UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

May 27, 1994

Mark Evans, RPM
U.S. Department of the Navy
Northern Division
10 Industrial Highway
Code 1823, Mail Stop 82
Lester, PA 19113-2090

RE: EPA's Preliminary Comments on the Focused Feasibility Studies for DRMO, Area A Landfill, OBDA/Area A Downstream, and the Spent Acid Tank at the Naval Submarine Base-New London, Groton, Connecticut

Dear Mr. Evans:

The purpose of this letter is to transmit my preliminary general and ecological comments (See Attachment 1) on the subject documents. Additional comments will be forthcoming on the ARARs and the specific alternatives. At this time I am requesting an additional time extension of 15 days. I will make every effort to provide you comments prior to June 15, 1994.

The impacts of the leaching of contaminants left in the saturated soil have not been evaluated for any of the sites. As the State has classified this area as a suitable drinking water aquifer, this must be evaluated to implement final action on the ground water operable unit (OU) for any of the sites.

The contaminated unsaturated soils are proposed to be removed but contaminated saturated soils are proposed to be left in place at DRMO and Spent Acid without information as to how this action impacts the ground water. I am concerned with this approach and consider these actions to be interim, not final actions for the soil OU.

The capping alternative at DRMO may be premature. The Navy should also evaluate an excavation and paving interim action alternative while continuing investigations on the impacts of the contaminants left in the saturated soils. Construction of a cap may be an unnecessary interim step, when the results of the ground water OU studies may require excavation or treatment to remove the contaminants left in the saturated zone.

Another concern I have is with the continuing operations at the DRMO yard. The cleanup is addressing the past contamination. However, the activities that are going to continue are the same ones that caused some of the contamination we are cleaning up. It would seem inappropriate to have to clean up this area again.

I look forward discussing with you what the Navy is planning to do to ensure that the protection of the environment along the Thames River continues after the cleanup is complete.

The first four sections of each of the Focused Feasibility Studies (FFS) are poorly organized, poorly written, and accompanied by confusing tables, charts, and maps. As a result, it is difficult to understand the nature and extent of the contamination at the Sub Base and at the AOC, the risk to human health and the environment posed by the contamination, and the relative merits of the proposed alternatives for remediation of the contamination in connection with the different operable units.

These documents should be understood by the general public without a lot of difficulty. There is often a technical statement that is made without justification or explanation and a general confusion about what is guidance and what is site specific information.

I have also included preliminary comments on the design work plans as was promised after receiving the FFS (See Attachment 2).

If you have any questions regarding these comments, you should feel free to call me at (617) 573-5736.

Sincerely,

Christine Williams, RPM
Federal Facilities Superfund Section

Attachments

cc. Mark Leone, CT DEP
Andy Stockpole, NLNSB
Mary Sanderson, EPA
Patti Tyler, EPA
Rona Gregory, EPA
Dan Winograd, EPA

ATTACHMENT 1

GENERAL COMMENTS ON ALL 4 FFSs

Section 1.0

1. Despite the organization of the document into sections and sub-sections, it is very difficult to locate the portions of the FFS which describe the Sub Base and the nature and extent of the contamination. As an example, Section 1.1 is identified as "Purpose and Scope" yet the first two sentences begin a description of the Sub Base. The rest of the section wanders through a description of the RI/FS process at the Sub Base and a description of the remainder of the work in the Phase II RI work plan. Section 1.2 entitled "Site Background" then continues the description of the Sub Base begun in the first two sentences of Section 1.1.

2. The FFS should begin with a coherent description of the Site and the surrounding community. The description should include the location of the Sub Base, the topography/geology of the Sub Base including mention of the Thames River and the activities that occur on the river, and the relationship between the federal facility and the surrounding community. A base map identifying more of the buildings and the land use at the Naval Submarine Base would be helpful. It is important to give the reader the context in which all of the later detailed information can be interpreted.

3. In addition to a site description, a site history is necessary. When did the Navy acquire the Sub Base, has it always been used as a naval submarine base, what activities occur on the Sub Base, have there been other environmental problems?

4. A brief summary of the RI is necessary to highlight the nature and extent of the contamination at the Sub Base. What are the contaminants of concern? In what media are they found? A graphic of the Naval Submarine Base showing the major contaminants of concern should be included.

5. Once the Sub Base has been described adequately, the FFS should focus more closely on the specific operable unit. Similar descriptive information should be provided for each of the Areas of Concern (AOC). As well as locating the AOC in the context of the Sub Base, a detailed description of the activities that have occurred at the AOC should be included.

6. Each of the reports makes the following statement in the first page, "As work on the FS progressed, the US EPA expressed concern regarding the adequacy of the data on the extent of the contamination, on which the FS was based." The sentences following this statement make no explanation of how the Navy planned to make the data adequate. A statement should be made

that the Navy got approval of the Phase II RI Work Plan and has provided additional data to the EPA who has now agreed to allow the Navy to go ahead with the FS based on the previous and additional data collected.

7. Each of the FFSs refers to the Phase I RI Report for site-specific geologic and hydrologic information. This should be summarized in the FFS so that the reader need only look at the Report for greater detail.

Section 2.0

8. Sections 2.2, 2.3 and 2.5 are misplaced. They deliver no coherent message. The confusion it elicits is exaggerated because the FFS has not yet described the environmental problem. The description of the Laboratory Analysis Program, the Target Compound Lists, the Target Analyte List, and Quality Assurance/Quality Control program are more appropriately placed in a technical appendix.

9. The results of the sampling programs need to be highlighted and summarized, not the process. Important information is buried in paragraphs describing process. For example in the DRMO FS, Section 2.4.1 Test Borings focuses solely on process and refers to Appendix A where the actual logs are located. But Section 2.4.2 Field Screening Using X-Ray Fluorescence describes the process and then comments on results in the same paragraph. The presentation is confusing enough to leave the reader wondering at the end of the paragraph whether or not lead is a problem at DRMO and at the Spent Acid Disposal Area and what matrix interference is.

10. The remaining subsections suffer from the same disorganization. The structure of the FFS should simplify the reader's task in understanding the report. A consistent pattern demonstrating where to look for descriptions of process and where to look for summaries of results should be established and then followed. Otherwise important results will be overlooked by the reader.

11. Figures depicting soil analytical results are best placed in chapter 3. They should include a column indicating the action level for each contaminant analyzed. Also, a second version of these figures should be prepared and again placed in Chapter 3. In the second version, include only those results that are above action levels so that a clear picture of the contaminants of concern can be seen, as shading those contaminants above TBC values is difficult to distinguish. An additional graphic of the conceptual model of soil depths to be removed of hotspots would be helpful.

Section 3.0

12. Section 3.0 is poorly organized and unnecessarily long. Too

much effort is spent summarizing guidance rather than identifying and screening the technologies. Remedial action objective are developed here but then obliquely referred to in the rest of the documents. Many statements such as: The following constituents were present in the site above TBC values...were made that then didn't say what the TBC values were and if the values were above the Remedial Action Objective values.

Section 3.2 Remedial Action Objectives (Step 1) is confusing in its reference to the Phase I RI. As has been noted previously, the information referred to must be summarized briefly. Not every reader (including this one) has access to the referred to document. A substantive reference is meaningless in such a situation.

13. The section also states "There are no chemical-specific ARARs for contaminated soils." Is that an accurate statement? There are several pages of chemical-specific ARARs listed in the section. Perhaps they are using the term ARAR to refer only to something that is applicable or relevant and appropriate. The Region often uses the term ARAR more generically to include TBC standards also.

