



**Final**

**First Five-Year Review Report  
Installation Restoration Program  
Sites 2, 16, 17, 18, and 24**

**FORMER MARINE CORPS AIR STATION  
EL TORO, CALIFORNIA**

**September 2009**

Prepared for:

**Base Realignment and Closure  
Program Management Office West  
San Diego, California**

Prepared under:

**Naval Facilities Engineering Command  
Contract Number N62742-03-D-1837  
Contract Task Order 0032  
DCN: ET-1837-0032-0008**



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**Final**  
**First Five-Year Review Report**  
**for**  
**Installation Restoration Program Sites 2, 16, 17, 18, and 24**  
**Former Marine Corps Air Station El Toro**  
**Irvine**  
**Orange County, California**

**September 2009**



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James Callian  
BRAC Environmental Coordinator  
Former Marine Corps Air Station El Toro

Date: Sept 30, 2009

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## ACRONYMS AND ABBREVIATIONS

§	Section
µg/L	micrograms per liter
2,4-DB	2,4-dichlorophenoxybutyric acid
4,4'-DDD	4,4'-dichlorodiphenyldichloroethane
4,4'-DDE	4,4'-dichlorodiphenyldichloroethene
4,4'-DDT	4,4'-dichlorodiphenyltrichloroethane
ARAR	applicable or relevant and appropriate requirement
ARIC	area requiring institutional controls
ASTM	American Society for Testing and Materials
ATS	AECOM Technical Services, Inc.
BCT	BRAC Cleanup Team
bgs	below ground surface
BNI	Bechtel National, Inc.
BO	Biological Opinion
BRAC	Base Realignment and Closure
Cal/EPA	California Environmental Protection Agency
CAO	Cleanup and Abatement Order
CCMI	CERCLA Component of the Modified Irvine Desalter Project
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action Navy
COC	chemical of concern
COPC	chemicals of potential concern
COPEC	chemical of potential ecological concern
CSS	coastal sage scrub
cy	cubic yards
DCA	dichloroethane
DCE	dichloroethene
DO	dissolved oxygen
DHS	California Department of Health
DOJ	U.S. Department of Justice
DON	Department of the Navy
DRMO	Defense Reutilization and Marketing Office
DTSC	Department of Toxic Substance Control
Earth Tech	Earth Tech, Inc.
EC	electrical conductivity
ECL	evaluation concentration level
ECLMP	evaluation concentration level monitoring point
ERRG	Engineering/Remediation Resources Group, Inc.
ESD	Explanation of Significant Differences
ET	Evapotranspiration
FAA	Federal Aviation Administration

FFA	Federal Facility Agreement
FFS	Focused Feasibility Study
FS	Feasibility Study
GAC	granular activated carbon
gpm	gallons per minute
HDPE	high density polyethylene
HHRA's	human-health risk assessment
HI	hazard index
IAS	Initial Assessment Study
IC	institutional control
IDP	Irvine Desalter Project
I-RACR	Interim Remedial Action Completion Report
IRP	Installation Restoration Program
IRWD	Irvine Ranch Water District
JEG	Jacobs Engineering Group, Inc.
JMM	James M. Montgomery Engineers, Inc.
JP	jet propellant
LFG	landfill gas
LIFOC	Lease in Furtherance of Conveyance
LTM	Long-Term Monitoring
LUC	land-use control
MCAS	Marine Corps Air Station
MCL	maximum contaminant level
MNA	monitored natural attenuation
MOU	memorandum of understanding
MPE	Multi-Phase Extraction
MSC	miscellaneous site of concern
NAVFAC Pacific	Naval Facilities Engineering Command, Pacific
NAVFAC SW	Naval Facilities Engineering Command Southwest
NCP	National Contingency Plan
NFA	no further action
NPL	National Priorities List
O&M	Operation and Maintenance
OCGP	Orange County Great Park
OCHCA	Orange County Health Care Agency
OCWD	Orange County Water District
OPS	operating properly and successfully
ORP	oxidation-reduction potential
OU	operable unit
PA	principal aquifer
PAH	polycyclic aromatic hydrocarbons
PCAP	Petroleum Corrective Action Program
PCB	polychlorinated biphenyl
PCE	tetrachloroethene

PERF	Project Evaluation Review Form
pH	negative logarithm of hydrogen ion concentration
PLC	Programmable Logic Controller
PM	Project Manager
PMO	Program Management Office
PRG	preliminary remediation goal
PVC	polyvinyl chloride
Ra-226	radium-226
RAB	Restoration Advisory Board
RACR	Remedial Action Completion Report
RAOs	Remedial Action Objectives
RCRA	Resource Conservative and Recovery Act
RI	Remedial Investigation
RME	reasonable maximum exposure
ROD	Record of Decision
RPM	Remedial Project Manager
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act (of 1986)
SCAQMD	South Coast Air Quality Management District
SGU	Shallow Groundwater Unit
SOCWA	Southern California Water Authority
SVE	soil vapor extraction
SVOCs	semi-volatile organic compounds
TCA	trichloroethane
TCE	trichloroethylene
TDS	total dissolved solids
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
TPHd	total petroleum hydrocarbons as diesel
TPHg	total petroleum hydrocarbons as gasoline
U.S EPA	United States Environmental Protection Agency
U.S. FWS	United States Fish and Wildlife Service
U.S.	United States
VOC	volatile organic compound

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## EXECUTIVE SUMMARY

This report presents the results of the first five-year review for five sites located at former Marine Corps Air Station (MCAS) El Toro, California. The five sites addressed in this report are Installation Restoration Program (IRP) Sites 2 and 17 (vadose zone remedy), and IRP Sites 16, 18, and 24 (groundwater remedy). The purpose of the five-year review is to evaluate whether the remedies implemented at IRP Sites 2, 16, 17, 18, and 24 are functioning as intended by the respective Records of Decision (RODs) (Department of the Navy [DON] 2000, DON 2002a, DON 2003) and remain protective of human health and the environment.

### Authority for Conducting Five-Year Reviews

The DON is the lead agency for conducting five-year reviews at former MCAS El Toro under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The DON has prepared this five-year review pursuant to CERCLA Section (§) 121(c) and the National Contingency Plan (NCP). In addition, the United States Environmental Protection Agency's (U.S. EPA's) Five Year Review Guidance (U.S. EPA 2001) and Navy/Marine Corps policy for conducting CERCLA five-year reviews (DON 2004) were extensively used in preparation of this five-year review report. In accordance with the Navy/Marine Corps policy for conducting CERCLA five-year reviews, the first site on an installation that triggers the five-year review triggers the five-year review clock for the entire installation. As documented in the IRP Site 16 Remedial Design (CDM 2006), the beginning of the remedial action construction at IRP Site 16 in September 2004 triggered the first five-year review for former MCAS El Toro. In order to streamline and synchronize the five-year reviews, other sites including IRP Sites 2, 17, 18, and 24 were evaluated since the response actions at these sites have either been completed or are ongoing. This approach is consistent with § 27.3 of the Federal Facility Agreement (FFA) between the Marine Corps/DON, U.S. EPA Region 9, the California Department of Health Services (DHS) (part of which is currently the Department of Toxic Substances Control [DTSC]), and the California Regional Water Quality Control Board, Santa Ana Region (RWQCB); and the U.S. EPA's Five Year Review Guidance (U.S. EPA 2001).

### Status of IRP Sites Addressed in the Five-Year Review Report

A summary of the status of the sites addressed in this five-year review report is presented in the following table.

**Table ES-1 : Summary of Current Status of IRP Sites 2, 16, 17, 18, and 24**

Site I.D.	Summary of Current Status
IRP Sites 2 and 17	<p>The selected remedy at both IRP Sites 2 and 17 included landfill capping and institutional controls (ICs). This remedial action was documented in the interim ROD signed by the DON and regulatory agencies in July 2000 (DON 2000). An Explanation of Significant Differences (ESD) was issued in June 2009 (DON 2009) that documented that the selected remedy presented in the Final Interim ROD is the final remedy for IRP Site 17 and for the vadose zone at IRP Site 2. This ESD also documented that the Final Interim ROD will serve as the Final ROD for IRP Site 17 and for the vadose zone at IRP Site 2.</p> <p>Remedial action construction at IRP Sites 2 and 17 was completed in February 2008 and July 2008, respectively. The FFA signatories concurred with the Remedial Action Completion Report (RACR) for IRP Sites 2 and 17 (Earth Tech 2009a) and that the remedial action objectives (RAOs) have been attained. The operation and maintenance (O&amp;M) activities were initiated in November 2008.</p>
IRP Site 16	<p>The selected remedy included monitored natural attenuation (MNA) and ICs, and was documented in the ROD issued in July 2003 (DON 2003). The remedial construction activities included installation of wells in September 2004. The first groundwater monitoring event as part of the selected remedy following ROD signature commenced in October 2004. The operating properly and successfully (OPS) evaluation for the remedy was completed in September 2007 (CDM 2007). The FFA signatories concurred with the OPS evaluation. Periodic groundwater and soil vapor monitoring is currently in progress.</p>

Site I.D.	Summary of Current Status
IRP Sites 18 and 24	The selected remedy at both IRP Sites 18 and 24 included groundwater extraction and treatment, and ICs and was documented in the ROD issued in June 2002 (DON 2002a). Remedial action construction activities at IRP Sites 18 and 24 were completed and respective Interim Remedial Action Completion Report (I-RACRs) (Tetra Tech 2008, Weston 2007a) were issued in March 2008 and August 2007, respectively. The FFA signatories concurred with the I-RACRs. The O&M activities are currently in progress at both sites.

### Five-Year Review Process

In accordance with the U.S. EPA's Comprehensive Five-year Review Guidance (U.S. EPA 2001), the five-year review process at each of the five sites addressed in this report consisted of the following components:

- Community notification and involvement:* Community leaders and interested parties were notified that the five-year reviews will be conducted for IRP Sites 2, 16, 17, 18, and 24 in a Restoration Advisory Board (RAB) meeting held on 28 January 2009. Detailed meeting minutes of this RAB meeting were mailed in April 2009 to interested parties on the RAB mailing list. The interested members of the community were briefed regarding the ongoing five-year review process during the RAB meeting held on 15 April 2009. Following completion of the five-year review, the five-year review report and a brief summary of this report will be made available to the stakeholders.
- Document review:* Several documents were reviewed for IRP Sites 2, 16, 17, 18, and 24 as part of the five-year review for these sites. The objective of the document review was to obtain relevant information and data that could be used as the basis for assessment of the performance of the remedies implemented at these sites. The types of documents reviewed included RODs and ESDs, remedial investigation/feasibility study (RI/FS) reports, remedial design/remedial action work plans, RACRs and as-built drawings, and documents containing monitoring data and information.
- Data review:* The data reviewed for IRP Sites 2 and 17 included the inspection checklists completed by the current owner (Federal Aviation Administration [FAA]) of the major portion of the property containing the two sites, to evaluate compliance with ICs. The O&M activities are currently in progress for IRP Sites 2 and 17 and data from these activities will be reported in semi-annual/annual reports to be issued at a later date. Therefore, O&M data for IRP Sites 2 and 17 will be reviewed as part of the subsequent five-year reviews.

IRP Site 16: The data reviewed for IRP Site 16 consisted of groundwater MNA data, vadose zone monitoring data and information concerning implementation and maintenance of the ICs. The primary source for these data was the Groundwater Monitoring Data Summary Reports and Annual Long-Term Monitoring Reports that generally provided data for the site from 2004 through 2008.

IRP Sites 18 and 24: Quarterly groundwater monitoring and system operation data summaries and annual remedy status reports were reviewed to evaluate the remedial progress at IRP Sites 18 and 24. Data collected included system operation data, compliance sampling results, and groundwater monitoring data. It should be noted that detailed O&M reports presenting data for the IRP Site 18 groundwater extraction system and for the IRP Sites 18 and 24 Treatment Plants were not available from Irvine Ranch Water District (IRWD) during the preparation of this Five-Year Review Report. Therefore, only operational summaries prepared by IRWD and previously presented to the Base Realignment and Closure (BRAC) Cleanup Team (BCT) were evaluated as part of this five-year review. This five-year review is based on the review of the available data collected as part of system

O&M for IRP Sites 18 and 24 for a period of approximately 2.5 years, starting from system startup to March 2009.

- *Site Inspection:* Site inspections were conducted for IRP Sites 2, 16, 17, 18, and 24 as part of the five-year review to provide information about the status of these sites, and to visually confirm and document the conditions of the remedies, the sites, and the surrounding areas. The first inspection event for IRP Sites 2, 16, 17, 18, and 24 was conducted on 11 March 2009. This inspection was conducted by a team consisting of representatives from the DON, BRAC Program Management Office (PMO) West, U.S. EPA Region 9, DTSC, RWQCB, and Orange County Health Care Agency (OCHCA). Additional detailed inspections of the remedies at IRP Site 2, 16, 17, 18, and 24 were conducted by the respective O&M contractors in March 2009.
- *Interviews:* Interviews were conducted as part of the five-year review with various stakeholders to provide additional information about the status of IRP Sites 2, 16, 17, 18, and 24. The interviewees included representatives from the DON BRAC PMO West, regulatory agencies, O&M contractors, and RAB members.
- *Protectiveness Determination:* Based on the technical assessments of the remedies at IRP Site 2, 16, 17, 18, and 24, protectiveness statements were made for each site. The technical assessments are summarized below.

### Technical Assessment Summary

The technical assessment conducted as part of the five-year review process focused on responses to the following three key questions presented in the U.S. EPA's Comprehensive Five-year Review Guidance (U.S. EPA 2001):

1. Question A: Is the remedy functioning as intended by the decision documents?
2. Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection still valid?
3. Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Based on the document/data review, site inspections, and interviews, the responses to Questions A, B, and C for all five IRP sites were affirmative, affirmative, and negative, respectively. The results of the technical assessments are summarized below.

**IRP Sites 2 and 17:** Based on the documents reviewed, the site inspection, and the interviews, the remedies at IRP Sites 2 and 17 are functioning as intended by the ROD and as modified by the ESD. The engineering components of the remedies are operating and functioning as designed. Based on the documents reviewed and site inspections, there was no evidence of activities at IRP Sites 2 and 17 that are inconsistent with the land-use restrictions presented in the O&M Plan for the sites. The evaluation of applicable or relevant and appropriate requirements (ARARs) documented in the ROD indicated that there were no significant changes to the standards/requirements identified as ARARs in the IRP Sites 2 and 17 ROD that could affect the protectiveness of the remedies at the two sites. Additionally, no newly promulgated standards were identified that could affect the protectiveness of the remedies at IRP Sites 2 and 17.

The exposure pathways assumed in the risk assessment conducted during the Phase II RI have not changed. The remedy for IRP Site 17 and vadose zone of IRP Sites 2 is implemented for waste isolation and containment, and is not intended to meet any site-specific, risk-based cleanup level; therefore, review of toxicity and other contaminant characteristics used to determine the original

cleanup level was not required. There is no other information that calls into question the protectiveness of the remedy.

**IRP Site 16:** Based on the documents and data reviewed, site inspections, and the interviews, the remedy at IRP Site 16 is functioning as intended by the ROD and the remedial design. The existing groundwater monitoring network as part of MNA provides adequate down-gradient monitoring of volatile organic compounds (VOCs). The cross-gradient monitoring needs to be enhanced. The enhancement of the cross-gradient monitoring well network is in accordance with the IRP Site 16 ROD and the Remedial Design. The IRP Site 16 Remedial Design provides for the installation of additional groundwater monitoring wells if they are determined to be necessary based on the groundwater monitoring results.

The interpreted limits of the groundwater TCE plume remain within the boundary of the area where ICs (including restrictions on the use of groundwater) are applied. The review of the documents and site-inspections indicate that no activities have been conducted at the site that are inconsistent with land-use restrictions documented in the remedial design (CDM 2006).

Site grading to maintain positive drainage has been implemented at IRP Site 16 and is performing as required. Vadose zone monitoring has been implemented; however, no definitive trends have been observed in the data. The DON is updating the vadose zone monitoring strategy/procedures in consultation with regulatory agencies.

Based on the evaluation of ARARs documented in the ROD, it was concluded that there were no significant changes to the standards/requirements identified as ARARs in the IRP Site 16 ROD that could affect the protectiveness of the remedy at the site. Additionally, no newly promulgated standards were identified that could affect the protectiveness of the remedy at IRP Site 16.

The exposure pathways assumed in the risk assessment conducted for IRP Site 16 have not changed. Additionally, there has been no change in toxicity values of TCE (the main risk driving constituent) used in the risk assessments for IRP Site 16 and no appreciable change in TCE concentrations in groundwater. Therefore, current risks/hazards associated at IRP Site 16 are expected to be similar to the previous estimates. There is no other information that calls into question the protectiveness of the remedy.

**IRP Sites 18 and 24:** Based on the documents and data reviewed, site inspections, and the interviews, the remedies implemented at IRP Sites 18 and 24 are functioning as intended by the ROD as modified by the ESDs. Based on the performance data collected since remedy initiation, the extraction well-field is performing as designed. The O&M data shows an overall reduction in the size of the 500 micrograms per liter ( $\mu\text{g/L}$ ) TCE iso-concentration contour, when the baseline data collected in September 2006 is compared to the data collected in July 2008. The review of the documents and site-inspections indicate that no activities have been conducted in the areas overlying IRP Sites 18 and 24 that are inconsistent with the land-use restrictions.

Based on the evaluation of ARARs documented in the ROD, it was concluded that there were no significant changes to the standards/requirements identified as ARARs in the IRP Sites 18 and 24 ROD that could affect the protectiveness of the remedies. Additionally, no newly promulgated standards were identified that could affect the protectiveness of the remedies at IRP Sites 18 and 24.

The exposure pathways assumed in the risk assessments conducted for groundwater at IRP Sites 18 and 24 have not changed. Additionally, there has been no change in toxicity values of TCE used in the risk assessments for IRP Sites 18 and 24 and no appreciable change in TCE concentrations in groundwater. Therefore, current risks/hazards associated at IRP Sites 18 and 24 are expected to be

similar to the previous estimates. There is no other information that calls into question the protectiveness of the remedies at IRP Sites 18 and 24.

### **Protectiveness Statements**

Based on the technical assessments summarized above, the following protectiveness statements were made for the subject sites:

**IRP Sites 2 and 17:** Based on the technical assessment, the remedies at IRP Sites 2 and 17 are being implemented in accordance with the ROD (DON 2000) and are protective of human health and the environment. Potential exposure to waste at IRP Sites 2 and 17 have been addressed through construction of landfill caps that isolate and contain the waste and impacted soil, installation of access restrictions and warning signs, and implementation of ICs. Long-term protectiveness of the remedial actions will be ensured by O&M activities including cover inspection and maintenance; and groundwater, landfill gas (LFG), and unsaturated zone monitoring.

**IRP Site 16:** Based on the technical assessment, the remedy at IRP Site 16 is being implemented in accordance with the ROD (DON 2003) and is protective of human health and the environment. MNA is being implemented to attain groundwater cleanup goals at the site and in the interim, exposure pathways that could result in unacceptable risks to human receptors are being controlled with ICs.

**IRP Sites 18 and 24:** Based on the technical assessment, the remedies at IRP Sites 18 and 24 are being implemented in accordance with the ROD (DON 2002a) and are protective of human health and environment. The groundwater extraction and treatment is being implemented to attain groundwater cleanup objectives at IRP Sites 18 and 24 and in the interim, exposure pathways that could result in unacceptable risks to human receptors are being controlled with ICs.

### **Issues, Recommendations and Follow-up Actions**

No issues were identified for IRP Sites 2, 16, 17, 18, and 24 that currently or in the future would prevent the respective remedies at these sites from being protective of human health and/or the environment. Therefore, no recommendations or follow-up actions are required to ensure protectiveness of the remedies. However, consistent with the U.S. EPA guidance (U.S. EPA 2001), recommendations were made that do not directly relate to achieving or maintaining the protectiveness of the remedies, and pertain to activities such as O&M of the remedies and coordination with other agencies.

**SUMMARY FORM  
FIRST FIVE-YEAR REVIEW**

**FORMER MARINE CORPS AIR STATION EL TORO, CALIFORNIA**

<b>SITE IDENTIFICATION</b>		
<b>Site name (from WasteLAN):</b> El Toro Marine Corps Air Station		
<b>U.S. EPA ID (from WasteLAN):</b> CA6170023208		
<b>Site areas addressed in this five-year review:</b> Installation Restoration Program (IRP) Site 2 (Operable Unit [OU]-2B), IRP Site 16 (OU-3B), IRP Site 17 (OU-2B), IRP Site 18 (OU-1), IRP Site 24 (OU-2A)		
<b>Region:</b> 9	<b>State:</b> CA	<b>City/County:</b> Irvine/Orange
<b>SITE STATUS</b>		
<b>NPL status:</b> <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
<b>Remediation status</b> (choose all that apply): <input checked="" type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Complete		
<b>Multiple OUs?</b> <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	<b>Construction completion date:</b> N/A	
<b>Has site been put into reuse?</b> <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO (Portions of the site have been transferred)		
<b>REVIEW STATUS</b>		
<b>Lead agency:</b> <input type="checkbox"/> U.S. EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input checked="" type="checkbox"/> Other Federal Agency <u>Department of the Navy</u>		
<b>Author name:</b> Department of the Navy, Base Realignment and Closure Program Management Office West		
<b>Author title:</b>	<b>Author affiliation:</b>	
<b>Review period:</b> September 2004 to September 2009		
<b>Date(s) of inspection:</b> 11, 12 and 18 March 2009		
<b>Type of review:</b>		
<input checked="" type="checkbox"/> Post-SARA	<input type="checkbox"/> Non-NPL Remedial Action Site	
<input type="checkbox"/> Pre-SARA	<input type="checkbox"/> NPL State/Tribe-lead	
<input type="checkbox"/> NPL-Removal only	<input type="checkbox"/> Regional Discretion	
<b>Review number:</b> <input checked="" type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
<b>REVIEW STATUS - CONTINUED</b>		
<b>Triggering action (for the entire Former MCAS El Toro):</b>		
<input type="checkbox"/> Actual Remedial Action Onsite Construction at OU # _____	<input type="checkbox"/> Construction Completion	
<input checked="" type="checkbox"/> Actual Remedial Action Start at IRP Site 16	<input type="checkbox"/> Previous Five-Year Review Report	
<input type="checkbox"/> Other		
<b>Triggering action date (for the entire Former MCAS El Toro):</b> September 2004 (Beginning of remedial action construction at IRP Site 16)		
<b>Due date (five years after triggering action date):</b> September 2009		

## Five-Year Review Summary Form, cont'd

### **Issues:**

No issues have been identified for IRP Sites 2, 16, 17, 18, and 24 that currently or in future would prevent the respective remedies at these sites from being protective of human health and the environment.

### **Recommendations and Follow-up Actions:**

Since no issues have been identified for IRP Sites 2, 16, 17, 18, and 24 that currently prevent the remedies at these sites from being protective, or may do so in future, no recommendations or follow-up actions are required to ensure protectiveness of the remedies. However, consistent with the U.S. EPA guidance (U.S. EPA 2001), recommendations have been made that pertain to activities such as operation and maintenance (O&M) of the remedies and coordination with other agencies.

#### ***IRP Sites 2 and 17***

- The Orange County Great Park (OCGP) Corporation is planning on opening discussions with the Department of the Interior/FAA regarding access to the areas in the vicinity of IRP Sites 2 and 17 for guided (docent-lead) tours. It is recommended that DON coordinate with FAA in its discussions with OCGP regarding access to the areas in the vicinity of IRP Sites 2 and 17 for guided tours. It should be ensured that the remedies at IRP Sites 2 and 17 remain protective of any potential receptors due to the planned use of IRP Sites 2 and 17 for guided tours. The DON in coordination with FAA should consider limiting OCGP access for guided tours to access roads at the sites.

#### ***IRP Site 16***

- The DON and regulatory agencies are working together to finalize the vadose zone monitoring strategy for IRP Site 16.
- The planned soil excavation activities as part of Petroleum Corrective Action Program (PCAP) to remove residual petroleum hydrocarbons will have short-term incidental impacts on two elements of the IRP Site 16 groundwater remedy. These two elements include approximately six monitoring wells and the positive drainage required over the main pit area. It is recommended that the DON restore the site to ensure positive drainage over the main pit area and replace the impacted wells as appropriate to ensure effective monitoring and attainment of RAOs presented in the ROD.
- Continue to evaluate lateral extents of VOCs in groundwater and augment groundwater monitoring network as required to confirm distribution of TCE to the west and northwest.

#### ***IRP Sites 18 and 24***

- Continue to evaluate monitoring and other O&M data, and make specific recommendations to further optimize the groundwater extraction and treatment systems per the Performance Monitoring and Sampling and Analysis Plan (Earth Tech 2007).
- Continue to ensure periodic communication/coordination between the DON, IRWD, and Orange County Water District (OCWD) for evaluation of the performance of the IRP Sites 18 and 24 Treatment Plants.
- Ensure timely completion of detailed O&M Reports presenting data for the IRP Site 18 groundwater extraction system and for the IRP Sites 18 and 24 Treatment Plants.
- Ensure O&M Manual procedures are followed so that the treatment systems and in particular the activated carbon units for vapor-phase treatment operate as designed.
- Evaluate long-term effects on plume capture if the lower PA extraction rates documented in the last six months persist.

### **Protectiveness Statements:**

#### ***IRP Sites 2 and 17***

Based on the technical assessment, the remedies at IRP Sites 2 and 17 are being implemented in accordance with the ROD (DON 2000) and are protective of human health and the environment. Potential exposure to waste at IRP Sites 2 and 17 have been addressed through isolating and containing the waste and impacted soil, installation of access restrictions and warning signs, and

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implementation of ICs. Long-term protectiveness of the remedial actions will be ensured by O&M activities including cover inspection and maintenance; and groundwater, LFG, and unsaturated zone monitoring.

### **IRP Site 16**

Based on the technical assessment, the remedy at IRP Site 16 is being implemented in accordance with the ROD (DON 2003) and is protective of human health and the environment. MNA is being implemented to attain groundwater cleanup goals at the site and in the interim, exposure pathways that could result in unacceptable risks to human receptors are being controlled with ICs.

### **IRP Sites 18 and 24**

Based on the technical assessment, the remedies at IRP Sites 18 and 24 are being implemented in accordance with the ROD (DON 2002a) and are protective of human health and environment. The groundwater extraction and treatment is being implemented to attain groundwater cleanup objectives at IRP Sites 18 and 24 and in the interim, exposure pathways that could result in unacceptable risks to human receptors are being controlled with ICs.

## 1. Introduction

This report presents the results of the first five-year review for five sites located at former Marine Corps Air Station (MCAS) El Toro, California. The five sites addressed in this report are Installation Restoration Program (IRP) Sites 2 and 17 (vadose zone remedy) and Sites 16, 18, and 24 (groundwater remedy). The purpose of the five-year review is to evaluate whether the remedies implemented at IRP Sites 2, 16, 17, 18, and 24 are functioning as intended by the respective Records of Decision (RODs) (Department of the Navy [DON] 2000, DON 2002a, DON 2003) and remain protective of human health and the environment. The methods, findings, and conclusions of the reviews conducted are documented in this five-year review report.

The data analysis in support of the five-year review and this report were prepared by AECOM Technical Services, Inc. (ATS) (formerly Earth Tech, Inc.) on behalf of the DON Base Realignment and Closure (BRAC), Program Management Office (PMO) West and the Naval Facilities Engineering Command Southwest (NAVFAC SW). This work was authorized by the United States Navy, Naval Facilities Engineering Command, Pacific (NAVFAC Pacific) under contract task order No. 0032 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) III Program, Contract No. N62742-03-D-1837.

### 1.1 BACKGROUND

Former MCAS El Toro was commissioned in 1943 as a Marine Corps pilot fleet operation training facility and closed in July 1999, as a part of the BRAC Act. The first indication of contamination at the Base occurred during routine water quality monitoring in 1985, when the Orange County Water District (OCWD) discovered trichloroethylene (TCE) in groundwater at an irrigation well located approximately 3,000 feet down-gradient of former MCAS El Toro. In June 1988, the United States Environmental Protection Agency (U.S. EPA) recommended adding former MCAS El Toro to the National Priorities List (NPL) of the Superfund/Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Program due to volatile organic compound (VOC) groundwater contamination at the Base boundary and in agricultural wells west of the Base. Former MCAS El Toro was added to the NPL on 15 February 1990. In October 1990, the Marine Corps/DON signed a Federal Facility Agreement (FFA) with the U.S. EPA Region 9, the California Department of Health Services (DHS) (part of which is currently the Department of Toxic Substances Control [DTSC]), and the California Regional Water Quality Control Board, Santa Ana Region (RWQCB) (U.S. EPA, California, DON 1990). The FFA is a cooperative agreement that:

- Assures environmental impacts are investigated and appropriate response actions are taken to protect human health and the environment;
- Establishes a procedural framework and schedule for developing, implementing, and monitoring appropriate response actions;
- Facilitates cooperation, exchange of information, and participation of the parties; and
- Assures adequate assessment, prompt notification, and coordination between Federal and State agencies.

The implementation of the FFA is included as one of the responsibilities of the BRAC Cleanup Team (BCT). The BCT consists of representatives from the DON BRAC PMO West, U.S. EPA, DTSC, and RWQCB. The team was established to manage and coordinate environmental restoration and compliance programs related to the closure of former MCAS El Toro.

Environmental response action activities pursuant to CERCLA are being performed at several sites within former MCAS El Toro under the IRP. The purpose of the DON IRP is to reduce the risk to

human health and the environment from past waste disposal operations and hazardous material spills from DON activities in a cost-effective manner consistent with the Defense Environmental Restoration Program requirements (DON 2001a).

Twenty-five IRP Sites have been investigated at former MCAS El Toro. Twenty-four of these sites are grouped into three operable units (OUs). IRP Site 23 was evaluated in a Resource Conservation and Recovery Act (RCRA) Facility Assessment under the FFA and, as a result, was eliminated as an environmental concern under the IRP.

This five-year review addresses IRP Sites 2, 16, 17, 18, and 24, which are discussed throughout this report. A brief synopsis of the IRP status of sites within former MCAS El Toro that are not addressed in this five-year review report is presented in Table 1-1.

**Table 1-1: IRP Status for Sites within former MCAS El Toro not Addressed in this Five-Year Review Report**

Operable Unit	Site ID	Site Description	Summary of Remedial Activities and Status of Remedial Measures
OU-2A	IRP Site 25	Major Drainages	IRP Site 25 included major drainages within former MCAS El Toro. After the Phase II remedial investigation (RI) showed that IRP Site 25 was not a source of regional groundwater contamination, the site was recommended for "no action" and included with several OU-3 sites in a no-action ROD that was signed in September 1997 (DON 1997a).  Five-year review is not required for IRP Site 25 since no action was selected in the ROD for the site, and hazardous substances, pollutants, or contaminants do not remain on the site above levels that allow for unlimited use or unrestricted exposure.
OU-2B	IRP Site 2 (groundwater)	Magazine Road Landfill	A feasibility study (FS) is currently under preparation for evaluation of remedial action alternatives for VOC-impacted groundwater at IRP Site 2.
OU-2C	IRP Site 3	Original Landfill	A ROD selecting the remedy for the landfill IRP Sites 3 and 5 was finalized in June 2008 (DON 2008a). The design of the remedial action is currently in progress.
	IRP Site 5	Perimeter Road Landfill	
	Anomaly Area 3	Debris Disposal Area	
OU-3A	IRP Site 4	Ferrocene Spill Area	IRP Sites 4, 6, 9, 10, 13, 15, 19, 20, 21, and 22 were found to present no unacceptable risks to human health or the environment, and recommended for no action based on the results of the investigations. These sites were addressed along with IRP Site 25 in the final no action ROD (DON 1997a).
	IRP Site 6	Drop Tank Drainage Area No. 1	
	IRP Site 9	Crash Crew Pit No. 1	Five-year review is not required for IRP Sites 4, 6, 9, 10, 13, 15, 19, 20, 21, and 22 since no action was selected in the ROD for all the sites, and hazardous substances, pollutants, or contaminants do not remain on the sites above levels that allow for unlimited use or unrestricted exposure.
	IRP Site 10	Petroleum Disposal Area	
	IRP Site 13	Oil Change Area	
	IRP Site 15	Suspended Fuel Tanks	
	IRP 20	Hobby Shop (OU-3)	
	IRP Site 21	Materials Management Group, Building 320	
	IRP Site 22	Tactical Air Fuel Dispensing System	
IRP Site 11	Transformer Storage	IRP Site 11 was addressed in a ROD signed in September 1999 that documented the selected remedial action for Units 1 and 2 and	

Operable Unit	Site ID	Site Description	Summary of Remedial Activities and Status of Remedial Measures
OU-3A (contd.)		Area (OU-3)	included no further action (NFA) for Unit 3 (DON 1999). The remedial action at IRP Site 11 was completed in 2005 and the Final Remedial Action Report was issued in September 2006 (Accord and Earth Tech 2006). The Final Remedial Action Report documented that no additional response actions are needed to protect human health and the environment at IRP Site 11, and the site can be released for unrestricted reuse.  Five-year review is not required for IRP Site 11 since the site was released for unlimited use and unrestricted exposure.
	IRP Site 8	Defense Reutilization and Marketing Office (DRMO) Storage Yard (OU-3)	IRP Sites 8 and 12 were addressed in a ROD signed in March 2007 (DON 2007). This ROD presented the selected remedy for non-radiological constituents of concern for IRP Site 12, and radiological and non-radiological constituents of concern for IRP Site 8. The remedial action construction for these sites began in January 2009.  Five-year review is not required for IRP Sites 8 and 12 since remedial action for these sites is currently in progress. This remedial action is expected to be completed in 2009 and will not result in hazardous substances, pollutants, or contaminants remaining at the sites above levels that allow for unlimited use and unrestricted exposure.
	IRP Site 12	Sludge Drying Beds (OU-3)	
	IRP 19	Aircraft Expeditionary Refueling Site (OU-3)	Site consisted of 4 units. Unit 1 was closed by the California RWQCB, Santa Ana Region on 14 May 1997. Unit 4 was addressed as part of the underground storage tank program. The underground storage tanks associated with Unit 4 were closed in September 2003 and September 2004. The ROD documenting NFA for Units 2 and 3 was signed in September 1997 (DON 1997a).  Five-year review is not required for IRP Site 19 since the ROD documented NFA for Units 2 and 3 and CERCLA hazardous substances, pollutants, or contaminants do not remain on the site above levels that allow for unlimited use or unrestricted exposure.
OU-3B	IRP Site 1	Explosive Ordnance Disposal Training Range	IRP Site 1 is currently in the RI/FS stage of the CERCLA process. Phase II RI (Earth Tech 2006a) was completed in January 2006 and preparation of FS report is underway.
	IRP Site 7	Drop Tank Drainage Area No. 2 (OU-3)	IRP Sites 7 and 14 were addressed in a no action ROD that was signed in June 2001 (DON 2001b).  Five-year review is not required for IRP Sites 7 and 14 since no action was selected in the ROD for the sites and hazardous substances, pollutants, or contaminants do not remain on the sites above levels that allow for unlimited use or unrestricted exposure.
	IRP Site 14	Battery Acid Disposal Area (OU-3)	

## 1.2 FIVE-YEAR REVIEW AUTHORITY AND GENERAL APPROACH

The DON has prepared this five-year review pursuant to CERCLA Section (§) 121(c) and the National Contingency Plan (NCP). In addition, U.S. EPA's Five Year Review Guidance (U.S. EPA 2001) and Navy/Marine Corps policy for conducting CERCLA five-year reviews (DON 2004) were extensively used in preparation of this five-year review report.

CERCLA §121 states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for*

*which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

In addition, the NCP; Title 40 of the Code of Federal Regulations (CFR) §300.430(f)(4)(ii) states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

Pursuant to CERCLA § 121(c) and the NCP, five-year review has been conducted at former MCAS El Toro to evaluate if the remedies at IRP Sites 2, 16, 17, 18, and 24 are or will be protective of human health and the environment. In accordance with the Navy/Marine Corps policy for conducting CERCLA five-year reviews (DON 2004), the first site on an installation that triggers the five-year review triggers the five-year review clock for the entire installation. As documented in the IRP Site 16 Remedial Design (CDM 2006), the beginning of the remedial action construction at IRP Site 16 in September 2004 triggered the first five-year review for former MCAS El Toro. In order to streamline and synchronize the five-year reviews, other sites including IRP Sites 2, 17, 18, and 24 were evaluated since the response actions at these sites have either been completed or cleanup is ongoing. This approach is consistent with § 27.3 of the FFA and the U.S. EPA's Five Year Review Guidance (U.S. EPA 2001).

## 2. Site Chronology

Table 2-1 lists important events for former MCAS El Toro that are common to IRP Sites 2, 16, 17, 18, and 24. The list of important events unique to IRP Sites 2 and 17, IRP Site 16, and IRP Sites 18 and 24 are presented in Tables 2-2, 2-3, and 2-4, respectively.

**Table 2-1: Chronology of Site Events – Former MCAS El Toro**

Event	Date
Initial Assessment Study (IAS) (Brown and Caldwell 1986) completed. — IAS identified 17 sites within former MCAS El Toro as potential sources of contamination.	1985
Site Inspection Plan of Action (James M. Montgomery Engineers, Inc. [JMM] 1988) issued. — This plan recommended 19 sites for investigation.	August 1988
Former MCAS El Toro added to the NPL.	February 1990
FFA (U.S. EPA, California, DON 1990) signed by the Marine Corps/DON with the U.S. EPA Region 9, the California DHS (part of which is currently the DTSC), and the RWQCB. — The FFA is a cooperative agreement that assures that environmental impacts at former MCAS El Toro are investigated and appropriate response action are taken to protect human health and the environment. The FFA also provides procedural framework and schedule for developing, implementing, and monitoring appropriate response actions.	October 1990
Formation of BCT.	October 1990
Former MCAS El Toro placed on BRAC III list.	March 1993
Former MCAS El Toro closed under BRAC Act	July 1999

**Table 2-2: Chronology of Site Events – OU-2B, IRP Site 2 Vadose Zone and IRP Site 17**

Event	Date
Approximate duration of operation of IRP Site 2 landfill.	Late 1950s to about 1980
Approximate duration of operation of IRP Site 17 landfill.	1970 to about 1986
Phase I Remedial Investigation (RI) Draft Technical Memorandum (Jacobs Engineering Group, Inc. [JEG] 1993) issued. — IRP Sites 2 and 17 were discovered and added to the IRP as part of Phase I RI process.	May 1993
Phase II RI (Bechtel National, Inc. (BNI) 1996a) complete for IRP Site 2. — Phase II RI established the nature and extent of contamination at IRP Site 2 and presented the results for human health and ecological risk assessments.	March 1996
Phase II RI (BNI 1996b) complete for IRP Site 17. — Phase II RI established the nature and extent of contamination at IRP Site 17 and presented the results for human health and ecological risk assessments.	September 1996
FS (BNI 1997a) complete for IRP Site 2. — FS evaluated the alternatives for remediation of IRP Site 2 and to address risks to human health and the environment at the site.	March 1997
FS (BNI 1997b) complete for IRP Site 17. — FS evaluated the alternatives for remediation of IRP Site 17 and to address risks to human health and the environment at the site.	February 1997
Final Proposed Plan (DON 1998) issued for IRP Sites 2 and 17. — The Proposed Plan presented the DON's preferred alternative (single layer soil cap with institutional controls [ICs] and monitoring) for remediation of IRP Sites 2 and 17.	May 1998
Final Interim ROD (DON 2000) signed by the DON and regulatory agencies. — The Final Interim ROD documented the selected remedy (single layer soil cap with ICs and monitoring) for IRP Site 17 and vadose zone of IRP Site 2. The ROD also	July 2000

Event	Date
documented that the selected remedy for VOC-impacted groundwater at IRP Site 2 will be presented in a separate ROD.	
Supplemental/Pre-design investigations completed at IRP Sites 2 and 17. — Supplemented investigations were conducted to further refine the lateral extent of landfill boundaries at IRP Sites 2 and 17.	June 2002
Biological opinion (BO) and BO Amendment issued by United States Fish and Wildlife Service (U.S. FWS 2002, 2004) for IRP Sites 2 and 17. — The focus of BO was twofold: (1) protection of the coastal California gnatcatcher ( <i>Poliophtila californica</i> ), a Federally threatened species, and (2) replacement and protection of the coastal sage scrub (CSS) critical habitat throughout IRP Sites 2 and 17 associated with the gnatcatcher.	December 2002, September 2004
Remedial Design Work Plan (Earth Tech 2005) finalized for IRP Site 17 remedy and vadose zone remedy at IRP Site 2.	November 2005
Remedial Action Work Plan (Engineering/Remediation Resources Group, Inc. [ERRG] 2005; ERRG 2008) finalized for IRP Site 17 remedy and vadose zone remedy at IRP Site 2.	December 2005
Remedial action initiated at IRP Site 2.	September 2005
Remedial action initiated at IRP Site 17.	November 2007
Remedial action construction complete at IRP Site 2.	February 2008
Remedial action construction complete at IRP Site 17.	July 2008
Remediation Verification Report finalized for IRP Site 2 (ERRG 2009a) — The Remediation Verification Report contains construction-related documentation such as as-built drawings, survey maps, and certification reports for IRP Site 2	February 2009
Remediation Verification Report finalized for IRP Site 17 (ERRG 2009b) — The Remediation Verification Report contains construction-related documentation such as as-built drawings, survey maps, and certification reports for IRP Site 2	February 2009
Remedial Action Completion Report (RACR) (Earth Tech 2009a) finalized for IRP Sites 2 and 17. — The RACR documented that construction activities are complete for IRP Site 2 vadose zone remedy and IRP Site 17 remedy. The RACR also documented that landfill remedies at both sites achieve the remedial action objectives (RAOs) presented in the ROD.	March 2009
Operation and Maintenance (O&M) Plan (Earth Tech 2009b) finalized for IRP Sites 2 and 17. — The O&M Plan presents the methods and procedures for long-term monitoring and maintenance of IRP Sites 2 and 17 landfill remedies.	March 2009
Explanation of Significant Differences (ESD) (DON 2009) finalized. — The ESD documented that the Final Interim ROD (DON 2000) will serve as final ROD for IRP Site 17 and vadose zone of IRP Site 2. The ESD also documented significant and non-significant changes to certain components of the selected remedies for IRP Sites 2 and 17 presented in the Final Interim ROD.	June 2009

**Table 2-3: Chronology of Site Events – OU-3B, IRP Site 16**

Event	Date
Phase I Remedial Investigation (RI) Draft Technical Memorandum (JEG 1993) issued.	May 1993
Phase II Remedial Investigation (RI) (BNI 1997f) complete. — Phase II RI established the nature and extent of contamination in soil and groundwater at IRP Site 16 and presented the results for human health risk assessment.	June 1997
Multi-Phase Extraction (MPE) pilot test and aquifer testing conducted at IRP Site 16. — The pilot test was conducted to evaluate the effectiveness of MPE to remediate VOCs in soil and groundwater. — Aquifer testing was conducted at IRP Site 16 to estimate aquifer properties (hydraulic conductivity) of the uppermost saturated zone and to provide data to estimate the groundwater seepage velocity for tracking advective transport and natural attenuation of the TCE in groundwater by dispersion and diffusion.	October 2000 to April 2001
Phase II Focused FS (BNI 2002a) completed.	August 2002

Event	Date
<ul style="list-style-type: none"> <li>The focused FS was conducted to evaluate potential remedial alternatives for IRP Site 16 soil and groundwater. The focused FS recommended further action for groundwater, NFA for shallow soil, and vadose zone monitoring to confirm VOC concentrations are not increasing.</li> </ul>	
Final Proposed Plan (DON 2002b) issued. <ul style="list-style-type: none"> <li>The Proposed Plan presented the DON's preferred alternative (monitored natural attenuation [MNA] with ICs) for remediation of IRP Site 16.</li> </ul>	September 2002
ROD (DON 2003) signed by the DON. <ul style="list-style-type: none"> <li>The ROD documented the selected remedy (MNA with ICs) for IRP Site 16.</li> </ul>	July 2003
Groundwater monitoring well installation completed and MNA started.	September 2004
Pre-design evaluation of MNA and vadose zone monitoring. <ul style="list-style-type: none"> <li>A pre-design evaluation of MNA was conducted at IRP Site 16 to: 1) evaluate the extent to which chemical and biological processes may be occurring within the TCE plume; 2) evaluate hydraulic conductivity; and 3) initiate vadose zone monitoring to confirm soil gas concentrations. The pre-design evaluation concluded that the subsurface conditions were not conducive to promoting chemical/biological degradation of TCE. Therefore, the primary mechanisms for natural attenuation are physical processes (e.g., advection, dispersion and diffusion), rather than chemical or biological degradation.</li> </ul>	May 2005
Remedial design (CDM 2006) finalized.	March 2006
Main training pit backfilled and site grading completed as part of the selected remedy.	June 2006
Groundwater monitoring well recommended in the remedial design installed.	October 2006
Operating properly and successfully (OPS) evaluation completed (CDM 2007). <ul style="list-style-type: none"> <li>An OPS evaluation was performed to document that the remedy in place was installed and is being implemented in accordance with the remedial design and is: 1) protective of human health and the environment; 2) enforceable; 3) based on reliable technology; and operating within a site that has been adequately characterized.</li> </ul>	September 2007
2006 Annual Long Term Monitoring (LTM) Report (CDM 2008a) issued. <ul style="list-style-type: none"> <li>This report documented remedial actions conducted at IRP Site 16 in 2006.</li> </ul>	October 2008
2007 Draft Annual LTM Report (CDM 2008b) issued <ul style="list-style-type: none"> <li>This report documented remedial actions conducted at IRP Site 16 in 2007.</li> </ul>	January 2009

**Table 2-4: Chronology of Site Events – OU-1, IRP Site 18 and OU-2A, IRP Site 24**

Event	Date
First indication of VOC release.	1985
OCWD groundwater investigation (Herndon and Reilly 1989) concluded that former MCAS EI Toro was the source of TCE contamination in groundwater down-gradient of the Base.	1986
Cleanup and Abatement Order (CAO) 87-89 issued by the RWQCB for former MCAS EI Toro.	1987
Perimeter study investigation completed to address the RWQCB CAO. <ul style="list-style-type: none"> <li>This investigation reported VOCs in the shallow groundwater unit (SGU) near the southwestern boundary of former MCAS EI Toro.</li> </ul>	1988
Operation of interim pump-and-treat system near the Base boundary.	June 1989-September 1993
RWQCB rescinds the CAO.	April 1993
Phase I RI Draft Technical Memorandum (JEG 1993) issued. <ul style="list-style-type: none"> <li>This RI evaluated potential releases and risks associated with sites in OU-1, OU-2, and OU-3. The Phase I RI concluded that the source of regional groundwater contamination was the southwest quadrant of the Base, but it did not indicate specific sources. A preliminary risk assessment was conducted. IRP Sites 24 and 25 were added during Phase I RI.</li> </ul>	May 1993

Event	Date
<p>OU-1, IRP Sites 18 and 24 RI report (JEG 1994) issued.</p> <ul style="list-style-type: none"> <li>— Phase I RI at OU-1 identified a plume of TCE in groundwater originating beneath the area now designated as Site 24 and the potential VOC sources by collecting soil gas samples. Metal evaluation concluded that the elevated metal concentrations were results of ambient conditions.</li> </ul>	July 1994
<p>Interim-action RI/FS report for groundwater contamination designated as OU-1 issued (JEG 1996).</p> <ul style="list-style-type: none"> <li>— Interim-action RI/FS documented results of Phase I RI at OU-1 and evaluated potential actions to reduce impact of VOCs in groundwater.</li> </ul>	1996
<p>Phase II RI for IRP Site 24 VOC contamination (BNI 1997c) complete.</p> <ul style="list-style-type: none"> <li>— The Phase II RI at Site 24 characterized the nature and extent of VOCs in soil and groundwater, and collected data for a baseline human-health assessment.</li> </ul>	June 1997
<p>FS for vadose zone contamination at IRP Site 24 (BNI 1997d) complete.</p> <ul style="list-style-type: none"> <li>— The FS presented the analysis of alternatives for remediation of vadose zone of IRP Site 24 and to address risks to human health and the environment.</li> </ul>	March 1997
<p>Interim ROD for vadose zone contamination at IRP Site 24 (DON 1997b) finalized.</p> <ul style="list-style-type: none"> <li>— The interim ROD documented the selected remedy for vadose zone contamination at IRP Site 24.</li> </ul>	September 1997
<p>FS for groundwater contamination at IRP Site 24 (BNI 1997e) finalized.</p> <ul style="list-style-type: none"> <li>— The FS presented the analysis of alternatives for remediation of groundwater at IRP Site 24 and to address risks to human health and the environment.</li> </ul>	December 1997
<p>Groundwater remediation pilot test implemented at IRP Site 24 (BNI 1998).</p> <ul style="list-style-type: none"> <li>— The pilot test collected additional data to assist in the remedial alternative design to minimize VOC migration in SGU and from SGU to principal aquifer (PA). Standard and vacuum-enhanced groundwater extraction and groundwater injection were evaluated.</li> </ul>	June 1997-July 1998
<p>Technical Memorandum, Evaluation of OU-1 Remediation Alternative 8A with Respect to NCP Criteria issued (BNI 2001).</p> <ul style="list-style-type: none"> <li>— This evaluation was to optimize conceptual design of IRP Site 18 alternative, which led to the development of Alternative 8A that uses separate treatment systems for groundwater extracted from areas inside and outside the TCE plume in the PA. The technical memorandum presented the results of the evaluation of Alternative 8A using a groundwater model, the evaluation against the NCP criteria, and comparison with other alternatives for OU-1.</li> </ul>	2001
<p>Implementation of IRP Site 24 vadose zone remediation.</p>	1998-2000
<p>Preliminary assessment of VOCs at Building 307 (located within the boundary of IRP Site 24 (Earth Tech 2001a) completed.</p> <ul style="list-style-type: none"> <li>— This assessment was to identify and characterize the possible presence of VOCs in soil gas, soil, and groundwater as a result of laundry and dry cleaning operations at Building 307. The results confirmed that there has not been a significant release at Building 307.</li> </ul>	September 2001
<p>The OCWD, Irvine Ranch Water District (IRWD), and the Settling Federal Agencies comprised of the U.S. Department of Justice (DOJ) and DON reached a Settlement Agreement (DOJ 2001).</p> <ul style="list-style-type: none"> <li>— The Settlement Agreement documented the Modified Irvine Desalter Project (IDP) operated by OCWD/IRWD would accept and treat VOC-impacted groundwater from IRP Site 24 and the PA.</li> </ul>	June 2001
<p>ROD for OU-1 and OU-2A (DON 2002a) finalized.</p> <ul style="list-style-type: none"> <li>— This ROD presented the selected remedy for groundwater as pump-and-treat / incorporated Settlement Agreement with the IDP requirements.</li> </ul>	June 2002
<p>Groundwater modeling for OU-1 and OU-2A (Earth Tech 2003) completed.</p> <ul style="list-style-type: none"> <li>— The groundwater modeling was performed to assist the design of the groundwater extraction strategy for the VOC plume pursuant to the ROD.</li> </ul>	October 2003

Event	Date
<p>Pre-design Investigation for SGU Remedy at IRP Site 24 (Earth Tech 2004) completed.</p> <ul style="list-style-type: none"> <li>— The pre-design investigation was conducted to reduce the uncertainties in groundwater modeling, assess whether soil vapor extraction (SVE) is technically feasible and cost-effective to enhance the groundwater remedy, and select a layout for conveyance piping network.</li> </ul>	May 2004
<p>100 Percent Design Submittal (Weston 2005b) finalized for IRP Site 24.</p> <ul style="list-style-type: none"> <li>— The 100 Percent Design Submittal provided the engineering design, specifications, and implementation methodology for remedial action at IRP Site 24, VOC Source Area.</li> </ul>	March 2005
<p>Remedial Construction started at IRP Site 24.</p>	February 2005
<p>IDP construction started.</p>	April 2005
<p>100% Design Submittal (Tetra Tech 2006) finalized for IDP.</p> <ul style="list-style-type: none"> <li>— The 100 Percent Design Submittal provided rationale and supporting engineering documentation for remedial design package for the IDP.</li> </ul>	January 2006
<p>Remedial construction completed at IRP Site 24.</p>	February 2006
<p>ESD finalized for IRP Site 18, Regional VOC Plume (OU-1) and IRP Site 24, VOC Source Area (DON 2006b).</p> <ul style="list-style-type: none"> <li>— This ESD addressed the changes to the CERCLA Components of the Modified IDP (CCMI).</li> </ul>	February 2006
<p>IDP construction completed.</p>	July 2006
<p>Final O&amp;M Manual (Tetra Tech 2007a) finalized for SGU Treatment Plant, IDP.</p>	June 2007
<p>Final O&amp;M Manual (Tetra Tech 2007b) finalized for PA Treatment Plant, IDP.</p>	June 2007
<p>Interim-RACR (I-RACR) (Weston 2007a) finalized for IRP Site 24, VOC Source Area, Groundwater Remedy.</p> <ul style="list-style-type: none"> <li>— The RACR documented that construction activities are complete for IRP Site 24 groundwater remedy.</li> </ul>	August 2007
<p>Performance Monitoring, and Sampling and Analysis Plan (Earth Tech 2007) finalized.</p> <ul style="list-style-type: none"> <li>— The Plan outlined performance monitoring of OU-1 and OU-2A Groundwater Remedy to assess effectiveness of the remedy.</li> </ul>	August 2007
<p>O&amp;M Manual (Weston 2007b) finalized for SGU well field and conveyance system, IRP Site 24.</p>	August 2007
<p>Interim-RACR (Tetra Tech 2008) finalized for IDP.</p> <ul style="list-style-type: none"> <li>— The RACR documented that construction activities were complete for IDP.</li> </ul>	March 2008
<p>Annual Remedy Status Report finalized for IRP Sites 18 and 24 Groundwater Remedy, September 2006-August 2007 (Weston 2008a).</p> <ul style="list-style-type: none"> <li>— This report documented and evaluated data collected for four quarters of groundwater monitoring (September 2006 to August 2007) and operations for SGU remedy.</li> </ul>	October 2008
<p>Draft Annual Status Report finalized for IRP Sites 18 and 24 Groundwater Remedy, September 2007-August 2008 (Weston 2008b).</p> <ul style="list-style-type: none"> <li>— This report documented and evaluated data collected for four quarters of groundwater monitoring (September 2007 to August 2008) and operations for SGU remedy.</li> <li>— This report also presented an evaluation of water level elevations, analytical solutions, and numerical flow modeling to estimate the zone of hydraulic capture resulting from groundwater extraction (Earth Tech 2008).</li> </ul>	December 2008
<p>ESD finalized for IRP Sites 18 and 24, Vadose Zone Resampling (DON 2008b).</p> <ul style="list-style-type: none"> <li>— This ESD was prepared to explain differences between the Interim and Final RODs for soil at Site 24 that are associated with groundwater. The primary focus of the ESD was resampling of the vadose zone at the conclusion of groundwater remediation to assure that soil has not been recontaminated from VOCs in groundwater.</li> </ul>	December 2008
<p>OPS Report issued for IRP Site 24, VOC Source Area, Groundwater Remedy (Weston 2009a).</p> <ul style="list-style-type: none"> <li>— The Report demonstrated that the IRP Site 24 groundwater remedy is OPS.</li> </ul>	January 2009

### **3. Background**

#### **3.1 IRP SITES 2 AND 17**

##### **3.1.1 Physical Characteristics**

Former MCAS El Toro is located in south central Orange County, California, approximately 8 miles southeast of the city of Santa Ana and 12 miles northeast of Laguna Beach (Figure 3-1). IRP Site 2, Magazine Road Landfill, is located in the eastern portion of former MCAS El Toro (Figure 3-2) within OU-2B. Solid waste generated at former MCAS El Toro and some solid waste from former MCAS Tustin was disposed at IRP Site 2 from the late 1950s until about 1980. IRP Site 2 consisted of the Magazine Road Landfill (comprised of Areas A and B) and Areas C1, C2, and D2, which contained surficial waste from unauthorized dumping (Figure 3-3).

IRP Site 17, Communication Station Landfill, is located in the eastern portion of former MCAS El Toro (Figure 3-2). IRP Site 17 consisted of the Communication Station Landfill and Areas B and C, which contained surface accumulation of construction debris from former Marine Corps activities (Figure 3-4). The IRP Site 17 landfill served as a disposal facility for Basewide activities from 1981 to 1983. However, aerial photographs indicate landfilling possibly began in 1970 and continued through 1986.

##### **3.1.2 Land and Resource Use**

IRP Sites 2 and 17 were used as solid waste landfills and disposal areas until about 1980 and 1986, respectively. IRP Sites 2 and 17 are located in undeveloped areas in the foothills of the Santa Ana Mountains in the eastern portion of former MCAS El Toro. This portion of former MCAS El Toro has been transferred to the Federal Aviation Administration (FAA) as part of a federal agency-to-agency transfer (DON and FAA 2001) (see Figure 3-2). A portion of the area transferred to FAA (including IRP Sites 2 and 17) will be managed by the Department of the Interior as a habitat reserve (City of Irvine 2003 and City of Irvine 2008).

Portions of areas within 1,000 feet of the IRP Sites 2 and 17 landfills lie within Carve-outs II-V and II-F, which were leased in 2005 to Heritage Fields, LLC (Orange County Great Park Corporation and Lennar Corporation), a private developer (DON and Heritage Fields, LLC 2005a). The County of Orange has developed plans to construct the Alton Parkway extension and improvements to the Borrego Canyon Wash within Carve-out II-V. The property required for construction of Alton Parkway extension and improvements to the Borrego Canyon Wash within Carve-out II-V will be transferred by deed to the County of Orange.

##### **3.1.3 Site History**

###### **3.1.3.1 IRP SITE 2**

The suspected types of wastes disposed into IRP Site 2 landfill during its operation included construction debris, municipal-type waste from Base operations, batteries, waste oils, hydraulic fluids, paint residues, transformers, and waste solvents. It is also possible that equipment painted with radium paint, or other low-level radiological materials consistent with former Base operations, may have been inadvertently disposed into the IRP Site 2 landfill.

IRP Site 2 was added to the IRP as part of the Phase I RI process, which included review of available records and other documents pertaining to past disposal practices at the former MCAS El Toro (JEG 1993). Phase I (JEG 1993) and Phase II RIs (BNI 1996a) were conducted for the assessment of the nature and extent of non-radiological chemicals of potential concern (COPCs) in shallow and subsurface soils, groundwater, and landfill gas (LFG) at IRP Site 2. Based on these investigations, it

was estimated that approximately 400,000 cubic yards (cy) of waste were placed in Areas A and B during the operational life of IRP Site 2 landfill (Figure 3-3).

The radiological investigations have been conducted for soil and groundwater at IRP Site 2 (Weston 2000, Weston 2004, Earth Tech 2000, and Earth Tech 2001b). The investigations pertaining to soil at IRP Site 2 concluded that the selected landfill capping remedy documented in the ROD (DON 2000), would protect human health from unacceptable exposure to radium-226 (Ra-226) (Earth Tech 2006b). The groundwater evaluations concluded that the landfills are not adversely impacting the groundwater by releasing radionuclides, and radiological constituents are not considered COPCs for groundwater at IRP Site 2 (Earth Tech 2000 and Earth Tech 2001b).

#### 3.1.3.2 IRP SITE 17.

IRP Site 17 landfill was actively used from 1981 to 1983 as a Stationwide disposal facility. Aerial photographs indicate that landfilling activities were underway as early as 1970 and continued through 1986. Suspected waste types disposed at the site included domestic waste rubble, cooking grease, oils and fuels from sumps, and empty drums. It is also possible that equipment painted with radium paint, or other low-level radiological materials consistent with Base operations, may have been inadvertently disposed into the Site 17 landfill.

IRP Site 17 was discovered and added to the IRP as part of the Phase I RI process, which included review of available records and other documents pertaining to past disposal practices at former MCAS El Toro (JEG 1993). Phase I and Phase II RIs were conducted for the assessment of the nature and extent of non-radiological COPCs in shallow and subsurface soils, groundwater, and LFG at IRP Site 17. Based on these investigations, it was estimated that approximately 160,000 cy of waste were placed in the main landfill area of IRP Site 17.

