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LETTER REGARDING U S EPA REGION I REVIEW AND COMMENTS ON THE REVISED DRAFT FEASIBILITY STUDY FOR SITE 8 NETC NEWPORT RI
8/11/2011
U S EPA REGION I

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MASSACHUSETTS 02109-3912

August 11, 2011

Maritza L. Montegross
Remedial Project Manager
NAVFAC MIDLANT, Code OPNEEV
9742 Maryland Avenue, Bldg. Z-144
Norfolk, VA 23511-3095

Re: Revised Draft Feasibility Study
Site 08, NUSC Disposal Area RI/FS
NAVSTA Newport, Rhode Island
July 2011

Dear Ms. Montegross:

EPA has received the "Revised Draft Feasibility Study for Site 08, NUSC Disposal Area," dated July 2011, as prepared by Tetra Tech NUS, Inc., on behalf of Naval Station Newport, RI. The Revised Draft Feasibility Study (FS) summarizes the site history, offers remedial action objectives, and develops and evaluates remedial alternatives designed to remediate site soils, groundwater, and sediments. EPA evaluated the Revised Draft FS to determine if it was consistent with CERCLA, the NCP, EPA's "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" (October 1998), and other applicable EPA guidance and policies. In addition, EPA evaluated the Revised Draft FS for consistency, technical accuracy, and completeness.

EPA had agreed to a 30-day review period for the Revised Draft FS. In an attempt to make a good faith effort at meeting this obligation, EPA is issuing partial comments on the Revised Draft FS with this letter, and intends to issue additional comments by no later than September 2, 2011. In addition, Navy issued the BIOCHLOR modeling details, relevant to Appendix D of the Revised Draft FS, on August 9, 2011. EPA's additional comments to be issued September 2, 2011 will address our review of this additional data. The enclosed comments reflect a significant level of review and will provide the Navy with information on many of EPA concerns, so that the Navy can proceed with efforts to consider and respond to these comments. All of EPA's and RIDEM's comments on the Revised Draft FS will be issued prior to the September 21, 2011 RPM meeting. EPA advises Navy to include adequate time on the agenda of that meeting for comment resolution discussion.

General and specific comments on the Revised Draft FS are presented in the attached comment document. Note that comments offered in EPA's October 18, 2010 letter on the Draft FS of August 2010 are also restated where they remain a concern and have not been addressed.

If you have any questions, please contact me at (617) 918-1754 or at lombardo.ginny@epa.gov.

Sincerely,

Ginny Lombardo

Ginny Lombardo
Remedial Project Manager

Attachment

cc: Pamela Crump, RI DEM
Deb Moore, NAVSTA Newport
James Ropp, TtNUS
Stephen Parker, TtNUS
Ken Munney, USF&W
Chau Vu, EPA
Bart Hoskins, EPA
David Peterson, EPA
Greg Kemp, Mabbett & Associates, Inc.

EPA Comments on
Revised Draft Feasibility Study for
Site 8 – NUSC Disposal Area
July 2011

Comments from EPA's October 18, 2010 Letter on the Draft Feasibility Study:

Numerous comments raised in EPA's October 18, 2010 letter on the Draft Feasibility Study (August 2010 version) were not adequately addressed in the Revised Draft. The comments are restated here:

General Comment:

6. The FS must include calculations of the total residual risks for all media and all receptors based on the proposed PRGs. The purpose of this is to ensure that by remediating the site contaminants to the proposed PRGs, the total residual risks from remaining contamination will be within the acceptable risk range and will not exceed 10^{-4}. [Note that RIDEM Regulations are an ARAR, so Navy must comply with the more stringent 10^{-5} total residual risk.]

Specific Comments:

22. Page 1-20 [Page 1-34 in Revised Draft], Section 1.10.1: Although EPA's blood lead models recommend use of the average lead concentrations and the results of the models are below the EPA's level of concern, the maximum detected lead concentrations in surface and subsurface soils are 2,870 mg/kg and 4,650 mg/kg, respectively, in the exposed area. In the paved area, the maximum detected lead concentration in subsurface soil is 27,200 mg/kg. These concentrations exceed EPA's screening level of 400 mg/kg and RIDEM residential direct contact criteria of 150 mg/kg for lead. Since PRGs were not developed for lead and these high concentrations are proposed to be left in place without remediation, ICs are necessary to prevent any current or future exposures due to any potential development. [Provide further discussion of lead in this section.]

29. Section 2.2.2, Human Health PRGs, Table 2-4: The selected soil PRGs for construction workers, industrial workers, lifelong recreational users, and hypothetical lifelong residents were set at target cancer risk level of 10^{-5}. These PRGs exceed RIDEM Direct Contact Criteria for almost all COCs. The RIDEM standards are ARARs that must be achieved by the soil remediation alternatives. For Hypothetical Lifelong Residents, all chemical risks except for naphthalene are based on RSLs (note the RSL should be 3.6). Please clarify why naphthalene is different.

