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Contract No. N62470-05-D-0004
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Parsons Project No. 745855

PROJECT NOTE NO. 50

SUBJECT: **Marine Corps Base (MCB) Camp Pendleton Federal Facilities Agreement (FFA) Meeting (No. 101)**
DATE HELD: **19 August 2010**

Attendees:

On site: Theresa Morley (Naval Facilities Engineering Command, Southwest [NAVFAC SW]), Joseph Murtaugh (MCB Camp Pendleton), Derral Van Winkle (NAVFAC SW), Adam Hill (NAVFAC SW), Martin Hausladen (United States Environmental Protection Agency [USEPA or EPA]), Cheryl Prowell (San Diego Regional Water Quality Control Board [RWQCB or Water Board]), John Odermatt (RWQCB), Kimberly Day (California [Cal] EPA/Department of Toxic Substances Control [DTSC]), Steve Griswold (Parsons), Lauri Roché (Parsons), Josh Sacker (Parsons).

By teleconference: Bill Mabey (Tech Law), Tayseer Mahmoud (DTSC), Dan Griffiths (Parsons).

Introduction and Status of Deliverables and Fieldwork

A one-day meeting was held in Pasadena to update the FFA Team (Team) on program status. Refer to attached sign-in sheet and agenda. Following introductions, Ms. Morley provided the status of deliverables and fieldwork (refer to attachments for full list of planned deliverables and dates). Mr. Adam Hill was reintroduced as part of the Navy team and he will be managing Site 7. Mr. Hausladen suggested that the FFA meetings be held every four months. He will check with EPA legal; such a change may require a letter to file.

For the Installation Restoration (IR) Site 33 Remedial Action Work Plan (RAWP), USEPA indicated to the Navy that the document did not have enough information to facilitate a review, so the Navy recalled the document and will re-issue it when the remediation contractor is selected for the site.

For the Site Investigation (SI) Report for Site 62, the contractor will be collecting additional data to close a data gap before finalizing the report.

Mr. Hausladen said that the USEPA will be accepting the draft Site 1H Remedial Action Closure Report (RACR). Ms. Prowell said that construction storm water permits are an Applicable or Relevant and Appropriate Requirement (ARAR), and she had some concerns that will be in her written comments.

For Site 1D, a focused feasibility study cannot be done until the data gap analysis is complete, so the Navy plans to award the data gap analysis work plan shortly.

Mr. Hill will be awarding the Explanation of Significant Differences (ESD) for Site 7 for the 2nd photovoltaic project.

22/23 Area Groundwater RI/FS Comment Review/Discussion

Mr. Griswold presented a summary of many of the key agency comments on the Draft 22/23 Area Remedial Investigation/Feasibility Study (RI/FS) Report, together with proposed summary responses. The presentation was meant to allow discussion of some of the key issues identified by the agencies and to allow the Team to discuss which alternatives are preferred. The Draft FS Alternatives are:

- Alternative 1: No Action
- 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
- Alternative 5: Ex Situ Wellhead Treatment at Well 2202
- Alternative 6: Wellhead Treatment at Well 2202 and Reinjection of Treated Water

USEPA Comment 1 suggests that with such large dilute plumes, land use controls (LUCs) and long-term monitoring are practical components of any potential remedy. Dr. Mabey suggested that the site approval process at Camp Pendleton may make LUCs a viable approach. Mr. Hausladen said that USEPA is internally re-evaluating their approach to large diverse plumes and cost-risk reduction benefit relationships based on data from across the United States. One rule of thumb USEPA has been considering is if a site has groundwater contamination less than 10 times the maximum contaminant level (MCL), there may consideration of less aggressive alternatives if risk to human health can still be prevented with these less aggressive methods.

Mr. Odermatt did not agree with this concept, saying that the problem with this site is that natural attenuation is not an effective remedial remedy for the suite of groundwater pollutants in the 22/23 Area. The remainder of this paragraph contains the RWQCB position provided by Mr. Odermatt: The site has been undergoing natural attention since it was first addressed in an RI/FS for OU2 (circa 1996), and at least one site related groundwater pollutant has migrated to 22 and 33 Area base water supply wells during the intervening time. Using natural attenuation as the sole remediation is functionally equivalent to establishing a “containment zone” under State Water Board Policy (Resolution No. 96-079: Containment Zone Policy). State Water Board Resolution No. 96-79 (amends Resolution No. 92-49) and specifically prohibits the Regional Board from establishing a containment zone within a critical recharge area. The Navy has already provided information indicating that the 22/23 Area Groundwater site is located in a critical recharge area, as evidenced by the recharge analysis

included in the RI/FS for OU2 sites (1996) and base water supply report by Leedshill and Herkenhoff (1988). Mr. Odermatt provided the group with the approximate dates for the cited references. [Per RWQCB request of 20 September 2010, three documents are attached to these minutes (Section 3.0 of Draft Final RI/FS for Operable Unit 2 Site 8 and 22/23 Area Sites, MCB Camp Pendleton, 23 September 1996; SWRCB Resolution 96-079 (amending Resolution 92-49); and cover page for Basewide Water Requirement/Availability Study, Leedshill and Herkenhoff, dated September 1988)]. Under the current situation, the RWQCB would have a hard time concurring with a remedy (for the 22/23 Area Groundwater sites) that relies upon groundwater monitoring and natural attenuation without an active plume control / treatment remedial component.

