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NSB NEW LONDON
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DEPARTMENT OF THE NAVY
NORTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
10 INDUSTRIAL HIGHWAY
MAIL STOP, #82
LESTER, PA 19113-2090

IN REPLY REFER TO

5090
Code 1823\ME

21 DEC 1998

Ms. Kymberlee Keckler
Remedial Project Manager
U.S. Environmental Protection Agency
J.F.K. Federal Building (HBT)
Boston, MA 02203-2211

Dear Ms. Keckler:

SUBJ: RESPONSES TO USEPA LETTER OF NOVEMBER 16, 1998 ON THE DRAFT FINAL REMEDIAL INVESTIGATION REPORT FOR THE LOWER SUBASE, NAVAL SUBMARINE BASE NEW LONDON, GROTON, CT

Thank you for reviewing the Draft Final Remedial Investigation Report for the Lower Subase sites at the Naval Submarine Base New London. Please find attached the Navy's responses to the comments in your November 16, 1998 letter.

The Navy looks forward to finalizing this RI, and working with you and the CTDEP on the Feasibility Studies for the Lower Subase. If you have any other questions or comments please do not hesitate to contact me at (610) 595-0567 ext. 162.

Sincerely,

Mark Evans
By direction of the
Commanding Officer

Copy to: Mr. Mark Lewis, CTDEP
Mr. Dick Conant, NSB-NLON
Mr. Corey Rich, TetraTech NUS - Pittsburgh

RESPONSES TO
USEPA's NOVEMBER 16, 1998 LETTER OF COMMENTS
REGARDING THE OCTOBER, 1998
DRAFT FINAL REMEDIAL INVESTIGATION REPORT
FOR THE LOWER SUBASE
NAVAL SUBMARINE BASE - NEW LONDON
GROTON, CONNECTICUT

December 18, 1998

GENERAL COMMENTS (COVER LETTER)

1 Cover Letter, p. i, Second ¶

Comment: Previous EPA comments noted inconsistencies in the use of the term "shallow soil." The revised text is now clear that "shallow" refers to 0-4 or 0-5 feet depending upon the Zone (*e.g.*, p. 2-3). The text sections for each Zone also define "shallow."

Response: Agreed. No further action is required.

2 Cover Letter, p. i, Third ¶

Comment: EPA's earlier comments addressed general characterization of conditions affecting fate and transport of contaminants and the conclusions drawn from that characterization. EPA considered the assessment of geochemical conditions to be overly general, and requested that the RI be revised to include more site-specific and contaminant-specific information. In general, the sections of the RI that treat fate and transport are greatly improved.

Response: Agreed. No further action is required.

3 Cover Letter, p. i, Fourth ¶

Comment: A plausible conceptual model is advanced for areas showing lead contamination in soils with, apparently, limited migration. The scenario suggested is that low-pH releases associated with historic lead-acid battery use would have facilitated transport of lead, and that a rise in pH owing to subsequent dilution and reactions with soil constituents would result in relatively insoluble precipitates. If a decision for future action will be based on this suggested scenario, then data will need to be collected for support. A relatively straightforward analysis that may support this scenario is to examine the sulfate content of soils in these areas and compare to background. Relatively insoluble sulfate phases may be left from the neutralization of sulfuric acid. Such an analysis could bolster the argument that the lead is now in a relatively immobile form.

The following remarks provide brief assessments of the revised Contaminant Fate and Transport sections for each Zone:

> *Zone 1* (page 4-20, §4.5.1): The text has been expanded to include discussion of PAHs, TPH, and lead in both soil and groundwater. Conceptual models are offered in this revised report that address seeming contradictions in the previous draft (*e.g.*, the low pH

associated with battery acid provides a possible explanation for the apparent mobility of lead at the site at some time in its history, while relatively insoluble phases may have formed as the acid was buffered by soil constituents). The conceptual models for both organics (PAHs and TPH) and inorganics (lead) appear to be consistent with what is known about the site history and chemical conditions.

Zone 2 (page 5-14, §5.5.1): The setting and concerns are similar to those in Zone 1, and the discussion is correspondingly similar. The primary difference is that PAHs are not detected in groundwater in Zone 2. The text again is more complete and internally consistent in its development of a conceptual model for likely controls on mobility of lead.

