18 November 1997

RESPONSE TO REGULATORY COMMENTS ON DRAFT SITE ASSESSMENT/EXTENDED SITE ASSESSMENT REPORT FOR 18 POINTS OF INTEREST, NAVAL TRAINING CENTER, SAN DIEGO, CALIFORNIA
CTO-0122

N00247.000473
NTC SAN DIEGO
SSIC # 5090.3

Comments from Mr. Hausladen

Written on 15 August 1997

Mr. Martin Hausladen
United States Environmental Protection Agency

COMMENTS

Comment 1: Sections 2.4.1 and 2.4.2. It would be helpful to provide a map with topographic contours. This would help the reader understand text references (e.g., the "flat area that may represent a natural terrace" and the reference to the topographic slope break).	**Response 1:** Please refer to Figure 2-5, Northern NTC Cross Section, for a view of the elevation changes across the base. This figure shows the text references, including the "natural terrace."
Comment 2: Sections 3.5.1 and 3.5.2. Please specify the filter size and method.	**Response 2:** All samples for metals analyses were filtered using a 0.45-micron filter that was placed in-line with the peristaltic pump used for the collection of the samples. These specificatons will be given in Sections 3.5.1 and 3.5.2.
Comment 3: Analytical tables in Section 4 only present concentrations above detection limits, leaving many table fields blank. Non detect results (e.g., < 0.5 mg/kg) should also be included in the tables. If a compound was not analyzed for a particular sample this should be indicated with NA.	**Response 3:** For clarity the tables in Section 4 are presented showing only the analytical results reported above the detection limits. The complete tables of all analytical results including those reported below the detection limits are presented in Appendix H. If all results, including those below the detection limits, were reported in the tables, they become difficult to read and understand due to the increased size.
Comment 4: At many sites arsenic was detected at concentrations exceeding the project-specific threshold level. However, the report attributed the arsenic to natural processes since the arsenic was generally detected within "background" concentrations established in several other investigations. Please provide a summary and discussion of these investigations and an analysis of their applicability to the NTC study area. A comparison of the geologic units used to establish the background levels to geologic units in the NTC study area should be included.	**Response 4:** NTC is located on the western slope of the Point Loma Peninsula. Part of the base is located on the in-place or slope deposits derived from the Bay Point Formation, a sequence of shallow marine, estuarine sediments. The lower (eastern) part of NTC is situated on dredged material from San Diego Bay, hydraulically placed over the salt marsh and salt flat deposits in the old mouth of the San Diego River. Two other Navy bases in the San Diego area have substantial portions of their land surface made up of fill hydraulically dredged from San Diego Bay - Naval Air Station North Island, and Naval Station San Diego. Both of these bases have had background studies performed for the hydraulic fill material.

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Comment 4 (continued)	**Response 4** (continued)
	At the Naval Station San Diego, 210 uncontaminated samples were statistically analyzed, and the 95th percentile of the arsenic concentrations was selected, in conjunction with regulatory agencies, as the background At the Naval Station San Diego, 210 uncontaminated samples were statistically analyzed, and the 95th percentile of the arsenic concentrations was selected, in conjunction with regulatory agencies, as the background threshold. This threshold value was 9.05 mg/kg. (BNI, 1996a) At the Naval Air Station North Island, immediately across San Diego Bay from NTC, 56 specifically selected "background samples" were analyzed for arsenic and the data were statistically analyzed. The 99th percentile of the arsenic concentrations was chosen, in conjunction with regulatory agencies, as the background threshold. This threshold value was 5.62 mg/kg. (JEG, 1995) A specific background study has not been performed for the various members of the Bay Point Formation (i.e. fine-grained shaley layers and coarser layers), but some data are available from studies at several sites on Point Loma. In particular, a fine-grained sample from approximately 40 feet below ground surface, with no contamination above it, exhibited 57 mg/kg of arsenic. Coarser-grained samples from the same location, as expected, had concentrations of arsenic generally less than 10 mg/kg. (BNI, 1996b) US EPA opinions are expressed in a 1992 "Issue Paper" titled "Options for Addressing High Background Levels of Hazardous Substances at CERCLA Sites". Among others, they refer to a 1975 US Geological Survey study designed to help with the issue of natural metals concentrations for various regions of the United States (Conner and Shacklette, 1975), and a Journal of Environmental Quality article on Selenium, Fluorine and Arsenic (Shacklette et al, 1983). Looking at these references, the natural range of arsenic for the U.S. is suggested to be <0.2 to 97 mg/kg and the mean value for the western U.S. is estimated at 6.1 mg/kg.

