N00102.AR.001802
NSY PORTSMOUTH
5090.3a

MEMORANDUM AND COMMENTS FROM MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION REGARDING AN ESTUARINE ECOLOGICAL RISK ASSESSMENT CASE STUDY FOR NSY PORTSMOUTH ME
2/3/1993
MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION

S T A T E O F M A I N E
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF HAZARDOUS MATERIALS AND SOLID WASTE CONTROL

M E M O R A N D U M

TO: Nancy Beardsley, Project Manager, Division of Federal Facilities Remediation

FROM: Troy Smith, Geologist
Division of Technical Services Troy

DATE: February 3, 1993

SUBJECT: Review of An Estuarine Ecological Risk Assessment Case Study For Naval Shipyard, Portsmouth - Kittery, Maine, Draft Preliminary Phase I Report

---

The following are comments on the contents of the above mentioned report. If you have any questions or need for clarification, please do not hesitate to contact me.

GENERAL COMMENTS

1. The disclaimer at the beginning states that the report has not been internally reviewed. My opinion is that the report was submitted prematurely, editing is incomplete, data analysis is incomplete, and I feel more data interpretation is required. My comments are focused on the data collection, analysis, interpretation and reporting. I have not pointed out the numerous grammatical errors in the report. Therefore, the next submittal should not be titled a draft final, it should be considered another draft. This report does not meet the minimum requirements for a draft and should be rewritten and resubmitted as a draft.

2. The work plan states that all chemical analysis will be performed in phase I, and included in this report.

3. To provide consistency between the sections I recommend that the report be edited by two or three people instead of the five people listed on the title page.

4. There is nothing presented in this report to describe past offshore practices at the shipyard. Information regarding dredging needs to be presented. The areas effected from the past offshore activities of the Shipyard should be correlated to the sample station locations. Data collected in this report may be severely impacted by these activities because the depositional environments may have been stripped clean, or depositional rates may have been enhanced. If this has happened then the data collected will be hard to interpret without knowing how and when the stations were impacted.

5. Please supply the Maine DEP with a copy of Mueller et al. 1992.

6. I recommend that a methods section be placed in this report. All methods used for data collection and analysis should be placed in this section. This would better organize the information and procedures will not have to be repeated in each section.

7. An explanation of figures using histograms should be included in the text. It appears that the top of the bar is the average, however the "error bar" that is shown on these figures is not explained. Describe how these are derived mathematically and what they mean in terms of the data set.

SPECIFIC COMMENTS

8. Section 2, Page 5; First paragraph.
Improper reference to Puruell and Bowman 1991. This study did not take place at the Shipyard as the reference implies.

9. Section 2, Page 5; Last full paragraph, statement: "However, the project is also aimed at developing a comprehensive assessment framework for the estuary...".

This study once combined with the onshore study will provide the comprehensive assessment. This study does not address the sources and the source strengths of the contaminants migrating from the shipyard to the estuary. Only when this step is added to this process will there be a comprehensive framework developed.

10. Section 2, Page 6; Last full paragraph, statement: "Most of the work conducted during phase I has consisted of identifying Stressors and determining if there is evidence of Effects within the estuary."

I would recommend that a conclusion to this report be written to provide this information. Specifically how each SWMU is related to what was found. Also included in this section would be statements on contaminants discharged by other identified Stressors, the expected impacts of these releases, what has been done to limit these releases, and what effects this will have on the estuary.

11. Section 2, Page 8; Last Paragraph, statement: "The distribution of measured contaminants relative to their sources on the Shipyard will be further evaluated during Phase II, by analyzing the results of hydrodynamic and contaminant transport models and distributions of chemical markers, to determine potential sources of contamination."

During the Phase II analysis of chemical markers I recommend that contaminants found in the subsurface soils and in the groundwater be used. Contaminants in these environments pose a threat to the estuary and should be used to identify chemical markers. A potential for wasting large amounts of time and money exists if we wait until after Phase II to use the some of the more important information from the onshore study.

12. Section 2, Page 10; Environmental Design and Overview of Activities: The explanation of the 34 Stations. Provide a table showing the station number and the area it is targeting or characterizing, specifically for those surrounding the Shipyard. At what point were stations 10A and 12A added, what investigations were done at these sites? Provide a figure showing the locations of these two additional stations. Locate the Pierce Island waste water treatment discharge points. The other potential sources of contamination should be located on a figure.

