UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

April 19, 1999

Mr. Michael McClelland
Naval Facilities Engineering Command
Engineering Field Activity, West
900 Commodore Drive
San Bruno, CA 94066-5006

RE: Draft Technical Memorandum, Distribution of the Bay Mud Aquitard and Characterization of the B-Aquifer in Parcel B

Dear Mr. McClelland:

EPA has completed its review and comment of the above referenced document. Our comments are presented in an attachment to this letter.

Please call me at 415/744-2409, if you any questions about these comments.

Sincerely,

Claire Trombadore
Remedial Project Manager

Attachment

cc: Chein Kao, DTSC
David Leland, RWQCB
Jil Finnegan, EFA- West
Amy Brownell, City of SF

REVIEW COMMENTS ON THE
DRAFT TECHNICAL MEMORANDUM
DISTRIBUTION OF THE BAY MUD AQUITARD AND
CHARACTERIZATION OF THE B-AQUIFER
IN PARCEL B, HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

GENERAL COMMENTS

1. The Navy has done an incomplete job of evaluating the data presented in the Draft Technical Memorandum, Distribution of the Bay Mud Aquitard and Characterization of the B-Aquifer in Parcel B ("the B-Aquifer Technical Memorandum"). (This is addressed in greater detail in several of the Specific Comments presented below). Because the data analysis is incomplete, the Navy has not adequately evaluated the relationship between the A- and the B-aquifers, which is one of the primary purposes of this study as listed in Section 1.2 (Purpose) of the B-Aquifer Technical Memorandum.

2. The objective stated in Section 1.2 to evaluate the presence and thickness of the Bay Mud Aquitard was not accomplished. The new information was not adequately integrated with the existing information and it was not presented in a readily usable form. Maps and cross sections should be included to facilitate the interpretation of the results of this investigation. Please update the map from the Parcel B RI showing distribution of the Bay Mud Aquitard and add a map showing the distribution of the B-aquifer. At a minimum, cross sections A-A' (Figure 3.7-10) and D-D' (Figure 3.7-13) of the RI should be updated to include new boring data. The Navy should also include isopach maps.

3. One stated goal of this investigation was to characterize the B-aquifer. This goal does not appear to have been met in this document. There is no description of the soil layers that compose the aquifer, the text does not explain how the A-aquifer is differentiated from the B-aquifer when the two aquifers are in direct contact, there is no statement about horizontal or vertical gradients, and groundwater characteristics and differences from A-aquifer are not discussed. In addition, it appears that the borings in the western area may not have been drilled deep enough to encounter the B-aquifer.

4. It appears that the two B-aquifer monitoring wells (IR18MW100B and IR18MW101B) were not screened to the top of the B-aquifer and therefore the analytical results for groundwater samples collected from these wells may not provide an accurate characterization of groundwater quality in the B-aquifer, which is one of the data gaps this work was intended to address. The B-Aquifer Technical Memorandum should be revised to provide a more extensive analysis of the collected data, and to provide explanations for the well screen intervals and the interpreted data. Specific approaches to addressing these deficiencies are provided below, in several of the Specific Comments.

5. Please explain why top of casing elevations were not surveyed or at least estimated from

nearby borings. This information is necessary to evaluate gradients.

6. EPA questions whether or not just two monitoring wells, four borings, and one hydropunch are sufficient to adequately characterize the nature and water quality of the B-aquifer on Parcel B. Please clarify why the Navy believes this very limited new data set clarifies the our earlier questions from the RI about the B-aquifer.

7. EPA's QA section continues to have concerns that all groundwater samples are routinely filtered. The EPA QA section continues to request that at least some percentage of groundwater samples be collected without filtering. For example, a low flow purge pump and no filter should be used to collect 10 percent of the total number of groundwater samples during any future sampling events on Hunters Point Shipyard. A separate letter on this issue with respect to the basewide QAAP will be submitted to the Navy in the near future. At present, there is still no official letter of approval for the basewide QAAP from EPA's QA office. The QA office has approved the QAAP for soil sample collection but has not approved it for groundwater sampling. The filtering issue is the only one that is still not resolved to the satisfaction of the EPA Region 9 QA office.

