14 June 1993

MEMORANDUM

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NSY LONG BEACH
SSIC #5090.3

From: Chris Leadon (Code 1852.CL)
To: Joseph Joyce (Code 1832.JJ)
Faiq Aljabi (Code 1832.FA)
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Via: Jim Farris (Code 1853)

Subj: TECHNICAL REVIEWS OF THE DRAFT RI/FS WORK PLANS, DRAFT PRELIMINARY ASSESSMENT FOR SITE 6B, AND DRAFT SITE MANAGEMENT PLAN FOR THE LONG BEACH, CA. NAVAL STATION AND NAVAL SHIPYARD.

Ref: (a) Southwest Division, Naval Facilities Engineering Command (NAVFACENGCOM), Draft Remedial Investigation/Feasibility Study (RI/FS), Work Plan, Naval Station (NS) Long Beach, Long Beach, CA., prepared by CH2M Hill, Santa Ana, Ca., April 30, 1993.

(b) Southwest Division, NAVFACENGCOM, Draft Remedial Investigation/Feasibility Study (RI/FS), Work Plan, Naval Shipyard (NSY) Long Beach, Long Beach, CA., prepared by CH2M Hill, Santa Ana, Ca., April 30, 1993.

(c) Southwest Division, NAVFACENGCOM, Draft Site Management Plan, Installation Restoration Program, Naval Complex Long Beach, Long Beach, CA., prepared by CH2M Hill, Santa Ana, Ca., April 30, 1993.

(d) Southwest Division, NAVFACENGCOM, Draft Preliminary Assessment Report, Site 6B, Naval Station Long Beach, Long Beach, CA., prepared by CH2M Hill, Santa Ana, Ca., April 30, 1993.

(e) U.S. Environmental Protection Agency (EPA), Office of Emergency and Remedial Response, Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final, EPA/540/G-89/004, Washington, D.C., Oct. 1988.

(f) U.S. Environmental Protection Agency (EPA), Office of Emergency and Remedial Response, Risk Assessment Guidance for Superfund: Vol. I - Human Health Evaluation Manual (Part C, Risk Evaluation of Remedial Alternatives), Interim Final, PB92-963334, Publication 9285.7-01C, reproduced by U.S. Department of Commerce, NTIS, Springfield, VA., 22161, Dec. 1991.

(g) Smucker, Stanford J., Region IX Preliminary Remediation Goals (PRGs), Second Quarter 1993, U. S. Environmental Protection Agency (EPA), Region IX, 75 Hawthorne St., San Francisco, CA., 94105-3901, April 2, 1993.

1. Per references (a),(b),(c), and (d), the subject documents have been reviewed. For Ref(a), the Jacobs document reference number is CLE-C01-01F249-B7-0001, CTO # 249. For Ref(b), the Jacobs document reference number is CLE-C01-01F250-B7-0001, CTO # 250. For Ref(c), the Jacobs document reference number is CLE-C01-01F226-S1-0001, CTO # 226. For Ref(d), the Jacobs document reference number is CLE-C01-01F249-B6-0001, CTO # 249.

2. **General Impression of the Draft Work Plans:**

The overall contents are:	Good (See Comment 6.b)
The documents are:	Incomplete
Document quality is:	Good (See Comment 6.b)

3. **General Impression of the Draft Site Management Plan:**

The overall contents are:	Adequate
The documents are:	Complete
Document quality is:	Adequate

4. **General Impression of the Draft Site 6B Preliminary Assessment Report:**

The overall contents are:	Adequate
The documents are:	Complete
Document quality is:	Adequate

5. **General Comments on the Draft Site Management Plan (Ref c):**

a. The Site Management Plan for Long Beach Naval Complex should include descriptions of the planned future phases in the IR process for each of the IR sites. The probable future data collection, no further action, human health risk assessments, ecological risk assessments, effects of base closure, remediation, or other IR phases, including the necessary reports, should be described for each site.

b. The railroad routing, environmental sampling, and remediation options involved in rapidly cleaning up Site 6A and selling the land to the Port of Long Beach, for the construction of a highway overpass and railroad track, should be included in the Site Management Plan. Information on the feasible options could be taken from meeting notes by Andrea Muckerman, the previous RPM for Long Beach. For project continuity, it would be helpful to managers and RPM's in the future to have the main options for the remediation of Site 6A clearly laid out in the Site Management Plan.