Zone 3 (page 6-16, §6.5.1): The setting and concerns are similar to those in Zones 1 and 2, and the discussion is correspondingly similar. Turbidity in groundwater samples is noted as a possible explanation for high historic detections of lead. The text shows improved completeness and internal consistency. However, the original paragraph on metals fate and transport remains in the text (page 6-19, ¶1). The old paragraph should be deleted.

Zone 4 (page 7-21, §7.5.1): The discussion has been expanded in a fashion similar to that for other Zones. This appears to be appropriate for the site.

Zone 5 (page 8-16, §8.5.1): The text has been modified to focus more on the particular findings for Zone 5. In particular, PAHs are linked to apparent leakage from a heating oil UST. VOCs have been detected in historic groundwater sampling, but at relatively low levels. Metals are present in soils at concentrations slightly above background, and do not appear to be a major concern.

Zone 6 (page 9-9, §9.5.1): The relatively brief discussion of fate and transport reflects the relatively moderate contamination found in the Zone (PAHs in soil and groundwater, elevated nickel and zinc in soils).

Zone 7 (page 10-18, §10.5.1): The discussion of PAH and lead contamination is significantly expanded, with appropriate attention to the specific conditions of the site. The widespread detections of PAHs in soils is explained by filling activity, and the appearance of PAHs in groundwater is ascribed plausibly to particulates. The presence of high lead concentrations in soils is again attributed to the historic use of lead-acid batteries, as in Zones 1, 2, and 3. Again, a conceptual model is offered that appears to be consistent with what is known about historic use and site conditions. Lead is present in groundwater, but appears to have remained local, consistent with the conceptual model for limited mobility.

Response: Agreed. If a decision for remedial action will be based on the proposed conceptual model, then additional data will be required to support the model. The additional sampling and analysis, if necessary, will be completed during the Feasibility Study or Remedial Design stage of the project and the analysis suggested by the USEPA will be considered during development of the Work Plan.

Zone 1 – Agreed. No further action is required.

Zone 2 – Agreed. No further action is required.

Zone 3 – Agreed. The old paragraph will be deleted.

Zone 4 – Agreed. No further action is required.

Zone 5 – Agreed. No further action is required.

Zone 6 – Agreed. No further action is required.

Zone 7 – Agreed. No further action is required.

4 Cover Letter, p. iii, Second ¶

Comment: The Navy states that a definition of "tiered monitoring program" will be provided in the Executive Summary and in Section 4. Such a definition was not added to the revised RI (*e.g.*, page ES-4, §ES.2.2.; page 4-35, §4.7.2).

Response: Agreed. A definition for "tiered monitoring program" will be inserted on p. ES-4, §ES.2.2 and page 4-35, §4.7.2.

5 Cover Letter, p. iii, Third ¶

Comment: Based on the original comments made on the Draft Remedial Investigation Report for the Lower Subase, two major outstanding ecological concerns were identified. One included the elevated concentrations of inorganics and polycyclic aromatic hydrocarbons (PAHs) potentially migrating from the various storm sewer systems and transporting to the Thames River. The second major ecological concern was the magnitude of potential risks associated with the results of the native blue mussel samples in Zone 4 and the results of the sediment toxicity testing and benthic community analysis associated with Zone 7.

The Navy has responded to the first major ecological concern regarding the storm sewer systems in Section 12.0 Summary and Conclusions by stating that "cleaning and repair of the storm sewer systems are recommended for each zone."