There was some discussion among the Team members regarding the terminology of natural attenuation, and whether it includes the physical mechanisms of dispersion, diffusion, and volatilization.

Regarding the question of how many groundwater sampling events should be conducted following the first five years after finalization of the Record of Decision (ROD) (USEPA Comment 4), the U.S. Department of the Navy (DON) suggestion is to conduct sampling every two years. Mr. Hausladen suggested that sampling be conducted three times in a five year period to provide sufficient information for the five-year review. Ms. Prowell added that, following the first five years of annual data, a statistical analysis be developed based on the data, which would be used to show whether the trend is decreasing or increasing and used to establish an appropriate sampling frequency. Mr. Griswold noted that at such low concentrations, caution should be used when looking at variations in data and also that it would be appropriate to use the entire available data set when looking at trends, not just the first 5-year monitoring period. Dr. Mabey stated that the use of a statistical evaluation also needs to be balanced with scientific judgment. Mr. Mahmoud asked if sampling would be conducted during the wet or dry season. Mr. Griswold suggested that the annual sampling in the first five years should provide for some sampling in each time of year when the water levels are at their lowest and highest points.

DTSC Comment 4 asked if excavation might be a viable approach for mass removal in the known hot spot areas (areas having the highest concentrations of trichloroethene [TCE] and 1,2,3-trichloropropane [TCP]). There was discussion about how such an approach would require about 3,000 truckloads to remove and replace the existing soil, and that contaminant concentrations in the removed soils may be undetectable.

Dr. Mabey said that it may not reduce remediation time. Mr. Mahmoud asked that the response provide a more thorough rationale as to why excavation would not be feasible and a rough-order of magnitude cost of implementing excavation of the hot spots. Mr. Van Winkle added that the Navy has new internal guidelines and policy about evaluating all alternatives under the nine CERCLA criteria for sustainability, and that use of trucks and fuel used in any excavation and removal would have to be evaluated in the FS.

Ms. Prowell suggested that the Navy investigate remedial options that include either adding treated water into the existing water supply (reservoir augmentation) or pipe the treated water into lines used to distribute recycled water within the watershed. During the discussion of possible options, Ms. Morley noted that according to military policy, once a piece of equipment or resource is ”replaced or repaired” using a certain type of funding, it cannot be used again for its original purpose. This would apply to using Well 2202 as a drinking water production well.

Per DTSC Comment 20, Ms. Day asked if nano-scale zinc is still being considered, and if so, there would be concern regarding the toxicity of zinc being present in the drinking water aquifer. Mr. Griffiths stated that the most recent research by University of Oregon is showing that a larger particle size of approximately 40 to 60 microns appears to be most effective but such a size cannot be injected, which limits the macro-scale application to direct emplacement via trenching or drilling. Dr. Mabey said that zero-valent zinc (ZVZ) is showing promise for destruction of 1,2,3-TCP. There was discussion of how effective ZVZ would be at the concentrations present in the aquifer. Ms. Prowell said that the RWQCB has a general permit for injection of compounds into aquifers, and that any injection would be subject to those requirements. ARARs were discussed, and the fact that administrative requirements of permits would not be required but DON would adhere to substantive requirements of permit.

RWQCB Comments 1 and 2 requested that 1,2-dichloroethane (DCA) and methyl tert-butyl ether (MTBE) be added as chemicals of concern (COCs) in the IR program. Regarding 1,2-DCA, there was discussion that it was not a COC for any of the sites in the underground storage tank (UST) program. 1,2-DCA is a lead scavenger associated with releases of leaded gasoline but there are no known releases of leaded gasoline in the 22/23 area; therefore, it is not a COC at any of the UST sites and is not being analyzed for at all sites. Mr. VanWinkle suggested that there may have been unknown or unreported spills at some of the UST cases in the 22/23 Area. Ms. Prowell noted that elevated 1,2-DCA concentrations occurred where 1,2,3-TCP was also elevated and that the 1,2-DCA was more likely associated with the release of 1,2,3-TCP and it would not be appropriate to defer 1,2-DCA to the UST program. After some discussion, it was agreed that since 1,2-DCA is reported as part of method 8260B, it will be monitored as part of the IR program.

Regarding MTBE, it was agreed that there is not a need to specifically add MTBE as a COC in the IR program. However, if an alternative is selected that might have an impact on the MTBE plume, then this should be accounted for and discussed in the implementation of the alternative.

For RWQCB Comment 8, Mr. Griffiths discussed the trend analysis graphs for each of the four monitoring wells cited in the comment. Following the review of the data for each well, Ms. Prowell asked that the graphs and explanation be included in the response to comment.

