



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

5090
Ser RAE30.TM/310
June 27, 2012

Ms. Cheryl Prowell
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 107th FEDERAL FACILITIES
AGREEMENT (FFA) MEETING DATED MAY 10th, 2012, MARINE
CORPS BASE CAMP PENDLETON

Dear Ms. Prowell, Mr. Mahmoud, Mr. Hausladen:

Enclosed are the minutes to the Marine Corps Base, Camp Pendleton Federal Facilities Agreement (FFA) meeting Number 107, held on May 10th, 2012. Should you have questions, please call me at (619) 532-1502.

Sincerely,

A handwritten signature in purple ink that reads "Theresa L. Morley".

THERESA MORLEY
Lead Remedial Project Manager
By direction

5090
Ser RAE30.TM/310
June 27, 2012

Enclosures: (1) 107th FFA Meeting Minutes
(2) 107th FFA Meeting Agenda
(3) Sign in Sheet
(4) Deliverables/Fieldwork Spreadsheets
(5) FFA Schedule
(6) 22/23 ROD Presentation
(7) Well Siting Study for Chappo Subbasin
Investigation
(8) Site 1119 Project Update

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

PROJECT NOTE NO. 57

SUBJECT: Marine Corps Base (MCB) Camp Pendleton Federal Facilities Agreement (FFA) Meeting (No. 107)

DATE HELD: May 10, 2012

Attendees:

Theresa Morley (Naval Facilities Engineering Command Southwest [NAVFAC SW]), Adam Hill (NAVFAC SW), Derral Van Winkle (NAVFAC SW), Tracy Sahagun (MCB Camp Pendleton), Joseph Murtaugh (MCB Camp Pendleton), Martin Hausladen (United States Environmental Protection Agency [USEPA or EPA]), Bill Mabey (Tech Law), Tayseer Mahmoud (California [Cal] EPA/Department of Toxic Substances Control [DTSC]), Kelly Dorsey (San Diego Regional Water Quality Control Board [RWQCB or Water Board]), John Odermatt (RWQCB), Steve Griswold (Parsons), and Josh Sacker (Parsons).

Introduction and Status of Deliverables and Fieldwork

A meeting was held at MCB Camp Pendleton Pacific Views Event Center to update the FFA Team (Team) on program status. Refer to attached sign-in sheet and agenda.

Following introductions, Ms. Morley discussed the deliverables spreadsheet and fieldwork spreadsheet (attached), followed by the FFA Schedule (attached).

Regarding Item #10, the Record of Decision (ROD) for No Further Action (NFA) at Site 1111 will be resubmitted to the agencies for review. The date on the deliverable spreadsheet reflects the original submittal date. Mr. Hausladen noted that the EPA legal review will take 45 days.

Item #14, the ROD for 22/23 Area Groundwater, is being provided to agency personnel at this meeting, with copies being provided by mail to those not in attendance.

Item #15, the project completion report for 12 Area, Site 13 will not be submitted on the date shown on the deliverables schedule. A risk assessment is being conducted for the site, and the site may not be appropriate for an NFA decision. There will be discussion with the agencies to determine technical strategy for the site. The schedule will be revised when the technical approach is finalized.

On the field work spreadsheet, Item #5 was briefly discussed. A test well is being installed at the site by Geosyntec.

A tour of the job sites where work is being performed is scheduled with the Team after the meeting.

22/23 Area Groundwater ROD and Well Siting Study (Chappo Subbasin)

Mr. Griswold summarized the remedial alternatives in the ROD for 22/23 Groundwater, including the selected remedy, which is a combination of Alternatives 2 (Land Use Controls and Long Term Monitoring), 3 (Alternate Water Supply by Installing new Base Well), and 4 (Source Area Treatment via In Situ Technologies) from the Feasibility Study (FS) and Proposed Plan. The presentation slides (attached) provide descriptions of each of these alternatives. Mr. Griswold explained that the Navy performed an extensive review of the document, and that there have been some clarifications in the description of the alternatives since the FS. These changes included the use of the term “design studies” instead of “pilot studies,” because the in situ remedy described in Alternative 4 has been selected, and the initial smaller-scale studies will fine-tune the final design of the systems. Also, the wording was clarified to state that zero-valent zinc or zero-valent iron will be used to address the area with highest concentrations of 1,2,3-trichloropropane (TCP), and enhanced bioremediation will be used to address the area with highest concentrations of trichloroethene (TCE). In addition the “consumer reports” table in the ROD includes a new column for the selected alternative so that the combined alternative was evaluated against the nine National Contingency Plan (NCP) criteria. A request was also made regarding the authorizing signatures that would be required for the document.

Following the summary of the ROD, a discussion of the upcoming Chappo Subbasin investigation was provided (refer to attached slides). The presentation provided a review of the project objectives, prior planning meetings, bedrock contours, and the design elements of the investigation. The Draft Sampling and Analysis (SAP) is scheduled for delivery to the FFA Team May 23.

Mr. VanWinkle asked why the planned pumping test was only 24 hours. Several factors went into this planned approach, including; the primary reason for the pumping test was to draw water into the well to determine if detectable contaminants are in the vicinity of the test well; the analysis of aquifer hydraulic properties was a secondary objective; , and, there is some concern with regard to management of the discharge water. There is a possibility that the pumping duration could be extended if it is possible to discharge to the river, as was done during prior United States Geological Survey (USGS) testing. Mr. Sacker mentioned that the well would not reach steady state conditions within the first several days of pumping, but that the results of a 24-hour test could be analyzed using non-steady state methods.

