



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
REGION 2  
290 BROADWAY  
NEW YORK, NY 10007-1866

07/11 - 7/2005

**CERTIFIED MAIL**  
**RETURN RECEIPT REQUESTED**

Mr. Kevin Cloe  
Navy Technical Representative  
Installation Restoration Section (South)  
Environmental Program Branch  
Environmental Division,  
Atlantic Division (LANTDIV), Code EV23KC  
Naval Facilities Engineering Command  
6506 Hampton Blvd.  
Norfolk, VA 23508-1278

Re: Naval Activity Puerto Rico (NAPR), formerly Naval Station Roosevelt Roads,  
EPA I.D. Number PRD2170027203, EPA Comments on:

- 1) Tow Way Fuel Farm (SWMUs 7 & 8) Draft Final Corrective Measures Study Final Report, dated November 2004, and
- 2) SWMU 54 and 55 Draft Corrective Measures Study Final Report, dated October 2004
- 3) SWMU 9 Draft Work Plan for Steps 3b and 4 of Baseline Ecological Risk Assessment for Area B (Tanks 214 and 215), dated December 1, 2004.

Dear Mr. Cloe:

The United States Environmental Protection Agency (EPA) Region 2 has completed its review of the above two Draft CMS Reports and the Navy's response to EPA's January 30, 2004 comments on the November 2003 Draft CMS Final Report for Tow Way Fuel Farm. The above two CMS reports and the Navy's responses to EPA's prior comments on the Tow Way Fuel Farm CMS were submitted on behalf of the Navy by Baker Environmental's letters of October 28 and November 8, 2004. As part of our review, EPA requested our contractor, Booz Allen Hamilton, to review both CMS reports and the Navy's response to EPA's January 30, 2004 comments on the November 2003 Draft CMS Final Report for Tow Way Fuel Farm. EPA has also completed its review of the proposal for conducting steps 3b and 4 of the Baseline Ecological Risk Assessment (BERA) for SWMU 9 Area B (Tanks 214 and 215), dated December 1, 2004.

Draft CMS Final Reports for Tow Way Fuel Farm (SWMUs 7 & 8) and SWMUs 54 & 55

Based on these reviews, EPA has determined that the Draft Final CMS reports for Tow Way Fuel Farm (SWMU 7 & 8) and SWMUs 54 & 55, as well as the final remedy proposals made in them, have significant outstanding issues that must be resolved before those CMS reports can be accepted and the proposed final remedy recommendations be considered sufficiently acceptable to proceed with public review and comment on them. EPA is concerned about certain unsupported assumptions, particularly with regard to the monitored natural attenuation (MNA) remedies proposed for the dissolved constituent plumes in the groundwater at both Tow Way Fuel Farm and SWMUs 54 and 55. Any MNA proposal must be consistent with EPA's 1999 Guidance (OSWER Directive 9200.4-17) on the usage of MNA at Superfund and RCRA sites. EPA has a number of other concerns, including:

- a) incomplete analysis of the fate and transport of the dissolved contaminants in the groundwater, particularly at SWMU 55. EPA's concerns regarding fate and transport of the dissolved contaminants at SWMU 55 were previously discussed in our letters of February 24, 2004 and September 1, 2004 (regarding the Draft and Final TCE Plume Delineation and Source Investigation Reports), and also in the enclosed Technical Review;
  
- b) the recommendation for continued usage and extensive expansion of the hydrocarbon recovery system at Tow Way Fuel Farm, utilizing only phased-separated hydrocarbon (PSH) "skimming". EPA recommends that consideration be given to implementing a recovery system involving not only "skimming", but also including some form of more aggressive multiphase recovery system, such as a dual-phase (PSH and water), i.e., a pumping well system, or even multiphase extraction (water, PSH, and vapor) system, i.e., vacuum enhanced recovery system. The usage of a dual-phase or multiphase recovery system typically should significantly reduce the remedial time frame to achieve acceptable clean-up, by reducing the remaining PSH volume to a much greater extent and more rapidly than through the usage of an entirely passive recovery system, i.e., PSH "skimming". With "shimming" no hydraulic "draw-down" is created around individual recovery wells. Such "draw-down" enhances PSH movement towards the recovery well. The passive "skimming" system proposed in the CMS calls for 60 recovery wells. A dual-phase or multi-phase system typically requires a much smaller number of wells due to each well having a much greater "zone of influence/capture". While EPA is aware of Navy concerns with the increased operation & maintenance (O & M) costs and NPDES or UIC permitting requirements for handling the volumes of groundwater recovered with a dual-phase or multi-phase recovery system, a shortened remediation time frame using a dual-phase or multi-phase recovery system could mitigate the costs associated with the O & M and permitting requirements, compared to an all "skimming" recovery system.

