FINAL
FORMER MARINE CORPS AIR STATION (MCAS) El Toro
97th Restoration Advisory Board (RAB) Meeting Minutes

Meeting Location: Irvine City Hall, Conference Training Center, Irvine California
Meeting Date/Time: 09 December 2009/06:45pm – 07:50 pm
Minutes Prepared by: Tony Guiang, CDM

Attachment:

First Five-Year Review Summary
Presentation Slides: "Installation Restoration Program (IRP) Site 1 Update."

WELCOME/INTRODUCTIONS/AGENDA REVIEW:

Mr. Jim Callian (Base Realignment and Closure [BRAC] Environmental Coordinator [BEC] and Navy RAB Co-Chair) welcomed everyone and asked Ms. Marcia Rudolph (RAB member, Subcommittee Chair) to lead the Pledge of Allegiance. Self-introductions by all those in attendance followed. A total of 24 attendees were present. Mr. Bob Woodings (RAB Co-Chair) and Ms. Mary Eileen Mathias (RAB member) were given excused absences.

ANNOUNCEMENTS/ REVIEW OF ACTION ITEMS

Mr. Callian began the meeting with the following announcements and discussion:

- Mr. Callian reviewed the RAB meeting agenda; no changes to the agenda were suggested by the RAB.

- Mr. Callian presented a series of slides listing dates and times for the upcoming quarterly RAB meetings. In addition, he presented slides listing key Navy and Regulatory Agency contacts, RAB points of contact, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Administrative Record (AR) File and Information Repository (IR) locations and hours, and environmental and reuse/redevelopment websites. Mr. Callian reiterated the RAB's focus was on environmental issues and not reuse.

- Mr. Callian requested attendees to sign the Sign-in sheets, noting the Navy's requirement to document community involvement and participation.

- Mr. Callian announced the Navy has finalized the First Five-Year Review of environmental restoration actions (remedies) conducted at five IRP sites including IRP Site 2 (Magazine Road Landfill), IRP Site 16 (Former Crash Crew Training Pit No. 2), IRP Site 17 (Communication Station Landfill), IRP Site 18 (Regional Volatile Organic Compound [VOC] Groundwater Plume), and IRP Site 24 (VOC Source Area). He showed an overhead slide titled, "First Five-Year Review Report" and explained the Navy was required to evaluate the implementation and performance of ongoing remedies at sites every five years to determine if they continue to be protective of human health and the environment. He noted the Five-

year review process involved a technical assessment of the remedies and information gathering from members of the community, regulatory agencies, and contractors to help in the protectiveness determination of the remedy. The conclusions of the First Five Year Review are that the remedies at MCAS El Toro IRP sites, which were installed in accordance with the Record of Decisions (RODs), are protective of human health and the environment. Mr. Callian added the document is available for public review on the Navy BRAC Program Management Office (PMO) website, the IR, and the AR.

- Mr. Callian reviewed the action items from the last RAB meeting held on 19 August 2009. In response to an action item from Mr. Hersch requesting an update on the status of land transfer, Mr. Callian showed an overhead slide titled "Remaining Disposal Parcels and FOST Areas" which showed the properties which comprise the Finding of Suitability to Transfer (FOST) #5 and FOST #6. He noted the Navy was currently addressing comments from DTSC regarding the suitability to transfer properties designated in orange. Mr. Callian indicated the areas shown in orange are the Carve Out (CO) areas being retained by the Navy.

Mr. Callian asked if there were any comments or questions. Mr. Ouellette (Community member) asked if there were similar maps which show what properties in FOST #1 through #4 have been transferred. Mr. Callian replied the properties that have been transferred are identified by the parcels which show no color and for more specific information, he directed him to visit the AR.

APPROVAL OF 19 AUGUST 2009 RAB MEETING MINUTES

Mr. Callian opened the floor for discussion, questions, or corrections to the 19 August 2009 RAB meeting minutes. No comments, corrections, or questions were made and the 19 August 2009 meeting minutes were approved.

SUBCOMMITTEE MEETING REPORT

Ms. Rudolph began her subcommittee meeting report by showing a copy of the Draft Action Memorandum (AM) for Time Critical Removal Action (TCRA) at adjacent properties to IRP Site 1. The TCRA would address property not originally included during the assessment of IRP Site 1. She noted the topic of the RAB presentation would provide more detail on the TCRA.

Ms. Rudolph thanked the Regulators for their participation in the subcommittee meeting. She noted they provided valuable information relative to the current status of IRP Sites 3 and 5. In regard to IRP Site 3, she mentioned cleanup efforts were delayed owing to what was recently discovered at the site. Ms. Rudolph deferred further discussion of this topic to the Regulators during their regulatory update.

In closing, Ms. Rudolph welcomed attendees to the next subcommittee meeting on 27 January 2010 at 5:30 pm and extended her holiday wishes to the RAB.

REGULATORY AGENCY UPDATE

Ms. Mary Aycock (United States Environmental Protection Agency [U.S. EPA])

Ms. Aycock provided the following update to the RAB:

- Ms. Aycock was happy to report her management signed the final letter approving the Five-Year Review on the 28 September 2009 and thanked the Navy and all those who participated in the review for moving the document to its Final status.

- Ms. Aycock noted the BRAC Cleanup Team (BCT) meeting held earlier today was very productive. She made special mention of several site tours over the past few months and thanked, in particular, Mr. Marc Smits (Navy Remedial Project Manager [RPM]) and Mr. Callian for allowing the U.S. EPA to come out and tour the landfill sites and see firsthand the progress in regard to the restoration efforts at the sites.

- As discussed with Ms. Rudolph in the subcommittee meeting, Ms. Aycock explained she hoped to accomplish several milestones and agendas in the coming year. Among them was updating the Community Involvement Plan and scheduling an annual tour to allow the community to visit and see the ongoing activities at the site. Ms. Aycock stated she looks forward to talking to the Navy and some of the RAB members in the upcoming year in regard to these items.

Mr. Quang Than (DTSC)

Mr. Than provided the following update to the RAB:

- Mr. Than stated he conducted a site walk at IRP Sites 3 and 5 earlier today in order to view the progress at the landfills. In regard to IRP Site 5, he noted the foundation layer was in place and commented on the good grading job by the contractors in spite of the recent rain. He explained as soon as procurement for the liner is accomplished, it will be the next step in the construction followed by the application of a vegetative cover.

- Owing to the recent discovery of radium material at IRP Site 3, Mr. Than noted progress has been delayed until confirmation samples [those taken to verify cleanup] could be collected and analyzed. He mentioned further consolidation of the landfill at IRP Site 3 will make the footprint for the landfill cover smaller than anticipated in addition to having the landfill located further from the Borrego Canyon Wash.

In closing, Mr. Than asked the RAB if there were any comments or questions. No comments or questions were made.

IRP Site 1 – REMEDIAL ACTION STATUS

The IRP Site 1, Explosive Ordnance Disposal (EOD) Training Range Update presentation took place in three parts. The first part of the presentation was given by Ms. Dunn. She began by thanking the RAB members who participated in the June 2009 site walk at IRP Site 1 and showed a photograph of attendees who took part (Slide 1). She provided an overview of the topics to be covered (Slide 3) and showed a map of IRP Site 1 which comprises northern and

southern ranges, a buffer zone sub parcel area which runs along the western portion of the site (Slide 4), and the property adjacent to the site. Slide 15 in the presentation was an enlarged version of Slide 4 showing IRP Site 1.

Ms. Dunn provided a summary of the current CERCLA status for soil at IRP Site 1 and groundwater at IRP Sites 1 and 2, including the Site Description and History (Slide 5) and Investigations To Date (Slide 6), and Feasibility Study (FS) Remedial Action Objectives (RAOs) (Slide 8) for groundwater and soil. The overall presentation was then broken into two parts to address each media (groundwater and soil) separately.

Ms. Dunn began the IRP Sites 1 and 2 groundwater update with an overview of the current Pilot Study to address groundwater at IRP Sites 1 and 2 (Slide 9). Mr. Wolff continued the Pilot Study discussion with a brief introduction of the anaerobic bioremediation process (Slide 11) which involves delivering a food source (substrate) to create an anaerobic (depleted oxygen) condition in the groundwater, which encourages bacterial growth. Mr. Wolff noted laboratory studies support the fact that contaminants (perchlorate at IRP Site 1 and trichloroethene [TCE] at IRP Site 2) are depleted when enough substrate is introduced into the groundwater for consumption by the bacteria. He noted the purpose of the pilot study was to see whether this technology works on a full scale and that the success of the technology is determined by measuring the extent of the treated areas.

Using a conceptual illustration and associated fieldwork photographs, Mr. Wolff further explained that in this pilot study, delivery of the substrate into impacted groundwater involved two techniques: direct injection and hydraulic fracturing (Slides 12 – 21). For clarification, Ms. Rudolph asked how deep the boreholes were drilled prior to initiating the fracturing process. Mr. Wolff replied that at IRP Site 1, the boreholes were drilled to approximately 45 to 55 feet below ground surface (bgs) and at IRP Site 2 the depths ranged from approximately 60 to 80 feet bgs. To augment Mr. Wolff's discussion, Mr. Callian noted hydraulic fracturing technology was popularized in the oil industry to rejuvenate oil reservoirs and increase production. He noted it was a relatively new technology for near-surface applications.

Mr. Wolff presented a figure showing where the direct injection and hydraulic fracturing techniques were being applied at IRP Sites 1 and 2 (Slide 14). Ms. Dunn finished the discussion on the groundwater pilot study. She noted that the pilot study will provide invaluable information which will be used to evaluate remedial alternatives in the Draft Final FS Report for groundwater. She gave a summary of preliminary conclusions at both IRP Site 1 (Slide 22) and IPR Site 2 (Slide 23) and Ms. Dunn provided a "next steps" schedule (Slide 24).

