

Public Information Materials
Former MCAS El Toro
3/28/07
86th Restoration Advisory Board Meeting

Held at Irvine City Hall
Irvine, CA

Materials/Handouts Include:

- *RAB Meeting Agenda/Public Notice – 3/28/07 RAB Meeting – 86th Meeting.
- *Meeting Minutes from the 1/31/07 RAB Meeting – 85th Meeting.
- MCAS El Toro RAB Mission Statement and Operating Procedures.
- MCAS El Toro – Navy Team contact information.
- MCAS El Toro – BRAC Cleanup Team Members and Key Project Representatives and Administrative Record File and Information Repository Locations and Contacts.
- MCAS El Toro RAB – Membership Application.
- MCAS El Toro RAB – Membership Roster
- MCAS El Toro RAB – Mailing List Coupon.
- MCAS El Toro RAB – Environmental Websites
- Reuse – Redevelopment Information.
- One-Page Glossary of Technical Terms.
- Former MCAS El Toro- IRP Sites 18 and 24 (Timelines 1985-1999 and 2000-2006), Activities Pertaining to Soil and Groundwater Investigations and Cleanup.
- Buildings/Structures/Facilities Within Leasable Parcels Finding of Suitability to Lease, Former MCAS El Toro, August 2005.
- Environmental Condition of Property (with Carve-Out Boundaries), Former MCAS El Toro, August 2005.
- Department of Defense – Responsibility for Additional Environmental Cleanup after Transfer of Real Property, July 1997.
- Department of Defense – A Guide to Establishing Institutional Controls at Closing Military Installations, February 1998.
- Department of the Navy – Policy for Conducting Comprehensive environmental Response, Compensation, and Liability Act (CERCLA) Statutory Five-Year Reviews, November 2001.
- Department of the Navy – Policy for Optimizing Remedial and Removal Actions under the Environmental Restoration Programs, April 2004.
- Department of Defense – Perchlorate Work Group Packet, January 2006.
- Department of Defense – Institutional Controls, Spring 1997.
- U.S. EPA Fact Sheet – A Citizen’s Guide to Natural Attenuation, October 1996.
- U.S. EPA Fact Sheet – Perchlorate Update, March 2002.
- U.S. EPA Fact Sheet – Superfund Sites: Five-Year Review, June 2001.
- MCAS El Toro RAB Inquiry – Environmental Data Quality, September 2003.
- Commonly Asked Questions Regarding The Use of Natural Attenuation for Chlorinated Solvent Spills at Federal Facilities.
- IRP *Presentation* – IRP Site 1, Explosives Ordnance Disposal (EOD) Training Range, Feasibility Study Update, Presented by Jim Callian, Navy BRAC Project Manager and Hsien Chen and Chris Cavers, Earth Tech, March 28, 2007 RAB meeting.

* Mailed to all RAB meeting mailer recipients on 3/21/07.

Agency Comments and Letters - U.S. Environmental Protection Agency (U.S. EPA)

- No Items Submitted

Agency Comments and Letters – California Environmental Protection Agency (Cal-EPA)

- No Items Submitted

Department of Toxic Substances Control (DTSC)

- No Items Submitted

California Regional Water Quality Control Board (RWQCB), Santa Ana Region

- No Items Submitted

**Former MCAS El Toro
Restoration Advisory Board**

*Irvine City Hall
One Civic Center Plaza, Irvine*

**March 28, 2007
6:30 – 8:45 p.m.
86th RAB Meeting
Conference and Training Center**

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**RAB Subcommittee Meeting
5:00-6:00 p.m., Room L-104**

AGENDA

RAB members that are unable to attend please call either Darren Newton, Marine Corps/Navy RAB Co-Chair at (949) 726-5398 or (619) 532-0963 -or- Bob Woodings, RAB Community Co-Chair at (949) 461-3481.

Question and Answer (Q&A) Ground Rules

- **Q&A follows individual presentations; time designated for presentations includes Q&A time.**
- **"Open Q&A" session (environmental topics) is at the end of the New Business segment.**
- **After adjournment, Marine Corps/Navy representatives are available to answer more questions.**

Welcome/Introductions/Agenda Review/Pledge (6:30-6:45)

Darren Newton
Navy RAB Co-Chair

Old Business (6:45-7:25)

Approval of 1/31/07 Meeting Minutes (6:45-6:50)

Bob Woodings
RAB Community Co-Chair

Announcements/Review of Action Items (6:50-7:10)

Darren Newton & Bob Woodings

- Irvine Desalter Project/Groundwater Cleanup Sites 18 and 24

Subcommittee Meeting Report (7:10-7:25)

Marcia Rudolph
RAB Subcommittee Chair

New Business (7:25-8:30)

Regulatory Agency Comment Update (7:25-7:40)
*Federal and State Regulatory Oversight of Environmental
Restoration and Cleanup at Former MCAS El Toro*

Federal Rep
Richard Muza
U.S. EPA

State Rep
Quang Than
Cal/EPA
DTSC

State Rep
John
Broderick
Cal/EPA
RWQCB

- ◆ Presentation – IRP Site 1, Explosives Ordnance Disposal (EOD) Training Range, Feasibility Study Update (7:40-8:20)

James Callian
Navy RPM

Open Q&A (Environmental Topics) (8:20-8:30)

Darren Newton

Meeting Summary & Closing (8:30-8:45)

Darren Newton & Bob Woodings

Meeting Evaluation & Topic Suggestions for Future Meetings

PUBLIC NOTICE

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

Restoration Advisory Board Meeting

Restoration Advisory Board (RAB) meetings provide community members and the general public a first-hand opportunity to learn more about the environmental cleanup of former MCAS El Toro. Project managers from the Navy and the regulatory agencies make presentations and are available to answer your questions. Since 1994, concerned citizens and government representatives have been regularly meeting to discuss the environmental cleanup program. Your input is encouraged and appreciated.

86th Meeting

Wednesday, March 28, 2007 – 6:30-8:45 p.m.

**Irvine City Hall, Conference and Training Center
One Civic Center Plaza, Irvine**

This meeting will feature the following presentation specific to Former MCAS El Toro:

- Installation Restoration Program Site 1, Explosives Ordnance Disposal (EOD) Training Range, Feasibility Study Update**

**For more information about Environmental Programs at Former MCAS El Toro, please contact:
Base Realignment and Closure, Mr. Darren Newton, BRAC Environmental Coordinator,
7040 Trabuco Road, Irvine, CA 92618 – (949) 726-5398 or (619) 532-0963**

FORMER MARINE CORPS AIR STATION EL TORO

RESTORATION ADVISORY BOARD MEETING

January 31, 2007

MEETING MINUTES

The 85th Restoration Advisory Board (RAB) meeting for Marine Corps Air Station (MCAS) El Toro was held Wednesday, January 31, 2007 at Irvine City Hall. The meeting began at 7:31 p.m. These minutes summarize the RAB meeting discussions and presentations.

WELCOME, INTRODUCTIONS, AGENDA REVIEW

Mr. Darren Newton, Base Realignment and Closure (BRAC) Environmental Coordinator (BEC) for Former MCAS El Toro and Navy RAB Co-Chair, welcomed everyone to the meeting and said a variety of handout materials pertaining to Former MCAS El Toro are available on the information table. He reviewed the RAB meeting agenda and the key topics for this RAB meeting are: the Community Co-Chair elections, the decision of potentially switching to quarterly RAB meetings, a brief discussion on the Navy's position regarding runway demolition, and the State of the Station presentation. Mr. Newton asked Ms. Marcia Rudolph, RAB Subcommittee Chair to lead the Pledge of Allegiance.

Announcements

Mr. Newton asked for self-introduction of attendees. He acknowledged that Mr. Ted Rigoni, from the County of Orange, Public Works, Road and Traffic Engineering, and representative for the Alton Parkway Extension project, was present. Mr. Newton said that Mr. Rigoni had brought some information regarding the Alton Parkway Extension project and noted that handouts would not be placed on the Navy's regular information table due to a conflict with the mission statement of the MCAS El Toro RAB; interested persons were directed to Mr. Rigoni.

Mr. Brian Fisk and Mr. Tim Gerich, from the City of Irvine, were introduced to the RAB meeting attendees. Mr. Louie Cardinelli was welcomed as a new Navy Remedial Project Manager (RPM). Mr. Tim Chauvel, Public Participation Specialist, Department of Toxic Substances Control (DTSC), and Ms. Viola Cooper, Community Involvement Coordinator, U.S. Environmental Protection Agency (U.S. EPA), were also introduced to RAB members and welcomed to the meeting.

Mr. Newton said if RAB members cannot attend RAB meetings to please contact him or Mr. Bob Woodings, RAB Community Co-Chair. It is important for RAB members to inform either of the co-chairs if they will be absent. There were no excused absences.

Mr. Newton reviewed the handouts available on the information table, including the contact information of the BRAC Cleanup Team.

Mr. Newton read an excerpt from the RAB Mission Statement as a reminder of the RAB's mission:

"The mission of the RAB is to promote community awareness and obtain timely constructive community review and comment on proposed environmental restoration actions to accelerate the cleanup and property transfer of MCAS El Toro. The RAB serves as a forum for the presentation of comments and recommendations to U.S. Marine Corps (Navy) and Remedial Project Managers (RPMs) of the U.S. Environmental Protection Agency (U.S. EPA), and the Department of Toxic Substances Control (DTSC)."

Mr. Newton requested that anyone, who has questions regarding reuse and redevelopment issues, to contact the representatives provided on the Reuse-Redevelopment handout on the information table. He also suggested contacting Mr. Rigoni regarding the Alton Parkway Extension and Mr. Jim Werkmeister, Lennar Corporation, for information on redevelopment underway at the former station.

Mr. Newton mentioned the Navy had received a plaque detailing the proclamation of the Board of Directors from the Orange County Water District (OCWD) and Irvine Ranch Water District (IRWD) at the January 25, 2007 El Toro Groundwater Remedy Ceremony for IRP Sites 18 and 24 recognizing the Navy for an outstanding job in it's effort to preserve the region's watershed. He showed the RAB a picture of the plaque and read a portion of the proclamation.

"Whereas, from 1994-2001, IRWD, OCWD, and the Department of the Navy and the Department of Justice in the spirit of cooperation developed and designed a project to remove the pollution, and

Whereas, in January 2007, the Navy's Shallow Groundwater Unit was completed and activated to protect Orange County's valuable groundwater resources, and

Whereas, the political, business, environmental, health, and community and water leaders in Orange County are visionaries and are to be commended for the leadership, foresight and responsible water management for the 21st century.

Now, the Irvine Ranch Water District and the Orange County Water District Boards of Directors commend the Department of the Navy for environmental stewardship upon completion of the Shallow Groundwater Unit."

Mr. Newton noted that Mr. Bob Coleman, Ms. Oriana Camacho, and Ms. Katherine Lowry, all of Brown and Caldwell, the Navy's Community Relations Support Contractor, were a tremendous aid to the overall success of the El Toro Groundwater Remedy Ceremony.

Ms. Mary Aileen Matheis, RAB member representing IRWD, mentioned that IRWD is also holding an Irvine Desalter Project Dedication Ceremony on February 20, 2007 at 10 a.m. It is open to RAB members and all interested community members. She said Congressman John Campbell was scheduled to attend.

Mr. Newton reminded RAB members that the next MCAS El Toro RAB meeting is scheduled for March 28, 2007.

OLD BUSINESS

Review and Approval of the November 29, 2006 RAB Meeting Minutes

Mr. Newton asked if anyone had any changes or input to the November 29, 2006, RAB meeting minutes. No objections or input was noted. The meeting minutes were approved without amendment.

Annual Community Co-Chair Elections

Mr. Newton reviewed the RAB Community Co-Chair responsibilities. He asked if anyone would like to volunteer themselves as a candidate for the Community Co-Chair position for the next year. Mr. Woodings stated he would like to continue on in this role. Ms. Matheis seconded the motion presented by Mr. Woodings. No one opposed the motion; therefore, Mr. Woodings was re-elected as the RAB Community Co-Chair.

Vote for Retaining or Revising the RAB Meeting Schedule (bimonthly or quarterly)

Mr. Newton discussed the possibility of changing the current bimonthly RAB meeting schedule to quarterly. On the current bimonthly schedule for the 2007 RAB meetings are: March 28th, May 31st, July 25th, September 26th, and November 28th. If the RAB meetings were to switch to a quarterly schedule, the meetings would in January, April, and July, and October. Mr. Newton stated that, in general, there were four main Installation Restoration Program (IRP) decision documents, called a

Record of Decision (ROD), remaining. Review of RI/FS reports that lead up to the RODs is a key purpose of the RAB. Ms. Rudolph asked Mr. Newton what the remaining decision documents were and for the schedule for these documents. Mr. Newton replied that the main ROD documents are for IRP Site 1, IRP Sites 2 and 17 landfills (Final ROD), for IRP Sites 3 and 5 landfills, and for Anomaly Area 3. After the remedial design is complete for each of the four decision documents, the Navy will move on to remedial action. Mr. Newton then posed the formal question to the RAB members of whether they wanted to remain bimonthly or switch to a quarterly schedule.

Ms. Rudolph stated that prior to tonight's meeting, she had discussed with Mr. Rich Muza, Project Manager, U.S. EPA, about the possibility of an IRP Site 2 presentation during the RAB meeting scheduled for May 31, 2007. Mr. Muza noted that the IRP Site 2 groundwater portion has not yet been approved.

RAB members discussed possible options. Peter Hersh, RAB member, suggested that the RAB stay on a bimonthly schedule, however a meeting could be cancelled if need be if key topics will not be covered. Mr. Newton suggested that the MCAS El Toro RAB meet in March, May, September, and November or December, depending on the Thanksgiving holiday. Mr. Chris Crompton, RAB member, reminded RAB members of past discussions regarding the summer (July) RAB meetings. He suggested that the RAB maintain the bimonthly schedule, but allow RAB members a reprieve during the month of July, and that this would prevent a scheduling conflict with plans for presentations at future MCAS El Toro RAB meetings. The RAB members concurred with the suggestion for five meetings per year with the July reprieve and the new schedule was approved effective immediately.

MCAS El Toro RAB Subcommittee Meeting Report

Mr. Newton said that prior to Ms. Rudolph's report on the activities of the RAB Subcommittee he would like to address questions raised at previous RAB meetings by the RAB Subcommittee. First, he discussed the Alton Parkway Extension. Second, he addressed concerns raised regarding sampling under the runways.

Alton Parkway Extension

Mr. Newton referred to a RAB Subcommittee Meeting Report covered on page 3 of the November 29, 2006 RAB meeting minutes pertaining to the Alton Parkway Extension. To help answer Ms. Rudolph's previous questions, Mr. Ted Rigoni, County of Orange, representative for the Alton Parkway Extension project, was asked to participate in tonight's RAB meeting. Mr. Newton emphasized that a Notice of Availability for the Alton Parkway Extension Draft Environmental Impact Report (EIR) was available and to ask Mr. Rigoni for the details. Mr. Newton showed on an overhead the location of Alton Parkway project and stated that the reason that the Navy was involved with this project is because the proposed roadway extension will be situated on part of the Navy Carve-out associated with IRP Site 2 landfill. Mr. Newton added that Mr. Rigoni would be available to answer any questions pertaining to this roadway extension after the RAB meeting.

A question was raised regarding the time schedule for the Alton Parkway construction. Mr. Rigoni responded that optimally construction would begin in late 2008 or the beginning of 2009 and further details would be provided at a later date. In addition, he stated that his contact information was listed on the Notice of Availability handout if anyone had any further questions. Mr. Newton asked the RAB to speak with Mr. Rigoni regarding the Alton Parkway Extension project after the RAB because redevelopment of the property is in conflict with the mission statement of the El Toro RAB.

The public comment period on Alton Parkway Extension Draft EIR ends February 5, 2007. Ms. Rudolph questioned whether the Navy was going to officially respond to the Draft EIR. Mr. Newton

replied that the Navy is currently completing their comments on the Draft EIR. He added that copies of the Navy comments will be available at the next RAB meeting.

Sampling Under the Runways

Mr. Newton discussed a previous RAB Subcommittee question raised regarding the Navy's position on sampling under the runways at Former MCAS El Toro. He used a map of the former station to show what property is still currently retained by the Navy and property that has been transferred.

He stated that the Navy's position is that the runway areas have been adequately evaluated and no additional investigation is required. The basis for this assertion is based on known prior land use, construction records, and results of environmental investigations. Three environmental investigations that have been previously conducted are the 1993 Resource Conservation and Recovery Act (RCRA), the 1995 Environmental Baseline Survey (EBS), and a 2003 EBS. Conclusions from these environmental investigations are that soil contamination was not present beneath the runways as a result of construction practices.

There is no information supporting the use of oil during construction of the runway foundations. The runways were built shortly after the U.S. Government acquired the property in 1942. Land use prior to purchase by the U.S. Government was agricultural. There is documentation that oil was used on the shoulders of the runways for dust suppression and vegetation control, and these areas have been investigated as Potential Release Location (PRL) Runway Infield Area (RIA). The Navy did not document the presence of oil beneath the concrete in any of the trenches or boreholes during the construction activities for remediation at IRP Sites 18 and 24.

Additionally, the Navy has received regulatory concurrence on uncontaminated property identified and it has been documented in the 1995 EBS and the 2003 EBS. Mr. Newton emphasized that if the new property owner did find something, the Comeback Policy has provisions within it that ensure that the Navy would address areas that are identified with soil contamination as a result of prior Navy (Marine Corps) activities.

Mr. Newton asked Mr. Fisk and Mr. Gerich, both with the City of Irvine, to come forward. Mr. Fisk introduced himself as the Manager of Planning and Redevelopment for the City of Irvine and Mr. Gerich as the Principal Planner and Redeveloper for the City of Irvine. Mr. Fisk explained that there are three sections in the Planning and Redevelopment Department: the Interview Division, the Housing Division, and the Planning and Managing Division that support planning and entitlement for Lennar and Great Park projects.

Mr. Fisk stated that his role is that of leading the regulatory agency for the City and processing the City projects through the City Council for entitlement approval. Specifically, his division oversees all California Environmental Quality Act (CEQA) mitigation measures for the Great Park project that have been placed as a result of the 2003 EBS. Mr. Fisk stated that if a developer found hazardous materials during construction, specific protocol measures are currently in place to outline cleanup requirements. Prior to approval of sub grading permits, the applicant is subject to submit documentation or analysis proving that there are no levels of residual soil contamination. These safeguards ensure thoroughness of the mitigation monitoring process.

Mr. Newton emphasized to the RAB members, that there are provisions in place to ensure that if something is found on the transferred property, the Navy will be notified immediately.

Ms. Rudolph's RAB Subcommittee Report

- Ms. Rudolph reported during the RAB Subcommittee report how pleased she was with the MCAS El Toro Groundwater Remedy Ceremony for IRP Sites 18 and 24 that had taken place on January 25, 2007. The Irvine Desalter Project has always been a key concern for the RAB and it is a big relief that the cleanup of groundwater is underway. She said that citizen support helped the process and it would have taken longer without citizen involvement. She added that it would have been nice to have had Bob Woodings there to say a few words about the RAB at the ceremony.

- She mentioned a Draft Final Supplemental EBS Report for the on-station portion of the Defense Fuel Pipeline, a fuel supply line that ran from Norwalk to El Toro. The report stresses the point that portions of the fuel line have been closed or removed. Ms. Rudolph requested an update on the fuel pipeline during the next meeting.
- Additionally, she requested more information on IRP Site 1 and the perchlorate plume.
- She said the El Toro Reuse Planning Authority has officially closed due to successful environmental justice campaigns, and the remaining funds will be distributed as needed. Ms. Jean Pasco, Head of Archives for Orange County, was mentioned as a possible candidate for establishing an El Toro RAB archive centered on all RAB meeting minutes and agendas. This recommendation was made in the hopes that more citizens can become knowledgeable of past and present RAB accomplishments.

NEW BUSINESS

◆ Regulatory Agency Comment Update

Mr. Rich Muza, U.S. EPA and Mr. John Broderick, Cal/EPA Regional Water Quality Control Board, were present and both expressed they had no prepared statements for tonight's meeting.

Mr. Quang Than, Project Manager, DTSC, stated that he was excited to come on board for this project and in participating with the RAB. He added that he is looking forward to becoming familiar on all RAB agenda topics.

◆ Presentation – Former MCAS El Toro State of the Station Environmental Program, Annual Status Update, presented by Mr. Darren Newton, Navy BRAC Environmental Coordinator and RAB Co-Chair

Mr. Newton started by briefly reviewing the "vision" and "mission" statements for Former MCAS El Toro. The "vision" is to expedite the restoration and reuse of Former MCAS El Toro. The "mission" is fast-track remediation to promote reuse and protect human health and the environment by working cooperatively with the regulatory agencies, the community, and the stakeholders. Mr. Newton reminded RAB members that bolded items on the presentation handout represented new information, while un-bolded items cover information previously provided to the RAB.

Mr. Newton introduced the various program activities. Four key categories are: funding; projects that are stationwide; Installation Restoration Projects that are site-specific; and promotion of reuse for property transfer.

- Funding
- Projects (Stationwide)
 - Groundwater Monitoring
 - Radiological Reports
 - Potential Release Locations (PRLs)
 - Compliance Program
- Installation Restoration (IR) Projects (Site-specific)
 - Landfills
 - Shallow Soils
 - Groundwater
- Promote Reuse (Property Transfer)
 - Finding of Suitability to Transfer (FOST)
 - Finding of Suitability to Lease (FOSL)

- Redevelopment within Carve-outs, Environmental Requirements
- Reuse Forum, quarterly meetings with developers and contractors

Funding

From 1985 to 2006, the Navy has funded/obligated approximately \$200.8 million dollars for Former MCAS El Toro. Of this total sum, approximately \$184.4 million dollars covered the IR Program and approximately \$52.4 million dollars has gone towards the Compliance Program. The Navy's current budget for fiscal year (FY) 2007 is approximately \$23 million dollars. The estimated cost to complete from 2007 to 2036 is approximately \$72 million dollars. The Navy anticipates that all the remedies will be in place by 2010.

Projects - Groundwater Monitoring

The Navy has revised their Groundwater Monitoring Program from base-wide monitoring to a program that supplements site-specific monitoring requirements. Subsequently, a Revised Groundwater Monitoring Work Plan is currently in preparation. The Round 23 Groundwater Monitoring Report was issued for review in September 2006. The Round 24 Groundwater Monitoring was completed in November 2006 and the monitoring report is scheduled to be issued shortly. Indoor-air risk assessment verification modeling was performed at the highest volatile organic compound (VOC) groundwater sites; subsequently, the Navy determined that indoor air intrusion from VOCs is not an issue at Former MCAS El Toro.

Ms. Content Arnold, Navy Lead Remedial Project Manager (RPM) stated that the Navy plans to issue the Round 24 Groundwater Monitoring Report along with the Annual Groundwater Monitoring Report in the next two months. A suggestion was made to present the report as a topic at the March 28, 2007 RAB meeting if the document is complete.

Global Projects - Radiological

In 2000, a Historical Radiological Assessment (HRA) was completed. Conclusions from the HRA revealed that only limited areas required additional surveys and assessments. In October 2006, the Navy received U.S. EPA concurrence on the Miscellaneous Building Release Report. The Navy is currently awaiting state regulatory agency concurrence on a series of buildings pending a confirmation survey, anticipated to be completed in February 2007. Mr. Jim Callian, Navy RPM, was recently on-site surveying the remaining buildings to finalize the Miscellaneous Building Release Report.

Mini Release Report #2 was finalized in August 2006. Mr. Callian clarified that a mini release reports could potentially include testing and conclusions on one to four sites. Mini Release Report #3 covered IRP Sites 3 and 5 and Anomaly Area 3 and was finalized in December of 2006. Mini Release Report #4 includes IRP Site 1 and outdoor sites and is scheduled to be finalized in February 2007.

Pertinent radiological issues that have been raised include the Navy refining the use of the 1 pico-Curie per gram (pCi/g) above background as the target cleanup goal for Radium-226 where applicable at Former MCAS El Toro. Resolution of radiological issues was incorporated into Feasibility Study Reports for IRP Sites 8 and 12, IRP Sites 3 and 5, and IRP Sites 2 and 17. All work is being coordinated with the Navy's Radiological Affairs Support Office, in addition to the U.S. EPA, DTSC, and California Department of Health Services.

Projects - Potential Release Locations (PRLs) and Compliance Program

The Navy began with 76 PRLs that were subsequently grouped into four groups – I, II, III, and IV. Group IV has been further divided into four subcategories (A, B, C, and D). Groups I and II were previously completed. Ten of the Group III PRLs received regulatory concurrence for No Further Investigation (NFI) in November 2006. Four remaining PRLs from Group III were moved into Group IV-C. The schedules for the remaining PRLs requiring evaluation are currently being determined. Presently, there 34 remaining PRLs: 6 PRLs in Group IV-A; 14 PRLs for Group IV-B; and 14 PRLs for Group IV-C.

Mr. Newton discussed the Compliance Program and work-in-progress. He explained the categories of Compliance Program sites and listed the number of such sites that are being worked on or are awaiting formal closure documentation:

- Underground Storage Tank (UST) – 33 remaining
- Aboveground Storage Tank (AST) – 3 remaining
- Oil Water Separator (OWS) – 1 remaining
- Aerial Photographic Features/Anomalies (APHO) – 11 remaining
- Solid Waste Management Unit/Temporary Accumulation Area (SWMU/TAA) – 15 remaining.

Mr. Jim Werkmeister, Lennar, asked what the timeframe was for completing the PRLs. Mr. Newton replied that the PRLs are currently under the Compliance Program. He further detailed that no site characterization schedule has been developed as yet, but that the Navy anticipates completing the PRL program within one year. PRLs are identified through the EBS process that involves thorough investigation of the former base.

Mr. Newton briefly reviewed the Comeback Policy under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). He stated that the handout available on the information table titled, "Responsibility for Additional Environmental Cleanup after the Transfer of Real Property" detailed the circumstances under which the Navy would perform additional cleanup on property that is transferred by deed to any person or entity outside the government.

Installation Restoration Program Projects

IRP Sites 3 and 5, Original and Perimeter Road Landfills and Anomaly Area 3

Mr. Newton reminded the RAB members that just prior to tonight's RAB meeting, a public meeting was held to present the Proposed Plan for IRP Sites 3 and 5. The Proposed Plan presented the Navy's preferred remedy for capping these landfill sites. The capping remedy includes a flexible membrane liner, with long-term monitoring, and institutional controls. The Navy anticipates that the Draft ROD will be completed in March 2007. Efforts initiated for the Remedial Design/Remedial Action (RD/RA), including long-term monitoring and institutional controls will continue.

The Draft Anomaly Area 3 Remedial Investigation/Feasibility Study (RI/FS) Report was issued for regulatory agency review in December 2005. A supplemental groundwater sampling and analysis plan (SAP) was finalized in January 2007. The Navy is scheduled to revise the RI/FS in August 2007 based on groundwater sampling results and resubmit it to the regulatory agencies.

IRP Sites 2 and 17, Magazine Road & Communication Station Landfills

A Final Interim ROD for landfill covers at IRP Sites 2 and 17 and NFA for groundwater at IRP Site 17 was completed in 2000. The landfill property has been transferred from the Navy via federal-agency-to-federal agency (fed-to-fed) transfer to the Federal Aviation Administration (FAA). There is a 1,000-foot buffer zone that extends into Parcel II. From December 2005 to the present, remedial action construction at IRP Site 2 has included: waste consolidation from areas C1, C2, and D into the bifurcation unit; installation of two new monitoring wells in C2; and placement of the landfill 4-foot thick engineered evapotranspirative (ET) cap onto the landfill.

The next step for Site 2 is completion of the ET cover soil placement scheduled for February 2007. Optimally, the Navy anticipates all necessary top soil will be imported and put in place and final drainage components will be completed by March or April 2007. This process includes revegetation of the landfill cover using containerized plants and hydro seed and completion of the irrigation system. The first year of maintenance for the landfill cap and revegetation is planned from April 2007 to April 2008. The Navy plans to begin construction of landfill cover for IRP Site 17 in fall 2007.

IRP Site 1, Explosive Ordnance Disposal (EOD) Training Range

Mr. Newton emphasized that IRP Site 1 is not associated with public sale. The Navy had a productive year in 2006 at IRP Site 1. The ephemeral pond repair was completed in February 2006. The Final Treatability Study and Aquifer Test for perchlorate impacted groundwater were completed in November 2006. The Final RI was issued in December 2006.

The Navy is scheduled to complete the Draft FS in January 2007, the Draft Proposed Plan in June 2007, and the Draft ROD in November 2007. The conveyance strategy for the site includes a fed-to-fed transfer to the FAA; whereby the FAA would enter into a memorandum of understanding with the Federal Bureau of Investigation for "like use."

IRP Sites 8 and 12, Defense Reutilization and Marketing Office Storage Area and Sludge Drying Beds

The Navy completed a Draft ROD in 1999 for IRP Sites 8 and 12. Regulatory agency concurrence for radiological release for portions of IRP Sites 8 and 12 was received in January 2005. Subsequently, the Proposed Plan was issued to the public in March 2006 and the Proposed Plan public meeting was held on March 29, 2006. The ROD was finalized on January 25, 2007. The next steps for these sites include implementing the RD/RA phase. The RA work plan is scheduled for completion in June 2007 and with the implementation of the remedy commencing in December 2007. The Navy anticipates that site closeout will occur in 2008.

