



Department of Toxic Substances Control



Winston H. Hickox
Agency Secretary
California Environmental
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Edwin F. Lowry, Director
5796 Corporate Avenue
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M60050.000558
MCAS EL TORO
SSIC #5090.3

March 19, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Marine Corps Air Station El Toro
Base Realignment and Closure
P.O. Box 51718
Irvine, California 92619-1718

RESPONSE TO COMMENTS, DRAFT FINAL WORK PLAN AND HEALTH AND SAFETY PLAN, PHASE II REMEDIAL INVESTIGATION, INSTALLATION RESTORATION PROGRAM (IRP) SITE 1, EXPLOSIVE ORDNANCE DISPOSAL (EOD) RANGE, MARINE CORPS AIR STATION (MCAS) EL TORO

Dear Mr. Gould:

The Department of Toxic Substances Control (DTSC) has received the Department of the Navy's responses to our December 15, 2000 comments, Draft Final Work Plan, and Health and Safety Plan on February 8, 2001. We also received a second response from the Department of the Navy (DON) on February 15, 2001.

The DON'S response reiterates the position of the United States Marine Corps (USMC) that no hazardous waste treatment of explosive ordnance occurred at Site 1, EOD Range, and that no open burn/open detonation (OB/OD) took place at that location. USMC further maintains that munitions were used at the EOD Range for their intended purpose, including training of military and explosive ordnance disposal personnel. As such, the USMC believes the use of munitions is not regulated by the Resource Conservation and Recovery Act (RCRA).

DTSC maintains that the Marine Corps' explosive ordnance detonation activities at the EOD Range included the operation of an OB/OD hazardous waste treatment unit pursuant to the RCRA Part A application submitted by the DON in June 1988. The OB/OD unit received interim status authorization between June 8, 1988 and December 31, 1991. It then operated without any authorization from DTSC between January 1, 1992 and July 1999, in violation of state law. Therefore, RCRA closure and post-closure requirements specified in Chapter 6.5 of the California Health and Safety

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at www.dtsc.ca.gov.

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Code (HSC) and Title 22, California Code of Regulations (CCR), Section 66265.112 apply to the OB/OD unit located within the investigation boundary for IRP Site 1.

DTSC understands that to facilitate a settlement of the differing positions, the DON has chosen to incorporate State substantive closure and post-closure requirements as relevant and appropriate requirements (ARARs) in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response being taken at Site 1. As a result, the DTSC Hazardous Waste Management Program, Permitting Division will work with the Site Mitigation Program, Office of Military Facilities to ensure that RCRA closure plan requirements for the OB/OD unit are incorporated into the CERCLA cleanup process.

Additionally, RCRA post-closure requirements were not incorporated in the Draft Final Work Plan. DTSC requires that the DON add Title 22, CCR, Article 7, Sections 66265.110, 66265.111, 66265.114, 66265.115, 66265.116, 66265.117, 66265.118, 66265.119, and 66265.120 as ARARs for any selected removal or remedial action at Site 1.

Please contact Mr. Tayseer Mahmoud, Permit Writer, at (714) 484-5419 for questions regarding the OB/OD unit or Ms. Triss Chesney, Remedial Project Manager, at (714) 484-5395 for questions regarding IRP Site 1.

Sincerely,



John E. Scandura, Chief
Southern California Branch
Office of Military Facilities



Karen Baker, C.E.G, C.H.G., Chief
Geology and Corrective Action Branch
Permitting Division

Enclosure: DTSC Comments

cc: Ms. Nicole Moutoux
Remedial Project Manager
U. S. Environmental Protection Agency
Region IX
Superfund Division (SFD-8-1)
75 Hawthorne Street
San Francisco, California 94105-3901

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cc: Mr. John Broderick
Remedial Project Manager
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3339

Mr. Gregory F. Hurley
Restoration Advisory Board Co-chair
620 Newport Center Drive, Suite 450
Newport Beach, California 92660-8019

