



DEPARTMENT OF THE NAVY  
NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST  
1220 PACIFIC HIGHWAY  
SAN DIEGO, CA 92132-5190

5090  
Ser RAE30.TM/039  
February 26, 2013

Mr. Brian Kelley  
California Environmental Protection Agency  
California Regional Water Quality Control Board  
Mitigation & Cleanup Unit  
9174 Sky Park Court, Suite 100  
San Diego, CA 92123-4340

Mr. Tayseer Mahmoud  
California Environmental Protection Agency  
Department of Toxic Substances Control  
Brownfields and Environmental Restoration Program  
5796 Corporate Avenue  
Cypress, CA 90630

Mr. Martin Hausladen  
U. S. Environmental Protection Agency  
Region IX, Code SFD-8-B  
75 Hawthorne Street  
San Francisco, CA 94105-3901

SUBJECT: MEETING MINUTES FOR THE 109<sup>th</sup> FEDERAL FACILITIES  
AGREEMENT (FFA) MEETING DATED JANUARY 17<sup>th</sup>, 2013,  
MARINE CORPS BASE CAMP PENDLETON

Dear Mr. Kelley, Mr. Mahmoud, Mr. Hausladen:

Enclosed are the minutes to the Marine Corps Base, Camp Pendleton Federal Facilities Agreement (FFA) Meeting Number 109, held on January 17<sup>th</sup>, 2013. Should you have questions, please call Ms. Theresa Morley at (619) 532-1502.

Sincerely,

A handwritten signature in black ink, appearing to read "Gaston C Bordenave", is written over the typed name.

GASTON C. BORDENAVE, JR  
By direction

- Enclosures:
- (1) 109<sup>th</sup> FFA Meeting Minutes
  - (2) 109<sup>th</sup> FFA Meeting Agenda
  - (3) Sign in Sheet
  - (4) Deliverables/Fieldwork Spreadsheets
  - (5) FFA Schedule
  - (6) FY13 Funding and Projects Briefing
  - (7) 22/23 Groundwater Chappo Subbasin Update
  - (8) Site 21 Pilot Study Update
  - (9) Site 1116 Phase I and II Results
  - (10) Site 1115 RI/FS Update

Copy to: CG, MCB Camp Pendleton (Attn: ACOS, Environmental Security - Mr. Joe Murtaugh)

## PROJECT NOTE NO. 59

**SUBJECT: Marine Corps Base (MCB) Camp Pendleton Federal Facilities Agreement (FFA) Meeting (No. 109)**

**DATE HELD: January 17, 2013**

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### **Attendees:**

Theresa Morley (Naval Facilities Engineering Command Southwest [NAVFAC SW]), Tracy Sahagun (MCB Camp Pendleton), Joseph Murtaugh (MCB Camp Pendleton), Martin Hausladen (United States Environmental Protection Agency [USEPA or EPA]), Tayseer Mahmoud (California [Cal] EPA/Department of Toxic Substances Control [DTSC]), Kimberly Day Gettmann (Cal EPA/DTSC), Cheryl Prowell (San Diego Regional Water Quality Control Board [RWQCB or Water Board]), Jeff Oslick (Noreas), Steve Griswold (Parsons), Lauri Roché (Parsons), and Josh Sacker (Parsons).

Attendees by Teleconference: Bill Mabey (Tech Law) and Brian Kelley (RWQCB).

### **Introduction and Status of Deliverables and Fieldwork**

A meeting was held at the Parsons Pasadena office to update the FFA Team (Team) on the program status. Refer to attached sign-in sheet and agenda (attached). Following introductions, Ms. Morley discussed the FFA schedule, the deliverables spreadsheet, and the fieldwork spreadsheet (attached).

Ms. Morley summarized the status of each of the items on the FFA schedule, and noted that there are three new Installation Restoration (IR) sites that have been added to the schedule. The sites are 1120 (Stuart Mesa Pesticide Maintenance Areas), 1121 (Site 1D Groundwater), and 1122 (Shot Fall Zone). The Shot Fall Zone site consists of overshoot from a skeet and trap club at the MCB Camp Pendleton boundary in San Clemente. Once funding is in place for these sites, deliverable dates can be established.

The deliverable schedule was reviewed by Ms. Morley. The 22/23 Area Groundwater Record of Decision (ROD) is near completion. The EPA and the Navy legal counsel are working on finalizing the language in the ROD related to Land Use Controls. The zero-valent zinc (ZVZ) pilot study is on hold due to the need for more borings at the planned injection area.

Ms. Prowell announced that she will be transferring to Region 2 of the RWQCB, and that Brian Kelly will be the interim point of contact for the RWQCB for the Camp Pendleton project.

### **Fiscal Year 2013 Funding and Projects Briefing**

Ms. Morley presented a summary of planned projects (see attached slides). There was some discussion about the Five Year Review. Site 7 is currently the only site to be included in a Five Year Review in 2013. 22/23 Area Groundwater will be included in a future Five Year Review after the ROD is completed due to the inclusion of Land Use Controls in the remedy. Regarding Site 7, the Department of the Navy (DON) will likely propose a revised monitoring schedule for the site before the next FFA meeting. Ms. Morley noted that the United States Geological Survey (USGS) suggested the use of phytoremediation at Site 1D. Mr. Hausladen said to check with the people doing phytoremediation at the Long Beach project.

Ms. Prowell asked where the USGS data will be published for 22/23 Area and Site 1119. Mr. Sacker indicated that the data for 22/23 Area was in the Remedial Investigation/Feasibility Study (RI/FS) Report for that site, and the Site 1119 RI/FS Report will contain the data from Wells 26016 and 26018.

### **22/23 Area Groundwater Well Siting Study**

Mr. Griswold provided a summary of the status of the Well Siting Study (see attached slides). The study is being conducted in a portion of the Santa Margarita River designated as the Chappo Subbasin. A briefing was held on December 3 with the new director of the Base Office of Water Resources regarding the IR Program and this specific site. The investigation involves installation of wells at multiple screen depths at each of four locations, and sampling of existing well CH-5a. One of the planned monitoring well locations could not be used due to access and habitat issues, and has been relocated on the Marine Corps Air Station (MCAS). The new planned location is in the process of being approved by MCAS for biological, air space clear zones, utilities, rig mast height, and operational constraints.

### **Site 21 Pilot Study Update**

Mr. Griswold updated the team on the current status of the pilot study at Site 21 (see attached slides). Some details were provided regarding well installations and injection of carbon substrate to test the effectiveness of enhanced in-situ bioremediation. The data collected to date shows that the initial pilot study injection was successful at reducing volatile organic compound (VOC) (primarily trichloroethene [TCE]) concentrations in the treated area. It is anticipated that this expanded pilot study will be as effective in an area of the site with lower concentrations (below approximately 100 microgram per liter [ $\mu\text{g/L}$ ]). Mr. Mahmoud asked if the pond would be sampled, and Mr. Griswold said that is not planned at this time because pond water was sampled in the past, which showed detections of TCE at concentrations well below regulatory screening limits. .

## **Site 1116 Phase I and Phase II Site Inspection Results**

Ms. Morley presented a history of investigations and actions at the three subsites that comprise Site 1116 (Subsites 140008, 1491, and 14112, see attached slides). Cone penetrometer test (CPT) and hydropunch data at Site 140008 indicate the presence of TCE up to 280 µg/L, with higher concentrations in the vicinity of the stream channel. At Subsite 1491, TCE is present up to 84 µg/L, and the higher concentrations are also in the vicinity of the stream channel. Groundwater appears to flow from Subsite 140008 toward the northeast to Subsite 1491 within alluvial sediments in the channel. Ms. Morley noted that the remediation planned at the subsites will proceed, but that there will also be further delineation of the TCE.

There was some discussion about the planned medical clinic that will be built in the vicinity of Building 1431. Dr. Day Gettmann requested that a soil gas survey be conducted where the building is planned. Although the site is thought to be on bedrock, there may be cracks or fissures that could transmit vapor. Ms. Morley agreed that a soil gas survey could be done. Dr. Day Gettmann and Ms. Prowell discussed the possible need for a vapor barrier at the new building or possibly adding a ground-floor garage for ventilation. There was no FFA Team approval for a permanent structure at this location without a vapor intrusion assessment and/or the possible use of a vapor barrier at the site. Ms. Prowell said that the figure seemed to show the new building footprint on the streambed, and Ms. Morley said that the figure in question needs to be corrected.

Ms. Morley provided an overview of the status and data obtained at Subsite 14112, where sample results show TCE and fuel-related compounds in groundwater. A Removal Action Work Plan is in progress for Site 1116.

## **Site 1115 Update for Remedial Investigation/Feasibility Study (RI/FS)**

Dr. Oslick provided a status update for the Site 1115 RI/FS (see attached slides), including background information for each of the different areas of the site where past releases occurred. The three areas are a) Former Underground Storage Tank (UST) Site 1 (Gas Station), b) Former UST sites 5/8/9/17 (Motor Pool Service Bays), and c) Former UST Sites 6/7 (Wash Rack Area). Fuel-related compounds are the primary chemicals of potential concern (COPCs) at the Site 1 area, and a mixture of fuel-rated contaminants and solvents are the primary COPCs at the other two locations. Dr. Oslick described groundwater gradients, the results of previous investigations and the latest data obtained at the site.

To address the different areas of contamination at the site, Target Treatment Zones (TTZs) will be established based on the types and concentrations of contaminants in each area. In addition, the shallow and the deep water-bearing zones at the site will likely be separate TTZs because the deeper zone has much lower concentrations of COPCs, and because a different approach may be needed for the shallow vs. the deep zones.

Dr. Oslick showed conceptual maps of where the different TTZs are located on the site, and also described potential technology types that would be considered. He also said that it will likely be necessary to have Land Use Controls (LUCs) as part of the remedy for the site. Ms. Morley noted that a large part of the site may need LUCs initially, but that the area would likely shrink over time as plumes become smaller. Dr. Mabey asked

if the remediation approach for the site would be more aggressive or passive. Ms. Morley said that the hottest spots in the source areas would likely have more aggressive treatment, and that the more dilute areas outside the source areas may have less aggressive treatment. There was discussion of several possible treatment options. Dr. Mabey mentioned that thermal remediation was not on the list in the presentation, and noted that at a recent conference there were interesting results with thermal remediation combined with persulfate. Dr. Oslick noted that 1,2-dichloroethane (DCA) is a recalcitrant compound, and that naturally high sulfate in groundwater complicates the use of bioremediation. There was also a brief discussion about the possible use of thermal remediation at the site, but it was noted that the energy costs for thermal are high, and that renewable energy sources will be evaluated.

### **Path Forward for IR Site 33 (52 Area Armory)**

Ms. Morley summarized the status of Site 33 and the planned approach going forward. The worst of the plume was removed by excavation, and now soil gas will be sampled under the gun cleaning pad at a depth of 3-6 feet below ground surface to address vapor intrusion risk. The soil gas sampling cannot be done until mid February due to utility clearances, but if the readings are high, additional excavation may be needed. Ms. Morley noted that if additional excavation is needed, the actual remedy will not change, but just the footprint. Mr. Hausladen asked if the costs will change substantially from the Engineering Evaluation/Cost Analysis (EE/CA), and Ms. Morley said that they will not because the original work came in under that estimate. Mr. Hausladen said that it may be possible to do an addendum to the Action Memorandum since there are no new contaminants of concern or difference in approach. It will need to document change in site boundary. But, he will check with EPA legal to determine if a different approach is needed. Mr. Mahmoud indicated that DTSC would likely be agreeable with what the EPA comes up with regarding the needed documentation. Ms. Prowell said that an addendum to the Action Memorandum should be appropriate given that further action would still be within the estimated budget. The Team agreed that they are open to this planned modification, but will await the review of the new data to reach final agreement.

### **Path Forward for Site 1116**

Ms. Morley noted that the highest concentrations of TCE at Subsite 1491 are in a different location than as shown in the Action Memorandum. In the interest of streamlining the process, she is proposing that an addendum to the Action Memorandum be prepared to show the changed location of the planned cleanup action. Mr. Hausladen said that the Navy should send a letter documenting the change and the planned location.

There was also discussion about how the Site 1116 subsites have petroleum contamination as well as Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) contaminants. Ms. Prowell agreed with Ms. Morley that it would be helpful to get the sites, or portions of sites, that have petroleum contamination back into the UST program. The remaining subsites (14112, 1491 and 140008) may become a new site so IR 1116 could be closed.