38. Page 3-10 – 3-11 [Pages 3-9 – 3-10 in Revised Draft], Section 3.3.3: The Impermeable Cap option is eliminated because Navy contends that construction of an impermeable cap would not be possible at the Paved Storage Area due to access restrictions and because infiltration would increase in areas that are not capped. EPA does not accept the premise that Navy's operational access restrictions should prevent a CERCLA cleanup nor does EPA accept that

construction of an impermeable cap should be eliminated from consideration as a viable remedy. The paved area could be considered an impermeable or low permeability cover or the cap could be constructed to allow it to be paved to restore its current use. Note that if an impermeable cap is needed to comply with RIDEM Remediation Regulations leachability criteria, the cap construction would need to comply with applicable requirements. An impermeable cap option should be evaluated in the FS.

39. Page 3-12, Section 3.3.4: The text states: "*due to the mission critical use of the Paved Storage Area, only partial excavation is considered, which would exclude the material beneath the Paved Storage Area.*" EPA does not accept the premise that Navy's operational access restrictions should prevent a CERCLA cleanup. Site uses could be temporarily relocated while an excavation action is taken.

50. Page 3-36 [Page 3-29 in Revised Draft], Section 3.5.3, Cover System and Section 6.1.3: In Section 3.5.3, under the "Consolidation and Cover System" option, the text states: "*As a result, stormwater storage capacity of the pond would be reduced.*" Should this issue and associated water storage implications also be considered under the "Cover System" option? In Section 6.1.3, the sediment alternative, SD3, includes a 1 foot cover system. Again, should stormwater storage capacity implications be considered here? An additional consideration is the habitat alteration associated with capping sediment in the absence of any dredging. Given that the pond is already shallow, the addition of substrate to cover contamination could make areas too shallow to be suitable habitat for pond biota. Any site remediation should not accelerate the natural filling and possible eutrophication of the pond. Once the extent of the PRG exceedances is fully determined, it will be necessary to determine the pond depths in these areas to better decide on the appropriateness of capping. It may be necessary to use a combination of dredging and capping to ensure that habitat is not lost. Note that the sediment remedies may require mitigation for lost federal and State wetland resources, which would likely include creation/excavation of replacement pond/wetland resources.

61. Sections 4.1.2 and 4.1.3: Any alternatives that leave contaminated soil in place need to be covered and meet the applicable or relevant and appropriate standards for covers, in this case likely the RI Remediation Regulations or the RI Solid Waste Regulations. The cover needs to address both contact and leachability risks posed by the contaminated soil.

63. Page 4-9, ARARs Section: There also needs to be a determination as to which alternative poses the Least Environmentally Damaging Practicable Alternative for protecting wetland resources under the federal Clean Water Act.

77. Page 6-5, Section 6.1.3, LUCs: LUCs may also include requirements to maintain the dam for the pond to keep covered sediments from being released downstream.

80. Page 6-14, Cost Section: Cost calculation should include permanent maintenance of the pond dam.

89. Figure 4-2: Regarding the soil cover, please clarify if this cover will be designed as a low permeability cover and provide a permeability value if known at this time. This figure makes reference to the 100-year flood elevation regarding the armored slope for the soil cover toe termination. Please clarify how the 100-year flood elevation will be determined.

New Comments on the July 2011 Revised Draft Feasibility Study:

General Comments:

1. In EPA's December 24, 2009 Conditional Concurrence Letter on the Draft Final RI for NUSC Disposal Area, EPA listed issues that must be considered in the NUSC FS. The following issues that were identified in that letter are not adequately addressed in the Revised Draft FS:

   - *For the South Meadow, evaluation of remedial alternatives will need to consider and address the finding that additional 55-gallon capacity drums likely exist in this area (refer to page 3-9 of Draft Final RI).*
   - *For the Paved Gated Storage Area, the evaluation of remedial alternatives will need to consider and address the portion of the area where the Navy was unable to complete a geophysical survey to evaluate the area for the existence of subsurface anomalies.*

   With respect to the South Meadow, the Navy must present a remedial alternative for soil that includes the removal of all remaining containers in the South Meadow. Where it is known that additional drums remain in this area, EPA would expect the selected remedy to include the removal of these and any other containers in the area.