IRP Site 11, Transformer Storage Area

IRP Site 11 is officially closed. The Final Closeout Report was issued in March 2006 and all activities were completed in April 2006. Therefore, the Navy is removing this site from the environmental program. Mr. Newton pointed out that at last year's State of the Station, the Navy had 11 IRP sites remaining but today there are 10.

IRP Site 16, Crash Crew Pit No. 2

The Navy completed a new well installation for sampling at IRP Site 16 in November 2006. The Navy issued a Draft Final Operating Properly and Successfully (OPS) Report on January 9, 2007. The OPS Report ensures that the property becomes suitable for transfer. The status of Petroleum Corrective Action portion at the site included the January 2007 completion of soil vapor extraction (SVE) remediation of petroleum contamination. Additionally in January 2007, the Navy completed rebound tests where the system is shut down for 24 days and turned back on. This test is conducted to determine if contamination "rebounds" to past concentrations. Tests results indicated rebound is not occurring. The Navy plans to issue the Draft Site Closeout Report in March 2007.

IRP Site 18: VOC-Contaminated Groundwater (off-station)

Mr. Newton mentioned how much he appreciated all of the RAB member's supportive comments regarding the El Toro Groundwater Remedy Ceremony. The Navy issued the Final ROD in 2002. The Final Remedial Design (100 percent) for construction of extraction wells and Principal Aquifer treatment system was finished in January 2006. Construction of extraction wells ET-1, ET-2, IRWD-78, and the Principal Aquifer treatment system were completed in the spring 2006. The Final Explanation of Significant Differences was finalized in February 2006. At that time, the Navy issued a remedial action fact sheet providing details on the construction and operation of the system. Construction and operational start-up began in October 2006. The Draft Operation and Maintenance (O&M) manual for the Principal Aquifer treatment system was issued on January 12, 2007.

Mr. Don Zweifel, RAB member, stated that the RAB members had always been concerned that toxic chemicals at the site would eventually trickle down to the Principal Aquifer. He said that evidently the Navy is indicating that the Principal Aquifer is contaminated or else there would be no treatment system in place. Mr. Newton confirmed that Mr. Zweifel's statement was correct. Using a map he showed the location of the groundwater plume within the shallow groundwater and the Principal

Aquifer that runs east to west. The source area of trichloroethene (TCE) is on-station at Buildings 296 and 297. From this point, TCE migrated from the soil into the groundwater to approximately 150 feet below the ground surface. The groundwater flows from west to east migrating off-station into the Principal Aquifer at a depth ranging from 300 to 1,000 feet. This off-station portion of the TCE plume is known as IRP Site 18. Three wells, ET-1, ET-2, and Well 78, extract groundwater from the Principal Aquifer and vary in depth up to 1,000 feet deep pumping up to 2,900 gallons of groundwater per minute.

The next step for IRP Site 18 is completion and issuance of the Final O&M Manual scheduled for July 2007. Completion of the OPS Report is planned for summer 2007 while long-term monitoring will commence in fall 2007.

IRP Site 24, VOC Source Area (On-Station)

The on-station portion of the TCE plume is IRP Site 24. In January 2006, a Draft Final No Further Action (NFA) ROD for soil at IRP Site 24 was issued. The Navy constructed 35 Shallow Groundwater Unit (SGU) extraction wells associated with 2 miles of conveyance piping on-station in spring and summer of 2006. The SGU treatment system construction and operational start-up was in sequence with the off-station portion. Mr. Newton showed where the on-station portion of the groundwater cleanup system is located, including the holding tanks that contain up to 5,400 gallons each. This well network includes 35 wells that extract the groundwater for transfer into the holding tanks and then to the air stripper for treatment to remove TCE. Currently, all 35 wells work together pumping up to 390 gallons per minute. In October 2006, the Navy conducted a shakedown period to ensure that all systems were operational.

The Navy finalized the Draft Performance Monitoring and Sampling and Analysis Plan (SAP) in September 2006. The Draft O&M Manual for the SGU treatment system was issued for regulatory agency review in January 2007. In addition, work is being completed on the Draft O&M Manual for the SGU well field and conveyance system. The next step is the Final O&M Manual in July 2007. The Navy's current schedule calls for the completion of OPS Report during summer 2007, thereby making it environmentally suitable for transfer in September 2007. The next step would be the FOST and long-term monitoring in fall 2007.

Environmental Program Summary

Mr. Newton presented a table summarizing the environmental program stating that approximately 86 percent of the 1,034 Locations of Concern comprising the overall program has been completed at El Toro. Originally, there were 409 USTs that required further action. The Navy has completed 376 of these which equates to 92 percent close out for USTs. He said the IRP Sites are considered the "big ticket" items since the Navy has only ten remaining sites to complete work on. Remedy in place (RIP) for the IRP Sites is anticipated for November 2010. The table includes: USTs; aboveground storage tanks (ASTs); oil/water separators (OWSs); aerial photo anomalies (APHOs); solid waste management units/temporary accumulation areas (SWMU/TAAAs); miscellaneous sites; PCB transformer sites; and IRP sites.

Environmental Program Summary - Locations of Concern Status

Status	USTs	ASTs	OWSs	APHOs	SWMU TAAs	MSC	PCB XFRMRs	IRP SITES
TOTAL (1034)	409	39	56	124	167	100	124	25
NFA/NFI* (923)	376	36	55	112	140	65	124	15
Complete (86%)	92%	92%	98%	90%	89%	65%	100%	60%
Closeouts in Agency Review (3)	0	0	0	1	2	0	0	0
In Progress (108)	33	3	1	11	15	35	0	10
Anticipated NFA Date	Mar 2009	Sep 2007	Oct 2007	Sep 2008	Dec 2008	Sep 2008	NFA	Nov 2010

*NFA/NFI – No Further Action/No Further Investigation

Transfer and Reuse

To promote reuse for property transfer, the Navy transferred 2,800 acres under FOST 1 in July 2004 and FOST 2 in December 2005. Mr. Newton explained that a FOST is when the Navy retained property is separated out into carve-out areas. Currently, there are 41 carve-out areas that are non-transferable and remain under Navy control. The Navy continues to meet with the environmental team and developers quarterly to discuss coordination efforts in environmental cleanup and redevelopment strategies. The next step is the completion of FOST 3, scheduled for April 2007.

Mr. Zweifel asked for a further explanation of FOST 3. Mr. Newton responded that FOST 3 is the Defense Fuel Pipeline including a portion that ran across Irvine Boulevard. Lennar has since removed the pipeline and the Navy has augmented the EBS for the pipeline. Further details will be provided at the next RAB meeting when the Navy discusses current progress on FOST 3. If FOST 3 is viable for completion, then work on FOST 4 will commence.

For redevelopment in the carve-out areas, the FOST portions require prior Navy approval for alteration of the property including infrastructure, removal, construction, demolition, or grading. There is a project review process that requires submittal of a project environmental review form (PERF) for Navy and subsequent regulatory agency review. The new owner submits a project description to the Navy that describes how the work will be accomplished without adverse effects on: the environmental remediation program, human health and safety, and the environment. The Navy Real Estate Team coordinates the review of the PERF with the Navy Environmental Team and the regulators in accordance with the lease in furtherance of conveyance (LIFOC) requirements. The time frames for review and approval depend upon the impacts and the quality and completeness of the submittal.

◆ Open Q&A -- Environmental Topics

Mr. Zweifel inquired what the thickness of the membrane was for IRP Site 2 landfill. Mr. Newton replied that the cover for IRP Site 2 is four-foot soil ET cover and there is no membrane within the cap. Mr. Newton asked if there were any further environmental questions. No questions were raised.

MEETING EVALUATION AND FUTURE TOPICS

Upcoming RAB Meeting and Subcommittee Meeting

The next RAB meeting will be held from 6:30 p.m. to 8:45 p.m., Wednesday, March 28, 2007, at Irvine City Hall, One Civic Center Plaza, Irvine in the Conference and Training Center. The next RAB Subcommittee meeting will also be held on, from 5:00 to 6:00, in Room L-104, at Irvine City Hall.

Mr. Newton suggested that future topics include:

- Defense Fuels Pipeline
- Water Quality
- Round 24 Groundwater Monitoring Report
- Annual Report Groundwater Monitoring Report
- IRP Site 24 Update

Recent RAB Subcommittee Meetings

The most recent RAB Subcommittee meeting was held January 31, 2007, in Room L-104, Irvine City Hall, before the RAB meeting. The RAB Subcommittee meeting report presented in these meeting minutes provides an update on the latest issues expressed.

RAB Meeting Adjournment – January 31, 2007 Meeting

The 85th meeting of the MCAS El Toro Restoration Advisory Board was adjourned at 9:16 p.m.

1/31/07 RAB Meeting Attendance:

<u>TOTAL PEOPLE IN ATTENDANCE</u>	<u>TOTAL PEOPLE ON SIGN-IN SHEET</u>	<u>TOTAL RAB MEMBERS PRESENT</u>	<u>TOTAL RAB AGENCY MEMBERS PRESENT</u>	<u>TOTAL RAB COMMUNITY MEMBERS PRESENT</u>	<u>TOTAL EXCUSED ABSENCES RAB MEMBERS</u>	<u>EXCUSED ABSENCES – AGENCY RAB/ COMMUNITY RAB</u>
35	32	10	4	6	0	0

RAB and Subcommittee Meeting and Public Meeting Dates

RAB Members - The list below indicates which dates are currently reserved for RAB and RAB Subcommittee meetings at Irvine City Hall, Conference and Training Center, Room L-102, and Room L-104, respectively. Please note that dates on this list may also serve as combined RAB/public meetings.

<u>RAB and Subcommittee Meeting Dates (meeting space confirmed)</u>	<u>RAB Meeting Conference and Training Center (CTC) or Room L-102 6:30 – 9:00 p.m.</u>	<u>Subcommittee Meeting Room L-104 5:00 – 6:00 p.m.</u>
Wed - March 28, 2007	CTC	Room L-104
Wed - May 30, 2007	CTC	Room L-104

Materials/Handouts Available at the 1/31/07 RAB Meeting Include:

- *RAB Meeting Agenda/Public Notice – 1/31/07 RAB Meeting – 85th Meeting.
- *Meeting Minutes from the 11/29/06 RAB Meeting – 84th Meeting.
- MCAS El Toro RAB Mission Statement and Operating Procedures.
- MCAS El Toro – Navy Team contact information.
- MCAS El Toro – BRAC Cleanup Team Members and Key Project Representatives and Administrative Record File and Information Repository Locations and Contacts.
- MCAS El Toro RAB – Membership Application.
- MCAS El Toro RAB– Membership Roster.
- MCAS El Toro RAB – Mailing List Coupon.
- MCAS El Toro RAB– Meeting Schedule.
- MCAS El Toro RAB – Environmental Websites.
- Reuse – Redevelopment Information.
- One-Page Glossary of Technical Terms.
- MCAS El Toro Installation Restoration Program Site Location Map.
- Former MCAS El Toro- IRP Sites 18 and 24 (Timelines 1985-1999 and 2000-2006), Activities Pertaining to Soil and Groundwater Investigations and Cleanup.
- Former MCAS El Toro Environmental Condition of Property (with Carve-out Boundaries), August 2005.
- Former MCAS El Toro Buildings/Structures/Facilities within Leasable Parcels Finding of Suitability to Lease, August 2005.
- Department of Defense - Responsibility for Additional Environmental Cleanup after Transfer of Real Property, July 1997.
- Department of Defense - A Guide to Establishing Institutional Controls at Closing Military Installations, February 1998.
- Department of Defense – Institutional Controls, What they are and how they are used, spring 1997.
- Department of the Navy - Policy for Conducting Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Statutory Five- Year Reviews, November 2001.
- Department of the Navy- Policy for Optimizing Remedial and Removal Actions under the Environmental Restoration Programs, April 2004.
- Department of Defense – Perchlorate Work Group Packet, January 26, 2006.
- U.S. EPA Fact Sheet – A Citizen’s Guide to Natural Attenuation, October 1996.
- U.S. EPA Fact Sheet – Perchlorate Update, March 2002.
- U.S. EPA Fact Sheet – Superfund Sites: Five-year Review, June 2001.
- MCAS El Toro RAB Inquiry- Environmental Data Quality, September 2003.
- Commonly Asked Questions Regarding the Use of Natural Attenuation for Chlorinated Solvent Spills at Federal Facilities.
- *Presentation* – Former MCAS El Toro State of the Station, 85th Restoration Advisory Board Meeting, presented by Darren Newton, BRAC Environmental Coordinator, January 31, 2007.

* Mailed to all RAB meeting mailer recipients on 1/24/07.

Agency Comments and Letters - U.S. Environmental Protection Agency (U.S. EPA)

- No Items Submitted.

Agency Comments and Letters – California Environmental Protection Agency (Cal-EPA)

- No Items Submitted.

Department of Toxic Substances Control (DTSC)

- MCAS El Toro Schedule of Work Completed Since 11/29/06.

California Regional Water Quality Control Board (RWQCB), Santa Ana Region

- No Items Submitted.

Copies of all past RAB meeting minutes and handouts are available at the MCAS El Toro Information Repository, located at the Heritage Park Regional Library in Irvine. The address is 14361 Yale Avenue, Irvine; the telephone number is (949) 936-4040. Library hours are Monday through Thursday, 10 a.m. to 9 p.m.; Friday and Saturday, 10 a.m. to 5 p.m.; Sunday 12 p.m. to 5 p.m.

Internet Sites

Navy and Marine Corps Internet Access

BRAC PMO Web Site (includes RAB meeting minutes):

Navy web site: <http://www.bracpmo.navy.mil/>

For El Toro RAB information: http://www.bracpmo.navy.mil/bracbases/california/eltooro/rab_information.aspx

Department of Defense – Environmental Cleanup Home Page Web Site:

<http://www.dtic.mil/envirodod/>

U.S. EPA:

www.epa.gov (this is the homepage)

www.epa.gov/superfund (site for Superfund)

www.epa.gov/ncea (site for National Center for Environmental Assessment)

www.epa.gov/federalregister (site for Federal Register Environmental Documents)

www.epa.gov/fedrgstr/EPA-IMPACT/2004/April/Day-27/i9203.htm (site for Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for the Riverside fairy shrimp)

Cal/EPA:

www.calepa.ca.gov (this is the homepage)

www.dtsc.ca.gov (site for Department of Toxic Substances Control)

www.swrcb.ca.gov/ (site for Santa Ana Regional Water Quality Control Board)

SENSITIVE RECORD

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AND ARE NOT AVAILABLE FOR PUBLIC VIEWING

E-MAIL ADDRESSES OF PRIVATE CITIZENS

FOR ADDITIONAL INFORMATION, CONTACT:

DIANE C. SILVA, RECORDS MANAGER
NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 556-1280
E-MAIL: diane.silva@navy.mil

**MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
January 31, 2007
RAB MEMBER SIGN-IN SHEET**

Name	Signature	Please Provide Your Email
Bell, Richard		
Broderick, John	<i>John Broderick</i>	<i>broderickj@waterboards.ca.gov</i>
Crompton, Chris	<i>Chris Crompton</i>	
Hakim, Sue		
Herndon, Roy		
Hersh, Peter	<i>Peter Hersh</i>	<i>phersh@coycattle.com</i>
Hurley, Greg		
Jung, Dan		
Malloy, Steve		
Marquis, Roland		
Marquis, Suzanne		
Matheis, Mary Aileen	<i>Mary Aileen Matheis</i>	<i>mamatheis1@aol.com</i>
Muza, Rich	<i>Rich Muza</i>	<i>muza.richard@epa.gov</i>
Newton, Darren - Co-Chair	⊗	
Reavis, Gail		
Rudolph, Marcia	<i>MR</i>	
Than, Quang	⊗	
Woodings, Bob - Co-Chair	<i>Bob Woodings</i>	
Zweifel, Donald E.	<i>D. Zweifel</i>	

EAB = Excused Absence

⊗ Attended, did not sign in

**PLEASE
SIGN IN**

**FORMER MCCEL TORO
RAB PUBLIC MEETING- SIGN-IN SHEET**

January 31, 2007

NAME <i>PLEASE PRINT CLEARLY</i>	AFFILIATION <i>(community member/resident, elected official, agency official)</i>	MAILING ADDRESS	PHONE EMAIL FAX	SHOULD WE ADD YOU TO THE MAILING LIST? (yes/no)
<i>Viola Cooper</i>	<i>US EPA</i>	<i>on file</i>		
<i>Ray Ouellet</i>	<i>Mission Viejo Resident</i>	<i>on file</i>		
<i>CRISPIN WANDRICK</i>	<i>EARTH TECH</i>	<i>on file</i>		
<i>Arina Broughton</i>	<i>Haley & Aroney</i>	<i>" "</i>		
<i>Bob Weman</i>	<i>Brown & Caldwell</i>			
<i>Oriana Camacho</i>	<i>Brown & Caldwell</i>			

PLEASE
SIGN IN

FORMER MCAS EL TORO
RAB PUBLIC MEETING- SIGN-IN SHEET
January 31, 2007

NAME <i>PLEASE PRINT CLEARLY</i>	AFFILIATION <i>(community member/resident, elected official, agency official)</i>	MAILING ADDRESS	PHONE EMAIL FAX	SHOULD WE ADD YOU TO THE MAILING LIST? (yes/no)
Marc P. Smits	Navy			
Jim Callian	NAVY		James.callian.dtr@navy.mil	
Jennifer Emberger	NAVY			
Tony Mestlorn	"			
Tim CHAUVEL	DTSC	CYRESS	tchauvel@dtsc.ca.gov	
Richard Pribyl	NAVY		richard.pribyl@navy.mil	

SENSITIVE RECORD

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AND ARE NOT AVAILABLE FOR PUBLIC VIEWING**

PHONE NUMBER OF PRIVATE CITIZEN

FOR ADDITIONAL INFORMATION, CONTACT:

**DIANE C. SILVA, RECORDS MANAGER
NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132**

**TELEPHONE: (619) 556-1280
E-MAIL: diane.silva@navy.mil**

**PLEASE
SIGN IN**

SENSITIVE **FORMER MC EL TORO**
RAB PUBLIC MEETING- SIGN-IN SHEET
January 31, 2007

NAME <i>PLEASE PRINT CLEARLY</i>	AFFILIATION <i>(community member/resident, elected official, agency official)</i>	MAILING ADDRESS	PHONE EMAIL FAX	SHOULD WE ADD YOU TO THE MAILING LIST? (yes/no)
Brian Fisk	City of Irvine		(949) 724-7447	
Tim Gehrid	City of Irvine		(949) 724 7452	
Jim Werkmeister	Lennar			
Jerry Kucharski	Director		949 552 3599	
Dhananjay Rawal	EES		714-251-0295 x201	
JEFF STANEK	EARTH TECH		(949) 330-2002	

MARINE CORPS AIR STATION EL TORO
Installation Restoration Program
Restoration Advisory Board Mission Statement and Operating Procedures

This "Marine Corps Air Station (MCAS) El Toro, Installation Restoration Program, Restoration Advisory Board (RAB), Mission Statement and Operating Procedures," replaces the Revised Version dated January 31, 1996. This revised document contains a new section on the RAB Subcommittee, which replaces the old section. The new section is based on modifications made and approved by a majority vote of the RAB members present at the April 21, 1999 RAB meeting with further refinements made at the May 26, 1999 RAB meeting. Modifications incorporated resulted in revising the subcommittee structure so there is now only one RAB subcommittee. (Note: the original Mission Statement document was dated and signed on February 28, 1995.)

The Restoration Advisory Board (RAB) mission statement and operating procedures, herein referred to as "the mission statement and operating procedures", is entered into by the following parties; U. S. Marine Corps (USMC); U. S. Environmental Protection Agency (USEPA), Region 9; California Department of Toxic Substances Control (DTSC), Region 4; and the RAB. Marine Corps Air Station (MCAS) El Toro has developed a Community Relations Plan (CRP) which outlines the community involvement program. The RAB supplements the community involvement effort. A copy of the CPP is available at the information repository located at the Heritage Park Regional Library, 14361 Yale Avenue, Irvine, CA 92714.

I. Mission Statement of the RAB

a. The mission of the RAB is to promote community awareness and obtain timely constructive community review and comment on proposed environmental restoration actions to accelerate the cleanup and property transfer of MCAS El Toro. The RAB serves as a forum for the presentation of comments and recommendations to USMC, Remedial Project Managers (RPMS) of USEPA, and DTSC.

II. Basis and Authority for this Mission Statement and Operating Procedures

a. This mission statement and these operating procedures are consistent with the Department of Defense (DoD), USEPA Restoration Advisory Board Implementation Guidelines of September 27, 1994, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendment and Reauthorization Act (SARA) of 1986, particularly Sections 120 (a), 120 (f), 121 (f), and 10 U.S.C. 2705, enacted by Section 211 of SARA, and September 9, 1993, DoD policy letter entitled, "Fast Track Cleanup at Closing Installations".

III. Operating Procedures

A. Membership

1. All RAB members must reside in or serve communities within Orange County.
2. Members shall serve without compensation. All expenses incidental to travel and review inputs shall be borne by the respective members or their organization.
3. If a member fails to attend two consecutive meetings without contacting the RAB, or at least one of the RAB co-chairs, or fulfill member responsibilities including involvement in a subcommittee, the RAB co-chairs may ask the member to resign.
4. Members unable to continue to fully participate shall submit their resignation in writing to either of the RAB co-chairs.
5. Total membership in the RAB shall not exceed 50 members.
6. Applications for RAB membership vacancies shall take place as such vacancies occur. Applications will be reviewed and approved by the Base Realignment and Closure (BRAC), Environmental Coordinator (BEC), USEPA, and DTSC along with consultation with the RAB community co-chair. Candidates will be notified of their selection in a timely manner.
7. Each RAB community member is considered equal whatever their position in the community, and has equal rights and responsibilities.

RAB Membership Responsibilities

- a. Actively participate in a subcommittee and review, evaluate, and comment on technical documents and other material related to installation cleanup, all assigned tasks are to be completed within the designated deadline date.
- b. Attend all RAB meetings.
- c. Report to organized groups to which they may belong or represent, and to serve as a mediator for information to and from the community.
- d. Serve in a voluntary capacity.

B. RAB Structure

1. The RAB shall be co-chaired by the MCAS El Toro BEC, and a community co-chair member. The BEC shall preside over the orderly administration of membership business.

2. A community co-chair will be selected by a majority vote of the RAB community members in attendance. Elected officials and government agency staff members of any legally constituted MCAS El Toro reuse groups are excluded from holding the community co-chair position. The community co-chair will be selected annually on the anniversary of the effective date of the agreement.

Community Co-Chair Responsibilities

- a. Assure those community issues and concerns related to the environmental restoration/cleanup program are brought to the table.
 - b. Assist the USMC in assuring that technical information is communicated in understandable terms.
 - c. Coordinate with the BEC to prepare and distribute an agenda prior to each RAB meeting, and for the review and distribution of meeting minutes.
 - d. Assist subcommittees in coordinating and establishing meeting times/locations.
 - e. The community co-chair may be replaced by a majority vote of the RAB community members present at the meeting in which a vote is undertaken.
3. The RAB shall meet quarterly. More frequent meetings may be held if deemed necessary by the RAB co-chairs. The BEC will facilitate in the arrangement of the meetings and notify members of the time and location.
4. Agenda items will be compiled by the RAB co-chairs. Suggested topics should be given to the BEC or community co-chair no later than two (2) weeks prior to the meeting. The BEC shall be responsible for providing written notification to all RAB members of the upcoming agenda and supporting documents, at least two (2) weeks prior to the date, time, and place of scheduled RAB meeting.
5. The BEC shall be responsible for recording and distribution of meeting minutes. Also, the BEC shall collect a written list of attendees at each meeting, which will be incorporated into the meeting minutes. For quarterly meetings, the minutes will be distributed 30 days prior to the following meeting. For more frequent meetings, the minutes will be distributed as soon as possible.
6. A copy of the RAB meeting minutes will be sent to all RAB members. Supporting documents will be available for public review in the information repository and other repositories as identified.

7. RAB members will be asked to review and comment on various environmental restoration documents. Written comments may be submitted individually by a member, or by the RAB as a whole. Written comments will be submitted to the community co-chair on the subject documents within the schedule as provided for regulatory agency comments. The community

co-chair will consolidate comments from RAB members and provide all comments received to the BEC. The BEC will ensure that a written response is provided to the RAB in a timely manner.

RAB Subcommittee

8. On April 21, 1999, the RAB concurred that only one subcommittee is necessary to provide a concentrated focus on environmental cleanup issues. Therefore, the existing relevant subcommittees envisioned in the original "Mission Statement and Operating Procedures" dated February 28, 1995, have been dissolved, and incorporated into one subcommittee.

a. Membership on the subcommittee will be comprised of volunteers from the RAB, or may be selected by the BEC and the community co-chair.

b. The regular bimonthly RAB subcommittee meeting will continue to be scheduled for the last Wednesday of the month alternating with the regular meeting of the full RAB held at Irvine City Hall, Conference and Training Center, Irvine, California.

c. The subcommittee will set their own agendas and meetings and will be open to the public. The subcommittee chair will notify the BEC and community co-chair of all meeting times and places including additional subcommittee meetings other than the regularly scheduled bimonthly subcommittee meeting.

d. The subcommittee will elect a chair. The subcommittee membership may dismiss a subcommittee chair by a majority vote. Subcommittee chair removal is determined at the meeting where removal is addressed by majority vote of the RAB members present.

e. Membership on the subcommittee will include the RAB community co-chair.

f. Subcommittee status will be reviewed annually, in May, to determine if changes are needed or the continued existence is required.

g. The RAB subcommittee may establish ad hoc subcommittees for specific issues and purposes that would focus efforts on a short-term basis.

h. The subcommittee may request the participation, involvement, and advice of regulatory agency members.

9. MCAS El Toro has established an information repository for public documents relating to restoration activities at MCAS El Toro. The repository is located at the Heritage Park Regional Library, 14361 Yale Avenue, Irvine, CA 92714. RAB members, as well as the general public, are authorized access to any documents, studies or information, which have been placed in the repository or distributed at RAB meetings. The community co-chair will be provided one (1) copy of all draft documents. The subcommittee will be provided up to seven (7) copies of draft documents.

IV. Effective Date and Amendments

a. The effective date of this mission statement and operating procedures shall be the date that the last signatory signs this mission statement and operating procedures.

b. This mission statement and operating procedures may be amended by a majority vote of the RAB members present. Amendments must be consistent with the MCAS El Toro Federal Facility Agreement (FFA), and the statues stated in Part 11 of the mission statement and operating procedures, (Basis and Authority for this Mission Statement and Operating Procedures).

V. Terms and Conditions

a. The terms and conditions of this RAB mission statement and operating procedures, and DONs endorsement thereof, shall not be construed to create any legally enforceable rights, claims or remedies against DON or commitments or obligations on the part of DON, and shall be construed in a manner that is consistent with CERCLA, 10 U.S.C. Section 2705, and 40 CFR Part 300.

VI. Termination

a. This mission statement and operating procedures will be terminated upon completion of requirements as stated in the FFA. However, after implementation of the final remedial design, it may be terminated earlier upon a majority vote of the RAB membership.

VII. Signatories to the Membership Mission Statement and Operating Procedures

IN WITNESS WHEREOF, we have set our hand this _____ day of _____ 1995.

MCAS El Toro BRAC Environmental Coordinator

RAB Community Co-Chair

U. S. Environmental Protection Agency RPM

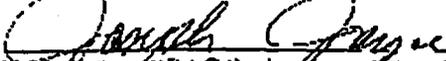
California Department of Toxic Substances Control RPM

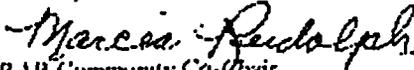
The original "Mission Statement and Operating Procedures", dated February 28, 1995, is on file at Marine Corps Air Station (MCAS) El Toro, Environment and Safety. It was signed by Mr. Joseph Joyce, Base Realignment and Closure (BRAC), Environmental Coordinator (BEC), Ms. Marcia Rudolph, Restoration Advisory Board (RAB), Community Co-chair, Ms. Bonnie Arthur, Environmental Protection Agency (EPA), Remedial Project Manager, and Mr. Juan Jimenez, Department of Toxic Substances Control (DTSC), Remedial Project Manager.

Shown below is an excerpt from the original "Mission Statement and Operating Procedures", dated February 28, 1995 with signatures of the above-mentioned individuals.