### **Schedule for Next FFA Meeting**

The next FFA Meeting is scheduled to be held at MCB Camp Pendleton on May 16, 2013.

**MCB Camp Pendleton  
109<sup>th</sup> FFA Meeting Agenda  
101 West Walnut Street  
Pasadena, CA 91103**

**January 17<sup>th</sup>, 2013**

- |                    |   |
|--------------------|---|
| <b>0930 – 0945</b> | <b>Welcome and Introductions (Navy)</b>   |
| <b>0945 – 1015</b> | <b>Project Deliverables, FFA Schedule Update and Planned/In Progress Field Work Status (Navy)</b>     |
| <b>1015 – 1045</b> | <b>Fiscal Year 2013 Funding and Projects Briefing</b>   |
| <b>1045 – 1100</b> | <b>Break</b>  |
| <b>1100 – 1200</b> | <b>Presentation on Field Data for Site 1116 and Changes to Removal Action – 14 Area Groundwater</b>   |
| <b>1200 – 1245</b> | <b>Lunch</b>  |
| <b>1245 – 1345</b> | <b>Presentation on Field Data for Site 1115 – FSSG Lot</b>  |
| <b>1345 – 1430</b> | <b>Discussion on Path Forward for IR Site 33 (52 Area Armory) and Site 1116 (14 Area Groundwater)</b> |

CLIENT \_\_\_\_\_ JOB NO. \_\_\_\_\_ SHEET \_\_\_\_\_ OF \_\_\_\_\_  
 SUBJECT 169th PFA meeting Sign-In BY \_\_\_\_\_ DATE \_\_\_\_\_  
 1-17-13 CKD. \_\_\_\_\_ REVISION \_\_\_\_\_

<u>Name</u>	<u>Organization</u>	<u>Phone/Email</u>
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Jeff Osuac	NORAS	jeff.osuac@norasinc.com 949-467-9105

## FFA Schedule for Draft Documents – January 17, 2013

Original schedule was agreed to by all FFA signatories at the May 17, 2011 FFA meeting. Updates are made every four months, prior to the FFA meetings. Dates marked with an asterisk are tentative, based on funding and subject to change. Once funding becomes available for a site, the date will be updated and the asterisk removed. Items in italics represent field work and are not enforceable.

### **Site 6 (Site number is for funding purposes only) – 22/23 Area Groundwater**

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This site consists of VOC plumes in the groundwater under the 22 and 23 Areas. Various industrial activities have historically taken place in the 22 and 23 Areas. An RI/FS was completed in January 2011. The Proposed Plan outlined the various alternatives from the FS and proposed the preferred alternative which is a combination of alternatives 2, 3 and 4. Alternative 2 includes Land Use Controls and Long-Term Monitoring, Alternative 3 involves an Alternate Water Supply and Alternative 4 is Source Area Treatment via In-Situ Technologies. A public comment period and public meeting for the Proposed Plan were held in July/August 2011. A Record of Decision is being reviewed by the agencies. To evaluate the effectiveness of the remedies proposed for Alternative 4, two pilot studies are planned: a Zero Valent Zinc (ZVZ) Permeable Reactive Barrier is planned for the TCP plume; and, Enhanced InSitu Bioremediation (EISB) is planned for the TCE plume. The DoN has finalized the work plan for the ZVZ pilot study, but the EISB work plan is currently in agency review.

- |   |                    |
|---|--------------------|
| – Proposed Plan   | complete           |
| – Geotechnical and Design Information for ZVZ PRB Pilot Study | complete           |
| – <i>Implementation of ZVZ PRB Pilot Study</i>                | <i>in progress</i> |
| – <b>Record of Decision</b>                                   | <b>5/8/2012</b>    |
| – <b>Well Siting Study Sampling and Analysis Plan</b>         | <b>complete</b>    |
| – <i>Field Work for Well Siting Study</i>                     | <i>in progress</i> |
| – Work Plan for Enhanced InSitu Bioremediation (EISB)         | complete           |
| – <i>Field Work for EISB Pilot Study</i>                      | <i>in progress</i> |

**Extension for Record of Decision requested to incorporate multiple Navy and Marine Corps comments and for Sampling and Analysis Plan to accommodate changes in Navy Quality Assurance Officer**

### **\*\*POST ROD Site 7 – Box Canyon Landfill**

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This site is a CAMU situated above an old municipal landfill. This site is post-ROD. The selected remedy was an EvapoTranspiration (ET) cap with land use controls. The site must be fenced and signed. Annual inspections are made in relation to the monitoring systems, cover maintenance, drainage/erosion control, cracks, settlement and movement and vegetation growth. Additionally, groundwater monitoring wells are sampled every year and gas probes are sampled according to the percent of methane in the probe. The groundwater monitoring results and the annual maintenance activities are summarized in annual reports. The methane results are emailed to the FFA team monthly. A Gas Collection and Control System (GCCS) was recently installed.

- Memo to File for Site 7 (pv panels) complete
- *Field Work for Non Methane Organic Compounds* complete
- Memo To File complete
- Report for Non Methane Organic Compounds complete
- Annual Post Closure Maintenance Report (for CY12) 2/15/2013
- Annual Groundwater Monitoring Report 7/3/2013

### **12 Area Site 13 – Former Building 1280 and 1283**

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This site is the site of a former UST and has some low level concentrations of VOCs in groundwater. An RI/FS has been completed for the site but the site has not progressed further in the CERCLA process. Due to an impending construction project through the site, contaminated soil and groundwater were removed from the area to be impacted by construction. A year of groundwater monitoring has been completed and a Project Completion Report is in agency review. The report recommends further action for the site.

- Groundwater Monitoring Report complete
  - **Project Completion Report for Soil and Groundwater** complete
  - **Engineering Evaluation/Cost Analysis** 5/30/2013\*
  - **Action Memorandum** 5/30/2013\*
  - **Proposed Plan** 5/30/2014\*
  - **Record of Decision** 5/30/2014\*
- Dates changed as a result of the May 10, 2012 FFA Meeting**

### **Site 21 – 14 Area Surface Area Impoundment**

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This site was a former oxidation pond near a maintenance facility which has some low levels of VOCs in groundwater. A Remedial Investigation has been completed for the site, but not a Feasibility Study. Currently a pilot study to evaluate the effectiveness of in-situ bioremediation of chlorinated solvents at low concentrations in groundwater is in planning. A Technical Memorandum reporting on the effectiveness of the first year of the pilot study was recently finalized, as was the Pilot Study Addendum. Currently, the second phase of the pilot study is underway.

- Pilot Study Tech Memo complete
  - Site 21 Pilot Study Work Plan Addendum complete
  - *Second Phase of Pilot Study Field Work* in progress
  - **Feasibility Study** 11/15/2013\*
  - **Proposed Plan** 11/15/2014\*
  - **Record of Decision** 11/15/2015\*
- Dates were changed as a result of the September 15, 2011 FFA meeting**

### Site 33 – 52 Area Armory

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Gun cleaning in the armory contributed to a PCE plume downgradient of the armory. A Remedial Investigation and Feasibility Study have been completed for this site. An Engineering Evaluation/Cost Analysis and Non-Time Critical Action Memorandum have also been completed. The preferred remedy is excavation of the source material, including groundwater which would then be treated and disposed of in the sanitary sewer system and is almost complete.

- |  |                 |
|--|-----------------|
| – Removal Action Work Plan                                   | complete        |
| – <i>Removal Action (geophysical work started 15 Nov 11)</i> | <i>complete</i> |
| – Removal Action Completion Report                           | 10/25/2013*     |
| – Proposed Plan  | 11/15/2014*     |
| – Record of Decision   | 11/15/2015*     |

### Site 150 – 21 Area, Location 1

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This site became an IR site recently after a discovery investigation conducted based on information gained from a former Marine stationed at Camp Pendleton. During the discovery investigation, one location had vinyl chloride in soil gas that exceeded risk screening criteria. Field work for the Site Inspection has located groundwater contamination. This will move the site to the Remedial Investigation phase.

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|---|-------------------------|
| – <i>Site Inspection Field Work</i>                   | <i>complete</i>         |
| – Site Inspection Report                              | complete                |
| – <b>Remedial Investigation Work Plan</b>             | <b>4/21/2013</b>        |
| – <b><i>Field Work for Remedial Investigation</i></b> | <b><i>4/21/2014</i></b> |
| – <b>Remedial Investigation Report</b>                | <b>2015*</b>            |
| – <b>Proposed Plan</b>                                | <b>2016*</b>            |
| – <b>Record of Decision</b>                           | <b>2017*</b>            |
- Dates changed (RI added) as a result of the SI field work**

### Site 1003 (Site number is for funding purposes only) – Site 1D Groundwater

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This site is a former burn ash site and has undergone a Remedial Investigation and Feasibility Study for soil only. A ROD was signed documenting the selected remedy consisting of excavation and off-base disposal of contaminated soil. During the remedial action a cell with 90 drums and drum fragments containing liquid and solid chemicals was discovered. The drums were removed but the material in the drums had reached groundwater. A Remedial Action Closure Report was completed to close out the soil portion of the site, but the groundwater contamination remains to be addressed. As an interim measure, until funding could be secured for further investigation, 650,000 gallons of the groundwater was pumped from the site, treated and disposed of in the base sanitary sewer system. This lowered the concentrations of contaminants in

groundwater, however, additional work is planned. This site is for soil only; the groundwater is a new IR Site listed as IR Site 1121. This site will close once the Data Gap Analysis Report is complete.

- Data Gap Analysis for Groundwater Work Plan complete
- *Data Gap Analysis Field Work* complete
- Data Gap Analysis Report in agency review

#### **Site 1111 – 26 Area Ash and Debris Disposal Area**

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This burn ash site was remediated and four quarters of groundwater monitoring have been completed. The site was revegetated and a report was written summarizing the actions that had been completed to date, and why the site qualified for unrestricted land use.

- Proposed Plan for No Further Action complete
- Record of Decision for NFA in review

#### **Site 1114 – 41 Area Arroyo**

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This site was created to investigate the PCE concentrations in one well that used to be associated with IR Site 9 (closed). A Site Inspection was carried out and described low-level concentrations of TPH and vinyl chlorides in soil gas and groundwater. A Remedial Investigation was conducted to validate the findings of the SI and to complete a risk assessment for the site. The EPA did not agree with the proposed NFA, therefore the site will move to the remediation phase.

- Remedial Investigation Report complete
- **Engineering Evaluation/Cost Analysis & Action Memorandum** in progress
- **Removal Action Work Plan** 4/1/2013
- **Removal Action** 2013\*
- **Removal Action Completion Report** 2014\*
- Proposed Plan 2015\*
- Record of Decision 2016\*

**Dates were changed as a result of EPA rejection of AM**

#### **Site 1115 – 13 Area FSSG Lot**

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There are two plumes underneath the parking lot at this site, one shallow and one deep, containing chlorinated solvents and benzene. A Remedial Investigation and Feasibility Study are needed for the site. A pilot study to evaluate the effectiveness of in-situ bioremediation of chlorinated solvents in groundwater was completed. The technology was successful, but the site geology limited its effectiveness. A Technical Memorandum detailing the pilot study is complete. A work plan to collect more data is final and the contractor is currently in the field; the results will be included in a Remedial Investigation/Feasibility Study.

- Tech Memo complete
  - **Work Plan to collect additional data for site** complete
  - **Field Work to collect additional data** complete
  - **Remedial Investigation/Feasibility Study** 4/30/2013
  - **Proposed Plan** 4/30/2014\*
  - **Record of Decision** 4/30/2015\*
- Dates were changed as a result of the September 15, 2011 FFA meeting**

### **Site 1116 – 14 Area Groundwater**

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Nine USTs were transferred from the UST Program to the IR Program due to low-levels of chlorinated solvents. A Site Inspection was completed and six of the sites do not warrant further action under the IR Program. The three other sites will be remediated. An EE/CA and Action Memo were sent, along with a work plan for limited investigation to close data gaps, to the agencies for review. Once the field work for the limited investigation is complete, a work plan to remediate the sites will be prepared.