   With respect to the Paved Gated Storage Area where the existence of subsurface anomalies is unknown, EPA would expect a contingency remedy to address the following situations:

   - If groundwater restoration goals are not achieved in a reasonable timeframe and there is reason to believe that continuing sources of contamination from this area may be inhibiting groundwater cleanup, Navy will need to complete follow-on geophysical investigations in this area and remove subsurface anomalies.
   - If the use of the site is changed, including the transfer of the property outside the Navy or elimination of the active use of the Paved Gated Storage Area, Navy will need to complete follow-on geophysical investigations in this area and remove subsurface anomalies.

2. As discussed during the Supplemental RI effort, there is currently insufficient data to support a Monitored Natural Attenuation (MNA) remedy for this site. EPA has again scored the site using the data available, including data from the latest monitoring event (Appendix D.3), by completing the checklist available in the Biochlor model which evaluates the site based on a long list of indicator parameters relevant to MNA. The result for the North Meadow plume was a score of 9 which indicates that limited evidence exists for anaerobic biodegradation of chlorinated hydrocarbons (range 6 to 14). A score of 15 or higher is indicative of adequate evidence for MNA. Strong evidence requires a score greater than 20. EPA's MNA

Guidance (*Use of MNA at Superfund, RCRA Corrective Action, and UST Sites*, April 1991) states: The efficacy of MNA "*... involves collection of site-specific data sufficient to estimate with an acceptable level of confidence both the rate of attenuation processes and the anticipated time required to achieve remediation objectives.*" Navy calculated the source attenuation rate (k point) based on the data available for monitoring location MW-03B which is comprised of four samples collected over eight years, three of which were collected within the past three years. Navy calculated an attenuation rate of 0.252, but has not provided any analysis as to the confidence inherent in that estimate for the rate. Because MW-03B was the only location where more than two samples have been collected, no other locations could be evaluated for comparative purposes. EPA requests that Navy provide an independent evaluation of the confidence level for the source attenuation rate and include the calculation in the FS. Please also provide confidence levels for estimates of the time to achieve the required cleanup goals.

3. Both soil and sediment remedial alternatives will have varying levels of habitat impacts. The remedial alternatives developed should include a remedial component and associated costs for site restoration, as appropriate.

4. If the extent of contamination depicted in Figure 2-6 is accurate, then Navy has an opportunity to minimize the area of the site that is restricted with LUCs. Only a relatively small area of subsurface contamination exists in the North Meadow and west of NUWC Pond. EPA requests that Navy consider another soil alternative that excavates all the contaminated subsurface soil from the north end of the site, so that portion of the site is available for unrestricted use and unencumbered by LUCs. This alternative could also have economic advantages in that the area could be restored without having to recreate the existing topography.

5. Please include a figure in the FS that presents the wetland setback boundaries.

Specific Comments (comments should be addressed throughout the FS, as appropriate)**:**

1. Page 1-35, Section 1.10.2, and Page 2-6, Section 2.2.1: Page 1-35 states: "*The chemicals in groundwater exceeding threshold values for the construction worker scenario were not selected as COCs for industrial groundwater because the representative site concentrations (95% UCL) did not exceed the calculated risk values.*" Page 2-6 states: "*Although the RI identified risks to construction workers from exposure to metals in groundwater, the screening steps conducted in Section 1.10 of this FS eliminated metals as COCs for the construction worker because the representative (95% UCL) site concentration in groundwater did not exceed the calculated target risk value.*" Clarify these statements. Provide a list of the constituents that these statements apply to. Is the Navy indicating that a qualitative risk analysis was done for the groundwater contaminants with levels exceeding screening values? If so, provide the analysis that supports these conclusions.

2. Page 2-10, Section 2.3.1, 5th Bullet: This RAO was revised from the August 2010 Draft FS. The August 2010 Draft FS included the RAO as: "*Prevent the migration of contamination to the surface water and sediment via groundwater transport.*" In EPA's October 18, 2010 Letter, Specific Comment 2, EPA offered comments on this RAO requesting that Navy

establish how compliance with this RAO would be monitored and achieved and requesting that the Navy ensure that remedial alternatives proposed meet this RAO. The Revised Draft FS revises this RAO to: "*Prevent the migration of sediment COCs that could cause unacceptable ecological risk to pond and stream sediment via groundwater transport and overland runoff.*" This revised language is not appropriate, since sediment COCs are not the same as COCs in groundwater and soil. The RAO should be revised to: "*Prevent the migration of groundwater COCs and soil COCs to surface water and sediment at levels that could cause unacceptable ecological risks.*" In EPA's October 18, 2010 Letter, General Comment 7, EPA indicated that surface water and sediment impacts from migrating groundwater contamination were a concern and monitoring would be required. The Revised Draft FS does incorporate requirements for surface water and sediment monitoring. Once a monitoring plan is prepared for the site, the Navy will need to establish an acceptable monitoring program for surface water and sediment and establish appropriate comparison criteria for determining compliance with this RAO.