14. Section 3.2.1 would benefit from an explanation of the context. It appears that the risk is calculated for workers only in several of the FS. How is that point reached? I assume that children live close enough to the naval base to be trespassers on the base. The measures that have been taken to ensure that they do not have access to the AOCs should be presented here as part of the Navy's justification for only considering commercial/industrial risk scenarios. The future types of work that will be done at the AOCs in the future should be presented. The definition of "hotspot" would be best presented here also.

15. The whole section would benefit greatly from a total rewrite. Again greater attention must be paid to the organization of the section. Step One would be more comprehensible if it began with a discussion of the process, then moved into a description of the risk, then into the identification of the contaminants of concern, and finally into a description of the cleanup levels.

16. Step Two should identify and describe the appropriate remedial measures that could address the cleanup of the contaminants of concern. And Step Three should discuss the impacts on other media. In this instance, the discussion should focus on the effect of the remediation of the source of contamination in the soils on groundwater.

17. Step Four is better organized than the others. But there is no explanation of "unreasonable time periods" and "insufficiently developed technology" as it is used in this section. There is also no complete explanation of why each of the process options were retained except for the table. This should be expanded and

placed into an Appendix as was the Evaluation of Process Options in Step 5.

18. Step Five-Again, the most important substantive information is mixed in with process information. It is difficult to locate the substantive information and to interpret it out of context.

19. Most of the text is a superficial regurgitation of Agency guidance ("Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA," October, 1988). The section includes detailed tables that are helpful. But there is no explanation of the reasoning involved in moving from a description of the process to the results described in the tables. As with the previous sections of the FFS, a summary in words complementing the tables and explaining how the results of the screening process were reached and what the significance is would be very useful.

SECTION 4

20. In all of the Fs there is a sentence in Section 4.1 that states that the range of alternative developed incorporate the requirement of the NCP and the SOW. The Navy's SOW should not be referred to here because that is misleading in that adherence to the NCP is a statutory and regulatory requirement. The Navy's contract SOW is merely an agreement between the Navy and the contractor; it is possible that the contract SOW could misinterpret the NCP.

21. The summary produced in Section 4.1 includes the correct buzz words from the NCP but often uses them out of context. For example, the NCP speaks of the second bullet being included in the range of alternatives identified in the first bullet. But the FFS merely lists them without indicating any relationship. The third bullet is listed in the FFS as a single alternative; the NCP speaks of a range of alternatives. The FFS lists innovative treatment technologies -- as necessary only if appropriate. The NCP clearly specifies the criteria used to determine appropriateness; the FFS does not.

22. As has been commented previously, there is no explanatory text moving from the summary of the NCP to the chosen alternatives listed in Table 4-1. There is no way to determine whether the mandates from the NCP have been followed. Although the no-action alternative is identified, no identification is made of treatment technologies or innovative treatment technologies. An informed reader may indeed be able to infer such categories from the table but the FFS should not assume such inferences.

23. In general, there is no adequate discussion of cost-effectiveness in any of the alternatives described in Section 4.3. The statements are conclusionary and do not provide

sufficient information to support meaningful comparisons.

24. In general, the screening process is not adequately discussed. Again the statements are conclusionary using the appropriate buzz words from the NCP. The weight given to different factors in the screening process is never discussed. It is not clear that similar factors are weighed similarly for different alternatives.

25. The connection between implementability and competitive bidding is not clear. It seems that competitive bidding is more aptly related to cost-effectiveness.

Alternative 6-1

26. The conclusion in Section 4.3.1 that the no-action alternative is the most cost-effective alternative is questionable. Although there is no cost, the alternative is also the least effective.

Alternative 6-2

27. The term "deed restrictions" should be changed to "institutional controls". Institutional controls encompasses a broader methodology to continue with the same protective use at the site while the Navy still owns the site and includes deed restrictions at the time of transfer.

Section 5.0

28. The statements in sections 5.2.1.8 about state acceptance are confusing. First, the statement that "state perceptions of the alternatives is not known" implies that the state has not been included. However, the second paragraph describes the involvement of the State of Connecticut. If the State has been kept informed of all activities, it is hard to understand why the Navy has no sense of what the State is thinking in connection with the different alternatives.

29. The comments about community acceptance are also disturbing. They suggest no willingness to identify or address community concerns at a point in the process where the input would be meaningful. Although community acceptance is considered a modifying criteria, it is still one of the criteria to be used in choosing the preferred alternative. It is not sufficient to wait for the public comment period in connection with the issuance of the ROD before determining whether the community has concerns. Community acceptance must be considered in choosing the preferred alternative.

Specific Comments

DRMO

1. DRMO--From an ecological perspective the exposure pathway examined was one of leaching of contaminants into the river potentially affecting the aquatic community. It was determined, as stated in the Phase I RI, risk from surface water impact due to ground water discharge is acceptable because the resulting leachate would exceed AWQC for certain metals but with an estimated 1:25 dilution in the mixing zone impacts would be negligible. Consequently, the feasibility study was designed to address risk from a human health standpoint. However, this does not eliminate sediment contamination due to groundwater discharge. It is possible that groundwater contaminants may build up along the groundwater/sediment interface. This question alone justifies the need for sediment sampling. The Thames River assessment should also discuss the cumulative impacts to the river from the Goss Cove Landfill, the Lower Sub Base and the DRMO.

2. DRMO Section 1--The first paragraph on page 7 needs to be expanded. Describe more completely "other non-salvageable waste items." What quantities of materials were burned on the shoreline and then "disposed over the riverbank and partially covered." What was disposed of? Ashes? And what were they partially covered by? What has happened to that disposal area?

3. DRMO Section 3--Target levels are established for PCBs, CaPAHS, and lead. But because of the weaknesses of the previous sections, it is not clear how they came to be identified as the contaminants of concern. Obviously, that is a key issue in the FFS and there should be no doubt as to how or why those contaminants were identified. The discussion of DDT on page 51 needs to be expanded and "an unacceptable hazard" needs to be defined.

4. DRMO Section 3--The last paragraph on page 74 is troubling and raises several questions. Should the process options for TCE-contaminated soil be retained at this point? What is the effect on the soil cleanup of delaying remediation of VOC impacted soils until the groundwater portion of the remedy? It appears that one important effect is that the soil will not be clean? What will happen to the TCE-contaminated soil if groundwater contamination is not sufficient to warrant any remedial action?

5. DRMO Page 60, 2nd paragraph

A typographical error was found in the first sentence. There are four primary COCs not three as stated. Please correct.

6. DRMO Section 4.2 is lifted without citation from the NCP.

7. DRMO--Alternative 6-1

In addition it is not clear what is meant by the statement that the expected lifetime of the remedy is finite and contingent upon continued maintenance. It appears that one important effect is that the soil will not be clean.

8. DRMO-Alternative 6-2

The analysis of the effectiveness of the access restriction alternative is confusing. Although it is noted that migration of contaminated soils by water would not be prevented, the next sentence makes no mention of continuing migration of groundwater contamination as a factor in evaluating long-term protectiveness. And in the screening section, no mention is made of the migration of contaminants through the groundwater.

The reference to the need to relocate DRMO operations in the analysis of the implementability of the access restriction alternative and later in the screening is misplaced. Administrative feasibility does not encompass such an effect. Rather it focuses on the administrative feasibility of the action itself -- in this case, deed restrictions and perimeter fencing.

And finally, the significance of the statement that the duration of the effectiveness of the remedy is finite since routine maintenance and monitoring are necessary to assure continued protectiveness is not clear.

9. DRMO-Alternative 6-3

Only brief mention is made of the possibility that the groundwater was contaminated prior to installation of the cap. A discussion of the effectiveness of the alternative should explore that aspect. It should be a part of the screening discussion also.

The effectiveness of a cap actually containing the contamination left in the saturated soils can not been evaluated since there is no hydrological information. Since the Navy has not evaluated the groundwater and tidal hydrology at this site, a capping alternative may be prematurely proposed. The Navy will need to fully characterize the site hydrology prior to the construction of the cap.

