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ALAMEDA POINT
SSIC NO. 5090.3

Department of Toxic Substances Control

Linda S. Adams
Secretary for
Environmental Protection

Maureen F. Gorsen, Director
700 Heinz Avenue, Suite 100
Berkeley, California 94710-2721

Arnold Schwarzenegger
Governor

MEMORANDUM

TO: Dot Lofstrom, PG
Senior Engineering Geologist
Office of Military Facilities

FROM: Michelle Dalrymple, PG Stuart W Black for
Engineering Geologist
Geologic Services Unit

REVIEWED BY: Mark Vest, PG, CEG James Rohrer for
Senior Engineering Geologist
Geologic Services Unit

DATE: January 29, 2007

SUBJECT: **REVIEW OF THE DRAFT DATA GAP SAMPLING WORK PLAN FOR OU-1, OU-2A, AND OU-2B, ALAMEDA POINT, ALAMEDA, CALIFORNIA DATED NOVEMBER 3, 2006**

ACTIVITY REQUESTED

Per your request, the Northern California Geological Services Unit (GSU) has reviewed the *Draft Data Gap Sampling Work Plan for OU-1, OU-2A, and OU-2B, Alameda Point, Alameda, California* dated November 3, 2006 (DWP). The DWP was prepared by Tetra Tech EC, Inc. for the U.S. Department of the Navy, Naval Facilities Engineering Command, Southwest Division (Navy). GSU has reviewed geologic and hydrogeologic aspects of the DWP for technical adequacy and data interpretations. Activities performed included reading the document and reviewing the DTSC project file for background information.

PROJECT SUMMARY

The DWP presents the scope of proposed data gap sampling for three Alameda Point Operable Units (OUs): OU-1, OU-2A, and OU-2B. Operable Unit 1 comprises Installation Restoration (IR) Sites 6, 7, 8, 14, 15, and 16. Sites 14 and 15, however, are being addressed separately and are not included in the DWP. OU-2A comprises IR

Sites 9, 13, 19, 22, and 23. OU-2B comprises IR Sites 3, 4, 11, and 21. These sites are being investigation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendment and Reauthorization Act. Remedial Investigation (RI) and Feasibility (FS) reports have been completed for each of the OUs. However, revised FS reports are required for OU-2A and OU-2B following completion of the data gap sampling effort proposed in the DWP. A Record of Decision is currently under review for the four OU-1 IR sites addressed in the DWP. The proposed data gap sampling effort is intended to facilitate preparation of the Remedial Design/Remedial Action Work Plan by collecting supplemental information that will fill the data gaps identified in the RI and FS reports for each OU, as well as collecting the necessary parameters to support remedial design activities.

The scope of work proposed in the DWP has the following objectives:

- Refine characterization and understanding of the nature and extent of soil contamination related to individual solid waste management units (SWMUs) and other areas that were identified as a result of previous investigations.

- Determine aquifer parameters, including groundwater flow direction, within the first water-bearing zone (FWBZ) and the second water-bearing zone (SWBZ).

- Refine characterization and understanding of the lateral and vertical extent of contaminant plumes.

Based on our completed review, the following comments and recommendations are provided for your information and use.

GENERAL COMMENTS AND RECOMMENDATIONS

A. Screening Criteria for Soil. Screening criteria proposed for the step-out and step-down decision rules for soil investigations in this DWP are Environmental Protection Agency Region 9 Residential Soil Preliminary Remediation Goals (PRGs). The data quality objectives (DQOs) for SWMUs state that if the chemical of potential concern (COPC) concentrations in initial soil samples are less than the screening criteria, then the SWMUs are not considered to have leaked contaminants to the environment and no further action is required. However, PRGs are risk-based values intended to address direct human-exposure to impacted soil and should not be used to determine whether a leak has occurred and/or soil contamination has been delineated. In addition, PRGs do not address potential human exposure due to emission of subsurface vapors into building interiors (indoor air). Furthermore, PRGs do not address the potential for leaching of chemicals to groundwater. For example, the PRG for 1,1,1-trichloroethane is 1,200,000 micrograms per kilogram. Concentrations of

this and other COPCs that are well below their respective PRGs may pose a future threat to groundwater if allowed to remain in place. The use of PRGs as screening criteria for the SWMU investigations and for step-out/step-down decision rules is inappropriate.

Recommendation

GSU requests that alternative screening criteria are chosen for the SWMU and soil data gaps such as California Regional Water Quality Control Board Environmental Screening Levels (RWQCB, 2005) for organic chemicals, and Alameda Point background values for metals to determine the need for further action and/or additional characterization.

B. Decision Rules for Groundwater at SWMUs. The sampling methodologies and DQOs for SWMUs described in Section 4 and presented on Table 3-1, respectively, discuss the methodology and decision rules for soil sampling. Decision rules for groundwater sampling are not described in the text or table and should be provided. In addition, in Step 4 of the DQOs on Table 3-1 it is stated that step-down sampling based on groundwater analytical results will not be performed. Without step-down groundwater sampling, characterization of contamination associated with SWMUs at the completion of this phase of work may be incomplete, and additional data may be required.

Recommendation

GSU requests that decision rules are provided for groundwater samples with contamination exceeding screening criteria at SWMU locations. GSU further requests that step-out and step-down sampling is proposed at SWMUs based on groundwater analytical results in an attempt to ensure complete characterization at the end of this phase of work.

C. Need for Additional Investigation. It is stated in Section 5 that further investigation of the groundwater contaminant plumes is necessary to ensure proper design of remedial activities. Additional data are being collected to:

- Complete the characterization of the various COPC plumes;
- Evaluate the fate and transport of individual COPCs;
- Monitor the migration of the plume during remedial activities;
- Optimize remedial design; and
- Evaluate natural attenuation.

It is also stated in Section 5 that, following completion of this scope of work, it is anticipated that no additional field activities will be required to complete the FS or

to support the remedial design. However, a FS has not been completed for OU-2A and OU-2B. It is unknown what the preferred remedy will be at these sites. Additional data and/or pilot testing may be needed subsequent to the selection of a preferred alternative to optimize the remedial design.

Recommendation

Please clarify that, while the proposed investigation is intended to be comprehensive, additional data may be needed at some of the sites following selection of the preferred remedy.

D. Basis for Proposed Groundwater Investigation. It is not possible for GSU to agree with the groundwater investigation approach presented in the DWP because rationales for the design of the proposed groundwater sampling network and other proposed groundwater activities have not been provided. Without this information, it is not possible to determine whether the sampling network and other activities are appropriate to meet the stated objectives.

Recommendation

The rationale for each activity proposed to address groundwater investigation data gaps should be provided for each site. The rationale for direct-push technology (DPT) and monitoring well locations should specify why each proposed location is deemed necessary (i.e., upgradient control, downgradient control, plume axis, vertical extent, etc.). This information could be provided on a table (such as Table A.5-2 in Appendix A) but should be supported with site-specific data. In addition to chemical data, site-specific groundwater flow directions and the depth and thickness of the Bay Sediment Unit (BSU) are two factors that affect the proposed groundwater sampling approach. This information should be provided and discussed for each site. Geologic cross-sections and piezometric surface maps should be provided as support for this information (see Specific Comments 3 and 4).

E. Plume Contours. Because the specific rationale for the proposed groundwater sampling locations is not provided, the basis for many of the DPT and monitoring well locations is unclear. Based on a review of maps presented in Section 5 of the DWP, it appears that the proposed groundwater sampling locations are often based on confirming the limits of the composite volatile organic compound (VOC) plumes shown on the various figures. However, insufficient detail has been provided on the figures to determine what these figures actually represent. If the composite VOC plume contours are controlling the proposed sampling locations as it appears, then it is important to verify the accuracy of this information.