Ms. Polin Modanlou
MCAS El Toro Local Redevelopment Authority
10 Civic Center Plaza, 2nd Floor
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Mr. Steven Sharp
Orange County Health Care Agency
2009 East Edinger Avenue
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Ms. Judy Gibson
United States Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
2730 Loker Avenue West
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Remedial Project Manager
Naval Facilities Engineering Command
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ENCLOSURE

DTSC Comments

**DTSC COMMENTS ON
THE RESPONSE TO COMMENTS, DRAFT FINAL WORK PLAN
AND HEALTH AND SAFETY PLAN,
PHASE II REMEDIAL INVESTIGATION,
INSTALLATION RESTORATION PROGRAM (IRP) SITE 1,
EXPLOSIVE ORDNANCE DISPOSAL (EOD) RANGE,
MARINE CORPS AIR STATION (MCAS), EL TORO, CALIFORNIA**

The Department of Toxic Substances Control (DTSC) reviewed the above response to comments, Draft Final Work Plan (Work Plan) and Draft Final Health and Safety Plan (HSP), all dated February 2001. The Work Plan describes the objectives and procedures to conduct a Phase II Remedial Investigation (RI) at IRP Site 1. The purpose of the Phase II RI is to further identify and characterize the potential impact to human health and the environment as a result of past operations at Site 1.

After review of the response to comments and the associated Draft Final documents, DTSC has the following comments.

Response to Comments Submitted by Triss Chesney, Dated December 15, 2000

1. Responses for DTSC Comment Numbers 1 through 11, 13 and 14 (submitted by Triss Chesney) were adequately addressed.
2. DTSC Comment Number 12 (submitted by Triss Chesney), Tables 4-3 and 4-4, Requirements for Soil and Groundwater Sample Preservation, Maximum Holding Time, and Containers: Verify holding times with the *Third Edition of Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, SW-846* (SW-846), prepared by the United States Environmental Protection Agency (EPA). If holding times differ, provide an explanation. For example, in Tables 4-3 and 4-4, the maximum holding time for nitrate is identified as 14 days; however, SW-846 specifies a holding time of 48 hours for sample extraction to analysis.

Department of Navy (DON) Response: Has been revised to be consistent with SW-846.

It appears that the holding times for nitrate in both Tables 4-3 and 4-4 have not been revised to reflect SW-846. The holding time from sample extraction to analysis should be 48 hours, rather than 14 days. Please revise the values in the tables.

Draft Final Work Plan

1. Section 2.7, Site Characterization: In general, this section summarizes and provides a general statement regarding the results of previous investigations. It is recommended that analytical results from the previous investigations be

compiled into tables in Appendix B. Appendix B includes some of the data from previous investigations, but is not comprehensive. Since this data is being used as a basis for the Phase II RI, it should be presented clearly.

Additionally, where results of the analytical data is summarized in general statements, the specific values that are being used for comparison should be provided. For example, Section 2.7.4, Subsurface Soil (deeper than 10 feet bgs), Perchlorate Verification Study, states, "All samples were reported with concentrations below the reporting limit for perchlorate." Please provide the reporting limit for perchlorate.

2. Section 2.7.2, Surface Soil (0-1 feet bgs [below ground surface]), Phase I RI: This section states, "None of the analytes exceeded applicable preliminary remediation goals (PRGs)"

For completeness, the results should be included in Appendix B. Please specify the PRGs considered to be "applicable," e.g. residential or industrial.

3. Section 2.7.2, Surface Soil (0-1 feet bgs), Perchlorate Verification Study: This section states, "The summary of the analytical results for these samples is included in Appendix B."

Appendix B does not include the results of perchlorate analysis for surface samples SS-01, SS-02 and SS-03. For completeness, the results should be included in Appendix B.

4. Section 2.7.3, Shallow Soil (1-10 feet bgs), Perchlorate Verification Study: This section states, "A summary of the analytical results in included in Appendix B."

Appendix B does not include the results of perchlorate analysis for the shallow soil samples collected at approximately 1 and 5 feet bgs at each of the 14 locations (HA-01 through HA-14). For completeness, the results should be included in Appendix B.