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Comments from Mr. Hausladen

Comment 4 (continued)	**Response 4** (continued) The project-specific threshold level for arsenic in soil is 0.38 mg/kg, which is the 1996 U.S. EPA Region IX PRG for residential landuse. As discussed above, naturally occurring arsenic levels in soils in the San Diego area would be expected to exceed this extremely low value. For the 18 POIs investigated in the SA/ESA, the arsenic concentrations reported in soils are well within the expected background arsenic levels found in the San Diego area. References to the documents cited above are included as Attachment A.
Comment 5: Section 4.4., pg. 4-10, paragraph 1. The second sentence is not written clearly. The sentence should state how risk was estimated using the maximum detected concentration and the PRG.	**Response 5:** The text will be revised to state that detailed information about the procedures and results are included in Appendix I.
Comment 6: Section 4.4, p. 4-11, paragraph 3. A tidal mixing factor of 30 is overly optimistic because several invalid assumptions were used in the methodology as presented in Appendix A. It is possible that tidal dilution within the aquifer can influence chemical concentrations prior to discharge to marine water, but unlikely that the mixing factor would be as high as 30. A general discussion of the tidal mixing and how it could influence chemical concentrations and risk could be retained but references to specific mixing factors should be deleted.	**Response 6:** All references to the tidal mixing factor will be removed from the Final Report. However, it should be noted that the tidal mixing factor and the discussion regarding it was included in the SA/ESA Work Plan, which was reviewed and approved by the regulatory agencies. It is an essential part of any investigatory program to produce reports which are consistent with the procedures (especially DQOs) defined and agreed to in work plan documents.
Comment 7: Section 4.8.6, p. 4-42, second bullet. The text states "that soil and groundwater are not contaminated with chemicals associated with machinery operations or maintenance," but low concentrations of several organic compounds that may be associated with the site were detected. It would be more correct to state that the results of the investigation indicate that the contaminants detected at the site are at concentrations that do not present an excess risk and that the extent of contamination is limited.	**Response 7:** The bullet will be reworded to state that the contaminants do not present an excess risk and the extent of the reported contamination is limited.