RWQCB Comment 11 says that action levels should be set based on a risk-based approach. Mr. Griswold noted that the DON should not be held to cleanup levels below drinking water standards. In the case of 1,2,3-TCP, the response level is 0.5 µg/L although the Cal EPA public health goal (PHG) is 0.0007 µg/L. Ms. Day said she will look into the toxicological studies behind the development of the PHG. There was discussion of the need for a numeric remedial goal for 1,2,3-TCP. The remedial goal currently in the FS is 0.5 µg/L. Ms. Morley noted that at other sites, the military has been held liable retroactively for providing supply water that met promulgated action levels at the time after action levels were reduced.

RWQCB Comment 13 says that the costs of an alternate water supply should be addressed in each of the alternatives equally. Ms. Prowell pointed out that on Table L17, the cost estimate for Alternative 6, Hydraulic Containment, Task 2 is listed as “Installation, Development, and Testing of New Water Supply Well”. That led Ms. Prowell to conclude that a new supply well was included in this alternative. According to Mr. Griswold, that was a typo and the costs for the new supply well in Alternative 3 were assumed to be comparable to the costs of a reinjection well under Alternative 6.

There was discussion of the various alternatives presented in the FS. Ms. Prowell noted that she thought Alternatives 5 and 6 are desirable because they have hydraulic control and have the greatest likelihood of protecting the remaining supply wells in the 33 Area. If Alternative 5 is not preferred by the Base, then the RWQCB favors Alternative 6. Ms. Morley said that Alternative 3 appears to be the most effective because it will provide a clean water supply and will also provide some characterization that would be helpful in managing the water supply and ensuring that it stays clean. Mr. Hausladen said that if additional well drilling were to be conducted in the water supply aquifer, then down-hole geophysical logs would be a useful tool for better understanding the depths of water-bearing zones.

Alternative 2 by itself was generally not supported by the Team as a whole because no active steps are being taken to improve the current groundwater situation. Mr. Odermatt said that Alternative 2 or 3 would have to establish a containment zone per California State Water Resources Control Board (SWRCB) Resolution 92-49, and he does not think that the Santa Margarita River system would qualify as a containment zone due to the area being defined as a critical recharge area. As Mr. Odermatt recalled the Chappo area was defined as a critical recharge area as part of work supporting the OU 2 ROD, and hence cannot be considered for a Containment Zone per SWRCB Resolution 92-49. Mr. Hausladen said that he would be amenable to Alternative 3, and that the situation can be reassessed after 5 years. Ms. Prowell said that another problem with Alternative 2 or 3 is that there is no defined timeframe for when cleanup goals would be achieved. Mr. Griswold concurred and said that the overall timeframe is going to be decades based on the trends seen so far.

Ms. Morley suggested a combined approach that would include the aquifer characterization described in Alternative 3, and would also conduct pilot studies

in the source areas, resulting in a blend of Alternatives 3 and 4. Characterization would include depth-specific sampling of the aquifer. Mr. Hausladen and Ms. Day said they support the idea of additional characterization as part of the selected alternative. Ms. Prowell said that a lot of characterization has been done and that a decision should not be delayed. The RWQCB supports reinjection as an alternative. Mr. Griswold noted that there is an element of characterization in Alternatives 3, 4, and 6, but that the focus of the characterization differs depending on the objectives of the remedy. For example, Alternative 3 would focus on getting a better understanding of distribution of contaminants in the aquifer in order to better site a future supply well, Alternative 4 would focus on characterizing the source areas to better design the details of the pilot studies, and Alternative 6 would focus on characterizing the aquifer for placement of a reinjection well.

Meeting Wrap-up and Schedule for Next Meeting

The next FFA Meeting is scheduled to be held at MCB Camp Pendleton, CA on November 4, 2010.

MCB Camp Pendleton
101st FFA Meeting Agenda

Parsons Conference Room
101 West Walnut Street
Pasadena, CA

August 19th, 2010

0900 – 0910	**Welcome and Introductions**
0910 – 0940	**Project Deliverables Status**
0940 – 1030	**22/23 Area Groundwater RI/FS Alternative Selection and Response to Comment Review/Discussion**
1030 - 1040	**Break**
1040 – 1130	**22/23 Area Groundwater RI/FS Alternative Selection and Response to Comment Review/Discussion (con't)**
1130 – 1245	**Lunch**
1245 - 1300	**Meeting Conclusion / Action Items**

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CLIENT NAVFAC SW CAMP PENDLETON JOB NO. ____ SHEET ____ OF ____
SUBJECT 101st FFA Meeting 19 AUG 2010 BY ____ DATE ____
CKD. ____ REVISION ____

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MCB Camp Pendleton Deliverables Spreadsheet