- Engineering Evaluation/Cost Analysis(3 subsites – Moving Forward) appendix to Action Memo
  - Action Memorandum (3 subsites – Moving Forward) complete
  - Expanded Site Inspection WP (3 subsites – Moving Forward) complete
  - *Field Work for Site Inspection* (3 subsites – Moving Forward) complete
  - **Expanded Site Inspection Report (3 subsites – Moving Forward)** **appendix to RAWP**
  - **Removal Action Work Plan (RAWP) (3 subsites – Moving Forward)** **3/23/2013**
  - **Interim Removal Action (3 subsites – Moving Forward)** **8/14/2013\***
  - Removal Action Completion Report (3 subsites – Moving Forward) 2014\*
  - Proposed Plan for No Further Action (6 subsites – NFA) 2015\*
  - Record of Decision (6 subsites – NFA) 2016\*
- Dates were changed as a result of the September 17, 2012 FFA meeting.**

### **Site 1117 – 15/16 Area Groundwater**

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Six USTs were transferred from the UST Program to the IR Program due to low-levels of chlorinated solvents. The agencies have reviewed the Site Inspection Report recommending the site move into the Remedial Investigation phase.

- *Field Work for Site Inspection* complete
  - Site Inspection Report complete
  - **Remedial Investigation Work Plan** **5/6/2013**
  - **Remedial Investigation Field Work** **9/27/2013\***
  - **Remedial Investigation Report** **2014\***
  - **Proposed Plan** **2015\***
  - **Record of Decision** **2016\***
- Remedial Investigation added based on agency comments on Site Inspection**

## Site 1118 – 21/26/52 Area Groundwater

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Three USTs were transferred from the UST Program to the IR Program due to low-levels of chlorinated solvents. The Site Inspection report was reviewed by the regulatory agencies and additional work, including a soil gas investigation, is needed to verify if no further action is appropriate for these sites. An Extended Site Inspection Work Plan to address agency concerns with the Site Inspection Report is in agency review.

- **Extended Site Inspection (ESI) Work Plan** **in progress**
- *Field Work for Site Inspection* 2/27/2013\*
- Extended Site Inspection Report 9/27/2013\*
- Proposed Plan 5/27/2014\*
- Record of Decision 1/27/2015\*

**Dates changed as a result of document quality issues**

## Site 1119 – 26 Area Groundwater

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This site was created to investigate the source or sources of chlorinated solvents in the 26 Area production wells. Field work for the Remedial Investigation has been completed and lab data is in data validation. TCE had been discovered at two of the wells and further investigation is needed to delineate extent of contamination and to locate the source, if possible. An addendum to the Remedial Investigation Work Plan is currently in preparation.

- *Field Work for Remedial Investigation* *complete*
- **Work Plan Addendum to Delineate Source** **in progress**
- **Additional RI Field Work** **2013\***
- **RI/FS Report** **2013\***
- **Proposed Plan** **2014\***
- **Record of Decision** **2015\***

**Dates changed as a result of the Jan 19, 2011 FFA meeting**

## Site 62 – Asphalt Batch Plant

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This site was created when a transformer containing PCBs tipped over and spilled. A Site Inspection was performed, however data was missing and further investigation was needed. An Extended Site Inspection was conducted and the report is being reviewed by the agencies. The report recommends further action.

- Extended Site Inspection Work Plan *complete*
- *Field Work for Extended Site Inspection* *complete*
- Extended Site Inspection Report *recalled*
- Proposed Plan 5/1/2013\*
- Record of Decision 5/1/2014\*

### **Site 1120 – Stuart Mesa Pesticide Maintenance Areas**

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This site was created in 2012 to address pesticide contamination due to agricultural maintenance activities. A Phase II Environmental Assessment was completed for this site in support of real estate agreement closure. The Environmental Assessment is analogous to a Site Inspection, so this site enters the Installation Restoration Program at the Remedial Investigation stage.

- Remedial Investigation Work Plan 2013\*
- *Remedial Investigation Field Work* 2014\*
- Remedial Investigation Report 2015\*
- Proposed Plan 2016\*
- Record of Decision 2017\*

### **Site 1121 – Site 1D Groundwater**

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This site was created in 2012 to differentiate Site 1D groundwater from Site 1D soil, which was closed due to a previous remedial action and Record of Decision. There is a plume consisting of elevated concentrations of VOCs, metals, and pesticides.

- Remedial Investigation Work Plan in progress
- *Remedial Investigation Field Work* 4/15/2013
- Remedial Investigation Report 2014\*
- Proposed Plan 2015\*
- Record of Decision 2016\*

### **Site 1122 – Shot Fall Zone**

---

This site was created in 2013 to address lead and Polycyclic Aromatic Hydrocarbon contamination due to overshoot from skeet range activities off base. Limited soil samples were collected that indicated elevated levels of lead, so the site will come into the Installation Restoration Program at the Site Inspection stage.

- Site Inspection Work Plan 2014\*
- *Site Inspection Field Work* 2015\*
- Site Inspection Report 2016\*
- Proposed Plan 2017\*
- Record of Decision 2018\*

MCB Camp Pendleton Deliverables Spreadsheet

Date: 1/17/13

Item	Document	Contractor	Status	Date Due	Agency Comments	Response Received From:		
				to Agencies	Due By	EPA	DTSC	RWQCB
1	ROD for NFA at Site 1111	SDV	Waiting on EPA	12/22/11	2/20/12	28-Mar	15-Feb	17-Feb
2	Report for NMOCs - Site 7 Box Canyon	Trevet	FINAL	2/21/12	4/23/12	NC	23-Apr	26-Apr
3	ROD for 22/23 Area Groundwater	Parsons	Waiting on EPA	5/8/12	7/9/12	25-Jun	27-Jun	9-Jul
4	SAP for Well Siting Study - 22/23 Area Groundwater	Parsons	FINAL	5/23/12	7/23/12	23-Jul	3-Jul	20-Jul
5	Work Plan for EISB - 22/23 Area Groundwater	Battelle	FINAL	6/1/12	7/31/12	1-Aug	24-Jul	23-Jul
6	Annual Groundwater Monitoring Report - Site 7 - Box Canyon	Trevet	FINAL	6/8/12	8/7/12	NC	2-Aug	6-Aug
7	SI Report for Site 150 - SEERMA Site	TEC	FINAL	6/15/12	8/14/12	NC	9-Aug	10-Aug
8	Data Gap Analysis Report for Site 1D - Burn Ash Site	SDV	Responding to agency comments	7/23/12	9/21/12	21-Sep	10-Sep	21-Sep
9	ESI Report for Site 62 - Asphalt Batch Plant		Recalled					
10	EE/CA and AM for Site 1114 - 41 Area Arroyo	Battelle	Responding to agency comments	8/22/12	10/22/12	23-Oct	11-Oct	27-Sep
11	Project Completion Report - 12 Area Site 13	SDV	Responding to agency comments	9/12/12	11/12/12	NC	8-Nov	5-Nov
12	ESI Work Plan for Site 1118 - 21/26/52 Area Groundwater	ECM	Responding to agency comments	9/17/12	11/16/12	NC	14-Nov	16-Nov
13	RI Work Plan - Site 1121 - 1D Groundwater	SDV	Responding to agency comments	10/10/12	12/10/12	NC	10-Dec	10-Dec
14	RI Work Plan Addendum for Site 1119 - 26 Area Groundwater	Parsons	With agencies	12/19/13	2/18/13			
15	Work Plan to Install Wells & Monitor Groundwater - Site 33	Trevet	Preparing pre-draft	3/15/13				
16	ESI Report for Site 1116 - 14 Area Groundwater	ECM	Preparing pre-draft	3/23/13				
17	Removal Action Work Plan - Site 1116 14 Area Groundwater	ECM	Preparing pre-draft	3/23/13				
18	RAWP for Site 1114 - 41 Area Arroyo	Trevet	Preparing pre-draft	4/1/13				
19	RI Work Plan for Site 150 - 21 Area Boat Basin	Trevet	Preparing pre-draft	4/21/13				
20	RI/FS for Site 1115 - FSSG Lot	Parsons	Preparing pre-draft	4/30/13				
21	RI Work Plan for Site 1117 - 16/17 Area Groundwater	Trevet	Preparing pre-draft	5/6/13				

Agencies have commented

**MCB Camp Pendleton Fieldwork Spreadsheet**

**Date: 1/17/13**

Item	Field Work	Planned Start Date	Planned Completion Date
1	Field Work for 22/23 Area Groundwater ZVZ Pilot Study	2/6 - 2/8: Well Installations 2/13 - 2/15: Well Develop/Survey 2/20 - 2/24: Baseline GW Event/Slug Test April - Install PRB	on hold
2	Field Work for Site 1116 ESI	complete	
3	Field Work for Site 21 Pilot Study (remob)	complete	
4	Field Work for Site 1115 Data Collection	complete	
5	Field Work for Site 1118 ESI	February	
6	EISB Pilot Study - 22/23 Area GW	February	
7	Well Siting Study - 22/23 Area Groundwater	3-Dec-12	15-Mar-13
8	RI Field Work - Site 1D		

Date: 1/17/13

Item	Document	Contractor	RTCs to agencies	RTC Approved		
				EPA	DTSC	RWQCB
1	ROD for NFA at Site 1111	SDV	RTCs sent 11/26		26-Nov	26-Nov
2	ROD for 22/23 Area Groundwater	Parsons	addl RTCs sent 9/4		31-Aug	4-Sep
3	Data Gap Analysis Report for Site 1D - Burn Ash Site	SDV				
4	EE/CA and AM for Site 1114 - 41 Area Arroyo	Battelle				
5	Project Completion Report - 12 Area Site 13	SDV				
6	RI Work Plan Site 1121 - 1D Groundwater	SDV				
7	Work Plan Addendum for Site 1119 - 26 Area GW	Parsons				
8	ESI Work Plan for Site 1118 - 21/26/52 Area GW	ECM				
9	RI Work Plan - Site 1D Groundwater	SDV				
10	RI/FS for Site 1115 - FSSG Lot	Parsons				
11	Removal Action Work Plan - Site 1116 14 Area GW	ECM				
12						

# FY13 FUNDING AND PROJECTS

109<sup>th</sup> FFA Meeting  
January 17, 2013

## FY13 Total - \$7.4M

- ▣ 22/23 Area Groundwater – Land Use Control Implementation Plan (LUCIP)
- ▣ 22/23 Area Groundwater – 1<sup>st</sup> year groundwater monitoring
- ▣ Site 7 (Box Canyon Landfill) – Install Gas Probes to Replace GP-14 and GP-15
- ▣ Site 7 – Five Year Review (in-house)

## **FY13 (continued)**

- ▣ **Site 7 - Revegetation**
- ▣ **Site 7 - Long Term Monitoring and Maintenance/Operation of Gas Control System**
- ▣ **Site 33 (52 Armory) - Excavate Gun Cleaning Pad for Vapour Intrusion Risk**
- ▣ **Site 33 - Proposed Plan and Record of Decision**

## **FY13 (continued)**

- ▣ **Complete Site 62 (Asphalt Batch Plant)**
- ▣ **Site 1114 (41 Area Arroyo) - Install Monitoring Wells and Groundwater Sampling**
- ▣ **12 Area Site 13 - Engineering Evaluation/Cost Analysis and Action Memorandum**
- ▣ **Site 1115 (FSSG Lot) - Pave crescent and Remedial Action**

## **FY13 (continued)**

- ▣ **Site 1116 (14 Area Groundwater) – Performance Monitoring**
- ▣ **Site 1116 – Investigate TCE Plume?**
- ▣ **Site 1119 (26 Area Groundwater) – Proposed Plan and Record of Decision**
- ▣ **Revegetation**
- ▣ **Monitoring Well Database**

## **FY13 (continued)**

- ▣ **New Site 1120 (Ag Fields Maintenance Area) – Remedial Investigation**
- ▣ **New Site 1121 (Site 1D Groundwater) – Pilot Study with USGS for Phytoremediation?**
- ▣ **New Site 1121 – Proposed Plan and Record of Decision**
- ▣ **New Site 1122 (Shot Fall Zone) – Remedial Investigation?**



# MCB CAMP PENDLETON 22/23 AREA GROUNDWATER WELL SITING STUDY (CHAPPO SUBBASIN)

17 January 2013

109<sup>th</sup> FFA Meeting



## CHAPPO SUBBASIN INVESTIGATION

### Update:

- ❖ December 5, 2012 – Sent Final Sampling and Analysis Plan to FFA Team
- ❖ December 3, 2012 - Briefed OWR on the IR Program, this IR Site, and the New Well
- ❖ December 28, 2012 - Sampled Well CH-5A
  - HydraSleeves for 1,2,3,-TCP – Preliminary Results ND.
  - Passive Diffusion Bags (PDBs) placed to sample for all other VOCs (will return to collect samples January 18, 2013).
- ❖ January 21 – Planned start date for drilling and well installation



