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

September 14, 2001

BRAC Environmental Coordinator
Base Realignment and Closure, Environmental Division
Attn: Mr. Dean Gould
P.O. Box 51718
Irvine, CA 92619-1718

RE: Draft Final Phase II Focussed Feasibility Study and Draft Proposed Plan, OU-3, IRP Site 16, Crash Crew Training Pit No. 2, Marine Corps Air Station, El Toro

Dear Mr. Gould:

Enclosed please find EPA's comments on the Draft Final Focussed Feasibility Study for Site 16. Comments from EPA's regional counsel, Thelma Estrada, apply to both the Proposed Plan and the Focussed FS.

As our comments indicate, EPA has the following three primary concerns:

- the FFS does not appear to provide an adequate range of alternatives (in particular, a true treatment option);
- the proposal to close the vadose zone requires further justification, and;
- the proposed monitoring remedy for the groundwater does not meet remedial action objectives.

In addition, we have some concern regarding the fact that this document is in draft final form. It appears that this report is significantly different from the draft document and, based on the comments EPA and the State have provided, there are critical issues that must be resolved before this report can be finalized. We suggest that the Navy consider holding working meetings with the BCT when developing the final report.

We look forward to discussing these issues in furtherance of the environmental cleanup of MCAS El Toro.

If you have any questions, please call me at (415) 744-2366.

Sincerely,

Nicole G. Moutoux
Project Manager
Federal Facilities Cleanup Branch

Enclosures
cc: Marc Smits, SWDIV
Triss Chesney, DTSC
Patricia Hannon, RWQCB
Greg Hurley, RAB Community Co-Chair
Marcia Rudolph, RAB Subcommittee Chair
Ms.Polan Modanlou, MCAS EL Toro Local Redevelopment Authority

Draft Final Focused Feasibility Study for Site 16

General Comments

1. The three remedies described in the Draft Final FS are No Further Action, Groundwater Monitoring, and Containment with Groundwater Monitoring. The Focused FS should provide at least one remedial alternative that includes active treatment against which the other alternatives can be compared.

2. Given that the Multi-Phase Extraction Study was not effective for groundwater cleanup, but quite effective for soil, has the BCT ever discussed the viability of Air Sparging in conjunction with SVE?

3. In the discussions of Alternative 2, the Navy makes many references to natural attenuation, yet, the remedy proposed and evaluated is Groundwater Monitoring. Since the Navy believes that some form of natural attenuation is occurring, the Navy should consider adding natural attenuation as part of an additional more active alternative.

4. Comments on the Technical Memorandum for Site 16 should be resolved before this FS can be finalized.

5. It is not clear how the groundwater flow direction to the northeast at the site has been determined with certainty. The groundwater monitoring wells shown on Figure 1-13 are essentially co-linear. As long term monitoring of the site and the Navy's estimation of the extent of contamination at the site are dependent on the direction of groundwater flow at the site, it is critical that the direction of groundwater flow at the site be determined with accuracy. If additional groundwater elevation data from adjacent sites is available to support the Navy's assumed groundwater flow direction, please present it in the Draft Final Phase II Focused Feasibility Study Report. If this data is not available, please indicate how sufficient data will be obtained to determine the direction of groundwater flow at the site or provide further justification for why the stated groundwater flow direction is accurate.

6. The FFS Report indicates that there may be up to 90,000 gallons of petroleum hydrocarbons in the site vadose zone (Table 2-4). It is not clear what influence the presence of these hydrocarbons has on the concentrations of trichloroethylene (TCE) detected in soil gas collected from the site vadose zone, or on the mass of TCE present in the vadose zone soils. Because chlorinated solvents were co-disposed with the hydrocarbons used at this fire-fighting training facility, significant amounts of TCE may still be contained in this hydrocarbon matrix. Mass transfer limitations from this matrix may not release TCE to the soil gas in the time frame considered by the Navy, and thus the rebound period allowed by the Navy to assess the effectiveness of the vadose zone component of the multiphase extraction (MPE) may not have been sufficient. Please revise the FFS Report to address the possible interaction between the chlorinated solvents and the petroleum hydrocarbons that are still present in the site vadose zone.

