RESPONSES TO EPA'S AUGUST 12, 18, AND 20, 2008 COMMENTS AND SEPTEMBER 15, 2008 REBUTTALS ON THE JULY 2008 DRAFT SAMPLING AND ANALYSIS PLAN FOR THE THAMES RIVER SEDIMENT SAMPLING AT ZONE 4, PIER 1, AND OUTER PIER 1 NAVAL SUBMARINE BASE-NEW LONDON, GROTON, CONNECTICUT

ISSUED: AUGUST 26, 2008 REVISED: SEPTEMBER 22, 2008

SPECIFIC COMMENTS – AUGUST 12, 2008 EMAIL

Specific Comment No. 1:

The three sample locations under Pier 1 and one to the west of Pier 1 may not be sufficient. Additional samples to enhance the sample density would be preferable, given the lack of previous sampling in the area, and may limit the need for follow-up sampling. At a minimum, one sample between TRP1-SD-003 and TRP1-SD-004, moving 004 closer to the end of the Pier, and one sample to the west of Pier 1 between TRP-SD-001 and previous sample location P6 should be collected.

Response:

Agree. Two more samples will be added at the suggested locations and TRP1-SD-004 will be moved closer to end of Pier 1. The set of TRP1 sample locations will be renumbered from TRP1-SD-001 to TRP1-SD-010 going north to south, then west to east. The additional samples will be added to Figure 10-5, Section 11.6 will be revised to describe these locations and to state that at Pier 1 there will be six surface locations and 18 subsurface locations, the table of sample location northings and eastings on Worksheet #14 will be modified, and changes will be made as appropriate to SAP Worksheet #17 - Sampling Design and Rationale, SAP Worksheet #18 - Sampling Locations and Methods/SOP Requirements Table, and SAP Worksheet #20 - Field Quality Control Sample Summary Table.

Specific Comment No. 2:

At the beginning of Section 11.4 (referring to Decision Rule #2 and Figure 11-2) the text states: "PRGs in this figure are as identified in Section 11.3." Section 11.3, however, does not define the PRGs. Please define the PRGs.

Response:

Agree. PRGs are not defined in Section 11.3. The following text will be added to Section 11.3:

"PRGs are the following:

- Total ERM-Q threshold associated with a 50 percent reduction in benthic invertebrate reproduction (1.17).

- Total PCBs threshold associated with a 50 percent reduction in benthic invertebrate reproduction (208 µg/kg)."

Sp cific Comment No. 3:

Further, Section 11.2 refers to attaining "quantitation limits (QLs) and MDLs less than the established ecological PRGs." Detection limits should be sensitive enough to meet screening benchmarks, not the PRGs established in the Validation Study Report, and should be consistent with the DLs used in the Validation Study.

R spons :

Agree with clarification. The DLs and MDLs were established to be less than the ERMs and the limits specified in the Regional Implementation Manual (EPA and USACE, 2004). The MDLs provided in Worksheet #15 for the parameters that will be used to evaluate ecological risk are below the screening benchmarks; however, because the goal of this project is to collect data to calculate ERM-Qs, it is not a requirement that the MDLs are less than the screening benchmarks. Therefore, no reference to the screening benchmarks will be included in Section 11.2 or Worksheet #11. The DLs used in the Validation Study were considered as appropriate during development of the SAP. The following sentence will replace the existing sentence in Section 11.2 of the SAP.

"Samples will be analyzed for target analytes using methods (SW-846 8270, CT ETPH, SW-846 6010, SW-846 7471, SW-846 8081, SW-846 8082 Congeners, and Walkley-Black Method) that can attain quantitation limits (QLs) and MDLs less than the established ERMs and the limits specified in the Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters (EPA and USACE, 2004). ERM-Qs will be computed from the target analyte concentrations and compared to PRGs."

Specific Comment No. 4: Figure 10-5.

There are two sample numbers TRP1-SD-006. Please renumber the samples in this figure.

Response:

Disagree. There is only one sample TRP1-SD-006 shown on Figure 10-5. However, due to the addition of two samples at Pier 1, all TRP1 samples will be renumbered.

AUGUST 18, 2008 EMAIL

INTRODUCTION

A number of samples had concentrations of chromium and lead greater than the 20 times rule, which indicates that these samples could potentially be characteristically hazardous. Other than these contaminants and a couple pesticides (chlordane and heptachlor) none of the analytical results for other COCs indicate the potential for hazardous characteristics. Several of the potentially characteristically hazardous samples are located outside the areas currently designated for remediation.