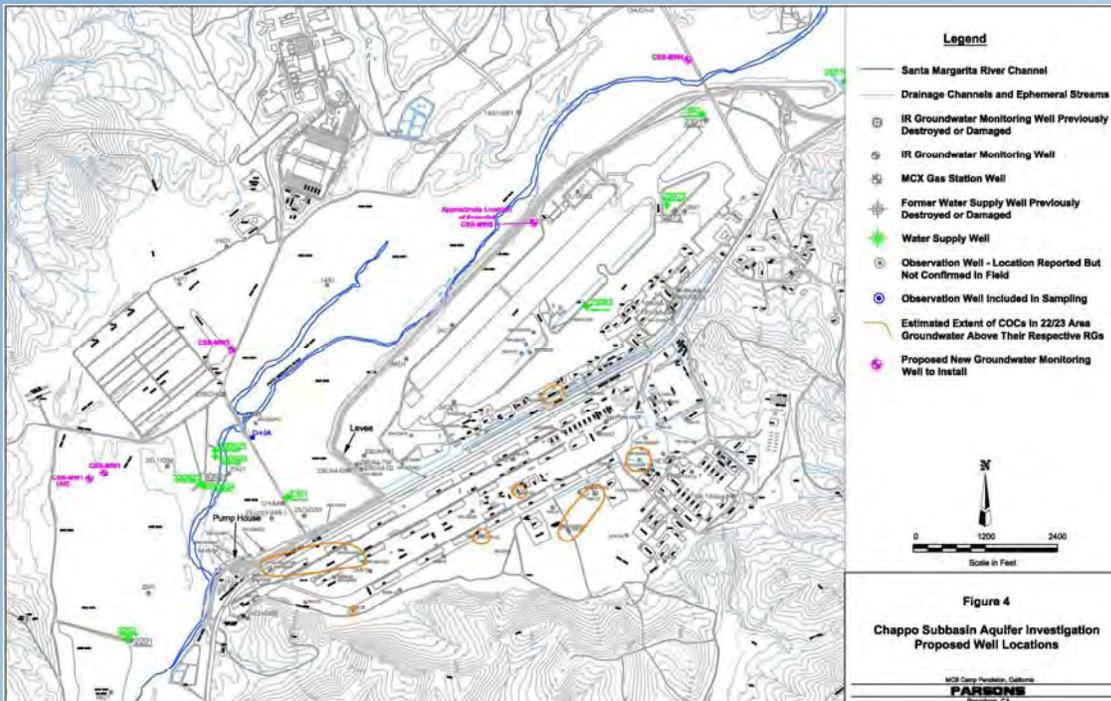


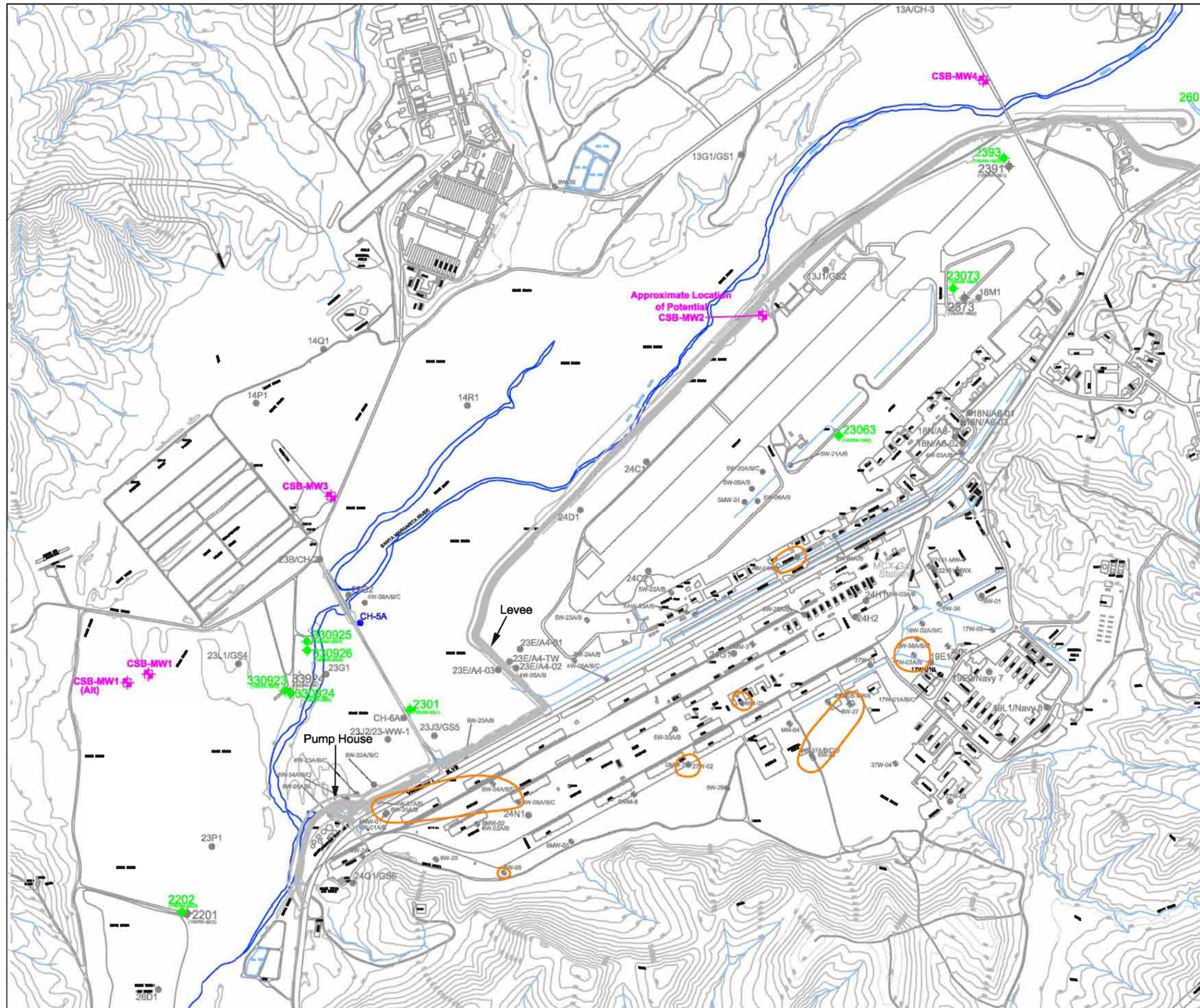
# CHAPPO SUBBASIN INVESTIGATION

## Well CSB-MW2:

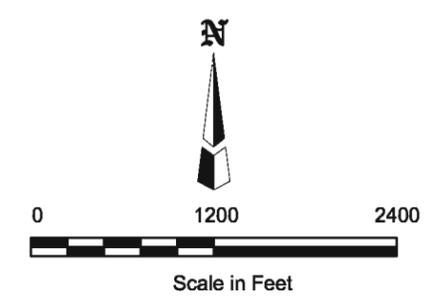
- ❖ Original well location could not be used due to access issues and habitat concerns.
- ❖ December 13, 2012 - Meeting held at MCAS to determine alternate location.
- ❖ Alternate location approved by Base Office of Water Resources (OWR).
- ❖ Alternate location in process of being approved by MCAS (biological, air space clear zones, utilities, rig mast height, and operational constraints).

# CHAPPO SUBBASIN INVESTIGATION





- Legend**
- Santa Margarita River Channel
  - Drainage Channels and Ephemeral Streams
  - IR Groundwater Monitoring Well Previously Destroyed or Damaged
  - IR Groundwater Monitoring Well
  - MCX Gas Station Well
  - Former Water Supply Well Previously Destroyed or Damaged
  - Water Supply Well
  - Observation Well - Location Reported But Not Confirmed In Field
  - Observation Well Included in Sampling
  - Estimated Extent of COCs in 22/23 Area Groundwater Above Their Respective RGs
  - Proposed New Groundwater Monitoring Well to Install



**Figure 4**  
**Chappo Subbasin Aquifer Investigation**  
**Proposed Well Locations**

MCB Camp Pendleton, California  
**PARSONS**  
 Pasadena, CA

# MCB CAMP PENDLETON SITE 21 PILOT STUDY UPDATE

17 January 2013

109<sup>th</sup> FFA Meeting



## Site 21 Pilot Study

### Update:

- ❖ May 2012 - New wells installed and baseline groundwater samples collected and analyzed.
- ❖ July 2012 - Initial expanded injection began.



## Site 21 Pilot Study

### Update:

- ❖ August/September 2012 - Injection wells 21W-28 and 21W-29 were re-drilled and re-installed with stronger annular seal.
- ❖ October 2012 - Injection completed at wells 21W-4B, 21W-25, 21W-28, and 21W-29.
- ❖ Substrate consisted of emulsified vegetable oil (EVO), pH buffer, dairy whey, and site groundwater.



## Site 21 Pilot Study

### Injection Details:

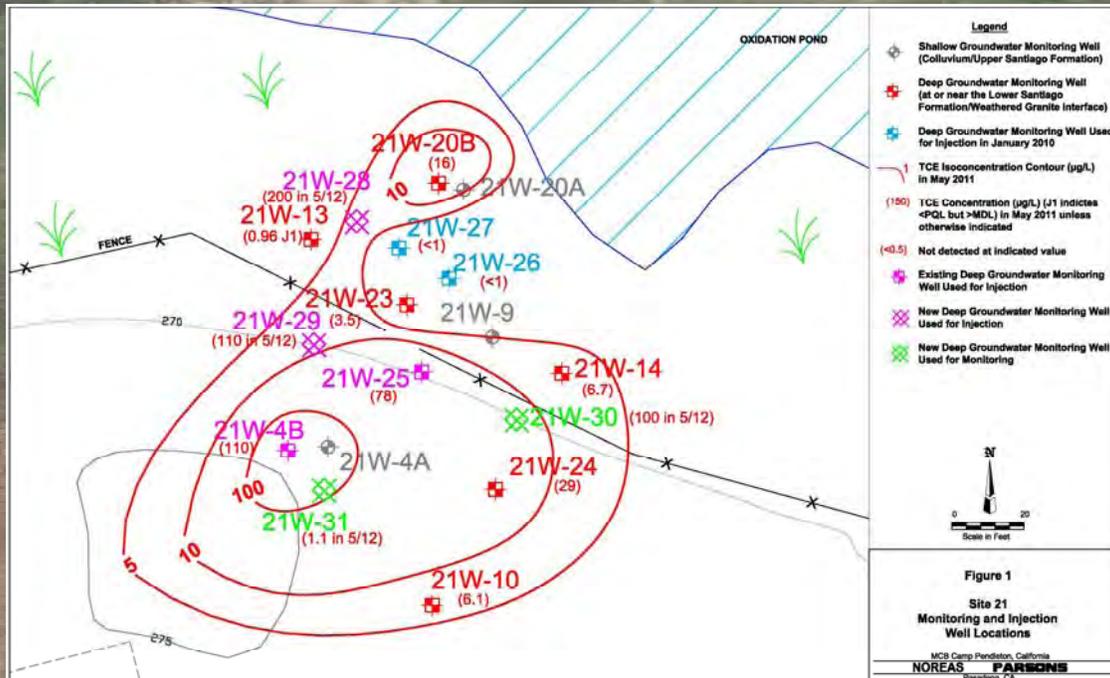
- ❖ Groundwater was extracted from site monitoring wells using submersible pumps and placed in two 500 gallon storage tanks. Monitoring wells used for groundwater extraction included: 21W-13, 21W-14, 21W-18B, 21W-20B, 21W-23, 21W-26, 21W-27, 21W-30, and 21W-31.
- ❖ EVO and dairy whey were added directly to the tanks containing extracted groundwater then mixed using diaphragm pump.
- ❖ pH buffer was added using a dosimeter.
- ❖ Injection volumes in individual wells were adjusted to accommodate for actual hydraulic conditions encountered during the field effort.