Date: 8/19/10

				Date Due	Agency Comments	Response Received From:		
Item	**Document**	**Contractor**	**Status**	**to Agencies**	**Due By**	**EPA**	**DTSC**	**RWQCB**
1	Remedial Action Closure Report for OU4 Site 30 - Firing Range Soil	Battelle	FINAL	9/22/09	11/23/09	**X**	**X**	**X**
2	Non Time Critical Removal Action Memorandum Site 33 - Armory Site	Battelle	FINAL	9/12/09	1/12/10	**X**	**X**	**X**
3	Phase II Extraction Report for Site 7 (Box Canyon) LFG	TetraTech	FINAL	12/21/09	2/18/10	**NC**	**X**	**X**
4	SAP for Groundwater Monitoring at 12 Area Site 13	SDV	Responding to Agency Comments	2/5/10	4/6/10	**X**	**X**	**X**
5	Community Involvement Plan Update	SDV/Barrett	FINAL	2/26/10	4/27/10	**NC**	**X**	**X**
6	Site Inspection Report for Site 62 (PCB Site in 62 Area)	SeaAlaska	Closing data gap	4/7/10	6/7/10	**NC**	**X**	**X**
7	ESD for Site 7 (Box Canyon) Photovoltaic Panel Project	SDV	FINAL	4/2/10	4/23/10	**X**	**X**	**X**
8	Remedial Action Closure Report for OU3 Site 1A - Burn Ash Site	Battelle	FINAL	4/23/10	6/22/10	**NC**	**X**	**X**
9	RI/FS for 22/23 Area Groundwater	SDV/Parsons	With agencies	5/14/10	7/13/10	**X**	**X**	**X**
10	Annual Groundwater Monitoring Report - Site 7 Box Canyon	Trevet	With agencies	6/15/10	8/16/10	**NC**	**NC**	**X**
11	NTCRA Work Plan for Site 33 - Armory Site	Battelle	Recalled					
12	Remedial Action Closure Report for OU5 Site 1H - Burn Ash Site	SDV	With agencies	7/6/10	9/6/10			
13	Site Inspection Report for Site 1116 - 14 Area Groundwater	Trevet	With agencies	8/12/10	10/12/10			
14	Design for GCCS - Site 7 Box Canyon	GeoSyntec	With agencies	8/20/10	10/19/10			
15	SAP for NMOC Sampling at Site 7 - Box Canyon	Trevet/Parsons	Preparing Pre-draft	Aug				
16	Site Inspection Report for Site 1118 - 21/26/52 Area Groundwater	SeaAlaska	Preparing Pre-draft	Sep				
17	Remedial Action Closure Report for OU4 Site 1D for Soil - Burn Ash Site	SDV	Preparing Pre-draft	Oct				
18	RI/FS Work Plan for Site 1119 - 26 Area Groundwater	Parsons	Preparing Pre-draft	Oct				
19	Data Gap Analysis Work Plan for Site 1D - Burn Ash Site		Need to award					
20	ESD for Site 7 (Box Canyon) 2nd Photovoltaic Panel Project	CH2MHill	Need to award					
21	Site Inspection Report for Site 1117 - 15/16 Area Groundwater	ERRG	SAP Addendum - preparing pre-draft					

Agencies have commented

MCB Camp Pendleton Fieldwork Spreadsheet

Date: 8/19/10

Item	Field Work	Planned Start Date	Planned Completion Date
1	Groundwater at Site 1D - Burn Ash Site	In progress	
2	Site 1114 - 41 Area Arroyo (PCE in well)	Started last week, drill rig stuck	Will resume once site is dry

MCB CAMP PENDLETON SUMMARY OF THE FFA TEAM COMMENTS ON THE 22/23 AREA GROUNDWATER RI/FS

19 August 2010

101st FFA Meeting

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22/23 AREA GROUNDWATER RI/FS

FS Alternatives

- Alternative 1: No Action
- 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
- Alternative 5: Ex Situ Wellhead Treatment at Well 2202
- Alternative 6: Wellhead Treatment at Well 2202 and Reinjection of Treated Water

22/23 AREA GROUNDWATER RI/FS

USEPA Comment 1:

- The site has large dilute (LD) plumes with low concentrations of VOCs, in aerobic groundwater conditions with minimal microbial processes to reliably biotransform the VOCs. It is problematic to implement cost effective groundwater remediation using in situ technologies, and groundwater extraction and treatment will require many years. 'Hot spot' mass removal may not significantly reduce remediation times. Growing consensus appears to be that LTM and ICs are practical components of a remedy for such LD plumes. LTM/LUCs are likely to be part of any potential remedy.
- If LTM is selected as a remedy component, DON should also consider including review of advances in groundwater remediation technologies as part of Five-Year Reviews.

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22/23 AREA GROUNDWATER RI/FS

Response to USEPA 1:

- As noted in the comment, LUCs and LTM are likely to be a major part of any remedy. More aggressive steps are provided in Alternatives 3 through 6, including possible source area treatment. More cost-prohibitive options were evaluated but screened out in the document. Additional discussion could be added outlining very costly approaches, such as a large-scale PRB or hundreds of injection points throughout the 22/23 Area.
- 5-Year reviews could include a review of new technologies relevant to the site.

