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LETTER AND COMMENTS ON U S NAVY RESPONSE TO COMMENTS REGARDING
REVISED DRAFT FINAL ESTUARINE ECOLOGICAL RISK ASSESSMENT NSY
PORTSMOUTH ME
3/23/1998
LEPAGE ENVIRONMENTAL SERVICES

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March 23, 1998

Peter Vandermark
Seacoast Anti-Pollution League
P. O. Box 1136
Portsmouth, New Hampshire 03802

Subject: Review of Responses to Comments, *Revised Draft Final Estuarine Ecological Risk Assessment*

Dear Mr. Vandermark:

As you requested, we are transmitting comments to the Seacoast Anti-Pollution League (SAPL) concerning the Navy's responses to comments on the April 1997 *Revised Draft Final Estuarine Ecological Risk Assessment*. The report, prepared by the Navy's Marine Environmental Support Office in Narragansett, Rhode Island, will be used in making decisions regarding remedial actions. It presents the results of an ecological risk assessment performed to assess ecological risks to offshore environments in the Piscataqua River posed by contaminants associated with the Portsmouth Naval Shipyard.

We provided comments on the April 1997 document in a letter to you dated August 23, 1997, which the Navy recently responded to. The Navy also responded to comments submitted by regulatory and natural resource agencies; we did not review those responses. Dr. David Brown's comments regarding the Navy's responses to his August 1997 comments are attached. I found many of the Navy's responses to my earlier comments to be satisfactory. Where questions or issues remain, I have reiterated my original comment below, retaining the numbering from my August 1997 letter.

5. Page 3-1, Section 3.1. The description of the estuarine system would be enhanced by additional information about other potential sources of contaminants besides the Shipyard.

The Navy responded that an evaluation of other sources was contained in Section 8.4. It would be helpful if a reference to Section 8.4 was added to the fourth paragraph so the reader would know where to look for additional information.

10. Page 3-5, Section 3.2.2. The very high river currents are described as diluting and transporting any chemicals or particulates associated with the DRMO (Defense Reutilization and Marketing Office). Where would the particulates be deposited and accumulate?

The Navy's response indicates that some of the material would have accumulated in depositional areas of the estuary, and refers to figure 3-2 for locations of depositional areas in the lower estuary. This information should be added to the text at the top of page 3-5.

12. Page 3-6, Section 3.2.7. What are the other hazardous materials disposed in the underground tanks at SWMU [Solid Waste Management Unit] #11? The RFI Data Gap Report indicates that not all of the contaminated soil was removed from the site. How much contaminated soil is estimated to remain? What are the contaminants?

The response states that the text revisions will mention that concentrations on some metals were elevated, but that these contaminants may be related to the JILF (Jamaica Island Landfill) and not the former waste oil tanks. It is not clear how the proposed text revision relates to my original questions. Please clarify. In addition, what is the basis for stating that the elevated levels of metals may not be related to the materials disposed in the underground tanks?

15. Page 3-7, Sections 3.2 & 3.3. A section summarizing of potential pathways would make a logical and helpful transition from the description of the SWMUs in Section 3.2 to the potentially exposed habitats described in Section 3.3.

The Navy indicates that the format of the report follows EPA guidance and that exposure pathways analysis is presented in Section 4.1.5. The text in the first paragraph of Section 3.3 should be revised to include a reference to the pathways analysis in Section 4.1.5.

16. Page 3-8, Section 3.3.1. Is there any commercial fishing going on in the estuarine pelagic habitat described in this section?

Given citizen concerns regarding the safety of fishing in the estuary, additional information concerning the nature of the recreational and commercial fisheries should be provided in the revised text, including the species involved, the potential contaminants and effects, and the likely locations for fishing activities.

18. Page 3-14, Section 3.4.5. Exposure of several species, such as harbor seals, is anticipated to be low due to their rare occurrence at the Shipyard. How does the Navy know these species rarely occur?