Based on the Navy's response pertaining to the second major ecological concern, the text is not consistent. In particular, the language presented in Section 12.0 Summary and Conclusions and the information identified in Table 12-1 Summary of Recommendations specifically for the Thames River appear contradictory. On Page 12-2, the first sentence in the last paragraph states, "No additional action is recommended for the Thames River at the current time, but additional surface water and sediment sampling or 'hot spot' removal actions could be completed as part of the tiered groundwater sampling programs for the zones, if the data warrants." In contrast, Table 12-1 under the Thames River, lists Zones 1-7 as SW/SD-FS (LA) that indicates "Limited Action including a tiered Groundwater Monitoring Program with the second tier of the program including surface water and sediment sampling in the Thames River." Based on the zone-specific ecological risk assessments for Zones 4 and 7, potential risks to benthic organisms were low to moderate. Also, the results of the historic toxicity tests from sediments collected near Piers 17 (Zone 4) and 33 (Zone 5) were of concern. EPA understands that these areas have been dredged, but the current nature and extent of any residual contaminants are unknown. The Navy has provided a weight of evidence table for each of the Zones along the Thames River summarizing the existing data and the magnitude of ecological risk that can be made from the measures of exposures and effects (measurement endpoints). For the majority of Zones, with the exception of Zones 4 and 7, the magnitude of risk is low. The results of sediment chemistry and native blue mussel samples reflect a moderate potential ecological risk for Zone 4. The results of sediment toxicity testing, benthic community analysis and bioaccumulation testing support the conclusion of a moderate potential ecological risk. This information should be further integrated into a Feasibility Study for the Thames River that should address the data gaps and confirm the contaminant concentrations in sediments where necessary. For Zones 4 and 7, the first tier of the monitoring program should include additional sediment sampling.

Table 11-92 has been added as requested. This table presents a weight of evidence summary of the ecological analysis. Summary tables per Zone have also been added. It was agreed at the August 27, 1998 meeting that the need for additional sediment sampling or additional toxicity testing would be discussed at a meeting after these tables were reviewed.

Response: The Navy believes the text provided in Section 12 is consistent with the definition of a tiered Groundwater Monitoring Program. The definition of a tiered Groundwater Monitoring Program is as follows:

> The purpose of a tiered Groundwater Monitoring Program is to monitor contaminant migration routes (e.g., the groundwater) from a site to determine if site-specific contaminants are impacting downgradient receptors via contaminant migration. Typically, a Groundwater Monitoring Program is implemented at a site that generally poses little risk to human health or the environment due to direct exposure, but the site has remaining source area concentrations that pose a potential contaminant migration problem. The program will have action levels, that if exceeded, trigger additional sampling activities in the media of downgradient areas (i.e., surface water and sediment). The end goal of a tiered Groundwater Monitoring Program is to provide information that is necessary to determine if the selected remedial action for the site is acceptable.

Based on this definition, the recommendations provided for the Thames River on p. 2-12 and in Table 12-1 are consistent. However, because of the moderate risks to ecological receptors associated with the Thames River adjacent to Zones 4 and 7, the Navy agrees that further characterization of the sediment of the Thames River is required in these locations. The Navy proposes to complete the additional sampling and analysis activities during the Feasibility Study as part of a Data Gap Investigation and not part of the tiered Groundwater Monitoring Program. The reason for this approach is that a tiered Groundwater Monitoring Program will not be implemented until a Record of Decision is signed for the site and the program has been formally selected as part of the remedial action for the zones of the Lower Subase. The recommendations for the Thames River provided in the draft final Lower Subase RI report will be changed to indicate that additional characterization of the sediment in the Thames River adjacent to Zones 4 and 7 should be completed as part of a Data Gap Investigation and this investigation will be completed during the Feasibility Study. Further discussions will be required between the Navy, USEPA, CTDEP, and NOAA to determine the scope of the sampling effort.

To clarify, the USEPA's statement that the current nature and extent of residual contamination in the Thames River is unknown due to recent dredging activities is inaccurate. The dredging of the Thames River was completed prior to the sampling activities for the Lower Subase Remedial Investigation. Therefore, the analytical results for those samples are representative of current conditions.

SPECIFIC COMMENTS (ATTACHMENT A)

1 Tables 3-3 & 3-7

Comment: It does not appear as if Tables 3-3 and 3-7 were revised as requested in EPA's June 23, 1998 letter. The Navy's August response to comments agreed with the requested changes.

Response: Disagree. Both Tables 3-3 and 3-7 were revised as requested. Additional information is required from the USEPA regarding the changes that are required.