3. Page 2-11, Section 2.4: It is not apparent that the subsurface soil volumes presented in the table on this page are consistent with the description in the 3rd bullet on this page. Review and correct as appropriate or clarify why Navy believes they are consistent.

4. Section 2.2.2, Human Health PRGs, and Table 2-4: Regarding the selected PRG for total cPAHs expressed as benzo(a)pyrene equivalents, the value of 2.1 mg/kg for industrial PRG is based on 10^{-5} target cancer risk level. This selected PRG exceeds RIDEM Direct Exposure Criteria of 0.8 mg/kg for industrial scenario. Since RIDEM DECs are considered ARARs, they must be achieved as cleanup goals so RIDEM DEC should be selected as PRG in this scenario.

5. Section 2.2.2, Human Heath PRGs, and Table 2-5: The selected groundwater PRGs were set at either target cancer risk level of 10^{-5} or target hazard index of 1. The selected PRGs for chromium, carbon tetrachloride, tetrachlorethane, vinyl chloride, and arsenic exceed existing federal drinking water standards and are not acceptable. The PRGs should be selected as the lowest levels of MCL, non-zero MCLGs, or risk-based levels. Please revise PRGs for the COCs mentioned above.

6. Section 2.2.2, Ecological PRGs, and Table 2-6: Based on EPA's comments on the Supplemental RI, it was agreed that lead would be included as a COC for sediment in both stream and pond sediment. Table 2-6, however, does not include a PRG for lead for the pond. The Navy should establish a PRG for lead in sediment in the pond.

7. Page 3-2, Section 3.1, Containment: The last sentence of this section should refer to both surface water and groundwater movement. Please edit the text accordingly.

8. Page 3-10, Section3.3.3, Conclusion: The report states "*soil PRGs and groundwater conditions do not require mitigating COC leachability in soil.*" Subsurface vadose soil concentrations in the South Meadow exceed the RIDEM leachability criteria. Therefore, remedial alternatives must be designed to eliminate leaching in those areas where the criteria are exceeded.

9. Page 3-16, Section 3.3.6, Conclusion: The conclusion that on-site consolidation has no significant advantages is not supported by the prior discussion of this technology. It appears that utilization of this technology could result in potentially significant cost advantages. EPA requests that Navy consider developing an additional soil alternative that incorporates on-site consolidation, which would reduce the off-site disposal cost for arsenic-impacted soil as compared to SO2, and would reduce the volume of imported soil as compared to SO3.

10. Page 3-19, Section 3.4.2, MNA: The report states: "*more data over time would be helpful for further evaluating the effectiveness of MNA at the site.*" It is EPA's understanding that Navy is committed to conduct additional rounds of MNA sampling. Please provide a schedule for the planned additional sampling program. See General Comment 2 above. It is likely that more data will be required to establish a reasonable confidence level for any MNA remedy component.

11. Page 3-20, Section 3.4.3, Hydraulic Containment: Please edit the 2nd and 3rd sentences of the description here to state: "*A hydraulic containment system is similar to an extraction well system but the purpose of the two systems differs somewhat. The wells used in a hydraulic containment system would be designed and situated to provide optimum efficiency in holding contaminated groundwater in place to minimize migration whereas an extraction system would be focused on maximizing the removal of contaminant mass.*"

12. Page 3-21, Section3.4.4, Extraction Wells: Consistent with the SC11, edit the 1st sentence of the description here by changing the word *identical* to *similar*.

13. Page 3-29, Section3.5.3, Consolidation and Cover System: The report limits consolidation options to only one that creates an upland area out of the existing pond area. EPA requests that Navy consider developing an additional sediment alternative that includes consolidation of sediments within the pond.

14. Section 4: See comments 38 and 61 of EPA's October 18, 2010 comments (restated above). If leachability criteria are exceeded in vadose soil, then an impermeable cover would be required to limit leaching. The data suggest that the leachability criteria exceedances are limited to a small area in the South Meadow.

15. Section 4.1.2 and 4.1.3, Removal of Anomolies, and Figures 4-1 and 4-3: These Sections indicate that "*soil/debris including geophysical survey anomalies, buried drums, and the paint can area near the site entrance would be excavated from the limits identified*" on Figures 4-1 and 4-3. However, elsewhere in the report, it is stated: "*The existing pavement over the Paved Storage Area would serve as a cap and soil/debris located within its limits would not be excavated.*" Confirm that all 4 anomolies depicted in Figures 4-1 and 4-3 will be excavated. In addition, in EPA's December 24, 2009 Conditional Concurrence Letter on the Draft Final RI for NUSC Disposal Area, EPA listed the following issue to be addressed in the NUSC FS:

    - *For the Buried Container Area, evaluation of remedial alternatives will need to consider and address the finding that some unknown quantity of paint cans and associated soil*

lead contamination remain south of the excavated area and constitute a continuing source of contamination to the sediments in Deerfield Creek and NUWC Pond (see page 4-84 of the Draft Final RI).

