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LETTER AND COMMENTS REGARDING PROPOSED SAMPLING AND ANALYSIS PROGRAM INTERIM OFFSHORE MONITORING FOR OPERABLE UNIT 4 (OU 4) NSY PORTSMOUTH ME
8/14/1998
LEPAGE ENVIRONMENTAL SERVICES

# Lepage Environmental Services, Inc.

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August 14, 1998

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

Subject: Review of *Proposed Sampling and Analysis Program, Interim Offshore Monitoring for OU4*

Dear Mr. Vandermark:

As you requested, we are transmitting comments to the Seacoast Anti-Pollution League (SAPL) concerning the July 1998 *Proposed Sampling and Analysis Program, Interim Offshore Monitoring for OU4*. Operable Unit 4, or OU4, includes the areas offshore potentially impacted by sites onshore at Portsmouth Naval Shipyard. The document was prepared by Brown and Root Environmental to provide a framework for the proposed offshore monitoring plan that will be discussed at a Technical Meeting on August 20th in Kittery. In addition to the opportunity to comment on this report, we will also have an opportunity to provide input at the August 20th meeting and to comment on the more detailed monitoring plan when it is released.

**1. General Comment.** The April 1997 *Revised Draft Final Estuarine Ecological Risk Assessment* identified research needed to reduce uncertainty in the results of the risk assessment and "essential monitoring studies". This information is summarized in Table 8-2. I have attached a copy of this table on which the essential monitoring studies have been circled. Additional monitoring and research needs are also outlined in the text of the *Risk Assessment* text. An example is the discussion near the top of page 8-15 of improving estimates of sediment accumulation rates to greatly enhance the ability to evaluate contaminant movement in the estuary. The *Proposed Sampling and Analysis Program, Interim Offshore Monitoring for OU4* focuses on sediment chemistry and mussel and juvenile lobster tissue. How and when will the Navy address the other essential monitoring and research needs identified in the *Revised Draft Final Estuarine Ecological Risk Assessment*?

**2. General Comment.** While I realize the subject document is intended to provide a basis for discussion at the August 20th meeting and additional detailed information will be included in subsequent documents, an acronym glossary and reference list would have been helpful.

**3. Page 2, What to Sample.** The Navy proposes one round of sediment porewater and juvenile lobster sampling as being sufficient for the Preliminary Remediation Goal (PRG) needs. How will potential seasonal effects be evaluated?

**4. Page 2, What to Analyze.** It would be helpful to have a list of the COCs (contaminants of concern) included in the report. The summary of COCs by Area of Concern presented in Table 4-6 of the April 1997 *Revised Draft Final Estuarine Ecological Risk Assessment* includes tDDx as a COC for four out of the six areas listed. Why isn't it included as a parameter for analysis in the offshore monitoring program.

**5. Pages 2 & 3, Where to Sample.** I'm not sure the locations proposed for sampling are sufficient or appropriate to meet the essential monitoring needs identified in the *Revised Draft Final Estuarine Ecological Risk Assessment.* In addition, given citizen concerns with potential impacts in Spruce Creek, I am uncomfortable with the lack of additional sampling in that area. I look forward to further discussion at the August 20th meeting. Also, how will the effects of non-shipyard contaminant sources be evaluated for the reference areas and how will the shipyard's effects on the Areas of Concern be weighed against the effects of non-shipyard sources on the reference areas?

**6. Page 3, When to Sample.** It is not clear if the timing and frequency of sampling is sufficient to meet the monitoring needs identified in the *Revised Draft Final Estuarine Ecological Risk Assessment.* I believe this is also an appropriate issue to discuss on August 20th.

**7. Table 1.** A list of the COCs and a copy of the decision tree should be provided.

**8. Table 3.** Are there any outside influences (industrial, agricultural, etc.) for reference location RF-1? In an earlier comment letter, we had suggested that research regarding sediment accumulation rates and the vertical distribution of heavy metals in sediments in Portsmouth Harbor and in Spruce Creek performed by Stanley Bonis and Dr. Henri Gaudette (University of New Hampshire) would be helpful in understanding inputs from the shipyard as well as from other sources in the estuary. The Navy had indicated they would be in touch with the researchers about their data. What is the status of this communication?