Response:

Disagree. Thames River sediment sample results were evaluated in the Thames River Validation Study (Battelle, 2008) to determine if there were actionable risks under CERCLA. The Validation Study was reviewed and accepted by EPA. The concluding remarks of the Validation Study are as follows:

"Zone 4 poses risk...in an area defined by the undredged sediment shelf extending approximately 50 feet offshore of the quay wall. The actual footprints in Zone 4 encompass 0.39 acres (risk to single endpoint) and 0.29 acres (risk to multiple endpoints) but the northern boundaries of those footprints were influenced by the lack of data north of the former Pier 4. Therefore, the Zone 4 footprint for evaluation in the FS represents the entire area of the undredged sediment shelf extending approximately 50 feet out from the quay wall and running the entire length of Zone 4."

In other words, the Validation Study recommended that for Zone 4, based on ecological risk, an area 50 feet wide by the length of Zone 4 be considered during development of remedial

alternatives in the Lower Subase FS. Therefore, the Navy intends to address only that portion of Zone 4 with actionable CERCLA risks. The Validation Study determined that the areas outside of the Zone 4 footprint did not pose unacceptable risks to ecological receptors.

The purpose of the sampling and analysis proposed in the SAP for Zone 4 is to further evaluate the vertical extent of contamination and to determine the disposal requirements for the sediment. As described in the SAP, the sediment samples will be analyzed by TCLP to evaluate the potential for it to be characteristic hazardous waste and determine appropriate disposal options. Use of actual TCLP results versus the "20 times rule" will eliminate the uncertainty associated with making a hazardous waste determination.

The following table shows chromium and lead results for the Thames River Validation Study samples, with samples exceeding the "20 times rule" highlighted. The toxicity criterion for both chromium and lead are 5 mg/L; therefore, values greater than 100 mg/kg (20 x 5 mg/L) are highlighted. It should be noted that the ER-Ms for chromium and lead that are used to evaluate the potential for ecological risk are 218 and 370 mg/kg, respectively. This information highlights the conservativeness of the "20 times rule."

From the table it can be seen that in general, the highest chromium and lead concentrations are in the areas proposed for remediation. Most chromium concentrations in samples outside of the proposed remediation areas are below 100 mg/kg and are similar to the range of concentrations detected in the upstream reference samples. Samples outside of proposed remediation areas, with the exception of P6, have lead concentrations less than 150 mg/kg, only slightly greater than the "20 times rule". Many of the lead concentrations are also within the range of concentrations detected in the upstream reference samples. Several of the chromium and lead concentrations detected in the upstream reference samples are also greater than 100 mg/kg. It is unlikely that these samples would have a toxicity characteristic due to lead. Therefore, use of the "20 times rule" seems to be overly conservative and not applicable.

Validation Study Analytical Results for Chromium and Lead

Analyte			Chromium		Lead	
Area	Station	Sample Type/Depth	Result (mg/kg)	Qualifier	Result (mg/kg)	Qualifier
Samples Within Areas Designated for Remediation						
Zone 4	Z4-1	Surface	320.99		524.34	
Zone 4	Z4-2	Surface	313.38		840.59	
Inner Pier 1	P1-C2	0 - 2 ft	112		399	
Inner Pier 1	P1-C2	2 ft - 4 ft	62.0		230	J
Inner Pier 1	P1-C2	4 ft - 5 ft	68.4		415	J
Outer Pier 1	P2	Surface	92.04		110.52	
Outer Pier 1	P3	Surface	78.86		90.83	
Outer Pier 1	P1-C3	0 - 2 ft 7 in	101		165	J
Outer Pier 1	P1-C4	0 - 2 ft	73.8		157	J

Validation Study Analytical R sults for Chromium and Lead (Continued)