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22/23 AREA GROUNDWATER RI/FS

USEPA Comment 2:

- The RI says that a continuing source could be present in the saturated zone soils, and that DNAPL is unlikely. Although not unreasonable, these data gaps should be revisited if the selected remedial alternative does not perform as expected, or if additional sampling can be done if hot spot remediation (Alternative 4) is implemented.

Response:

- Note that Alternative 4 (Source Area Treatment) includes limited additional studies/sampling to further define and characterize the nature and extent of the hot spots to better design the proposed source area treatment applications. During the 5-year review, if the chosen remedial alternative is not performing as expected, then the approach will be re-evaluated.

22/23 AREA GROUNDWATER RI/FS

USEPA Comment 4 (also DTSC 6, RWQCB 16):

- The document says that natural attenuation is slowly diminishing VOCs over time, but there is no reference to implementation of MNA as defined in EPA guidance. Discuss stability of plumes, and the conclusion that continuing sources are not significant in the context of MNA. Also, the LTM alternative proposes annual monitoring for 5 years, then every 2 years after that. DON should consider continuing every year until cleanup levels are met.

22/23 AREA GROUNDWATER RI/FS

Response to USEPA 4 (also DTSC 6, RWQCB 16):

- There is evidence of contaminant reduction by dispersion, diffusion, sorption, and volatilization. However, there is insufficient evidence to indicate that naturally occurring biological destructive mechanisms are occurring. Therefore, MNA alone is not proposed as an alternative because it cannot be demonstrated per the standard remedial criteria. However, some aspects of natural attenuation are occurring as evidenced by declining contaminant concentrations at most of the monitoring wells in the 22/23 area. Thus, MNA is a viable supporting mechanism that can be applied in conjunction with other remedial actions, including LUCs and LTM.
- Regarding monitoring frequency, DON proposes to leave the current assumptions for cost purposes, but add text explaining that the first five years of data will be used during the 5-year review to determine the sampling frequency going forward.

22/23 AREA GROUNDWATER RI/FS

DTSC Comment 4:

- The report says that it is likely that contamination from past releases remain sorbed to soil particles in the saturated zone and capillary fringe, and that such contamination will continue to slowly desorb and be released into site groundwater over time. If it is likely that residual DNAPL will be entrained in the soil matrix within a localized area, then a limited excavation option should be a viable approach for removing source area(s).

22/23 AREA GROUNDWATER RI/FS

Response to DTSC 4:

- Direct excavation was considered in the early stages of the FS process and rejected due to the required depth and volume of excavation and the associated sustainability impacts of equipment and haul trucks. For example, the excavation necessary to remove the 5 µg/L TCE area would involve the removal and replacement of approximately 40,000 cubic yards of soil which would involve about 2,500 to 3,000 truckloads to remove/replace the existing soil. The TCP hot spot would require a similarly large excavation in a relatively undisturbed vegetated area.

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22/23 AREA GROUNDWATER RI/FS

DTSC Comment 8:

- Suggest evaluating a hybrid approach that combines source area treatment and wellhead treatment. Each alternative may not provide a complete solution by itself.

Response:

- It is possible that Team members might suggest that more than one alternative be implemented. The various alternatives are presented for decision-making purposes; however, cost becomes prohibitive as alternatives are combined.

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22/23 AREA GROUNDWATER RI/FS

DTSC Comment 20:

- There are concerns with the use of nanoscale zinc, including the possible high concentrations of zinc in drinking water.

Response:

- The use of ZVZ and/or nano scale zinc is in the research stages of investigation. Questions regarding the use of this technology are currently being investigated, included the effects of pH on effectiveness, the most effective particle sizes, and many other factors. It is suggested that if ZVZ becomes closer to possible implementation, that DON fully discuss the research results with the Team.

22/23 AREA GROUNDWATER RI/FS

RWQCB Comment 1:

- Add 1,2-DCA as a COC in the IR program.

Response:

- 1,2-DCA is not at concentrations that warrant identification as a COC, but because 1,2-DCA is reported as part of 8260B testing, DON agrees to include 1,2-DCA in the long-term monitoring program.

22/23 AREA GROUNDWATER RI/FS

RWQCB Comment 2, 20:

- Add MTBE as a COC in the IR program.

Response:

- If Alternative 4 is selected, the proposed in-situ pilot-scale remediation would not overlap the MTBE plume. Groundwater conditions will be monitored for geochemical impacts.

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22/23 AREA GROUNDWATER RI/FS

RWQCB Comment 4:

- Is DNAPL present?

Response:

- No, the dissolved phase concentrations of the various contaminants are not indicative of the presence of DNAPL. DNAPL may be potentially present if greater than 1 percent of the solubility limit of any contaminant. 1% of the solubility limit for TCE and TCP is 1,100 µg/L and 1,750 µg/L, respectively. Section 2.4 will be revised to clarify this point.