7. The modeling of the future movement of the TCE plume and of the vadose zone as a continuing source to the groundwater employs a number of assumptions and simplified conditions, and therefore the quality of the modeling results may not be suitable to the remediation decisions to be made at the site, particularly if the decision is to only monitor the TCE plume over 19 years when the model estimates the concentrations will have decreased below the 5 ug/L target Maximum Concentration Level (MCL) . For example, the assumption that TCE does not sorb to saturated zone soils is conservative in overestimating the extent of the plume, but this assumption also may underestimate the estimated time required for concentrations to drop below the MCL. Please conduct additional modeling based on more accurate site information, and possibly includes some sensitivity analyses to provide a better evaluation of future groundwater conditions.

8. The FFS lacks a description of any regrading at the site. Ponding of rainfall or other water releases at the site would increase infiltration into the site vadose zone which could lead to the transport of contaminants (VOC and petroleum hydrocarbons) to groundwater. The Navy should consider adding regrading of the site to all alternatives other than NFA.

Specific Comments

1. **Section 1.3.2 Physical Characteristics of the Site, Page 1-25, Figures 1-12 and 1-13**: The text states that the regional groundwater flow is to the northwest in the shallow and deep aquifers, and the figures show these same directions for the Site 16 Units 1 and 2. However, the figures show the monitoring wells in a near-linear alignment which then does not conclusively define flow in the northwest direction. Given the complex lithology and possibly discontinuous sand lenses, please discuss how these few wells in a narrow linear array are sufficient to determine that preferential groundwater flow is not in a more northerly or westerly direction, and whether these monitoring wells shown are suitable for defining and monitoring the TCE plume.

2. **Section 1.3.3.1 Draft Final Remedial Investigation Report, Page 1-26:** Cross sections showing the presence and contours of petroleum hydrocarbons would be useful to better develop a conceptual model for chemicals that remain in soil. Contours for TCE in the soil profile on Figures 1-9 and 1-10 would also be useful for comparison with the petroleum contours because the mass of petroleum is likely a sink of TCE to the vadose zone as well as saturated zone soils. Please provide these contours and discuss the uncertainties in the mass estimates of both TCE and the petroleum hydrocarbons, noting the complex lithology of the site as shown in Figures 1-9 and 1-10, and include in particular the extensive coarse-grained sands near the water table.

3. **Figure 1-8, Page 1-31**: This figure only shows the 5 ug/L TCE contour but groundwater concentrations at the site have been recently measured as high as 260 to 390 ug/L. Please include the contours for these higher concentrations contours to better describe the presence of TCE in groundwater at Site 16.

4. **Section 1.3.4 Multiphase Extraction Pilot Study, Pages 1-39 through 1-83:** While a large mass of VOCs have been removed by the Multiphase Extraction (MPE) Pilot Study, the estimates of the masses of TCE and petroleum hydrocarbons remaining in soil appear to have considerable uncertainty. For example, page 1-71 notes that approximately 72 pounds of TCE was removed during the MPE study and that previous calculations had estimated approximately 60 pounds of TCE were present; page 1-74 states that a revised calculation now estimates that 99 pounds of TCE were initially present. Please discuss the uncertainties in these estimates, including an evaluation of the complex lithology that may have allowed preferential extraction through more permeable soils and leaving a significant mass of TCE in the petroleum phase that is available for mass transfer-limited diffusion, concentration buildup, and TCE loading to groundwater.

5. **Section 1.3.5.4 Chemical Persistence and Mobility and Table 1-18, Pages 1-96 through 1-101:** The data in Table 1-18 are not appropriate for evaluating the mobility and persistence of VOC constituents in Site 16 soils in the most contaminated area. The amount of each constituent sorbed is presented as a range of percent values based on organic carbon data measured on Unit 3 soils, and the organic carbon on soils in the contaminated area (Unit 2) may be higher than these background soils and therefore more TCE may be in the sorbed phase. The calculations also ignore sorption to the clay fraction of soils which is important when the organic carbon content of soils is very low. The listed transformation half-lives by microbial processes for constituents in soils are also inappropriate as they are literature values. More accurate representations of sorption should use organic carbon data measured on the specific soil parcels of interest; if these data are measured for Site 2, please instruct the laboratory to use methods that do not lose the more volatile hydrocarbon petroleum constituents that are often lost using the standard organic carbon method. Please also revise the text to state that the listed half-lives in soil are likely underestimates of persistence, and they do not pertain to constituents that are within the hydrocarbon matrix; for example the listed "conservative" biotransformation half-lives (see footnote c) in Table 1-18 for TCE and benzo(a)pyrene are 1 year and 1.45 years, respectively, and the persistence of these chemicals at many other sites shows these half-lives are clearly underestimates.