13. Section 2, Page 10; Last Paragraph.
The reference to Watts Fluid Air as a potential contamination source. Based on conversations with Maine DEP staff associated with Watts Fluid Air it seems highly unlikely that contamination from this site would have migrated to Spruce Creek and down to Stations 20 and 21. A wetland was impacted at this site, however remedial efforts have removed the materials in this wetland. A pump and treat system is currently remediating the groundwater at this site. Therefore, I feel that all references to Watts Fluid Air as a potential source should be removed from the report, with the possible exception of the reference on page 8.

14. Section 2, Page 13; Second Paragraph.
The transect stations that were visited by NOAA's Coastal Ocean Program and New Hampshire's Water Resource Program should be located on a figure.

15. Section 2, Page 15; Second Paragraph.
It should be noted that the Food and Drug Administration action levels are not based on a risk analysis. It should also be stated that based on this ecological risk assessment, action may be required even though levels are below the FDA levels.

16. Section 2, Page 15; Third Paragraph.
Does figure 7 show all the habitats for the area around Seavey Island? I recommend that the information collected pertaining to the bottom sediments, and biological community for all areas be compiled on maps showing the extent of the fine silt material, courser sand material, and areas with little or no sediment. A map showing the extent of each biota studied should be presented. These maps will be helpful to assess if the stations selected cover the areas of concern, or if there are more areas that need to be investigated.

17. Section 2, Page 18; Third Paragraph.
Reference to McLaren/Hart 1991. McLaren Hart did not evaluate the health risks associated with flounder and lobster in the 1991 human health risk assessment.

18. Section 2, Page 21; First Paragraph, statement:
"However, if the chemical data do not correspond to the stress indicators, then what likely is being observed is background noise related to the overall interaction between natural and man-made stress on the ecosystem."

This is a broad statement that may or may not be true. For particular biota which are sedentary and will bioaccumulate the chemicals being used this may be true. However, if the biota used to indicate stress are mobile or the species does not bioaccumulate the chemicals used in the study, this conclusion may not be true. This statement should be applied to specific situations where evidence exists to show that this is true, and not used as a general conclusion. In section 3.13, introduction, there is a better explanation of how sediment, toxicity, ecological stress, and biological effects thresholds results can be evaluated.

19. Section 2, Page 21; Summary and Conclusions, first Paragraph.

The conclusion of the data synthesis spoken of in this paragraph is a major aspect of this phase I report. This is the information that is required to determine the effects that the Shipyard has had on the estuary. I expect this information to be included in the next DRAFT of this report. Because this data is not presented in this report the next submission should also be considered a draft and not a draft final.

20. Section 3.1, Page 1.
The title "Characterization of the Sediments" is not a accurate title for the data that was presented. If this was a true characterization more information would be presented. Full characterization is needed to understand what is being sampled. This characterization will help determine if past practices at the Shipyard effected how and where sediment is being deposited. Characterization is needed to determine how long the stations sampled have been depositional environments. These are the types of conclusions that can be drawn from a sediment characterization, what is presented in the report is only a sediment classification from which very little can be concluded.

21. Section 3.3, Abstract.
Clarify the terms surface and subsurface, does it refer to water surface or bottom substrate surface.

22. Section 3.3, Introduction.
It has already been established that past Shipyard practices pose risks to the surrounding marine environment. Dredging spoils were highly contaminated, sediment samples taken during the RFI were elevated. Therefore, all references that suggest that the Shipyard may pose risks should be changed because it is understood that the Shipyard does pose risks.

23. Section 3.3, Methods.
Please send a copy of UNH-JEL SOP 1.05,1.06, and 1.07 to the Maine DEP.

24. Section 3.3, Results.
Please use station numbers consistent with the rest of the report.

25. Section 3.4, Introduction.
When will the results of this assessment be used to define site-specific toxicity, and thus ecological risk to water column organisms. If site specific toxicity is not going to be completed in phase I, the last sentence of this section should be removed from the report.

26. Section 3.4, Methods.
Expand on the fact that the analysis was performed after the 48 hour holding time. How long after 48 hours was the analysis completed? Were there stations that were held longer than others? Is there a need to repeat this analysis?