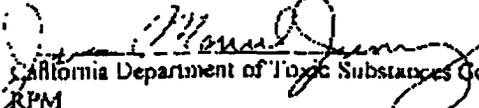
VII. Signatories to the Membership Mission Statement and Operating Procedures

IN WITNESS WHEREOF, we have set our hand this 28th day of FEBRUARY, 1995


MCAS El Toro BRAC Environmental Coordinator


RAB Community Co-Chair


U.S. Environmental Protection Agency RPM


California Department of Toxic Substances Control
RPM

Former MCAS El Toro Marine Corps/Navy Team

- **Darren Newton, *BRAC Environmental Coordinator***
 - **darren.newton@navy.mil**
 - **(619) 532-0963 FAX (619) 532-0940**

- **Content Arnold, *Lead Remedial Project Manager***
 - **(619) 532-0790 FAX (619) 532-0780**

SENSITIVE RECORD

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AND ARE NOT AVAILABLE FOR PUBLIC VIEWING

PHONE NUMBER AND E-MAIL ADDRESS
OF PRIVATE CITIZEN

FOR ADDITIONAL INFORMATION, CONTACT:

DIANE C. SILVA, RECORDS MANAGER
NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 556-1280
E-MAIL: diane.silva@navy.mil

MCAS El Toro Installation Restoration Program

BRAC Cleanup Team (BCT) Members* and Key Project Representatives

Lead Agency

Mr. Darren Newton*
BRAC Environmental Coordinator
Base Realignment and Closure
Environmental Division
MCAS El Toro
7040 Trabuco Road
Irvine, CA 92618
(949) 726-5398 or (619) 532-0963
darren.newton@navy.mil



For More Information

Administrative Record (AR): the collection of reports and documents used in the selection of cleanup or environmental management alternatives. Anyone is welcome to review AR file documents at MCAS El Toro, BRAC Office, Perimeter Road, Building 307. To schedule an appointment call Ms. Marge Flesch at (949) 726-5398, Monday-Thursday, 7:00 a.m. to 3:00 p.m.

Information Repository (IR): copies of reports, documents and other environmental information are available for public review. Call for updated hours.

Heritage Park Regional Library
14361 Yale Avenue, Irvine, CA
(949) 936-4040

Monday-Thursday – 10 am-9 pm
Friday-Saturday – 10 am-5 pm
Sunday – 12 pm-5 pm

Federal Representatives

Mr. Richard Muza*
Project Manager
U.S. EPA Region IX
75 Hawthorne Street (SFD-8-1)
San Francisco, CA 94105
(415) 972-3349
muza.richard@epa.gov

Ms. Viola Cooper
Community Involvement Coordinator
Superfund Division
75 Hawthorne Street (SFD-3)
San Francisco, CA 94105
U.S. EPA, Region IX
(415) 972-3243 or (800) 231-3075
cooper.viola@epa.gov

Restoration Advisory Board Point-of-Contacts

Mr. Bob Woodings
RAB Community Co-Chair
(949) 461-3481
bwoodings@ci.lake-forest.ca.us

Ms. Marcia Rudolph
RAB Subcommittee Chair
(949) 830-9816
Rudolphm@earthlink.net

State Representatives

Mr. Quang Than*
Project Manager, Cal/EPA Dept. of Toxic
Substances Control (DTSC)
5796 Corporate Avenue
Cypress, CA 90630
(714) 484-5352
qthan@dtsc.ca.gov

Mr. John Broderick*
Project Manger, Cal/EPA Regional Water
Quality Control Board (RWQCB)
3737 Main Street, Suite 500
Riverside, CA 92501-3338
(951) 782-4494
jbroderick@waterboards.ca.gov

Mr. Tim Chauvel
Public Participation Specialist, Cal/EPA
Dept. of Toxic Substances Control (DTSC)
5796 Corporate Avenue
Cypress, CA 90630
(714) 484-5487
tchauvel@dtsc.ca.gov



Navy's Base Realignment and Closure Website

<http://www.bracpmo.navy.mil>

(Please note the website address
change as of July 2006)

2. What has been your experience working as a member of a diverse group with common goals?

3. Please indicate if you are interested in being considered for the Community Co-Chairperson position on the RAB by checking the box below:

Yes, I would like to be considered.

4. Are you willing to serve a 2-year term as a member of this RAB?

Yes, I am willing to serve a 2-year term as a member of this RAB.

5. By submitting this signed application, you are aware of the time commitment which this appointment will require for you.

6. By submitting this signed application, you willingly agree to work cooperatively with other members of the committee to ensure efficient use of time for addressing community issues related to environmental restoration of the facility.

PRIVACY ACT STATEMENT: The personal information requested on this form is being collected in order to determine interest in and qualification for membership on the Restoration Advisory Board. The information will be reviewed by a selection panel and will be retained in a file at BRAC Environmental Coordinator's Office at MCAS El Toro. The information will not be disseminated. Providing information on this form is voluntary.

Applicant Signature

Date

Please return your completed application to:

Darren Newton
BRAC Environmental Coordinator
Base Realignment & Closure, Environmental Division
MCAS El Toro
7040 Trabuco Road
Irvine, CA 92618

FAX - (949) 726-6586

SENSITIVE RECORD

PORTIONS OF THIS RECORD ARE CONSIDERED SENSITIVE
AND ARE NOT AVAILABLE FOR PUBLIC VIEWING

E-MAIL, HOME ADDRESSES, AND PHONE NUMBERS
OF PRIVATE CITIZENS

FOR ADDITIONAL INFORMATION, CONTACT:

DIANE C. SILVA, RECORDS MANAGER
NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 556-1280
E-MAIL: diane.silva@navy.mil

REVISED – March 28, 2007

MCAS EL TORO

Restoration Advisory Board - Membership Roster

Sam Abu-Shaban 1241 East Dyer Road, Suite 120 Santa Ana, CA 92705-5611 Group Affiliation: Environmental Health Division, Orange County Health Care Agency	Daytime (714) 453-6273 FAX (714) 754-1768 oabu-shaban@ocha.com
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+Michael S. Brown, PhD 850 Cathedral Vista Lane Santa Barbara, CA 93110 Group Affiliation: Technical Consultant to City of Irvine	Daytime (805) 898-0980 FAX (805) 898-0087
+Tim Chauvel Public Participation Specialist Cal-EPA/Dept. of Toxic Substances Control 5796 Corporate Avenue Cypress, CA 90630	Daytime (714) 484-5487 FAX (714) 484-5329
+Viola Cooper (SFD-3) Community Involvement Coordinator U.S. EPA, Region 9 75 Hawthorne Street San Francisco, CA 94105	Daytime (800) 231-3075 or (415) 972-3243 cooper.viola@epa.gov
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REVISED – March 28, 2007

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Director of Strategic Programs, City Manager's Office

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Irvine Ranch Water District

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REVISED – March 28, 2007

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RAB Marine Corps/Navy Co-Chair

Darren Newton
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7040 Trabuco Road
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City Councilperson for Lake Forest

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Quang Than
Office of Military Affairs
Cal-EPA/Dept. of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630

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FAX (714) 484-5437

RAB Community Co-Chair (re-elected on 1/31/07, 5th one-year term)

Bob Woodings
25550 Commercecentre Drive, Suite 100
Lake Forest, CA 92630
Group Affiliation: Director of Public Works, City of Lake Forest

Daytime (949) 461-3481
FAX (949) 461-3512
bwoodings@ci.lake-forest.ca.us

Donald E. Zweifel
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Placentia, CA 92870
Group Affiliation: Community Member,
Exec. Dir., Gulf & Vietnam Vets Historical Assn.

Home (714) 993-4085
FAX (714) 993-4085

+ Not RAB member but included on RAB member list.

MCAS El Toro

Installation Restoration Program

MAILING LIST REQUEST COUPON

If you would like to be on the mailing list to receive information about environmental restoration activities at MCAS El Toro, please complete the coupon below. You may mail or fax it, or use the e-mail option. If you chose to send you mailing list request via e-mail, please include the information requested in the coupon.

Base Realignment and Closure
Attn: Ms. Marge Flesch
7040 Trabuco Road
Irvine, CA 92618

FAX – (949) 726-6586

E-mail –

- Add me to the MCAS El Toro Installation Restoration Program mailing list.
- Send me information on Restoration Advisory Board membership.

Name _____

Street _____

City _____ **State** _____ **Zip Code** _____

Affiliation (optional) _____

Telephone _____

Internet Access - Environmental Web Sites

BRAC PMO Website:

<http://www.bracpmo.navy.mil/bracbases/california/eltoro/default.aspx>

Department of Defense - Environmental Web Page:

<http://www.dtic.mil/envirodod/>

U.S. EPA:

www.epa.gov (homepage) www.epa.gov/superfund/ (Superfund)

www.epa.gov/ncea (National Center for Environmental Assessment)

www.epa.gov/federalregister (Federal Register Environmental Documents)

<http://www.epa.gov/EPA-SPECIES/2005/April/Day-12/e6825.htm> (site for endangered and threatened wildlife and plants, Riverside fairy shrimp)

Cal/EPA:

www.calepa.ca.gov (homepage)

www.dtsc.ca.gov (Department of Toxic Substances Control)

www.dhs.ca.gov (Department of Health Services)

www.swrcb.ca.gov/rwqcb8 (Santa Ana Regional Water Quality Control Board)

Reuse – Redevelopment Information

Orange County Great Park

<http://www.ocgp.org/>

Great Park Conservancy

<http://www.orangecountygreatpark.org/>

Heritage Fields

<http://www.heritagefields.com/>

Heritage Fields LLC is a joint venture of Lennar Homes of California, Inc., LNR Property Corporation, Rockpoint Group, L.L.C.,

Blackacre Institutional Capital Management, LLC and MSD Capital, L.P. Lennar and LNR are the managing partners of the joint venture.

<http://www.lennar.com/>

City of Irvine

Planning Commission

<http://www.ci.irvine.ca.us/council/comms/planning/default.asp>

Effective June 2, 2005, the Planning Commission will meet at 5:30 PM (new time) on the first and third Thursday of each month. Meetings take place in the City Council Chambers at Irvine City Hall, 1 Civic Center Plaza, Irvine.

Glossary of Technical Terms

Air Stripping: A treatment technology that transforms VOCs in groundwater to gas for removal and treatment.

Aquifer: A particular zone or layer of rock or soil below the earth's surface through which groundwater moves in sufficient quantity to serve as a source of water.

Cleanup Goals: Chemical concentration levels that are the goals of the remedial action. Once the cleanup goals have been achieved, the remedy is considered protective of human health and the environment.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): Commonly known as the Superfund. This law authorizes EPA to respond to past hazardous waste problems that may endanger public health and the environment. CERCLA was authorized and amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA).

Domestic Use: Use of water for drinking, cooking, and bathing.

Downgradient: Groundwater that is downstream of an area of soil or groundwater contamination.

Extraction Wells: Wells used to pump groundwater to the surface for treatment or for use.

Feasibility Study (FS): An analysis of cleanup or remedial alternatives to evaluate their effectiveness and to enable selection of a preferred alternative.

Federal Facility Agreement: A voluntary agreement entered into by the Navy, U.S. EPA, and Cal-EPA (Department of Toxic Substances Control (DTSC), and the California Regional Water Quality Control Board (RWQCB)) establishing an overall framework for how the investigation and cleanup of MCAS El Toro is to be conducted.

Groundwater: Underground water that fills pores in soil or openings in rocks.

Infiltration: Process by which dissolved chemical constituents are carried by water through the soil.

Intermediate Zone: A generally low permeability layer that separates that shallow groundwater unit from the principal aquifer at MCAS El Toro.

Maximum Contaminant Levels (MCLs): The maximum permissible level of a contaminant in water delivered to any user of a public water system. MCLs are enforceable standards.

Maximum Contaminant Level Goal: A non-enforceable concentration of a drinking-water contaminant, set at a level at which no known adverse effects on human health occur.

Monitored Natural Attenuation: Refers to the routine sampling and testing of groundwater to assess the cleanup effectiveness of natural attenuation processes.

Monitoring Well: Wells drilled at specific locations either on or near a hazardous waste site, for the purpose of determining direction of groundwater flow, types and concentrations of contaminants present, or vertical or horizontal extent of contamination.

Natural Attenuation: The process by which a compound is reduced in concentration over time, through adsorption, degradation, dilution, and/or transformation.

Nitrates: Compounds containing nitrogen which dissolve in water and may have harmful effects on humans and animals. Nitrates are commonly used in fertilizers.

Operable Unit (OU): Term for each of a number of separate activities undertaken as part of a Superfund site cleanup.

Plume: A three-dimensional zone within the groundwater aquifer containing contaminants that generally move in the direction of, and with, groundwater flow.

Principal Aquifer: The main (regional) water-bearing aquifer in the vicinity of MCAS El Toro.

Rebound: The tendency of soil gas concentrations to increase after SVE is turned off.

Record of Decision (ROD): A public document that explains what cleanup alternative will be used at a specific NPL site. The ROD is based on information and technical analysis generated during the remedial investigation/feasibility study and consideration of public comments and community concerns.

Remedial Action (RA): The actual construction or implementation phase that follows the remedial design of the selected cleanup alternative at a Superfund site.

Remedial Design (RD): The design of the selected cleanup alternative for a Superfund site.

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

Shallow Groundwater Unit: The shallowest water-bearing zone beneath MCAS El Toro.

Soil Gas: Gas found in soil pore space. In contaminated areas, soil gas may include VOCs.

Soil Vapor Extraction (SVE): A process whereby contaminated soil gas is brought to the surface for treatment.

Trichloroethene (TCE): A volatile organic compound that has been widely used as an industrial solvent. TCE is a colorless, odorless liquid that, when inhaled or ingested in large amounts, can cause irritation of the nose, throat, and eyes, nausea, blurry vision, or dermatitis. EPA has classified TCE as a "probable human carcinogen."

Total Dissolved Solids (TDS): Used to reflect salinity of groundwater.

Upgradient: Groundwater that is upstream of an area of soil or groundwater contamination.

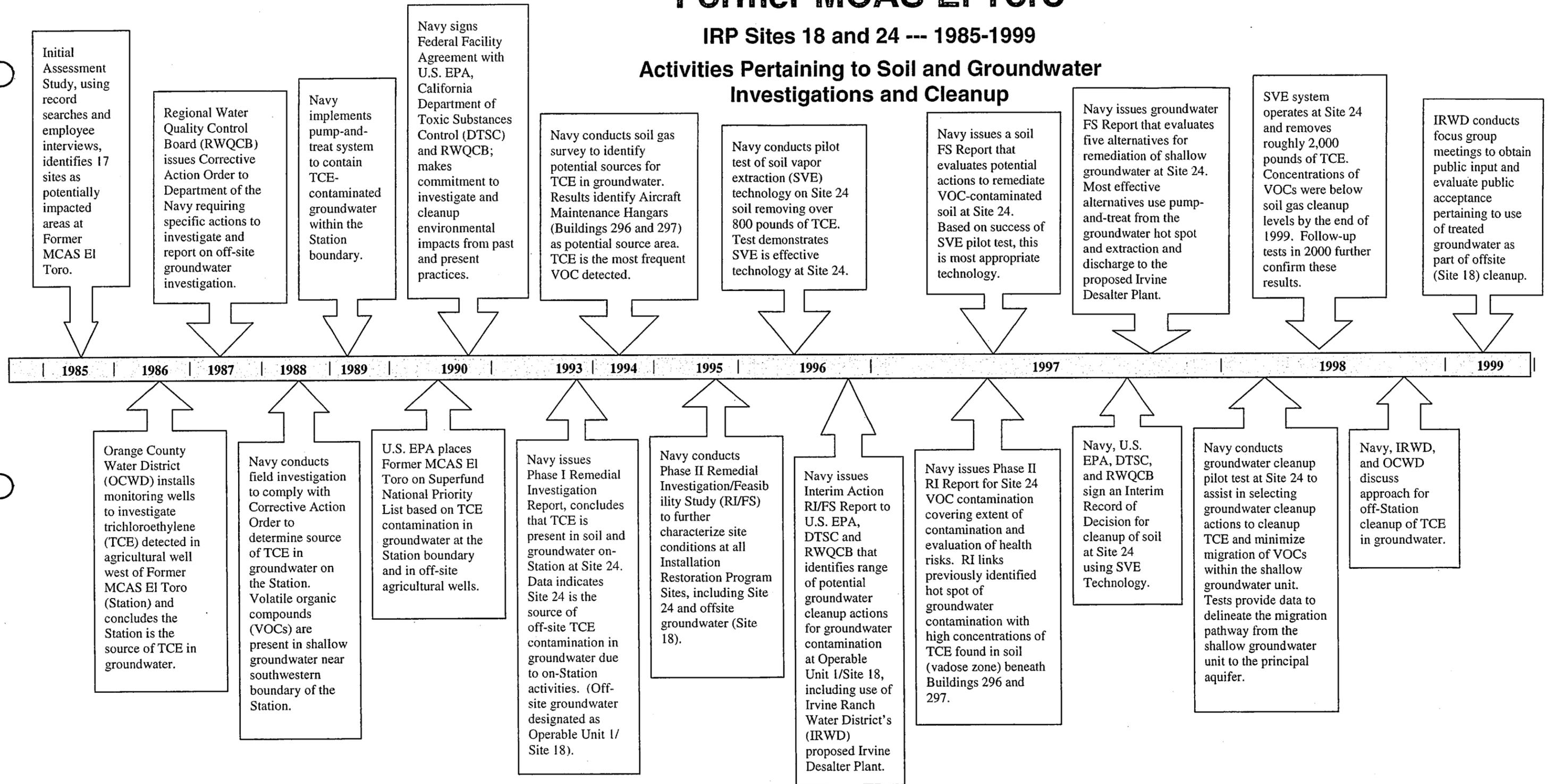
Volatile Organic Compound (VOC): An organic (carbon containing) compound that evaporates readily at room temperature. VOCs are commonly used in dry cleaning, metal plating, and machinery degreasing operations.

Water Quality Standards: State-adopted and U.S. EPA-approved ambient standards for water bodies. The standards cover the use of the water body and the water quality criteria which must be met to protect the designated use or uses.

Former MCAS El Toro

IRP Sites 18 and 24 --- 1985-1999

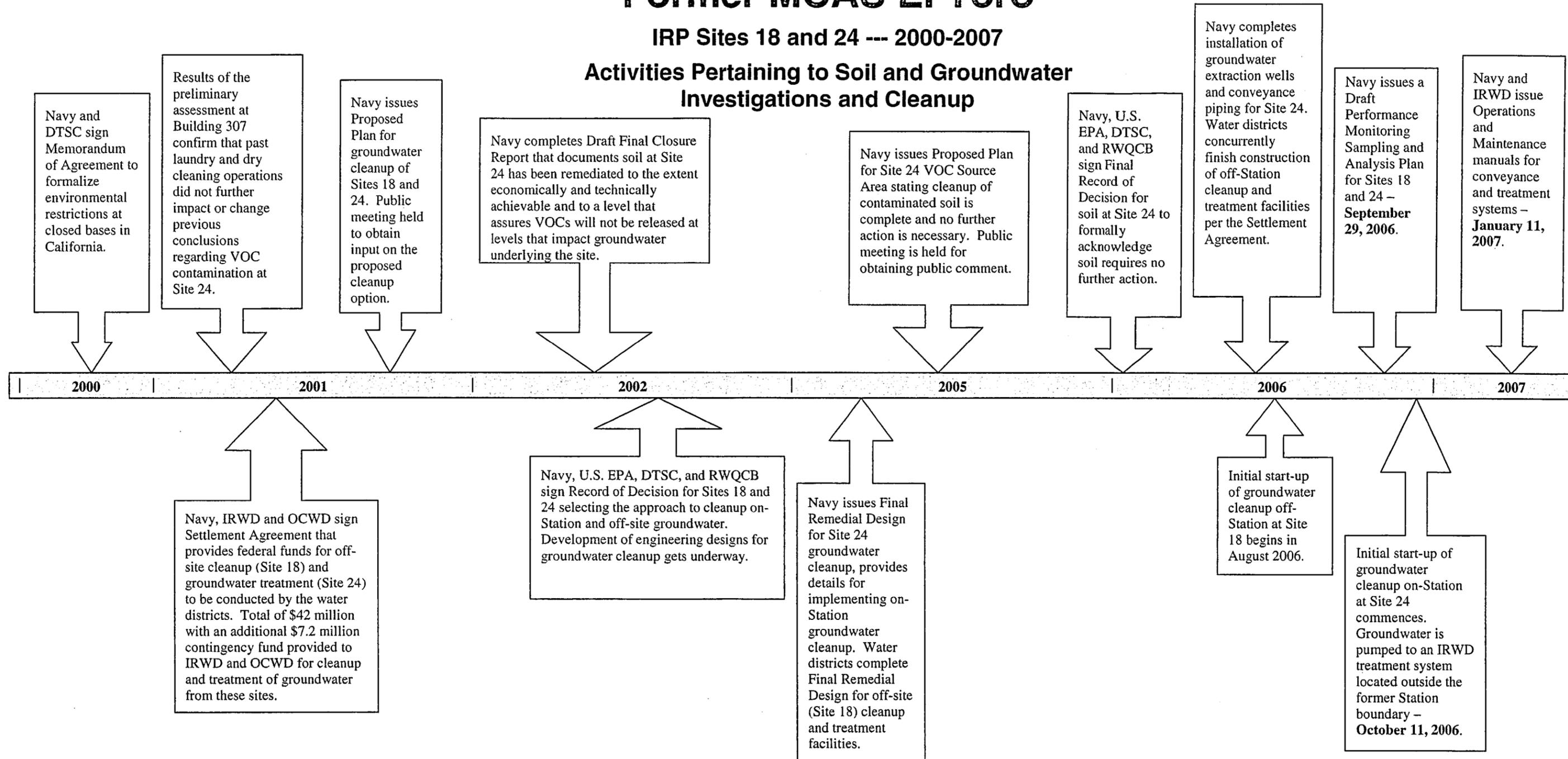
Activities Pertaining to Soil and Groundwater Investigations and Cleanup



Former MCAS El Toro

IRP Sites 18 and 24 --- 2000-2007

Activities Pertaining to Soil and Groundwater Investigations and Cleanup



SENSITIVE RECORD

PORTIONS OF THIS RECORD ARE CONSIDERED SENSITIVE
AND ARE NOT AVAILABLE FOR PUBLIC VIEWING

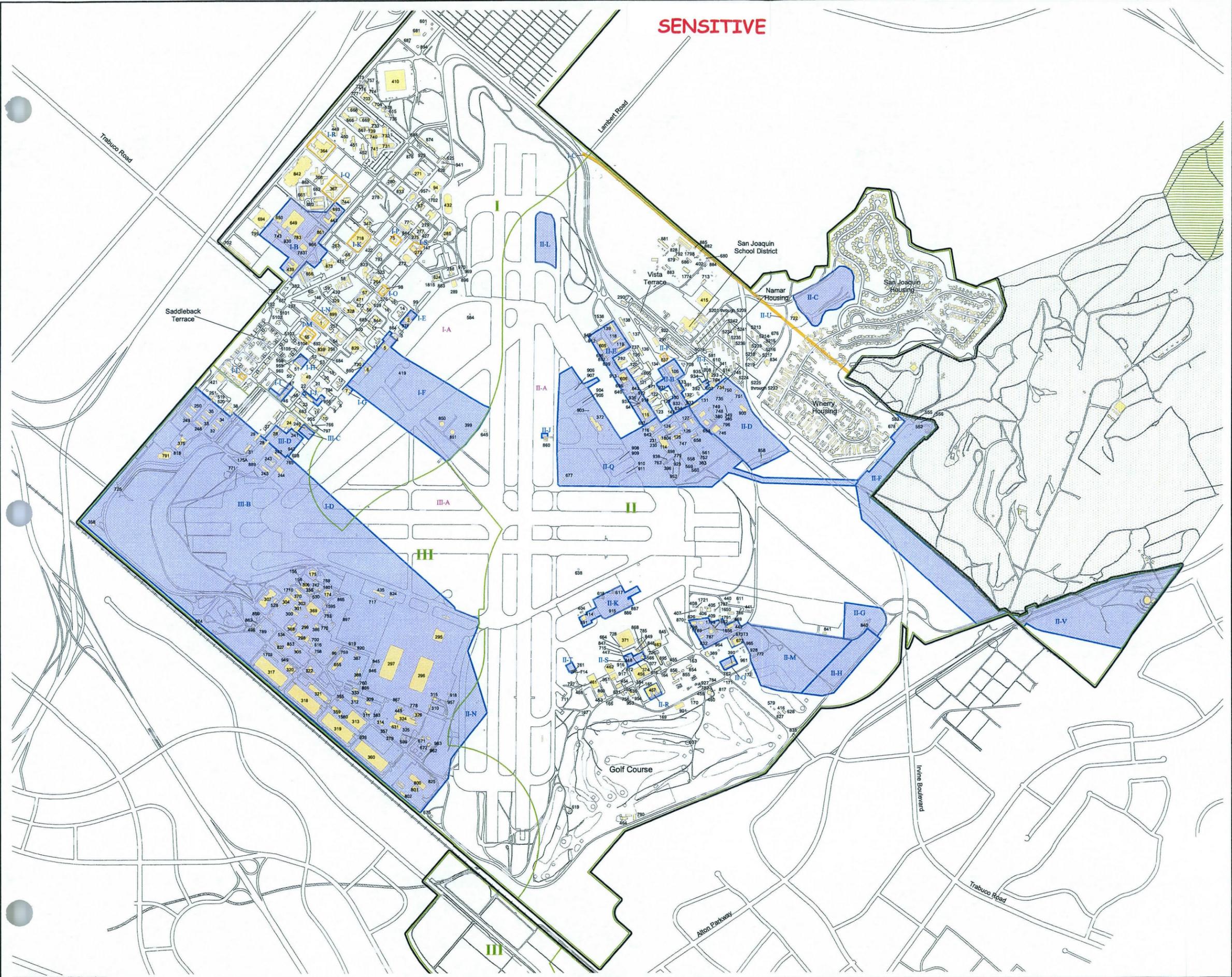
BUILDINGS/STRUCTURES/FACILITIES
WITHIN LEASABLE PARCELS
FINDING OF SUITABILITY TO LEASE

ENVIRONMENTAL CONDITION OF PROPERTY
(WITH CARVE-OUT BOUNDARIES)

FOR ADDITIONAL INFORMATION, CONTACT:

DIANE C. SILVA, RECORDS MANAGER
NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 556-1280
E-MAIL: diane.silva@navy.mil



SENSITIVE

SENSITIVE

LEGEND

- Property Boundary
- Roads
- Navy Sale Parcel Boundary
- Navy Sale Parcel Number
- Areas Suitable for Lease (Carve-Outs)
- Transfer Parcel Number (Parcel IV in entirety is suitable for Transfer)
- Areas Suitable for Transfer
- Carve-Out Number
- Petroleum Carve-Out
- Transferred Parcel
- Building/Facility
- Building/Facility Number
- Navy property addressed in a Site-specific EBS

SOURCE

Final Environmental Baseline Survey,
Former Marine Corps Air Station
El Toro, California. Earth Tech 2003b.

NOTES

Legal descriptions will be prepared for all carve-outs;
the depictions of carve-outs on this figure are approximate.

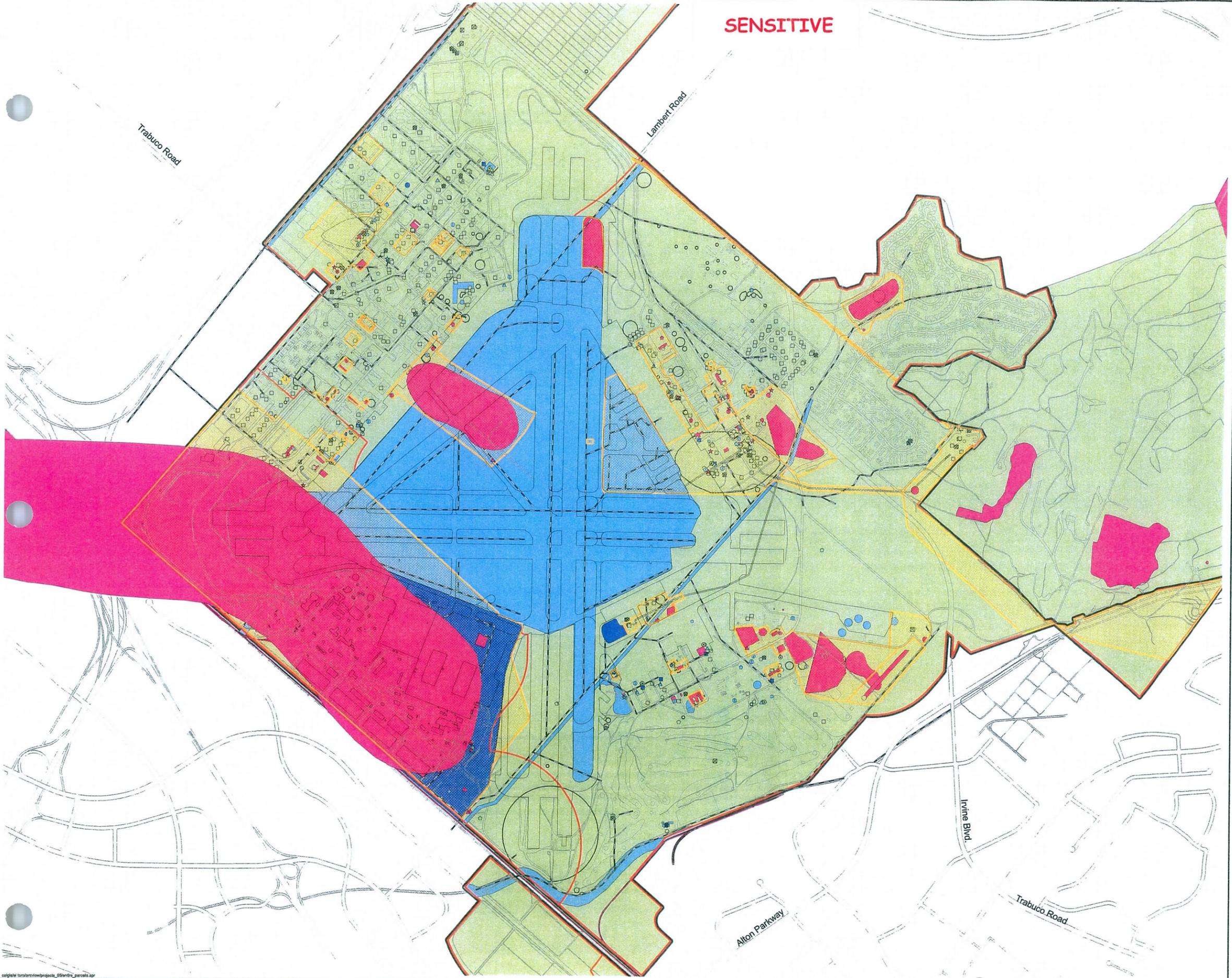


August 2005

**Buildings / Structures / Facilities
Within Leasable Parcels
Finding of Suitability to Lease
Former MCAS El Toro
California**

original: toro\arcview\projects_05\envlin_parcels.apr

SENSITIVE



SENSITIVE

LEGEND

- Property Boundary
- Roads
- Pipeline
- Stormwater Drainage Line
- Navy Transfer Parcel Boundary
- Great Park Plan Boundaries
- Buildings
- Areas Suitable for Lease (Carve-Outs)
- Environmental Condition of Property (ECP)**
- Categories 1 and 2
- Category 3
- Category 4
- Categories 5, 6, and 7
- Oil Water Separator
- Aboveground Storage Tanks
- Underground Storage Tanks
- Washrack
- Silver Recovery Unit
- Septic Tank
- RFA Site
- PCB Transformer/Equipment
- Potential Release Locations
- TAA Site

SOURCE

Final Environmental Baseline Survey,
Former Marine Corps Air Station
El Toro, California. Earth Tech 2003b.