An additional alternative for hotspot removal and paving should be evaluated as an interim action while the Navy completes the management of migration OU investigations. The capping alternative could then be fully evaluated for containment of the contaminated saturated soils.

Compliance with ARARs is not mentioned in the "Effectiveness" discussion.

Alternative 6-3 appears to be susceptible to deterioration by desiccation and/or weathering due to the limited cover. The 12-inch crushed stone cover appears to allow infiltration that would hydrate the geocomposite clay liner soon after installation. Although, this would tend to limit downward migration of infiltrating water, the shallow cover would leave the geocomposite exposed to repeated freeze-thaw cycles. This would likely deteriorate the effectiveness of the clay liner significantly. Therefore, it cannot be considered "impermeable" as stated. Additionally, there is no proposed drainage layer as is suggested by RCRA guidance. Previous discussion focuses only on excavation and removal of soils containing contaminants above cleanup levels; apparently, remaining fill materials will not be disturbed. Therefore, there may be a potential for excessive settlement that could result in breaching of the proposed low permeability barrier.

10. DRMO-Alternative 6-4

The "Description" should explain how hot spots are defined. Elsewhere it appears that not all contaminated soil will be removed but rather only contaminated soil to a depth of three feet. The Navy should not assume that the reader knows the problems that will be encountered with the removal of soils below 3 feet.

Eliminate unnecessarily subjective adjectives or explain the caparisons: "lightly contaminated soils;" "significant coordination;" "adequate protection to human health." Describe the coordination with other agencies.

The "Screening" analysis should be more detailed. Briefly describe more specifically why the alternative does not provide any greater protection than other alternatives despite its higher cost.

11. DRMO-Alternative 6-5

Again, as commented above, the term "hot spots" should be defined more specifically.

The comment that long-term liability to the Navy is not eliminated because there is no destruction of hazardous constituents seems totally out of context as well as being a legal conclusion. If the statement were correct, it would apply to each alternative in which hazardous constituents are not destroyed so it is confusing that it first appears at this point in the analysis of alternatives. However, the statement is not correct; the generator's obligation is to handle the hazardous constituents as RCRA requires. If the requirements of RCRA are met, no action remains against the generator.

12. DRMO-Alternative 6-6

In the "Description" section, again it is necessary to define "accessible" soils. I am assuming that refers back to the idea that soils to a depth of three feet will be treated. Also, how will it be determined which "soils containing lower levels of contamination" will be treated? And finally, what is the significance of the fact that the cap is not impervious. Be more explicit in describing the connection between chemically stabilizing the contaminants and construction of an impervious cap.

Be more explicit about demonstrated field experience with PCBs and other organics. What are the problems or potential problems?

In the "Screening" section, the statement that the reduction of contaminant mobility is not a primary remedial action objective is confusing. The remedial action objective is to reduce the exposure of workers to contaminants in the soil; the question to be posed is whether the alternative reduces that risk and not whether one portion alone of that alternative is the primary remedial action alternative.

13. DRMO-Alternative 6-7

See the comments for Alternative 6-6.

In the "Description" paragraph, the sentence that begins "This alternative treats a larger volume of soil than the other alternatives because..." is difficult to understand. It seems to combine several ideas without clearly explaining the relationship of the ideas.

In the "Implementability" section, be more explicit about the "proper precautions...to minimize fugitive dust." Do such precautions add to the cost of the alternative?

14. DRMO-Alternative 6-8

Describe the incineration process more fully. What is the residue -- lead-contaminated soil or ash?

In the "Effectiveness" paragraph, vitrification is mentioned without any explanation of what it is or why it is suddenly being raised. Also, explain more fully the short-term risks to the community from air emissions associated with incineration.

It is not clear whether the cost-effectiveness of the alternative changes significantly if the mobile unit is utilized for other operable units on the naval base. The alternative is screened out on the basis of cost but it appears that the cost used was the cost assuming mobilization solely for use at DRMO. If the 36% cost saving is realized, how does the cost compare with other alternatives? And what is the likelihood of the cost saving being realized?

15. DRMO-Alternative 6-9

Again, explicitly but briefly describe the technology and how it works including an explanation of an afterburner and the condensation process.

Vitrification is again mentioned without any explanation of its relevance or meaning. And again, short-term risks to the community are mentioned without being explained.

Explain what the significance of the lack of experience of vendors with materials other than petroleum hydrocarbons and VOCs is. Does that have any impact on the effectiveness of the alternative and if not, why not?

Again, the cost-effectiveness does not appear to have been evaluated if the technology is used at other operable units. Because the screening process is so poorly described for all of the alternatives, it is not possible to follow the reasoning. That is particularly true for the decision to screen out Alternative 6-8 yet to retain Alternative 6-9.

16. DRMO-Alternative 6-10

Again, the technology needs to be described briefly. And the discussion of short-term risks to the community should be expanded so that the reader can understand the weight given to this factor in the screening process.

The alternative appears to be screened out because it is an innovative technology. The appropriate buzz words are used in the screening but only in a conclusory manner. There is not enough information given to allow the reader to follow the reasoning.

17. The Navy should evaluate an additional alternative of excavation and paving since the effects on the groundwater and the sediment contamination of the Thames River of leaving saturated soils have not been evaluated. The results of the additional investigations may prove the need additional excavation of the contaminated saturated soils and if the site is already capped, the expense would be greatly increased.

SPENT ACID

Spent Acid Section 1 P5--An explanation of what commercially available proven technology is needed. The Navy screen out technology that would be practical at this site?

Spent Acid Section 2.6 P22--A discussion of the summary of the investigation results should be presented here. The reader is left with the impression that the investigation was just a paper exercise, instead of realizing that the actual results are explained in the paragraphs that follow.

Spent Acid Section 3.2.1.3 P38--A discussion of the 4 ft cleanup depth vs the depth construction workers would be expected to be exposed to soils should be presented.

Spent Acid Section 3.2.3 P45--The correlation between 500 ppm total lead and 5 ppm TCLP should be explained.

Spent Acid Section 3.4 P48--The Navy only analyzed only 1 sample below 4 feet deep, also several XRF values are higher below 4 feet than they were at the 0-2 foot level. How is the statement made that no there is no indication of significant lead contamination below the dept of 4 feet?

Spent Acid Section 3.6 P56--The evaluation of process options that have been retained in provide in Appendix G not H as is indicated.

Spent Acid Section 5.4.4--The Navy has not yet fully evaluated the extent of lead contaminated soils below 2 feet since only 1 sample was analyzed below 2 feet. The statement that "...contaminated soils have been identified above the groundwater table, making the cap more effective.", is premature.

Spent Acid Section 6.4-- The statement that this alternative [6-7] substantially reduces the volume of materials to be landfilled should be more quantitatively addressed.

Spent Acid Section 4.3.2 P64--The statement that the "Migration of contaminated soils by water and air erosion would be prevented, provided that the existing pavement is maintained", creates a question in the readers mind as to what the requirements to maintain the pavement is now. Is there a threat to human health and the environment?

Spent Acid P84 and other ARAR tables--The storage tank laws and regulation are applicable if there is a storage tank that will be removed at the site.

Spent Acid P95--An explanation should be provided why the Navy has decided to go down only to groundwater for the excavation.

AREA A LANDFILL

1. As stated in the report, some of the remediation alternatives may require some very minor filling to stabilize the grade of the toe of the landfill slope where it meets the wetland. A qualitative assessment of the wetlands quality impacted by remedial activity is recommended. As part of this assessment, a detailed description of the impacted wetland is required. This includes any proposed remediation activities in the vicinity of the small pond, which is immediately adjacent to the landfill. The assessment should also examine particular qualities in this wetland both from a function and habitat standpoint. The outcome of the assessment will dictate the extent of mitigation required. **Prior to remedial activity, the type and extent of mitigation should be agreed upon.** Depending upon the assessment and habitat impacted, mitigation may take the form of improvement or enhancement of habitat adjacent to the landfill or perhaps wetland improvement in some other area of the base, for example, in the downstream wetlands.