27. Section 3.4, Results.
It appears that station 2 also differed significantly from the control. Expand on the results of this test. What do the results mean? Is there a significant difference between stations 2,3,4,and 7?

28. Section 3.5.
The title of this section does not reflect the information provided in this section. A microbiological study implies that several species of biota were studied, this study only evaluated *Clostridium perfringens*.

29. Section 3.5, Abstract.
An abstract is a statement that summarizes the important aspects of a given text. Abstracts incorporate procedures and results into a brief statement. This abstract does not present information on what was found during the investigation.

30. Section 3.5, Introduction.
It is obvious that the Shipyard is not the only source of contamination in the estuary, and that due to the mixing, areas of deposition will be impacted by a variety of sources. It appears that the intent of this study is to identify areas impacted by fecal contamination and attribute the contamination in these areas solely to fecal contamination. Identifying areas impacted by fecal contamination is fine however, this may not be the only contamination impacting these areas. I hope that this study is not attempting to attribute all of the contamination in areas impacted by fecal deposition to this source. In any given area there can be many sources impacting that area. This report should focus on the impact that the Shipyard has had on the estuary.

31. Section 3.5, Introduction.
How *C. perfringens* responds to certain environmental stresses needs to be discussed more. Do the environmental stresses include physical stresses such as temperature, salinity, ect? What environmental stresses that the Shipyard has placed on the estuary might also cause the bacteria to produce spores? If this is going to be a line of evidence for fecal contamination, more information will need to be provided explaining what environmental stresses the bacteria will and will not react to.

32. Section 3.5, Methods.
Present a table showing when stations were sampled, what medium was sampled, and what bacteria was analyzed.

33. Section 3.5, Results and Discussion; Page 3.
Figures 1 and 2 are not included in the report.

34. Section 3.5, Results and Discussion; Second Paragraph, third sentence.
Station 15, November result of approximately 23 should also be mentioned because it appears to be significantly higher than the rest of the samples.

35. Section 3.5, Results and Discussion.
Present a table showing the results of all the samples taken. Just presenting the figures without the raw data is unacceptable.

36. Section 3.5, Results and Discussion.
The sampling of the Great Bay Estuary should be included in the Methods section. The results of this sampling should be presented here.

37. Section 3.5, Results and Discussion; Page 3, last sentence.
Do the results of the entercocci sampling agree with this conclusion that observed contamination levels may not reflect recent contamination?

38. Section 3.5, Results and Discussion; Page 4, first full paragraph.
It appears that the results show that the levels of entercocci are spatially variable(station 15 and 16), and that using this bacteria may not be a good indicator of trends. Please address this issue in the text.

39. Section 3.5, Results and Discussion.
Box core surface sediment samples. Provide a diagram that expresses the results described in this section.

40. Section 3.5, Results and Discussion.
What impact did the past dredging activities at the Shipyard have on the results?

41. Section 3.5, Figure 8.
Provide the sample intervals for each sample in depths A-E. Place the intervals from shallowest at the top of the figure to deepest at the bottom of the figure.

42. Section 3.6, Introduction.
The data presented did not address the question of how released substances make their way into the main Piscataqua channel, as was stated in the introduction. Section 3.6 requires a summary section to address this issue and to summarize the flow at each station during a tide cycle. Comments on how the profile at each station effects mixing, deposition, and flushing of the estuary should be made.

43. Section 3.6, Table 1.
The last reading on 11/3/91, it appears that the time of the measurement was reported wrong. Comparing this table with figure 6, the time should be 1428 hours.

44. Section 3.6, Figure 4.
This figure does not match the data presented in table 1.

45. Section 3.6, Figure 7.
Provide the data used in this figure on table 1.

46. Section 3.6, Figure 20.
Provide the data used in this figure on table 4.

47. Section 3.6, Results.
Expand on each profile, it appears that there are different flow regimes at different depths, this should be an important aspect of the hydrodynamics of the river. Expand on the importance of Figures 26-30, and figures 31-34.

48. Section 3.7, Introduction.
Provide more detail on how wasting disease is affected by different types of contamination. Does the wasting disease respond more to fecal, PAHs, or metals contamination? What activities at the Shipyard could potentially effect the advancement of the wasting disease.

49. Section 3.7, Introduction; Third paragraph, first sentence.
Are the ongoing studies referred to in this sentence part of the Phase II study, or are they being conducted independent of the environmental risk assessment?