2 pp. 4-22 to 4-23

Comment: The text (pp. 4-22 to 4-23) has been modified to clarify the statement concerning cross contamination ("... adjacent zones on the Thames River" to "... adjacent zones *or* the Thames River"). The conclusions concerning the migration of lead in groundwater, however, remain unsubstantiated in the revised text. The logic behind the conclusion that "lead does not appear to be migrating with groundwater" should be better supported in the text. It is stated that the drawings show this, but the drawings leave room for different interpretations. Is this conclusion based on the gradients in lead concentration indicated by the contour plots? If so, there is a suggestion of transport toward the river, although the concentration that may be arriving at the river may be low. Also, any conclusions based on the distribution of lead shown by these contour maps must remain rather speculative, given the sparse data on which they are based. Please note this in the text.

Response: Agree. The text on pp. 4-22 and 4-23 regarding the migration of lead will be qualified as suggested.

3 p. 4-24

Comment: The text has been modified appropriately to discuss the questionable dissolved oxygen (DO) data in more depth.

Response: Agreed. No further action is required.

4 p. 4-37

Comment: The text (page 4-37 and corresponding text in subsequent sections devoted to other Zones) has been modified as requested to reflect the sometimes-sketchy characterization of the nature and extent of contamination owing to limitations imposed by infrastructure and base activities. The change is adequate.

Response: Agreed. No further action is required.

5 pp. 5-18 to 5-19

Comment: The discussion of natural attenuation indicators has been revised adequately to address ambiguities and apparent contradictions.

Response: Agreed. No further action is required.

6 § 5.5, p. 5-14

Comment: EPA requested that an evaluation of the storm sewers as a potential pathway for lead transport to the river be included in the Fate and Transport section. However, such a discussion does not appear in Section 5.5.

Response: A brief discussion regarding the potential for lead to be transported to the Thames River via the storm sewer system will be added to Section 5.5.2.

7 p. 6-12

Comment: Text has been modified adequately to clarify the relationship between metals in Zone 3 and background values. The usage of the phrase "slightly above background" is defined more quantitatively, as well.

Response: Agreed. No further action is required.

8 p. 6-16

Comment: The text offers a good discussion of the significance of metals analyses that are higher for filtered than for unfiltered samples. The question is resolved.

Response: Agreed. No further action is required.

9 §6.5.2, p. 6-19

Comment: The text has been revised to indicate that the interpretations are based on a kriging scheme applied to "limited" data, and that cross-contamination "may" be indicated. The revised wording is more objective; the changes are adequate.

Response: Agreed. No further action is required.

10 §6.5.2, p. 6-20

Comment: The conclusion concerning possible cross-contamination to Zone 2 by lead is changed entirely in the revised text. It is now stated that cross-contamination is *not* indicated. This conclusion is more consistent with the general, conceptual model that has been embraced. The changes are adequate.

Response: Agreed. No further action is required.

11 p. 6-22

Comment: The text has been revised to indicate that there is some evidence for sulfate reduction. The change is adequate.

Response: Agreed. No further action is required.

12 p. 6-23

Comment: The text has been modified as requested to indicate more circumspection with regard to natural attenuation. The statement to the effect that additional investigations would be needed in the event that natural attenuation is selected as a remedy is appropriate.

Response: Agreed. No further action is required.

13 §6.7.1, p. 6-31

Comment: The text has been revised as requested to clarify the differences between groundwater samples taken from a temporary well in Building 31 (unfiltered) and those taken from nearby monitoring wells (filtered). The changes are adequate.

Response: Agreed. No further action is required.

14 §6.7.2

Comment: The text in this section (page 6-31) as well as similar sections for other Zones, has been modified as requested to indicate appropriate circumspection. The changes are adequate.

Response: Agreed. No further action is required.

15 Appendix I

Comment: Appendix 1.2 uses RBC tables from October 22, 1997. The current version is dated April 1998. Uncertainty in the human health risk assessment is increased by using the older version of the RBC tables. Please explain how use of the updated RBCs would affect the risk assessment.

References for the Kp (Permeability Coefficient), t* (time it takes to reach steady state), and T (lag time) were not provided. References for all variables should be provided.