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22/23 AREA GROUNDWATER RI/FS

RWQCB Comment 8:

- The document states that there is a decreasing trend in contamination, but there are exceptions (6W-01A, 6MW-01, 6W-29, and 4W-04A); explain them.

Response:

- VOC concentrations have been slowly declining at the majority of the 50-plus monitoring wells within the 22/23 Area. However, the four wells cited in the comments are exceptions. At three of the four wells specified in this comment (6W-01A, 6MW-01, and 6W-29), the trend appears to be neither up nor down, but relatively stable over the entire monitoring program duration since the early 90s. There have been short term increases between some monitoring events. The major exception to the general trend in the monitoring wells is found at 4W-04A. This exception is pointed out and discussed in some detail within the document and the concentration trends at this location are the basis for labeling the area around this well as a hotspot. This hotspot is part of the potential remedial action in FS Alternative 4 (Source Area Treatment).

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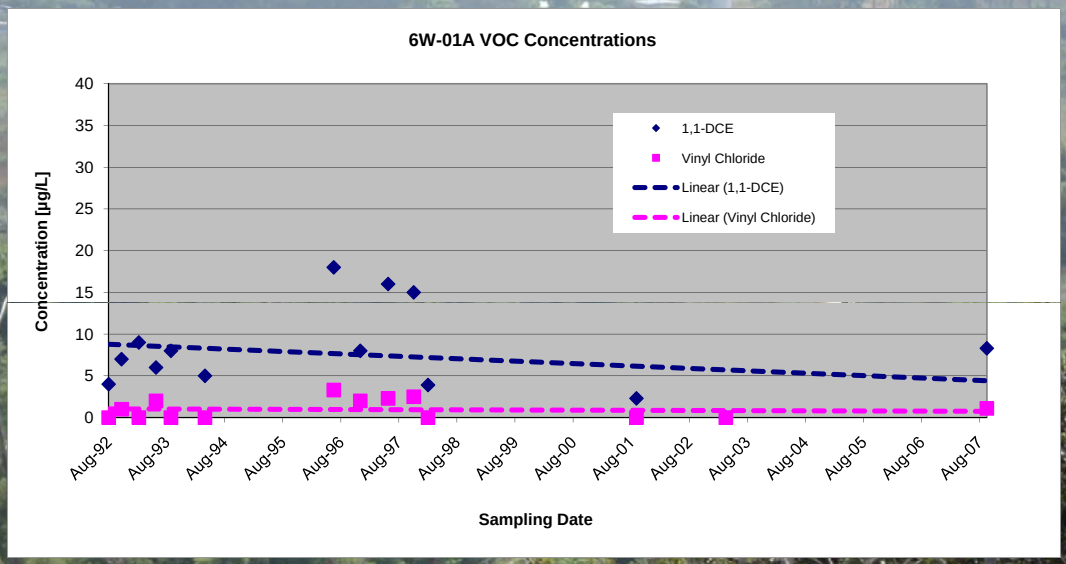
22/23 AREA GROUNDWATER RI/FS

Well 6W-01A:



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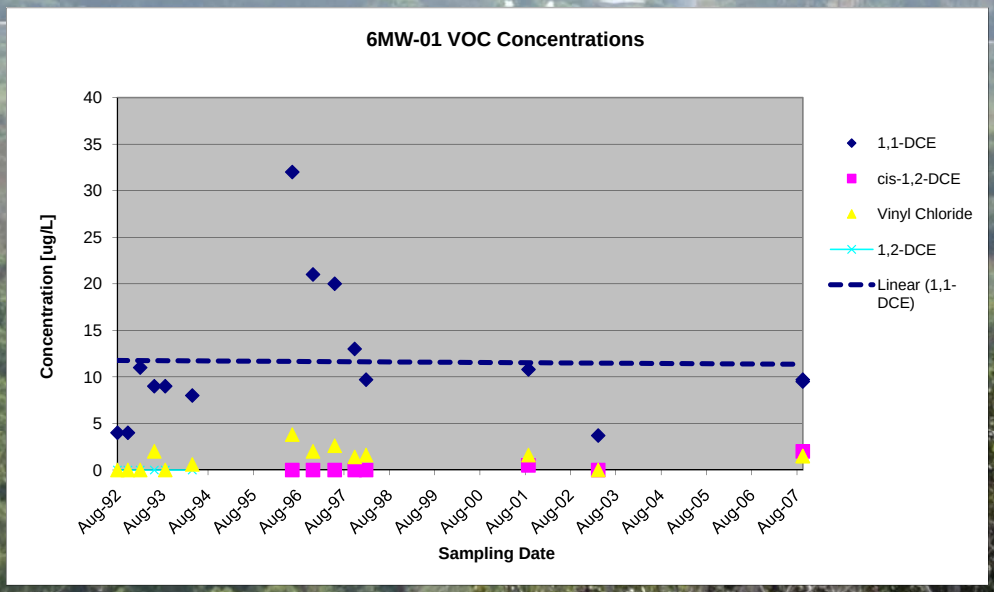
22/23 AREA GROUNDWATER RI/FS