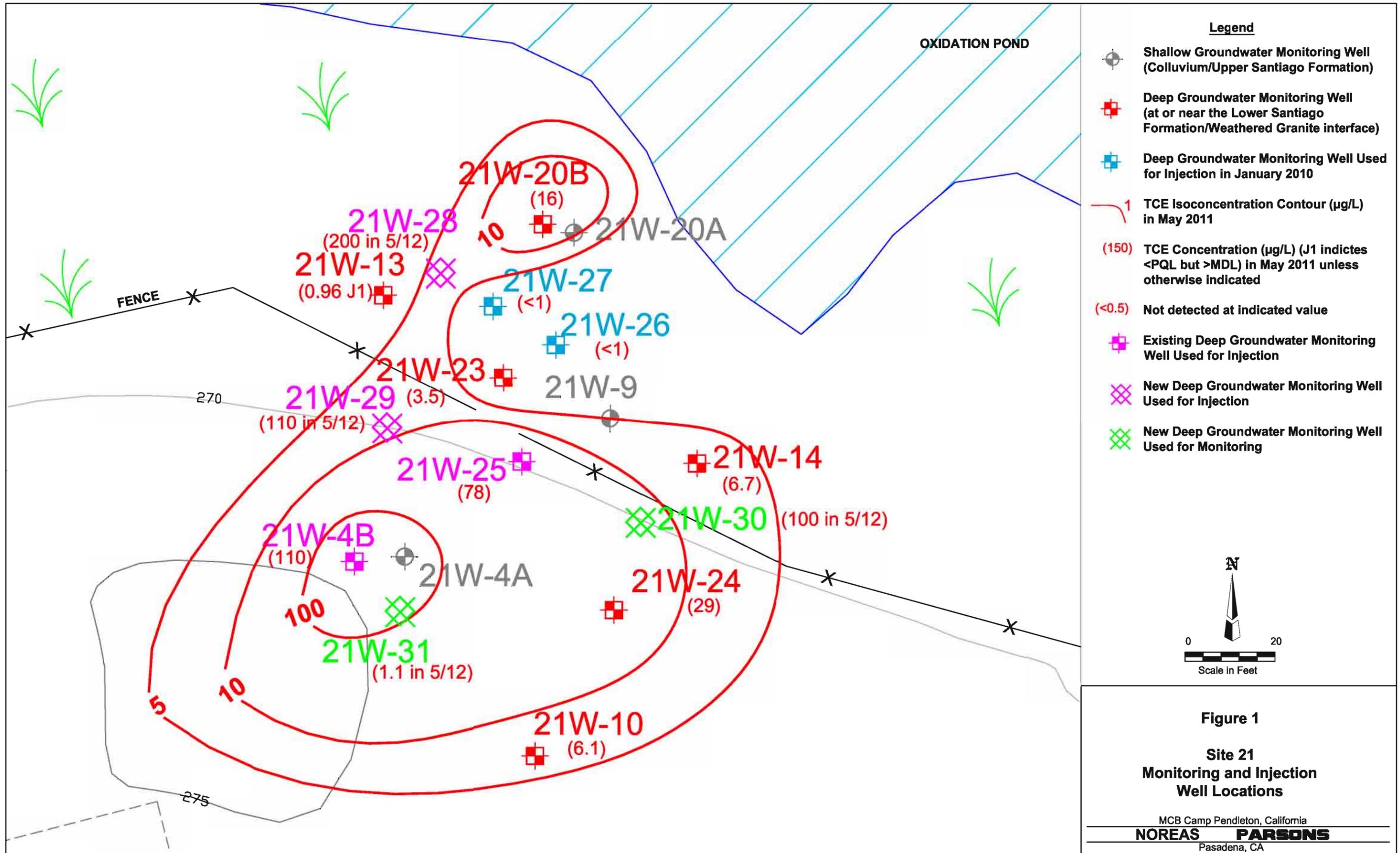
# Site 21 Pilot Study

## Injection Details:

- ❖ Hydraulic communication was verified in the field by water level measurements in monitoring wells in proximity to the injection wells and/or the presence of substrate in extraction wells.
- ❖ Hydraulic communication was observed in wells 21W-13, 21W-20B, 21W-23, 21W-26, 21W-27, 21W-30, and 21W-31.
- ❖ Substrate was uniformly distributed through the entire treatment area based on locations where hydraulic communication was observed.
- ❖ Next performance groundwater sampling is scheduled to occur late February 2013.

# Site 21 Pilot Study Injection







## IR SITE 1116 PHASE I & II SI



# IR SITE 1116 PHASE I AND PHASE II SITE INSPECTION RESULTS



**JANUARY 17, 2013, FFA MEETING**

1



## IR SITE 1116 PHASE I & II SI



### History

- March 2007 - Nine UST sites in Area 14 transferred to IR Program. Designated as Site 1116.
- We now refer to the UST sites as “Subsites” of Site 1116.
- 2010 – Site Inspection investigated previously identified VOCs in soil and groundwater at six Subsites.
- February 2011 – SI Report recommended additional investigations for Subsites 1491, 14112 and 140008.
- EE/CA and Action Memorandum for interim remedial action have been approved by the FFA.

2



## IR SITE 1116 PHASE I & II SI



Subsite 14112



Subsite 1491

Subsite  
14008

3



## IR SITE 1116 PHASE I & II SI



### Phase I SI Activities Conducted (April 2012)

- UST Search at Subsite 14008:
  - Purpose: Locate the possible presence of a heating oil tank or any other undocumented USTs.
  - A records search did not indicate the presence of additional USTs near Building 14008.
  - Geophysical survey:
    - Covered approximately 15,000 square feet area near well RW1 and in the area of historical high TCE concentrations.
    - The only anomaly was a storm drain inlet.

4



## IR SITE 1116 PHASE I & II SI



### Phase I SI – Geophysical Survey Near Building 140008



## IR SITE 1116 PHASE I & II SI



### Phase I SI Activities Conducted (April 2012)

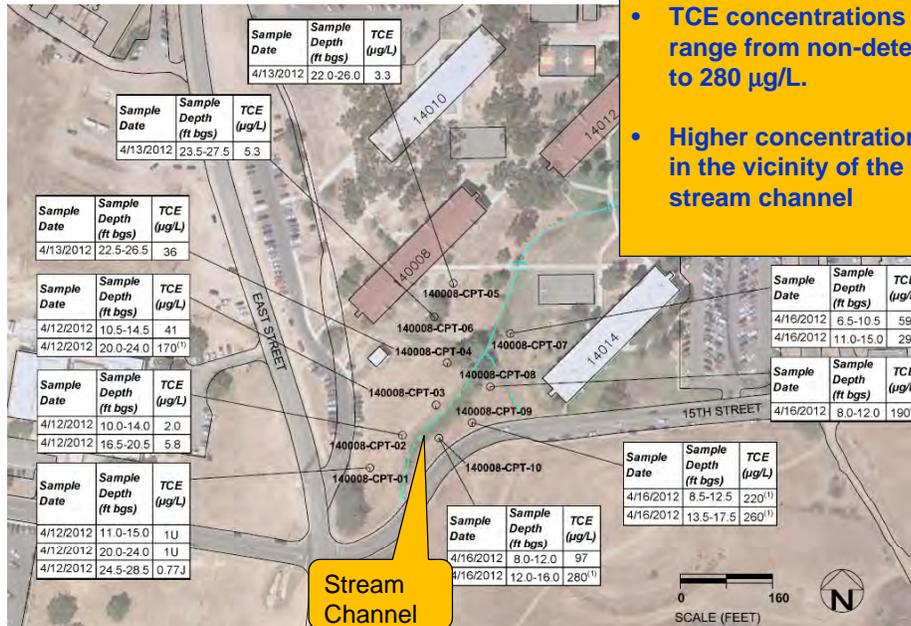
- Cone penetration test (CPT) investigation:
  - To facilitate the placement and screening of groundwater monitoring wells.
  - 10 CPT locations at Subsite 140008.
  - 17 CPT locations at Subsite 1491.
- Groundwater sampling at CPT locations with Hydropunch® sampler.



# IR SITE 1116 PHASE I & II SI



## Phase I SI – Hydropunch® TCE Concentrations (Subsite 140008)



- TCE concentrations range from non-detect to 280 µg/L.
- Higher concentrations in the vicinity of the stream channel

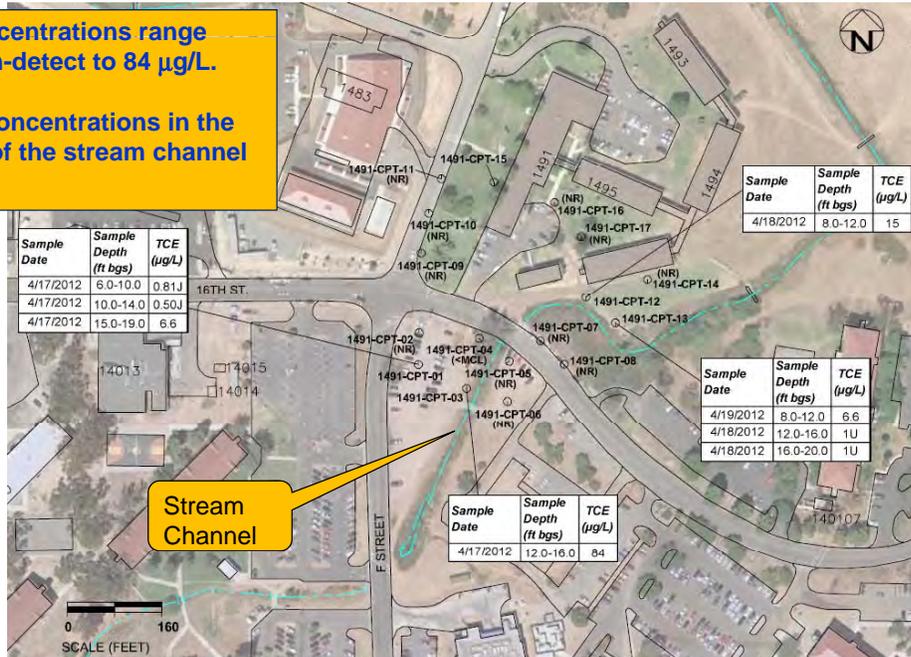


# IR SITE 1116 PHASE I & II SI



## Phase I SI – Hydropunch TCE Concentrations (Subsite 1491)

- TCE concentrations range from non-detect to 84 µg/L.
- Higher concentrations in the vicinity of the stream channel





## IR SITE 1116 PHASE I & II SI



### Phase II SI (October 2012) – Subsite 140008

- Based on historical and Phase I results, eight groundwater monitoring wells (MW5, MW6, MW7A, MW7B, MW8A, MW8B, MW9, and MW10) were installed.
- Two locations were dry (PMW-2 and PMW-3, located south of 15<sup>th</sup> Street) (boring refusal at granitic bedrock).
- The borings indicate that soils are characterized by silts and sands underlain by sandstone and siltstone north of the stream channel and granitic bedrock south of the stream channel.
- The stream channel is underlain by unconsolidated soils (undifferentiated weathered bedrock, alluvium and fill soils) and are more permeable than bedrock to either side.