Ms. Dorsey asked why the proposed test well near Base well 2301 was determined to be a necessary location. She noted that the proposed location is in close proximity to well 2301, and that the Air Station may impact the well. Mr. Sacker noted that well 2301 has been free of contamination, and that this proposed test well was selected based on input from Stetson and other parties at the previously-discussed Base planning meeting. Parsons agreed to check again with Stetson to ensure that the location is correctly placed to meet the intent of the Base Office of Water Resources.

The logistical challenges of drilling these new test wells were also discussed, including biological considerations and access, and that the well locations were selected in consideration of these logistics. Mr. Odermatt said that there might be a possibility of needing to meet substantive requirements for Army Corp of Engineers 401/404 permit for dredging and filling within a navigational waterway, but that there may be an exception for these types of wells.

Site 1119

Ms. Griswold presented the Remedial Investigation (RI) field investigation work conducted to date, including the results of analytical testing of 78 groundwater sample results from various existing and new wells in the subbasin (see attached slides). Base well 26016 had a TCE detection of approximately 11 µg/L during initial sampling and, therefore, was never put into production. Supply well 26018 has consistently had detections of about 2 µg/L of TCE. The highest detected TCE concentration in 26018 was 2.6 µg/L. There are TCE detections in new monitoring wells 1119-MW-1 and 1119-MW-4, with a maximum concentration of 32 µg/L, and concentrations generally increase with depth in both of these locations. The passive diffusion bag (PDB) results also showed increasing levels of TCE with depth in well 26016, although all results in that well were below 2 ug/L.

Based on discussions during the previous FFA meeting, it was agreed additional wells would be installed at Site 1119 to try and define the extent of contamination and possibly identify a source area. DON plans to proceed with additional investigation in advance of producing an RI/FS document. The locations of four proposed monitoring wells were presented in the slides. These would be multi-screened nested wells and were located to further define the known detections of TCE.

There was discussion regarding the placement of the planned new monitoring wells. Mr. Hausladen and Ms. Dorsey questioned the need for monitoring wells 1119-MW-11 and 1119-MW-12, since these are in the known area of contamination and would likely not assist with defining the source. Ms. Morley noted that several parties were involved in the planned placement of the new wells (i.e. Environmental Security, Office of Water Resources, etc.), but that locations could be discussed. Mr. Hausladen and Ms. Dorsey recommended focusing the investigation upgradient of 1119-MW-4 in order to try to better define a possible source. Ms. Dorsey suggested a phased approach for the investigation, starting with wells 1119-MW-9 and 1119-MW-10.

Mr. Mabey suggested that a soil gas survey be conducted in the area around the former train depot (Building 26012) in an effort to determine if a residual source of volatile organic compounds (VOCs) can be located. This could serve to potentially find source areas, and provide data to evaluate possible vapor intrusion risk. The discussion concluded with the DON agreeing to consider the soil gas survey and the installation of the initial two monitoring well locations, as discussed.

Schedule for Next Meeting and Site Visits

The next FFA Meeting is scheduled to be held in Santa Rosa on Monday, September 17, 2012.

The Team visited the following field sites before adjourning for the day:

- Site 1D where new monitoring wells have been installed.
- The 22/23 Area Groundwater design study location where the highest concentrations of 1,2,3-TCP were detected.
- Site 1118, where Mr. VanWinkle discussed the site conditions and results to date.
- The area of Site 1119 where 1119-MW-9 and 1119-MW-10 are planned to be installed.
- Site 33 where shoring is currently being installed as part of a remediation project.

**MCB Camp Pendleton
107th FFA Meeting Agenda**

**Pacific Views Event Center – Crawford Room
Marine Corps Base Camp Pendleton**

May 10th, 2012

- 0930 – 0945 Welcome and Introductions (Navy)**
- 0945 – 1000 Project Deliverables and Planned/In Progress Field Work
Status (Navy)**
- 1000 – 1045 22/23 Area Groundwater Record of Decision and Well Siting
Study (Chappo Subbasin) – Parsons**
- 1045 – 1100 Break**
- 1100 – 1130 Planned Locations for New Groundwater Monitoring Wells at
IR Site 1119 - Parsons**
- 1130 – 1145 Meeting Conclusion / Action Items**
- 1145 – 1230 Lunch**
- 1230 – 1530 Base Tour for Interested Parties**

**Start at IR Site 1D - new wells and layout;
Proceed to the ZVZ Pilot Test in the 22 area;
Drive by the 26 Area Mechanized Museum and storage yard. (IR Site 1119);
Proceed to subsite 2664 (IR Site 1118);
Possibly Site 33 and subsite 520400 (IR Site 1118) (north end of base).**

CLIENT _____ JOB NO. _____ SHEET _____ OF _____
 SUBJECT _____ BY _____ DATE _____
 CKD. _____ REVISION _____

FFA Meeting May 10, 2012

<u>Name</u>	<u>Organization</u>	<u>Phone / Email</u>
Steve Griswold	Parsons	626 440 6076 steve.griswold@parsons.com
Josh Sacker	Parsons	626 440-6191 josh.sacker@parsons.com
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Derral Van Winkle	NAVFAC SW	(619) 532-2220 derral.vanwinkle@navy.mil
Tracy Sahagun	ES, CPEN	760-725-9752 Tracy.Sahagun@usmc.mil
Adam Hill	NAVFAC SW	(619) 532-4340 adam.j.hill@navy.mil
Theresa Morley	NAVFAC SW	(619) 532-1502 theresa.morley@navy.mil
Tayseer Mahmoud	DTSC	(714) 484-5419 emahmoud@dtsc.ca.gov
Martin Hausladen	LSEPA	(415) 992-3007 hausladen.martin@epa.gov
BILL MABEY	TECHLAW	bmabe@techlawinc.com
John Odermatt	SDRWQCB	858-637-5595 jodermatt@waterboard.ca.gov
Kelli Dorsen	4	858-461-2980 kdorsen@waterboard.ca.gov