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Comments from Mr. Hausladen

Comment 8: Section 4.9.1, p. 4-43, paragraph 2. The Building 160 demolition date in the text does not match the demolition dates on Figures 4-9 and 4-10. Please clarify whether demolition occurred in 1984 or 1994 and revise either the text or the figures.	**Response 8:** Building 160 was demolished in 1994. Figures 4-9 and 4-10 will be revised to the appropriate date.
Comment 9: Section 4.10.2, p. 4-58, paragraph 1. Please clarify the number of wells used for the SVE system.	**Response 9:** Sentence 4 in paragraph 1 will be revised to state: "According to a report by OHM, ... 14 wells are being utilized for the SVE system. Of these 14 wells, 7 wells are located within Building 228, and 7 wells are located on the northwest and northeast sides of the building."
Comment 10: Section 4.11.6, p. 4-81, first bullet. Please show IRP Site 2 well MW-3 on Figures 4-15 and 4-16.	**Response 10:** Figures 4-15 and 4-16 will be revised to show IRP Site 2, well MW-3.
Comment 11: Section 4.12.6, p. 4-88, second bullet. The project-specific threshold level was incorrectly used as an indication of whether a release did or did not occur. Small releases or releases that have dissipated could result in the detection of analytes at concentrations below the project-specific threshold levels. Petroleum hydrocarbons are most likely not natural. Please change this bullet to indicate that the results of the investigation indicate that releases at the site, if they occurred, resulted in minimal contamination.	**Response 11:** The second bullet will be revised to read, "Based on the comparison of the soil and groundwater sample concentrations with project-specific threshold levels, contaminants at POI 19 do not present an excess risk, and the extent of the reported contamination is limited."
Comment 12: Section 4.16.6, p. 4-128, second and third bullets. There is some evidence for small releases of contamination to soil and groundwater. Toluene and TRPH were detected in soil and the solvent trichlorofluoromethane was detected in groundwater. Please revise these two bullets to indicate that there is evidence for small releases.	**Response 12:** The bullet will be reworded to state that although the contaminants are present, they do not present an excess risk, and the extent of the reported contamination is limited.
Comment 13: Figure 4-31, p. 4-134. Two samples were collected at location P72-B1. However, the results from only one sample are shown. Please include all analytical results on this figure.	**Response 13:** The results from the surface soil sample taken at P72-B1 were inadvertently omitted from the figure and will be added.
Comment 14: Figure 4-33, p. 4-139. The analytical results for P76-B1 are presented in a confusing format. Two sets of results for xylenes and toluene are presented for soil samples even though duplicate soil samples were not collected. Please change the presentation of the data to eliminate this confusion.	**Response 14:** The presentation of the groundwater results will be changed to eliminate the apparent confusion.

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Comment 15: Section 4.18.5, p. 4-140, last paragraph. Comparisons of analyte concentrations to project-specific threshold were incorrectly used as an indication of whether a release occurred. Project-specific threshold levels are an indication of risk regardless of whether a release occurred. Please correct the statement.	**Response 15:** The sentences will be reworded to read, "Concentrations of toluene and xylenes reported above detection limits in groundwater were significantly below project-specific threshold levels and were also reported in the associated method blanks. Therefore, due to the absence of TPH reported in both soil and groundwater and the very low concentrations of xylenes and toluene reported in groundwater, there is ..."
Comment 16: Section 4.19.5, p. 4-146, paragraph 3. The last sentence of the paragraph is poorly written. Threshold levels are incorrectly used as an indication of releases and the sentence seems to imply that soil and groundwater results can be ignored as an indication of a release because there is a "lack of other indications of a release." Please rewrite this sentence.	**Response 16:** The last sentence will be rewritten to read, "However, the metals are not typically associated with printing facility activities and are not reported above threshold levels in the soil. The soil and groundwater results indicate that activities conducted at Building 11 have not resulted in a release to soil or groundwater at POI 85."
Comment 17: Section 4.22, Figure 4-40 and Tables 4-18 and 4-19. The distinction between filtered and unfiltered sample results is central to the analysis of the groundwater data. Please clearly distinguish between filtered and unfiltered sample results on these tables and figures; if unfiltered data is not included, please provide this data so the reader can compare concentrations of filtered and unfiltered metals.	**Response 17:** All groundwater samples collected for metals were filtered. There are no unfiltered groundwater metals data from this investigation. Figure 4-40, Tables 4-18 and 4-19 will be revised to clarify this fact.
Comment 18: Section 4.22.5, p. 4-176, paragraph 3. The text states that the detected concentration of hexavalent chromium exceeds the project-specific threshold level in one sample; however, this sample could not be found on Table 4-18. Please clarify.	**Response 18:** Hexavalent chromium was reported above the detection limit in one of the groundwater samples, but it was below the project-specific threshold level. The sentence has been revised to read, "Of the 14 samples collected (13 direct-push and 1 monitoring well), aluminum (5 samples), copper (3 samples), and zinc (2 samples) exceeded ...."
Comment 19: Section 4.22.5, p. 4-179, paragraphs 1 and 2. Copper and zinc were used as historic antifouling additives to paint. Locations where painting or sandblasting of marine equipment was done, where paint was stored, or where spent sandblast abrasive or dredge were used as fill would likely have elevated levels of copper and/or zinc. These contaminants would be detected in groundwater from the impacted area and in downgradient monitor wells.	**Response 19:** Comment noted.