NOTES

Legal descriptions will be prepared for all carve-outs;
the depictions of carve-outs on this figure are approximate.



August 2005

**Environmental Condition of Property
(with Carve-Out Boundaries)
Former MCAS El Toro
California**

calgis\el_toromcaw\projects_05\enviro_parcel1.spr



ACQUISITION AND
TECHNOLOGY

THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-3010

JUL 25 1997



MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY
(INSTALLATIONS, LOGISTICS AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE NAVY
(INSTALLATIONS AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE AIR FORCE
(MANPOWER, RESERVE AFFAIRS, INSTALLATIONS AND
ENVIRONMENT)
DEPUTY UNDER SECRETARY OF DEFENSE
(ENVIRONMENTAL SECURITY)
DEPUTY UNDER SECRETARY OF DEFENSE
(INDUSTRIAL AFFAIRS AND INSTALLATIONS)
DIRECTOR, DEFENSE LOGISTICS AGENCY (D)

SUBJECT: Responsibility for Additional Environmental Cleanup after Transfer of Real Property

The purpose of the attached policy is to describe the circumstances under which DoD would perform additional cleanup on DoD property that is transferred by deed to any person or entity outside the federal government. This policy is applicable to real property under DoD control that is to be transferred outside the federal government, and is effective immediately. For property that is transferred pursuant to section 120(h)(3)(C) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, 42 USC 9620(h)(3)(C)), this policy applies after the termination of the deferral period.

DoD continues to be committed to a remedy selection process that provides for full protection of human health and the environment, even after property has been transferred by DoD. The Deputy Under Secretary of Defense (Environmental Security) will issue separately any specific guidance needed to implement this policy. This policy should be read to be compatible with and does not supersede other related DoD policies, and is to be incorporated in the next revision of the appropriate DoD Instruction. I ask for your support in implementing this policy and working with communities so that they can make informed decisions in developing their redevelopment plans.

R. Noel Longuemare
Acting Under Secretary of Defense
(Acquisition and Technology)

Attachment



**DoD Policy on Responsibility for Additional Environmental Cleanup
After Transfer of Real Property**

Background. This policy is instituted within the framework established by land use planning practices and land use planning authorities possessed by communities, and the environmental restoration process established by statute and regulation. The land use planning and environmental restoration processes – two separate processes – are interdependent. Land use planners need to know the environmental condition of property in order to make plans for the future use of the land. Similarly, knowledge of land use plans is needed in order to ensure that environmental restoration efforts are focused on making the property available when needed by the community and that remedy selection is compatible with land use. This policy does not supplant either process, but seeks to integrate the two by emphasizing the need to integrate land use planning assumptions into the cleanup, and to notify the community of the finality of the cleanup decisions and limited circumstances under which DoD would be responsible for additional cleanup after transfer.

Cleanup Process. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, 42 USC 9601 et seq.) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP, 40 CFR 300) establish the requirements and procedures for the cleanup of sites that have been contaminated by releases of hazardous substances. CERCLA, furthermore, requires that a deed for federally owned property being transferred outside the government contain a covenant that all remedial action necessary to protect human health and the environment has been taken, and that the United States shall conduct any additional remedial action "found to be necessary" after transfer. Within the established restoration process, it is DoD's responsibility, in conjunction with regulatory agencies, to select cleanup levels and remedies that are protective of human health and the environment. The environmental restoration process also calls for public participation, so that the decisions made by DoD and the regulatory agencies have the benefit of community input.

Land Use Assumptions in Cleanup Process. Under the NCP, future land use assumptions are developed and considered when performing the baseline risk assessment, developing remedial action alternatives, and selecting a remedy. The NCP permits other-than-residential land use assumptions to be considered when selecting cleanup levels and remedies, so long as selected remedies are protective of human health and the environment. The U.S. Environmental Protection Agency (EPA) further amplified the role of future land use assumptions in the remedy selection process in its May 25, 1995, "Land Use in the CERCLA Remedy Selection Process" directive (OSWER Directive No. 9355.7-04).

Development of Land Use Plans. By law, the local community has been given principal responsibility for reuse planning for surplus DoD property being made available at Base Realignment and Closure (BRAC) installations. That reuse planning and implementation authority is vested in the Local Redevelopment Authority (LRA) described in the DoD Base Reuse Implementation Manual (DoD 4165.66-M). The DoD Base Reuse Implementation Manual calls for the LRA to develop the community redevelopment plan to reflect the long term needs of the community. A part of the redevelopment plan is a "land use plan" that identifies the proposed land use for given portions of the surplus DoD property. The DoD is committed to working with local land use planning authorities, local government officials, and the public to develop realistic assumptions concerning the future use of property that will be transferred by DoD. The DoD will act on the expectation that the community land use plan developed by the LRA reflects the long-range regional needs of the community.

Use of Land Use Assumptions in the Cleanup Process. DoD environmental restoration efforts for properties that are to be transferred out of federal control will attempt, to the extent reasonably practicable, to facilitate the land use and redevelopment needs stated by the community in plans approved prior to the remedy selection decision. For BRAC properties, the LRA's redevelopment plan, specifically the land use plan, typically will be the basis for the land use assumptions DoD will consider during the remedy selection process. For non-BRAC property transfers, DoD environmental restoration efforts will be similarly guided by community input on land use, as provided by the local government land use planning agency. In the unlikely event that no community land use plan is available at the time a remedy selection decision requiring a land use assumption must be made, DoD will consider a range of reasonably likely future land uses in the remedy selection process. The existing land use, the current zoning classification (if zoned by a local government), unique property attributes, and the current land use of the surrounding area all may serve as useful indicators in determining likely future land uses. These likely future land uses then may be used for remedy selection decisions which will be made by DoD (in conjunction with regulatory agencies) in accordance with CERCLA and the NCP.

DoD's expectation is that the community at-large, and in particular the land use planning agency, will take the environmental condition of the property, planned remedial activities, and technology and resource constraints into consideration in developing their reuse plan. The February 1996 "Guide to Assessing Reuse and Remedy Alternatives at Closing Military Installations" provides a useful tool for considering various possible land uses and remedy alternatives, so that cost and time implications for both processes can be examined and integrated. Obviously, early development of community consensus and publication of the land use plan by the LRA or the land planning agency will provide the stability and focus for DoD cleanup efforts.

Applicable guidelines in EPA's May 25, 1995, "Land Use in the CERCLA Remedy Selection Process" Directive should be used in developing cleanup decisions using land use assumptions. For a remedy that will require restrictions on future use of the land, the proposed plan and record of decision (ROD) or other decision documents must identify the future land use assumption that was used to develop the remedy, specific land use restrictions necessitated by the selected remedy, and possible mechanisms for implementing and enforcing those use restrictions. Examples of implementation and enforcement mechanisms include deed restrictions, easements, inspection or monitoring, and zoning. The community and local government should be involved throughout the development of those implementation and enforcement mechanisms. Those mechanisms must also be valid within the jurisdiction where the property is located.

Enforcement of Land Use Restrictions. The DoD Component disposal agent will ensure that transfer documents for real property being transferred out of federal control reflect the use restrictions and enforcement mechanisms specified in the remedy decision document. The transfer document should also include a description of the assumed land use used in developing the remedy and the remedy decision. This information required in the transfer documents should be provided in the environmental Finding Of Suitability to Transfer (FOST) prepared for the transfer. The DoD Component disposal agent will also ensure that appropriate institutional controls and other implementation and enforcement mechanisms, appropriate to the jurisdiction where the property is located, are either in-place prior to the transfer or will be put in place by the transferee as a condition of the transfer. If it becomes evident to the DoD Component that a deed restriction or other institutional control is not being followed, the DoD Component will attempt to ensure that appropriate actions are taken to enforce the deed restriction.

The DoD expects the transferee and subsequent owners to abide by restrictions stated in the transfer documents. The DoD will reserve the right to enforce deed restrictions and other institutional controls, and the disposal agent will ensure that such language is also included in the transfer documents. If DoD becomes aware of action or inaction by any future owner that will cause or threaten to cause a

Policy on Responsibility for Additional Environmental Cleanup

release or cause the remedy not to perform effectively, DoD also reserves the right to perform such additional cleanup necessary to protect human health and the environment and then to recover costs of such cleanup from that owner under the terms of the transfer document or other authority.

Circumstances Under Which DoD Would Return to do Additional Cleanup. A determination may be made in the future that the selected remedy is no longer protective of human health and the environment because the remedy failed to perform as expected, or because an institutional control has proven to be ineffective, or because there has been a subsequent discovery of additional contamination attributable to DoD activities. This determination may be made by DoD as a part of the remedy review process, or could be a regulatory determination that the remedy has failed to meet remediation objectives. In these situations, the responsible DoD Component disposing of the surplus property will, consistent with CERCLA Section 120(h), perform such additional cleanup as is both necessary to remedy the problem and consistent with the future land use assumptions used to determine the original remedy. Additionally, after the transfer of property from DoD, applicable regulatory requirements may be revised to reflect new scientific or health data and the remedy put in place by DoD may be determined to be no longer protective of human health and the environment. In that circumstance, DoD will likewise, consistent with CERCLA Section 120(h), return to perform such additional cleanup as would be generally required by regulatory agencies of any responsible party in a similar situation. Also note that DoD has the right to seek cost recovery or contribution from other parties for additional cleanup required for contamination determined not to have resulted from DoD operations.

Circumstance Under Which DoD Would Not Return to do Additional Cleanup. Where additional remedial action is required only to facilitate a use prohibited by deed restriction or other appropriate institutional control, DoD will neither perform nor pay for such additional remedial action. It is DoD's position that such additional remedial action is not "necessary" within the meaning of CERCLA Section 120(h)(3). Moreover, DoD's obligation to indemnify transferees of closing base property under Section 330 (of the Fiscal Year 1993 Defense Authorization Act) would not be applicable to any claim arising from any use of the property prohibited by an enforceable deed restriction or other appropriate institutional control.

Changes to Land Use Restrictions after Transfer. Deed restrictions or other institutional controls put in place to ensure the protectiveness of the remedy may need to be revised if a remedy has performed as expected and cleanup objectives have been met. For example, the specified groundwater cleanup levels have been reached after a period of time. In such a case, the DoD Component disposing of the surplus property will initiate action to revise the deed restrictions or other institutional controls, as appropriate.

DoD will also work cooperatively with any transferee of property that is interested in revising or removing deed restrictions in order to facilitate a broader range of land uses. Before DoD could support revision or removal, however, the transferee would need to demonstrate to DoD and the regulators, through additional study and/or remedial action undertaken and paid for by the transferee, that a broader range of land uses may be undertaken consistent with the continued protection of human health and the environment. The DoD Component, if appropriate, may require the transferee to provide a performance bond or other type of financial surety for ensuring the performance of the additional remedial action. The transferee will need to apply to the DoD Component disposal agent for revision or removal of deed restrictions or other institutional controls. Effective immediately, the process for requesting the removal of such restrictions by a transferee should be specified by the disposal agent in the documents transferring property from DoD.

Making those revisions or changes will be considered by DoD to be an amendment of the remedy decision document. Such an amendment will follow the NCP process and require the participation by DoD and regulatory agencies, as well as appropriate public input.

Disclosure by DoD on Using Future Land Use in Remedy Selection. A very important part of this policy is that the community be informed of DoD's intent to consider land use expectations in the remedy selection process. At a minimum, disclosure shall be made to the Restoration Advisory Board (or other similar community group), the LRA (if BRAC) or other local land use planning authority, and regulatory agencies. The disclosure to the community for a specific site shall clearly communicate the basis for the decision to consider land use, any institutional controls to be relied upon, and the finality of the remedy selection decision, including this policy. In addition, any public notification ordinarily made as part of the environmental restoration process shall include a full disclosure of the assumed land use used in developing the remedy selected.

Policy on Responsibility for Additional Environmental Cleanup

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February 1998

A Guide to Establishing Institutional Controls at Closing Military Installations

About This Guide

This guide supplements the land use matrix developed under the February 1996 "Guide to Assessing Reuse and Remedy Alternatives at Closing Military Installations" by helping to ensure the compatibility between the selected land use and the selected remedy. The land use matrix is intended as a tool to build consensus among Base Realignment and Closure (BRAC) cleanup teams (BCTs), local redevelopment authorities (LRAs), restoration advisory boards (RABs), and other community members, as well as to identify and resolve the complex restoration and reuse issues at closing installations. This guide further explains land use restrictions, namely institutional controls (ICs), that may be associated with a restoration and reuse alternative. This guide is intended to:

ICs are mechanisms that protect property users and the public from existing site contamination that continues to be present during the use of a site.

- facilitate, early in the process, discussions among stakeholders to enhance understanding of ICs, i.e., what they are and how they might be used as part of a proposed remedy alternative in the BRAC cleanup program;
- act as a planning tool and checklist to assist stakeholders in considering a selected remedy which does in fact include the use of ICs; and
- provide a framework for building cooperation among the stakeholders in the establishment and maintenance of ICs.

For a particular restoration and reuse alternative, the stakeholders may identify the need for ICs. This guide assumes that the LRA will take the environmental condition of property into account in development of its reuse plan, and that use restrictions will be included in the remedy decision arrived at through the remedy selection process. In this guide, ICs are taken to be mechanisms that protect property users and the public from existing contamination that continues to be present during the use of a site. A more detailed explanation of ICs is presented in the BRAC Environmental Program Fact Sheet: *Institutional Controls: What They Are and How They Are Used* (see "Where to Learn More," page 8). There may be other ICs associated with the property but not related directly to an environmental response action, such as historic and cultural preservation, access for utility maintenance, or ecological concerns, e.g., wetlands and wildlife protection.

Conflict can arise among stakeholders during the process of identifying and evaluating restoration and reuse alternatives. A detailed discussion of conflict resolution techniques can be found in the July 1996 document entitled *Partnering Guide for Environmental Missions of the Air Force, Army, and Navy* (see "Where to Learn More," page 8). That guide provides techniques for forming and maintaining an effective problem-finding, problem-solving team. By applying the techniques described, the parties involved in establishing and maintaining ICs can identify common issues and maximize the effectiveness of the tools available to each.



What Is the Role of Institutional Controls in the Remedy Selection Process?

The potential need for ICs is identified when stakeholders develop the land use matrix recommended in the BRAC Environmental Program Fact Sheet: *A Guide to Assessing Reuse and Remedy Alternatives at Closing Military Installations*. When various restoration and reuse alternatives are being developed, the first question to be asked is:

Does this alternative require some sort of control or limit on use of the property?

If the answer to that question is "yes," then this guide should be used to evaluate how an IC would be established. Consider the pros and cons of establishing and maintaining ICs should be an integral part of the decision-making process in the selection of a restoration action. When ICs are used, they are a vital part of the remedy and must be maintained to protect human health and the environment. ICs are legal mechanisms, such as deed restrictions, and may be coupled with physical controls, such as signs posted at the site or fences. The control or notice mechanism will vary depending on the nature of the contamination, its location, the targeted land use, the structures located on the site, and the length of time for which the use is restricted.

During remedy selection, the nature and extent of specific limits placed on future property use should be discussed with the community and the LRA so that they may be considered in planning reuse of BRAC property.

Once remedy alternatives, including ICs, have been identified, the remedy selection process is applied to evaluate the alternative as a whole, including any ICs involved. For example, using the process under the National Contingency Plan (NCP) for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the BCT will develop a proposal on which the public and regulatory agencies will be invited to comment — both in writing and at a public meeting. A response to those comments will be prepared, and a response action selected. Throughout the remedy selection process, the ICs will be evaluated in the same manner as all other components of a potential remedy, as required by statute and Executive Order 12580. Stakeholders need to seriously consider and discuss all aspects of establishing, maintaining, and funding ICs as part of a remedy.

Two situations commonly occur in which ICs play an important role: (1) to protect the integrity of an engineering control intended to contain contamination, reduce its mobility, and minimize exposure, such as a landfill cap, and (2) to limit the exposure of individuals to residual contamination by limiting the reuse activities associated with that portion of the installation.

Information collected during the Remedial Investigation is used to determine if contamination is present and to characterize the site. In some cases, removing all contamination to allow unrestricted use of property may be very costly, the technology may be unavailable, or the time required to remediate and transfer the property may be prohibitive considering the community's reuse requirements for planned reuse and timing of property transfer.

The preferred remedy, protective of human health and the environment, sometimes requires that contaminants not be disturbed, leaving them in place. For example, the excavation of landfills can actually increase the risk to human health and the environment; in the short term, by exposing toxic contamination. One approach to reducing the long-term risk associated with contamination left in place is to limit the uses to which that property will be put. The limit may be broad — for example, residential occupancy — or it may be specific — for example, any activity involving the disturbance of soil must be avoided in advance and any excavated soil must be disposed of properly.

During the remedy selection, the nature and extent of the specific limits placed on future property use should be discussed with the community and the LRA so that they may be considered in planning reuse of BRAC property. Although the final decisions, such as engineering plans, zoning plans, and certain longer-term ICs such as deed restrictions, will not be determined until the Remedial Design is developed, the Feasibility Study (FS) should provide as clear a description as possible of the nature of the anticipated restrictions. Another important element of the FS is the anticipated duration of the restriction. If the



tion is limited to a relatively short period during the actual remediation, it will have a very different impact on reuse than restriction that is anticipated to last for a longer period of time. Such a longer-term restriction, for example, might be a restriction on groundwater use until treatment or attenuation has reduced contaminant levels to below health-based standards or a restriction on surface use over a landfill cap.

The proposed plan outlines the preferred remedial alternative and summarizes the other alternatives considered in the FS. The proposed plan should be written in a manner that can be easily understood by the public. A clear statement of the restrictions associated with the proposed action should be included to allow the public to be fully informed about the proposed action and the applications of using ICs if they are a part of that action. The remedy selection process under CERCLA and the Environmental Protection Agency's (EPA) position on the use of ICs are described in the National Contingency Plan (NCP) (40 CFR 300.430(a)(1)(iii)) and its preamble (55 FR 8706). Under the NCP, community acceptance is one of the nine criteria for selecting a CERCLA remedy. While community acceptance is an essential ingredient in making the final remedy selection, it is not always possible to accomplish all the community's goals. It is the Department of Defense's (DoD) responsibility to make the final remedy selection in accordance with applicable laws and requirements and to ensure that it will be protective of human health and the environment, as well as be compatible with, to the extent reasonably practicable, community reuse plans. The final remedy selection is formalized through the Record of Decision (ROD), which will be compatible with any ICs that are implemented at the site.

When the Selected Response Includes Institutional Controls

Form a Team

If a selected response includes ICs, the team members (see box) involved in developing the future land use and evaluating the response should work together to establish and maintain the selected ICs. Requirements for establishment and maintenance of ICs vary from site to site and are dependent on the real property and environmental cleanup laws and regulations of that jurisdiction. Cooperation, therefore, is essential to achieve success. That success depends on building a team that will be effective in using the tools available at that site and in that location.

Team members already should be a part of the process through their participation in groups such as those listed in the box below. Key members of these existing entities (although others may be consulted as necessary) should be part of the team developing a plan for the success of ICs at that site. It is important to build a team that works together to ensure the success of the response action and the effective reuse of the land.

Team Member	Potential Role in Establishing and Maintaining ICs
AC Cleanup Team	Identify the remaining contamination and associated risks at a site that requires ICs
Responsible Authority	Identify the intended use of the site consistent with the environmental condition of property that may require ICs, may assist in the establishment of ICs
Community Stakeholders (including the RAB)	Provide input and recommendations on establishing and maintaining ICs
Transaction Coordinator	Facilitate the coordination of information on property reuse and transfer with all cleanup activities, including establishment of ICs
Real Estate Attorney/Environmental Attorney	Develop deed language for restrictions; may assist in developing other ICs
Local, State, and Local Government Officials	Establish monitor or enforce ICs
Interested Holders of Property Interest	Maintain a use of the site that is consistent with ICs



Establish Cooperation

Success will be easier to achieve when the following commitments are made:

- The team makes a commitment to the success of ICs
- The team develops the skills needed to work together well
- Throughout the process, all team members make a commitment to open communication
- The team members maintain mutual trust, honor, and respect
- The team members accept responsibility, make decisions, take risks, and resolve issues
- The team makes decisions through consensus
- The team develops creative solutions and applies them to all problems
- The team maintains agreed-upon processes for resolving disagreements or disputes
- The team evaluates progress and recognizes successes

Task of the Team

The team identifies issues that may be relevant to any number of response actions. It does not suggest how to resolve the issues, but offers tools that the team may find useful. It is up to the team establishing the ICs to develop and implement a plan that uses these and other tools and the resources available to them at that site to create an effective remedy.

Checklist of Issues and Tools To Be Considered in Establishing and Maintaining ICs

The following questions should be asked when DoD and stakeholders discuss how to establish and maintain ICs.

What are the ICs meant to accomplish?

What types of reuse are possible, given the environmental condition of property and/or the planned remedial activities? Example:

TYPE OF REUSE ALLOWED

- Residential
 - Housing
 - Daycare
 - Hospitals
 - Schools
 - Other
- Commercial
- Industrial
- Recreation
- Agricultural
- Other



What are the activities that must be restricted? For example:

SPECIFIC RESTRICTIONS

- Uses of ground and surface water
 - Prohibitions against drinking the water
 - Prohibitions against use of groundwater from existing wells
 - Prohibitions against any other use of the water (e.g., irrigation, watering livestock, or recreational uses, including fishing)
 - Restrictions to maintain the integrity of monitoring and reinjection wells
 - Other
- Use of soils
 - Prohibitions against excavation, construction, drilling, or disturbance of the soil (e.g., well installation that may connect an uncontaminated aquifer with a contaminated aquifer, or maintaining landfill cap)
 - Restrictions governing depth of excavation
 - Other
- Other ICs not directly related to the environmental response
 - Restrictions preserving historic or cultural areas
 - Restrictions protecting wildlife or wetlands
 - Restrictions governing access to the property (e.g., utility maintenance)

3. What are the techniques and tools available to establish and maintain ICs?

TECHNIQUES: METHODS FOR ACCOMPLISHING THE GOALS OF THE ICs

- Layering:** Layering means the use of a strategy to combine mutually reinforcing controls, for example, a combination of deed restrictions, physical barriers, and notice can expand the number of parties involved and strengthen the network that maintains the remedy and protects human health and the environment. Many tools can be used at the same time and at various levels to accomplish that result. Different team members may have methods available to them that enhance maintenance of the remedy.
- Notice:** Providing notice that controls exist at a site is essential to maintain those controls and ensure that users of the property abide by them. The more people who are aware of and responsible for an IC, the easier it is to ensure that the controls will be heeded and maintained.

The more people who are aware of and responsible for an IC, the easier it is to ensure that the controls will be heeded and maintained.

IC SPECIFIC ACTIONS THAT CAN BE USED TO IMPLEMENT THESE TWO TECHNIQUES

- Deed Language:** Language in the deed is a good method of providing notice and generally will be an important part of any IC plan. The legal instrument and language used should be tailored to the requirements and processes that are best suited to the jurisdiction. The instrument, which may be separate from the deed, may be a covenant or easement or some other form of property right; however, before relying on any such right, the legality and enforceability of such a right in the jurisdiction must be determined. The legal instrument should provide a



A Guide to Establishing Institutional Controls At Closing Military Installations

stand-alone explanation of the restrictions and should cite the portions of the administrative record, regulations, and transfer documents that are relevant to establishing the restrictions. Language providing notice and describing the restrictions may also be included in the transfer documents.

Depending on state law, which may vary, and depending on the intentions of the parties to the original transaction and third parties who hold an interest in the land, deed language can be structured to give enforcement rights to the previous owner and to those third parties. Deed restrictions implementing ICs should be structured to run with the land — in other words, to remain in force despite changes in ownership; for example, by stating that the restrictions benefit the surrounding property and benefit the general public, or by stating that the parties intend the ICs to run with the land and bind future parties. State laws vary and the enforceability of deed restrictions should be considered carefully in structuring deed language. The more stakeholders that have authority to enforce a deed restriction, the more effective it will be as a method of control. In spite of any legal limits on the enforceability of deed language, a deed restriction is an important form of notice.

- Records and Community Involvement:** Other available methods of providing notice include the administrative record for the response action; local records like planning and zoning maps and subdivision plats; and similar state records and registries. Means of community education such as public meetings, recurring notices in newspapers, and signs and fences also provide notice.
- Federal, state, and local laws and regulations:** Statutory authority under CERCLA and the Resource Conservation and Recovery Act (RCRA) may provide Federal and state regulators direct legal authority to protect human health and the environment, prevent releases, or control site activities. State and local governments may also play a role through already existing legal frameworks or regulatory programs such as permitting the use of land, monitoring public health through public health statutes, authorizing zoning and land use plans, passing ordinances, and acting under established statewide environmental programs. Such legal avenues can be integrated into an IC plan and provide notice that activities at the site in question are restricted.
- Inspections:** There may be inspections of the affected property associated with the selected remedy, generally as part of the remedy's operation and maintenance. Even though these inspections may not be intended for the purpose of monitoring an IC, they may provide an opportunity to assess activities at the site. For example, an inspection of monitoring wells may also provide an opportunity to establish compliance with an IC restricting excavation. Other existing inspection routines associated with regulatory programs not related to the remediation may also protect the site in question. While such inspections should not be confused with the ICs themselves, they can be used to assist in the maintenance of ICs. Such existing programs can be integrated into an IC plan in association with or in addition to the state and local laws and regulations listed above. The state and Federal members of the BCT may give the appropriate section or branch of the environmental regulatory agency or other pertinent agency notice of the IC or deed restriction by adding the organization's representative to the finding of suitability to transfer distribution list. In addition, the Federal government is required to review a remedy at least every five years, where contamination remains in place. Where ICs are part of the remedy, such reviews should include verification that the ICs are still in place and effective.
 - Remedy-specific environmental inspections (generally part of operation and maintenance of a remedy)
 - Inspections to ensure the integrity of the landfill cap
 - Inspections of the leachate treatment system
 - Inspections of the water treatment system
 - Other inspections required for operation and maintenance



- Other Federal, state, and local government inspections not directly related to the environmental response
 - Restrictions preserving historic or cultural areas
 - Restrictions protecting wildlife or wetlands
 - Restrictions governing access to the property (e.g., utility maintenance)
 - Restrictions concerning health
 - Restrictions concerning building standards
 - Other

What are the responsibilities to maintain and ensure the effectiveness of ICs?

When a network for establishing an IC is created, it is also appropriate and necessary to discuss the associated responsibilities for maintaining its effectiveness. As previously noted, there are numerous existing statutory frameworks and regulatory programs at the Federal, state, and local levels that provide the authority to maintain the integrity of the remedy requirements. Stakeholders may need to discuss resources that are available or might be needed for certain ICs. They also need to discuss how long-term responsibilities for IC implementation at the site will be coordinated among team members.

- Statutory authority to enforce RCRA and CERCLA
 - State and local, general or site-specific enforcement authorities that can be applied
 - Property laws
 - Zoning
 - Permitting programs
 - Other laws or ordinances
 - Funding maintenance of the IC
 - Long-term coordination responsibilities

How is an IC modified or terminated?

ICs may also be modified or terminated over time. It is therefore useful to discuss what time frames, if known, and what procedures may be necessary for accomplishing these tasks. Due to the site-specific nature of IC plans, procedures for modifications to ICs may vary depending on that plan.