c) EPA also has concerns that the recommended remedy for the contaminated soils at Tow Way Fuel Farm involves only institutional controls/land use restrictions. The CMS indicates that because the Navy plans to keep the fuel lines at Tow Way Fuel Farm in place, and moth-ball them until the future use of the fuel systems is determined, excavation of contaminated soils is not practical. However, the presence of an inactive, moth-balled system, that the Navy has no plans to utilize, and over which the Navy intends to relinquish control, should not represent an impediment that precludes aggressive remediation of the contaminated soils to provide a permanent remedy. EPA's policy is for a preference for a permanent remedy rather than a remedy based entirely on imposition of land use restrictions. Therefore, EPA recommends that the CMS be revised to include some excavation of the contaminated soils at Tow Way Fuel Farm. Excavation could significantly reduce the duration of time over which land use controls might be required. This is particularly true with regard to arsenic contamination in the soils at Tow Way, as concentrations of this contaminant is not expected to degrade over time. Otherwise land-use controls might be required in perpetuity, unless the arsenic and other contaminant levels are reduced via excavation or some other remedial measure, to levels fully protective of human health.

d) MNA is proposed as part of the recommended remedy for groundwater at both Tow Way Fuel Farm and SWMUs 54 and 55; yet the effectiveness of MNA at these sites in a reasonable timeframe has not yet been demonstrated, as required pursuant to EPA's 1999 Guidance (OSWER Directive 9200.4-17) on the usage of MNA at Superfund and RCRA sites. The 1999 MNA Guidance indicates that "...MNA will be an appropriate remediation method only where .....it will be capable of achieving site-specific remediation objectives within a timeframe that is reasonable compared to other alternatives." The 1999 Guidance also requires that "...the effectiveness of MNA in both the near-term and long-term timeframes should be demonstrated to EPA..." In addition, other remedial measures (such as enhanced bioremediation at SWMU 54 and injection of sodium permanganate at SWMU 55) to supplement or enhance MNA are recommended to be pilot tested to evaluate their effectiveness. Therefore, both CMS Reports should be revised to clearly describe what actions will be taken if:

- 1) based on the first two years of future groundwater monitoring results MNA is found to not be sufficiently effective in a reasonable timeframe, and/or

- 2) the bench and/or pilot scale tests of other remedial measures to supplement or enhance MNA (such as enhanced bioremediation at SWMU 54 and injection of sodium permanganate at SWMU 55) demonstrate that those other measures will not likely be effective.

e) In addition, all the recommended remedies for both Tow Way Fuel Farm and SWMUs 54 and 55 involve some institutional controls. However, the proposals for institutional controls are not sufficiently detailed to allow EPA to fully evaluate the adequacy of such controls. Also, the draft CMS reports do not describe how the land use and groundwater usage restrictions will be maintained and monitored following sale or transfer of those portions of the property where these SWMUs are located.

The above and other concerns are discussed more fully in the enclosed two Technical Reviews.

Pursuant to Condition III.E.7(c) of the facility's existing RCRA permit, within 45 days of your receipt of this letter, please submit either revised Draft CMS Final Report for Tow Way Fuel Farm (SWMU 7 & 8) and for SWMUs 54 and 55, or addendum to those CMS reports, addressing the above comments and those in the two Enclosures. If the revised Draft CMS Final Report and/or addendums are found to acceptably address EPA's concerns, then pursuant to Condition III.E.9 of the RCRA permit, the selected remedies must undergo public review and comment before being fully approved by EPA.

Draft Work Plan for steps 3b and 4 of BERA for SWMU 9 Area B (Tanks 214 -215)

As you know, as part of our review of the Draft Work Plan for steps 3b and 4 of the BERA, EPA and our contractor, Booz Allen Hamilton, have reviewed and commented on several preliminary versions of this proposal, which were revised and submitted on behalf of the Navy by Baker Environmental, via Email. EPA has determined that the Draft Work Plan for steps 3b and 4 of the BERA submitted on behalf of the Navy by Baker Environmental's letter of December 1, 2004 is acceptable. However, prior to implementation of the work, EPA requests that the Navy submit, for EPA's concurrence, a table and/or map giving the exact number and/or locations where samples will be collected for the *Leptocheirus plumulosus* toxicity tests described in Section 6.3.1.2 of the December 1, 2004 Work Plan for steps 3b and 4 of the BERA.

If you have any questions, please telephone me at (212) 637- 4167.

Sincerely yours,



Timothy R. Gordon  
Remedial Project Manager  
Caribbean Section  
RCRA Programs Branch

Enclosures (2)

cc: Ms. Yarissa Martinez, P.R. Environmental Quality Board, w/o encl.  
Mr. Julio I. Rodriguez Colon, P.R. Environmental Quality Board, w/encl.  
Commander S.D. Kennedy, NAPR, w/o encl.  
Ms. Kathy Rogovin, Booz Allen & Hamilton, w/o encl.  
Mr. Mark Kimes, Baker Environmental, w/encl.