6. **General Comments on the Draft RI/FS Work Plans (Refs a and b):**

a. The RI/FS Work Plans for Long Beach are supposed to be revised in the future before: (1) additional iterations of site characterization activities; (2) additional treatability investigations; (3) any significant changes in scope; or (4) any significant changes to the budget schedule (Ref e). A Work Plan Revision Request (WPRR) should be cleared with the California Dept. of Toxic Substances Control (DTSC) for any significant changes to the budget schedule or scope (Ref e).

Since a new contractor will complete the RI/FS work at Long Beach, the computer files of the texts and any other transferable parts of the Work Plan should be given to the new contractor. Any necessary revisions of the Work Plan in the future could then be made without retyping the entire documents. Revisions are especially likely during the speeded-up IR process for base closure at the Long Beach Naval Station.

b. The contents and quality of the Work Plans are good in general, except for the incorrectly calculated screening concentrations. Improvements, based on the review comments, were made in the contents and quality since the Preliminary Review Draft Work Plans . After the mistakes in the screening risk concentrations are repaired and data quality objectives are stated for the harbor sediments, the RI/FS Work Plans should be given good ratings.

The two Work Plans represent an enormous amount of work and there is excellent science in many parts of the reports. For example, the geology, leaching model, and bioassays are leading work in their specialties among the environmental reports we receive at Southwest Division. The leaching model from these Long Beach reports has been copied and successfully used in the IR work at Camp Pendleton, El Toro, and other Marine and Navy bases. The planned use of a horizontal ground water pollutant dispersion model to link surface water quality standards to on-site ground water clean-up levels is an innovative approach that could be used in other remedial investigations.

Appendix A on ARAR's in the Long Beach Work Plans was rewritten in an 80 hour effort by Rex Calloway. It is now one of the best discussions of ARAR's in any Southwest Div. IR report.

c. The Physical Setting sections in both Work Plans are comprehensive and include subsections on climate, geology, hydrogeology, land use, water supply, stormwater drainage, demographics, ecological resources, human and ecological receptors, soils, sediments, and surface waters. They are a couple of the most complete Environmental Setting sections I have reviewed so far.

d. The accepted use of a horizontal ground water to surface water pollutant dispersion model by the Regional Water Quality Control Board is one of the central ideas in the ARAR's agreements for the Long Beach RI/FS work. As described in Section 2.3.1 of the Work Plans (Refs a and b), the surface water quality standards in the California Enclosed Bays and Estuaries Plan are to be compared to predicted concentrations of contaminants reaching West Basin or San Pedro Bay from the ground water in IR sites. Remediation clean-up levels will be planned for the ground water in IR sites at Long Beach according to the water quality standards of the Enclosed Bays and Estuaries Plan and the concentrations of the contaminated groundwater predicted to reach the bays by a horizontal dispersion model.

Applying surface water quality standards to establish inland groundwater clean-up levels by using a horizontal ground water dispersion model is a basic part of the planned RI/FS work at Long Beach. It is also a new and innovative approach in the application of ARAR's in the IR projects set up through the Navy's Southwest Division.

The use of the horizontal water quality dispersion model should be mentioned in each chapter on a specific site where it will be used in the Work Plans (Refs a and b). The application of the water quality standards in the Enclosed Bays and Estuaries Plan to clean-up standards in the ground water of inland IR sites should be explained in Appendix A on ARAR's in the Work Plans (Refs a and b) and in Chapter 6 on ARAR's and Chapter 7 on Data Quality Objectives in the Site Management Plan (Ref c).

The way the horizontal dispersion model would work should really be explained in a short appendix like Appendix C on the leaching model in the Work Plans. The equations that

describe horizontal groundwater dispersion and tidal groundwater flow to the bays should really be written out with a list of parameter definitions. A diagram of the model, like Figure C-1 in Appendix C, but showing the horizontal dispersion of contaminants in the groundwater would be very helpful. The Navy managers, new contractors, regulators, and the public could then quickly see the intended use of the horizontal groundwater dispersion model.