- Length of time ICs are needed
- Legal steps to remove or modify each IC
- Organizations that may be involved with modification or termination:
 - Federal government
 - State government
 - State court
 - Local government
 - Local court
 - Landowner
 - Adjacent landowner
 - Previous landowner



A Guide to Establishing Institutional Controls At Closing Military Installations

Where to Learn More

For information on this and other BRAC issues can be found by reading:

- DoD's Future Land Use Policy: *Responsibility for Additional Environmental Cleanup after Transfer of Real Property* (July 1997)
- BRAC Environmental Program Fact Sheet: *Institutional Controls: What They Are and How Are They Used* (Spring 1997)
- BRAC Environmental Program Fact Sheet: *A Guide to Assessing Reuse and Remedy Alternatives at Closing Military Installations* (February 1996)
- *Fast Track to FOST: A Guide to Determining if Property is Environmentally Suitable for Transfer* (Fall 1996)
- *Partnering Guide for Environmental Missions of the Air Force, Army, and Navy* (July 1996)

For more information, contact:

Office of the Assistant Deputy Under Secretary of Defense
(Environmental Cleanup)
Attn: Fast-Track Cleanup
3400 Defense Pentagon
Washington, D.C. 20301-3400

For more information, contact:

<http://www.dtic.mil/envirodod/envbrac.html>

For additional information about selection of response actions, see the following EPA Office of Solid Waste and Emergency Response (OSWER) documents:

- *Land Use in CERCLA Remedy Selection Process*, OSWER Publication Number PB95-963234\NDZ (June 1995)
- *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*, OSWER Publication Number 9355.0-30 (April 1991)
- *A Guide to Selecting Superfund Remedial Actions*, OSWER Publication Number 9355.0-27FS (April 1990)

For more information, contact:

<http://www.epa.gov/epa/oswer>

Guide to Establishing Institutional Controls at Closing Military Installations was prepared with input from an interdisciplinary work group made up of representatives of the Office of the Secretary of Defense, the DoD Components, the U.S. EPA, General Services Administration, the California EPA, the National Association of Attorneys General, the International City/County Management Association, the National Association of Installation Developers, and others. This guide is not a formal statement of DoD policy, but is meant to assist in the establishment and maintenance of ICs at BRAC properties.



DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, D. C. 20350-2000

IN REPLY REFER TO

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From: Chief of Naval Operations

To: Distribution

Subj: POLICY FOR CONDUCTING COMPREHENSIVE ENVIRONMENTAL
RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA)
STATUTORY FIVE-YEAR REVIEWS, NOVEMBER 2001

Ref: (a) Navy/Marine Corps Installation Restoration Manual
(Feb 97)

Encl: (1) Navy/Marine Corps Policy for Conducting Comprehensive
Environmental Response, Compensation, and Liability
Act (CERCLA) Statutory Five-year Reviews, November,
2001

1. Enclosure (1) establishes procedures for conducting five-year reviews, facilitates consistency of five-year reviews across the Navy/Marine Corps, clarifies current policy, and delineates roles and responsibilities of various entities in conducting or supporting five-year reviews.

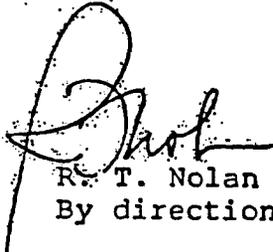
2. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), requires that remedial actions resulting in any hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure be reviewed every five years to assure protection of human health and the environment, regardless of the National Priorities List (NPL) status of the site or installation.

3. This policy has been coordinated and concurred with by the Marine Corps.

4. This policy will be included in the next revision to reference (a). It will also be available on the N45 website (<http://web.dandp.com/n45/index.html>) under Environmental Restoration/Training, References.

Subj: POLICY FOR CONDUCTING COMPREHENSIVE ENVIRONMENTAL
RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA)
STATUTORY FIVE-YEAR REVIEWS

5. Questions or comments concerning this policy should be
directed to Mr. Geoffrey D. Cullison, CNO N453D, 2211 So. Clark
St., Arlington, VA 22202-3735, (703) 602-5329 (DSN 332-5329),
cullison.geoffrey@hq.navy.mil.


R. T. Nolan
By direction

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**Navy/Marine Corps Policy for
Conducting Comprehensive Environmental Response, Compensation,
and Liability Act (CERCLA) Statutory Five-year Reviews
November 2001**

Ref: EPA Comprehensive Five-Year Review Guidance, June 2001, EPA 540-R-01-007, OSWER No. 9355.7-03B-P, §1.3.1

1. Statutory requirements:

a. The statutory requirement for five-year review was added to CERCLA as part of the Superfund Amendments and Reauthorization Act of 1986 (SARA). A five-year review is required when both of the following conditions are met, whether the site is on the National Priorities List (NPL) or not:

1) Upon completion of the remedial actions at a site, hazardous substances, pollutants, or contaminants will remain above levels that allow for unlimited use and unrestricted exposure. For example, if a site is restricted to industrial use because hazardous substances, pollutants, or contaminants remain above levels that allow for unlimited use and unrestricted exposure, five-year reviews must be conducted.

2) The Record of Decision (ROD) or Decision Document (DD) for the site was signed on or after October 17, 1986 (the effective date of SARA).

b. CERCLA §121(c), as amended, 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.

c. The National Contingency Plan (NCP), 42 U.S.C. § 9621(c), implementing regulations, 40 C.F.R. Part 300.430(f)(4)(ii), provide:

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 initiation of the selected remedial action.

d. Consistent with Executive Order 12580, the Secretary of Defense is responsible for ensuring that five-year reviews are conducted at all qualifying Department of Defense (DoD) cleanup sites.

e ... EPA classifies five-year review as either "statutory" or "policy" depending on whether it is required by statute or conducted as a matter of EPA policy. In particular, EPA views five-year reviews conducted of RODS issued before October 17, 1986 as being conducted as a matter of policy because the five-year review requirement didn't become law until that date. Statutory five-year reviews are required by law and will be conducted by the Navy/Marine Corps at any site meeting the requirements of the law. We generally do not conduct policy five-year reviews.

2. Definitions:

a. For purpose of this policy, "site" means a location on an installation's property where a hazardous substance has been deposited, stored, disposed, or placed, or has otherwise come to be located where, upon completion of the remedial action, hazardous substances, pollutants, or contaminants will remain at the site above levels that allow for unlimited use and unrestricted exposure. This includes areas off the installation where contamination may have migrated. For purpose of this policy, "site" also means Operable Unit.

b. "Unlimited use" and "unrestricted exposure" mean that there are no restrictions on the potential use of land or other natural resources.

3. Purpose of a five-year review:

a. The purpose of a five-year review is not to reconsider decisions made during the selection of the remedy, as specified in the ROD, but to evaluate the implementation and performance of the selected remedy.

b. Where a site has a remedial action that is still in the Remedial Action-Construction (RA-C) phase or the Remedial Action-Operations (RA-O) phase, a five-year review should confirm that immediate threats have been addressed and that the remedy will be protective when complete.

c. Where a site is in the Long Term Management (LTMgt) phase, the five-year review should confirm whether the selected remedy remains protective.

d. When the five-year review indicates that the remedy is not performing as designed, the report should recommend actions to improve performance.

4. NPL status: The continuing presence of hazardous substances, pollutants, or contaminants above levels that allow for unlimited use and unrestricted exposure under CERCLA establishes the requirement for a five-year review, not the NPL status of the installation. Reference (a) states that EPA will delete an installation from the NPL when deletion criteria have been satisfied and that an installation will not be kept on the NPL solely because it is subject to five-year reviews. If the installation has been deleted or is in the process of being deleted, the five-year review report should address the status of any deletion action.

5. Resource Conservation and Recovery Act (RCRA) response: Five-year reviews are not required if cleanup of a site is addressed under RCRA corrective action. In cases where both RCRA and CERCLA authorities are used to address different sites on an installation, a five-year review is only required for those portions of the installation being addressed under CERCLA that meet the criteria for five-year reviews. When a RCRA action is included as a portion of a ROD or DD or other CERCLA decision document, the RCRA action should be included in the five-year review.

6. Interim remedial action: By itself, an interim remedial action at a site does not start the clock for a five year review of that site; it is treated like any other remedial action for the purpose of five-year reviews. An interim remedial action triggers the five-year review clock if it meets any of the criteria outlined in paragraph 1. above. For instance, if an alternate water supply is installed but hazardous substances, pollutants, or contaminants remain onsite above levels that allow for unlimited use and unrestricted exposure, a review is required by statute. A subsequent action may then reduce the hazardous substances, pollutants, or contaminants to levels allowing unlimited use and unrestricted exposure. Remedial actions are those actions consistent with a permanent remedy taken instead of, or in addition to, removal action.

7. Five-year review "trigger":

a. In keeping with the requirements of CERCLA §121(c) and the NCP, initiation of the selected remedial action that will result in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure after the remedial action is complete is the "trigger" that starts the five-year review clock. For most Navy/Marine Corps sites, this "trigger" is the onsite mobilization for commencement of the RA-C phase.

b. The first site on an installation that triggers the five-year review clock triggers the five year review clock for the entire installation, or that portion of the installation addressed under the ROD or DD.

c. Where the selected remedy will result in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure but will not require a RA-C phase, such as monitored natural attenuation using existing wells and/or institutional controls, the remedy start date is the ROD or DD signature date and therefore is also the trigger for the five-year review clock.

8. Five-year review due dates:

a. The five-year review report for a site is to be completed and signed within five years of the trigger date for that site. Subsequent five-year reviews should be signed no later than five-years after the signature date of the previous five-year review reports.

b. Because the regulators do not have a statutory role in the conduct of five-year reviews, it will be up to Navy/Marine Corps to enforce the five-year review dates. To assist the field in tracking five-year review dates, there is a field in NORM that allows management to track these dates.

9. Results of a five-year review: The results of the five-year review are presented in a five-year review report.

a. The five-year review report should;

- 1) clearly state whether the remedy is or is expected to be protective,
- 2) document any deficiencies identified during the review, and
- 3) recommend specific actions to ensure that a remedy will be or will continue to be protective.

b. Where necessary, five-year review reports should include descriptions of follow-up actions needed to achieve, or to continue to ensure, protectiveness. Along with these recommendations, the report should list a timetable for performing the actions and the parties responsible for implementation.

c. If it is determined that cleanup levels or remedial action objectives cannot be achieved through the remedial action, the recommendations may suggest the type of decision process (e.g., ROD or DD, ROD or DD Amendment, Explanation of Significant Differences (ESD)) needed to evaluate or make changes to the remedy, cleanup levels, or remedial action objectives.

d. For sites that are still in the RA-O phase (pre-Response complete) where evaluation and optimization of the remedial action operations are performed routinely, most information for the five-year review should be readily available.

10. Review and Signature: Pursuant to the delegations of authority in sections 2(d) and 11(g) of Executive Order 12580, and DoD Instruction 4715.7 of 22 April, 1996, Department of the Navy (DON) is the approval authority for CERCLA five-year reviews conducted at sites under its jurisdiction, custody or control.

a. Five-year reviews completed with ER,N or BRAC funds will be signed by the Commanding Officer of the supporting EFD/A.

b. Five-year reviews completed with installation funds will be signed by the installation Commanding Officer/Commanding General or a designee of the Regional Environmental Coordinator.

c. Regulatory agencies have no statutory review authority in five-year reviews conducted by DON in its Lead Agent authority except where some past DON Federal Facility Agreements (FFAs) have included five-year review reports as enforceable primary documents. Future FFAs and Federal Facility-State Remediation Agreements (FFSRAs) are not to include five-year review reports as either primary or secondary documents. However, five-year reviews may be submitted to the appropriate regulators for their review and comment as a matter of partnering.

11. Keeping the community informed:

a. Because the five-year review addresses the status and protectiveness of a remedy, it should be used to communicate this information to the community. If the Restoration Advisory Board (RAB) is still active at the installation, preparation for and conduct of the five-year review should be an agenda item at each RAB meeting conducted while the five-year review is underway. Where necessary, additional RAB meetings should be held to ensure the community is kept up to date on progress and results of the five-year review. If the RAB is inactive or has disbanded, the installation shall determine the most effective approach to informing the community based on the level of community interest. At a minimum, community involvement activities during the five-year review should include notifying the community that the five-year review will be conducted, notifying the community that the five-year review has been completed, and providing the results of the review to the local site repository.

b. The installation Public Affairs Officer can recommend appropriate methods of communication (e.g., public notices, fact sheets) for notifying the public.

c. Upon completion of the five-year review and Five-Year Review Report, a brief summary of the report should be made available to the stakeholders. The summary should include a short description of the remedial action, any deficiencies, recommendations and follow-up actions that are directly related to protectiveness of the remedy, and the determination(s) of whether the remedy is or is expected to be protective of human health and the environment. The summary should also provide the location of the site information repository and/or where a copy of the complete report can be obtained, and provide the date of the next five-year review or notify the community when five-year reviews will no longer be necessary.

e. Five year reviews are not Administrative Record material and are not to be included therein. However, the RPM should ensure that the signed five-year review report is placed in the site information repository.

12. Discontinuing five-year reviews:

a. There is no statutory provision for the discontinuation of statutory reviews. However, EPA acknowledges in reference (a) that five-year reviews may no longer be needed when no hazardous substances, pollutants, or contaminants remain on site above levels that allow for unlimited use and unrestricted exposure, reference (a), paragraph 1.2.4. The basis for this finding should be documented in the final Five-Year Review report.

b. If a ROD or DD states that a five-year review will be performed, but prior to conducting the first review the EFD/EFA determines that no review is required, this finding should be recorded in a major document subject to public comment, such as a Proposed Plan or a Notice of Intent to Delete.



DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, DC 20350-2000

IN REPLY REFER TO

5090
N45C/N4U732343
23 April 2004

From: Chief of Naval Operations, Environmental Readiness
Division (N45)
To: Distribution

Subj: POLICY FOR OPTIMIZING REMEDIAL AND REMOVAL ACTIONS UNDER
THE ENVIRONMENTAL RESTORATION PROGRAMS

Ref: (a) Management Guidance for Defense Environmental
Restoration Program (DERP), September 2001
(b) Navy/Marine Corps Installation Restoration Manual,
June 2001
(c) Navy Guidance for Optimizing Remedial Action
Operation (RAO), April 2001
(d) Navy Guide to Optimal Groundwater Monitoring,
January 2000
(e) Navy Guidance for Optimizing Remedy Evaluation,
Selection and Design, April 2004

Encl: (1) Navy/Marine Corps Policy for Optimizing Remedial and
Removal Actions, April 2004

1. Enclosure (1) establishes procedures for optimizing the screening, evaluation, selection, design, and implementation for long-term operation and management of response actions conducted under the Environmental Restoration (ER) Program, which includes the Installation Restoration (IR) and Munitions Response (MR) Programs. This policy is to be applied to both remedial and removal actions. Implementation of this policy will ensure that the Navy/Marine Corps consistently monitors, tracks, and reports the optimization efforts for all ER sites.

2. Section 20 of reference (a) requires the Department of Defense (DoD) Components to continually evaluate remedies. This policy will ensure that all remedies are continually evaluated. Reference (b) outlines the process the Navy/Marine Corps follows in implementing the ER Program. References (c) through (e) provide specific guidance for meeting the requirements of enclosure (1).

Enclosure (1)

Subj: POLICY FOR OPTIMIZING REMEDIAL AND REMOVAL ACTIONS UNDER
THE ENVIRONMENTAL RESTORATION PROGRAMS

3. This policy has been coordinated and concurred with by the
Marine Corps.

4. This policy will be included in the next revision to
reference (b). It will also be available on the N45 website
(<http://web.dandp.com/n45/index.html>) under Environmental
Restoration/Training, References.

5. My point of contact concerning this policy is Mr. Dave
Olson, N45C, (703) 602-2571, DSN: 332-2571 or email at
david.l.olson@navy.mil.

William G. Mattheis
WILLIAM G. MATTHEIS
Acting

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COMNAVREG PEARL HARBOR HI (N465)
COMNAVMARIANAS GU (N45)
COMNAVREG NW SEATTLE WA (N45)

**Navy/Marine Corps Policy for
Optimizing Remedial and Removal Actions
At all Installation Restoration and Munitions Response Program
Sites**

April 2004

Background

As the Navy/Marine Corps have progressed through implementation of the Installation Restoration (IR) Program and begun the Munitions Response (MR) Program, many sites have advanced through the remedy evaluation, selection, design, and construction phases and are undergoing Remedial Action Operation (RAO) and Long Term Management (LTMgt). This has shifted a growing proportion of the available Environmental Restoration Navy (ER,N) and Base Realignment and Closure (BRAC) funds to these long-term site cleanup commitments. Continued monitoring of these remedies has indicated that some remedies selected are not meeting cleanup objectives as planned. Further evaluation of specific sites has revealed several areas where optimization efforts could be applied to ensure the most appropriate remedies are screened, evaluated, selected, designed, and properly operated/maintained, and that options are available to modify systems to ensure cleanup objectives are met in a timely, cost effective manner. These results prompted the need for further optimization direction. Section 20 of the Management Guidance for Defense Environmental Restoration Program (DERP), September 2001, requires the Components to continually optimize remedies. This policy outlines the Navy/Marine Corps efforts to be conducted to ensure all remedies are continually optimized through evaluation of all available data at each phase of the project.

Applicability

This policy applies to all response cleanup actions conducted at Navy/Marine Corps IR and MR Sites. It applies equally to response actions at active installations as well as closing installations. The procedures outlined in this policy and the referenced guidance documents are to be used during the following phases:

- Feasibility Study and/or Engineering Evaluation/Cost Analysis
- Record of Decision and/or Action Memorandum (Remedy Selection)
- Remedial Design

- Remedial and/or Removal Action Construction
- Remedial/Removal Action Operation
- Long Term Management

The principles of this policy will also apply to any other sub-phases or related phases, including RCRA corrective actions, which accomplish the goals of the phases listed above.

Policy

1. *Planning, Design, and Construction* - During the planning stages of the remedial and/or removal action processes, the guidance outlined in the Navy Guidance for Optimizing Remedy Evaluation, Selection and Design (April 2004) shall be followed. This guidance document applies, at a minimum, to the following phases of the cleanup program:

- Feasibility Study and/or Engineering Evaluation/Cost Analysis
- Record of Decision and/or Action Memorandum (Remedy Selection)
- Remedial Design

This guidance document could also be referenced during the Remedial and/or Removal Action Construction phase. Applicability during this phase will likely be due to changed conditions found during construction.

Following this guidance during these phases of the cleanup process will ensure that the most appropriate response actions are screened, evaluated, selected, and designed for each Navy/Marine Corps IR and MR Site.

Special Technical Issue: Since 1998, Navy, other DoD Components, and the Environmental Protection Agency (EPA) have been conducting evaluations of the effectiveness of "pump and treat" systems to address groundwater contamination. Consensus of all parties is that pump and treat systems are rarely the optimal alternative for groundwater response actions. Therefore, any plans to install new pump and treat systems on Navy and Marine Corps installations requires approval from Headquarters (HQ) at the Naval Facilities Engineering Command (NAVFAC). This requirement applies to all "pump and treat" systems (remedial and removal actions) where groundwater is removed from the sub-surface by pumping or other means, treated above ground in any way, and discharged in any way (i.e. off site disposal, sewer systems, re-injected, etc.). In order to receive the NAVFAC HQ approval, the IR Manager shall forward a summary of the site background, the conceptual site model (CSM), the remedial action objectives, a listing of the technologies screened for the site, a summary of the alternatives analysis, and a statement of why "pump and treat" is the most appropriate technology to be used at the site, including a life cycle cost analysis (net present value and total site cost) and exit

strategy. NAVFAC HQ will provide a written approval/disapproval response to the IR Manager based on review of this submittal.

2. Operation - Following completion of the construction of the remedial/removal system (for sites where the remedial action objective is not achieved at the completion of the remedial action construction phase), operation of the remedial/removal system commences. The performance of these systems should be evaluated at least annually to measure progress toward the remedial action objective. The Navy Guidance for Optimizing Remedial Action Operation (RAO), April 2001, shall be followed for optimizing the RAO phase of the process and the Navy Guide to Optimal Groundwater Monitoring, January 2000 shall be followed to optimize any groundwater monitoring program(s) (if part of the remedy selected).

Following this guidance document during the RAO phase will ensure that the remedy is operating efficiently and as designed. Spatial and temporal trend analysis of data will help assess system performance and its ability to effectively treat the target area and contaminants. Data analysis shall be used to determine when each technology has reached its effective use, when it is time to transition a remedy to a sequential phase, determine whether a remedy needs to be modified or replaced with a more effective system, and when remedial objectives have been met.

3. Long Term Management - When the remedial action objectives have been met and the Response Complete (RC) milestone has been reached, there may be a need for further long term management (LTMgt) to ensure the remedy remains protective if the cleanup levels achieved do not allow for unrestricted use of the property. The Navy Guide to Optimal Groundwater Monitoring, January 2000 shall be followed for the groundwater monitoring portion of the LTMgt phase. NAVFAC is also working on some additional LTMgt guidance documents to address other aspects of the LTMgt phase, which shall be followed when complete.

Following these guidance documents will ensure that the LTMgt requirements are achieved in a cost effective manner. Periodic evaluation of these requirements and site conditions will ensure that sites in this phase ultimately receive Site Closeout status, thus allowing the site to eventually be used for unrestricted use.

4. Tracking and Reporting - A new module has been added to the Navy's NORM database. RPMs shall update the information semi-

annually to track optimization efforts through all phases of the cleanup process. The Navy will use this data to report on our efforts to continuously optimize our remedies. Specific guidance for inputting data into NORM shall be provided in future NAVFAC HQ Budget Guidance documents.



Department of Defense

Perchlorate Work Group

Perchlorate Facts

The National Academies of Science (NAS) released its report on the health implications of perchlorate on January 10 and 11, 2005.

Perchlorate (ClO₄⁻) is both a naturally occurring and man-made compound.



Ammonium perchlorate is an efficient and stable oxidizer used in solid fuel for rockets and missiles.

Perchlorate does not cause Grave's disease, it was a treatment for Grave's disease.

Today, DoD makes every effort to prevent releases of perchlorate into the environment.

Learn more about how perchlorate is used

News Announcements

January 26, 2006

- ★ Policy on DoD Required Actions Related to Perchlorate, DoD (PDF: 34 Kb)

January 26, 2006

- ★ EPA Issues Guidance for Protective Cleanups of Perchlorate

October 27, 2005

DoD Perchlorate Treatment Technology Project Underway in California's Inland Empire

October 18, 2005

Plants as BioAccumulators of Perchlorate, Harvey, Gregory J., Environmental Safety and Health Division (PPT: 744 Kb)

More Announcements

DoD Addresses Perchlorate



DoD has been working collaboratively with EPA, DOE, NASA and a variety of other federal, state, local and tribal entities since the 1990s to better understand and address perchlorate. DoD's investment in science and technology will contribute to EPA's effort to establish a safe drinking water standard for perchlorate.

DoD has spent more than \$60 million to date on the following initiatives:

- perchlorate detection methods,
- perchlorate occurrence studies,
- human health effects studies,
- pollution prevention measures
- treatment technologies, and
- site assessment and cleanup efforts



ACQUISITION,
TECHNOLOGY
AND LOGISTICS

OFFICE OF THE UNDER SECRETARY OF DEFENSE
3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

JAN 26 2006

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY
(INSTALLATIONS AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE NAVY (INSTALLATIONS
AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE AIR FORCE
(INSTALLATIONS, ENVIRONMENT, AND LOGISTICS)
DEFENSE LOGISTICS AGENCY (DSS-E)

SUBJECT: Policy on DoD Required Actions Related to Perchlorate

On January 10, 2005, the National Academy of Sciences completed its toxicological review of perchlorate. Based on the results of the NAS review, the U.S. Environmental Protection Agency (EPA) adopted an oral reference dose (RfD) for perchlorate, which, when used to calculate a Drinking Water Equivalent Level (DWEL), is equivalent to 24.5 parts per billion (ppb). If EPA determines regulation under the Safe Drinking Water Act (SDWA) is appropriate, it will establish a Maximum Contaminant Level Goal (MCLG). Once an MCLG is established, EPA will set an enforceable Maximum Contaminant Level (MCL), which is set as close to the MCLG as feasible using the best available analytical and treatment technologies and taking cost into consideration. Historically, MCLs have been set at levels different from the DWEL. Until such time as EPA or the states promulgate standards for perchlorate, DoD is establishing 24 ppb as the current level of concern for managing perchlorate. Once established, DoD will comply with applicable state or federal promulgated standards whichever is more stringent.

This guidance supersedes the September 29, 2003, memorandum, "Interim Policy on Perchlorate Sampling," and applies to active and closed installations, operational and other than operational ranges, and Formerly Used Defense Sites (FUDS) within the United States, its territories, and possessions, except where otherwise noted. The sampling results generated pursuant to this guidance must be retained by the installation and included in regular updates to each Component's perchlorate database. Semi-annual Environmental Management Reviews will include, on an as-needed basis, reporting requirements for perchlorate.

For drinking water systems and wastewater effluent discharges, perchlorate sampling and follow-on actions taken pursuant to this policy will be considered an Environmental



continue sampling quarterly until they and their major command are satisfied that perchlorate concentrations are likely to remain below the level of concern (24 ppb). Installations that do not detect perchlorate in drinking water at concentrations above 4 ppb for two consecutive sampling events are not required to continue sampling for perchlorate unless otherwise required to do so by regulation or permit terms. The requirements of this paragraph also apply to water systems at overseas permanent facilities that are required to conduct sampling.

DoD Wastewater Effluent Discharges

DoD Components shall sample semi-annually for perchlorate at permitted point sources where use of perchlorate is associated with processes related to the manufacture, maintenance, processing, recycling, or demilitarization of military munitions. Sampling will be conducted in conjunction with effluent sampling conducted under the permit applicable to that point source. Installations with confirmed results that indicate the presence of perchlorate in wastewater effluent discharges shall notify their headquarters and consult with them on appropriate actions. Depending on applicable water quality standards and other factors (e.g., mixing zones), permit modifications and/or follow-on actions may be required. Nothing in this policy is intended to diminish any requirements established by wastewater discharge permits issued by EPA, state, or host nation regulatory authorities for DoD installations or operations.

This policy is effective immediately.



Philip W. Grone
Deputy Under Secretary of Defense
(Installations and Environment)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

January 26, 2006

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

MEMORANDUM

SUBJECT: Assessment Guidance for Perchlorate

FROM: 
Susan Parker Bodine
Assistant Administrator

TO: Regional Administrators

This guidance replaces previous Office of Solid Waste and Emergency Response (OSWER) guidance and the accompanying questions and answers (referenced below) regarding perchlorate under the National Oil and Hazardous Substances Contingency Plan (National Contingency Plan, NCP), 40 CFR Part 300. As explained below, following the National Academy of Sciences' National Research Council (NRC) review, EPA adopted a reference dose (RfD) for perchlorate of 0.0007 milligram/kilogram-day (mg/kg-day), and this guidance applies that to EPA's CERCLA program. This RfD leads to a Drinking Water Equivalent Level (DWEL) of 24.5 micrograms/liter (ug/L) or 24.5 parts per billion (ppb).

Previous guidance on this topic included the 2003 guidance entitled "Status of EPA's Interim Assessment Guidance for Perchlorate," and the accompanying questions and answers, as well as the 1999 "Interim Assessment Guidance for Perchlorate." Those past guidances endorsed use of the provisional RfD range, 0.0001 to 0.0005 mg/kg-day, until the final health risk benchmark was established. They went on to use the standard default body weight (70 kg, approximately 154 pounds) and water consumption level (2 liters/day [L/day]) to calculate a DWEL of 4-18 ppb that was used as a recommended screening level.

Several agencies, including EPA, asked the NRC to review perchlorate toxicity. NRC's January 2005 final report, "Health Implications of Perchlorate Ingestion," recommended an RfD of 0.0007 mg/kg-day. Based on the NRC report and their recommended RfD, the EPA Integrated Risk Information System (IRIS) perchlorate RfD is now 0.0007 mg/kg-day. This IRIS RfD is now a value "to be considered" (TBC) in accordance with section 300.400(g)(3) of the NCP. As suggested by the NCP's preamble (55 Fed. Reg. 8745 (1990)), and subsequent guidance (OSWER Directive 9285.7-53 (2003)), use of the RfD in EPA's IRIS is preferred and consistent with the NCP's intent. EPA has determined that the RfD recommended by NRC and adopted by EPA represents the best available science regarding the toxicity of perchlorate.

and characterized; actual and potential exposure pathways through environmental media; actual and potential exposure routes; and other factors, as set out in 40 CFR 300.430(d). For example, the RI may indicate that individuals at a site may be exposed to perchlorate through multiple pathways. In such cases, contribution from non-water sources should be considered based on site-specific data until further national guidance on relative source contribution is developed. The Regions should consult applicable guidance, such as "Risk Assessment Guidance for Superfund: Volume I, Part A" (EPA/540/1-89/002, Dec. 1989) at pp. 8-15; and "Risk Assessment Guidance for Superfund: Volume I, Part B" (EPA/540/R-92/003, Pub. 9285.7-01B, Dec. 1991) at p. 20. If you have questions on the application of this guidance contact the Science Policy Branch of OSWER's Office of Superfund Remediation and Technology Innovation.

Final remediation goals and remedy decisions are made in accordance with 40 CFR 300.430(e) and (f) and associated provisions.



INSTITUTIONAL CONTROLS

What they are and how they are used

WHAT IS AN INSTITUTIONAL CONTROL?

The purpose of this fact sheet is to provide an overview of Institutional Controls (IC) and how they are used. A separate fact sheet is being developed on establishing and maintaining ICs as part of an environmental cleanup remedy decision. That fact sheet will also be available on the Department of Defense (DoD) BRAC Environmental homepage at <http://www.dtic.mil/envirodod/envbrac.html>.