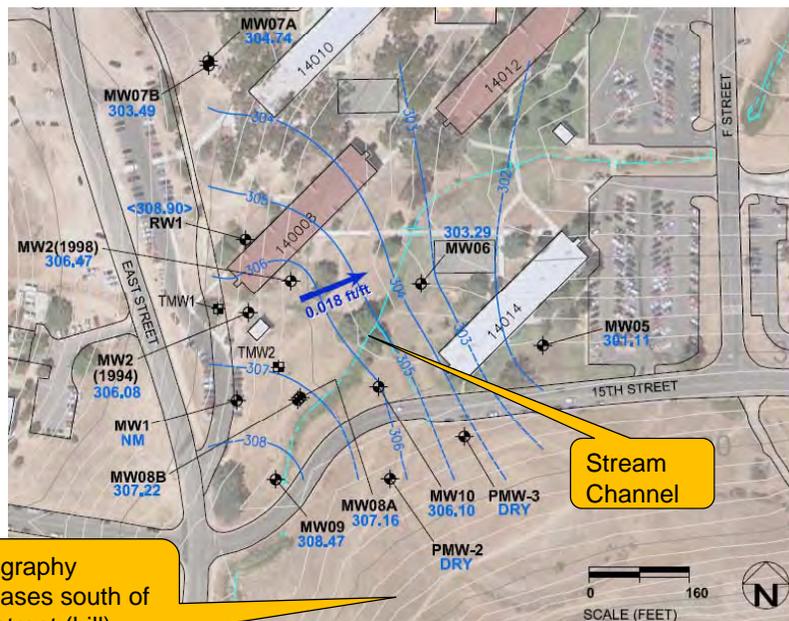
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## IR SITE 1116 PHASE I & II SI



### Groundwater Elevation Contours (Subsite 140008)



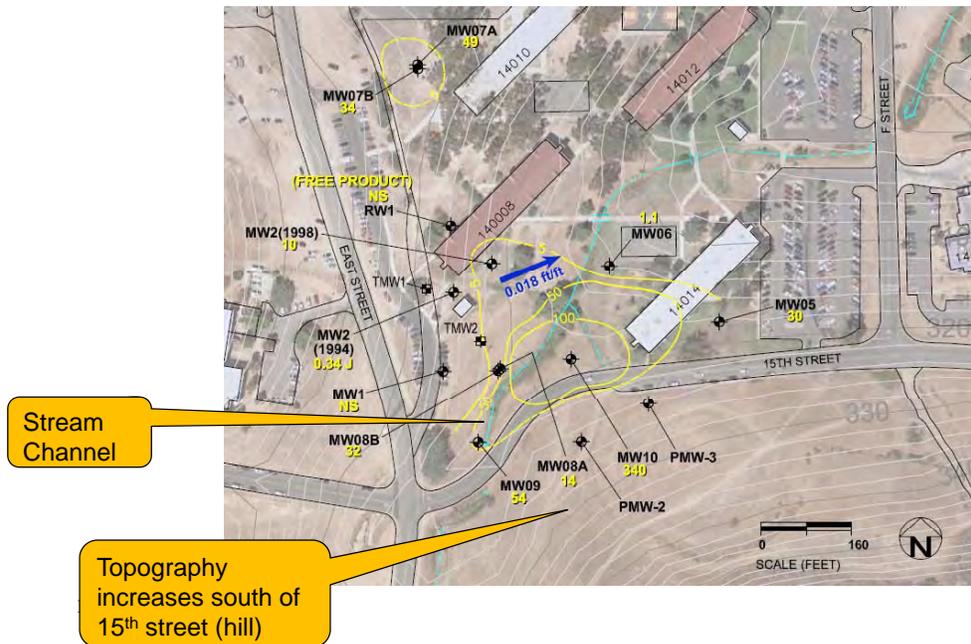
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## IR SITE 1116 PHASE I & II SI



### Groundwater TCE Concentrations (Subsite 140008)



## IR SITE 1116 PHASE I & II SI



### Phase II SI (October 2012) – Subsite 140008

- Groundwater flow:
  - Inferred groundwater flow direction is towards the northeast.
  - Seems to follow the stream channel.
- TCE concentrations:
  - Relatively high in the vicinity of the stream channel.
  - Reported TCE concentrations range from 0.34  $\mu\text{g/L}$  (estimated value) (MW2) to 340  $\mu\text{g/L}$  (MW10).
- Reported PCE concentrations range from 0.2  $\mu\text{g/L}$  (MW2) to 5.7  $\mu\text{g/L}$  (MW10).



## IR SITE 1116 PHASE I & II SI



### Phase II SI (October 2012) – Subsite 1491

- Based on historical and Phase I results, eight groundwater monitoring wells (MW13, MW14, MW15, MW16A, MW16B, MW17, MW18, MW19) were installed.
- Based on the borings and the Morro Hill 7.5' Quadrangle map, soils at the site are characterized by silts and sands underlain by granitic bedrock.
- The stream channel is underlain by unconsolidated soils (undifferentiated weathered bedrock, alluvium and fill soils) and are more permeable than bedrock to either side.

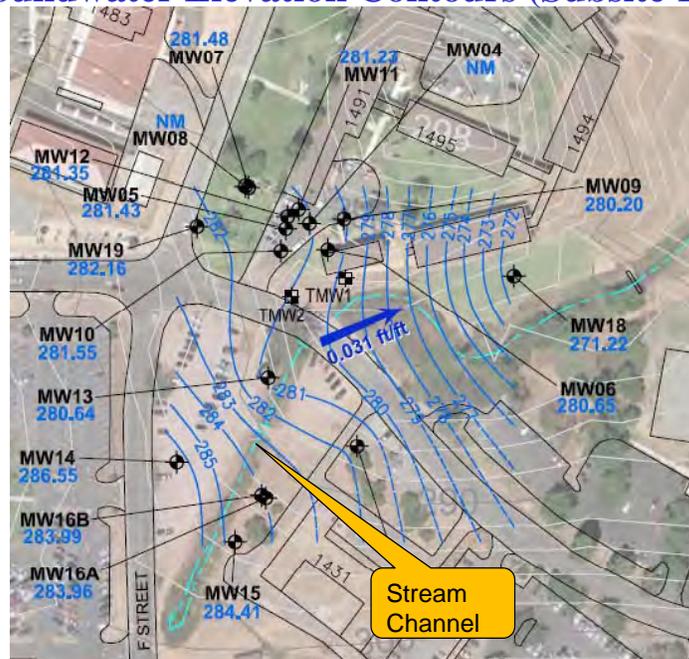
13



## IR SITE 1116 PHASE I & II SI



### Groundwater Elevation Contours (Subsite 1491)



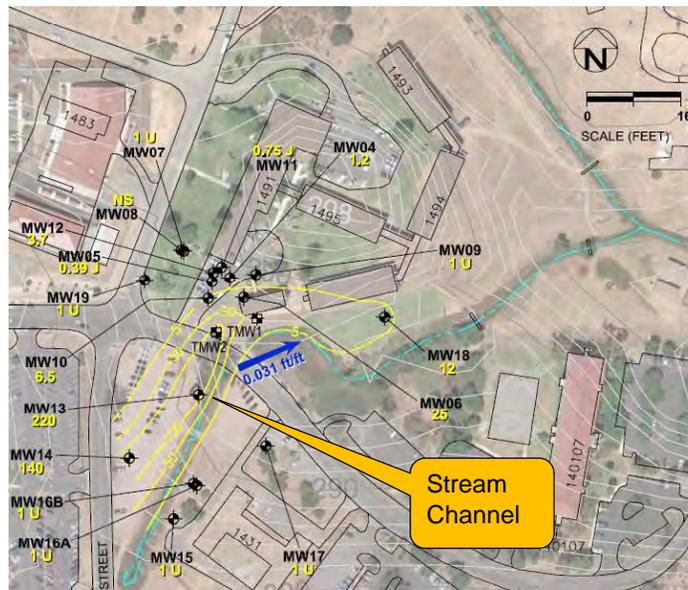
14



## IR SITE 1116 PHASE I & II SI



### Groundwater TCE Concentrations (Subsite 1491)



15



## IR SITE 1116 PHASE I & II SI



### Phase II SI (October 2012) – Subsite 1491

- Groundwater flow:
  - Inferred groundwater flow direction is towards the northeast.
- TCE concentrations:
  - Relatively high in the vicinity of the stream channel.
  - Reported TCE concentrations range from 0.39 µg/L (estimated value) (MW05) to 220 µg/L (MW13).
- Reported concentrations of PCE ranged from 0.2 µg/L (estimated value) (MW18) to 3.7 µg/L (MW13).
- Reported concentrations of benzene range from 0.33 µg/L (estimated value) (MW01) to 5.8 µg/L (MW12).

16



## IR SITE 1116 PHASE I & II SI



### PHASE II ACTIVITIES (October 2012) – Subsite 14112

- Two 1,500 gallon reinforced concrete USTs used for storing diesel fuel were removed in 1997.
- During the 2010 SI, 1,2-DCA, benzene, cis-1,2-DCE, and TCE were detected at concentrations exceeding the project screening limits.
- MW13 was installed downgradient of MW-5 and MW-10 to delineate TPH and VOCs.
- Sampled MW01 with phase separated hydrocarbons (PSH).
- All wells without PSH were sampled.

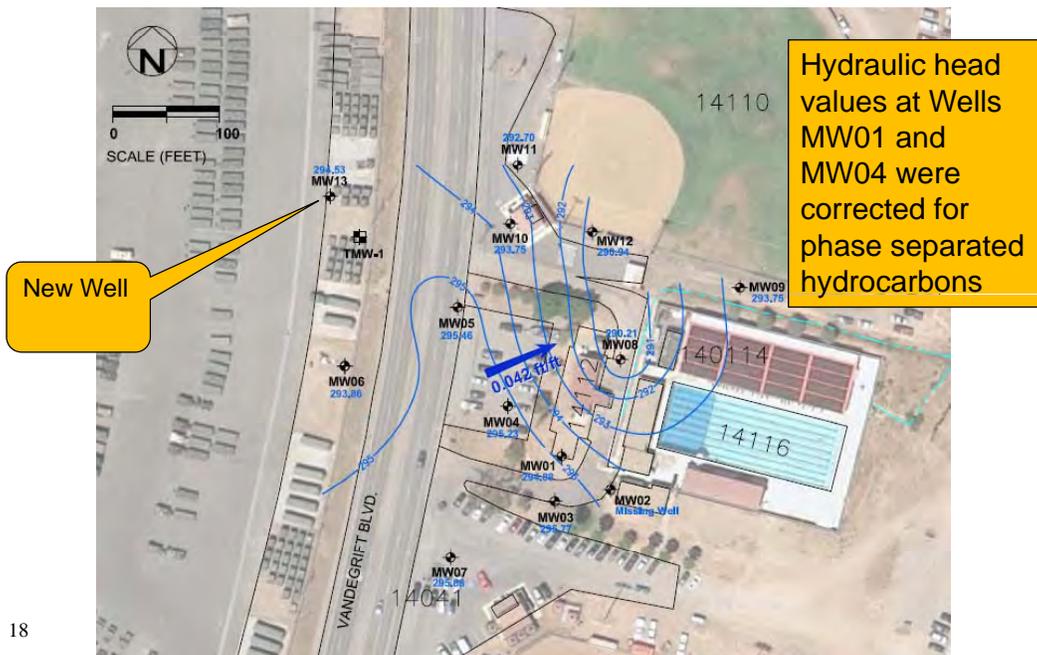
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## IR SITE 1116 PHASE I & II SI



### Groundwater Elevation Contours (Subsite 14112)



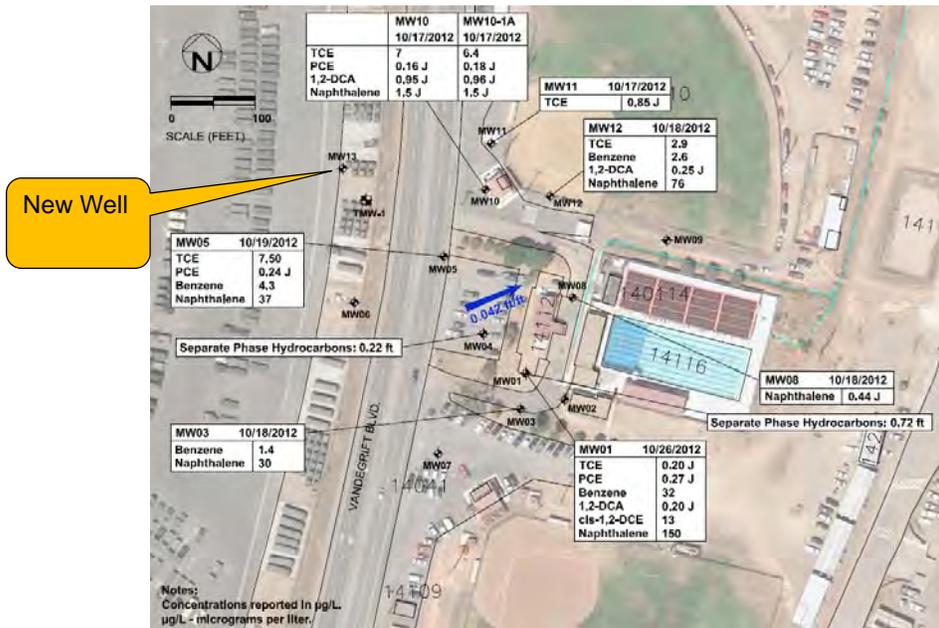
18



# IR SITE 1116 PHASE I & II SI



## Groundwater Sample Results (Subsite 14112)



19



# IR SITE 1116 PHASE I & II SI



## SI ACTIVITIES (October 2012) – Subsite 14112

- Groundwater flow direction is generally to the northeast.
- Separate phase hydrocarbons were observed in MW01 (0.72 ft) and MW04 (0.22 ft).
- Groundwater sampling results – new well (MW13):
  - Benzene was reported at an estimated concentration of 0.37 µg/L (below the project screening limit [0.39 µg/L] [tapwater RSL]).
  - Remaining analytes were not reported at or above the respective reporting limits.