2. The risk-based cleanup goals appear to be derived for human health and very little is mentioned of ecological receptors. It should be noted that after a wetlands assessment is completed, and if appropriate habitat is identified in the wetland, then risk-based cleanup goals should be based on ecological hazard indices as well. In addition, a TBC cleanup value of 10 mg/kg PCB may not be appropriate for ecological receptors, because of the elevated PCBs found in the landfill adjacent to the wetlands. It is suggested that a literature search be conducted to locate appropriate ecological risk-based cleanup goals.

3. It is suggested that the projected toe of the landfill be pulled back so that stabilization be provided without any further impact to the wetlands from remedial activity.

4. Previous remedial documents depict the Area A landfill as extending, and including, the tennis courts to about Route 12. Although it is briefly mentioned in the Draft FFS, on page 6, under Site Background that, "Based upon soil borings and sample analyses, the subsurface material in the eastern portion consist of clean fill rather solid wastes." The chemical analyses should be referenced within the document that supports this conclusion. Further discussion of these results is warranted regarding the exclusion of this section of landfill from the proposed remedial actions.

5. Conformational sampling is suggested to delineate the boundary of the landfill and wetlands. From previous documents, it appears that only two samples, 2WSD2 and 2WTB2, were taken. These were taken in the vicinity of the concrete pad. The test bore sample exhibited some PCB contamination; therefore, additional sampling may be warranted. As discussed in our RPM meeting of May 6, 1994, you have agreed to provide me with a proposed sampling plan as soon as possible.

6. Given the statement made on Page 6, Paragraph 2 that all non-salvageable materials generated by submarines and base operations were disposed of in the Area A landfill, it appears that ARARs regarding closure of hazardous waste disposal areas may be applicable. That is, the materials appear to represent wastes from industrial activities and may contain significant hazardous waste. Therefore, the landfill closure may require a RCRA Subtitle C cap.

7. Page 43, Section 3.3.1.1, Risk-Based Remedial Action Objectives

A third bullet should be added to address the reduction of exposure to ecological receptors, as well as the human health scenario. Please correct.

8. P44, Section 3.3.1, Please explain the rationale for choosing the target levels of 50 ppm for subsurface soils when the target cleanup level for a PCB spill is 10 ppm.

9. Page 69, Section 4.3.1, Alternative 2L-1: No Action, 3rd paragraph

Further discussion is recommended to explain why obtaining concurrence from other agencies will be difficult. Please correct.

10. Page E-3, Water Quality Criteria (WQC), bottom of page

The section states, "There are several small streams and man-made structures that transport storm water to the Thames River. For these streams, it may not be appropriate to apply water quality criteria that were developed for aquatic life, since these organisms cannot live in the habitat provided by these small streams or ditches." The elimination of this ARAR based on this rationale is not appropriate. As noted in the Water Quality Criteria for 1986 (WQC) in Appendix C, the WQC, "... are intended not only to protect essential and significant life in water and the direct users of water, but also to protect life that is dependent on life in water for its existence, or that may consume intentionally or unintentionally any edible portion of such life." Depending on the stream or drainage ditch, Section 304 of the Clean water Act may be relevant. Please revise.

11. Appendix F: The beginning and ending pages appear to be missing from this appendix.

12. Appendix F, Section 4.11.2.1 Subsurface Soil and Sediments, 1st paragraph and 2nd paragraph

13. The last sentence of the first paragraph refers to the summary of soils and sediments data in Tables 2-6 & 2-9 in Section 2.0, respectively. However, these tables actually are the "Summary of QA/QC Samples" and "Natural Background Levels for

Inorganic Compounds". Please correct. In addition, please include all previous sediment and soils data in the finalized version.

14. The first sentence of the second paragraph refers to the summary of subsurface soils and sediments data in Tables 4-24 through 4-27. However, these tables are missing from Section 4.0. Please include.

15. P98, First Paragraph: The use of an trench up gradient may intercept some shallow groundwater, but without any information on the ground water flow in this area, the alternative cannot be fully evaluated. The contaminant migration through the saturated landfill soils and into the wetlands has not been described in the FFS. Prior to construction of the cap, the ground water interaction must be fully understood.

16. P-98, Third Paragraph: The statement that the capping does not eliminate the possibility of migration both laterally as well as vertically, should be further evaluated. There is no conceptual model presented to explain this statement, so therefore the reader must assume that the Navy is not planning to evaluate the effects of ground water flowing through the landfill contents at this time nor is the Navy planning to evaluate this as part of the groundwater OU. This contradicts the statement on the bottom of P-1 that the intent of the acceleration of remedial activities at Area A Landfill is to eliminate or minimize risks associated with the operable unit of soils/landfill contents.

17. It should be noted that the value of maximum frost depth penetration for this portion of Connecticut is in excess of 40 inches according the NAVFAC Design Manual 7.1. Therefore, the 36 inches of cover above the clay barrier layer may not be adequate. Figure 5-1 should be revised to include at least 40 inches of cover.

18. Figure 5-1: The cover configuration depicted does not appear to be acceptable for a RCRA final cover. In addition to the frost depth considerations discussed above which would require as additional 16 inches of cover, there is no drainage provided. Although the geocomposite would provide a low permeability (2×10^{-6} centimeters per second), its thickness is less than one inch, even when hydrated. Since there is no drainage for infiltrating water, a hydraulic head will develop on the clay geocomposite. In addition to causing freeze-thaw problems, the increased hydraulic head in conjunction with the relative thinness of the clay layer effectively increases the hydraulic gradient across the barrier. Additionally, the geocomposite shown may be subject to significant stresses from settlement that can also deteriorate the barrier effectiveness. Clay geocomposites are typically not used alone in a landfill cover, but rather in conjunction with a geomembrane as an underliner.

19. Figure 5-1 also shows a cap over the OBDA. The integration of the two caps is not discussed in the FFS. The effectiveness and implementability of a cap at this site should be evaluated in one of the Navy's FFS documents. The separate FFS for the OBDA does not evaluate a cap for the OBDA, only a cover.

20. P 117 Second Paragraph: The cap description does not match the figure commented on above. This description also does not match the conceptual model used to discuss action-specific ARARs. Which is the cap that was focused on in the study?

OBDA

1. The human health based cleanup level is not appropriate for such an ecologically sensitive area. Additional evaluation, such as equilibrium partitioning and/or limited additional sampling for combination full CLP analysis and bioassays as was requested in previous comments, must be made to determine the ecologically protective cleanup level.

2. There has been sediment toxicity testing with the amphipod Hyallela azteca and the earthworm Lumbricus terrestris. There has also been a sediment macrobenthic invertebrate survey. A qualitative survey of fish, amphibians and reptiles was also performed. An attempt to evaluate surface soil toxicity and bioaccumulation potential, both in situ and in the laboratory, was performed using L. terrestris. The field and laboratory testing has shown mixed results in defining DDTR as the direct source of toxicity. In the cases of the sediment toxicity tests on pond samples, there is, in general, an inverse correlation between percent survival and DDTR concentration. There is, however, a very significant reduction in the number of taxa and/or individuals found in the stream benthic invertebrate survey downstream of the upper pond and OBDA, that generally correlates to an increase in DDT concentration. There is also clearly a significant reduction in survival and benthic community numbers from the "Lower Pond Samples" and to a lesser degree OBDA. These two areas have shown very elevated DDTR concentrations in past analysis. It is recommended that consideration be given to further study of another reference area which closely models the physical characteristics of the pond substrate and is outside the area of potential impact. This study should take place in the spring eliminating the concern regarding environmental stressors such as low water and low DO conditions. The site-specific biological survey should be made using appropriate reference locations for comparison. I do not consider the pond in the AREA "A" wetlands, another area of concern, an adequate reference area. In addition, a full suite of chemical analyses should be run for each sample, including the reference, as previously recommended. This will attempt to minimize uncertainty regarding chemical effects and, if necessary, assist in developing an ecological site-specific cleanup goal.