Recommendation

The source of the data upon which the plume interpretations are based should be indicated on the maps. Please include the source and date of the information, a list of the individual VOCs that were composited to define the extent, and the concentration that is represented by the dashed contour on each figure. The historical data points that were used to create the interpreted plumes should be identified, and the plumes should be queried where uncertain or unknown. Please update this information with recent data from the Basewide Groundwater Monitoring Program (BGMP), if applicable (see Specific Comment 10).

F. Conceptual Site Models (CSMs). The DWP presents CSMs for sites that have known groundwater contamination and require further investigation. However, the CSMs oversimplify the actual site conditions and do not accurately reflect what is known about the lithology and contaminant distribution. GSU questions the usefulness of these oversimplified depictions of site conditions.

Recommendation

The CSMs should be revised to more accurately reflect site-specific lithologic data and contaminant distribution, and should be updated as additional data become available.

SPECIFIC COMMENTS AND RECOMMENDATIONS

1. Section 1.0 – Introduction. The DWP states that the purpose of the data gap sampling is to facilitate preparation of the remedial design and remedial action work plan, but a FS has not been completed or finalized for OU-2A and OU-2B sites. It is unknown what the preferred remedy will be at these sites. Additional data and/or pilot testing may be needed subsequent to the selection of a preferred alternative to optimize the remedial design. Please clarify the current status of each site and the path forward following finalization of the Data Summary Report. Please clarify that, depending on the selected remedy, additional data may be needed (see General Comment C).

2. Section 1.2 – Work Plan Objectives. Please check the completeness of information on Table 1-4, and correct this information as necessary. It appears that some text has been cut-off due to a formatting error.

3. Section 2.4 – Geology. This section refers to geologic cross-sections in Appendix B. Please check the quality of the cross-sections provided. Some cross-sections are missing relevant information due to a possible printing error. Also, it is unclear why these cross-sections have been included since they are

not specifically discussed in the DWP. The site-specific cross-sections should be referenced and discussed as support for the proposed groundwater sampling approach (see General Comment D) and the CSM (see General Comment F).

4. Section 2.6 – Site-Specific Hydrogeology.

   a. The subsections for each site should be amended to include a description of the hydrogeologic units that are present including information regarding the presence or absence of the BSU, the approximate thickness of the BSU, the depth to the Merritt Sand, and other relevant information. This information is needed to support the proposed groundwater sampling approach at each of the sites (see General Comment D).

   b. GSU understands that there is a high degree of local variability in groundwater flow directions at each of the subject sites. However, for the purpose of evaluating the groundwater sampling approach and monitoring well locations proposed in the DWP, flow direction maps are needed (see General Comment D). A series of maps should be provided because groundwater flow directions typically vary over time. Please include and discuss such maps in the draft final Work Plan.

5. Section 4.1.2 – AST/UST Sampling Methodology. There is a large amount of information in this section and on Table 3-1 describing the sampling approach and decision rules that will be used for the various sizes of underground storage tanks (USTs) and aboveground storage tanks (ASTs) to be investigated as part of this DWP. However, according to information contained on Table 1-2 of the DWP, there are only five AST/UST SWMUs requiring further investigation under the CERCLA program. With the exception of one SWMU (AOC 009) that is reportedly includes five ASTs of unknown size, the remaining four AST/UST SWMUs are relatively small (600 to 3,000 gallons). It is unclear why decision rules discuss the sampling approach for ASTs/USTs of 5,000 to greater than 20,000 gallon capacities.

   Also, according to Table 1-3c, one of the five SWMUs (AST 360E) is proposed to be included with AST 360A sampling under the total petroleum hydrocarbon (TPH) program. However, Table 1-5 provides sampling locations, depths, and analyses for this SWMU. Sampling and analytical schedules for other ASTs and USTs being addressed under the TPH program are not provided on Table 1-5. For clarity, please list the ASTs and USTs that are proposed for investigation as part of the scope of this DWP, and describe what is known about their contents and respective sizes. Please simplify and tailor the proposed approach to the five AST/USTs SWMUs that are addressed in this data gap effort. The DWP should specifically address whether or not the ASTs and USTs in the TPH program are being investigated as part of this data gap sampling effort.

6. Section 4.3.1 – Gap Sampling Methodology. There are only four Generator Accumulation Points (GAPs) to be investigated as part of this data gap sampling effort. The approximate size of each should be known from maps, site walks, and/or SWMU profile reports. The specific approach for each GAP should be provided to simplify the information contained in this section.

7. Section 5.0 – Soil and Groundwater Plume Delineation Sampling and Rationale.

   a. The groundwater step-out and step-down sample criteria of 2 and 20 times the screening criteria, respectively, seem arbitrary and require further elaboration. At most of the sites, the lateral continuity and competency of the BSU aquitard has not been demonstrated. It is possible that vertical migration through or within the BSU has occurred or is occurring. At other sites, the BSU is absent and the FWBZ is in direct hydraulic communication with the SWBZ. Also, the method for the collection of grab groundwater samples, as described in Appendix A, Section 6.3.3, may result in low-biased VOC concentrations due to potential volatile losses and disequilibrium with the surrounding formation. Therefore, the 2 and 20 times criteria should not be applied to these samples. The horizontal and vertical extent should be delineated to the respective Maximum Contaminant Level (MCL) of contaminant of concerns directly beneath and downgradient from known source areas.

   b. It is stated that step-down samples will be collected from the SWBZ if any COPC is detected in a groundwater sample collected at the base of the FWBZ at a concentration of 20 times its screening criterion. However, based on experience at other Alameda Point sites (OU-2B and IR Site 5), permeable portions of the BSU that occur between the FWBZ and SWBZ have been found to contain significant levels of contamination. Often, the SWBZ in these areas shows little or no impact. Therefore, step-down samples should also be collected from permeable intervals within the BSU, if encountered, to evaluate the vertical extent of contamination between the FWBZ and SWBZ. Based on the results of the step-down sampling, monitoring wells may be required in the permeable portions of the BSU between the FWBZ and SWBZ, rather than in the SWBZ.

8. Section 5.1.1.2 – Site 6 Groundwater Investigation (Data Gap 1).

   a. The rationale for the proposed number, depths, and locations of groundwater sampling (DPT points and monitoring wells) must be provided. It is not possible for GSU to evaluate the proposed sampling approach for the groundwater investigation without this information (see General Comment D).

b. CPT data from previous investigations at IR Site 6 indicate that there may be a sandy interval within the BSU at depths between 20 and 35 feet below ground surface (bgs). Contamination may be present in this interval. GSU requests that step-down samples are collected from permeable intervals within the BSU, if encountered, to evaluate the vertical extent of contamination between the FWBZ and SWBZ (see Specific Comment 7).

9. Section 5.1.2.3 – Site 7 Groundwater Investigation (Data Gap 5). The information in Table 1-4 is inconsistent with the information provided in this section. Table 1-4 states that the groundwater data gap for IR Site 7 was identified based on polynuclear aromatic hydrocarbons (PAHs) and possible polychlorinated biphenyls (PCBs) in groundwater. According to Table 1-4, the proposed field activity is to sample all existing monitoring wells for PCBs. It is stated that per the Proposed Plan, the PAH issue will be evaluated under the TPH program. However, in Section 5.1.2.3 of the DWP, additional DPT sampling of soil and groundwater is proposed at three locations at IR Site 7. Since the groundwater contamination at this site has been transferred to the TPH Program (with the possible exception of PCBs), GSU questions the need for the additional soil and groundwater investigation proposed under the CERCLA Program. Please clarify the purpose and basis for the groundwater investigation proposed for IR Site 7 in the DWP (see General Comment D).