**TECHNICAL REVIEW OF THE  
NOVEMBER 2004 CORRECTIVE MEASURES STUDY FINAL REPORT (CMS FINAL  
REPORT) AND NAVY RESPONSE TO EPA JANUARY 30, 2004, COMMENTS ON THE  
NOVEMBER 2003 DRAFT CMS FINAL REPORT**

**TOW WAY FUEL FARM  
NAVAL ACTIVITY PUERTO RICO  
CEIBA, PUERTO RICO**

**REPA3-1203-045  
December 10, 2004**

**I EPA GENERAL COMMENTS**

1. The response is acceptable.
2. The response is acceptable based on information presented in Tables 3-1 through 3-3.
3. The response is acceptable.
4. The November 2004 Corrective Measures Study Final Report (CMS Final Report) now provides additional information on estimated time frames for alternative implementation and achievement of corrective action objectives (CAOs). However, the estimated time frames are unsupported and appear to represent very general "ballpark" numbers. For example, the estimated time frames for contaminant concentration reduction via monitored natural attenuation (MNA) are presented in Appendix B as either 10 years (if other groundwater treatment methods are used along with MNA) or 20 years (without additional treatment). The duration of required MNA activity is dependent on the ability of each initial active treatment component to remove source materials and treat groundwater. Consequently, a qualitative discussion to support the estimated time frames should be provided. The CMS Final Report should be revised to more accurately predict and fully justify estimated time frames for achieving CAOs for each medium within each alternative. It should be noted that, although each alternative will be evaluated as a whole with regard to projected time required for cleanup, the estimates will need to be determined on a media-specific basis (e.g., soil, groundwater, and phase separated hydrocarbon [PSH]).

Finally, Naval Activity Puerto Rico (NAPR) should review the Technical Implementability sections throughout Section 2 to ensure that the description of each alternative includes the estimated time frame for cleanup of each impacted medium (soil, groundwater, and PSH). Where appropriate, the report should indicate that contamination is expected to remain in place indefinitely.

## **II BAH GENERAL COMMENTS**

1. The response is acceptable.
2. The response is acceptable.
3. The response is acceptable.
4. The report should be expanded to include more specific cleanup time frame estimates and complete documentation on the basis for such estimates. Refer to the discussion on EPA General Comment 4 above for further detail.
5. The response is acceptable.
6. The response is acceptable.
7. The response is not acceptable. In addition to referencing the response to Specific Comment No. 4, which has been found to be inadequate, the response does not provide a convincing demonstration that alternative remedial options, such as two- and three-phase extraction, would not significantly increase the removal rates for PSH. The response cites an 8-month period in which a multiphase extraction system was operated but in which only 20 gallons of PSH were removed to refute the results of the earlier Terra Vac study. However, no further explanation or analysis of this poor performance was provided. A more complete analysis and comparison of the Terra Vac and subsequent tests should be provided to evaluate the potential efficacy of multiphase extraction technologies.
8. The response is not acceptable. The response indicates that the Resource Conservation and Recovery Act (RCRA) Part B Appendix B does not require a discussion of the distribution of PSH and contaminated groundwater relative to the site hydrogeology and the impact of that site hydrogeology, including the variability in hydraulic characteristics of subsurface materials, on the performance of remedial technologies. However, Section IV, A, 1 of Appendix B of the RCRA Part B Permit requires that the performance based on effectiveness of each remedial alternative be evaluated. Appendix B (pg. B-5) specifically requires that, "any specific waste or site characteristics which could potentially impede effectiveness shall be considered." The response has also referred to the Corrective Measures Site Investigation Report for cross sections of the site that identify subsurface materials and PSH thickness. However, the Corrective Measures Site Investigation Report does not provide a cross section through the principal area of PSH remediation. The information and analysis requested in the original comment is still required to fully evaluate the technologies that are under consideration for remediation of PSH and contaminated groundwater.

9. The response is acceptable.
10. The response is partially acceptable. The response is correct in stating that process options were screened during the CMS Task 1 to eliminate those that do not achieve the corrective measure objective within a reasonable time. However, as indicated in Section III.C. of Appendix B of the RCRA Part B Permit (pg. B-3), the Task I screening “focuses on eliminating those technologies which have severe limitations for a given set of wastes and site-specific conditions.” Thus, it is still necessary in subsequent CMS tasks to evaluate and clearly demonstrate the efficacy of a screened technology, particularly as it will be applied in each specific remedial alternative.

The CMS Final Report has provided greater detail and analysis of the PSH skimming technology as intended for use in the remedial alternatives under consideration. These details include the use of 60 skimming wells and an assumed radius of influence of 25 feet. However, no analysis has been presented to demonstrate that PSH skimming applied in this manner will meet the CAO of reducing PSH thickness to 0.01 feet throughout the entire area affected by PSH. It is important to note that analysis presented in the CMS Task I report appears to indicate that such a design may not meet the CAO in a reasonable time period.