MCB Camp Pendleton Deliverables Spreadsheet

Date: 5/10/12

Item	Document	Contractor	Status	Date Due to Agencies	Agency Comments Due By	Response Received From:		
						EPA	DTSC	RWQCB
1	Technical Addendum for GCCS Design	Trevet/Geosyntech	FINAL	8/19/11	soon	NC	13-Sep	19-Sep
2	Removal Action Work Plan - Site 33 (52 Area Armory)	Shaw	FINAL	8/31/11	10/28/11	NC	27-Oct	28-Oct
3	Pilot Study Tech Memo - Site 1115 FSSG Lot	Parsons	FINAL	9/16/11	11/13/11	NC	11-Nov	14-Nov
4	SI Addendum Work Plan for Site 1116 - 14 Area Groundwater	ECM	FINAL	10/5/11	12/5/11	NC	2-Dec	7-Nov
5	Pilot Study Tech Memo - Site 21 Oxidation Pond	Parsons	FINAL	10/18/11	12/19/11	NC	15-Dec	6-Jan
6	Groundwater Monitoring Report - 12 Area Site 13	SDV	FINAL	10/18/11	12/19/11	NC	6-Dec	NC
7	Site Inspection Report for Site 1117 - 15/16 Area Groundwater	ERRG	Finalizing	11/2/11	1/2/12	NC	3-Jan	5-Jan
8	Site 21 Pilot Study WP Addendum - Oxidation Pond	Parsons	FINAL	11/15/11	1/13/12	17-Jan	11-Jan	18-Jan
9	Action Memorandum for Site 1116 - 3 subsites (EE/CA as an appendix)	SDV	Public comment period ends 2 Jun	11/21/11	1/20//12	24-Jan	18-Jan	20-Jan
10	ROD for NFA at Site 1111	SDV	EPA requires rewrite	12/22/11	2/20/12	28-Mar	15-Feb	17-Feb
11	Annual Maintenance Report - Site 7 Box Canyon	Trevet	Finalizing	1/27/12	3/27/12	NC	29-Mar	22-Mar
12	Report for NMOCs - Site 7 Box Canyon	Trevet	Responding to agency comments	2/21/12	4/23/12	NC	23-Apr	26-Apr
13	Work Plan to Collect Data - Site 1115 FSSG Lot	Parsons	With agencies	2/28/12	4/30/12	NC	17-Apr	
14	ROD for 22/23 Area Groundwater	Parsons	With agencies	5/8/12	7/9/12			
15	Project Completion Report - 12 Area Site 13	SDV	Navy reviewing pre-draft	5/19/12				
16	SAP for Well Siting Study - 22/23 Area Groundwater	Parsons	Navy reviewing pre-draft	5/23/12				
17	Work Plan for EISB - 22/23 Area Groundwater	Battelle	Preparing pre-draft	6/1/12				
18	Annual Groundwater Monitoring Report - Site 7 - Box Canyon	Trevet	Preparing pre-draft	6/12/12				
19	SI Report for Site 150 - SEERMA Site	TEC	Preparing pre-draft	6/15/12				
20	Data Gap Analysis Report for Site 1D - Burn Ash Site	SDV	Preparing pre-draft	7/9/12				
21	Work Plan Addendum for Site 1119 - 26 Area Groundwater	Parsons	Need money for addl wells	7/11/12				
22	EE/CA and AM for Site 1114 - 41 Area Arroyo	Battelle	Preparing pre-draft	8/1/12				
23	ESI Report for Site 62 - Asphalt Batch Plant	RBA	Preparing pre-draft	8/16/12				
24	ESI Work Plan for Site 1118 - 21/26/52 Area Groundwater	ECM	Preparing pre-draft	8/27/12				
25	RI Work Plan - Site 1D Groundwater	SDV	Preparing pre-draft	10/10/12				
26	RI/FS for Site 1115 - FSSG Lot	Parsons	Follows results of field investigation	10/31/12				
27	Removal Action Work Plan - Site 1116 14 Area Groundwater	ECM	Preparing pre-draft	11/14/12				

Agencies have commented

MCB Camp Pendleton Fieldwork Spreadsheet

Date: 5/10/12

Item	Field Work	Planned Start Date	Planned Completion Date
1	Field Work for Site 1D Data Gap Analysis	6-Feb-12	complete
2	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
3	Field Work for Site 33 Remedial Action	6-Feb-12	delayed
4	Field Work for Site 1116 ESI	12-Mar-12	18-Jun-12
5	Install GCCS System Site 7	May 18; Jun 28	10-Jul-12
6	Field Work for Site 21 Pilot Study	4-May-12	1-Jun-12
7	Field Work for Site 1115 Data Collection	late June	
8	Field Work for Site 1118 ESI		

Date: 5/10/12

Item	Document	Contractor	RTCs to agencies	RTC Approved		
				EPA	DTSC	RWQCB
1	Site Inspection Report for Site 1117 - 15/16 Area GW	ERRG	addl comment RTCs sent 5/8	N/A	7-May	addl comment 5/7
2	ROD for NFA at Site 1111	SDV				
3	Annual Maintenance Report - Site 7 Box Canyon	Trevet	addl RTCs sent 5/7	N/A	26-Apr	8-May
4	Report for NMOCS - Site 7 Box Canyon	Trevet				
5	Work Plan to Collect Data - Site 1115 FSSG Lot	Parsons				
6	ROD for 22/23 Area Groundwater	Parsons				
7	SAP for Well Siting Study - 22/23 Area Groundwater	Parsons				
8	Project Completion Report - 12 Area Site 13	SDV				
9	Annual GW Monitoring Report - Site 7 - Box Canyon	Trevet				
10	SI Report for Site 150 - SEERMA Site	TEC				
11	Data Gap Analysis Report for Site 1D - Burn Ash Site	SDV				
12	Work Plan Addendum for Site 1119 - 26 Area GW	Parsons				
13	ESI Report for Site 62 - Asphalt Batch Plant	RBA				
14	ESI Work Plan for Site 1118 - 21/26/52 Area GW	ECM				
15	RI Work Plan - Site 1D Groundwater	RBA				
16	RI/FS for Site 1115 - FSSG Lot	Parsons				
17	Removal Action Work Plan - Site 1116 14 Area GW	ECM				
18	Work Plan for EISB - 22/23 Area Groundwater	Battelle				
19	EE/CA and AM for Site 1114 - 41 Area Arroyo	Battelle				

