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NSB NEW LONDON
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DEPARTMENT OF THE NAVY
NORTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
10 INDUSTRIAL HIGHWAY
MAIL STOP, #82
LESTER, PA 19113-2090

IN REPLY REFER TO

5090
Code 1823/ME
MAY 23 1997

Mr. Mark Lewis
Connecticut Department of Environmental Protection
Bureau of Water Management
Permitting, Enforcement & Remediation Division
79 Elm Street
Hartford, CT 06106-5127

SUBJ: RESPONSES TO CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION COMMENTS DATED MARCH 7, 1997 ON THE DRAFT FEASIBILITY STUDY FOR THE AREA A DOWNSTREAM/OBDA SITE NAVAL SUBMARINE BASE - NEW LONDON, GROTON, CT

Dear Mr. Lewis:

Please find enclosed the Navy's responses to your comments of March 7, 1997 on the Draft Feasibility Study for the Area A Downstream/OBDA site at NSB-NLON.

I hope that any concerns you may have had on the FS are addressed by these responses. Please call me at (610) 595-0567 ext. 162 if you have any questions or wish to discuss this issue further.

Sincerely,

MARK EVANS
Remedial Project Manager
By direction of the
Commanding Officer

Copy to:
Mr. Andrew Stackpole, NSB-NLON
Ms. Kymberlee Keckler, USEPA Region I (w\o attachments)
Mr. Jean-Luc Glorieux, B&R Pittsburgh (w\o attachments)

RESPONSES TO
CTDEP's MARCH 7, 1997 LETTER OF COMMENTS
REGARDING THE
DECEMBER 1996 REVISED DRAFT FFS REPORT
FOR THE AREA DOWNSTREAM/OBDA
NAVAL SUBMARINE BASE NEW LONDON
GROTON, CONNECTICUT

May 19, 1997

GENERAL COMMENTS

1. The State's Preferred Alternative

Comment: Under Alternative 2, contaminated sediments and soil would be capped in place. Under Alternative 3 contaminated soil and sediment would be excavated and shipped off site for disposal, while under Alternative 4 sediments would be shipped off site for disposal and soil would be treated and replaced on site. The State would prefer that contaminated soils not be left in place, as proposed under Alternative 2. The State would support either Alternative 3 or Alternative 4, providing that the selected alternative is implemented in accordance with all requirements of our Remediation Standard Regulations. We are pleased that the Navy has informally agreed to select Alternative 4.

Response: State's preference acknowledged. The Navy is currently favoring Alternative 3.

2. Applicability of Direct Exposure and Pollutant Mobility Criteria

Comment: Significant concentrations of DDT, DDD, and DDE are present in both soil and sediment, and significant risks are associated with these compounds. Direct Exposure and Pollutant Mobility Criteria for these compounds are not given in the regulations. Since these three compounds are the main Contaminants of Concern (COCs), Direct Exposure and Pollutant Mobility Criteria must be calculated for each. In addition, Direct Exposure and Pollutant Mobility Criteria should be calculated for manganese, since it is a contributor to risk under several risk assessment scenarios, and it is leaching from fill placed by the Navy. Several options are available to the Navy for doing so.

Response: Direct Exposure Criteria for all COCs, including DDTR, and receptors of concern under all potential exposure scenarios have been evaluated for this site in Section 9.6 and Table 9-31 of the Phase II RI Report (B&R Environmental, March 1997) which has been provided to CTDEP. Manganese has been evaluated as a COC for direct exposure in the human health risk assessment and determined not to be of concern. The presence of manganese in the groundwater is not indicative of a source at this site because of the prevalence of this constituent at other sites on base. Although significant concentrations of DDTR are present in the soil and sediments, these constituents were not detected in any of the 55 groundwater samples collected at the site, and therefore, they do not appear to be sufficiently mobile to impact the groundwater at this site.

The following statement will be added to Section 1.3.4 of the FFS Report in support of a waiver of the GB mobility criteria:

"*Since the pesticides were applied on the water bodies, any portion of the soil that remain above the seasonal high water table (such as bedrock outcrops) are unlikely to be contaminated with these pesticides. Also, since dredge spoil discharged at the site has probably been deposited in low-lying areas, any inorganic compounds arising from this dredge spoil are unlikely to have contaminated these elevated portions of soil.*".

As discussed during the meeting held at NSB-NLON on April 8, 1997, the Navy is proposing to use Alternative Direct Exposure Criteria, in accordance to RCSA Section 22a-133k-2(d)(2). Also, as discussed during the April 8 meeting, a separate letter-report will be prepared to describe the human health risk assessment, the development of Proposed Remedial Goals (PRGs) under the Alternative Direct Exposure Criteria, and site-specific information for a waiver of the GB mobility criteria. This letter-report will be submitted to CTDEP and to the Connecticut Department of Public Health as part of the Final FFS Report.

3. Calculating Direct Exposure Criteria

Comment: Section 22a-133k-2(b)(4) of the Regulations provides a mechanism for the Commissioner to approve a Direct Exposure Criterion for a substance when one is not specified in the regulations. This section of the regulations includes equations for calculating both residential and industrial/ commercial Direct Exposure Criteria. These are the equations that were used by the Department for calculating the default Direct Exposure Criteria listed in Appendix A of the regulations, and the equations make use of the same generic risk assessment scenarios that were used in the Department's calculations. A memo correcting errors in the risk based equations contained in the regulations is appended for use in calculating these criteria.