Analyte			Chromium		Lead	
Area	Station	Sample Type/Depth	Result (mg/kg)	Qualifier	Result (mg/kg)	Qualifier
Samples Outside Areas Designated for Remediation						
Zone 4	Z4-3	LDUP	108.58		144.59	
Zone 4	Z4-3	Surface	104.82		135.78	
Zone 4	Z4-4	Surface	100.34		112.45	
Zone 4	Z4-4	FDUP	99.66		118.56	
Zone 4	Z4-5	Surface	86.59		106.13	
Zone 4	Z4-6	Surface	79.31		78.63	
Zone 4	Z4-S1	Surface	61.49		54.86	
Zone 4	Z4-S2	Surface	84.62		101.52	J
Zone 4	Z4-S3	Surface	85.74		93.94	J
Zone 4	Z4-S4	Surface	87.97		89.39	J
Zone 4	Z4-S5	Surface	88.14		84.46	
Zone 4	Z4-S6	Surface	53.89		119.41	
Zone 4	Z4-S6	FDUP	87.72		131.45	J
Zone 4	Z4-C1	2 ft – 4 ft	112		149	J
Zone 4	Z4-C1	4 ft – 6 ft	127		162	J
Zone 4	Z4-C1	5 ft 6 in – 7 ft 3 in	14.6		1.79	J
Zone 4	Z4-C2	2 ft – 4 ft	28.4		31.5	J
Zone 4	Z4-C2	4 ft – 5 ft 5 in	22.4		26.6	J
Outer Pier 1	P4	Surface	89.57		122.9	J
Outer Pier 1	P5	Surface	88.63		78.86	
Outer Pier 1	P6	Surface	76.71		295.06	J
Outer Pier 1	P1-C5	2 ft - 4 ft	123		165	J
Outer Pier 1	P1-C5	4 ft - 6 ft	111		147	J
Outer Pier 1	P1-C5	4 ft - 6 ft	114		161	J
Reference	R-S1	Surface	69.12		50.42	J
Reference	R-S2	Surface	53.19		37.36	J
Reference	R-S3	Surface	61.73		35.91	J
Reference	R-S4	Surface	38.28		13.46	J
Reference	R-S5	Surface	73.42		51.21	J
Reference	R-S6	Surface	82.15		67.4	J
Reference	RA-1	Surface	54.24		46.33	
Reference	RA-1	Surface	55.44		35.97	
Reference	RA-2	Surface	48.39		19.46	
Reference	RA-3	Surface	48.76		20.69	
Reference	RA-4	Surface	114.27		96.55	
Reference	RA-5	Surface	83.93		61.63	
Reference	RA-6	Surface	105.2		101.09	

Black on White - Exceeds "20 Times" Criteria of 100

Sediment analytical results for pesticides were presented in Appendix B of the Thames River Validation Study in nanograms per gram (ng/g). None of the sediment results for Zone 4 and Pier 1 exceeded the "20 times rule" for chlordane or heptachlor. Therefore, EPA's mention of them as a potential concern does not seem to have merit.

In conclusion, the Navy intends to evaluate remedial options for the Zone 4 footprint with ecological risk as identified in the Thames River Validation Study. Sediment samples will be collected from within that footprint and analyzed by TCLP to determine if it is characteristic hazardous waste. The Navy will not speculate using the "20 times rule" whether the Thames River sediment outside of areas of proposed remediation have hazardous waste characteristics. No actionable ecological risks under CERCLA have been identified for those areas that would warrant further consideration by the Navy.

EPA Rebuttal – September 15, 2008 Email

EPA indicated that the 20 times rule had been exceeded but did not advocate that the 20 times rule should be used to characterize the sediment. As pointed out in the response, the inclusion of pesticides in the comment as exceeding the 20 times rule was in error and is retracted.

The Navy's comment at the end of the fifth paragraph that the conservativeness of the 20 times rule is demonstrated by the ERM values for chromium and lead that exceed the 20 times rule is misguided in that the two criteria are unrelated. EPA does agree that the TCLP data to be collected should be used to characterize the sediment for disposal and not the 20 times rule.

Additional Response:

Comment noted. Retraction accepted.

Agree/Disagree with clarification. It is agreed that ERM values and the 20 times rule are unrelated criteria. ERM values are used to determine potential risks to ecological receptors and the 20 times rule can be used to conservatively make a hazardous waste determination for waste disposal purposes. However, EPA's original comment proposed using the 20 times rule to justify collection of additional sediment samples to characterize ecological risks outside the areas currently designated for remediation. The conservative statement was made because the 20 times rule concentration for chromium and lead (100 mg/kg) was below the ERMs (218 and 370 mg/kg, respectively), and hence results in the dichotomy that the sediment is a potential characteristic hazardous waste, but does not present a risk to ecological receptors. In addition, even though it is inappropriate use, the 20 times rule would result in an overly conservative estimate of the extent sediment requiring remediation.

Agree. The PRGs determined in the final Thames River Validation Study Report (i.e., Total ERM-Q < 1.17 and PCBs < 208 µg/kg) will be used to determine the extent of sediment that requires remediation. TCLP data will be used to characterize the sediment for disposal.