FFA Schedule for Draft Documents – May 10, 2012

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

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> | in progress |
| – Record of Decision | 5/8/2012 |
| – Well Siting Study Sampling and Analysis Plan | 5/23/2012 |
| – Work Plan for Enhanced InSitu Bioremediation (EISB) | 6/1/2012 |
- 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**

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 |
| – Fieldwork for Non Methane Organic Compounds | complete |

- Memo To File complete
- Annual Post Closure Maintenance Report (for CY11) complete
- Report for Non Methane Organic Compounds in review
- Annual Groundwater Monitoring Report 6/12/2012

12 Area Site 13 – Former Building 1280 and 1283

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 DoN review. The report recommends further action for the site.

- Groundwater Monitoring Report complete
 - **Technical Report for Soil Removed in Support of the MILCON 7/30/2012***
 - **Feasibility Study 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

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 4/15/2013***
 - **Proposed Plan 4/15/2014***
 - **Record of Decision 4/15/2015***
- Dates were changed as a result of the September 15, 2011 FFA meeting**

Site 33 – 52 Area Armory

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 currently underway.

- Removal Action Work Plan complete
- *Removal Action (geophysical work started 15 Nov 11)* in progress
- Removal Action Completion Report 10/25/2013*
- Proposed Plan 11/15/2014*
- Record of Decision 11/15/2015*

Site 150 – 21 Area, Location 1

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.

- Fieldwork complete
 - Site Inspection Report 6/15/2012
 - **Remedial Investigation Work Plan** **4/21/2013***
 - **Field Work for Remedial Investigation** **4/21/2014***
 - **Remedial Investigation Report** **2015***
 - **Proposed Plan** **2016***
 - **Record of Decision** **2017***
- Dates changed (RI added) as a result of the SI field work**

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

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.

- Data Gap Analysis for Groundwater Work Plan complete
- *Fieldwork* complete
- Data Gap Analysis Report 7/9/2012
- **Remedial Investigation for Groundwater Work Plan** **10/10/2012**

- *Field work for RI* 3/9/2013*
 - *RI/FS Report* 3/11/2014*
 - *Proposed Plan* 2015*
 - *Record of Decision* 2016*
- Dates changed (RI added) as a result of agency comments**

Site 1111 – 26 Area Ash and Debris Disposal Area

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

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** 8/1/12
 - **Removal Action Work Plan** 2013*
 - **Removal Action** 2013*
 - **Removal Action Completion Report** 2014*
 - Proposed Plan 2015*
 - Record of Decision 2016*
- Dates were changed as a result of NFA rejection**

Site 1115 – 13 Area FSSG Lot

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 in agency review; the results will be included in a Remedial Investigation/Feasibility Study.

- Tech Memo complete
 - **Work Plan to collect additional data for site** in review
 - **Field work to collect additional data** 8/8/2012
 - **Remedial Investigation/Feasibility Study** 10/31/2012
 - **Proposed Plan** 10/31/2013*
 - **Record of Decision** 10/31/2014*
- Dates were changed as a result of the September 15, 2011 FFA meeting**

Site 1116 – 14 Area Groundwater

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) waiting for CG signature
- Expanded Site Inspection WP (3 subsites – Moving Forward) complete
- *Field Work for Site Inspection* (3 subsites – Moving Forward) in progress
- *Expanded Site Inspection Report* (3 subsites – Moving Forward) 9/15/2012
- Removal Action Work Plan (3 subsites – Moving Forward) 11/14/2012
- *Interim Removal Action* (3 subsites – Moving Forward) 5/14/2013*
- 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*

Site 1117 – 15/16 Area Groundwater

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.

- Fieldwork complete
 - Site Inspection Report complete
 - **Remedial Investigation Work Plan** 3/27/2013*
 - **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

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.

- Extended Site Inspection (ESI) Work Plan 8/27/2012
- *Field work* 2/27/2013*
- ESI Report 9/27/2013*
- Proposed Plan 5/27/2014*
- Record of Decision 1/27/2015*

Site 1119 – 26 Area Groundwater


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..

- Fieldwork complete
 - **Work Plan Addendum to Delineate Source** **contingent on funding**
 - **Additional 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

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 lab data is in data validation.

