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IN REPLY REFER TO

5090
Code EV23\ME
July 9, 2004

Ms. Kymberlee Keckler
Environmental Protection Agency Region I
Federal Facilities Superfund Section (HBT)
1 Congress Street
Boston, MA 02114-2023

Dear Ms. Keckler:

SUBJECT: RESPONSES TO EPA COMMENTS OF MAY 18, 2004 ON THE SAMPLING EFFORT FOR THE THAMES RIVER AT THE NAVAL SUBMARINE BASE NEW LONDON, GROTON, CT

Thank you for your review of the above referenced documents. After reading the reviewer's comments, we realize there appears to be some confusion regarding the following data collections components:

- sediment sample;
- bioassay replicates;
- fish tissue samples; and,
- sample size calculations.

Each of these elements is briefly discussed in the following sections.

*Surface Sediment Samples*

Surface sediment samples represent a localized area from which the sediment sample is collected. It is expected that each surface sediment sample will consist of a homogenized composite of several sampling grabs taken from the sediment surface layer (0-5 cm) at a given sediment sampling location. These samples will be analyzed for the COPCs failing the ecological screening evaluation, and will provide the base sample material used for the planned bioassay tests. The sample design and DQO specifications require 6 surface sediment samples from each of the 3 areas of concern and the Reference Area. This results in the proposed 24 surface sediment samples. To support the EE/CA planned in Pier 1, an additional two surface

sediment samples will be collected and undergo chemical analysis only to delineate the boundary between the inner and outer Pier 1 area.

*Sediment Core Samples*

In addition to the surface sediment samples, 2 sediment cores will be collected from Zone 4 and 7, and 3 from Pier 1, two locations in the inner area and one in the outer area. The cores will be collected to a maximum depth of eight feet or until the vibracore reaches refusal. Each two foot increment of core will undergo chemical analysis for COPCs failing the ecological risk screen. Two additional cores will be collected within the inner Pier 1 area to characterize the sediment and depth to unconsolidated material to support the EE/CA.

*Replicates for Bioassay*

At each surface sediment sample location, surface sediment will be collected to conduct the bioassay tests. The bioassay test design consists of running test replicates at each specified sample location. Each replicate is a subsample of sediment form the corresponding surface sediment sample location. Each replicate is used to form a test chamber in which test organisms are added. The sample design suggests that 13 replicates will be necessary to insure adequate statistical power to distinguish differences and achieve the DQO specifications. This results in 6 sample locations consisting of up to 13 replicates per locations in each of the 3 areas of concern and the Reference Area. Twenty organisms are placed in each replicate so that a total of 360 organisms are initially included in the bioassay tests for each surface sediment sample. The bioassay laboratory control will also have up to 13 replicates. The actual number of replicates necessary will be based on the test variability associated with the specific laboratory conducting the bioassay and will be no less 5 as specified by the EPA protocol.

*Fish Tissue Samples*

Composite fish tissue samples will be collected that represent localized areas within the three areas of concern and the Reference Area. Fish will be collected within each localized area, and will be homogenized to form a fish tissue

sample consisting of at least 50 grams wet weight. This will provide sufficient mass to conduct the required analytical analyses with the desired analytical sensitivity. The sample design consists of up to five composite samples from each of the 3 areas of concern (Zone 4, Zone 7, and outer Pier 1) and the Reference Area.

*Sample Size Calculations*

1. Surface sediment samples:

- The objective is to determine the number of surface sediment samples needed from each area of concern and the Reference Area to achieve DQO error specifications.
- Sample size calculations were calculated using formulas based on Dunnett's test.
- It was determined that 6 surface sediment samples are needed from each of the 3 areas of concern and the Reference Area.
- These data shall be used to evaluate subareas within each area of concern and Reference area for COPC concentration differences and in the establishment of causality, if unacceptable toxicity impact is observed to any assessment endpoint population.

2. Replicates for bioassay:

- The objective is to determine the number of replicate bioassays to be conducted for each sediment location from an area of concern or Reference Area that are needed to achieve DQO error specifications.
- Replicate size calculations were calculated using formulas based on a 2-sample *t*-test. It was determined that up to 13 bioassay replicates for each surface sediment sample are needed. Current estimates of bioassay replicate variability were based on the multi-laboratory tests reported in the EPA *Leptocheirus plumulosus* protocol and will be updated by the actual bioassay laboratory variability for the laboratory conducting the bioassays for the three measurement endpoints -- survival, growth and reproduction. The bioassay replicate calculation shall be based on the measurement endpoint with the greatest variability reported.

- These data shall be used to evaluate sediment toxicity to benthic assessment end point populations

3. Forage fish tissue samples:

- The objective is to determine the number of composite forage fish tissue samples to be collected to achieve DQO error specifications.
- Sample size calculations were calculated using formulas based on Dunnett's test.
- It was determined that up to 5 composite forage fish tissue samples are needed from each area of the three areas of concern and the Reference Area.
- These data shall be used to evaluate bioaccumulation transfer of the metals to upper trophic level assessment endpoint populations.

Table 1 provides a summary of the sample design and distinguishes the number of sample locations and replicates associated with each sample type and each area of concern.

**Table 1. Summary of Proposed Sample Design**

| TYPES OF SAMPLES | AREA OF CONCERN | | | | |
|---|---|---|---|---|---|
| | **Zone 4** | **Zone 7** | **Pier 1** | **Reference Area** | **Laboratory Control** |
| Surface sediment | 6 | 6 | 6 | 6 | n/a |
| Sediment cores (8 foot core or refusal)[b] | 2 | 2 | 5[c] | n/a | n/a |
| Bioassay replicates[a] | 13 replicated per location | 13 replicated per location | 13 replicated per location | 13 replicated per location | 13 replicates for control |
| Forage fish | 5 | 5 | 5 | 5 | n/a |

[a] Up to 13 replicates are proposed; the actual number of replicates will be based on the test variability associated with laboratory conducting the test

[b] 2 cores from Zones 4 and 7, and 3 cores from Pier 1 will undergoing chemical analysis on 2 foot increments

[c] Two cores will be collected for non-chemistry; physical characteristics and depth to unconsolidated sediment

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The sediment core samples are being collected and analyzed for COPCs, to assist in bounding the depth of unacceptable COPC concentrations in support of a feasibility study should unacceptable ecological risk be determined.

Hopefully this clarifies the reviewers' comments and concerns. Further details and resolution of the other comments provided are being incorporated into the Draft Sampling and Analysis Plan for the Thames River, which will be sent out on July 23, 2004. If you desire, we are willing to discuss this further with you to clarify the proposed approach. Please do not hesitate to contact me at (610) 595-0567 extension 162 if you have any further questions or comments.

Sincerely,

MARK EVANS
Remedial Project Manager
By direction of the
Commanding Officer

Copy to:
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Ms. Melissa Cokas, NSB-NLON
Mr. Don Gunster, Batelle
Mr. Dean Neptune, Neptune and Company

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