Well 6MW-01:



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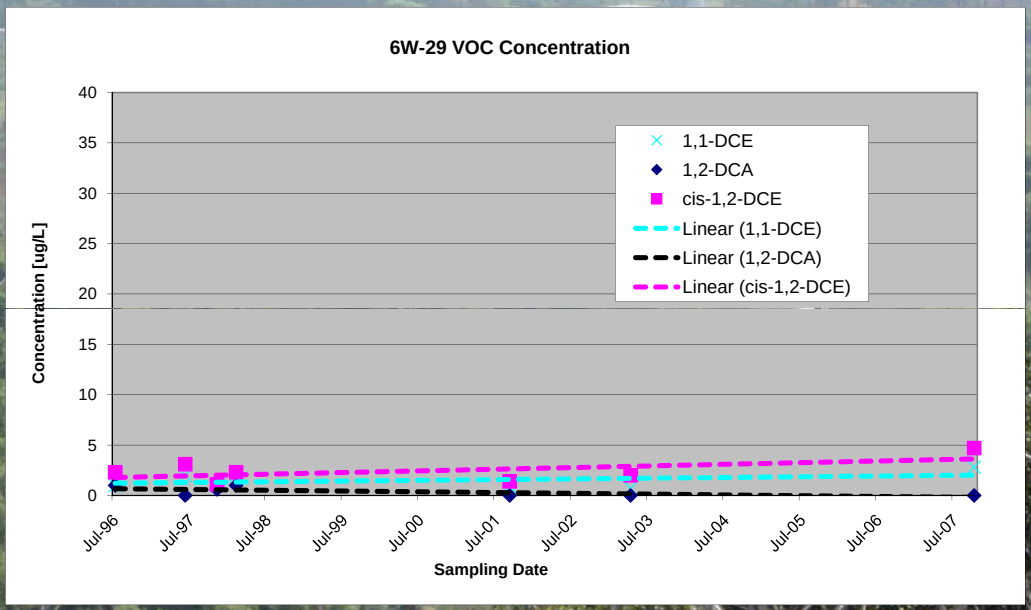
22/23 AREA GROUNDWATER RI/FS

Well 6W-29:



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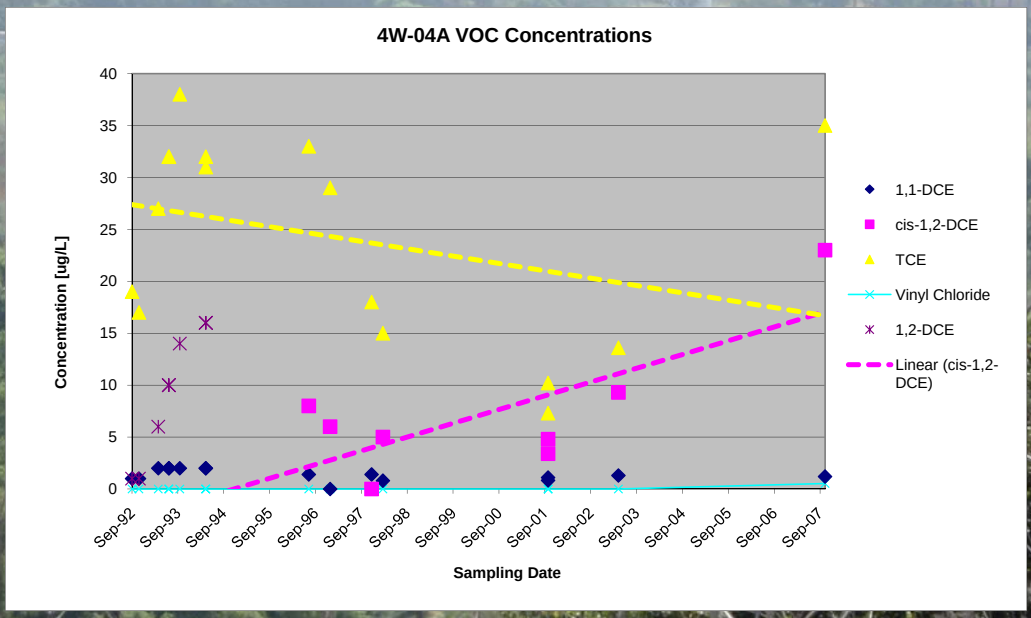
22/23 AREA GROUNDWATER RI/FS

Well 4W-04A:



22/23 AREA GROUNDWATER RI/FS

RWQCB Comment 11:

- Groundwater action levels should be set at concentrations such that the cumulative risk from exposure to site related COCs will be within or below the risk management range (at 10^{-4} to 10^{-6}) when the remedial action objectives are attained.