### **III BAH SPECIFIC COMMENTS**

1. The response is acceptable.
2. The response is acceptable.
3. The response is acceptable.
4. The response is acceptable.
5. The response is acceptable.
6. The response is acceptable.
7. The response is not acceptable. The response indicates that while process options are interchangeable, this is best reserved for the recommended alternative where the removal, substitution, or addition of a process option is more apparent. The response indicates that the Navy can “add, remove, or substitute in any alternative and not change the outcome if groundwater is not being produced.” While the meaning of this response is not entirely clear, it is taken to mean that only options that do not produce groundwater can be considered for substitution. However, there should be no inherent limitation on options that produce groundwater. If such an option should provide significant improvement in

outcome, particularly in reducing the time frame for remediation, it should be considered. It is also noted that the CMS Final Report provided no analysis of potential substitutions of technology options when evaluating the remedial alternative and selecting a recommended alternative.

8. The response is acceptable. Although the response does not fully address the concerns expressed in the original comment, the revisions to the CMS plan provide adequate analysis of the options involving the withdrawal, treatment, and disposal of contaminated groundwater.
9. The response is acceptable
10. The response is acceptable. Nevertheless, excavation of contaminated soil should be reconsidered once the future use of the fuel systems are determined. Excavation of contaminated soil would be preferable if it could significantly reduce the duration over which land use controls (LUCs) would be required, particularly if all of the arsenic contamination could be removed, as this contaminant is not expected to degrade over time.
11. The response is acceptable. The revised CMS provides sufficient additional details regarding the extraction of groundwater in Alternative 3 to allow evaluation of the alternative.
12. The response is acceptable.
13. The response is not acceptable. The response indicates that, “unless you are remediating the recovered groundwater to drinking water standards, hydraulic control must be established at all times.” However, the CMS Final Report (pg. 2-15) states that the Puerto Rico Environmental Quality Board (PREQB) Underground Injection Control (UIC) Division would expect that any re-injected water meet drinking water standards at a minimum. Thus, re-injected water quality should not be a constraint to injecting downgradient of the extraction wells.
14. The response is acceptable.
15. The response is acceptable.
16. The response is acceptable.
17. Refer to BAH Specific Comment 19.
18. The response is acceptable. Please refer to BAH Specific Comment 10.

19. As correctly noted in the Navy response, the revised Draft CMS Final Report is based on the alternatives developed in the Task 1 CMS. As also noted in the Navy response, process components may be added, substituted, or eliminated if it will improve the alternative. Nevertheless, throughout the responses, NAPR appears reluctant to consider even evaluating potential modifications to the existing alternatives in an attempt to achieve Tow Way Fuel Farm (TWFF) cleanup more expediently and/or permanently. However, we believe that this is the most appropriate time for such an evaluation, using detailed information in the revised draft report on alternative and process component strengths, weaknesses, effectiveness, and costs. In response to the Navy's request for more specific direction on potential modifications, we provide the following recommendations.

Although it is understood that certain treatment components may have beneficial impacts on several media, a preliminary evaluation of information presented on Tables 3-1 through 3-3 suggest that other component combinations may be appropriate. According to Table 3-1, the most favorable soil treatment appears to be accomplished under Alternatives 5 (land farming and biodegradation) and 2 (bioventing). According to Table 3-2, the most favorable groundwater treatment options are included in Alternatives 1 (MNA), 4 (MNA and air sparging), and 5 (MNA and electrochemical geo-oxidation [ECGO]). According to Table 3-3, the most favorable PSH treatment would be accomplished under Alternatives 1 and 4 (skimming) and 5 (CleanOx biological treatment). However, as indicated in the previous comments, the relative effectiveness of PSH skimming and dual or other multiphase extraction technologies have not been adequately resolved. Additionally, as discussed in previous BAH Specific Comment 21, excavation and disposal of contaminated soil could be the preferable alternative. A moth-balled system that the Navy no longer has a use for should not be seen as an impediment to excavation. Excavation is preferable if it could significantly reduce the institutional controls that would be required, and the aggressive remediation of soil could remove all arsenic contamination, which will otherwise remain in perpetuity. Neither landfarming nor bioventing will be effective for remediation of arsenic in soil. Similarly, some form of multiphase extraction may be preferable to PSH skimming.

Revise the report to consider this and other possible combinations of media-specific components from the options outlined above. NAPR should compare the resultant combinations to Alternative 1, specifically indicating whether the modifications would serve to improve or enhance the overall remedy. A separate table similar to Table 3-1 is recommended for documenting strengths and weakness of the modified corrective measures alternatives. Such conclusions should also be fully justified and documented in the text.