What is the basis for stating that seals are not frequently seen around Seavey Island? Has the Navy (or anyone else) made a study of seal activities around the island?

20. Page 4-2, Section 4.1.1. With regard to the criteria listed at the top of the page, how was the importance of a receptor to the ecology of the estuary determined? Were the species most sensitive to the stressors associated with the Shipyard chosen?

How complete is the array of "important resource species" documented in Short's 1992 *Great Bay Estuary Profile* that is cited in the Navy's response? Does it include all "important" species? How is importance determined? How were selected receptors proven to be sensitive to the COCs (contaminants of concern). What is the basis for assuming species to be sensitive to COCs?

21. Page 4-3, Section 4.1.1. Individual species are listed for each of the assessment endpoints except the benthic and salt marsh endpoints. What species were selected for those two endpoints?

How was the community of species mentioned in the Navy response, rather than individual species, evaluated for the salt marsh and benthic communities?

22. Page 4-5, Section 4.1.4. Additional information regarding other potential sources of contaminants in the estuary should be provided.

The text should be revised to refer the reader to the information presented in Section 8.4

23. Page 4-6, Section 4.1.4. It is not clear what the reference areas listed in the middle of the page are, how they were selected, and what the basis for comparison is. Are the reference areas also adversely impacted by contaminants, or are they "pristine"?

The Navy proposes revising the text to include a more detailed description of each area of concern (AOC) and each reference area (per response to DEP comment 28). However, it is not clear how the effects of non-shipyard contaminant sources have been evaluated for the reference areas, nor is it clear how the shipyard's effects on the AOCs can be weighed against the effects of non-shipyard sources on the reference areas. Please clarify.

26. Page 4-12, Section 4.2.2.2.2. Without knowing more about reference areas (see comment 23), we are unable to interpret comparisons with areas associated with shipyard SWMUs.

The descriptions the Navy proposes to add to the text in response to the DEP's comment #28 will help. However, it is still unclear how the reader can compare the results of impacts from different sources on AOCs and reference areas.

27. Page 4-14, Section 4.2.2.2.4. Additional information must be provided concerning the "Mussel Watch" mentioned at the top of the page and elsewhere in the document.

The footnote that will be added regarding the Mussel Watch program will be helpful to the reader. The proposed footnote will state that samples are collected "periodically" from a variety of settings around the country. How often is "periodically"? Additional information concerning the number of samples involved in both the Mussel Watch and Great Bay Estuary sampling, as well as the rationale for basing warning levels on the 98th and 95th percentile concentrations of the two programs, respectively, should also be provided.

28. Page 4-14, Section 4.2.2.2.4.1. The last sentence on the page states that water quality criteria were not available for all chemical contaminants. Which are missing that apply to the shipyard?

The Navy's response that the COCs that have criteria are listed in Table 6-11 and that COPCs evaluated in the risk assessment are listed in Table 4-4 should be added to the text at the bottom of page 4-14.

29. Page 4-16, Section 4.2.3. The text states that where storage tanks or the actual source were absent, the average soil concentration observed at each SWMU was screened to the upper end of the background soil range. The upper end of the background soil concentrations is reportedly used because the source concentration would have to be "significantly higher" in order to pose a risk. This comparison has the appearance of downgrading the potential for contamination. Why wouldn't the highest observed soil concentration, representing a "worst case" be used? The "high" end of observed soil concentrations might be "significantly higher" than background. If the average of the observed soil concentrations is used, why isn't the average background concentration? Furthermore, is there sufficient data to consider performing these comparisons in this manner? Is the data unbiased, not clustered, and not spatially correlated? What is considered "significantly higher"?

The Navy provided responses to all but the next-to-last question, which has implications for interpreting the data statistically. In addition, it is not clear that the sample sizes were sufficient to perform the statistical analysis. Please comment. The responses conclude with the statement that no COCs were eliminated from the assessment because they were less than background. Were any COCs eliminated because concentrations were not significantly higher than background concentrations?