6. **Section 1.3.5.5 Groundwater Modeling and Mass Loading Evaluation, Page 1-102:** The modeling and calculation effort presented in this section are described as "limited" and "simplified", respectively, and yet the results are represented as being key for making decisions that groundwater monitoring and possibly groundwater extraction are sufficient for groundwater remediation, and that further soil venting is not necessary. Although some aspects of the modeling assumptions are not clear in this Draft Final Study Report, an evaluation of the information available does suggest that some assumptions may be inappropriate, and some of these issues are discussed below. Please consider collecting additional data to support the assumed site specific conditions or conducting some analyses of the sensitivity of the calculation/modeling results.

7. **Groundwater Model Results, Page 1-104 and Table 1-20:** The text and Table 1-20 states that the retardation factor is assumed to be zero (sorption does not occur) and which is considered conservative in projecting the maximum extent of the TCE plume.

While an estimation of the maximum extent of the TCE plume is useful in the absence of site specific data, neglecting sorption ignores the saturated zone soils as a continuing source of TCE to the groundwater plume. This assumption of no sorption then minimizes the time required for the plume concentrations to drop below the 19 years as projected by the model. It is also unclear how the model results reflect amount of TCE already sorbed to these soils if the amount of TCE sorbed is higher than calculated in table 1-18. Please reevaluate the consequences of the assumption of zero TCE sorption on soils with regard to the extent of the plume, the concentrations within the plume and the time for concentrations of TCE to drop below the stated 5 ug/L TCE target value. In the absence of site specific data, please consider several modeling scenarios where a range of TCE sorption to soil is used to estimate the TCE concentrations in groundwater, and where the sorbed TCE mass is also considered as a continuing source to groundwater.

8. **Groundwater Model Results, Page 1-104 and Table 1-20:** The first paragraph states that the modeling simulation was conducted to "represent natural groundwater conditions at Site 16 (i.e., no groundwater pumping)", and yet Table 1-20 indicates that sustained pumping at 15 gallons per minute (gpm) was assumed at 16GE1 and 0.5 gpm at 16MPE1. Later discussions indicate that these rates were assumed for the groundwater extraction scenario. Please clarify if pumping at 16GE1 and 16MPE1 was assumed for the natural groundwater conditions, contrary to what is stated in the text. Please also clarify why pumping of 0.5 gpm at 16MPE1 was included in the scenarios and whether any other parameters were changed between the scenarios.

9. **Mass Loading Threshold Estimates, Page 1-111**: The "simplified calculation" used to estimate the mass loading to groundwater from vadose zone soil gases is useful initial information for a conceptual model but several aspects of the calculation are not clear. For example, if the groundwater model used the same parameters listed in Table 1-20, please indicate if the assumed mixing zone is actually 30-feet deep, recognizing the considerable dilution is provided by this assumption. Please discuss the condition that, if no sorption is assumed and the existing TCE in groundwater is effectively decreased by advection/dilution and dispersion, TCE loading from an 83 ug/L concentration in soil moisture into a shallower mixing zone would exceed the 5 ug/L MCL value. Please also provide more information on how the loading of TCE in soil moisture was simulated for the modeling effort.