Ms. Dunn provided an IRP Site 1 soil update as the last part of the presentation. She explained the RAOs for soil focus on two impacts to the soil: munitions and explosives of concern (MEC) and naphthalene. Ms. Dunn summarized previous investigations, including the Fall 2008 Supplemental Munitions Characterization at IRP Site 1. This discussion included the purpose and scope of the characterization (Slides 25 and 26), field activities conducted at the site in 2008 (Slides 27 and 28), and results from the characterization activities (Slide 30). She also showed photographs of field activities (Slide 29) and reiterated that all munitions items found during the 2008 characterization were demilitarized and appropriately disposed of.

Ms. Dunn explained that a TCRA has been chosen to further address potential MEC items on the adjacent property (Slide 31), and she provided a figure indicating where this TCRA would take place (Slide 32) as well as a list of the tasks involved with the TCRA (Slide 33). Ms. Dunn concluded the Site 1 soil discussion with a "next steps" schedule (Slide 34).

In closing, Ms. Dunn asked if there were any comments or questions to the RAB presentation. Ms. Rudolph asked for confirmation that the TCRA at IRP Site 1 would not affect the fairy shrimp ponds at the site. Ms. Dunn replied the Navy was not conducting the TCRA in that portion of the site and that the Navy has been in close coordination with the U.S. Fish and Wildlife Service and the California Department of Fish and Game (through DTSC). Mr. Callian added the TCRA has been scheduled to not impact the California gnatcatcher's breeding season.

OPEN QUESTION AND ANSWER

Mr. Callian thanked Ms. Dunn and Mr. Wolff for the presentation and opened the floor for discussion on other environmental topics the RAB would like discussed at the next RAB. Ms. Rudolph asked for an update of IRP Sites 3 and 5 at the next RAB. Mr. Ouellette asked for a "State of the Station" update. In response, Mr. Callian replied the Navy was no longer including a "State of the Station " presentation at the RABs but would consider an update of IRP Sites 3 and 5.

Ms. Rudolph asked about the financial status of the IRP at Former MCAS El Toro and inquired whether there was money available to finance further cleanup and investigations. Mr. Callian replied the Navy was fully funded for the upcoming fiscal year.

MEETING SUMMARY AND CLOSING

Mr. Callian thanked everyone for attending and extended a Happy Holiday greeting to the RAB and those in attendance. The 09 December 2009 meeting adjourned at 7:50 pm.

LIST OF HANDOUTS PROVIDED AT THE MEETING

- 09 December 2009 Former MCAS El Toro RAB Meeting Agenda and Upcoming RAB Meeting Schedule
- Where to Get More Information & Environmental Websites
- First Five-Year Review Summary
- Presentation Slides: "Installation Restoration Program (IRP) Site 1 Update, Former MCAS El Toro, California"
- Former MCAS El Toro IRP Site Location Map
- Former MCAS El Toro RAB Mission Statement and Operating Procedures
- Former MCAS El Toro RAB Fact Sheet/Membership Application

- Former MCAS El Toro Mailing List Coupon

Copies of the meeting minutes and handouts provided at the 09 December 2009 RAB meeting are available at the IR for former MCAS El Toro located in the Government Publication Section of the Heritage Park Regional Library, Irvine, California. Library hours are 10 am to 9 pm Monday through Thursday; 10 am to 5 pm Friday and Saturday; and 12 pm to 5 pm on Sunday. The library may be reached at (949) 936-4040. In addition, copies of the meeting minutes and handouts are also available at the CERCLA AR maintained at Building 307 at former MCAS El Toro by Ms. Sue Rawal. Documents can be viewed by appointment; call Ms. Rawal at (949) 726-5398 between 9 am and 1 pm Monday through Thursday.

Final minutes from previous RAB meetings can be found on the internet at the Navy BRAC PMO website: www.bracpmo.navy.mil

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INTERNET SITES

Navy and Marine Corps Internet Access

BRAC PMO Web Site (includes RAB meeting minutes): http://www.bracpmo.navy.mil/

Department of Defense – Environmental Cleanup Home Page Web Site:

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

U.S. EPA:

Homepage: www.epa.gov

Superfund information: www.epa.gov/superfund

National Center for Environmental Assessment: www.epa.gov/ncea

Federal Register Environmental Documents: www.epa.gov/federalregister

Cal/EPA:

Homepage: www.calepa.ca.gov

Department of Toxic Substances Control: www.dtsc.ca.gov

Department of Health Services, reorganized into the Department of Health Care Services and the Department of Public Health: www.dhs.ca.gov

Santa Ana Regional Water Quality Control Board: www.waterboards.ca.gov/santaana

Additional Websites: Reuse and Redevelopment

Orange County Great Park: www.ocgp.org

Great Park Conservancy: www.orangecountygreatpark.org

First Five-Year Review Summary
Installation Restoration Program Sites 2, 16, 17, 18, and 24
Former Marine Corps Air Station El Tor0, California

December 2009

Introduction

The Department of the Navy (DON) completed the first five-year review of environmental restoration actions ("remedies") for the following five Installation Restoration Program (IRP) sites located at former Marine Corps Air Station (MCAS) El Toro, California: Site 2 (Magazine Road Landfill); Site 16 (former Crash Crew Training Pit No. 2); Site 17 (Communication Station Landfill); Site 18 (Regional Volatile Organic Compound [VOC] Groundwater Plume); and Site 24 (VOC Source Area).

The Navy is required to evaluate the implementation and performance of ongoing remedies every five years to determine if they continue to be protective of human health and the environment. During the January 2009, Restoration Advisory Board (RAB) meeting, the Navy announced that it was initiating the first five-year review for former MCAS El Toro. Interested members of the community were briefed regarding the ongoing five-year review process during the RAB meeting held on 15 April 2009. This brief First Five-Year Review Summary provides information about the five-year review process, why it was conducted, and presents the results of the first five-year review for MCAS El Toro.

Former MCAS El Toro Background and Environmental History

Former MCAS El Toro was commissioned in 1943 as a Marine Corps pilot fleet operation training facility and was closed in July 1999, as a part of the Base Closure and Realignment Act (BRAC) Act. In June 1988, the United States Environmental Protection Agency (U.S. EPA) recommended adding former MCAS El Toro to the National Priorities List (NPL) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (commonly referred to as "Superfund") due to VOC-impacted groundwater at the station boundary and in agricultural wells west of the Station.

The Navy, on behalf of the Marine Corps, entered into a Federal Facility Agreement (FFA) with U.S. EPA Region 9, the California Department of Toxic Substances Control (DTSC) (formerly California Department of Health Services [DHS]), and the California Regional Water Quality Control Board, Santa Ana Region (RWQCB). The main purpose of the FFA is to assure environmental impacts are investigated and appropriate response actions are taken to protect human health and the environment. The implementation of the FFA is included as one of the responsibilities of the BRAC Cleanup Team (BCT) which consists of representatives from the DON, U.S. EPA, DTSC, and RWQCB.

Site Specific Selected Remedies/Cleanups

IRP Site 2 and IRP Site 17,

IRP Site 2, the Magazine Road Landfill and IRP Site 17, the Communication Station Landfill served as waste disposal facilities during the operation of MCAS El Toro until the early- to mid-1980s. The remedies for these sites (landfill caps) included 4-foot-thick clean soil covers to isolate the landfill wastes; long-term monitoring; and land-use restrictions to restrict activities that may lead to unacceptable

exposure to known chemicals of concern. The operation and maintenance of these landfill covers includes inspection and maintenance of the covers; and groundwater, soil moisture, and landfill gas monitoring. The purpose of this monitoring is to demonstrate the effectiveness of the remedy and to document that it is performing as designed to protect human health and the environment.

IRP Site 16

IRP Site 16, former Crash Crew Training Pit No. 2, consisted of unlined earthen pits or trenches used to train the Station's emergency response personnel in fire fighting techniques in the event of an accident. These training activities included using combustible liquids, including trichloroethene (TCE), which were poured into the pits and ignited. As a result of these training activities, TCE migrated downward to and impacted groundwater at concentrations that exceed the maximum contaminant level (MCL) or drinking water standard. The remedy for IRP Site 16 is Monitored Natural Attenuation (MNA) and Institutional Controls (ICs) which includes the following components:

- Groundwater monitoring to track TCE concentration decreases over time;
- Maintaining positive drainage over the former fire-fighting training pit to minimize infiltration of rain and surface water;
- Land-use restrictions implemented to protect monitoring equipment, and to prevent the use of TCE-impacted groundwater; and,
- Soil vapor monitoring above the groundwater table to document that any residual TCE in soil does not impact groundwater quality.

IRP Sites 18 and 24

VOC-impacted groundwater originating at the IRP Site 24 VOC Source Area within the Shallow Groundwater Unit (SGU), migrated southwest and near the Station boundary, downward into the deeper Principal Aquifer (PA), forming the IRP Site 18 Regional VOC Groundwater Plume. IRP Site 18, the Regional VOC Groundwater Plume, is located entirely off-Station and is defined as groundwater in the deeper PA impacted with TCE at concentrations exceeding the MCL; it extends approximately 3 miles west of the former MCAS El Toro boundary.

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

Cleanup of VOCs in soil at IRP Site 24 was completed and it no longer results in a release of VOCs to groundwater. The regulatory agencies agreed with the Navy's determination that for soil at IRP Site 24, no further action is required to protect human health and the environment. Since the remedy for soil at IRP Site 24 is complete, five-year reviews are not required for soil. The first five-year review for IRP Sites 18 and 24 was conducted only for the ongoing groundwater remedy at these sites.