30. Page 4-16, Section 4.2.3. What are the locations where ground water and surface water could migrate through more than one SWMU?

The Navy responded that groundwater might migrate through more than one SWMU where a SWMU was up-gradient of another SWMU, and that, based on the conceptual model of groundwater flow, "this may not be very likely". This wording of this conclusion appears to imply there are locations where groundwater may be likely to flow through more than one SWMU. Please clarify.

31. Pages 4-16 through 4-19, Section 4.2.3. Regarding the industrial waste outfalls at SWMU #5 and other SWMUs in this section, where and how did the Navy look for visible ecological damage? The paragraph should also mention where the dredged sediments were disposed. Did the refuse dumped in the river at the DRMO include lead batteries or other significant potential sources of contaminants? If so, a description should be provided. See comment 12 above about providing additional information about soil contamination remaining at SWMU #11. The text

should mention that, in addition to concerns with hydrocarbons, elevated concentrations of metals were found in monitoring wells at SWMU #27. It seems a bit of a stretch to assume that the vaults at MBII are in good condition, just because those at MBI are thought to be in good condition. The vaults at MBII could have been damaged during burial or may be located below the water table and have started to deteriorate.

With regard to the first question, the Navy responded that "Following US EPA Region I guidance, the area around the disposal site should (emphasis added) be visually inspected for signs of ecological damage". This does not answer the question of how and where the Navy looked for visible signs of ecological damage. Please respond. The Navy concludes the response stating that the condition of the MBII vaults is unknown. The text on page 4-19 should clearly state that the location and condition of the MBII vaults are unknown.

32. Page 4-19, Section 4.2.3. While there are reportedly no records of herbicide disposal at any of the SWMUs, were herbicides used at the Shipyard? If so, how were they handled and where were they used and stored?

The Navy's response does not address where herbicides were used and stored. Please respond.

33. Page 4-33, Section 4.4.4. What were the specific results of the chemical markers study?

Based on the Navy's response, a reference to the results of the chemical marker study described in Section 8.4 should be added to the text. It would also be helpful to have a copy of the 1995 Bowen and Pruell report cited in the text to review.

34. Page 5-1, Section 5, and Appendix IX. Section 5 refers to the information presented in Appendix IX. There are numerous scattered hand-written notations in the Appendix, the meaning of which is not always clear. Nor is it clear if those notations should be considered part of the document or if they should be ignored. Please clarify.

It would be helpful to have a copy of the final version of the Appendix prior to the upcoming April 28th technical meeting concerning unresolved issues involving the ecological risk assessment meeting, rather than waiting for the final report to be issued.

35. Page 5-5, Section 5.2.1. How will the modeling results showing a relatively high percentage of lead in Spruce Creek be evaluated further?

The Navy responded that no further evaluation of Spruce Creek is required to complete the risk assessment. Given the public's concern regarding contaminants in Spruce Creek and the statement in the text that all the modeling simulations of the lower estuary indicate a relatively high percentage of lead accumulating in Spruce Creek, the Navy should justify why no additional work is required in Spruce Creek.

39. Page 5-17, Section 5.4.5. The blue mussel is described as being found ubiquitously in intertidal and subtidal habitats. Mussels in these different environments would not have comparable exposure to contaminants. Those in a rocky intertidal area are not likely to have the same potential exposure to contaminants bound to sediment particles as mussels located in sediment accumulation areas, such as mud flats. Were the mussels providing the data cited in the ecological risk assessment collected from a variety of environments, or a single type of habitat? If the latter, what habitat do the mussels represent exposure for? If the former, were the data divided or analyzed according to habitat or were the data co-mingled?

In its response, the Navy indicated the data were analyzed according to the assessment endpoint being evaluated. This should be clearly stated in the text as well.