GENERAL COMMENTS – AUGUST 18, 2008 EMAIL

Gen ral Comment No. 1:

The sampling proposed in this Sampling and Analysis Plan (SAP) is not sufficient to satisfy the requirement to define the lateral and vertical extent of contamination for Zone 4. The 50-foot area along the quay wall was previously proposed for remediation. Additional sampling to better define the extent of contamination (see Section 10.1.3 of the SAP; last sentence) and to characterize the sediment identified for removal and disposal (see Section 11.1) is needed. All of the proposed samples along the quay wall are located within the area identified for removal; therefore, while these samples can characterize the sediment to be removed, they do not define the lateral extent of contamination. Additional samples are required outside the 50-foot wide area identified for removal to establish the limits of contaminated sediment that needs to be removed.

Respons :

Disagree with clarification. The lateral extent of ecological risk at Zone 4 was previously determined by the Validation Study. As stated in §10.1.3 of the SAP, the conclusion of the Thames River Validation Study BERA was that the area of Zone 4 sediment highlighted on Figure 10-4 was the medium of concern that required further evaluation in the FS. (Figure 10-4 of the SAP will be modified to show an overlay of both the contamination footprint and the proposed 50-foot wide excavation area.) For the Zone 4 area along the quay wall, the intent of the SAP is to define only the vertical extent of contamination, as the lateral extent has already been determined. To be conservative, the 50-foot wide shelf along the quay wall will be remediated along the entire length of Zone 4, longer than the contaminated area determined by the Validation Study. No additional samples are needed to determine the lateral extent of the Zone 4 sediment excavation area.

EPA Rebuttal – September 15, 2008 Email:

However, the magnitude of the chromium and lead concentrations outside the 50-foot wide footprint is an indication that the western lateral extent of contamination may not have been adequately defined by the relatively few sediment samples collected along that 50-foot boundary. As noted in the Thames River Validation Study, the 50 foot wide area is only an approximation. Some additional sampling to confirm the appropriateness of a firm 50-foot excavation boundary is warranted. Alternatively, better rationale for the 50-foot limit should be provided to support limiting the SAP.

Additional Response:

Disagree with clarification. As shown in the table provided in the Response to the Introduction Comment, the only Zone 4 sediment sample locations with chromium and lead concentrations that exceeded ERMs were Z4-1 and Z4-2. These samples are located within the 50-foot wide footprint. As discussed previously, use of the 20 times rule to determine the extent of areas with ecological risks is not appropriate. The extent of contamination will be made using the ecological-based PRGs.

Two sediment core samples (Z4-C1 and Z4-C2) were collected in Zone 4, outside of the 50-foot wide footprint, as part of the Thames River Validation Study. Their locations are shown on Figure 10-5 of the SAP. However, the data was not considered in the Validation Study Report to determine the extent of sediment contamination. In addition, as discussed in the response to Specific Comment No. 7, four new sediment core samples are proposed to be collected to the west of the 50-foot area at approximately 100 feet and 200 feet, respectively, from the Quay Wall. The Navy proposes to use the results from these 6 additional sediment core samples, along with the 4 sediment core samples proposed in the SAP, to finalize delineation of the extent of contaminated sediment that requires remediation. Figure 10-5 was updated to show the locations of all of the proposed core sediment samples and it is attached to this response-to-comment document.

General Comment No. 2:

Only a small area between Pier 1 and 2 is designated for remediation. However, only two samples been collected between these piers in the area not designated for remediation, yet one of those samples failed the toxicity testing for the three evaluation parameters. This indicates that additional sampling between Piers 1 and 2 is required to adequately define the extent of contamination. Please include additional sampling of this area in this SAP.

Response:

Disagree with clarification. The area between Piers 1 and 2 has not been identified as a Site, Zone, or Operable Unit and no source of contamination has been identified for this area. It is unclear from this comment which sample location and parameters are of concern; however, an additional location west of Pier 1 will be sampled, as described in Specific Comment No. 1. If the results of the proposed sampling west of Pier 1 indicate potential risks to ecological receptors, then additional samples will be collected to complete the determination of the extent of contamination.

SPECIFIC COMMENTS – AUGUST 18, 2008 EMAIL

Specific Comment No. 5: §11.1, p. 28.

Decision Statement #1 needs to include sampling to also define the lateral extent of contamination. The existing database is not sufficient and needs to be supplemented.

Response:

Disagree. See response to General Comment No. 1.

EPA Rebuttal – September 15, 2008:

See comment on response to General Comment #1.

Additional Response:

See Additional Response to General Comment No. 1.

Specific Comment No. 6: §11.3, p. 29.

Edit the first two sentences to indicate that the lateral extent of contamination for Zone 4 needs to be delineated.

Response:

Disagree. See response to General Comment No. 1.

EPA Rebuttal – September 15, 2008:

See comment on response to General Comment #1.