3. Tables containing tissue concentration data should include a note which indicates that concentrations are on a wet weight basis.

4. Page 8, Section 1.3.2, Ecological Site Investigation

This section states that, " Investigations were performed to develop risk based remedial action objectives (RAO) for soil and sediment that would be protective of the environment". According to Appendix D, which contains the risk memo regarding this area of concern (to Barry Giroux from Charles Menzie of Menzie Cura &

Assoc. Inc.), terrestrial risk to invertebrate-eating birds and small mammals was assessed based on comparison to lowest observed apparent effect level (LOAEL) values from literature. The present guidelines for performing risk evaluation of this nature recommends the use of no observed apparent effect level (NOAEL) or no observed effect concentration (NOEC) values. The main purpose of the use of these NOAEL or NOEC endpoints is to ensure a safe level and to offset the lack of comparative species sensitivity data.

From the standpoint of aquatic risk, the discussion of the presence of amphibians noted observation of green frog, spring peeper and leopard frog. These were observed in the upper pond and stream discharging to the upper pond. None were observed or collected in the lower pond or OBDA ponds. The memo continues the discussion stating that salamanders were observed in the area between the upper pond and OBDA pond. Page 62 of the Draft FFS indicates these were red-backed salamanders (Plethodon cinereus). Red-backed salamanders are an entirely terrestrial species and are not appropriate for use in a discussion of aquatic risk. Benthic invertebrate surveys and sediment toxicity tests using the amphipod H. azteca and the earthworm L. terrestris were performed. These results were inconclusive in correlating DDTR concentrations with specified measurement endpoints. Other causes of low survival and population counts as indicated may be attributed to low oxygen concentration due to decay and low water conditions. However, dissolved oxygen was not measured for these sediments and surface water samples.

Target cleanup levels for surface sediment and soils were recommended to be 29 ppm, which is solely based on human health risk. The above ecological information provides little information that would allow for the development of an ecologically based cleanup level. A TBC value 500 ppb was considered, but according to Table 4-4 is not applicable, and a default cleanup level of 29 ppm is proposed for sediments as well.

The following points suggest that the non-human portion of the environment is not being protected using this value. For terrestrial risk, it would be more appropriate to compare dietary intake of small avian and mammalian species to a chronic reproductive NOAEL or NOEC value. In addition, since a BAF could not be developed from the data, a literature based BAF should be applied. After this is completed, a cleanup level could be back-calculated for terrestrial risk. From an aquatic standpoint, 29 ppm far exceeds NOAA guidelines, New York State sediment guidance, and Ontario Ministry of the Environment sediment criteria. The evaluation of a target clean up level for sediments through equilibrium partitioning, normalizing DDT concentrations to TOC, is suggested.

5. Page 17, Section 2.4.2, Sediments

Sediments were taken at some locations using a shovel. This is not recommended. When the sample is lifted through the water column the finer sediments are lost.

6. Page 33, Table 2-11, Area A Downstream/OBDA-Soil and Biota

Please note whether the worm body burdens are on a wet weight or dry weight basis. All unit should be given on the same basis.

7. Page 36, Table 2-13, Area A Downstream/OBDA- Sediment and Biota

See comment #6

8. Page 40, Section 2.6.3.2, Sediments, 2nd paragraph

Comparison of sediment samples to soil background samples is not appropriate. Sediment media are different from soils. The chemical characteristics and the potential exposure scenarios they represent can be quite different. It is recommended that consideration be given to sampling background sediment locations and analyzing for full CLP TAL/TCL.

9. Page 43, Qualitative Soil Survey

There was no control location selected. Without a control it will be hard to determine whether the results represent conditions indicative of low impact. How will conclusions be drawn from this survey?

10. Page 47, Section 3.2.2, Freshwater Aquatic Field Investigation, 5th paragraph

This paragraph states sample 2DSD18 is from the middle of the upper pond. Plate 1 indicates the location as the SW shoreline. Please clarify.

11. Page 48, Table 3-3, DDTR Concentration In Soils And Introduced Earthworms

Wet weight or dry weight should be noted. Please correct.

12. Page 50, Semiquantitative Benthic Survey

After reviewing the stream reference locations along Gungywamp Road, the reference locations constitute a poor selection for several reasons. These areas are not representative of site stream conditions. Also, the reference stream substrate consisted on a more sandy, gravel makeup, while the streams in the downstream Area "A" wetlands appeared to consist of a more silty surface substrate. In addition, the more westerly stream

reference sample location was located in the discharge area of a storm water culvert. The easterly location was the more acceptable of the two locations. Due to the difficulty in finding adequate reference streams, discussion on the substrate regarding the more easterly reference stream and the onsite streams is warranted. Perhaps a discussion on the difference can be incorporated into the survey results. The use of the Area "A" wetlands pond as a reference pond was also considered a poor choice. The pond is in an area developed from dredge spoils which is part of the study/impact area. The control pond should represent the best conditions to reflect an optimum unimpacted benthic ecosystem while being most representative of the area of study.

13. Page 64, Section 3.3.2, Freshwater Aquatic Field Investigation

This reviewer questions the ability to correlate the results from the bioassay tests with DDTR concentrations found in separate samples from the same sampling locations. The reason is that the gross characteristics of the bioassay samples as stated in Appendix C leads one to believe that these sample consisted primarily of detritus and not true sediment. The question of concern is: What was the description of the sediment samples used for chemical analysis? If they are not similar in characteristics, comparison and conclusion of the chemical analysis and bioassay will be difficult. If they are the same, are they true sediment samples?

14. Page 67, Section 3.4, Discussion of Ecological Field Investigation Results

This reviewer disagrees, in part, with the sampling locations selected for a ranking of 4, high toxicity and lack of native invertebrate population. Not all location ranked were subjected to toxicity testing. Ranked locations from Plate 1 include, 2DSS5, 2DSS13, 2DSS14, 2DSD25, 2DSD26, 2DSS7, 2DSS15, 2DSD18, MCLL1, 3DSD4A, 3SD4, 3SD3A, 2DSD19, 2DSS16, 2DSS17, 2DSS18, 2DSS1 and MCLL2. Location 2DSD14 has a DDTR concentration of 11.4mg/Kg. Location 2DSD20 has a screening DDTR concentration of 5 mg/Kg. Neither of these were involved in toxicity testing however, concentration of DDTR are much greater than those with significant mortality. In addition, 2DSD14 benthic invertebrate sampling resulted in only 1 individual Oligochaeta and 1 Diplopoda representative. Benthic survey results for 2DSD20 showed only 11 Oligochaeta. Some discussion regarding this issue is warranted.

15. CONCLUSIONS

It appears that there are two primary issues to be resolved. The first is the correlation between sediment and soil bioassay results, and their corresponding biological surveys and contaminant concentrations. The present information would

suggest that action was taken based primarily on bioassays and surveys, which resulted in a lack of correlation to chemical specific toxicant concentrations. The second issue involves deriving a site-specific cleanup level which cannot presently be determined based on ecological risk. Terrestrial issues should be considered as suggested above, by reevaluating modeling results. If the ponds are used as spring breeding areas, than mitigation could result in the loss of an important natural resource. Furthermore, if a spring survey were to show that these ephemeral water bodies were being used by local populations, lack of toxic effects may indicate that no mitigation is required. On the other hand, if mitigation were to take place and these ponds were being used as breeding areas, then mitigation should be completed prior to the next breeding season or population effects would likely result.