50. Section 3.7, Methods; First sentence. Figure 2 indicated that eelgrass was collected from twelve stations in Portmouth Harbor, not ten stations as stated in this sentence. Later in this same paragraph it states the in August and September of 1991 eelgrass was collected from twelve stations. Were there more than two sampling events or is there a mistake made in this sentence? If all of the samples were collected in August and September, then this paragraph should be rewritten so that the information is stated once without confusion.

51. Section 3.7.
Have past practices at the Shipyard included activities that would clear out eelgrass beds to allow ships to navigate better? How has the dredging practices at the Shipyard effected eelgrass beds?

52. Section 3.7, Discussion.
Discuss the importance of each measurement in determining the overall health of the eelgrass. For example, is the length of the rhizome more important to the health of the plant than the reproductive shoot density?

53. Section 3.8, Title.
There has been very little analysis presented in this report. Please change the title so that it reflects what is presented.

54. Section 3.8, Introduction; First paragraph.

This is a great introduction, however the analysis discussed was not performed so please remove this paragraph until the analysis has been completed.

55. Section 3.8, Results and Discussion; Second paragraph.

There is only one sentence in this paragraph that discusses information specific to the Shipyard. Please expand on how the generalizations regarding the ecology of Ascophyllium effect each station.

56. Section 3.9, Title.
Perhaps a better title would be Flounder and Lobster Collection and Population Density Analysis.

57. Section 3.9, Introduction.
Provide figures showing the previous investigations and the areas they covered.

58. Section 3.9, Introduction.
Provide sampling dates in the text.

59. Section 3.9, Methods; First paragraph.
Reference transect numbers when discussing their location.

60. Section 3.9, Results.
There is no mention of the chemical analysis that was performed on the samples collected.

61. Section 3.10, Introduction; Third paragraph.
This paragraph states that samples were obtained from stations 3-9 however, there are no results for station 8 listed in table II or the figures. Please explain this discrepancy.

62. Section 3.10, Discussion; First paragraph.
It appears that mussels collected in Clark Island Embayment may not be compared to mussels collected elsewhere in the estuary. Is resampling required? In the future, strict attention should be paid to where samples are taken so that data collected can be compared. This will eliminate questions about the results and the need for resampling.

63. Section 3.11, Introduction.
What was the basis for selecting the stations to perform the mussel deployment?

64. Section 3.11, Results and Discussion.
There is no mention of the chemical analysis on the tissue.

65. Section 3.11, Figure 1.
Please provide information on stations 19 and 22.

66. Section 3.11, Results.
Provide tables listing the results that are reflected in the figures.

67. Section 3.11, Results and Discussion.
Provide more detailed explanations why the deployment at station 10 was not retrieved.

68. Section 3.12, Methods; First paragraph, fourth sentence.
This sentence conveys the idea that one composite sediment sample for chemical analysis was made from all the samples. It is my understanding that one composite sample was made at each station. Please clarify this sentence.

69. Section 3.12, Table 1.
Label the first two columns.

70. Section 3.12, Discussion.
The conclusion that stations 22 and 23 may not be good reference stations is interesting. Can this conclusion be applied to the rest of the studies? It appears that this study indicates that stress observed at these two stations maybe associated with the higher energy environment. Expand on this idea, and update the other sections accordingly.

71. Section 3.13, Figure 1.
This figure shows station 10A as a sampling location, however the sampling results do not consistently show results for this station, please offer an explanation.

72. Section 3.13, Analytical Screen; Page 6, second full paragraph.
If sampling was completed at station 10A, in close proximity to the DRMO, why was it omitted from the analytical screen for sediments. It appears it would fit into the selection criteria for the analytical screen stated in this paragraph.

73. Section 3.13, Figure 2.
Provide an explanation for the abbreviations used for each PAH.

74. Section 3.13, Figure 3.
This figure should include all the stations at which a PAH analysis was conducted on the sediments. For example, Section 3.14, table 2 has PAH values for stations 9, 11, 16, and 23. These stations plus other stations where sediment PAHs were analyzed should be included in this figure.