20. The response is acceptable.
21. The response is acceptable. Please refer to BAH Specific Comment 10.

22. All paragraphs of this response are acceptable.
23. The response is acceptable.
24. The response is acceptable.
25. The response is not acceptable. The response indicates that a ranking of 3 was given to alternative 4 because air sparging would increase the hydraulic gradient immediately around the well and potentially push contamination away from the well. However, the mounding that occurs at the initiation of air sparging is only a temporary phenomenon that dissipates quickly. The movement on groundwater resulting from this temporary mounding should have no long-term impact on the remedy.
26. The response is acceptable.
27. Despite NAPR's conclusion that the permit requires only limited scheduling detail (to include design, construction, and operations task), we repeat our request for presentation of MNA details on Figure 3-1. The schedule should indicate when locations for the MNA monitoring well network will be determined (design phase), when the five new wells will be installed (construction phase), and when semiannual sampling will begin (operations phase). In addition, Figure 3-1 should be modified to include additional detail presented in the Navy response. The engineering evaluation to be conducted after five years of operation should be specifically included as a line item on the schedule, and a footnote should be added stating the purpose of this evaluation. To clarify that the schedule also accounts for implementation of LUCs, the last three sentences in the Navy response should be inserted as another footnote on the figure. Finally, the figure may no longer present realistic projections for start and finish dates, given the fact that the CMS Final Report is not yet approved. If necessary, the figure should be revised to include more probable start and finish dates based on the current status of this project.
28. In response to concerns regarding the actual cost of implementing LUCs at the TWFF, NAPR contends that their original estimate of \$5,000 should be more than sufficient. Furthermore, NAPR notes that engineering control costs will be negligible (because the fence is already in place) and that costs for periodic inspections have been included in the estimate. However, this response is inconsistent with the dollar values presented in the Appendix B order of magnitude cost estimates, which now show an estimated cost of \$20,000 for implementation and maintenance of institutional controls. Additional discussion should be provided to explain why the LUC costs increased fourfold (when the response indicated that no increases were necessary), and to list the specific line items comprising the current estimated dollar value. Finally, the report should be revised to explain why costs for LUC implementation are expected to be the same for each of the

five possible alternatives when different LUC programs would be implemented under the various scenarios, particularly in association with Alternative 3.

29. Refer to EPA General Comment 4 for additional recommendations with regard to estimated time frames for cleanup via MNA.
30. The response is acceptable.
31. The response is acceptable.
32. Although operation and maintenance (O&M) labor hours have been reduced in some cases, this comment does not appear to have been consistently applied across all treatment components. For example, O&M labor hours for the extraction well process option still includes a total of 32 hours per week. This level of effort and that projected for several other process options still seem excessive. Additional information on how these estimates were derived, and details on what will be accomplished with these labor hours, would provide support for NAPR's current estimates. Revise the Appendix B cost estimates appropriately, adding footnotes to include the requested information where appropriate.
33. The response with regard to cost calculation corrections is acceptable. Refer to Specific Comment 34 for discussion of soil disposal costs.
34. According to the response to comments 33 and 34, the estimated cost for soil disposal of \$180 per ton is a direct quote from Clean Harbors, and is higher than usual because soil will be barged off of the island for disposal. However, the current estimate in Appendix B for soil disposal under Alternative 3 cites a cost quote of \$96 per ton using a different vendor (Environmental Management Specialists). The report should be revised to describe the basis for the current cost estimate for soil disposal. In addition, the Draft CMS Final Report should be revised to explain why disposal costs are no longer included for treated soil excavated and treated ex-situ under Alternatives 4 and 5.
35. The response is acceptable with regard to cost estimate titles. Refer to Specific Comment 34 for discussion of soil disposal costs.
36. The response is acceptable.
37. Provide a specific Web page reference for supporting cost estimate documentation on the Remediation Technologies Development Forum (RTDF) Web site.

The original comment expressed concerns that O&M costs were inadvertently omitted from the ECGO cost estimates in Appendix B. However, NAPR indicates that the lump sum costs identified as line item "ECGO Process" include such costs. Because it is a

proprietary system, capital and O&M costs have not been broken down in detail. However, the vendor will supply equipment and specialized laborers for installation and operation of the treatment system. Nevertheless, it is assumed that costs not directly associated with equipment and labor (e.g., electric and utilities) will be borne by NAPR without going through the vendor and should be added to the O&M portion of the ECGO estimates. Revise the report and cost estimates accordingly.