Confirm that the limits of the paint can area excavation depicted in Figures 4-1 and 4-3 adequately corresponds to the remaining paint cans and soil lead contamination referenced in the Draft Final RI.

16. Section 4.1.2 and 4.1.3: Additional details on LUCs should be provided. What uses would be prohibited?

17. Page 4-2, Section 4.1.2: In the discussion of LTTD, indicate the volume of soil to be treated.

18. Page 4-3, Section 4.1.2, Verification Sampling: The report indicates that verification samples will be used "*for comparison the industrial PRGs and for generating a post remedial action risk assessment.*" However, existing data shows that subsurface soils exceed industrial PRGs (e.g., Figure A-5), so what is the purpose of the verification sampling? If industrial PRGs are exceeded, will additional excavation be completed? In addition, what is the purpose of the post remedial action risk assessment? Will both existing subsurface soil data and the verification sampling be included in this risk assessment? The collection of sidewall samples will be important and should be collected every 25 feet of excavation perimeter. The report only refers to sidewall samples "*from the slope of the soil/debris that remains onsite below the Paved Storage Areas.*" Sampling of all sidewall areas will be needed.

19. Section 4.2.2: This Section does not discuss the findings of the verification sampling and how that data will be used to demonstrate overall protection of human health and the environment and/or compliance with ARARs. If the verification sampling can support the demonstration of compliance with these evaluation criteria, it should be discussed here.

20. Page 4-9, Section 4.2.2, Long-Term Effectiveness and Permanence: The report states: "*Although not all of the...geophysical anomalies would be removed from the site*". The report must clarify what anomalies will remain and what additional risks these pose. See General Comment 1 and Specific Comment 15.

21. Page 4-10, Section 4.2.2, Implementability: What is the level of As that will be allowed in the PAH contaminated soil that is planned for LTTD treatment and reuse onsite? How significant is the impact of debris on the volume of soil that can be treated with LTTD?

22. Page 4-11, Section 4.2.3: Please supplement the discussion of Alternative SO3 to describe to what extent, if any, it will reduce the flood capacity of the flood plain. Also, it is not feasible to install two feet of soil cover along the creek, the stream, and the pond perimeter as shown in Figure 4-3 without any excavation. This is not discussed in the alternative. However, it appears to be addressed in the cost estimate by excavation and regrading to allow the placement of clean fill cover in these areas. Please confirm.

23. Page 4-13, Section 4.2.3, Implementability: The text refers to "*removal of hot spot areas*" and "*backfilling for consolidation*". Please clarify.

24. Page 4-15 Section 4.3: The cost comparison table on this page states that the annual O&M/LTM costs for alternatives SO2 and SO3 would be the same. However, there are 50% more wells to monitor for SO3. Please review and correct as appropriate. Address this same issue in Appendix C which bases O&M/LTM costs on 10 wells for both of these alternatives, which contradicts the text description of the alternatives.

25. Section 5 and Table 5-3: Specific comments 67 and 68 of EPA's October 18, 2010 letter are only partially addressed in the revised draft. The report must be revised to include discussion of the mobilization of arsenic and manganese that can occur when reductive dechlorination remedies are employed. Navy needs to supplement the discussion throughout the FS to acknowledge this fact and discuss how this may result in levels of As and Mg above the elevated levels already present. In addition, the report provides remedial information and timeframes for CVOCs, but a comparable discussion on attenuation of metals and expected timeframes to achieve metals cleanup goals needs to be included. The report does include general statements such as *"(i)t is expected that as CVOCs contamination is depleted, these metals contaminants would also be subsequently attenuated through physical and chemical processes*" and "*metal contamination would be naturally attenuate over time*" and "*(e)levated concentrations of metal COCs...would also be attenuated through naturally-occurring processes after CVOCs are depleted in the subsurface*". However, Navy must include additional discussion to support that MNA would attenuate metals in groundwater and that remedial goals would be achieved in a reasonable timeframe. The report should explain that following depletion of CVOC contamination, the groundwater aquifer should re-establish aerobic conditions which would then provide for the binding of the metals to the aquifer solids. Reference to EPA's Guidance, *MNA of Inorganic Contaminants in Groundwater*, October 2007 (http://www.epa.gov/nrmrl/pubs/600R07139/600R07139.pdf) or literature studies could be provided as support.