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Comments from Mr. Hausladen

Comment 20: Appendix A, page A-13, Tidal Mixing Factor Equation. There are many assumptions implied in the tidal mixing method which are not discussed. These assumptions should be stated so that applicability of these assumptions to site-specific conditions can be evaluated. Some of these assumptions appear to invalidate the method used to calculate the tidal mixing factors. The principal objections to the tidal mixing method are listed below:

a. The marine-aquifer boundary is assumed to be a vertical boundary. It is more likely that the boundary will be a sloping boundary and not a vertical boundary. A sloping boundary condition would reduce the tidal flux to the aquifer.

b. The methodology used to calculate a specific tidal mixing factor assumes complete mixing of fresh groundwater and saline marine water within the aquifer. This is highly unlikely due to the density differences between the relatively fresh groundwater and saline marine water. It is more likely that groundwater and marine water will not mix than that complete mixing will occur; therefore, the calculated tidal mixing factors, if not invalid, are extremely optimistic.

c. The method appears assumes almost instantaneous mixing at the aquifer boundary. The tidal flux is a function of the distance from the marine/aquifer interface (x), where the greater the distance (x), the lower the tidal flux value and lower the calculated tidal mixing factor. The instantaneous mixing assumption seems unreasonable.

Response 20:

a) For purposes of calculating the tidal flux to the aquifer, the aquifer flow is assumed to be at a right angle to the marine-aquifer boundary which is assumed to be vertical. This assumption is valid even though it is a simplification of the actual boundary conditions. While the tidal flux is reduced by the actual angle of the sloping marine-aquifer boundary (by the sin of alpha) the aquifer flux is proportionally reduced by the same angle; therefore, while the vertical marine-aquifer boundary is a simplification, it is a valid assumption.

b) Tidal flux of marine water into the freshwater aquifer occurs with the natural diurnal tidal changes. The tidal-mixing factor depends on the characteristics of the tide and the hydraulic characteristics of the groundwater system. During the flood tide, the amount of influence tidal flux has on the aquifer varies on a gradient based on the distance from the boundary interface. This gradient indicates mixing of marine and freshwater, despite the differences in water density, with the greatest degree of mixing taking place closest to the boundary. During the ebb tide, this mixed water is discharged to the marine system. Therefore, over a complete tidal cycle, the average value is as calculated regardless of the degree of mixing. Also, since the water quality objectives used to determine compliance with the Ocean Plan or the Enclosed Bays and Estuaries Plan are to be applied to 3-day or 30 day averages, the average value, as calculated, is appropriate. The equations presented in Appendix A, page A-13 were used to calculate this mixing factor within the aquifer.

c) The method used to calculate the tidal mixing factor does not assume almost instantaneous mixing at the aquifer boundary. As stated in Comment 20, part b mixing is assumed to occur within the aquifer over the period of a complete tidal cycle. Based on the calculation, a tidal mixing factor of 30 is estimated to occur in the sediments during one complete tidal cycle.