7. **Specific Comments on the Work Plans (Refs. a and b):**

a. In Appendix B of Refs (a) and (b), in Table B-1, the Risk-Based Screening Concentrations for Noncarcinogens in Soil, for the Industrial Scenario, includes impossibly large numbers. The screening concentrations for Chromium III, Tin, and Xylenes are over 1 billion parts per billion. Most of the screening concentrations in Tables B-1 and B-4 are too large.

The equations listed in Appendix B of the Work Plans were copied exactly from the EPA RAGS manual (Ref f) except that limits to the concentrations resulting from the equations were overlooked in the calculations of the screening concentrations. The RAGS manual (Ref f) includes footnotes for the Risk-based PRG equations for the Commercial/Industrial scenario, carcinogenic and noncarcinogenic effects from soil, that state " If PRG > C_{sat}, then set PRG = C_{sat}. " These footnotes and the calculations of C_{sat} were overlooked in the calculations of the screening concentrations listed in Tables B-1 and B-4.

In the recent EPA PRG list (Ref g), a maximum cap of 10% (100,000 ppm or 100 million ppb) was put on the calculated PRG concentrations for noncarcinogenic chemicals in soil. This maximum 10% limit was also overlooked in the calculations of the screening concentrations in the Long Beach Work Plans (Refs a and b).

In comparison to the PRG's in the April 2, 1993 EPA list (Ref g), the chemicals with calculated screening concentrations in Table B-1 that were way off, in addition to those with impossibly large numbers, were: acenaphthene, anthracene, 1,2-Dichloroethene, ethylbenzene, fluorene, naphthalene, and 1,1,1-Trichloroethane. The other chemicals in Table B-1 with calculated screening concentrations larger than the EPA PRG's in Ref(f) were: acetone, butyl benzyl phthalate, 1,1-Dichloroethane, di-n-butylphthalate, mercury, toluene, and zinc. 2-Butanone and Dibenzofuran were probably also calculated too large, but PRG's were not available to compare to the calculated concentrations.

Many of the screening concentrations in Table B-4, for the Residential Scenario of Noncarcinogens in Soil, are all also too large. In comparison to the EPA PRG's (Ref g), the chemicals with calculated screening concentrations in Table B-4 that were way off were: acenaphthene, anthracene, ethylbenzene, fluorene, naphthalene, 1,1,1-Trichloroethane, and xylene. The other chemicals in Table B-4 with calculated screening concentrations larger than the EPA PRG's in Ref(g) were: acetone, antimony, butyl benzyl phthalate, cadmium, Chromium III, Chromium IV, copper, 1,1-Dichloroethane, 1,2-Dichloroethene, di-n-butylphthalate, endrin, fluoranthene, manganese, mercury, methoxychlor, nickel, pyrene, selenium, silver, tin, toluene, and zinc. 2-Butanone and Dibenzofuran were probably also calculated too large, but PRG's were not available to compare to the calculated concentrations.

The screening concentrations calculated using EPA numbers for carcinogens in soil, for both the industrial and residential scenarios, in Tables B-2 and B-5 were close to the PRG

concentrations (Ref g), but should be checked more closely for errors. The EPA PRG concentrations from Ref(g) should be substituted for the calculated carcinogenic screening concentrations in Tables B-2 and B-5 in the Draft RI/FS Work Plans for Long Beach (Refs a and b).

The inhalation pathway was left out of the RI/FS screening concentrations when the volatilization factor (VF) term was not used in the equations on page B-15 of the Work Plans (Refs a and b). The inhalation pathway should be included in the screening concentrations by substituting PRG's for the screening concentrations, since the PRG's include inhalation of volatiles (Ref g). All references to the use of the equations from the RAGS manual (Ref f) to calculate screening concentrations, on pages B-1 and B-2 and anywhere else in the Work Plans, should be changed to refer to the EPA PRG's as the basis of the screening concentrations. Any statements that a different number of exposure pathways, than the ingestion and inhalation of volatiles, were evaluated in the RI/FS Work Plans, such as in the third paragraph of Appendix B, should be changed. The evaluation of only these two exposure pathways, ingestion and inhalation of volatiles, are included in the EPA PRG's (Ref g). With the substitution of the PRG's for the previously calculated screening concentrations in the RI/FS Work Plans, only these two exposure pathways will be evaluated at the Long Beach sites. The substitution of the PRG's actually adds one pathway, inhalation of volatiles, to the one pathway, ingestion, in the screening concentrations for soil.