**9. Additional Comment.** The Navy's February 6, 1998, responses to comments on the April 1997 *Revised Draft Final Estuarine Ecological Risk Assessment* included the following items relating to offshore monitoring:

- **EPA Comment 1.** The EPA commented that the thorough evaluation of the numerous seep discharges was a data gap. In its response to this comment and to MEDEP comments 13 and 46, the Navy stated that a detailed evaluation of data from the current seep sampling is being prepared. What is the status of the seep data report? The

compilation and evaluation of the seep data will be helpful in the development of the offshore sampling plan.

- **EPA Comment 2.** This comment relates to understanding why eelgrass is not present in Clark Cove. With the apparent correlation between elevated metal concentrations in the environment and the lack of eelgrass in what otherwise appears to be a suitable habitat (see NOAA's Specific Comment 3), additional monitoring in Clark Cove might shed some light on the cause(s) and lead to an appropriate remedial action. How does the proposed sampling and analysis program address this issue?

- **EPA Comment 3.** The EPA pointed out that several marshes around the shipyard appeared to be stressed, and that the Feasibility Study (FS) should consider monitoring marshes. The MEDEP (Comment 61) also expressed concern regarding salt marsh impacts. Is there monitoring that could be performed prior to the FS that would identify if the ecological stress is related to COCs?

- **MEDEP Comment 1.** The comment related to the "great deal of uncertainty related to many aspects of the report". The Navy's response is that major sources of uncertainty will be addressed by the FS. Does the Navy believe the interim monitoring program, as proposed, will gather all the information necessary to address all the major sources of uncertainty? Will collection of sediment, mussel, and lobster data be sufficient to reduce uncertainties to an acceptable level?

- **MEDEP Comment 63.** The MEDEP was concerned with the "huge amount of uncertainty" regarding whether "the high concentrations of contaminants had any effects on the [epibenthic] organisms" in the Dry Dock area. How does the proposed monitoring program address reducing the uncertainty?

- **SAPL Comment 40.** Our comment related to the statement that the uncertainty associated with the lobster sampling and analysis can not be resolved without continued monitoring using the improved analytical procedures. The Navy responded that, due to high variability, seasonal migration patterns and life history, lobsters would need to be monitored yearly for three to five years to begin to see trends. Yet the offshore monitoring program proposes to sample lobster only once (see Comment 3 above). Please clarify.

- **SAPL Comment 41.** We questioned how many samples would be needed to draw definitive conclusions regarding winter flounder fish tissue analysis results. The Navy response indicated collecting eight to ten samples per year for a period of three to five years would probably be needed to discern trends. The offshore monitoring program does not include sampling winter flounder. How does the Navy intend to address monitoring winter flounder?

**10. Additional Comment.** There are a couple of issues relating to offshore monitoring that were raised in comments and subsequent responses and comments on the November 1997 *On-Shore/Off-Shore Contaminant Fate and Transport Modeling Phase II Work Plan.* The Navy responded to the followup comments in a letter dated June 3, 1998. MEDEP Specific Comment 2 pointed out that the results of the 1976 dredging study indicated sediments at OU5 had some of the highest levels of lead and zinc in the estuary, and that 1993 sampling results showed extremely high levels of zinc at OU5. Because the levels might indicate current sources contributing to the high levels of metals in OU5 sediments, the MEDEP stated the sediments should be sampled again, maybe as part of the offshore monitoring program. The Navy agreed with the latter. How does the proposed offshore monitoring program address the metals levels in sediments at OU5?

In SAPL Comment 1, we had asked how, when, and by whom migration of lead and mercury would be evaluated. The concern was raised by the geochemical modeling performed by Dr. Andrew Reeve for the MEDEP that indicated little contamination is being transported due to surface complexation of the trace elements, but that lead and mercury would not be retarded due to surface complexation. The Navy responded that, in addition to evaluating lead and mercury in the Phase II modeling effort, consideration would be given to the possible higher mobility of lead and mercury in the development of the monitoring program. Also, the need for "closer evaluation" of lead and mercury would be considered in the offshore monitoring work plan. How does the proposed monitoring program address lead and mercury and, in particular, concerns regarding their mobility?