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Comments from Mr. Hausladen

Comment 21: Appendix A, page A-13, Tidal Mixing Factor Equation. The tidal mixing factor does not appear to be necessary to recommend no further action, so EPA recommends that all references to the tidal mixing factor be deleted from the SA/ESA.	**Response 21:** See response to Comment 6.
Comment 22: Appendix G. The original GPR records or traces referenced in the last sentence of the first page of the NORCAL letter were not included in Appendix A of the geophysical letter report.	**Response 22:** As noted on the cover page of Appendix F, the NORCAL GPR records and traces (originally Appendix D) were not included in the SA/ESA report. The original GPR records and traces did not contribute to the conclusions.
Comment 23: Appendix G. The daily field reports (Appendix D) of the letter report were not included, and the text does not include a discussion of calibration procedures or base-station procedures. Please discuss procedures used to set up and calibrate the magnetometer. Also discuss whether base station readings were made, the frequency of those readings, and the location of the base station. Since only gradiometer measurements were made, base station measurements for diurnal variation are unnecessary, but are often useful to evaluate cultural interference.	**Response 23:** Daily calibration was performed as indicated on the attached NORCAL "Equipment Functional Checks" sheet (Attachment B). Calibration records are contained in the survey electronic file and were not included in the report. Daily reports and calibration records are available for review by advanced notice from the files at the NORCAL office.
Comment 24: Appendix G. The plates from two investigation reports were mixed together and Plate 2 from the first investigation report was missing. It would be much easier to understand the geophysical report if the second report and associated figures were together in one place and either preceded or followed the first report.	**Response 24:** The main report and supplemental report were combined to avoid duplication in the Draft SA/ESA. They will be included as separate reports in the Final SA/ESA report, as requested.
Comment 25: Appendix H. Please provide an explanation of abbreviations and data qualifiers at the beginning of the analytical tables.	**Response 25:** Explanations of the abbreviations and data qualifiers will be included at the beginning of the Appendix H analytical tables in the Final SA/ESA.

ATTACHMENT A

REFERENCES

References Cited

BNI (Bechtel National, Inc.), 1996a, **Background Study Report Naval Station San Diego**, Prepared for SouthWest Division Naval Facilities Engineering Command.

BNI, 1996b, **Extended Site Inspection, Sites 5, 10 and 20, Naval Command, Control and Ocean Surveillance Center, Point Loma**, Prepared for SouthWest Division, Naval Facilities Engineering Command.

Conner and Schacklette, 1975, **Background Geochemistry of Some Rocks, Soils, Plants and Vegetables in the Conterminus United States**, US Geological Survey Professional Paper 574-F.

JEG (Jacobs Engineering Group), 1995, **Naval Air Station North Island Background Soil Sampling Report**, Prepared for SouthWest Division, Naval Facilities Engineering Command.

Shacklette, H.T., Boerngen, J. G., and Keith, J. R., 1983, **Selenium, Fluorine, and Arsenic in Surficial Materials of the Conterminus United States**, **Journal of Environmental Quality,** vol. 12, no. 1.

ATTACHMENT B

NORCAL
Equipment Functional Checks

NORCAL

Equipment Functional Checks

We performed equipment functional checks for the ground penetrating radar (GPR) electromagnetic line location (EMLL) and vertical magnetic gradiometer (VMG) equipment prior to the start of any data acquisition to check for proper equipment operation. These tests consisted of; 1.) performing the internal tests as specified by the manufacturer of each instrument; 2.) performing external tests to verify that reasonable, repeatable, and continuous data were obtained; 3.) verifying that the horizontal control coordinates corresponded to the coordinates recorded in the instrument. We also monitored sensor and/or receiver alignment as well as proper data acquisition rates. Additional monitoring of data quality including downloading, reviewing, and processing data at the end of each day.

The external functional checks for the GPR and EMLL equipment were performed at the beginning of each field day at either a designated test site, or the survey area we began work at. These checks included operating the EMLL and GPR equipment over a known utility alignment. We verified that both EMLL instruments provided a response typical of a continuous metallic pipeline, and adjusted gain levels accordingly. We then collected GPR data along a 10 foot calibration traverse over the known alignment. We examined the GPR data for reflection patterns typical of underground utilities. We then obtained a second profile over the same traverse to verify that the GPR data was repeatable. We also made a time scale calibration check with the built in time calibrator.

The VMG functional checks included a "Cold Boot" of the system prior to the investigation at the various sites. The "Cold Boot" function resets the instrument's memory and acquisition parameters to the original factory specifications. We then manually entered the specific parameters for our survey, i.e. sampling rates, and survey spacings. The instrument was then operated within each survey area at a specific grid node that appeared to be free of significant metallic sources. A total of seven to ten measurements were taken before and after the data acquisition to verify that the measurements were repeatable to within 1% of the mean.

Documentation of these checks included recording the VMG measurements and GPR profiles. Other notations included the date, time of day, site number, antenna frequency, and operator initials for reference. This was also documented in the Daily Field Reports.