10. **Section 1.3.5.5 Groundwater Modeling and Mass Loading Evaluation, overview for entire section:** Although the modeling and calculations are limited and have many assumptions, the modeling results do not appear to be consistent with historical site data and the site conceptual model that is described on pages 1-98 and 1-99. For example, the vadose zone-to-groundwater loading calculation develops a "modeling factor" of 16.6 that relates TCE concentration in soil moisture to that in groundwater (83 ug/L and 5 ug/L, respectively (page 1-115). The TCE concentrations in groundwater are approximately 250 ug/L for the April 2001 sampling (Table 1-14), suggesting the corresponding soil moisture concentrations of TCE producing such groundwater concentrations would then be on the order of a 4,000 ug/L. If "most of the TCE loading to groundwater ... occurred

15 to 28 years ago" (page 1-104), and TCE concentrations in groundwater have been decreasing in the subsequent 15 to 28 years as the modeling effort suggests, then the TCE concentrations attributed to leaching would have been substantially higher than the 4,000 ug/L value. Such TCE loading to groundwater would suggest high TCE concentrations that also could be attributed to TCE movement to the water table either in a separate TCE phase or at a high concentration in the petroleum carrier. Please evaluate the uncertainties with regard to the distribution of chemicals at the site as they are present in the vadose zone and as a source to groundwater. Please revise the FFS Report to provide additional details on the assumptions of the groundwater model and how the allowable soil gas concentration was calculated. Please also justify why the mass loading does not apparently consider the hydrocarbon matrix in the vadose zone as a TCE source.

11. **Section 2.3.2 Saturated Zone Contamination, Page 2-16 and Tables 2-7 and 2-8:** There is no discussion of the uncertainties of the plume volume and mass of TCE in groundwater in the cited tables. Please evaluate the uncertainties in these data, and explain how the average TCE concentration of 60 ug/L was selected. Please also explain why the calculation of the estimated mass of TCE in groundwater does not include any contribution from the TCE sorbed to saturated zone soils.

12. **Section 3.2.2.1 Long Term Groundwater Monitoring, Page 3-11:** In addition to the parameters listed in the groundwater monitoring program, please also include Total Organic Carbon (TOC) analyses, particularly if Total Petroleum Hydrocarbons by EPA Method 8015-M may be dropped from the monitoring program. Please consider that TOC is a very useful measure of groundwater quality with regard to changes in site geochemistry as well understanding the quality of groundwater itself.

13. **Costs, Tables 4-1 and 4.2, Pages 4-14 and 4-22, respectively**: The indirect costs require some explanation as to apparent discrepancy in the values reported and which are magnified into the Total Cost estimates by the contingency and escalation factors. In particular, the Total O&M cost for Alternative 2 is $568,233 and the Indirect Cost is $271,445, or a factor of 2. For Alternative 3 the corresponding costs are $1,166,239 and $1,381,376, or a factor of 0.8. While it is understood that these costs result from the use of the RACER cost model, please explain the substantial increase in the indirect costs for Alternative 3.

Comments from EPA's Office of Regional Counsel:

1. Both the Proposed Plan and the draft final FFS state that alternatives 2 (groundwater monitoring and deed restrictions) and 3 (containment and deed restrictions) will comply with ARARs. However, both documents do not even cite to, much less discuss, a potential State ARAR, Resolution 92-49. Res. 92-49 requires dischargers to cleanup and abate the effects of their discharges in a manner that promotes attainment of background water quality, or the best water quality (not exceeding water quality objectives) that is reasonable if background water quality cannot be restored. Res. 92-49 also requires the discharger to conduct a technical and economic feasibility analysis in deciding what best

water quality is reasonable. If the DON does not agree that Res. 92-49 is a State ARAR, it nevertheless still needs to discuss and explain its analysis in these documents. The two documents also need to state what the Regional Water Board's position is on DON's position regarding Res. 92-49 at El Toro.

2. Alternative 2, which the DON prefers, is confusing. This alternative is called groundwater monitoring with deed restrictions. Yet, in discussing this alternative in both the FS and the PP, DON seems to be also stating that under this alternative, groundwater will also be cleaned up through "natural processes" to MCLs. If DON is proposing an alternative that is basically monitored natural attenuation, it should call it that and discuss the criteria and requirements for MNA.

3. It appears that the Navy is essentially stating that since the aquifer at this site is not currently a source of drinking water because of high TDS, that it is fine to allow the groundwater to stay contaminated for 19 years (the time for the plume to go down to MCLs under alternative 2). I believe this aquifer is a potential source of drinking water. DON needs to justify its decision not to cleanup this potential source of drinking water for the next 19 years, and why such a decision still complies with Federal and State ARARs.