The remedy for groundwater at IRP Sites 18 and 24 consists of extraction and treatment of impacted groundwater, operation and maintenance of remediation system components, performance monitoring, and ICs. Groundwater extracted from IRP Sites 18 and 24 is treated at two separate treatment plants owned and operated by Irvine Ranch Water District (IRWD). Treatment of IRP Site 18 groundwater is part of the Irvine Desalter Project (IDP), which is a water supply development project initiated by the Orange County Water District and IRWD.

What is a "Five-Year Review"?

The 1980 CERCLA is commonly referred to as "Superfund." CERCLA was amended in 1986 by "SARA," the Superfund Amendments and Reauthorization Act, to include Department of Defense facilities. SARA also requires periodic reviews of cleanup remedies that leave contaminants in place on a site at concentrations that do not allow for unrestricted and unlimited property use.

This periodic review occurs every five years after the start of the first response action and continues until no hazardous substances, pollutants, or contaminants remain on site above concentrations that allow for unlimited property use and unrestricted site access/exposure.

How was the Five-Year Review Conducted?

The first five-year review for Former MCAS El Toro IRP Sites 2, 16, 17, 18, and 24 was conducted in accordance with CERCLA, SARA, guidance published by the U.S. EPA, and the Navy's five-year review policy. This review included the following steps:

- *Document and Data review:* Key documents were reviewed to obtain relevant information that could be used to assess the performance of the remedies implemented at the sites. The documents contained site histories, constituents of concern, remedies evaluated to reduce potential risk to acceptable levels, the selected remedial actions, detailed engineering procedures and equipment installed as part of the remedial actions, and data obtained from engineering components of the remedy (e.g., groundwater monitoring wells).
- *Community notification and involvement:* Community leaders and interested parties were notified that the five-year reviews would be conducted for IRP Sites 2, 16, 17, 18, and 24 in a Restoration Advisory Board (RAB) meeting held on 28 January 2009. Detailed meeting minutes of this RAB meeting were mailed in April 2009 to interested parties on the RAB mailing list. Interested community members were briefed regarding the ongoing five-year review process during the15 April 2009 RAB meeting.
- *Site Inspections:* Site inspections were conducted to visually confirm and document conditions of the sites, the remedies, and the surrounding areas. The first inspection was conducted on 11 March 2009 by the DON, FFA signatories (U.S. EPA, DTSC, and RWQCB), and the Orange County Health Care Agency (OCHCA). Additional detailed inspections were conducted by the Navy's operation and maintenance contractors in March 2009.
- *Interviews:* Interviews with various stakeholders were conducted as part of the five-year review to provide additional information about the status of the sites. Those interviewed included representatives from the Navy, U.S. EPA, DTSC, RWQCB, operation and maintenance contractors, and members of the RAB for former MCAS El Toro.
- *Protectiveness Determinations:* Information gathered during the first three steps helped answer the following:
    - Are the remedies that were put in place functioning as intended?
    - Are the exposure assumptions, cleanup levels, data, and remedial action objectives on which the remedies were based still valid?
    - Is there any new information available that would call into question the protectiveness of the remedies?

Were there any Issues that Prevent the Remedies from Being Protective?

No issues were identified that currently prevent or will in the future prevent the respective remedies from being protective of human health and the environment. However, some recommendations were made to ensure the continued effective operation and maintenance of the remedies.

Are the Remedies Functioning and Effective?

A technical assessment was conducted and a Protectiveness Statement developed based on the results of the technical assessment. The overall effectiveness of the selected remedies is presented in a "Protectiveness Statement" in the Final First Five-Year Review Report for MCAS El Toro. A summary of this evaluation is presented below.

Technical Assessment	Sites 2 and 17	Site 16	Sites 18 and 24
Is the remedy that was put in place functioning as intended?	Yes	Yes	Yes
Are the exposure assumptions, clean-up levels, data, and remedial action objectives on which the remedy was based still valid?	Yes	Yes	Yes
Is there any new information available that would call into question the protectiveness of the remedy?	No	No	No
Conclusion / Protectiveness Statement	**The remedies at IRP Sites 2, 16, 17, 18, and 24 are being implemented in accordance with their respective decision documents and are protective of human health and the environment.**		

Date of Next Five-Year Review

The next Five-Year Review for former MCAS El Toro will be completed by the end of September 2014, five years from the completion date of this review.

Information Repository

A copy of the Final First Five-Year Review Report for former MCAS El Toro is available at the two locations presented below. Both locations have collections of key reports and historical documents reviewed by the Navy as part of this five-year review. Please visit the Navy's website for more information: http://www.bracpmo.navy.mil/default.aspx.

Information Repository
Heritage Park Regional Library
MCAS El Toro Information Repository
14361 Yale Avenue
Irvine, CA 92604
(949) 936-4040
Hours: Monday – Thursday: 10:00 A.M. to 9:00 P.M.
Friday and Saturday: 10:00 A.M. to 5:00 P.M.
Sunday: Noon to 5:00 P.M.

BRAC Office Building, Building 307,
MCAS El Toro
To schedule a review contact:
Ms. Sue Rawal
Phone: (949) 726-5398

RAB Tour – June 2009

WELCOME

Installation Restoration Program (IRP)
Site 1 Update

Former MCAS El Toro, California

Presented By:

Jackie Dunn, P.E., *Remedial Project Manager*

BRAC Program Management Office West

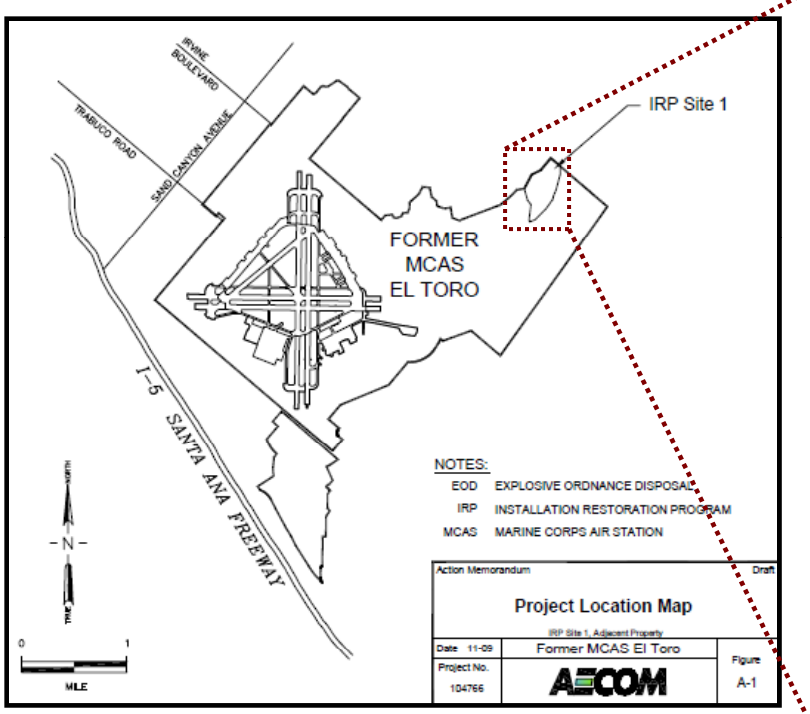
09 December 2009

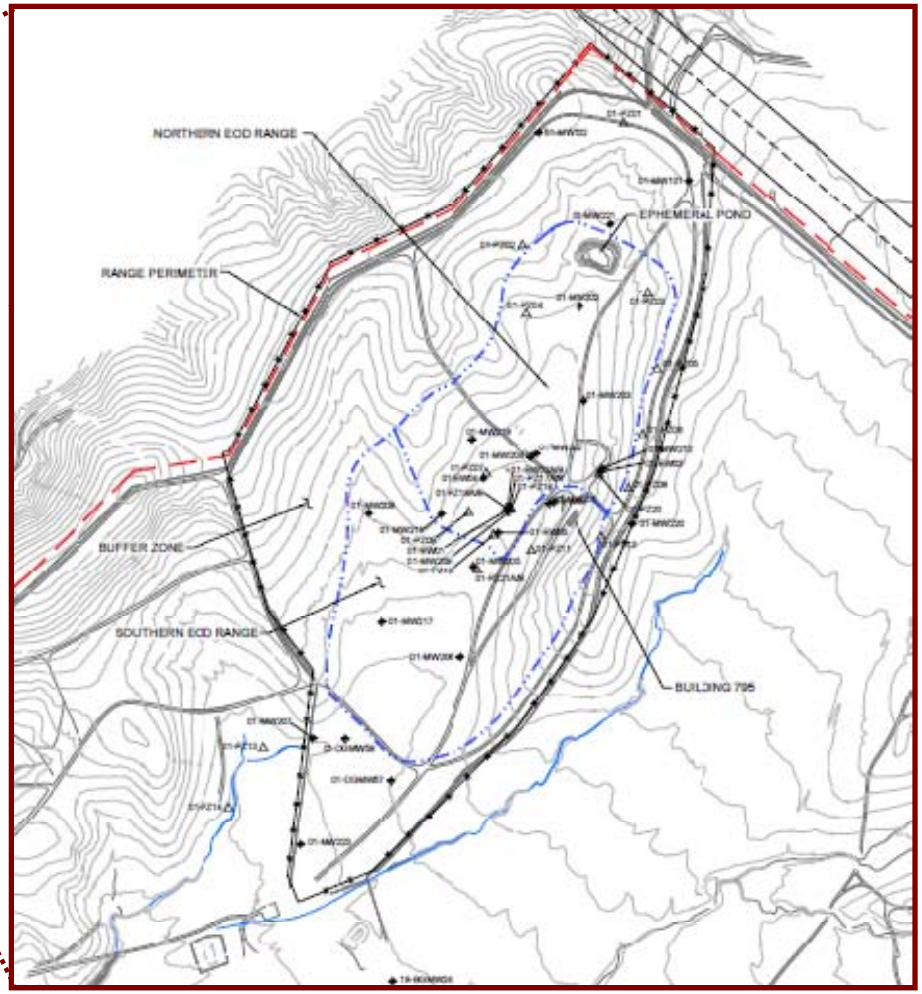
Presentation Overview

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

- Site History
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Process Status
- Investigations to Date
- Feasibility Study (FS) Remedial Action Objectives (RAOs)
- Current Activities
  - Groundwater Pilot Study
  - Supplemental Munitions Characterization
- Next Steps