10. Section 5.1.3.2 – Site 8 Groundwater Investigation (Data Gap 7). GSU questions the interpreted extent of VOCs depicted on Figure 5-9. Benzene has historically been reported at concentrations above the MCL at well M08-03, and recently (Spring 2006) benzene was detected in groundwater from well M08-01 at a concentration of 16 micrograms per liter (µg/L) (ITSI, 2006). The MCL for benzene is 1 µg/L. Based on the known extent of benzene above the MCL at IR Site 8, it is unclear how the proposed DPT sampling will fully define the extent of benzene in groundwater at IR Site 8. Please provide the rationale for the proposed sampling locations (see General Comments D and E).

11. Section 5.1.3.3 – Site 8 Transformers (Data Gap 6). There is a discrepancy between Table 1-4 and this section regarding the location of the transformers addressed by this data gap. Table 1-4 indicates that the transformers in question are located at IR Site 7, not at IR Site 8. Please resolve this discrepancy.

12. Section 5.1.4.3 – Site 16 Groundwater Investigation (Data Gap 9).

a. The rationale for the proposed number, depths, and locations of groundwater sampling (DPT points and monitoring wells) must be provided. It is not possible for GSU to evaluate the proposed sampling approach for the groundwater investigation without this information (see General Comment D).

b. According to the presentation at the February 21, 2006 BCT meeting, one of the conclusions of the Full-Scale In-Situ Chemical Oxidation Removal Action at IR Site16 South was that soil in the vicinity of the former UST 608 may still have an unknown volume of sorbed mass contributing to the elevated levels of VOCs found in groundwater. Furthermore, it was concluded that the extent of residual soil contamination needs to be determined and removed prior to conducting additional remediation of this area. GSU questions why this data gap is not included in the scope of work proposed as part of this DWP. Please clarify whether this data gap is being addressed under a different scope of work and/or include sampling and analysis required to complete this effort in the draft final Work Plan. Groundwater samples should be collected from the SWBZ in this area to confirm the vertical extent of contamination.

13. Section 5.2.1 – Site 9 Data Gap Investigation. This section states that there are 12 data gaps including 4 SWMUs located within IR Site 9. However, two of the SWMUs listed (OWS-547 and AOC 009) are not located at IR Site 9. Please correct the information provided in this section regarding the number of SWMUs and data gaps at IR Site 9.

14. Section 5.2.1.3 – Site 9 Metals in Soil Investigation (Data Gap 18). The comments with respect to metals in soil (comments on Data Gaps 12 and 18 on Table 1-4) discuss chromium, arsenic, aluminum, and lead elevated above background, not above screening levels. The scope of investigation for Data Gap 18 should be expanded to include metals in soil that are elevated above background such as chromium and lead, in addition to arsenic.

15. Section 5.2.1.4 – Site 9 Groundwater Investigation (Data Gaps 11, 12, 13,14, and 17).

a. The CSMs for IR Site 9 (Figures 5-13 and 5-16) illustrate the BSU as a silty clay, but the cross-sections in Appendix B show that the BSU is comprised of silty sands, clayey sands, and sandy clays beneath IR Site 9. The composition of the BSU has implications to the CSM because the more permeable lithologies can allow contaminant transport to deeper water-bearing zones. Also, the contaminant plumes shown on the CSMs do not accurately reflect the dissolved contaminant distribution at IR Site 9, particularly in the downgradient direction. GSU requests that a single CSM is presented for IR Site 9 that more accurately depicts lithology and contaminant distribution (see General Comment F).

b. The rationale for the proposed number, depths, and locations of groundwater sampling (DPT points and monitoring wells) must be provided. It is not possible for GSU to evaluate the proposed sampling approach for the groundwater investigation without this information (see General Comment D).

c. Please provide a figure showing the plume contours to illustrate the horizontal distribution of VOCs in the SWBZ. Please clarify whether the vertical extent of groundwater contamination beneath the site has been defined or will be defined by this investigation.

16. Section 5.2.2 – Site 13 Data Gap Investigation. Please clarify that AOC 009 is a fourth data gap located within IR Site 13.

17. Section 5.2.2.3 – Site 13 Groundwater Investigation (Data Gap 21).

a. The CSM for IR Site 13 (Figure 5-19) illustrates the BSU as a silty clay, but the cross-section in Appendix B indicates that the BSU beneath IR Site 13, where present, is predominantly silty sand. Also, the CSM illustrates a plume that extends across the width of the site, but Figure 5-20 shows two plumes that are disconnected. The CSM should be revised to present a more accurate depiction of lithology and contaminant distribution (see General Comment F).

b. The rationale for the proposed number, depths, and locations of groundwater sampling (DPT points and monitoring well) must be provided. It is not possible for GSU to evaluate the proposed sampling approach for the groundwater investigation without this information (see General Comment D).

18. Section 5.2.3.2 – Site 19 Groundwater Investigation (Data Gap 22).

a. The CSM for IR Site 19 (Figure 5-21) illustrates the BSU as a silty clay, but the cross-section in Appendix B indicates that the BSU beneath IR Site 19, where present, is predominantly silty sand, clayey sand, and sandy silt. The CSM should be revised to present a more accurate depiction of lithology (see General Comment F).

b. The rationale for the proposed number, depths, and locations of groundwater sampling (DPT points and monitoring wells) must be provided. It is not possible for GSU to evaluate the proposed sampling approach for the groundwater investigation without this information (see General Comment D).

19. Section 5.2.4 – Site 22 Data Gap Investigation. Please clarify that OWS-547 is a third data gap located within IR Site 22.

20. Section 5.2.4.2 – Site 22 Groundwater Investigation (Data Gap 26).

a. The CSM for IR Site 22 (Figure 5-24) illustrates the BSU as a silty clay, but the cross-section in Appendix B indicates that the BSU beneath IR Site 22, where present, is predominantly silty sand and clayey sand. The CSM should

be revised to present a more accurate depiction of lithology (see General Comment F).

b. The rationale for the proposed number, depths, and locations of groundwater sampling (DPT points and monitoring wells) must be provided. It is not possible for GSU to evaluate the proposed sampling approach for the groundwater investigation without this information (see General Comment D).

21. Section 5.2.5.2 – Site 23 Groundwater Investigation (Supplemental Data Gap).

a. The CSM for IR Site 23 (Figure 5-26) illustrates the BSU as a silty clay, but the cross-section in Appendix B indicates that the BSU beneath IR Site 23, where present, is predominantly silty sand and clayey sand. The CSM should be revised to present a more accurate depiction of lithology (see General Comment F).

b. The rationale for the proposed number, depths, and locations of groundwater sampling (DPT points) must be provided. It is not possible for GSU to evaluate the proposed sampling approach for the groundwater investigation without this information (see General Comment D).

22. Section 5.3 – OU-2B Data Gap Investigation. Please clarify in this section that the groundwater data gaps identified at each OU-2B site will be addressed using a site-wide approach.

23. Section 5.3.1 – Site 3 Data Gap Investigation. Table 1-4 identifies Former Building 109 as a data gap at IR Site 3 (Data Gap 27). However, this data gap does not appear to be addressed in the DWP. Please add the proposed sampling approach and rationale for Data Gap 27 to the draft final Work Plan.