- ICs have a long history as a tool in property law and their use in a non-environmental context is quite common. An example of an IC in a non-environmental context is a prohibition against having a television reception satellite dish in a planned community.
- An IC is a legal or institutional mechanism that limits access to or use of property, or warns of a hazard. An IC can be imposed by the property owner, such as use restrictions contained in a deed or by a government, such as a zoning restriction.

USES OF INSTITUTIONAL CONTROLS IN ENVIRONMENTAL CLEANUP

- ICs are used to ensure protection of human health and the environment.
- ICs are used to protect ongoing remedial activities and to ensure viability of the remedy.
- ICs are specifically provided for by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP).
- DoD has used and will use ICs in remedial activities during cleanup and as part of a final remedy.

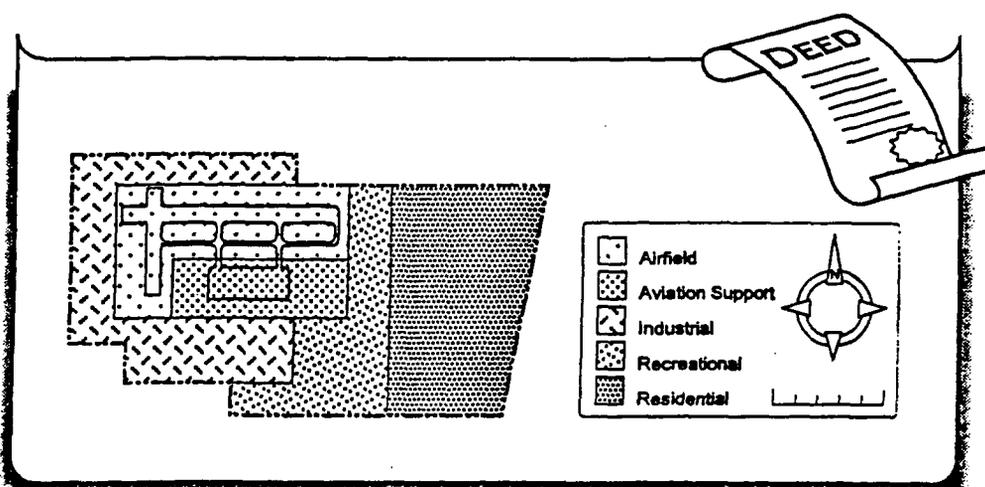
TYPES OF INSTITUTIONAL CONTROLS

ICs fall into two categories:

- Proprietary controls
- Governmental controls

WHAT IS A PROPRIETARY CONTROL?

- A proprietary control is a private contractual mechanism contained in

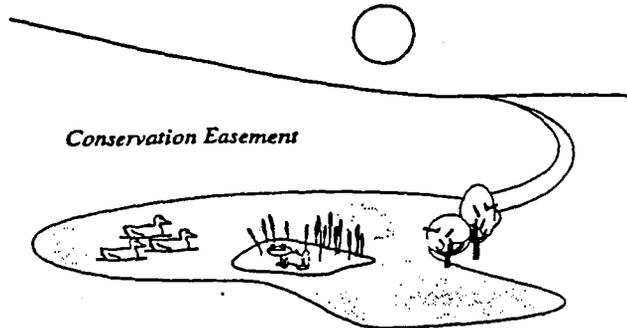


the deed or other document transferring the property.

- Proprietary controls involve the placement of restrictions on land through the use of easements, covenants, and reversionary interests. Easements, covenants, and reversionary interests are nonpossessory interests. Nonpossessory interests give their holders the right to use or restrict the use of land, but not to possess it.
- State law varies on the application and enforcement of such restrictions.

What is an Easement?

- An easement allows the holder to use the land of another, or to restrict the uses of the land. For example, a conservation easement restricts the owner to uses that are compatible with conservation of the environment or scenery.



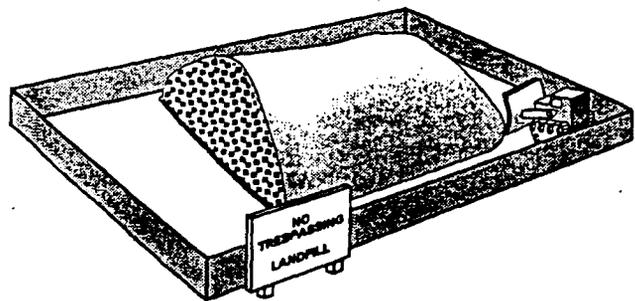
- If the owner violates the easement, the holder may bring suit to restrain the owner.
- An easement "appurtenant" provides a specific benefit to a particular piece of land. For example, allowing a neighbor to walk across your land to get to the beach. The neighbor's land, the holder of the easement, benefits by having beach access through your land.
- An easement "in gross" benefits an individual or company. For example, allowing the utility company to come on your land to lay a gas line. The utility company, the holder of the easement, benefits by having use of the land to lay the gas line.
- An affirmative easement allows the holder to use another's land in a way that, without the ease-

ment, would be unlawful-- for example, allowing a use that would otherwise be a trespass.

- A negative easement prohibits a lawful use of land -- for example, creating a restriction on the type and amount of development on land.

What is a Covenant?

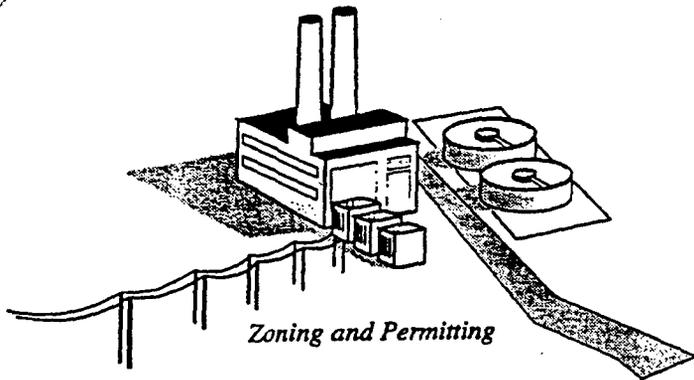
- A covenant is a promise that certain actions have been taken, will be taken, or may not be taken.
- Covenants can bind subsequent owners of the land. There are special legal requirements needed to bind subsequent owners.
- An affirmative covenant is a promise that the owner will do something that the owner might not otherwise be obligated to do -- for example, maintaining a fence on the property that surrounds a landfill.



- A negative covenant is a promise that an owner will not do something that the owner is otherwise free to do -- for example, restricting the use of groundwater on the land.

What is a Reversionary Interest?

- A reversionary interest places a condition on the transferee's right to own and occupy the land. If the condition is violated, the property is returned to the original owner or the owner's successors.
- Each owner in the chain of title must comply with conditions placed on the property. If a condition is violated the property can revert to the original owner, even if there have been several transfers in the chain of title.



WHAT IS A GOVERNMENTAL CONTROL?

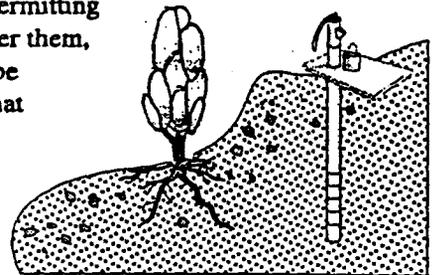
- Governmental controls are restrictions that are within the traditional police powers of state and local governments to impose and enforce.
- Permit programs and planning and zoning limits on land use are examples of governmental controls.

What are possible governmental controls?

- **Zoning**— Use restrictions imposed through the local zoning or land use planning authority. Such

restrictions can limit access and prohibit disturbance of the remedy. Zoning authority does not exist in every jurisdiction.

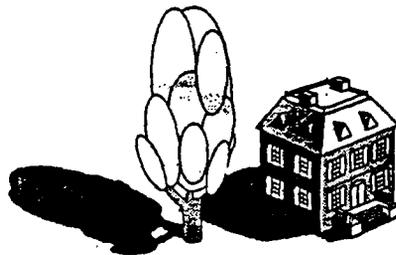
- **Siting restrictions** — Control land use in areas subject to natural hazards, such as earthquakes, fires, or floods. Such restrictions are created through statutory authority to require that states implement and enforce certain land use controls as well through local ordinances.
- **Groundwater restrictions**— Specific classification systems used to protect the quality of or use of ground water. These systems operate through a state well permitting system. Under them, criteria may be established that must be met before a use permit or construction is allowed.



Examples of the Application of Institutional Controls

Historic Preservation at U.S. Customs House, Boston

In 1987, the Custom House in Boston was deemed excess and the General Services Administration (GSA), through special legislation, sold it to the Boston Redevelopment Authority. At the time of the sale, the GSA placed an historic preservation covenant in the deed to protect the exterior architectural and structural integrity of the building. The Boston Redevelopment Authority wanted to resell the Custom House to a developer that planned to connect it by a skyway to a building half a block away. When GSA refused to remove the historic covenant, the deal fell through. Several years later, the Marriott Corporation proposed a plan to buy the Custom House and create an urban park between the Marriott at the Wharf and the Custom House. Under the plan, the building will retain its historic appearance and will be used as one of Marriott's time-share properties.



Examples of the Application of Institutional Controls

Limiting Subsurface Use at Former Minuteman Missile Silos

With the end of the Cold War, the Department of Defense announced the retirement of the Force Minuteman missile system in North and South Dakota and Missouri. As allowed by the Strategic Arms Reduction Treaty, the Air Force, after extensive technical analysis and public comment, determined that dismantlement of the missile facilities would be accomplished by imploding the structures, capturing the contamination within the concrete structures; capping each structure with a combination of three feet of soil and a thick plastic liner; and contouring the landscape at an additional depth of seven feet above the facility. The Air Force also determined that CERCLA 120(h) applied to the transfer of these facilities to non-federal entities. The Air Force and the U.S. Environmental Protection Agency (EPA) found a sensible approach to address environmental issues, which was formalized in an agreement between the two agencies. The agreement calls for the GSA in disposing the property to notify federal and state regulators when the property is transferred; provide prior notice to and obtain the approval of federal and state regulators for any construction or other activity that would affect the underground facility or groundwater monitoring wells; and place restrictions in the deed of conveyance to prohibit future property owners from installing water wells or otherwise physically penetrating beneath the surface of the site below two feet. The Air Force and regulators also were provided with rights of access. The ICs are in place for the disposal of these missile sites in North and South Dakota and Missouri.

Other Sources of Information

1. John Pendergrass, *Use of Institutional Controls as Part of a Superfund Remedy: Lessons from Other Programs*, 26 ELR 10219 (March 1996).
2. Report of the Future Land Use Working Group to the Defense Environmental Response Task Force, *Types of Institutional Controls*, (May 1996), available on DoD BRAC environmental homepage at <http://www.dtic.mil/envirodod/envbrac.html>.
3. Report to the Future Land Use Working Group to the Defense Environmental Response Task Force, *Making Institutional Controls Effective*, (September 1996) available on DoD BRAC environmental homepage at <http://www.dtic.mil/envirodod/envbrac.html>.

NOTICE

We welcome and invite your comments on this fact sheet, as we seek ways to improve the information provided. Please send comments to the following address:

OADUSD (Environmental Cleanup)
 Attn: Fast-track Cleanup
 3400 Defense Pentagon
 Washington, D.C. 20301-3400.



A Citizen's Guide to Natural Attenuation

Technology Innovation Office

Technology Fact Sheet

What is natural attenuation?

Natural attenuation makes use of natural processes to contain the spread of contamination from chemical spills and reduce the concentration and amount of pollutants at contaminated sites. Natural attenuation—also referred to as *intrinsic remediation*, *bioattenuation*, or *intrinsic bioremediation*—is an *in situ* treatment method. This means that environmental contaminants are left in place while natural attenuation works on them. Natural attenuation is often used as one part of a site cleanup that also includes the control or removal of the source of the contamination.

How does natural attenuation work?

The processes contributing to natural attenuation are typically acting at many sites, but at varying rates and degrees of effectiveness, depending on the types of contaminants present, and the physical, chemical and biological characteristics of the soil and ground water. Natural attenuation processes are often categorized as *destructive* or *non-destructive*. Destructive processes destroy the contaminant. Non-destructive processes do not destroy the contaminant but cause a reduction in contaminant concentrations.

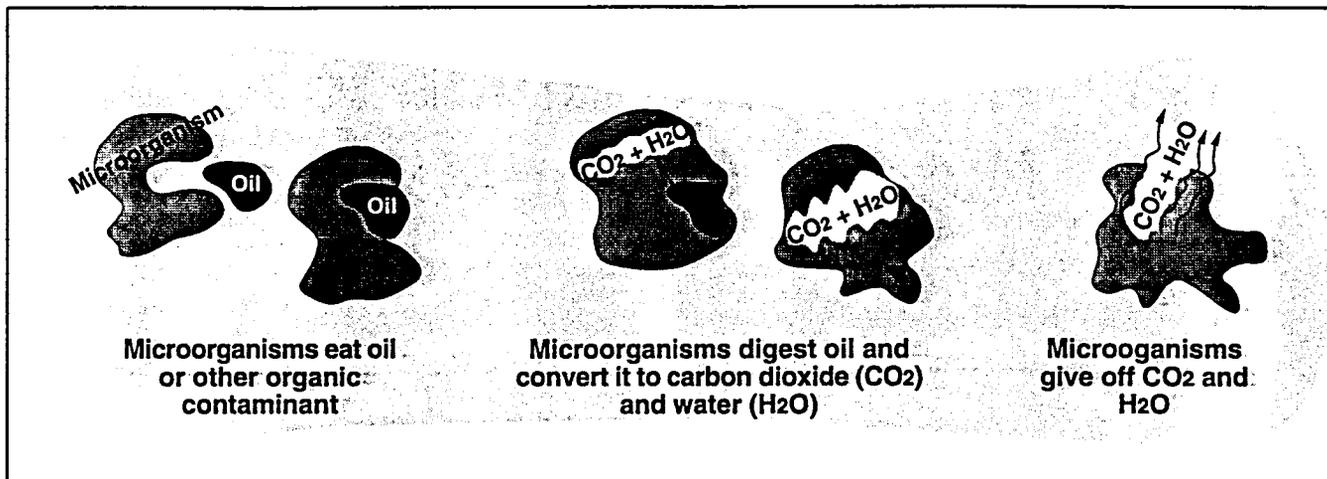
Natural attenuation processes may reduce contaminant mass (through destructive processes such as **biodegradation** and chemical transformations); reduce contaminant concentrations (through simple **dilution** or **dispersion**); or bind contaminants to soil particles so the contamination does not spread or migrate very far (**adsorption**).

Biodegradation, also called bioremediation, is a process in which naturally occurring microorganisms (yeast, fungi, or bacteria) break down, or *degrade*, hazardous substances into less toxic or nontoxic substances. Microorganisms, like humans, eat and digest organic substances for nutrition and energy. (In chemical terms, “organic” compounds are those that contain carbon and hydrogen atoms.) Certain microorganisms can digest organic substances such as fuels or solvents that are hazardous to humans. Biodegradation can occur in the presence of oxygen (aerobic conditions) or without oxygen (anaerobic conditions). In most subsurface environments, both aerobic and anaerobic biodegradation of contaminants occur. The microorganisms break down the organic contaminants into harmless products—mainly carbon dioxide and water in the case of aerobic biodegradation (Figure 1). Once the contaminants are degraded, the

A Quick Look at Natural Attenuation

- Uses naturally occurring environmental processes to clean up sites.
- Is non-invasive and allows the site to be put to productive use while being cleaned up.
- Requires careful study of site conditions and monitoring of contaminant levels.

Figure 1. Schematic Diagram of Aerobic Biodegradation in Soil



microorganism populations decline because they have used their food sources. Dead microorganisms or small populations in the absence of food pose no contamination risk. The fact sheet entitled *A Citizen's Guide to Bioremediation* describes the process in detail (see page 4).

Many organic contaminants, like petroleum, can be biodegraded by microorganisms in the underground environment. For example, biodegradation processes can effectively cleanse soil and ground water of hydrocarbon fuels such as gasoline and the BTEX compounds—benzene, toluene, ethylbenzene, and xylenes. Biodegradation also can break down chlorinated solvents, like trichloroethylene (TCE), in ground water but the processes involved are harder to predict and are effective at a smaller percentage of sites compared to petroleum-contaminated sites. Chlorinated solvents, widely used for degreasing aircraft engines, automobile parts, and electronic components, are among the most often-found organic ground-water contaminants. When chlorinated compounds are biodegraded, it is important that the degradation be complete, because some products of the breakdown process can be more toxic than the original compounds.

The effects of **dilution** and **dispersion** appear to reduce contaminant concentration but do not destroy the contaminant. Relatively clean water from the ground surface can seep underground to mix with and dilute contaminated ground water. Clean ground water from an underground location flowing into

contaminated areas, or the dispersion of pollutants as they spreading out away from the main path of the contaminated plume also lead to a reduced concentration of the contaminant in a given area.

Adsorption occurs when contaminants attach or *sorb* to underground particles. Fuel hydrocarbons tend to repel water, as most oily substances do. When they have an opportunity to escape from the ground water by attaching to organic matter and clay minerals that also repel water, they do so. This is beneficial because it may keep the contaminants from flowing to an area where they might be a health threat. Sorption, like dilution and dispersion, appears to reduce the concentration and mass of contamination in the ground water, but does not destroy the contaminants.

Why consider natural attenuation?

In certain situations, natural attenuation is an effective, inexpensive cleanup option and the most appropriate way to remediate some contamination problems. Natural attenuation is sometimes mislabeled as a “no action” approach. However, natural attenuation is really a proactive approach that focuses on the confirmation and monitoring of natural remediation processes rather than relying totally on “engineered” technologies. Mobile and toxic fuel hydrocarbons, for example, are good candidates for natural attenuation. Not only are they difficult to trap because of their mobility, but they are also among the contaminants most easily destroyed by biodegradation. Natural attenuation is non-invasive, and, un-

like many elaborate mechanical site cleanup techniques, while natural attenuation is working below ground, the land surface above ground may continue to be used. Natural attenuation can be less costly than other active engineered treatment options, especially those available for ground water, and requires no energy source or special equipment.

Will natural attenuation work at every site?

To estimate how well natural attenuation will work and how long it will take requires a detailed study of the contaminated site. The community and those conducting the cleanup need to know whether natural attenuation, or any proposed remedy, will reduce the contaminant concentrations in the soil and water to legally acceptable levels within a reasonable time.

Natural attenuation may be an acceptable option for sites that have been through some active remediation which has reduced the concentrations of contaminants. However, natural attenuation is not an appropriate option at all sites. The rates of natural processes are typically slow. Long-term monitoring is necessary to demonstrate that contaminant concentrations are continually decreasing at a rate sufficient to ensure that they will not become a health threat. If not, more aggressive remedial alternatives should be considered.

What Is An Innovative Treatment Technology?

Treatment technologies are processes applied to the treatment of hazardous waste or contaminated materials to permanently alter their condition through chemical, biological, or physical means.

Innovative treatment technologies are those that have been tested, selected or used for treatment of hazardous waste or contaminated materials but lack well-documented cost and performance data under a variety of operating conditions.

Because the ability of natural attenuation to be an effective cleanup method depends on a variety of conditions, the site needs to be well-characterized to determine if natural attenuation is occurring or will occur. Sites where the soil contains high levels of natural organic matter, such as swampy areas or former marshlands often provide successful conditions for natural attenuation. Certain geological formations such as fractured bedrock aquifers or limestone areas are less likely candidates for natural attenuation because these environments often have a wide variety of soil types that cause unpredictable ground water flow and make predicting the movement of contamination difficult.

Where is natural attenuation being used?

Natural attenuation is being used to clean up petroleum contamination from leaking underground storage tanks across the country.

Within the Superfund program, natural attenuation has been selected as one of the cleanup methods at 73 ground-water-contaminated sites—but is the sole treatment option at only six of these sites. Some of these sites include municipal and industrial landfills, refineries, and recyclers.

At the Allied Signal Brake Systems Superfund site in St. Joseph, Michigan, microorganisms are effectively removing TCE and other chlorinated solvents from ground water. Scientists studied the underground movement of TCE-contaminated ground water from its origin at the Superfund site to where it entered Lake Michigan about half a mile away. At the site itself, they measured TCE concentrations greater than 200,000 micrograms per liter ($\mu\text{g/L}$), but by the time the plume reached the shore of Lake Michigan, the TCE was one thousand times less—only $200\mu\text{g/L}$. About 300 feet offshore in Lake Michigan, the concentrations were below EPA's allowable levels. EPA estimated the plume took about 20 years to move from the source of contamination to Lake Michigan—plenty of time for the microorganisms naturally present in the ground water to destroy the TCE without any outside intervention. In fact, microorganisms were destroying about 600 pounds of TCE a year at no cost to taxpayers. EPA determined that nature adequately remediated the TCE plume in St. Joseph.

For More Information

The publications listed below can be ordered free of charge by faxing your request to NCEPI at 513-489-8695. If NCEPI is out of stock of a document, you may be directed to other sources. Some of the documents listed also can be downloaded free of charge from EPA's Cleanup Information (CLU-IN) World Wide Web site (<http://clu-in.com>) or electronic bulletin board (301-589-8366). The CLU-IN help line number is 301-589-8368.

You may write to NCEPI at:

National Center for Environmental Publications and Information (NCEPI)
P.O. Box 42419
Cincinnati, OH 45242

- *A Citizen's Guide to Bioremediation*, April 1996, EPA 542-F-96-007.
- *Symposium on Intrinsic Bioremediation of Ground Water*, August 1994, EPA 540-R-94-515.
- *Bioremediation Research: Producing Low-Cost Tools to Reclaim Environments*, September 1995, EPA 540-R-95-523a.
- "Natural Bioremediation of TCE," *Ground Water Currents* (newsletter), September 1993, EPA 542-N-93-008.
- "Innovative Measures Distinguish Natural Bioattenuation from Dilution/Sorption," *Ground Water Currents* (newsletter), December 1992, EPA 542-N-92-006.
- *How to Evaluate Alternative Cleanup Technologies for UST Sites*, (Chapter on Natural Attenuation), May 1995, EPA 510-B-95-007.
- *Bioremediation Resource Guide*, September 1993, EPA 542-B-93-004. **A bibliography of publications and other sources of information about bioremediation technologies.**
- *Engineering Bulletin: In Situ Biodegradation Treatment*, April 1994, EPA 540-S-94-502.
- *Selected Alternative and Innovative Treatment Technologies for Corrective Action and Site Remediation: A Bibliography of EPA Information Sources*, January 1995, EPA 542-B-95-001. **A bibliography of EPA publications about innovative treatment technologies.**
- *WASTECH[®] Monograph on Bioremediation*, ISBN #1-883767-01-6. Available for \$49.95 from the American Academy of Environmental Engineers, 130 Holiday Court, Annapolis, MD 21401. Telephone 410-266-3311.

NOTICE: This fact sheet is intended solely as general guidance and information. It is not intended, nor can it be relied upon, to create any rights enforceable by any party in litigation with the United States. The Agency also reserves the right to change this guidance at any time without public notice.



Perchlorate Update

MARCH 2002

The United States Environmental Protection Agency (EPA) has released its revised draft toxicity assessment, "Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization." When finalized, this assessment will be an important update of EPA's health assessment that reflects the state of the science regarding the health effects of the chemical perchlorate. The preliminary revised human health risk estimates found in the document are still undergoing review and deliberations both by the external scientific community and within EPA, and do not represent EPA policy at this stage.

How To Review and Comment on EPA's Draft Perchlorate Toxicity Assessment

The draft perchlorate toxicity assessment is available at EPA's National Center for Environmental Assessment (NCEA) Web site www.epa.gov/ncea under "what's new." Written public comments on the scientific literature and on EPA's characterization of the science in the draft perchlorate assessment will be accepted by EPA's contractor, Eastern Research Group, for consideration during the Agency's document revision process. These comments will be made available to the peer reviewers. Public comments must be received by April 5, 2002. Send your comments to: Eastern Research Group ERG, Attn: Meetings, 100 Harrwell Avenue, Lexington, MA 02421. If your comments are under 50 pages in length, you can send them via email attachment (in Word, WordPerfect or PDF) to meetings@erg.com.

What is Perchlorate?

Perchlorate is both a naturally occurring and man-made chemical. Most of the perchlorate manufactured in the United States is used as the primary ingredient of solid rocket propellant. Wastes from the manufacture and improper disposal of perchlorate-containing chemicals are increasingly being discovered in soil and water.

How Can Perchlorate Affect Human Health?

Perchlorate interferes with iodide uptake into the thyroid gland. Because iodide is an essential component of thyroid hormones, perchlorate disrupts how the thyroid functions. In adults, the thyroid helps to regulate metabolism. In children, the thyroid plays a major role in proper development in addition to metabolism. Impairment of thyroid function in expectant mothers may impact the fetus and newborn and result in effects including changes in behavior, delayed development and decreased learning capability. Changes in thyroid hormone levels may also result in thyroid gland tumors. EPA's draft analysis of perchlorate toxicity is that perchlorate's disruption of iodide uptake is the key event leading to changes in development or tumor formation.

What are the Preliminary Conclusions of the Draft Toxicity Assessment?

The EPA draft assessment concludes that the potential human health risks of perchlorate exposures include effects on the developing nervous system and thyroid tumors. The draft assessment includes a draft reference dose (RfD) that is intended to be protective for both types of effects. It is based on early events that could potentially result in these effects, and factors to account for sensitive populations, the nature of the effects, and data gaps were used. The draft RfD is 0.00003 milligrams per kilogram per day (mg/kg/day). The RfD is defined as an estimate, with uncertainty spanning perhaps an order of magnitude, of a daily exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of adverse effects over a lifetime. As with any EPA draft assessment document containing a quantitative risk value, that risk value is also draft and should not at that stage be construed to represent EPA policy. Thus, the draft RfD for perchlorate is still undergoing science review and deliberations both by the external scientific community and within the Agency.

The assessment provides a hypothetical conversion of the draft RfD to a drinking water equivalent level, assuming factors of 70 kilograms (kg) body weight and 2 liters (L) of water consumption per day. The converted draft estimate would be 1 microgram per liter (ug/L) or 1 part per billion (ppb). If the Agency were to make a determination to regulate perchlorate, the RfD, along with other considerations would factor into the final value.

Does Perchlorate Cause Cancer?

Perchlorate is associated with disruption of thyroid function which can potentially lead to thyroid tumor formation. This draft toxicity assessment accounts for both developmental and tumor formation effects.

Does My Water Contain Perchlorate?

Confirmed perchlorate releases have occurred in at least 20 states throughout the United States (see Figure 2). In EPA Region 9, perchlorate releases have occurred in California, Arizona, and Nevada. Perchlorate has also been released into the Colorado River, which is a drinking water source for some areas of the region. Additional information and maps detailing those sites are available in Chapter 1 of the draft of the "Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization." EPA, other federal agencies, states, water suppliers and industry are already actively addressing perchlorate contamination through monitoring for perchlorate in drinking water and surface water. The full extent of perchlorate contamination is not known at this time.

What is Being Done about Perchlorate?

A peer review of the draft perchlorate

toxicity assessment will be held March 5 and 6, 2002 in Sacramento, CA. The purpose of the peer review is to provide an independent review of the scientific information and interpretation used in the document. Once the assessment is finalized, the reference dose will be used in EPA's ongoing efforts to address perchlorate problems. EPA's draft reference dose represents a preliminary estimate of a protective health level and is not a drinking water standard. In the future, EPA may issue a Health Advisory that will provide information on protective levels for drinking water. This is one step in the process of developing a broader response to perchlorate including, for example, technical guidance, possible regulations and additional health information. A federal drinking water regulation for perchlorate, if ultimately developed, could take several years.

In 1998, perchlorate was placed on EPA's Contaminant Candidate List for consideration for possible regulation. In 1999, EPA required drinking water monitoring for perchlorate under the Unregulated Contaminant Monitoring Rule (UCMR). Under the UCMR, all large public water systems and a representative sample of small public water systems are required to monitor for perchlorate over the next two years to determine whether the public is exposed to perchlorate in drinking water nationwide.

How is Perchlorate Removed from Water?

Several types of treatment systems designed to reduce perchlorate concentrations are operating around the United States, reducing perchlorate to below the 4 ppb reporting level. Biological treatment and ion (anion) exchange systems are among the technologies that are being used, with additional treatment technologies under development.

Many other perchlorate studies have been completed during the last several years. A May 2001 summary of 65 perchlorate treatment studies is available online at www.gwrnac.org/ (click on "Technical Documents" then look for "Technology Status Reports"). The summary report was prepared by the Ground-Water Remediation Technologies Analysis Center. Most of the projects described in the report are bench-scale and pilot-scale demonstrations of water treatment technologies, although several entries describe full-scale systems and soil treatment methods. Most of the projects employ biological treatment methods or ion (anion) exchange technology, although reverse osmosis, nanofiltration, granular activated carbon, and chemical reduction are also discussed. Results of federally-funded perchlorate treatment research, managed by the American Water Works Association Research Foundation (AWWARF), are also becoming available (see www.awwarf.com/research/spperch.asp).

Is Perchlorate-contaminated Water Safe to Drink?

EPA's draft toxicity assessment is preliminary and thus, it is difficult to make definitive recommendations at this stage. Other factors that influence the answer to this question include how much water is consumed, the degree of perchlorate contamination and the health status of the consumer.