26. Page 5-6, Section 5.1.3, and Page 5-8, Section 5.1.4: The report indicates that a pilot study would confirm well spacing and the application rate for treatment for GW3 or GW4. Please discuss how the pilot study would address bedrock contamination which is assumed to migrate via fractures and therefore presumably has inconsistent structural geology throughout the site.

27. Page 5-13, Section 5.2.2, Short-Term Effectiveness: Clarify the discussion in the 2nd paragraph. The discussion apparently refers to two separate RAOs so edit the text to make it clear which RAOs are achieved when.

28. Page 5-14, Section 5.2.2: Correct the section number for GW-3; it should be 5.2.3.

29. Page 5-17, Section 5.2.3: Correct the section number for GW-4; it should be 5.2.4.

30. Page 5-22, Section 5.3: Edit the second full sentence on the page to read: "For Alternative *GW-4*, …."

31. Section 6.0: Throughout the discussion of sediment remedies, the text indicates that: "*Damaged ecosystems are expected to recover within five years through repopulation from upstream sources.*" Similar statements occur in other sections of the document. However, these statements are not substantiated. There is no upstream pond from which seed stock for emergent and submerged vegetation could drift downstream to the pond. Therefore, it seems unlikely that there would be substantial rapid recovery if vegetation were eliminated from shallow areas of the pond. Provide support that upstream sources can provide adequate sources of flora and fauna for repopulation of the pond where remedies are proposed to excavate and/or cover/cap the existing biota.

32. Page 6-3, Section 6.1.2, ENR Sediment Cover: EPA would expect acoustic surveys to confirm cover placement. Revise the text discussion on acoustic surveys to: "*Acoustic surveys will be performed prior to and after placing the cover material to confirm that the required cover layer thickness has been achieved.*" What timeframe does Navy believe will be required to adequately augment the six inch applied cover with another six inches of natural cover? What is the basis for the sedimentation rate?

33. Section 6.1.3: Alternative SD3 includes the placement of a geotextile membrane as part of a cover system for contaminated sediments. However, a geotextile membrane was not included in the retained sediment process options provided in Section 3.5. In addition, EPA is concerned about the proposed use of geotextile fabric as an underlayment for a sediment cap. Using geotextile fabric would immediately smother any existing benthic organisms and would likely be more destructive to pond life than a gradually-applied sand or other cap. The geotextile might also become exposed (as often occurs on banks and in terrestrial settings) in which case it may become a more inhospitable substrate for life than the existing contaminated sediments. If the Navy has documentable reason to believe that geotextile fabric offers a substantial benefit, this needs to be explained further in the FS.

34. Page 6-5, Section 6.1.3, Verification Sampling: Revise the text discussion on acoustic surveys to: "*Acoustic surveys will be performed prior to and after placing the cover material to confirm that the required cover layer thickness has been achieved.*"

35. Page 6-7, Section 6.1.4, and Page 6-16, Section 6.2.4: The text on page 6-7 states: "*the dewatering process is expected to be supplemented using filtration bags and an absorbent agent*" and "*sodium polyacrylate will be added to each truck...to absorb any additional free water...*" However, Page 6-16 states: "*This alternative does not provide any active treatment technologies...*" See EPA's October 18, 2010 letter, Specific Comment 4. The remedial elements noted on Page 6-7 for Alternative SD4 may partially meet the criterion for treatment and should be noted on Page 6-16.

36. Page 6-9, Section 6.2.1, Cost: Correct the discount rate to 2.3 percent, which is the rate used for the soil and groundwater cost evaluations. 2.3 percent is the latest Office of Management and Budget real discount rate. Please make this same correction for all the sediment alternatives.

37. Page 6-11, Section 6.1.3, Short-Term Effectiveness: Clarify whether SD2 would be effective and protective once the initial 6-inch cover has been placed or whether it would not become effective and protective until after the natural enhancement has occurred resulting in a 12-inch cover.

38. Table 2-4: Please clarify why RIDEM's leachability criteria are not applicable for site soil. Benzo(a)pyrene concentrations far in excess of RIDEM's leachability criteria exist in subsurface vadose soil in the South Meadow (TP-15A and SB 110). The absence of significant PAH concentrations in groundwater does not obviate the need to satisfy the RIDEM leachability criteria.

39. Table 3-1, Page 3: Phytoremediation using ferns has been found to be a very effective treatment technology for remediating arsenic is soil. The screening comments need to be revised to acknowledge this. The existence of the paved area is not a valid reason to screen out this technology, as it could be applied in other areas that are not paved.

40. Table 3-3, Page 2: The rationale for eliminating consolidation of sediment within the pond is that this would reduce the storage capacity of the pond. However, sediment consolidation can be combined with some level of excavation in a way that would not reduce storage capacity of the pond. See Specific Comment 13. Such an alternative could require less cover material thus maintaining a greater storage capacity than alternatives that only cover existing sediment in place.

