UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
JOHN F. KENNEDY FEDERAL BUILDING
BOSTON, MASSACHUSETTS 02203-0001

October 19, 1995

Mark Evans, Remedial Project Manager
U.S. Department of the Navy
Naval Facilities Engineering Command
Northern Division
10 Industrial Highway
Code 1823, Mail Stop 82
Lester, PA 19113-2090

Re: Ecological Risk Assessment Problem Formulation and Conceptual Models for Naval Submarine Base, in Groton, CT

Dear Mr. Evans:

I am writing in response to your request for EPA to review the *Ecological Risk Assessment Problem Formulation and Conceptual Models* report dated September 1995. EPA's comments and recommendations are discussed below and on Attachment A.

Owing to the number of variables involved in establishing exposure pathways, I recommend that we establish the use of such variables (*e.g.*, body weights, BAF, BCFs, % sediment, soil ingestion) soon. Perhaps we should discuss specific values for these parameters at our meeting on October 25, 1995 as it may also have bearing on receptor specific exposure pathway models? It was my understanding that one of the main objectives for developing this document was to help select assessment endpoints so that the data and conclusions can be focused toward evaluation of those assessment endpoints. We must also decide upon assessment endpoints and look forward to discussing your proposals.

I am concerned that the report omits the Sediment Triad Approach within the Ecological Effects Assessment Section. The freshwater information thus far shows significant impairment to site related water courses. A complete evaluation of the benthic community, sediment chemistry, and toxicity testing will help establish any causal relationships between contaminant exposure and adverse biological impacts. The Thames River studies clearly identify Goss Cove as a cause for concern. Again, chemical analysis should help us assess site-related chemical toxicity.

According to this document the base wide ecological risk assessment ("BERA") will *"integrate information and results presented in previous documents with results of investigations conducted in 1995 in response to the preliminary findings contained in these documents"* into the Draft Phase II RI ecological risk assessment. As agreed on June 29, 1995, the document contains a summary of base background, previous investigations, site descriptions, ecological receptors and

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exposure pathways for soil, sediment, surface water, and air, and potential contaminants of concern detected during both RI investigations.

The final BERA must include the pertinent data supplied in the August 1991 Draft Report prepared by Atlantic and by Menzie Cura & Associates. More specifically, Appendix F contains data needed to evaluate ecological risks to soil invertebrates in the Area A Wetlands through the equilibrium partitioning approach. The majority of unresolved issues with the data were related to the interpretation of the data and the inability to make decisions because of uncertainty. Consequently, additional sampling was necessary.

Currently, exposure models are proposed to evaluate dermal contact of soil to the raccoon, the mallard, and the red tailed hawk. Since this exposure will be minimized by the outer coatings of fur or feathers (and limited data from other sources), EPA suggests that this route be presented as a potential exposure pathway in the problem formulation but eliminated from a characterization of exposure and effects. Additionally, EPA agrees that the inhalation exposure route is not a primary pathway and would not significantly contribute to the majority of the risk, so it should only be discussed qualitatively.

None of the food chain models include the evaluation of exposure and potential ecological effects to small mammals. Small mammals are a large percentage of the diets of both the red tailed hawk and racoon and therefore should be included as a representative ecological receptor. A recommendation for a primary terrestrial consumer would be the smoky shrew (*Sorex fumeus*). In addition, the shrew can be used to evaluate risks from soil invertebrates.

On September 19, 1995, I received the data from the Area A Downstream Watercourses sampling events that occurred during the Spring of 1995. A summary and interpretation of this data should be included in the BERA. The report should discuss how this information will be incorporated into the Sediment Triad Approach.

Frog embryo toxicity test data indicate no significant difference in survival between site stream sediments and the study area reference stream. This data does demonstrate a significant negative difference in survival between the OBDA Pond and Pequot Woods Pond. A significant difference in percent embryo malformation between these two ponds is also exhibited. The malformation endpoint results may be less indicative of pond-related contaminants as shown by the comparison with Niantic Pond where the difference is not significant. Although not as severe in the Lower Pond, percent survival is reduced. Lower Pond is characterized by elevated levels of DDD (150 mg/kg), DDE (5 mg/kg), and DDT (59 mg/kg). Lead concentrations in Niantic Pond sediments are 703 mg/kg. However, without the combined interpretation for the chemistry, water quality, and toxicity test results it is difficult to establish causality for site related constituents.

Based on sediment chemistry, benthic community data, and toxicity testing results there appears to be a potential ecological risk in Area A Downstream and Goss Cove Landfill.

Based upon laboratory control survival, freshwater sediment toxicity tests results for both test species are acceptable. Comparison of site water bodies (lentic and lotic) shows a severe impact on survivability (*e.g.*, 100% mortality). However, the reference ponds had significant mortality as well, and therefore test mortality may be from a cause other than site contaminants. Test chemistry (including dissolved oxygen) was maintained throughout the test at acceptable levels but should be confirmed. This would confirm whether low DO was a frequent problem in site water bodies. Evaluation of this information in conjunction with the benthic community analysis from March may indicate that the Lower Pond may be impacted by something other than DO levels.