5. Section 2.7.4, Subsurface Soil (deeper than 10 feet bgs), Phase I RI: This section states, "None of the analytes exceeded applicable PRGs . . ."

Please specify the PRGs considered to be "applicable," e.g. residential or industrial.

6. Section 3.3.3, Decision Inputs: Item number 4 includes California DHS [Department of Health Services] Action Levels (ALs).

1,4-Dioxane is a stabilizer for chlorinated solvents. According to the *OPPT [Office of Pollution Prevention and Toxics] Chemical Fact Sheet for 1,4 Dioxane (CAS No. 123-9-1)* (EPA, February 1995), 1,4-Dioxane does not bind well to soil and should readily leach to groundwater. As a result, transport to groundwater could occur without leaving significant residue in soil. The respective California Drinking Water AL specified by DHS is 0.003 milligrams per liter (mg/L). EPA Methods 8260 and 8270 can be modified to quantify 1,4-dioxane. The reporting limit for 1,4-dioxane should be at or as close to the AL as practicable. Please include 1,4-dioxane in the analysis of groundwater samples and modify the associated sections (e.g. Section 3.3.5 - Decision Rules, Section 3.3.7 - Sampling Design, Section 5.2.2 - Laboratory Analytical Methods and Requirements, Section 5.2.3 - Quality Control Requirements, etc.), accordingly.

7. Section 3.3.5, Decision Rules: Item number 6 states, "Groundwater sample(s) with maximum perchlorate concentration(s) will be analyzed for NDMA."

Please incorporate the decision rule for NDMA into Section 3.3.7, Sampling Design.

8. Section 3.3.7.3, Tier 3: The third paragraph states, "Groundwater samples will be analyzed for . . . and radionuclides."

Please clarify how sampling and analysis for radionuclides in groundwater during Tier 3 will be coordinated with the station-wide evaluation described in Section 2.5.1, Radionuclide Investigation. According to Section 2.5.1, Radionuclide Investigation, "a station-wide radionuclide evaluation, including Site 1, is currently being conducted. This radionuclide evaluation will provide more definitive data on the origin of radioisotopes detected in groundwater at various sites on the station, including Site 1. Conclusions and recommendations of this evaluation pertaining to Site 1 will be incorporated into the RI, as appropriate."

9. Table 5-2, Project Quality Control Criteria for Soil Samples and Table 5-3, Project Quality Control Criteria for Groundwater Samples: Note ^a states, "For VOCs, SVOCs, explosives, dioxins, and perchlorate, the lower of California Modified PRGs and EPA Region IX PRGs (October 1999 Update) has been used . . ."

DTSC Comments on the Response to Comments,
Draft Final Work Plan and Draft Final Health and Safety Plan
Phase II Remedial Investigation
IRP Site 1, EOD Range, MCAS El Toro, California
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Since the residential scenario will be evaluated to ensure flexibility in risk management decisions, the required reporting limit should be compared against the residential PRGs (California Modified and EPA Region IX). Please reflect this in the table and the associated notes.

Additional comments prepared by the Industrial Hygiene and Field Safety Section (IHFSS) and the Geological Services Unit (GSU) are also included. The Human and Ecological Risk Division (HERD) did not have additional comments.



Winston H. Hickox
Agency Secretary
California Environmental
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Department of Toxic Substances Control

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Gray Davis
Governor

MEMORANDUM

TO: Triss Chesney
Office of Military Facilities
Site Mitigation Branch
Cypress, California

FROM: Alan E. Jessen
Associate Industrial Hygienist
Human and Ecological Risk Division (HERD)
Industrial Hygiene and Field Safety Section (IHFSS)

DATE: 1 March 2000

SUBJECT: MCAS EL TORO, PHASE II
CLARIFICATION OF HEALTH AND SAFETY PLAN CONCERNS
Remedial Investigation for Site 1, Explosive Ordinance Disposal Range
PCA code: 14740 Site/WP: 400055/47

BACKGROUND

The original health and safety plan review, dated 28 November 2000, had three concerns noted on it (Attachment 1). The Response to Review Comments, dated February 2001, was faxed to me on 9 February (Attachment 2). Since that time new information was made available concerning possible radioactive material at this site. This letter clarifies my response to changes noted in attachment 2 in light of the new information.

