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September 10, 2004

Ms. Kymberlee Keckler
US Environmental Protection Agency Region I
Remedial Project Manager
Federal Facilities Superfund Section

**Subject: Response to EPA Region 1 Comments on Draft Thames River Validation Study Naval Submarine Base - New London Groton, Connecticut Work Plan, July 2004, Dated August 26, 2004 and NOAA Letter Dated August 9, 2004**

Dear Ms. Keckler:

On behalf of Mark Evans, Remedial Project Manager, thank you for your review of the above referenced document. Attached are the Navy's responses to comments from EPA's letter dated August 26, 2004 and NOAA's comments dated August 9, 2004.

We are planning to conduct the field work in support of the validation study the week of October 4, 2004 and would like to work with you in resolving any outstanding issues prior to initiating that effort.

Please feel free to call Mark Evans directly at (610) 595-0567 ext.162 to set up a conference call or meeting to discuss these responses.

Sincerely,

Donald Gunster

Donald Gunster
Project Manager, Battelle

Attachment

cc: Bart Hoskins, USEPA, Boston, MA
Ken Finkelstein, NOAA, Boston, MA
Mark Lewis, CTDEP, Hartford; CT
Mark Evans, EFANE
Jason Speicher, EFANE
Melissa Cokas, NSBNL, Groton, CT

**U.S. Environmental Protection Agency, Region I**
**Response to August 26, 2004 Comments**
**Draft Thames River Validation Study**
**Naval Submarine Base - New London Groton, Connecticut Work Plan, July 2004**

## GENERAL COMMENTS

1. **The sediment/bioassay locations at Outer Pier 1, Zone 4, and Zone 7 generally overlap with the areas previously sampled as part of the Pilot Study. While sample coverage appears to be adequate over the three areas, the locations with the highest contamination in Zone 4 may not be adequately represented. The highest concentrations of several COPC, as evident in the September 2003 Pilot Study and in the Battelle presentation "Thames River Naval Submarine Base - New London Ecological Screening Risk Assessment and Refinement Next Steps", dated November 2003, appear to be closer to shore, at previous sample locations Z4-33 and Z4-36. To capture the highest COPC contamination at Zone 4, it may be useful to reposition Z4-S2 and Z4-S3 closer to these previous sample locations.**

   **Response:** Samples Z4-S2 and Z4-S3 in Zone 4 will be moved approximately 50 feet closer to the quay wall. Figure 3-3 on page 34 of the Work Plan will be revised to reflect this change, as well as Figure C-3 and corresponding coordinates of these two sample locations in the Sampling and Analysis Plan (SAP).

2. **The list of COPC for Zones 4 and 7 and Pier 1 matches those identified in the SERA for nearly all cases. There are a few exceptions, however: According to Table D-14 (Appendix D), DDT is a COPC for benthic organisms in Zone 4. Table 2-1 lists DDE as a Zone 4 COPC, but not DDT.**

   **Response:** Table 2-1 correctly shows that DDE is a COPC in Zone 4, but not DDT. Table D-14 will be revised to be consistent with Table 2-1. Although DDD and DDT concentrations in Zone 4 exceeded sediment screening benchmarks, concentrations of these constituents in Zone 4 were not different than those observed in the Reference Area (see Table D-8).

3. **Table D-14 lists DDE and DDT as COPC, while Table 2-1 lists only DDT.**

   **Response:** Table 2-1 will be revised to correctly show that DDE and DDT are both COPCs to benthic invertebrates in Zone 7.