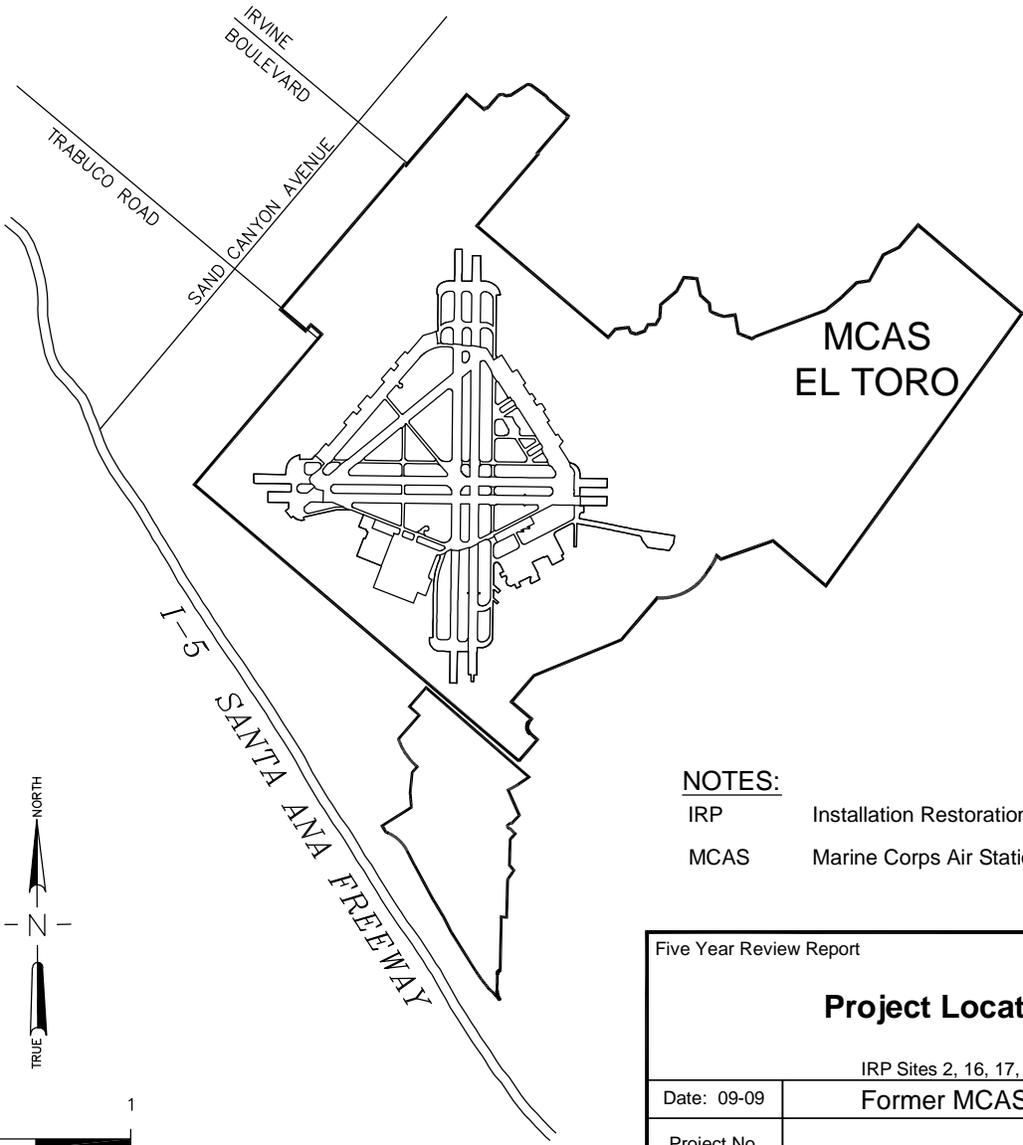
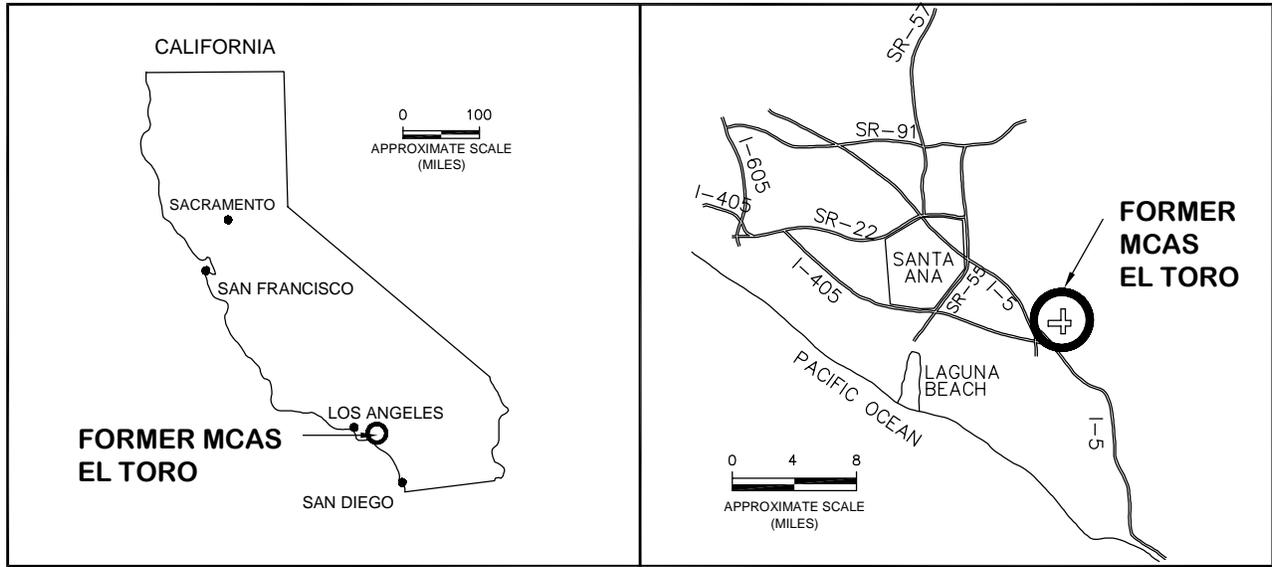
The radiological investigations have been conducted for soil and groundwater at IRP Site 17 (Weston 2000, Weston 2004, Earth Tech 2000, and Earth Tech 2001b). The investigations pertaining to soil at IRP Site 17 concluded that the selected landfill capping remedy documented in the ROD (DON 2000), would protect human health from unacceptable exposure to Ra-226 (Earth Tech 2006b). The groundwater evaluations concluded that the landfills are not adversely impacting the groundwater by releasing radionuclides, and radiological constituents are not considered COPCs for groundwater at IRP Site 17 (Earth Tech 2000 and Earth Tech 2001b).

#### 3.1.4 Initial Response

The DON conducted time-critical removal actions to mitigate potential exposure to landfill debris and waste as a result of ongoing erosion. These removal actions were undertaken at IRP Sites 2 and 17 from 1996 to 1997 (NAVFAC SW 1996). Actions included fencing the sites, removing drums and other debris from the surface of the landfill, and constructing drainage features to reduce the erosion that had been occurring at both sites.

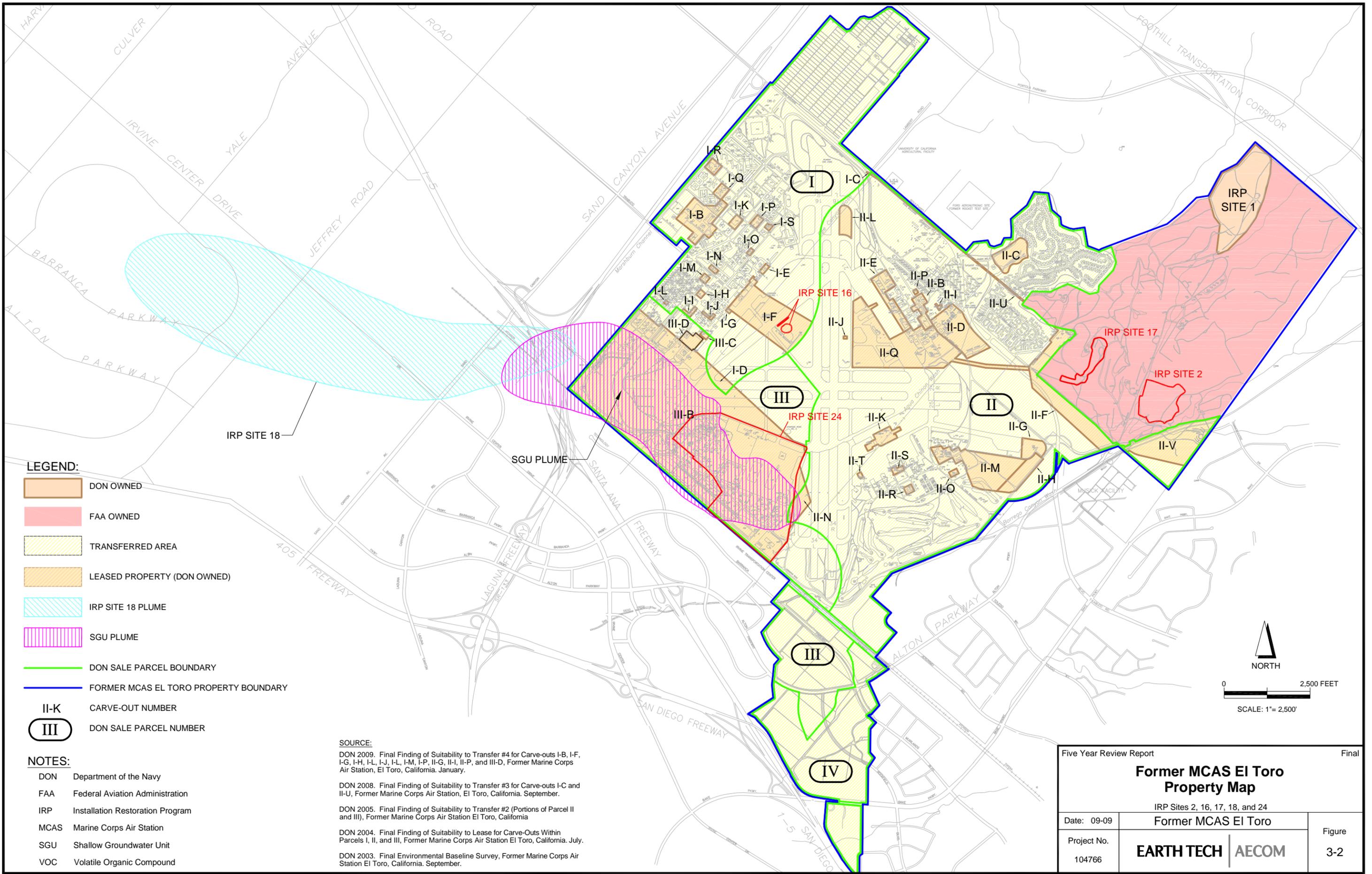
#### 3.1.5 Basis for Taking Action

IRP Sites 2 and 17 were historically used as landfills for waste disposal. Phase I and II RIs (BNI 1996a and 1996b), and supplemental investigations delineated the landfill boundaries and identified several COPCs at IRP Sites 2 and 17. The human-health and ecological risk assessments estimated the risks/hazards at two sites if no action were taken. These risk assessments, and the results of Phase I and II RIs, and supplemental investigations provided the basis for remedial actions at IRP Sites 2 and 17. The following sections present a summary of results of the environmental investigations and risk assessments conducted at IRP Sites 2 and 17.



- NOTES:**
- IRP            Installation Restoration Program
  - MCAS        Marine Corps Air Station

Five Year Review Report		Final
<b>Project Location Map</b>		
IRP Sites 2, 16, 17, 18, and 24		
Date: 09-09	Former MCAS El Toro	
Project No. 104766	<b>EARTH TECH</b>   <b>AECOM</b>	Figure 3-1



**LEGEND:**

- DON OWNED
- FAA OWNED
- TRANSFERRED AREA
- LEASED PROPERTY (DON OWNED)
- IRP SITE 18 PLUME
- SGU PLUME
- DON SALE PARCEL BOUNDARY
- FORMER MCAS EL TORO PROPERTY BOUNDARY
- II-K CARVE-OUT NUMBER
- III DON SALE PARCEL NUMBER

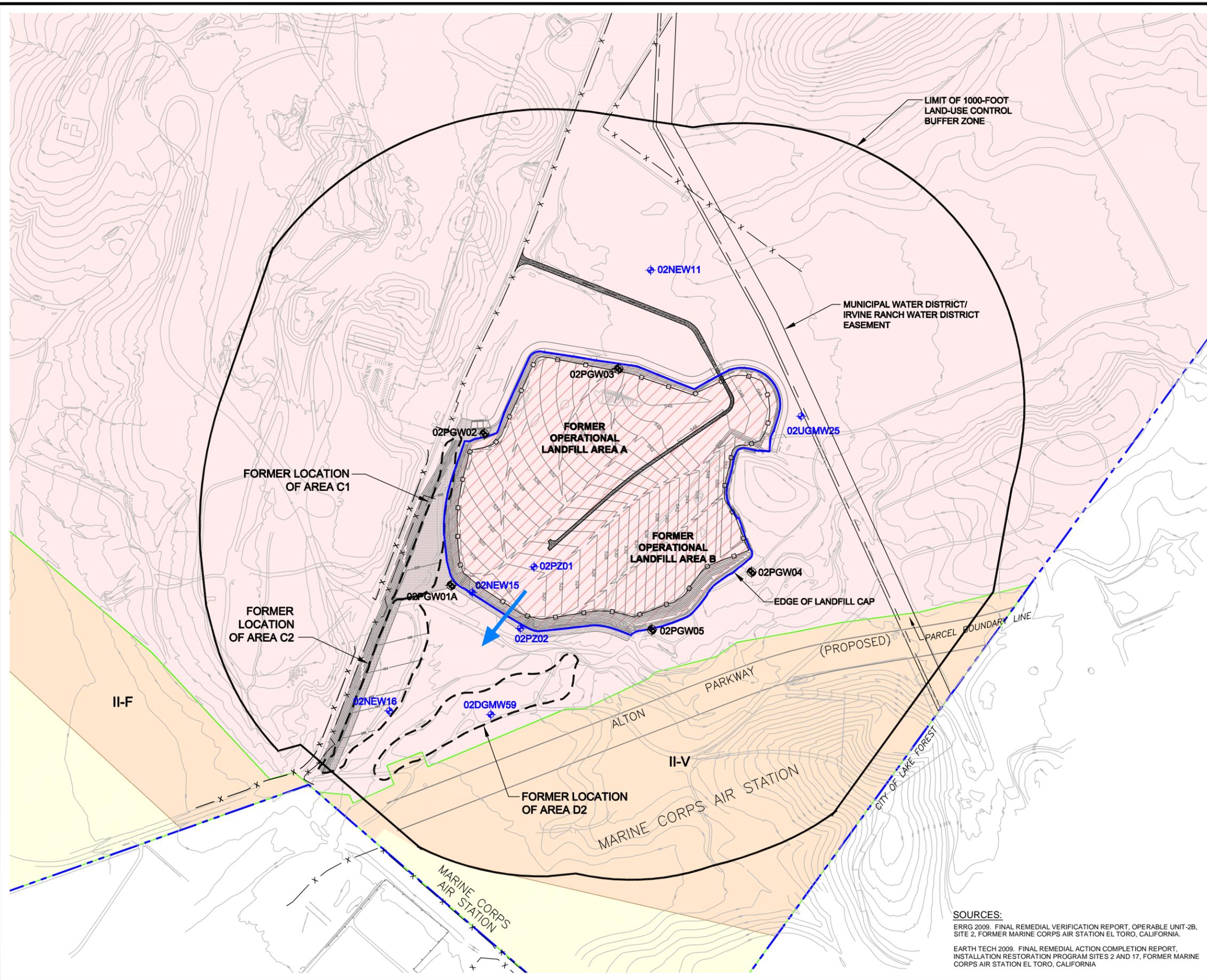
**NOTES:**

- DON Department of the Navy
- FAA Federal Aviation Administration
- IRP Installation Restoration Program
- MCAS Marine Corps Air Station
- SGU Shallow Groundwater Unit
- VOC Volatile Organic Compound

**SOURCE:**

- DON 2009. Final Finding of Suitability to Transfer #4 for Carve-outs I-B, I-F, I-G, I-H, I-L, I-J, I-L, I-M, I-P, II-G, II-I, II-P, and III-D, Former Marine Corps Air Station, El Toro, California. January.
- DON 2008. Final Finding of Suitability to Transfer #3 for Carve-outs I-C and II-U, Former Marine Corps Air Station, El Toro, California. September.
- DON 2005. Final Finding of Suitability to Transfer #2 (Portions of Parcel II and III), Former Marine Corps Air Station El Toro, California
- DON 2004. Final Finding of Suitability to Lease for Carve-Outs Within Parcels I, II, and III, Former Marine Corps Air Station El Toro, California. July.
- DON 2003. Final Environmental Baseline Survey, Former Marine Corps Air Station El Toro, California. September.

Five Year Review Report		Final
<b>Former MCAS El Toro Property Map</b>		
IRP Sites 2, 16, 17, 18, and 24		
Date: 09-09	Former MCAS El Toro	
Project No. 104766	<b>EARTH TECH   AECOM</b>	Figure 3-2

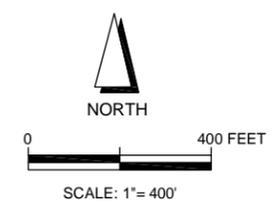


### LEGEND

- DON OWNED
- FAA OWNED
- TRANSFERRED AREA
- GROUNDWATER MONITORING WELL
- GAS MONITORING PROBE
- DON SALE PARCEL BOUNDARY
- FORMER MCAS EL TORO BOUNDARY
- II-F** CARVE-OUT NUMBER
- III DON SALE PARCEL NUMBER
- APPROXIMATE EXTENT OF FINAL LANDFILL COVER AREA
- APPROXIMATE LIMIT OF FORMER UNCONTROLLED DISPOSAL
- ACCESS ROAD
- RIPRAP
- 2-FOOT CONTOURS
- CHAIN-LINK FENCE
- 3-STRAND WIRE FENCE
- BUILDING
- GENERAL GROUNDWATER FLOW DIRECTION

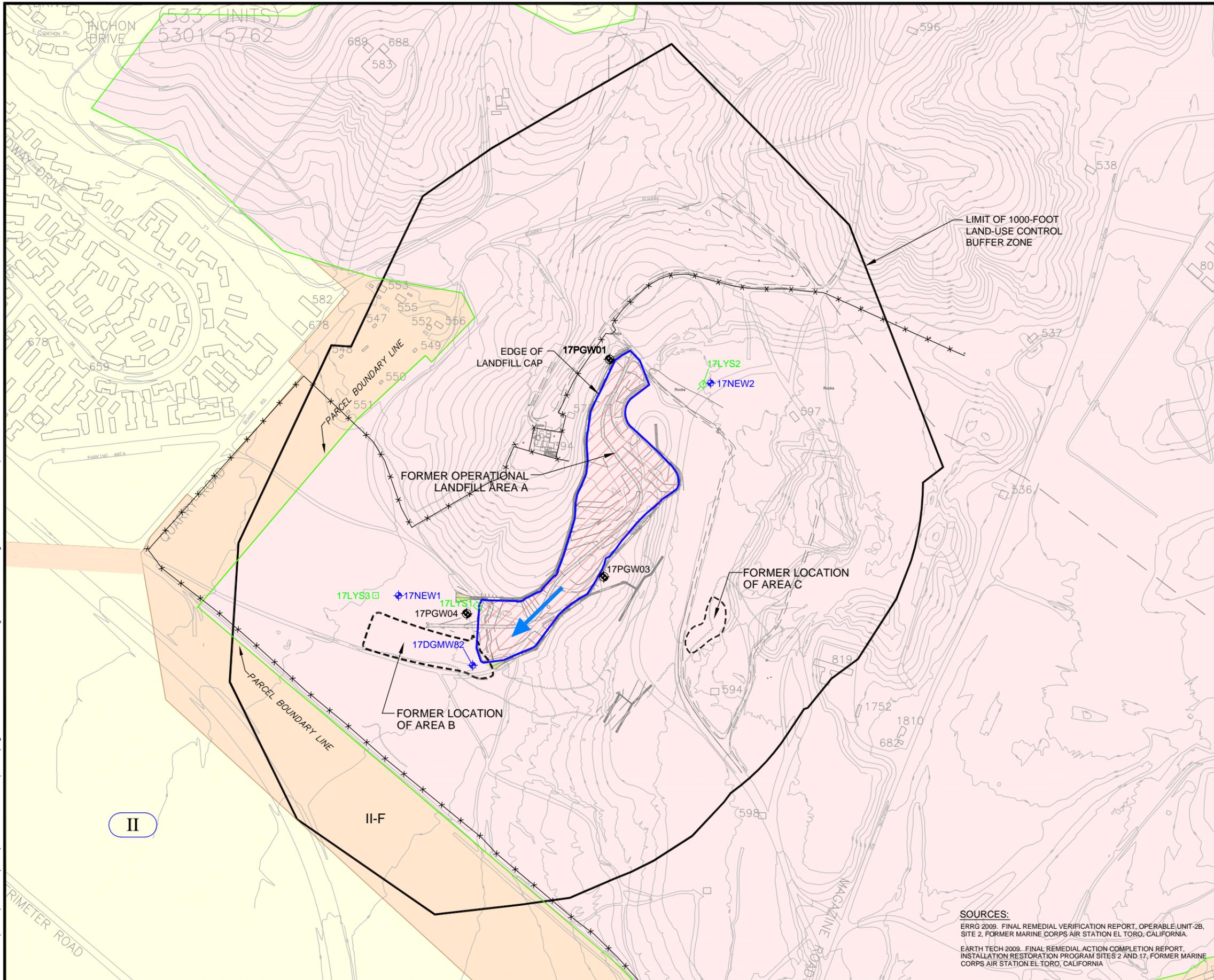
**NOTES:**

- DON Department of Navy
- ERRG Engineering/Remediations Resources Group
- FAA Federal Aviation Administration
- IRP Installation Restoration Program
- MCAS Marine Corps Air Station



**SOURCES:**  
 ERRG 2009. FINAL REMEDIAL VERIFICATION REPORT, OPERABLE UNIT-2B, SITE 2, FORMER MARINE CORPS AIR STATION EL TORO, CALIFORNIA.  
 EARTH TECH 2009. FINAL REMEDIAL ACTION COMPLETION REPORT, INSTALLATION RESTORATION PROGRAM SITES 2 AND 17, FORMER MARINE CORPS AIR STATION EL TORO, CALIFORNIA

Five Year Review Report		Final
<b>Site Plan - IRP Site 2</b>		
IRP Sites 2, 16, 17, 18, and 24		
Date: 09-09	Former MCAS El Toro	
Project No. 104766	<b>EARTH TECH   AECOM</b>	Figure 3-3

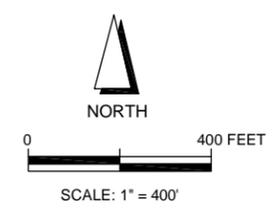


### LEGEND

- DON OWNED
- FAA OWNED
- TRANSFERRED AREA
- GROUNDWATER MONITORING WELL
- LYSIMETER (VERTICAL)
- LYSIMETER DRILLED AT 30° (SHOWS ANGLE DIRECTION)
- GAS MONITORING PROBE
- NAVY SALE PARCEL BOUNDARY
- FORMER MCAS EL TORO BOUNDARY
- II-F** CARVE-OUT NUMBER
- III NAVY SALE PARCEL NUMBER
- APPROXIMATE EXTENT OF FINAL LANDFILL COVER AREA
- APPROXIMATE LIMIT OF FORMER UNCONTROLLED DISPOSAL
- FENCE LINE
- RIPRAP ENERGY DISSIPATOR
- BUILDING
- VEGETATION
- GENERAL GROUNDWATER FLOW DIRECTION

**NOTES:**

- DON Department of Navy
- FAA Federal Aviation Administration
- IRP Installation Restoration Program
- MCAS Marine Corps Air Station



**SOURCES:**  
 ERRG 2009. FINAL REMEDIAL VERIFICATION REPORT, OPERABLE UNIT-2B, SITE 2, FORMER MARINE CORPS AIR STATION EL TORO, CALIFORNIA.  
 EARTH TECH 2009. FINAL REMEDIAL ACTION COMPLETION REPORT, INSTALLATION RESTORATION PROGRAM SITES 2 AND 17, FORMER MARINE CORPS AIR STATION EL TORO, CALIFORNIA

Five Year Review Report		Final
<b>Site Plan - IRP Site 17</b>		
IRP Sites 2, 16, 17, 18, and 24		
Date: 09-09	<b>Former MCAS El Toro</b>	Figure
Project No. 104766	<b>EARTH TECH   AECOM</b>	3-4

### 3.1.5.1 LANDFILL WASTES AND BOUNDARIES – IRP SITES 2 AND 17

The lateral extents of IRP Sites 2 and 17 landfills were evaluated during the Phase II RIs (BNI 1996a and 1996b) and revised based on the pre-design investigations (Earth Tech 2005). The FS' (BNI 1997a and BNI 1997b) estimated that approximately 400,000 cy and 160,000 cy of wastes were placed in IRP Sites 2 and 17 landfills, respectively, during their respective operational lives. The actual or potential release of wastes at the two landfills presented a threat to human health and the environment. The revised landfill boundaries based on the pre-design investigations were used to design and construct the landfill caps to address threats to human health and the environment at IRP Sites 2 and 17.

### 3.1.5.2 LFG – IRP SITES 2 AND 17

Investigations were conducted to assess surface emissions and subsurface migration of LFG from both IRP Sites 2 and 17 as part of Phase I (JEG 1993) and II RIs (BNI 1996a and BNI 1996b), and as part of remedial design (Earth Tech 2005). A review of previous and current LFG sample test results and the LFG modeling results indicated that a LFG collection and treatment system was not required at IRP Sites 2 and 17. However, to ensure protection of human health and the environment, LFG monitoring was made part of the O&M of the landfills at IRP Sites 2 and 17 (Earth Tech 2009b).

### 3.1.5.3 SUMMARY OF HUMAN HEALTH RISK ASSESSMENT – IRP SITES 2 AND 17

During the Phase II RI, the DON considered the potential human-health risks associated with the landfill sites. Although IRP Sites 2 and 17 are planned for reuse as a habitat reserve, the human health risk assessment for these sites was performed assuming recreational and residential scenarios. Exposure of potential child receptor under recreational use was considered to be limited to COPCs in surface soils (0 feet to 2 feet below ground surface [bgs]); whereas it was assumed that the resident could be exposed to COPCs present in groundwater down-gradient of the site. The resident was assumed to live adjacent to and down-gradient of the landfill sites and use groundwater pumped from the shallow groundwater aquifer.

Risks to an excavation worker at the landfill sites were qualitatively assessed. Cancer risk to these individuals was estimated to be approximately 46 times less than the risk to a playing child and was therefore not considered significant.

Possible exposure pathways examined for COPCs in surface soil at the landfill sites were ingestion of soil, inhalation of vapors and dust, and direct contact with the skin. Possible exposure pathways for COPCs in groundwater were ingestion, inhalation of vapors, and direct contact with the skin.

The excess cancer risks from soil exposure at IRP Sites 2 and 17 were estimated to fall within the NCP-defined risk management range of  $10^{-6}$  to  $10^{-4}$  under a recreational scenario, if no remedial action were undertaken. The excess lifetime cancer risks for IRP Sites 2 and 17 due to exposure to soil under a recreational scenario were estimated to be  $6.6 \times 10^{-6}$  and  $7.9 \times 10^{-6}$ , respectively, based on the U.S. EPA toxicity factors.

Under the no remediation scenario, the non-cancer hazard indices (HIs) for IRP Sites 2 and 17 were estimated to be less than 1, which are generally considered protective of human health.

The excess cancer risks and non-cancer HIs for IRP Sites 2 and 17 under the residential scenario exceeded  $10^{-4}$  and 1, respectively, primarily due to the presence of metals in groundwater. However, a detailed statistical evaluation documented in the ROD (DON 2000) indicated that concentrations of

metals at the landfill sites fall within the range of ambient concentrations. Therefore, the estimated risks could not be attributed to activities that occurred at the landfill sites.

#### 3.1.5.4 SUMMARY OF ECOLOGICAL RISK ASSESSMENTS – IRP SITES 2 AND 17

Ecological risk assessments were performed to assess current and potential hazards to ecological receptors posed by chemicals of potential ecological concern (COPECs) present in soils at IRP Sites 2 and 17, and in surface water at IRP Site 2 (due to the presence of a seasonal seep at IRP Site 2). The ecological risk assessments are important since IRP Sites 2 and 17 are in a reuse area designated for habitat preservation and is known to have habitats that support the Federally threatened California gnatcatcher.

At IRP Sites 2 and 17, the potential for mobilization of COPECs in the food chain was evaluated by modeling plant, invertebrate, deer mouse, California quail, American robin (surrogate species for the California gnatcatcher), coyote, and red-tailed hawk. The ecological risks for the ecological receptors were quantified by calculating HIs at IRP Sites 2 and 17 and the reference sites (uncontaminated by Base operations). The calculated HIs at IRP Sites 2 and 17 for ecological receptors did not differ significantly from the HIs calculated for the reference areas with the exception of American robin at IRP Site 2. The estimated HI for American robin at IRP Site 2 exceeded the HI at the reference area by 7 times. Although exposures appeared to be elevated for the American robin, used as a surrogate for the California gnatcatcher, the RI concluded that gnatcatchers are currently breeding at IRP Sites 2 and 17 and do not appear to be affected by chemicals or investigation activities.

## 3.2 IRP SITE 16

### 3.2.1 Physical Characteristics

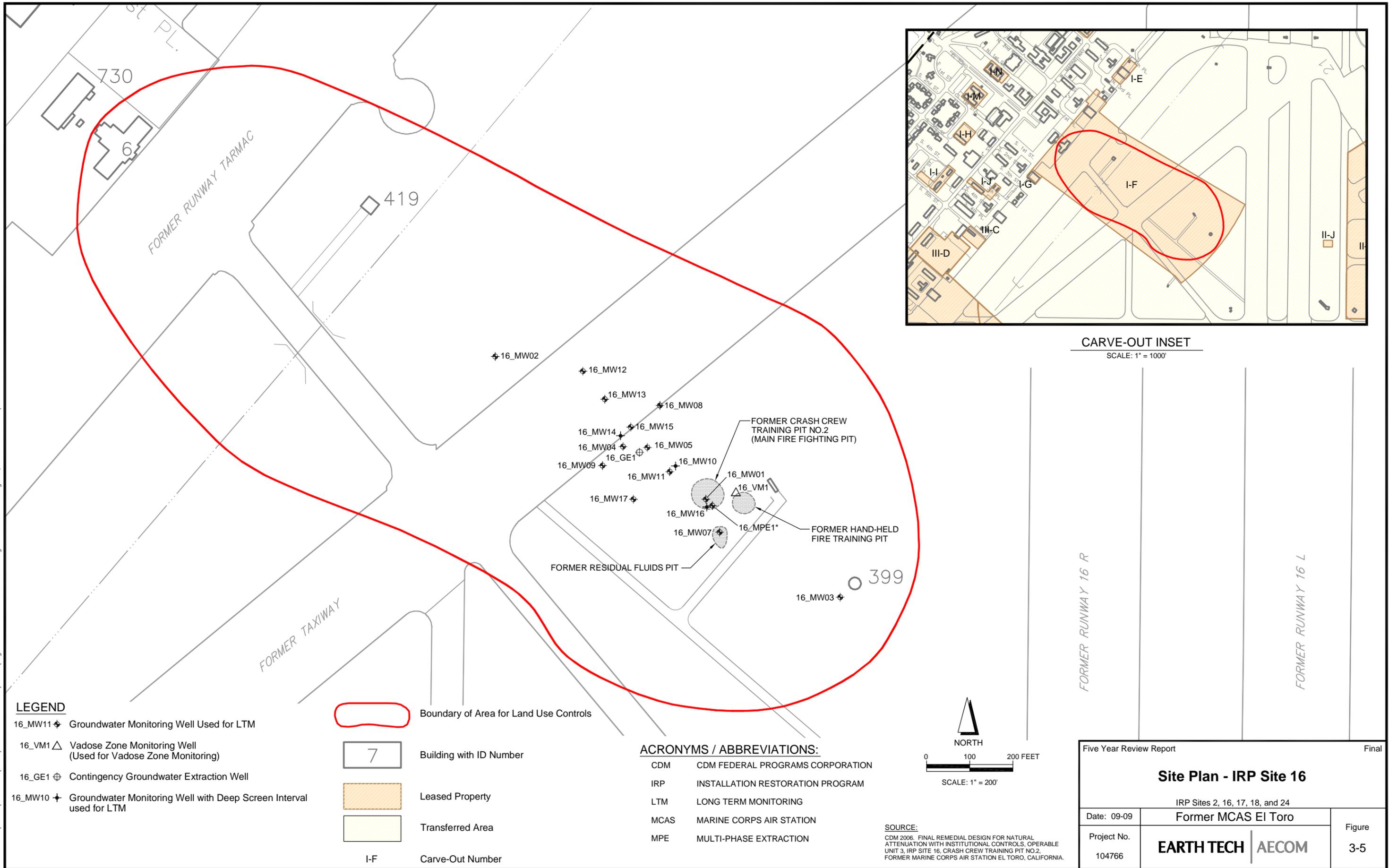
IRP Site 16, former Crash Crew Training Pit No. 2, is located in the northwestern quadrant of former MCAS El Toro (Figure 3-2) within OU-3B. It consisted of three unlined earthen pits or trenches within an area of approximately 1.9 acres located near Runway 21 (designated as Units 1 and 2) and a drainage channel oriented parallel to the runway and located approximately 150 feet northwest of the training pits/trenches (designated as Unit 3) (Figure 3-5). Two of the pits were used for fire fighting training and the third pit reportedly served as a storage reservoir for residual fuel. The main training pit was roughly circular in shape, measuring approximately 67 feet in diameter and was 2 feet to 3 feet in depth. The second training pit consisted of a 3-foot wide trench that was 10 feet in length. The third pit used as a reservoir consisted of a 5-foot deep trench, 12 feet wide and 35 feet in length.

### 3.2.2 Land and Resource Use

The previous land use at IRP Site 16 between 1972 and 1985 was for crash crew fire fighting training. Following cessation of training activities in 1985, the pits/trenches were filled in. Since Base closure in 1999, the land use has remained unchanged and is essentially unused. During the preparation of the ROD in 2003, the anticipated land use for IRP Site 16 was as a regional park for recreation.

IRP Site 16 is within a lease area designated as Carve-out I-F in the transfer documents being prepared for the property (see Figure 3-2). The DON currently leases the area containing IRP Site 16 to the Heritage Fields, LLC (OCGP Corporation and Lennar Corporation), a private developer (DON and Heritage Fields, LLC 2005b). The current plan for the reuse of the IRP Site 16 property is park/open space for recreation (City of Irvine 2003 and City of Irvine 2008). It will become part of the OCGP.

File: L:\work\104766\cod\5-Year Review\Final\Fig 3-5 - Site 16 Plan.dwg Time: Aug 31, 2009 - 4:14pm



Five Year Review Report		Final
<b>Site Plan - IRP Site 16</b>		
IRP Sites 2, 16, 17, 18, and 24		
Date: 09-09	Former MCAS El Toro	
Project No. 104766	<b>EARTH TECH   AECOM</b>	Figure 3-5

### 3.2.3 Site History

Crash crew training pit No. 2 was used to train Base emergency response personnel fire fighting techniques in the event of an accident. During training exercises at the main training pit, the pit was reportedly filled with water, covered with a mixture of combustible waste liquids from the reservoir pit and then ignited. The fires at the main pit were generally extinguished with water. Handheld fire extinguisher training was conducted at the second (smaller) training pit. Substances used to fuel the fires reportedly consisted of residual fuels including jet propellant grade 5 (JP-5) and aviation gasoline, waste lubricants (crank case oil) and other combustible liquid wastes. Small amounts of napalm and white phosphorus may also have been used.

Environmental studies performed between 1995 and 2001 including soil, soil gas and groundwater sampling detected contaminants in the subsurface at IRP Site 16. Contaminants detected included fuel-range total petroleum hydrocarbons (TPH), VOCs, semi-volatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs) and metals in soil, VOCs in soil gas, and VOCs and metals in groundwater. The principal contaminant in the subsurface at IRP Site 16 was TCE, presumably from the waste liquids used for fueling the training fires. It was estimated that 275,000 gallons of residual liquids may have been placed into the three training pits of which it is speculated that up to 10 percent or 27,500 gallons may have seeped into the soil surrounding and underlying the training pits.

Most of the contamination was found to be in the upper 2 feet of soil, although VOCs were also detected at depth and in groundwater approximately 160 feet bgs. It was concluded that the use of large quantities of water as the primary fire suppressant during the training exercises at Unit 1 promoted the movement of residual aqueous phase VOCs downward to the water table causing TCE to impact the groundwater at concentrations exceeding the maximum contaminants level (MCL). TCE is present at concentrations exceeding drinking water standards (MCL) in a plume that extends from approximately 200 feet upgradient of the main training pit to approximately 330 feet down-gradient of the main training pit area.

### 3.2.4 Initial Response

Between September 2000 and April 2001, a pilot test was conducted at IRP Site 16 to evaluate MPE for treating VOCs in the subsurface. During the pilot test, both soil gas and groundwater were extracted from the treatment area centered at the main crash crew training pit. Based on the pilot test results it was concluded that MPE was effective for removing VOCs from the vadose zone soil, and has reduced VOC concentrations in soil within the source area to levels that are protective of groundwater. However, the pilot test results indicated that MPE was not effective for removing VOCs from groundwater and was excluded as a potential groundwater remedy element during remedial alternative selection.

### 3.2.5 Basis for Taking Action

The basis for taking remedial action at IRP Site 16 is the presence of TCE in groundwater at concentrations that exceed the MCL. The RI concluded that exposure routes for contact with TCE are complete and that TCE at concentrations exceeding the MCL present an unacceptable human health risk to human receptors from ingestion, direct contact and vapor inhalation associated with groundwater use. A response action was recommended for the site because if the TCE was to be left unaddressed, it may pose an unacceptable health risk to human receptors down-gradient, beyond the boundaries of the former training pit area.

### 3.2.5.1 SUMMARY OF SITE RISKS ASSOCIATED WITH SHALLOW SOIL

Surface and near surface soil (up to 10 feet bgs) at the training pits of IRP Site 16 were found to contain 31 and 60 COPCs, respectively, including petroleum hydrocarbons, VOCs, SVOCs including PAHs and metals. The detected metals were generally below Stationwide background levels and were excluded for further consideration. The remaining COPCs were assessed to evaluate risk assuming both residential and industrial exposure scenarios.

Exposure pathways for surface and shallow soil included ingestion, dermal contact and inhalation of vapors and particulate matter (fugitive dust). Risks due to exposure to COPCs in shallow soil at IRP Site 16 were found to be mainly attributable to several PAHs and metals, but were generally concluded to be within acceptable ranges.

### 3.2.5.2 SUMMARY OF SITE RISKS ASSOCIATED WITH DEEP SOIL

Deep soil (beyond 10 feet bgs) at IRP Site 16 was found to contain petroleum hydrocarbons, PAHs and metals to 132 feet bgs, and VOCs extending into groundwater at 160 feet bgs. It was concluded that infiltration of water used for fire suppression during training exercises aided the downward migration of VOCs to lower depths and eventually into groundwater.

Because no complete pathways for exposure to the deep soil were identified, chemicals reported in the deep soil were not included in the COPCs list for risk assessment. However, the potential migration of chemicals to groundwater was evaluated. In addition, upon completion of the MPE pilot test, it was concluded that a sufficient quantity of VOCs within the deep soil of the vadose zone were removed at the treatment area (main training pit) to be protective of groundwater.

### 3.2.5.3 SUMMARY OF SITE RISKS ASSOCIATED WITH GROUNDWATER

Risks associated with groundwater at IRP Site 16 were based on groundwater samples collected during the Phase II RI that were analyzed for VOCs only. Only two VOCs (1,1,2-trichloro-1,1,2-trifluoroethane and TCE) were reported in those samples. Both were identified as COPCs. VOCs in groundwater are believed to be limited to the upper 30 feet of the saturated zone and presently extend at concentrations exceeding MCLs or reporting limits approximately 350 feet down-gradient from the main training pit (presumed source area).

Exposure pathways for groundwater included ingestion, dermal contact and inhalation of vapors, under the assumption that the groundwater is pumped and used directly for domestic purposes. Human health risks associated with the VOCs in groundwater were mainly attributed to the presence of TCE at concentrations exceeding the MCL of 5 micrograms per liter ( $\mu\text{g/L}$ ). The excess lifetime cancer risk was estimated to be  $8.5 \times 10^{-5}$  for groundwater. The HI for groundwater was estimated to be 8.4. Both risk and hazard associated with groundwater were mainly attributable to the vapor inhalation exposure pathway (inhalation of volatiles from groundwater during household water use). It was concluded that the risks due to exposure to VOCs in groundwater at IRP Site 16 were not acceptable.

### 3.2.5.4 SUMMARY OF INDOOR AIR RISKS

A risk evaluation for vapor intrusion into indoor air was performed in 2004 using confirmation soil gas samples collected from the site in January 2002 (approximately 10 months after completion of the MPE pilot test). COPCs identified at IRP Site 16 were the three VOCs detected in the soil gas samples (TCE, 1,1,2-trichloro-1,1,2-trifluoroethane, and trichloromethane). Estimates of the volatile emissions of these COPCs from the contaminated soil to indoor air were modeled using the Johnson and Ettinger Model. Risk to adult and child receptors based on both residential and industrial settings

were estimated from the modeled emissions. Both cancer and non-cancer risks/hazards were found to be within acceptable limits (see Table 3-1).

**Table 3-1: IRP Site 16 Summary of Site Risks Associated with Indoor Vapor Intrusion**

Exposure Route	Cancer Risk		Non-cancer Hazard Index
	Based on U.S. EPA Toxicity Value	Based on Cal/EPA Toxicity Value	
Indoor air inhalation under residential setting	$3.2 \times 10^{-6}$	$5.7 \times 10^{-8}$	0.0035
Indoor air inhalation under industrial setting	$1.5 \times 10^{-7}$	$2.6 \times 10^{-9}$	0.0001

Notes:

Cal/EPA – California Environmental Protection Agency

It was concluded from these results that no actions were required and no restriction to land reuse at IRP Site 16 are necessary for vapor intrusion. It was also noted that there were uncertainties associated with the results because of the use of a provisional TCE cancer slope factor that is subject to change. Although the evaluation determined that TCE was the main risk/hazard driver for vapor intrusion at IRP Site 16, the risks/hazards were believed to be over estimated due to the conservative assumptions used during the evaluation. The U.S. EPA and the State of California concurred with the conclusions of indoor air risk evaluation.

### 3.3 IRP SITES 18 AND 24

#### 3.3.1 Physical Characteristics

##### 3.3.1.1 IRP SITE 18

IRP Site 18, Regional VOC Groundwater Plume, is located southwest of the former MCAS El Toro boundary, down-gradient of IRP Site 24 and is entirely off-Base (Figure 3-2). IRP Site 18, Regional VOC Groundwater Plume, is defined as the area where TCE concentrations exceed 5 µg/L in the PA (Figure 3-6). The contaminated groundwater at IRP Site 18 originated from the SGU at IRP Site 24, which migrated into the PA near the southwestern Base boundary, and extends into the PA off-Base approximately 3 miles to the west of the former Base boundary. The average width of the off-Base VOC plume is approximately 3,000 feet. VOC contamination reaches depths of 450 feet bgs in some areas.

##### 3.3.1.2 IRP SITE 24

IRP Site 24, VOC Source Area, encompasses approximately 200 acres (Figure 3-2). The site is largely industrialized and contains two large aircraft hangars (Building 296 and 297) and several smaller buildings that were used historically for aircraft and vehicle maintenance and repair (Figure 3-6). Maintenance activities (e.g., aircraft washing, degreasing) conducted adjacent to and within these buildings are believed to be the source of the VOC contamination in site soil and groundwater.

#### 3.3.2 Land and Resource Use

##### 3.3.2.1 IRP SITE 18

Land above the IRP Site 18 groundwater plume has historically been used for agricultural activities. However, recently the land use has changed to mixed use with agricultural, commercial, and residential areas. IRP Site 18 consists of mostly developed land consisting of residential,

commercial, parks and light industrial facilities. Some undeveloped parcels and agricultural areas also exist on land overlying the IRP Site 18 groundwater plume.

Historically, the regional aquifer at IRP Site 18 has been mainly used for non-potable uses such as irrigation. The regional aquifer at IRP Site 18 has not been used in the past as a source of municipal drinking water because of elevated concentrations of total dissolved solids (TDS) and nitrates that exceeded water quality standards. The IRWD developed the IDP to remove TDS and nitrates to allow for utilization of regional groundwater for domestic use. However, the extraction wells associated with the IDP are generally located cross-gradient and several miles from the regional VOC plume.

### 3.3.2.2 IRP SITE 24

The southwestern quadrant of former MCAS El Toro, which includes IRP Site 24, was the center of industrial activity at the Base. The site was highly industrialized and contains two large aircraft hangars (Buildings 296 and 297) and several smaller buildings that were used for aircraft and vehicle maintenance and repair. These activities generated waste solvents that are believed to be the source of the VOC contamination at the site.

IRP Site 24 currently consists of unused aircraft hangars, aircraft maintenance facilities, supply and storage facilities, and some unused administrative facilities. During the preparation of the ROD in 2002, the proposed reuse for IRP Site 24 was industrial (cargo). Since then, this reuse plan has been revised. IRP Site 24 currently lies within Carve-outs III-B and II-N (see Figure 3-2). The DON currently leases the area containing IRP Site 24 to Heritage Fields, LLC (OCGP Corporation and Lennar Corporation), a private developer. The current plan is to reuse property containing IRP Site 24 as a park/open space for recreation, and institutional and transportation facilities. The major portion of the property containing IRP Site 24 will become part of the OCGP.

Neither the SGU nor the PA at IRP Site 24 are used as sources of municipal drinking water. Groundwater near the Base is used for irrigation.

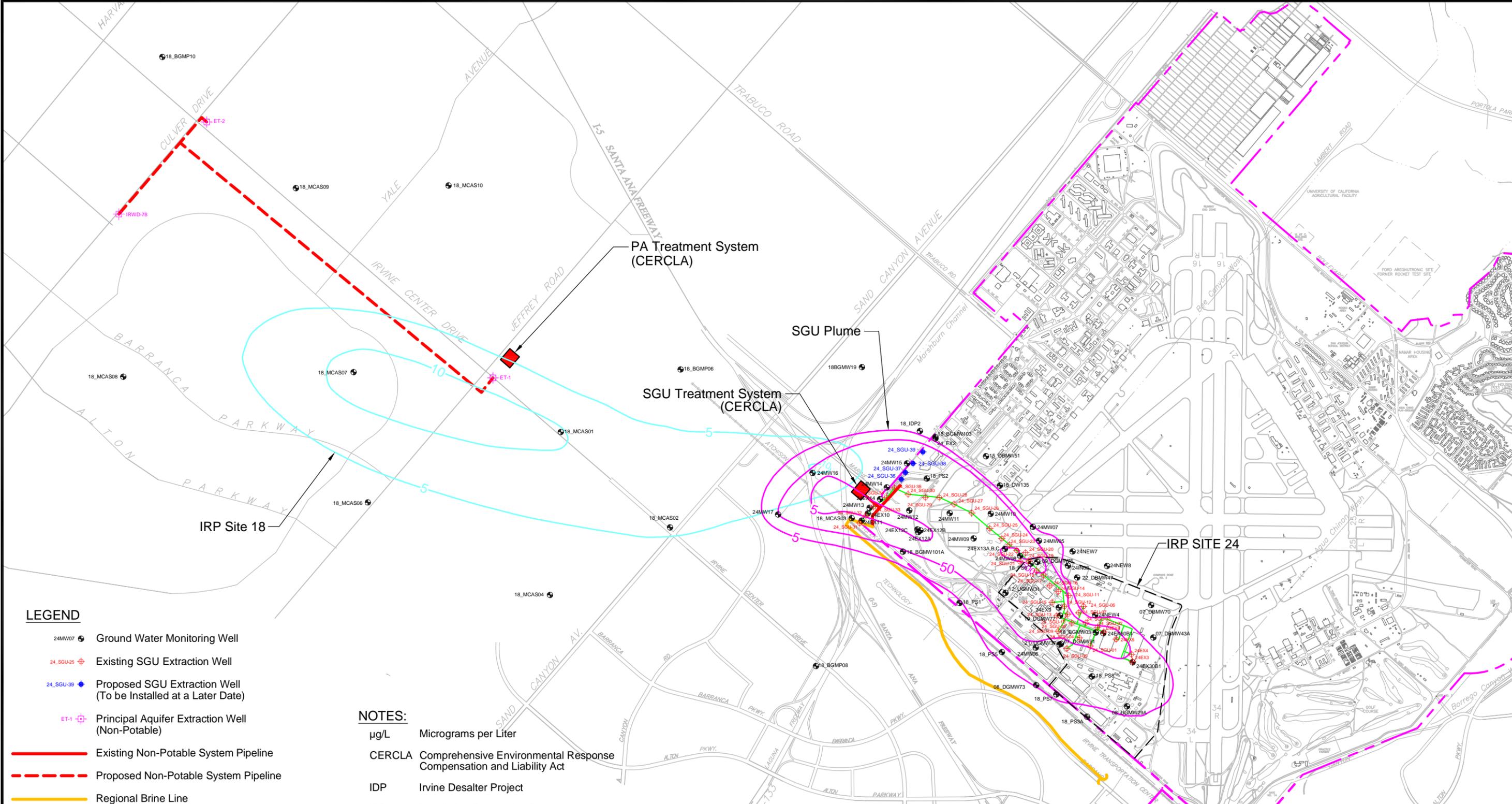
### 3.3.3 Site History

The initial indication of the occurrence of a release at the Base was the discovery of TCE in groundwater at an irrigation well located approximately 3,000 feet down-gradient of former MCAS El Toro during routine water quality monitoring in 1985 by the OCWD. In 1985, the DON began an IAS to locate potential release sites on the Base. The IAS report identified 17 sites as potential sources of contamination (Brown and Caldwell 1986).

In December 1989, the DON began preparing a Phase I RI Work Plan and associated documents. The DON reviewed available reports and other documents pertinent to past disposal practices and concluded that 22 sites would be investigated and these site were grouped into three OUs. OU-1 consisted of the regional VOC groundwater plume investigation and included groundwater at Site 18 and throughout MCAS El Toro, including the area later defined as IRP Site 24. IRP Site 24, identified as the VOC-source area, was added to OU-2A.

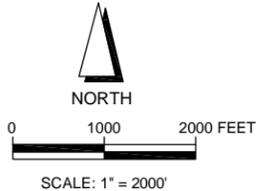
A variety of contaminants in groundwater, soil, surface water, and sediment were identified during the Phase I RI. The source of contamination for regional groundwater was found to be in the southwest quadrant of the Base. The Phase II RI, conducted in 1995 and 1996, demonstrated that soil at IRP Site 24 was the source of the regional VOC contamination and that human-health risk from exposure to the groundwater exceeded U.S. EPA guidelines.

File: L:\work\104766\cadd\5-Year Review\Final\Fig 3-6 - Site 18 & 24 Plan.dwg Time: Aug 31, 2009 - 4:15pm



- LEGEND**
- 24MW07 Ground Water Monitoring Well
  - 24\_SGU-25 Existing SGU Extraction Well
  - 24\_SGU-39 Proposed SGU Extraction Well (To be Installed at a Later Date)
  - ET-1 Principal Aquifer Extraction Well (Non-Potable)
  - Existing Non-Potable System Pipeline
  - Proposed Non-Potable System Pipeline
  - Regional Brine Line
  - SGU Conveyance Pipeline
  - TCE Isoconcentration Contour in the Shallow Groundwater Unit ( $\mu\text{g/L}$ ) (July 2008)
  - TCE Isoconcentration Contour in the Principal Aquifer ( $\mu\text{g/L}$ ) (July 2008)
  - IRP Site 24 Boundary
  - Former MCAS El Toro Boundary

- NOTES:**
- $\mu\text{g/L}$  Micrograms per Liter
  - CERCLA Comprehensive Environmental Response Compensation and Liability Act
  - IDP Irvine Desalter Project
  - IRP Installation Restoration Program
  - MCAS Marine Corps Air Station
  - OU Operable Unit
  - PA Principal Aquifer
  - SGU Shallow Groundwater Unit
  - SVE Soil Vapor Extraction
  - TCE Trichloroethene



Source: 100% Design Submittal, Irvine Desalter Project (Tetra Tech, 2006)

Five Year Review Report		Final
<b>Site Plan - IRP Sites 18 and 24</b>		
IRP Sites 2, 16, 17, 18, and 24		
Former MCAS El Toro		
Date: 09-09	Figure	
Project No. 104766	<b>EARTH TECH   AECOM</b>	3-6

Past operations and practices at former MCAS El Toro contributed to soil and groundwater VOC contamination at IRP Site 24. Industrial activities at IRP Site 24, such as dust suppression with waste liquids, paint stripping, degreasing, vehicle and aircraft washing, and waste disposal practices, involved the use of solvents containing VOCs such as TCE and tetrachloroethylene (PCE). Waste solvents may have reached the surface or subsurface through leakage, runoff, storm drains, or direct application to the soil and are believed to be the source of VOCs in the regional groundwater. The precise origin, nature, and use of TCE released at the site and the circumstances and quantities of individual releases are not documented. TCE usage at former MCAS El Toro is believed to have discontinued in the mid-1970s.

The VOC-contaminated groundwater at IRP Site 18 originated from the SGU at IRP Site 24, which migrated into the PA near the southwestern Base boundary, and extends into the PA off-Base approximately 3 miles from the former Base boundary. The agricultural land use likely contributed to the elevated concentrations of TDS and nitrate that are found throughout the basin.

Subsequent to the Phase II RI, groundwater evaluations were performed for metals, perchlorate, and radionuclides. The evaluation for metals showed that metals at the Base reflect ambient Basewide groundwater quality conditions and are not the result of site-related contamination (BNI 1999). The evaluation for perchlorate showed that only IRP Site 1 has elevated perchlorate concentrations. The evaluation for radionuclides confirmed that radionuclides in groundwater are naturally occurring and are not due to historical activities (Earth Tech 2000 and Earth Tech 2001b). After a total of seven rounds of groundwater monitoring, the DON prepared a comprehensive CERCLA Groundwater Plan (BNI 1999). Based on the groundwater monitoring results, it was concluded that the only chemical category confirmed to have impacted groundwater at IRP Sites 18 and 24 was VOCs.

### **3.3.4 Initial Response**

After the detection and discovery of VOCs in the SGU near the Base boundary in 1987, an interim groundwater pump and treatment system was installed under the CAO by the RWQCB Santa Ana Region. The system pumped and treated groundwater from three extraction wells between June 1989 and September 1993. The extracted groundwater was treated with a granular activated carbon (GAC) treatment system and used to irrigate the Base golf course. On 13 April 1993, RWQCB rescinded the CAO, because the required actions were complete and the DON had entered into the FFA to investigate and remediate environmental impacts associated with past and present activities at former MCAS El Toro. In September 1993, the pump and treatment system was shut down (JEG 1996).

Remediation of the vadose zone at IRP Site 24 was conducted from 1999 to 2001 per the selected remedy documented in the OU-2A interim ROD (DON 1997b). The selected remedy included SVE to address VOCs in soil. Following remedy implementation, the Closure Report (Earth Tech 2002) concluded that VOC concentrations in soil gas had been reduced below the groundwater protective threshold limits. The Final OU-2A ROD (DON 2006a) documented NFA for the IRP Site 24 vadose zone based on the protection of human health and the environment.

### **3.3.5 Basis for Taking Action**

Baseline human-health risk assessments (HHRAs) were conducted for IRP Site 18 using data collected during the Phase I RI (JEG 1994) and for IRP Site 24 with data from the Phase I (JEG 1994) and II RIs (BNI 1997c). An indoor air risk assessment was also performed at IRP Site 24. The risks posed by VOCs in groundwater are within the range that requires some type of remedial action (U.S. EPA 1991).

### 3.3.5.1 IRP SITE 18

The HHRA for IRP Site 18 addressed all constituents in groundwater within the OU-1 investigation area (i.e., groundwater at IRP Site 18 and throughout the entire Base including Site 24). Potential human-health risks from exposure to groundwater contamination were characterized by estimating risks specific to each well. Three exposure scenarios, residential, agricultural, and recreational, were evaluated.

The estimated excess cancer risk associated with VOCs exceeded  $10^{-6}$  in 29 wells, and the primary VOCs responsible for these exceedances, and considered as chemicals of concern (COCs) were limited to 11 organic compounds; 1,1,2-trichloroethane (1,1,2-TCA), 1,1-dichloroethene (1,1-DCE), 1,2-dichloroethane (1,2-DCA), 1,2-dichloropropane, benzene, bromodichloromethane, carbon tetrachloride, chloroform, chloromethane, PCE, and TCE.

The estimated excess lifetime cancer risk for the residential reasonable maximum exposure (RME) exceeded  $10^{-6}$  for exposure to untreated groundwater for two of the active agricultural wells. The major contributors were TCE, arsenic, and beryllium. Only TCE was considered as a COC.

Risk evaluation under various recreational exposure scenarios was conducted and for various scenarios, the risks were within the range considered allowable by U.S. EPA and Cal/EPA.

### 3.3.5.2 IRP SITE 24

At IRP Site 24, 23 VOCs were identified as COPCs for groundwater risk assessment. The exposure scenario evaluated was residential.

The groundwater risk assessment results indicated that if no remediation occurred and homes were built on-site, the lifetime excess upper-bound cancer risk presented by COPCs in groundwater to occupants of the houses would be approximately  $2 \times 10^{-3}$  if the water used in these houses came only from contaminated groundwater. Additionally, the HI for TCE and carbon tetrachloride exceeded 1. The COPCs in soil would not pose unacceptable cancer risk or noncarcinogenic effects to the same potential receptors. Therefore, it was concluded that risks posed by VOCs in groundwater are within the range that requires remedial action (U.S. EPA 1991).

### 3.3.5.3 IRP SITE 24 INDOOR AIR RISK

A human-health risk evaluation was performed for IRP Site 24 to evaluate the potential exposure to indoor air that could accumulate in buildings constructed at the site under residential and industrial worker land-use scenarios (BNI 2004).

The data set used in this evaluation was collected approximately 7 months after the SVE remediation system was shut down to assess whether any rebound concentrations exceeded the cleanup threshold, in accordance with the approved closure strategy for the vadose zone source area (Earth Tech 2002). The samples were collected from 15 feet to 111 feet bgs. The Johnson and Ettinger Model was used to estimate risk.

The COPCs at IRP Site 24 evaluated for indoor air risk were: trichlorotrifluoroethane, 1,1,2-TCA, 1,1-DCE, 1,2-DCA, carbon tetrachloride, chloroform, PCE, and TCE.

The estimated cancer risk for a hypothetical resident adult exposed to indoor air COPCs at IRP Site 24 for 350 days a year over 30 years was quantified at  $7.8 \times 10^{-6}$  (using U.S.EPA criteria) and  $3.1 \times 10^{-7}$  (using Cal/EPA criteria). The estimated HI under this scenario was 0.011.

The estimated cancer risk for an industrial worker exposed to indoor-air COPCs at IRP Site 24 for 250 days a year over 25 years was quantified at  $3.3 \times 10^{-7}$  (using U.S. EPA criteria) and  $1.3 \times 10^{-8}$  (using Cal/EPA criteria). The cancer risk using U.S. EPA criteria is primarily associated with TCE exposure, which accounts for 94 percent of the risk. The estimated HI under this scenario was 0.00031.

On the basis of the modeled risk evaluation results, it was concluded that IRP Site 24 does not pose unacceptable risks to human health via the air inhalation exposure pathway. Therefore, no action is required and no restrictions on reuse of the site are necessary relative to this potential route. The U.S. EPA and the State of California concurred with the conclusions of indoor air risk evaluation.

## 4. Remedial Actions

This section summarizes the remedial actions for the five IRP sites presented in this Five-Year Review Report. It includes discussions on remedy selection, implementation and where relevant, O&M. Discussions are provided individually for each of the subject sites.

### 4.1 IRP SITES 2 AND 17

#### 4.1.1 Remedy Selection

The remedy selection processes for the response actions at IRP Sites 2 and 17 were presented in the following documents:

- Proposed Plan issued by the DON in May 1998 (DON 1998)
- ROD signed by the DON in April 2000 (DON 2000)

The ROD for IRP Sites 2 and 17 was signed by the DON on 13 April 2000. This ROD documented the following RAOs for IRP Sites 2 and 17 developed based on the Phase I and Phase II RIs, the baseline HHRAs, and a review of applicable or relevant and appropriate requirements (ARARs):

- Prevent direct contact with the landfill wastes;
- Control run-on, run-off, and erosion;
- Monitor LFG migration;
- Minimize infiltration and potential contaminant leaching to groundwater;
- Prevent surface water in washes from contacting the landfill;
- Prevent contaminated sediments from entering the washes and being carried off-site;
- Reduce risk to sensitive habitats that support special-status species of plants and wildlife; and
- Prevent domestic use of groundwater containing VOCs above MCLs (IRP Site 2).

The last RAO pertaining to restriction of domestic use of VOC-impacted groundwater was developed for IRP Site 2 groundwater. The groundwater use at IRP Site 2 is presently restricted through restrictions placed on the transferred and leased portions of the IRP Site 2 property. These restrictions are specified in the memorandum of understanding (MOU) with FAA, and the Lease in Furtherance of Conveyance (LIFOC) with Heritage Fields, LLC. (see Section 3.1.2 for details). In addition, the remedial action for VOCs in IRP Site 2 groundwater will be addressed in a separate ROD.

Five remedial alternatives were developed for IRP Sites 2 and 17 based on the U.S. EPA's presumptive remedy approach for landfills, to satisfy the above RAOs. Based on the evaluation of remedial alternatives presented in the ROD, Alternative 3, Single Layer Soil Cap with ICs and Monitoring, was selected as the remedy for IRP Site 17 and vadose zone of IRP Site 2. The selected remedy for vadose zones of IRP Sites 2 and 17 as documented in the Final Interim ROD (DON 2000) included below-mentioned components. Each component applies to both IRP Sites 2 and 17 unless otherwise noted.

- A single-layer, minimum 4-foot-thick monolithic soil cap to prevent contact with landfill materials and to reduce infiltration into landfill contents.
- On-site waste consolidation prior to capping.

- Erosion control features to control surface water flow and protect the integrity of the cap.
- Fencing, signs, and gates with locks to restrict access to the sites.
- Land use restrictions to protect the integrity of the landfill cap, restrict irrigation, prevent use of groundwater at IRP Site 2, assure that contact with landfill materials does not occur, and allow DON, FFA signatories, and California Integrated Waste Management Board and/or its Local Enforcement Agency access to the sites for the purpose of conducting or overseeing monitoring and maintenance.
- Natural resource/habitat mitigation measures will be coordinated with the U.S FWS.
- Monitoring of soil gas and soil moisture to detect any migration of contaminants from the landfills.
- Groundwater monitoring to detect any releases of contaminants from the landfills. Monitoring wells will be secured to prevent damage.
- The cap, drainage features, settlement monuments, and security features will be inspected and maintenance will be performed as necessary to assure the integrity of the landfill cap and prevent unauthorized access.
- Periodic reviews (every 5 years) to evaluate the monitoring results and verify that the action remains protective of human health and the environment.

The ROD documented that groundwater at IRP Site 17 does not require remediation. The ROD for IRP Sites 2 and 17 was designated as interim because:

- Ongoing radiological investigations were not complete at the time the ROD was issued. Therefore, the results of these investigations could not be incorporated into the remedy selection.
- The selection of the remedy for IRP Site 2 groundwater was postponed pending completion of additional investigations, including sampling for perchlorate.
- The evaluation of results for perchlorate confirmation sampling for IRP Site 17 groundwater was not complete.

The radiological investigations for groundwater and soil, and perchlorate confirmation sampling for groundwater at IRP Sites 2 and 17 were completed subsequent to the issuance of the Final Interim ROD. The evaluation of radionuclides in groundwater at IRP Sites 2 and 17 was conducted as a part of a Stationwide radionuclide assessment at former MCAS El Toro (Earth Tech 2000 and Earth Tech 2001b). Based on this investigation, it was concluded that radionuclides in groundwater at former MCAS El Toro are naturally occurring. Therefore, the landfills are not adversely impacting groundwater by releasing radionuclides, and radiological constituents are not COPCs for groundwater at IRP Sites 2 and 17.

The radiological investigations for soil at IRP Sites 2 and 17 were completed in November and December 2001 (Weston 2004). Based on results from these investigations, a Technical Memorandum (Earth Tech 2006b) was prepared to evaluate the performance of the selected remedy in the Final Interim ROD, with respect to radionuclides, using the nine evaluation criteria identified in the NCP (40 CFR § 300.430 [e][9][iii]). This evaluation confirmed prior assessments presented in the regulatory agency-concurred Final Remedial Design Submittal for IRP Sites 2 and 17 (Earth Tech 2005) that the selected vadose zone remedies for the two sites are protective of human-health and the environment with respect to radionuclides.

