UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

April 26, 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: Work Plan for the Thames River Ecological Sampling

Dear Mr. Evans:

I am writing in response to your request for EPA to review the *Letter Work Plan for the Thames River Ecological Sampling*. EPA reviewed this work plan in light of its responsiveness to our earlier comments (*see* letters dated December 22, 1994 and March 8, 1995) and the adequacy of the proposed sampling for evaluating the potential for ecological risk from exposure of chemical contaminants, including those related to base activities. This work plan includes sediment sampling in the Thames River at nine locations and one upstream reference location. Sediment samples shall be analyzed for full CLP TCL/TAL, TOC, grain size, acid volatile sulfides ("AVS"), and simultaneously extracted metals ("SEM"). Surface water analyses at the sediment/surface water interface will include pH, temperature, salinity, and dissolved oxygen measurements. In conjunction with the chemical analyses, sediment toxicity testing will be performed utilizing two marine/estuarine benthic invertebrate species. EPA's detailed comments are presented on Attachment A.

I look forward to working with you on the Thames River assessment. Please do not hesitate to call me at (617) 573-5777 should you have any questions or wish to arrange a meeting.

Sincerely,

Kymberlee Keckler, Remedial Project Manager
Federal Facilities Superfund Section

cc: Mark Lewis, CT DEP, Hartford, CT
Andy Stackpole, NSBNL, Groton, CT
Dan Winograd, USEPA, Boston, MA
Patti Tyler, USEPA, Boston, MA

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Dale Weiss, TRC, Lowell, MA
Ken Finkelstein, NOAA, Boston, MA

ATTACHMENT A

Page	Comment
p. 1-2, bottom of page, 1st bullet	The sample locations proposed in EPA's March 8, 1995 letter were selected to evaluate specific potential source locations. Sample location T3SD3 is upstream of Pier 33 and Building 174 and was meant to define input from DRMO and Area A downstream watercourses. A sediment sample taken adjacent to these locations could verify whether contaminant transport from Pier 33 or Building 174 to the Thames River is occurring. As addressed in Dr. Finkelstein's letter dated April 17, 1995, an additional sediment sample location should be placed along Pier 33 to evaluate the potential biological exposure from elevated lead concentrations (85,000 mg/kg) detected during the Site Investigation. Therefore, EPA recommends an additional sediment sample at Pier 33 and a downstream sampling location (11 locations in total).
p. 2-1, § 2.1, 1st bullet	The project objectives must include the evaluation of potential adverse effects to benthic macroinvertebrates from exposure to contaminated sediments. The results of the sediment toxicity tests from locations adjacent to the base (and suspected to be impacted from site specific discharges) will be statistically compared with those results from both the upstream location (reference) and the laboratory control sediments. It is important to note that the data derived from these additional studies (sediment chemistry data and sediment toxicity tests) will be used to supplement and modify the information and interpretation of the ecological risk assessment in the Phase II Remedial Investigation.
p. 2-1, § 2.1, 3rd ¶	There are 16 possible sets of results based on the ecological sampling, analysis, and data evaluation. One of the conclusions is listed as "NO IMPACT." Currently, it is premature to conclude that "NO IMPACT" or "REFERENCE IMPACTED" would obviate that need to perform any additional work in the Thames River. It would be more likely that surface water or sediment sampling/monitoring would be required.
p. 2-3, Table 2-1	The third column implies that interpretation of results could indicate that metals are toxic, but not bioavailable. This is unclear. Toxicity usually indicates that contaminants are bioavailable. Is this column stating that sediment toxicity is due to contaminants other that metals?
p. 2-4,	This section is somewhat unclear. This discussion should simply state that

top of page	contamination of the reference location is possible. Comparison of "site related" contaminants to a reference location should be made in light of possible sources of contamination at the reference.
p. 2-8, top of page	In an effort to better evaluate the metal binding capacity of the sediments, EPA recommends that AVS and SEM data be integrated into the following equation of SEM-AVS instead of SEM/AVS. Based on a preliminary classification scheme proposed in EPA's National Sediment Inventory, the following information has been developed for the sum of molar concentrations of cadmium, copper, nickel, lead, and zinc: 1) SEM-AVS > 5 indicates a high probability of adverse effects to aquatic life; 2) SEM-AVS = 0 to 5 indicates a medium probability of adverse effects to aquatic life; and 3) SEM-AVS < 0 indicates a low probability of adverse effects to aquatic life. This information, along with toxicity test data, will help identify the potential for adverse ecological effects. EPA recommends that the text be revised to incorporate these changes. Interpretation of the SEM and AVS data should be evaluated in light of recent information published by EPA's Office of Water and Office of Research and Development on the Briefing Report to the EPA Science Advisory Board (*see Equilibrium Partitioning Approach to Predicting Metal Bioavailability in Sediments and the Derivation of Sediment Quality Criteria for Metals*, EPA-822-D-94-002).
p. 2-8, bottom of page	The SEM and AVS data can only be used to develop sediment quality criteria for the five metals: cadmium, copper, nickel, lead, and zinc. Sediment Quality Criteria for these five metals can be derived by comparing the sum of molar concentrations for cadmium, copper, lead, nickel, and zinc to the molar concentrations of AVS in sediments. Site specific total organic carbon can be used to develop organic based partition coefficients (in addition to the AVS) to calculate the interstitial water concentrations to compare to Ambient Water Quality Criteria Final Chronic Values. The SQC approach only estimates predicted adverse impacts from these five metals and does not guarantee that the sediments are non-toxic.
p. 3-4, Table 3-1	It is unclear why nine separate samples from the reference are proposed for toxicity testing. A statistical comparison should be made between "site related" sample results and laboratory control and reference results. Accordingly, only a single sediment sample collected using the same procedure as the "site related" samples is necessary for pairwise analysis.