40. Page 5-21, Section 5.4.6. The last paragraph in the section states that the uncertainty associated with the lobster sampling and analysis can not be resolved without continued monitoring using the improved analytical procedures. How long would monitoring have to be conducted in order to elucidate trends?

The Navy's response suggests that, given a number of variables, lobsters would probably have to be monitored yearly for three to five years to begin to discern trends. Does the Navy have any plans to conduct this sort of monitoring?

41. Pages 5-22 & 5-23, Section 5.4.7. Given the description of the winter flounder migratory habits, how representative of conditions adjacent to the Shipyard are the tissue analysis results? The section ends with the statement that the small number of samples precludes making any definitive conclusions at this time. How many samples would need to be collected in order to draw definitive conclusions?

As with the lobster monitoring in comment 40, the Navy suggests monitoring over a three to five-year period to begin to discern trends. Does the Navy plan to collect the eight to ten samples per year of winter flounder, as suggested in the response?

43. Page 8-2, Section 8.1. It appears that DDT compounds are potential risk drivers, although they have not been linked to a specific SWMU. Additional information is needed regarding the use, storage, handling, and possible disposal of DDT compounds at the Shipyard.

The Navy's response indicates that the application of pesticides generally occurred on a small scale in buildings. However, information on the specific location(s) where pesticides were handled, stored, and disposed was not provided. Please clarify.

Additional Comment. At a recent meeting of the Geological Society of America, a graduate student at the University of New Hampshire, Stanley Bonis, presented the results of his research regarding sediment accumulation rates and the vertical distribution of heavy metals for several

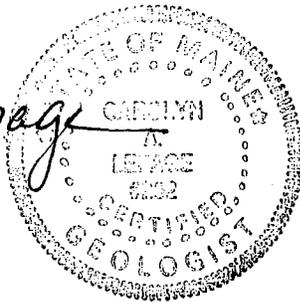
cores collected in the estuary north of the shipyard. He has concluded that peak concentrations of selected metals can be correlated with known industrial activities in the river basin. I understand that Mr. Bonis' thesis advisor, Dr. Henri Gaudette, has also conducted work on the sediments in Portsmouth Harbor and in Spruce Creek in conjunction with the student research. It would be helpful to know the nature, extent, and findings of Dr. Gaudette's work, in addition to Mr. Bonis' results, prior to the April 28th technical meeting. Perhaps additional light can be shed on inputs from the shipyard as well as from other sources.

If you have any questions regarding the comments above, please give me a call at 207-777-1049.

Sincerely,



Carolyn A. Lepage, C.G.
President



Enc.

cc: Iver McLeod, Department of Environmental Protection
Meghan Cassidy, Environmental Protection Agency
David Brown, Sc.D.
✓ Marty Raymond, Portsmouth Naval Shipyard

March 13, 1998
Carolyn A. Lepage, C.G.
Lepage Environmental Services, Inc.
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Auburn, Maine 04211-1195.

Re: Response to Comments, Offshore Ecological Risk Assessment for Installation Restoration Program, Portsmouth Naval Shipyard, Kittery Maine.

Dear Carolyn:

I have reviewed the document as requested. My review is focused on the Navy's responses to my comments only.

Many of my comments were addressed in the 'response to comments'. There are two areas that still require attention. They involve limitations in the WOE approach and the use of statistical treatments of the smaller data sets.

- 1) Navy response to recommendation 3 section 1, on page 45. ... *"Development of an expanded summary report as a stand-alone document" is under consideration to explain the report.*

I agree that an expanded summary report is needed. A document for the public that clearly outlines the Ecological Risk Assessment is a sound approach. The Navy should address each question from SAPL as part of this document. The document should be written at the level so that a technical reader with a high school level science background can understand it.