The toxicity test results from stream sediments also show virtually no survival for either species. The significance of these results is also constrained by the reduction in survival in reference sediments. The benthic invertebrate survey results from the streams, however, indicate that the effects may be caused by site related contaminants.

The Thames River sediment toxicity test results (both species) indicate that the Goss Cove sample was significantly impacted. There are indications of significant toxicity at locations SDTR04 and T3SD4. The power of these results may be reduced by the absence of toxicity in *Leptocheirus plumulosus*. The difference in the sensitivity between the two test organisms for various contaminants should be examined.

The discussion of receptor species selection states that these species were chosen in part because of the amount of information on diet, home range, resource requirements and metabolism. Another major point of selection is the amount of data relating these species (or related species) to chemical sensitivity at the site. If the toxicity data is not available, the uncertainty associated with the final exposure calculations should be considered.

EPA will discuss specific recommendations for the parameters that will be used in the models (*e.g.*, BAF, % diet, ingestion rates, home ranges, body weights and reference toxicity values) when we meet on October 25, 1995. After we receive the results of the risk assessment, we should discuss the significance of any risks to the ecosystem so that we can make an informed risk management decision. Please do not hesitate to contact me at (617) 573-5777 should you have any questions prior to our meeting.

Sincerely,

Kymberlee Keckler, Remedial Project Manager
Federal Facilities Superfund Section

Attachment

cc: Mark Lewis, CTDEP, Hartford, CT
Andy Stackpole, NSBNL, Groton, CT
Joan Miles, USEPA, Boston, MA
Patti Lynne Tyler, USEPA, Boston, MA
Dale Weiss, TRC, Lowell, MA
Ken Finkelstein, NOAA, Boston, MA

ATTACHMENT A

Page	Comment
p. 3-2, § 3.1.3	This section does not include any discussion of the analytical data or risk analyses from the Phase I study. Please include the IR Report (August 1991) because it provides a substantial amount of information. We also need to discuss risks to the Area A wetlands.
p. 3-7, § 3.1.11	This section contains no discussion of inorganics found at the site. In particular, lead was found at a concentration of 403 mg/Kg. This concentration exceeds background and may be detrimental to biota. Please include a discussion of inorganics.
pp. 5-8 through, 5-12 § 5.0	Please correct the numbering sequence for these sections.
p. 5-8, § 5.2.3.2	This section discusses contaminant transport from the landfill to the wetland then to downstream areas. Since landfill contaminants are discharging through groundwater to the downstream water courses (especially the OBDA pond), EPA recommends that this source be explored further. The results from the leachate study should be considered in this evaluation.
p. 5-7, Figure 5-2	Based on the remedial action proposed for Area A Landfill, the soil exposure pathway will be eliminated to any ecological receptors. Therefore, it will not be necessary to assess landfill soil as an exposure pathway.
p. 5-9, Figure 5-3	This figure indicates that the receptor species, the mallard duck, a dabbler, would be evaluated for ingestion of prey but not plants. According to several sources [including Rudis and Degraaf (1987), *New England Wildlife: Habitat, Natural History and Distribution*; and USDOA General Technical Report NE-108 and Trippensee (1953), *Wildlife Management: Fur bearers, Waterfowl and Fish* Vol. II 1953], the majority of the mallard diet consists of vegetation. EPA recommends that the impacts associated with the diet focus on plant ingestion rather than prey. This would also be consistent with the discussion of receptor species selection. In addition, the ingestion of soil by the red tailed hawk will be reconsidered. It is probable that this raptor consumes a fairly small amount of soil. Consequently, EPA recommends that this route of exposure be eliminated from further consideration.

p. 5-11, Figure 5-4	For the mallard, ingestion of prey should be switched to ingestion of plants for reasons stated above. Additionally, there is a likely absence of data regarding the direct contact exposure of the mallard to sediment. Accordingly, EPA requests that you reconsider this pathway of exposure.
p. 5-15, § 5.3, 3rd ¶	EPA recommends that for the Area A Downstream watercourses comparison to sediment quality guidelines include the use of Ontario Ministry of the Environment, Sediment Quality Guidelines. In addition, AVS/SEM data should also be used in the discussion regarding bioavailability. This section should also explain how aquatic receptors will be evaluated (*see* Figure 5-3).
p. 5-17, § 5.3	Use of this duck as a receptor species is questionable in the Thames River. Although this and other duck species were observed in Mamacoke Cove, the depth of the river adjacent to the base makes it unlikely that a dabbling duck species would be feeding in the immediate area. If the mallard duck is to be used only for Area A Wetlands and Downstream Watercourses then the use of the word "Riverine" should be eliminated from the discussion.