SPECIFIC COMMENTS

1. **Section 2.0, p. 2.** Please add a sentence explaining variations between the planned work as discussed in the SAP and the work that was actually performed.

2. **Section 2.3, p. 4, paragraph 2: Monitoring Well Installation and Sampling Procedures** - The second sentence of this paragraph indicates that the maximum screen length for B-aquifer monitoring wells was approximately 2 feet less than the thickness of the B-aquifer encountered at that location. However, a review of the boring logs for the two B-aquifer monitoring wells (IR18MW100B and IR18MW101B) indicates that these wells were screened near the bottom of the undifferentiated sedimentary deposits, which are assumed to be the B-aquifer sediments. According to the boring log for IR18MW100B, these deposits extend from approximately 28 feet below ground surface (bgs) to 48 feet bgs. This well is screened from 40 to 45 feet bgs, twelve feet below the top of the B-aquifer. According to the boring log for IR18MW101B, the undifferentiated deposits extend from approximately 28 feet below ground surface (bgs) to 43 feet bgs. This well is screened from 37 to 42 feet bgs, nine feet below the top of the B-aquifer. Revise this section to provide the rationale for the depth and length of the well screens in the two B-aquifer monitoring wells.

3. **Section 2.3, p. 4, paragraph 2, sentence 7.** Please verify that the "borehole casing" is the same as the "drive pipe" that was discussed in the first paragraph.

4. **Section 2.3, p. 4, last bullet.** Please specify how field filtering was done (e.g., hand vacuum pump and disposable filter, hand vacuum pump and glass filterware, peristaltic pump with in-line filter, etc.).

5. **Section 2.4, p. 5. Hydropunch Procedures.** Please specify the borings where the

hydropunch was used. Further, please clarify what type of hydropunch sampler was used. There is no discussion of the depth of the hydropunch sample or the screen interval for the hydropunch sampler. If a trademark hydropunch sampler (with a screened interval of several inches) was used, then no discussion of the screen interval is necessary, but the ™ symbol should be placed after the word hydropunch. If a non-trademarked hydropunch sampler was used, then revise this section to present the depth of the sample (95 feet according to Section 3.5) and the length of the screened interval for the hydropunch sampler.

6. **Section 3.1, p. 6.** This section states that Bay Mud was absent in both monitoring well IR18MW100B and monitoring well IR18MW101B, and that the bottom of these well borings terminated in Franciscan bedrock. This is not consistent with the lithologic descriptions for these well borings presented in the boring logs in the appendix. The boring log for IR18MW100B indicates Bay Mud deposits occur from approximately 48 to 68 feet bgs, and does not indicate that Franciscan bedrock was encountered in this well boring. The boring log for IR18MW101B indicates that a clay layer was encountered from 43 to 53 feet in depth with the boring terminating in seven feet of clayey gravel, but does not indicate that Franciscan bedrock was encountered. Revise this section to be consistent with the data presented in the boring logs.

   In addition, there is no discussion regarding how A- and B-aquifer sediments were distinguished from each other in the field. For example, the boring log for IR18MW101B indicates poorly graded sand from 24 to 48 feet bgs. However, the interval from 24 to 28 feet bgs is labeled undifferentiated upper sand deposits (A-aquifer sediments), while the interval from 28-43 feet bgs is labeled undifferentiated sedimentary deposits (B-aquifer sediments). Revise this section to provide a discussion of the characteristics of the different sediments, particularly the criteria for classification of Bay Mud deposits, and how the various lithologies were distinguished from each other in the field.