To correct the mistakes in the screening concentrations and the resulting errors in screening out chemicals or sites or setting detection limits, basically the following steps should be carried out:

(1) EPA PRG's from Ref(g) should be substituted for the calculated screening concentrations in Tables B-1, B-2, B-4, B-5, and 2-2.

(2) For chemicals with no available PRG concentrations in Ref(g), such as 2-Butanone and Dibenzofuran, the screening concentrations should be recalculated using the appropriate equations that include chemical specific volatilization factor terms. The volatilization factor terms should be included in the calculations of the screening concentrations for the carcinogenic and noncarcinogenic effects from industrial soil, using the equations listed on page B-15 of Appendix B in the Work Plans (Refs a and b), which are Equations 7' and 6' in the RAGS Manual (Ref f). For residential soil, Equations 1.a, 1.b(1), and 1.b(2) from the EPA PRG list (Ref g) for carcinogenic and noncarcinogenic effects should be used including the volatilization factor term. Using these equations will include the pathway for inhalation of volatiles in the screening concentrations, matching the EPA PRG's. The appropriate limits, C_{sat} or the 10 % maximum, should then be correctly applied to the calculated screening concentrations.

(3) The data sets of chemical data from all the IR site at the Long Beach Naval Complex should be rescanned using the EPA PRG's as the screening concentrations, to see if any chemicals, sites, or areas of concern were mistakenly dropped from further action in the project.

(4) Check the setting of detection limits to see if the incorrect screening concentrations mistakenly effected any detection limits.

(5) Reinstate any chemicals, sites, or areas of concern that were mistakenly dropped because of the incorrect screening concentrations.

(6) Any tables, diagrams, or maps showing chemicals or source areas of concern that exceeded the screening criteria should be updated after comparing the chemical concentrations in the data set from each site to the EPA PRG concentrations. The tables showing the chemicals that exceeded the screening concentrations in bold print, in the text section on each site, for example, will have to be updated.

(7) Rewrite all sections of the Work Plans (Refs a and b) to include any chemicals, sites, source areas of concern, potential exposure pathways, or corrected detection limits that should be considered with the corrected screening concentrations. Although the text sections on each site, as well as summary sections, will have to be searched for errors or omissions, it is <u>important</u> that this be done for the conclusions of the study to be correct.

The RPM's and RTM's involved in the Long Beach RI/FS would like to check the contractor's work after the corrections of the screening concentrations, site data, and text discussions are made.

b. In the Executive Summary of both RI/FS Work Plans (Refs. a and b), the word "on" should still be changed to " or " in the third phrase of the second sentence of the third paragraph.

c. Section 1.4, on the Purpose and Scope of the Work Plan, should still be moved in front of the Facility Background Section 1.1 - right after the Introduction section in both reports.

d. The text of Attachment 2 of Appendix C on Sorption Distribution coefficient data does not copy clearly. The text of Attachment 2 and Table 4.1 should be retyped with a clearer word processing software font for both Work Plans.

e. The following maps and graphs still should be improved in the Work Plans (Ref a and b). Six out of nine figures that I noted should be improved in my comments on the Preliminary Review Draft Work Plans were improved in the Draft Work Plans, a good rate of improvement. But the following maps and graphs that were not improved still should be updated.

f. In Figure 3-18, in the Facilitywide Assessment chapter of both work plans, it's still hard to see the coastline. The background map part of the figure should be copied darker. The overlayed names on the map are dark enough, but if the whole figure is copied darker to bring out the coastline, I don't think the overlayed names will get too dark.

g. Also in Figures 3-25 in both Work Plans, the coastline is still not clear. It's the same problem as in Figures 3-18 discussed in Comment (f) above.

h. In Figure D-1, the Decision Tree diagram for Sediment Toxicity in Appendix D, page D-15, there are still incorrect open spaces between letters in the words in the squares.

i. Figure 6-1 on page 6-3 of the Site Management Plan (Ref c) on " Interaction Of The ARAR's Process And The RI/FS Process " is a good diagram that helps explain the ARAR's process. Figure 6-1 from the Site Management Plan (Ref c) should be added to Appendix A in both Work Plans (Refs a and b). The Appendix A's in the Work Plans (Refs a and b) are identical to Chapter 6 in the Site Management Plan (Ref c) except Figure 6-1's are missing from the Work Plans.