Response: Table 1 presents a comparison of the screening values used in the Lower Subase RI report and the values presented in the most recent EPA Region III RBC table (October 1, 1998) for those chemicals for which the criteria has changed. The results of human health risk assessment were evaluated using the most recent RBC table to determine what impact, if any, the new screening criteria would have on the risk assessment. The results of the evaluation are as follows:

- The changes in RBCs for exposures to soil have no significant impact on the results of the human health risk assessment. No additional chemicals would have been retained as COCs if the most recent RBC table was used in the selection process. If the most recent RBC tables had been used in selecting COCs then beryllium, which was retained as a COC for soil in all zones, would not have been retained as a COC in any zone for soil. The inclusion of beryllium in the human health risk assessment did not significantly impact the estimated risks because the most recent toxicity criteria for beryllium was used in the risk assessment.

- The changes in RBCs for exposures to groundwater have no significant impact on the results of the human health risk assessment. 2-Methylnaphthalene would have been retained as COCs for Zones 1 and 5 and beryllium would not have been retained as a COC at Zone 4 if the most recent RBC table was used in the COC selection process. If exposures to 2-methylnaphthalene in groundwater were evaluated in the human health risk assessment then the hazard index for constructions workers at Zone 1 would increased from 0.75 to 0.80 and at Zone 5 the hazard index would increased from 0.85 to 0.93.

- There would not have been any changes in the chemicals retained for evaluation of exposures to eating fish caught in the Thames River if the most recent RBC tables were used in the COC selection process.

The references for Kp, t*, and T are provided in Section 3.4.3.6 of the draft final RI report on p. 3-54 where the calculation of dermal exposure to groundwater is discussed. As stated in the text, values were obtained from EPA's *Dermal Exposure Assessment: Principles and Applications*, January 1992. An annotated version of Table 5-8 from this reference will be included in Appendix I.3. The annotations provided on the table will indicate the chemicals and coefficients used for the human health risk assessment.

TABLE 1

COMPARISON OF SCREENING CRITERIA USED IN THE LOWER SUBASE RI TO OCTOBER 1998 EPA REGION III RBC TABLE NSB-NLON, GROTON, CONNECTICUT

Chemical	Tap Water ug/L		Soil (Residential) mg/kg		Fish mg/kg	
	Old Value (1)	New Value (2)	Old Value (1)	New Value (2)	Old Value (1)	New Value (2)
Volatile Organic Compounds						
1,1,1-Trichloroethane	NC	NC	NC	NC	120 n	27 n
1,1-Dichloroethane	810 n	800 n	NC	NC	NC	NC
Semivolatile Organic Compounds						
1,3-Dichlorobenzene	540 n	14 n	NC	NC	NC	NC
2-Methylnaphthalene	1500 n	120 n	3100 n	1600 n	54 n	27 n
Benzo(a)anthracene	NC	NC	0.88 c	0.87 c	NC	NC
Benzo(a)pyrene	NC	NC	0.088 c	0.087 c	NC	NC
Benzo(b)fluoranthene	NC	NC	0.88 c	0.87 c	NC	NC
Benzo(k)fluoranthene	NC	NC	8.8 c	8.7 c	NC	NC
Dibenzo(a,h)anthracene	NC	NC	0.088 c	0.087 c	NC	NC
Carbazole	3.4 c	3.3 c	NC	NC	NC	NC
Dibenzofuran	150 n	24 n	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	0.88 c	0.87 c	NC	NC
Naphthalene	1500 n	730 n	3100 n	1600 n	54 n	27 n
Pesticides/PCBs						
Aroclor-1260	NC	NC	0.16 c	0.32 c	0.00041 c	0.0016 c
Gamma-BHC (Lindane)	NC	NC	NC	NC	NA	0.0024 c
Gamma-chlordane	NC	NC	NC	NC	0.0024 c	0.009 c
Heptachlor epoxide	NC	NC	NC	NC	0.07	0.00035 c
Metals						
Beryllium	0.016 c	73 n	0.15 c	160 n	0.00073 c	2.7 n
Chromium (total)	180 n	110 n	390 n	230 n	6.8 n	4.1 n
Manganese	840 n	730 n	1800 n	1600 n	32 n	27 n

Notes:

(1) - Value used in RI report.

(2) - USEPA Region III Risk-based Concentration Table, October 1, 1998.

NC - No change in value.

n - RBC based on noncarcinogenic effects.

c - RBC based on carcinogenic effects.