ORIGINAL COMMENTS AND CLARIFICATIONS

COMMENT 1. Monitoring Instrumentation, Section 6.8.1, page 6-5. It was noted in section 5.2.5 that, while not expected, there is a chance of depleted uranium containing products being present. However, no instruments have been selected to detect alpha particles. Nor has any sampling been tested for uranium (Table 3-1, Shallow Metal Concentrations). An alpha detecting instrument should be used on site. The use of this instrument and its detection action levels should be included in tables 6-1 to 6-4 as appropriate.

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Triss Chesney – MCAS El Toro, California
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Clarification

It has since been discovered that depleted uranium is not suspected at this site. The radiological material of concern is from the possible disposal of low level radioisotopes once used at this station, not associated with weapons used by EOD. The following is from the Historical Radiological Assessment (HRA) from May 2000 I received from you.

For Site 1 -

"since the report did not indicate the year that the disposal occurred, radioactive isotopes used on the Station should be included in the survey effort. This would include Ra-226, Sr-90, Co-60 and Th-232. The survey objective is to search for and detect these radioisotopes which may be present within 18 inches of the ground surface. The radionuclides of interest at this site, Ra-226 and Co-60 can be detected using a high density survey up to a depth of approximately 18 inches, with gamma detection equipment. Radionuclides Sr-90 and Th-232 are detected through the Bremsstrahlung effects of beta radiation and will be detected to a lesser depth than Ra-226 and Co-60 (pg. 30)."

The instrumentation identified in the Survey Plan includes the following portable meters:

- Sodium iodide crystal scintillation detectors for gamma detection.
- Pancake-type thin window Geiger-Mueller gas filled chambers (or equivalent) for beta-gamma detection.
- Radiation exposure rate meters (Micro-R) for determining area exposure rate.
- Alpha-beta ZnS(Ag) scintillators for stationary one-minute alpha and one-minute beta readings.

Based on this information, the Health and Safety Plan should not reference depleted uranium but reflect the new information on the radioisotopes mentioned above. Instrumentation taken to the site should also be edited in light of this information.

COMMENT 2. Monitoring Procedures, Section 6.8.2 to Section 6.8.4, page 6-6. These sections only describe when VOCs will be measured. Table 6-1 notes other non-VOC measuring instruments to be brought into the field. Please indicate the frequency or anticipated use of all instruments taken into the field.

Clarification

This comment was in error as the information was found in the original Health and Safety Plan. No changes are necessary in response to this comment.

Triss Chesney – MCAS El Toro, California
Phase II Remedial Investigation for Site 1, Explosive Ordnance Disposal Range
1 March 2000
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COMMENT 3. Personal Protective Equipment, Section 7, page 7-1. When gloves are necessary an inner and outer glove of nitrile rubber is to be used. Nitrile rubber is not effective against benzene, fair for toluene and good for xylene. If the inner or outer glove would be changed to laminated film or supported polyvinyl alcohol gloves then protection would be excellent for these and other substances.

Clarification

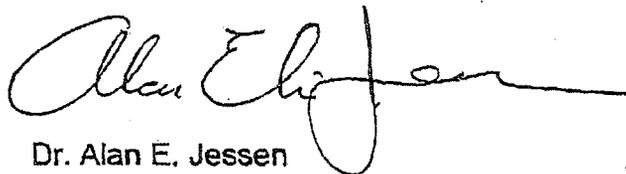
The chemicals noted section 3.1.2. do not indicate that benzene is found at the site. However, fuels and toluene were found in the soil. Section 5.2.1. notes that benzene and toluene are components of fuels. It is inferred that the toluene came from the fuels. Air monitoring of VOC is geared towards benzene due to its low threshold limit.