Sensitive populations, like pregnant women, children and people who have health problems or compromised thyroid conditions, should follow the advice of their health care provider regarding the amount and type of liquids, including water that should be consumed.

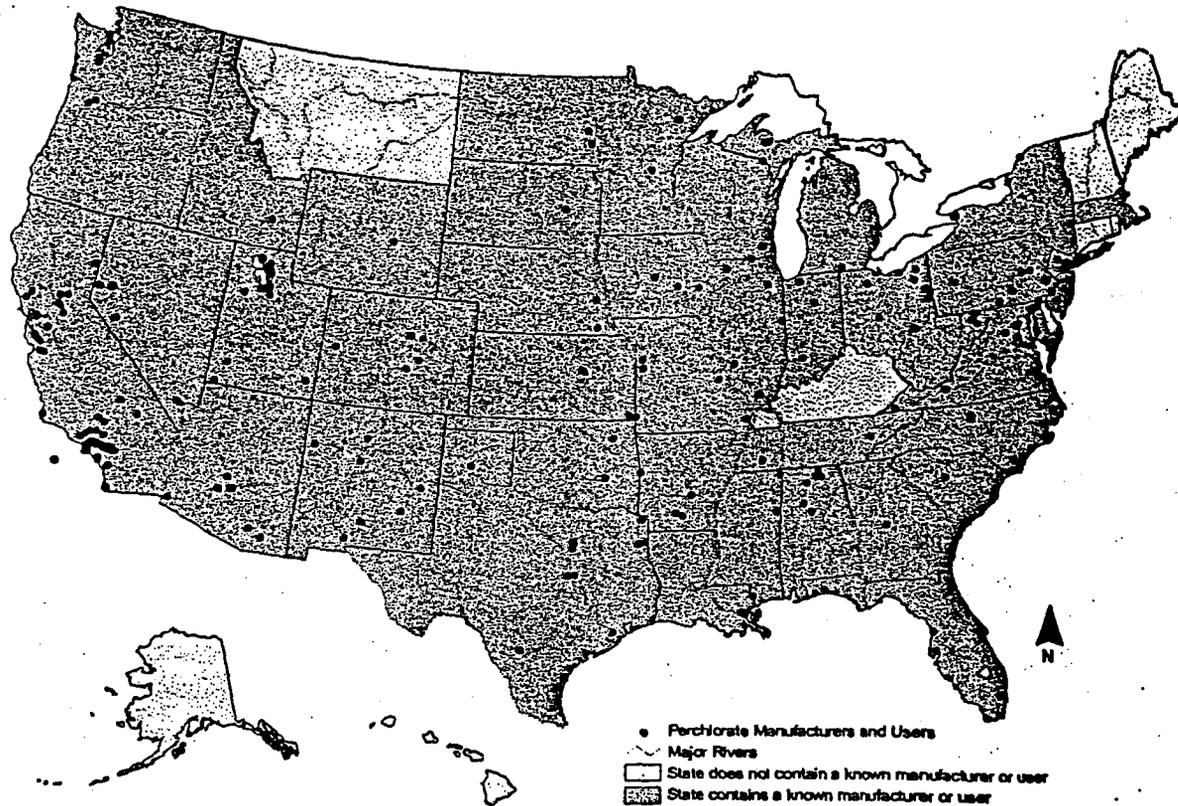


Figure 1: U.S. Perchlorate Manufacturers and Users, as of October 2001

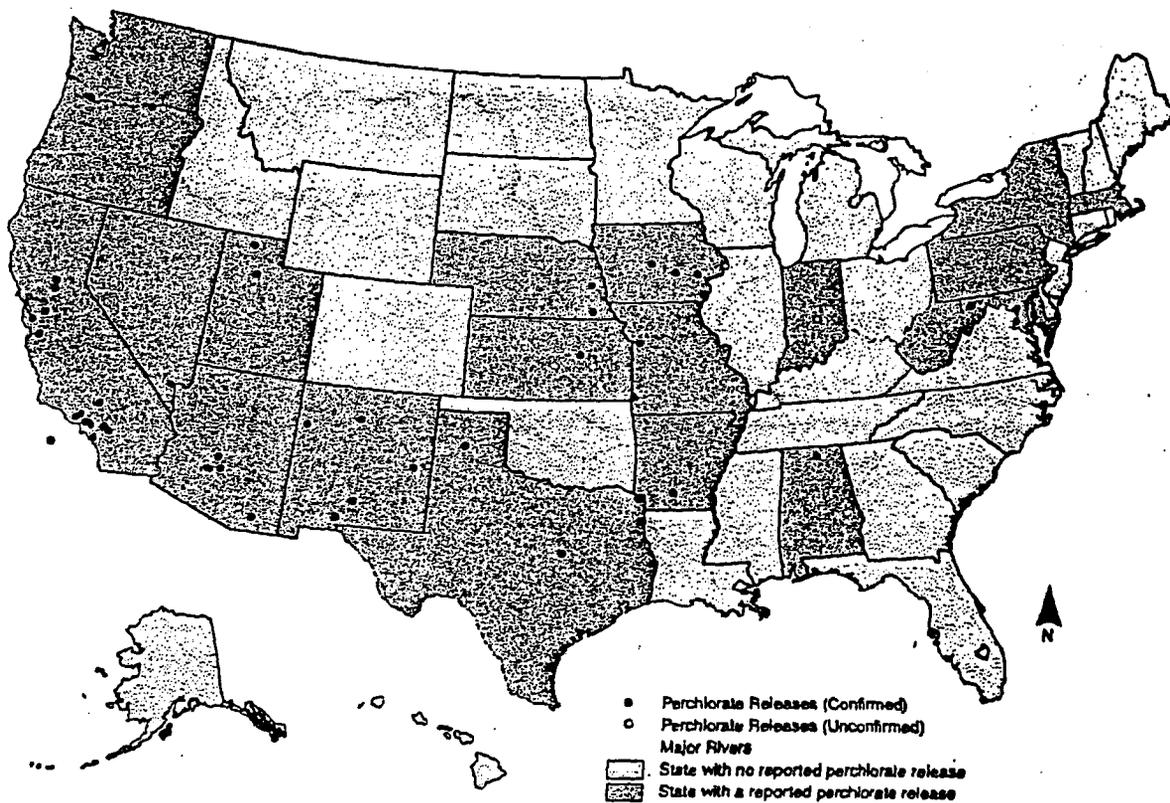


Figure 2: Reported Releases of Perchlorate into the Environment, as of November 2001

For more information

U.S. Environmental Protection Agency Contacts

Direct health and risk assessment questions to:

Annie Jarabek
National Center for Environmental Assessment
Office of Research and Development
(919) 541-4847

Direct questions about occurrence to:

Kevin Mayer
Region 9 Remedial Project Manager
Superfund Division
(415) 972-3176

Direct questions about treatment technology to:

Wayne Praskins
Region 9 Superfund Division
San Gabriel Valley treatment studies
(415) 972-3181

Direct questions about regulatory issues to:

David Huber
Office of Ground Water and Drinking Water
(202) 564-4878

Direct questions about the Integrated Risk Information System (IRIS) to:

Amy Mills
National Center for Environmental Assessment
Office of Research and Development
(202) 564-3204

During the peer review and in regard to Region 9

Direct press inquiries to:
Lisa Fasano
Region 9 Office of Public Affairs
(415) 947-4307

After peer review and outside of Region 9

Direct press inquiries to:
Dave Deegan
EPA Office of Media Relations
(202) 564-7839

or

Richard David
Immediate Office of the Assistant Administrator
Office of Research and Development
(202) 564-3376

Direct questions about community involvement or the mailing list to:

Wenona Wilson
Region 9 Community Involvement Coordinator
Superfund Division
(415) 972-3239
(800) 231-3075



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Superfund Today

FOCUS ON FIVE-YEAR REVIEWS AND INVOLVING THE COMMUNITY

Checking Up On Superfund Sites: The Five-Year Review

The U.S. Environmental Protection Agency (EPA) conducts regular checkups, called five-year reviews, on certain Superfund sites. EPA looks at sites where cleanup left wastes that limit site use. For example, EPA will look at a landfill to make sure the protective cover is not damaged and is working properly. EPA will also review sites with cleanup activity still in progress after five years.

In both cases, EPA checks the site to make sure the cleanup continues to protect people and the environment. The EPA review team conducts the review, asks and answers questions, and writes a report on the results of the review. At some sites, other Federal agencies, a State agency, or an Indian Tribe may do the review, but EPA stays involved in the process and approves the report.

The Five-Year Review is:

- a regular EPA checkup on a Superfund site that has been cleaned up—but waste was left behind—to make sure the site is still safe;
- a way to make sure the cleanup continues to protect people and the environment; and
- a chance for you to tell EPA about site conditions and any concerns you have.

During the review, EPA studies information on the site, including the cleanup and the laws that apply, and inspects the site to make sure it continues to be safe. EPA also needs information from people who are familiar with the site. As someone living close to the site, you may know about things that can help the review team decide if the site is still safe. Here are some examples of things to tell EPA about:

- Broken fences, unusual odors, dead plants, materials leaving the site, or other problems;
- Buildings or land around the site being used in new ways;
- Any unusual activities at the site, such as dumping, vandalism, or trespassing; and
- Ways the cleanup at the site has helped the area.

For More Information ...

... about a Superfund site in your neighborhood, please call the toll-free Superfund/RCRA Hotline at 1-800-424-9346 or the Community Involvement Coordinator in the EPA regional office for your state. Your local EPA office can tell you where you can go to review files on every Superfund site in your area. Often, EPA holds community meetings to let people who live near a site know about site activities. You also may find useful information on the Superfund home page (www.epa.gov/superfund). More information about the five-year review process can be found in the document, "Comprehensive Five Year Review Guidance," EPA 540-R-01-007, OSWER 9355.7-03B-P, June 2001.

The Five-Year Review: Continuing to Protect You and the Environment

Step 1: Develop Plan

To plan a five-year review, the site manager forms a review team, which may include an EPA Community Involvement Coordinator, scientists, engineers, and others. The team members decide what they will do at the site and when they will do it. The Community Involvement Coordinator is the member of the team who works with your community during the review.

Your role: EPA will announce the start of the review, probably through a notice in a newspaper or a flyer. Review the notice to see when the review will start.

Step 2: Collect Information

The review team members collect information about site cleanup activities. They talk with people who have been working at the site over the past five years, as well as local officials, to see if changes in local policy or zoning might affect the original cleanup plan. The team usually visits the site to see if the cleanup equipment is working properly, to take new samples, and to review records of activities at the site to make sure the cleanup is still effective. Finally, the review team may talk to people who live or work near the site to learn about site activities during the past five years. They may give you a call or meet with you in person.

Your role: If you know anything about unusual site activities at or around the site, such as trespassing or odors, or have any other concerns, call the Community Involvement Coordinator.

Step 3: Ensure Safety, Announce Findings, and Publish Report

The review team uses the information collected to decide if your community and the environment are still safe from the contaminated material left at the site. If the cleanup activities are keeping people and the environment safe, the team calls them "protective." When cleanup goals are not being met, or when problems come up, the review team will call the cleanup activities "not protective." When the team finishes the five-year review, it writes a report about the information that includes background on the site and cleanup activities, describes the review, and explains the results. The review team also writes a summary and announces that the review is finished. They tell your community (via public notices, flyers, etc.) where to find copies of the report and summary—at a central place called the site repository—for anyone to see.

Your role: Read about the site and learn about the cleanup methods being reviewed. Review the report. Ask the Community Involvement Coordinator any questions you have about the site.

What Happens After The Review?

As long as contaminated materials at the site stop people from freely using the land, EPA will do a review every five years. EPA also regularly monitors the site based on an operations and maintenance plan they develop. For example, the site manager may visit the site and read reports about activities at the site. Also, site workers may visit the site to cut the grass, take samples, or make sure equipment is working. If you see any problems or things that concern you—don't wait for the five-year review—let EPA know right away.

Environmental Data Quality

The Navy, through its prime contractors, employs several laboratories to perform a wide variety of environmental analyses. These laboratories are required to successfully complete the state of California certification process and the Navy's laboratory evaluation program before they are used for Navy projects. These quality control programs are designed to determine if laboratories have (and use) adequate quality control and quality assurance procedures that enable them to produce reliable environmental data. As a component of these certification programs the lab must be able to produce acceptable analytical results for samples provided by the certifying agency. These samples are known as performance evaluation samples, and ongoing laboratory performance is monitored throughout the year through analyses of additional performance evaluation samples. .

The quality of environmental data is judged according to various criteria; these include Precision, Accuracy, Representativeness, Completeness and Comparability. These criteria are collectively referred to as the PARCC parameters. Precision refers to the variability of the data (i.e. how closely results from the same test of the same sample agree). Precision of reported results is a function of inherent field-related variability plus laboratory analytical variability. Accuracy is the degree of agreement between the test result and the true value of the property being measured; it is a measure of bias in the system. Representativeness is a parameter that is most concerned with the proper design of the sampling plan and the absence of cross-contamination. Good representativeness is achieved through careful selection of sampling locations, testing parameters and methods, and proper sample collection and handling procedures. Completeness refers to the amount of usable data obtained from a given sampling effort, and comparability is related to the similarity of data obtained from one sampling effort to another. Comparability is achieved through the use of consistent methods of acquisition, handling, and analysis of samples.

Analytical methods, many types of quality control samples, and quality assurance procedures have been developed by the EPA and others to insure that environmental data satisfy these PARCC parameters and will meet project needs. The Navy documents these criteria in its project specific Sampling and Analysis Plans.

The Navy uses the following types of quality control (QC) checks to insure that the environmental data collected of the highest quality:

1. Duplicate samples collected in the field or prepared in the laboratory to demonstrate precision
2. Equipment Rinse Blanks collected in the field to verify adequacy of decontamination procedures and insure the accuracy of results
3. Trip Blanks transported with environmental samples to verify that no contamination occurs during sample transport

4. Source Blanks collected in the field to verify that no contamination occurs during sample collection
5. Matrix Spikes prepared in the laboratory to determine the precision and accuracy, of analytical results
6. Surrogate and Internal Standards prepared in the laboratory, which serve as the basis for quantification and provide a measure of accuracy
7. Method Blanks prepared in the laboratory to detect possible laboratory contamination and assess accuracy

The number and type of QC samples required depends upon the nature and purpose of the samples being collected. For example, a trip blank is a sealed water sample that is placed in the cooler used to transport samples from the field to the lab. Trip blanks are only used when water samples are being collected for volatile organic compound (VOC) analysis. This is because water samples can absorb and retain air borne contaminants if not properly handled and sealed. In general, the type of sample and the tests to be performed determines which types of quality control samples are needed. These requirements are documented for each project in the associated Sampling and Analysis Plan.

The quality of laboratory measurements is verified on several levels before test results are released to the end users. Test results that are not fully compliant with the prescribed quality control requirements are flagged with coded laboratory qualifiers to alert the end users. These lab qualifiers allow the end-user to determine data usability. In addition, the Navy uses independent (third party) data validation to verify compliance with a wide variety of method and QC requirements. Data sets whose QC requirements are not fully compliant are also flagged (validation qualifiers). These qualifiers are important to the data users in assessing data usability.

As described above, good quality data requires many things from sample collection to data reporting. Analysis of environmental samples are highly prescriptive, there is no room for arbitrary experimentation or sloppy techniques. Deviations from the prescribed methods are not allowed unless acceptable alternatives are approved in advance.

COMMONLY ASKED QUESTIONS REGARDING THE USE OF NATURAL ATTENUATION FOR CHLORINATED SOLVENT SPILLS AT FEDERAL FACILITIES

This brochure was developed through a partnership among the U.S. EPA, Air Force, Army, Navy, and Coast Guard.

Do federal, state, and local regulations allow natural attenuation as an option for remediation of chlorinated solvents?

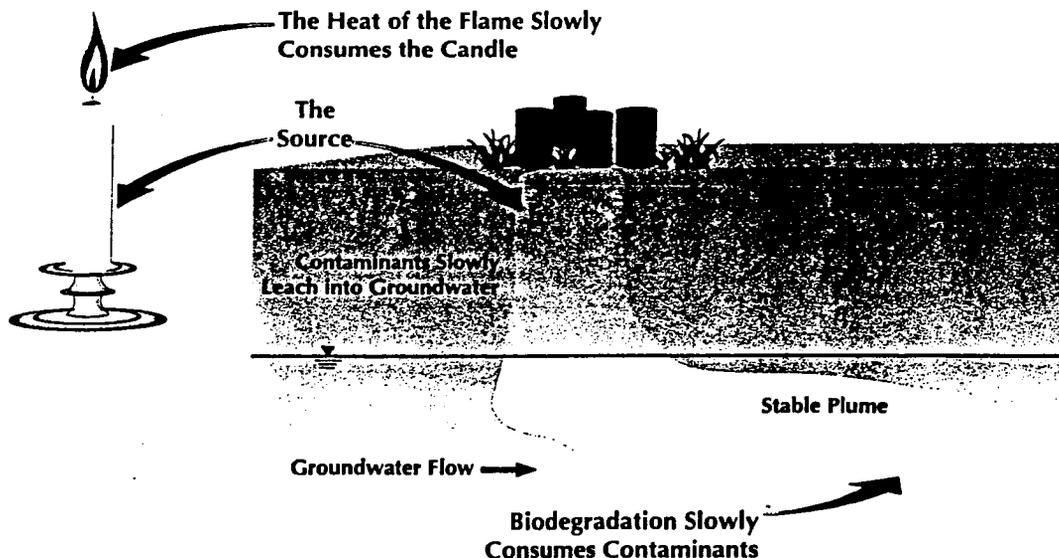
Natural attenuation is recognized by the EPA as a viable method of remediation for soil and groundwater that can be evaluated and compared to other methods of achieving site remediation as a part of the remedy selection process. The selection of natural attenuation as a component of any site remedy should be based on its ability to achieve remediation goals in a reasonable timeframe and protect human health and the environment. EPA recognition of natural attenuation extends to sites regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the Resource Conservation and Recovery Act (RCRA); and underground storage tank (UST) regulations. Natural attenuation is not a default option or a "presumptive remedy." As with any remedy, it must comply with state groundwater use classifications and standards.

What is natural attenuation?

When chlorinated solvents such as trichloroethene (TCE) or perchloroethene (PCE) are spilled or leak into the soil or groundwater, several natural processes can occur to destroy or alter these chemicals. These processes, known collectively as natural attenuation, include adsorption to soil particles, biodegradation of contaminants, and dilution and dispersion in groundwater. Many contaminants are prevented from migrating off the site because they are adsorbed to soil particles. Although biodegradation does not occur at all chlorinated solvent sites, it can be an important process in destroying these contaminants. Dilution and dispersion do not destroy contaminants, but can significantly reduce their potential risk at many sites.

"Intrinsic" and "passive" remediation are other terms which have been used to describe the combined effect of these processes. Dr. John Wilson of the EPA compares natural attenuation in groundwater to the flame of a candle. The source of the flame is the wax of the candle just as the source of the groundwater contamination is the concentrated solvents trapped in the soil. The flame appears steady because the wax is destroyed in the flame as fast as it is removed from the candle. In the same way, many groundwater plumes will reach "steady state" at some distance from the source, when biological reactions are able to destroy contaminants as they enter the groundwater from the soil. Eventually, the candle is consumed by the flame just as the contaminants in the soil and groundwater can be attenuated through biodegradation and other natural processes.

"Under certain site conditions, and if properly documented, natural attenuation can be a viable option for remediating sites as a stand-alone option or in conjunction with other engineered remediation." Jim Woolford, Director, EPA's Federal Facilities Restoration and Reuse Office



How is natural attenuation different from the "do nothing" approach?

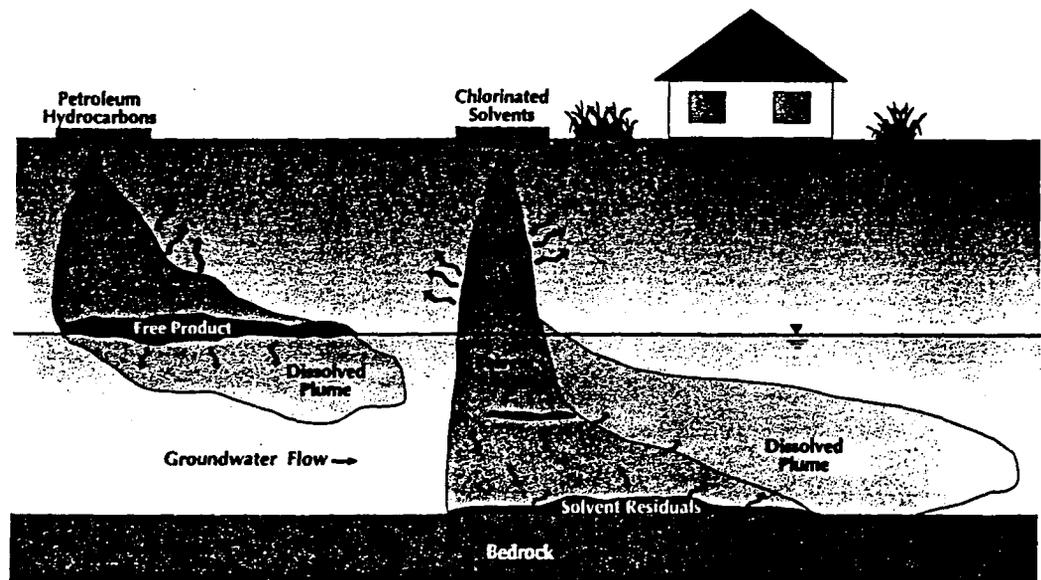
Natural attenuation is sometimes mislabeled as the "do nothing" or "walk away" approach to site cleanup. The truth is that natural attenuation is a proactive approach that focuses on the verification and monitoring of natural remediation processes rather than relying totally on "engineered" processes.

Before natural attenuation can be proposed for any site, significant soil and groundwater data must be collected and evaluated to document that natural attenuation is occurring and to estimate the effectiveness of natural processes in reducing contaminant concentrations over time. If natural attenuation is selected as the preferred site remedy, the party responsible for site cleanup must commit to long-term monitoring to verify that the contaminants pose no risk to human health or the environment and that natural processes are reducing contaminant levels and risk as predicted. Land use and groundwater use are generally controlled on these sites to prevent human exposure to contaminants.

How does natural attenuation of chlorinated solvents differ from natural attenuation of petroleum products such as fuels?

Because chlorinated solvents are synthetic chemicals, they tend to be more resistant to natural biodegradation processes. However, significant evidence now exists that biochemical reactions can also break down chlorinated compounds in the soil and groundwater. These processes are harder to predict and are effective at a smaller percentage of sites compared to petroleum-contaminated sites. Despite these limitations, significant progress has been made in understanding the fate and transport of chlorinated solvents and the role of natural attenuation.

Chlorinated solvents also migrate differently than petroleum hydrocarbons. Because chlorinated compounds have a greater density than water, they tend to sink rapidly into the aquifer. When large quantities of solvent are released, they will sink until they encounter an impermeable layer where they form small pools which serve as a long-term source of groundwater contamination. These untreated sources dissolve slowly over time, contaminating large volumes of water.



How can you tell if natural attenuation may work at a site?

Experts in the science of natural attenuation have identified several good indicators or lines of evidence that can be used to prove that natural processes are reducing contaminant concentrations. The following lines of evidence are useful in documenting the natural attenuation of chlorinated solvents:

- Historical trends indicating a decrease in contaminant concentrations, as well as a stable or retreating plume. A stable or retreating plume generally indicates that contaminants are being destroyed as fast as they are dissolved into the groundwater.
- Favorable geochemical conditions. Biological reactions will change the chemical composition of the groundwater. One condition which is particularly favorable for chlorinated solvent destruction occurs in groundwater that has been completely depleted of oxygen and nitrate. Depleted levels of sulfate and elevated levels of dissolved methane are also favorable conditions.
- Breakdown or "daughter" products. Chlorinated solvents are often destroyed by biochemical reactions which remove one chlorine atom at a time from the "parent" or original solvent. When these breakdown products are detected in the groundwater, it provides evidence that contaminant destruction is underway. It is important for biodegradation to be complete, because some breakdown products may be more toxic than parent compounds.
- Laboratory "microcosm" studies. These studies can be used to simulate aquifer conditions and to demonstrate that native bacteria can create the necessary biochemical reactions to destroy contaminants of concern. This technique is sometimes required for chlorinated solvent sites because the biochemical reactions are more complex and more difficult to predict than reactions on petroleum-contaminated sites.

The Air Force Center for Environmental Excellence is developing a comprehensive natural attenuation protocol (Draft Technical Protocol for Natural Attenuation of Chlorinated Solvents in Groundwater) for chlorinated solvent sites. This document describes how this evidence can be collected during site investigation activities and how it can be interpreted to estimate the contribution of natural attenuation in the remediation process.

Will natural attenuation be effective on all chlorinated sites?

Definitely not. Some chlorinated solvent contamination has impacted large quantities of groundwater which will be required for some beneficial use. There are risks associated with the continued migration of these plumes into public drinking water supplies and some form of engineered remediation is needed at these sites. On sites where no current risk to public health or the environment exists, natural attenuation can play an important role in reducing future risk if institutional controls (e.g., deed restrictions and zoning ordinances) can be implemented. Scientists are beginning to observe certain site profiles where natural attenuation has a higher probability of being integrated into the remediation process. These include:

- Sites where chlorinated solvents are spilled with other petroleum compounds (the best biochemical reactions for degradation are produced).
- Sites where the soil contains high levels of natural organic matter, such as swampy areas or former marshlands.
- Sites where shallow (unused) groundwater is separated from deeper groundwater by a thick, low-permeability clay layer.
- Sites where there is little or no source remaining due to active remediation.

Why are chlorinated solvent spills so common at federal facilities?

Chlorinated solvents were developed as superior cleaning solutions for removing grease and carbon buildup from metal parts. For over 40 years they were widely used by U.S. industry and the federal government for a variety of equipment cleaning tasks.

Prior to environmental laws restricting their use, these compounds were often stored in drums or underground storage tanks and disposed of in the sanitary sewer, in evaporation ponds, or mixed with fuels and burned. These solvents have created significant groundwater contamination at many federal facilities. Since 1976, when RCRA was established, the use and disposal of these solvents have been carefully regulated and many chlorinated solvents have been replaced with less harmful substitutes.

Can natural attenuation achieve site cleanup goals?

Natural attenuation may be effective in achieving cleanup goals at some sites, particularly when these goals are based on site-specific risk reduction. For example, if contaminant migration is limited to shallow groundwater, and groundwater use can be controlled, natural attenuation may eventually achieve cleanup goals on some sites. However, natural attenuation is more likely to play a role in cleaning up a portion of a chlorinated site. Natural attenuation is more likely to clean up areas that have lower levels of contamination. Such areas are normally found outside of highly contaminated source areas, or at sites with relatively small source areas.

What are some of the potential advantages and limitations of natural attenuation?

Potential Advantages

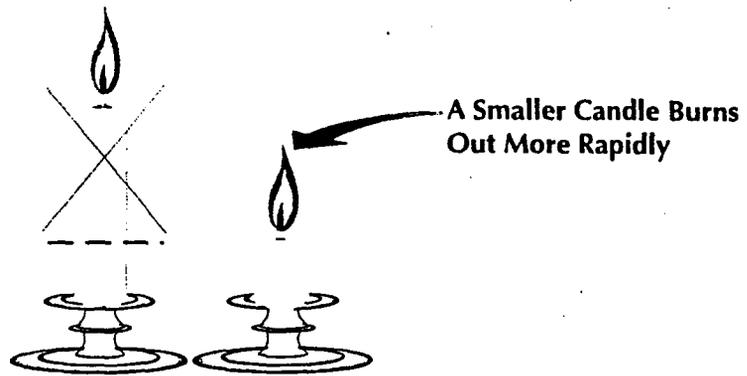
- Less generation or transfer of wastes.
- Less intrusive and disruptive than engineered methods.
- Can be combined with active remedial measures or used to remediate a portion of the site.
- Remediation costs may be lower than with active remediation.

Potential Limitations

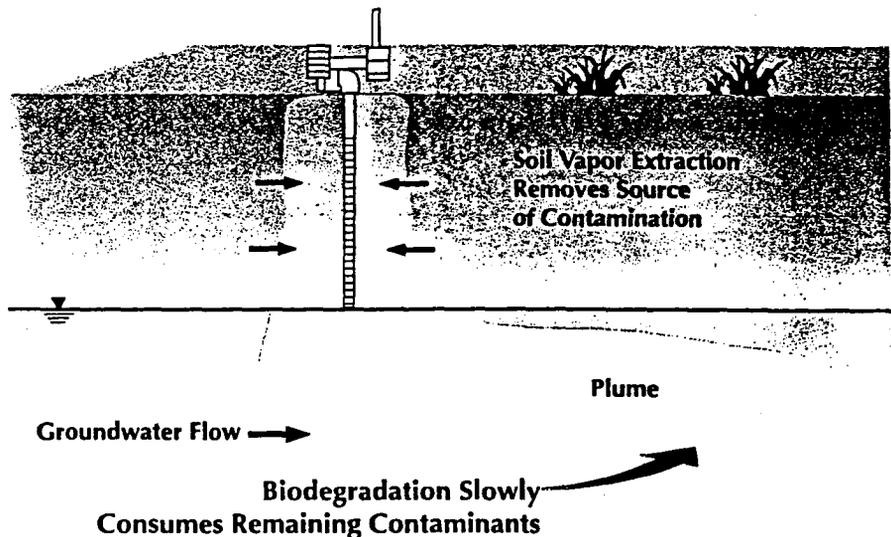
- May require more time to achieve cleanup goals and requires a commitment to long-term monitoring. On some sites, long-term monitoring costs can be excessive.
- If natural attenuation rates are too slow, the plume could continue to migrate.
- Incomplete biodegradation can create new, more toxic contaminants.
- Land and groundwater use controls are often required.