Results from confirmation sampling for perchlorate in groundwater at IRP Site 17 indicate that perchlorate did not exceed laboratory reporting limits at the site. These sampling results are presented in the Final O&M Plan for IRP Sites 2 and 17 (Earth Tech 2009b). Therefore, it was concluded that no modification to the selected remedy is required to protect human-health and the environment with respect to perchlorate in groundwater at IRP Site 17.

In June 2009, the DON signed a Final ESD (DON 2009) that documents that the Final Interim ROD for IRP Sites 2 and 17 will serve as the final ROD for IRP Site 17 and vadose zone of IRP Site 2. In addition, the ESD documents significant and non-significant changes in certain components of the selected remedies for IRP Sites 2 and 17 presented in the Final Interim ROD. These components include land-use restrictions, a post-closure monitoring plan, and a remedial action selection strategy for IRP Site 2 groundwater. This ESD will be made available to the public for review.

#### **4.1.2 Remedy Implementation**

The remedial design for IRP Sites 2 and 17 was finalized in November 2005 (Earth Tech 2005). As part of the pre-design investigation, Earth Tech performed exploratory trenching and potholing to confirm the waste placement boundary at both sites. The waste placement boundaries were revised based on this evaluation, and the results of the investigation were presented in Attachment C of the Final Design Submittal (Earth Tech 2005). These revised boundaries were used to design and construct the landfill caps at IRP Sites 2 and 17.

The remedial construction activities at IRP Sites 2 and 17 started in September 2005 and November 2007, respectively. The remedial construction was completed at IRP Sites 2 and 17 in February 2008 and July 2008, respectively. The RACR for IRP Sites 2 and 17 (Earth Tech 2009a) was finalized in March 2009 to document the following:

- The construction activities are complete and landfill remedies are in place at both sites.
- The landfill remedies achieve the RAOs specified in the ROD (DON 2000) for IRP Site 17 and vadose zone of IRP Site 2.
- The final inspections of the constructed remedies were conducted by the DON and the Remedial Design/Oversight Contractor in February 2008 (IRP Site 2) and July 2008 (IRP Site 17).
- The landfill remedies at both sites are protective of human health and the environment.

The RACR presented the details of the remedial action implementation at IRP Sites 2 and 17. The remedial action components for IRP Sites 2 and 17 may be divided into two parts: landfill cover construction and implementation of ICs. The implementation of each of these components is summarized in the following sections.

##### **4.1.2.1 LANDFILL COVER CONSTRUCTION**

The landfill cover construction activities at IRP Sites 2 and 17 are summarized in the following subsections. The post-construction site maps of IRP Sites 2 and 17 are presented on Figures 4-1 and 4-2, respectively.

#### **Waste Consolidation**

Approximately 109,320 cy of waste were removed from Areas C1/C2 and D2 of IRP Site 2 from October 2005 through February 2006 (see Figure 3-3). The waste was consolidated into the former operational landfill area of IRP Site 2 prior to cover construction. Prior to consolidation, the waste

excavated from Areas C1/C2 was screened for the presence of radionuclides. Following excavation, confirmation samples were collected from Areas C1/C2 and analyzed for TPH, metals, SVOCs, polychlorinated biphenyls (PCBs), and pesticides. The analytical results demonstrated that no COCs exceeded the background concentrations and preliminary remediation goals (PRGs).

On-site waste consolidation into the IRP Site 17 landfill footprint entailed relocation of surface waste and excavation of soil and debris from several areas including Aerial Photograph Anomaly 44/105, Area B, and Area C (see Figure 3-4). The waste was consolidated into the former operational landfill area of IRP Site 17 prior to cover construction. Prior to consolidation, the waste excavated from Areas C1/C2 was screened for the presence of radionuclides.

### **Subgrade and Foundation Layer Preparation**

Subgrade and foundation layers were prepared at IRP Sites 2 and 17 before the installation of evapotranspiration (ET) covers. At IRP Site 2, waste excavated from Area C1/C2 was consolidated into the subgrade layer and compacted as part of the subgrade construction. At IRP Site 17, common fill material used to build up the landfill subgrade was generated from an on-site stockpile and material excavated from the excess cut areas outside the landfill footprint. A 1-foot foundation layer was placed over the prepared subgrade at both IRP Sites 2 and 17 using onsite soils and/or borrow material from an off-site source. The foundation layer material was compacted to a minimum of 90 percent maximum dry density at a moisture content within 2 percent of the optimum moisture content as determined by test method American Society of Testing and Materials (ASTM) D1557-02e1.

### **ET Cover Installation**

A 4-foot thick ET soil cover was placed over the entire landfill area of both IRP Sites 2 and 17. Approximately, 220,000 cy and 64,500 cy of ET cover soil were imported to complete the landfill caps at IRP Sites 2 and 17, respectively, from an off-site source. The ET cover soil moisture content was adjusted to within 3 percent of the optimum moisture content and compacted to a minimum of 90 percent of the corresponding maximum dry density as determined by test method ASTM D1557-02e1.

### **Construction of Drainage and Riprap Energy Dissipater Features**

The permanent cover drainage structures constructed at IRP Site 2 included drainage berms, downdrains, trapezoidal channels, riprap, and shotcrete V-ditches (see Figure 4-1). The permanent cover drainage structures constructed at IRP Site 17 included earthen dissipater berms (at various locations on the landfill cover), earthen V-ditches, concrete-lined trapezoidal channels, concrete-lined V-ditches, and two riprap energy dissipaters (see Figure 4-2).

### **Well and Settlement Monument Installation**

At IRP Site 2, two new groundwater monitoring wells (02NEW29 and 02NEW30) were installed. These groundwater monitoring wells were within areas requiring waste consolidation and are required for VOC plume monitoring. One landfill perimeter gas well 02PGW01A was installed as part of the remedial action to replace 02PGW01 which was within areas requiring waste consolidation (Figure 4-1). At IRP Site 17, three new perimeter gas wells 17PGW01, 17PGW03, and 17PGW04, and one lysimeter (17LYS4) were installed as part of landfill cap construction (Figure 4-2).

File: L:\work\104766\cad\5-Year Review\Final\Fig 4-1 - Site 2 Post Construction.dwg Time: Aug 31, 2009 - 4:15pm

**LEGEND:**

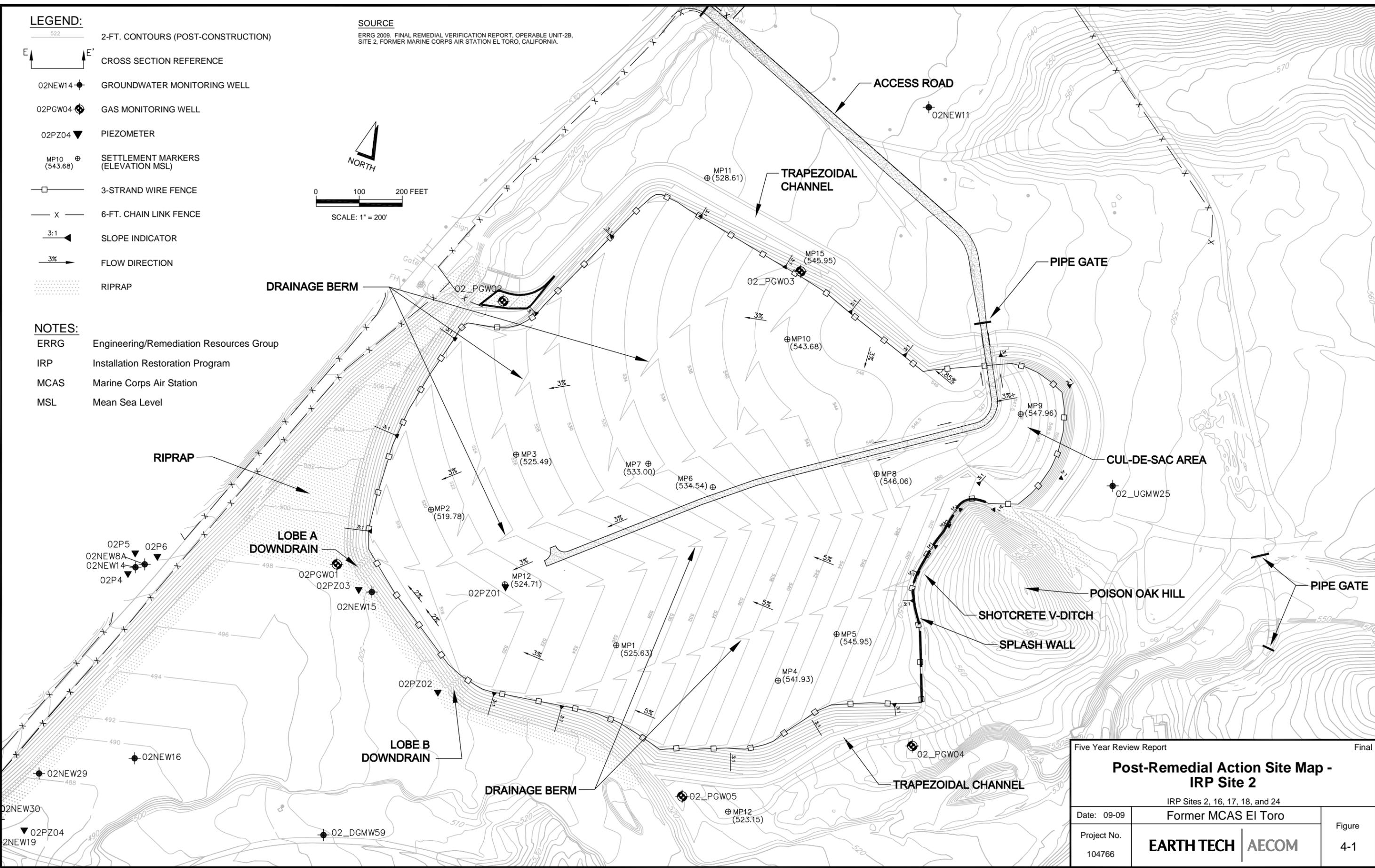
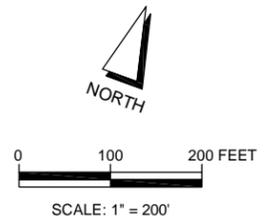
- 522 2-FT. CONTOURS (POST-CONSTRUCTION)
- E' CROSS SECTION REFERENCE
- 02NEW14 GROUNDWATER MONITORING WELL
- 02PGW04 GAS MONITORING WELL
- 02PZ04 PIEZOMETER
- MP10 (543.68) SETTLEMENT MARKERS (ELEVATION MSL)
- 3-STRAND WIRE FENCE
- X 6-FT. CHAIN LINK FENCE
- 3:1 SLOPE INDICATOR
- 3% FLOW DIRECTION
- RIPRAP

**NOTES:**

- ERRG Engineering/Remediation Resources Group
- IRP Installation Restoration Program
- MCAS Marine Corps Air Station
- MSL Mean Sea Level

**SOURCE**

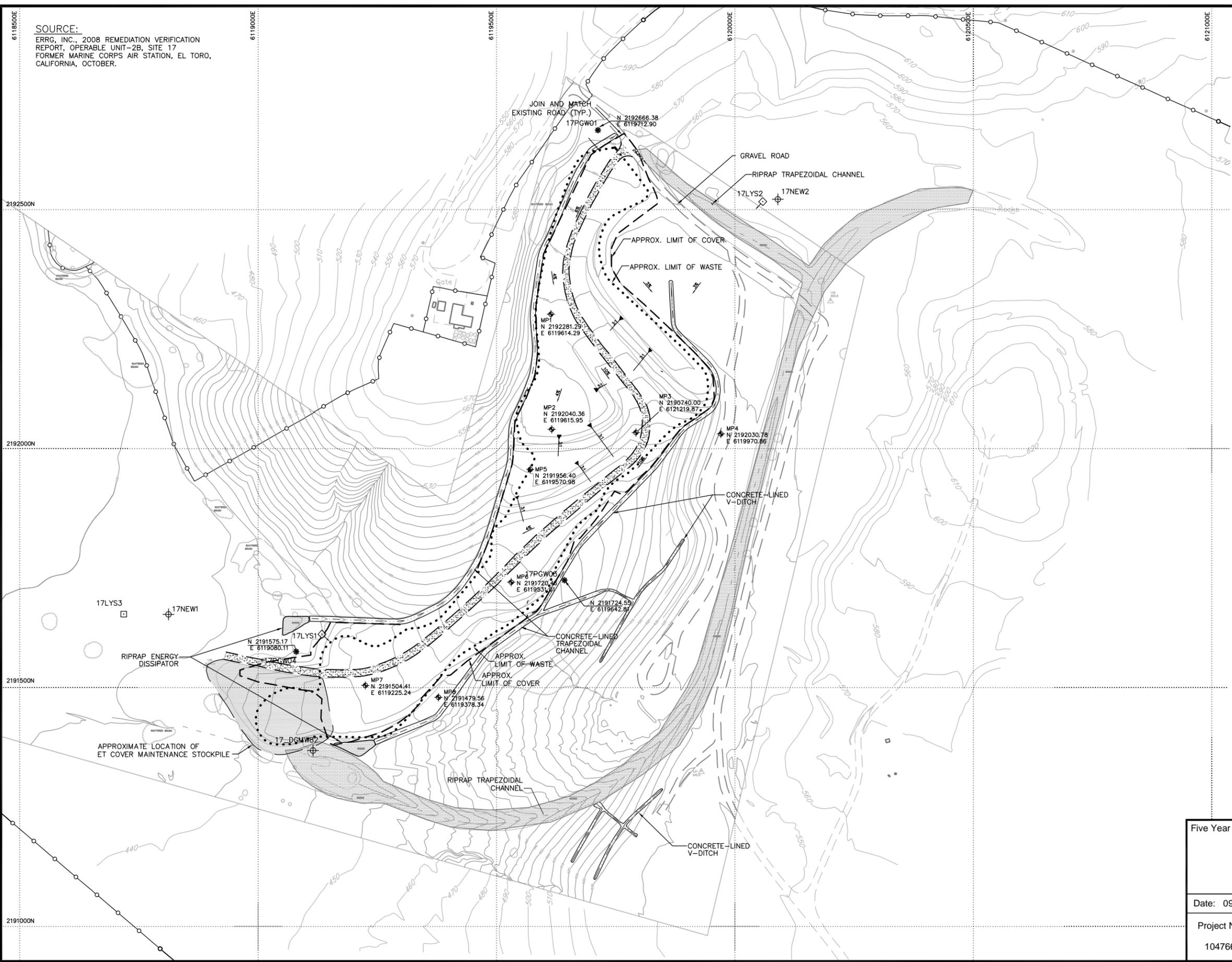
ERRG 2009. FINAL REMEDIAL VERIFICATION REPORT, OPERABLE UNIT-2B, SITE 2, FORMER MARINE CORPS AIR STATION EL TORO, CALIFORNIA.



Five Year Review Report		Final
<b>Post-Remedial Action Site Map - IRP Site 2</b>		
IRP Sites 2, 16, 17, 18, and 24		
Date: 09-09	Former MCAS El Toro	
Project No. 104766	<b>EARTH TECH   AECOM</b>	Figure 4-1

File: L:\work\104766\5-Year Review\Final\Fig 4-2 - Site 17 Post Construction.dwg Time: Aug 31, 2009 - 4:15pm

**SOURCE:**  
 ERRG, INC., 2008 REMEDIATION VERIFICATION REPORT, OPERABLE UNIT-2B, SITE 17 FORMER MARINE CORPS AIR STATION, EL TORO, CALIFORNIA, OCTOBER.

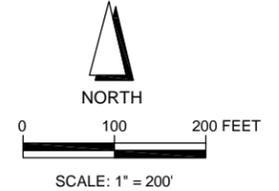


**LEGEND**

- 2-FT CONTOUR (FINAL GRADE)
- 550 — 10-FT CONTOUR (FINAL GRADE)
- 2192000N --- GEODETIC GRID LINE
- - - - - APPROX. LIMIT OF COVER
- ..... APPROX. LIMIT OF WASTE
- - - - - GRADE BREAK
- ==== CONCRETE-LINED CHANNELS/DITCHES
- ▨ RIPRAP
- ▨ ACCESS ROAD
- ⊕ SETTLEMENT MONUMENT
- FENCE LINE
- BUILDING
- VEGETATION
- POWER POLE
- ▲ SLOPE (HORIZONTAL TO VERTICAL)
- 3:1 SLOPE AND FLOW DIRECTION
- 3% SLOPE AND FLOW DIRECTION
- ⊕ 17NEW2 GROUNDWATER MONITORING WELL
- ⊕ 17LYS2 LYSIMETER DRILLED AT 30° ANGLE (SHOWS ANGLE DIRECTION)
- ⊕ 17PGW01 GAS MONITORING PROBE
- ⊕ MP5 SETTLEMENT MONUMENT

**NOTES:**  
 1. FINAL CONTOURS SHOWN ARE ELEVATIONS AFTER PLACEMENT OF FOUNDATION LAYER AND EVAPOTRANSPIRATION SOIL COVER OVER PREPARED SUBGRADE.

ERRG Engineering/Remediation Resource Group, Inc.  
 ET Evapotranspiration  
 IRP Installation Restoration Program  
 MCAS Marine Corps Air Station



Five Year Review Report		Final
<b>Post-Remedial Action Site Map - IRP Site 17</b>		
IRP Sites 2, 16, 17, 18, and 24		
Date: 09-09	Former MCAS El Toro	
Project No. 104766	<b>EARTH TECH   AECOM</b>	Figure 4-2

A total of 12 settlement monuments were installed at IRP Site 2 and 8 settlement monuments were installed at IRP Site 17 (see Figures 4-1 and 4-2).

### **Site Access Road Construction**

To facilitate landfill operations and maintenance, access roads were constructed at both IRP Sites 2 and 17. The landfill access road at IRP Site 2 is 1,800-foot-long by 12-foot-wide and the access road at IRP Site 17 is 1,700-foot-long by 12-foot-wide. Both the access roads were designed for low-traffic volume with the potential for heavy construction equipment entering the site periodically for maintenance purposes.

### **Security Fence and Signage Installation**

Upon completion of landfill construction and demobilization activities at IRP Site 2 in early July 2007, the installation of permanent security fence, gates, locks, and signage was conducted. In addition, four-strand wire fencing was installed around the perimeter of the landfill and three pipe gates limiting vehicular access to the landfill cap were constructed.

The installation of a permanent security fence at IRP Site 17 was conducted in March 2008. In addition to fence installation, repairs were made to a section of fence along the west side of Magazine Road. Signs were placed on the three access gates to IRP Site 17. The three access gate locations are at the FAA receiver facility, Magazine Road, and Quarry Road. In addition, signs were also placed every 500 feet along the new security fence and at the top and bottom of the site access road traversing the landfill cover.

### **Erosion Control and Site Restoration**

Erosion control and site restoration for IRP Site 2 and 17 landfills consisted of (1) revegetation of the restored surfaces to prevent erosion of the topsoil and ET cover, (2) installation of geotextile, geomembranes, erosion control blankets, jute netting, fiber rolls, and stone revetments, (3) application of hydroseeding on the 3:1 side slope surfaces, and (4) incorporation of mulch within the identified laydown area.

Revegetation of IRP Sites 2 and 17 included restoration of CSS and mulefat in both on-cover and off-cover landfill areas per the requirements of BO and BO Amendment (U.S. FWS 2002 and U.S. FWS 2004). Additionally, hydroseed specifically designed for the restoration effort was applied to certain areas of IRP Sites 2 and 17 to control erosion.

### **Biological Monitoring**

Biological monitoring was conducted as part of remedial action construction to ensure that field activities at IRP Sites 2 and 17 were conducted in accordance with the BO and BO Amendment (U.S. FWS 2002 and U.S. FWS 2004), which identifies threatened or endangered species at the sites and prescribes activities required to protect those species. The focus of the IRP Sites 2 and 17 BO is twofold: (1) protection of the coastal California gnatcatcher (*Polioptila californica*), a Federally threatened species, and (2) replacement and protection of the CSS critical habitat throughout IRP Sites 2 and 17 associated with the gnatcatcher.

### **Land Surveying**

Land surveying was performed by a third party entity, under the direction of a California-licensed professional surveyor during construction of the landfill covers to establish, document, and certify elevations for each grading phase. Following the completion of the earthwork, drawings were

prepared and approved by a California-licensed professional surveyor, documenting elevations of the completed subgrades and foundation layers, and the placement to the ET covers at IRP Sites 2 and 17. The survey data verified that a minimum of 4 feet of ET cover was placed over the waste.

#### 4.1.2.2 IMPLEMENTATION OF ICs

In accordance with Section 9.2 of the ROD and the O&M Plan, ICs are required at IRP Sites 2 and 17 to:

- maintain the integrity of the landfill caps by preventing excavations;
- minimize infiltration of surface waters;
- prevent land use that presents unacceptable risk to human health and the environment due to residual contamination;
- protect groundwater monitoring equipment; and
- preserve access to the sites and associated monitoring equipment for the DON and the FFA signatories.

A Land-Use Control (LUC) Plan has been prepared that presents description, implementation, maintenance, and enforcement procedures for ICs for the vadose zone of IRP Site 2, and the vadose zone and groundwater of IRP Site 17. This LUC Plan is included as an attachment to the O&M Plan for IRP Sites 2 and 17 (Earth Tech 2009b). The LUC Plan shows the areas requiring institutional controls (ARICs) at IRP Sites 2 and 17 and presents the land-use restrictions. The ARICs for IRP Sites 2 and 17 include former operational landfill areas for which landfill caps have been constructed (hereinafter referred to as capped landfill areas) and areas surrounding the landfill cap boundaries, also referred to as the buffer zones (see Figures 3-3 and 3-4).

The land-use restrictions restrict activities that may adversely affect the integrity of the landfill cap and present unacceptable risk to human health due to potential exposure to residual contamination. In addition the land use restrictions prevent removal or damage to remedy components including monitoring equipment and preserve access to the sites by the DON and FFA signatories.

In addition to land-use restrictions, the LUC Plan also discusses legal mechanisms for the implementation of ICs. The major portions of the ARICs at IRP Sites 2 and 17 have been transferred to the FAA. The DON currently has a MOU with the FAA that documents the land use restrictions (DON and FAA 2001). This MOU is being used as a mechanism for the implementation of ICs by the DON for the areas owned by the FAA.

Portions of ARICs at IRP Sites 2 and 17 lie within Carve-outs II-V and II-F (see Figures 3-3 and 3-4), which were leased in 2005 to Heritage Fields, LLC (OCGP Corporation and Lennar Corporation), a private developer. These areas will be leased until the time FFA signatories concur that the landfill capping remedies at IRP Sites 2 and 17 are OPS. Following concurrence of the FFA signatories, Carve-outs II-V and II-F will be transferred to a non-Federal entity.

The interim land-use restrictions are being administratively handled through a LIFO (DON and Heritage Fields 2005a), until portions of ARICs at IRP Sites 2 and 17 currently leased to a private developer are conveyed by deed to the Lessee. The LIFO for Parcel II at former MCAS El Toro is currently in place and includes the interim land use restrictions.

A detailed discussion of future implementation mechanisms for ICs in case of transfer of whole or part of IRP Sites 2 and 17 ARICs to a non-Federal entity is presented in the LUC Plan (Earth Tech 2009b).

#### **4.1.3 System Operation and Maintenance**

The DON is conducting O&M of IRP Sites 2 and 17 landfill caps in accordance with the O&M Plan finalized in February 2009 (Earth Tech 2009b). The O&M activities for the landfill caps may be divided into the following two categories:

- Cover inspection and maintenance
- Groundwater, unsaturated zone (soil moisture), and LFG monitoring
- ICs inspections and maintenance

##### *4.1.3.1 O&M REQUIREMENTS - COVER INSPECTION AND MAINTENANCE*

In accordance with the O&M Plan (Earth Tech 2009b), the following landfill features are being inspected and maintained as part of the O&M:

- CSS and Mulefat
- Settlement Monuments
- Erosion
- Drainage System
- Groundwater Monitoring Wells
- LFG Monitoring Probes
- Lysimeters
- Site Security Features
- Access Roads

The inspection schedule for these features is presented in the O&M Plan. The frequency for inspection of CSS and mulefat ranges from monthly to quarterly during the first six years and annually thereafter for the next 24 years. Settlement monuments will be inspected quarterly until stabilized. Erosion control features will be inspected quarterly and following significant events. The drainage system, groundwater monitoring wells, LFG monitoring probes, lysimeters, site security features, and access roads will be inspected semiannually for five years, and annually thereafter for 25 years.

##### *4.1.3.2 O&M REQUIREMENTS - GROUNDWATER, UNSATURATED ZONE (SOIL MOISTURE), AND LFG MONITORING*

#### **Groundwater Monitoring**

A Detection Monitoring Program is being implemented for IRP Sites 2 and 17 landfills to meet substantive requirements of Title 27 California Code of Regulations (CCR) §20420. The objectives of the groundwater monitoring are:

- Assess the performance of the landfill cover system and ICs,
- Evaluate if releases are migrating beyond compliance monitoring locations,

- Monitor constituents exceeding standards,
- Provide data to optimize monitoring requirements during the 30-year post-closure compliance period,
- Appraise compliance with the RAOs, and,
- Satisfy regulatory requirements for landfill closure.

Seven monitoring wells have been included in the groundwater monitoring well network for IRP Site 2 and three monitoring wells have been included in the groundwater monitoring well network for IRP Site 17. Groundwater monitoring will be conducted quarterly for the first year and semi-annually for the next five years. The groundwater samples will be analyzed for VOCs, metals, general chemistry (including TDS, pH, electrical conductivity (EC), chloride, sulfate, sulfide, and nitrate as nitrogen), SVOCs, herbicides, pesticides, and PCBs. The detailed groundwater monitoring plan is presented in the O&M Plan. The data obtained from groundwater monitoring will be analyzed according to the methods and procedures described in the O&M Plan.

### **Unsaturated Zone (Soil Moisture) Monitoring**

Lysimeters were not installed at IRP Site 2 due to a relatively small separation between the waste and groundwater; therefore, no soil moisture monitoring will be conducted for IRP Site 2. Soil moisture monitoring will be only conducted at IRP Site 17. The LTM program objectives that pertain to the protection of groundwater quality (after the remedy has been implemented) are: (1) to evaluate the performance of the remedy and, (2) to act as the first assessment of when landfill wastes may potentially leach to groundwater during the post-closure monitoring period of the landfills.

At IRP Site 17, soil moisture samples will be collected from three lysimeters and analyzed to characterize if constituents are inconsistent with background values. Soil moisture monitoring will be conducted quarterly for the first year and semi-annually for the next five years. The groundwater samples will be analyzed for metals, general chemistry (including TDS, pH, EC, chloride, sulfate, sulfide, and nitrate as nitrogen), and SVOCs. The detailed groundwater monitoring plan is presented in the O&M Plan. The data obtained from soil moisture monitoring will be analyzed according to the methods and procedures described in the O&M Plan.

### **Landfill Gas Monitoring**

The LTM program objective for LFG is to monitor for the migration of LFG to the perimeter of the landfill boundaries at IRP Sites 2 and 17. The IRP Site 2 LFG monitoring network consists of five perimeter gas monitoring wells surrounding the former landfill. The IRP Site 17 LFG monitoring network consists of three lysimeters and three perimeter gas monitoring wells surrounding the former landfill. LFG monitoring using perimeter gas monitoring wells will be performed on a quarterly basis until stabilized. The LFG will be deemed as stabilized if four consecutive quarters of monitoring indicate that concentrations of methane are less than one half of the established threshold (5 percent of LEL or 50,000 parts per million by volume). LFG monitoring using IRP Site 17 lysimeters will be performed on a semi-annual basis for the first five years of LTM. The data obtained from LFG monitoring will be analyzed according to the methods and procedures described in the O&M Plan.

#### **4.1.3.3 O&M REQUIREMENTS – ICs INSPECTION AND MAINTENANCE**

Site inspections will be conducted at IRP Sites 2 and 17 to evaluate compliance with ICs. The O&M plan contains a checklist for documenting compliance/non-compliance with land use restrictions and reporting the results of ICs inspections. The current users of the ARICs at IRP Sites 2 and 17, FAA

and current lessee (Heritage Fields, LLC), will complete these checklists for each IC inspection event. These checklists will be submitted to the FFA signatories.

#### 4.1.3.4 O&M ACTIVITIES TO DATE

By the end of April 2009, two O&M monitoring events were conducted at IRP Sites 2 and 17. The first O&M event was conducted in November/December 2008 and the second was conducted in March 2009. These events included groundwater sampling, unsaturated zone monitoring (IRP Site 17 only), LFG monitoring, and inspections of covers and ICs. The data collected from these O&M events has been analyzed. A semi-annual report presenting the results of these O&M events was issued in August 2009 (ATS 2009).

#### 4.1.3.5 PROBLEMS ENCOUNTERED

One of the wells at IRP Site 2, 02PZ01, was constructed within the landfill waste and required an extension to raise it to the level of the landfill cap. A constriction has been observed in this well and groundwater samples could not be collected by traditional sampling methods. The DON's O&M contractor is evaluating alternatives to rectify the problem. It should be noted that 02PZ01 serves as an early detection well for groundwater release and the data from this well is not used to assess compliance with ARARs.

Intense rains in the 2008-2009 wet season caused rills, erosion, and ponding at various locations of the IRP Site 17 landfill. Erosion occurred in the areas along the access roads and ponding occurred at a few locations due to irregular topsoil placement. Engineering solutions including augmenting placement of sandbags and contouring of topsoil were implemented to reduce the erosion and ponding from rain events. Permanent erosion control features have been implemented and repairs made at the site to reduce and/or prevent erosion on the side slopes of the landfill. Erosion will be further reduced in the future through the establishment of vegetation.

## 4.2 IRP SITE 16

### 4.2.1 Remedy Selection

The remedy selection processes for the response action at IRP Site 16 were documented in the following documents:

- Proposed Plan issued by the DON in September 2002 (DON 2002b)
- ROD signed by the DON in July 2003 (DON 2003)

The RAOs for the selected remedy implemented at IRP Site 16, as discussed in the ROD (DON 2003), include the following:

- Monitor concentrations of VOCs in soil vapor within the vadose zone to confirm that concentrations do not increase with time;
- Restore the beneficial uses of the shallow aquifer underlying IRP Site 16 to the extent practicable while preventing or minimizing VOC migration beyond current boundaries at concentrations exceeding site cleanup levels; and
- Protect human health by preventing the extraction of shallow VOC-impacted groundwater for domestic use until the site cleanup goals are achieved.

On the basis of the IRP Site 16 RI (BNI 1997f), Focused Feasibility Study (FFS) (BNI 2002a) and MPE pilot test results (BNI 2002b), the DON, in coordination with U.S. EPA, DTSC and RWQCB,

selected groundwater MNA and ICs as the final remedy for IRP Site 16. The selection of this remedy is documented in the *IRP Site 16 ROD* (DON 2003) that was finalized and signed by the DON on 22 July 2003. It was determined that this remedy would be protective of human health or welfare, and the environment. The final remedy for IRP Site 16 includes the following elements:

- MNA of groundwater to ensure TCE concentrations decrease over time;
- Vadose zone monitoring to ensure TCE concentrations in the vadose zone do not impact groundwater quality;
- Site grading to fill in the training pit and promote proper drainage of storm water; and
- Implementation of ICs to protect the monitoring wells and monitoring equipment, prevent the use of impacted groundwater and maintain the site.

## 4.2.2 Remedy Implementation

### 4.2.2.1 WELL CONSTRUCTION

Monitoring well installation for the groundwater monitoring well network at IRP Site 16 was performed in September 2004 (nine wells) and in October 2006 (one well). The nine new wells (16\_MW08 through 16\_MW16) were installed with six screened at the water table and two screened approximately 30 feet below the water table. The last monitoring well to be installed at the site was 16\_MW17. This well was installed approximately 175 feet west of the training pit area at the request of regulatory agencies. Figure 4-3 shows the current monitoring well locations.

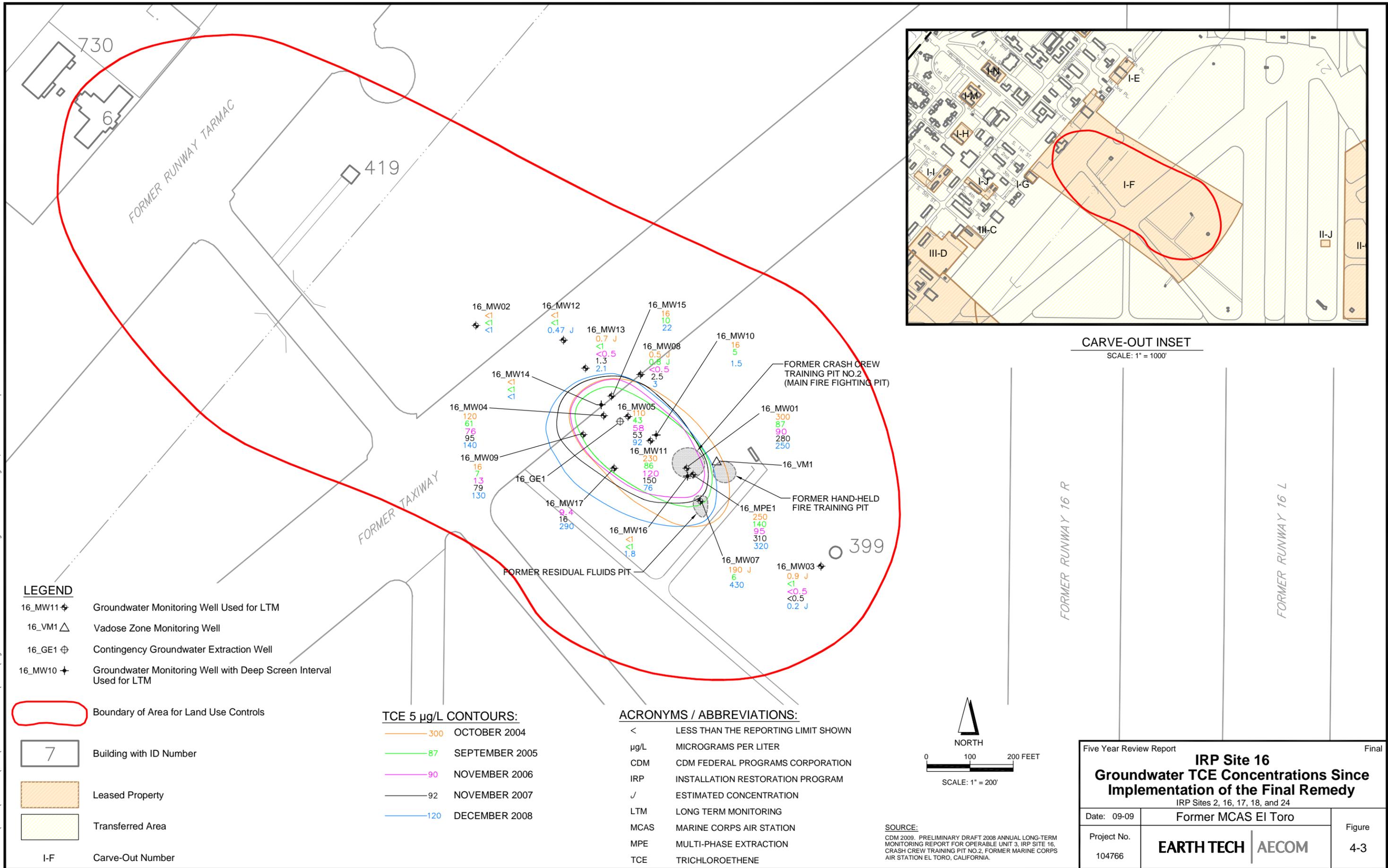
Based on the results of groundwater MNA in 2008, the installation of three additional groundwater monitoring wells was recommended to document the lateral distribution of the TCE plume to the west and northwest (CDM 2009). These proposed wells have not yet been installed.

### 4.2.2.2 MNA OF GROUNDWATER

Long-term groundwater monitoring for MNA at ten selected wells was initiated at IRP Site 16 in September 2004 and is presently being conducted semiannually in accordance with the *Final Remedial Design for Monitored Natural Attenuation with Institutional Controls* (CDM 2006). Groundwater samples are collected using dedicated pumps and a micro-purging technique and analyzed for TPH and VOCs. Groundwater quality data are evaluated for trend and used to ensure that TCE concentrations in groundwater decrease with time through natural processes and do not migrate beyond the ARIC defined as the migration/dispersion distance predicted by the site groundwater fate and transport model, plus 300 feet. The target groundwater cleanup goal is the MCL for TCE (5 µg/L). The duration of 19 years is predicted to be required to achieve the stated cleanup goal for the groundwater TCE plume by natural attenuation. Figure 4-3 shows the current interpretation of the extent of the TCE groundwater plume through the last 2008 monitoring event.

### 4.2.2.3 VADOSE ZONE MONITORING

Vadose zone monitoring consists of sampling and analysis of soil gas from the head space within four selected MPE pilot test and groundwater monitoring wells for VOCs. Vadose zone monitoring was initiated at IRP Site 16 at the same time as groundwater MNA, in September 2004. It is generally performed semiannually to confirm that TCE concentrations in soil gas do not impact groundwater quality. During vadose zone monitoring, one well volume is purged from each of the selected monitoring points using a vacuum pump. Representative soil gas samples are then drawn from the wells using summa canisters for laboratory analysis. Soil vapor VOC data are evaluated for trend.



**LEGEND**

- 16\_MW11 Groundwater Monitoring Well Used for LTM
- 16\_VM1 Vadose Zone Monitoring Well
- 16\_GE1 Contingency Groundwater Extraction Well
- 16\_MW10 Groundwater Monitoring Well with Deep Screen Interval Used for LTM

Boundary of Area for Land Use Controls

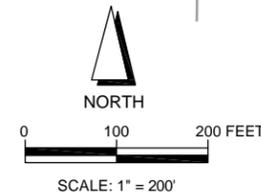
- Building with ID Number
- Leased Property
- Transferred Area
- I-F Carve-Out Number

**TCE 5 µg/L CONTOURS:**

- 300 OCTOBER 2004
- 87 SEPTEMBER 2005
- 90 NOVEMBER 2006
- 92 NOVEMBER 2007
- 120 DECEMBER 2008

**ACRONYMS / ABBREVIATIONS:**

- < LESS THAN THE REPORTING LIMIT SHOWN
- µg/L MICROGRAMS PER LITER
- CDM CDM FEDERAL PROGRAMS CORPORATION
- IRP INSTALLATION RESTORATION PROGRAM
- J ESTIMATED CONCENTRATION
- LTM LONG TERM MONITORING
- MCAS MARINE CORPS AIR STATION
- MPE MULTI-PHASE EXTRACTION
- TCE TRICHLOROETHENE



**SOURCE:**  
CDM 2009. PRELIMINARY DRAFT 2008 ANNUAL LONG-TERM MONITORING REPORT FOR OPERABLE UNIT 3, IRP SITE 16, CRASH CREW TRAINING PIT NO.2, FORMER MARINE CORPS AIR STATION EL TORO, CALIFORNIA.

**CARVE-OUT INSET**

SCALE: 1" = 1000'

Five Year Review Report Final

**IRP Site 16**  
**Groundwater TCE Concentrations Since Implementation of the Final Remedy**  
IRP Sites 2, 16, 17, 18, and 24

Date: 09-09	Former MCAS El Toro	Figure
Project No. 104766	<b>EARTH TECH   AECOM</b>	4-3

Vadose zone monitoring was scheduled in the ROD to last two years. However, this was changed in the subsequent remedial design to be conducted semi-annually through at least the first five years, when it will be evaluated.

#### 4.2.2.4 SITE GRADING

In June 2006, the main crash crew training pit at IRP Site 16 was backfilled with clean soil and the surface was graded to promote storm water drainage. The pit backfilling and grading activity are documented in the *Site Grading Summary Report, IRP Site 16, Former MCAS El Toro* (ECS 2007). The other two training pits were reportedly backfilled in the past soon after use of the training pits stopped. Grading plans in the remedial design require that storm water drain away from the former pit toward storm drains to the northwest.

#### 4.2.2.5 IMPLEMENTATION OF ICs

ICs implemented at IRP Site 16 include land use and lease/deed restrictions, periodic inspections, site maintenance, and notification and reporting requirements. The procedures and requirements for these controls are detailed in the *Final Remedial Design for Monitored Natural Attenuation with Institutional Controls* (CDM 2006). The land use controls and restrictions are implemented to prevent potential exposure to TCE in groundwater, protect the integrity of the monitoring wells and maintain surface drainage. Land use controls specifically prohibit new well installations and the use of groundwater from within the ARIC until the site achieves the target groundwater cleanup goal (TCE MCL). The ICs also prohibit the disturbance of the existing monitoring wells and equipment at the site without specific approval from the DON and the regulators, and requires maintenance of the ground surface to maintain proper drainage away from the former training pits.

Petroleum hydrocarbons in soil at IRP Site 16 are being addressed under the former MCAS El Toro Petroleum Corrective Action Program (PCAP).

In 2007 an OPS evaluation was performed for the IRP Site 16 final remedy. Information from the ongoing MNA and vadose zone monitoring were evaluated to demonstrate that the selected remedy is operating successfully and as intended. The OPS evaluation report (CDM 2007) concluded that the final remedy has been implemented in accordance with the approved remedial design and is:

- Protective of human health and the environment;
- Enforceable (through implementation of the ICs that include land use controls and deed restrictions);
- Based on reliable technology (MNA); and
- Operating within a site that has been adequately characterized.

In addition to satisfying the above OPS criteria, the evaluation also concluded that the following U.S. EPA core criteria for successful MNA groundwater remedies were satisfied:

- Construction of the source control portion of the remedy (via MPE pilot test); and
- Monitoring information showing that natural attenuation is working (via MNA sampling).

#### 4.2.3 System Operation and Maintenance

System O&M activities at IRP Site 16 consist of semiannual groundwater MNA sampling, vadose zone monitoring, site inspections and maintenance and reporting. O&M is currently being conducted in accordance with the *Final Remedial Design for Monitored Natural Attenuation with Institutional*

*Controls* (CDM 2006). It was initiated in September 2004 and is ongoing. Since its initiation as a part of the final remedy at IRP Site 16 in September 2004 and through the end of 2008, nine groundwater MNA sampling events and up to seven vadose zone monitoring events have been completed.

The remedial design specifies that groundwater be sampled from ten selected wells and for soil gas to be sampled from four selected wells during each monitoring event. Groundwater sampling is to be performed following the low flow-minimum drawdown (micro-purge) procedure, and selected MNA parameters are to be measured in the field during well purging. All groundwater samples are required to be analyzed for TPH and VOCs, and soil gas samples are required to be analyzed for VOCs following appropriate test methods.

Groundwater TCE data are compared to the MCL to ensure that the TCE plume remains within the ARIC. If TCE is detected in a certain sentry well (16\_MW13) at concentration exceeding the trigger concentration (10 µg/L) that is confirmed by re-sampling, then regulators are notified and an investigation into the cause is launched within 90 days to assess the adequacy of the LTM program and recalibrate the groundwater fate and transport model to determine if TCE will extend beyond the IC boundaries.

Soil gas data are statistically evaluated for trend to ensure that VOC concentrations are not increasing and threaten groundwater quality. If VOCs in soil appear to be increasing over any two-year period, then groundwater data are assessed to determine if VOC concentrations in groundwater are also increasing. If VOC concentrations increases correspond to the soil gas data, then vadose monitoring is to continue. Vadose zone monitoring can be halted if VOC concentrations are not increasing over a two-year period.

During each monitoring event, the site is inspected to ensure compliance with the ICs. The wells are inspected to verify that they are in good condition and are secure. The ground surface is inspected to ensure proper drainage of storm water away from the training pits is maintained. Inspection results are reported with the monitoring data, along with recommendations for any maintenance, if needed.

The use of existing wells with various screen intervals and the fluctuating water table has resulted in inconsistencies in the vadose zone sampling interval among the wells and between samples. This was in part due to instances where vadose zone monitoring could not be performed at one or more wells because of the entire screen interval being below the water table. In addition, vadose zone monitoring was temporarily suspended during the implementation of SVE Pilot Test associated with the corrective action for the fuel hydrocarbons. The variable sample intervals have introduced uncertainty into the comparability of the analytical results that has contributed to a high degree of scatter in the data which adversely affects the trend analysis. This condition was not anticipated during development of the remedial design.

The frequency for vadose zone monitoring presented in the ROD as part of the IRP Site 16 final remedy was adjusted in the final remedial design to coincide with the groundwater MNA schedule which was finalized in the *Final Remedial Design for Monitored Natural Attenuation with Institutional Controls* (CDM 2006). This adjustment changed the vadose zone monitoring frequency to semiannual.

### 4.3 IRP SITES 18 AND 24

#### 4.3.1 Remedy Selection

The remedy selection processes for the response actions at IRP Sites 18 and 24 were documented in the documents listed below:

- Proposed Plan issued by the DON in November 2001 (DON 2001c)
- Groundwater ROD signed by the DON in June 2002 (DON 2002a)

The ROD presented the RAOs for IRP Sites 18 and 24 VOC plumes as listed below (DON 2002a).

##### *IRP Site 18 groundwater:*

- Reduce VOC concentrations in the SGU and the PA to Federal or State cleanup levels.
- Contain migration of VOCs above cleanup levels in the PA.
- Prevent domestic use of groundwater containing VOCs at concentrations exceeding cleanup levels.

##### *IRP Site 24 groundwater:*

- Reduce VOC concentrations in the SGU to Federal or State cleanup levels.
- Prevent use of groundwater containing VOCs at concentrations exceeding cleanup levels.
- Prevent VOCs at concentrations above cleanup levels from migrating beyond the SGU.

The selected remedy for the OU-1 and OU-2A VOC plumes includes groundwater extraction and treatment, and ICs (DON 2002a) integrated with the IDP. The remedy included the following components:

- Construction, operation, and maintenance of a groundwater extraction system to remove VOCs from groundwater in the SGU and PA,
- Treatment of VOC-contaminated groundwater from the SGU and PA using air stripping and reverse osmosis at a central treatment plant,
- Discharge of treated groundwater to injection well IDP-1 or for reclaimed water use,
- Treatment of VOC vapors with GAC filters to meet air quality standards before discharge to the atmosphere,
- Performance monitoring during the remedial action,
- Confirmatory groundwater sampling at the end of remediation to confirm that VOC concentrations meet Federal and State cleanup levels, and
- ICs to prevent use of contaminated groundwater, protect equipment, and allow access to the DON, OCWD/IRWD, and regulatory agency personnel.

During the remedial design, the CERCLA remedy was modified and the changes were documented in the ESD signed in June 2006 (DON 2006b). The changes include the following:

- Elimination of reverse osmosis as a treatment process for VOC-impacted groundwater,
- Use of separate treatment facilities for the SGU and PA groundwater,

- Revised location for extraction well ET-2,
- Revised extraction rates for ET-1, ET-2, and IRWD-78,
- Inclusion of the Southern California Water Authority (SOCWA) brine line as an alternative disposal option for clean, treated groundwater from the SGU.

Another ESD to the OU-1 and OU-2A Groundwater ROD was prepared in December 2008 to address vapor sampling at the conclusion of groundwater remediation at the vadose zone source area (DON 2008b). The vadose zone source area is located in the immediate vicinity of Hangars 296 and 297. Soil vapor sampling will be conducted in the vicinity of Hangars 296 and 297 at the completion of the IRP Site 18 and IRP Site 24 groundwater remedy. Results from this sampling will then be used as the basis for documenting whether average VOC concentrations remain below groundwater-protective threshold limits specified in the Final OU-2A ROD (DON 2006a).

### **4.3.2 Remedy Implementation**

#### **4.3.2.1 IRP SITE 18**

A groundwater extraction and treatment system for IRP Site 18 was designed and constructed in accordance with the selected remedy documented in the Final Groundwater ROD (DON 2002c). The 100-Percent Design was submitted to the BCT on 31 May 2005 (Tetra Tech 2006). Remedy construction began in April 2005 and was completed in July 2006.

The remedy at IRP Site 18 includes three wells, ET-1, ET-2, and IRWD 78 which extract groundwater from the PA. In addition, the IRWD constructed a treatment plant to treat the extracted VOC-impacted groundwater. The PA Treatment Plant is currently treating extracted water from ET-1 and discharging the treated water into the IRWD non-potable system. TCE concentrations in the groundwater from wells ET-2 and IRWD 78 are below 5 µg/L; therefore, groundwater extracted from these wells is not treated for VOCs and is pumped directly to the IRWD non-potable system.

The major construction activities conducted as part of remedy implementation for IRP Site 18 are summarized below.

#### **PA Extraction Wells**

Each of the three extraction wells (ET-1, ET-2, and IRWD 78) used for extraction of groundwater from the PA were rehabilitated prior to remedy implementation. Well rehabilitation consisted of pre-downhole video surveying, well casing brushing and bailing, initial well development using air jetting, chemical development, mechanical air lifting and swabbing, test pumping, depth-specific water sampling, well disinfection, and post-downhole video surveying. New pumps, motors, and ancillary equipment were also installed.

#### **PA Treatment Plant**

The PA Treatment Plant was constructed in accordance with the 100-Percent Design Report, Plans and Specifications (Tetra Tech 2006). This system uses a low-profile air stripper to separate VOCs from the water. The off-gas from the air stripper is then treated using vapor-phase GAC.

#### **System Shakedown**

Upon completion of construction, the PA Treatment Plant system was started up to confirm proper operation. The system shakedown activities included confirmation that all mechanical and electrical

equipment was constructed per design criteria; rotation check of all pumps; and comprehensive inspection of all electrical and instrumentation controls and components.

### **System Startup**

At the completion of the shakedown period, the PA Treatment Plant system was started up to confirm proper operation. The system startup activities included verifying design flows, confirming that treatment systems met the design criteria, verifying that control systems operate as designed, and testing air and water quality.

### **Implementation of ICs**

ICs for the off-Base portion of the groundwater plume are intended to protect residents from use of VOC-impacted groundwater for domestic purposes until cleanup goals are achieved. The ICs for the off-Base portion of VOC groundwater plume are based on local permit programs administered by the Orange County Health Care Agency (OCHCA) and IRWD. These agencies require that any person planning to construct a water well must apply for and obtain a permit for construction of such well. These agencies are also authorized to include necessary conditions in the permit to assure adequate protection of public health. The DON has received commitments from OCHCA and IRWD to provide the DON with copies of any well permit applications received or permits issued within the geographic scope of the off-Base groundwater plume (the areal extent exceeding federal and state MCLs) until remediation of the plume has been completed.

No new water wells have been installed within the VOC plume. No permit applications or permits for water wells or monitoring wells within the geographic scope of the OU-1 and OU-2A remedy have been received by the DON from OCHCA or IRWD.

#### **4.3.2.2 IRP SITE 24**

A groundwater extraction and treatment system for IRP Site 24 was designed and constructed in accordance with the selected remedy documented in the Final Groundwater ROD (DON 2002c). The 100-Percent Design (Weston 2005b) was submitted to the BCT in March 2005.

Remedial construction activities began in February 2005 and were implemented in accordance with the Final Remedial Action Work Plan (Weston 2005a), and the 100-Percent Design Submittal (Weston 2005b).

The remedy implementation by the DON for IRP Site 24 included installation of wells to extract groundwater from the SGU, conveyance piping, storage, and pumping facilities. Conveyance piping conveys groundwater from extraction wells to the transfer station (also known as the Compound). The transfer station is used to pump groundwater from the former MCAS El Toro boundary to the Treatment Facility constructed by the IRWD for SGU groundwater. The treated effluent from the SGU is currently pumped to the SOCWA brine line for ocean disposal.

The major construction activities conducted as part of remedy implementation for IRP Site 24 are summarized below.

### **SGU Extraction and Monitoring Well Installation**

A total of 35 extraction wells, 24SGU-01 through 24SGU-35, were installed as part of the remedial action implementation. The wells ranged in total depths from 145 feet to 236 feet, and the screen lengths ranged from 50 feet to 125 feet. In addition, four existing wells (24EX3, 24EX4, 24EX5, and

24EX6) were converted to groundwater extraction wells and modified for SVE enhancement. The well locations are shown on Figure 3-6.

Six nested monitoring wells, 24MW09 to 24MW15, and three multiport Westbay System monitoring wells, 24MW08, 24MW16 and 24MW17, were installed for groundwater monitoring. The locations are shown in Figure 3-6.

### **High-Voltage Line Installation**

The existing power infrastructure did not meet the requirements for the groundwater extraction system. A new high-voltage electrical service was installed in accordance with Southern California Edison requirements. Two new 150 kilovolt ampere transformers, switchgear and meter panels were installed on concrete pads along with fencing to secure the transformers.

### **SGU Conveyance System Installation**

Approximately 13,000 linear feet of conveyance piping was installed as part of the conveyance system. The underground piping conveys extracted groundwater from the wells to a transfer station (known also as the Compound). The construction included excavation of below-grade pipe trenches; installation of high density polyethylene (HDPE) pipe, fittings, valves, and conduit; pipe integrity tests; and trench backfilling and compaction.

### **Transfer Station Installation**

Extracted groundwater is transferred via conveyance piping to the IRWD SGU Treatment Plant. The transfer station consists of concrete pads for tanks and pumps and the control room; two 5,400-gallon double-contained equalization tanks; two 30-horsepower transfer pumps; an 8-foot by 12-foot metal control room building on a concrete slab-on-grade; schedule 80 polyvinyl chloride (PVC) above-grade piping, valves and fittings; instrumentation (including ultrasonic level sensors, a float switch and secondary leak detection switches, local pressure gauges, a Rosemount pressure transmitter, a combination pH/temperature sensor and display panel, and a flowmeter/totalizer and display panel); and fencing around the transfer station.

### **IRP Site 24 SGU Treatment Plant**

The treatment plant constructed for SGU groundwater consists of a packed column air-stripper to separate VOCs from the groundwater. The off-gas from the air stripper tower is treated using vapor-phase GAC.

### **Injection Well**

Well IDP-1 was converted for injection of treated SGU water into the PA. IDP-1 was equipped with an injection pump, meter, piping, well packer, and appurtenances. IDP-1 was tested during the construction period and was found to be capable of accepting up to 125 gallons per minute (gpm) of water. However, due to the presence of perchlorate in the SGU water, the injection system was not placed into service.

### **System Shakedown**

Following installation of all system components, the SGU extraction wells, conveyance system, and treatment plant were started up to confirm proper operation. The objectives of the system shakedown were to verify that mechanical systems, controls, and interlocks were operating in

accordance with design criteria, verify design assumptions, evaluate sustainable extraction rates, and confirm communications between the transfer and treatment systems.

The activities during startup included checking pump operation against pump performance curves, comparing actual flow rates to the design rates, monitoring water levels to evaluate induced drawdown at each well, and collecting samples to establish baseline levels and discharge criteria comparison.

### **System Startup**

The system was started up on 11 October 2006 according to the procedures in the 100 Percent Design Submittal (Weston 2005b). The objective of the startup was to finalize detailed O&M protocols for maintenance, mechanical operation, monitoring, and to adjust the controls for performance optimization.

### **Implementation of ICs**

Provisions preserving access to the property for the DON and regulatory personnel to conduct investigations, surveys, sampling, monitoring, and remedial actions are set forth in the LIFOC.

Provisions protecting the groundwater extraction, injection, and monitoring wells and associated piping and equipment are set forth in the LIFOC. To prevent lessee personnel from mistaking remediation equipment for utilities infrastructure, the following protection was added: all system pull boxes and vaults are stenciled "US Navy Property—Do Not Open." High voltage pull boxes were also identified as high voltage. The land-use restrictions identified in the ROD for IRP Site 24 will be incorporated into the deed when the property overlying on-Station portion of IRP Site 24 is conveyed to a non-federal entity

The Lessee is required to complete a Project Evaluation Review Form (PERF) for any work proposed in the leased portion of the property. A PERF is submitted to the DON for approval and the U.S. EPA, RWQCB, and DTSC for their concurrence.

The SGU Transfer Station is surrounded by a chain-link fence with three strands of barbed wire. The gate is locked when the site is not manned. The control room building located within this fenced area is also locked when not manned.

The extraction well vault covers and high voltage pull boxes are protected with security locks (specialized locking bolts). Monitoring well caps are tagged and locked.

#### **4.3.3 System Operation and Maintenance**

System O&M activities are currently being conducted in accordance with the following plans:

1. The *Performance Monitoring and Sampling and Analysis Plan* (Earth Tech 2007), which presents a sampling plan to evaluate remedy performance and progress versus RAOs.
2. The *SGU Wellfield and Conveyance System O&M Plan* (Weston 2007b) identifies O&M details from the SGU wellfield and conveyance system to the point of connection with the IRWD SGU Treatment Plant.
3. The *SGU Treatment System O&M Plan* provides O&M details for the SGU treatment system and conveyance from the point of connection from the DON to the SGU treatment system and discharge via reinjection or ocean outfall (Tetra Tech 2007a).

4. PA Treatment System O&M Plan which provides O&M details for the PA extraction wells, conveyance system, PA Treatment Plan, and discharge to the non-potable system (Tetra Tech 2007b).

#### 4.3.3.1 O&M REQUIREMENTS – SYSTEM OPERATION

Under normal operating conditions, extracted groundwater is continuously pumped to the equalization tanks and then subsequently pumped to the SGU treatment system. The extraction pumps, transfer pumps, variable frequency drives, and water level in the equalization tank is controlled by instrument signals sent to and interpreted by the programmable logic controller (PLC).

The equalization tanks are vented to the atmosphere through two 55-gallon vapor adsorption drums, operated in series. The influent, midpoint, and effluent of these drums are monitored on a weekly basis. Once the breakthrough is noted at the midpoint, the GAC in the drums is changed out within two weeks of breakthrough detection.

During well field operations, the flow rate of each extraction well pump is monitored and evaluated for indication of possible biofouling. Possible silt accumulation is monitored in well field pipelines.

System data is downloaded from the PLC and collected from field instrument readings on a regular basis.

Routine inspections are conducted on a scheduled basis to enhance the life and performance of equipment. All maintenance activities are recorded in the Maintenance Log. Routine maintenance and inspection includes weekly, monthly and annual schedules. Inspection Checklists are used to record both scheduled and unscheduled maintenance for the equipment, valves, and instruments associated with the System. Routine weekly inspections are performed and documented on the O&M Report and Facility Operations Log. Routine monthly, quarterly, semiannual, or annual wellhead inspections are documented on the Monthly Inspection Checklist.

#### 4.3.3.2 O&M REQUIREMENTS – MONITORING WELL SAMPLING

The monitoring wells associated with the remedy are shown on Figure 3-6. The network includes 45 on-Base monitoring wells with 80 screens/ports and 18 off-Base wells with 70 screens/ports. All of the monitoring wells are monitored quarterly for water level, and most of the wells are sampled quarterly for VOCs. In accordance with the *Performance Monitoring and Sampling and Analysis Plan* (Earth Tech 2007), well sampling and monitoring frequencies may be revised as trends become established.

#### 4.3.3.3 O&M REQUIREMENTS – EXTRACTION WELL SAMPLING

SGU extraction wells were sampled for VOCs daily for the first week of system operation, weekly for the following month, and monthly thereafter since remedy implementation. The PA extraction wells are sampled quarterly for VOCs by OCWD.

#### 4.3.3.4 O&M REQUIREMENTS – SGU TREATMENT PLANT SAMPLING

Evaluation concentration level (ECL) monitoring is performed monthly upstream of the point of connection between the DON's transfer station and IRWD's SGU Treatment Plant.

Water discharged from the SGU Treatment Plant is sampled by IRWD to monitor compliance with the discharge permit requirements. Water discharged to the SOCWA brine line is monitored in accordance with RWQCB Order No. R9-2006-0055. Air discharged from the SGU Treatment Plant

is also monitored to ensure compliance with South Coast Air Quality Management District (SCAQMD) Rule 1401 as specified in the O&M Plan (Tetra Tech 2007a).

#### 4.3.3.5 O&M REQUIREMENTS – PA TREATMENT PLANT

The PA extraction wells (ET-1, ET-2 and IRWD-78) are sampled quarterly for VOCs by OCWD. If the VOC concentrations are below MCLs in ET-2 and IRWD-78, the extracted water will continue to be distributed directly into the non-potable system. If VOC concentrations exceed the MCLs, the water will be pumped to the PA Treatment Plant (located at ET-1) using the existing transmission pipelines prior to distribution to the non-potable system.

Intake to the PA Treatment Plant is sampled quarterly by OCWD for VOCs, general chemistry, metals, radionuclides, and other organic constituents to monitor compliance with the ECLs.

Water discharged from the PA Treatment Plant is sampled to monitor compliance with the criteria for discharge into the non-potable system as described in the PA O&M Plan (Tetra Tech 2007b). Air discharged from the PA Treatment Plant is also monitored to ensure compliance with SCAQMD Rule 1401 as specified in the O&M Plan (Tetra Tech 2007b).

#### 4.3.3.6 O&M REQUIREMENTS – INSTITUTIONAL CONTROLS

ICs associated with the remedy apply primarily to access restrictions and protection of treatment system components. Annual inspection and reporting is performed to document compliance with ICs. The annual inspection documents the status of compliance with the ICs in the Environmental Restriction Covenant and Agreements and quitclaim deeds protecting on-Base extraction, injection, and drinking water wells, monitoring wells, and associated piping and equipment. Results of the IC inspections, including the LUC Compliance Certificates, are submitted with Annual Remedy Status Reports.

#### 4.3.3.7 O&M ACTIVITIES TO DATE

In addition to the routine system inspection and maintenance specified in the O&M Manuals (Tetra Tech 2007a, Tetra Tech 2007b, Weston 2007b), ten rounds of groundwater sampling events were conducted between March 2006 and August 2008. Groundwater monitoring was performed quarterly, and the monitoring activities include groundwater level measurements, groundwater sampling, and chemical analysis per the *Final Performance Monitoring and Sampling and Analysis Plan* (Earth Tech 2007). The dates for ten rounds of sampling were:

- Event 1: March 2006
- Event 2: September 2006
- Event 3: December 2006
- Event 4: March 2007
- Event 5: August 2007
- Event 6: October 2007
- Event 7: January 2008
- Event 8: April 2008
- Event 9: July 2008
- Event 10: December 2008

After operating the system and evaluating the monthly and quarterly monitoring results, changes were made to optimize the groundwater monitoring and system operation as documented in the *Annual Remedy Status Report* (Weston 2008a, 2008b).

#### 4.3.3.8 PROBLEMS ENCOUNTERED

##### **SGU Extraction and Conveyance System**

During the initial months of operation, the SGU extraction and conveyance system experienced a few shutdowns, primarily in response to shutdowns of the IRWD SGU Treatment Plant. The average uptime efficiency for the year 2006 was 62 percent. The average uptime increased to 85 percent from April 2007 through August 2007, and to 94.2 percent for the period from September 2007 to August 2008.