**TECHNICAL REVIEW**

**DRAFT CORRECTIVE MEASURES STUDY  
FINAL REPORT FOR SWMUS 54 AND 55**

**NAVAL ACTIVITY PUERTO RICO  
CEIBA, PUERTO RICO**

**REPA3-1203-044  
December 7, 2004**

**I GENERAL COMMENTS**

1. A technical review has been conducted of the Draft Corrective Measures Study Final Report for SWMUs 54 and 55 (Draft CMS Report) for Naval Activity Puerto Rico (NAPR) in Ceiba, Puerto Rico. The review indicates that while the Draft CMS Report provides detailed analyses of a variety of remedial alternatives for SWMU 54 and SWMU 55, a number of technical concerns remain. Many of these technical concerns focus on the analysis of the fate and transport of contaminants at SWMU 55, including the effectiveness of natural attenuation as a potential remedy at that SWMU. A number of other technical concerns with the analysis of specific technologies have also been noted. These concerns are documented in the following Specific Comments and should be addressed before the analysis and recommendations of the CMS Report can be accepted.
2. The introduction of the Draft CMS Report for SWMUs 54 and 55 indicates that transfer of property or parcels of property from NAPR to other entities will require transfer of the EPA Part B Permit and states that EPA will be involved in that transfer. The Draft CMS Report does not address how NAPR will ensure that the proposed corrective action objectives (CAOs) remain appropriate when the site is transferred. The CMS Report should include a discussion of how NAPR will ensure that the CAOs will remain appropriate once the site is transferred, considering the land use assumptions upon which they are currently based.
3. The Draft CMS Report recommends institutional controls as part of the final remedy for SWMUs 54 and 55. However, the institutional controls have not been adequately defined or evaluated in the Draft CMS Report. As part of the technical evaluation and justification for the selected remedy, the CMS Report should be revised to identify the specific institutional controls that will be utilized, the potential routes of exposure to contaminated media, and the means by which the controls will effectively block each potential exposure route. In addition, the CMS Report should indicate how the institutional controls will be maintained after property transfer.

4. The Draft CMS Report presents a series of remedial alternatives, many of which require further evaluation, such as bench and/or pilot scale studies, before they can be determined to be effective and implementable. However, these alternatives are being evaluated and compared to other alternatives as if they would be effective. Under such an approach, it is possible that an alternative could be selected that subsequently would be ineffective. Most of the proposed alternatives include institutional controls and monitored natural attenuation (MNA). It is not clear whether it is NAPR's intention to proceed with only the institutional control and MNA components of an alternative if the third technological component of that alternative is found to be ineffective, or to reevaluate the remaining remedial alternatives and select and implement another alternative. The CMS Report should clearly indicate how NAPR will proceed if bench and/or pilot scale tests demonstrate that the selected remedial alternative will not likely be effective.

## **II SPECIFIC COMMENTS**

### **2.0 Task I - CAO Development and Determination of Corrective Measure Alternatives**

#### **2.4 Risk Assessments**

##### **2.4.1 Human Health Risk Assessments - SWMU 54 & SWMU 55**

##### **2.4.1.3 Exposure Assessment and Methodology for Development of CAOs**

1. The text (page 2-15) and Appendix B both indicate that the results of the Johnson and Ettinger (J&E) indoor air modeling are included in Appendix B. Appendix B currently contains the description of site-specific parameters, but does not include the printouts of the J&E spreadsheet results. Appendix B should be revised to include the model worksheet printouts for each groundwater chemical of potential concern (COPC) evaluated considering the groundwater volatilization to indoor air exposure pathway at SWMU 54.
2. The text (page 2-16) indicates that the construction workers' exposure to groundwater is evaluated at SWMU 54, but does not mention whether this evaluation occurs at SWMU 55. The Final Task I CMS Report includes an evaluation for this potential exposure pathway at Tow Way Fuel Farm (SWMU 55), as groundwater is relatively shallow in this area. Additionally, Tables C-11 through C-14 present the CAOs developed for this exposure pathway for both SWMUs 54 and 55. The text should be revised to indicate that the construction workers' exposure to groundwater is also evaluated at SWMU 55.

Additionally, Table 2-23 presents the groundwater CAOs for the construction worker at SWMU 55; however, some of the values presented are not consistent with what has been developed (as presented in Table C-14), but appear to have been adopted from the Final Task I CMS Report. For example, Table 2-23 indicates the construction worker CAO for cis-1,2-dichloroethene is  $6.0E+4 \mu\text{g/L}$ , but on Table C-14, the actual CAO developed is  $7.6E+4 \mu\text{g/L}$ . This inconsistency is only present for two COPCs (cis-1,2-dichloroethene and tetrachloroethene). While the differences are nominal, the inconsistencies should be

corrected so that the final approved CAOs are clearly documented and consistent throughout the CMS Report.

#### **2.4.1.5 Quantitative CAOs**

3. Table 2-23 presents the CAOs for COPCs in groundwater for SWMU 55. Based on Table 2-8, 1,2-dichloroethane was selected as a COPC but no CAO appears to have been developed for this contaminant based on what is presented in Table 2-23. NAPR should provide justification for excluding the development of a CAO for 1,2-dichloroethane, or revise the CMS and Table 2-23 to include a CAO for this contaminant.

#### **2.4.3 Screening Level Ecological Risk Assessment - SWMU 55**

4. When discussing the Screening Level Ecological Risk Assessment for SWMU 55 reported in the Final CMS Task 1 Report, the Draft CMS Report (pg. 2-29) indicates that an ecological CAO of 200  $\mu\text{g/L}$  was established for trichloroethylene (TCE) in groundwater. The Draft CMS Report further indicates that, "it was noted that TCE was not detected in the groundwater sample collected from a monitoring well located within the estimated travel path of the TCE plume, nor was it detected in downgradient surface water and sediment collected from the Ensenada Honda." The Draft CMS Report subsequently indicates that, "it was concluded that this VOC is not migrating with groundwater to the Ensenada Honda at ecologically important concentrations."