Project Location Map





IRP Site 1 Description/History

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

- Approximately 74 acres
- EOD training at the site for over 40 years (~1953-1999)
- Training activities included the usage:
  - Cartridge-actuated devices and ammunition
  - FS Smoke (sulfur trioxide chlorosulfonic acid)
  - Hand grenades, land mines
  - Jet-Assisted Takeoff (JATO) Bottle Testing
- Northern EOD Training Range – military
- Southern EOD Training Range – FBI and Orange County law enforcement
- Current security: fence/locked gate

Previous IRP Site 1 Investigations

1985	Initial Assessment Survey
1993	Phase I RI
1998	Verification of Perchlorate (GW)
1998	MEC Range Identification and Assessment
1999	Perchlorate Verification Investigation (Soil)
2000	Radiological Assessment
2001	Site-Specific Environmental Baseline Survey (EBS) & FOST-Like Summary Document
2002-2006	Phase II RI
2005-2006	Aquifer Testing and Bench-Scale Microcosm Studies (GW)
2005-2009	Routine Groundwater Monitoring
2007	Final Radiological Release Report
2007	Draft Feasibility Study (FS) (Soil and GW)
2008	Draft Final FS (Soil)
2008-2009	Additional Munitions Characterization (Soil)
2009	Pilot Study – Perchlorate & TCE (GW)

STEPS IN THE CERCLA PROCESS

We Are Here

Site Discovery	NPL Listing/ FFA Signed	Remedial Investigation (RI)	Feasibility Study (FS)	Proposed Plan (PP) & Public Comment	Record of Decision (ROD)	Remedial Design (RD)	Remedial Action (RA)
Contamination first discovered	If applicable, site is listed on the U.S. EPA National Priorities List (NPL)	The RI identifies the nature and extent of contamination	The FS develops and evaluates remedial (cleanup) alternatives for contamination	The public has an opportunity to comment on the proposed cleanup plan and other alternatives	The selected remedy and responses to public comments are documented in the ROD	Detailed plans and specifications for the remedy are developed	The RD for cleanup is implemented by the Marine Corps/Navy

→ Process →

Feasibility Study (FS)
Remedial Action Objectives (RAOs)

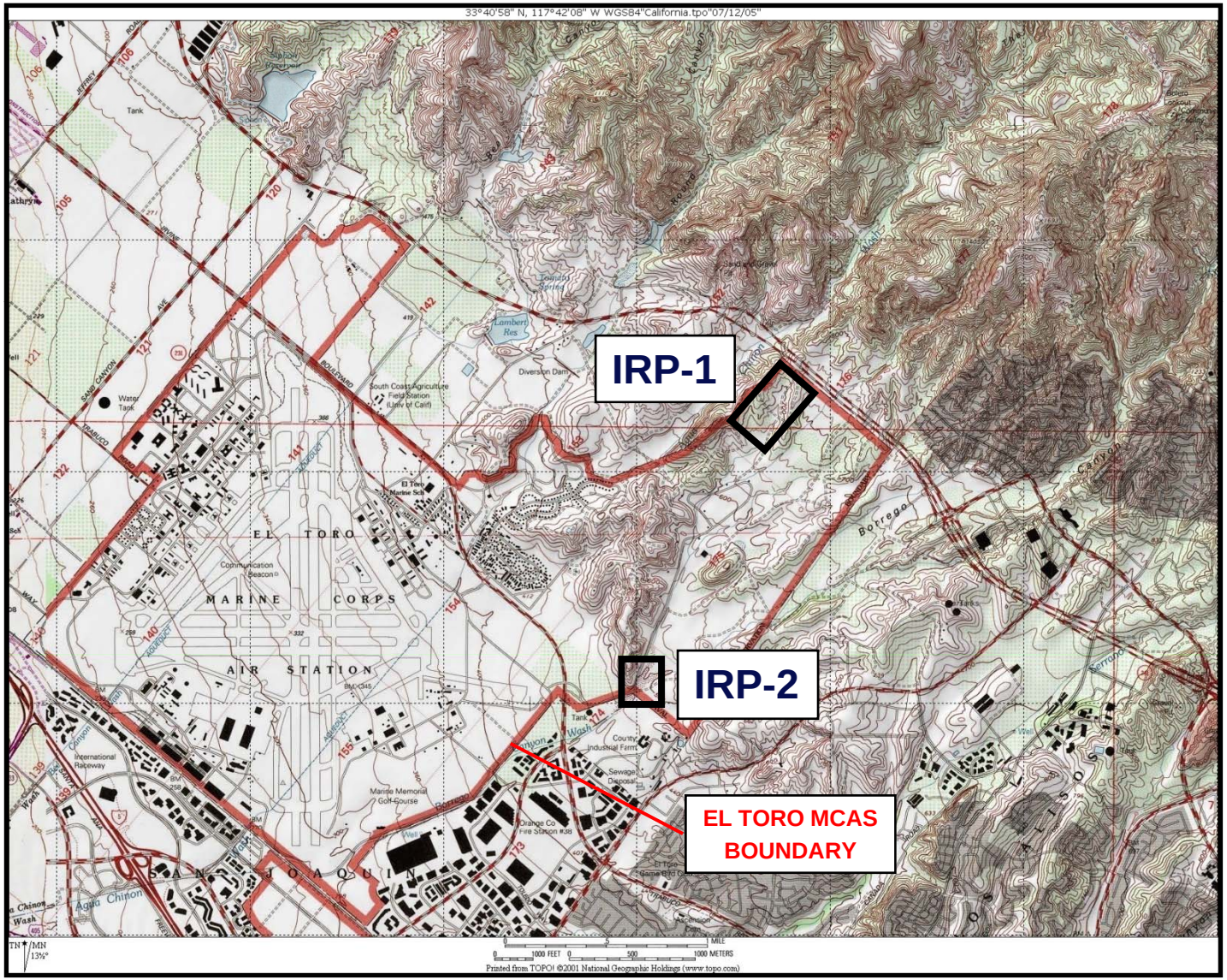
- **Groundwater RAOs**
  - Minimize the potential for domestic use of perchlorate-impacted groundwater that results in a noncancer Hazard Index (HI) of greater than 1.
  - Minimize potential off-Station migration of perchlorate-impacted groundwater that results in a noncancer HI of greater than 1.
- **Soil RAOs**
  - Munitions & Explosives of Concern (MEC) – Impacted Soil
    - Minimize potential for exposure to MEC that would result in unacceptable hazards to future receptors at IRP Site 1.
  - Napthalene – Impacted Soil
    - Minimize potential for exposure to naphthalene-impacted soil that would result in unacceptable risks to future receptors at IRP Site 1.

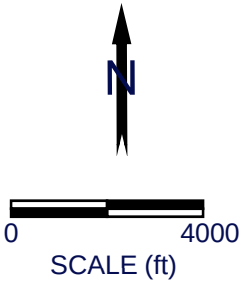
Groundwater Update – Pilot Study

Purpose:

- Gather site-specific data to evaluate the effectiveness of techniques for *in situ* bioremediation of perchlorate-impacted groundwater at IRP Site 1
- Evaluate techniques for in situ treatment of perchlorate-and trichloroethene (TCE)-impacted groundwater near the Station boundary (IRP Site 2 vicinity)
- Refine cost estimates for remedial alternatives evaluated in the Feasibility Study (FS)

Groundwater Update – Pilot Study





Groundwater Update – Pilot Study

How Does Anaerobic Bioremediation Work?