Deriving clear conclusions from this type of data is difficult, and made even more so by uncontrollable variables. To render the most from the data, those variables that can be controlled should be. It is suggested that at least pond, and after discussion, stream surveys and bioassays be performed to a limited extent again. Sampling location selection should be based on a range of historical concentrations of DDTR from the maximum to ND. An agreed upon reference pond should be chosen. (This may already have taken place based on the report of a site reconnaissance in the spring of 1994 by TRC and Navy personnel). The work should be performed in the spring to early summer as recommended to minimize natural environmental stressors. Chemical analysis and surveys should be performed on the same samples after homogenization. Field chemistry should be performed and include DO determination. A fixed based laboratory should be used for the chemical analysis. A representation of these samples should be analyzed for CLP TAL/TCL to minimize chemical uncertainty that may be evident with the present data.

Discussion on the priority of these tasks is suggested. If, for example, a spring biological survey alone indicates that these ponds are lacking in biological activity, perhaps developing a cleanup level based on equilibrium partitioning should be considered. This final recommendation is offered after seeing the inconclusive results from the previous data regarding a chemical dose response. Future sampling and biological assessment activities should be undertaken to negate any remaining uncertainties.

ATTACHMENT 2

1.0 WORK PLAN COMMENTS

1.1 The following comments were generated upon review of the work plans. These comments should be used as a departure point on which to view the FFS comments.

2.0 DEFENSE REUTILIZATION MARKETING OFFICE

2.1 General Comments

The overall approach for interim remedial design appears to be relatively sound. Excavation of soils containing concentration of contaminants above cleanup levels, subsequent off-site treatment/disposal of soils, backfilling the excavation with clean soil, and construction of a protective cover (Alternative 3 or 4) should provide a reasonable level of protection to human health and the environment as an interim measure and given the stated continued use of the facility by the Navy.

A stated design life should be proposed for the interim remedy. Although the interim remedy may be upgraded at some time after construction, too long a delay can result in sufficient deterioration of the barrier that additional cover material, paving, etc. would not provide as beneficial an upgrade as might be expected.

2.2 Page-Specific Comments

Page 4, ¶2	The Work Plan should clarify what types of supplemental data are planned to be collected. It appears that only further delineation of extent and depths of contamination will be conducted. However, information on soil density and potential for differential settlement is warranted to support the evaluation of cap alternatives. Also, the type of soil and grain size may be necessary for evaluation of the type of cover to be placed on the site.
Pages 5-6	The Work Plan should discuss how the results of the focused feasibility study (FFS) will be integrated into the proposed design. The interim design is scheduled to be completed prior to completion of the focused feasibility study. Although a preliminary evaluation of alternatives is presented in the Work Plan, the level of detail that would normally be found in a feasibility study is not included. Therefore, it is not clear how results of the focused feasibility study, to be conducted subsequent to this work plan, will be used to assist in selecting the interim remedial alternative for the site.

Page 7, ¶3

The Work Plan should discuss the potential for future subsidence, including differential settlement, because the area was used as a "major base landfill and burning ground prior to 1969." Previous discussion in the Work Plan focuses only on excavation and removal of soils containing contaminants above cleanup levels; apparently, remaining fill materials will not be disturbed. Therefore, there may be a potential for excessive settlement that could result in breaching of the proposed low permeability barrier.

Page 18

Cleanup levels for the polyaromatic hydrocarbons (PAHs) that were stated to be widespread throughout the area (page 15) should be discussed in the text. If these are not a risk problem or if the risk will be alleviated by capping, it should be stated in the Work Plan.

If the potential exists for surface soils to be transported to the Thames River via surface water runoff or during flood events, then cleanup goals for surface soil should be protective of aquatic receptors present in the adjacent Thames River. Although a cap is proposed to extend over unpaved portions of the DRMO site, the proposed investigation should address the potential for contaminants to be transported via flooding events. If this potential exists, then soil cleanup goals protective of ecological receptors such as the National Oceanic and Atmospheric Administration sediment guidelines (NOAA ER-L values) should be established.

Page 27, ¶3

The Work Plan discusses mobilizing an air stripper to the site to remove trichloroethylene (TCE) from soils. However, air stripping is employed for removing volatile compounds from water, not soils.

Page 28, ¶3

The proposed use of existing paved areas as a cap should be clarified in the Work Plan. The Work Plan proposes evaluation of the integrity of the existing paved areas of the site, in conjunction with determining the areal extent of the proposed cap. However, it is not clear whether the paved areas will remain untouched, regardless of potential contamination in the subsurface, or if these areas are considered to be contaminated. If the paved areas are proposed as part of a cover, the details of paving construction should be provided because the soils beneath the paved areas may not have a sufficiently low permeability.

Page 31,

This paragraph discusses the need for the former

¶1 landfill area to receive a RCRA-type cap. Two alternatives that meet the requirements for a RCRA hazardous waste landfill are proposed for inclusion in the preliminary alternative evaluation (Alternatives 2 and 4). However, neither of the proposed alternatives appear to definitively meet the requirements for RCRA closure. Further discussion is provided in the comments for Figure 3-3 and Figure 3-5.

Page 31, ¶2 The statement that an asphalt cover is "considerably more expensive" than a crushed stone cover does not appear to be correct. According to the proposed alternatives, the addition of an asphalt cover adds one dollar per square foot to the cap cost. This increase is approximately 60 percent, not two hundred percent, as stated. The text should be corrected.

Figure 3-2 Silt may not achieve a permeability of $1x10^{-5}$ centimeters per second (cm/sec) or less. Although silty soils may have relatively low permeabilities, placement of silt alone may not achieve the stated permeabilities. Addition of bentonite powder or use of material with a clay fraction is probably necessary. The Work Plan should discuss how the low permeability will be attained and verified.

Figure 3-3 A filter fabric should be placed between the crushed stone "choked with fines" layer and the proposed gravel drainage layer to prevent clogging of the drainage layer.

A double barrier is not provided as stated on the figure. Rather, a composite barrier of clay and geomembrane is provided. According to previous discussion and Figure 3-2, the crushed stone layer is not considered a barrier. The text in Figure 3-3 should be corrected.

Alternative 2 does not appear to meet the requirements of a RCRA hazardous waste landfill cover. Additional cover soil may be required, depending on depth of frost penetration, susceptibility of the cover to erosion through operational use of the equipment at the DRMO, and potential for settlement to adversely affect long-term performance of the cover.

It should also be noted that the limited availability of clay should not be a significant disadvantage because silt may be mixed with bentonite powder at a composition of several percent, to achieve the requisite permeabilities,

often at much less cost.

Figure 3-4 — Alternative 3 appears to be susceptible to deterioration by desiccation and/or weathering due to the limited cover. The 12-inch crushed stone cover appears to allow infiltration that would hydrate the geocomposite clay liner soon after installation. Although, this would tend to limit downward migration of infiltrating water, the shallow cover would leave the geocomposite exposed to repeated freeze-thaw cycles. This would likely deteriorate the effectiveness of the clay liner significantly. Therefore, it cannot be considered "impermeable" as stated. Additionally, the proposed drainage layer of drainage netting would likely be inhibited in its performance due to direct contact with the geocomposite. As operational loading pressures take effect and hydration of the clay causes swelling, the permeability of the netting will decrease. Thus, additional hydraulic head will build up on the "barrier".