If the soil noted in section 3.1.2. was tested for benzene then it is assumed that there is no benzene in the soil and monitoring for benzene in the air is precautionary. This being the case the use of two nitrile gloves would be appropriate. However, if benzene is found in the soil in significant amounts (high enough to volatilize and be measured in the air at the site) then the use of nitrile on nitrile double gloves would not be appropriate due to nitrile's high permeability to benzene.

The health and safety plan should reflect this. It should state in section 3.1.2. that benzene was not found in the soil and section 7.0 should consider the possibility that different gloves should be used if previously undetected chemicals (benzene) are detected.

CONCLUSION

Hopefully this clarifies what is expected in the final health and safety plan. If you have any questions, please contact me at ajessen@dtsc.ca.gov or by phone (510) 540-3758.



Dr. Alan E. Jessen
Associate Industrial Hygienist

2 Attachments

1. Concerns Noted 28 November 2000
2. Response to Review Comments, Feb 2001

Triss Chesney – MCAS El Toro, California
Phase II Remedial Investigation for Site 1, Explosive Ordinance Disposal Range
November 28, 2000
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SPECIFIC COMMENTS

1. Monitoring Instrumentation, Section 6.8.1, page 6-5. It was noted in section 5.2.5 that, while not expected, there is a chance of depleted uranium containing products being present. However, no instruments have been selected to detect alpha particles. Nor has any sampling been tested for uranium (Table 3-1, Shallow Metal Concentrations). An alpha detecting instrument should be used on site. The use of this instrument and its detection action levels should be included in tables 6-1 to 6-4 as appropriate.
2. Monitoring Procedures, Section 6.8.2 to Section 6.8.4, page 6-6. These sections only describe when VOCs will be measured. Table 6-1 notes other non-VOC measuring instruments to be brought into the field. Please indicate the frequency or anticipated use of all instruments taken into the field.
3. Personal Protective Equipment, Section 7, page 7-1. When gloves are necessary a inner and outer glove of nitrile rubber is to be used. Nitrile rubber is not effective against benzene, fair for toluene and good for xylene. If the inner or outer glove would be changed to laminated film or supported polyvinyl alcohol gloves then protection would be excellent for these and other substances.

CONCLUSIONS

The submitted documents require additional information and/or clarification of the issues identified above. The areas where the IHFSS has requested additional information and or clarification must be corrected or clarified and resubmitted for further review. Of special concern is the ability to detect depleted uranium without instruments. With this information further comment on personal protection equipment or actions to take when detected can be addressed.

New work tasks or changing site conditions (i.e. previously undocumented contaminates or higher contaminate concentrations.) will require the submittal of a revised Health and Safety Plan (HARP) or additional addendum.

HERD-IHFSS is available to discuss this document and related issues. Should questions arise, please contact Alan Jessen at (510) 540-3758.

Document Title:

(1) Draft Health and Safety Plan, Phase II Remedial Investigation, Installation Restoration Program (IRP) Site 1 Explosive Ordnance Disposal (EOD) Range, Marine Corps Air Station (MCAS), El Toro, California

Reviewers: Afan E. Jessen and Kathleen Yokota, Human and Ecological Risk Division (HERD), Industrial Hygiene and Field Safety Section (IHFS), Department of Toxic Substances Control, Letter dated December 15, 2000.