Response:

- Calculation of risk-based groundwater concentrations for all chemicals protective of drinking water ingestion is not necessary since drinking water standards are applicable. Such calculated concentrations may in some cases be below applicable drinking water standards (for example, the USEPA RSL and Cal EPA PHG are both 0.0007 µg/L for TCP, while the California RL is 0.5 µg/L). DON should not be held to cleanup levels below drinking water standards.

22/23 AREA GROUNDWATER RI/FS

RWQCB Comment 13:

- The cost of an alternate water supply should also be included in Alternatives 2, 4, and 5.

Response:

- Well 2202 never exceeded any regulatory thresholds; it was voluntarily taken off-line. The responsibility of the IR program at this site is to provide alternatives to address the contamination in groundwater. Currently the Base has sufficient supply and the need for an alternate water supply will be determined by the Base.

22/23 AREA GROUNDWATER RI/FS

RWQCB Comment 14:

- If LTM (and/or MNA) and LUCs are chosen as the remedy, what triggers could be included in the ROD in the event that COCs remain elevated for longer than anticipated?

Response:

- A trigger could be included in the LTM remedy. Such a trigger could entail a reversal of downward contaminant trends at sentry wells located at the leading edge and/or at wells located in the core plume(s) over a meaningful time interval (e.g., 5 years). Contingency would be an increase in sampling frequency at affected wells leading to a second contingency of a more aggressive remedial option (for example, including Alternative 4).

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RWQCB Comment 22:

- Include discussion of the TCP detection in well 26016.

Response:

- DON is planning to fully address the COC detections in the 26 Area in an upcoming investigation and report for the 26 Area.

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RWQCB Comment 28:

- Include air sparging/soil vapor extraction (AS/SVE) as an alternative.

Response:

- The AS/SVE technology was not retained for further evaluation for the entire 22/23 Area groundwater due to various factors including the cost to implement versus contaminant mass removed/destroyed. The other in-situ technologies carried forward are projected to remove more mass than AS/SVE. AS/SVE was likely more effective at the fuel plume where LNAPL was present, because floating contamination can be easily partitioned into the vapor phase from the capillary fringe.

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RWQCB Comment 29:

- Include a present worth analysis.

Response:

- A present worth analysis could be included, but will show costs for LTM and O&M to be significantly lower than those currently shown. After consideration of the merits of each method, DON decided that the non-NPV method represents a more realistic estimate. This is because the costs incurred to the government to implement a given remedial alternative are paid on a year-by-year basis. The NPV method is more appropriate in situations where the full cost of remediation is paid up-front in an escrow-type of account, which earns interest over time.

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RWQCB Comment 33:

- Provide a basis for the 1500 gpm pumping rate for wellhead treatment. Modeling for the 22 Area MCX gas station was based on flow rates for supply wells of 305 gpm. Please explain the rationale for proposing an extraction well designed to pump at 5 times the rate of a supply well. A lower flow rate would correspond to smaller and less expensive pumps, carbon adsorbers, and other treatment system components.

Response:

- Data obtained by Parsons indicates that the Base supply wells in the Santa Margarita River valley have been actively pumped at a rate of approximately 1000 to 1500 gpm. Therefore, the system components were designed for the maximum likely pump rate of a Base supply well.

22/23 AREA GROUNDWATER RI/FS

Production Well Flow Rates:

Table 2-2
22/23 Area Groundwater
Production Well Construction Data
MCB Camp Pendleton, California

MCB Camp Pendleton Well Identification	Relationship to 22/23 Area GW	Screened Interval (feet bgs)		Total Depth (feet bgs)	TD During Drilling	Screen Type	Screen Diameter (inch)	Pump Rates (GPM)	Comments
2200	Downgradient	88	170	unknown	unknown	unknown	unknown	unknown	Agricultural Well
Rifle Range Well (22000)[a]	Cross Gradient	70	92				unknown	unknown	Abandoned
2202	Downgradient	96	176	176	181	SS	24	1250	Mud, electric, and gamma logs and a camera survey were also provided by the Base.
2301	Cross Gradient	91	137	137	140	SS	16	unknown	
23063	Upgradient	90	150	150	175	SS	14	1200	
23073	Upgradient	88	168	168	175	SS	16	1500	
2393	Downgradient to Site 1111, or far upgradient of 22/23 Area	90	110	110	119	SS	16	940	
330923	Cross Gradient	80 130	120 140	140 140	145	SS	12	1200	
33924	Cross Gradient	88	117	120	150	SS	unknown	500	Inactive - was replaced by 330923
330925	Cross Gradient	50 100	90 110	110 110	122	SS	12	1250	

bgs = below ground surface
ss = stainless steel
UGGS/Parsons sampled wells 2202, 2301, 330923, 330925, 26016, 26018, and 22000 in 2008/2009.

a = Well 22000 ("Rifle Range Well") was never put into production and is considered inactive. This well is screened from approximately 70-92' and potentially collapsed below 92'. This well was sampled by UGGS/Parsons in 2009. This well is not included as one of the nine production wells in the Chappo Subbasin.

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