "…execution and recording of a written instrument that imposes an easement, covenant, restriction, or servitude, or combination thereof , as appropriate, upon the present and future uses of the land."
	Prohibits certain uses of land containing hazardous waste without a specific variance.	Hazardous waste property.	Cal. Health & Safety Code § 25232(b)(1)(A)–(E)	Applicable	Land-use restrictions will be used to prohibit the following activities at AA 3: residential use of the site, construction of hospitals for humans, schools for persons under 21 years of age, day care centers for children, or any permanently occupied human habitation on the sites. See Section 4.2 for the DTSC and EPA positions.
	Provides processes and criteria for obtaining written variances from a landuse restriction and for removal of the land use restrictions.	Transfer property from the DON to a nonfederal agency.	Cal. Health & Safety Code §§ 25233(c) and 25234	Applicable	Cal. Health & Safety Code § 25233(c) sets forth "relevant and appropriate" substantive criteria for granting variances based upon specified environmental and health criteria. Cal. Health & Safety Code § 25234 sets forth the following "relevant and appropriate" substantive criteria for the removal of a land-use restriction on the grounds that "…the waste no longer creates a significant existing or potential hazard to present or future public health or safety."

Table 6: State Action-Specific ARARs for Remedial Action at AA 3

Alternative 2: Limited Grading, Monitoring and Institutional Controls.					
Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Cal/EPA Department of Toxic Substances Control*					
Land Use Covenants	A land use covenant imposing appropriate limitations on land use shall be executed and recorded when Facility closure, corrective action, remedial or removal action, or other response actions are undertaken and Hazardous materials, hazardous wastes or constituents, or hazardous substances will remain at the property at levels which are not suitable for unrestricted use of the land.	Property transfer by federal government to non-federal entity.	Cal. Code Regs. tit. 22, § 67391.1	Relevant and Appropriate	Cal. Code Regs. tit. 22 § 67391.1 provides for a land-use covenant to be executed and recorded when remedial actions are taken and hazardous substances will remain at the property at concentrations that are unsuitable for unrestricted use of the land. The substantive provisions of this regulation have been determined to be "relevant and appropriate" state ARARs by the DON. DTSC's position is that Cal. Code Regs. tit. 22, § 67391.1 is an ARAR. EPA considers the following provisions to be relevant and appropriate: Cal. Code Regs. tit. 22, § 67391.1(a)(1), (a)(2), (d), (e)(1) and (e)(2).
California Integrated Waste Management Board*					
	All points of access to the site must be restricted. All monitoring, control, and recovery systems shall be protected from unauthorized access. Once closure activities are complete, site access by the public may be allowed in accordance with the approved postclosure maintenance plan.	Disposal sites that did not complete closure prior to November 18, 1990; new postclosure activities that may jeopardize the integrity of previously closed disposal sites.	Cal. Code Regs. tit. 27, § 21135 (f) and (g)	Applicable	The requirements are applicable for implementing controls for access restriction and protection of monitoring systems.
Final Cover	Requires that final cover shall function with minimum maintenance and provide waste containment to protect public health and safety by controlling at a minimum, vectors, fire, odor, litter and landfill gas migration. The final cover shall also be compatible with postclosure land use.	Disposal sites that did not complete closure prior to November 18, 1990; new postclosure activities that may jeopardize the integrity of previously closed disposal sites.	Cal. Code Regs. tit. 27, § 21140	Applicable	The requirements are applicable for final cover design.
Final grading	Requires that final grades be designed and maintained to reduce impacts to health and safety, and take into consideration any postclosure land use. Also requires discharger to produce and submit to the Enforcement Authority an iso-settlement map at least every five years only if RWQCB does not require such maps.	Disposal sites that did not complete closure prior to November 18, 1990; new postclosure activities that may jeopardize the integrity of previously closed disposal sites.	Cal. Code Regs. tit. 27, § 21142, except procedural requirements of 21142 (b)	Applicable	The requirements for the design and maintenance of final cover grades are applicable. Substantive requirements for evaluation of settlement at least every 5-years are relevant and appropriate. The requirement for submission of an iso-settlement map to the Enforcement Authority are procedural in nature and does not constitute an ARAR.
Cover seismic requirements	The owner shall assure the integrity of final slopes under both static and dynamic conditions to protect public health and safety and prevent damage to postclosure land uses, roads, structures, utilities, gas monitoring and control systems, leachate collection and control systems to prevent public contact with leachate, and prevent exposure of waste.	Disposal sites that did not complete closure prior to November 18, 1990; new postclosure activities that may jeopardize the integrity of previously closed disposal sites.	Cal. Code Regs. tit. 27, § 21145, except procedural requirements of 21145 (b)	Applicable	The substantive requirements are applicable to the design of the cap.
Erosion control	The drainage and erosion control system shall be designed and maintained to assure integrity of postclosure land uses, roads, and structures; to prevent public contact with	Disposal sites that did not complete closure prior to November 18, 1990; new postclosure activities that	Cal. Code Regs. tit. 27, § 21150	Applicable	The requirements are applicable for design and maintenance of erosion control system.