Comment No.	Section No.	Comment	Response
1.	6.B.1, page 6-5	It was noted in section 5.2.5 that, while not expected, there is a chance of depleted uranium products being present. However, no instruments have been selected to detect alpha particles. Nor has any sampling been tested for uranium (Table 3-1, Shallow Metal Concentrations). An alpha detecting instrument should be used on site. The use of this instrument and its detection action levels should be included in tables 6-1 to 6-4 as appropriate.	Appropriate radiation monitoring procedures have been added as Section 6.9 of the HSP
2.	6.8.2 to 6.8.4, page 6-6	These sections only describe when VOCs will be measured. Table 6-1 notes other non-VOC measuring instruments to be brought into the field. Please indicate the frequency or anticipated use of all instruments taken into the field.	Tables 6-2 through 6-4 and Section 6.8.5, clearly indicate monitoring requirements and action level response procedures for all instruments to be used on site.
3.	7., page 7-1	When gloves are necessary, an inner and outer glove of nitrile rubber is to be used. Nitrile rubber is not effective against benzene, fair for toluene and good for xylene. If the inner or outer glove would be changed to laminated film or supported polyvinyl alcohol gloves, then protection would be excellent for these and other substances.	Noted, however no changes in glove specifications will be made. The glove material performance characteristics noted in the comment are for general material types (i.e., nitrile rubber, PVA, etc.), not specific manufacturers' formulations, and are based on tested performance against pure materials (benzene, etc.) only. Earth Tech has considerable experience in fuel contaminated environments (characterized by low concentrations of contaminants in a soil or water matrix) using the specific gloves indicated in the HSP. We have found their performance to be excellent under these conditions, both from a chemical protection standpoint and in meeting the physical challenges of our work.

TOTAL P.03



Department of Toxic Substances Control



Winston H. Hickox
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California Environmental
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Gray Davis
Governor

MEMORANDUM

TO: Triss Chesney
Hazardous Substances Engineer
Office of Military Facilities

FROM: Ron Okuda *R.O.*
Hazardous Substances Engineering Geologist
Geological Services Unit

DATE: March 14, 2001

SUBJECT: DRAFT FINAL PHASE II REMEDIAL INVESTIGATION, IRP SITE 1,
EXPLOSIVE ORDNANCE DISPOSAL RANGE, MARINE CORPS AIR
STATION, EL TORO, CALIFORNIA

PCA: 14740

Site Code: 400055-47

INTRODUCTION

As requested, the Geological Services Unit (GSU) staff of the Department of Toxic Substances Control (DTSC) reviewed the Response to GSU Comments on the Draft Phase II Remedial Investigation, IRP Site 1, Explosive Ordnance Disposal Range, Marine Corps Air Station, El Toro, California dated September 2000. Also reviewed was the Draft Final Work Plan, Phase II Remedial Investigation IRP Site 1, Explosive Ordnance Disposal Range, Marine Corps Air Station, El Toro, California dated February 2001.

GENERAL COMMENTS

Draft Final Phase II Report

1. Section 4.2.5.1 Well Installation and Construction, Page 4-3
 - A. GSU suggest that a well installation work plan be submitted prior to proceeding to Tier 3. The BCT would then have an opportunity to agree on the number and location of any new groundwater monitoring wells. The Work Plan would propose the new well locations or justification that

an existing well is appropriately located for monitoring the groundwater.

- B. The Report states that the well casing will consist of 4-inch inside diameter flush-threaded, Schedule 40 polyvinyl chloride (PVC) with 0.020-inch slotted screen and 20-40 size quartz sand or equivalent filter pack material.
- i. GSU recommends that this section also discuss the dimensions of the borehole diameter and outer casing diameter. GSU recommends that the borehole diameter be at least four inches larger than the outside diameter of the casing.
 - ii. The selection of the filter pack grain size and the screen slot size should be based on a grain size analysis of the formation. Proper sizing of the filter pack and screen slot size may reduce the turbidity levels in new wells compared to the high turbidity levels recorded in existing wells.
 - iii. The length of the screen interval is not discussed in the Report. GSU recommends that the screen length not exceed 15 feet and the screen be installed across the groundwater table with two to five feet of screened casing above the water table.

Response To Comments

1. Adequate responses were provided for GSU's comments numbers 2.A, 3, 4, 5.B, 6, 9, 10, 11.A, and 11.B. The appropriate text and figures were revised in the Report. GSU still has concerns about the responses to the following comments:
2. GSU Comment Number 1 (Response to Comment Number 1)

The Report states that no ponding or accumulation contributing to surface water flow has occurred during recent times. GSU recommends that the report include the time period in which no ponding of water occurred instead of "recent times." It is GSU's recollection that the retention pond was not visible from the main road or area where EOD activities primarily took place and therefore was not inspected on a regular basis. It possible that the retention pond still is holds water during rainy periods and supports wildlife or a vernal pool community.