24. Section 5.3.2.3 – Site 4 Building 360 Soil Investigation (Data Gaps 31 and 33).

a. Please provide a reference for the 1998 follow-on investigation described in the fourth paragraph on page 5-34.

b. Please describe the approach that will be used to evaluate metals contamination in soil identified in sample B04-41 on the north side of Building 360 (Data Gap 31).

c. The rationale for the proposed number, depths, and locations of soil and groundwater sampling must be provided. It is not possible for GSU to evaluate the proposed sampling approach for the soil and groundwater investigation without this information (see General Comment D).

25. Section 5.3.3 – Site 11 Data Gap Investigation. Table 1-4 identifies the source of trichloroethene in well MW03-15 as Data Gap 37 at Site 11. However, this data gap does not appear to be addressed in the DWP. Please add the proposed sampling approach and rationale for the investigation of Data Gap 37 to the draft final Work Plan.

26. Section 5.3.5 – OU-2B Site-Wide Groundwater (Data Gaps 29, 43, 44, and 45).

    a. This section does not discuss the proposed scope of work to investigate elevated levels of dissolved lead found in groundwater on the northern portion of IR Site 3 near Building 517 (Data Gap 29). This groundwater contamination is not commingled with the VOC plumes shown on Figure 5-39. A separate scope of work to investigate the dissolved lead at IR Site 3 should be included in the draft final Work Plan.

    b. The CSM for OU-2B (Figure 5-38) illustrates the BSU as a silty clay. This interpretation is oversimplified and is inconsistent with lithologic information shown on the cross-sections in Appendix B. Also, there are two relatively large dense non-aqueous phase liquid (DNAPL) source zones at OU-2B that are not shown on the CSM. Finally, the depth of contamination illustrated on the CSM for OU-2B is inaccurate. Contamination extends well below the base of the BSU. GSU requests that the CSM is revised to present a more accurate depiction of lithology and contaminant distribution (see General Comment F).

    c. It should be noted that there are discrepancies in the nomenclature used for hydrogeologic units between the DWP and the RI (SulTech, 2005) and BGMP (ITSI, 2006). The DWP refers to the interval from 20 to 40 feet bgs as the SWBZ (Figure 5-40), while the RI and BGMP refer to this same interval as the FWBZ. The DWP reverts back to the RI/BGMP nomenclature in Table 5-1 for wells screened in this interval (see wells M03-10, M03-12, M03-13, and M03-15). Incidentally, well M03-16, which is a key downgradient monitoring well in this interval, and wells M03-11 and M03-14, which are upgradient and cross-gradient control wells, respectively, are not included on Table 5-1. These wells and other key wells that may be missing from Table 5-1 should be added. The nomenclature for the hydrogeologic intervals at OU-2B should be re-evaluated in the Data Summary Report.

    d. A considerable number of new FWBZ and SWBZ monitoring wells are proposed for this investigation. However, GSU cannot concur with this approach because the basis for the proposed locations and depths is not provided. For example, GSU questions the need for the 19 proposed FWBZ monitoring wells. The current monitoring network is comprised mostly of FWBZ wells that, except in immediate VOC source areas, are relatively

unimpacted (ITSI, 2006). The data from the RI and other comprehensive studies performed at OU-2B (Tetra Tech EM Inc. and Einarson, Fowler, and Watson, 1998) indicate that the majority of the chlorinated VOC contamination is migrating through deeper intervals (between 20 and 40 feet bgs). However, there are very few monitoring wells screened in this interval. The three downgradient monitoring wells that are screened in this interval (M03-10, M03-15, and M03-16) exhibit some of the highest levels of VOCs found in monitoring wells at OU-2B (ITSI, 2006). This deeper interval and the vertical extent of VOC contamination should be the focus of the proposed investigation. FWBZ monitoring wells may be needed, however, to delineate the extent of benzene and lead at IR Site 3.

e. Based on current research regarding the character of dissolved plumes emanating from DNAPL source zones, it is likely that the majority of dissolved contaminant mass in the groundwater at OU-2B occurs in relatively narrow, linear, high-strength plume centers. Judgmental placement of broadly-spaced monitoring wells is not an effective way to characterize such plumes. Recent studies have shown the success of high-resolution monitoring techniques, such as multi-level monitoring transects, to enhance the understanding of contaminant distribution and mass-flux from source areas. This has been shown to be an important tool for evaluating the success of source removal and determining the possible success of monitored natural attenuation (Guilbeault et al., 2005).

   GSU requests that the Navy consider using multi-level monitoring transect(s) perpendicular to the plume axis immediately downgradient from the DNAPL source zones to identify high-strength plume cores and estimate mass-flux as part of the remedial design. Regardless of the selected approach, the rationale for the proposed number, depths, and locations of groundwater monitoring wells must be provided. It is not possible for GSU to evaluate the proposed sampling approach for the groundwater investigation without this information (see General Comment D). The rationale for the sampling network at OU-2B should be amended to be consistent with Strategies for Monitoring the Performance of DNAPL Source Zone Remedies (Interstate Technology and Regulatory Council, 2004).

27. Section 7.13 – Quarterly Groundwater Monitoring Well Sampling. Please clarify in this section and in the appropriate sections of the SAP, the plan for newly constructed groundwater monitoring wells following the four quarters of sampling. Does the Navy plan to incorporate these wells into the BGMP?

If you have any questions or need additional information regarding this matter, please contact me at (510)540-3926 or at mdalrymp@dtsc.ca.gov.

REFERENCES

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Department of Toxic Substances Control

Linda S. Adams
Secretary for
Environmental Protection

Maureen F. Gorsen, Director
1011 North Grandview Avenue
Glendale, California 91201

Arnold Schwarzenegger
Governor

MEMORANDUM

TO: Dot Lofstrom, Senior Engineering Geologist
Susan Goss, Engineering Geologist
OMF Sacramento Office
8800 Cal Center Drive
Sacramento, CA 95826

FROM: James M. Polisini, Ph.D.
Staff Toxicologist, HERD
1011 North Grandview Avenue
Glendale, CA 91201

DATE: January 17, 2007

SUBJECT: DRAFT WORK PLAN FOR DATA GAP SAMLING WORK PLAN FOR OPERABLE UNIT 1, 2A, AND 2B, ALAMEDA POINT, ALAMEDA, CALIFORNIA
[SITE 201209-18 PCA 18040 H:50]

BACKGROUND

HERD reviewed the document titled *Draft Data Gap Sampling Work Plan for OU-1, OU-2A, and OU-2B Data Gap Sampling Alameda Point, Alameda, California, dated November 3, 2006.* This document was prepared by Tetra Tech EC, Inc. of San Diego, California and delivered by courier to the HERD offices on November 3, 2006. Review of the associated Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) was forwarded in a HERD memorandum dated January 8, 2007.

The objective of this Work Plan is to facilitate preparation of the Remedial Design/Remedial Action (RD/RA) Work Plan by collecting supplemental information that will fill the data gaps identified in the Remedial Investigation (RI) and Feasibility Study (FS) reports for Operable Unit 1 (OU-1), OU-2A and OU-2B as well as collecting the necessary parameters to support design activities. The information collected during this data gaps effort will facilitate:

1. Refining the nature and extent of soil contamination related to individual Solid Waste Management Units (SWMUs) and other areas that were identified as a result of previous investigations.

2. Determining aquifer parameters, including groundwater flow direction, within the First Water Bearing Zone (FWBZ) and the Second Water Bearing Zone (SWBZ).
3. Refining the lateral and vertical extent of groundwater contamination plumes.