Table 6: State Action-Specific ARARs for Remedial Action at AA 3

Alternative 2: Limited Grading, Monitoring and Institutional Controls.					
Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
	waste and leachate; to assure integrity of gas monitoring and control systems; to prevent safety hazards; and to prevent exposure of waste.	may jeopardize the integrity of previously closed disposal sites.			
	During the postclosure maintenance period, the owner/operator shall assure that landfill gas control and leachate collection and control is done in a manner that prevents public contact and controls vectors, nuisance, and odors.	Disposal sites that did not complete closure prior to November 18, 1990; new postclosure activities that may jeopardize the integrity of previously closed disposal sites.	Cal. Code Regs. tit. 27, § 21160 (a) and (b) except where the provisions refer to leachate collection and control.	Applicable	The landfill gas control system will be implemented and maintained in accordance with the substantive provisions of Cal. Code Regs. tit. 27, §§ 20921 – 20937, that have been determined to be ARARs for AA 3 remedial action. The leachate production and accumulation has not been evident at AA 3, therefore the provisions for leachate collection and control are not ARARs.

Note:
* Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the DON accepts the entire statutes or policies as ARARs; specific ARARs are addressed in the table below each general heading; only substantive requirements of the specific actions are considered ARARs.

Acronyms/Abbreviations:

§	section	RWQCB	Regional Water Quality Control Board
ARAR	Applicable or relevant and appropriate requirement	SWRCB	State Water Resources Control Board
Cal. Code Regs.	California Code of Regulations	tit.	title

ATTACHMENT 4
RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY
FORMER MARINE CORPS AIR STATION (MCAS) EL TORO, CALIFORNIA
PROPOSED PLAN FOR ANOMALY AREA 3

Comments Received During Public Meeting Held on August 19, 2009

Comments by: Robert L. Woodings, PE, RAB Community Co-Chair

Number	Comments	Responses
1	I have been involved with the Navy's development of its proposed plan for cleanup of Anomaly Area 3 at Former MCAS El Toro for several years. The Navy, and its consultants, has done an excellent job performing its investigations, analysis, and reporting. The Navy has kept the public informed and conducted regular meetings with Restorations Advisory Board (RAB) for Former MCAS El Toro. The RAB minutes document the process and provide an excellent reference. Regulatory review and comments support the implementation of the Proposed Plan. I support the implementation of the Proposed Plan.	Thank you for your comment. The Navy appreciates the RAB and public input throughout the CERCLA process.

Comments by: Peter Hersch, MCAS El Toro RAB Member

2	Please provide a detailed explanation of why Alternative 3A is not being considered further. Overall, it appears to be more effective, and not prohibitively more expensive. Alternative 3B also takes more proactive steps to protect the environment and provide a greater degree safety for area occupants as civilian uses are implemented. Also, the perception that specific and cost effective remediation is occurring as opposed to primarily monitoring is important with respect to public acceptance. Thank you for considering these comments.	Alternatives 2, 3, and 4 are equally protective of human health and the environment. Alternative 2 provides the best overall balance when taking into account all the criteria. Alternative 2 includes the following components: • Limited grading • Institutional controls • Passive/active landfill gas venting and monitoring • Long-term environmental monitoring The preferred alternative for Anomaly Area 3 (AA 3) presented in the Proposed Plan was based on a comprehensive detailed analysis of each alternative and a comparative analysis of their relative performance with respect to two threshold and five balancing criteria; in accordance with the National Oil and Hazardous Substances Contingency Plan (NCP), and as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Please refer to Final Remedial Investigation/Feasibility Study for AA 3, July 2009 for more details. The comparative analysis presented in the Remedial Investigation/Feasibility Study (RI/FS) Report and in Table 1 of the Proposed Plan for AA 3 was intended to distinguish the relative advantages and disadvantages of the alternatives and identify key tradeoffs that must be balanced during the remedy selection process. The two NCP threshold criteria, protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs), must be satisfied. The five balancing NCP criteria include long-term effectiveness; reduction of contaminant toxicity, mobility, or volume through

		treatment; short-term effectiveness; implementability; and cost. Long-term effectiveness was given the most weight, followed by implementability, and then cost. When two or more alternatives were rated comparably, cost was used as the deciding factor to present the preferred alternative. Alternative 2 was identified in the Proposed Plan as the preferred alternative over Alternative 3A or 3B due to relatively better short-term effectiveness, implementability, and lower cost, as shown in the comparative analysis of alternatives for AA 3 in Table 1 of the Proposed Plan.