4. **Heptachlor is listed as a COPC for Pier 1 sediments, but is not included in Table 2-1.**

   **Response:** Heptachlor will be added to Table 2-1 as a COPC in the outer area of Pier 1.

5. **In addition, PCB, DDE and DDT are bioaccumulative and should also be COPCs for piscivorous birds. Please review the COPC list and correct as necessary.**

   **Response:** PCBs, DDE, and DDT were eliminated as food chain COPCs in the Screening and COPC Refinement presented in Appendix D. PCBs were eliminated as a food chain COPC because modeled food chain doses using maximum observed sediment concentrations of PCBs in Zone 4, Zone 7, and the outer area of Pier 1 were less than the NOAEL-based TRV (see Tables D-6, D-7, and D-16). Maximum concentrations of DDE in Zone 7 and the outer area of Pier 1 resulted in food chain doses that were less than the NOAEL TRV, as did maximum concentrations of DDT in Zone 4 and outer Pier 1. Although maximum concentrations of DDE in Zone 7 and DDT in Zone 4 resulted in doses exceeding NOAEL TRVs, these constituents were eliminated as COPCs during Step 3a refinement because doses calculated using the sediment 95% UCL on the mean in these areas were less than the NOAEL TRV (see Tables D-11 and D-13).

**SPECIFIC COMMENTS (ATTACHMENT A)**

1. **p. 1, §1.1. The second bullet refers to an "ERA Step 3A COPC refinement, according to EPA (1997) guidelines." While the proposed BERA follows the 1997 EPA guidelines, it should be noted that the term "Step 3A COPC refinement" is taken from the Navy Guidance for Conducting Ecological Risk Assessments.**

   **Response:** Agreed. ERA Step 3A COPC refinement is directly referred to in the Navy Guidance for Conducting Ecological Risk Assessments. However, although not specifically referred to as Step 3A, EPA Guidance entitled *The Role of Screening-Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments* (ECO Update, 2001) includes "Refinement of the Contaminants of Potential Concern (COPCs) by examining the assumptions used in Steps 1 and 2" under Step 3. This step includes consideration of background concentrations, frequency and magnitude of detection, dietary considerations, and additional considerations, specifically food web transfers, and bioaccumulation/biomagnification. An additional reference to the EPA 2001 ECO Update will be provided in the revised text. The bullet will be revised as follows, "Conduct ERA Step 3a COPC refinement, according to the Navy Guidance and Policy for Conducting Ecological Risk Assessments (Navy, 1999) for chemical constituents in the outer area of Pier 1. The COPC refinement will also be consistent with the considerations discussed as part of the third step in the 1997 EPA Ecological Risk Assessment Guidance for Superfund (EPA, 1997) and EPA 2001 ECO Update (EPA, 2001)."

2. **p. 30, §3.3. This section presents dose modeling data interpretation. The text and equations are contradictory. The text specifies that forage fish tissue data will be collected and refers reader to modeling methodology presented in Appendix B. The equations presented include modeled fish concentrations. The field sampling program includes collection of fish so that chemical concentrations in fish can be used in the bird dose modeling. Food chain models for the double-crested cormorant will be based on measured site tissue concentrations, not modeled concentrations. The equations should be deleted from this section. Also the text indicates that biota-sediment accumulation factors will be derived. Such a derivation discussion is out of place in this text and should be deleted. The text is presenting interpretation of food chain modeling results. It is appropriate to refer the reader to the appendix for the modeling methodology. Please only discuss the interpretation of results in this section. Please describe how the results will be interpreted if the field sampling effort is unsuccessful and no fish tissue data are available for the modeling. It is not necessary to indicate in this section how the model would be different, only how the data interpretation would be different.**

   **Response**: The Dose Equation in Section 3.3 is correct as written, however, the definition of the term $C_{fish}$ in the equation will be revised to indicate that it represents **measured** chemical concentrations in fish tissue. In addition, the reference to Equation 2 will be removed. The second equation in Section 3.3 should be rearranged to solve for the term *BSAF*. As rearranged, the second equation would read: $BSAF = \left( \frac{C_{fish} / \%Lipid}{C_{Sed} / \%TOC} \right)$

   The food chain dose equation and the discussion of BSAF derivation will be moved to the Appendix in the final work plan. If adequate amounts of fish tissue cannot be collected in the area, the food chain dose will be estimated using bioaccumulation factors obtained from the literature or other studies where conditions are similar to those observed in the NSB New London area.