This work plan outlines sampling at numerous Solid Waste Management Units (SWMUs), Underground Storage Tanks (USTs) and Aboveground Storage Tanks (ASTs), Oil Water Separators (OWS), Generator Accumulation Points (GAPs), Wash Down Areas (WDs)

In 1930, the U.S. Army acquired the original base property from the City of Alameda and began construction activities in 1930. In 1936, the Navy acquired title to the land from the Army and began building an air station. Construction of the Base included filling tidelands, marshlands, and sloughs with dredge materials from the San Francisco Bay. NASA was an active naval facility from 1940 to 1997. Base operations included aircraft, engine, gun and avionics maintenance; engine overhaul and repair; fueling activities; and metal plating, stripping and painting activities. Naval Air Station Alameda (NASA) was designated for closure under the Base Realignment and Closure Act (BRAC) in 1993.

GENERAL COMMENTS

Significant portions of the sampling methodology and groundwater plume characterization require the review and concurrence of the DTSC Geological Services Unit (GSU) or a DTSC hydrogeologist. The comments contained in this memorandum address only the risk assessment implications of the outlined work plan. However, use of a two times (2x) the health-based screening criteria for identification of the boundary of a groundwater plume is contrary to standard procedure to characterize a groundwater plume to detection limits and has the potential to underestimate the risk and/or hazard associated with any exposure to groundwater. Groundwater plume characterization should be performed to detection limits.

All the proposed groundwater screening criteria are based on human health values. OU-1, OU-2B and OU-2A groundwater flow is described as towards the Oakland Inner Harbor, the Seaplane Lagoon or San Francisco Bay. Second Water Bearing Zone groundwater is described as discharging to the surface water of San Francisco Bay. Therefore, ecologically-based screening criteria must also be considered when evaluating the potential impact of the groundwater plumes under investigation.

Multiple organic compound categories are specified when describing the sampling strategy for the OU-1, OU-2A and OU-2B facilities and locations. Naphthalene, when considered for carcinogenic effects, has a significant impact on the total incremental cancer risk via the indoor air inhalation pathway at NASA due to shallow groundwater. Naphthalene must be measured in all media samples where Semivolatile Organic

Compounds (SVOCs) or Volatile Organic Compounds (VOCs) are measured. In addition, HERD recommends that naphthalene be specifically listed in the work plan as a reportable analyte for all investigations except where inorganic elements are the sole Contaminants of Potential Concern (COPC).

As this is a data gaps work plan, some justification must be provided where biased sampling is proposed. For example, a simple statement that four samples will be collected to the east, west, north and south of a point of interest or only at the inflow point for a tank, but not at the outflow point, are not sufficient to evaluate the proposed level of sampling.

HERD defers to the DTSC GSU, or a DTSC hydrogeologist, regarding the 1 year limit on sampling of existing (e.g., Site 7 – Groundwater Investigation, Section 5.1.2.3, page 5-7) or new groundwater wells (e.g., Site 16 – Groundwater Investigation, Section 5.1.4.3, page 5-13).

SPECIFIC COMMENTS

1. Sites 14 and 15, although included in the list of OU-1 sites (Section 2.2.1, page 2-2), are not included as part of the scope of work outlined. Some rationale, in addition to stating that they are addressed separately, must be provided for dropping OU-1 Sites 14 and 15 from the data gaps work plan.

2. Transformers at Site 6 were sampled for Polychlorinated Biphenyls (PCBs) and those above the 'action level' were removed (Section 2.2.1.1, page 2-4). The adequacy of this action cannot be evaluated without statement of the 'action level' for transformer PCBs. Please include the transformer PCB 'action level' in the text.

3. Chemicals of Concern (COCs) in Site 7 soil include arsenic, cadmium and lead from the soil debris area (Section 2.2.1.2, page 2-5) near the footprint of a former incinerator, Building 459. Site-wide groundwater impacts associated with the area of Building 459 are indicated only for organic compounds. As arsenic, cadmium and lead are indicated as soil COCs inorganic element impacts on groundwater must be evaluated. Please amend the text to agree with the detailed presentation (Attachment A, Table A.5-1, page 2 of 8), referenced in the Data Quality Objectives (DQO) table (Table 3-1), which indicates Title 22 metals will be analyzed in unsaturated soil, saturated soil and groundwater at Site 7.

4. The Site 8 description (Section 2.2.1.3, page 2-6) lists arsenic and Trichloroethylene (TCE) as potential groundwater contaminants. The description of the contamination requiring further investigation for Site 8 groundwater only lists Volatile Organic Compounds (Section 2.2.1.3, page 2-7, third bulleted item).

Please amend the text to agree with the detailed presentation (Attachment A, Table A.5-1, page 2 of 8), referenced in the Data Quality Objectives (DQO) table (Table 3-1), which indicates Title 22 metals will be analyzed in unsaturated soil, saturated soil and groundwater at Site 8.

5. Transformers at Site 8 were sampled for Polychlorinated Biphenyls (PCBs) and those above the 'action level' were removed (Section 2.2.1.3, page 2-7). The adequacy of this action cannot be evaluated without statement of the 'action level' for transformer PCBs. Please include the transformer PCB 'action level' in the text. Please indicate whether the transformers which remained, and were relinquished to Alameda Power and Telecom, contained measurable concentrations of PCBs.

6. Site 16 past characterization identified cadmium and copper in surface soils adjacent to UST 608-1 (Section 2.2.1.4, page 2-7). Lead paint and metals in batteries were also reportedly stored at Site 16. Scrap Yard D-7, used for aircraft demolition and part storage, was identified as not a likely source (Section 2.2.1.4, page 2-8) area in previous investigations. Despite the identification of inorganic elements in surface soils, only VOCs and PCBs are identified as potential contaminants in the list supplied for further investigation (Section 2.2.1.4, page 2-8 and 2-9). Please amend the text to agree with the detailed presentation (Attachment A, Table A.5-1, page 3 of 8), referenced in the Data Quality Objectives (DQO) table (Table 3-1), which indicates Title 22 metals will be analyzed in unsaturated soil, saturated soil and groundwater at two Site 16 locations.

7. Past characterization of Site 9 identified chromium and 'residual metals contamination' in additional to VOCs and other organic compounds (Section 2.2.2.1, page 2-9), but not at levels to qualify as soil COPCs. Inorganic elements (i.e., 'metals') are included with VOCs and Semivolatile Organic Compounds (SVOCs) in the list of COPCs for site-wide groundwater. The list of groundwater COPCs (Attachment A, Table A.5-1, page 3 of 8 and Table A.5-2, page 7 of 21) is acceptable given that Title 22 metals are specified where 'metals' are an analytical group. This comment is meant for the DTSC Project Manager and no response is required from the Navy or the Navy contractor.

8. Previous Site 13 investigations identified various assorted organic compounds, such as benzene, toluene, ethylbenzene and xylene (BTEX) and Polycyclic Aromatic Hydrocarbons (PAHs), and inorganic elements including lead and manganese (Section 2.2.2.2, page 2-11). Both organic compounds and 'metals' are identified as COPCs for further evaluation in soil and/or groundwater. The list of groundwater COPCs (Attachment A, Table A.5-2, page 9 of 21) is acceptable given that Title 22 metals are specified where 'metals' are an analytical group.

This comment is meant for the DTSC Project Manager and no response is required from the Navy or the Navy contractor.