8. **Specific Comments on Sites 1 and 2 in the Draft Naval Station RI/FS Work Plan (Ref a):**

a. A map of the proposed additional sampling sites at Sites 1 and 2 should be added to Section 4.5.

b. The location of additional soil and groundwater sample sites from borings for groundwater monitoring wells in Site 2 should still be specified in Section 4.5. As described at the top of page 4-2, occasional leakage of waste oils, acids, solvents, and chromic acid reportedly occurred from damaged drums stored at Site 2. In Table 4-7, the Data Quality Objectives (DQO) Summary for Sites 1 and 2, additional soil and groundwater samples are proposed to be taken from groundwater monitoring wells, but the location of samples in Site 2 are not specified.

9. **Specific Comments on Site 4 in the Draft Naval Station RI/FS Work Plan (Ref a):**

a. A cross-sectional drawing of the outer edge of the Mole along the jogging path at Site 4 would be helpful. Representative sample locations in: (1) the sediment at the toe of the Mole, (2) in the rip-rap boulders, (3) in the fill material on the outer edge of the Mole, and (4) on the top of the jogging path should be shown on the cross-sectional drawing to make the discussion in the 3rd paragraph of page 6-66 and on page 6-67 more understandable.

10. **Specific Comments on Site 6A in the Draft Naval Station RI/FS Work Plan (Ref a):**

a. The descriptions of groundwater flow in the first paragraph of Section 8.2.2, pages 8-11 and 8-12, and also in Section 8.3 page 8-32, state that groundwater flows in a northeastern direction. The groundwater elevation at the site is described as being measured at high tide. When the tide is falling in San Pedro Bay, from the high tide elevation towards low tide, the elevation of the open water of the bay falls before the elevation of the adjacent ground water. The ground water of land adjacent to the bay, such as Site 6A, is connected to the tides of the open bay and will flow back towards the harbor to some extent during falling tides, in addition to generally flowing in a northeastern direction during the rising tide. This should be explained in the first paragraph of Section 8.2.2, and mentioned in Section 8.3, because the direction of ground water flow determines the direction of contaminant transport.

b. In Section 8.3 on page 8-32, the second sentence states: " Dissolved groundwater contamination would migrate in the direction of the groundwater gradient." As described in Comment 10(a) above, there is a possibility of groundwater flow toward San Pedro Bay during the falling tide. It should also be mentioned on page 8-32, Section 8.3, that there is a possibility of some dissolved groundwater contamination migrating to San Pedro Bay during the falling tide.

c. In Section 8.4 at the bottom of page 8-56 and the top of page 8-57, and also in Section 8.5 on page 8-58, several remediation methods are described for groundwater at Site 6A. What is not mentioned is that it may not be possible to remediate the groundwater of the site. If the groundwater was remediated, movement of the tidally influenced groundwater across the site boundaries would probably in time bring in new contaminated groundwater to Site 6A from nearby polluted sites.

11. **Specific Comments on Site 7 in the Draft Naval Station RI/FS Work Plan (Ref a):**

a. The proposed 32 sediment samples in the West Basin of the harbor are probably too many. The Long Beach Harbor sediments are probably well-mixed because of mixing by ship propellors. As stated on page 9-18 of the Work Plan (Ref a): " In summary, it appears that the sediments within most of the harbor are subject to disturbance by vessel operations. The disturbed sediments can be mobilized into the water column and subsequently transported throughout the harbor by tidal action and wind-driven currents." Hazardous substances from the Long Beach Naval Complex are probably randomly distributed in the harbor sediments, although greater concentrations probably occur in the sediments nearer the Naval Complex and possibly the Mole.