20



## IR SITE 1116 PHASE I & II SI



### SI ACTIVITIES (October 2012) – Subsite 14112

- Summary of Groundwater Sampling results for the remaining Wells:  
(Analytes with at least one reported concentration above the respective Project Screening Limit):

Analyte	Minimum Concentration (µg/L)	Maximum Concentration (µg/L)
1,2-DCA	0.20 J (MW01)	0.96 J (MW10-1A)
Benzene	0.31 J (MW10)	32 (MW01)
Naphthalene	0.44 J (MW08)	150 (MW01)
PCE	0.16 J (MW10)	0.27 J (MW01)
TCE	0.85 J (MW11)	7.5 (MW05)
cis-1,2-DCE	1 U (various)	13 (MW01)



## IR SITE 1116 PHASE I & II SI



QUESTIONS?

## MCB Camp Pendleton

### IR Site 1115 Remedial Investigation/ Feasibility Study FFA Meeting - January 17, 2013

## Presentation Overview



- I. Background Information**
  - A. Former UST Site 1 (Gas Station)**
    - A. Nature of Contamination
    - B. Removal Actions / Pilot Studies
  - B. Former UST Sites 5/8/9/17 (Motor Pool Service Bays)**
    - A. Nature of Contamination
    - B. Removal Actions / Pilot Studies
  - C. Former UST Sites 6/7 (Wash Rack Area)**
    - A. Nature of Contamination
- II. Extent of Contamination – Conceptual Designation of Target Treatment Zones**
- III. General Response Actions & Technology Screening**

# IR Site 1115 - Location



## I. Background Information



### Former Site 1 Gas Station

- 10,000 Gallon gasoline UST
- Sources: UST leak, well (abandoned) screened across aquitard (deep aquifer source)

### Principal Contaminants

- Large benzene/petroleum hydrocarbon (TPH)/ 1,2-dichloroethane (1,2-DCA) plume in shallow and deep aquifer zones; trichlorethene (TCE) and daughter products farther from Site 1
- Historical free product TPH (gasoline)

### Interim Actions Completed

- Abandonment of long-screened well
- Soil removal action in 2001 (vadose zone)
- Soil vapor extraction/air-sparge pilot test (2001)

# I. Background Information



## Former UST Sites 5/8/9/17

- UST 5: 1,500 gal UST for diesel/heating
- UST 8: 200 gal UST for diesel/heating
- UST 9: 650 gal UST for waste oil
- UST 17 (pipeline connecting USTs 5 & 8)

## Principal Contaminants

- TPH, TCE, daughter products
- Historical free-product TPH (shallow aquifer)
- Dilute plume in deep aquifer

## Interim Actions Completed

- Free product removal
- SVE/product extraction pilot test (2001)
- Bioremediation pilot test (2009)

# I. Background Information



## Former UST Sites 6/7

- UST 6: 350 gal UST for oily waste
- UST 7: 500 gal UST for oily waste
- Wash Rack

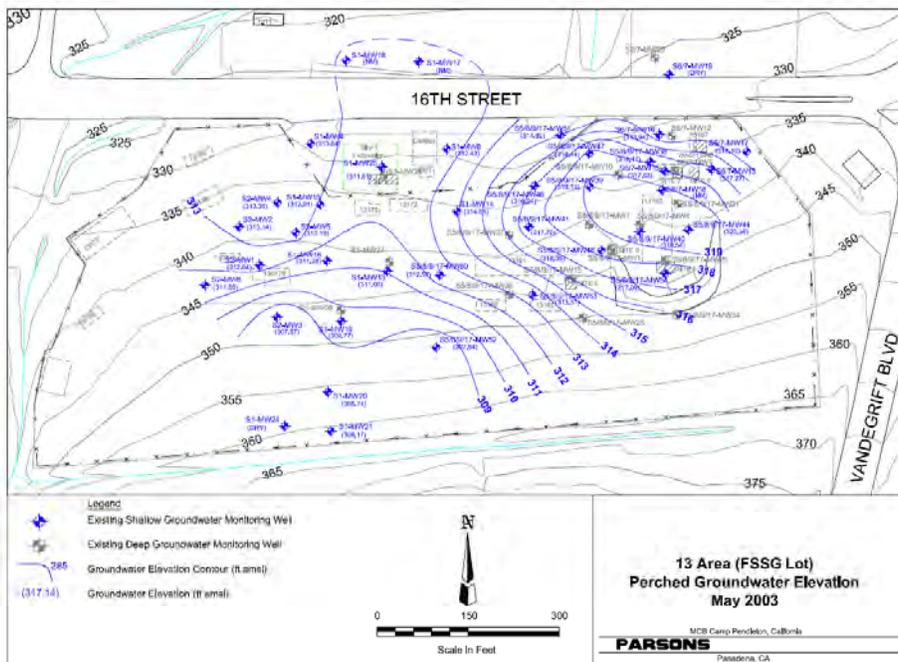
## Principal Contaminants

- TPH, TCE, Benzene, 1,2-DCA

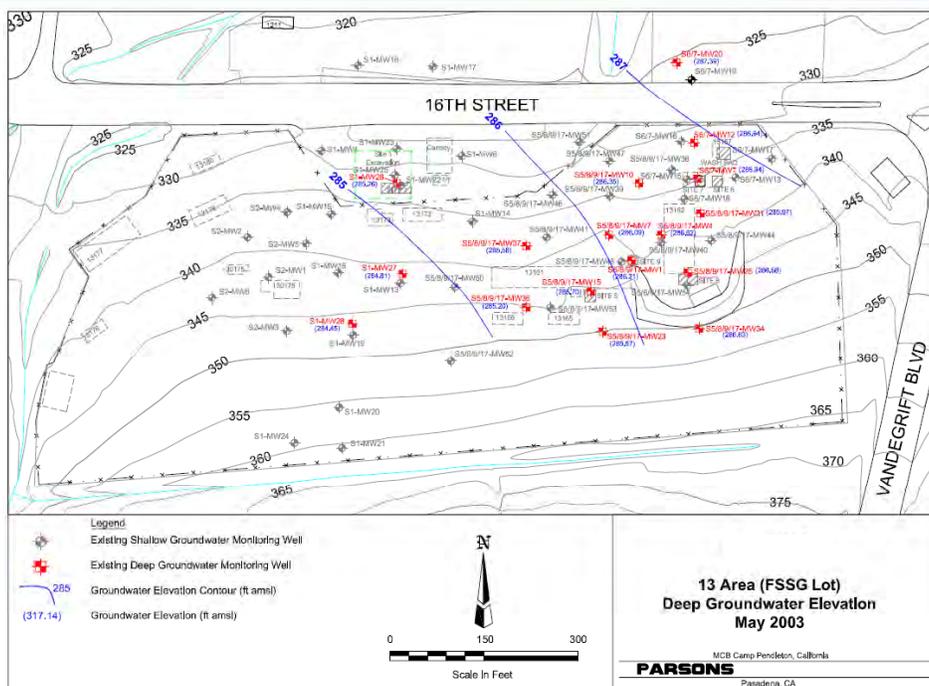
## Interim Actions Completed

- Free product removal

# Groundwater Flow – Shallow Aquifer



# Groundwater Flow – Deep Aquifer



## II. Extent of Contamination – Recent Additional Delineation



### Four new monitoring wells installed and sampled in 2012:

- 1115-MW9
  - Purpose: Define deep aquifer VOC conditions on west side of Site 1115.
  - Results were below Maximum Contaminant Levels (MCLs). Trichloroethene (TCE) and chloroform were above Project Screening Limits (PSLs).
- 1115-MW10 and 1115-MW11
  - Purpose: Shallow aquifer VOC delineation southeast of Site 5/8/9/17
  - Results were below PSLs
- 1115-MW12
  - Purpose: Refine limit of VOC contamination in northeast portion of Site 1115
  - Results were below MCLs; Above PSLs for benzene, TCE, naphthalene

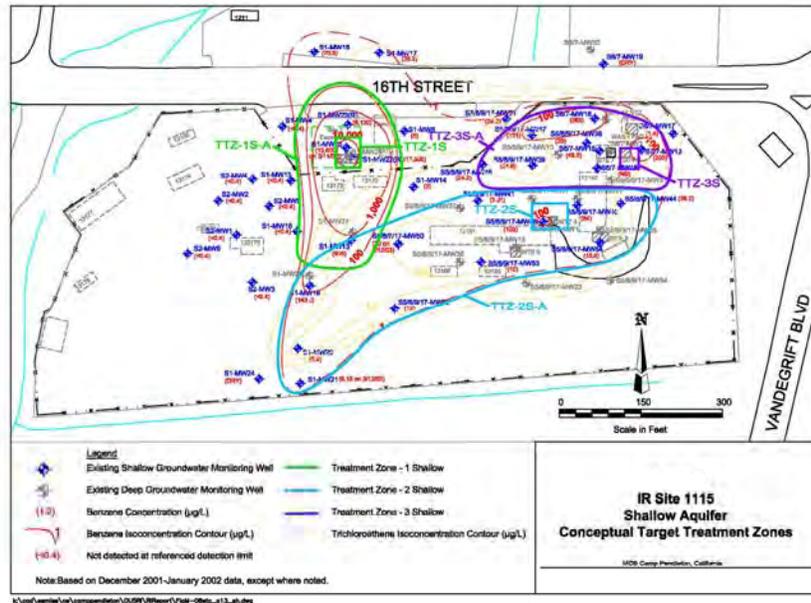


## II. Conceptual Target Treatment Zones (TTZs)



- **Purpose:** TTZs are designated to promote optimal selection of response actions and remedial alternatives.
- TTZs represent distinct chemical and/or hydrogeological conditions.
- Delineation of boundaries of dilute plume (non-source area) TTZs will be based on the dominant contaminants present in each area.
- “Source zone” TTZs will be defined based on estimated contaminant concentration thresholds.

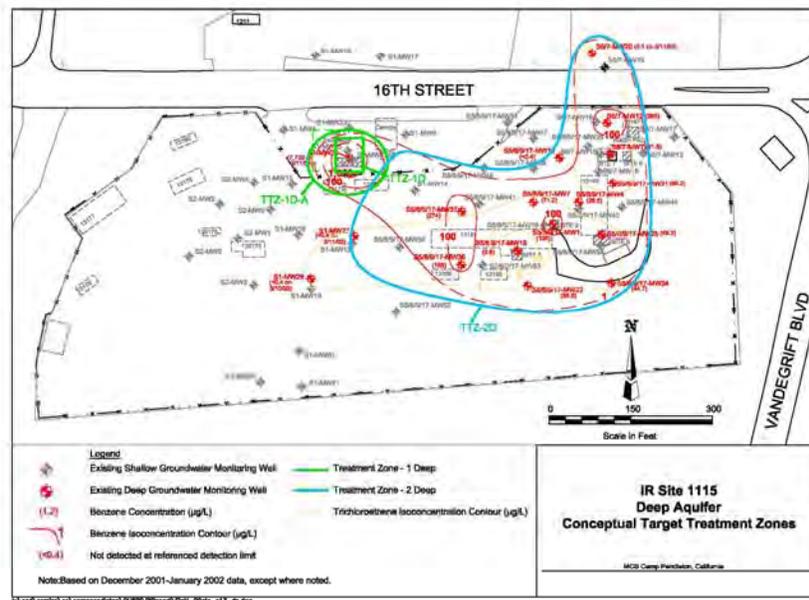
## II. Extent of Contamination & Conceptual Shallow Target Treatment Zones (TTZs)