Several months after startup, the pump discharge strainers in certain wells became plugged more frequently than others. The strainers are now monitored based on operational needs by noting the increase in discharge pressure and the strainers are cleaned out as frequently as necessary to maintain pump operation.

The volume of groundwater extracted from the SGU during the second year of operation was 224,042,860 gallons (measured at the transfer pump flow totalizer) compared to 125,232,340 gallons removed during the first year of operation (which was affected by the IRWD SGU Treatment Plant shutdowns). The annual IRWD SGU Treatment Plant contractual treatment volume is 208,000,000 gallons.

The evaluation concentration level monitoring point (ECLMP) is sampled on a monthly basis to evaluate compliance with the ECLs. There were minor and sporadic ECL exceedances reported. To date, these exceedances have not required any response as the IRWD SGU Treatment Plant has sufficient capacity to treat the extracted groundwater at these concentrations without applying additional treatment methods. The ECL exceedances have not adversely impacted either the IRWD treatment processes or the ability to comply with discharge requirements.

The most frequent operational issue for the IRP Site 24 extraction system was the flooding of some well vaults during periods of heavy rain, which in some cases occurred as a result of clogged storm drains. In other cases, water seeped in through the bottom of some of the well vaults. The DON's O&M contractor has identified the wells with this condition and has engineered a solution to prevent flooding from occurring in future.

There have also been a few incidents where groundwater conveyance system components were damaged by tenants of the lessee (OCGP). The DON and OCGP have worked together to establish measures to ensure the lessee tenants protect the conveyance system components.

##### **SGU and PA Treatment Plants**

The following significant events were encountered during the startup phase of the SGU and PA Treatment Plants:

- Air heaters at both SGU and PA Treatment Plants failed due to excessive moisture buildup. The heaters were replaced and the installation was modified to minimize moisture buildup.
- Scaling occurred at both air stripping units at the SGU and PA Treatment Plants. Scale inhibitor systems were installed and tested at both locations, and were found to be effective in preventing scale build-up.

- Influent water to the SGU system was found to have perchlorate concentrations ranging from 6 to 9.3 µg/L. While these concentrations are lower than the ECL, they exceeded the permit limits for injection at IDP-1. Therefore, injection well IDP-1 could not be placed into service.
- The groundwater extraction well ET-1 is currently operated at flows less than the design value of 1,000 gpm due to problems related to treatment plant operation. These problems include flooding of air-stripper trays and activation of the relief valve at flows greater than 850 gpm. The average extraction flow rates for IRWD-78 and ET-2 are also lower than their design values of 600 and 1,300 gpm, respectively.
- Carbon replacement was not performed in accordance with the documented O&M procedures at either the SGU or PA Treatment Plants. This led to incomplete treatment of TCE vapors and their subsequent discharge into the atmosphere from the SGU Treatment Plant between October 2007 and April 2008 and between December 2008 and March 2009; and from the PA Treatment Plant between February 2008 and March 2009.

## **5. Progress Since the Last Review**

This was the first five-year review for IRP Sites 2, 16, 17, 18, and 24.

## 6. Five-Year Review Process

This section discusses the activities performed during the five-year review process for IRP Sites 2, 16, 17, 18, and 24. The status of these sites is summarized in Table 6-1. The DON conducted five-year reviews at these sites in accordance with the following guidance documents:

- *Comprehensive Five-Year Review Guidance* (U.S. EPA 2001)
- *Department of Navy Policy for Conducting Five-Year Reviews Under the Installation Restoration Program* (DON 2004)

The five-year review process at each of the five sites addressed in this report consisted of the following components:

- Administrative component;
- Community notification and involvement;
- Document review;
- Data review;
- Site Inspection;
- Interviews; and
- Protectiveness determination.

**Table 6-1 : Summary of Status of IRP Sites 2, 16, 17, 18, and 24**

Site I.D.	Summary of Current Status
IRP Sites 2 and 17	The selected remedy at both IRP Sites 2 and 17 included landfill capping and ICs. Remedial action construction at IRP Sites 2 and 17 was completed in February 2008 and July 2008, respectively. The FFA signatories concurred with the RACR for IRP Sites 2 and 17 (Earth Tech 2009a) and that the RACs have been attained. O&M activities were initiated in November 2008.
IRP Site 16	The selected remedy included MNA and ICs. The installation of groundwater monitoring wells required for implementation of the selected remedy following ROD signature commenced in September 2004 (CDM 2006). The OPS evaluation for the remedy was completed in September 2007. The FFA signatories concurred with the OPS evaluation. Periodic groundwater and soil vapor monitoring is currently in progress.
IRP Sites 18 and 24	The selected remedy at both IRP Sites 18 and 24 included groundwater extraction and treatment, and ICs. Remedial action construction activities at IRP Sites 18 and 24 were completed and respective I-RACRs (Tetra Tech 2008, Weston 2007a) were issued in March 2008 and August 2007, respectively. The FFA signatories concurred with the I-RACRs. The O&M activities are currently in progress at both sites.

### 6.1 ADMINISTRATIVE COMPONENTS

The lead agency for this five-year review is the DON. The five-year review team for IRP Sites 2, 16, 17, 18, and 24 was led by DON BRAC PMO West remedial project managers (RPMs) and the BRAC Environmental Coordinator (BEC). The members of the five-year review team included:

- ATS – Included technical experts such as civil/environmental engineers, geologists, hydrogeologists, and risk assessors.
- CDM Federal Programs Corporation – Provided community relations support.

During February and March 2009, the five-year review team established the review schedule for each of the five IRP sites addressed in this report. The components of the five-year review included:

- Community notification and involvement;
- Review of relevant documents pertaining to IRP Sites 2, 16, 17, 18, and 24;
- Review and analysis of relevant data presented in the reports for IRP Sites 2, 16, 17, 18, and 24;
- Inspection of IRP Sites 2, 16, 17, 18, and 24;
- Interviews; and
- Preparation of five-year review report.

The schedule for five-year review of IRP Sites 2, 16, 17, 18, and 24 called for a draft five-year review report being issued in May 2009 and the final report being issued prior to September 2009.

## **6.2 COMMUNITY NOTIFICATION AND INVOLVEMENT**

In 1994, the Restoration Advisory Board (RAB) was established to give interested parties from local communities a channel for participation in the environmental restoration process at former MCAS El Toro. Since 1994, there have been over 90 RAB meetings. These RAB meetings typically occur every two months and are scheduled in the evenings after normal working hours (6:30 to 9:00 p.m.) at the city of Irvine City Hall, Conference and Training Center. The meetings are open to the public and include representatives from the DON, City and County offices, and regulatory agencies. By sharing information from the regular meetings with the groups they represent, RAB members help increase awareness of the IRP process; in addition, members of the public can contact RAB members to obtain information or express concerns to be discussed at subsequent meetings.

Community leaders and interested parties were notified that the five-year reviews will be conducted for IRP Sites 2, 16, 17, 18, and 24 in a RAB meeting held on 28 January 2009. A notice for this RAB meeting was published in a local newspaper. The agenda for this RAB meeting was mailed out to the RAB mailing list (approximately 360 recipients) approximately two weeks before the meeting. Detailed meeting minutes of this RAB meeting were mailed in April 2009 to interested parties on the RAB mailing list.

The interested members of the community were briefed regarding the ongoing five-year review process during the RAB meeting held on 15 April 2009. The community members were also interviewed during the five-year review process for IRP sites addressed in this report to get their views about current site conditions, problems, or related concerns (see Section 6.6 for details).

Following completion of the five-year review, a brief summary of the five-year review report will be made available to the stakeholders. This summary will include short descriptions of the remedial actions at IRP Sites 2, 16, 17, 18 and 24, and the results of the five-year review including the determinations of whether the remedies at the sites are protective of human health and the environment. The summary will also provide the location of site information repository where the complete copy of the report can be obtained, and provide the date of the next five-year review.

A brief summary of the results of the five-year review will also be presented to the RAB members and interested community members in a RAB meeting.

### **6.3 DOCUMENT REVIEW**

Several documents were reviewed for IRP Sites 2, 16, 17, 18, and 24 as part of the five-year reviews for these sites. The objective of the document review was to obtain relevant information and data that could be used as the basis for assessment of the performance of the remedies implemented at the IRP Sites 2, 16, 17, 18, and 24. The type of documents reviewed included the following:

- Documents containing the basis for the response action including remedy decision documents such as RODs and ESDs, RI/FS reports, toxicological and chemical characteristics databases, and Federal and State statutory and regulatory requirements identified as ARARs in the remedy decision documents.
- Documents containing information about design and implementation of the remedy including remedial design/remedial action work plans, RACRs, and as-built drawings.
- Operational summaries provided by IRWD.
- Documents containing monitoring data and information that can be used to assess whether the remedial action continues to operate and function as designed. These documents include routine monitoring reports, and reports documenting that the remedy is OPS.

The document review list for each of the five subject IRP Sites is presented in Section 12 at the end of this report.

### **6.4 DATA REVIEW**

#### **6.4.1 IRP Sites 2 and 17**

O&M activities are currently being conducted at IRP Sites 2 and 17. The data from these activities including groundwater, unsaturated zone, and perimeter gas monitoring results will be reported in semi-annual/annual reports to be issued at a later date. These data will be reviewed as part of the subsequent five-year reviews for IRP Sites 2 and 17.

The monitoring for compliance with ICs has been conducted at IRP Sites 2 and 17 in accordance with the LUC Plan presented in Appendix C of the O&M Plan (Earth Tech 2009b). The evaluation of compliance with the ICs based on this monitoring is presented in the sections below.

##### **6.4.1.1 PROPERTY OWNED BY FAA**

The major portion of the ARICs at IRP Sites 2 and 17 is owned by FAA (see Figures 3-3 and 3-4). The FAA is required to complete the inspection checklists included in the LUC Plan for documenting compliance/non-compliance with land use restrictions and submit to DON. The data review conducted as part of this five-year review indicated that ICs inspection checklists were completed and submitted by FAA to DON on 20 March 2009. The ICs inspection checklists were also completed by another user of the FAA property, the U.S. FWS. These checklists will be presented to the regulatory agencies in the annual monitoring reports for IRP Sites 2 and 17 to be issued at a later date.

A review of completed checklists indicates that no activities were conducted in the ARICs within the boundary of FAA property that are inconsistent with the land-use restrictions documented in the LUC Plan. The Federal Bureau of Investigation (FBI) repaired/replaced the existing structures within the ARIC at IRP Site 2 that were damaged due to the October 2007 Santiago Wildfires. An approval was obtained from the DON and regulatory agencies prior to conducting these repairs/replacements.

#### 6.4.1.2 LEASED PROPERTY

Portions of ARICs at IRP Sites 2 and 17 are leased to Heritage Fields, LLC (OCGP Corporation and Lennar Corporation) (see Figures 3-3 and 3-4). The interim land-use restrictions in these areas are being administratively handled through a LIFO (DON and Heritage Fields 2005a). The interim land use restrictions in the LIFO meet the objectives of the ICs presented in the ROD (DON 2000). The Lessee is required to fill out a PERF for any work proposed in the leased portion of the property. Based on the evaluation of PERFs submitted to date, no activities have been conducted at IRP Sites 2 and 17 that may adversely affect the integrity of the landfill caps and present unacceptable risk to human health due to potential exposure to residual contamination.

#### 6.4.2 IRP Site 16

Data reviewed for IRP Site 16 consisted of groundwater MNA data, vadose zone monitoring data, and information concerning implementation and maintenance of the ICs. The primary source for these data was the Monitoring Data Summary Reports and Annual Long-Term Monitoring Reports that generally provided data for the site from 2004 through 2008. Groundwater data reviewed included water level data, laboratory analytical results for TPH and VOCs for samples collected from the monitoring wells, and field measurements of specific groundwater quality parameters. Data reviewed from vadose zone monitoring included analytical results for VOCs for soil gas samples collected from the four selected wells.

In addition to data associated with groundwater remedy at IRP Site 16, data pertaining to vadose zone pilot tests at the site was also reviewed. This included review of Final Technical Memorandum for Multiphase Extraction Pilot Study (BNI 2002b) and Closure Report for miscellaneous site of concern (MSC) B3 (ECS 2008).

##### 6.4.2.1 GROUNDWATER LEVEL DATA

Groundwater elevation data have been collected from the IRP Site 16 wells in accordance with the Final Remedial Design (CDM 2006). Groundwater levels have fluctuated seasonally and with the amount of precipitation, but overall have not changed appreciably since implementation of the remedy in September 2004. The groundwater gradient (reported to the northwest at 0.007 feet per foot) has been consistent in both direction and magnitude during this timeframe and is consistent with the Stationwide groundwater gradient. It is noted that the fluctuating water table resulting from the groundwater level changes in the wells is sufficient to have potentially caused inconsistent soil gas sampling intervals within the wells selected for vadose zone monitoring.

##### 6.4.2.2 GROUNDWATER CONCENTRATION DATA

Groundwater sampling has been conducted semiannually at IRP Site 16 in general accordance with the Final Remedial Design. Deviations from the sampling plan have been minor and did not affect data quality or usability. Groundwater concentration data do not exhibit clear or consistent trends associated with natural attenuation due to natural biological/chemical degradation of the VOCs. It was concluded that the primary mechanisms occurring at the site to attenuate TCE in groundwater are physical processes including advection, diffusion and dispersion. This observation is consistent with the results of previous investigations at IRP Site 16 documented in the ROD (DON 2003).

VOC concentrations recently reported for 2008 indicate that the TCE to the west and northwest of the groundwater plume appears to be spreading laterally and this observation needs to be confirmed (CDM 2009).

#### 6.4.2.3 GROUNDWATER MNA PARAMETER DATA

The groundwater MNA parameters monitored for IRP Site 16 consist of temperature, pH, specific EC, oxidation-reduction potential (ORP) and dissolved oxygen (DO). These parameters have been measured in the field semiannually during well purging in accordance with the Final Remedial Design. To date, the MNA parameter data do not indicate the occurrence of natural biodegradation of the VOCs. The temperature, pH and EC data were relatively constant and no consistent trends were exhibited for the ORP and DO data. However, during recent events, depleted DO and decreased ORP readings in some of the wells located at the source area were observed.

In December 2008, monitoring for the other MNA parameters was performed once at all 18 wells in accordance with the remedial design. Based on analytical results from these MNA parameter samples, it was concluded that the VOC attenuation mechanisms occurring at the site continue to be predominantly physical processes (e.g., advection, dispersion and diffusion) rather than by biological degradation. These findings are consistent with the ROD and the technical assessments performed during the remedial design for IRP Site 16. Relatively high concentrations of nitrate, sulfate, DO and ORP in some monitoring wells; and the lack of detection of methane, ethane, ethene and iron II in groundwater samples indicate insufficient reducing conditions for biological degradation of TCE at IRP Site 16.

#### 6.4.2.4 VADOSE ZONE MONITORING DATA

Vadose zone monitoring has been conducted at IRP Site 16 in general accordance with the Final Remedial Design. Four existing wells were monitored semiannually for VOCs in soil gas. Deviations from the sampling plan include using different sample collection procedures and different test methods from those specified in the remedial design. Although these deviations did not appear to have adversely affected data quality or usability, different soil gas sampling intervals caused by the fluctuating water table and different screen intervals could be the reason for the appreciable scatter exhibited by the data. In addition, the soil gas monitoring was temporarily suspended during the implementation of the PCAP SVE Pilot Test. As a result, DON is revising the vadose zone monitoring strategy/procedure for IRP Site 16 in consultation with the regulatory agencies. Vadose zone monitoring was suspended at IRP Site 16 after the March 2008 sampling event pending review of a revised monitoring strategy/procedure

#### 6.4.2.5 VADOSE ZONE REMEDIATION DATA

Pilot tests were conducted at IRP Site 16 that led to significant VOC mass removal from the vadose zone at the site. The first pilot test included assessment of MPE for treating VOCs in the subsurface. MPE pilot testing was conducted at IRP Site 16 in accordance with the recommendation in the Phase II RI between September 2000 and April 2001. During the pilot test, both soil gas and groundwater were extracted from the pilot test area centered at the main crash crew training pit.

The pilot test concluded that MPE was effective for removing VOCs from the vadose zone soil, and reduced VOC concentrations in soil within the source area to levels that are protective of groundwater. However, the pilot test results indicated that MPE was not effective for removing VOCs from groundwater. MPE was not considered viable on the basis of the MPE pilot test results and excluded as a potential remedy element during remedial alternative selection. As a result of the source area reduction using MPE, the RAOs developed in the focused FS were revised to focus on reducing TCE concentrations in groundwater (see Section 4.2.1).

As part of the PCAP, remediation of petroleum constituents including TPH as gasoline (TPH-g) and TPH as diesel (TPH-d) is being conducted in the area containing the three former pits (also referred to as MSC B3) at IRP Site 16. A SVE pilot test was conducted at MSC B3 from July 27, 2006

through January 12, 2007 (see Figure 3-5) (ECS 2008). As part of the pilot test, 18 SVE wells were installed and SVE was implemented using a portable trailer-mounted SVE system. Analytical results from vapor samples collected from the influent and effluent sample ports indicated that approximately 374 pounds of TPHg and 15.6 pounds of total VOCs (99 percent TCE) were recovered in the vicinity of MSC B3 during the SVE pilot test.

Confirmation soil sampling conducted following implementation of SVE to depths of approximately 60 to 140 feet bgs indicated that concentrations of TPHg and TPHd were reduced by more than half, and concentrations of VOCs were reduced by more than an order of magnitude. Based on these results and the information from contaminant vertical transport modeling, it was concluded that the current condition of vadose zone in the vicinity of three former training pits at MSC B3 is protective of groundwater. The Closure Report recommended NFA for MSC B3 (ECS 2008). However, based on RWQCB comments on the Closure Report, the removal of residual petroleum hydrocarbons by excavation of soil is planned as part of PCAP at the site.

#### 6.4.2.6 COMPLIANCE WITH ICs

The DON currently leases the area containing IRP Site 16 to the Heritage Fields, LLC (OCGP Corporation and Lennar Corporation), a private developer (DON and Heritage Fields, LLC 2005b). The interim land-use restrictions at IRP Site 16 are being administratively handled through a LIFO until the time carve-out containing IRP Site 16 (see Figure 3-5) is conveyed by deed to the Lessee (DON and Heritage Fields 2005b). The interim land-use restrictions in the LIFO prevent activities that may adversely impact the remedy components or may present unacceptable risks to human health and the environment. The Lessee is required to fill out a PERF for any work proposed in the leased portion of the property. Based on the evaluation of PERFs submitted to date, no activities have been conducted at IRP Site 16 that may adversely affect the remedy integrity and present unacceptable risk to human health.

#### 6.4.3 IRP Sites 18 and 24

Quarterly groundwater monitoring and system operation data summaries and annual remedy status reports were reviewed to evaluate the remedial progress. Data collected included system operation data, compliance sampling results, and groundwater monitoring data. It should be noted that detailed O&M Reports presenting data for the IRP Site 18 groundwater extraction system and for the IRP Sites 18 and 24 Treatment Plants were not available from IRWD during the preparation of this Five-Year Review Report. Therefore, only operational summaries prepared by IRWD and previously presented to the BCT were evaluated as part of this five-year review. This five-year review is based on the review of the available data collected as part of system O&M for IRP Sites 18 and 24 for a period of approximately 2.5 years, starting from system startup to March 2009.

##### 6.4.3.1 VOC MASS REMOVAL FROM SGU AND PA

The total VOC mass removed from the SGU since system startup until August 2008 is estimated at 602 pounds or 22 percent of the total estimated baseline mass in-place (2,700 pounds) (Weston 2008a). Since April 2007, the average rate of VOC removal has been consistent at approximately 30 pounds per month.

Groundwater is extracted from the PA using three wells, ET-1, ET-2, and IRWD-78. Since ET-2 and IRWD-78 are located in the areas of the PA where TCE concentrations are generally below the MCL, mass removal was only calculated for ET-1. The total VOC mass removed during the second year of operation (September 2007 to August 2008) from ET-1 was 29 pounds. Currently the average VOC mass removal is approximately 2.5 pounds per month.

Groundwater extracted from the SGU and PA is being treated at the SGU and PA Treatment Plants which are operated by the IRWD. TCE is first removed from extracted groundwater using air-strippers that transfer it into vapor phase; vapor phase TCE is then treated using two GAC filters in series. An evaluation of treatment system data indicates that the air-strippers at the SGU and PA Treatment Plants are removing TCE from extracted groundwater at removal efficiencies approaching 100 percent (IRWD 2009).

A review of influent and effluent TCE concentrations for the vapor-phase GAC filters indicated breakthrough of VOCs through both the primary and secondary filters. Carbon replacement was not performed at required frequencies at either the SGU or PA Treatment Plants. This led to incomplete treatment of TCE vapors and their subsequent discharge into the atmosphere from the SGU Treatment Plant between October 2007 and April 2008 and between December 2008 and March 2009; and from the PA Treatment Plant between February 2008 and March 2009. Although the carbon replacement was not performed at the recommended intervals, the treatment systems did not pose unacceptable risks to human health according to SCAQMD health risk criteria.

Both treatment systems are operated under SCAQMD Permits that require treatment of VOCs to comply with SCAQMD Rule 1401 and to not pose an unacceptable risk to human health for nearby receptors. An evaluation of the risks associated with these VOC discharges was performed using the methodology and calculator developed by the SCAQMD. This evaluation, based on available monitoring data, assumed the GAC filters were operating at zero percent efficiency (i.e. no treatment of vapor phase TCE) and maximum TCE air discharge rates. Results from this risk evaluation indicated that TCE vapors discharged into the atmosphere did not pose unacceptable risks to human health for potential residential and/or commercial receptors. Risk estimates for the SGU and PA Treatment Plants did not exceed the SCAQMD Rule 1401 risk threshold of ten in one million ( $1 \times 10^{-5}$ ). Therefore, the treatment systems met the thresholds of SCAQMD ARARs identified in the ROD for IRP Sites 18 and 24.

#### 6.4.3.2 GROUNDWATER ELEVATION MONITORING AND HYDRAULIC CAPTURE

The design and extraction strategy was to initially focus extraction in areas with higher VOC concentrations near and down-gradient of the source area with extraction subsequently increasing towards the Base boundary. A review of groundwater elevation data and modeling results indicates that the extraction well-field is performing as designed, resulting in capture of the on-Station portion of the SGU plume. Consistent with this design and extraction strategy, and as documented in the 2008 Annual Report, the contingency wells along the Base boundary will be installed to enhance plume capture at and down-gradient of the Base boundary.

The modeling results based on average extraction rates sustained through August 2007 project complete capture of the VOC plume in the PA over a 40 year period. However, over the last six months extraction rates have on average been lower than values used in the predictive model or stipulated in decision documents. If these lower flow rates persist, the model should be updated to evaluate the long term effects associated with these lower extraction rates.

Due to the relatively short period of operation, the capture of the plume (based on TCE concentrations) cannot be fully evaluated. The data indicate an overall reduction in hot-spot areas (TCE concentrations exceeding 500  $\mu\text{g/L}$ ) at IRP Site 24 when the baseline data collected in September 2006 are compared to the data collected in July 2008 (see Figure 6-1). Concentrations in the PA have been relatively stable since system startup.

#### 6.4.3.3 GROUNDWATER EXTRACTION FLOW RATES

Of the three wells (ET-1, ET-2, and IRWD-78) used for extraction of groundwater from the PA, TCE concentrations exceed MCLs in groundwater extracted from ET-1. The design flow-rate for ET-1 is 1,000 gpm; however, it is currently operated at flows less than the design value due to problems related to treatment plant operation. These problems include flooding of air-stripper trays and activation of the relief valve at flows greater than 850 gpm.

The average extraction flows for IRWD-78 and ET-2 are also lower than their design values of 600 and 1,300 gpm, respectively. As noted above, the long term effects of the lower extraction rates on plume capture will need to be evaluated if the extraction rates observed over the last six months persist.

#### 6.4.3.4 COMPLIANCE WITH ICs

##### **On-Base Portion of the SGU Plume**

The DON currently leases the on-Base portion of the area overlying SGU plume to Heritage Fields, LLC (OCGP Corporation and Lennar Corporation) (see Figures 3-2). The interim land-use restrictions for this area are being administratively handled through a LIFOc until the time property Carve-Out areas overlying the SGU plume are conveyed by deed to the Lessee (DON and Heritage Fields 2005a and DON and Heritage Fields 2005c). The interim land-use restrictions in the LIFOc prevent activities that may adversely impact the SGU remedy components or may present unacceptable risks to human health and the environment. The Lessee is required to fill out a PERF for any work proposed in the leased portion of the property. Based on the evaluation of PERFs submitted to date, no activities have been conducted in the area overlying the SGU plume that may adversely affect the remedy or present unacceptable risk to human health.

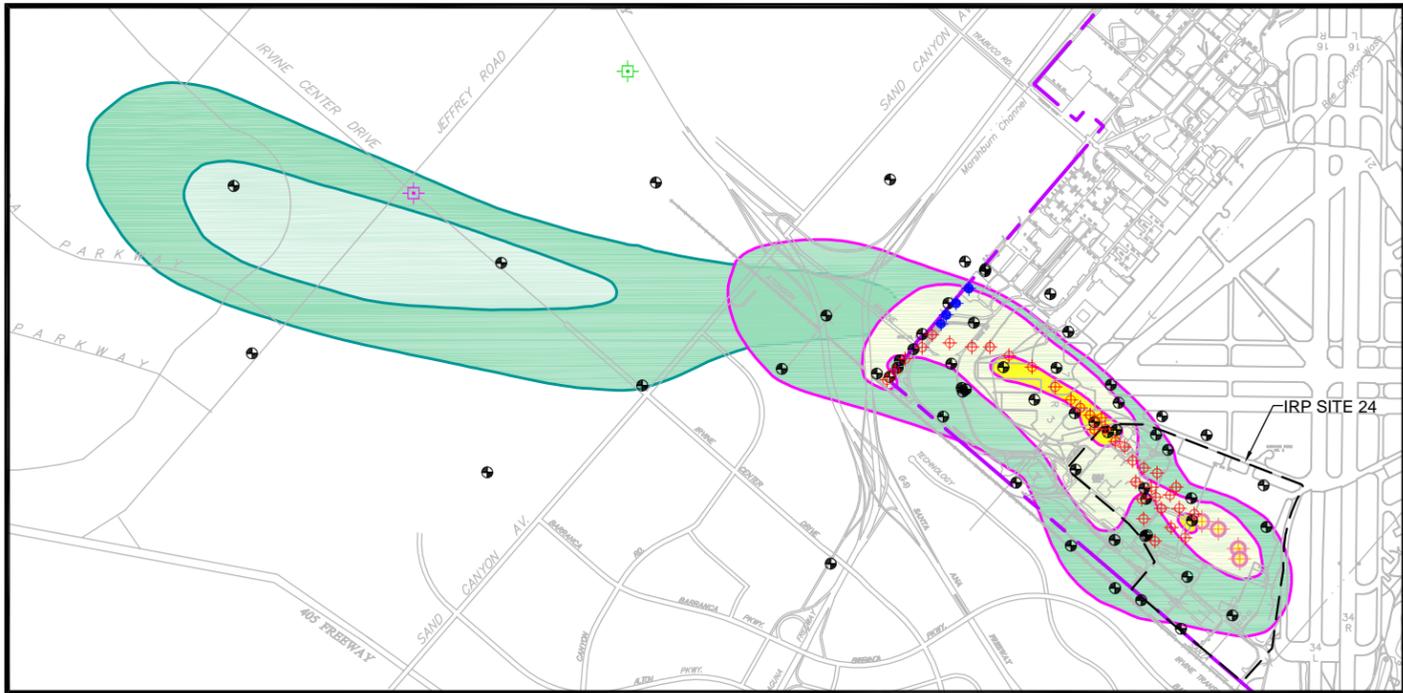
##### **Off-Base Portions of VOC Groundwater Plumes**

The ICs for the off-Base portion of the VOC groundwater plumes associated with IRP Sites 18 and 24 (see Figure 3-2) are based on local permit programs administered by OCHCA and IRWD. The OCHCA and IRWD have completed checklists for calendar years 2006 through 2008 that indicate that no applications for new well permits were received and no new permits were issued by IRWD and/or by OCHCA for wells within the geographic boundaries of IRP Sites 18 and 24. These checklists were presented to the regulatory agencies in the Final Annual Remedy Status Report for 2007-2008 for IRP Sites 18 and 24, which was issued in May 2009 (Weston 2009b).

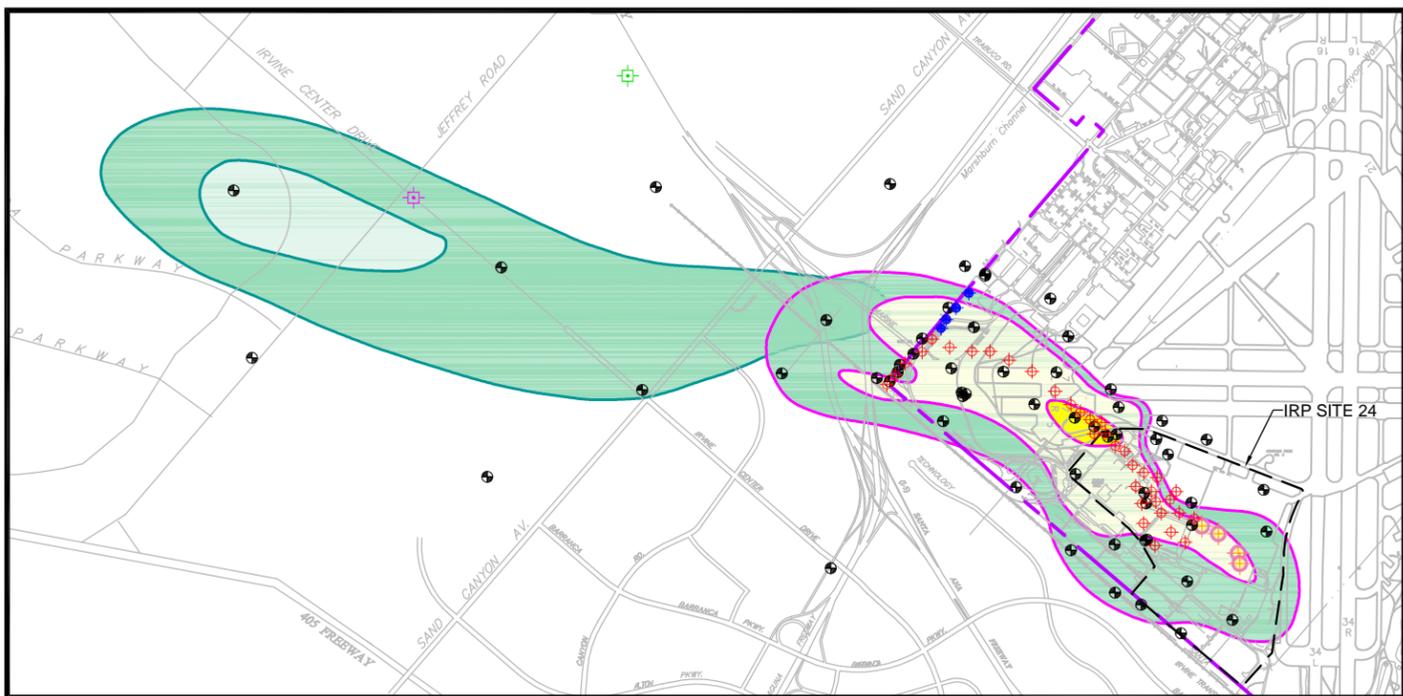
## **6.5 SITE INSPECTION**

Site inspections were conducted for IRP Sites 2, 16, 17, 18, and 24 as part of the five-year review to provide information about the status of these sites, and to visually confirm and document the conditions of the remedies, the sites, and the surrounding areas. The first inspection event for IRP Sites 2, 16, 17, 18, and 24 was conducted on 11 March 2009. This inspection was conducted by a team consisting of representatives from the DON, BRAC PMO West, U.S. EPA Region 9, DTSC, RWQCB, and OCHCA.

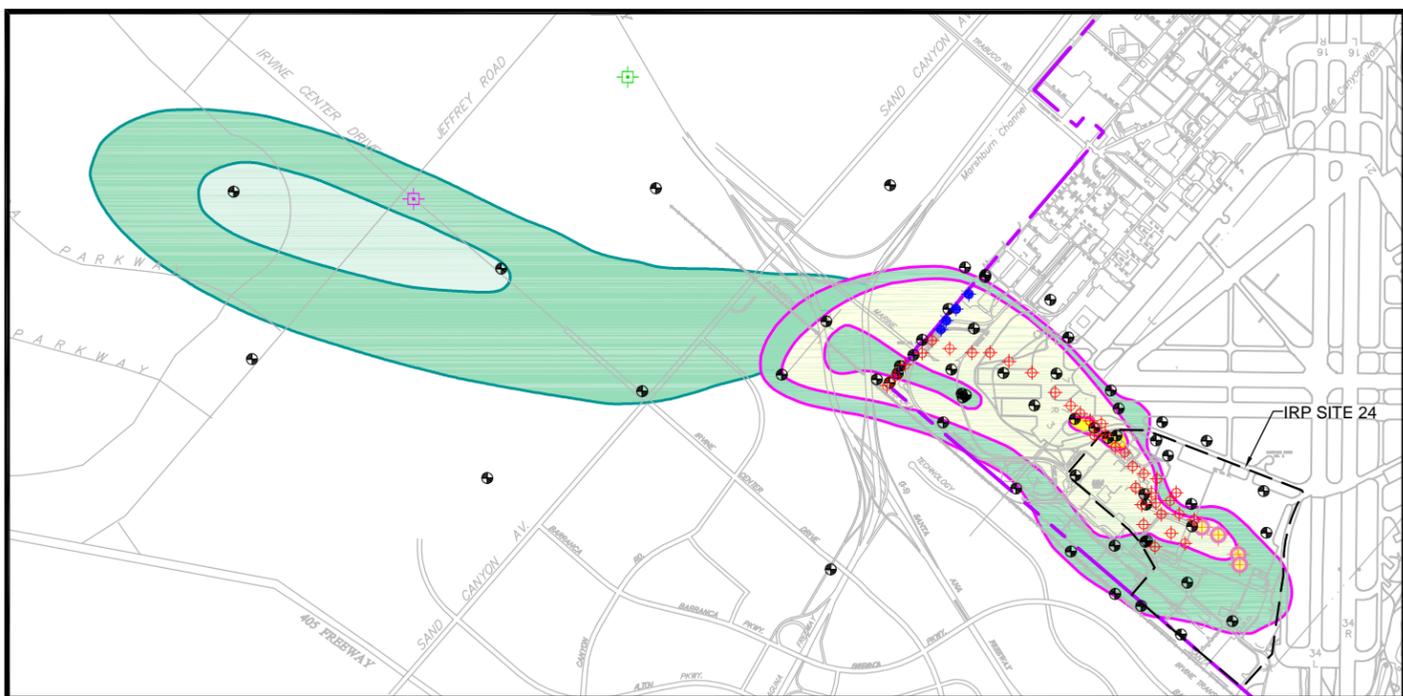
Table 6-2 presents a list of participants for the 11 March 2009 site inspection. During this inspection, representative features of the implemented remedies at IRP Sites 2, 16, 17, 18, and 24 including selected groundwater/perimeter gas monitoring wells, VOC treatment system components, and landfill cover components such as vegetation and drainage features were inspected. Additional detailed inspections of the remedies at IRP Site 2, 16, 17, 18, and 24 were conducted by O&M



SEPTEMBER 2006 BASELINE



AUGUST 2007 (END OF 1ST YEAR OF OPERATION)



JULY 2008 (END OF 2ND YEAR OF OPERATION)

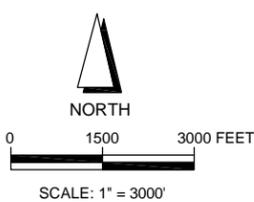
**LEGEND**

- Monitoring Well
- ⊕ Existing SGU Extraction Well
- ◆ Proposed SGU Extraction Well (To be Installed at a Later Date)
- ⊕ Principal Aquifer Extraction Well (Non-Potable)
- ⊕ Principal Aquifer Extraction Well (Potable)
- ⊕ Well to be used for Evaluation of SVE Enhancement
- IRP Site 24 Boundary
- - - Former MCAS El Toro Boundary
- SGU Plume Boundary
- Principal Aquifer Plume Boundary

- 5 µg/L TCE Isoconcentration Contour
- 10 µg/L TCE Isoconcentration Contour
- 50 µg/L TCE Isoconcentration Contour
- 500 µg/L TCE Isoconcentration Contour

**NOTES:**

- µg/L Microgram per Liter
- IDP Irvine Desalter Project
- IRP Installation Restoration Program
- OU Operable Unit
- TCE Trichloroethene



Five Year Review Report		Final
<b>TCE Isoconcentration Contours Over Time</b>		
<b>IRP Sites 18 and 24</b>		
IRP Sites 2, 16, 17, 18, and 24		
Date: 09-09	Former MCAS El Toro	
Project No. 104766	<b>EARTH TECH   AECOM</b>	Figure 6-1

**Table 6-2: Details of Site Inspections**

Site	Inspection Date	Inspection Participants
IRP Site 2	11 March 2009	DON <ul style="list-style-type: none"> <li>• Content Arnold (Lead RPM)</li> <li>• Marc Smits (RPM)</li> <li>• Dina Walton (RPM)</li> <li>• Scott Kehe (Navy ROICC)</li> </ul> Regulatory Agencies <ul style="list-style-type: none"> <li>• Rich Muza (RPM, U.S. EPA)</li> <li>• Quang Than (RPM, DTSC)</li> <li>• Dave Murchison (DTSC)</li> </ul> DON Five-Year Review/O&M Contractor <ul style="list-style-type: none"> <li>• Crispin Wanyoike (Project Manager, ATS)</li> <li>• Jeff Stanek (Project Hydrogeologist, ATS)</li> <li>• Harvinder Singh (Project Engineer, ATS)</li> </ul> OCHCA <ul style="list-style-type: none"> <li>• James Strozier (Hazardous Waste Specialist)</li> </ul>
	12 March 2009	DON O&M Contractor <ul style="list-style-type: none"> <li>• Hsien Chen (Senior Engineer, ATS)</li> </ul>
IRP Site 16	11 March 2009	DON <ul style="list-style-type: none"> <li>• Content Arnold (Lead RPM)</li> <li>• Marc Smits (RPM)</li> <li>• Dina Walton (RPM)</li> <li>• Scott Kehe (Navy ROICC)</li> </ul> Regulatory Agencies <ul style="list-style-type: none"> <li>• Rich Muza (RPM, U.S.EPA)</li> <li>• Quang Than (RPM, DTSC)</li> <li>• Dave Murchison (DTSC)</li> <li>• John Broderick (RPM, RWQCB)</li> </ul> DON Five-Year Review Contractor <ul style="list-style-type: none"> <li>• Crispin Wanyoike (Project Manager, ATS)</li> <li>• Jeff Stanek (Project Hydrogeologist, ATS)</li> <li>• Harvinder Singh (Project Engineer, ATS)</li> </ul> DON O&M Contractor <ul style="list-style-type: none"> <li>• Randa Chichakli (Project Manager, CDM)</li> </ul>
IRP Site 17	11 March 2009	DON <ul style="list-style-type: none"> <li>• Content Arnold (Lead RPM)</li> <li>• Marc Smits (RPM)</li> <li>• Dina Walton (RPM)</li> <li>• Scott Kehe (Navy ROICC)</li> </ul> Regulatory Agencies <ul style="list-style-type: none"> <li>• Rich Muza (RPM, U.S. EPA)</li> <li>• Quang Than (RPM, DTSC)</li> <li>• Dave Murchison (DTSC)</li> </ul> DON Five-Year Review/O&M Contractor <ul style="list-style-type: none"> <li>• Crispin Wanyoike (Project Manager, ATS)</li> <li>• Jeff Stanek (Project Hydrogeologist, ATS)</li> </ul>

Site	Inspection Date	Inspection Participants
		<ul style="list-style-type: none"> <li>Harvinder Singh (Project Engineer, ATS)</li> </ul> OCHCA <ul style="list-style-type: none"> <li>James Strozier (Hazardous Waste Specialist)</li> </ul>
	12 March 2009	DON O&M Contractor <ul style="list-style-type: none"> <li>Hsien Chen (Senior Engineer, ATS)</li> </ul>
IRP Site 18	11 March 2009	DON <ul style="list-style-type: none"> <li>Content Arnold (Lead RPM)</li> <li>Marc Smits (RPM)</li> <li>Dina Walton (RPM)</li> <li>Scott Kehe (Navy ROICC)</li> </ul> Regulatory Agencies <ul style="list-style-type: none"> <li>Rich Muza (RPM, U.S.EPA)</li> <li>Quang Than (RPM, DTSC)</li> <li>Dave Murchison (DTSC)</li> <li>John Broderick (RPM, RWQCB)</li> </ul> DON Five-Year Review Contractor <ul style="list-style-type: none"> <li>Crispin Wanyoike (Project Manager, ATS)</li> <li>Jeff Stanek (Project Hydrogeologist, ATS)</li> <li>Harvinder Singh (Project Engineer, ATS)</li> </ul> DON O&M Contractor <ul style="list-style-type: none"> <li>Tracy Walker (Project Manager, Weston)</li> <li>David Hemend (Weston)</li> </ul> IRWD <ul style="list-style-type: none"> <li>John Hills</li> </ul>
	11 March 2009	IRWD <ul style="list-style-type: none"> <li>John Hills</li> </ul>
	30 March 2009 and 6 April 2009	IRWD
IRP Site 24	11 March 2009	DON <ul style="list-style-type: none"> <li>Content Arnold (Lead RPM)</li> <li>Marc Smits (RPM)</li> <li>Dina Walton (RPM)</li> <li>Scott Kehe (Navy ROICC)</li> </ul> Regulatory Agencies <ul style="list-style-type: none"> <li>Rich Muza (RPM, U.S.EPA)</li> <li>Quang Than (RPM, DTSC)</li> <li>Dave Murchison (DTSC)</li> <li>John Broderick (RPM, RWQCB)</li> </ul> DON Five-Year Review Contractor <ul style="list-style-type: none"> <li>Crispin Wanyoike (Project Manager, ATS)</li> <li>Jeff Stanek (Project Hydrogeologist, ATS)</li> <li>Harvinder Singh (Project Engineer, ATS)</li> </ul> DON O&M Contractor <ul style="list-style-type: none"> <li>Tracy Walker (Project Manager, Weston)</li> </ul> IRWD <ul style="list-style-type: none"> <li>John Hills</li> </ul>
	18 March 2009	DON O&M Contractor

Site	Inspection Date	Inspection Participants
		<ul style="list-style-type: none"> <li>Tracy Walker (Weston)<sup>a</sup></li> </ul>
	11 March 2009	IRWD <ul style="list-style-type: none"> <li>John Hills<sup>b</sup></li> </ul>
	30 March 2009 and 6 April 2009	IRWD

Notes:

<sup>a</sup> The scope of inspections included SGU extraction/monitoring well network, conveyance system, and transfer station.

<sup>b</sup> The scope of inspections included SGU Treatment Plant.

contractors on the dates listed in Table 6-2. The results of the site inspections are documented in the subsections below.

### 6.5.1 IRP Sites 2 and 17

Site inspections were conducted at IRP Sites 2 and 17 to assess the condition of the remedies including fences and caution signs for access control, the integrity of the caps, and the condition of monitoring wells and features for storm water control. The results of the inspection events at IRP Sites 2 and 17 were compiled in one inspection checklist for each site and included in Appendix A. The photographs taken during the inspection event on 11 March 2009 are presented in Appendix B.

The inspections indicated that cracks, settlement, holes, and bulges were generally not evident on IRP Sites 2 and 17 landfill covers. Minor erosion was observed at both IRP Sites 2 and 17 landfills. No evidence of settlement, degradation, erosion, undercutting, obstruction, or excessive vegetation growth was observed during the inspection of the drainage system at IRP Sites 2 and 17. The groundwater and perimeter gas monitoring wells, and lysimeters are in good condition and functioning as designed. No evidence of activities was observed at IRP Sites 2 and 17 during the inspections of these sites that were inconsistent with land-use restrictions presented in the O&M Plan.

The DON's O&M Contractor noted that routine O&M of the landfills at IRP Sites 2 and 17 have been initiated. CSS restoration on the landfill cover has progressed well at IRP Site 2 and provides adequate cover to minimize erosion. For IRP Site 17, the CSS restoration is ongoing and large areas of the landfill cover presently have little or no vegetation. As a result during the rainfall events, erosion gullies developed along the access road, which were repaired promptly. In addition, top soil has been regarded at IRP Site 17 to improve drainage and minimize ponding.

### 6.5.2 IRP Site 16

Site inspections were conducted at IRP Site 16 to assess the condition of the remedy including groundwater monitoring wells and sampling pumps/tubing. The results of the inspection events at IRP Site 16 were compiled in one inspection checklist, which is included in Appendix A. The photographs taken during the inspection event on 11 March 2009 are presented in Appendix B.

The inspections indicated that components of the IRP Site 16 remedy including groundwater monitoring wells, and gas monitoring probes/wells are in good condition and functioning as designed. Site conditions indicate that ICs are being properly implemented.

The DON's O&M Contractor for IRP Site 16 noted that maintaining positive drainage on the graded former main pit area is part of the IRP Site 16 remedy and although it is possible to evaluate the overall site drainage pattern, the recent vegetation growth has made it difficult to assess whether

there may be small areas of water ponding on the graded former pit. Subsequent to site-inspection, OCGP mowed the grass and the Navy confirmed positive drainage at the source area.

The O&M Contractor also noted that soil gas concentrations have not yielded consistent results and soil gas sampling procedures were being revised by the DON and regulatory agencies. The overall observations of the O&M Contractor regarding VOC concentrations in groundwater are reflected in the discussion of data review for IRP Site 16 in Section 6.4.2.

During the inspection of IRP Site 16 and the subsequent interview (see Section 6.6), the U.S. EPA noted that IRP Site 16 was assessed for the potential vapor intrusion pathway in 2004 (BNI 2004); and as part of the five-year review the DON needs to reassess whether the data, assumptions, and methodology used in this evaluation are still valid and if conditions at the site continue to not pose a threat to public health via the potential vapor intrusion pathway. The protectiveness evaluation of the remedy at IRP Site 16 including protection against potential vapor intrusion is presented in Section 7.2.2 of this report.

### **6.5.3 IRP Site 18**

Site inspections were conducted for IRP Site 18 by the DON and IRWD to assess the condition of the remedy components including extraction/monitoring wells, pumps, treatment system components, electrical enclosures/panels, and access restrictions such as fencing and gates. The results of the inspection events at IRP Site 18 were compiled in one inspection checklist, which is included in Appendix A. The photographs taken during the inspection event on 11 March 2009 are presented in Appendix B.

The inspection events indicated that the components of the groundwater extraction remedy at IRP Site 18 including monitoring/extraction wells, pumps, wellhead plumbing, extraction system pipelines, valves, electrical enclosures, tanks, and treatment system components (air stripper, GAC, and pumps) are in good condition.

IRWD representatives indicated that, based on water quality data, the IRP Site 18 treatment system is successfully removing TCE from groundwater. However, the treatment of vapor phase TCE by carbon adsorption has been incomplete, since carbon replacement was not performed at the required frequencies. The overall observations of the IRWD regarding operation of the remedy, VOC mass removed, and VOC concentrations, are reflected in the discussion of data reviewed for IRP Site 18 in Section 6.4.3. The IRWD also indicated that it is seeking engineering improvements including controls to increase the air stripper influent flow rate from the current limit of 850 gpm to the design rate of 1,000 gpm.

During the inspection of IRP Site 18 and the subsequent interview (see Section 6.6), the U.S. EPA noted that as part of the five-year review, the DON needs to provide multiple lines of evidence that support the conclusion that conditions at the site do not pose a threat to public health via the potential vapor intrusion pathway. The protectiveness evaluation of the remedy at IRP Site 18 including protection against potential vapor intrusion is presented in Section 7.3.2 of this Report.

### **6.5.4 IRP Site 24**

Site inspections were conducted at IRP Site 24 to assess the condition of the remedy including extraction/monitoring wells, pumps, treatment system components, electrical enclosures/panels, and access restrictions such as fencing and gates. The results of the inspection events at IRP Site 24 were compiled in two inspection checklists, which are included in Appendix A. The first inspection checklist was substantially completed by the DON's O&M Contractor and pertains to the

groundwater extraction and conveyance system. The second inspection checklist was substantially completed by the IRWD and pertains to the SGU treatment system. The photographs taken during the inspection event on 11 March 2009 are presented in Appendix B.

The inspections indicated that components of the groundwater extraction remedy at IRP Site 24 including monitoring/extraction wells, pumps, wellhead plumbing, extraction system pipelines, valves, electrical enclosures, equalization tanks, and SGU treatment system components (air stripper, GAC and pumps) are in good condition. The IRWD representative indicated that TCE is being effectively removed from groundwater by the air stripper. However, the treatment of TCE-impacted air by carbon adsorption has been incomplete since carbon replacement was not performed at a required frequency. The overall observations of the IRWD regarding operation of the remedy, VOC mass removed, and VOC concentrations, are reflected in the discussion of data review for IRP Site 24 in Section 6.4.3. Site conditions at IRP Site 24 indicate that ICs are being properly implemented.

The DON's O&M contractor indicated that there have been no significant issues with SGU extraction and conveyance system operation to date. The overall observations of the DON's O&M Contractor regarding operation of the remedy, VOC mass removed, VOC concentrations, and hydraulic capture of the plume are reflected in the discussion of data review for IRP Site 24 in Section 6.4.3.

During the inspection of IRP Site 24 and the subsequent interview (see Section 6.6), the U.S. EPA noted that IRP Site 24 was assessed for the potential vapor intrusion pathway in 2004 (BNI 2004); and as part of the five-year review the DON needs to reassess whether the data, assumptions, and methodology used in this evaluation are still valid and conditions at the site continue to not pose a threat to public health via the potential vapor intrusion pathway. The protectiveness evaluation of the remedy at IRP Site 24 including protection against potential vapor intrusion is presented in Section 7.3.2 of this report.

## 6.6 INTERVIEWS

Interviews were conducted as part of the five-year review with various stakeholders to provide additional information about the status of IRP Sites 2, 16, 17, 18, and 24. A list of interviewees is presented in Table 6-3.

**Table 6-3: List of Interviewees - IRP Sites 2, 16, 17, 18 and 24**

Interviewee Name	Title	Affiliation	IRP Site
<i>DON</i>			
Content Arnold	Lead RPM	DON BRAC PMO West	2, 16, 17, 18, and 24
Marc Smits	RPM	DON BRAC PMO West	2, 17, 18, and 24
Louie Cardinale	RPM	DON BRAC PMO West	16
<i>Regulatory Agencies</i>			
Rich Muza	RPM	U.S. EPA	2, 16, 17, 18, and 24
John Broderick	RPM	RWQCB, Santa Ana Region	2, 16, 17, 18, and 24
Quang Than	RPM	DTSC	2, 16, 17, 18, and 24
<i>RAB</i>			
Robert Woodings	RAB Co-Chair	RAB, Former MCAS El Toro	2, 16, 17, 18, and 24

Interviewee Name	Title	Affiliation	IRP Site
Marcia Rudolph	RAB Subcommittee Chair	RAB, Former MCAS El Toro	2, 16, 17, 18, and 24
<i>DON O&amp;M Contractors</i>			
Crispin Wanyoike	Project Manager, O&M Contractor	ATS	2 and 17
Randa Chichakli	Project Manager, O&M Contractor	CDM	16
Tracy Walker	Project Manager, O&M Contractor	Weston Solutions, Inc.	18 and 24
<i>Other</i>			
Roy Herndon	Chief Hydrogeologist	OCWD	18 and 24
John Hills	Director of Water Quality	IRWD	18 and 24
James Werkmeister	Manager, Environmental Affairs	Lennar	2, 16, 17, 18, and 24
Glen Worthington	Manager of Planning and Environmental Services	OCGP	2, 16, 17, 18, and 24

Detailed interview documentation for each IRP site addressed in this five-year review is presented in Appendices C through H. The documentation includes the listing of interviewees for each site, date and time of the interview, contact information, and responses to interview questions. Specific interview results for the five IRP sites addressed in this five-year review report are discussed below.

### 6.6.1 IRP Sites 2 and 17

The lists of interviewees for IRP Sites 2 and 17 are presented on the interview documentation forms presented in Appendix C. Individual interview records documenting each interview are presented in Appendix D.

The following subsections provide a brief summary of the interviews.

#### Overall Performance/Impression of the Remedy

Ms. Content Arnold (Lead RPM, DON BRAC PMO West), Mr. Marc Smits (RPM, DON BRAC PMO West), and Mr. Glen Worthington (Manager of Planning and Environmental Services, OCGP) indicated that the remedies implemented at IRP Sites 2 and 17 have been successful. Mr. Jim Werkmeister (Manager, Environmental Affairs, Lennar) and Mr. Crispin Wanyoike (Project Manager, O&M, IRP Sites 2 and 17) indicated that the remedies at IRP Sites 2 and 17 are being implemented as intended or as specified in the ROD/ Design Submittal. No significant problems were identified regarding the implemented remedies during the interviews.

#### Community Concerns/Effects

Mr. Robert Woodings (RAB Co-Chair), Ms. Content Arnold, and Mr. Marc Smits indicated that they were not aware of any community concerns regarding IRP Site 2 and 17 or their operation and administration. Ms. Marcia Rudolph (RAB Subcommittee Chair) did not list any community concerns regarding IRP Site 17 and indicated that the community will continue to monitor the reports summarizing the condition of the containment remedy at IRP Site 2. Mr. Marc Smits noted

that the activities conducted as part of remedial action construction at IRP Sites 2 and 17 had little to no impact on the surrounding community.

### **Problems Encountered during Remedy Construction**

Ms. Content Arnold, Mr. Marc Smits, and Mr. James Werkmeister (Manager, Environmental Affairs, Lennar) mentioned the effects of October 2007 Santiago Wildfire on the remedial construction activities at IRP Sites 2 and 17. This fire damaged IRP Site 2 remedy components including the erosion control matting and irrigation system. The damaged components of the IRP Site 2 remedy were repaired/replaced to ensure that the remedy functioned as designed. The fires also destroyed existing vegetation at IRP Site 17 before the construction of the landfill cap began at the site.

### **Problems Encountered during O&M**

Mr. Marc Smits and Mr. Crispin Wanyoike identified two problems encountered during O&M activities at IRP Sites 2 and 17. These problems include a constriction in groundwater monitoring well at IRP Site 2 and erosion at IRP Site 17 due to intense rains. A brief discussion of these problems is presented in Section 4.1.3.5.

### **Effectiveness of Land-Use Controls**

Mr. Rich Muza (U.S. EPA RPM), Mr. Quang Than (DTSC RPM), and Mr. John Broderick (RWQCB RPM) indicated that LUCs have been effective at IRP Sites 2 and 17.

### **Communication of Site Activities and Progress**

The representatives of the regulatory agencies (Mr. Rich Muza, Mr. Quang Than, and Mr. John Broderick), community (Mr. Robert Woodings and Ms. Marcia Rudolph), Lennar (Mr. James Werkmeister), and OCGP (Mr. Glen Worthington) feel that they are well informed about the activities and progress at IRP Sites 2 and 17. Mr. Robert Woodings indicated that the RAB meeting minutes are sufficiently detailed; therefore, the members of the community can remain well informed.

### **Other Comments/Suggestions/Recommendations**

The following additional comments/suggestions/recommendations were made during the interviews:

- Mr. Robert Woodings indicated that the DON should make internet resources for information on IRP Sites 2 and 17 easier to find.
- Mr. Glen Worthington indicated that OCGP is planning on opening discussions with the Department of the Interior/FAA regarding access to the areas in the vicinity of IRP Site 2 for guided (docent-lead) tours.
- Mr. Robert Woodings indicated that wells associated with IRP Site 2 groundwater investigation will need to be relocated as part of the Alton Parkway construction. The DON is currently coordinating with the County of Orange regarding the construction of Alton Parkway and its potential effects on the IRP Site 2 remedy.

#### **6.6.2 IRP Site 16**

A list of interviewees for IRP Site 16 is presented on the interview documentation forms presented in Appendix E. Individual interview records documenting each interview are presented in Appendix F.

The following subsections provide a brief summary of the interviews.

## **Overall Performance/Impression of the Remedy**

Ms. Randa Chichakli indicated that the IRP Site 16 monitoring program is effectively monitoring the natural attenuation of the TCE plume and is adequate to maintain the protectiveness of the remedy except on the western side of the plume. As noted in Section 6.4.2.2, Ms. Randa Chichakli noted that groundwater monitoring network would be augmented as required to confirm distribution of TCE to the west and northwest. Ms. Content Arnold indicated that the OPS report for IRP Site 16 was finalized in September 2007 and concurred upon by the U.S. EPA and the State of California.

## **Community Concerns/Effects**

Mr. Robert Woodings, Ms. Marcia Rudolph, Ms. Content Arnold, and Mr. Louie Cardinale indicated that they were not aware of any community concerns regarding IRP Site 16. Mr. Rich Muza indicated that an issue of perceived threat from potential vapor intrusion due to TCE plumes in the Irvine area has been questioned by the public. Mr. Muza further indicated that IRP Site 16 was assessed for the potential vapor intrusion pathway in June 2004 (BNI 2004) and U.S. EPA recommends that the DON reassess whether the data, assumptions, and methodology used in this evaluation are still valid and if conditions at the site continue to not pose a threat to public health via the potential vapor intrusion pathway. The protectiveness evaluation of the remedy at IRP Site 16 including protection against potential vapor intrusion is presented in Section 7.2.2 of this report.

## **Effectiveness of Land-Use Controls**

Mr. Rich Muza and Mr. Quang Than indicated that LUCs have been effective at IRP Site 16. Mr. John Broderick indicated that it is too early to comment on the effectiveness of the LUCs since IRP Site 16 has not been redeveloped.

## **Communication of Site Activities and Progress**

The representatives of the regulatory agencies (Mr. Rich Muza, Mr. Quang Than, and Mr. John Broderick), community (Mr. Robert Woodings and Ms. Marcia Rudolph), Lennar (Mr. James Werkmeister), and OCGP (Mr. Glen Worthington) feel that they are well informed about the activities and progress at IRP Site 16.

## **Other Comments/Suggestions/Recommendations**

The following additional comments/suggestions/recommendations were made during the interviews:

- Mr. Rich Muza indicated that the planned PCAP at IRP Site 16 will temporarily impact the in-place remedy at the site. Mr. Muza further stated that U.S. EPA notified the DON in a letter on 2 February 2009 that U.S. EPA deems the existing monitoring wells at IRP Site 16 to be a significant component of the CERCLA MNA remedy. In the same letter, the U.S. EPA requested that at the conclusion of the PCAP, a report be submitted to the Agency that includes (1) well logs and construction details for all replacement monitoring wells and the comparison of the results of a round of ground-water quality sampling from the replacement monitoring wells to the TCE trend from the destroyed monitoring wells, and 2) details on the PCAP site regrading efforts to assure proper drainage in the TCE plume source area as mandated by the ROD for IRP Site 16.
- Mr. Quang Than suggested that some of the replacement wells destroyed during the PCAP should be placed at the most useful locations to monitor the VOC plume.
- Mr. Quang Than recommended that the DON should work with DTSC to ensure proper soil gas sampling in monitoring wells at IRP Site 16 (see Section 6.4.2.4 for details).

- Ms. Randa Chichakli indicated that although it is possible to evaluate the overall site drainage pattern, the recent vegetation growth has made it difficult to assess whether there may be small areas of water ponding on the graded former pit. Subsequent to site-inspection and interviews conducted as part of this five-year review, OCGP mowed the grass at IRP Site 16 and the Navy confirmed positive drainage at the source area
- Mr. James Werkmeister recommended that as part of property transfer, the DON should consider revision of IC boundaries consistent with the plume boundaries and monitoring well network.

### **6.6.3 IRP Sites 18 and 24**

The lists of interviewees for IRP Sites 18 and 24 are presented on the interview documentation forms presented in Appendix G. Individual interview records documenting each interview are presented in Appendix H.

The following subsections provide a brief summary of the interviews.

#### **Overall Performance/Impression of the Remedy**

Ms. Content Arnold, Mr. Marc Smits, and Mr. Roy Herndon (Chief Hydrogeologist, OCWD) indicated that the remedies implemented at IRP Sites 18 and 24 have been successful. Mr. Tracy Walker (Project Manager, O&M, IRP Sites 18 and 24) indicated that the SGU extraction system has effectively removed more than 600 pounds of VOCs. Mr. John Hills (IRWD) indicated that based on water quality data, the IRP Sites 18 and 24 Treatment Systems are successfully removing TCE from groundwater.

#### **Community Concerns/Effects**

Several interviewees including Ms. Content Arnold, Mr. Marc Smits, Mr. Robert Woodings, and Mr. Rich Muza indicated that the community has expressed concerns regarding IRP Sites 18 and/or 24. These concerns are summarized below:

- The community has expressed general concerns pertaining to the IRP Site 18 regional groundwater plume.
- The community has expressed concerns related to risks due to potential vapor intrusion from the groundwater plume. Mr. Rich Muza (U.S. EPA) indicated that an issue of perceived threat from potential vapor intrusion due to TCE plumes in the Irvine area has been questioned by the public. Mr. Muza further indicated that IRP Site 24 was assessed for the potential vapor intrusion pathway in June 2004 (BNI 2004) and that IRP Site 18 has not been formally assessed for the potential vapor intrusion pathway. The U.S. EPA recommended that for IRP Site 24, the DON should reassess whether the data, assumptions, and methodology used in previous vapor intrusion risk evaluation are still valid and if conditions at the site continue to not pose a threat to public health via the potential vapor intrusion pathway. For IRP Site 18, the DON should provide multiple lines of evidence that result in the conclusion that conditions at the site do not pose a threat to public health via the potential vapor intrusion pathway.
- Concerns have been raised about the use of water wells within IRP Site 24 and potential health hazards from military personnel potentially exposed to TCE while the Base was operational.
- Concerns were also raised in the Woodbridge Area regarding potential installation of a production well at the North Lake Beach Club.

- Ms. Marcia Rudolph indicated that continued monitoring and testing is required to assure the community of the effectiveness of the remedial action at IRP Sites 18 and 24.