Figure 3-5 — Alternative 4 does not necessarily meet the requirements for a RCRA hazardous waste landfill. As stated in the comment for Alternative 2, presented in Figure 3-3, a double barrier is not provided. The proposed barrier is a composite barrier of a geocomposite material. The limited cover provided will leave this composite barrier susceptible to freeze-thaw stresses and settlement due to operational loads. Additionally, the manufacturer discusses the need for protecting the bentonite if it is to be placed face down on coarse grained soils. There is no information provided pertaining to the suitability of the expected in-place soils to meet this requirement.

3.0 AREA A LANDFILL

3.1 General Comments

In general, the work plan appears to have been assembled without in-depth analysis of site-specific conditions. The work plan for the Area A Landfill has several figures that do not belong in the Area A Landfill work plan, and is missing the figures relating to the Area A Landfill.

The approach employed to arrive at the recommended alternative for the landfill cover is inadequately documented. There is no discussion of the basis for the costs used; and no qualitative comparison of the advantages of each alternative according to the seven primary evaluation criteria specified in EPA feasibility study guidance: implementability, short-term effectiveness, long-

term effectiveness, ability to reduce toxicity, mobility and volume of contamination, protectiveness of human health and the environment, compliance with ARARs, and cost. It appears that the focused feasibility study discussed is a formality only to "document" the alternative recommended. The specific information on how future uses (parking lot) will be integrated into the cover, type of waste (hazardous or non-hazardous) and limited discussion of the concrete pad hot spot is not provided in this document. Therefore, the proposed capping alternative is not justified, based on the limited information presented in the work plan.

3.2 Page-Specific Comments

Pages 5-6	The shaded area on Table 1-1, the interim remedial design schedule, refers to the Area Downstream Sediments/OBDA, not the Area A Landfill. Table 1-1 should be corrected so that the Area A Landfill information is shaded.
Page 7, ¶4	The text should clarify if any of the incinerator ash was deposited in the Area A Landfill prior to cessation of incinerator operation in 1963. If so, then this may be a source of the observed lead and cadmium discussed on page 13, paragraph 2. Placement of incinerator ash may require closure under RCRA Subtitle C.
Page 8	Figure 2-1 is not appropriate for inclusion in this work plan since it describes the downstream sediments/OBDA area. It should be replaced with the site plan relating to Area A Landfill.
Page 14	Figure 2-3 is not appropriate for inclusion in this work plan. It should be replaced with the figure relating to Area A Landfill.
Page 12, ¶2	It should be kept in mind that EPA does not consider the To-Be Considered (TBC) Values as clean-up goals. Clean-up levels still need to be established.
Page 13, ¶3	Figure 2-3 information cannot be evaluated because the information does not relate to Area A Landfill. A summary of data relating to observed contamination needs to be provided.
Page 16, ¶3	The discussion of cadmium distribution in this paragraph in addition to discussions of contaminant distribution elsewhere (Section 2.4: Nature and Extent of Ground Water Contamination) suggests that there are significant unknowns in regard to site conditions at the landfill. Additionally, it is not known whether there is a potential for

significant methane gas production or differential settlement at the landfill. Because of this, in general, it appears that development, evaluation and selection of a specific landfill cover for this landfill is premature. This is especially critical since there is a significant likelihood that the interim remedy will become the permanent remedy. The text must identify each variable which may alter landfill cover design and present contingencies for incorporation of new information into the design.

Page 18, ¶4 — The lack of complete understanding of ground water flow patterns in the vicinity of the landfill suggests that additional information is warranted prior to selecting a landfill cover. Depending upon the cap selected and constructed including run-off/run-on diversion trenches and/or ground water interceptor trenches there could be significant alteration of ground water flow patterns. The text needs to include contingencies in the landfill cover design for this possibility.

Page 19, ¶2 — It appears that the focused feasibility study is being performed only to "document" the alternative already selected for design and implementation. This is contrary to the guidance for conduct of remedial investigations and feasibility studies. Based upon the information provided to date, there does not appear to be enough information to justify selection of an alternative. As an example, if capping were to significantly reduce infiltration, would this cause water from the wetland area to migrate into the landfill due to a reduced hydraulic head? Since there appears to be leachate breakout at the OBDA area of the landfill, would the alteration of groundwater flow actually generate more contaminated ground water? This is not to imply that a cap is not warranted or necessary, but rather to call attention to the need to consider all site conditions prior to developing specific final cover configurations for inclusion in remedial alternatives. Contingencies, such as a leachate collection system, must be included for potential problems which are difficult to predict with existing data.

Page 20, ¶3 — The text states that "all of the evaluated capping alternatives have a surface layer that will vary to suit potential site usage," such as open vegetated areas, asphalt cover, concrete cap or a soil geosynthetic cover. However, the remedial caps presented in Figures 3-1 through 3-4 do not show or discuss these referenced variations. Therefore, an

evaluation of the effectiveness of each alternative cannot be made. The work plan must detail the proposed variations in the upper cap layer for each alternative.

Page 21, ¶1 — Given the statement made on Page 7, Paragraph 4 that all non-salvageable materials generated by submarines and base operations were disposed of in the Area A landfill, it appears that ARARs regarding closure of hazardous waste disposal areas may be applicable. That is, the materials appear to represent wastes from industrial activities and may contain significant hazardous waste. Therefore, the landfill closure may require a RCRA Subtitle C cap as opposed to a RCRA Subtitle D cap. The Navy should discuss why it believes that these ARARs are not applicable. This issue must be resolved (feasibility study) in order to evaluate and select a final cover configuration.

Page 21, ¶3 — The recommended alternative (Alternative 3) is not appropriate for this landfill, even if the whole site were to be capped with this configuration. Specific comments for each of the alternatives are given below. Although there may be reasons for this alternative being recommended, the limited discussion and information presented in this work plan does not support the contention that it is the most cost-effective alternative that would provide protection of human health and the environment. The work plan must be revised to present and discuss the assumptions behind the information presented for each alternative.

Figure 3-1 — This cover configuration does not appear to meet EPA or State of Connecticut cover requirements for closure under RCRA Subtitle D. While the thickness of the two layers is acceptable, the landfill appears to be underlain by dredge spoil from the Thames River (Figure 2-2). The permeability of this material is not discussed. If this material has a permeability less than that shown for the cover, the cover infiltration value may have to be lower in order to eliminate the buildup of infiltration on the landfill bottom. The text should discuss the dredge spoil material and how its effects have been taken into consideration.

Figure 3-2 — It is not clear how the value of $15.30 per square foot of cover was calculated. It appears that this value is grossly exaggerated. At this cost, the landfill closure cost would be approximately $667,000 per acre. Typical closure costs for a landfill cover of this type ranges from $200,000 to

$250,000 per acre. Additional justification of the costs must be presented.

The illustrated section should include a geosynthetic filter fabric beneath the erosion layer and above the gravel drainage layer in order to prevent clogging of the drainage layer by downward migrating soil particles.

The comment concerning this cover requiring significant grading does not appear appropriate since the existing site conditions pose no special problems due to topography. The text needs to document this "disadvantage."

It should be noted that the value of maximum frost depth penetration for this portion of Connecticut is in excess of 40 inches according the NAVFAC Design Manual 7.1. Therefore, the 36 inches of cover above the clay barrier layer may not be adequate. The figure should be revised to include at least 40 inches of cover.

Figure 3-3

The cover configuration depicted does not appear to be acceptable for a RCRA final cover. In addition to the frost depth considerations discussed for Figure 3-2 which would require as additional 16 inches of cover, there is no drainage provided. Although the geocomposite would provide a low permeability (2×10^{-6} centimeters per second), its thickness is less than one inch, even when hydrated. Since there is no drainage for infiltrating water, a hydraulic head will develop on the clay geocomposite. In addition to causing freeze-thaw problems, the increased hydraulic head in conjunction with the relative thinness of the clay layer effectively increases the hydraulic gradient across the barrier. Additionally, the geocomposite shown may be subject to significant stresses from settlement that can also deteriorate the barrier effectiveness. Clay geocomposites are typically not used alone in a landfill cover, but rather in conjunction with a geomembrane as an underliner. These issues should be addressed more fully in a feasibility study prior to selection of the final cover alternative.