3. **Appendix B, The ecological risk problem formulation does not specify how the assessment was focused to only evaluate piscivorous bird risk from exposure to chromium, lead, mercury, and zinc. The rationale for dismissal of evaluating risk from exposure to PCB and pesticides should be specified. Because of the propensity for bioaccumulation, it is unclear why PCB, DDE, and DDT are contaminants of concern for benthic invertebrates but not for piscivorous birds. Although the screening level risk assessment modeling may support the dismissal, the dose model did not include actual fish tissue data. The focus of contaminants of concern needs to be included in the problem formulation. A well developed problem formulation is essential to the baseline ecological risk assessment.**

**Response**: The COPC screening and refinement for the areas included in this investigation is presented in detail in Appendix D of the Work Plan. Appendix D includes specific rationale for eliminating or retaining chemicals as COPCs for each assessment endpoint. PCBs were eliminated as a food chain COPC because modeled food chain doses using maximum observed sediment concentrations in Zone 4, Zone 7, and the Outer Area of Pier 1 were less than the NOAEL-based TRVs (see Tables D-6, D-7, and D-16). Maximum concentrations of DDE in Zone 7 and the Outer Area of Pier 1 resulted in food chain doses less than the NOAEL TRV, as did maximum concentrations of DDT in Zone 4 and outer Pier 1. Although maximum concentrations of DDE in Zone 7 and DDT in Zone 4 resulted in doses exceeding NOAEL TRVs, these constituents were eliminated as COPCs during the Step 3a refinement because doses calculated using the sediment 95% UCL of the mean were less than the NOEAL TRVs (see Tables D-11 and D-13). References will be added to this section to point the reader to the in-depth screening and COPC refinement presented in Appendix D.

4. **Section 3.3 text refers reader to modeling methodology presented in Appendix B. However, the equations and methodology are not fully presented in Appendix B. The exposure parameters are presented. The food chain model equations should be added to Appendix B.**

   **Response**: The equations are currently presented in Section 3.3 and revisions per the comment above will be included in Appendix B to address the reviewers concern.

5. **Appendix C. Please provide a reference to the EPA Region I Data Validation Functional Guidelines within the Draft Sampling and Analysis Plan (SAP). The text of Section C.5.1.2 indicates that the EPA data validation guidelines may not apply to the low-level data because the requirements of the methods may vary. EPA expects the data validation report to clearly indicate when the EPA (Region I or National Functional Guidelines) were not used for the evaluation of the analytical data and provide rationale for following other guidelines for the evaluation of the analytical data.**

   **Response:** A reference to the 1996 Region 1, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses will be included in the SAP in addition to the National Functional Guidelines (NFG). The SAP will be updated to specify that because the EPA NFGs are based upon Contract Laboratory Program (CLP) SOWs and <u>not</u> SW-846, NOAA, or other methods, data validation will follow the framework and qualification scheme of the NFG as applicable to the EPA methods. The SAP will also be updated to specify that the validation reports will clearly state if method specific criteria was used in lieu of NFG criteria when the NFG were not technically applicable.

6. **p. C-39,§ C.3.2.5. In the Draft Sampling and Analysis Plan, Fish Sample Collection, the collection of *Fundulus sp.* is proposed to provide fish tissue data to use in the food web models for the double crested cormorant. Please provide rationale for collecting these taxa of fish. Mummichogs and striped killifish are not bottom feeders, may not be exposed to bedded contaminated sediments, and therefore may not represent forage fish with the highest body burdens of site COPC. Are there local species of fish that may be more exposed to COPC in sediments in the deep areas around the piers? Will bottom feeders be kept if they are collected?**

   **Response:** A Pilot Study implemented in July to assess various fish collection methods in the area found *Fundulus* spp. and silversides to be the most common fish in the Thames River Reference Area. Schools of menhaden were also commonly observed in the Lower Subase area, particularly around the pier structures. It is agreed that although bottom-feeding fish likely have the highest exposure to sediment contaminants, all forage fish species (epibenthic or pelagic) will be retained so that samples submitted for tissue analysis will represent the species actually present in the area and available for piscivorous birds to consume. The final Work Plan will be revised to reflect that all collected forage fish less than 12 cm will be retained.