Response to GSU Comment:

A hydrological assessment was conducted to evaluate the accumulation of water in the pond during a 100 year storm. The results indicate that ponding can be expected but no overflow will occur that will contribute to runoff from the site.

This pond was designated as a vernal pond during the Environmental Impact Study (EIR); sampling conducted in the pool detected the Riverside Fairy Shrimp, which is listed as a federally endangered species. The work plan has been revised to include evaluation of the surface water pathway.

GSU Response:

This information should be included in Section 2.6.3, Ecology which discusses animal and plant species.

3. GSU's comment number 2.B. (response to Comment Number 3)

In the upper northeast end of Site 1, the groundwater flow, based on water level measurements from wells 01_MW101, 01_MW102, and 01_MW202 is to the west (Figure 2-4). The estimated groundwater flow direction (south-southwest) in the center portion of Site 1 is based on groundwater data from wells installed along the length of Site 1. GSU is concerned that groundwater may flow in a more westerly direction in the center portion of the Site. GSU would like to have groundwater level measurements collected from the northwest boundary of Site 1 to verify the groundwater flow direction. If groundwater flow in the vicinity of well 01_MW201 is actually to the west, perchlorate detected in well 01_MW201 may not intersect well 01_MW205 which is currently believed to be a downgradient well.

Response to GSU Comment:

Water level data from wells located in the Northwest boundary would not add to the current understanding of groundwater flow direction in the center of the site. Based on the current conceptual site model and existing water level data for Site 1, the general groundwater flow direction appears to be to the south-southwest which is consistent with the surface topography. In addition, the RI Work Plan has been revised to include groundwater sampling as part of Tier 1 activities. Results from this sampling event along with soil sampling results from Tier 1 and 2 will be used to optimize placement of additional wells including cross-gradient wells.

GSU Response:

GSU still has reservation regarding the groundwater flow gradient beneath Site 1. Figure 2-3 shows that the sandstone and siltstone bedrock underlying the unconsolidated alluvium is saturated and is not an aquiclude for groundwater flow. Once a conceptual model for fate and transport is developed, a plan to investigate and verify the model should be developed. Although groundwater flow direction generally mimics surface topography, it is not always the case.

GSU recommends that a groundwater monitoring well or temporary well be installed in the southwest portion of Site 1 to confirm the groundwater flow gradient and flow direction.

4. GSU's Comment Number 5.A. (Response to Comment Number 6)

GSU is concerned that a data gap exist in the depiction of groundwater flow direction beneath Site 1. Site 1 is shaped like a trough trending northeast to southwest. Except for wells 01_MW102 and 01_MW207, the groundwater monitoring wells are installed along the longitudinal axis of Site 1 (Figure 2-1). The groundwater flow direction is shown as flowing south-southwest based on the line of wells. GSU believes that groundwater in the central portion of Site 1 may flow to the west and southwest. GSU recommends that a well be installed to the west of wells 01_MW205 or 01_MW206 to verify the groundwater flow direction and determine whether well 01_MW205 is actually downgradient to well 01_MW201. GSU also recommends that groundwater samples be collected in the vicinity of 01_MW201 to determine the extent of groundwater contamination that exceeds the California DHS Action Level for perchlorate.

Response to GSU Comment:

Six additional monitoring wells were installed during the Perchlorate Verification Study to supplement data for defining the extent of perchlorate in groundwater and to determine the magnitude and direction of groundwater gradient. Well locations were based on the conceptual model for groundwater flow at the site. Groundwater flow direction in the shallow aquifer is consistent with site topography and is generally towards the south-southwest. Groundwater samples will be collected as part of Tier 1 activities. The intent is to optimize placement based on soil contamination identified during Tier 1 and Tier 2 sampling.