During the review of the January 21, 2004 Draft TCE Plume Delineation & Source Investigation Report Tow Way Fuel Farm Report and the subsequent reviews of the Navy's Preliminary (6/23/04) and Final (8/11/04) Response to Comments (RTC) of the subsequent response, concerns have been expressed about the characterization of the contaminant plume at SWMU 55. In particular, concerns have been expressed regarding the failure to fully characterize the plume within bedrock. It was acknowledged that such a plume characterization would be difficult but was not necessary unless the ecological CAOs ultimately established indicate that a potential ecological impact in the nearby Ensenada Honda might exist.

However, with an ecological CAO for TCE established at 200  $\mu\text{g/L}$ , it is not possible to conclude with any certainty that contaminated groundwater is not discharging to the nearby Ensenada Honda at concentrations above this CAO. While it is agreed that the likely impact on Ensenada Honda is likely to be small, it appears necessary to address these potential risks in a more direct fashion. One approach may be to increase the CAO based on an analysis of dilution of any potential discharge into this large surface water body using tidal flushing and dilution calculations.

5. The Screening Level Ecological Risk Assessment described in the Draft CMS Report (pg. 2-29) has concluded that the establishment of CAOs is not necessary for eight chlorinated solvent constituents detected in the SWMU 55 area in addition to TCE. This conclusion was based, in large part, on the low concentrations of these constituents,

which did not exceed the surface water screening values. While currently detected concentrations of these additional VOC constituents do not appear to pose a significant ecological risk to the Ensenada Honda, the failure to establish quantitative CAOs may become problematic in the future, particularly if the concentration of these constituents should increase in the future. It is important to note that several of the remedial options under consideration may generate increased concentrations of these additional chlorinated VOC constituents. Consequently, it would appear necessary to retain those constituents that may be generated under the various remedial alternatives as COPCs. It would also appear prudent to establish CAOs for these constituents.

## **2.6.2 Preliminary Screening of Alternatives**

### **2.6.2.2 Waste Characteristics**

6. When discussing the characteristics of the wastes at SWMUs 54 and 55, the Draft CMS Report (pg. 2-38) indicates that the two constituents that must be addressed (benzene and TCE) are “both found only in a dissolved aqueous phase, and are not likely present as non-aqueous phase liquids (NAPLs).” While no NAPLs have been detected, the duration and concentration of the releases of these constituents strongly suggest that there may be some limited residual NAPL acting as a continual source in the release areas. The presence of limited, residual NAPL will likely influence the relative effectiveness of several of the remedial alternatives under consideration at these sites (see Specific Comment No. 16). Consequently, it is important that the CMS Report acknowledge the potential presence of residual NAPL in the source areas.

## **3.0 Task II - Evaluation of the Corrective Measures Alternatives**

### **3.2 SWMU 54 & 55 - Alternative 2**

7. Alternative 2 consists of institutional controls and monitored natural attenuation. The Draft CMS Report indicates that an MNA evaluation would need to be performed at SWMU 54 prior to implementation of this alternative. However, the need to perform a similar evaluation at SWMU 55 has not been clearly acknowledged. Although some data are available to identify and evaluate MNA processes at SWMU 55, the data and analysis currently available are not sufficient to meet EPA requirements for the selection of an MNA remedy. A more complete MNA evaluation is necessary before an MNA remedy could be selected for SWMU 55 and should be included in this alternative.

#### **3.2.1 Technical**

##### **3.2.1.1 Implementability**

8. The Draft CMS Report (pg. 3-5) indicates that, “the expected time of implementation of MNA is short.” However, the report provides no basis for this conclusion. The modeling of the MNA processes presented in the Draft CMS Report assumed constant strength sources and, consequently, could not predict remediation time frames. Unless further justification can be provided to support the statement that, “the expected time of

implementation of MNA is short," the CMS Report should be revised to indicate that the expected time of implementation of an MNA alternative is unknown.

9. The BIOCHLOR modeling presented for SWMU 55 in the Draft CMS Report indicates that the TCE plume should migrate beyond the SWMU boundaries into Ensenada Honda within approximately 5 years at detectable concentrations. The Draft CMS Report (pg. 3-6) indicates that, "however, current knowledge of the plume indicates that the plume has not reached the Ensenada Honda and that concentrations decrease to non-detect after 240 feet." Based on these monitoring data, the Draft CMS Report concludes that, "other abiotic mechanisms may be at work in the aquifer to keep the concentrations low."