9. Site 19 was previously the site of a hazardous waste storage yard designated as Building 134A and associated Yard D-13. This facility was formally closed by DTSC in 1999 (Section 2.2.2.3, page 2-12). HERD defers to the DTSC Project Manger regarding the proposed limitation of soil and groundwater analysis to VOCs in the southern portion of Site 19 (Section 2.2.2.3, page 2-13). This comment is meant for the DTSC Project Manager and no response is required from the Navy or the Navy contractor.

10. Previous investigations at Site 22, previously the site of a gasoline service station, identified fuel related organic compounds, VOCs, SVOCs, thallium in groundwater and lead and arsenic in soil (Section 2.2.2.4, page 2-24). The list of groundwater COPCs (Attachment A, Table A.5-2, page 11 of 21) is acceptable given that Title 22 metals are specified where 'metals' are an analytical group. This comment is meant for the DTSC Project Manager and no response is required from the Navy or the Navy contractor.

11. Evaluation of Site 23, the former missile rework operations Building 530, is being pursued under the Total Petroleum Hydrocarbon (TPH) Program (Section 2.2.2.5, page 2-15). No list of analytes for investigation of the site-wide groundwater is presented in the text, however, the list of groundwater COPCs (Attachment A, Table A.5-2, page 12 of 21) is acceptable given that Title 22 metals are specified where 'metals' are an analytical group. This comment is meant for the DTSC Project Manager and no response is required from the Navy or the Navy contractor.

12. Site 3, previously the location of four aviation gasoline ASTs, is being pursued under the TPH Program (Section 2.2.3.1, page 2-17). Previous investigations identified lead in soil and groundwater as a COPC but only petroleum products are identified as targets for further site-wide groundwater investigations (Section 2.2.3.1, page 2-18) however, the list of groundwater COPCs (Attachment A, Table A.5-2, page 13 of 21 and page 15 of 21) is acceptable given that Title 22 metals are specified where 'metals' are an analytical group. This comment is meant for the DTSC Project Manager and no response is required from the Navy or the Navy contractor.

13. The description of Site 4, the location of Building 360 the Aircraft Engine Facility, outlines the recent discovery of concrete vats inside the Building 360 Plating shop which contained liquids with hazardous levels of total chromium, hexavalent chromium, cadmium and cyanide (Section 2.2.3.2, page 2-21). Additional soil sampling during installation of the VOC treatment grid indicates unsaturated zone

chromium and cyanide contamination of unknown extent. The list of groundwater COPCs (Attachment A, Table A.5-2, page 17 of 21) is acceptable given that Title 22 metals are specified as an analytical group. This comment is meant for the DTSC Project Manager and no response is required from the Navy or the Navy contractor.

14. Studies at Site 11, including Building 14 which operated as an aircraft testing and repair facility until 1997, identified elevated concentrations of lead in stained soil at the southwestern corner of Building 14 (Section 2.2.3.3, page 2-23). Even though the text indicates that soil alone will be further characterized, the list of groundwater COPCs (Attachment A, Table A.5-2, page 19 of 21) is acceptable. This comment is meant for the DTSC Project Manager and no response is required from the Navy or the Navy contractor.

15. Site 21 includes Building 162, which operated as a ship and aircraft maintenance shop from 1945 until 1997, outlines further soil and groundwater organic compound and inorganic element investigations of soil and groundwater (Section 2.2.3.4, page 2-24; Attachment A, Table A.5-1, page 8 of 8; Table A.5-2, page 21 of 21) which are acceptable. The further investigations outlined include the soil and groundwater associated with the mercury spills in Building 398. This comment is meant for the DTSC Project Manager and no response is required from the Navy or the Navy contractor.

16. HERD defers to the DTSC GSU, or a DTSC hydrogeologist, regarding the hydrogeology summary (Section 2.5, page 2-28) of the FWBZ and the SWBZ in addition to the site-specific hydrogeology (Section 2.6, page 2-30). This comment is meant for the DTSC Project Manager and no response is required from the Navy or the Navy contractor.

17. U.S. EPA Region 9 Preliminary Remediation Goals (PRGs, EPA [2004]) are proposed as screening criteria for soil (Section 3.0, page 3-1). PRGs are not intended to screen chemicals from further evaluation in a human health risk assessment, but to provide a method for relatively easy and quick calculation of human health risk and/or hazard based on a defined list of exposure pathways for a limited set of exposure scenarios (i.e., residential use and industrial use). Human health risk and/or hazard associated with soil contaminants should only be estimated after full characterization to analytical detection limits.

18. Drinking water Maximum Contaminant Levels (MCLs) are proposed as screening criteria for groundwater (Section 3.0, page 3-1). Department of Health Services (DHS) drinking water MCLs are not strictly risk-based, but include risk management considerations, and therefore cannot be directly used to provide an estimate of cancer risk and/or non-cancer hazard. Risk-based water

concentrations (e. g., U.S. EPA Region 9 tapwater PRGs [EPA, 2004]) could be used to estimate the potential risk and/or hazard associated with potential exposure to groundwater contaminants as an interim step toward a full Human Health Risk Assessment (HHRA). HERD recommends that groundwater plumes be characterized to detection limits as health based tap water criteria can, on occasion, be below detection limits.

19. In addition to the human health methodological problems with using screening criteria, shallow groundwater depths (e.g., 5 feet below ground surface) occur throughout NASA. Exposure to groundwater contaminants via the indoor air inhalation pathway can contribute significant risk and/or hazard for NASA sites. DHS MCLs and EPA Region 9 PRGs do not include exposure via inhalation of indoor air. The groundwater characterization must include all COPCs, based on physical characteristics and toxicity, likely to contribute to indoor air exposure at NASA-specific concentrations. This would include DHS drinking water Unregulated Chemicals Requiring Monitoring (UCRM) (http://www.dhs.ca.gov/ps/ddwem/chemicals/unregulated/index.htm) as well as COPCs listed by the Office of Environmental Health Hazard Assessment (OEHHA) Public Health Goals (PHGs) (http://www.oehha.ca.gov/water/phg/index.html). These PHGs are risk-based concentrations which could be used for an estimation of risk and/or hazard associated with groundwater as an interim step toward a full HHRA. A summary table of MCLs, UCRM and PHGs is available (http://www.dhs.ca.gov/ps/ddwem/chemicals/phgs/chemicalinformation.htm).

20. Any use of human health-based concentrations (Section 3.0, page 3-1) ignores potential ecological impacts associated with OU-1, OU-2A and/or OU-2B groundwater. Groundwater flow in the FWBZ and SWBZ is described as toward the Oakland Inner Harbor (OIH), the Seaplane Lagoon (SPL) and San Francisco Bay (SFB) (Section 2.5, page 2-28 and page 2-29). Potential groundwater exposure pathways are admittedly complete as the SWBZ is 'believed to discharge through lateral groundwater flow' to the OIH, the SPL and SFB (Section 2.5.3, page 2-30). Ecologically-based water screening criteria should include Federal National Ambient Water Quality Criteria (NAWQC) and California Water Quality Objectives (WQO).

21. It appears that step-down groundwater sampling will not be pursued for OWS regardless of the results of the groundwater results (Table 3-1, page 1 of 10, Step 4). Please provide the justification for proscribing step-down sampling.

22. The presence of concentrations of COPCs which are less than risk-based criteria does not mean facilities 'have not leaked contaminants to the environment' (Table 3-1, page 1 of 10, Step 5). Please amend this statement to indicate that the facility in this case has not leaked contaminants to the environment at concentrations causing risk and/or hazard above acceptable levels. The conclusion regarding

concentrations less than screening criteria should be amended at each occurrence in addition to the one identified.