The grid setup of 32 sampling sites is actually a second phase type of sampling designed to check the spatial pattern of contamination in the sediment. With a normal project schedule, a smaller number of sediment samples would be taken in a first phase using a DQO approach to check if a spatially homogeneous or ordered pattern exists in the sediment. It was decided to recommend going ahead with the 32 sample grid setup because it facilitates a sped-up project schedule made necessary by the pending closure of the Long Beach Naval Station. Taking the samples in the grid pattern will result in valuable information for other studies at the Southwest Division on hazardous wastes in sediment.

b. A plan for Data Quality Objectives Statistics should also be included in the section on the Harbor Sediments, Site 7. The number of sediment and bioassay samples planned to be taken from the harbor through the RI/FS project should be set according to Data Quality Objectives Statistical Methods. Data Quality Objectives should be set for the harbor sediments for several possible alternative outcomes in the results from the chemical sediment and bioassay data analyses.

If no " hotspot " is found in the chemical analyses of the harbor sediment, this indicates the contamination is randomly distributed. Instead of trying to take additional sediment and bioassay samples to locate a hotspot, data quality objectives statistics should be used to either prove that no more samples are needed because no hotspot exists or to set how many additional samples would verify whether a hotspot exists.

Contaminate isopleths should be drawn on maps of the harbor to delineate any hotspots using the data from the first phase of sampling before any additional samples are planned. If a hotspot or definitely ordered spatial pattern of contaminants in the sediment is found in the first phase of sediment samples, data quality objectives statistics should be used to help plan the number of additional samples needed to further delineate the hotspot.

Navy Managers should be given a clear estimate of the costs involved in collecting and analyzing specific numbers of sediment and bioassay samples planned for optional phases in the RI/FS. The total number of chemical sediment samples that are planned to be collected

and analyzed is already 81 ! Bioassay analyses is also planned for most of these sediment samples.

The costs of chemical sediment and bioassay sample collection and analysis should be compared to the costs of several probable dredging and disposal clean-up scenarios. It may turn out that the whole harbor or a large part of it will have to be dredged anyway in a clean-up effort. The amount of dredging may be set at a standard amount or area by the Army Corps of Engineers. It is possible that the cost of taking many sediment samples will not result in a savings in clean-up costs. The cost of collecting and analyzing sediment samples from the harbor should be compared to the probable costs of dredging and disposal in an engineering economic analysis.

c. More background samples should be taken, a total of 5 to 8 samples, around the outside of the Mole. The background samples should be taken at locations far enough away from the Navy's property to guarantee good background samples and to absolve the Navy of responsibility for any contamination in the sampling areas.

The screening criteria used for chemicals in sediment that are listed in Table 9-4 and described in Appendix D, and subsequent clean-up standards for sediment should be checked to be sure they are acceptable to the Navy as ARAR's. Background levels of contaminants could be used as a clean-up standard. The use of clean-up standards with concentrations less than the background levels could result in cleaning-up Long Beach Harbor more than the adjacent industrial harbor areas. The transport of sediment from the adjacent harbor areas would in time recontaminate Long Beach Harbor back to the background level.

d. The chemical concentrations in scoured sediment should be checked versus the concentrations in unscoured sediment. The scoured sediments would be from dredged areas and would probably have different contaminate concentrations due to the dredging. If the contaminant concentrations in the scoured areas are below regulatory levels, the data from the scoured areas could be used possibly to justify limiting the cleanup of the dredged areas of the harbor. The grain sizes in the sediment samples can be used to determine if the sediment at a sampling location is scoured or unscoured.

e. The northwest corner of Long Beach Harbor inside Piers 7 and 9 should not be considered a different sediment environment from the West Basin. It is still shown as a separate sediment environment in Figure 9-4 page 9-35. Deep draft vessels, including LPH's, LHD's, LSD's, and LST's, frequently tie up to Pier 9. The propellors from these vessels would stir up the sediments the same way ship propellors stir up West Basin. The northwest harbor area is still listed on page 9-34 as an area with little shipping disturbance.

f. The information fron Lee Simon that he thought there might be old storm drains from off-base north of Ocean Boulevard running under the Naval Complex and emptying into Long Beach Harbor has not been included in the report yet. The locations of the possible storm drains should be checked on because if they are present, they would be a significant additional source of pollution to the harbor sediments.

g. A bottom depth NOAA chart map of Long Beach Harbor should still be included in Chapter 9. It would be very useful for the description of sediment sampling.