7. **p. C-46, §C.3.4.3.6 Please clarify how the AVS/SEM sample will be collected and indicate what depth interval of the sediment will be targeted for the AVS/SEM sample. The AVS/SEM sample should be collected separately from the bulk sediment sample, *i.e.*, before homogenization, to avoid contact with oxygen. In addition, the amount of sediment seeded for the analysis should also be provided.**

   **Response:** Collection of the AVS/SEM sample is detailed on page C-38 (Section C.3.2.3 Sediment Collection). Specifically, sediment for AVS/SEM analysis will be collected first, from a single grab sample, rather than from a composite of all samples from a station. The AVS/SEM sample will be collected by scooping sediment from the center of the grab. Care will be taken to avoid the layer of sediment touching the grab. AVS/SEM sample jars (4 oz) will be filled with no headspace and capped as quickly as possible to minimize exposure of the sediment to air.

8. **p. C-55, §C.5.1.2. The EPA National Functional Guidelines (NFG) have been updated. References to the NFGs and use of the appropriate NFG for evaluation of this data must be ensured. Please review the following web site and verify that the up-to-date and applicable guidelines are used in the evaluation of the data: http://www.epa.gov/superfund/programs/clp/guidance.htm. Region I, EPA-New England Data Validation Functional Guidelines should also be reviewed and incorporated into the SAP.**

**Response:** The reference to the October 1999 NFG for Organic Contaminants and July 2002 for Inorganic Contaminants will be included in the SAP. Since the EPA Region 1 Guidelines do not include bias (i.e., J+ or J-) in the qualification for inorganic constituents, the EPA Region 1 scheme will be used for consistency with the NFG for organic contaminants qualification.

9. **p. C-63, Table C-3. This table appears to indicate that the fish samples will not be subjected to the same analysis. Mercury should be analyzed in each of the fish samples.**

   **Response:** Results from the SLERA indicate that mercury is not a COPEC in Zone 4 and Zone 7 because sampling during the Pilot Study revealed concentrations of mercury in these two areas were not statistically different from concentrations observed in the Reference Area. Thus, for the BERA, mercury will not be analyzed in fish tissue from these two areas; only chromium, lead, and zinc will be measured in fish tissue from Zones 4 and 7. Results from the SLERA showed that mercury may pose a risk to benthic organisms and upper-trophic level birds in the Pier 1 area; therefore, in addition to chromium, lead, and zinc, mercury will also be analyzed from this area. Mercury results from the outer area of Pier 1 could not be statistically compared to the Reference Area; therefore mercury is on the preliminary list of COPCs due to its exceedance of screening benchmarks. It is important to note, however, that the maximum concentration of mercury in the outer area of Pier 1 is less than the maximum concentrations of mercury in Zones 4 and 7, where it was eliminated as a COPC because concentrations were not statistically different from concentrations in the Reference Area. To allow for comparisons, all four COPECs will also be analyzed from fish tissue in the reference area.

10. **p. C-68, Table C-11. Please verify the holding time for the equipment blank to be analyzed for mercury.**

    Response: The holding time for Hg in water has been verified and is 90 days per EPA Method 1631 Revision E.