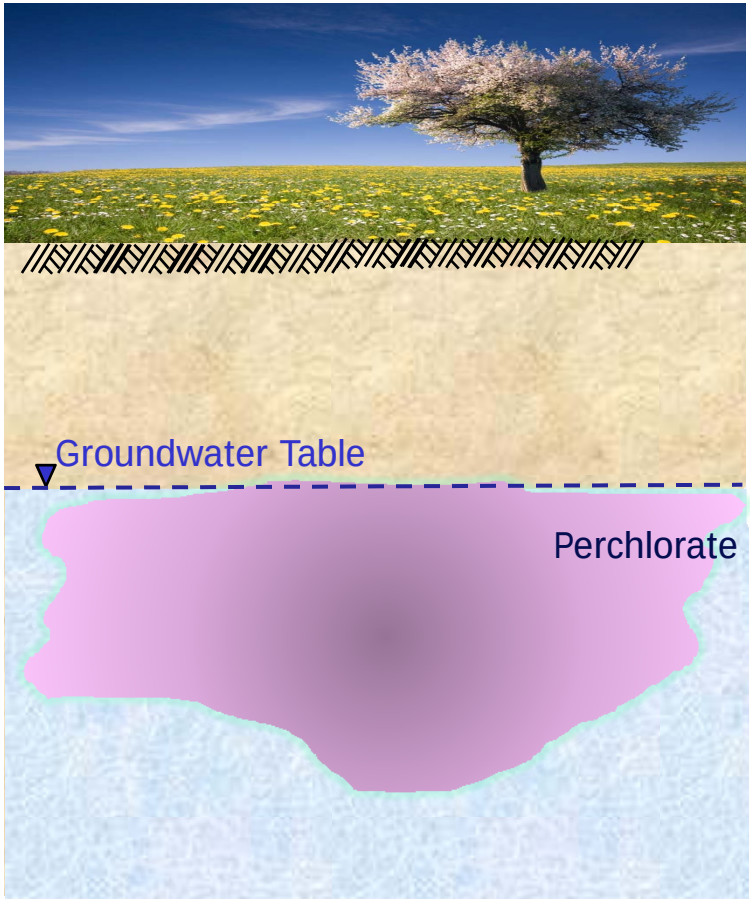
- Groundwater: naturally “aerobic” conditions (contains dissolved oxygen)

- Supply a food source (substrate) → produce “anaerobic” (depleted in oxygen) conditions

- Lab studies – if groundwater environment changes from aerobic to anaerobic, anaerobic bacteria will appear

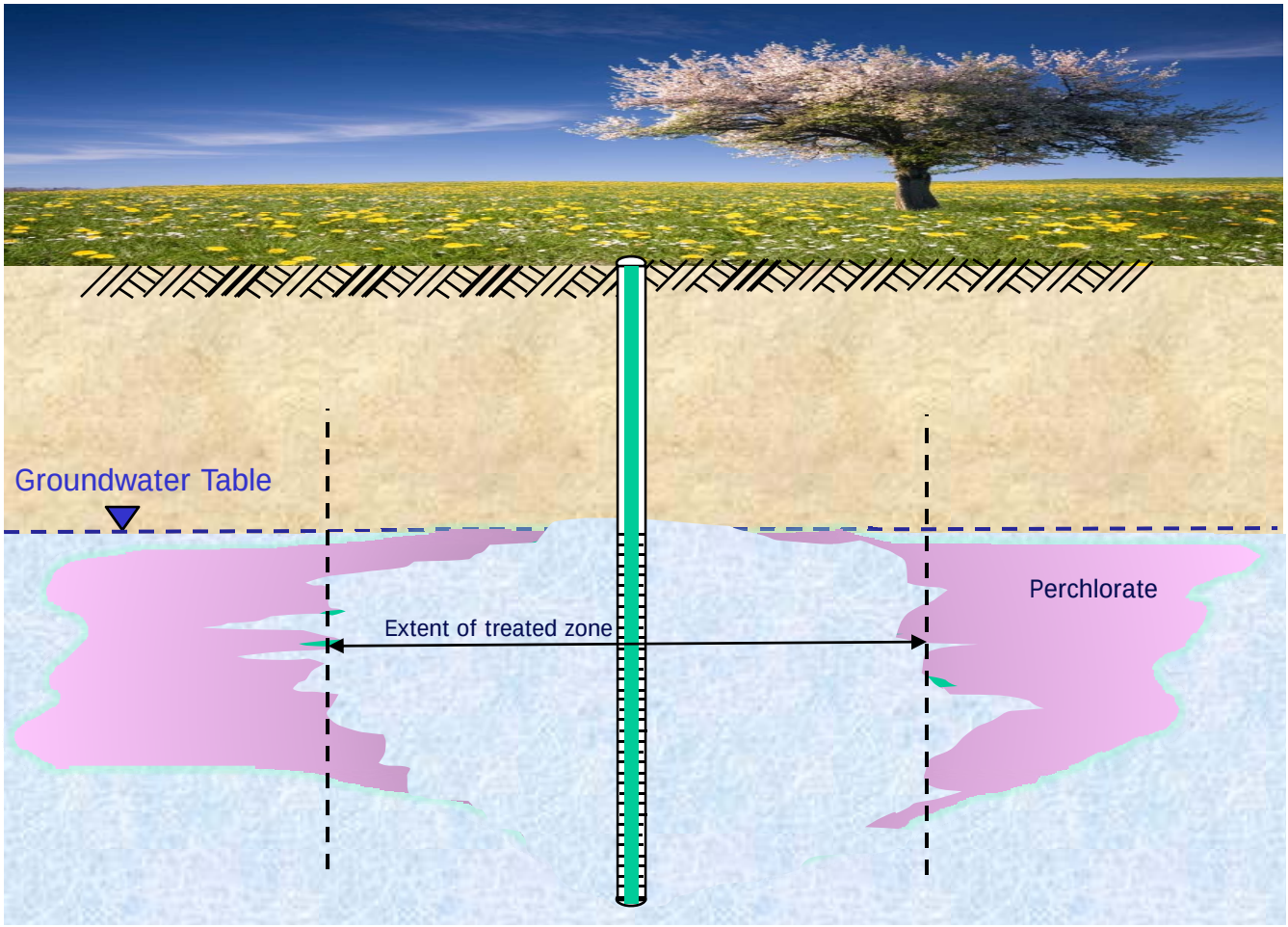
- Anaerobic bacterial population growth and substrate consumption → by-product: perchlorate degradation

- Upon depletion of the food source (substrate), the anaerobic bacteria die off and the groundwater environment reverts to its pre-existing natural aerobic state, *minus the perchlorate*



Groundwater Update – Pilot Study

Conceptual Illustration of Direct Injection Substrate Delivery:



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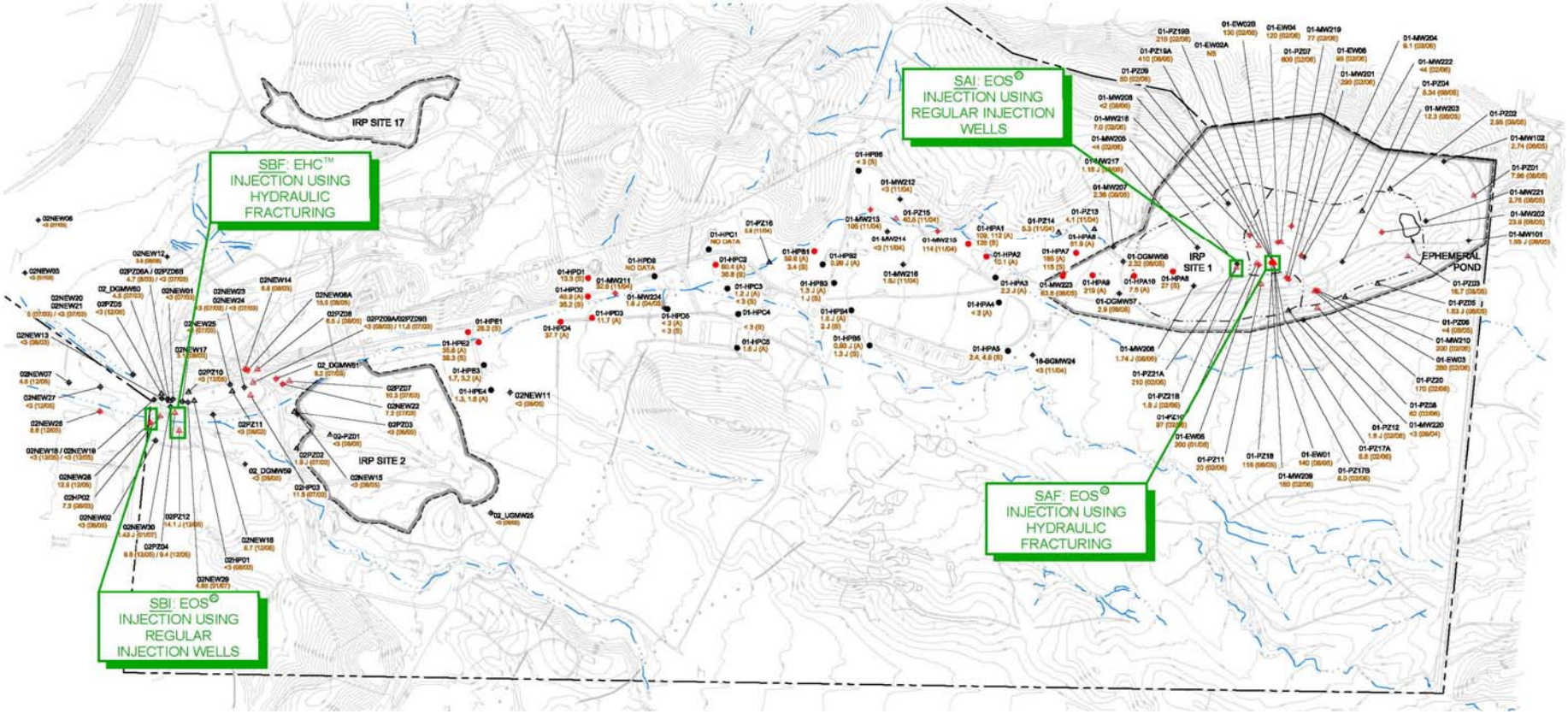
Groundwater Update – Pilot Study

Basic Steps – Substrate Emplacement Using Injection Wells:

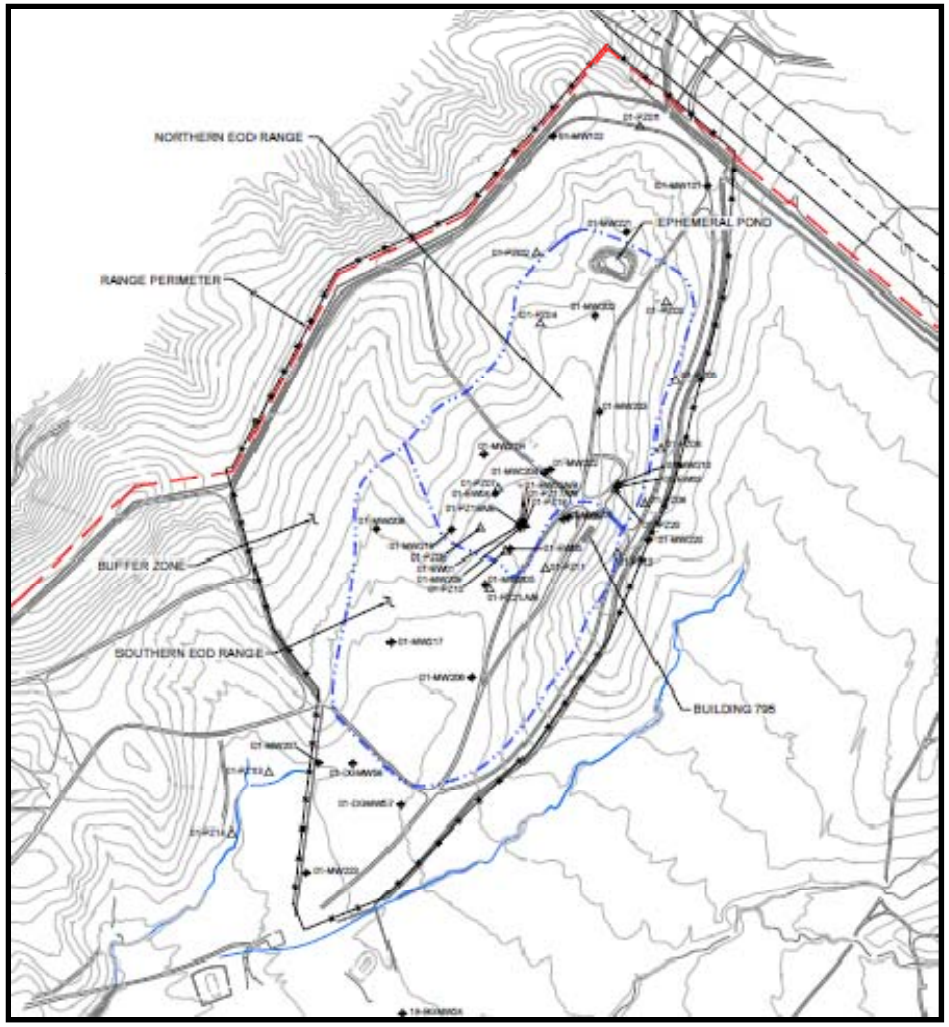
1. Install injection well (2-inch diameter) with screen interval designed to span the vertical extent of contamination
2. Inject a known volume of a slow release substrate (e.g. EOS®) mixed with a tracer (sodium bromide) at pilot test locations at the Source Area (Site 1) and at the Station Boundary (Site 2)
3. Monitor groundwater chemistry in nearby monitoring wells at various distances from the injection well to evaluate:
   - Distribution of the injected substrate using tracers
   - Changes in geochemical conditions, perchlorate, and TCE concentrations over time

Groundwater Update – Pilot Study



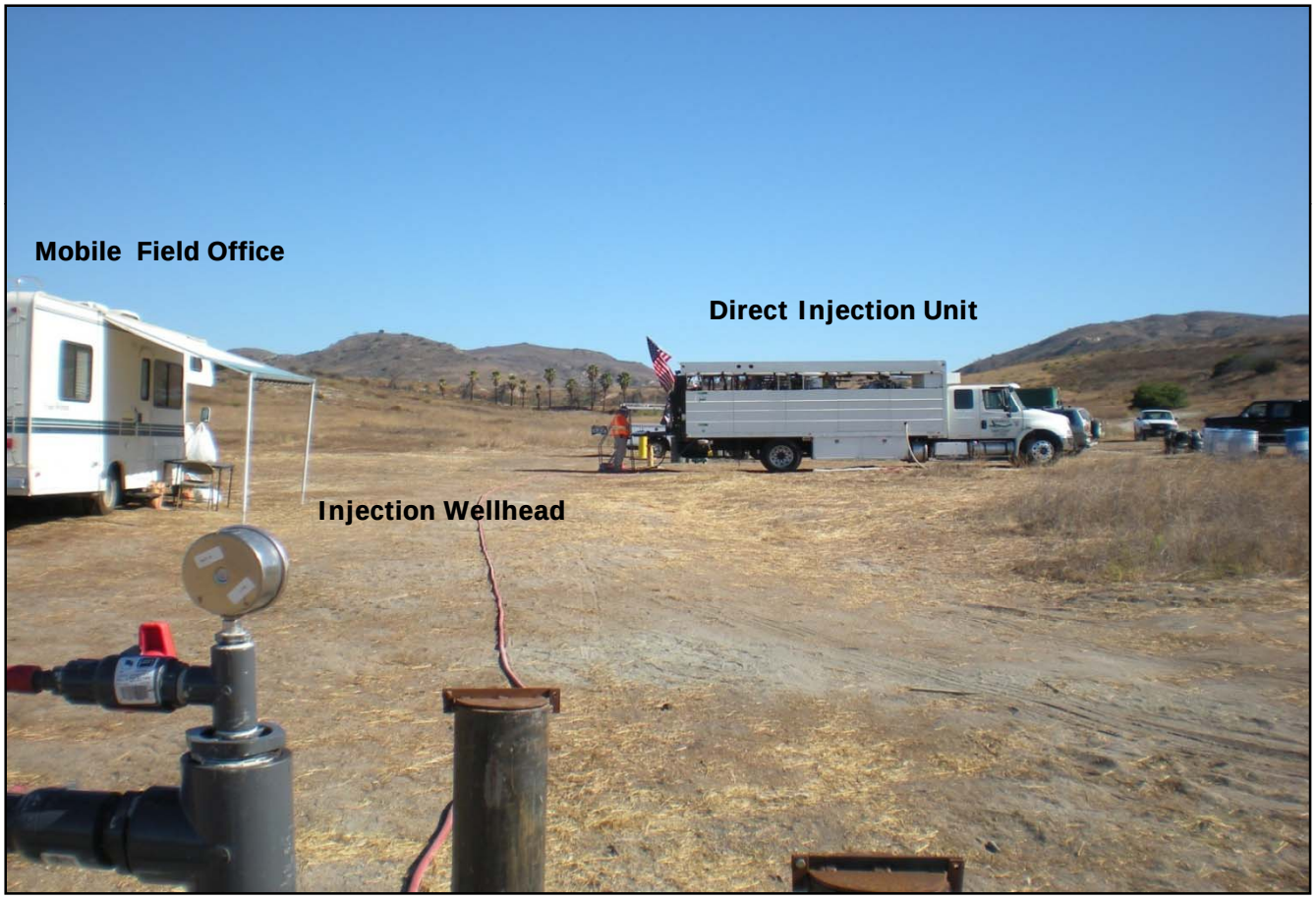
Groundwater Update – Pilot Study

Site 1 Map



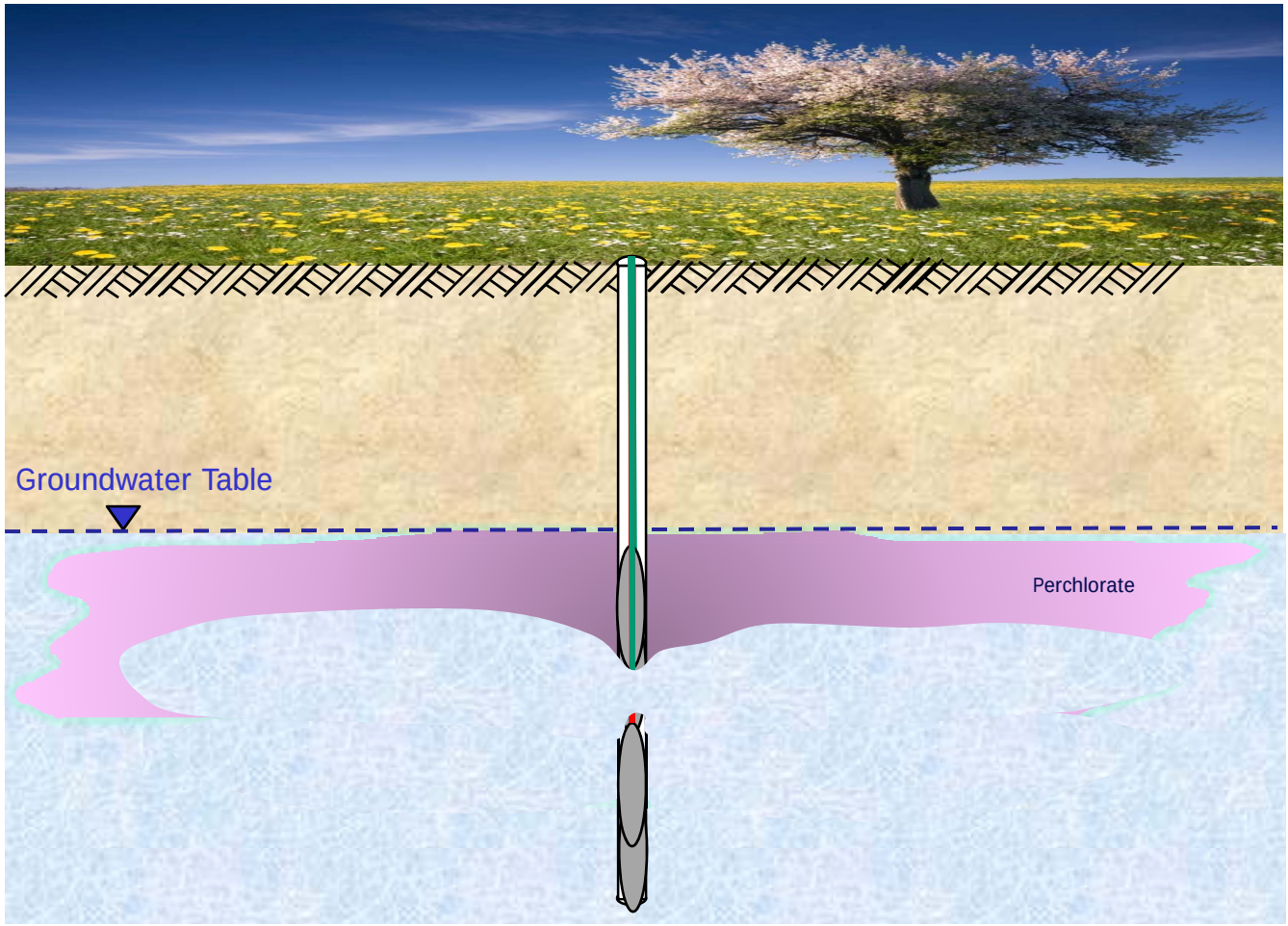
Groundwater Update – Pilot Study

Direct Injection – Site 1:



Groundwater Update – Pilot Study

Conceptual Illustration of Injection by Hydraulic Fracturing for Substrate Delivery:



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Groundwater Update – Pilot Study

Basic Steps – Substrate Emplacement Using Hydraulic Fracturing:

1. Drill fracturing borehole through the contaminated groundwater zone
2. Isolate incremental fracturing intervals using inflatable packers
3. Bioremediation substrate mixed with a conservative tracer, sodium bromide, and a fluorescent dye would be injected into subsurface using hydraulic fracturing (over-pressurized)
4. Pump a slurry mixture containing a viscous fluid (guar gum and water mixture) and proppant sand under high pressure to create fractures
5. Monitor groundwater chemistry in nearby monitoring wells following fracturing and substrate injection to:
   - Assess subsurface distribution of the injected substrate and tracers
   - Evaluate changes in geochemical conditions and perchlorate concentrations at Site 1
   - Evaluate changes in geochemical conditions, perchlorate and TCE concentrations at Site 2
6. Use surface geophysics to interpret the extent of fracturing

Groundwater Update – Pilot Study

Substrate Injection Using Hydraulic Fracturing:

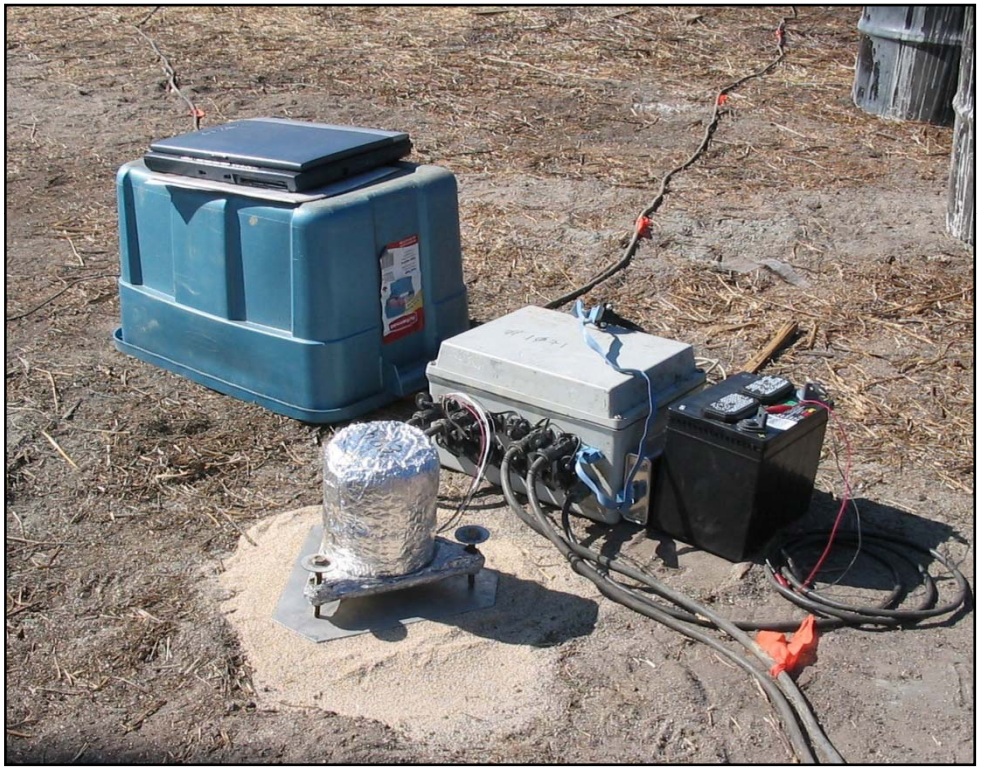
Viscous fracture fluid containing proppant sand

Drilling fracture boring at Site 1

Pumping fracture fluid under high pressure at Site 1

Groundwater Update – Pilot Study

Substrate Injection Using Hydraulic Fracturing:



Tiltmeter with data logger

Double packer setup for fracturing

Groundwater Update – Pilot Study

Substrate Injection Using Hydraulic Fracturing:

Drilling fracture boring at Site 2

Fracturing Unit at Site 2

Groundwater Update – Pilot Study

Preliminary Conclusions – Site 1:

- Direct injection of EOS®: reduction of perchlorate within alluvium immediately downgradient from the source area
- Hydraulic fracturing of the “tight” weathered bedrock: appears to increase the natural permeability of the bedrock and opening pathways for delivery of bioremediation substrate to the impacted groundwater
- Injection of EOS® (following hydraulic fracturing): reduction of perchlorate within the source area bedrock
- Data collection, evaluation and validation on-going
- Extent and geometry of fracturing is currently under evaluation
- The pilot test data will provide valuable information for the remedial alternative analysis in the Feasibility Study (FS) for Site 1 & 2 Groundwater

Groundwater Update – Pilot Study

Preliminary Conclusions – Site 2:

- Injection of EHC® with hydraulic fracturing: reduction in both perchlorate and TCE concentrations within bedrock
- Hydraulic fracturing of the “tight” weathered bedrock: appears to increase the natural permeability of the bedrock and opening pathways for delivery of bioremediation substrate to the impacted groundwater
- Data collection, evaluation and validation on going
- Extent and geometry of fracturing is currently under evaluation
- The pilot test data will provide valuable information for the remedial alternative analysis in the Feasibility Study (FS) for Site 1 & 2 Groundwater

Groundwater Update – Next Steps

Anticipated Groundwater (IRP Site 1 & 2) Schedule:

- Complete Pilot Study – April 2010
- Issue Pilot Study Technical Memo – June 2010
- Issue Draft Final FS for Groundwater – June 2010

Soil Update – Supplemental Munitions Characterization

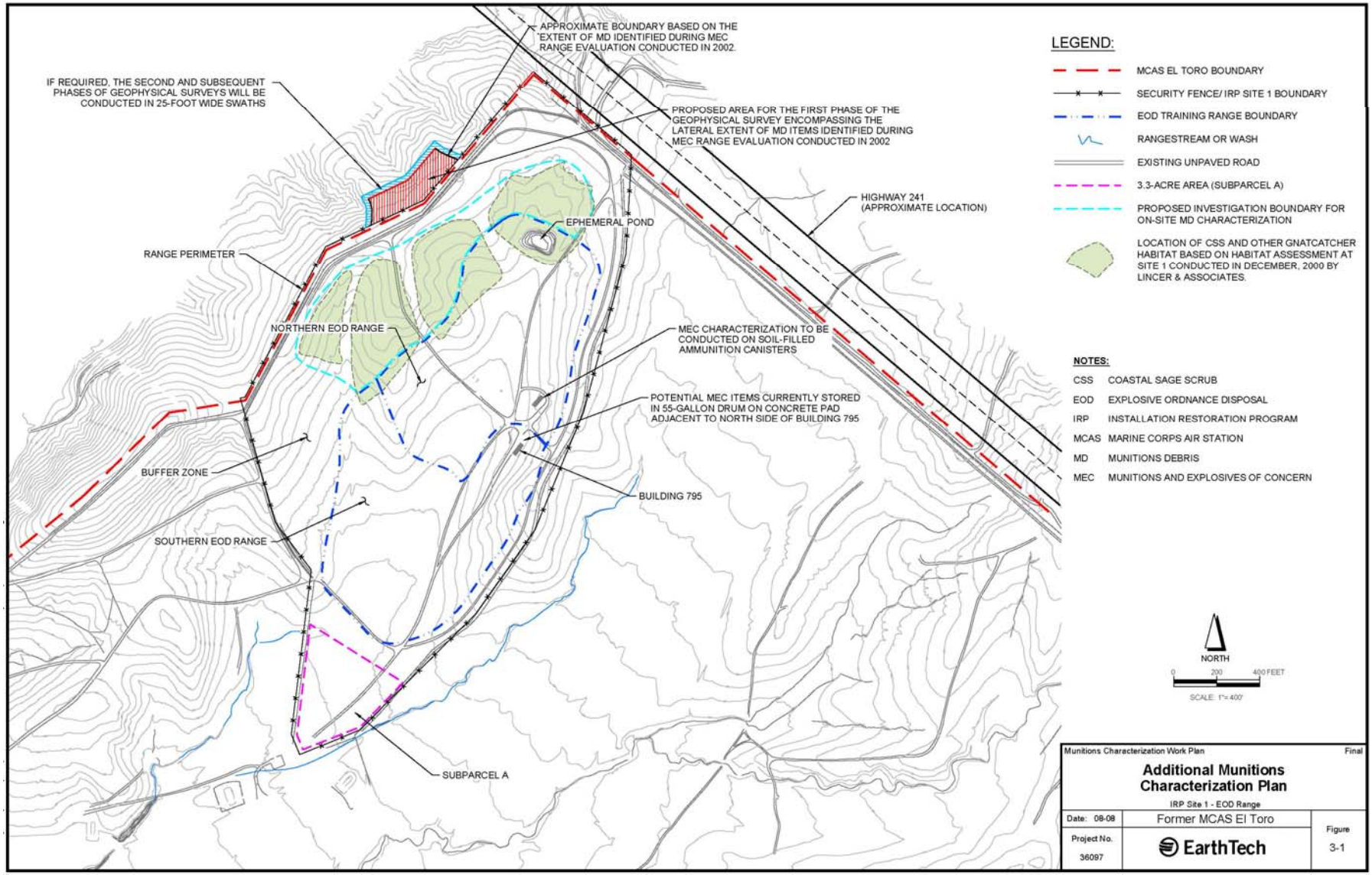
Purpose:

- Supplemental Munitions Characterization conducted in support of the Vadose Zone FS
- Final Agency-concurred Munitions Characterization Work Plan issued on August 5, 2008

Scope:

- Characterize munitions on-site in vegetated areas that became accessible after the October 2007 Santiago wildfire
- Characterize munitions on property adjacent to and northwest of IRP Site 1 boundary
- Characterize items contained within soil-filled ammunition cans stacked outside a former EOD training observation bunker
- Evaluate and subsequently demilitarize potential MEC items stored within a 55-gallon drum at the site

Soil Update – Supplemental Munitions Characterization



Soil Update – Supplemental Munitions Characterization

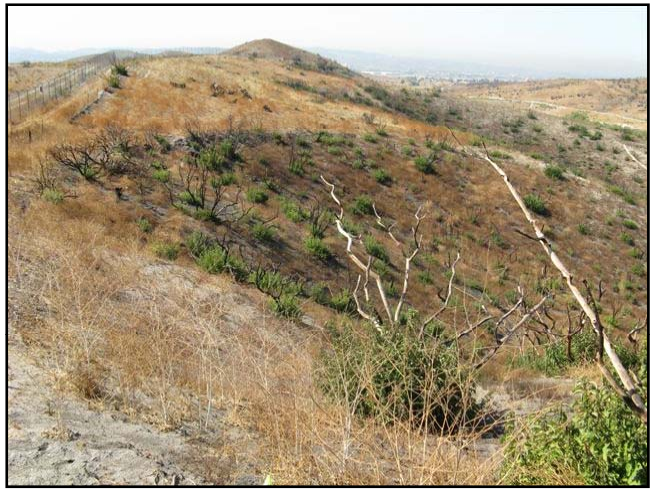
- **On-Site:**
  - Visual sweeps on approximately 12.6 acres in formerly vegetated Buffer Zone areas
    - 24 MEC items found at 14 locations
- **Adjacent Property:**
  - Visual sweeps and geophysical screening using hand-held all-metals detectors on approximately 2 acres
    - 6 potential MEC items found (all 20 mm projectiles) (2 surface and 4 near-surface; all less than 1 foot below ground surface)
  - MD was observed outside and adjacent to the planned characterization area, therefore reconnaissance & visual sweeps performed on approximately 43 additional acres adjacent to IRP Site 1
    - 19 potential MEC items at 16 locations

Soil Update – Supplemental Munitions Characterization

Characterization of Soil-Filled Ammunition Cans and 55-Gallon Drum:

- Soil from 104 ammunition cans passed through sieve
  - Numerous metallic objects recovered
  - Soil stockpile sampled for explosives compounds and contaminants of potential concern (COPCs) at IRP Site 1
- Evaluation of MEC items contained within a 55-gallon drum:
  - 38 potential MEC items, mostly 20 mm projectiles

Soil Update – Supplemental Munitions Characterization



Adjacent Property Area, Looking South

Sieving Soil for Metallic Objects

Surface Sweep Being Conducted in On-site Area

Potential MEC Items Recovered
(mostly 20 mm projectiles)

Soil Update – Supplemental Munitions Characterization

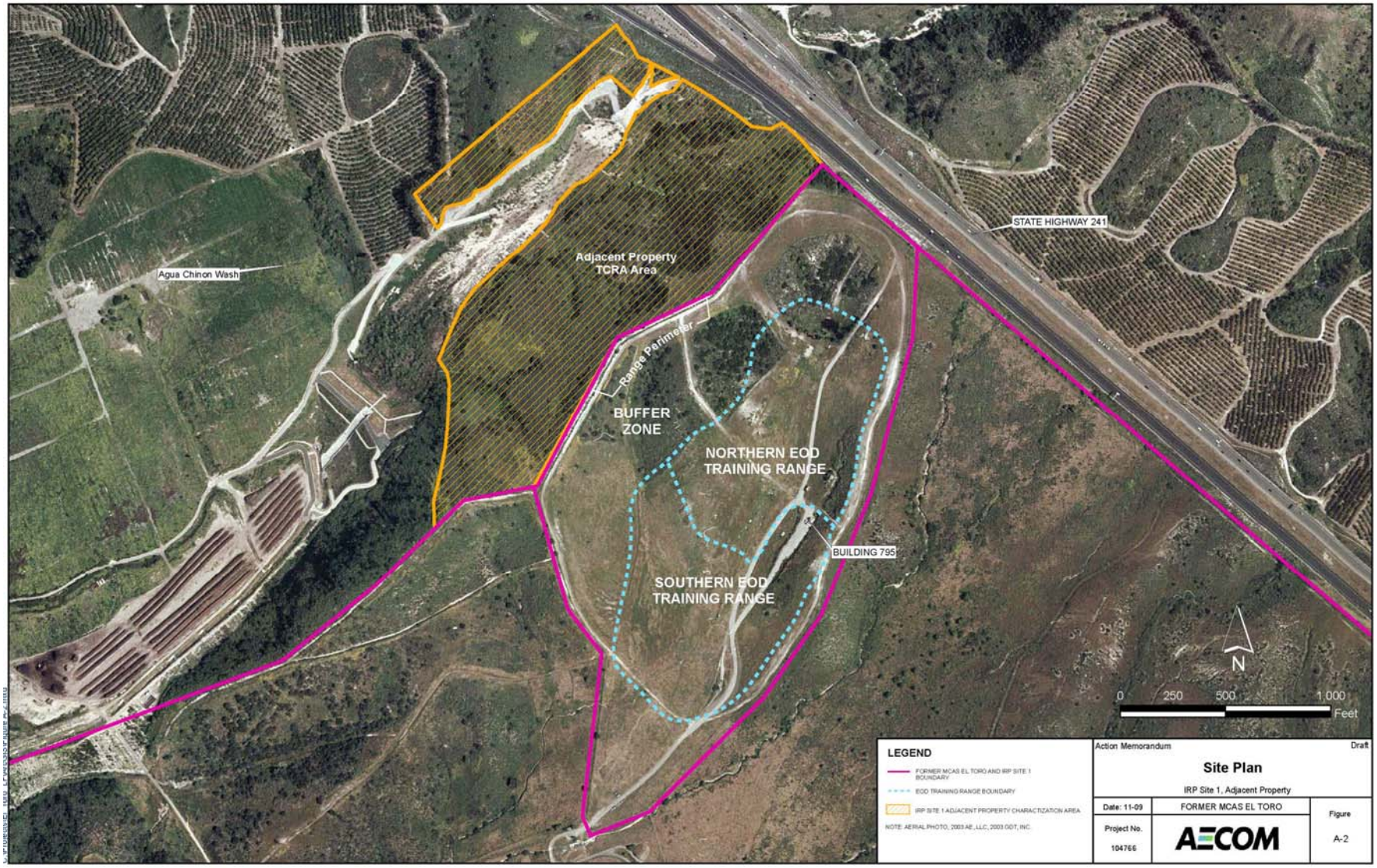
Results:

- Cultural debris (non-munitions-related scrap metal) and empty ammunition cans were transported to a metal recycling facility
- All potential MEC items were demilitarized and rendered safe
- All munitions debris (MD) items were certified as scrap metal and were transported to a metal recycling facility, where the certified MD was shredded

Soil Update – Time-Critical Removal Action

- Allows the Navy to address threats to human health and the environment prior to signing of a Record of Decision
- Scope includes:
  - More comprehensive evaluation using geophysical techniques that evaluate the potential presence of buried munitions
  - Removal of munitions identified during the geophysical activities
- Stakeholders (Regulatory Agencies and property owners) will review project documentation

Soil Update – Time-Critical Removal Action



Soil Update – Time-Critical Removal Action

- Tasks include:
  - Surveying
  - Vegetation trimming
  - Surface clearance of any metallic objects
  - Digital geophysical mapping (DGM)
  - Detector-aided visual investigation (using hand held metal detectors)
  - Characterization of anomaly sources
  - Demilitarization of non-MEC items by certification and shredding or smelting
  - Demilitarization of MEC items (if found) by explosive means

Soil Update – Next Steps

Anticipated Soil (IRP Site 1) Schedule:

- Issue Draft Action Memo and Removal Action Work Plan (RAWP) – December 2009
- Regulatory Agency Review – December – January 2010
- Issue Final Action Memo and RAWP – January 2010
- Implement Removal Action – Jan/Feb/March 2010
- Revised Draft Final FS for Soil – May/June 2010

Questions?