Ms. Content Arnold and Mr. Marc Smits indicated that the DON has been proactive in providing information to address the concerns of the community. These efforts have included the following:

- The DON issued a Technical Memorandum that presents results of indoor air risk evaluation for IRP Site 24 (BNI 2004). This Memorandum concluded that no action is required to address potential exposure due to vapor intrusion. The U.S. EPA and the State of California concurred with this conclusion. In addition, per the comments received from U.S. EPA, as part of this five-year review the DON is reevaluating whether the data, assumptions, and methodology used in the 2004 risk evaluation for IRP Site 24 are still valid and if conditions at the site continue to not pose a threat to public health via a potential vapor intrusion pathway (see Section 7.3.2). For IRP Site 18, the DON is presenting multiple lines of evidence that support the conclusion that conditions at the site do not pose a threat to public health via a potential vapor intrusion pathway (see Section 7.3.2).
- The DON has responded to multiple Freedom of Information Act (FOIA) requests as well as informal requests for information related to the Base.
- The DON has provided responses to newspaper reporters' questions related to the ongoing cleanup and community concerns.
- The DON provides regular update of cleanup programs at former MCAS El Toro to the interested members of the community in RAB meetings.
- The DON issued a Fact Sheet to inform the public of the groundwater cleanup at IRP Sites 18 and 24 in August 2008. This Fact Sheet specifically addressed the concern regarding exposure to TCE via the Base historical water supply. In addition, an independent evaluation was completed by the Agency for Toxic Substances and Disease Registry.
- The community concerns in the Woodbridge Area regarding the installation of production well associated with the IDP were mitigated by locating the well to the northeast.

### **Significant O&M Events**

Mr. Marc Smits, Mr. Tracy Walker, and Mr. John Hills identified three problems encountered during O&M activities at IRP Sites 18 and 24. These problems include pump seizing and scaling issues with air strippers, flooding of well vaults, and damage to conveyance system components by lessee activates. A brief discussion of these problems is presented in Section 4.3.3.8. Mr. John Hills indicated that activated carbon was not replaced at the required frequency at both SGU and PA Treatment Plants and this deficiency will be corrected in future.

### **Effectiveness of Land-Use Controls**

Mr. Rich Muza and Mr. Quang Than indicated that LUCs have been effective at IRP Site 24. Mr. John Broderick indicated that it is too early to comment on the effectiveness of the LUCs since IRP Site 24 has not been redeveloped.

Mr. Rich Muza indicated that LUCs have been effective at IRP Site 18. Mr. Quang Than indicated that there should be some kind of prohibition or restriction on access to groundwater off-Base. Section 4.3.2.1 describes that the restrictions on access to groundwater off-Base are based on local permit programs administered by the OCHCA and IRWD. Mr. John Broderick indicated that LUCs for IRP Site 18 appear to be sufficient.

### **Communication of Site Activities and Progress**

The representatives of the regulatory agencies (Mr. Rich Muza, Mr. Quang Than, and Mr. John Broderick), the community (Mr. Robert Woodings and Ms. Marcia Rudolph), Lennar (Mr. James Werkmeister), and OCGP (Mr. Glen Worthington) feel that they are well informed about the activities and progress at IRP Sites 18 and 24.

### **Other Comments/Suggestions/Recommendations**

The following additional comments/suggestions/recommendations were made during the interviews:

- Mr. Marc Smits indicated that DON's contactor has done an excellent job of managing the O&M of IRP Site 24 and DON will continue to coordinate/communicate with IRWD/OCWD to evaluate the performance of the IRP Sites 18 and 24 treatment systems.
- Mr. Marc Smits, Mr. Quang Than and Mr. Tracy Walker noted that installation of four contingency wells is planned by the DON consistent with the remedial design to enhance hydraulic capture of the SGU plume near the Base boundary.
- Mr. Roy Herndon recommended continued use and refinement of the capture zone model based on empirical operational (e.g. drawdown) data so that the DON and IRWD/OCWD continue to have confidence in the model's ability to evaluate overall SGU plume containment.
- Mr. John Hills indicated that IRWD may evaluate options to increase the current flow rate (averaging 850 gpm) for the PA Treatment System to the design flow rate of 1,000 gpm. Currently, running at flows higher than 850 gpm creates operational problems such as flooding of the air stripper trays and activation of the relief feature.
- IRWD recommended review of the design, operation practices, and laboratory/field data by a specialized engineering firm to recommend potential improvements and optimization of the process.
- Mr. James Werkmeister recommended continued vigilance to protect remediation system components, and implementation of better marking of remediation system components and notifications during construction/development.

## 7. Technical Assessment

In accordance with the U.S. EPA guidance on five-year reviews (U.S EPA 2001), technical assessment for this five-year review focused on responses to the following three key questions for each of the five subject IRP Sites:

- 1) Question A: Is the remedy functioning as intended by the decision documents?
- 2) Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection still valid?
- 3) Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

The responses to these questions are discussed for each of the five IRP Sites below.

### 7.1 IRP SITES 2 AND 17

#### 7.1.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

The results of document review, site inspections, and interviews indicate that the remedy is functioning as intended by the ROD (DON 2000), as modified by the ESD (DON 2009). As documented in the RACR (Earth Tech 2009a), construction of the landfill caps at IRP Sites 2 and 17 and implementation of land-use restrictions achieve the RAOs developed for the two sites. The RACR presented a detailed discussion of the attainment of the RAOs by implementation of the landfill capping remedies.

The landfill caps were constructed per the ROD and design specifications presented in the remedial design submittal for IRP Sites 2 and 17 (Earth Tech 2005). The land-use restrictions are being implemented through two separate instruments, MOU (DON and FAA 2001) and LIFOC (DON and Heritage Fields 2005a), at IRP Sites 2 and 17. The MOU documents land-use restrictions for the IRP Sites 2 and 17 areas owned by FAA. The LIFOC documents land-use restrictions for buffer zone areas surrounding IRP Sites 2 and 17 landfill caps currently leased either to Heritage Fields, LLC or the city of Irvine. During the site inspections, the DON's O&M contractor did not observe evidence of any activities that were inconsistent with the land-use restrictions specified in the O&M Plan (Earth Tech 2009b). In accordance with the LUC Plan, the FAA (current owner of the major portion of ARICs at IRP Sites 2 and 17) completed the inspection checklists for ICs and submitted to DON on 20 March 2009. These inspection checklists will be included in the O&M reports for IRP Sites 2 and 17 to be issued at a later date. A review of completed checklists indicates that no activities were conducted in the ARICs within the boundary of FAA property that are inconsistent with the land-use restrictions documented in the LUC Plan. In addition, based on the review of the PERFs completed by the Lessee for portions of ARICs that are currently leased, no activities have been conducted at IRP Sites 2 and 17 that may adversely affect the integrity of the landfill caps and present unacceptable risk to human health due to potential exposure to residual contamination.

The observations made during site inspections (see Section 6.5.1) did not indicate any activities inconsistent with land-use restrictions documented in the LUC Plan. The site inspections also indicated that all engineering components of the remedy including landfill cap, monitoring wells, access restrictions (fence and/or signs), and drainage features are operating and functioning as designed. No damage to engineering features of the remedies was observed.

The O&M activities are currently being conducted to monitor the effectiveness of the landfill capping remedy at IRP Sites 2 and 17. These activities include cover inspection and maintenance;

and monitoring of groundwater, soil moisture, and LFG. These O&M activities will ensure that remedies at IRP Sites 2 and 17 remain protective of human health and the environment.

### **7.1.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and RAOs used at the Time of Remedy Selection Still Valid?**

The assumptions made during the remedy selection for IRP Sites 2 and 17 are consistent with current site conditions and remain essentially unchanged. The remedies at the two sites are in place and the RAOs presented in the ROD are still applicable and appropriate. No changes to site conditions have occurred that would affect the remedy performance.

#### **Changes in ARARs**

The ARARs identified in the IRP Sites 2 and 17 ROD were reviewed to evaluate if there are any changes in these standards that may affect the protectiveness of the remedies at the two sites (see Table I-1 in Appendix I). Based on this evaluation, it was concluded that there were no significant changes to the standards/requirements identified as ARARs in the IRP Sites 2 and 17 ROD that could affect the protectiveness of the remedies at the two sites. Additionally, no newly promulgated standards were identified that could affect the protectiveness of the remedies at IRP Sites 2 and 17.

#### **Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics**

The human health risk assessment for IRP Sites 2 and 17 was performed assuming recreational and residential exposure scenarios. Exposure of a recreational child was considered to be limited to contaminants in surface soil. The resident was assumed to live adjacent to and down-gradient of the landfill sites and could be exposed to impacted groundwater. These exposure pathways represent conservative exposure scenarios and have not changed. Therefore, revisions/changes to exposure pathways are not warranted.

The landfill containment remedies for IRP Site 17 and vadose zone of IRP Site 2 were implemented to preventing contact with waste and were not intended to meet any site-specific, risk-based cleanup level; therefore, review of toxicity and other contaminant characteristics used to determine the original cleanup level was not required.

### **7.1.3 Question C: Has any other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?**

To date, there has been no new information, technology development, or advances in science that have come to light to suggest a change in the protectiveness of the final remedies implemented for IRP Sites 2 and 17.

#### **7.1.4 Technical Assessment Summary**

Based on the documents reviewed, the site inspection, and the interviews, the remedies at IRP Sites 2 and 17 are functioning as intended by the ROD, as modified by the ESD. The engineering components of the remedies are operating and functioning as designed. Based on the documents reviewed and site inspections, there was no evidence of activities at IRP Sites 2 and 17 that are inconsistent with the land-use restrictions presented in the O&M Plan. The evaluation of ARARs documented in the ROD indicated that there were no significant changes to the standards/requirements identified as ARARs in the IRP Sites 2 and 17 ROD that could affect the protectiveness of the remedies at the two sites. Additionally, no newly promulgated standards were identified that could affect the protectiveness of the remedies at IRP Sites 2 and 17.

The exposure pathways assumed in the risk assessment conducted during the Phase II RI have not changed. The remedy for IRP Site 17 and vadose zone of IRP Sites 2 is implemented for waste isolation and containment, and is not intended to meet any site-specific, risk-based cleanup level; therefore, review of toxicity and other contaminant characteristics used to determine the original cleanup level was not required. There is no other information that calls into question the protectiveness of the remedy.

## **7.2 IRP SITE 16**

### **7.2.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?**

The results of documents and data review, site inspections, and interviews indicate that the final remedy (MNA and ICs) implemented for TCE in groundwater at IRP Site 16 is functioning as intended by the ROD and remedial design. The major portion of the contaminant mass in the shallow soil was removed during the MPE pilot test conducted at the site. In addition, SVE implemented as part of the PCAP at MSC B3 removed VOCs from deeper soils including the TCE associated with IRP Site 16. The existing groundwater monitoring network as part of MNA provides adequate down-gradient monitoring of VOCs. However, the results of data review indicate that the cross-gradient monitoring needs to be enhanced to allow for more definitive establishment of trends (see Section 6.4.2). The enhancement of the cross-gradient monitoring well network is in accordance with the IRP Site 16 ROD and the Remedial Design. The IRP Site 16 Remedial Design provides for the installation of additional groundwater monitoring wells if they are determined to be necessary based on the groundwater monitoring results.

In spite of the need for enhancement of the cross-gradient groundwater monitoring network, the interpreted limits of the groundwater TCE plume remain within the boundary defined by the ARIC. MNA and ICs are adequate to determine the protectiveness and effectiveness of the final remedy and continue to mitigate human health risks associated with the impacted groundwater.

An ARIC has been established and land use controls have been implemented at the site within this area that:

- Prohibits well installation and use of groundwater from the ARIC without approval;
- Prohibits disturbance of the MNA well network and equipment without approval; and
- Requires maintenance of the ground surface to promote proper surface drainage away from the former training pits.

Currently, property containing IRP Site 16 is leased to Heritage Fields, LLC and land-use restrictions at the site are implemented through LIFO (DON and Heritage Fields 2005b). The Lessee is required to fill out a PERF for any work proposed in the leased portion of the property. Based on the evaluation of PERFs submitted to date, no activities have been conducted at IRP Site 16 that may adversely affect the remedy integrity and present unacceptable risk to human health. Additionally, no evidence of activities inconsistent with land-use restrictions was observed during the site-inspections conducted as part of this five-year review.

Although there are no physical markers, warning signs or barriers delineating the ARIC, access to IRP Site 16 is currently restricted by fencing that surrounds the former Base and is patrolled regularly by security personnel.

Site grading to maintain positive drainage has been implemented at IRP Site 16 and is performing as required. Vadose zone monitoring has been implemented; however, no definitive trends have been

observed in the data. The DON is updating the vadose zone monitoring strategy/procedures in consultation with regulatory agencies.

Although the IRP Site 16 remedy is functioning as designed, opportunities exist to improve the performance of the remedy. These opportunities pertain to augmenting the existing groundwater monitoring network and vapor sampling methods as described below:

1. The data review indicates that the groundwater monitoring network to the west and northwest may not be providing adequate data on the distribution of VOCs (CDM 2009). The existing groundwater monitoring network would need to be augmented to allow for complete plume delineation and for more definitive establishment of trends in VOC concentrations.
2. Vapor sampling methods used to evaluate the presence of VOCs in the deep vadose zone have not yielded consistent results. As a result, the DON is updating the vadose zone monitoring strategy/procedure in consultation with the regulatory agencies

#### **7.2.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and RAOs used at the Time of Remedy Selection Still Valid?**

The assumptions made during the remedy selection for IRP Site 16 are consistent with current site conditions and remain essentially unchanged. The conceptual site model and RAOs presented in the ROD are still applicable and appropriate. No new future land uses have been identified and no changes to site conditions have occurred that would affect the remedy effectiveness.

**Changes in Cleanup Level.** The target cleanup level for TCE in groundwater is based on the MCL for TCE of 5 µg/L. This water quality standard remains unchanged from the signing date of the ROD.

**Changes in Exposure Pathways and Toxicity.** No additional routes of exposure to chemicals in the subsurface at IRP Site 16 have been identified since implementation of the remedy. The previous human health risk evaluation results were based on conservative assumptions that tended to over estimate risk. Risk/hazards from other site contaminants, including potential chemical degradation byproducts of TCE, continue to be insignificant or inconsequential because of incomplete exposure pathways, or relatively low concentrations.

There has been no change in toxicity values of TCE (the main risk-driving constituent) used in the risk assessments for IRP Site 16.

**Changes to Risk.** Risk evaluation results used as the basis for the remedy selection for IRP Site 16 in the ROD were not re-evaluated for this five-year review. Because TCE concentrations in groundwater have not changed appreciably, associated risks/hazards are expected to be similar to the risks/hazards previously estimated.

The risks due to potential vapor intrusion into indoor air were calculated in 2004 for IRP Site 16 (see Section 3.2.5.4). These risks were estimated to be within acceptable limits. No significant changes to these risk estimates are expected based on the following:

- TCE concentrations have not changed appreciably
- The assumptions and methodology used in the previous risk evaluation are still valid

Therefore, the earlier conclusion of the risk assessment that IRP Site 16 does not pose unacceptable risk to human health due to vapor intrusion and inhalation of indoor air is still valid.

**Changes to ARARs.** ARARs identified in the ROD for IRP Site 16 were reviewed to determine whether any updates to the regulations were enacted that could potentially affect the protectiveness of the remedy. Requirements, regulations, and standards either have not changed since the ROD signing date, or the changes do not affect the protectiveness of the remedy as currently being implemented. The individual ARARs identified in the ROD are summarized in Table I-2 of Appendix I.

### **7.2.3 Question C: Has any other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?**

To date, there has been no new information, technology development, or advances in science that have come to light to suggest a change in the protectiveness of the final remedy implemented for IRP Site 16.

### **7.2.4 Technical Assessment Summary**

Based on the documents and data reviewed, site inspections, and the interviews, the remedy at IRP Site 16 is functioning as intended by the ROD and the remedial design. The existing groundwater monitoring network as part of MNA provides adequate down-gradient monitoring of VOCs. The cross-gradient monitoring needs to be enhanced. The enhancement of the cross-gradient monitoring well network is consistent with the IRP Site 16 ROD and the Remedial Design. The IRP Site 16 Remedial Design provides for the installation of additional groundwater monitoring wells if they are determined to be necessary based on the groundwater monitoring results.

The interpreted limits of the groundwater TCE plume remain within the boundary defined by the ARIC. The review of the documents and site-inspections indicate that no activities have been conducted at the site that are inconsistent with land-use restrictions documented in the remedial design (CDM 2006). Site grading to maintain positive drainage has been implemented and is performing as required. Vadose zone monitoring has been implemented; however, no definitive trends have been observed in the data. The DON is updating the vadose zone monitoring strategy/procedures in consultation with regulatory agencies.

Based on the evaluation of ARARs documented in the ROD, it was concluded that there were no significant changes to the standards/requirements identified as ARARs in the IRP Site 16 ROD that could affect the protectiveness of the remedy at the site. Additionally, no newly promulgated standards were identified that could affect the protectiveness of the remedy at IRP Site 16.

The exposure pathways assumed in the risk assessment conducted for IRP Site 16 have not changed. Additionally, there has been no change in toxicity values of TCE (the main risk-driving constituent) used in the risk assessments for IRP Site 16 and no appreciable change in TCE concentrations in groundwater. Therefore, current risks/hazards associated at IRP Site 16 are expected to be similar to the previous estimates. There is no other information that calls into question the protectiveness of the remedy.

## **7.3 IRP SITES 18 AND 24**

### **7.3.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?**

Based on the results of documents and data review, site inspections, and interviews, the final remedies implemented at IRP Sites 18 and 24 are functioning as intended by the ROD and as

modified by the ESDs. The extraction strategy in the design was to initially focus extraction in areas with higher VOC concentrations near to and down-gradient from the source areas, with extraction subsequently increasing at the Base boundary. Based on the combination of water level elevation and groundwater flow data and modeling results, the extraction well-field is performing as designed, resulting in capture of the on-site portion of the SGU plume. Consistent with this design and extraction strategy, and as documented in the 2008 Annual Report, the contingency wells along the Base boundary will be installed to enhance plume capture at and down-gradient of the former Base boundary.

The groundwater modeling results project complete capture of the VOC plume in the PA over a 40-year period based on average extraction rates sustained through August 2007. However, since the extraction rates for the last six months have on average been lower than values used in the predictive model or stipulated in decision documents, an assessment of the long-term effect of these lower extraction rates should be performed (see Section 6.4.3.2 for details).

Due to the relatively short period of operation, capture of the plume based on TCE concentrations cannot be fully evaluated. The data does show an overall reduction in size of the 500 µg/L TCE iso-concentration contour at IRP Site 24 when the baseline data collected in September 2006 are compared to the data collected in July 2008 (see Figure 6-1). Concentrations in the PA have been relatively stable since system startup.

As noted in the discussion of data review in Section 6.4.3, the SGU and PA treatment facilities are effectively removing VOCs from groundwater. In addition, O&M procedures for the SGU and PA Treatment Plants have not been followed; as a result, incomplete treatment and discharge of TCE occurred at both Treatment Plants due to the activated carbon not being replaced at the required frequency. However, screening risk assessments performed indicate that these vapors did not pose unacceptable risks to human health for the potential residential or commercial receptors (see Section 6.4.3.1 for details).

The O&M procedures presented in the O&M Plans for IRP Sites 18 and 24 (Earth Tech 2007, Weston 2007b, Tetra Tech 2007a, and Tetra Tech 2007b) provide the framework for the effective operation of the remedies. More vigilant monitoring, reporting, and maintenance by IRWD is required to ensure effective operation of the PA and SGU Treatment Systems.

The groundwater extraction and treatment systems are inspected on a weekly basis. Routine monthly and annual inspection and maintenance are also being performed to optimize the system so that it operates as continuously as possible. The Performance Monitoring and Sampling and Analysis Plan (Earth Tech 2007) provides a sufficient framework for optimization of groundwater monitoring locations.

The ICs have been implemented for the areas overlying IRP Sites 18 and 24 to protect potential receptors (e.g. residents) from use of VOC-impacted groundwater and to protect remediation equipment. The area overlying the on-Base portion of the IRP Site 24 plume is leased to Heritage Fields, LLC, and land-use restrictions in the area are implemented through LIFOCs (DON and Heritage Fields 2005a and DON and Heritage Fields 2005c). The Lessee is required to complete a PERF for any work proposed in the leased portion of the property. Based on the evaluation of PERFs submitted to date, no activities have been conducted at IRP Site 24 that may adversely affect the remedy integrity or present unacceptable risk to human health.

The ICs for the off-Base portion of VOC groundwater plumes are based on local permit programs administered by OCHCA and IRWD. OCHCA and IRWD have completed checklists for calendar years 2006 through 2008 that indicate that no applications for new well permits were received and no

new permits were issued by IRWD and OCHCA within the geographic boundaries of IRP Sites 18 and 24. These checklists were presented to the regulatory agencies in the Final Annual Remedy Status Report for 2007-2008 for IRP Sites 18 and 24, which was issued in May 2009 (Weston 2009b).

### **7.3.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and RAOs used at the Time of Remedy Selection Still Valid?**

The assumptions made during the remedy selection for IRP Sites 18 and 24 are consistent with current site conditions and remain essentially unchanged. The remedy is in place and the RAOs presented in the ROD are still applicable and appropriate. No changes to site conditions have occurred that would affect the remedy performance.

**Changes in Cleanup Level.** There have been no changes in MCL values for the constituents of concern since the signing date of the ROD. Therefore, the results of protectiveness evaluations are still valid.

**Changes in Exposure Pathways and Toxicity.** No additional routes of exposure to chemicals in groundwater at IRP Sites 18 and 24 have been identified. The results of previous human health risk evaluation were based on conservative assumptions that tended to overestimate risk.

**Changes in Risk.** Risk evaluation methodologies have not changed during the current review period, and this has not altered assumptions for the remedy selection for the OU-1 and OU-2A groundwater. Risk estimates used as the basis for the remedy selection in the ROD were not recalculated for this five-year review. Since TCE concentrations in the subsurface have not changed appreciably, associated risks/hazards are presumed to have remained similar.

The risks due to potential vapor intrusion into indoor air were estimated in 2004 for IRP Site 24 and it was concluded that IRP Site 24 does not pose unacceptable risks to human health via the air inhalation exposure pathway (BNI 2004) (see Section 3.3.5.3). No significant changes to these risk estimates are expected based on the following:

- Residual TCE concentrations in the vadose zone are not expected to have changed appreciably from the concentrations at the time of 2004 vapor intrusion risk evaluation (BNI 2004). In addition, groundwater TCE concentrations are either the same or less than the concentrations during the 2004 vapor intrusion risk evaluation.
- Soil gas confirmation sampling will be performed in the former VOC source area upon completion of the groundwater remedy.
- The assumptions and methodology used in the previous risk evaluation are still valid.

Therefore, the earlier conclusion of the risk assessment that IRP Site 24 does not pose unacceptable risk to human health due to vapor intrusion and inhalation of indoor air is still valid.

Similar to IRP Site 24, IRP Site 18 does not pose a threat to public health via the potential vapor intrusion pathway because of the following reasons:

- Low concentrations of VOCs occur in the PA at depths of approximately 200 feet bgs. Sampling performed at shallower depths (i.e., less than 200 feet), indicates that VOCs are not present in groundwater at concentrations exceeding the MCLs. In most of the shallow depth intervals, the concentrations of VOCs do not exceed reporting limits (typically less than 1 µg/L). Therefore, the pathway for exposure due to vapor intrusion is incomplete for IRP Site 18.

- The results of the risk assessment indicate that IRP Site 24 does not pose unacceptable risk to human health due to vapor intrusion and inhalation of indoor air. Based on the rationale that IRP Site 24 with much higher concentrations of VOCs present at shallower depths compared to IRP Site 18 does not pose unacceptable risk to human health due to vapor intrusion, and pathway for vapor intrusion is incomplete at IRP Site 18, the VOCs in groundwater are not expected to pose a threat to human health via the vapor intrusion pathway.

**Changes to ARARs.** ARARs identified in the ROD for IRP Sites 18 and 24 were reviewed to evaluate whether any updates to the regulations could potentially affect the protectiveness of the remedy. Based on this evaluation, it is concluded that the requirements, regulations, and standards either have not changed since the ROD signing date, or the changes do not affect the protectiveness of the remedy as currently being implemented. The individual ARARs identified in the ROD are summarized in Table I-3 of Appendix I.

### **7.3.3 Question C: Has any other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?**

To date, there has been no new information, technology development, or advances in science that have come to light to suggest a change in the protectiveness of the final remedies implemented for IRP Sites 18 and 24.

### **7.3.4 Technical Assessment Summary**

Based on the documents and data reviewed, site inspections, and the interviews, the remedies implemented at IRP Sites 18 and 24 are functioning as intended by the ROD as modified by the ESDs. Based on the combination of groundwater elevation data and modeling results, the extraction well-field is performing as designed with capture of the on-site portion of the SGU plume. The contingency wells along the former Base boundary will be installed to enhance plume capture at and down-gradient of the Base boundary. The O&M data show an overall reduction in size of the 500 µg/L TCE iso-concentration contour, when the baseline data collected in September 2006 is compared to the data collected in July 2008.

For the PA, modeling results based on average extraction rates sustained through August 2007 project complete capture of the VOC plume in the PA over a 40 year period. However, if lower extraction rates similar to the values over the last six months persist, an evaluation of long-term effects on plume capture in PA should be conducted. The review of the documents and site-inspections indicate that no activities have been conducted in the areas overlying IRP Sites 18 and 24 groundwater plumes that are inconsistent with the land-use restrictions.

Based on the evaluation of ARARs documented in the ROD, it was concluded that there were no significant changes to the standards/requirements identified as ARARs in the IRP Sites 18 and 24 ROD that could affect the protectiveness of the remedies. Additionally, no newly promulgated standards were identified that could affect the protectiveness of the remedies at IRP Sites 18 and 24.

The exposure pathways assumed in the risk assessments conducted for groundwater at IRP Sites 18 and 24 have not changed. Additionally, there has been no change in the toxicity value of TCE used in the risk assessments for IRP Sites 18 and 24 and no appreciable change in TCE concentrations in groundwater. Therefore, current risks/hazards associated at IRP Sites 18 and 24 are expected to be similar to the previous estimates. There is no other information that calls into question the protectiveness of the remedies at IRP Sites 18 and 24.

## **8. Issues**

No issues have been identified for IRP Sites 2, 16, 17, 18, and 24 that currently or in the future would prevent the respective remedies at these sites from being protective of human health and/or the environment.

## 9. Recommendations and Follow-up Actions

Since no issues have been identified for IRP Sites 2, 16, 17, 18, and 24 that currently prevent the remedies at these sites from being protective, or may do so in future, no recommendations or follow-up actions are required to ensure protectiveness of the remedies. However, consistent with the U.S. EPA guidance (U.S. EPA 2001), recommendations have been made that do not directly relate to achieving or maintaining the protectiveness of the remedies, and pertain to activities such as O&M of the remedies and coordination with other agencies.

### 9.1 IRP SITES 2 AND 17

Table 9-1 summarizes the recommended follow-up actions for IRP Sites 2 and 17.

**Table 9-1: IRP Site 2 and 17 Follow-Up Action Recommendations**

No.	Recommendation	Party Responsible for Implementing Recommendation
1	OCGP is planning on opening discussions with the Department of the Interior/FAA regarding access to the areas in the vicinity of IRP Sites 2 and 17 for guided (docent-lead) tours. It is recommended that DON coordinate with FAA in its discussions with OCGP regarding access to the areas in the vicinity of IRP Sites 2 and 17 for guided tours. It should be ensured that the remedies at IRP Sites 2 and 17 remain protective of any potential receptors due to the planned use of IRP Sites 2 and 17 for guided tours. The DON in coordination with FAA should consider limiting OCGP access for guided tours to access roads at the sites.	DON and FAA

### 9.2 IRP SITE 16

Table 9-2 summarizes the recommended follow-up actions for IRP 16 Site.

**Table 9-2: IRP Site 16 Follow-Up Action Recommendations**

No.	Recommendation	Party Responsible for Implementing Recommendation
1	The DON and regulatory agencies are working together to finalize the vadose zone monitoring strategy for IRP Site 16.	DON
2	The planned soil excavation activities as part of PCAP to remove residual petroleum hydrocarbons will have short-term, incidental impacts on two elements of the IRP Site 16 groundwater remedy. These two elements include approximately six monitoring wells and the positive drainage required over the main pit area. It is recommended that the DON restore the site to ensure positive drainage over the main pit area and replace the impacted wells as appropriate to ensure effective monitoring and attainment of RAOs presented in the ROD.	DON
3	Continue to evaluate lateral extents of VOCs in groundwater and augment groundwater monitoring network as required to confirm distribution of TCE to the west and northwest.	DON

### 9.3 IRP SITES 18 AND 24

Table 9-3 summarizes the recommended follow-up actions for IRP Sites 18 and 24.

**Table 9-3: IRP Sites 18 and 24 Follow-Up Action Recommendations**

No.	Recommendation	Party Responsible for Implementing Recommendation
1	Continue to evaluate monitoring and other O&M data, and make specific recommendations to further optimize the groundwater extraction and treatment systems per the Performance Monitoring and Sampling and Analysis Plan (Earth Tech 2007).	DON
2	Continue to ensure periodic communication/coordination between the DON, IRWD, and OCWD for evaluation of the performance of the IRP Sites 18 and 24 Treatment Plants.	DON, IRWD, and OCWD
3.	Ensure timely completion of detailed O&M Reports presenting data for the IRP Site 18 groundwater extraction system and for the IRP Sites 18 and 24 Treatment Plants.	IRWD
4	Ensure O&M Manual procedures are followed so that the treatment systems and in particular the activated carbon units for vapor-phase treatment operate as designed.	IRWD
5	Evaluate long-term effects on plume capture if the lower PA extraction rates documented in the last six months persist.	IRWD

## **10. Protectiveness Statement**

### **10.1 IRP SITES 2 AND 17**

Based on the technical assessment presented in Section 7, the remedies at IRP Sites 2 and 17 are being implemented in accordance with the ROD (DON 2000) and are protective of human health and the environment. Potential exposure to waste at IRP Sites 2 and 17 have been addressed through construction of landfill caps that isolate and contain the waste and impacted soil, installation of access restrictions and warning signs, and implementation of ICs. Long-term protectiveness of the remedial actions will be ensured by O&M activities including cover inspection and maintenance; and groundwater, LFG, and unsaturated zone monitoring.

### **10.2 IRP SITE 16**

Based on the technical assessment presented in Section 7, the remedy at IRP Site 16 is being implemented in accordance with the ROD (DON 2003) and is protective of human health and the environment. MNA is being implemented to attain groundwater cleanup goals at the site and in the interim, exposure pathways that could result in unacceptable risks to human receptors are being controlled with ICs.

### **10.3 IRP SITES 18 AND 24**

Based on the technical assessment presented in Section 7, the remedies at IRP Sites 18 and 24 are being implemented in accordance with the ROD (DON 2002a) and are protective of human health and environment. The groundwater extraction and treatment is being implemented to attain groundwater cleanup objectives at IRP Sites 18 and 24 and in the interim, exposure pathways that could result in unacceptable risks to human receptors are being controlled with ICs.

## **11. Next Review**

The next five-year review for former MCAS EL Toro will be required by September 2014, five years from the date of this review. This five-year review included the evaluation of available O&M data for IRP Sites 2, 16, 17, 18, and 24 ranging in duration from less than a year to approximately 4 years. The next five-year review will include a more comprehensive evaluation of the O&M data for IRP Sites 2, 16, 17, 18, and 24 including but not limited to the data collected from September 2009 to September 2014.

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**Appendix A**  
**Site Inspection Checklists**

## **IRP Site 2**



**Site Inspection Checklist  
First Five-Year Review  
IRP Site 2 Vadose Zone, Former MCAS El Toro  
Landfill Cover/Containment**

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency California Department of Toxic Substances Control

Contact	<u>Mr. Quang Than</u>	<u>Remedial Project Manager</u>	<u>03/19/09</u>	<u>(714) 484-5352</u>
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached See Appendix D of this report

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Agency California Regional Water Quality Control Board, Santa Ana Region

Contact	<u>Mr. John Broderick</u>	<u>Remedial Project Manager</u>	<u>03/19/09</u>	<u>(951) 782-4494</u>
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached See Appendix D of this report

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Agency \_\_\_\_\_

Contact	_____	_____	_____	_____
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached \_\_\_\_\_

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Agency \_\_\_\_\_

Contact	_____	_____	_____	_____
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached \_\_\_\_\_

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4. **Other interviews** (optional)  Report attached. (See Appendix D of this report)

Ms. Content Arnold, Lead Remedial Project Manager, Dept. of the Navy, BRAC PMO West
Mr. Marc Smits, Remedial Project Manager, Dept. of the Navy, BRAC PMO West
Mr. Rich Muza, Remedial Project Manager, U.S. EPA Region IX
Mr. Robert Woodings, RAB Co-Chair, RAB, Former MCAS El Toro
Ms. Marcia Rudolph, Subcommittee Chair, RAB, Former MCAS El Toro
Mr. Jim Werkmeister, Manager, Environmental Affairs, Lennar
Mr. Glen Worthington, Manager of Planning and Environmental Services, Orange County Great Park

**Site Inspection Checklist  
First Five-Year Review  
IRP Site 2 Vadose Zone, Former MCAS El Toro  
Landfill Cover/Containment**

<b>III. ON-SITE DOCUMENTS &amp; RECORDS VERIFIED</b> (Check all that apply)			
1.	<b>O&amp;M Documents</b>		
	<input checked="" type="checkbox"/> O&M manual/work plan	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> As-built drawings	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Maintenance logs	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks _____		
2.	<b>Site-Specific Health and Safety Plan</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Contingency plan/emergency response plan	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks _____		
3.	<b>O&amp;M Records</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks _____		
4.	<b>Permits and Service Agreements</b>		
	<input type="checkbox"/> Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Other permits _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	Remarks <u>O&amp;M Plan addresses substantive requirements of ARARs identified in the ROD</u>		
5.	<b>Gas Generation Records</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	Remarks <u>No gas generation</u>		
6.	<b>Settlement Monument Records</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks _____		
7.	<b>Groundwater Monitoring Records</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks _____		
8.	<b>Soil Moisture Monitoring Records</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	Remarks _____		
9.	<b>Discharge Compliance Records</b>		
	<input type="checkbox"/> Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Water (effluent)	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	Remarks _____		
10.	<b>Daily Access/Security Logs</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks <u>Maintained in project logbook</u>		

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 2 Vadose Zone, Former MCAS El Toro  
 Landfill Cover/Containment**

<b>IV. ACCESS AND INSTITUTIONAL CONTROLS</b>		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
<b>A. Fencing and Gates</b>			
1.	<b>Fencing damaged</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Fencing secured <span style="float: right;"><input type="checkbox"/> N/A</span>
Remarks _____ _____			
2.	<b>Gates damaged</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Gates secured <span style="float: right;"><input type="checkbox"/> N/A</span>
Remarks _____ _____			
<b>B. Other Access Restrictions</b>			
1.	<b>Signs and other security measures</b>	<input checked="" type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
Remarks <u>Signs installed still in place</u>			
<b>C. Institutional Controls (ICs)</b>			
1.	<b>Implementation and enforcement</b>		
Site conditions imply ICs not properly implemented		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Site conditions imply ICs not being fully enforced		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Type of monitoring (e.g., self-reporting, drive by) <u>Drive by</u>			
Frequency <u>Annual</u>			
Responsible party/agency <u>Department of the Navy</u>			
Contact <u>Mr. Marc Smits, RPM</u>			
Reporting is up-to-date		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Reports are verified by the lead agency		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Specific requirements in deed or decision documents have been met		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Violations have been reported		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Other problems or suggestions: <input type="checkbox"/> Report attached			
<u>Annual certifications from FAA received and will be included in Annual Reports.</u>			
_____			
_____			
_____			
2.	<b>Adequacy</b>	<input checked="" type="checkbox"/> ICs are adequate	<input type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A
Remarks _____ _____ _____			

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 2 Vadose Zone, Former MCAS El Toro  
 Landfill Cover/Containment**

<b>D. General</b>			
1.	<b>Vandalism/trespassing</b>	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> No vandalism evident	Remarks _____ _____
2.	<b>Land use changes on site</b>	<input checked="" type="checkbox"/> N/A	Remarks _____ _____
3.	<b>Land use changes off site</b>	<input checked="" type="checkbox"/> N/A	Remarks <u>None to date. Alton Parkway extension construction planned within two years</u> _____
<b>V. GENERAL SITE CONDITIONS</b>			
<b>A. Roads</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	<b>Roads damaged</b>	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A	Remarks <u>Road in good condition</u> _____
<b>B. Other Site Conditions</b>			
Remarks _____ _____ _____ _____ _____			
<b>VI. LANDFILL COVER</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
<b>A. Landfill Surface</b>			
1.	<b>Settlement</b> (Low spots)	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Settlement not evident	Areal extent _____    Depth _____ Remarks _____ _____
2.	<b>Cracks</b>	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Cracking not evident	Lengths _____    Widths _____    Depths _____ Remarks <u>Minor cracking noted in prior inspections</u> _____
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Erosion not evident	Areal extent _____    Depth _____ Remarks <u>Minor erosion</u> _____

**Site Inspection Checklist**  
**First Five-Year Review**  
**IRP Site 2 Vadose Zone, Former MCAS El Toro**  
**Landfill Cover/Containment**

4.	<b>Holes</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Holes not evident
	Areal extent _____	Depth _____	
	Remarks _____		
	_____		
5.	<b>Vegetative Cover</b>	<input type="checkbox"/> Grass	<input checked="" type="checkbox"/> Cover properly established
			<input checked="" type="checkbox"/> No signs of stress
	<input type="checkbox"/> Trees/Shrubs (indicate size and locations on a diagram)		
	Remarks _____		
	_____		
6.	<b>Alternative Cover (armored rock, concrete, etc.)</b>	<input checked="" type="checkbox"/> N/A	
	Remarks _____		
	_____		
7.	<b>Bulges</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Bulges not evident
	Areal extent _____	Height _____	
	Remarks _____		
	_____		
8.	<b>Wet Areas/Water Damage</b>		
	<input type="checkbox"/> Wet areas/water damage not evident		
	<input type="checkbox"/> Wet areas	<input type="checkbox"/> Location shown on site map	Areal extent _____
	<input type="checkbox"/> Ponding	<input type="checkbox"/> Location shown on site map	Areal extent _____
	<input type="checkbox"/> Seeps	<input type="checkbox"/> Location shown on site map	Areal extent _____
	<input type="checkbox"/> Soft subgrade	<input type="checkbox"/> Location shown on site map	Areal extent _____
	Remarks <u>None noted</u>		
	_____		
9.	<b>Slope Instability</b>	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map
			<input checked="" type="checkbox"/> No evidence of slope instability
	Areal extent _____		
	Remarks _____		
	_____		
<b>B. Drainage System (Shotcrete-lined Channels/Berms/Ditches)</b>			<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A
1.	<b>Settlement</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of settlement
	Areal extent _____	Depth _____	
	Remarks _____		
	_____		
2.	<b>Material Degradation</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of degradation
	Material type _____	Areal extent _____	
	Remarks _____		
	_____		
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of erosion
	Areal extent _____	Depth _____	
	Remarks _____		
	_____		

**Site Inspection Checklist**  
**First Five-Year Review**  
**IRP Site 2 Vadose Zone, Former MCAS El Toro**  
**Landfill Cover/Containment**

4.	<b>Undercutting</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of undercutting
	Areal extent _____	Depth _____	
	Remarks _____		
	_____		
5.	<b>Obstructions</b> Type _____	<input checked="" type="checkbox"/> No obstructions	
	<input type="checkbox"/> Location shown on site map	Areal extent _____	
	Size _____		
	Remarks _____		
	_____		
6.	<b>Excessive Vegetative Growth</b>	Type _____	
	<input checked="" type="checkbox"/> No evidence of excessive growth		
	<input checked="" type="checkbox"/> Vegetation in channels does not obstruct flow		
	<input type="checkbox"/> Location shown on site map	Areal extent _____	
	Remarks _____		
	_____		
<b>C. Cover Penetrations</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	<b>Gas Vents</b>	<input type="checkbox"/> Active	<input type="checkbox"/> Passive
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs Maintenance	
	<input type="checkbox"/> N/A		
	Remarks _____		
	_____		
2.	<b>Gas Monitoring Probes</b>		
	<input checked="" type="checkbox"/> Properly secured/locked	<input checked="" type="checkbox"/> Functioning	<input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A
	Remarks _____		
	_____		
3.	<b>Groundwater Monitoring Wells</b> (within surface area of landfill)		
	<input checked="" type="checkbox"/> Properly secured/locked	<input checked="" type="checkbox"/> Functioning	<input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A
	Remarks <u>02PZ01 has a constriction at approximately 18 feet below the top of casing that prevents use of groundwater sampling equipment</u>		
	_____		
4.	<b>Lysimeters</b>		
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs Maintenance	<input checked="" type="checkbox"/> N/A
	Remarks _____		
	_____		
5.	<b>Settlement Monuments</b>	<input checked="" type="checkbox"/> Located	<input checked="" type="checkbox"/> Routinely surveyed <input type="checkbox"/> N/A
	Remarks _____		
	_____		

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 2 Vadose Zone, Former MCAS El Toro  
 Landfill Cover/Containment**

<b>D. Gas Collection and Treatment</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
<b>1. Gas Treatment Facilities</b>		
<input type="checkbox"/> Flaring <input type="checkbox"/> Thermal destruction <input type="checkbox"/> Collection for reuse <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
<b>2. Gas Collection Wells, Manifolds and Piping</b>		
<input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
<b>3. Gas Monitoring Facilities</b> ( <i>e.g.</i> , gas monitoring of adjacent homes or buildings)		
<input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> N/A Remarks _____ _____		
<b>VII. OVERALL OBSERVATIONS</b>		
<b>A. Implementation of the Remedy</b>		
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).  <u>O&amp;M activities have been initiated in accordance with the approved O&amp;M Plan. Coastal sage restoration on cover has progressed very well and there is adequate cover to minimize erosion.</u>  <u>O&amp;M inspection should also look for presence of rodent holes.</u>		
<b>B. Adequacy of O&amp;M</b>		
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. _____		
<b>C. Early Indicators of Potential Remedy Problems</b>		
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.  <u>None noted</u>		
<b>D. Opportunities for Optimization</b>		
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. _____		

## **IRP Site 16**

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 16, Former MCAS El Toro  
 Monitored Natural Attenuation and Institutional Controls**

I. SITE INFORMATION	
<b>Site name:</b> IRP Site 16, Former MCAS El Toro	<b>Date of inspection:</b> March 11, 2009
<b>Location and Region:</b> Irvine, CA; U.S.EPA Region IX	<b>EPA ID:</b> CA6170023208
<b>Agency, office, or company leading the five-year review:</b> BRAC Program Management Office West, Department of the Navy	<b>Weather/temperature:</b> Cloudy, ~50°F
<b>Remedy Includes:</b> (Check all that apply) <input checked="" type="checkbox"/> Monitored natural attenuation <span style="margin-left: 300px;"><input type="checkbox"/> Other _____</span> <input checked="" type="checkbox"/> Institutional controls <input checked="" type="checkbox"/> Access controls <input checked="" type="checkbox"/> Vadose zone monitoring <input checked="" type="checkbox"/> Site grading	
<b>Attachments:</b> <input checked="" type="checkbox"/> Inspection team roster attached (see Table 6-2 of this report) <input checked="" type="checkbox"/> Site map attached (See Figure 3-5 of this report)	
II. INTERVIEWS (Check all that apply)	
<b>1. O&amp;M Site Manager</b> <u>Ms. Randa Chichakli</u> <u>Project Manager</u> <u>03/20/09</u> <div style="display: flex; justify-content: space-between; margin-left: 100px;"> <span>Name</span> <span>Title</span> <span>Date</span> </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone <input checked="" type="checkbox"/> Other    Phone no. <u>858-268-3383</u> Problems, suggestions; <input checked="" type="checkbox"/> Report attached <u>See Appendix E of this report</u> _____	
<b>2. O&amp;M Staff</b> <u>N/A</u> _____      _____ <div style="display: flex; justify-content: space-between; margin-left: 100px;"> <span>Name</span> <span>Title</span> <span>Date</span> </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone    Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____ _____	

**Site Inspection Checklist  
First Five-Year Review  
IRP Site 16, Former MCAS El Toro  
Monitored Natural Attenuation and Institutional Controls**

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency California Department of Toxic Substances Control

Contact	<u>Mr. Quang Than</u>	<u>Remedial Project Manager</u>	<u>03/19/09</u>	<u>(714) 484-5352</u>
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached See Appendix E of this report

Agency California Regional Water Quality Control Board, Santa Ana Region

Contact	<u>Mr. John Broderick</u>	<u>Remedial Project Manager</u>	<u>03/19/09</u>	<u>(951) 782-4494</u>
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached See Appendix E of this report

Agency \_\_\_\_\_

Contact	_____	_____	_____	_____
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached \_\_\_\_\_

Agency \_\_\_\_\_

Contact	_____	_____	_____	_____
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached \_\_\_\_\_

4. **Other interviews** (optional)  Report attached. (See Appendix E of this report)

Ms. Content Arnold, Lead Remedial Project Manager, Dept. of the Navy, BRAC PMO West

Mr. Louie Cardinale, Remedial Project Manager, Dept. of the Navy, BRAC PMO West

Mr. Rich Muza, Remedial Project Manager, U.S. EPA Region IX

Mr. Robert Woodings, RAB Co-Chair, RAB, Former MCAS El Toro

Ms. Marcia Rudolph, Subcommittee Chair, RAB, Former MCAS El Toro

Mr. Jim Werkmeister, Manager, Environmental Affairs, Lennar

Mr. Glen Worthington, Manager of Planning and Environmental Services, Orange County Great Park

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 16, Former MCAS El Toro  
 Monitored Natural Attenuation and Institutional Controls**

<b>III. ON-SITE DOCUMENTS &amp; RECORDS VERIFIED</b> (Check all that apply)			
1.	<b>O&amp;M Documents</b> <input checked="" type="checkbox"/> O&M manual/work plan <input checked="" type="checkbox"/> As-built drawings <input type="checkbox"/> Maintenance logs Remarks _____ _____	<input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
2.	<b>Site-Specific Health and Safety Plan</b> <input checked="" type="checkbox"/> Contingency plan/emergency response plan Remarks _____ _____	<input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> N/A
3.	<b>O&amp;M Records</b> Remarks _____ _____	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
4.	<b>Permits and Service Agreements</b> <input type="checkbox"/> Air discharge permit <input type="checkbox"/> Effluent discharge <input type="checkbox"/> Other permits _____ Remarks _____ _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
5.	<b>Groundwater Monitoring Records</b> Remarks _____ _____	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
6.	<b>Discharge Compliance Records</b> <input type="checkbox"/> Air <input type="checkbox"/> Water (effluent) Remarks _____ _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
7.	<b>Daily Access/Security Logs</b> Remarks _____ _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
<b>IV. ACCESS AND INSTITUTIONAL CONTROLS</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
<b>A. Fencing</b>			
1.	<b>Fencing damaged</b> <input type="checkbox"/> Location shown on site map Remarks _____ No fences at IRP Site 16. _____	<input type="checkbox"/> Gates secured	<input checked="" type="checkbox"/> N/A

**Site Inspection Checklist  
First Five-Year Review  
IRP Site 16, Former MCAS El Toro  
Monitored Natural Attenuation and Institutional Controls**

2. **Gates damaged**       Location shown on site map       Gates secured       N/A  
 Remarks No gates at IRP Site 16.

**B. Other Access Restrictions**

1. **Signs and other security measures**       Location shown on site map       N/A  
 Remarks No signs or other security measures in place at IRP Site 16.

**C. Institutional Controls (ICs)**

1. **Implementation and enforcement**  
 Site conditions imply ICs not properly implemented       Yes     No     N/A  
 Site conditions imply ICs not being fully enforced       Yes     No     N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Self-reporting through completing and submission of checklists  
 Frequency Annual  
 Responsible party/agency Department of the Navy

Contact Mr. Louie Cardinale, RPM

Reporting is up-to-date       Yes     No     N/A  
 Reports are verified by the lead agency       Yes     No     N/A  
 Specific requirements in deed or decision documents have been met       Yes     No     N/A  
 Violations have been reported       Yes     No     N/A  
 Other problems or suggestions:       Report attached

2. **Adequacy**       ICs are adequate       ICs are inadequate       N/A  
 Remarks \_\_\_\_\_

**D. General**

1. **Vandalism/trespassing**       Location shown on site map       No vandalism evident  
 Remarks \_\_\_\_\_

2. **Land use changes on site**       N/A  
 Remarks No land use changes at IRP Site 16 since remedy implementation.

3. **Land use changes off site**       N/A  
 Remarks Offsite land use changes (i.e., development of former MCAS El Toro) have not impacted IRP Site 16.

**Site Inspection Checklist  
First Five-Year Review  
IRP Site 16, Former MCAS El Toro  
Monitored Natural Attenuation and Institutional Controls**

<b>V. GENERAL SITE CONDITIONS</b>	
<b>A. Roads</b>	<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A
1. <b>Roads damaged</b>	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A
Remarks <u>No road damage at IRP Site 16.</u>	
<b>B. Other Site Conditions</b>	
Remarks <u>Maintaining positive drainage on the former source area is part of the IRP Site 16 remedy. Semi-annual inspections visually evaluate whether positive drainage is maintained. Though still possible to evaluate the overall site drainage pattern (remains positive), recent vegetative overgrowth makes it difficult to determine whether there may be small areas of water ponding on the former source area. IRP Site 16 O&amp;M activities should include maintenance and controlling of vegetation on the former source area cap for adequate evaluation of drainage.</u>	
<b>VI. GROUNDWATER REMEDY</b>	
<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
<b>A. Monitored Natural Attenuation</b>	<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A
1. <b>Groundwater Monitoring Wells</b> (natural attenuation remedy)	<input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A
Remarks <u>All groundwater monitoring wells are functioning and in good condition. All groundwater monitoring wells except 16 MPE1 are properly secured/locked. 16 MPE1 (6-inch diameter well) is not fitted with a locking well cap. Water levels in all wells (17 wells total) are measured semi-annually; 10 wells are sampled semi-annually per the Remedial Design.</u>	
2. <b>Dedicated Groundwater Sampling Pumps</b>	<input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs repair
Remarks _____	
3. <b>Gas Monitoring Probes/Wells</b>	<input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input checked="" type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A
Remarks <u>All soil gas monitoring wells (16 MPE1, 16 MW01, 16 MW07, and 16 VM1) are functioning and in good condition. All soil gas monitoring wells except 16 MPE1 are properly secured/locked. 16 MPE1 (6-inch diameter well) is not fitted with a locking well cap. Soil gas samples are generally collected semi-annually from each well; however, soil gas samples were not collected in Fall 2008 because soil gas sampling procedures were being revised by Navy and regulatory agencies.</u>	
<b>B. Monitoring Data</b>	
1. Monitoring Data	<input checked="" type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality
2. Monitoring data suggests:	<input type="checkbox"/> Groundwater plume is effectively contained <input type="checkbox"/> Contaminant concentrations are declining

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 16, Former MCAS El Toro  
 Monitored Natural Attenuation and Institutional Controls**

Groundwater monitoring data (through Fall 2008 [Round 28]) shows an increase in TCE concentrations along the western side of the TCE plume (13 µg/L to 130 µg/L at 16 MW09 and 9.4 µg/L to 290 µg/L in 16 MW17). These increases may be in part due to the continued dispersion of TCE. Therefore, per the remedial design, groundwater monitoring network would need to be augmented as appropriate to confirm distribution of TCE to the west and northwest. In addition, monitoring well network and frequencies should be continuously optimized based on the observed trends in TCE concentrations.

**VII. OVERALL OBSERVATIONS**

**A. Implementation of the Remedy**

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The IRP Site 16 remedy is effectively monitoring the natural attenuation of the TCE plume. Per the remedial design, groundwater monitoring network would need to be augmented as appropriate to confirm distribution of TCE to the west and northwest.

Per the Remedial Design, the purpose of soil gas monitoring in the source area is to identify whether VOC concentrations are increasing in the vadose zone and potentially impacting groundwater quality. Soil gas monitoring data has not shown any definitive trends. The Navy is in the process of finalizing the vadose zone monitoring procedure/strategy in consultation with the regulatory agencies.

**B. Adequacy of O&M**

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

As noted above, the monitoring program at Site 16 is adequate to maintain protectiveness of the remedy. Per the remedial design, groundwater monitoring network would need to be augmented as appropriate to confirm distribution of TCE to the west and northwest.

**C. Early Indicators of Potential Remedy Problems**

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

Please see comments above.

**D. Opportunities for Optimization**

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

As noted above in VII, A, soil gas monitoring data has not shown any definitive trends. The Navy is in the process of finalizing the vadose zone monitoring procedure/strategy in consultation with the regulatory agencies.

## **IRP Site 17**



**Site Inspection Checklist  
First Five-Year Review  
IRP Site 17, Former MCAS El Toro  
Landfill Cover/Containment**

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency California Department of Toxic Substances Control

Contact	<u>Mr. Quang Than</u>	<u>Remedial Project Manager</u>	<u>03/19/09</u>	<u>(714) 484-5352</u>
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached See Appendix D of this report

Agency California Regional Water Quality Control Board, Santa Ana Region

Contact	<u>Mr. John Broderick</u>	<u>Remedial Project Manager</u>	<u>03/19/09</u>	<u>(951) 782-4494</u>
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached See Appendix D of this report

Agency \_\_\_\_\_

Contact	_____	_____	_____	_____
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached \_\_\_\_\_

Agency \_\_\_\_\_

Contact	_____	_____	_____	_____
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached \_\_\_\_\_

4. **Other interviews** (optional)  Report attached. (See Appendix D of this report)

Ms. Content Arnold, Lead Remedial Project Manager, Dept. of the Navy, BRAC PMO West

Mr. Marc Smits, Remedial Project Manager, Dept. of the Navy, BRAC PMO West

Mr. Rich Muza, Remedial Project Manager, U.S. EPA Region IX

Mr. Robert Woodings, RAB Co-Chair, RAB, Former MCAS El Toro

Ms. Marcia Rudolph, Subcommittee Chair, RAB, Former MCAS El Toro

Mr. Jim Werkmeister, Manager, Environmental Affairs, Lennar

Mr. Glen Worthington, Manager of Planning and Environmental Services, Orange County Great Park

**Site Inspection Checklist  
First Five-Year Review  
IRP Site 17, Former MCAS El Toro  
Landfill Cover/Containment**

<b>III. ON-SITE DOCUMENTS &amp; RECORDS VERIFIED (Check all that apply)</b>			
1.	<b>O&amp;M Documents</b>		
	<input checked="" type="checkbox"/> O&M manual/work plan	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> As-built drawings	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Maintenance logs	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks _____		
2.	<b>Site-Specific Health and Safety Plan</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Contingency plan/emergency response plan	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks _____		
3.	<b>O&amp;M Records</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks _____		
4.	<b>Permits and Service Agreements</b>		
	<input type="checkbox"/> Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Other permits _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	Remarks <u>O&amp;M Plan addresses substantive requirements of ARARs identified in the ROD.</u>		
5.	<b>Gas Generation Records</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	Remarks <u>No gas generation</u>		
6.	<b>Settlement Monument Records</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks _____		
7.	<b>Groundwater Monitoring Records</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks _____		
8.	<b>Soil Moisture Monitoring Records</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks _____		
9.	<b>Discharge Compliance Records</b>		
	<input type="checkbox"/> Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Water (effluent)	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	Remarks _____		
10.	<b>Daily Access/Security Logs</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks <u>Maintained in project logbook</u>		

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 17, Former MCAS El Toro  
 Landfill Cover/Containment**

<b>IV. ACCESS AND INSTITUTIONAL CONTROLS</b>		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
<b>A. Fencing and Gates</b>			
1.	<b>Fencing damaged</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Fencing secured <span style="float: right;"><input type="checkbox"/> N/A</span>
Remarks _____ _____			
2.	<b>Gates damaged</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Gates secured <span style="float: right;"><input type="checkbox"/> N/A</span>
Remarks _____ _____			
<b>B. Other Access Restrictions</b>			
1.	<b>Signs and other security measures</b>	<input checked="" type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
Remarks <u>Signs installed still in place</u>			
<b>C. Institutional Controls (ICs)</b>			
1.	<b>Implementation and enforcement</b>		
Site conditions imply ICs not properly implemented		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Site conditions imply ICs not being fully enforced		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Type of monitoring (e.g., self-reporting, drive by) <u>Drive by</u>			
Frequency		<u>Annual</u>	
Responsible party/agency		<u>Department of the Navy</u>	
Contact		<u>Mr. Marc Smits, RPM</u>	
Reporting is up-to-date		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Reports are verified by the lead agency		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Specific requirements in deed or decision documents have been met		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Violations have been reported		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Other problems or suggestions:		<input type="checkbox"/> Report attached	
<u>Annual certifications from FAA received and will be included in Annual reports</u> _____ _____ _____			
2.	<b>Adequacy</b>	<input checked="" type="checkbox"/> ICs are adequate	<input type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A
Remarks _____ _____ _____			

**Site Inspection Checklist  
 First Five-Year Review  
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 Landfill Cover/Containment**

<b>D. General</b>			
1.	<b>Vandalism/trespassing</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No vandalism evident
Remarks _____ _____			
2.	<b>Land use changes on site</b>	<input checked="" type="checkbox"/> N/A	
Remarks _____ _____			
3.	<b>Land use changes off site</b>	<input checked="" type="checkbox"/> N/A	
Remarks <u>None to date. Alton Parkway extension construction planned within two years</u> _____			
<b>V. GENERAL SITE CONDITIONS</b>			
<b>A. Roads</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	<b>Roads damaged</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A
Remarks <u>Road in good condition</u> _____			
<b>B. Other Site Conditions</b>			
Remarks _____ _____ _____ _____ _____			
<b>VI. LANDFILL COVER</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
<b>A. Landfill Surface</b>			
1.	<b>Settlement</b> (Low spots)	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Settlement not evident
Areal extent _____      Depth _____			
Remarks _____ _____			
2.	<b>Cracks</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Cracking not evident
Lengths _____      Widths _____      Depths _____			
Remarks _____ _____			
3.	<b>Erosion</b>	<input checked="" type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
Areal extent _____      Depth _____			
Remarks <u>Minor erosion rills along road and at the earthen down</u> _____			

**Site Inspection Checklist  
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4.	<b>Holes</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Holes not evident
	Areal extent _____	Depth _____	
	Remarks _____ _____		
5.	<b>Vegetative Cover</b>	<input type="checkbox"/> Grass	<input type="checkbox"/> Cover properly established
		<input type="checkbox"/> No signs of stress	
	<input type="checkbox"/> Trees/Shrubs (indicate size and locations on a diagram)		
	Remarks <u>Landfill surfaces with slope greater than 3:1 hydroseed. Habitat/vegetation planting underway by restoration contractor.</u>		
6.	<b>Alternative Cover (armored rock, concrete, etc.)</b>	<input checked="" type="checkbox"/> N/A	
	Remarks _____ _____		
7.	<b>Bulges</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Bulges not evident
	Areal extent _____	Height _____	
	Remarks _____ _____		
8.	<b>Wet Areas/Water Damage</b>		
	<input type="checkbox"/> Wet areas/water damage not evident		
	<input type="checkbox"/> Wet areas	<input type="checkbox"/> Location shown on site map	Areal extent _____
	<input type="checkbox"/> Ponding	<input type="checkbox"/> Location shown on site map	Areal extent _____
	<input type="checkbox"/> Seeps	<input type="checkbox"/> Location shown on site map	Areal extent _____
	<input type="checkbox"/> Soft subgrade	<input type="checkbox"/> Location shown on site map	Areal extent _____
	Remarks <u>Erosion along roads repaired by restoration contractor.</u>		
	_____		
9.	<b>Slope Instability</b>	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map
		<input checked="" type="checkbox"/> No evidence of slope instability	
	Areal extent _____		
	Remarks _____ _____		
<b>B. Drainage System (Shotcrete-lined Channels/Berms/Ditches)</b>		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	<b>Settlement</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of settlement
	Areal extent _____	Depth _____	
	Remarks _____ _____		
2.	<b>Material Degradation</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of degradation
	Material type _____	Areal extent _____	
	Remarks _____ _____		
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of erosion
	Areal extent _____	Depth _____	
	Remarks <u>Applies to drainage features adjacent to landfill cover</u>		
	_____		

**Site Inspection Checklist  
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4.	<b>Undercutting</b> Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Depth _____	<input checked="" type="checkbox"/> No evidence of undercutting
5.	<b>Obstructions</b> Type _____ Size _____ Remarks _____	<input type="checkbox"/> Location shown on site map Areal extent _____	<input checked="" type="checkbox"/> No obstructions
6.	<b>Excessive Vegetative Growth</b> Type <u>None noted</u> Remarks _____	<input checked="" type="checkbox"/> No evidence of excessive growth <input checked="" type="checkbox"/> Vegetation in channels does not obstruct flow <input type="checkbox"/> Location shown on site map Areal extent _____	
<b>C. Cover Penetrations</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	<b>Gas Vents</b> Remarks _____	<input type="checkbox"/> Active <input type="checkbox"/> Passive <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> N/A	
2.	<b>Gas Monitoring Probes</b> Remarks _____	<input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A	
3.	<b>Groundwater Monitoring Wells</b> (within surface area of landfill) Remarks _____	<input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A	
4.	<b>Lysimeters</b> Remarks _____	<input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A	
5.	<b>Settlement Monuments</b> Remarks _____	<input checked="" type="checkbox"/> Located <input checked="" type="checkbox"/> Routinely surveyed <input type="checkbox"/> N/A	

**Site Inspection Checklist  
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<b>D. Gas Collection and Treatment</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
<b>1. Gas Treatment Facilities</b>		
<input type="checkbox"/> Flaring <input type="checkbox"/> Thermal destruction <input type="checkbox"/> Collection for reuse <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
<b>2. Gas Collection Wells, Manifolds and Piping</b>		
<input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
<b>3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)</b>		
<input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> N/A Remarks _____ _____		
<b>VII. OVERALL OBSERVATIONS</b>		
<b>A. Implementation of the Remedy</b>		
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).  <u>Routine monitoring of remediation has been initiated. Planting associated with habitat (coastal sage scrub) restoration is ongoing. Large areas of the landfill cover have little to no vegetation. As a result, during rainfall events erosion gullies have developed along the access road. The restoration contractor has promptly repaired these gullies. In addition, ponding of water periodically occurred at the bottom of the landfill in areas where top soil placement did not allow for efficient drainage. Top soil in these areas has been regraded and better drainage off-the landfill surface is now occurring.</u>		
<b>B. Adequacy of O&amp;M</b>		
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. _____		
<b>C. Early Indicators of Potential Remedy Problems</b>		
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.  <u>None noted</u>		
<b>D. Opportunities for Optimization</b>		
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. _____		

## **IRP Site 18**

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 18, Former MCAS El Toro  
 Groundwater Pump and Treat**

<b>I. SITE INFORMATION</b>	
<b>Site name:</b> IRP Site 18, Former MCAS El Toro	<b>Date of inspection:</b> 03/30/09 and 04/06/09
<b>Location and Region:</b> Irvine, CA; U.S.EPA Region IX	<b>EPA ID:</b> CA6170023208
<b>Agency, office, or company leading the five-year review:</b> BRAC Program Management Office West, Department of the Navy	<b>Weather/temperature:</b>
<b>Remedy Includes:</b> (Check all that apply) <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Groundwater Pump and Treatment</li> <li><input checked="" type="checkbox"/> Access controls</li> <li><input checked="" type="checkbox"/> Institutional Controls</li> </ul>	
<b>Attachments:</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Inspection team roster attached (see Table 6-2 of this report)</li> <li><input checked="" type="checkbox"/> Site map attached (see Figure 3-6 of this report)</li> </ul>	
<b>II. INTERVIEWS</b> (Check all that apply)	
<b>1. O&amp;M Site Manager:</b> <u>Steve Habiger</u> <u>IRWD Systems Operations Manager</u> <u>April 2, 2009</u> <div style="display: flex; justify-content: space-between; margin-left: 100px;"> <span>Name</span> <span>Title</span> <span>Date</span> </div> Interviewed <input type="checkbox"/> at site <input checked="" type="checkbox"/> at office <input type="checkbox"/> by phone      Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____ _____	
<b>2. O&amp;M Staff:</b> <u>Wayne Wright</u> <u>IRWD System Operations Production and Treatment Supervisor</u> <u>April 2, 2009</u> <div style="display: flex; justify-content: space-between; margin-left: 100px;"> <span>Name</span> <span>Title</span> <span>Date</span> </div> Interviewed <input type="checkbox"/> at site <input checked="" type="checkbox"/> at office <input type="checkbox"/> by phone      Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____ _____	

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3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency California Department of Toxic Substances Control

Contact	<u>Mr. Quang Than</u>	<u>Remedial Project Manager</u>	<u>03/19/09</u>	<u>(714) 484-5352</u>
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached See Appendix G of this report

Agency California Regional Water Quality Control Board, Santa Ana Region

Contact	<u>Mr. John Broderick</u>	<u>Remedial Project Manager</u>	<u>03/19/09</u>	<u>(951) 782-4494</u>
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached See Appendix G of this report

Agency \_\_\_\_\_

Contact	_____	_____	_____	_____
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached \_\_\_\_\_

Agency \_\_\_\_\_

Contact	_____	_____	_____	_____
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached \_\_\_\_\_

4. **Other interviews** (optional)  Report attached. (See Appendix G of this report)

Ms. Content Arnold, Lead Remedial Project Manager, Dept. of the Navy, BRAC PMO West
Mr. Marc Smits, Remedial Project Manager, Dept. of the Navy, BRAC PMO West
Mr. Rich Muza, Remedial Project Manager, U.S. EPA Region IX
Mr. Robert Woodings, RAB Co-Chair, RAB, Former MCAS El Toro
Ms. Marcia Rudolph, Subcommittee Chair, RAB, Former MCAS El Toro
Mr. Roy Herndon, Chief Hydrogeologist, Orange County Water District
Mr. Jim Werkmeister, Manager, Environmental Affairs, Lennar
Mr. Glen Worthington, Manager of Planning and Environmental Services, Orange County Great Park

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 First Five-Year Review  
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 Groundwater Pump and Treat**

<b>III. ON-SITE DOCUMENTS &amp; RECORDS VERIFIED</b> (Check all that apply)			
1.	<b>O&amp;M Documents</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> O&M manual	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> As-built drawings	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Maintenance logs	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks _____ _____		
2.	<b>Site-Specific Health and Safety Plan</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Contingency plan/emergency response plan	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks : Maintained at the IRWD Operations Center, 3512 Michelson Dr., Irvine, CA 92612-1799		
3.	<b>O&amp;M Records</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks _____		
	Maintained at IRWD SCADA/Tab Ware system (electronically)		
4.	<b>Permits and Service Agreements</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Air discharge permit	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input type="checkbox"/> Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Waste disposal, POTW	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Other permits _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	Remarks: Maintained at the IRWD Operations Center, 3512 Michelson Dr., Irvine, CA 92612-1799		
5.	<b>Groundwater Monitoring Records</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks: Maintained at the IRWD Operations Center, 3512 Michelson Dr., Irvine, CA 92612-1799		
6.	<b>Discharge Compliance Records</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Air	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input type="checkbox"/> Water (effluent)	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	Remarks _____ _____		
7.	<b>Daily Access/Security Logs</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	Remarks _____ _____		

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<b>IV. ACCESS AND INSTITUTIONAL CONTROLS</b>		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
<b>A. Fencing</b>			
1.	<b>Fencing damaged</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Fencing secured <input type="checkbox"/> N/A
Remarks _____ _____			
2.	<b>Gates damaged</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Gates secured <input type="checkbox"/> N/A
Remarks _____ _____			
<b>B. Other Access Restrictions</b>			
1.	<b>Signs and other security measures</b>	<input checked="" type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
Remarks _____ _____			
<b>C. Institutional Controls (ICs)</b>			
1.	<b>Implementation and enforcement</b> ( <i>ICs implemented through Permit Programs by OCHCA and IRWD</i> )		
Site conditions imply ICs not properly implemented		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Site conditions imply ICs not being fully enforced		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Type of monitoring (e.g., self-reporting, drive by) <u>Review of checklists completed by Orange County Health Care Agency and Irvine Ranch Water District. This review is done by the Department of the Navy.</u>			
Frequency <u>Annual</u>			
Responsible party/agency <u>Department of the Navy</u>			
Contact <u>Mr. March Smits, RPM</u>			
Reporting is up-to-date		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Reports are verified by the lead agency		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Specific requirements in deed or decision documents have been met		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Violations have been reported		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Other problems or suggestions:		<input type="checkbox"/> Report attached	
<u>Remarks: See Section 6.4 of this report for details on ICs implementation at IRP Site 18.</u>			
_____			
_____			
2.	<b>Adequacy</b>	<input type="checkbox"/> ICs are adequate	<input type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A
Remarks : <u>See Section 6.4 of this report for details on ICs implementation at IRP Site 18.</u>			
<b>D. General</b>			
1.	<b>Vandalism/trespassing</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No vandalism evident
Remarks _____ _____			

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 18, Former MCAS El Toro  
 Groundwater Pump and Treat**

2. **Land use changes on site**  N/A  
 Remarks \_\_\_\_\_  
 \_\_\_\_\_

3. **Land use changes off site**  N/A  
 Remarks \_\_\_\_\_  
 \_\_\_\_\_

**V. GENERAL SITE CONDITIONS**

**A. Roads**  Applicable  N/A

1. **Roads damaged**  Location shown on site map  Roads adequate  N/A  
 Remarks \_\_\_\_\_  
 \_\_\_\_\_

**B. Other Site Conditions**

Remarks \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**VI. GROUNDWATER REMEDY**

**A. Groundwater Extraction Wells, Pumps, and Pipelines**  Applicable  N/A

1. **Pumps, Wellhead Plumbing, and Electrical**  
 Good condition  All required wells properly operating  Needs Maintenance  N/A  
 Remarks: IRWD introduced NALCO C-5 sequestering additive into the pump influent to prevent potential calcium carbonate scaling.