75. Section 3.13, Table 3; Station 7.
Explain the "dup avg" used in the third row of this set.

76. Section 3.13, Analytical Screen Results; PAH concentrations.
I recommend that the concentration found in this study be compared to the study completed in Casco Bay as part of the Casco Bay Estuary Project. Casco Bay is similar to Portsmouth Harbor, it is a developed bay with a large number of industries using the waterway. The report is titled, "Assessment of Sediment Quality in Casco Bay". A copy can be obtained by contacting Lee Doggett at the Casco Bay Estuary Project, 312 Canco Road, Portland, Maine 04103 ,or by calling 207-822-6300. I feel that Casco Bay is a better comparison for Portsmouth Harbor than Allen Harbor, Boston Harbor, or several of the other harbors mentioned in this report.

77. Section 3.13, page 7; Second paragraph, statement: "There was no clear pattern between the distribution of PAHs and PCBs (Figures 3 and 5)."

This statement is misleading, these two figures show no correlation, however I feel this statement must be modified to make the point that additional studies looking at source strengths and co-solvency of PCBs and PAHs may show better correlations. I realize that this study is not looking at source strengths, however statements like this can be misleading if the conclusions are not placed in the proper context. Section 2 stated that future studies will focus on source strengths, however this point also needs to be made when conclusion such as this one are stated.

78. Section 3.13, page 8; Third full paragraph.
This paragraph needs to be rewritten. The second sentence does not list all of the metals that were above the MDL shown on figure 13. The third sentence only points out two generalities about the differences between eelgrass and rock weed, there are more that two generalities to be made from this data.

79. Section 3.13, Conclusion.
An additional discussion of contaminants solubility in sea water should also be added to this section

80. Section 3.14, Introduction; Fourth sentence, statement: "The PNSY facility may have contributed to a portion of the loadings of contaminants found during an ongoing survey of the area (Munns et al. 1992.)."

It has been demonstrated that the Shipyard has contributed to the loadings of contaminants in the estuary. This sentence should be rewritten to reflect the known information. The emphasis of this study is to identify the impacts the Shipyard has had on the estuary.

81. Section 3.14, Introduction.
There is no discussion of how chemical markers from sewage, urban runoff, atmospheric deposition, and petroleum will be differentiated or associated with activities at the Shipyard. The following are a list of issues that need to be addressed in each section of the introduction.

Sewage. Has the Shipyard used any surfactants to wash ships or cleanup spills at the site? This is an important point because three of the markers listed in section B are associated with surfactants.

Urban Runoff. How do the markers identified get into the environment? Are the markers more associated with tire wear from highway traveling, or are they associated with the decay of tires from all vehicles, or are they associated with decay from discarded tires? Have there been any tires disposed of in the landfill at the Shipyard? The landfill was used for wastes associated with activities at the Shipyard, I assume this means warn tires from military vehicles.

Atmospheric and Petroleum. I recommend that an analysis similar to the one performed in section 4.1 of the above mentioned report, associated with the Casco Bay Estuary Project, be performed at this site. This will help better determine if the PAHs found are associated with releases, combustion, or are naturally occurring.

82. Section 3.14, Results and Discussion; First paragraph.

This paragraph identifies sources targets including the Shipyard, however table 1 does not identify marker measurements for the Shipyard as is stated in the text.

83. Section 3.14, Results and Discussion; Section A, Shipyard.

In addition to using Cutting Oils and Qualitative Screening I recommend that PAHs found in the groundwater results be used. I understand that future reports will combine on-shore and off-shore studies, however if this section is to be included in this report, and is serious about identifying markers associated with the Shipyard, then groundwater results need to be used to establish chemical markers.

84. Section 3.14, Qualitative Screening.

Why was station 10 used in this screening? The on-shore study identified the landfill and the DRMO as the most impacted areas. I feel that stations associated with these areas better meet the criteria stated in the second sentence of this section.

85. Section 3.14, Figure 2.

Station 8 results are not consistent with station 8 results in figure 3, section 3.13.

86. Section 3.14, Conclusions; Second paragraph.
If cutting oils are to be used as markers, comments need to be made about how soluble it is in sea water and where it might accumulate. I feel my comment about using groundwater results in this study is strengthened by the fact that chemical markers have not been identified. The components dissolved in the groundwater and discharging through tide cycles into the estuary will accumulate in the estuary, therfore I feel that it is imperative that this information be used as soon as possible in this study.

87. Section 3.14, Conclusions; Last paragraph.
Until a complete analysis is completed and an understanding of source strengths is known, this conclusion should not be included in this report.