- Extended Site Inspection Work Plan complete
- Fieldwork complete
- Extended Site Inspection Report 8/16/2012
- Proposed Plan 5/1/2013*
- Record of Decision 5/1/2014*



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

10 May 2012

107th FFA Meeting



22/23 AREA GROUNDWATER ROD

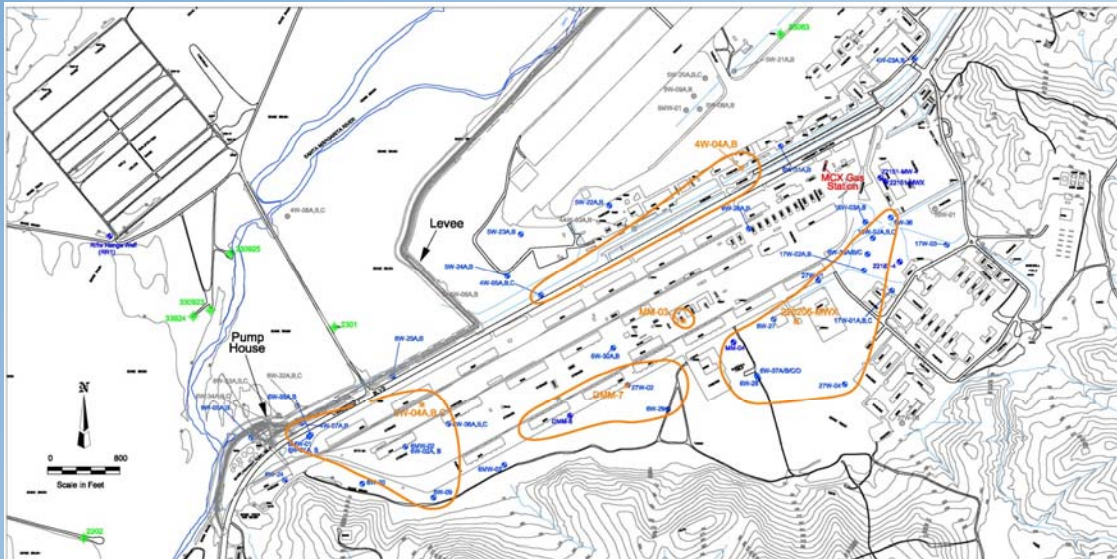
Selected Remedy

- ❖ Alternative 2: Land Use Controls and Long Term Monitoring
- ❖ Alternative 3: Alternate Water Supply by Installing New Base Well or Wells
- ❖ Alternative 4: Source Area Treatment via In Situ Technologies



22/23 AREA GROUNDWATER ROD

Five Groundwater Contaminant Plume Areas



22/23 AREA GROUNDWATER ROD

Alternative 2: Land Use Controls and Long Term Monitoring

- ❖ Implement land use controls to restrict future access to the groundwater in the immediate vicinity of the site where chemicals in groundwater may be present above MCLs or RLs. This includes a requirement that any planned installation of a drinking water well in the immediate vicinity of the plumes would be subject to MCB Camp Pendleton's site approval process, which is required for all projects at the Base involving construction, acquisition, or modification.
- ❖ Conduct a long-term groundwater monitoring program to track chemical concentrations and possible movement, provide early warning of potential impacts to downgradient receptors, and evaluate the attenuation of contamination in and downgradient of the VOC plumes.



22/23 AREA GROUNDWATER ROD

Alternative 3: Alternate Water Supply by Installing New Base Well or Wells

- ❖ Conduct a detailed hydrogeologic investigation of the Chappo subbasin to identify specific water-bearing zones and/or geographic areas of the subbasin that would be best suited for placement of a new well that would not be impacted by contamination for many years. In addition, the new well will need to meet Base requirements with respect to water rights, environmental constraints, and connection to Base infrastructure.
- ❖ Install a replacement water supply well to provide an alternate supply of drinking water.



22/23 AREA GROUNDWATER ROD

Alternative 4: Source Area Treatment via In Situ Technologies

- ❖ Alternative 4A is in situ treatment using zero-valent iron or zero-valent zinc. This technology uses reactive metals (i.e., iron or zinc) injected into the aquifer for chemical reduction of contaminants. This technology will be applied at the plume area around well 220205-MWX to treat contaminants in groundwater, consisting primarily of 1,2,3-TCP. A design study will be conducted first to evaluate the effectiveness of this technology and to refine the full-scale remedy implementation.
- ❖ Alternative 4B is in situ enhanced bioremediation. In situ groundwater bioremediation is a technology that encourages growth and reproduction of indigenous microorganisms to enhance biodegradation of organic constituents in the saturated zone. This technology will be applied at the plume area around well 4W-04A to treat contaminants in groundwater, consisting primarily of TCE. A design study will be conducted first to evaluate the effectiveness of this technology and to refine the full-scale remedy implementation.



22/23 AREA GROUNDWATER ROD

Minor Changes Since the FS

- ❖ Design studies to optimize remedial design for Alternative 4
- ❖ ZVZ/ZVI used to address 1,2,3-TCP and enhanced bioremediation to address TCE
- ❖ "Consumer Reports" table shows a column for the selected remedy