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**  
 Good condition  Needs Maintenance  
 Remarks \_\_\_\_\_  
 \_\_\_\_\_

3. **Spare Parts and Equipment**  
 Readily available  Good condition  Requires upgrade  Needs to be provided  
 Remarks \_\_\_\_\_  
 \_\_\_\_\_

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<b>C. Treatment System</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
1.	<b>Treatment Train</b> (Check components that apply) <input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input checked="" type="checkbox"/> Air stripping <input checked="" type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Filters _____ <input checked="" type="checkbox"/> Additive (e.g., chelation agent, flocculent) NALCO C-5 liquid polyphosphate inhibitor <input type="checkbox"/> Others _____ <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input checked="" type="checkbox"/> Equipment properly identified <input checked="" type="checkbox"/> Quantity of groundwater treated annually: 1319 acre-feet (about 430 Mgal) <input type="checkbox"/> Quantity of surface water treated annually _____ Remarks _____ _____
2.	<b>Electrical Enclosures and Panels</b> (properly rated and functional) <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____
3.	<b>Tanks, Vaults, Storage Vessels</b> <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs Maintenance Remarks _____ _____
4.	<b>Discharge Structure and Appurtenances</b> <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____
5.	<b>Treatment Building(s)</b> <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair <input checked="" type="checkbox"/> Chemicals and equipment properly stored Remarks _____ _____
6.	<b>Monitoring Wells</b> (pump and treatment remedy) <input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A  Remarks: information provided by OCWD (Roy Herndon)
<b>D. Monitoring Data</b>	
1	Monitoring Data <input type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality
2.	Monitoring data suggests: <input checked="" type="checkbox"/> Groundwater plume is effectively contained <input type="checkbox"/> Contaminant concentrations are declining

**Site Inspection Checklist  
First Five-Year Review  
IRP Site 18, Former MCAS El Toro  
Groundwater Pump and Treat**

<b>VII. OVERALL OBSERVATIONS</b>	
<b>A. Implementation of the Remedy</b>	<p>Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).</p> <p><u>The goal of this treatment is to ensure containment of the plume by removing the VOC from influent water by the air stripping process. The remedy is effective. Total concentration of the VOC in the influent is in the range of 5-10 ppb with the average concentration of about 7.8 ppb. Average VOC removal efficiency is 99.3%. Average VOC mass removal is 2.1 lbs/month.</u></p>
<b>B. Adequacy of O&amp;M</b>	<p>Describe issues and observations related to the implementation and scope of O&amp;M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.</p> <p><u>The air stripper cannot operate at the design flow of 1000 gpm because of flooding occurring at the air stripper trays and activation of the relief feature. The flow through the stripper was adjusted to approximately 850 gpm to insure the normal operation of the air stripper. IRWD will take the following steps to bring the flow up to 1000 GPM:</u></p> <ol style="list-style-type: none"> <li>1. <u>IRWD operations staff will work with air stripper manufacturer to make adjustments to the air and water settings to allow 1000 GPM to be treated.</u></li> <li>2. <u>If Option 1 above is not feasible, IRWD will investigate the options of either bypassing 200 GPM of flow around the air stripper or operating both air strippers together at 500 GPM flow each.</u></li> <li>3. <u>IRWD will modify the product water pump as needed to pump 1000 gpm and meet the higher pressure now existing in the non-potable water distribution system.</u></li> </ol> <p><u>Over the next two months IRWD is committed to increase the flows to the value of 1000 GPM. O&amp;M procedures as described in final O&amp;M Manual, PAP Treatment System, Well ET-2 and 78, June 2007; are current and are generally being followed through; also see response to "D" below.</u></p>
<b>C. Early Indicators of Potential Remedy Problems</b>	<p>Describe issues and observations such as unexpected changes in the cost or scope of O&amp;M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.</p> <p><u>N/A</u></p>
<b>D. Opportunities for Optimization</b>	<p>Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.</p> <p><u>IRWD is seeking engineering improvements and controls to increase the air stripper influent pump flow rate to the design rate of 1000 gpm.</u></p> <p><u>IRWD noted existing inadequacy in applying a Photo Ionization Detector (PID) instrument to measure the total VOC concentrations for the vapor phase GAC treatment. It was noted that contrary to O&amp;M procedures, some GAC canisters change-outs have not been occurring until both canisters have exceeded their treatment capacity. IRWD will proceed to eliminate PID instrument monitoring, and will strictly follow the O&amp;M Manual procedures for VOC vapor monitoring using the air samples sent to the specialized lab. The switch from lead to lag canister and subsequent GAC media change-outs will be performed on a TCE trigger level of 50 ppbv.</u></p>

## **IRP Site 24**

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 24 Groundwater Extraction and Conveyance System  
 Former MCAS El Toro  
 Groundwater Pump and Treat**

I. SITE INFORMATION	
<b>Site name:</b> IRP Site 24, Former MCAS El Toro	<b>Date of inspection:</b> March 18, 2009
<b>Location and Region:</b> Irvine, CA; U.S.EPA Region IX	<b>EPA ID:</b> CA6170023208
<b>Agency, office, or company leading the five-year review:</b> BRAC Program Management Office West, Department of the Navy	<b>Weather/temperature:</b> Cloudy, ~50°F
<b>Remedy Includes:</b> (Check all that apply) <input checked="" type="checkbox"/> Groundwater pump and treat <span style="margin-left: 200px;"><input type="checkbox"/> Other _____</span> <input checked="" type="checkbox"/> Institutional controls <span style="margin-left: 150px;">_____</span> <input type="checkbox"/> Access controls	
<b>Attachments:</b> <input checked="" type="checkbox"/> Inspection team roster attached (see Table 6-2 of this report) <input checked="" type="checkbox"/> Site map attached (See Figure 3-6 of this report)	
II. INTERVIEWS (Check all that apply)	
<b>1. O&amp;M Site Manager</b> <u>Mr. Tracy Walker</u> <u>Project Manager</u> <u>03/20/09</u> <div style="display: flex; justify-content: space-between; margin-left: 100px;"> <span>Name</span> <span>Title</span> <span>Date</span> </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone <input checked="" type="checkbox"/> Other    Phone no. <u>925-948-2652</u> Problems, suggestions; <input checked="" type="checkbox"/> Report attached <u>See Appendix H of this report</u> _____	
<b>2. O&amp;M Staff</b> <u>N/A</u> _____      _____ <div style="display: flex; justify-content: space-between; margin-left: 100px;"> <span>Name</span> <span>Title</span> <span>Date</span> </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone    Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____ _____	

**Site Inspection Checklist  
First Five-Year Review  
IRP Site 24 Groundwater Extraction and Conveyance System  
Former MCAS El Toro  
Groundwater Pump and Treat**

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency California Department of Toxic Substances Control

Contact Mr. Quang Than Remedial Project Manager 03/19/09 (714) 484-5352  
 Name Title Date Phone no.

Problems, suggestions;  Report attached See Appendix H of this report

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Agency California Regional Water Quality Control Board, Santa Ana Region

Contact Mr. John Broderick Remedial Project Manager 03/19/09 (951) 782-4494  
 Name Title Date Phone no.

Problems, suggestions;  Report attached See Appendix H of this report

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4. **Other interviews** (optional)  Report attached. (See Appendix H of this report)

Ms. Content Arnold, Lead Remedial Project Manager, Dept. of the Navy, BRAC PMO West

Mr. Marc Smits, Remedial Project Manager, Dept. of the Navy, BRAC PMO West

Mr. Rich Muza, Remedial Project Manager, U.S. EPA Region IX

Mr. Robert Woodings, RAB Co-Chair, RAB, Former MCAS El Toro

Ms. Marcia Rudolph, Subcommittee Chair, RAB, Former MCAS El Toro

Ms. John Hills, Irvine Ranch Water District

Mr. Roy Herndon, Chief Hydrogeologist, Orange County Water District

Mr. Jim Werkmeister, Manager, Environmental Affairs, Lennar

Mr. Glen Worthington, Manager of Planning and Environmental Services, Orange County Great Park

**III. ON-SITE DOCUMENTS & RECORDS VERIFIED** (Check all that apply)

1. **O&M Documents**

<input checked="" type="checkbox"/> O&M manual/work plan	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> As-built drawings	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Maintenance logs	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A

Remarks Extraction, monitoring, and conveyance system.

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2. **Site-Specific Health and Safety Plan**  Readily available  Up to date  N/A

Contingency plan/emergency response plan  Readily available  Up to date  N/A Remarks

Extraction, monitoring, and conveyance system.

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**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 24 Groundwater Extraction and Conveyance System  
 Former MCAS El Toro  
 Groundwater Pump and Treat**

3.	<b>O&amp;M Records</b> Extraction, monitoring, and conveyance system.	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A	Remarks
4.	<b>Permits and Service Agreements</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	
	<input type="checkbox"/> Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	
	<input type="checkbox"/> Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	
	<input type="checkbox"/> Other permits <u>See below</u>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A	
Remarks <u>ECLs per Settlement Agreement</u>					
5.	<b>Groundwater Monitoring Records</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A	
Remarks <u>Extraction, monitoring, and conveyance system.</u>					
6.	<b>Discharge Compliance Records</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A	
	<input type="checkbox"/> Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A	
	<input checked="" type="checkbox"/> Water (effluent)	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A	
Remarks <u>ECL requirements per Settlement Agreement</u>					
7.	<b>Daily Access/Security Logs</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A	
Remarks <u>Noted in O&amp;M logs</u>					
<b>IV. ACCESS AND INSTITUTIONAL CONTROLS</b>		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A		
<b>A. Fencing</b>					
1.	<b>Fencing damaged</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Fencing secured	<input type="checkbox"/> N/A	
Remarks _____					
2.	<b>Gates damaged</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Gates secured	<input type="checkbox"/> N/A	
Remarks _____					
<b>B. Other Access Restrictions</b>					
1.	<b>Signs and other security measures</b>	<input checked="" type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A		
Remarks <u>Remedy infrastructure marked "Property of DON, Do not Disturb."</u>					

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 24 Groundwater Extraction and Conveyance System  
 Former MCAS El Toro  
 Groundwater Pump and Treat**

<b>C. Institutional Controls (ICs)</b>			
1.	<b>Implementation and enforcement</b>		
	Site conditions imply ICs not properly implemented	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
	Site conditions imply ICs not being fully enforced	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
	Type of monitoring (e.g., self-reporting, drive by) <u>Self Reporting</u>		
	Frequency <u>Annual</u>		
	Responsible party/agency <u>Department of the Navy</u>		
	Contact <u>Mr. March Smits, RPM</u>		
	Reporting is up-to-date	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Reports are verified by the lead agency	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Specific requirements in deed or decision documents have been met	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Violations have been reported	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
	Other problems or suggestions:	<input type="checkbox"/> Report attached	
	_____		
	_____		
	_____		
	_____		
2.	<b>Adequacy</b>	<input checked="" type="checkbox"/> ICs are adequate	<input type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A
	Remarks _____		
	_____		
	_____		
<b>D. General</b>			
1.	<b>Vandalism/trespassing</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No vandalism evident
	Remarks <u>Damage to valve caused and repaired by tenant under lease</u>		
	_____		
2.	<b>Land use changes on site</b>	<input type="checkbox"/> N/A	
	Remarks <u>Firetruck lane erected over 24SGU09; pullbox lids are being upgraded to traffic rated lids.</u>		
	_____		
3.	<b>Land use changes off site</b>	<input checked="" type="checkbox"/> N/A	
	Remarks _____		
<b>V. GENERAL SITE CONDITIONS</b>			
<b>A. Roads</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	<b>Roads damaged</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A
	Remarks <u>No road damage evident.</u>		
	_____		

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 24 Groundwater Extraction and Conveyance System  
 Former MCAS El Toro  
 Groundwater Pump and Treat**

<b>B. Other Site Conditions</b>	
Remarks _____ _____	
<b>VI. GROUNDWATER REMEDY</b>	
<b>A. Groundwater Extraction Wells, Pumps, and Pipelines</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
<b>1. Pumps, Wellhead Plumbing, and Electrical</b>	
<input type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____	
<b>2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b>	
<input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____	
<b>3. Spare Parts and Equipment</b>	
<input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____	
<b>C. Treatment System</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
<b>1. Treatment Train</b> (Check components that apply)	
<input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input type="checkbox"/> Air stripping <input type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Filters _____ <input checked="" type="checkbox"/> Additive ( <i>e.g.</i> , chelation agent, flocculent) _____ <input type="checkbox"/> Others _____ <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> Sampling ports properly marked and functional <input checked="" type="checkbox"/> Sampling/maintenance log displayed and up to date <input checked="" type="checkbox"/> Equipment properly identified <input checked="" type="checkbox"/> Quantity of groundwater treated annually <u>177,514,212 gals (two year avg)</u> _____ <input type="checkbox"/> Quantity of surface water treated annually _____ Remarks <u>Carbon adsorbers used for passive vapor control from equalization tanks</u> _____ _____	
<b>2. Electrical Enclosures and Panels</b> (properly rated and functional)	
<input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____	

**Site Inspection Checklist  
First Five-Year Review  
IRP Site 24 Groundwater Extraction and Conveyance System  
Former MCAS El Toro  
Groundwater Pump and Treat**

3.	<b>Tanks, Vaults, Storage Vessels</b> <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs Maintenance Remarks _____ _____
4.	<b>Discharge Structure and Appurtenances</b> <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____
5.	<b>Treatment Building(s)</b> <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair <input type="checkbox"/> Chemicals and equipment properly stored Remarks _____ _____
6.	<b>Monitoring Wells (pump and treatment remedy)</b> <input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____
<b>D. Monitoring Data</b>	
1	Monitoring Data <input checked="" type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality
2.	Monitoring data suggests: <input checked="" type="checkbox"/> Groundwater plume is effectively contained <input checked="" type="checkbox"/> Contaminant concentrations are declining
<b>VII. OVERALL OBSERVATIONS</b>	
<b>A. Implementation of the Remedy</b>  Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).  <u>The remedy is designed to generally contain, remove, and treat VOC concentrations in excess of State &amp; Federal MCLs. The specific monitoring objective includes the following: evaluating the extent of hydraulic containment of the VOC plume, assessing the progress of the aquifer restoration, providing data for system performance optimization, and appraising compliance with the Remedial Action Objectives (RAOs). During the first two years of operation, the capture of the on-Station SGU VOC plume is nearly complete and capture of the principal aquifer plume is complete. However, an area of incomplete capture has been identified within the SGU plume at the Station boundary. Consistent with final remedy design, four contingency wells will be installed at the Station boundary. The System has effectively removed an estimated VOC mass of 602 pounds or 22 percent of the total estimated baseline mass in-place. All wells have been operational while some wells have been placed on standby mode as to maximize overall system performance and mass removal. Wells at hotspots are continually on while standby wells were rotated to maintain operability.</u>	

**Site Inspection Checklist  
First Five-Year Review  
IRP Site 24 Groundwater Extraction and Conveyance System  
Former MCAS El Toro  
Groundwater Pump and Treat**

**B. Adequacy of O&M**

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Routine O&M is performed weekly to maintain effective operation of the system. The system has maintained the system design flowrate of 400 gpm. In the first two years of O&M, the system has been successful in creating dynamic conditions within the SGU plume, in removing mass of VOCs from the SGU, and in near-complete hydraulic capture of the SGU plume at the Station boundary.

**C. Early Indicators of Potential Remedy Problems**

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

There have been no significant issues with system operation to date that would suggest that the protectiveness of the remedy may be compromised in the future. A supply of spare parts is kept onsite in order to make timely repairs and to keep system components operating as designed.

**D. Opportunities for Optimization**

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

VOC concentrations are evaluated from individual extraction wells in the context of hydraulic containment. The evaluation is used to adjust pumping strategies to maximize VOC removal without compromising hydraulic containment. Data trends from extraction and monitoring wells are used to decrease sampling frequencies and data reporting as appropriate.

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 24 Treatment System, Former MCAS El Toro  
 Groundwater Pump and Treat**

<b>I. SITE INFORMATION</b>	
<b>Site name:</b> IRP Site 24, Former MCAS El Toro	<b>Date of inspection:</b> 03/30/09 and 04/06/09
<b>Location and Region:</b> Irvine, CA; U.S.EPA Region IX	<b>EPA ID:</b> CA6170023208
<b>Agency, office, or company leading the five-year review:</b> BRAC Program Management Office West, Department of the Navy	<b>Weather/temperature:</b>
<b>Remedy Includes:</b> (Check all that apply) <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Groundwater Pump and Treatment</li> <li><input checked="" type="checkbox"/> Access controls</li> <li><input checked="" type="checkbox"/> Institutional Controls</li> </ul>	
<b>Attachments:</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Inspection team roster attached (see Table 6-2 of this report)</li> <li><input checked="" type="checkbox"/> Site map attached (see Figure 3-6 of this report)</li> </ul>	
<b>II. INTERVIEWS</b> (Check all that apply)	
<b>1. O&amp;M Site Manager:</b> <u>Steve Habiger</u> <u>IRWD Systems Operations Manager</u> <u>April 2, 2009</u> <div style="display: flex; justify-content: space-between; margin-left: 100px;"> <span>Name</span> <span>Title</span> <span>Date</span> </div> Interviewed <input type="checkbox"/> at site <input checked="" type="checkbox"/> at office <input type="checkbox"/> by phone      Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____ _____	
<b>2. O&amp;M Staff:</b> <u>Wayne Wright</u> <u>IRWD System Operations Production and Treatment Supervisor</u> <u>April 2, 2009</u> <div style="display: flex; justify-content: space-between; margin-left: 100px;"> <span>Name</span> <span>Title</span> <span>Date</span> </div> Interviewed <input type="checkbox"/> at site <input checked="" type="checkbox"/> at office <input type="checkbox"/> by phone      Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____ _____	

**Site Inspection Checklist  
First Five-Year Review  
IRP Site 24 Treatment System, Former MCAS El Toro  
Groundwater Pump and Treat**

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency California Department of Toxic Substances Control

Contact	<u>Mr. Quang Than</u>	<u>Remedial Project Manager</u>	<u>03/19/09</u>	<u>(714) 484-5352</u>
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached See Appendix G of this report

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Agency California Regional Water Quality Control Board, Santa Ana Region

Contact	<u>Mr. John Broderick</u>	<u>Remedial Project Manager</u>	<u>03/19/09</u>	<u>(951) 782-4494</u>
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached See Appendix G of this report

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Agency \_\_\_\_\_

Contact	_____	_____	_____	_____
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached \_\_\_\_\_

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Agency \_\_\_\_\_

Contact	_____	_____	_____	_____
	Name	Title	Date	Phone no.

Problems, suggestions;  Report attached \_\_\_\_\_

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4. **Other interviews** (optional)  Report attached.
- |  |
|--|
| Ms. Content Arnold, Lead Remedial Project Manager, Dept. of the Navy, BRAC PMO West            |
| Mr. Marc Smits, Remedial Project Manager, Dept. of the Navy, BRAC PMO West                     |
| Mr. Rich Muza, Remedial Project Manager, U.S. EPA Region IX                                    |
| Mr. Robert Woodings, RAB Co-Chair, RAB, Former MCAS El Toro                                    |
| Ms. Marcia Rudolph, Subcommittee Chair, RAB, Former MCAS El Toro                               |
| Mr. Roy Herndon, Chief Hydrogeologist, Orange County Water District                            |
| Mr. Jim Werkmeister, Manager, Environmental Affairs, Lennar                                    |
| Mr. Glen Worthington, Manager of Planning and Environmental Services, Orange County Great Park |
|  |

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 24 Treatment System, Former MCAS El Toro  
 Groundwater Pump and Treat**

<b>III. ON-SITE DOCUMENTS &amp; RECORDS VERIFIED</b> (Check all that apply)			
1.	<b>O&amp;M Documents</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> O&M manual	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> As-built drawings	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Maintenance logs	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks _____ _____		
2.	<b>Site-Specific Health and Safety Plan</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Contingency plan/emergency response plan	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks : Maintained at the IRWD Operations Center, 3512 Michelson Dr., Irvine, CA 92612-1799		
3.	<b>O&amp;M Records</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks _____		
	Maintained at IRWD SCADA/Tab Ware system (electronically)		
4.	<b>Permits and Service Agreements</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Air discharge permit	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input type="checkbox"/> Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	Waste disposal, POTW	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Other permits _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	Remarks: Maintained at the IRWD Operations Center, 3512 Michelson Dr., Irvine, CA 92612-1799		
5.	<b>Groundwater Monitoring Records</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	Remarks: Maintained at the IRWD Operations Center, 3512 Michelson Dr., Irvine, CA 92612-1799		
6.	<b>Discharge Compliance Records</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Air	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input type="checkbox"/> Water (effluent)	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	Remarks _____ _____		
7.	<b>Daily Access/Security Logs</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
	Remarks _____ _____		

**Site Inspection Checklist  
First Five-Year Review  
IRP Site 24 Treatment System, Former MCAS El Toro  
Groundwater Pump and Treat**

<b>IV. ACCESS AND INSTITUTIONAL CONTROLS</b>		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
<b>A. Fencing</b>			
1.	<b>Fencing damaged</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Fencing secured <span style="float: right;"><input type="checkbox"/> N/A</span>
Remarks _____ _____			
2.	<b>Gates damaged</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Gates secured <span style="float: right;"><input type="checkbox"/> N/A</span>
Remarks _____ _____			
<b>B. Other Access Restrictions</b>			
1.	<b>Signs and other security measures</b>	<input checked="" type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
Remarks _____ _____			
<b>C. Institutional Controls (ICs)</b> <i>(see Checklist for IRP Site 24 Extraction and Conveyance System)</i>			
1.	<b>Implementation and enforcement</b>		
Site conditions imply ICs not properly implemented		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Site conditions imply ICs not being fully enforced		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Type of monitoring (e.g., self-reporting, drive by) _____			
Frequency _____			
Responsible party/agency _____			
Contact _____			
	Name	Title	Date
	Phone no.		
Reporting is up-to-date		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Reports are verified by the lead agency		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Specific requirements in deed or decision documents have been met		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Violations have been reported		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Other problems or suggestions:		<input type="checkbox"/> Report attached	
_____			
_____			
2.	<b>Adequacy</b>	<input type="checkbox"/> ICs are adequate	<input type="checkbox"/> ICs are inadequate <span style="float: right;"><input type="checkbox"/> N/A</span>
Remarks _____ _____			
<b>D. General</b>			
1.	<b>Vandalism/trespassing</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No vandalism evident
Remarks _____ _____			

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 24 Treatment System, Former MCAS El Toro  
 Groundwater Pump and Treat**

2. **Land use changes on site**  N/A  
 Remarks \_\_\_\_\_  
 \_\_\_\_\_

3. **Land use changes off site**  N/A  
 Remarks \_\_\_\_\_  
 \_\_\_\_\_

**V. GENERAL SITE CONDITIONS**

**A. Roads**  Applicable  N/A

1. **Roads damaged**  Location shown on site map  Roads adequate  N/A  
 Remarks \_\_\_\_\_  
 \_\_\_\_\_

**B. Other Site Conditions**

Remarks \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**VI. GROUNDWATER REMEDY**

**A. Groundwater Extraction Wells, Pumps, and Pipelines**  Applicable  N/A

1. **Pumps, Wellhead Plumbing, and Electrical**  
 Good condition  All required wells properly operating  Needs Maintenance  N/A  
  
Remarks: Calcium carbonate scaling occurred at the feed pumps and double check valves (valve seats). The scale was manually and chemically cleaned, and NALCO C-5 scale inhibitor additive was set to be injected into the pump influent to prevent future scaling accidents. No scaling issues were reported since initiation of NALCO C-5 inhibitor injection.

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**  
 Good condition  Needs Maintenance  
 Remarks \_\_\_\_\_  
 \_\_\_\_\_

3. **Spare Parts and Equipment**  
 Readily available  Good condition  Requires upgrade  Needs to be provided  
  
Remarks: IRWD stores spare double check valves seats for quick replacement as needed.

**Site Inspection Checklist  
First Five-Year Review  
IRP Site 24 Treatment System, Former MCAS El Toro  
Groundwater Pump and Treat**

<b>C. Treatment System</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
1.	<b>Treatment Train</b> (Check components that apply) <input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input checked="" type="checkbox"/> Air stripping <input checked="" type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Filters _____ <input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____ <input type="checkbox"/> Others _____ <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input checked="" type="checkbox"/> Equipment properly identified <input checked="" type="checkbox"/> Quantity of groundwater treated annually: 669 acre-feet (about 218 Mgal) annually <input type="checkbox"/> Quantity of surface water treated annually _____ Remarks _____ _____
2.	<b>Electrical Enclosures and Panels</b> (properly rated and functional) <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____
3.	<b>Tanks, Vaults, Storage Vessels</b> <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs Maintenance Remarks _____ _____
4.	<b>Discharge Structure and Appurtenances</b> <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____
5.	<b>Treatment Building(s)</b> <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair <input checked="" type="checkbox"/> Chemicals and equipment properly stored Remarks _____ _____
6.	<b>Monitoring Wells</b> (pump and treatment remedy) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A  Remarks: <u>See checklist for IRP Site 24 Extraction and Conveyance System</u>
<b>D. Monitoring Data</b>	
1	Monitoring Data <input type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality
2.	Monitoring data suggests: <input checked="" type="checkbox"/> Groundwater plume is effectively contained <input type="checkbox"/> Contaminant concentrations are declining

**Site Inspection Checklist  
 First Five-Year Review  
 IRP Site 24 Treatment System, Former MCAS El Toro  
 Groundwater Pump and Treat**

<b>VII. OVERALL OBSERVATIONS</b>	
<b>A. Implementation of the Remedy</b>	<p>Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).</p> <p><u>The goal of this treatment is to ensure containment of the plume by removing the VOC from influent water by the air stripping process. The remedy is effective. Total concentration of the VOC in the influent is in the range of 125 to 294 ppb with the average concentration of 196 ppb. VOC removal efficiency is 100%. Average VOC mass removal is 27.2 lbs/month.</u></p>
<b>B. Adequacy of O&amp;M</b>	<p>Describe issues and observations related to the implementation and scope of O&amp;M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.</p> <p><u>O&amp;M procedures as described in final O&amp;M Manual, SGU Treatment System, June 2007; are current and are generally being followed through; also see response to "D" below.</u></p>
<b>C. Early Indicators of Potential Remedy Problems</b>	<p>Describe issues and observations such as unexpected changes in the cost or scope of O&amp;M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.</p> <p><u>N/A</u></p>
<b>D. Opportunities for Optimization</b>	<p>Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.</p> <p><u>IRWD noted existing inadequacy in applying a Photo Ionization Detector (PID) instrument to measure the total VOC concentrations for the vapor phase GAC treatment. It was noted that contrary to O&amp;M procedures, some GAC canisters change-outs have not been occurring until both canisters have exceeded their treatment capacity. IRWD will proceed to eliminate PID instrument monitoring, and will strictly follow the O&amp;M Manual procedures for VOC vapor monitoring using the air samples sent to the specialized lab. The switch from lead to lag canister and subsequent GAC media change-outs will be performed on a TCE trigger level of 50 ppbv.</u></p>

**Appendix B**  
**Photographs Taken During Site Inspection**

# Photograph Index

Photograph #1	IRP Site 2 Access Road
Photograph #2	IRP Site 2 Survey Marker
Photograph #3	IRP Site 2 Cap Vegetation
Photograph #4	IRP Site 2 Drainage Features
Photograph #5	IRP Site 16
Photograph #6	IRP Site 16 Main Training Pit
Photograph #7	IRP Site 16 Monitoring Well 16MW10
Photograph #8	IRP Site 17 Habitat Restoration
Photograph #9	IRP Site 17 Perimeter Gas Monitoring Well
Photograph #10	IRP Site 18 Well 18MCAS03
Photograph #11	IRP Site 18 Treatment System
Photograph #12	IRP Site 24 SGU Well 24SGU08
Photograph #13	IRP Site 24 Monitoring Well 24MW09
Photograph #14	IRP Site 24 Transfer Station
Photograph #15	IRP Site 24 Treatment System

# Photograph #1: IRP Site 2 Access Road



# Photograph #2: IRP Site 2 Cap Vegetation



# Photograph #3: IRP Site 2 Survey Marker



# Photograph #4: IRP Site 2 Drainage Features



# Photograph #5: IRP Site 16



# Photograph #6: IRP Site 16 Main Training Pit



# Photograph #7: IRP Site 16 Monitoring Well 16MW10



# Photograph #8: IRP Site 17 Habitat Restoration



# Photograph #9: IRP Site 17 Perimeter Gas Monitoring Well



**Photograph #10: IRP Site 18 Well**  
**18MCAS03**



# Photograph #11: IRP Site 18 Treatment System



# Photograph #12: IRP Site 24 SGU Well 24SGU08



# Photograph #13: IRP Site 24 Monitoring Well 24MW09



# Photograph #14: IRP Site 24 Transfer Station



# Photograph #15: IRP Site 24 Treatment System



**Appendix C**  
**Interview Documentation Forms – IRP Sites 2**  
**and 17**

**INTERVIEW DOCUMENTATION FORM**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE 17, FORMER MCAS EL TORO**

The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.

<b>Name</b>	<b>Title/Position</b>	<b>Organization</b>	<b>Date*</b>
Content Arnold	Lead Remedial Project Manager	Dept. of the Navy, BRAC PMO West	03/20/09
Marc Smits	Remedial Project Manager	Dept. of the Navy, BRAC PMO West	03/20/09
Rich Muza	Remedial Project Manager	U.S. EPA Region IX	03/19/09
Quang Than	Remedial Project Manager	California DTSC	03/19/09
John Broderick	Remedial Project Manager	California RWQCB, Santa Ana Region	03/19/09
Robert Woodings	RAB Co-Chair	RAB, Former MCAS El Toro	03/27/09
Marcia Rudolph	Subcommittee Chair	RAB, Former MCAS El Toro	03/27/09
Crispin Wanyoike	Project Manager, O&M, Sites 2 and 17	Earth Tech AECOM	03/20/09
Jim Werkmeister	Manager, Environmental Affairs	Lennar	03/27/09
Glen Worthington	Manager of Planning and Environmental Services	Orange County Great Park	03/27/09

\* Indicates the date interview questionnaire was sent via email, or interview was conducted in person or over the phone.

**Appendix D**  
**Interview Record Forms – IRP Sites 2 and 17**

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Content Arnold		<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Telephone No:</b> 619-532-0790		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307 City, State, Zip: Irvine, CA 92618	
<b>Fax No:</b> 619-532-0780			
<b>E-Mail Address:</b> Content.Arnold@navy.mil			

**Summary**

**IRP Site 2 Vadose Zone**

***What effects have site operations had on the surrounding community?***

Installation Restoration Program (IRP) Site 2 is located on federal property.

A Final Remedial Action completion Report (RACR) was issued in March 2009. The RACR documents that the landfill remedy achieves the remedial action objectives specified in the Final Interim Record of Decision (ROD) for IRP Site 17 and Vadose Zone of IRP Site 2. The RACR also documents that the remedy is protective of human health and the environment. The remedy also provides a viable habitat area for the coastal California gnatcatcher. For these reasons noted above, the remedial action at IRP Site 2 benefits the surrounding community.

***Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details of the known community concerns and the Navy's efforts to resolve them.***

No .

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Content Arnold	<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Telephone No:</b> 619-532-0790		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307	
<b>Fax No:</b> 619-532-0780		City, State, Zip: Irvine, CA 92618	
<b>E-Mail Address:</b> Content.Arnold@navy.mil			

**Summary**

***Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.***

The October 2007 Santiago Wildfire impacted IRP Site 2. The landfill cap at IRP Site 2 was in-place at the time. Fire damage to landfill components included the following: Portions of the irrigation system, portions of the coconut based erosion control matting, and some vegetation. Repairs were made to ensure that the remedy was functioning.

The Navy provided updates to the Base Realignment and Closure Cleanup Team (BCT) and Restoration Advisory Board.

***How would you characterize the performance of the remedial action(s) implemented at this site till date (i.e., successful, failed, or other)?***

In my opinion, the overall performance of the response action at this site has been successful.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Content Arnold	<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Telephone No:</b> 619-532-0790		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307	
<b>Fax No:</b> 619-532-0780		City, State, Zip: Irvine, CA 92618	
<b>E-Mail Address:</b> Content.Arnold@navy.mil			

**Summary**

***Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.***

The landfill has routine O&M activities that are underway. A Final Operation and Maintenance Plan was issued in February 2009. The site is regularly visited by the Navy staff, including the Navy biologist. Routine O&M Monitoring Reports will be issued to the BCT and RAB. BCT and RAB site visits have been conducted.

***Have there been unexpected O&M difficulties at the site since the completion of remedial action construction? If so, please give details.***

No unexpected O&M difficulties have been encountered.

***Do you have any comments, suggestions, or recommendations regarding the site's management or operation?***

No .

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Content Arnold		<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Telephone No:</b> 619-532-0790		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307 City, State, Zip: Irvine, CA 92618	
<b>Fax No:</b> 619-532-0780			
<b>E-Mail Address:</b> Content.Arnold@navy.mil			

**Summary**

**IRP Site 17**

***What effects have site operations had on the surrounding community?***

IRP Site 17 is located on federal property.

A Final RACR was issued in March 2009. The RACR documents that the landfill remedy achieves the remedial action objectives specified in the Final Interim ROD for IRP Site 17 and Vadose Zone of IRP Site 2. The RACR also documents that the remedy is protective of human health and the environment. The remedy will also provide a viable habitat area for the coastal California gnatcatcher. For these reasons noted above, the remedial action at IRP Site 17 benefits the surrounding community.

***Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details of the known community concerns and the Navy's efforts to resolve them.***

No.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Content Arnold		<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Telephone No:</b> 619-532-0790		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307 City, State, Zip: Irvine, CA 92618	
<b>Fax No:</b> 619-532-0780			
<b>E-Mail Address:</b> Content.Arnold@navy.mil			

**Summary**

***Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.***

The October 2007 Santiago Wildfire impacted IRP Site 17. The landfill cap had not been implemented at the time of the fire. Most of the vegetation at IRP Site 17 was consumed by the fire. However, per the Final Remedial Design, Site 17 was to be cleared and grubbed prior to implementation of the remedy.

The Navy provided updates to the BCT and Restoration Advisory Board.

***How would you characterize the performance of the remedial action(s) implemented at this site till date (i.e., successful, failed, or other)?***

In my opinion, the overall performance of the response action at this site has been successful.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Content Arnold		<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Telephone No:</b> 619-532-0790		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307 City, State, Zip: Irvine, CA 92618	
<b>Fax No:</b> 619-532-0780			
<b>E-Mail Address:</b> Content.Arnold@navy.mil			
<b>Summary</b>			
<p><b><i>Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.</i></b></p> <p>The landfill has routine O&amp;M activities that are underway. A Final Operation and Maintenance Plan was issued in February 2009. The site is regularly visited by the Navy staff, including the Navy biologist. Routine O&amp;M Monitoring Reports will be issued to the BCT and RAB. BCT and RAB site visits have been conducted.</p> <p><b><i>Have there been unexpected O&amp;M difficulties at the site since the completion of remedial action construction? If so, please give details.</i></b></p> <p>No unexpected O&amp;M difficulties have been encountered.</p> <p><b><i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i></b></p> <p>No.</p>			

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input checked="" type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Marc Smits		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Telephone No:</b> 619-532-0793		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307 City, State, Zip: Irvine, CA 92618	
<b>Fax No:</b> 619-532-0780			
<b>E-Mail Address:</b> marc.smits@navy.mil			

**Summary of Conversation**

**IRP Site 2 Vadose Zone**

***What effects have site operations had on the surrounding community?***

Construction activities occurred at Site 2 from approximately October 2005 to February 2008. Imported clean soil was hauled to the site and increased the truck traffic in the surrounding community. The site is located within property transferred to the Federal Aviation Authority (FAA). The remaining activities conducted at the sites were conducted onsite and had little to no impact on the surrounding community (cover placement, waste consolidation, operation and maintenance). The site is within a fenced area preventing access to the community.

***Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details of the known community concerns and the Navy's efforts to resolve them.***

No. Updates on the construction activities of the two landfills have been provided at Restoration Advisory Board (RAB) meetings and no significant concerns have been provided by the public. The Navy is currently in the process of restoring the site to provide habitat to the California gnatcatcher, a federally threatened species. Updates on the restoration activities and operation and maintenance will continue to be provided to the public.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input checked="" type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Marc Smits	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Telephone No:</b> 619-532-0793		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307	
<b>Fax No:</b> 619-532-0780		City, State, Zip: Irvine, CA 92618	
<b>E-Mail Address:</b> marc.smits@navy.mil			

**Summary of Conversation**

*Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.*

In the fall of 2007, a fire (Santiago fire) came through the site and damages some of the erosion control, irrigation equipment, and vegetation that had been installed as part of the landfill cover. Damaged components were repaired/replaced to ensure the remedy functioned as designed. Coordination with local authorities was necessary based on the area being impacted by the fire. No efforts were made to put out the fire since it was not located near any homes and was not accessible (locked gate).

*How would you characterize the performance of the remedial action(s) implemented at this site till date (i.e., successful, failed, or other)?*

The landfill was completed approximately a year ago and operation and maintenance activities are ongoing. Some improvements to drainage systems have been required but they have been relatively minor. The Navy prepared and the regulators concurred with a Final Remedial Action Completion Report (RACR) that documents that the landfill was constructed as designed and that the remedial action objectives have been met for the site. Based on the RACR being completed and field observations of the progress on the restoration activities, the performance of the remedial action to date has been successful. Additional data is necessary to evaluate the potential for landfill gas at the site. Results from this evaluation may impact the area requiring institutional controls at the site.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

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**Summary of Conversation**

***Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.***

Yes. During construction activities, a representative from the Navy's office attended the weekly Construction Quality Control meetings. Several site visits were held with the regulatory agencies and the public to provide opportunities to see the progress of the landfill capping activities. A final inspection was conducted in February 2008 to ensure all required components of the landfill cap had been completed. A 1<sup>st</sup> year inspection of the restoration of California gnatcatcher habitat was conducted in February 2009 and will continue at least through the 5<sup>th</sup> year of habitat establishment. Fieldwork has been documented in as-builts included in the Final Remediation Verification Report for Site 2.

***Have there been unexpected O&M difficulties at the site since the completion of remedial action construction? If so, please give details.***

One of the wells at the site was constructed within the landfill waste and required an extension to raise it to the level of the landfill cap. The well has been damaged and samples have not been able to be collected by traditional monitoring methods. Water levels are able to be collected since the probe does fit down the well. The Navy is working with the operation and maintenance contractor to determine the best path forward.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

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<b>Individual Contacted:</b>			
<b>Name:</b> Marc Smits		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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<b>Fax No:</b> 619-532-0780			
<b>E-Mail Address:</b> marc.smits@navy.mil			

**Summary of Conversation**

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

No. Operation and maintenance and restoration activities have begun and will continue per established work plans for the site.

**IRP Site 17**

*What effects have site operations had on the surrounding community?*

Construction activities occurred at Site 17 from approximately November 2007 through July 2008. Imported clean soil was hauled to the site and increased the truck traffic in the surrounding community. The site is located within property transferred to the Federal Aviation Authority (FAA). The remaining activities conducted at the sites were conducted onsite and had little to no impact on the surrounding community (cover placement, waste consolidation, operation and maintenance). The sites is within a fenced area preventing access to the community.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

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<b>E-Mail Address:</b> marc.smits@navy.mil			

**Summary of Conversation**

*Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details of the known community concerns and the Navy's efforts to resolve them.*

No. Updates on the construction activities of the two landfills have been provided at Restoration Advisory Board (RAB) meetings and no significant concerns have been provided by the public. The Navy is currently in the process of restoring the site to provide habitat to the California gnatcatcher, a federally threatened species. Updates on the restoration activities and operation and maintenance will continue to be provided to the public.

*Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.*

In the fall of 2007, a fire (Santiago fire) came through the site and removed the existing vegetation at the site. Coordination with local authorities was necessary based on the area being impacted by the fire. No efforts were made to put out the fire since it was not located near any homes and was not accessible (locked gate).

*How would you characterize the performance of the remedial action(s) implemented at this site till date (i.e., successful, failed, or other)?*

The landfill was completed approximately eight months ago and operation and maintenance

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
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**Summary of Conversation**

activities are ongoing. Restoration activities for the California gnatcatcher habitat are in the early stages. Some areas where erosion controls are necessary have been identified and mitigated. The Navy prepared and the regulators concurred with a Final Remedial Action Completion Report (RACR) that documents that the landfill was constructed as designed and that the remedial action objectives have been met for the site. Based on the RACR being completed and field observations of the progress on the restoration activities, the performance of the remedial action to date has been successful. Additional data is necessary to evaluate the potential for landfill gas at the site. Results from this evaluation may impact the area requiring institutional controls at the site.

***Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.***

Yes. During construction activities, a representative from the Navy's office attended the weekly Construction Quality Control meetings. Several site visits were held with the regulatory agencies and the public to provide opportunities to see the progress of the landfill capping activities. Fieldwork has been documented in as-builts included in the Final Remediation Verification Report for Site 17.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

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<b>Fax No:</b> 619-532-0780			
<b>E-Mail Address:</b> marc.smits@navy.mil			
<b>Summary of Conversation</b>			
<i>Have there been unexpected O&amp;M difficulties at the site since the completion of remedial action construction? If so, please give details.</i>			
<p>Intense rains caused rills, erosion, and ponding at various locations of the landfill. Temporary engineering methods were implemented to reduce the erosion from rain events. Permanent features have been implemented and erosion repairs made at the site to reduce and/or prevent erosion on the side slopes of the landfill. Erosion will be further reduced in the future through the establishment of vegetation.</p>			
<i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i>			
<p>No. Operation and maintenance and restoration activities have begun and will continue per established work plans for the site.</p>			

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITE 2 (VADOSE ZONE) AND IRP SITE17  
FORMER MCAS EL TORO**

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<b>Individual Contacted:</b>			
<b>Name:</b> Rich Muza		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> U.S. EPA Region IX
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**Summary**

**IRP Site 2 Vadose Zone**

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

Yes. EPA staff participated in a number of the weekly CQC Meetings and site walk-arounds during the remedial action construction activities at this site. EPA was also involved with the recent Five-Year Review inspection. Furthermore, EPA staff have taken part in Restoration Advisory Board tours of the site.

*Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events.*

No.

*Do you feel well informed about the site's activities and progress?*

Yes. EPA receives regular updates on the site at quarterly BCT Meetings. As per the approved O&M Manual, the Navy informs EPA when anything occurs that might have an adverse impact on the remedy.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

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<b>Individual Contacted:</b>			
<b>Name:</b> Rich Muza		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> U.S. EPA Region IX
<b>Telephone No:</b> 415-972-3349		<b>Street Address:</b> 75 Hawthorne Street	
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<b>E-Mail Address:</b> muza.richard@epa.gov			

**Summary**

*Do you feel the land use controls effective? (if applicable)*

Yes. No adverse impacts have occurred to date at this site due to activities of the current landowner. EPA was informed and provided plans for recent FBI improvements in the landfill area by the Navy.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

None.

**IRP Site 17**

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

Yes. EPA staff participated in a few of the weekly CQC Meetings and site walk-arounds during the remedial action construction activities at this site. EPA was also involved with the recent Five-Year Review inspection. Furthermore, EPA staff have taken part in Restoration Advisory Board tours of the site.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

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<b>E-Mail Address:</b> muza.richard@epa.gov			
<b>Summary</b>			
<i>Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events.</i>			
No.			
<i>Do you feel well informed about the site's activities and progress?</i>			
Yes. EPA receives regular updates on the site at quarterly BCT Meetings. As per the approved O&M Manual, the Navy informs EPA when anything occurs that might have an adverse impact on the remedy.			
<i>Do you feel the land use controls effective? (if applicable)</i>			
Yes. No adverse impacts have occurred to date at this site due to activities of the current landowner. EPA was informed and provided plans for recent FAA improvements in the landfill area by the Navy.			
<i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i>			
No.			

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITE 2 (VADOSE ZONE) AND IRP SITE17  
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<b>Location of Visit:</b>			

**Contact Made By:**

<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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**Individual Contacted:**

<b>Name:</b> Quang Than	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> California DTSC
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**Summary of Conversation**

**IRP Site 2 Vadose Zone**

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

Yes, recent 5-Year Review site visit last month and RAB Meeting site visit last summer. Also, review of site documents such as Remedial Verification Report, Remedial Action Completion Report, etc.

*Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events.*

No.

*Do you feel well informed about the site's activities and progress?*

Yes.

*Do you feel the land use controls effective? (if applicable)*

Yes.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE 17**  
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<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Quang Than		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> California DTSC
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**Summary of Conversation**

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

No.

**IRP Site 17**

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

Yes, recent 5-Year Review site visit last month and RAB Meeting site visit last summer. Also, review of site documents such as Remedial Verification Report, Remedial Action Completion Report, etc.

*Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events.*

No.

*Do you feel well informed about the site's activities and progress?*

Yes.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
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<b>E-Mail Address:</b> qthan@dtsc.ca.gov			
<b>Summary of Conversation</b>			
<i>Do you feel the land use controls effective? (if applicable)</i>			
Yes.			
<i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i>			
No.			

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITE 2 (VADOSE ZONE) AND IRP SITE17  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			

**Contact Made By:**

<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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**Individual Contacted:**

<b>Name:</b> John Broderick	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> California RWQCB, Santa Ana Region
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<b>Telephone No:</b> (951) 782-4494	<b>Street Address:</b> <b>City, State, Zip:</b>
<b>Fax No:</b>	
<b>E-Mail Address:</b> jbroderick@waterboards.ca.gov	

**Summary**

**IRP Site 2 Vadose Zone**

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

Yes. We are send copies of all documents for this site and receive a briefing quarterly on site status.

*Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events.*

No.

*Do you feel well informed about the site's activities and progress?*

Yes.

*Do you feel the land use controls effective? (if applicable)*

Yes.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> John Broderick		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> California RWQCB, Santa Ana Region
<b>Telephone No:</b> (951) 782-4494		<b>Street Address:</b>	
<b>Fax No:</b>		<b>City, State, Zip:</b>	
<b>E-Mail Address:</b> jbroderick@waterboards.ca.gov			
<b>Summary</b>			
<i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i>			
No.			
<b><u>IRP Site 17</u></b>			
<i>Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.</i>			
Yes. We are send copies of all documents for this site and receive a briefing quarterly on site status.			
<i>Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events.</i>			
No.			
<i>Do you feel well informed about the site's activities and progress?</i>			
Yes.			

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> John Broderick		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> California RWQCB, Santa Ana Region
<b>Telephone No:</b> (951) 782-4494		<b>Street Address:</b>	
<b>Fax No:</b>		<b>City, State, Zip:</b>	
<b>E-Mail Address:</b> jbroderick@waterboards.ca.gov			
<b>Summary</b>			
<i>Do you feel the land use controls effective? (if applicable)</i>			
Yes.			
<i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i>			
No.			

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b> 0920	<b>Date:</b> 3/27/09
<b>Type:</b> <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Crispin Wanyoike	<b>Title:</b> Senior Program Director	<b>Organization:</b> Earth Tech/AECOM	
<b>Individual Contacted:</b>			
<b>Name:</b> Robert Woodings	<b>Title:</b> Restoration Advisory Board (RAB) Co-Chair	<b>Organization:</b> RAB, Former MCAS El Toro	
<b>Telephone No:</b> 949-461-3481 <b>Fax No:</b>		<b>Street Address:</b>	
<b>E-Mail Address:</b>		<b>City, State, Zip:</b>	

**Summary**

**IRP Site 2 Vadose Zone**

***What effects have site operations had on the surrounding community?***

Coordination has been required to assess the potential effects of the Alton Parkway extension on the remedy at IRP Site 2. Community concerns include: Navy process has potentially affected the completion schedule for the Alton Parkway extension. Wells associated with IRP Site 2 Groundwater investigation will need to be relocated as part of the roadway construction.

***Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.***

No community concerns.

***Do you feel well informed about the site's activities and progress?***

The Navy, EPA, Cal EPA and RWQCB do a good job of communicating progress and any potential issues. The RAB minutes are sufficiently detailed so members of the community can remain well informed.

***Do you have any comments, suggestions, or recommendations regarding the site's management or operation?***

Make internet resources easier to find.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b> 0920	<b>Date:</b> 3/27/09
<b>Type:</b> <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Crispin Wanyoike	<b>Title:</b> Senior Program Director	<b>Organization:</b> Earth Tech/AECOM	
<b>Individual Contacted:</b>			
<b>Name:</b> Robert Woodings	<b>Title:</b> Restoration Advisory Board (RAB) Co-Chair	<b>Organization:</b> RAB, Former MCAS El Toro	
<b>Telephone No:</b> 949-461-3481 <b>Fax No:</b>		<b>Street Address:</b>	
<b>E-Mail Address:</b>		<b>City, State, Zip:</b>	

**Summary**

**IRP Site 17 Vadose Zone**

*What effects have site operations had on the surrounding community?*

No impacts on Alton Parkway extension.

*Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.*

No concerns.

*Do you feel well informed about the site's activities and progress?*

Similar to Site 2 well summarized and communicated by Navy and its consultants in RAB minutes.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

Make internet resources easier to find.

<b>INTERVIEW RECORD</b> <b>FIRST FIVE-YEAR REVIEW</b> <b>IRP SITE 2 (VADOSE ZONE) AND IRP SITE 17</b> <b>FORMER MCAS EL TORO</b>		
Site Name: IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		EPA ID No.: CA6170023208
Subject: First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		Time: _____ Date: _____
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
Location of Visit: _____		
<b>Contact Made By:</b>		
Name: _____	Title: _____	Organization: _____
<b>Individual Contacted:</b>		
Name: Marcia Rudolph	Title: Subcommittee Chair	Organization: Restoration Advisory Board (RAB), Former MCAS El Toro
Telephone No: 949-830-9816	Fax No: 949-830-4498	E-Mail Address: _____
Street Address: 24922 #139 Muirlands		City, State, Zip: Lake Forest, CA 92630
<b>Summary of Conversation</b>		
<u><i>IRP Site 2 Vadose Zone</i></u>		
<p><i>What effects have site operations had on the surrounding community?</i></p> <p><i>Little to none -</i></p>		
<p><i>Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.</i></p> <p><i>The community will continue to monitor reports of the condition/contaminants in the vadose zone.</i></p>		

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE 17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b>
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b>		<b>Title:</b>	
		<b>Organization:</b>	
<b>Individual Contacted:</b>			
<b>Name:</b> Marcia Rudolph		<b>Title:</b> Subcommittee Chair	
		<b>Organization:</b> Restoration Advisory Board (RAB), Former MCAS El Toro	
<b>Telephone No:</b>		<b>Street Address:</b>	
<b>Fax No:</b>		<b>City, State, Zip:</b>	
<b>E-Mail Address:</b>			

**Summary of Conversation**

*Do you feel well informed about the site's activities and progress?*

Yes

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

No.

<b>INTERVIEW RECORD</b> <b>FIRST FIVE-YEAR REVIEW</b> <b>IRP SITE 2 (VADOSE ZONE) AND IRP SITE 17</b> <b>FORMER MCAS EL TORO</b>		
Site Name: IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		EPA ID No.: CA6170023208
Subject: First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		Time: _____ Date: _____
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
Location of Visit: _____		
<b>Contact Made By:</b>		
Name: _____	Title: _____	Organization: _____
<b>Individual Contacted:</b>		
Name: Marcia Rudolph	Title: Subcommittee Chair	Organization: Restoration Advisory Board (RAB), Former MCAS El Toro
Telephone No: _____	Street Address: _____	
Fax No: _____	City, State, Zip: _____	
E-Mail Address: _____		
<b>Summary of Conversation</b>		
<b><u>IRP Site 17 Vadose Zone</u></b>		
What effects have site operations had on the surrounding community?		
None		
Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.		
No		

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITE 2 (VADOSE ZONE) AND IRP SITE 17  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California	<b>EPA ID No.:</b> CA6170023208
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<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro	<b>Time:</b>	<b>Date:</b>
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<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other <b>Location of Visit:</b>	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
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**Contact Made By:**

<b>Name:</b>	<b>Title:</b>	<b>Organization:</b>
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**Individual Contacted:**

<b>Name:</b> Marcia Rudolph	<b>Title:</b> Subcommittee Chair	<b>Organization:</b> Restoration Advisory Board (RAB), Former MCAS El Toro
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<b>Telephone No:</b>	<b>Street Address:</b> City, State, Zip:
<b>Fax No:</b>	
<b>E-Mail Address:</b>	

**Summary of Conversation**

*Do you feel well informed about the site's activities and progress?*

Yes.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

No.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Crispin Wanyoike		<b>Title:</b> Project Manager, O&M, Sites 2 and 17	<b>Organization:</b> Earth Tech AECOM
<b>Telephone No:</b> 949-330-2017		<b>Street Address:</b> 21064 Bake Pkwy., Ste 200	
<b>Fax No:</b>		<b>City, State, Zip:</b> Lake Forest, CA 92630	
<b>E-Mail Address:</b> Crispin.Wanyoike@aecom.com			

**Summary**

**IRP Site 2 Vadose Zone**

***How would you characterize the performance of the remedial action(s) implemented at this site till date (i.e., successful, failed, or other)?***

Remedial action is being implemented as specified in the ROD. Habitat and vegetation establishment has been very successful. As a result, there is adequate vegetation cover to minimize erosion.

***Are you aware of any regulatory notices of violation related to the site that required a response?***

None

***Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines described in the O&M Plan/Manuals? If so, how did the changes affect the protectiveness or effectiveness of the remedy?***

With the exception of a constriction on 02PZ01, an early warning well, all other monitoring and maintenance activities are being conducted in accordance with the O&M Plan. This early warning well is not expected to affect the protectiveness or effectiveness of the remedy as data from it is not used to assess compliance.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Crispin Wanyoike	<b>Title:</b> Project Manager, O&M, Sites 2 and 17	<b>Organization:</b> Earth Tech AECOM	
<b>Telephone No:</b> 949-330-2017		<b>Street Address:</b> 21064 Bake Pkwy., Ste 200	
<b>Fax No:</b>		<b>City, State, Zip:</b> Lake Forest, CA 92630	
<b>E-Mail Address:</b> Crispin.Wanyoike@aecom.com			

**Summary**

*Have there been unexpected O&M difficulties at the site since start-up? If so, please give details.*

See above response.

*Have there been opportunities to optimize O&M, or sampling efforts? Please give details.*

O&M activities were initiated in November 2008. Therefore, it is too early to look at optimization opportunities. The O&M Plan provides the framework for initiating optimization.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

No comments.

**IRP Site 17**

*How would you characterize the performance of the remedial action(s) implemented at this site till date (i.e., successful, failed, or other)?*

Cover construction was implemented in accordance with the design. Planting of CSS as part of the habitat restoration is ongoing.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Crispin Wanyoike	<b>Title:</b> Project Manager, O&M, Sites 2 and 17	<b>Organization:</b> Earth Tech AECOM	
<b>Telephone No:</b> 949-330-2017		<b>Street Address:</b> 21064 Bake Pkwy., Ste 200	
<b>Fax No:</b>		<b>City, State, Zip:</b> Lake Forest, CA 92630	
<b>E-Mail Address:</b> Crispin.Wanyoike@aecom.com			

**Summary**

*Are you aware of any regulatory notices of violation related to the site that required a response?*

None.

*Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines described in the O&M Plan/Manuals? If so, how did the changes affect the protectiveness or effectiveness of the remedy?*

Erosion along the access roads occurred several times, the extent of erosion was minimized by augmenting placement of sand bags by the restoration contractor. In addition, irregular top soil placement at the bottom of the landfill resulted in ponding. Contouring of the topsoil in these areas has been performed and ponding is no longer occurring.