12. **Specific Comments on Site 9 in the Draft Naval Shipyard RI/FS Work Plan (Ref b):**

a. A three-dimensional drawing of the proposed net of sample points at Site 9 would help readers visualize the plan. The text is not quite clear enough on the positions of the sampling sites, but if a three-dimensional drawing were added, the text would be O.K. because then it would be a discussion of the drawing.

b. Be sure the soil and groundwater samples in the first two phases, the characterization of the lateral and vertical extent of the plume, are analyzed for a full range of chemical constituents only after the samples show VOC concentrations. The VOC concentrations are to be detected by a fast turnaround VOC analysis. This will prevent many samples from being taken at Site 9 before contaminant concentrations are detected.

c. Would the third phase of installing monitoring wells in and down gradient of the plume be carried out only if the vertical groundwater results show contamination?

d. Be cautious about drilling through the aquitard. The drilling crew should be carefully supervised by a geologist if they are asked to drill through the aquitard.

13. **Specific Comments on the Draft PA Report for Site 6B (Ref d):**

a. The recommendations in Chapter 4 for further soil and groundwater sampling at Site 6B are unclear. More soil and groundwater samples should be taken near the abandoned UST's at the site. During World War II, a fuel farm of 12 concrete 50,000 gal. UST's was constructed. Five of the abandoned UST's were backfilled with soil in the 1950's. No soil or ground water samples were taken near the UST's when the remaining 7 abandoned UST's were backfilled with soil in 1985. As shown in Figure 2-4, only two soil samples were taken near the abandoned UST's in the 1990 study of the site by the Port of Long Beach. More soil and ground water samples should also be taken at other locations in Site 6B, as recommended in Chapter 4, to evaluate the extent of soil and groundwater contamination.

b. The coastline and the coastal areas of Long Beach, San Pedro, and the Palos Verdes peninsula are not visible in Figure 3-1. Figure 3-1 should be copied darker so that the base map in the figure is clear below the overlayed geologic cross section line.

c. The surficial deposits extending from 5 to 80 feet below the ground surface of Site 6B are described as a shallow water-bearing zone in the text of Section 3.1, page 3-1. But in Figure 3-2, the Geologic cross-section, the surficial deposits below the Long Beach Naval Complex are labeled an Aquitard. On page 3-2, the aquitard is described as only 20 feet thick. Ground water is shown to occur between 2.0 to 2.5 feet above mean low low water on Figure 3-3, near the ground surface at the west end of the Naval Complex. Figure 3-2, the Geologic cross-section , should be changed to show the occurrence of ground water near the surface and a thin 20 foot thick Aquitard beneath the Naval Complex.

14. **Specific Comments on the Draft Site Management Plan:**

a. On page 9-5 and 9-6 of the Site Management Plan (Ref c), Figures 9-1 and 9-2 showing the proposed RCRA Corrective Action Schedules for the Long Beach Naval Station and Naval Shipyard should be updated to show the acceleration of the schedules for BRAC.

15. **Recommendations:**

a. Accept the Draft Work Plans and incorporate comments as appropriate. The steps listed in Comment 4(a) to correct the effects of the mistakes in the screening concentrations in the Work Plans should be completed. The RPM's and RTM's involved in the Long Beach RI/FS would like to check the contractor's work after the corrections of the screening concentrations, site data, and text discussions are made.

A plan for Data Quality Objectives Statistics should also be included in the section on the Harbor Sediments, Site 7. The number of sediment and bioassay samples planned to be taken from the harbor through the RI/FS project should be set according to Data Quality Objectives Statistical Methods. Navy Managers should also be given a clear estimate of the costs involved in collecting and analyzing specific numbers of sediment and bioassay samples planned for optional phases in the RI/FS.

b. Accept the Draft Site Management Plan (Ref c) and incorporate comments as appropriate, except that the mistakes in the screening concentrations and any resulting decisions should be repaired.

c. Accept the Draft Preliminary Assessment Report for Site 6B at the Long Beach Naval Station and incorporate comments as appropriate.

16. If you have any questions, please feel free to contact Chris Leadon at 532-1153.

Chris Leadon

Chris Leadon

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