Figure 3-4

The potential problems due to frost penetration discussed above are applicable to this cover configuration also.

The placement of the FML/bentonite composite with the bentonite layer upward is incorrect. When this material is used for a landfill cover, the

bentonite side is placed down. The function is to minimize the leakage of any water through the membrane. As such, it is necessary to place the bentonite below the membrane. Additionally, when placed above the membrane, it will become hydrated as infiltrating water comes in contact with it. This will also result in swelling that could block the drainage netting resulting in a hydraulic head to build up on the barrier layer. The figure should be revised.

The comment that this option is "not most cost effective" is not appropriate. The 22 percent increase in relative cost to the alternative recommended (Alternative 3) is minimal given that it (if installed appropriately) provides a significantly higher degree of protection. It is for reasons such as this that the alternatives should be evaluated in a feasibility study prior to deciding upon a final cover option.

This cover configuration does not provide a double barrier as stated, but rather a composite barrier (if the bentonite side is installed correctly).

4.0 AREA A DOWNSTREAM/OBDA SITE

4.1 General Comments

The general remedial alternatives developed appear reasonable, and there are no major comments concerning the interim remedial actions proposed. However, certain components of the remedial action, such as removal of the drums, tanks and telephone poles, are given only limited mention. The work plan does not integrate the planned responses at this location with interim remedial actions at other locations. Given the potential that leachate from the Area A Landfill might discharge in the area of the Over-Bank Disposal Area (OBDA), it would seem logical to consider remedial actions at the landfill, concrete pad and the Downstream/OBDA Site area together.

4.2 Page-Specific Comments

Page 10, ¶1 — A significant waste disposal area is identified in this paragraph, but there is minimal discussion of the management of this waste and its potential contribution to site contamination. The text needs to discuss this in greater detail.

Page 10, ¶2 — Bright orange, organic sediments referred to as leachate from the landfill were observed in water discharging from the base of the dike embankment. However, there is no discussion as to how this will be addressed in this interim remedial design work plan or the interim remedial design work plan for the Area A landfill. Given that these interim remedial design work plans may become final remedial designs, the issue should be addressed.

Page 14, ¶4 — The statement that detected pesticides are the result of past pesticide application or migration of sediments is too limited. The pesticide concentrations detected in several surface samples (on the order of magnitude of 100 parts per million for at least three samples) is much higher than would necessarily be found through application for pest control. Given the location of the OBDA, it is possible that containers with pesticide residues, unused portions, or contents with expired dates could have been deposited in this location. The text must be revised to discuss this possibility.

Page 16, ¶4 — The comment that the distribution of contaminants at this site is not completely defined appears to be a valid observation. Given the discussions in the preceding paragraphs of the work plan, there is uncertainty as to the origin of detected contamination. Because of this, any interim

remedial measure proposed cannot be fully evaluated at this time. Although removal of contaminated sediments and debris at the OBDA with appropriate off-site disposal in a RCRA facility would be prudent and acceptable, the final areas and volumes to be remediated, remediation methodology, and site restoration measures remain uncertain. Therefore, any remedial measures taken at this site should not be considered final.

Page 21, ¶1 — The comment that the majority of the iron and manganese detected was probably leached from native soils may be inaccurate given that these inorganics are common constituents of landfill leachate. Additionally, even if these inorganics were leached from native soils, it may be due to acidic ground water generated from the landfill wastes. The text should discuss these possibilities.

Page 22, ¶4 — The discussion in this paragraph appears misplaced. Discussion of interim remedial actions should be placed in the preceding section. Removal of the tanks, drums, creosote-contaminated poles and other debris is not mentioned as a final remedial action in this paragraph or as an interim remedial action in the preceding paragraph, and should be added to the text.

Page 23, ¶3 — As discussed in the review of other interim remedial design work plans, this work plan also states that the focused feasibility study will be conducted to "document" the rationale for selection of the interim remedial measure. Given the data gaps for the site and interrelationship with other site remediation, this approach appears to be inadequate. All site conditions should be considered prior to developing remedial alternatives, or contingencies must be included for potential problems which are difficult to predict with existing data.

Page 26, ¶4 — As stated above, it is not clear that the pesticides detected are due only to normal application activities. The text should be revised to reflect that, in the absence of additional data and discussion, classification of the sediments as non-hazardous wastes may be premature.

Page 28, ¶6 — The brief two-sentence discussion of OBDA debris should receive considerably more attention in the body of the work plan since the OBDA debris appears to be a significant source of contamination and possibly hazardous materials.

5.0 SPENT ACID STORAGE AND DISPOSAL AREA AND AREA A LANDFILL - CONCRETE PAD

5.1 General Comments

Integration of the management of lead-contaminated soil at the spent-acid area with the remediation of soils at Building 31 is strongly recommended. This does not necessarily mean placing wastes together, but rather utilizing the technologies used at Building 31. The concrete pad remediation is an appropriate component of the Area A Landfill closure activities, especially if portions of the concrete pad will remain in place as part of the cap.

5.2 Page-Specific Comments

5.2.1 Spent Acid Storage and Disposal Area

Page 24, ¶3 — Removing the lead-contaminated soils for off-site disposal in an approved, permitted RCRA facility is appropriate. However, the depth of excavation should be 8 feet, rather than the stated depth of 6 feet, because Figure 2-2 shows ground water to be at least 8 feet below ground surface.

Page 25, ¶3 — Backfill material should be clean structural fill, not gravel. Although gravel may be used as a base course to support pavement, a column of gravel extending to the water table is not recommended based upon the limited data provided in the work plan, a column of gravel could provide an avenue of rapid infiltration of water not diverted by the surface cap/pavement.

5.2.2 Area A Landfill - Concrete Pad

Page 16 — The cross section shown does not appear to reflect conditions beneath the concrete pad. The closest borings are more than 100 feet away from the pad.

Pages 14-19 — The bulk of the discussion presented concerns the Area A Landfill. Although the concrete pad is located in this area, the interim remedial measure should focus on the concrete pad. For example, the text should include a discussion of the integrity of the existing concrete pad and potential for contamination to exist below the concrete pad.

In particular, there appears to be no sample data from the concrete pad itself or from soils below the pad. Given that the text on page 14, paragraph 1 mentions that there was evidence of past leakage of oil and that two transformers and several electrical switches were also noticed to have been

leaking in the past, it is possible that contaminants migrated beneath the pad through weathering cracks or at the edges of the pad. This is a concern, given the high concentrations of pesticides and polychlorinated biphenyls noted in samples from two locations adjacent to the concrete pad (2LSS1 and 2LSS2). Contingencies for dealing with potentially high concentrations of these materials should be included in the work plan.

Page 21, ¶3

The discussion presented, stating that capping the site would not provide a permanent remedy, appears to be contradictory to what is presented subsequently where it is implied that portions of the concrete cap will be left in place. Also, there does not appear to be any data that could be used to determine what portions of the pad are contaminated. This should be clarified.

Page 27, ¶3

As with the other interim remedial design work plans reviewed, a statement is made that a focused feasibility study is being performed to "document" the rationale for selection of the proposed interim remedial action. However, it appears that the timing of the feasibility study completion will not permit the study to fulfill its intended purpose of objectively evaluating various possible alternatives for remediation of the site. Prior to completion of the feasibility study, evaluation of the proposed interim action with the insufficient information available has limitations. All potential situations that the feasibility study would normally reveal must be included in the proposed interim action.