7. **Page 7: Section 3.2, Bay Mud Aquitard Distribution** - According to Section 1.1 and Section 1.2 (Background and Purpose)of the B-Aquifer Technical Memorandum, one of the data gaps the work described in the Technical Memorandum was intended to eliminate was the distribution of the Bay Mud Aquitard at Parcel B (specifically the northeastern and western regions of Parcel B). The text in Section 3.2 describes the distribution of the Bay Mud Aquitard at the six individual new boring and monitoring well locations completed as part of this work, and qualitatively states that the new data is consistent with previous results from the site. However, the qualitative statements should be supported with cross-sections and isopach maps showing the distribution of the Bay Mud Aquitard across Parcel B, in order to fully address the data gaps identified in Sections 1.1 and 1.2. Presentation of cross-sections and isopach maps will integrate the new data with existing site knowledge to provide an overall understanding of the distribution of the Bay Mud Aquitard across Parcel B. Revise this section to include cross-sections and isopach maps which incorporate lithologic data from the new monitoring wells and soil borings. At a minimum, cross-sections should be prepared in the directions that are parallel and perpendicular to the direction of groundwater flow. These cross-sections should be constructed to show the

extent of the Bay Mud Aquitard across Parcel B. If such cross-sections have been included in previous Parcel B reports, they should be updated to include the new monitoring well and soil boring lithologic data.

8. **Section 3.2, p. 7, paragraph 3.** The third paragraph of this section indicates that Bay Mud was only encountered in one (IR07B054) of the borings drilled in the western portion of Parcel B. However, it appears that Bay Mud was also encountered in borings IR18MW100B and IR18MW101B, which are also located in the western portion of Parcel B. Revise the text of this section to be consistent with the lithologic data presented in the boring logs.

9. **Section 3.3, p. 7-8, B-Aquifer Distribution** - This section of the B-Aquifer Technical Memorandum only describes the distribution of the B-aquifer at the six individual new boring and monitoring well locations completed as part of this work. As described in earlier comments above, preparation of cross-sections and isopach maps (in this case, isopach maps showing the thickness of the B-aquifer instead of the Bay Mud Aquitard) will integrate the new data with existing site knowledge to provide an overall understanding of the distribution of the B-aquifer across Parcel B, which is the overall purpose of this study. Revise this section to include cross-sections and isopach maps which incorporate lithologic data from the new monitoring wells and soil borings. The cross-sections may be the same cross-sections used to show the distribution of the Bay Mud Aquitard, if they extend to the bottom of the B-aquifer. Earlier isopach maps, cross sections, etc. for the B-aquifer presented in previous Parcel B reports should be updated to include the new monitoring well and soil boring lithologic data.

10. **Section 3.3, p. 8. first paragraph.** When the Bay Mud deposits are not encountered, please briefly explain the criteria used to differentiate between the A- and B-aquifers. This is not clear. An examination of the boring logs for IR18MW101B and IR18MW100B suggests that the monitoring wells were installed in the bottom of the A-aquifer and also suggests that the borings did not confirm the presence of a B-aquifer under the Bay Mud deposits. Plotting the data from IR18MW100B on cross section A-A' from Parcel B RI report also seems to indicate that the monitoring well was installed in the A-aquifer and that the B-aquifer was below the bottom of the boring. Please discuss the criteria for terminating these borings.

11. **Section 3.5, p. 9, last paragraph and first partial paragraph on page 10.** Much of the information in this paragraph is incorrect and speculative. The first two sentences are not necessarily true. When diesel and motor oil degrade (i.e., lose lighter fraction hydrocarbons through degradation), the density of the petroleum product increases and becomes equal to or denser than water. This highly degraded diesel or motor oil would not exhibit the same chromatogram as undegraded fuels. Alternatively, the petroleum product could have been Number 4, 5, and/or 6 industrial fuel oil; these fuels were commonly used to fuel ships and were often manufactured to be denser than water. Small amounts of diesel or gasoline would be sufficient to mobilize these heavy fuel oils. The signature of these heavy oils would include many of the same peaks as diesel and motor

oil, but would also include some longer-chain hydrocarbons.