- 2) Navy response to SAPL questions part 1. On page 39 *Clarification addresses data cited as possible evidence that certain ecological systems are impacted.*

This is not responsive. Questions 1 and 2 focus on "hot spots" and the ability to identify them from the information in the report. Does the Navy conclude that there are no hot spots or that the report is unable to identify them? Can the WOE approach identify hot spots? If it can, how would that work? Please provide a discussion on hot spots in the risk characterization section.

Question 3. My comment may have not been clear. I know where the data is summarized but I can not tell whether that data is sufficient to assess damage distant from the site. I suspect that it is and that there is no, or a minimal, problem. I can not find any discussion in the report to support my assumption. Please provide discussion which addresses this concern.

Question 4. The response to the NOAA comments 1 and 2 are more informative with respect to the lobster. It appears that the issue of lobster will be addressed appropriately

Question 5. I will clarify my concern. The sediment levels of some metals in Spruce Creek are higher near the surface than at deeper depths and the levels of Ag in mussels is elevated. Also the model indicates that materials may be carried by the tides into Spruce Creek. This is a community concern that needs to be addressed in the report? Please clarify the potential for shipyard impact on Spruce Creek in the risk characterization section.

Question 9. I understand the WOE approach. I realize that it is an attempt to integrate and evaluate all information in a reproducible way. The response does not address SAPL's question about total accumulated risk and the relative contribution of the shipyard.

My own explanation also may not have been clear. The addition of quantitative risk estimates, particularly upper bound estimates, is meaningless. Because the variability, and thus uncertainty, can be greater than the estimated risk itself the exercise simply adds together what we "don't know" with what we do know.

WOE does not appear to overcome this problem. Including a qualitative discussion of the limitations of WOE is needed to better address the SAPL concern. Please include this discussion in the report.

3) Navy response comment 6 pages 43-44. ... *ERA developed in accordance with EPA guidance and cooperation with technical experts, as well as acceptance of presentations at professional meetings. The need to help communicate the scientific validity of the data to the public is acknowledged.*

I agree that risk communication is needed. However my comment was that "the report needs to be strengthened to show how each of the conclusions flow from the data collected". That information is still needed in the report, it can not be addressed only in a public communication document. I disagree that the WOE report on "the manner that the conclusions were reached is transparent and reproducible". In fact, it is difficult if not impossible to determine how the conclusions were reached from information in the report or in Appendix IX, Weight-of-Evidence evaluations for the Assessment Endpoints, as it has been provided to the reviewers. The tables have numerous handwritten entries that often appear to substantively change the printed interpretation of the findings and the analysis.

The tables should be finalized and provided to the reviewers as soon as possible but prior to the April 28 technical meeting.

Please prepare a discussion that identifies the specific data and analysis supporting each conclusion.

4) Navy response to comment 2 b: *Confidence in Conclusions are summarized in section 1.3.*

I disagree. A summary of the limitations of the WOE approach is not presented in this section.

5) Navy response to 3 page 45 recommendations. *..Summary meets regulatory requirements _____” The response goes on to suggest an expanded summary report.*

The expanded summary report is needed. However it is also necessary to provide a detailed discussion of the findings in the report..

6) Navy response 3 recommendation., page 46. *“The objectives of the document are identified in section 2.2”*

Perhaps it would have been clearer if I had used the term rationale. Please provide a rationale for the approach used and include the purpose of the report..

7) Navy response to comment 2f page 49. *“.....no statistical tests were used.”*

Please look at the data in Appendix 5 and note the sample sizes. Tissue benchmarks are being calculated using a sample size of 2 which is not statistically valid. I agree that these are not statistical tests but these findings are a statistic analysis of the data that is used elsewhere in the WOE analysis and the findings are not correct. Please indicate whether samples sizes of less than 3 were used in the screening process.

8) Navy response to comment 2h page 49. *“The screening procedure was applied to all samples”*

Based on this response there are several instances where the sample sizes simply appear to be too small. Please clarify why it was considered appropriate to screen with sample sizes of less than 3.