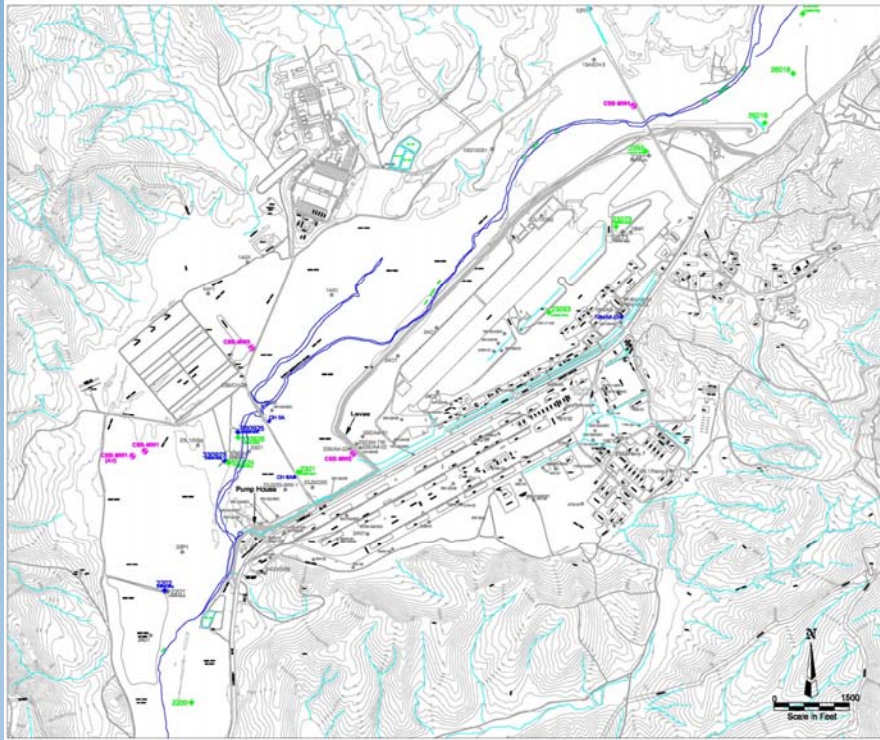


22/23 AREA GROUNDWATER ROD

Authorizing Signatures

- ❖ For the United States Department of the Navy, Marine Corps Base Camp Pendleton,
 - Vincent A. Coglianese, Commanding General, United States Marine Corps, Marine Corps Base Camp Pendleton
- ❖ For the United States Environmental Protection Agency,
 - To be determined
- ❖ For the California Environmental Protection Agency,
 - John E. Scandura, Branch Chief Brownfields and Environmental Restoration Program Department of Toxic Substances Control
 - David W. Gibson, Executive Officer, California Regional Water Quality Control Board, San Diego Region

CHAPPO SUBBASIN INVESTIGATION



CHAPPO SUBBASIN INVESTIGATION

Objective:

- ❖ Find suitable location for supply well.
 - Identify a location that meets production needs and avoids VOC impacts.
 - Not determining nature and extent, but rather developing better understanding of potential contaminant distribution in the subbasin.
 - Data will provide OWR additional information on aquifer at the planned locations, including depth to bedrock, potential yield, geochemistry, and confining layers.

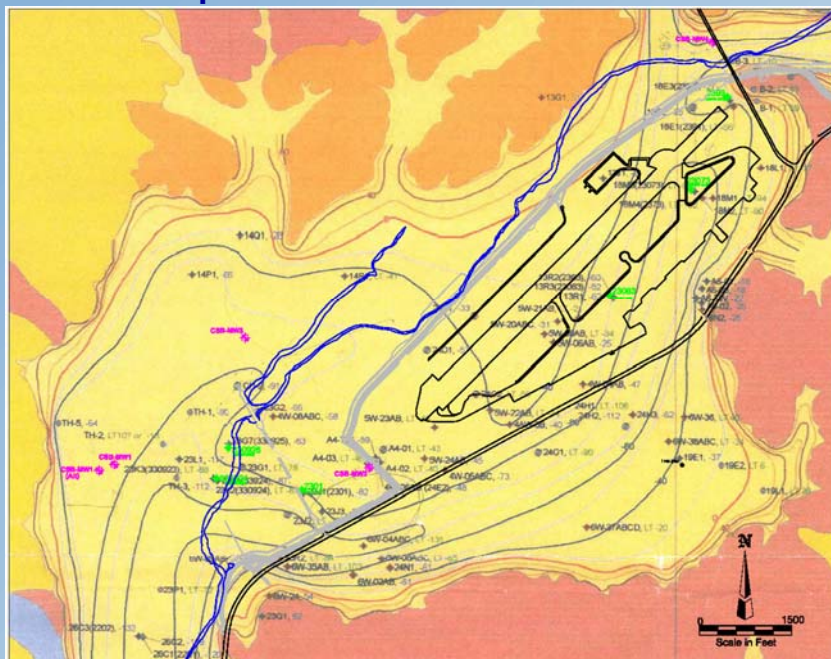
CHAPPO SUBBASIN INVESTIGATION

Planning Meeting

- ❖ Held on August 29, 2011 with Base water experts.
- ❖ Navy, Environmental Security, Office of Water Resources, Facilities Maintenance Division, Stetson Engineers (Jean Moran), and Parsons.
- ❖ Discussion of optimal locations for future supply well.
- ❖ Stetson Engineers developed map of bedrock contours, which is useful in estimating aquifer thickness.
- ❖ Logistical/Biological Constraints

CHAPPO SUBBASIN INVESTIGATION

Stetson Bedrock Map





CHAPPO SUBBASIN INVESTIGATION

Investigation Design:

- ❖ Areas with higher known water production
- ❖ Locations selected based on aquifer thickness, historical yield, and logistics
- ❖ Install five multi-depth well clusters at four locations
- ❖ Analyze samples for VOCs, including 1,2,3-TCP, and geochemical parameters
- ❖ Borehole geophysical logging to provide detailed changes in lithology



CHAPPO SUBBASIN INVESTIGATION

Investigation Design (continued):

- ❖ At best location, install 4" test well for 24-hour pumping test
- ❖ Determine if contaminants are present in vicinity of well
- ❖ Observe well yield
- ❖ Determine approximate aquifer properties

CHAPPO SUBBASIN INVESTIGATION

Schedule:

- ❖ Sampling and Analysis Plan - May 23, 2012
- ❖ Fieldwork - planned for November-December 2012