*Have there been unexpected O&M difficulties at the site since start-up? If so, please give details.*

See note above.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 2 and 17, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Crispin Wanyoike		<b>Title:</b> Project Manager, O&M, Sites 2 and 17	<b>Organization:</b> Earth Tech AECOM
<b>Telephone No:</b> 949-330-2017		<b>Street Address:</b> 21064 Bake Pkwy., Ste 200	
<b>Fax No:</b>		<b>City, State, Zip:</b> Lake Forest, CA 92630	
<b>E-Mail Address:</b> Crispin.Wanyoike@aecom.com			

**Summary**

*Have there been opportunities to optimize O&M, or sampling efforts? Please give details.*

O&M activities were initiated in November 2008. Therefore, it is too early to look at optimization opportunities. The O&M Plan provides the framework for initiating optimization.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

No comments.

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITE 2 (VADOSE ZONE) AND IRP SITE 17  
FORMER MCAS EL TORO**

<b>Site Name:</b> : IRP Sites 2 and 17, Former MCAS El Toro, Irvine, CA		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (vadose zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b> 1:30	<b>Date:</b> 3/27/09
<b>Type:</b> <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			

**Contact Made By:**

<b>Name:</b> Crispin Wanyoike	<b>Title:</b> Senior Program Director	<b>Organization:</b> Earth Tech/AECOM
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**Individual Contacted:**

<b>Name:</b> James Werkmeister	<b>Title:</b> Manager, Environmental Affairs	<b>Organization:</b> Lennar
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<b>Telephone No:</b> 949-784-4321 <b>Fax No:</b>	<b>Street Address:</b>
<b>E-Mail Address:</b>	<b>City, State, Zip:</b>

**Summary**

**IRP Site 2 and 17 Vadose Zone**

***What is your overall impression of the remedy implemented at this site (i.e., successful, failed, or other)?***

Remedy is being implemented as intended with no known issues.

***Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.***

Yes, the Santiago fire in October 2007 burnt erosion control matting and irrigation piping at Site 2. Stakeholders (Lennar, Navy, USFWS, FAA and City of Irvine) met to review potential erosion impacts due to vegetation loss in and around Site 2 and Site 17.

***Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.***

Informal inspections conducted as part of processing entry/utility clearance permits. Routine communications occur during reuse forum meetings with the Navy.

***Do you feel well informed about the site's activities and progress?***

Yes through project reports and reuse forum meetings.

***Do you have any comments, suggestions, or recommendations regarding the site's management or operation?***

Coordination of activities with the Navy has been adequate.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 2 (VADOSE ZONE) AND IRP SITE 17**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> : IRP Sites 2 and 17, Former MCAS El Toro, Irvine, CA		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 2 (Vadose Zone) and IRP Site 17, Former MCAS El Toro		<b>Time:</b> 1500	<b>Date:</b> 3/27/09
<b>Type:</b> <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b> OCGP Office			

**Contact Made By:**

<b>Name:</b> Crispin Wanyoike	<b>Title:</b> Senior Program Director	<b>Organization:</b> Earth Tech /AECOM
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**Individual Contacted:**

<b>Name:</b> Glen Worthington	<b>Title:</b> Manager of Planning and Environmental Services	<b>Organization:</b> Orange County Great Park
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<b>Telephone No:</b> 949-724-7406 <b>Fax No:</b>	<b>Street Address:</b>
<b>E-Mail Address:</b>	<b>City, State, Zip:</b>

**Summary**

*What is your overall impression of the remedy implemented at this site (i.e., successful, failed, or other)?*

Very successful

*Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.*

Not aware of any events/incidents

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

Ongoing communication regarding redevelopment and in particular the Alton Parkway Extension

*Do you feel well informed about the site's activities and progress?*

Project reports are provided by the Navy. Briefings on progress are provided as appropriate during reuse forums. There are well established lines of communication to facilitate required information exchange.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

OCGP is planning on opening discussions with the Department of Interior/FAA regarding access to areas in the vicinity of IRP Site 2 for guided (docent-lead) tours.

**Appendix E**  
**Interview Documentation Forms – IRP Site 16**

**INTERVIEW DOCUMENTATION FORM  
FIRST FIVE-YEAR REVIEW  
IRP SITE 16, FORMER MCAS EL TORO**

The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.

<b>Name</b>	<b>Title/Position</b>	<b>Organization</b>	<b>Date</b>
Content Arnold	Lead Remedial Project Manager	Dept. of the Navy, BRAC PMO West	03/20/09
Louie Cardinale	Remedial Project Manager	Dept. of the Navy, BRAC PMO West	03/20/09
Rich Muza	Remedial Project Manager	U.S. EPA Region IX	03/19/09
Quang Than	Remedial Project Manager	California DTSC	03/19/09
John Broderick	Remedial Project Manager	California RWQCB, Santa Ana Region	03/19/09
Robert Woodings	RAB Co-Chair	RAB, Former MCAS El Toro	03/27/09
Marcia Rudolph	Subcommittee Chair	RAB, Former MCAS El Toro	03/27/09
Randa Chichakli	Project Manager, O&M, Site 16	CDM	03/20/09
Jim Werkmeister	Manager, Environmental Affairs	Lennar	03/27/09
Glen Worthington	Manager of Planning and Environmental Services	Orange County Great Park	03/27/09

\* Indicates the date interview questionnaire was sent via email, or interview was conducted in person or over the phone.

**Appendix F**  
**Interview Record Forms – IRP Site 16**

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 16**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other <b>Location of Visit:</b>		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Content Arnold	<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Telephone No:</b> 619-532-0790		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307	
<b>Fax No:</b> 619-532-0780		<b>City, State, Zip:</b> Irvine, CA 92618	
<b>E-Mail Address:</b> Content.Arnold@navy.mil			

**Summary**

*What effects have site operations had on the surrounding community?*

The IRP Site 16 system equipment (monitoring well network) is located in a carve-out area on Former MCAS El Toro. The carve-out area is still owned by the Navy. All system equipment is secured and monitored.

*Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details of the known community concerns and the Navy's efforts to resolve them.*

No .

*Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.*

No .

*How would you characterize the performance of the remedial action(s) implemented at this site till date (i.e., successful, failed, or other)?*

In September 2007 a Final Operating Properly and Successfully

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 16**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California	<b>EPA ID No.:</b> CA6170023208
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<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro	<b>Time:</b>	<b>Date:</b> 03/20/09
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<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other <b>Location of Visit:</b>	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
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**Contact Made By:**

<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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**Individual Contacted:**

<b>Name:</b> Content Arnold	<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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<b>Telephone No:</b> 619-532-0790 <b>Fax No:</b> 619-532-0780 <b>E-Mail Address:</b> Content.Arnold@navy.mil	<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307 <b>City, State, Zip:</b> Irvine, CA 92618
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**Summary**

Evaluation Report for IRP Site 16 was issued. The US Environmental Protection Agency and the State of California concurred with the conclusions of this report.

Semiannual monitoring data continues to be evaluated to confirm the adequacy of the monitoring well network.

Institutional controls have been successful.

***Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.***

This site has routine O&M activities that are underway. The Navy communicates regularly with the Navy's O&M contractor. Inspections by the Navy's contractor are conducted on a regular basis (semiannual). The Navy staff visits the site periodically.

BCT site visits have been conducted.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 16**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other <b>Location of Visit:</b>		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Content Arnold		<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Telephone No:</b> 619-532-0790		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307	
<b>Fax No:</b> 619-532-0780		<b>City, State, Zip:</b> Irvine, CA 92618	
<b>E-Mail Address:</b> Content.Arnold@navy.mil			
<b>Summary</b>			
<p><i>Have there been unexpected O&amp;M difficulties at the site since the completion of remedial action construction? If so, please give details.</i></p> <p>No unexpected O&amp;M difficulties.</p> <p><i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i></p> <p>No .</p>			

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITE 16  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b>
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b>		<b>Title:</b>	<b>Organization:</b>
<b>Individual Contacted:</b>			
<b>Name:</b> Louie Cardinale		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Telephone No:</b> 619-532-0979		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307	
<b>Fax No:</b> 619-532-0780		<b>City, State, Zip:</b> Irvine, CA 92618	
<b>E-Mail Address:</b> rene.cardinale@navy.mil			

**Summary**

*What effects have site operations had on the surrounding community?*

I do not know of any impacts to the surrounding community.

*Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details of the known community concerns and the Navy's efforts to resolve them.*

I am not aware of any community concerns regarding Site 16.

*Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.*

I do not know of any instances of vandalism, trespassing, or emergency responses from local authorities.

*How would you characterize the performance of the remedial action(s) implemented at this site till date (i.e., successful, failed, or other)?*

The remedial action in place at Site 16 is monitored natural attenuation. This remedial action was certified as operating properly and successfully in September 2007 and appears to be continuing to protect human health and the environment.

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITE 16  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b>
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b>		<b>Title:</b>	<b>Organization:</b>
<b>Individual Contacted:</b>			
<b>Name:</b> Louie Cardinale		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Telephone No:</b> 619-532-0979		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307	
<b>Fax No:</b> 619-532-0780		<b>City, State, Zip:</b> Irvine, CA 92618	
<b>E-Mail Address:</b> rene.cardinale@navy.mil			
<b>Summary</b>			
<p><i>Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.</i></p> <p>As part of the remedy, semi-annual groundwater sampling, vadose zone soil gas sampling, and site grading inspections will continue to be completed in accordance with the remedial design.</p> <p><i>Have there been unexpected O&amp;M difficulties at the site since the completion of remedial action construction? If so, please give details.</i></p> <p>There have been no O&amp;M difficulties, that I am aware of, since the completion of the remedial action construction.</p> <p><i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i></p> <p>My recommendation would be that the Navy continues its active management of the Long Term Management of the remedy in place in accordance with the remedial design which continues to successfully protect human health and the environment.</p>			

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 16**  
**FORMER MCAS EL TORO**

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<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/19/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Rich Muza	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> U.S. EPA Region IX	
<b>Telephone No:</b> 415-972-3349 <b>Fax No:</b> 415-947-3520 <b>E-Mail Address:</b> muza.richard@epa.gov		<b>Street Address:</b> 75 Hawthorne Street <b>City, State, Zip:</b> San Francisco, CA 94105	

**Summary**

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

Yes. EPA staff have been involved in a site tour during the startup of the Petroleum Corrective Action Program SVE efforts in June 2007. EPA was also involved with the recent Five-Year Review inspection.

*Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events.*

No.

*Do you feel well informed about the site's activities and progress?*

Yes. EPA receives regular updates on the site at quarterly BCT Meetings. As per the approved RD/RA Work Plan, the Navy informs EPA when anything occurs that might have an adverse impact on the remedy.

*Do you feel the land use controls effective? (if applicable)*

Yes. No adverse impacts have occurred to date at this site due to activities of the current leasee.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 16**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California	<b>EPA ID No.:</b> CA6170023208
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<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro	<b>Time:</b>	<b>Date:</b> 03/19/09
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<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other <b>Location of Visit:</b>	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
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**Contact Made By:**

<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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**Individual Contacted:**

<b>Name:</b> Rich Muza	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> U.S. EPA Region IX
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<b>Telephone No:</b> 415-972-3349 <b>Fax No:</b> 415-947-3520 <b>E-Mail Address:</b> muza.richard@epa.gov	<b>Street Address:</b> 75 Hawthorne Street <b>City, State, Zip:</b> San Francisco, CA 94105
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**Summary**

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

Site 16 was assessed for the potential vapor intrusion pathway in the June 2004 "Final Technical Memorandum, IRP Sites 16 and 24, Indoor Air Risk Evaluation, Former Marine Corps Air Station El Toro, California". EPA recommends that the Navy reassess whether the data, assumptions, and methodology used in this evaluation are still valid and conditions at the site continue to not pose a threat to public health via the vapor intrusion pathway. Please note that this issue has been questioned by the public regarding a perceived threat from the TCE plumes in the Irvine area.

The Navy recently informed EPA of the need to complete a Petroleum Corrective Action Program cleanup at Site 16. This cleanup will temporarily impact the in-place remedy for the NPL Site. EPA notified the Navy in a letter of 2 February 2009 that we deem the existing monitoring wells at this site to be a significant component of the CERCLA MNA remedy. EPA further requested that at the conclusion of the Petroleum Corrective Action Program efforts that a report be submitted to the Agency that includes 1) well logs and construction details for all replacement monitoring wells and the comparison of the results of a round of ground-water quality sampling from the replacement monitoring wells to the TCE trend from the destroyed monitoring wells and 2) details on the post-corrective action site regrading efforts to assure proper drainage in the TCE plume source area as mandated by the Record of Decision for IRP Site 16.

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITE 16  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California	<b>EPA ID No.:</b> CA6170023208
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<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro	<b>Time:</b>	<b>Date:</b> 03/19/09
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<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other <b>Location of Visit:</b>	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
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**Contact Made By:**

<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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**Individual Contacted:**

<b>Name:</b> Quang Than	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> California DTSC
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<b>Telephone No:</b> 714 484 5352 <b>Fax No:</b> 714 484 5437 <b>E-Mail Address:</b> qthan@dtsc.ca.gov	<b>Street Address:</b> 5796 Corporate Avenue <b>City, State, Zip:</b> Cypress, California 90630
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**Summary of Conversation**

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

Yes, recent 5-Year Review site visit last month. Also, review of site documents such as Quarterly and Annual Groundwater Monitoring reports.

*Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events.*

No.

*Do you feel well informed about the site's activities and progress?*

Yes.

*Do you feel the land use controls effective? (if applicable)*

Yes.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

The Navy should work with DTSC to ensure proper soil gas samplings in monitoring wells at

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 16**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California	<b>EPA ID No.:</b> CA6170023208
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<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro	<b>Time:</b>	<b>Date:</b> 03/19/09
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<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other <b>Location of Visit:</b>	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
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**Contact Made By:**

<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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**Individual Contacted:**

<b>Name:</b> Quang Than	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> California DTSC
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<b>Telephone No:</b> 714 484 5352 <b>Fax No:</b> 714 484 5437 <b>E-Mail Address:</b> qthan@dtsc.ca.gov	<b>Street Address:</b> 5796 Corporate Avenue <b>City, State, Zip:</b> Cypress, California 90630
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**Summary of Conversation**

this site. In addition, regarding the replacement wells to the ones destroyed in the upcoming petroleum corrective action, some of these replacement wells should be placed at the most useful locations to monitor the VOC plume.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 16**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/19/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b> Regional Board office			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> John Broderick		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> California RWQCB, Santa Ana Region
<b>Telephone No:</b> (951) 782-4494		<b>Street Address:</b>	
<b>Fax No:</b>		<b>City, State, Zip:</b>	
<b>E-Mail Address:</b> jbroderick@waterboards.ca.gov			

**Summary**

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

Yes. We are send copies of all documents for this site and receive a briefing quarterly on site status.

*Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events.*

No.

*Do you feel well informed about the site's activities and progress?*

Yes.

*Do you feel the land use controls effective? (if applicable)*

It is too early to tell. The site has not been redeveloped.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 16**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/19/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b> Regional Board office			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> John Broderick		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> California RWQCB, Santa Ana Region
<b>Telephone No:</b> (951) 782-4494		<b>Street Address:</b>	
<b>Fax No:</b>		<b>City, State, Zip:</b>	
<b>E-Mail Address:</b> jbroderick@waterboards.ca.gov			
<b>Summary</b>			
<i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i>			
No.			

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 16**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California	<b>EPA ID No.:</b> CA6170023208
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<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro	<b>Time:</b> 0920	<b>Date:</b> 3/27/09
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<b>Type:</b> <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other <b>Location of Visit:</b> City of Lake Forest Office	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
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**Contact Made By:**

<b>Name:</b> Crispin Wanyoike	<b>Title:</b> Senior Program Director	<b>Organization:</b> Earth Tech /AECOM
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**Individual Contacted:**

<b>Name:</b> Robert Woodings	<b>Title:</b> Restoration Advisory Board (RAB) Co-Chair	<b>Organization:</b> RAB, Former MCAS El Toro
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<b>Telephone No:</b> 949-461-3481	<b>Street Address:</b>
<b>Fax No:</b>	<b>City, State, Zip:</b>
<b>E-Mail Address:</b>	

**Summary**

*IRP Site 16 (Former Firefighter Training Area)*

***What effects have site operations had on the surrounding community?***

There have been no particular concerns by members of the surrounding community. The Site is historically interesting due to the training exercises conducted at the Site.

***Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.***

No concerns

***Do you feel well informed about the site's activities and progress?***

Yes, there is adequate information exchange and the RAB minutes provide the required details about site activities and progress.

***Do you have any comments, suggestions, or recommendations regarding the site's management or operation?***

No concerns

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITE 16  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b>
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b>		<b>Title:</b>	<b>Organization:</b>
<b>Individual Contacted:</b>			
<b>Name:</b> Marcia Rudolph		<b>Title:</b> Subcommittee Chair	<b>Organization:</b> Restoration Advisory Board (RAB), Former MCAS El Toro
<b>Telephone No:</b>		<b>Street Address:</b>	
<b>Fax No:</b>		<b>City, State, Zip:</b>	
<b>E-Mail Address:</b>			

**Summary of Conversation**

*What effects have site operations had on the surrounding community?*

*None*

*Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.*

*No.*

*Do you feel well informed about the site's activities and progress?*

*Yes.*

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITE 16  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b>
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b>		<b>Title:</b>	<b>Organization:</b>
<b>Individual Contacted:</b>			
<b>Name:</b> Marcia Rudolph		<b>Title:</b> Subcommittee Chair	<b>Organization:</b> Restoration Advisory Board (RAB), Former MCAS El Toro
<b>Telephone No:</b>		<b>Street Address:</b>	
<b>Fax No:</b>		<b>City, State, Zip:</b>	
<b>E-Mail Address:</b>			
<b>Summary of Conversation</b>			
<p><i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i></p> <p>No.</p>			

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 16**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Randa Chichakli	<b>Title:</b> Project Manager, O&M, Site 16	<b>Organization:</b> CDM	
<b>Telephone No:</b> 858-268-3383 <b>Fax No:</b> 858-268-9677 <b>E-Mail Address:</b> chichaklire@cdm.com		<b>Street Address:</b> 9444 Farnham St, Suite 210 <b>City, State, Zip:</b> San Diego, CA, 92123	

**Summary**

*How would you characterize the performance of the remedial action(s) implemented at this site till date (i.e., successful, failed, or other)?*

The Site 16 monitoring program is effectively monitoring the natural attenuation of the TCE plume and is adequate to maintain protectiveness of the remedy except on the western side of the plume.

Groundwater monitoring data (through Fall 2008 [Round 28]) shows an increase in TCE concentrations along the western side of the TCE plume (13 - 130 µg/L at 16\_MW09 and 9.4 - 290 µg/L at 16\_MW17). These increases may be in part due to the continued dispersion of TCE. Groundwater monitoring data would continue to be evaluated and groundwater monitoring network may need to be augmented as appropriate to confirm distribution of TCE to the west and northwest.

*Are you aware of any regulatory notices of violation related to the site that required a response?*

None.

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITE 16  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Randa Chichakli	<b>Title:</b> Project Manager, O&M, Site 16	<b>Organization:</b> CDM	
<b>Telephone No:</b> 858-268-3383 <b>Fax No:</b> 858-268-9677 <b>E-Mail Address:</b> chichaklire@cdm.com		<b>Street Address:</b> 9444 Farnham St, Suite 210 <b>City, State, Zip:</b> San Diego, CA, 92123	

**Summary**

*Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines described in the O&M Plan/Manuals? If so, how did the changes affect the protectiveness or effectiveness of the remedy?*

There have been no significant changes to the O&M requirements, maintenance schedules, or semi-annual groundwater sampling routines. Soil gas sampling has also been conducted, when possible, on a semi-annual basis with two exceptions: 1) soil gas samples were not collected during Round 24 (November 2006) due to an SVE pilot test; and 2) soil gas sample collection was deferred during Round 28 (December 2008) while a revised vadose zone monitoring procedure/strategy was being developed by NAVFAC Southwest in consultation with the regulatory agencies.

Offsite land use changes (i.e., development of former MCAS El Toro) have not impacted Site 16.

*Have there been unexpected O&M difficulties at the site since start-up? If so, please give details.*

None.

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITE 16  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Randa Chichakli	<b>Title:</b> Project Manager, O&M, Site 16	<b>Organization:</b> CDM	
<b>Telephone No:</b> 858-268-3383 <b>Fax No:</b> 858-268-9677 <b>E-Mail Address:</b> chichaklire@cdm.com		<b>Street Address:</b> 9444 Farnham St, Suite 210 <b>City, State, Zip:</b> San Diego, CA, 92123	

**Summary**

*Have there been opportunities to optimize O&M, or sampling efforts? Please give details.*

The analytical method for VOC analysis in groundwater samples has changed from USEPA Method CLP: OLM 04.2 to USEPA Method 8260B. USEPA Method 8260B generally provides lower detection limits for volatiles than the CLP method.

Additionally, the analytical method for VOC analysis in soil gas samples has changed from USEPA Method TO-14A to USEPA Method TO-15. USEPA Method TO-15 allows analysis of all the compounds required in the RD and it implements stricter QC procedures providing a more consistent way of analyzing for volatiles in ambient air than USEPA Method TO-14A.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

As noted above, the monitoring program at Site 16 is adequate to maintain protectiveness of the remedy except for the western side of the plume where additional groundwater monitoring wells are necessary.

The Navy should continue to assess the lateral extents of VOCs and optimize groundwater monitoring program based on the analytical results of groundwater monitoring events.

Per the Remedial Design, the purpose of soil gas monitoring in the source area is to identify

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITE 16  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Site 16, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Randa Chichakli	<b>Title:</b> Project Manager, O&M, Site 16	<b>Organization:</b> CDM	
<b>Telephone No:</b> 858-268-3383 <b>Fax No:</b> 858-268-9677 <b>E-Mail Address:</b> chichaklire@cdm.com		<b>Street Address:</b> 9444 Farnham St, Suite 210 <b>City, State, Zip:</b> San Diego, CA, 92123	
<b>Summary</b>			
<p>whether VOC concentrations are increasing in the vadose zone and potentially impacting groundwater quality. Soil gas monitoring data has not shown any definitive trends. The Navy is in the process of finalizing the vadose zone monitoring procedure/strategy in consultation with the regulatory agencies.</p> <p>Maintaining positive drainage on the source area is part of the Site 16 remedy. Semi-annual inspections visually evaluate whether positive drainage is maintained. Though still possible to evaluate the overall site drainage pattern (remains positive), recent vegetative overgrowth makes it difficult to determine whether there may be small areas of water ponding on the former source area. IRP Site 16 O&amp;M activities should include maintenance and controlling of vegetation on the former source area cap for adequate evaluation of drainage.</p>			

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 16**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> : IRP Site 16, Former MCAS El Toro, Irvine, CA		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro		<b>Time:</b> 1:30	<b>Date:</b> 3/27/09
<b>Type:</b> <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other <b>Location of Visit:</b> Lennar Office		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Contact Made By:</b>			
<b>Name:</b> Crispin Wanyoike		<b>Title:</b> Senior Program Director	<b>Organization:</b> Earth Tech /AECOM
<b>Individual Contacted:</b>			
<b>Name:</b> James Werkmeister		<b>Title:</b> Manager, Environmental Affairs	<b>Organization:</b> Lennar
<b>Telephone No:</b> 949-784-4321 <b>Fax No:</b>		<b>Street Address:</b>	
<b>E-Mail Address:</b>		<b>City, State, Zip:</b>	
<b>Summary</b>			
<p><i>What is your overall impression of the remedy implemented at this site (i.e., successful, failed, or other)?</i>  Remedy is being implemented as intended with no known issues.</p> <p><i>Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.</i>  None</p> <p><i>Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.</i>  Informal inspections conducted as part of processing entry/utility clearance permits. Routine communications occur during reuse forum meetings with the Navy.</p> <p><i>Do you feel well informed about the site's activities and progress?</i>  Yes through project reports and reuse forum meetings.</p> <p><i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i>  As part of transfer we recommend that the Navy consider revision of IC boundaries consistent with plume boundaries and monitoring well network.</p>			

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITE 16**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> : IRP Site 16, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 16, Former MCAS El Toro		<b>Time:</b> 1500	<b>Date:</b> 3/27/09
<b>Type:</b> <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b> OCGP Office			

**Contact Made By:**

<b>Name:</b> Crispin Wanyoike	<b>Title:</b> Senior Program Director	<b>Organization:</b> Earth Tech/AECOM
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**Individual Contacted:**

<b>Name:</b> Glen Worthington	<b>Title:</b> Manager of Planning and Environmental Services	<b>Organization:</b> Orange County Great Park
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<b>Telephone No:</b> 949-724-7406 <b>Fax No:</b>	<b>Street Address:</b>
<b>E-Mail Address:</b>	<b>City, State, Zip:</b>

**Summary**

*What is your overall impression of the remedy implemented at this site (i.e., successful, failed, or other)?*

Remedy is doing it job

*Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.*

Not aware of any events/incidents.

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

No separate reviews or inspections conducted by OCGP

*Do you feel well informed about the site's activities and progress?*

Project reports are provided by the Navy. Briefings on progress are provided as appropriate during reuse forums. There are well established lines of communication to facilitate required information exchange.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

No comments

**Appendix G**  
**Interview Documentation Forms – IRP Sites 18**  
**and 24**

**INTERVIEW DOCUMENTATION FORM**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITES 18 AND 24, FORMER MCAS EL TORO**

The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.

<b>Name</b>	<b>Title/Position</b>	<b>Organization</b>	<b>Date*</b>
Content Arnold	Lead Remedial Project Manager	Dept. of the Navy, BRAC PMO West	03/20/09
Marc Smits	Remedial Project Manager	Dept. of the Navy, BRAC PMO West	03/20/09
Rich Muza	Remedial Project Manager	U.S. EPA Region IX	03/19/09
Quang Than	Remedial Project Manager	California DTSC	03/19/09
John Broderick	Remedial Project Manager	California RWQCB, Santa Ana Region	03/19/09
Robert Woodings	RAB Co-Chair	RAB, Former MCAS El Toro	03/27/09
Marcia Rudolph	Subcommittee Chair	RAB, Former MCAS El Toro	03/27/09
Arseny Kalinsky	Engineer/Planner	Irvine Ranch Water District	03/20/09
Roy Herndon	Chief Hydrogeologist	Orange County Water District	03/20/09
Tracy Walker	Project Manager, O&M, IRP Site 18	Weston Solutions	03/20/09
Jim Werkmeister	Manager, Environmental Affairs	Lennar	03/27/09
Glen Worthington	Manager of Planning and Environmental Services	Orange County Great Park	03/27/09

\* Indicates the date interview questionnaire was sent via email, or interview was conducted in person or over the phone.

**Appendix H**  
**Interview Record Forms – IRP Sites 18 and 24**

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITES 18 AND 24  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b>
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Content Arnold	<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Telephone No:</b> 619-532-0790		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307	
<b>Fax No:</b> 619-532-0780		<b>City, State, Zip:</b> Irvine, CA 92618	
<b>E-Mail Address:</b> Content.Arnold@navy.mil			

**Summary**

**IRP Site 18**

*What effects have site operations had on the surrounding community?*

The Installation Restoration Program (IRP) Site 18 system equipment (three extraction wells and a treatment facility) has been integrated and blended into the community infrastructure.

*Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details of the known community concerns and the Navy's efforts to resolve them.*

Some community members have expressed general concerns pertaining to the IRP Site 18 regional groundwater plume including recently expressed concerns related to potential vapor intrusion from the groundwater plume.

The Navy has been proactive in providing the community with technical information related to the environmental clean-up efforts at Former MCAS El Toro in both on-station and off-station areas.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITES 18 AND 24**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b>
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Content Arnold	<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Telephone No:</b> 619-532-0790		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307	
<b>Fax No:</b> 619-532-0780		<b>City, State, Zip:</b> Irvine, CA 92618	
<b>E-Mail Address:</b> Content.Arnold@navy.mil			

**Summary**

The following is a partial listing of the Navy's community relations efforts:

- Technical Memorandum: The Navy evaluated vapor intrusion in the *Final Technical Memorandum, IRP Sites 16 and 24, Indoor Air Risk Evaluation, Former Marine Corps Air Station El Toro, California* (Bechtel, June 2004). This Technical Memorandum concluded that no action is required and no restrictions on reuse of these two sites are necessary relative to vapor intrusion; the US Environmental Protection Agency and the State of California concurred with these conclusions. Based on the conclusions in the aforementioned Technical Memorandum and on IRP Site 18 site-specific details, it was determined that no complete pathway exists for vapor intrusion at IRP Site 18.
- Fact Sheets: The Navy provides Fact Sheets to update the community on the environmental restoration activities at Former MCAS El Toro. An IRP Sites 18 and 24 Groundwater Cleanup Fact Sheet was issued in August 2008.
- BRAC PMO Website (<http://www.bracpmo.navy.mil>): Pertinent environmental information is available online.
- Restoration Advisory Board (RAB) Meetings: The RAB continues to meet on a regular basis throughout the year. Agendas and meeting minutes are available at the BRAC PMO website and at local document repositories.
- Administrative Record File and Information Repository: Documents are available locally at the following locations:

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITES 18 AND 24  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b>
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Content Arnold	<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Telephone No:</b> 619-532-0790		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307	
<b>Fax No:</b> 619-532-0780		<b>City, State, Zip:</b> Irvine, CA 92618	
<b>E-Mail Address:</b> Content.Arnold@navy.mil			

**Summary**

**Heritage Park Regional Library**  
14361 Yale Avenue, Irvine, CA  
Hours: Mon - Thurs 10:00am - 9:00pm  
Fri - Sat 10:00am - 5:00pm  
Sun 12:00pm - 5:00  
Phone: (949) 551-7151

**MCAS El Toro Administrative Record File**  
BRAC Office, Building 307  
Former MCAS El Toro  
Phone: (949) 726-5398

*Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.*

No.

*How would you characterize the performance of the remedial action(s) implemented at this site till date (i.e., successful, failed, or other)?*

In my opinion, the overall performance of the response action at this site has been successful.

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITES 18 AND 24  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b>
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Content Arnold	<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Telephone No:</b> 619-532-0790 <b>Fax No:</b> 619-532-0780 <b>E-Mail Address:</b> Content.Arnold@navy.mil		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307 <b>City, State, Zip:</b> Irvine, CA 92618	

**Summary**

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

IRWD manages the operation and maintenance at this site.

*Have there been unexpected O&M difficulties at the site since the completion of remedial action construction? If so, please give details.*

IRWD manages the operation and maintenance of this site.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

No.

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITES 18 AND 24  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208
<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b>
<b>Date:</b>		
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
<b>Location of Visit:</b>		
<b>Contact Made By:</b>		
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>		
<b>Name:</b> Content Arnold	<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Telephone No:</b> 619-532-0790	<b>Fax No:</b> 619-532-0780	<b>E-Mail Address:</b> Content.Arnold@navy.mil
<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307		<b>City, State, Zip:</b> Irvine, CA 92618

**Summary**

**IRP Site 24 Groundwater**

*What effects have site operations had on the surrounding community?*

The IRP Site 24 Navy managed system equipment is located in a carve-out area on Former MCAS El Toro. The carve-out area is still owned by the Navy. The treatment system is located just outside of the station boundary. All system equipment is secured and monitored.

*Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details of the known community concerns and the Navy's efforts to resolve them.*

See response to Site 18 question above.

A concern has been expressed regarding potential exposure to trichloroethylene (TCE) during base operations. In August 2008 the Navy issued a Fact Sheet on IRP Sites 18 and 24 Groundwater Cleanup to update the community on environmental restoration activities.

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITES 18 AND 24  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b>
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Content Arnold	<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Telephone No:</b> 619-532-0790		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307	
<b>Fax No:</b> 619-532-0780		<b>City, State, Zip:</b> Irvine, CA 92618	
<b>E-Mail Address:</b> Content.Arnold@navy.mil			

**Summary**

*Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.*

No.

*How would you characterize the performance of the remedial action(s) implemented at this site till date (i.e., successful, failed, or other)?*

In my opinion, the overall performance of the remedial action at this site has been successful.

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

The Navy communicates regularly with the Navy's O&M contractor. Inspections by the Navy's contractor are conducted on a regular basis (monthly, quarterly, and annual). The Navy staff visits the site periodically.

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITES 18 AND 24  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b>
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Content Arnold		<b>Title:</b> Lead Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Telephone No:</b> 619-532-0790		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307	
<b>Fax No:</b> 619-532-0780		<b>City, State, Zip:</b> Irvine, CA 92618	
<b>E-Mail Address:</b> Content.Arnold@navy.mil			
<b>Summary</b>			
<i>Have there been unexpected O&amp;M difficulties at the site since the completion of remedial action construction? If so, please give details.</i>			
Minor O&M difficulties have been encountered and documented in the Annual Remedy Status Report .			
<i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i>			
No.			

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITES 18 AND 24  
FORMER MCAS EL TORO**

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<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Marc Smits	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Telephone No:</b> 619-532-0793 <b>Fax No:</b> 619-532-0780 <b>E-Mail Address:</b> marc.smits@navy.mil		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307 City, State, Zip: Irvine, CA 92618	

**Summary of Conversation**

**IRP Site 18**

***What effects have site operations had on the surrounding community?***

Site operations consist of the operation and maintenance of 3 extraction wells and a treatment system along with quarterly sampling of wells throughout Irvine. One of the wells and the treatment system are located in a secured, fenced facility in an inconspicuous area. Access is prohibited except to Irvine Ranch Water District (IRWD) staff. The remaining two wells are located along a main roadway (Culver Road) and are also inconspicuous. The Navy has not been informed of any impacts to the community from the operations of the wells, treatment system, or groundwater monitoring. For the quarterly monitoring, the Navy's contractor obtains a permit to allow for temporary road diversion at some of the well locations. The road diversions last for less than 4 hours per well.

***Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details of the known community concerns and the Navy's efforts to resolve them.***

The community has raised concerns regarding the groundwater plume in the principal aquifer and the potential impacts to homeowners residing above the groundwater plume. The main

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<b>Name:</b> Marc Smits	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Telephone No:</b> 619-532-0793 <b>Fax No:</b> 619-532-0780 <b>E-Mail Address:</b> marc.smits@navy.mil		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307 City, State, Zip: Irvine, CA 92618	

**Summary of Conversation**

concern presented to the Navy is the concern that trichloroethylene (TCE) in groundwater may be volatilizing as a gas and entering the homes of residents causing a health hazard.

The Navy has coordinated with IRWD on addressing the community's concerns. The Navy has provided a Technical Memorandum conducted for Sites 24 (VOC source area) and 16 that evaluated indoor air risk using actual soil gas data to members of the community for their use. The memorandum concludes that no action is required for the exposure route of vapor intrusion. Independent evaluations of the health risks at MCAS El Toro have recently been conducted by the Agency for Toxic Substances and Disease Registry (ATSDR). The Navy has responded to multiple Freedom of Information Act (FOIA) request as well as informal requests for information related to the base. The Navy has provided responses to reporters related to the ongoing cleanup and community concerns. The Navy issued a Fact Sheet to the public to inform them on the cleanup progress at IRP Sites 18 and 24. The Navy presents annually on the cleanup progress of IRP Sites 18 and 24 at the Restoration Advisory Board meetings.

The Navy is utilizing the five-year review to additionally address the main concern of vapor intrusion and present lines of evidence for why there is no exposure route for vapor intrusion at Site 18. The following are several lines of evidence that support the conclusion that vapor intrusion is not a viable pathway within the area the community is concerned:

- The Navy has been sampling since the early 1990s including wells within the off-

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<b>Individual Contacted:</b>			
<b>Name:</b> Marc Smits	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
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**Summary of Conversation**

station plume. The samples collected at the top of the water table have been non-detect for TCE. Therefore, there is no TCE to off-gas into the soil and migrate vertically through the soil.

*Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.*

There have been no incidents that required coordination with local authorities at this site. The Navy coordinates with IRWD periodically on the operation and maintenance of the system and extraction wells.

*How would you characterize the performance of the remedial action(s) implemented at this site till date (i.e., successful, failed, or other)?*

Overall, the performance has been successful. There have been issues related to pumps needing repair that have impacted the uptime of the extraction wells. The most critical well has been operating at or above the required annual pumping volume.

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<b>Individual Contacted:</b>			
<b>Name:</b> Marc Smits		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Telephone No:</b> 619-532-0793		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307 City, State, Zip: Irvine, CA 92618	
<b>Fax No:</b> 619-532-0780			
<b>E-Mail Address:</b> marc.smits@navy.mil			
<b>Summary of Conversation</b>			
<p><i>Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.</i></p> <p>The Navy periodically visits the off-station treatment system with IRWD and other interested parties. IRWD is responsible for the operation and maintenance and therefore, visits the site on a more regular basis.</p> <p><i>Have there been unexpected O&amp;M difficulties at the site since the completion of remedial action construction? If so, please give details.</i></p> <p>The pumps seizing and initial issues with the air stripper were not anticipated. The air stripper issues have been resolved although the design flowrate of 1000 gallons per minute has been difficult to meet. The Navy and IRWD will continue to coordinate to optimize the system and achieve the desired flowrates. One pump was out of commission for several months.</p> <p><i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i></p> <p>DON will continue to coordinate/communicate with IRWD/OCWD to evaluate the performance of the IRP Site 18 treatment system and associated wells.</p>			

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<b>Name:</b> Marc Smits	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Telephone No:</b> 619-532-0793		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307	
<b>Fax No:</b> 619-532-0780		City, State, Zip: Irvine, CA 92618	
<b>E-Mail Address:</b> marc.smits@navy.mil			

**Summary of Conversation**

**IRP Site 24 Groundwater**

***What effects have site operations had on the surrounding community?***

There has been little to no effect on the surrounding community due to site operations since the entire system is located on-base, the majority of the system is below ground/secured, and the transfer compound is secured/not located near any community activities. Activities associated with lease activities (waste recycling) have had to work around existing components of the system. Some elements of the system (extraction wells) have required protective measures to ensure they are not damaged by a lessee.

***Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details of the known community concerns and the Navy's efforts to resolve them.***

The community is concerned with IRP Site 24 since the site is the Volatile Organic Compound (VOC) Source Area for the off-station plume in the principal aquifer. Some concerns have been raised about the use of water wells within IRP Site 24 and health hazards from military personnel exposure to trichloroethylene (TCE) while the base was open.

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<b>Location of Visit:</b>			

**Contact Made By:**

<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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**Individual Contacted:**

<b>Name:</b> Marc Smits	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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<b>Telephone No:</b> 619-532-0793 <b>Fax No:</b> 619-532-0780 <b>E-Mail Address:</b> marc.smits@navy.mil	<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307 City, State, Zip: Irvine, CA 92618
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**Summary of Conversation**

The Navy has provided a Technical Memorandum conducted for Sites 24 (VOC source area) and 16 that evaluated indoor air risk using action soil gas data to members of the community for their use. The memorandum concludes that no action is required for the exposure route of vapor intrusion. Independent evaluations of the health risks at MCAS El Toro have recently been conducted by the Agency for Toxic Substances and Disease Registry (ATSDR). The Navy has responded to multiple Freedom of Information Act (FOIA) request as well as informal requests for information related to the base. The Navy has provided responses to reporters related to the ongoing cleanup and community concerns and prepared a Fact Sheet to inform the public on the progress of the cleanup. The Navy presents annually on IRP Sites 18 and 24 at the Restoration Advisory Board meetings.

***Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.***

The Navy has had several incidents on the base associated with lessee activities and storm events. Events include damage caused by the closing of gate valves and damage from heavy equipment. The Navy's contractor responded quickly to all events and was able to shutdown the system and prevent further damage. No outside authorities have ever been required to assist with these incidents. In accordance with the Operation and Maintenance Manual, the Navy has informed the regulators of the incidents and followed up with any mitigation measures that were taken to prevent future incidents.

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<b>Name:</b> Marc Smits	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Telephone No:</b> 619-532-0793 <b>Fax No:</b> 619-532-0780 <b>E-Mail Address:</b> marc.smits@navy.mil		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307 City, State, Zip: Irvine, CA 92618	

**Summary of Conversation**

***How would you characterize the performance of the remedial action(s) implemented at this site till date (i.e., successful, failed, or other)?***

The system has been performing very successfully with the annual design flowrate being exceeded. The system has been running at over 95% uptime for the past year. Capture zone analysis was conducted that indicates four additional extraction wells are necessary to complete capture at the station boundary. These wells were included in the original design as contingency wells and will be installed this year.

***Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.***

The Navy's operation and maintenance contractor visits the site on a weekly basis to inspect the system and ensure there is no damage to the system components. Monthly, quarterly, and annual inspections are conducted to address periodic maintenance activities conducted. The operation and maintenance activities are documented in the Annual Remedy Status Report. Non-routine maintenance activities such as repairs required to the system (i.e., flooding of well vaults) are also documented in the annual report.

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<b>Name:</b> Marc Smits	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Telephone No:</b> 619-532-0793 <b>Fax No:</b> 619-532-0780 <b>E-Mail Address:</b> marc.smits@navy.mil		<b>Mailing Address:</b> 7030 Trabuco Rd. Bldg 307 City, State, Zip: Irvine, CA 92618	

**Summary of Conversation**

*Have there been unexpected O&M difficulties at the site since the completion of remedial action construction? If so, please provide details.*

The main operation and maintenance difficulty not anticipated prior to operation is the flooding of the well vaults during rain storms. At certain wells, water enters the well vault from the bottom of the vault and damages extraction well components during rain events. The cause appears to be preferential pathways to the base of the vault due to aggregate material in the pipeline trench areas and around the vault. The Navy's contractor has identified the wells with this condition and engineered a solution to prevent this flooding from occurring in future events.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

The Navy's contactor has done a excellent job of managing the operation and maintenance of the site. DON will continue to coordinate/communicate with IRWD/OCWD to evaluate the performance of the IRP Site 24 treatment system.

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<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Rich Muza		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> U.S. EPA Region IX
<b>Telephone No:</b> 415-972-3349 <b>Fax No:</b> 415-947-3520 <b>E-Mail Address:</b> muza.richard@epa.gov		<b>Street Address:</b> 75 Hawthorne Street <b>City, State, Zip:</b> San Francisco, CA 94105	
<b>Summary</b>			
<b><u>IRP Site 18</u></b>			
<i>Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.</i>			
Yes. EPA was involved in a site visit shortly after the Site 18 system became operational. EPA was also involved with the recent Five-Year Review inspection.			
<i>Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events.</i>			
No.			
<i>Do you feel well informed about the site's activities and progress?</i>			
Yes. EPA receives regular updates on the site at quarterly BCT Meetings. As per the approved O&M Manual, the Irvine Ranch Water District informs EPA when anything occurs that might have an adverse impact on the remedy.			

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<b>Name:</b> Rich Muza		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> U.S. EPA Region IX
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<b>E-Mail Address:</b> muza.richard@epa.gov			

**Summary**

*Do you feel the land use controls effective? (if applicable)*

Yes. No water-supply wells have been installed within the footprint of the Site 18 TCE plume and no adverse impacts to remedial equipment has occurred.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

Site 18 has not been formally assessed for the potential vapor intrusion pathway. EPA recommends that the Navy provide the multiple lines of evidence that currently result in the conclusion that conditions at the site do not pose a threat to public health via the vapor intrusion pathway. Please note that this issue has been questioned by the public regarding a perceived threat from the TCE plumes in the Irvine area.

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<b>E-Mail Address:</b> muza.richard@epa.gov			

**Summary**

**IRP Site 24 Groundwater**

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

Yes. EPA was involved in a site visit during construction activities and shortly after the Site 24 system became operational. EPA was also involved with the recent Five-Year Review inspection. Furthermore, EPA staff have taken part in Restoration Advisory Board tours of the site.

*Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events.*

No.

*Do you feel well informed about the site's activities and progress?*

Yes. EPA receives regular updates on the site at quarterly BCT Meetings. As per the approved O&M Manual, the Navy informs EPA when anything occurs that might have an adverse impact on the remedy.

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<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/19/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Rich Muza		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> U.S. EPA Region IX
<b>Telephone No:</b> 415-972-3349		<b>Street Address:</b> 75 Hawthorne Street	
<b>Fax No:</b> 415-947-3520		<b>City, State, Zip:</b> San Francisco, CA 94105	
<b>E-Mail Address:</b> muza.richard@epa.gov			
<b>Summary</b>			
<p><i>Do you feel the land use controls effective? (if applicable)</i></p> <p>Yes. Only a few limited issues have occurred to date at this site due to activities of the current leasee. To date issues included drainage problems near a few extraction wells and mistaken shutdown of the system by a contractor. Both issues have been addressed in order to limit future impacts to system operation.</p> <p><i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i></p> <p>Site 24 was assessed for the potential vapor intrusion pathway in the June 2004 "Final Technical Memorandum, IRP Sites 16 and 24, Indoor Air Risk Evaluation, Former Marine Corps Air Station El Toro, California". EPA recommends that the Navy reassess whether the data, assumptions, and methodology used in this evaluation are still valid and conditions at the site continue to not pose a threat to public health via the vapor intrusion pathway. Please note that this issue has been questioned by the public regarding a perceived threat from the TCE plumes in the Irvine area.</p>			

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITES 18 AND 24  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/19/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			

**Contact Made By:**

<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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**Individual Contacted:**

<b>Name:</b> Quang Than	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> California DTSC
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<b>Telephone No:</b> 714 484 5352	<b>Street Address:</b> 5796 Corporate Avenue <b>City, State, Zip:</b> Cypress, California 90630
<b>Fax No:</b> 714 484 5437	
<b>E-Mail Address:</b> qthan@dtsc.ca.gov	

**Summary of Conversation**

**IRP Site 18**

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

Yes, recent 5-Year Review site visit last month. Also, review of site documents such as Quarterly and Annual Groundwater Monitoring and System Operation reports.

*Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events.*

Yes, numerous public inquiries/complaints have been received. Topics ranging from potential health hazards from drinking VOC contaminated groundwater, from vapor intrusion due to residence located atop of the VOC plume, from consuming produce irrigated by VOC contaminated water, from exposure to VOCs when serving as Marines on Base.

*Do you feel well informed about the site's activities and progress?*

Yes.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITES 18 AND 24**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/19/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			

**Contact Made By:**

<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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**Individual Contacted:**

<b>Name:</b> Quang Than	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> California DTSC
<b>Telephone No:</b> 714 484 5352	<b>Street Address:</b> 5796 Corporate Avenue	
<b>Fax No:</b> 714 484 5437	<b>City, State, Zip:</b> Cypress, California 90630	
<b>E-Mail Address:</b> qthan@dtsc.ca.gov		

**Summary of Conversation**

*Do you feel the land use controls effective? (if applicable)*

It seems like there should be some kind of prohibition or restrictions on access to groundwater off Base.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

No.

**IRP Site 24 Groundwater**

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

Yes, recent 5-Year Review site visit last month. Also, review of site documents such as Quarterly and Annual Groundwater Monitoring and System Operation reports.

*Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events.*

No.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITES 18 AND 24**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California	<b>EPA ID No.:</b> CA6170023208
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<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro	<b>Time:</b>	<b>Date:</b> 03/19/09
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<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other <b>Location of Visit:</b>	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
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**Contact Made By:**

<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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**Individual Contacted:**

<b>Name:</b> Quang Than	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> California DTSC
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<b>Telephone No:</b> 714 484 5352 <b>Fax No:</b> 714 484 5437 <b>E-Mail Address:</b> qthan@dtsc.ca.gov	<b>Street Address:</b> 5796 Corporate Avenue <b>City, State, Zip:</b> Cypress, California 90630
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**Summary of Conversation**

*Do you feel well informed about the site's activities and progress?*

Yes.

*Do you feel the land use controls effective? (if applicable)*

Yes.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

New extraction wells need to be added to capture the part of the TCE plume in the SGU that moves off Base.

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITES 18 AND 24  
FORMER MCAS EL TORO**

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<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/19/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b> Regional Board office			

**Contact Made By:**

<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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**Individual Contacted:**

<b>Name:</b> John Broderick	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> California RWQCB, Santa Ana Region
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<b>Telephone No.:</b> (951) 782-4494	<b>Street Address:</b> <b>City, State, Zip:</b>
<b>Fax No.:</b>	
<b>E-Mail Address:</b> jbroderick@waterboards.ca.gov	

**Summary**

**IRP Site 18**

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

Yes. We are send copies of all documents for this site and receive a briefing quarterly on site status.

*Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events.*

Yes, public concerns on vapor threat to residents from the diffused TCE plume.

*Do you feel well informed about the site's activities and progress?*

Yes.

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITES 18 AND 24  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208
<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b> <b>Date:</b> 03/19/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
<b>Location of Visit:</b> Regional Board office		
<b>Contact Made By:</b>		
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>		
<b>Name:</b> John Broderick	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> California RWQCB, Santa Ana Region
<b>Telephone No:</b> (951) 782-4494		<b>Street Address:</b> <b>City, State, Zip:</b>
<b>Fax No:</b>		
<b>E-Mail Address:</b> jbroderick@waterboards.ca.gov		

**Summary**

*Do you feel the land use controls effective? (if applicable)*

Do not know, they appear to be sufficient.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

No.

**IRP Site 24 Groundwater**

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

Yes. Site visits and review of monitoring reports. We insert information from monitoring reports and other documents in a database that is accessible by the public.

*Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events.*

No.

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
IRP SITES 18 AND 24  
FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/19/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b> Regional Board office			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> John Broderick		<b>Title:</b> Remedial Project Manager	<b>Organization:</b> California RWQCB, Santa Ana Region
<b>Telephone No:</b> (951) 782-4494		<b>Street Address:</b>	
<b>Fax No:</b>		<b>City, State, Zip:</b>	
<b>E-Mail Address:</b> jbroderick@waterboards.ca.gov			

**Summary**

*Do you feel well informed about the site's activities and progress?*

Yes. We are send copies of all documents for this site and receive a briefing quarterly on site status.

*Do you feel the land use controls effective? (if applicable)*

Reuse has not been completed in this area; it may be too early to tell.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

No.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITES 18 AND 24**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California	<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Sites 18 and 24, Former MCAS El Toro	<b>Time:</b> 0920	<b>Date:</b> 3/27/09
<b>Type:</b> <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b> City of Lake Forest Office		

**Contact Made By:**

<b>Name:</b> Crispin Wanyoike	<b>Title:</b> Senior Program Director	<b>Organization:</b> Earth Tech/AECOM
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**Individual Contacted:**

<b>Name:</b> Robert Woodings	<b>Title:</b> Restoration Advisory Board (RAB) Co-Chair	<b>Organization:</b> RAB, Former MCAS El Toro
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<b>Telephone No:</b> 949-461-3481 <b>Fax No:</b>	<b>Street Address:</b>
<b>E-Mail Address:</b>	<b>City, State, Zip:</b>

**Summary**

***IRP Site 18 (Principal Aquifer)***

***What effects have site operations had on the surrounding community?***

The operations are going on well and as planned. The Irvine Desalter Project water supply and it's relation to the Site 18 has had a more marked effect on the community.

***Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.***

Community concerns in the Woodbridge area were regarding potential installation of a production well at the North Lake Beach Club. The proposed well was associated with the Irvine Desalter Project, and the concerns were mitigated by the locating the well to the north east.

***Do you feel well informed about the site's activities and progress?***

Yes, there is adequate information exchange by both the Navy and IRWD and the RAB minutes provide the required details about site activities and progress.

***Do you have any comments, suggestions, or recommendations regarding the site's management or operation?***

No concerns

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITES 18 AND 24**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California	<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Sites 18 and 24, Former MCAS El Toro	<b>Time:</b> 0920	<b>Date:</b> 3/27/09
<b>Type:</b> <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b> City of Lake Forest Office		

**Contact Made By:**

<b>Name:</b> Crispin Wanyoike	<b>Title:</b> Senior Program Director	<b>Organization:</b> Earth Tech/AECOM
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**Individual Contacted:**

<b>Name:</b> Robert Woodings	<b>Title:</b> Restoration Advisory Board (RAB) Co-Chair	<b>Organization:</b> RAB, Former MCAS El Toro
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<b>Telephone No:</b> 949-461-3481 <b>Fax No:</b>	<b>Street Address:</b>
<b>E-Mail Address:</b>	<b>City, State, Zip:</b>

**Summary**

**IRP Site 24 (Shallow Groundwater Unit)**

***What effects have site operations had on the surrounding community?***

IRP Site 24 has not had as much effect on the surrounding community as Site 18. The operations are going on well and as planned.

***Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.***

No significant concerns

***Do you feel well informed about the site's activities and progress?***

Yes, there is adequate information exchange by both the Navy and IRWD and the RAB minutes provide the required details about site activities and progress.

***Do you have any comments, suggestions, or recommendations regarding the site's management or operation?***

No concerns

<b>INTERVIEW RECORD</b> <b>FIRST FIVE-YEAR REVIEW</b> <b>IRP SITES 18 AND 24</b> <b>FORMER MCAS EL TORO</b>		
<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208
<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b> _____ <b>Date:</b> _____
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other <b>Location of Visit:</b>		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
Contact Made By:		
<b>Name:</b>	<b>Title:</b>	<b>Organization:</b>
Individual Contacted:		
<b>Name:</b> Marcia Rudolph	<b>Title:</b> Subcommittee Chair	<b>Organization:</b> Restoration Advisory Board (RAB), Former MCAS El Toro
<b>Telephone No:</b> <b>Fax No:</b> <b>E-Mail Address:</b>	<b>Street Address:</b> <b>City, State, Zip:</b>	
Summary of Conversation		
<p><u><i>IRP Site 18</i></u></p> <p><i>What effects have site operations had on the surrounding community?</i></p> <p><i>None</i></p> <p><i>Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.</i></p> <p><i>Continued monitoring and testing to assure the community of the effectiveness of the remedial action.</i></p>		

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
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FORMER MCAS EL TORO**

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<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b>
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			

**Contact Made By:**

<b>Name:</b>	<b>Title:</b>	<b>Organization:</b>
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**Individual Contacted:**

<b>Name:</b> Marcia Rudolph	<b>Title:</b> Subcommittee Chair	<b>Organization:</b> Restoration Advisory Board (RAB), Former MCAS El Toro
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<b>Telephone No:</b>	<b>Street Address:</b>
<b>Fax No:</b>	<b>City, State, Zip:</b>
<b>E-Mail Address:</b>	

**Summary of Conversation**

*Do you feel well informed about the site's activities and progress?*

Yes.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

Not at this time.

<b>INTERVIEW RECORD</b> <b>FIRST FIVE-YEAR REVIEW</b> <b>IRP SITES 18 AND 24</b> <b>FORMER MCAS EL TORO</b>		
<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208
<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b> _____ <b>Date:</b> _____
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
<b>Location of Visit:</b> _____		
<b>Contact Made By:</b>		
<b>Name:</b> _____	<b>Title:</b> _____	<b>Organization:</b> _____
<b>Individual Contacted:</b>		
<b>Name:</b> Marcia Rudolph	<b>Title:</b> Subcommittee Chair	<b>Organization:</b> Restoration Advisory Board (RAB), Former MCAS El Toro
<b>Telephone No:</b> _____ <b>Fax No:</b> _____ <b>E-Mail Address:</b> _____	<b>Street Address:</b> _____ <b>City, State, Zip:</b> _____	
<b>Summary of Conversation</b>		
<u><b>IRP Site 24 Groundwater</b></u>		
<i>What effects have site operations had on the surrounding community?</i>		
<p style="font-size: 2em; font-family: cursive;">None</p>		
<i>Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.</i>		
<p style="font-size: 1.5em; font-family: cursive;">The community expects to be shown through ongoing monitoring/reports that the remedial action(s) are effective.</p>		

**INTERVIEW RECORD  
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<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b>	<b>Title:</b>	<b>Organization:</b>	
<b>Individual Contacted:</b>			
<b>Name:</b> Marcia Rudolph	<b>Title:</b> Subcommittee Chair	<b>Organization:</b> Restoration Advisory Board (RAB), Former MCAS El Toro	
<b>Telephone No:</b>	<b>Street Address:</b>		
<b>Fax No:</b>	<b>City, State, Zip:</b>		
<b>E-Mail Address:</b>			
<b>Summary of Conversation</b>			
<p><i>Do you feel well informed about the site's activities and progress?</i></p> <p>Yes.</p> <p><i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i></p> <p>Continue co-ordination between IRWD/Navy.</p>			

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITES 18 AND 24**  
**FORMER MCAS EL TORO**

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<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro	<b>Time:</b>	<b>Date:</b> 05/13/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other	<input type="checkbox"/> Incoming <input checked="" type="checkbox"/> Outgoing	
<b>Location of Visit:</b>		

**Contact Made By:**

<b>Name:</b> Crispin Wanyoike	<b>Title:</b> Senior Program Director	<b>Organization:</b> AECOM Technical Services
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**Individual Contacted:**

<b>Name:</b> Arseny Kalinsky	<b>Title:</b> Engineer/Planner	<b>Organization:</b> Irvine Ranch Water District
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<b>Telephone No.:</b> (949) 453-5867	<b>Street Address:</b> 15600 Sand Canyon Avenue <b>City, State, Zip:</b> Irvine, California 92618-3102
<b>Fax No.:</b> (949) 476-1187	
<b>E-Mail Address:</b>	

**Summary**

**IRP Site 18**

***How would you characterize the performance of the treatment system operated by the IRWD/OCWD to treat constituents of concern for the site (i.e. successful, failed, or other)?***

Based on the water quality data received and equipment maintenance records inspection, this site treatment system is operating successfully.

***Are you aware of any regulatory notices of violation related to the treatment system operated by IRWD/OCWD?***

No notices of violation have been received.

***Have there been unexpected O&M difficulties since start-up? If so, please give details.***

The air stripper water trays perforation showed traces of calcium carbonate scaling. Since startup of NALCO C-5 inhibitor injection the water trays perforation openings remain clean.

***Have there been opportunities to optimize treatment system operation? Please give details.***

**INTERVIEW RECORD**  
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<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Crispin Wanyoike		<b>Title:</b> Senior Program Director	<b>Organization:</b> AECOM Technical Services
<b>Individual Contacted:</b>			
<b>Name:</b> Arseny Kalinsky		<b>Title:</b> Engineer/Planner	<b>Organization:</b> Irvine Ranch Water District
<b>Telephone No.:</b> (949) 453-5867		<b>Street Address:</b> 15600 Sand Canyon Avenue <b>City, State, Zip:</b> Irvine, California 92618-3102	
<b>Fax No.:</b> (949) 476-1187			
<b>E-Mail Address:</b>			

**Summary**

Running at flows higher than 850 gpm creates operational problems such as flooding of the air stripper trays and activation of the relief feature. IRWD will evaluate several options to increase current water flow (averaging 850 gpm) to the design level of 1000 gpm:

- IRWD operations staff will work with air stripper manufacturer to make adjustments to the air and water settings to allow 1000 GPM to be treated
- If the option described above is not feasible, IRWD will investigate the options of either bypassing 200 GPM of flow around the air stripper or operating both air strippers together at 500 GPM flow each.
- IRWD will modify the product water pump as needed to pump 1000 gpm and meet the higher pressure in the non-potable water distribution system.

Over the next two months IRWD is committed to increase the flows to the value of 1000 GPM.

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the treatment system/site? If so, please give details.*

IRWD System Operations routinely visit the site for inspection and monitoring along with the

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**FIRST FIVE-YEAR REVIEW**  
**IRP SITES 18 AND 24**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> IRP Sites 18 and 24, Former MCAS El Toro, Irvine, California		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 05/13/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input checked="" type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Crispin Wanyoike		<b>Title:</b> Senior Program Director	<b>Organization:</b> AECOM Technical Services
<b>Individual Contacted:</b>			
<b>Name:</b> Arseny Kalinsky		<b>Title:</b> Engineer/Planner	<b>Organization:</b> Irvine Ranch Water District
<b>Telephone No:</b> (949) 453-5867		<b>Street Address:</b> 15600 Sand Canyon Avenue	
<b>Fax No:</b> (949) 476-1187		<b>City, State, Zip:</b> Irvine, California 92618-3102	
<b>E-Mail Address:</b>			
<b>Summary</b>			
<p>IRWD Water Quality Regulatory Compliance inspectors collecting water and vapor samples for prescribed analyses.</p> <p><i>Do you have any comments, suggestions, or recommendations regarding the treatment system/site's management or operation?</i></p> <p>IRWD noted existing inadequacy in applying a Photo Ionization Detector (PID) instrument to measure the total VOC concentrations for the vapor phase GAC treatment. It was noted that contrary to O&amp;M procedures, some GAC canisters change-outs have not been occurring until both canisters have exceeded their treatment capacity. IRWD will proceed to eliminate PID instrument monitoring, and will strictly follow the O&amp;M Manual procedures for VOC vapor monitoring using the air samples sent to the specialized lab. The switch from lead to lag canister and subsequent GAC media change-outs will be performed on a TCE trigger level of 50 ppbv. IRWD recommends review of the design, operation practices and lab/field data by a specialized engineering firm to recommend potential improvements and optimization of the process.</p>			

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<b>Location of Visit:</b>			
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<b>Name:</b> Crispin Wanyoike		<b>Title:</b> Senior Program Director	<b>Organization:</b> AECOM Technical Services
<b>Individual Contacted:</b>			
<b>Name:</b> Arseny Kalinsky		<b>Title:</b> Engineer/Planner	<b>Organization:</b> Irvine Ranch Water District
<b>Telephone No:</b> (949) 453-5867		<b>Street Address:</b> 15600 Sand Canyon Avenue	
<b>Fax No:</b> (949) 476-1187		<b>City, State, Zip:</b> Irvine, California 92618-3102	
<b>E-Mail Address:</b>			

**Summary**

**IRP Site 24 Groundwater**

***How would you characterize the performance of the treatment system operated by the IRWD/OCWD to treat constituents of concern for the site (i.e. successful, failed, or other)?***

Based on the water quality data received and equipment maintenance records inspection this site treatment system is operating successfully.

***Are you aware of any regulatory notices of violation related to the treatment system operated by IRWD/OCWD?***

No notices of violation have been received.

***Have there been unexpected O&M difficulties since start-up? If so, please give details.***

Early on we identified calcium carbonate scaling occurring at the feed pumps and double check valves (valve seats). The scale was manually and chemically cleaned, and NALCO C-5 scale inhibitor additive was set to be injected into the feed pumps influent to prevent future scaling accidents. No scaling issues were reported since initiation of NALCO C-5 inhibitor injection.