41. Figures 1-4, 1-5 and 1-6: In Figure 1-4, add the wells and borings that make up the cross-sections. The vertical datum for Figure 1-4 is NGVD 1929 whereas the vertical datum for the cross-sections, Figures 1-5 and 1-6, is said to be NGVD 1988. If correct, the elevations for the plan and cross-section figures will not coincide. Note that NGVD 1988 is an incorrect designation; it should be NAVD 1988. Please also confirm the datum used for the water level elevations shown on Figures 1-5 and 1-6. Please review and correct these figures as appropriate so that one consistent vertical datum is used throughout the FS.

42. Figure 2-3: The extent of surface soil contamination depicted in this figure is somewhat different from the extent of contamination depicted in Figures 4-1 and 4-3. Correct the inconsistencies, as appropriate.

43. Figure 2-10: This figure indicates that PRG exceedances were detected in the north end of Deerfield Creek. However, there is no figure showing which contaminants account for the PRG exceedances (lead and PCBs do not). Please add the appropriate figures to document why the north end of Deerfield Creek needs to be remediated.

44. Figure 4-1: It appears that some of the remediation work may occur within the wetland setback boundaries. Please edit the text of the FS to acknowledge this for each of the alternatives.

45. Figure 6-2: Please revise this figure to acknowledge the supplemental natural sedimentation cover that is a component of this remedy.

46. Appendix B.1:

a. Page 1: The calculations state that the "*area of surface soil PAH contamination (industrial)*" is 173,181 sf and that the "*total area of surface soil exceeding industrial PRGs*" is 175,908 sf. Review of Figure 2-3, which shows the limits of surface soil contamination, indicates that the area of arsenic contamination without PAH contamination is much greater than the difference between the above referenced areas (which is only 2,727 sf). Please review and correct the calculations or the figure as appropriate.

b. Page 3: Regarding the number of verification samples required, please note that verification samples will be required in order to reuse the LTTD treated soil and sidewall verification samples will be required at the perimeter of the excavations.

47. Appendix B.2:

a. Page 2: The calculations for GW2 refer to 49 existing monitoring wells; however, Appendix B.1 notes that 25 monitoring wells will be abandoned to construct a soil remedy. Please adjust the costing to account for replacing the abandoned wells as necessary so that an appropriate monitoring network will be constructed. If necessary, adjust the monitoring costs for the groundwater alternatives.

b. Page 3: The calculations refer to the Emulsified Oil Design Tool spreadsheets as the basis for the design values provided on this page. Provide copies of the spreadsheets, a list of the assumptions made, and the documentation that supports the adequacy of the design parameters used for costing.

c. Page 6: Please elaborate on the design basis and assumptions used to determine that 1,500 gallons of Fenton's reagent would be appropriate for groundwater treatment. What experience from other sites with contamination in bedrock groundwater is Navy relying on to establish the design parameters for this site?

d. Page 6: In the third last line on this page please correct the typo in the equation: it should be 2,800 hours/8 = 350 hours.

48. Appendix C:

a. SO2: The description of Line item 6.7 erroneously refers to treated soil. The volume of 10,447 tons for off-site disposal corresponds with the volume calculated in Appendix B.1 (7,050 CY = 10,4547 tons) so apparently none of the LTTD treated soil is assumed to require off-site disposal. Please correct the title of this line item.

b. SO2: For Site Restoration, please note that verification samples of the treated soil will be required before it can be reused at the site. Please account for that in the costs. Also,

unless accounted for in the treatment cost line item, some analysis of the soil to be treated will likely be required to properly treat the contaminated soil. Please clarify this.

c. SO3: For line item 6.4, it is likely that significantly more than four verification samples will be required because of the excavation that will be required along the creek, stream, and pond perimeter to allow the placement of the soil cover. Please review and adjust this assumption as appropriate.

d. SO3: Line Item 6.6 requires 4 waste characterization samples for only 22 tons of soil destined for off-site disposal. Please review and correct or clarify.

e. SO3: For Line Item 8, Monitoring Well Replacement, please correct the numbers used to correspond with the assumptions presented in Appendix B.1 (not the same as SO2).

f. SO3: For the recurring LTM costs, please correct the numbers used to correspond with the assumptions presented in Appendix B.1 (not the same as SO2).

g. GW2: Please clarify whether any of the 49 wells in the proposed monitoring network will need to be re-installed based on the abandonment of 25 wells as described in the soil alternatives. If so, please include the costs associated with installing the new wells. The same comment applies to alternatives GW3 and GW4.