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

Sincerely,

Carolyn A. Lepage

STATE OF MAINE
CAROLYN A. LEPAGE
6202
CERTIFIED GEOLOGIST

Carolyn A. Lepage, C.G.
President

Enc.

cc: Iver McLeod, Department of Environmental Protection
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Table 8-2. Significant findings for assessment and measurement endpoints. Significant findings (•), research needed to reduce uncertainty (→), and essential monitoring studies (➢) are identified.

| ASSESSMENT ENDPOINT / MEASUREMENT ENDPOINT | FINDING |
|---|---|
| **PELAGIC COMMUNITY** | |
| PRIMARY PRODUCTIVITY | • Within Normal Limits (PHYTOPLANKTON Biomass) |
| FLOUNDER | • Tissue Contaminant Residues Low<br>• Few Differences in contaminant concentrations between Portsmouth Harbor and Gulf Of Maine<br>• Evidence of Spleen Pathology<br><br>→ Evaluate link between PAH exposure, tissue concentration, and affect on spleen pathology<br>➢ Monitor seasonal variation of flounder abundance and contaminant levels, and spleen pathology |
| **BENTHIC COMMUNITY** | |
| INFAUNA | • Within Normal Range for Piscataqua River<br>• Sediment grain size and eelgrass biomass accounted for 55% of variance in number of species<br>• Sediment metals accounted for 13% of the variance in number of species<br>• Sediment tPCB accounted for 3% of the variance in number of species<br><br>→ Develop cause and effect relationship between benthic community response and contaminant exposure<br>➢ Monitor benthic community to assess trends |
| **EPIBENTHIC COMMUNITY** | |
| LOBSTERS | • Juveniles very abundant with significant recruitment<br>• Adult tissue concentrations similar to reference population<br>• Juvenile tissue levels elevated relative to reference population<br>• Bioaccumulation of PAH compounds in juveniles evident<br>• Sediment to tissue bioaccumulation factors calculated<br>• Important nursery and reproductive habitat delineated<br><br>→ Develop bioaccumulation and trophic transfer model<br>→ Relate tissue concentrations levels to biological effects<br>→ Better define lobster migratory patterns<br>➢ Monitor to assess status and trends of lobster stocks in Portsmouth Harbor<br>➢ Monitor seasonal differences in contaminant levels |
| FUCOID ALGAE | • Abundance Within Normal Range<br>→ Develop responses for contaminant exposure |

Table 8-2. Continued.

| ASSESSMENT ENDPOINT<br>MEASUREMENT ENDPOINT | FINDING |
|---|---|
| **EPIBENTHIC COMMUNITY** (cont.) | |
| MUSSELS | • Abundance/Density within normal range<br>• Empirical Pb-uptake model developed<br>• Tissue residues critical values exceeded for Pb and PHEN<br>• Elevated residue levels used to identify potential sources and hot spots<br>→ Develop relationships between tissue concentrations and affects on mussels at the individual, population, and ecosystem level<br>→ Relate mussel tissue concentrations to environmental exposure<br>➢ Conduct seasonal surveillance monitoring of mussel tissue concentrations in areas of concern and reference areas of the lower estuary<br>➢ Conduct directed sampling to evaluate contaminant releases from seeps and runoff into areas of concern during low flow and high flow conditions |
| **EELGRASS COMMUNITY** | • Abundance/Morphology Within Normal Range<br>• Excellent habitat quality beneficial to lobster recruitment<br>• Metal uptake proportional to sediment concentration for Hg, Pb, Cr, Cu, and Ni<br>• Absence of eelgrass inside Clark Cove may be due to disturbance, high ammonia and sulfides, and contaminant exposure<br>• Inverse relationship between sediment Pb and root/rhizome biomass<br>→ Evaluate relationship between eelgrass and metals bioavailability<br>→ Determine factors controlling absence of eelgrass in Clark Cove<br>➢ Conduct seasonal surveillance monitoring of contaminant levels<br>➢ Monitor status and health of eelgrass beds in the lower estuary |
| **SALTMARSH COMMUNITY** | • No evidence of large-scale disturbance<br>• Abundance and morphology stressed in some marshes<br>• Ecological differences between marshes could be related to chronic contaminant exposure<br>• Reduced canopy height correlated with high sediment PAH<br>→ Assess the assimilative capacity of saltmarsh peats<br>→ Develop relationships between habitat quality and exposure to contaminants<br>→ Develop methods to promote *Spartina* health and prevent erosion of saltmarsh substrates<br>➢ Monitor changes in saltmarsh area<br>➢ Monitor habitat quality of marshes adjacent to Seavey Island |