Further, the petroleum did not have to migrate from the surface; the fill in this area may have been contaminated before it was placed. It is also possible that contamination could have been pushed ahead of the hydropunch.

Sentences 3 through 7. This scenario is extremely unlikely. Plant material does not degrade to petroleum with a signature of TPH-d or TPH-mo. Further, the formation of petroleum requires millions of years and more heat and pressure than available since the Holocene formation of the bay mud.

Sentences 5 and 6. As petroleum products like diesel and motor oil degrade aerobically, the formation of organic acids occurs first. The likely source of the these organic acids is the degradation of petroleum.

Figure 3, sample chromatograms. EPA had a chemist review the chromatograms in Figure 3 and he does not agree with the Navy's conclusions. The chromatogram from the water sample looks like #4, #5 or #6 fuel oil. It is definitely not of biogenic origin because of the alkane spikes; therefore it must be a refined petroleum (e.g. Number 4, 5 and/or 6 fuel oil as stated above). The center of the "peak" for the water sample was 10.5 to 11 minutes. This is reasonably close to the motor oil example, where the peak centers at about 11 minutes. The chromatogram for decomposing plant material would look like the diesel standard without the spikes (i.e., smoother like the motor oil example is, but not as steep a peak as motor oil) and would be centered at 6 to 7 minutes.

12. **Section 4.0, p. 10-11, Conclusions and Recommendations** - Please modify this section to reflect changes made to the text to respond to above comments. Please specifically modify the second sentence in the third paragraph.

Further, Section 1.2 (Purpose) of the B-Aquifer Technical Memorandum states that the results of the Bay Mud Aquitard distribution study were used to assess the relationship of the A-aquifer and the B-aquifer. The only discussion of this relationship is in the first paragraph of Section 4, where it is stated that in some areas of Parcel B Bay Mud deposits separate the A- and B-aquifers, while in other portions of Parcel B, the B-aquifer is absent. However, this statement appears to be incomplete. As noted previously, the boring log for IR18MW101B indicates that A-aquifer sediments lie directly over B-aquifer sediments, and are not separated by Bay Mud deposits.

The apparent hydraulic communication between the A- and the B-aquifer at this location suggests the potential for contaminants to move from the A-aquifer into the B-aquifer, and points out the need for a more thorough evaluation of the relationship between the A- and the B-aquifers in the B-Aquifer Technical Memorandum. Such evaluation should include a discussion of the hydraulic characteristics of each aquifer, and the results of any aquifer testing that indicates either a hydraulic connection or a hydraulic separation between these

two aquifers.

Additionally, evidence of a hydraulic connection or separation can be obtained by evaluating the general chemistry parameters for groundwater samples collected from each aquifer. For example, shallow zone aquifers typically have higher total dissolved solids (TDS) concentrations than deeper zone aquifers. Observational evidence, such as the presence or absence of an aquitard is not sufficient by itself to evaluate the relationship between these two aquifers. Revise the B-aquifer Technical Memorandum to include a section evaluating the evidence for a hydraulic connection or separation between these two aquifers. Results of this evaluation can be referenced in the Conclusions and Recommendations section to determine if additional action is required at Parcel B.

13. **Other.** Just a thought. Ni was detected in excess of cleanup goals in boring IR07BO54. Does the Navy think this gives us more information about the delineation of the Ni on Parcel B? Maybe Ni is present in the A and B aquifers. Would Ni in the B-aquifer be a threat to SF Bay? Also, Tetra Tech performed the B-aquifer study and IT the Ni plume study but in the future, maybe the Navy can coordinate/integrate such studies. Perhaps by modifying the location and sample collection for IR07BO54, we could have gotten information to support both efforts. Shallow soil samples and hydropunch samples at IR07BO54 may have provided additional useful information to support the Ni plume study since it is thought that the location of IR07BO54 is outside the A-aquifer Ni plume.