11. **Appendix D. In Tables D-4, D-5, D-10, D-12, D-15 the max or 95% UCL EPCs are listed in the second column. Please correct the units to read "ug/Kg."**

    **Response:** The units for the 95% UCL EPCs in Tables D-4, D-5, D-10, D-12, and D-15 will be corrected to read μg/Kg.

**National Oceanic and Atmospheric Administration (NOAA)**
**Response to August 9, 2004 Comments**
**Draft Thames River Validation Study**
**Naval Submarine Base - New London Groton, Connecticut Work Plan, July 2004**

## SPECIFIC COMMENTS

1. **Pier 1 remains an enigma for me. My understanding was that dredging or some other aggressive remedial action was planned for the inner pier. However, Figure 3-5 shows considerable sampling within the Inner Pier zone. I am aware that the Navy must learn the boundary between the inner and outer pier (removal/isolation vs. further analysis, respectively) but 2 of 6 chemistry stations and 1 of 4 toxicity test stations (see Figure 3-5) are removed from the outer pier study. As the inner/outer pier boundary should be based on chemistry, I do not understand why the Navy plans on measuring toxicity in one sample in the inner pier (dose-response?). I suggest using funds dedicated to the EE/CA for assessment of both chemistry and toxicity in the inner pier if indeed the Navy needs that data. In fact I would like to have those two "lost" samples and add one each to Zones 4 and 7.**

   **Response**: The Navy intends to collect sufficient data to support the Validation Study for the Outer Area of Pier I and the EE/CA for the Inner Area of Pier 1. There is an economy of scale that is achieved by only mobilizing once in addition to reducing the schedule for completing the EE/CA. The primary focus of the proposed sampling for the Inner Pier 1 area is to define the boundary between the Inner Area and Outer Area of Pier 1. The inclusion of bioassay sample locations is intended to permit a dose-response relationship or a site-specific NOAEL and LOAEL concentration values for defining clean-up and supporting the risk characterizations phase of the BERA. If NOAA would like to discuss this approach further or needs additional clarification, the Navy would be willing to discuss any remaining issues during a conference call.

2. **I was surprised to learn that 6 samples meet the conditions set forth by Dunnett's test. But one more sample (i.e., 7) lowers the type II error to 10% and, by definition, increases the power by 10% (Table A-4). And given my comment above, those two samples are available. II don't need to point out that it is the Type II error that the government agencies would most want to lower.**

   **Response**: Table A-4 shows sediment sample size calculations based on historical data. These calculations are based on spatial variability estimates using ERM-Q values from the confirmatory laboratory data set. Table A-4 reflects an optimal number of six sediment samples per area, or a total of 24 samples. This occurs under the error conditions of alpha

(a) = 0.1 and various betas (ß = 0.05, 0.10, 0.15, 0.20) at a 50% difference in ERM-Qs between the Reference Area and Study Areas (4 areas). Decreasing beta from 0.20 to 0.10 would require one more sample from each area (7 samples per area for a total of 28 samples), not just one additional sample, given the same design assumptions.

3. **I was particularly interested in the ER-M quotient calculations explained in A.2.0 and shown in Figures A-1 to A-4. I assume this data came from the pilot study. But when I compared the points provided in Figure A-1 to Figure 1-2 (Zone 4), the latter had considerably more sample locations. A similar comparison for Zone 7 resulted in the same discrepancy. And I was wondering why you used only some of the data for the Figures showing the ER-M quotients?**

**Response:** Figure 1-2 shows several more sampling locations/data points than Figure A-1 because all data points, including historical data, data collected by previous contractors (*i.e.*, SAIC), and all the Rapid Sediment Characterization (RSC) Pilot Study data, are plotted in Figure 1-2. Since the RSC Pilot Study Work Plan identified only a subset of samples to be submitted for confirmatory laboratory analysis in support of the ecological risk assessment, Figures A-1 thru A-4 only represent the confirmatory sampling locations from the RSC Pilot Study along with the 1999 historical data from Pier 1 in Figure A-3. Since the confirmatory samples were analyzed for all of the contaminants of concern at the Subase, the longer analyte list is presented in Table A-1. All of the confirmatory data from the RSC Study were used for each of the Lower Subase locations in calculating the location specific ERM-Q values.