MCB CAMP PENDLETON SITE 1119 PROJECT UPDATE

10 May 2012

107th FFA Meeting

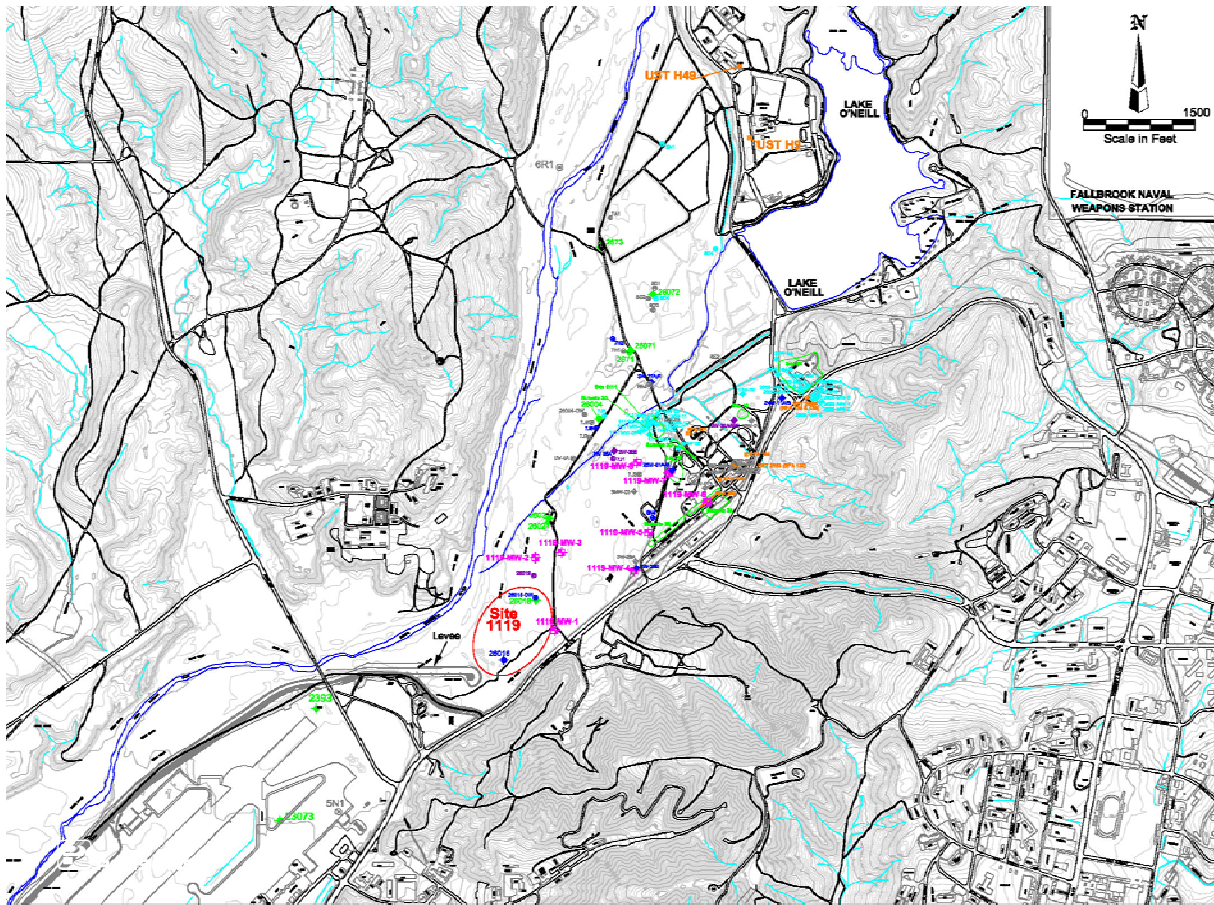


SITE 1119

Site History

- ❖ Defined as groundwater in the vicinity of Base wells 26016 and 26018.
- ❖ Previous groundwater detections in 26016 included 11 micrograms per liter ($\mu\text{g/L}$) of TCE during a constant discharge test conducted by CDM in 2008 and 0.51 $\mu\text{g/L}$ of TCE in a USGS sample at 65 ft bgs collected in 2009.
- ❖ USGS testing at 26016 also reported 1,2,3-TCP at 0.0064 $\mu\text{g/L}$ in the 80-foot depth specific sample. Low level *cis*-1,2-DCE was also detected at 65 ft bgs (0.45 $\mu\text{g/L}$). No other analytical results have indicated the presence of 1,2,3-TCP in wells 26016 or 26018.
- ❖ Sampling at production well 26018 has indicated multiple TCE detections, with a maximum detection of 2.6 $\mu\text{g/L}$ collected by FMD in 2009, and multiple detections of approximately 2 $\mu\text{g/L}$, including recent samples tested as part of the liquid-phase granular activated carbon (LGAC) operations at well 26018. These detections were consistent with test results (2.1 $\mu\text{g/L}$) from a surface discharge sample collected by the USGS in 2009.





SITE 1119

2011 Fieldwork Summary

July 2011 - Measured water levels in 47 existing wells. Pull old pumps to sample. Sampled 12 existing wells

Collected groundwater samples at 26016 and 26018-OW using passive diffusion bags (PDBs) and hydrasleeves.

August 2011 - New well locations determined based on initial groundwater sampling results and review of data from Stetson Engineers, including depth to bedrock and alluvial thickness maps. Summary email sent to Team.

September 2011 - Based on review of additional well data provided at meeting, two additional existing OWR wells (7J1 and 26019) were sampled using passive diffusion bags (PDBs) and hydrasleeves.