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<b>Name:</b> Crispin Wanyoike		<b>Title:</b> Senior Program Director	<b>Organization:</b> AECOM Technical Services
<b>Individual Contacted:</b>			
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<b>Fax No:</b> (949) 476-1187			
<b>E-Mail Address:</b>			
<b>Summary</b>			
<b><i>Have there been opportunities to optimize treatment system operation? Please give details.</i></b>			
Since adding treatment of the blended influent with NALCO C-5 inhibitor IRWD did not evaluate any other options to optimize the system operation.			
<b><i>Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the treatment system/site? If so, please give details.</i></b>			
IRWD System Operations routinely visit the site for inspection and monitoring along with the IRWD Water Quality Regulatory Compliance inspectors collecting water and vapor samples for prescribed analyses.			
<b><i>Do you have any comments, suggestions, or recommendations regarding the treatment system/site's management or operation?</i></b>			
IRWD noted existing inadequacy in applying a Photo Ionization Detector (PID) instrument to measure the total VOC concentrations for the vapor phase GAC treatment. It was noted that contrary to O&M procedures, some GAC canisters change-outs have not been occurring until both canisters have exceeded their treatment capacity. IRWD will proceed to eliminate PID instrument monitoring, and will strictly follow the O&M Manual procedures for VOC vapor			

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<b>Name:</b> Arseny Kalinsky		<b>Title:</b> Engineer/Planner	<b>Organization:</b> Irvine Ranch Water District
<b>Telephone No:</b> (949) 453-5867		<b>Street Address:</b> 15600 Sand Canyon Avenue	
<b>Fax No:</b> (949) 476-1187		<b>City, State, Zip:</b> Irvine, California 92618-3102	
<b>E-Mail Address:</b>			
<b>Summary</b>			
<p>monitoring using the air samples sent to the specialized lab. The switch from lead to lag canister and subsequent GAC media change-outs will be performed on a TCE trigger level of 50 ppbv. IRWD recommends review of the design, operation practices and lab/field data by a specialized engineering firm to recommend potential improvements and optimization of the process.</p>			

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<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro	<b>Time:</b>	<b>Date:</b> 03/20/09
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**Contact Made By:**

<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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**Individual Contacted:**

<b>Name:</b> Roy Herndon	<b>Title:</b> Chief Hydrogeologist	<b>Organization:</b> Orange County Water District
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<b>Telephone No:</b> 714-378-3260	<b>Street Address:</b> City, State, Zip:
<b>Fax No:</b>	
<b>E-Mail Address:</b> rherndon@ocwd.com	

**Summary**

**IRP Site 18**

***How would you characterize the performance of the treatment system operated by the IRWD/OCWD to treat constituents of concern for the site (i.e. successful, failed, or other)?***

I would suggest expanding the question beyond simply the treatment system but the overall remedy effectiveness. I would characterize the Site 18 remediation as a success. TCE concentrations at the Culver Drive wells have been generally stable, and concentrations within the Principal Aquifer appear to be stable or decreasing. The extracted water is being effectively treated and is put to beneficial use.

***Are you aware of any regulatory notices of violation related to the treatment system operated by IRWD/OCWD?***

No.

***Have there been unexpected O&M difficulties since start-up? If so, please give details.***

From the reports I've received from the Navy and IRWD, the PA extraction and treatment

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<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Roy Herndon		<b>Title:</b> Chief Hydrogeologist	<b>Organization:</b> Orange County Water District
<b>Telephone No:</b> 714-378-3260		<b>Street Address:</b>	
<b>Fax No:</b>		<b>City, State, Zip:</b>	
<b>E-Mail Address:</b> rherndon@ocwd.com			
<b>Summary</b>			
<p>systems are operating at a high on-line percentage and within expected parameters.</p> <p><i>Have there been opportunities to optimize treatment system operation? Please give details.</i></p> <p>As far as I know the treatment system has been operating efficiently.</p> <p><i>Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the treatment system/site? If so, please give details.</i></p> <p>Yes, OCWD participates in RAB meetings and has had frequent communications with the Navy and IRWD on the remediation system performance.</p> <p><i>Do you have any comments, suggestions, or recommendations regarding the treatment system/site's management or operation?</i></p> <p>I have been satisfied with the documentation on groundwater monitoring and system performance that OCWD receives regularly from the Navy. The Navy and IRWD staff have been very responsive to our questions and comments since the initial operation of the remedy.</p>			

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<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West	
<b>Individual Contacted:</b>			
<b>Name:</b> Roy Herndon	<b>Title:</b> Chief Hydrogeologist	<b>Organization:</b> Orange County Water District	
<b>Telephone No:</b> 714-378-3260		<b>Street Address:</b>	
<b>Fax No:</b>		<b>City, State, Zip:</b>	
<b>E-Mail Address:</b> rherndon@ocwd.com			

**Summary**

**IRP Site 24 Groundwater**

***How would you characterize the performance of the treatment system operated by the IRWD/OCWD to treat constituents of concern for the site (i.e. successful, failed, or other)?***

Again, I suggest expanding the question to the effectiveness of the remedy vs. only the treatment system. Based on the Navy's capture zone modeling, additional SGU extraction wells are needed and planned along the former base boundary to more effectively prevent the SGU plume from leaving the base boundary and moving into the Principal Aquifer. Based on reports from IRWD and the Navy, the treatment systems are achieving their desired treatment objectives.

***Are you aware of any regulatory notices of violation related to the treatment system operated by IRWD/OCWD?***

No.

***Have there been unexpected O&M difficulties since start-up? If so, please give details.***

Nothing significant that I am aware of.

**INTERVIEW RECORD  
FIRST FIVE-YEAR REVIEW  
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FORMER MCAS EL TORO**

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<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			

**Contact Made By:**

<b>Name:</b> Debra Theroux	<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
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**Individual Contacted:**

<b>Name:</b> Roy Herndon	<b>Title:</b> Chief Hydrogeologist	<b>Organization:</b> Orange County Water District
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<b>Telephone No:</b> 714-378-3260	<b>Street Address:</b>
<b>Fax No:</b>	<b>City, State, Zip:</b>
<b>E-Mail Address:</b> rherndon@ocwd.com	

**Summary**

*Have there been opportunities to optimize treatment system operation? Please give details.*

My understanding is that the Navy has been able to adjust flow rates of individual SGU wells to improve the capture zone as well as mass removal. I am not aware of the need for treatment system optimization thus far.

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the treatment system/site? If so, please give details.*

Yes, OCWD participates in RAB meetings and has had frequent communications with the Navy and IRWD on the remediation system performance.

*Do you have any comments, suggestions, or recommendations regarding the treatment system/site's management or operation?*

Continued use and refinement of the capture zone model based on empirical operational (e.g., drawdown) data is encouraged so that we can continue to have confidence in the model's ability to evaluate overall SGU plume containment.

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**FORMER MCAS EL TORO**

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<b>Subject:</b> First Five-Year Review for IRP Site 18 and IRP Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b>	<b>Date:</b> 03/20/09
<b>Type:</b> <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Tracy Walker		<b>Title:</b> Project Manager, O&M, Site 18	<b>Organization:</b> Weston Solutions, Inc.
<b>Telephone No:</b> 925-948-2652		<b>Street Address:</b> 1340 Treat Blvd	
<b>Fax No:</b> 925-948-2601		<b>City, State, Zip:</b> Walnut Creek, CA 94597	
<b>E-Mail Address:</b> walker.tracy@comcast.net			

**Summary**

**IRP Site 24 Groundwater**

***How would you characterize the performance of the remedial action(s) implemented at this site till date (i.e., successful, failed, or other)?***

The system has operated as designed and has effectively removed an estimated VOC mass of 602 pounds. Hydraulic capture of the on-Station SGU VOC plume is nearly complete and capture of the principal aquifer plume is complete. Four contingency wells will be installed at the Station Boundary to address the area of incomplete capture.

***Are you aware of any regulatory notices of violation related to the site that required a response?***

No.

***Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines described in the O&M Plan/Manuals? If so, how did the changes affect the protectiveness or effectiveness of the remedy?***

There have not been any significant changes in the O&M requirements, maintenance schedule,

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<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Tracy Walker		<b>Title:</b> Project Manager, O&M, Site 18	<b>Organization:</b> Weston Solutions, Inc.
<b>Telephone No:</b> 925-948-2652		<b>Street Address:</b> 1340 Treat Blvd	
<b>Fax No:</b> 925-948-2601		<b>City, State, Zip:</b> Walnut Creek, CA 94597	
<b>E-Mail Address:</b> walker.tracy@comcast.net			

**Summary**

or sampling routines.

*Have there been unexpected O&M difficulties at the site since start-up? If so, please give details.*

There have been problems with flooding at several wells. The flooding occurred as a result of clogged storm drains in some cases. In other cases, water came in through the bottom of the well vault. Flooding issues have been addressed. There have been three incidences where system components were damaged by contractors working for the Great Park Corporation.

*Have there been opportunities to optimize O&M, or sampling efforts? Please give details.*

System performance data were evaluated for trends using the Mann-Kendall trend analysis and time series plots. Modifications to the sampling frequency for monitoring wells and extraction wells have been approved by the regulatory agencies.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

No.

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<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Tracy Walker		<b>Title:</b> Project Manager, O&M, Site 18	<b>Organization:</b> Weston Solutions, Inc.
<b>Telephone No:</b> 925-948-2652		<b>Street Address:</b> 1340 Treat Blvd	
<b>Fax No:</b> 925-948-2601		<b>City, State, Zip:</b> Walnut Creek, CA 94597	
<b>E-Mail Address:</b> walker.tracy@comcast.net			

**Summary**

**IRP Site 18 Groundwater**

*How would you characterize the performance of the remedial action(s) implemented at this site till date (i.e., successful, failed, or other)?*

NA

*Are you aware of any regulatory notices of violation related to the site that required a response?*

NA

*Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines described in the O&M Plan/Manuals? If so, how did the changes affect the protectiveness or effectiveness of the remedy?*

NA

*Have there been unexpected O&M difficulties at the site since start-up? If so, please give details.*

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<b>Location of Visit:</b>			
<b>Contact Made By:</b>			
<b>Name:</b> Debra Theroux		<b>Title:</b> Interim BRAC Environmental Coordinator	<b>Organization:</b> Dept. of the Navy, BRAC PMO West
<b>Individual Contacted:</b>			
<b>Name:</b> Tracy Walker		<b>Title:</b> Project Manager, O&M, Site 18	<b>Organization:</b> Weston Solutions, Inc.
<b>Telephone No:</b> 925-948-2652		<b>Street Address:</b> 1340 Treat Blvd	
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<b>E-Mail Address:</b> walker.tracy@comcast.net			
<b>Summary</b>			
NA			
<i>Have there been opportunities to optimize O&amp;M, or sampling efforts? Please give details.</i>			
NA			
<i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i>			
NA			

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<b>Subject:</b> First Five-Year Review for IRP Site 24, Former MCAS El Toro		<b>Time:</b> 1:30	<b>Date:</b> 3/27/09
<b>Type:</b> <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other <b>Location of Visit:</b> Lennar Office		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Contact Made By:</b>			
<b>Name:</b> Crispin Wanyoike	<b>Title:</b> Senior Program Director	<b>Organization:</b> Earth Tech/AECOM	
<b>Individual Contacted:</b>			
<b>Name:</b> James Werkmeister	<b>Title:</b> Manager, Environmental Affairs	<b>Organization:</b> Lennar	
<b>Telephone No:</b> 949-784-4231 <b>Fax No:</b>		<b>Street Address:</b>	
<b>E-Mail Address:</b>		<b>City, State, Zip:</b>	

**Summary**

*What is your overall impression of the remedy implemented at this site (i.e., successful, failed, or other)?*

Remedy is being implemented as intended and it is successful.

*Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.*

Stormwater runoff control resulted in flooding of well vaults and a maintenance contractor closed wrong valve on extraction groundwater conveyance system resulting in damage to other valves. Issue corrected and measures to prevent such events implemented by both Lennar and the Navy.

*Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.*

Informal inspections conducted as part of processing entry/utility clearance permits. Routine communications occur during reuse forum meetings with the Navy.

*Do you feel well informed about the site's activities and progress?*

Yes through project reports and reuse forum meetings.

*Do you have any comments, suggestions, or recommendations regarding the site's management or operation?*

Continued vigilance to protect remediation system components. Implement better marking and notifications during construction development phase.

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FORMER MCAS EL TORO**

<b>Site Name:</b> : IRP Sites 18 and 24, Former MCAS El Toro, Irvine, CA		<b>EPA ID No.:</b> CA6170023208
<b>Subject:</b> First Five-Year Review for IRP Site 18 and Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b> 1500
<b>Date:</b> 3/27/09		
<b>Type:</b> <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
<b>Location of Visit:</b> OCGP Office		

**Contact Made By:**

<b>Name:</b> Crispin Wanyoike	<b>Title:</b> Senior Program Director	<b>Organization:</b> Earth Tech/AECOM
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**Individual Contacted:**

<b>Name:</b> Glen Worthington	<b>Title:</b> Manager of Planning and Environmental Services	<b>Organization:</b> Orange County Great Park
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<b>Telephone No:</b> 949-724-7406 <b>Fax No:</b>	<b>Street Address:</b>
<b>E-Mail Address:</b>	<b>City, State, Zip:</b>

**Summary**

**IRP Site 18**

***What is your overall impression of the remedy implemented at this site (i.e., successful, failed, or other)?***

Remedy is successful

***Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.***

Not aware of any incidents

***Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.***

No separate reviews or inspections.

***Do you feel well informed about the site's activities and progress?***

Project reports are provided by the Navy. Briefings on progress are provided as appropriate during reuse forums meetings. There are well established lines of communication to facilitate required information exchange.

***Do you have any comments, suggestions, or recommendations regarding the site's management or operation?***

As a City of Irvine Department, OCGP is aware of an activist group in the community that is in discussion with the Irvine Ranch Water District and the City of Irvine about their concerns regarding the off-site VOC plume. The Navy has assisted the City of Irvine in responding to these concerns.

**INTERVIEW RECORD**  
**FIRST FIVE-YEAR REVIEW**  
**IRP SITES 18 AND 24**  
**FORMER MCAS EL TORO**

<b>Site Name:</b> : IRP Sites 18 and 24, Former MCAS El Toro, Irvine, CA		<b>EPA ID No.:</b> CA6170023208	
<b>Subject:</b> First Five-Year Review for IRP Site 18 and Site 24 Groundwater, Former MCAS El Toro		<b>Time:</b> 1500	<b>Date:</b> 3/27/09
<b>Type:</b> <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit:</b> OCGP Office			

**Contact Made By:**

<b>Name:</b> Crispin Wanyoike	<b>Title:</b> Senior Program Director	<b>Organization:</b> Earth Tech/AECOM
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**Individual Contacted:**

<b>Name:</b> Glen Worthington	<b>Title:</b> Manager of Planning and Environmental Services	<b>Organization:</b> Orange County Great Park
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<b>Telephone No:</b> 949-724-7406 <b>Fax No:</b>	<b>Street Address:</b>
<b>E-Mail Address:</b>	<b>City, State, Zip:</b>

**Summary**

**IRP Site 24**

***What is your overall impression of the remedy implemented at this site (i.e., successful, failed, or other)?***

OCGP is aware that the Navy is planning on the installation of additional extraction wells, and had a question on why this installation was occurring now.

***Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.***

Aware of incidents where leasee activities have damaged groundwater conveyance system components and where well vaults have been flooded during high rainfall events. The OCGP and the Navy have worked together to establish measures to prevent flooding and ensuring leasees protect the conveyance system.

***Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give details.***

Yes there are ongoing discussions with the Navy regarding the impact of redevelopment activities on the Site 24 extraction wells and conveyance systems.

***Do you feel well informed about the site's activities and progress?***

Project reports are provided by the Navy. Briefings on progress are provided as appropriate during reuse forums meetings. There are well established lines of communication to facilitate required information exchange.

***Do you have any comments, suggestions, or recommendations regarding the site's management or operation?***

Continue processes established for communicating and status of environmental activities and redevelopment.

**Appendix I**  
**Review of ARARs**

## ACRONYMS AND ABBREVIATIONS

§	Section
ARARs	applicable or relevant and appropriate requirements
BACT	best available control technology
Cal/EPA	California Environmental Protection Agency
Cal. Civ. Code	California Civil Code
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CWA	Clean Water Act
DON	Department of the Navy
DOT	Department of Transportation
DTSC	Department of Toxic Substances Control, California
HSC	Health and Safety Code, California
IRP	Installation Restoration Program
LFG	Landfill gas
MCL	maximum contaminant level
RCRA	Resource Conservation and Recovery Act
RWQCB	Regional Water Resources Control Board
SCAQMD	South Coast Air Quality Management District
SWRCB	State Water Resources Control Board
TCLP	toxicity characteristic leaching procedure
USC	United States Code

**Table I-1: Summary of ARARs Review — Installation Restoration Program (IRP) Sites 2 and 17**

Applicable or Relevant and Appropriate Requirement (ARAR) in the Record of Decision (ROD)	Citation	ARAR Determination in ROD	Conclusions of Review
<b>Chemical-Specific ARARs</b>			
<b>Resource Conservation and Recovery Act (RCRA)*</b>			
Toxicity characteristic leaching procedure (TCLP) regulatory levels; persistent and bioaccumulative toxic substances TTLCs and STLCs. Defines characteristics to be used to determine if waste is RCRA hazardous waste.	Title 22 California Code of Regulations (CCR), Sections 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100	Applicable	This ARAR was met during remedial action construction and the requirement is no longer pertinent.
Defines characteristics to be used to determine if waste is non-RCRA hazardous waste.			
<b>California Environmental Protection Agency Department of Toxic Substances Control</b>			
Defines characteristics to be used to determine if waste is non-RCRA hazardous waste.	22 CCR 66261.22 (a)(3) and (4), 66261.24(a)(2) to (a)(8), 66261.101, 66261.3(a)(2)(C), or 66261.3(a)(2)(F)	Applicable	22 CCR 66261.22 (a)(3) and (4), 66261.24(a)(2) to (a)(8), 66261.101, 66261.3(a)(2)(C), or 66261.3(a)(2)(F)
<b>California Integrated Waste Management Board*</b>			
Landfill gas (LFG) Control. Requires that LFGs be controlled during periods of closure and post-closure maintenance. Period of control must continue for 30 years or until it can be demonstrated that there is no potential for gas migration beyond the property boundary.	27 CCR 20921(a)(1), (2), and (3) and 21160(b)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
<b>Location-Specific ARARs</b>			
<b>Hazardous Waste Control Act*</b>			
A facility within the 100-year floodplain must be designed, constructed, operated, and maintained to avoid washout.	22 CCR 66264.18(b)	Relevant and appropriate (for IRP Site 2 only)	This ARAR was met during the remedial action design/construction. IRP Site 2 landfill cover was designed to avoid overtopping of floodwaters and erosion of slopes. No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy at IRP Sites 2.
<b>Executive Order 11988, Protection of Floodplains*</b>			
Actions taken within a floodplain should avoid adverse effects, minimize potential harm, and restore and preserve natural and beneficial values.	Title 40 Code of Federal Regulations (CFR) Part 6, Appendix A; excluding Sections 6(a)(2), 6(a)(4), 6(a)(6); 40 CFR Part 6.302	Relevant and appropriate (for IRP Site 2 only)	This ARAR was met during the remedial action design/construction. IRP Site 2 landfill cover was designed to avoid adverse effects to the ability of Borrego Canyon Wash, its tributaries, and associated Alton Parkway channel improvements to convey floodwaters. No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy at IRP Site 2.

**Table I-1: Summary of ARARs Review — Installation Restoration Program (IRP) Sites 2 and 17**

Applicable or Relevant and Appropriate Requirement (ARAR) in the Record of Decision (ROD)	Citation	ARAR Determination in ROD	Conclusions of Review
<b>National Archaeological and Historical Preservation Act*</b>			
Regulates alteration of terrain caused by a Federal construction project or Federally licensed activity or program within an area where action may cause irreparable harm, loss, or destruction of significant artifacts. The responsible official or the Secretary of the Interior is authorized to undertake data collection and preservation.	Substantive requirements of 36 CFR 65, 40 CFR Part 6.301(3), 16 USC Section 469	Applicable	This ARAR was met during the remedial action design/construction and the requirement is no longer pertinent.
<b>Endangered Species Act of 1973*</b>			
Protects critical habitats upon which endangered species or threatened species depend. Requires the lead agency to identify whether a threatened or endangered species or its critical habitat will be affected by a proposed response action. If so, the agency must avoid the action or take appropriate mitigation measures so that the action does not affect the species or its critical habitat.	16 United States Code (USC) 1536(a), 50 CFR 402	Applicable	This ARAR was met during the remedial action design/construction. Monitoring and mitigation of potential adverse effects to California gnatcatcher, a Federally threatened species, were conducted during remedial action construction per the Biological Opinion (U.S. FWS 2002). Long-term monitoring of the landfills will also comply with Biological Opinion. No significant changes were made to the cited requirements (as of February 2009) that could affect the protectiveness of the remedies at IRP Sites 2 and 17.
<b>Migratory Bird Treaty Act of 1972*</b>			
Protects almost all species of native migratory birds in the U.S. from unregulated "taking," which can include poisoning at hazardous waste sites.	16 USC Section 703	Relevant and appropriate	This ARAR was met during the remedial action design/construction. The installation of cover would minimize exposure. Therefore, this requirement is met and is no longer pertinent.
<b>California Fish and Game Code*</b>			
Prohibits the taking of birds and mammals, including taking by poison.	California Fish and Game Code Section 3005	Substantive provisions applicable	This ARAR was met during the remedial action design/construction. The installation of cover would minimize exposure. Therefore, this requirement is met and is no longer pertinent.
Provides requirements for construction that will change the natural flow of surface water, use material from streambeds, or result in disposal into designated waters.	California Fish and Game Code Sections 1601 and 1603	Substantive provisions applicable for IRP Site 2	Consultation with California Department of Fish and Game during remedial design phase indicated that the cited requirements do not apply to Federal projects. Therefore, the requirement is no longer pertinent.
Projects within the State shall not jeopardize the existence of any endangered or threatened species or result in the destruction or adverse modification of a habitat essential to the species.	California Fish and Game Code Section 1900, 1908, 2053, and 2080	Applicable	This ARAR was met during the remedial action design/construction through Section 7 consultation with U.S. FWS. The requirements are no longer pertinent.

**Table I-1: Summary of ARARs Review — Installation Restoration Program (IRP) Sites 2 and 17**

Applicable or Relevant and Appropriate Requirement (ARAR) in the Record of Decision (ROD)	Citation	ARAR Determination in ROD	Conclusions of Review
<b>RCRA, 42 USC 6901 et seq.*</b>			
On-site waste generation. Persons who are involved with the generation of wastes shall determine whether that waste is a hazardous waste.	22 CCR 66262.10(a), 66262.11	Applicable	This ARAR was met during remedial action construction and the requirement is no longer pertinent.
Hazardous waste accumulation. Generator may accumulate waste on site for 90 days or less or must comply with requirements for operating a storage facility.	22 CCR 66262.34	Applicable	This ARAR was met during remedial action construction and the requirement is no longer pertinent.
<b>Landfill Closure and Post-closure Requirements</b>			
General performance standard requires elimination of the need for further maintenance and control; elimination of post-closure escape of hazardous wastes, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products.	22 CCR 66264.111, except as it cross-references procedural requirements	Relevant and appropriate	This ARAR was met during remedial action design/construction and the requirement is no longer pertinent.
If waste is to remain in a unit, the unit shall be compacted before any portion of the final cover is installed.	22 CCR 66264.228(e)(1)	Relevant and appropriate	This ARAR was met during remedial action design/construction and the requirement is no longer pertinent.
The final cover shall be designed and constructed to accommodate lateral and vertical shear forces generated by the maximum credible earthquake.	22 CCR 66264.310(a)(5)	Relevant and appropriate	This ARAR was met during remedial action design/construction and the requirement is no longer pertinent.
The final cover shall be designed to prevent the downward entry of water into the closed landfill for a period of at least 100 years.	22 CCR 66264.310(a)(1)	Relevant and appropriate	This ARAR was met during remedial action design/construction and the requirement is no longer pertinent.
Maintain the integrity and effectiveness of the final cover, including making repairs to the cover system as necessary to correct the effects of settling, subsidence, erosion, or other events throughout the post-closure period.	22 CCR 66264.310(b)(1)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Protect and maintain surveyed benchmarks throughout the post-closure period.	22 CCR 66264.310(b)(5)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
<b>State Water Resources Control Board (SWRCB) and Regional Water Resources Control Board (RWQCB)</b>			
Storm Water Runoff Controls. Prior to closure, inactive waste management units must comply with the substantive requirements for eliminating most non-storm water discharges, developing and implementing a SWPPP, and performing monitoring of storm water discharges.	SWRCB Order No. 91-13-DWQ, as amended by Order No. 92-12-DWQ (General Industrial Storm Water Permit)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Waste management units going through final closure, with 5 acres of disturbance or more, must comply with the substantive requirements for eliminating most non-storm water discharges, developing and implementing a SWPPP, and performing monitoring of storm water discharges.	SWRCB Order No. 92-08-DWQ (General Construction Activity Storm Water Permit)	Relevant and appropriate	This ARAR was met during remedial action design/construction and the requirement is no longer pertinent.

**Table I-1: Summary of ARARs Review — Installation Restoration Program (IRP) Sites 2 and 17**

<b>Applicable or Relevant and Appropriate Requirement (ARAR) in the Record of Decision (ROD)</b>	<b>Citation</b>	<b>ARAR Determination in ROD</b>	<b>Conclusions of Review</b>
Persons responsible for discharges at units that were closed, abandoned, or inactive on or before November 27, 1984, may be required to develop and implement a monitoring program in accordance with Article 1, Subchapter 3, Subdivision 1 (27 CCR 20380 et seq.).	27 CCR 20080(g)	Applicable	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Maintain monitoring systems and monitor groundwater, surface water, and the unsaturated zone in accordance with applicable requirements of Article 1, Subchapter 3, Chapter 3, Subdivision 1 (27 CCR 20380 et seq.).	27 CCR 21090(c)(3)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Establishes monitoring requirements for waste management units.	27 CCR 20380(a), (d), and (e)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Requires that a discharger establish a detection monitoring program and institute evaluation monitoring whenever there is measurably significant evidence of a release.	27 CCR 20385(a)(1), and (a)(2)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Groundwater monitoring system design and operation.	27 CCR 20415(e)(1) and 13	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Provides minimum requirements for a groundwater detection monitoring program.	27 CCR 20420	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Evaluation monitoring is required whenever there is measurably significant evidence of a release during a detection monitoring program.	27 CCR 20425	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
A discharger shall remediate releases from the waste management unit that affect water quality.	27 CCR 20430	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Alternatives to construction or prescriptive standards.	27 CCR 20080(b) and (c), and 27 CCR 21090(a)	Relevant and appropriate	This ARAR was met during remedial action design/construction and the requirement is no longer pertinent.
The post-closure maintenance period shall extend as long as the wastes pose a threat to water quality.	27 CCR 20950(a)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Classified waste management units shall be closed in accordance with an approved closure and post-closure maintenance plan.	27 CCR 21769	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Closed landfills shall be graded and maintained to prevent ponding and to provide slopes of at least 3 percent.	27 CCR 21090(b)(1)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Diversion and drainage facilities shall be designed and constructed to accommodate the anticipated volume of	27 CCR 20365(c) and (d)	Relevant and appropriate	No significant changes were made to the cited requirement (as of

**Table I-1: Summary of ARARs Review — Installation Restoration Program (IRP) Sites 2 and 17**

<b>Applicable or Relevant and Appropriate Requirement (ARAR) in the Record of Decision (ROD)</b>	<b>Citation</b>	<b>ARAR Determination in ROD</b>	<b>Conclusions of Review</b>
precipitation and peak flows. Collection and holding facilities associated with drainage control shall be emptied immediately or otherwise managed to maintain design capacity.			February 2009) that could affect the protectiveness of the remedy.
Prevention of erosion and related damage of the final cover through the post-closure maintenance period.	27 CCR 21090(c)(4)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Closed landfills shall be provided with the uppermost cover layer consisting of a vegetative layer of not less than 1 foot of soil, containing no waste or leachate, placed on top of a layer as defined in 27 CCR 21090(a)(2); vegetation rooting depth must not exceed the 27 CCR 21090(a)(2) layer (vegetation layer) depth.	27 CCR 21090(a)(3)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Hydraulic conductivities shall be determined primarily by appropriate field test methods in accordance with accepted civil engineering practice.	27 CCR 20320(c) and (d), and 20324(g)(1)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
<b>South Coast Air Quality Management District (SCAQMD)</b>			
States that a person shall not discharge any air contaminant into the atmosphere from any single source of emission for a period or periods more than 3 minutes in a 60-minute period.	SCAQMD Rule 401	Applicable	This ARAR was met during remedial action design/construction and the requirement is no longer pertinent.
Provides for regulation of fugitive dust emissions beyond the property line of the emission source and states a maximum allowable particulate matter (PM) measured as PM 10.	SCAQMD Rule 403	Applicable	This ARAR was met during remedial action design/construction and the requirement is no longer pertinent.
Requires person excavating a landfill to identify mitigation measures to ensure that a public nuisance condition does not occur.	SCAQMD Rule 1150	Applicable	This ARAR was met during remedial action design/construction and the requirement is no longer pertinent.
<b>California Integrated Waste Management Board</b>			
Landfill closure. Sets forth the performance standards and minimum requirements for proper closure, post-closure maintenance, and proper reuse of solid waste disposal sites to protect public health and safety and the environment.	27 CCR, Division 2, Chapter 3 (Criteria for all Waste Management Units, Facilities, and Disposal Sites), Subchapter 5, Article 2, 21100	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Security. All points of access to the site must be restricted. All monitoring, control, and recovery systems shall be protected from unauthorized access.	27 CCR 21135(f) and (g)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Final Cover Requirements. Cross-references Title 27 CCR, Section 21090, with regard to specific cover requirements and states that engineered alternatives to the prescriptive standard are allowed provided they meet performance requirements.	27 CCR 21140(a)(b)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Final Drainage and Erosion Control. The design of the final cover must control run-	27 CCR 21150	Relevant and	No significant changes were made to the cited requirement (as of

**Table I-1: Summary of ARARs Review — Installation Restoration Program (IRP) Sites 2 and 17**

<b>Applicable or Relevant and Appropriate Requirement (ARAR) in the Record of Decision (ROD)</b>	<b>Citation</b>	<b>ARAR Determination in ROD</b>	<b>Conclusions of Review</b>
on and runoff produced by a 100-year, 24-hour storm event. Slopes must be stabilized.		appropriate	February 2009) that could affect the protectiveness of the remedy.
Requires gas monitoring and control be conducted during the closure and post-closure maintenance period.	27 CCR 21160(b)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Post-Closure Land Uses. Requires that post-closure land uses be designated and maintained to protect health and safety; prevent contact with waste, LFG, and leachate; and prevent gas explosions. Requires approval if post-closure land uses involve structures within 1,000 feet of the disposal area, structures on top of waste, modification of the low-permeability layer, or irrigation over waste.	27 CCR 21190(a), (b), and (c)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Settlement. Closed waste management units shall be provided with at least two permanent monuments (to be installed by a licensed land surveyor or a registered civil engineer) from which the location and elevation of wastes, containment structures, and monitoring facilities can be determined throughout the post-closure maintenance period.	27 CCR 20950(d)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Conduct an aerial photographic survey to include closed portions of the unit and its immediate surrounding area, including the surveying monuments. This survey will be used to produce a topographic map showing as-closed topography and to allow early detection of any differential settlement.	27 CCR 21090(e)(1)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Emergency Response Plan. Requires the operator to maintain a written post-closure emergency response plan at the facility or at an alternate location.	27 CCR 21130	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Final Grading. The final cover of closed landfills shall be designed, graded, and maintained to prevent ponding and site erosion due to high runoff velocities. Slopes should be at least 3 percent.	27 CCR 21090(b)(1)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Content Requirements for Closure Plans. Cross-references Title 27, CCR, 21790(b)(1) through (b)(8).	27 CCR, Chapter 4, Article 4, Subchapter 4, Section 21800	Relevant and appropriate (except for administrative requirements)	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Content Requirements for Post-Closure Plans	27 CCR 21830	Relevant and appropriate (except for administrative requirements and 27 CCR 21830[b][8])	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Closure Certification	27 CCR 21880	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.

**Table I-1: Summary of ARARs Review — Installation Restoration Program (IRP) Sites 2 and 17**

<b>Applicable or Relevant and Appropriate Requirement (ARAR) in the Record of Decision (ROD)</b>	<b>Citation</b>	<b>ARAR Determination in ROD</b>	<b>Conclusions of Review</b>
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.	27 CCR 21180(a)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
<b>California Civil Code*</b>			
Provides conditions under which land use restrictions will apply to successive owners of land.	Civil Code Section 1471	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
<b>California Health and Safety Code (HSC)*</b>			
Allows DTSC to enter into an agreement with the owner of a hazardous waste facility to restrict present and future land uses.	California HSC 25202.5	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Provides a streamlined process to be used when entering into an agreement to restrict specific use of property in order to implement the substantive use restrictions of HSC 25232(b)(1)(A)-(E).	HSC 25222.1	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Prohibits certain uses of land containing hazardous waste without a specific variance.	HSC 25232(b)(1) (A)-(E)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.
Provides a process for obtaining a written variance from a land use restriction.	HSC 25233(c)	Relevant and appropriate	No significant changes were made to the cited requirement (as of February 2009) that could affect the protectiveness of the remedy.

*Notes:*

\* 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 entire statutes or policies as ARARs. Specific ARARs are listed in the table below each general heading; only substantive requirements of the specific citations are considered ARARs.

**Table I-2: Summary of ARARs Review — IRP Site 16**

ARAR in ROD	Citation	ARAR Determination in ROD	Conclusion of Review
<b>Chemical Specific ARARs</b>			
National Primary Drinking Water Standards (maximum contaminant levels [MCLs]) for Public Water Systems (for organic compounds)	40 CFR 141.61(a)	Relevant and Appropriate	The MCL for TCE used as the target groundwater cleanup criterion has not changed as of February 2009 (remains at 5 µg/L).
Definition of Hazardous Waste Under RCRA	22 CCR 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1) and 66261.100	Applicable	Definition and hazardous waste characteristics have not changed as of February 2009.
Groundwater Protection Standards for RCRA Treatment, Storage, and Disposal Facilities	22 CCR 66264.94 except 66264.94(a)(2) and 66264.94 (b)	Relevant and Appropriate	Groundwater protection standards have not changed as of February 2009.
Water Quality Standards for Contingency of National Pollutant Discharge Elimination System (NPDES) Discharge to Bee Canyon Wash	40 CFR 131.36(b) and 131.38	Applicable to Contingency Remedy Only	Changes to specific water quality standards since the ROD signing do not affect the remedy protectiveness since contingency pumping and waste discharge are not occurring.
Effluent Limitations to Meet Technology-Based Requirements	33 USC Chapter 26 Section (§)1311(b)(2) Clean Water Act (CWA) §301(b)	Applicable to Contingency Remedy Only	Changes to specific water quality standards since the ROD signing do not affect the remedy protectiveness since contingency pumping and waste discharge are not occurring.
Definition of Non-RCRA Hazardous Waste	22 CCR 66261.22(a)(3), 66261.22(a)(4), 66261.24(a)(8), 66261.24(a)(2), 66261.101, 66261.3(a)(2)(c) or 66261.3(a)(2)(f)	Applicable	Definition of non-RCRA hazardous waste, and waste characteristics as applied to potential waste generation have not changed as of February 2009.
RWQCB Authority to Regulate, Issue Permits and Take Enforcement Actions	California Water Code, Division 7, §13241, 13243, 13263(a), 13269, and 13360	Applicable	No changes to the cited provisions were made as of February 2009 that affects the remedy implementation or protectiveness.
Santa Ana River Basin (Water Quality Control) Plan Defining Beneficial Uses and Water Quality Objectives	California Water Code §13240 Chapters 3 and 4	Applicable	No changes to the cited provision were made as of the February 2009 update that affects the remedy implementation or protectiveness.
State Policy for Sources of Drinking Water designating all State waters as drinking water unless excluded or otherwise designated	California State Water Resources Control Board Resolution 88-63	Applicable	No changes were made to the beneficial use table as of the February 2009 update to the Basin Plan that affects the remedy implementation or protectiveness.
State Policy requiring State waters of high quality to be maintained to the maximum extent possible	California State Water Resources Control Board Resolution 68-16	Applicable to Contingency Remedy Only	Changes to specific water quality objectives since the ROD signing do not affect the remedy protectiveness since contingency pumping and waste discharge are not occurring.

**Table I-2: Summary of ARARs Review — IRP Site 16**

<b>ARAR in ROD</b>	<b>Citation</b>	<b>ARAR Determination in ROD</b>	<b>Conclusion of Review</b>
General Groundwater Cleanup Discharge Requirements under NPDES	California RWQCB Santa Ana Region Order No. R8-2002-0007, NPDES Permit No. CAG918001	Not a ARAR, used for guidance only	Changes to specific permit requirements in subsequent amendments (Order Nos. 2003-0085 and 2005-0110) do not affect the remedy protectiveness since contingency pumping and waste discharge are not occurring.
State Policy requiring testing of priority pollutants to determine effluent limitations of discharges	California State Surface Waters Plan §1.3 and 1.4	Applicable to Contingency Remedy Only	Changes to specific water quality objectives since the ROD signing do not affect the remedy protectiveness since contingency pumping and waste discharge are not occurring.
<b>Action Specific ARARs</b>			
Waste generator shall determine whether waste is hazardous	22 CCR 66262.10(a) and 66262.11	Applicable	No changes to the cited provisions were made as of February 2009 that affects the remedy implementation or protectiveness.
Requires the development of a plan and the use of testing to determine whether waste is hazardous	22 CCR 66264.13(a) and 66264.13(b)	Applicable	No changes to the cited provisions were made as of February 2009 that affects the remedy implementation or protectiveness.
Establishes accumulation limits (90 day) and requirements (appropriate storage and labeling) for waste hazardous	22 CCR 66262.34	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Requires use of appropriate storage, containerization, labeling, inspections, handling and use of spill containment for hazardous waste	22 CCR 66264.171, 66264.172, 66264.173, 66264.174, 66264.175(a) and 66264.175(b)	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Requirements for removal and decontamination of hazardous waste upon closure	22 CCR 66264.178	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Requirements for tank, piping and equipment design and use	22 CCR 66264.192, 66264.193(b), 66264.193(c), 66264.193(d), 66264.193(e) and 66264.193(f)	Applicable to Contingency Remedy Only	Changes to specific requirements since the ROD signing do not affect the remedy protectiveness since contingency pumping and waste discharge are not occurring.
Requirements for removal and decontamination of tanks, pipe and equipment upon closure	22 CCR 66264.192	Applicable to Contingency Remedy Only	Changes to specific requirements since the ROD signing do not affect the remedy protectiveness since contingency pumping and waste discharge are not occurring.
Monitoring requirements for identifying chemicals of concern	22 CCR 66264.93,	Relevant and Appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.

**Table I-2: Summary of ARARs Review — IRP Site 16**

ARAR in ROD	Citation	ARAR Determination in ROD	Conclusion of Review
Requirements for groundwater monitoring	22 CCR 66264.97(b), 66264.97(d) and 66264.97(e)(2) through 66264.97(e)(5)	Relevant and Appropriate	No changes to the cited provisions were made as of February 2009 that affects the remedy implementation or protectiveness.
Requirements for detection monitoring program	22 CCR 66264.98(b), 66264.98(c), 66264.98(f), 66264.98(g) and 66264.98(i)	Relevant and Appropriate	No changes to the cited provisions were made as of February 2009 that affects the remedy implementation or protectiveness.
Requirements for evaluation monitoring program	22 CCR 66264.99(b), 66264.99(c), 66264.99(e), 66264.99(f) and 66264.99(g)	Relevant and Appropriate	No changes to the cited provisions were made as of February 2009 that affects the remedy implementation or protectiveness.
Requirements for corrective action upon discovery of a release to ensure compliance with water quality protection standards	22 CCR 66264.100(b), and 66264.100(c)	Relevant and Appropriate	No changes to the cited provisions were made as of February 2009 that affects the remedy implementation or protectiveness.
Requirements for groundwater monitoring program to demonstrate effectiveness of correction action and compliance with water quality protection standards	22 CCR 66264.100(d)	Relevant and Appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Requirements for groundwater monitoring program to demonstrate completion of corrective action and compliance with water quality protection standards for 1 year	22 CCR 66264.100(g)(1) and 66264.100(g)(3)	Relevant and Appropriate	No changes to the cited provisions were made as of February 2009 that affects the remedy implementation or protectiveness.
Regulations limiting discharges of fugitive dust and fumes (including lead and particulate matter) to the atmosphere	SCAQMD Rules 403, 404 and 405	Applicable	No changes to the cited provisions were made as of February 2009 that affects the remedy implementation or protectiveness.
Regulations for packaging, marking and labeling of waste hazardous and use of placards during its transportation in accordance with DOT regulations	22 CCR 66262.30, 66262.31, 66262.32 and 66262.33	Applicable	No changes to the cited provisions were made as of February 2009 that affects the remedy implementation or protectiveness.
Groundwater monitoring requirements	22 CCR 20415(e)(12)(B)	Relevant and Appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Conditions under which land use restrictions will apply to successive land owners	California Civil Code §1471	Relevant and Appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Regulation allowing DTSC to enter into agreements with owners of hazardous waste facilities to restrict land use	California Health and Safety Code §25202.5	Relevant and Appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Regulation that streamlines the process of entering into agreements to restrict specific land uses of properties	California Health and Safety Code §25222.1	Relevant and Appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.

**Table I-2: Summary of ARARs Review — IRP Site 16**

ARAR in ROD	Citation	ARAR Determination in ROD	Conclusion of Review
Regulation for obtaining variances to land use restrictions	California Health and Safety Code §25233(c)	Relevant and Appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Regulations limiting single source discharges of visible air contaminants to the atmosphere	SCAQMD Rules 401(b)(1)(A)	Applicable	No changes to the cited provisions were made as of February 2009 that affects the remedy implementation or protectiveness.
Requirements for land use covenants	CCR Title 22, §67391.1	Relevant and Appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.

**Table I-3: Summary of ARARs Review —IRP Sites 18 and 24**

ARAR in ROD	Regulation Citation	ARAR Determination in ROD	Conclusion of Review
<b>Chemical Specific ARARs</b>			
National Primary Drinking Water Standards for Public Water Systems (MCLs) (for organic chemicals only)	40 CFR § 141.61	Relevant and Appropriate	The MCLs for the COCs at the sites used as the target groundwater cleanup criterion have not changed as of February 2009.
TCLP regulatory levels; persistent and bioaccumulative toxic substances TTCLs and STLCs	22 CCR 66261.24 (a)(1)	Applicable	Definition and hazardous waste characteristics have not changed as of February 2009.
Groundwater and vadose zone protection standards	22 CCR 66264.94 except 66264.94(a)(2) and 66264.94 (b)	Relevant and Appropriate	Groundwater and vadose zone protection standards have not changed as of February 2009.
Definition of “non-RCRA hazardous waste”.	22 CCR 66261.22(a)(3) and (4), 66261.24(a)(2) to (a)(8), 66261.101, 66261.3(a)(2)(c) or 66261.3(a)(2)(f)	Applicable	Definition of non-RCRA hazardous waste, and waste characteristics as applied to potential waste generation have not changed as of February 2009.
State MCL list for drinking water	22 CCR 64444	Relevant and Appropriate	The MCLs for the COCs at the sites used as the target groundwater cleanup criterion have not changed as of February 2009.
Authorizes SWRCB and RWQCB to establish standards to protect both surface and groundwater quality in water quality control plan, to issue permits for discharge including NPDES permits, and to take enforcement action to protect water quality	Cal. Water Code, div.7, §§ 13241, 13243, 13263 (a), 13269, and 13360 (Porter-Cologne Water Quality Act)	Applicable	No changes to the cited provisions were made as of January 2009 that affects the remedy implementation or protectiveness.
Describe water basins in Santa Ana region; establishes beneficial uses of ground and surface waters, water quality objectives, implementation plans to meet the objectives and protect beneficial uses; incorporates State-wide water quality control plans and policies.	Comprehensive Water Quality Control Plan for the Santa Ana Basin (Cal. Water Code § 13240)	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Incorporated into all regional board basin plans. Designates all ground and surface waters of the State as drinking water with exceptions.	SWRCB Res. No. 88-63 (Sources of Drinking Water Policy)	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
<b>Location Specific ARARs</b>			
Facility within 100-year floodplain must be designed, constructed, operated, and maintained to avoid washout.	22 CCR 66264.18(b)	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Actions taken within a floodplain should avoid adverse effects, minimize potential harm, and restore and preserve natural and beneficial values.	40 CFR § 6, Appendix A; excluding §§ 6(a)(2), 6(a)(4), 6(a)(6); 40 C.F.R. § 6.302(b)	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Construction within area where action may cause irreparable harm, loss, or destruction of significant artifacts.	Substantive requirements of 36 CFR § 65, 40 C.F.R. § 6.301(c), 16 USC § 469	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
<b>Action Specific ARARs</b>			
Person who generates waste shall determine whether waste is a hazardous waste	22 CCR 66262.10(a), 66262.11	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.

**Table I-3: Summary of ARARs Review —IRP Sites 18 and 24**

ARAR in ROD	Regulation Citation	ARAR Determination in ROD	Conclusion of Review
Requires that constituents of concern be identified.	22 CCR 66264.93	Relevant and appropriate	No changes to the cited provisions were made as of February 2009 that affects the remedy implementation or protectiveness. COCs has not been changed since the ROD was signed.
Requires that a groundwater monitoring system be established and provides requirements the system must meet.	22 CCR 66264.97(b) and (e)(1)-(5)	Relevant and appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Requires that the owner or operator of a regulated unit develop a detection monitoring program that will provide reliable indication of a release.	22 CCR 66264.98	Relevant and appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Requires that the owner or operator of a regulated unit develop an evaluation monitoring program that can be used to assess the nature and extent of a release from the unit.	22 CCR 66264.99	Relevant and appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Provide requirements for a corrective action program for a regulated unit.	22 CCR 66264.100(a),(b),(c)(d), (f), and (g)(1) and (3)	Relevant and appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Hazardous waste must be packaged in accordance with Department of Transportation (DOT) regulations before transport.	22 CCR 66262.30	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Hazardous waste must be labeled in accordance with DOT regulations before transport.	22 CCR 66262.31	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Provides requirements for marking hazardous waste before transport.	22 CCR 66262.32	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
A generator must assure that the transport vehicle is correctly placarded before transport of hazardous waste.	22 CCR 66262.33	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Establishes requirements for a generator to accumulate hazardous waste on-site for 90 days or less without a permit or grant of interim status.	22 CCR 66262.34	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
All new sources of air pollution that may result in a net emission increase of any nonattainment air contaminant or any halogenated hydrocarbons are to employ BACT.	SCAQMD Rule 1303	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
The sampling method and frequency of sampling shall be appropriate for the medium from which the samples are taken.	27 CCR 20415(e)(12)(b)	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Applies to stationary source, constructed or modified after effective date of requirement, that emits carcinogenic air contaminants.	SCAQMD Rule 1401	Applicable	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.

**Table I-3: Summary of ARARs Review —IRP Sites 18 and 24**

ARAR in ROD	Regulation Citation	ARAR Determination in ROD	Conclusion of Review
Requires that T-BACT be employed for new stationary equipment when the operation of that equipment results in a higher-than-allowable maximum individual cancer risk.			No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Provides conditions under which land-use restrictions will apply to successive owners of land.	Cal. Civ. Code § 1471	Relevant and appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Allows Department of Toxic Substances Control (DTSC) to enter into an agreement with the owner of a hazardous waste facility to restrict present and future land uses.	Cal. Health & Safety Code § 25202.5	Relevant and appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Provides a streamlined process to be used to enter into an agreement to restrict specific use of property.	Cal. Health & Safety Code § 25222.1	Relevant and appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.
Provides a process for obtaining a written variance from a land-use restriction.	Cal. Health & Safety Code § 25233(c)	Relevant and appropriate	No changes to the cited provision were made as of February 2009 that affects the remedy implementation or protectiveness.

**Appendix J**  
**Responses to Regulatory Comments**

**Document Title:**

Draft Five-Year Review Report, Installation Restoration Program Sites 2, 16, 17, 18, and 24, Former Marine Corps Air Station, El Toro, California

*Reviewers:*

*Mary T. Aycock; Superfund Remedial Project Manager; U.S. Environmental Protection Agency, Region IX.*

*Richard Howard, ROC 9 Task Order Manager, TechLaw Inc. (U.S. EPA's Contractor). Comments dated: 16 June 2009*

Comment No.	Section/Page No.	Comment	Response
<b>SPECIFIC COMMENTS</b>			
1.	Section 6.4.3.1 VOC Removal from SGU and PA, Page 6-7	The occurrence of breakthrough of volatile organic compounds (VOCs) through both the primary and secondary filters shows the absence of a preventive maintenance schedule for groundwater treatment plant operations. It also reflects the lack of accountability on the part of the plant operating personnel. Please develop and institute an updated preventive maintenance schedule for the vapor phase granular activated carbon (GAC) filters at the treatment plants to avoid accidental releases.	<p>The maintenance and inspection procedures for the Shallow Groundwater Unit (SGU) and Principal Aquifer (PA) Treatment Plants including granular activated carbon (GAC) change-out procedures which are presented in detail in their respective Operation and Maintenance (O&amp;M) Manuals (Tetra Tech 2007a and 2007b). In addition, the GAC (vapor phase) change-out frequencies are also stipulated in the permits issued to the Irvine Ranch Water District (IRWD) (treatment plant operator) by the South Coast Air Quality Management District (SCAQMD) for the SGU and PA Treatment Plants. Therefore, occurrence of breakthrough and incomplete treatment of trichloroethylene (TCE) vapors does not reflect the absence of preventive maintenance schedule; rather it was a result of failure to follow the documented O&amp;M procedures.</p> <p>The Department of the Navy (DON) recently received commitments from IRWD that the procedures presented in the O&amp;M manuals which ensure the treatment systems (and in particular the GAC units for "vapor-phase" treatment) are operated as designed, are being followed. As documented in Section 9, this will be accomplished through periodic communication/ coordination between the DON, IRWD and Orange County Water District (OCWD) to assess the performance of the SGU and PA Treatment Plants. IRWD will prepare Quarterly Treatment System Monitoring Report which will include documentation of compliance with discharge requirements and O&amp;M procedures.</p>

**Document Title:**

Draft Five-Year Review Report, Installation Restoration Program Sites 2, 16, 17, 18, and 24, Former Marine Corps Air Station, El Toro, California

**Reviewers:**

Mary T. Aycocck; Superfund Remedial Project Manager; U.S. Environmental Protection Agency, Region IX.

Richard Howard, ROC 9 Task Order Manager, TechLaw Inc. (U.S. EPA's Contractor). Comments dated: 16 June 2009

Comment No.	Section/Page No.	Comment	Response
2.	Section 6.4.3.2 Groundwater Elevation Monitoring and Hydraulic Capture, Page 6-7	The groundwater modeling and its results to project complete capture of the plume is very approximate. Any attempts to use the data from the modeling for site cleanup goals might lead to erroneous conclusions. Please use caution in the interpretation of the modeling data.	The DON agrees that the use of groundwater modeling results in predicting plume capture is approximate; although the groundwater modeling has been used to optimize extraction rates with the goal of efficiently achieving hydraulic containment. The performance of the extraction system in achieving site cleanup goals will be based on the groundwater monitoring results, including water level and contaminant concentration data.
3.	Section 6.6.2 IRP Site 16 Other comments/Suggestions/Recommendations, Page 6-18	<p>Of the five comments/suggestions/recommendations, only the fourth one was implemented. Please advise the status of the other four in your response.</p> <p>Comment 1: Mr. Rich Muza indicated that the planned PCAP at IRP Site 16 will temporarily impact the in-place remedy at the site. Mr. Muza further stated that U.S. EPA notified the DON in a letter on 2 February 2009 that U.S. EPA deems the existing monitoring wells at IRP Site 16 to be a significant component of the CERCLA MNA remedy. In the same letter, the U.S. EPA requested that at the conclusion of the PCAP, a report be submitted to the Agency that includes (1) well logs and construction details for all replacement monitoring wells and the comparison of the results of a round of ground-water quality sampling from the replacement monitoring wells to the TCE trend from the destroyed monitoring wells, and 2) details on the PCAP site regrading efforts to assure proper drainage in the TCE plume source area as mandated by the ROD for IRP Site 16.</p>	<p>The status of the four comments/suggestions/recommendations referred to in Section 6.6.2 are provided below:</p> <p><b>Comments 1 and 2: Mr. Rich Muza and Mr. Quang Than's comment pertaining to petroleum corrective action program (PCAP) at IRP Site 16:</b> The next phase of the (PCAP) at IRP Site 16 is currently in the planning phase. Following completion of the corrective action, a report will be submitted to the Federal Facility Agreement (FFA) signatories, including the United States Environmental Protection Agency (U.S. EPA), California Department of Toxic Substances Control (DTSC), and California Regional Water Quality Control Board, Santa Ana Region (RWQCB). This report will include the information requested by the U.S. EPA described in bullet #1 on Page 6-18 of the Five-Year Review Report. In addition, as documented in Section 9.2 and consistent with Mr. Than's comment, the DON will replace wells impacted by the corrective action as appropriate to ensure effective monitoring and attainment of remedial action objectives (RAOs) presented in the Record of Decision</p>

**Document Title:**

Draft Five-Year Review Report, Installation Restoration Program Sites 2, 16, 17, 18, and 24, Former Marine Corps Air Station, El Toro, California

*Reviewers:*

*Mary T. Aycocq; Superfund Remedial Project Manager; U.S. Environmental Protection Agency, Region IX.*

*Richard Howard, ROC 9 Task Order Manager, TechLaw Inc. (U.S. EPA's Contractor). Comments dated: 16 June 2009*

Comment No.	Section/Page No.	Comment	Response
		<p>Comment 2: Mr. Quang Than suggested that some of the replacement wells destroyed during the PCAP should be placed at the most useful locations to monitor the VOC plume.</p> <p>Comment 3: Mr. Quang Than recommended that the DON should work with DTSC to ensure proper soil gas sampling in monitoring wells at IRP Site 16 (see Section 6.4.2.4 for details).</p> <p>Comment 5: Mr. James Werkmeister recommended that as part of property transfer, the DON should consider revision of IC boundaries consistent with the plume boundaries and monitoring well network.</p>	<p>(ROD).</p> <p><b>Comment 3: Mr. Quang Than's comment pertaining to soil gas sampling:</b> The DON is committed to and is working to resolve the issue of deep vadose zone monitoring at IRP Site 16 in a manner that is agreeable to the FFA signatories; including U.S. EPA, DTSC, and the RWQCB; and within the framework of the Record of Decision (ROD) for the site.</p> <p><b>Comment 5: Mr. James Werkmeister's comment pertaining to institutional control (IC) boundaries:</b> The Navy is currently working to revise the IC boundaries for IRP Site 16 as a part of property transfer that will accommodate the planned future reuse and protect groundwater monitoring equipment, installed to assure protection of human health and the environment at the site.</p>

**Document Title:**

Draft Five-Year Review Report, Installation Restoration Program Sites 2, 16, 17, 18, and 24, Former Marine Corps Air Station, El Toro, California

*Reviewers:*

*Mary T. Aycok; Superfund Remedial Project Manager; U.S. Environmental Protection Agency, Region IX.*

*Richard Howard, ROC 9 Task Order Manager, TechLaw Inc. (U.S. EPA's Contractor). Comments dated: 16 June 2009*

Comment No.	Section/Page No.	Comment	Response
4.	Section 6.6.3 IRP Sites 18 and 24, Effectiveness of Land-Use Controls, Page 6-20	Mr. John Broderick's statement that land use controls (LUCs) for IRP site 18 appear to be sufficient does not support the protectiveness statement thoroughly. It appears from this section that the statement requires further justification. Please revisit the LUCs at IRP site 18 to make sure that the ICs are one hundred percent effective.	A detailed discussion of compliance with ICs for IRP Site 18 is presented in Section 6.4.3.4 of the report. ICs for the VOC groundwater plume associated with IRP Site 18 are intended to protect residents from use of VOC-impacted groundwater for domestic purposes until cleanup goals are achieved. Section 6.4.3.4 explains that the ICs for the IRP Site 18 VOC groundwater plume are based on local permit programs administered by the Orange County Health Care Agency (OCHCA) and IRWD. The OCHCA and IRWD have completed checklists for calendar years 2006 through 2008 that indicate that no applications for new well permits were received and no new permits were issued by IRWD and/or by OCHCA for wells within the geographic boundaries of IRP Site 18. The checklists will continue on an annual basis as long as the remedy is in place.
5.	Section 7.1.1 Question A: Is the Remedy functioning as intended by the Decision Documents, Page 7-1	The operations and maintenance (O&M) activities to monitor the effectiveness of the landfill capping remedy at IRP sites 2 and 17 include cover inspection and maintenance, and monitoring of groundwater, soil moisture and landfill gases (LFG). Please provide an inspection schedule that will ensure the protection of human health and environment as mandated by the ROD.	The detailed landfill inspection schedule, and monitoring plans for groundwater, soil moisture, and landfill gas for IRP Sites 2 and 17 are presented in the Final Operation and Maintenance Plan for these sites (Earth Tech 2009). This O&M Plan is consistent with the selected remedy documented in the Record of Decision for IRP Sites 2 and 17 (DON 2000), as modified by the Explanation of Significant Difference (DON 2009). The regulatory agencies provided their concurrence on the O&M Plan in February 2009.

**References:**

Department of the Navy (DON). 2000. Final Interim Record of Decision, Operable Unit 2B, Landfill Sites 2 and 17, Marine Corps Air Station El Toro, California. San Diego, CA. April.

**Document Title:**

Draft Five-Year Review Report, Installation Restoration Program Sites 2, 16, 17, 18, and 24, Former Marine Corps Air Station, El Toro, California

*Reviewers:*

*Mary T. Aycok; Superfund Remedial Project Manager; U.S. Environmental Protection Agency, Region IX.*

*Richard Howard, ROC 9 Task Order Manager, TechLaw Inc. (U.S. EPA's Contractor). Comments dated: 16 June 2009*

———. 2009. Final Explanation of Significant Differences, Operable Unit 2B, Installation Restoration Program Sites 2 and 17, Finalizing the Interim Final Record of Decision, Former Marine Corps Air Station El Toro, California. March.

Earth Tech, Inc. (Earth Tech). 2009. Final Operation and Maintenance Plan, IRP Sites 2 and 17, Former Marine Corps Air Station El Toro, California. San Diego, CA. February.

Tetra Tech, Inc. 2007a. Final Operations and Maintenance Manual, SGU Treatment Plant, Irvine Desalter Project. June

Tetra Tech. 2007b. Final Operations and Maintenance Manual, Principal Aquifer Treatment Plant, Well ET-2 & 78. Irvine Desalter Project. June.

**Document Title:**

Draft Five-Year Review Report, Installation Restoration Program Sites 2, 16, 17, 18, and 24, Former Marine Corps Air Station, El Toro, California; May 2009

Reviewer: Quang Than, Remedial Project Manager, Brownfields and Environmental Restoration Program, Department of Toxic Substances Control; Comments dated 6 July 2009.

Comment No.	Comment	Response
1.	Site 16: DTSC concurs that additional monitoring wells are needed on the west and northwest sides of the dissolved plume to better monitor the remedy.	The Department of the Navy (DON) will continue to monitor the lateral extent of volatile organic compounds (VOCs) in groundwater at IRP Site 16, and augment the groundwater monitoring network as necessary, and in coordination with the Federal Facility Agreement (FFA) signatories including RWQCB, USEPA, and DTSC.
2.	Site 16: The U.S. Environmental Protection Agency (USEPA) requires that monitored natural attenuation (MNA) remedies should be complete within a time-frame that is reasonable compared to alternative methods. The Navy should evaluate the progress toward, and provide an estimate of the time required to reach, the completion of the remedy.	At this time, monitoring data for IRP Site 16 collected to date are not sufficient to establish concentration trends which could be used to reliably estimate the time required to achieve the remediation goal established for trichloroethene (TCE) in groundwater at the site. The Navy will continue to monitor and report on the progress of the remedy as part of routine operation and maintenance (O&M) activities, and document the results in the O&M reports submitted to the regulatory agencies.
3.	Site 16: Well 16_MW13, which was chosen in the remedial design as a triggering well, is not ideally located downgradient of the source area, and may therefore fail to notify significant plume migration. The Navy should propose to substitute a new well located west of 16_MW13 as the triggering well.	As recommended in Section 9.2, the DON will continue to monitor the lateral extent of VOCs in groundwater at IRP Site 16 and augment the groundwater monitoring network, as necessary to monitor the distribution of TCE in the downgradient portion of the plume. Based on groundwater monitoring results, and in coordination with the FFA signatories, the DON may propose an alternate trigger well to the west of 16_MW13 in future O&M reports for IRP Site 16.
4.	Site 16: The issue of data quality of deep vadose zone soil gas sampling remains unresolved.	The DON is committed to and is working to resolve the issue of deep vadose zone monitoring at IRP Site 16 in a manner that is agreeable to the FFA signatories, and within the framework of the Record of Decision (ROD) for the site.

**Document Title:**

Draft Five-Year Review Report, Installation Restoration Program Sites 2, 16, 17, 18, and 24, Former Marine Corps Air Station, El Toro, California; May 2009

*Reviewer: Quang Than, Remedial Project Manager, Brownfields and Environmental Restoration Program, Department of Toxic Substances Control; Comments dated 6 July 2009.*

Comment No.	Comment	Response
5.	Sites 18&24: The Navy should include an evaluation of the observed changes in the dissolved plume including the mass of dissolved contaminant remaining, and estimate the time remaining before the remedy will be completed.	The Five-Year Review Report presented VOC plume maps for IRP Sites 18 and 24 based on the baseline sampling conducted in September 2006 and for the subsequent two years. During this interval, the configuration of the plume did not change, and therefore the estimated mass would also remain the same. It has been noted that it could take as long as 10 years before reliable estimates could be made for the remaining dissolved mass in the plume and the time for remedy completion. The Navy will continue to monitor the progress of the remedy as part of routine O&M and document the results, including estimates of remaining mass and time for remedy completion, as appropriate, in future O&M reports submitted to the regulatory agencies.

**Document Title:**

Draft Five-Year Review Report, Installation Restoration Program Sites 2, 16, 17, 18, and 24, Former Marine Corps Air Station, El Toro, California; May 2009

*Reviewer: John Broderick, Site Cleanup/DoD Section, California Regional Water Quality Control Board, Santa Ana Region; Letter dated 1 July 2009.*

Comment No.	Comment	Response
1.	<p>We have reviewed the above-referenced document, dated May 19, 2009, which we received on May 20, 2009.</p> <p>This report includes: 1) an introduction; 2) a program chronology by site; 3) a description of the remedial actions; 4) a description of the five-year review process; 5) a technical assessment by site; 6) recommendation and follow-up actions; and 7) a protectiveness statement.</p> <p>We have no comments on the report.</p>	Comments noted.