23. Evaluation of Underground Storage Tanks (USTs) and Aboveground Storage Tanks (ASTs) should include samples at both ends of the excavation for removed USTs or ASTs or at the inflow and outflow point, if known, regardless of size (Table 3-1, page 2 of 10 and 3 of 10, Step 4). Please amend the text to remove the single sample collection for USTs or ASTs less than 20, 000 gallons.

24. Please provide justification for outlining a 'no deeper than' criterion for soil samples from USTs (Table 3-1, page 2 of 10, step 4). In a data gap work plan, it would seem reasonable to continue to sample soil in the event obvious signs (e.g., staining) of a release are apparent or until groundwater is encountered.

25. It appears that step-down groundwater sampling will not be pursued for USTs or ASTs regardless of the results of the groundwater results (Table 3-1, page 3 of 10, Step 4). Please provide the justification for proscribing step-down sampling.

26. Please describe how two samples will be obtained 'at random' for Generator Accumulation Points (GAPs) 100 square feet to 250 square feet in size (Table 3-1, page 4 of 10, Step 4) or one sample within each third of GAPs greater than 250 square feet.

27. It appears that step-down groundwater sampling will not be pursued for GAPs regardless of the results of the groundwater results (Table 3-1, page 4 of 10, Step 4). Please provide the justification for proscribing step-down sampling.

28. Washdown Areas (WDs) are initially described as having 'not been investigated' (Table 3-1, page 5 of 10, Step 1), but then are grouped because of 'the nature of known contamination in the area' (Table 3-1, page 5 of 10, Step 4). Please correct this apparent contradiction.

29. The proposed sampling grid for WDs was developed so that there is a 95 percent probability of detecting a release with a radius of 30 feet (Table 3-1, page 5 of 10, Step 6). The DTSC Project Manager should determine whether this level of detail is sufficient based on site use history of the WDs under investigation. This comment is meant for the DTSC Project Manager and no response is required from the Navy or Navy contractor.

30. Please describe the process by which a subset of the soil investigation sites (Table 3-1, page 6 of 10, Step 3) were selected for GORE soil gas surveys (i.e., Site 7 and Site 3).

31. As the GORE Module results are only a qualitative measure of Volatile Organic Compounds (VOCs) some NASA-specific base level response must be developed. Please describe the location and collection of GORE Module samples at relatively uncontaminated sites so that 'hot spots' (Table 3-1, page 6 of 10, Step 2, Step 4 and Step 5) can be identified by comparison to GORE Module measurements at relatively unimpacted sites.

32. Given the qualitative nature of the GORE Module results, variance in collection of unsaturated soil samples for possible comparison of multiple GORE Module results would seem undesirable for inter-sample comparison. Please provide the justification for the allowable variance in depth of unsaturated soil samples of 'every 3 to 5 feet' (Table 3-1, page 6 of 10, Step 4).

33. The Groundwater Investigation DQOs (Table 3-1, page 9 of 10) are a hybrid of groundwater characterization and relative risk evaluation. Multiples of 2 times and 20 times health-based criteria previously proposed in this document are now supplemented by a 200 times screening criterion (Table 3-1, page 9 of 10, step 4) for placement of new SWBZ wells. As stated above, groundwater characterization should be performed to detection limits. Any potential health risk and/or hazard associated with groundwater can be presented after full characterization.

34. Several of the analytical groups in the Sampling and Analysis Plan (Attachment A, Table A.5-1) indicate only 'SVOCs' while others indicate 'SVOCs (including 1,4-dioxane)'. All locations were SVOCs are an analytical group must include 1,4-dioxane. Please amend Table A.5-1.

35. The text states that 'ASTs and USTs are similar with respect to their construction, dimensions and nature of material stored.' (Section 4.2, page 4-3). However, ASTs and USTs were constructed of 'steel, plexiglass or concrete' and tank volumes are described as 55 to 100,000 gallons in the same section. These descriptions would not appear to be similar in construction or volume. Perhaps the text was meant to indicate the majority of ASTs and USTs were similar. In addition, plexiglass is not a common tank material while tanks are commonly constructed of fiberglass. Please amend the text.

36. A minimum of two samples should be taken for any AST or UST, even those of 5,000 gallons or less (Section 4.2, page 4-5). If the fill point cannot be located the samples should be obtained at either end of the AST or UST location.

37. The generalized description of analytical groups is not presented for ASTs and/or USTs (Section 4.2.1, page 4-5), while generalized analytical groups are discussed for OWS (Section 4.1, page 4-3), GAPs (Section 4.3, page 4-6) and WDs (Section 4.4.2, page 4-8). In addition, the analyses to be performed on samples from ASTs

and/or USTs does not appear to be included in Table 3-1, as indicated in the text (Section 4.2.1, page 4-5). Please provide this discussion for ASTs and/or USTs in the text and table.

38. The investigation strategy for Generalized Accumulation Point (GAP) 11 differs from the GAP 59 and 44 investigations (Section 4.3.1, page 4-6). Please provide the rationale for differing investigations strategies in the text.

39. Methyl tertiary-butyl ether (MTBE) analyses are specifically identified only as part of the VOC analysis in the WD methodology (Section 4.4.2, page 4-8). MTBE analyses should be included for any sample where fuel products are the suspected or potential source.

40. A groundwater concentration of two times the health-based screening criteria (Attachment A, Table A.7-2) is proposed as the comparison criteria for the boundary of the groundwater plume (Section 5.0, page 5-2). HERD defers to the DTSC GSU, or a DTSC hydrogeologist, regarding the suitability of two times the health-based criteria for monitoring the fate and transport of a groundwater Contaminant of Potential Concern (COPC). However, the risk assessment implications of this proposal are that some unidentified mass of groundwater would exceed health-based criteria creating another risk assessment gap. Groundwater plumes are commonly characterized to detection limits concentrations in CERCLA investigations. Risk-based water criteria (e.g., U.S. EPA Region 9 tapwater PRGs) could then be used, as in interim step prior to a full Human Health Risk Assessment (HHRA), to estimate risk and/or hazard while monitoring the fate and transport of groundwater COPCs if deemed advisable. HERD recommends that groundwater plume characterization be performed to detection limits.

41. HERD defers to the DTSC GSU, or a DTSC hydrogeologist, regarding the suitability of the 20 times criterion (Section 5.0, page 5-2) to assess the potential for groundwater COPCs in the FWBZ to migrate to the SWBZ. This is not a risk assessment issue, except to note that 20 times a true risk-based concentration would equate to a cancer risk of $2x10^{-5}$ or a non-cancer Hazard Quotient (HQ) of 20.

42. Transformers with Polychlorinated Biphenyls (PCBs) 'greater than action levels' were removed from several locations (e.g., Site 6 Transformers, Section 5.1.1.3, page 5-5 and Site 8 Transformers, Section 5.1.3.3, page5-9). Responsibility for the remaining transformers was transferred to the Alameda Power and Telecom. HERD cannot evaluate the health implications of this action or transfer without statement of the PCB action level. Please clearly state the PCB action level in this, and all similar, sections of the text.

43. The Site 7 Groundwater (Data Gap 5) characterization indicates that the FWBZ is 'impacted by various VOCs' (Section 5.1.2.3, page 5-7). The only VOCs proposed for soil samples and groundwater analysis are benzene, toluene, ethylbenzene and xylene (BTEX) and MTBE (Section 5.1.2.3, page 5-7). Data Gap 5 soil and groundwater samples should be analyzed for the full suite of VOCs, including MTBE, unless justification can be provided in support of BTEX analysis as the only VOCs present.