Additional Response:

See Additional Response to General Comment No. 1.

Specific Comment No. 7: Worksheet #13, p.35.

This table indicates that the maintenance dredging project data will be used in lieu of adding redundant samples for the SAP. If the Navy intends to use those TEC samples to characterize the lateral and vertical extent of contamination at Zone 4 then the details of those sampling locations need to be presented so the overall sampling plan can be evaluated properly. The Navy should ensure that the maintenance dredging samples will be available for consideration in the final Lower Subase FS or the Lower Subase design.

Response:

Because maintenance dredging will be performed under a non-CERCLA program, reference to maintenance dredging sampling will be removed from Worksheet #13 and Figure 10-5 of the SAP. The maintenance dredging samples will not be included for consideration in the final Lower Subase FS or Lower Subase remedial design.

EPA Rebuttal – September 15, 2008 Email:

If the maintenance dredging samples will no longer be used in lieu of redundant SAP samples, additional SAP samples to replace the removed maintenance dredging samples should be included so that the originally intended database will be restored.

Additional Response:

See Additional Response to General Comment No. 1. The Navy will consider the data from the 2 existing sediment core samples (Z4-C1 and Z4-C2) from the Thames River Validation Study and the 4 newly proposed sediment core samples (TRZ4-SD-005 through TRZ4-SD-008) in the Lower Subase FS to determine the extent of contamination. The proposed sample locations are shown on the attached Figure 10-5.

Four sediment core samples will still be collected under the maintenance dredging program, but the data will not be directly usable in the FS because the samples will be composited prior to analysis, the analytical program is slightly different, and the QA/QC requirements are not the same as the CERCLA program.

Specific Comment No. 8: Worksheet #14, p.37.

Please change the sentence in the middle of the paragraph that reads: "If the boat and sampling equipment are unable to access ... the locations will be moved in the field to the western side of Pier 1 as far under or as close to the western side of Pier 1 as possible ...." to "If the boat and sampling equipment are unable to access ... the locations will be moved in the field only a distance necessary to provide adequate access but remaining as close to the original locations as possible."

Response:

Agree. Text change will be made.

Specific Comment No. 9: Figure 10-4

The risk footprint identified in this figure extends seaward beyond the limits of the proposed sediment removal. Please clarify the removal area (based on the existing database) does not include the entire risk footprint area.

Response:

Agree. The westernmost portion of the Zone 4 footprint is not within the 50-foot width of the proposed dredging area; therefore, the dredging area will be widened beyond 50 feet at that location to include the entire footprint. The revised dredging area perimeter will be shown on Figure 10-5 and an overlay of the Zone 4 footprint and the revised dredging area perimeter will be shown on Figure 10-4.

Specific Comment No. 10: Figure 10-5:

A single sample west of Pier 1 is not adequate to define the western extent of contamination. The only other sample location west of Pier 1, P6, had the greatest lead concentration (295 ppm) of all the Outer Pier 1 samples. Also, based on this lead concentration, sediment at P6 is potentially characteristically hazardous. Please include at least one additional sample between P6 and TRP1-SD-001. Evaluation of these sample results will determine whether the extent of contamination has been adequately identified.

Response:

Agree. See the response to Specific Comment No. 1 and the response to the August 18, 2008 email introduction.

SPECIFIC COMMENTS – AUGUST 20, 2008 EMAIL

Specific Comment No. 11: Section 11.2, page 29 of 115, last paragraph:

The last sentence does not make sense. Are both the Region 1 DV guidelines and the National Functional DV guidelines used for data validation? Please clarify.

Response:

Agree. The text will be revised to say "Validation will be performed using method specific criteria and the logic for data qualification detailed in Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses will be used to apply qualifiers to data."

Specific Comment No. 12: SAP Worksheet #12:

Measurement Performance Criteria Table - There is a footnote "1" next to Analytical Group, but the it is not defined.

Response:

Agree. This was an error. The footnote reference "1" will be deleted.

Specific Comment No. 13: SAP Worksheet #20, pages 72 and 73 of 115:

There should be a statement in the text (or as a footnote in the table) that indicates that precision and accuracy will be determined using lab duplicates and/or LCS/LSCDs (i.e., a reference to Worksheet 28). As currently written, the SAP gives the impression that there is no way to determine the precision or accuracy of the data.

Response:

Agree. The following text will be added to Worksheet 20: "Please note that precision and accuracy will be determined using lab duplicates, laboratory control spikes/laboratory control spike duplicates (LCS/LCSD), and matrix spike/matrix spike duplicates (MS/MSDs)as per Worksheet 28."