SITE 1119

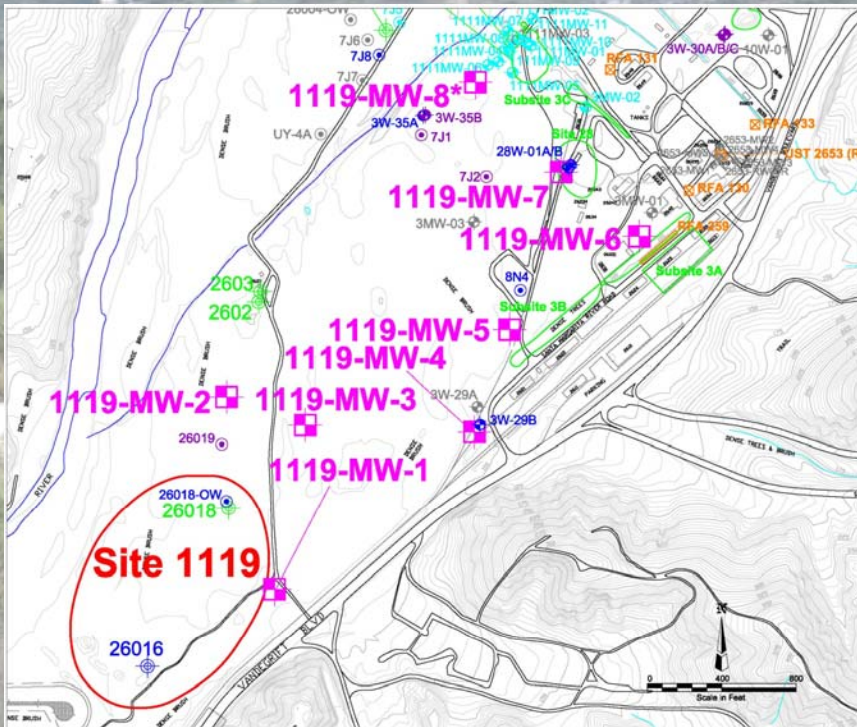
2001 Fieldwork Summary (continued)

- October 2011 - Toad fencing installed at three locations.
- November 2011 - Installed 26 new monitoring wells at 8 locations. Began well development.
- December 2011 - Completed well development. Collected groundwater samples from the 26 new wells and 4 existing wells that could not be sampled during the breeding season (bringing the total to 78 groundwater samples collected from discrete well screens and PDBs and hydrasleeves).



SITE 1119

Well Locations



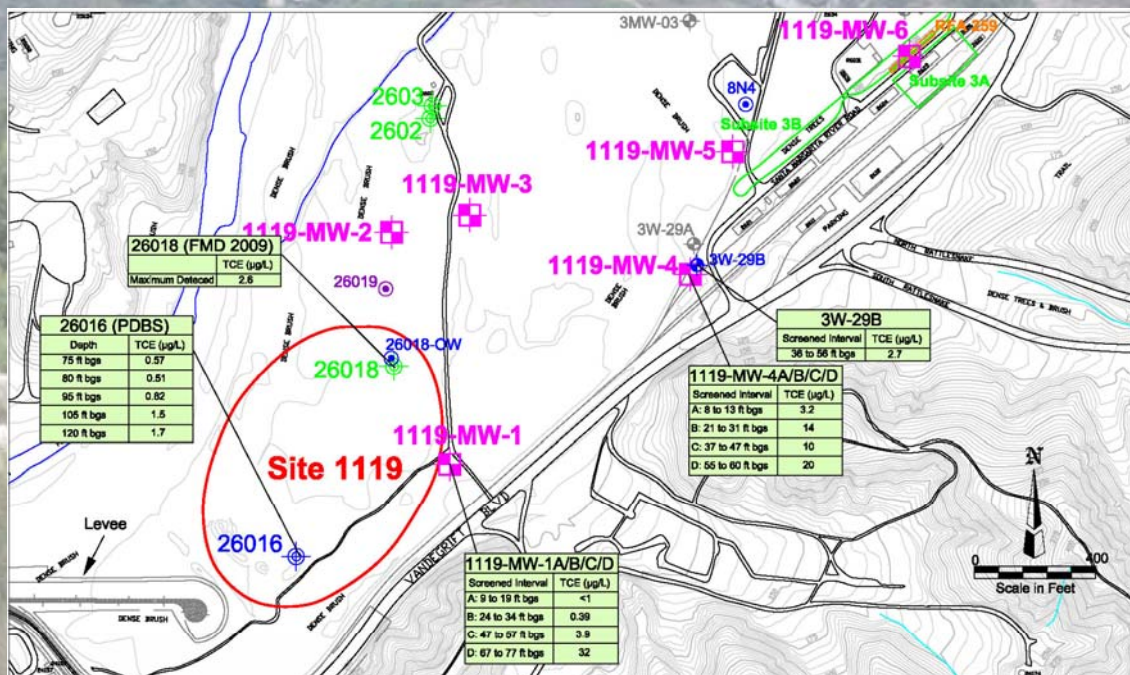
SITE 1119

Results to Date

- ❖ TCE detected in new monitoring wells MW-1 and MW-4 at multiple depths.
- ❖ TCE concentrations increase with depth (closer to bedrock).
- ❖ Highest concentrations along southeast edge of valley (i.e., southeast edge of aquifer), limited to downstream of Rattlesnake Canyon.
- ❖ Possible source area near former train depot .
- ❖ Higher concentrations historically detected in Well 26016 than in 26018; Well 26016 is closer to southeast edge of valley.
- ❖ The various locations where VOCs were not detected helps to isolate the potential source location of TCE at Site 1119 (i.e., former sites in a large upgradient portion of the basin are not contributing sources).

SITE 1119

2011 TCE Detections



SITE 1119

Planned Additional Investigation

- ❖ **Objective: To further define the area of contamination identified in the first mobilization**

SITE 1119

Planned Additional Investigation

- ❖ **Four new monitoring well locations.**
- ❖ **Maximum total depth of the deepest new monitoring wells will be 150 feet bgs, based on the data reviewed to date.**
- ❖ **Four or five separate clustered monitoring wells at each location.**

SITE 1119

Map of Planned New Monitoring Well Locations