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January 17, 2013

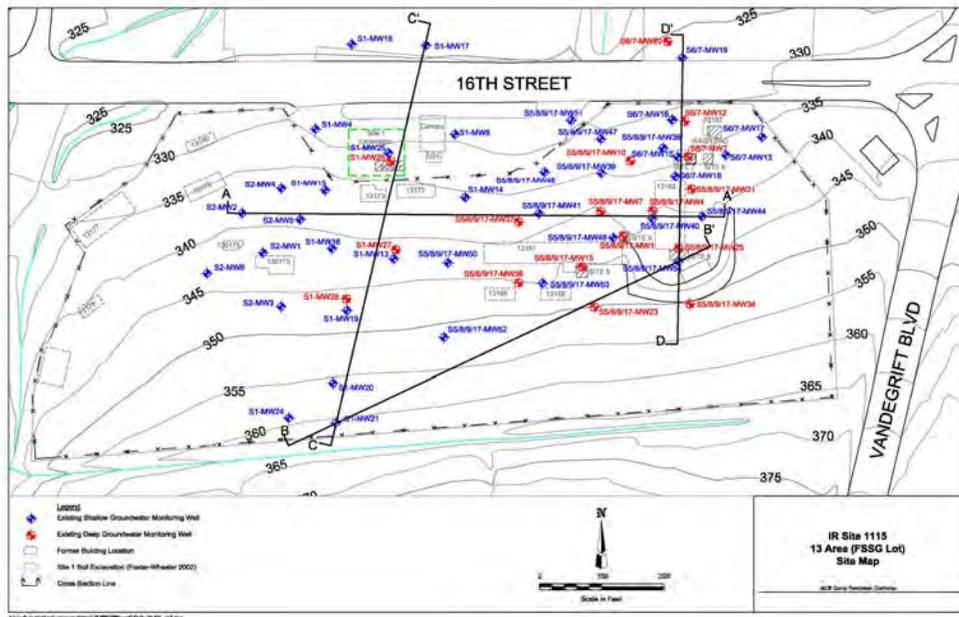
## II. Extent of Contamination & Conceptual Deep Target Treatment Zones



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January 17, 2013

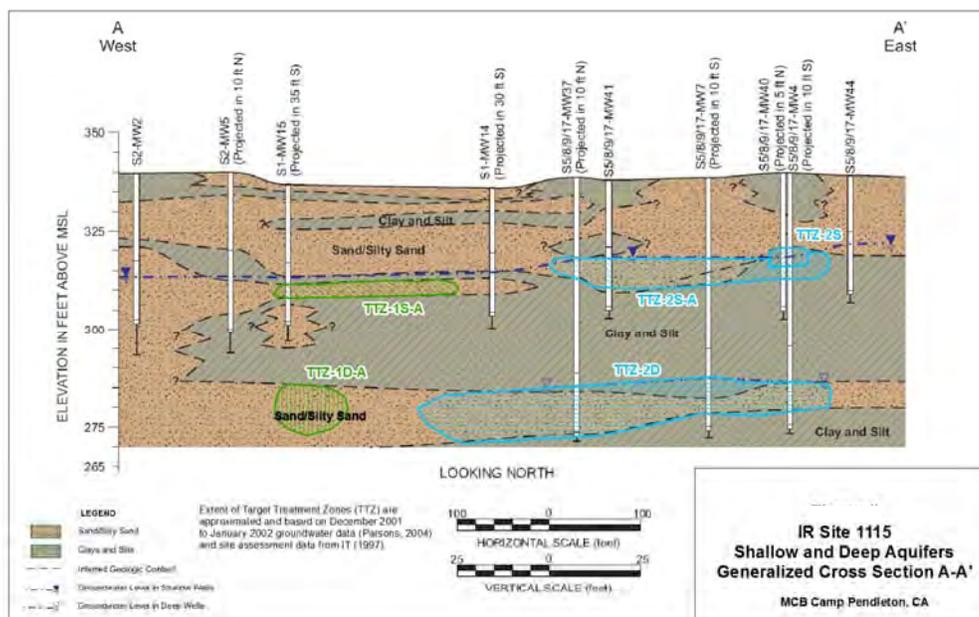
## II. Conceptual Target Treatment Zones Cross-Section Locations



13

January 17, 2013

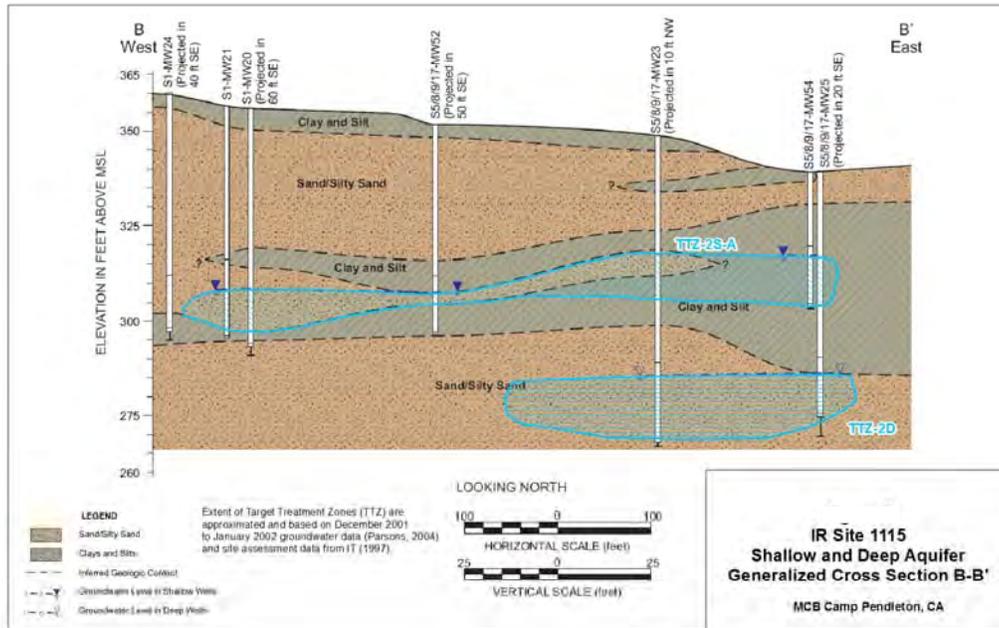
## II. Conceptual Target Treatment Zones



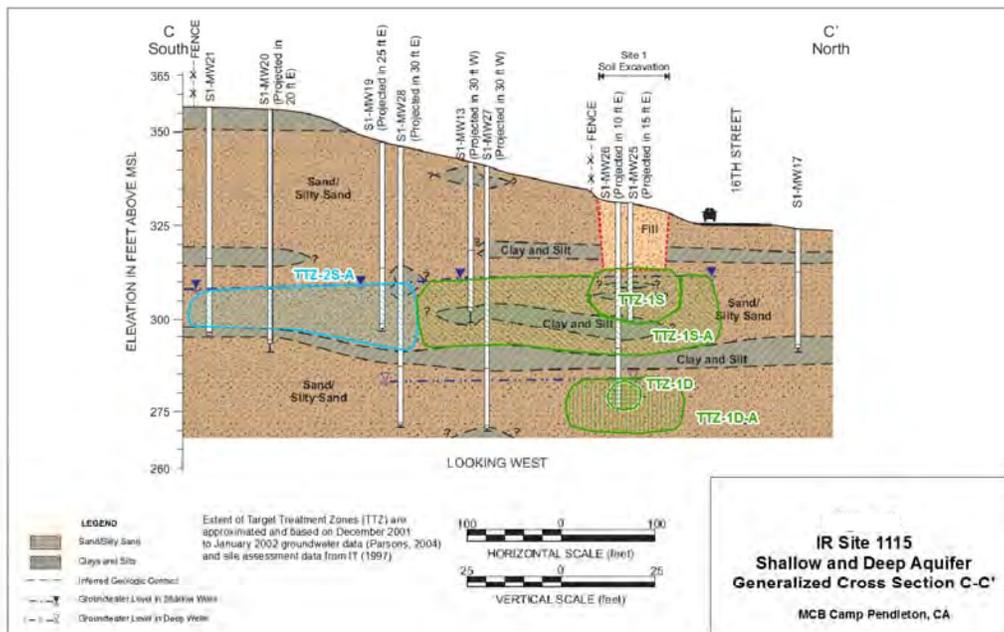
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January 17, 2013

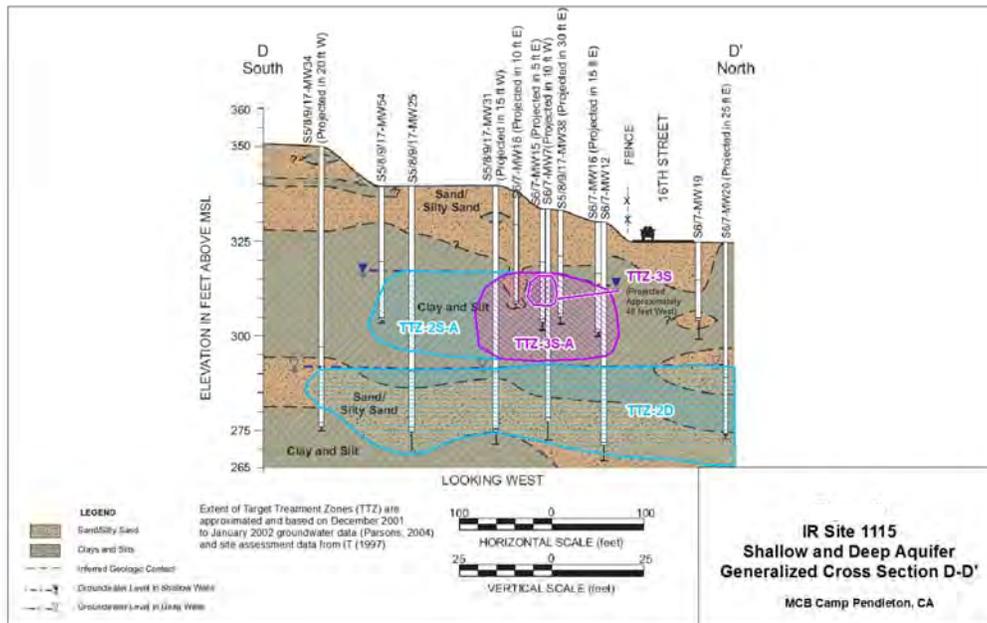
## II. Conceptual Target Treatment Zones



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## III. General Response Actions



**Wide range of GRAs are potentially applicable at Site 1115 due to the following factors:**

- Large aerial extent of contaminant dilute plumes
- Shallow and deep aquifers impacted
- Locally high concentrations of contaminants, free product
- Complex contaminant mixtures
- Most aquifer areas are very fine grained; pilot studies revealed difficulties of implementing various in-situ alternatives
- Remediation is anticipated to require substantial time

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### III. General Response Actions



**(Continued)**

- **Current site use is only for intermittent equipment staging.**
- **Land use controls for future land uses and groundwater use may be identified; potentially released as unrestricted as remedial actions are deemed effective over time.**
- **Remedial Investigation will evaluate the boundaries of IR Site 1115 to support proposed limits of land use controls, if implemented.**

### III. Technology Screening/Alternatives Analysis



#### **Technology Screening & Remedial Alternatives Analysis**

- **The NOREAS/Parsons team is performing a comprehensive technology screening and identification of remedial alternatives for each TTZ**
- **Anticipate Navy RAA review process in Jan/Feb 2013**

# III. Technology Screening/Alternatives Analysis



GRA	Technology Types	Screening Comments
<b>Groundwater</b>		
No action	Not applicable	Retained, required by NCP
In situ treatment	Biological (e.g. in situ bioremediation), chemical (e.g. in situ chemical oxidation), physical (e.g. air sparging/soil vapor extraction)	Retained, in situ treatment techniques potentially effective and implementable.
Ex situ treatment	Removal (on-site treatment or off-site disposal)	Retained, ex situ treatment techniques potentially effective and implementable, principally in source zones.
Monitoring	Monitored Natural Attenuation	Retained, potentially effective and implementable for low concentration areas
Institutional controls	Land-use restrictions	Retained, if required to address risk during long-term remediation
Access restrictions	Engineering controls (fences, etc.)	Due to depth of groundwater, eliminated as not applicable
Containment	Hydraulic control	Plumes are largely stable based on long-term monitoring
<b>Soil</b>		
No action	Not applicable	Retained, required by NCP
In situ treatment	Biological (bioventing), physicochemical (insitu solidification, soil vapor extraction)	Retained, potentially effective for source areas
Ex situ treatment	excavation with on-site treatment or off-site disposal	Retained, potentially effective for source areas
Monitoring	Soil gas monitoring	Eliminated, not applicable to high concentrations observed in source areas
Institutional controls	Land-use restrictions	Retained, potentially effective for source areas
Access restrictions	Engineering controls	Retained, potentially effective for source areas
Containment	Capping	Retained, potentially effective for source areas