The Draft CMS Report provides no data supporting other, abiotic mechanisms that might keep contaminant concentrations low. Moreover, the Draft CMS Report does not acknowledge the uncertainties associated with the plume characterization and monitoring network (see Specific Comment No. 4). The CMS Report should fully acknowledge these uncertainties and adjust the analyses and conclusions related to the fate of the SWMU 55 plume in this and other remedial alternatives accordingly.

10. One of the requirements of the EPA's Office of Solid Waste and Emergency Response (OSWER) Directive 9200.4-17 (1999) regarding the use of MNA at RCRA sites is that the site must be capable of being adequately monitored. For this reason, the application of MNA in fractured rock environments is frequently problematic. As indicated previously (see Specific Comments No. 4), the difficulty of monitoring this site has been acknowledged. Before MNA can be selected as the remedial alternative for the SWMU 55 plume, the difficulties and uncertainties regarding downgradient monitoring of this plume must be addressed.

### **3.4 SWMU 54 & 55 - Alternative 4**

#### **3.4.1 Technical**

##### **3.4.1.1 Performance**

11. The discussion of Alternative 4, which includes the injection of strong oxidants into the subsurface, does not include a recognition that this technology is the most likely of those considered to destroy residual NAPL in the subsurface. Because there is a strong probability that some residual NAPL is present in each of the sources areas (see Specific Comment No. 6), this advantage of the technology included in Alternative 4 should be recognized in the CMS Report.

##### **3.4.1.2 Reliability**

12. Alternative 4 includes the injection of oxidants into the benzene and TCE plumes at SWMUs 54 and 55 combined with MNA. MNA is intended to address any contaminants remaining after the completion of the in-situ oxidation. However, the Draft CMS Report does not acknowledge the potential impact of the injection of strong oxidants on microbial populations and the subsequent impact on the biodegradation of contaminants.

If MNA is to be relied upon to complete the remediation, the potential impacts of injecting strong oxidants into the subsurface on microbial populations and the aquifer's redox conditions should be fully evaluated in the CMS.

#### **4.0 SWMU 54 Task III - Justification and Recommendation of the Corrective Measure(s)**

##### **4.2 Recommendation of the Preferred Corrective Measure**

13. The Draft CMS Report has recommended Alternative 3 for the benzene plume in SWMU 54. However, no clear alternative has been recommended for the TCE plume at SWMU 54. It appears that only institutional controls are being recommended for the TCE plume. However, an alternative employing institutional controls only has not been formally included in the CMS. Consequently, no analysis of this alternative and relative comparison with other alternatives has been provided. The Draft CMS Report (pg. 4-3) indicates that, "if institutional controls are not sufficient for the TCE plume, it is recommended that MNA be added to this corrective measure for the TCE plume." However, it is not clear what basis will be used to decide if institutional controls are sufficient. The CMS Report should provide an analysis of implementing only institutional controls for the TCE plume in SWMU 54. Based on this analysis, the CMS Report should make a clear recommendation regarding the corrective measures for the TCE plume in SWMU 54.

#### **5.0 SWMU 55 Task III - Justification and Recommendation of the Corrective Measure(s)**

##### **5.1 Comparison of Alternatives**

###### **5.1.1 Comparison of Alternatives on Technical Merits**

14. Alternative 2, which includes MNA as the primary remedial approach, has been given the highest ranking on technical merit. However, given the uncertainties regarding the natural attenuation of the TCE plume at SWMU 55, including the limited evidence supporting an environment conducive to reductive dechlorination (see Specific Comment No. 7), it does not appear appropriate to give the highest technical ranking to Alternative 2. Unless adequate justification for this ranking is provided, a more realistic ranking should be assigned to Alternate 2.

###### **5.1.3 Comparison of Alternatives for Environmental Benefits**

15. The Draft CMS Report indicates that Alternative 3 was ranked slightly less than Alternative 2. Alternative 3 includes bioaugmentation and MNA, while Alternative 2 includes only MNA. The Draft CMS Report appears to indicate that at least part of the reason for ranking Alternative 3 slightly less than Alternative 2 was because Alternative 3 may cause the formation of vinyl chloride. It is not clear why this distinction is being made since vinyl chloride is a daughter product of TCE that will likely result from biodegradation occurring under either natural conditions or the enhanced conditions

induced by bioaugmentation. Unless this distinction can be adequately justified, it should be removed from the comparison of these two alternatives.

## **5.2 Recommendation of the Preferred Corrective Measure**

16. When identifying the preferred alternative between Alternative 3 (Bioaugmentation) and Alternative 4 (In-Situ Oxidation), the Draft CMS Report (pg. 5-3) indicates that the only differences between these alternatives is “a slightly lower rank for constructability of Alternative 4 and a slightly higher risk due to formation of vinyl chloride in Alternative 3.” While Alternative 4 was ultimately selected, the comparison between these two alternatives should include the consideration that the injection of a strong oxidant into the source area at SWMU 55 will be much more likely to destroy any residual DNAPL remaining as source material (see Specific Comments Nos. 6 and 11).