Table 8-2. Continued.

| ASSESSMENT ENDPOINT / MEASUREMENT ENDPOINT | FINDING |
|---|---|
| **WATER QUALITY** | |
| DO, Salinity, pH, Temp | • Within normal range |
| Nutrients | • Within normal range |
| Microbes | • Consistent with sewage input |
| Hydrodynamics | • Significant flushing in lower estuary<br>• Determined dynamics of estuarine water movement.<br>• Calibrated and validated hydrodynamic (DYNHYD) and transport models (WASP4 and WASP5) for the Great Bay Estuary<br>→ Conduct simulations of contaminant transport in the estuary |
| SEA URCHIN | • Toxicity Detected<br>• Exposure response relationship between Pb exposure and sea urchin survival, reproductivity, and fecundity developed<br>→ Relate sea urchin toxicity to ecosystem effects |
| CONTAMINATION LEVEL | • Extremely low contaminant concentrations, consistent with well flushed estuary<br>• Heavy metals in seep samples above ambient WQC<br>→ Determine loading rates from seeps and potential for groundwater discharge<br>→ Evaluate potential to intercept contaminant transport by restoring estuarine habitat<br>➢ Monitor mussel contaminant levels |
| DEPLOYED MUSSELS | • Physiology Within Normal Range<br>• No Appreciable Accumulation |
| **SEDIMENT QUALITY** | |
| GEOPHYSICAL | • Depositional Areas Identified<br>• Developed sediment distribution map.<br>• Determined sedimentation dynamics<br>→ Evaluate historical sediment accumulation patterns<br>➢ Monitor sediment accumulation and transport in lower estuary |
| CONTAMINATION LEVELS | • Contaminants of Concern Identified<br>• Developed information on contaminant spatial and temporal distributions<br>• Determined levels protective of marine organisms.<br>→ Assess assimilative and detoxifying capacity of sediments and shoreline substrates.<br>➢ Monitor sediment contamination levels over 3-4 year intervals |

Table 8-2. Continued.

| ASSESSMENT ENDPOINT<br>MEASUREMENT ENDPOINT | FINDING |
|---|---|
| GEOCHEMICAL | • Determined that high AVS was capable of reducing divalent metal availability<br>• Information from deep cores showed reduced contaminant levels in most recent sediment deposition<br><br>→ Determine sediment contaminant accumulation rates<br>→ Develop relationship between substrate characteristics of organic matter, total organic carbon, sulphides, grain size, etc. and chemical bioavailability<br>➢ Monitor seasonal variation in AVS and SEM |
| AMPHIPOD TOXICITY | • Toxicity Detected<br>• Toxicity associated with elevated DDT at 5 of the 7 stations where toxicity was observed<br><br>→ Evaluate the effect of multiple contaminants on observations of toxicity<br>➢ Monitor toxicity in conjunction with sediment surveillance |
| MICROBES | • Sewage Input Identified<br>• Sewage treatment plant sources identified<br>→ Determine relative loading of nonshipyard sources |
| CHEMICAL MARKERS | • No Unique Shipyard Marker Identified<br>• Significant Sewage Input in Portsmouth Harbor<br>• Evidence of Runoff, Atmospheric, and Petroleum Inputs<br>• Assessed historical trends of sources inputs.<br><br>→ Determine marker dispersion and deposition rates. |
| OVERALL | → Develop GIS capability for mapping and displaying ecological risk data and information |