h. SD2: For Line Item 7.3, please clarify that this cost is to install the six-inch cover in the pond, because significantly less than 2 acres of dredging will be required for this alternative. Sediment removal is likely to be a combination of excavation in the south end and dredging in the north end – are these costs reflected in this cost estimate?

i. SD3: For Line Item 7.5, please clarify that this cost is to install the two six-inch cover layers in the pond because significantly less than 2 acres of dredging will be required for this alternative. Sediment removal is likely to be a combination of excavation in the south end and dredging in the north end – are these costs reflected in this cost estimate? Also, please clarify the difference in unit costs for this line item versus line item 7.3 in SD2 (this difference may indicate that both layers are applied in a single pass for SD3).

j. SD4: Costs will be required to contain, collect, analyze, and treat the water removed from the sediment in the geotubes. Please include estimates for those costs for this alternative.

49. Appendix D.1:

a. No hydraulic conductivity testing was conducted within the footprint of the North Meadow plume. Navy used hydraulic conductivity data collected from the entire site and calculated a geometric mean value that was used for modeling. For reference, the geometric mean of the hydraulic conductivities for the three wells in the North Meadow is approximately one-half of the value used in Navy's modeling.

b. Other values used in the modeling such as effective porosity and fraction of organic carbon are estimated from literature values and may not accurately represent the site conditions. While it is not inappropriate to use such values in the absence of field data, doing so increases the uncertainty for the results obtained from the modeling.

c. Navy has estimated the effects of treatment by postulating residual plume shapes and contaminant concentrations to establish baseline conditions for MNA modeling following treatment. While this is not inappropriate, the baseline conditions are only a guess and therefore add considerable uncertainty to the modeling results. It is not known if the assumptions used are conservative.

d. The source attenuation rate (k point) was calculated based on four data points from one well because no other well has more than two data points. The result is that a significant modeling parameter was calculated using a very limited data set which results in significant uncertainty as to the accuracy of the value calculated.

e. For bio-treatment, the k point value was arbitrarily increased to 0.8 and the downgradient first-order decay coefficients (lamdas) were increased five-fold to simulate the effects of the bio-treatment. However, no supporting justification for a three- to four- fold increase in k point or a five-fold increase in lamda is presented in the FS. The accuracy of these estimates is unknown.

f. The modeling performed by Navy assumes that MW-03B is the source of the TCE contamination. However, there may be reason to believe the source could be elsewhere. MW-117B is somewhat upgradient of MW-03B and had a TCE concentration in 2008 of 730 µg/L whereas MW-03B had a TCE concentration of 190 µg/L in 2008. If groundwater actually flows from MW-03B to MW-117B then that could account of the TCE concentrations observed otherwise MW-117B may be independent of MW-03B.

g. No geophysical data has been collected from the wells within the footprint of the North Meadow plume. Of the North Meadow wells, only MW-114B and MW-115B have geophysical data. Therefore, the bedrock structure in the plume footprint is at this point uncharacterized adding uncertainty to the modeling results presented.

50. Appendix D.2: Comments provided for Appendix D.1 generally also apply to the modeling performed for the South Meadow and Building 179 plume.

51. Appendix E, Sustainable Evaluation of Remedial Alternatives: EPA did not complete a detailed technical evaluation of the analysis presented in Appendix E. In general, EPA supports Navy's efforts to evaluate the sustainability of planned remediation efforts and identify opportunities to mitigate environmental impacts of the remediation. EPA agrees that these considerations can be evaluated under the short-term effectiveness criteria. In addition, EPA agrees with Navy's statement here that *"(t)he results presented ...are provided with the intention of giving more information in order to make a more intelligent decision on which treatment to use"*. Further, EPA suggests that a valuable use of the results presented here will be in the design of the selected remedy to ensure that the drivers of any significant

impacts are considered and that those environmental impacts are mitigated to the extent practicable. The Navy's efforts should be consistent with EPA Region 1's Clean and Green Policy issued on February 18, 2010 (http://www.clu-in.org/greenremediation/docs/R1GRPolicy.pdf). In addition, EPA has developed a number of Green Remediation Fact Sheets that provide best management practices (BMPs) for a number of common remediation processes. Navy should consider these as they move forward with the remediation of the NUSC site: excavation and surface restoration (http://www.clu-in.org/greenremediation/docs/GR_Quick_Ref_FS_exc_rest.pdf), bio-remediation (http://www.clu-in.org/greenremediation/docs/GR_factsheet_biorem_32410.pdf), and clean fuel and emission technology (http://www.clu-in.org/greenremediation/docs/Clean_FuelEmis_GR_fact_sheet_8-31-10.pdf). Review of these BMP fact sheets may provide additional recommendations for reducing the environmental footprint of the remedies that could be added to the Recommendations Section of this analysis.