9) Navy response Section 5 comment 1. *Summary statistics are provided but no statistical tests are done which were not presented and discussed.*

I am not convinced that the averages and the standard deviations shown are correct. Are there at least three values for each point listed in tables 5-4 to 5-16? If there is not, the statistics are wrong and the results of the analysis should not be used. Please clarify the sample sizes.

- 9) Navy response to comment 2C page 52. *The EC 20 and EC 50 show that the level of lead required to cause the effects evaluated are far greater than the exposure measured at the site.*

I am sorry, I was not clear in my comment. The toxic responses induced at extremely high dose levels are not accurate measures of the physiological actions at low doses. I realize that one can do the math analysis on this data but it is not meaningful to compare the exposures at very high doses with the low doses found here. A chronic exposure may be more appropriate. Please clarify the use of this methodology.

- 11) Navy responses to Comments 2 d-g page 52 *Clarification is provided in the report sections 5.0, 7.0, 8.0 etc.*

I have re-read the sections. I disagree with the response that clear descriptions are provided. There is a lack of clarity and the discussion is not sufficient to determine which points are important and which are not. This is the conclusion section of the report. It is important and it requires clarity. Please address my original concerns.

- 10) Navy response section 7 comments. *Please read response pages 55-56. Additionally "By formulating conclusions within the context of the decision-making process, the results from the WOE analysis were used to develop conclusions about risk that are supportive of risk management and remediation at the shipyard."*

I fully understand that WOE analysis is a process. I also suspect that it is likely to be better than the methodology that it replaces. The report, particularly the Ecological Effects Assessment and the Risk Characterization, raises serious questions with regard to selection and validation of data and the methodology used to assess the findings. It does not mean that it is not correct, but it is not clear and it, in fact, may be incorrect.

The Navy's response, that the scientific validity of the method must be explained to RAB, TAG, and the general public, is reasonable. However other scientists should be able to read the original document and understand what was done and be able to check the validity of the methodology.

From the responses to the comment, it appears that the Navy wants one to infer,

- a) that WOE does not attempt to develop a composite score or another composite measure but only a conclusion as to a category of risk based on something like the Delphi approach,
- b) that it doesn't matter if the same relative weights are assigned to unrelated factors (methodological problem 1 [MP] page 54),
- c) that WOE can utilize poor data on important factors and balance it with excellent data on less important factors (MP2 page 54),
- d) that each component of the system is of equal importance (MP 3),
- e) that all reference values have the same weight (MP 4),

- f) that the size of data sets is relatively unimportant (MP 5),
- g) that the form of metals is unimportant to toxicology (MP 6), and
- h). that a comprehensive narrative describing what the report shows and the limitations of the study is not needed?

Please address the methodological problems outlined in the original comments.

In fact a comprehensive narrative would go far to justification of the conclusions. It should possible to determine how "the consensus between the authors and the technical reviewers about the risks and conclusions" (para. 2 section 7 page 56) was reached once Appendix IX is finalized? Further, the logic from Appendix IX should be incorporated in a complete narrative for each of the conclusions and included in the conclusion section of the report. Please address this concern.

11) Navy response to comment 2 d page 57. The risk levels are not linear they are categorical. The categories were determined by the magnitude of risk present (see section 7.1.1 for definitions of categories of risk).

Based on 7.1.1, it is not possible to determine how the risk categories are selected without completion of the tables in Appendix IX. I recommend that these tables be made available to the reviewers prior to finalizing the report. The current tables are not complete and contain numerous handwritten notations. The narratives are very important in the early stages of a new analysis such as the WOE. I suggest that the narratives be strengthened by addition of a discussion of the limitations of each decision.

Thank you for the attention to my initial comments. I am encouraged by the WOE concept but feel that outcomes of WOE need careful review if the method is to be accepted by the scientific community.

If you have any questions about these comments please call me at 203 259 5698.

Sincerely,



David R. Brown. Sc.D.