44. Site 7 Groundwater (Data Gap 5) existing groundwater wells will be sampled quarterly for a set of analytes which includes Polycyclic Aromatic Hydrocarbons (PAHs) (Section 5.1.2.3, page 5-8), while PAHs are not currently proposed for the three additional soil and groundwater samples (Section 5.1.2.3, page 5-7). Please include analysis for PAHs in the three additional soil and groundwater samples.

45. Please specify the type of microbial parameters which will be measured in saturated soil samples (e.g., Section 5.1.4.3, page 5-13 or Section 5.2.5.2, page 5-29). These parameters did not appear to be specified in the Sampling and Analysis Plan (Attachment A) reviewed previously.

46. The two times and twenty times screening criteria methodology is proposed for Site 16 groundwater (Data Gap 9, Section 5.1.4.3, page 5-13). Please see HERD Specific Comment number 40 and 41 above.

47. The Site 9 Sewer Soil Investigation (Data Gap 16, Section 5.2.1.2, page 5-15) specifically calls out 'SVOCs (including 1,4-dioxane)' and 'VOCs (including MTBE)'. All SVOC analyses should include 1,4-dioxane and MTBE should be included as an analyte for any sample where fuel products are the suspected or potential source.

48. The summary bulleted items indicate that 'approximately nine locations' at Site 9 (Data Gaps 11, 12, 13, 14 and 17, Section 5.2.1.4, page 5-17) are targeted for soil and groundwater samples while the main text, immediately below the bulleted items, states collection at 'nine locations'. Perhaps the bulleted item should be phrased as 'at least nine locations'.

49. The two times and twenty times screening criteria methodology is proposed for Site 9 groundwater (Data Gaps 11, 12, 13, 14 and 17, Section 5.2.1.4, page 5-18). Please see HERD Specific Comment number 40 and 41 above.

50. The summary bulleted items indicate that 'approximately six locations' at Site 13 (Data Gap 21, Section 5.2.2.3, page 5-21) are targeted for soil and groundwater samples while the main text, immediately below the bulleted items, states

collection at 'six locations'. Perhaps the bulleted item should be phrased as 'at least six locations'.

51. Groundwater in the FWBZ at Site 13 is impacted by BTEX, PAHs and 'other SVOCs' (Section 5.2.2.3, page 5-21). However, SVOCs are not proposed as analytes for groundwater samples to be collected. SVOCs should be added to the saturated soil analytes and the groundwater analytes for Site 13 (Data Gap 21) FWBZ HydroPunch© samples as well as the FWBZ monitoring well samples.

52. Please provide some rationale for evaluating soil for the Site 19 - Yard D-13 investigation (Data Gap 23) for VOCs only (Section 5.2.3.1, page 5-23) while the Site 19 - Groundwater Investigation (Data Gap 22) samples are analyzed for VOCs, SVOCs (including 1,2-dioxane), TPH-purgeable, TPH-extractable, and metals (Section 5.2.3.2, page 5-23). Perhaps the Yard D-13 (Data Gap 23) investigation could be folded into the Site 19 – Groundwater Investigation (Data Gap 22) to save costs.

53. The summary bulleted items indicate that 'approximately 10 locations' at Site 19 (Data Gap 22, Section 5.2.3.2, page 5-23) are targeted for soil and groundwater samples while the main text, immediately below the bulleted items, states collection at '10 locations'. Perhaps the bulleted item should be phrased as 'at least 10 locations'.

54. Site 4 – Building 163 (Data Gap 30) was used for aircraft overhauls and a machine shop, among other uses (Section 5.3.2.1, page 5-33). Please provide some rationale for not analyzing soils and groundwater at Site 4 – Building 163 (Data Gap 30) for SVOCs (Section 5.3.2.1, page 5-33).

55. The summary bulleted items indicate that 'approximately 9 locations' at Site 4 – Building 372 PCB Soil Investigation (Data Gap 32, Section 5.3.2.2, page 5-33) are targeted for soil and groundwater samples while the main text, immediately below the bulleted items, states collection for 'a total of nine samples'. Perhaps the bulleted item should be phrased as 'at least 9 locations'.

56. The Conceptual Site Model (CSM) for Site 4 – Building 372 PCB Soil Investigation (Data Gap 2) is that PCB containing fluid was historically sprayed on the area outside Building 372 (Section 5.3.2.2, page 5-33). PCB analysis alone is proposed for soil and groundwater samples. Soil and groundwater samples should be analyzed for VOCs, SVOCs, TPH-purgeable and TPH-extractable to account for the fluid in which the PCBs were dispersed.

57. Cyanide at hazardous levels was detected, among plating metals, in the liquid discovered in Building 360 tanks (Section 5.3.2.3, page 5-35). Cyanide should be

added to the analytical suite of VOCs, SVOCs and metals for Site 4 – Building 360 Soil Investigation (Data Gaps 31).

58. All GORE Modules should be installed to a standard depth to minimize inter-sample variation due to sampling depth, instead of the 2 to 3 feet currently specified (Section 7.2, page 7-2).

59. The work plan states that GORE Modules, for passive soil gas evaluation, will be left in place for two to four weeks (Section 7.2, page 7-2). Please state that the period of deployment must be the same for all GORE Modules deployed in a single investigation.

60. HERD defers to the DTSC GSU, or a DTSC hydrogeologist, for review of the groundwater sampling procedures (Section 7.8 through 7.14, pages 7-7 through 7-17).

61. An additional 'five times the screening criterion' for SWBZ samples is proposed to determine the depth interval to the next soil and groundwater sample (Section 7.8.1, page 7-10). Standard procedures is for soil and groundwater characterization to proceed to detection limits, but HERD defers to the DTSC GSU, or a DTSC hydrogeologist, regarding this proposed criterion.

CONCLUSIONS

The soil and groundwater investigations for these facilities and locations should be performed to detection limits and the risk-based screening be performed after the soil and/or groundwater is sufficiently characterized. Human health-based groundwater concentrations, such as EPA Region 9 tapwater Preliminary Remediation Goals (PRGs) or Office of Environmental Health Hazard Assessment Public Health Goals (PHGs) could be used as an interim step prior to a full Human Health Risk Assessment of groundwater risk and/or hazard.

Given the shallow groundwater at Naval Air Station Alameda, particular attention should be paid to Volatile Organic Compounds (VOCs) such as naphthalene which can significantly influence the indoor air pathway.

Ecologically-based aquatic toxicity criteria must be used when assessing groundwater contamination as groundwater flow towards and discharge to surface waters is described for the OU-1, OU-2A and OU-2B groundwater under investigation.

BRAC OFFICE

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REFERENCE

U.S. EPA. 2004. Users' Guide and Background Technical Document for USEPA Region 9's Preliminary Remediation Goals (PRG) Table.

HERD Internal Reviewer: Michael Wade, Ph.D., DABT
Senior Toxicologist

cc: Sophia Serda, Ph.D.
U.S. EPA Region IX (SFD-8-4)
75 Hawthorne Street
San Francisco, CA 94105

Ned Black, Ph.D., BTAG Member
U.S. EPA Region IX (SFD-8-4)
75 Hawthorne Street
San Francisco, CA 94105

Ms. Beckye Stanton, BTAG Member
California Department of Fish and Game
1700 K Street, Room 250
Sacramento, CA 94244-2090

Laurie Sullivan, M.S., BTAG Member
National Oceanic and Atmospheric Administration
c/o U. S. EPA Region 9 (H-1-2)
75 Hawthorne Street
San Francisco, CA 94105-3901

Naomi Feger, BTAG Member
San Francisco Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

Voice 818-551-2853
Facsimile 818-551-2841