Can natural attenuation processes be enhanced to speed up the cleanup process?

Natural attenuation may be successfully combined with other remediation techniques to achieve cleanup goals within a reasonable time frame. Engineered approaches that may be used in conjunction with natural attenuation include hydraulic containment, soil vapor extraction, source removal, and pump-and-treat methods. In addition, non-toxic organic compounds may be added to enhance the breakdown of contaminants.



Again, the candle provides a useful illustration of how active and natural remediation can be combined. If the top of the candle (the source) is cut off and removed, the flame (plume) will exist for only a fraction of the original time. Soil vapor extraction, free product recovery, soil excavation, and groundwater extraction in the source area are all methods of reducing or containing the source of solvent contamination. The rate at which the candle burns can also be increased by improving the conditions for combustion. As mentioned previously, many chlorinated solvents actually degrade faster in the absence of oxygen under anaerobic conditions. Researchers are now developing methods of adding highly biodegradable organic compounds to increase the natural bacteria population in the groundwater which will consume available oxygen and create these favorable conditions. Regardless of whether an engineered remediation or natural attenuation is used, controls on groundwater use will be required on most chlorinated solvent sites.



What if natural attenuation does not work at a site?

As with any remedy, if monitoring results indicate inadequate progress, it will be necessary to reevaluate the remedial action plan. If this occurs, the remediation project manager would consider implementing an engineered approach for all or part of the plume.

This brochure was developed through a partnership among the U.S. EPA, Air Force, Army, Navy, and Coast Guard. If you would like additional information about natural attenuation and its application at federal facilities, you may fax your request to the National Center for Environmental Publications and Information at (513) 489-8695 or contact the following agency home pages on the Internet:

EPA - <http://www.epa.gov>

Air Force - <http://www.afcee.brooks.af.mil>

Army - <http://aec-www.apgea.army.mil:8080>

Navy - <http://www.nfesc.navy.mil>

Coast Guard - <http://www.dot.gov/dotinfo/uscg>



SENSITIVE RECORD

PORTIONS OF THIS RECORD ARE CONSIDERED SENSITIVE
AND ARE NOT AVAILABLE FOR PUBLIC VIEWING

FIGURE 1 – PROJECT LOCATION MAP

FOR ADDITIONAL INFORMATION, CONTACT:

DIANE C. SILVA, RECORDS MANAGER
NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 556-1280
E-MAIL: diane.silva@navy.mil



WELCOME

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IRP Site 1 Explosive Ordnance Disposal Training Range Feasibility Study Review

Presented By

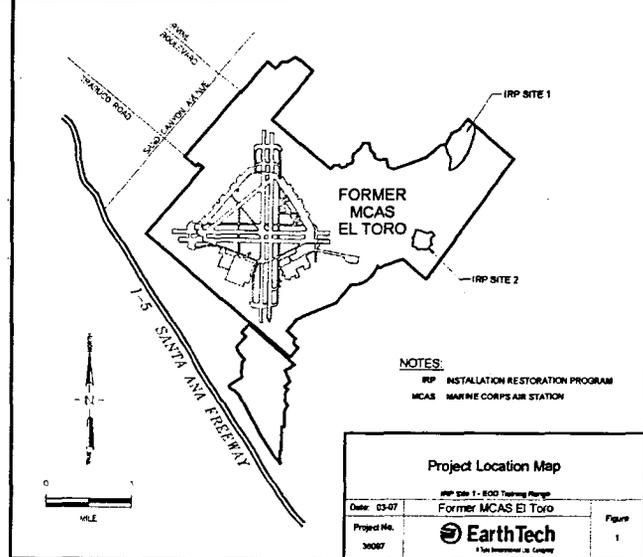
**Jim Callian (BRAC Project Manager)
Hsien Chen & Chris Cavers (Earth Tech)**

28 March 2007



Site Location

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Feasibility Study Approach

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- **FS approach consisted of the following general steps:**
 - **Refine the Conceptual Site Model (CSM)**
 - Summarize nature and extent of release
 - ID environmental media impacted, fate and transport of constituents of potential concern (COPCs)
 - Evaluate potential receptors and exposure pathways, and assess risk to human-health and the environment
 - Incorporate future site use

5



Feasibility Study Approach (Cont.)

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- **Define the Scope of the FS**
 - ID environmental media and COPCs requiring remedial action alternative analysis
- **Develop Remedial Action Objectives (RAOs)**
 - RAOs developed for each COPC and respective environmental media of concern
 - Based on protection of human-health and the environment and Applicable or Relevant and Appropriate Requirements (ARARs)
- **Develop General Response Actions (GRAs)**
 - e.g., Containment, excavation, and/or treatment
 - To satisfy the RAOs developed for media and COPCs

6



Feasibility Study Scope (Cont.)

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- **Identify and Evaluate Remediation Technologies and Process Options**
 - Individually evaluated in their effectiveness to achieve RAOs, technical and administrative implementability, and cost
- **Develop Remedial Alternatives**
 - Technologies and process options assembled to develop a range of remedial alternatives
- **Analysis of Remedial Alternatives**
 - Individual analysis following the nine National Contingency Plan (NCP) criteria
 - Comparative analysis to ID relative advantages and disadvantages of each alternative

7



Feasibility Study Scope (Cont.)

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- **Based on a review of the RI and the updated CSM, RAOs and remedial alternatives were developed for the following media of concern:**
 - Soil potentially containing MEC posing elevated explosive safety risk
 - Soil impacted with naphthalene at concentrations greater than Cal-Modified Preliminary Remediation Goals (PRGs) for industrial soil
 - Groundwater with perchlorate at concentrations posing unacceptable risk to human health

8



RAOs for MEC-Impacted Soil

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- **Based on COPCs, potential exposure pathways, and risks to human-health and the environment, the following RAO was developed for MEC-impacted soil:**
 - **Minimize potential for exposure to MEC that results in unacceptable hazards to future receptors at IRP Site 1**

9



Remedial Alternatives – MEC-Impacted Soil

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- **MEC-Impacted Soil**
 - **Alternative M-1: No Action**
(Required by the National Contingency Plan [NCP])
 - **Alternative M-2: Institutional Controls (ICs) and Access Restrictions**
 - **Alternative M-3: Near-Surface Excavation and Off-Site Disposal of MEC Items Plus ICs and Access Restrictions**
 - **Alternative M-4: Comprehensive Excavation and Off-Site Disposal of MEC Items**

10



Alternative M-2

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- **ICs and Access Restrictions would limit potential exposure to MEC-impacted soil:**
 - **Provide for and maintain the integrity of physical controls used to restrict access and unauthorized use of the site**
 - **Prohibit use of the property for any purpose other than as an EOD training range including land disturbing activities without prior written approval of the DON's cognizant explosives safety expert**
 - **Land disturbing activities as a part of EOD training shall be conducted under the supervision of qualified personnel**
 - **Allow for potential future monitoring and maintenance activities by the DON and oversight by Federal Facility Agreement (FFA) signatories**
 - **Prohibit removal of or damage to security features without prior written approval by the DON**

11



Alternative M-3

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- **MEC would be removed from IRP Site 1 to the extent that it does not pose an elevated explosive hazard for the potential future land-use of open space/wildlife reserve**
- **Excavation of soil containing metallic anomalies to a depth of 1 foot at Northern and Southern EOD Training Ranges**
- **On-site screening/sifting of excavated soil to remove metallic objects**
- **Evaluation of metallic objects to assess potential MEC hazard prior to demilitarization and off-site disposal/recycling as scrap**
- **Backfilling site with sifted soil**

12



Alternative M-4

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- **MEC would be removed such that it would not pose elevated explosive hazard for the potential residential reuse scenario**
- **Excavation of soil containing metallic anomalies at Northern and Southern EOD Training Ranges**
 - **Approach would include iterative application of geophysical mapping and would remove all metallic anomalies**
- **On-site screening of excavated soil to remove metallic objects**
- **Evaluation of removed metallic objects to assess potential MEC hazard, prior to demilitarization and off-site disposal/recycling as metallic scrap**
- **Backfilling site with sifted soil**

13



RAOs for Naphthalene-Impacted Soil

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- **Based on the potential exposure pathways and risks to human-health under an industrial use scenario (a receptor assumed to be exposed to soil from 0 to 10 feet deep), the following RAO was developed:**
 - **Minimize potential for exposure, under an industrial reuse scenario, to soil containing naphthalene at concentrations greater than the California-Modified Preliminary Remediation Goal (PRG) for industrial soil (4.2 milligrams per kilogram [mg/Kg])**

14



Remedial Alternatives – Naphthalene-Impacted Soil

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- **Naphthalene-Impacted Soil**
 - **Alternative N-1: No Action**
 - **Alternative N-2: ICs and Access Restrictions**
 - **Alternative N-3: Excavation and Off-Site Disposal of Naphthalene-Impacted Soil**

15



Alternative N-2

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- **ICs would:**
 - **Restrict existing and future land-uses and activities to minimize potential exposure to naphthalene-impacted soil**
 - **Allow access for monitoring and maintenance activities by the DON and for oversight by the FFA signatories**
 - **ICs implemented by the DON through an MOU or Quitclaim Deeds and “Covenant to Restrict Use of Property” depending upon whether IRP Site 1 is transferred to a Federal or non-Federal entity, respectively**

16



RAOs for Perchlorate-Impacted Groundwater

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- **Based on the COPCs, potential exposure pathways, risks to human-health and the environment, and potential ARARs, the following RAOs were developed:**
 - **Minimize the potential for domestic use of perchlorate-impacted groundwater that results in a noncancer Hazard Index (HI) of greater than 1**
 - **Minimize potential off-Station migration of perchlorate impacted groundwater that results in a noncancer HI of greater than 1**
- **A site-specific risk assessment indicated that the concentration of perchlorate that results in a noncancer HI of 1 for potential off-Station adult resident is 24.4 micrograms per liter (µg/L)**

19

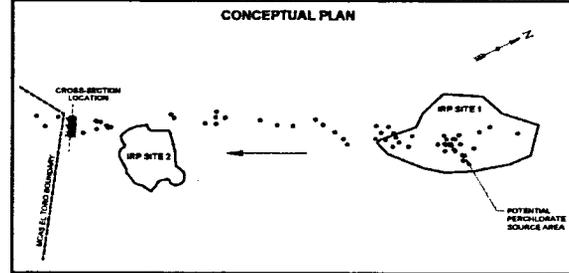


Remedial Alternatives - Groundwater

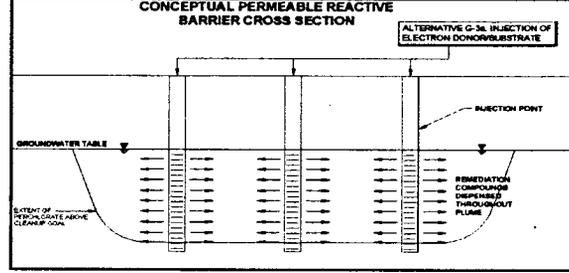
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- **Perchlorate-Impacted Groundwater**
 - **Alternative G-1: No Action**
 - **Alternative G-2: Monitored Natural Attenuation (MNA) and ICs**
 - **Alternative G-3: Containment Near the Station Boundary Plus MNA and ICs**
 - **Option G-3a: Permeable Reactive Barrier (PRB) and In-Situ Bioremediation**
 - **Option G-3b: Groundwater Recirculation System and In-Situ Bioremediation**

20



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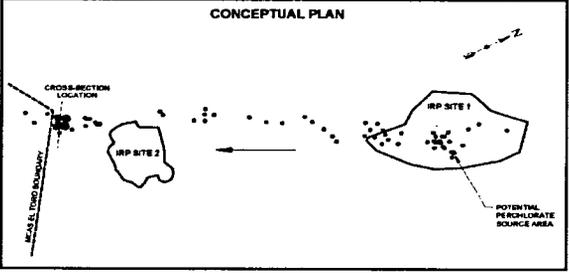


- LEGEND:**
- FAVORABLE REACTIVE BARRIER CONCEPTUAL LOCATION FOR EVALUATION ONLY. FINAL LOCATION TO BE DETERMINED IN THE REMEDIAL DESIGN.
 - INDICATES PERCHLORATE CONCENTRATION GREATER THAN 20 µM.
 - INDICATES DETECTABLE PERCHLORATE CONCENTRATION LESS THAN 20 µM.
 - ← GENERAL GROUNDWATER FLOW DIRECTION.
 - µM MICROGRAMS PER LITER.
- NOTE:** DIRECTION OF GROUNDWATER FLOW IS PERPENDICULAR TO THE CROSS SECTION AND INTO THE PAGES.

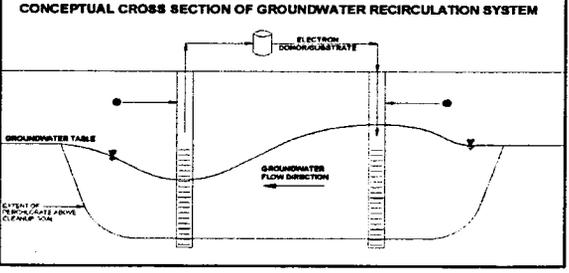
Conceptual Design: Alternative G-3a
Containment Using Permeable Reactive Barrier
and In-Situ Bioremediation

Rev. 1.0 - 11/01/2007

Date:	09-07	Former MCAS El Toro	Figure	4
Project No.:	34097	EarthTech		



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- LEGEND:**
- EXTRACTION WELL CONCEPTUAL LOCATION FOR EVALUATION ONLY. FINAL LOCATION TO BE DETERMINED IN THE REMEDIAL DESIGN.
 - INJECTION WELL CONCEPTUAL LOCATION FOR EVALUATION ONLY. FINAL LOCATION TO BE DETERMINED IN THE REMEDIAL DESIGN.
 - INDICATES PERCHLORATE CONCENTRATION GREATER THAN 20 µM.
 - INDICATES DETECTABLE PERCHLORATE CONCENTRATION LESS THAN 20 µM.
 - ← GENERAL GROUNDWATER FLOW DIRECTION.
 - µM MICROGRAMS PER LITER.

Conceptual Design: Alternative G-3b
Containment Using Groundwater Recirculation System
and In-Situ Bioremediation

Rev. 1.0 - 11/01/2007

Date:	09-07	Former MCAS El Toro	Figure	5
Project No.:	34097	EarthTech		



Remedial Alternatives – Groundwater

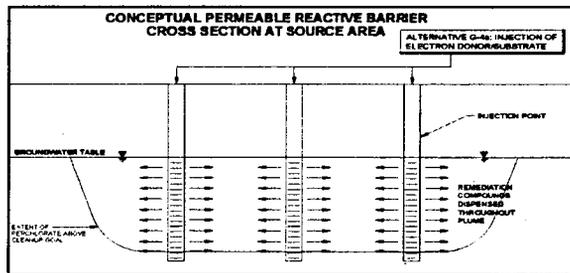
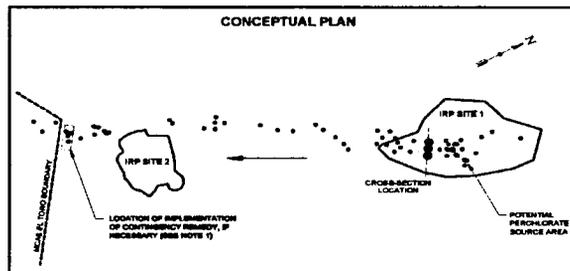
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- **Alternative G-4: Perchlorate Source Area Control Plus MNA and ICs**
 - **Option G-4a: Source Area Control Using PRB**
 - **Option G-4b: In-Situ Treatment of the Perchlorate Source Area using Direct Injection**

23



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- LEGEND**
- PERCHLORATE SOURCE AREA (SEE CONCEPTUAL PLAN FOR LOCATION)
 - POTENTIAL PERCHLORATE SOURCE AREA (SEE CONCEPTUAL PLAN FOR LOCATION)
 - LOCAL ROAD BOUNDARY
 - CROSS-SECTION LOCATION
 - IRP SITE 1
 - IRP SITE 2
 - LOCATION OF IMPLEMENTATION OF CONTINGENCY REMEDY, IF NECESSARY (SEE NOTE 1)
 - REMEDIATION COMPLIANCE DISCHARGE THROUGH CUTOFF PLUME
 - INJECTION POINT
 - BOUNDARY TABLE
 - EXTENT OF PERCHLORATE ABOVE CLEANUP GOAL
 - GENERAL GROUNDWATER FLOW DIRECTION
 - MNA MICROORGANISMS

NOTES

1. CONTINGENCY REMEDY SHALL BE IMPLEMENTED AT A CONTINGENCY REMEDY LOCATION IN THE "CONTINGENCY REMEDY LOCATION" AREA OF THE PERCHLORATE SOURCE AREA. THE CONTINGENCY REMEDY SHALL BE IMPLEMENTED AT THE CONTINGENCY REMEDY LOCATION IN THE "CONTINGENCY REMEDY LOCATION" AREA OF THE PERCHLORATE SOURCE AREA. THE CONTINGENCY REMEDY SHALL BE IMPLEMENTED AT THE CONTINGENCY REMEDY LOCATION IN THE "CONTINGENCY REMEDY LOCATION" AREA OF THE PERCHLORATE SOURCE AREA.
2. THE EXTENT OF PERCHLORATE ABOVE CLEANUP GOAL IS INDICATED BY THE DOTTED LINE.

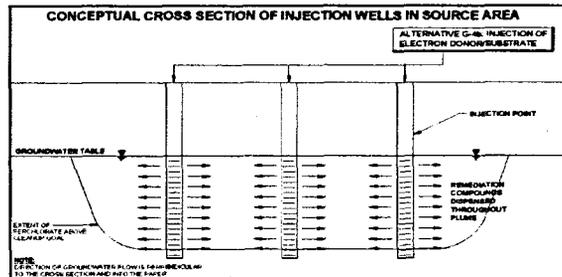
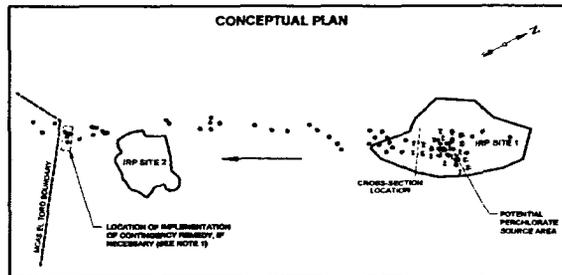
Conceptual Design: Alternative G-4a
Perchlorate Source Area Control Using PRB

Date: 03-07
Project No: 00007
EarthTech
FORMER MCAS EI TORO
J. B. BROWN CONSULTANTS

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LEGEND:

- ELECTRON WELLS IN THE SOURCE AREA FOR FUTURE USE OF ELECTRON DONOR/SUBSTRATE TO BE IMPLEMENTED BY THE CONTRACTOR ON A FUTURE DATE TO BE DETERMINED BY THE CONTRACTOR.
- INDICATES PERCHLORATE CONCENTRATIONS GREATER THAN 0.1 µg/L.
- ▨ INDICATES DETECTABLE PERCHLORATE CONCENTRATIONS LESS THAN 0.1 µg/L.
- GENERAL GROUNDWATER FLOW DIRECTION
- MVA MICROGRAM PER LITER

NOTE: CONTINGENCY OF THE STATIONARY REMEDIATION TO BE IMPLEMENTED AS A CONTINGENCY TO BE IMPLEMENTED IN THE EVENT OF A FUTURE DATE TO BE DETERMINED BY THE CONTRACTOR. PERCHLORATE CONCENTRATIONS GREATER THAN 0.1 µg/L.

Conceptual Design: Alternative G-4b
In-Situ Treatment of Perchlorate Source Area Using Direct Injection

Date: 03-07
Project No: 2006P

U.S. AIR FORCE TORO FORMER
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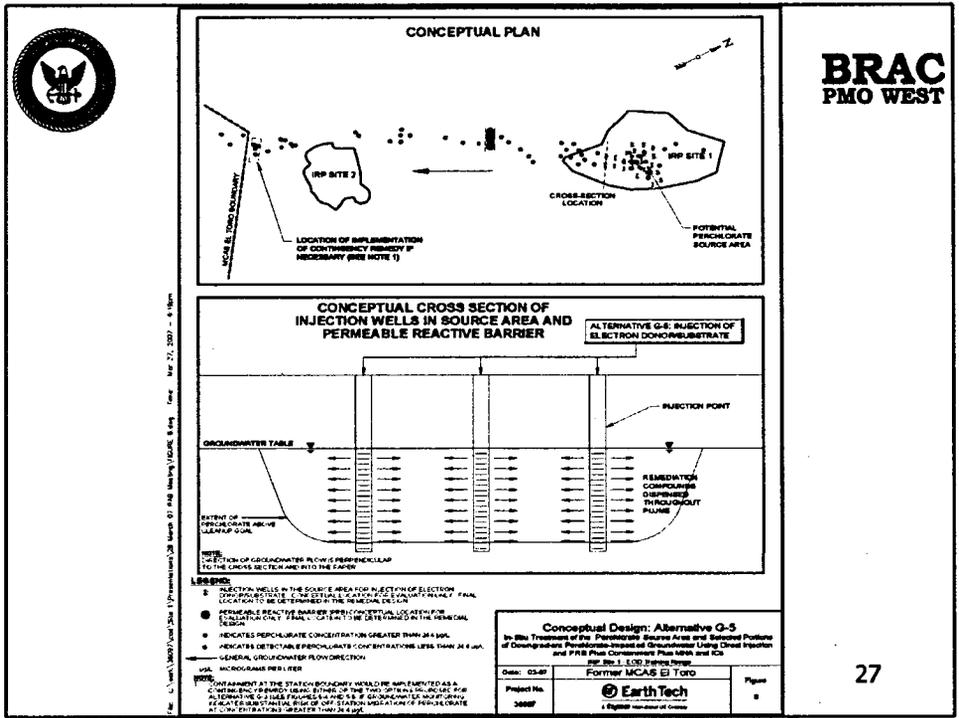
Page: 7



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Alternative G-5

- **Alternative G-5: In-Situ Treatment of the Perchlorate Source Area and Selected Portions of Downgradient Groundwater using Direct Injection and PRB Plus MNA and ICs**





Remedial Alternatives – Groundwater



- **Alternative G-6: Ex-Situ Remediation of Perchlorate-Impacted Groundwater and Infiltration of Treated Groundwater Plus ICs**
 - **Option G-6a: Ex-Situ Treatment with Fluidized Bed Reactor (FBR)**
 - **Option G-6b: Ex-Situ Treatment with Ion Exchange (IX)**

28



Detailed Analysis of Alternatives

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- **Comparative Analysis of Remedial Alternatives per the nine NCP Evaluation Criteria:**
 - **Threshold Criteria**
 - Overall protection of human-health and the environment
 - Compliance with ARARs
 - **Primary Balancing Criteria**
 - Long-term effectiveness and permanence
 - Reduction of toxicity, mobility, or volume through treatment
 - Short-term effectiveness
 - Implementability
 - Cost
 - **Modifying Criteria**
 - State acceptance
 - Community acceptance

31



Remedial Alternatives – MEC-Impacted Soil

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- **MEC-Impacted Soil**
 - **Alternative M-1: No Action**
 - **Alternative M-2: ICs and Access Restrictions**
 - **Alternative M-3: Near-Surface Excavation and Off-Site Disposal of MEC Items Plus ICs and Access Restrictions**
 - **Alternative M-4: Comprehensive Excavation and Off-Site Disposal of MEC Items**

32



Comparative Analysis of Alternatives

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Table ES-1: Summary of Individual and Comparative Analysis of Alternatives – MEC-Impacted Soil

U.S.EPA Criteria	M-1	M-2	M-3	M-4
Overall Protection of Human Health and the Environment	○	●	●	●
Compliance with ARARs	○	●	●	●
Long-Term Effectiveness	○	●	●	●
Reduction in Toxicity, Mobility, and Volume through Treatment	○	○	○	●
Short-Term Effectiveness	○	●	●	○
Implementability*	●	●	○	○
Cost*	No Costs	●	○	○
State Acceptance	The State has not commented on these alternatives.			
Community Acceptance	Evaluation follows the public comment period and will be addressed in the Record of Decision			

Notes:

Relative Performance in Satisfying Criteria

○ Poor ○ Poor - Fair ○ Fair ● Fair - Good ● Good

* Relative performance rating for implementability represents overall rating based on technical and administrative feasibility, and availability of services and materials

* Alternative that costs the least was rated as good

33



Remedial Alternatives – Naphthalene-Impacted Soil

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- **Naphthalene-Impacted Soil**
 - **Alternative N-1: No Action**
 - **Alternative N-2: ICs and Access Restrictions**
 - **Alternative N-3: Excavation and Off-Site Disposal of Naphthalene-Impacted Soil**

34



Comparative Analysis of Alternatives

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Table ES-2: Summary of Individual and Comparative Analysis of Alternatives - Naphthalene-Impacted Soil

U.S. EPA Criteria	N-1	N-2	N-3
Overall Protection of Human Health and the Environment	○	◐	●
Compliance with ARARs	○	●	●
Long-Term Effectiveness	○	◐	●
Reduction in Toxicity, Mobility, and Volume through Treatment	○	○	●
Short-Term Effectiveness	○	●	◐
Implementability*	●	◐	◐
Cost*	No Costs	●	◐
State Acceptance	The State has not commented on these alternatives.		
Community Acceptance	Evaluation follows the public comment period and will be addressed in the Record of Decision		

Notes:

Relative Performance in Satisfying Criteria



Poor



Poor - Fair



Fair



Fair - Good



Good

* Relative performance rating for implementability represents overall rating based on technical and administrative feasibility, and availability of services and materials

* Alternative that costs the least was rated as good.

35



Perchlorate-Impacted GW

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- **Alt. G-2: MNA and ICs**
- **Alt. G-3: Containment Near Station Boundary + MNA and ICs**
 - Option G-3a: PRB and In-Situ Bioremediation
 - Option G-3b: Groundwater Recirculation System and In-Situ Bioremediation
- **Alt. G-4: Perch. Source Area Control + MNA & ICs**
 - Option G-4a: Source Area Control using PRB
 - Option G-4b: Source Area treatment using Direct Injection
- **Alt. G-5: In-Situ Treatment of the Perchlorate Source Area and Selected Portions of Downgradient GW using Direct Injection and PRB + MNA and ICs**
- **Alt. G-6: Extraction and Treatment of Perchlorate-Impacted GW and Infiltration of Treated GW + ICs**
 - Option G-6a: Ex-Situ Treatment with FBR
 - Option G-6b: Ex-Situ Treatment with IX

36



Comparative Analysis of Alternatives

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Table ES-3: Summary of Individual and Comparative Analysis of Alternatives – Perchlorate-
Impacted Groundwater

U.S.EPA Criteria	G-1	G-2	G-3a	G-3b	G-4a	G-4b	G-5	G-6a	G-6b
Overall Protection of Human Health and the Environment	○	○	●	●	●	●	●	●	●
Compliance with ARARs	○	●	●	●	●	●	●	●	●
Long-Term Effectiveness	○	○	○	○	●	●	●	●	●
Reduction in Toxicity, Mobility, and Volume through Treatment	○	○	○	○	○	○	●	●	●
Short-Term Effectiveness	○	○	○	○	○	○	●	●	●
Implementability ^a	●	○	○	○	○	○	○	○	○
Cost ^b	No Costs	●	○	○	○	○	○	○	○
State Acceptance	The State has not commented on these alternatives.								
Community Acceptance	Evaluation follows the public comment period and will be addressed in the Record of Decision.								

Notes:

Relative Performance in Satisfying Criteria



Poor



Poor -
Fair



Fair



Fair -
Good



Good

^a Relative performance rating for implementability represents overall rating based on technical and administrative feasibility, and availability of services and materials

^b Alternative that costs the least was rated as good.

37



Schedule

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- **Regulatory Comments on Draft FS due 30 March 2007**
- **RAB Subcommittee meeting – Tentatively scheduled for 18 April 2007**
- **Draft Final FS – 1 May 2007**
- **Public Meeting Presenting the Proposed Plan–October 2007**

38



**MULTI-MEDIA ENVIRONMENTAL COMPLIANCE CONTRACT
TRANSMITTAL MEMORANDUM**

Contract No. N-68711-00-D-0004

File Code: 126463/003/3.21

TO: Contracting Officer
Dept. of the Navy
Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, CA 92108-4310

DATE: 4/9/07
D.O. # 0069
LOCATION: MCAS El Toro

Attention: Gracy Tinker

FROM: Bob Coleman 
Project Manager

DESCRIPTION: MCAS El Toro Public Information Materials, 3/28/07, RAB Meeting

TYPE: Deliverable (Cost) Deliverable (Technical) Other

VERSION: N/A **REVISION #:** 0
(Scroll down - e.g., Draft, Draft Final, Final)

ADMIN RECORD (PM to Identify): Yes No **Category** **Confidential**

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