GSU Response:

See GSU response to comment number 3.

5. GSU's Comment Number 7 (Response to Comment Number 9)

GSU believes that additional investigation is necessary to define extent of groundwater contamination that exceeds the California DHS Action Level for perchlorate. The report states that the perchlorate contamination has been defined based on one groundwater monitoring well (01_MW201). The perchlorate detected in well 01_MW201 could be water collected from the center or fringe of a plume. The size of the plume and mass of perchlorate in the groundwater is unknown. Following the decision logic that is proposed for soil

investigation, further investigation is warranted to define the extent of the "hot spot" groundwater contamination. Additional groundwater investigation would be prudent to make a better estimate of the concentration and extent of perchlorate for risk predictions and remedial planning purposes.

Response to GSU Comment:

Six additional monitoring wells were installed during the Perchlorate Verification Study to supplement data for defining the extent of perchlorate in groundwater. Based on perchlorate analysis data collected from wells located upgradient and downgradient of 01_MW201, and the conceptual model for the site, the detection of perchlorate in groundwater is localized. The RI Work Plan has been revised to include groundwater sampling as part of Tier 1 activities. Results from this sampling event along with soil sampling results from Tier 1 and Tier 2 will be used to optimize placement of additional wells including cross-gradient wells.

GSU Response:

See GSU response to comment number 3.

6. GSU's Comment Number 8 (Response to Comment Number 10)

The soil sampling proposal is a systematic pattern in which soil samples are collected from two depths approximately 1.5 and 5 feet below ground surface from 25 locations per study area. The sample locations will be at the center of 170 by 170 feet grid blocks. Grid blocks that contain a previous soil sampling location will be excluded from this sampling event.

In addition to the systematic sampling pattern GSU strongly recommends that soil samples be collected at the geophysical anomaly locations with samples targeted at the bottom of the former trench excavations. The plotted geophysical anomalies (Figure 2-2) show lineations which may indicate former trenches used for waste disposal. Each lineation may also contain varying amounts of waste and constituents of concern depending on the time period that the material was buried. The previous sampling of anomalies involved the collection soil samples at depths between 1 and 5 feet below ground surface. The report does not indicate whether the samples were collected at the bottom of the former trenches. Samples collected at shallower depths may have been waste, non-contaminated backfill soil, or a mixture. GSU recommends that the depth of the former trenches be determined before the proposed sampling event to help develop the sampling strategy. At each sampling location, one sample should be collected at 0.5 - 1.0 feet below ground surface and a deeper sample collected from the bottom of the former trench. Three (or more) samples per location may be necessary if the former trenches are greater than 5 feet in

depth. The bottom of the trenches can be determined by trenching perpendicular to the lineations or by collecting and logging soil cores.

Response to GSU Comment:

Existing data at these locations will be combined with RI Tier 1 data to determine the presence of any hot spots that may be associated with the observed geophysical anomalies. The bottom of the former trenches that were used for EOD training cannot be established conclusively by geophysical surveys. Therefore, during the Tier 2 activities trenching through the anomalies will be conducted. During this trenching, every attempt to confirm the trench bottoms will be made. If field observations confirm the bottom of the trenches, soil sample will be collected at these depths. Samples to characterize any residuals (resulting from EOD training activities) within each trench/sampling location will also be collected.

GSU Response:

The response did not address GSU's concerns.

GSU recommended that in addition to systematic random sampling strategy, judgmental samples be collected to target the geophysical survey anomalies. Suspected disposal trenches should be sampled to determine if they contain elevated concentrations of hazardous substances.

Tier 1 soil sampling is proposed at 1.5 and 5-foot depths. Our concern is that the 5-foot soil sample may not reach the bottom of the suspected trenches. GSU recommends that the samples depths be selected based on the observation of continuous cores. When a former trench is encountered, samples should be collected at intervals down to the base of the trench. The field geologist can adjust the depth of soil samples based on the visual examination of the soil core.

If you have any questions please contact me at (714) 484-5408.

Reviewed by:


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