The report notes that as previously discussed between EPA, the State and the Navy on October 25, 1996, the industrial land use scenario is the most likely exposure scenario for this site. Based on this, the Navy cites the industrial/ commercial Direct Exposure Criteria. If the site is not cleaned up to meet the residential Direct Exposure Criteria, an environmental land use restriction would be required to ensure that the site is not used for residential purposes. In addition, the Navy would be required to continue to maintain the fence that separates the site from the adjacent playground and swimming area. In addition, the Area A Downstream site is largely wetlands. For this reason, it is unlikely that the site could be developed if the site was transferred from the Navy to another entity. It is likely that in this circumstance, one of the few acceptable uses for the site would be as a passive recreational area. Please note that under Section 22a-133k-1(a)(53) of the Remediation Standard Regulations, an outdoor recreational area is considered a residential activity which would be prohibited unless the site were remediated to comply with the Residential Direct Exposure Criteria.

For your information, we have calculated the residential and industrial/ commercial Direct Exposure Criteria for DDT and associated compounds and provided these below:

	Direct Exposure Criteria (mg/kg)	
	Residential	Industrial/Commercial
DDD	2.6	23.8
DDE	1.8	16.8
DDT	1.8	16.8

Please note that the Department has established acceptable risk levels at 1E-6 for individual chemicals and 1E-5 for cumulative risks for exposure to mixtures of carcinogens. The report indicates that these risk levels are exceeded within zones 1, 2 and 3 for the older child trespasser and construction worker scenarios.

Response: The Navy appreciates CTDEP's assistance in estimating Direct Exposure Criteria for DDTR. However, as discussed in the response to Comment No. 2, the Navy is proposing to use Alternative Direct Exposure Criteria in accordance to RCSA Section 22a-133k-2(d)(2). Based on these, DDT was noted to contribute to a cumulative incremental cancer risk (ICR) exceeding 1E-6 but less than 1E-4. DDT in soil and sediment was the main contributor to this risk only in Zone 1, as shown in Table 1-13 of the FFS

Report. In order to comply with RCSA 22a-133k-2(d), remediation must attain a cumulative ICR of 1E-5 and a cumulative non-carcinogenic hazard index (HI) of 1.0. Currently, the FFS does present PRGs for attainment of a cumulative non-carcinogenic HI of 1.0, but it does not present PRGs for attainment of a cumulative ICR of 1E-5, and this is an oversight that will be addressed. However, since the PRGs driving the remediation are controlled by significantly more stringent ecological receptor protection criteria, it is anticipated that the impact of these revised human risk based PRGs will not be significant.

As agreed during the April 8 meeting, Section 1.3.5 of the FFS Report will be amended to provide a cross-reference to Section 9.6 of the Phase II RI Report which provides details on the baseline human health risk assessment for this site.

4. Alternative Exposure Scenarios

Comment: A second option available to the Navy is to use alternative risk based Direct Exposure Criteria based on site specific exposure scenarios. In order to determine the appropriate risk based clean up level for the site, future site uses must be explicitly identified. Within the report, the industrial Direct Exposure Criteria have been used. However, it is likely that neither the industrial nor the residential criteria contained in the regulations are entirely applicable. Exposure scenarios for child trespassers and construction workers have been identified in the human health risk assessment. The trespassing scenario, along with potential recreational exposure, are of concern at this site. The exposure assumptions implicit in the industrial Direct Exposure Criteria are not appropriate for setting risk based remedial goals considering recreational and trespasser scenarios.

If the Navy does not chose to apply the Direct Exposure Criteria calculated using the default exposure scenarios, I recommend that the Navy submit for the review and approval of the Department a proposal to develop alternate risk based criteria for this site based on site specific exposures, as provided for in Section 22a-133k-2(d)(2) of the Regulations. The potential exposure of children to this site must be evaluated for the establishment of appropriate remediation criteria.

Site specific Pollutant Mobility Criteria should also be calculated. Section 22a-133k-2(c)(5) allows the Commissioner to approve a Pollutant Mobility Criterion for a substance when one is not specified in the regulations. With the Commissioner's approval, the Navy may also use alternative Pollutant Mobility Criteria as specified in Section 22a-133k-2(d)(5), or an alternative Dilution or Dilution and Attenuation Factor as specified in Section 22a-133k-2(d)(6).

Response: See response to Comment No. 2. The Navy proposes the use of Alternative Direct Exposure Criteria, in accordance to RCSA Section 22a-133k-2(d)(2). The risk assessment methodology, assumptions and its results have been submitted to the State and USEPA for review as part of the Phase II RI Report (B&R Environmental, 1997). PRGs have been estimated based on this risk assessment and are discussed in Section 2.1.2.1 of the FFS Report. The only reason that industrial direct exposure standards have been presented in comparison to site concentrations in Table 1-10 is for a preliminary evaluation of the significance of contamination at the site.

As agreed during the April 8 meeting, neither the industrial or residential Direct Exposure Criteria are applicable to the site. Accordingly, Table 1-10 will be deleted and Section 1.3.4 of the FFS Report will be modified to remove all discussion related to the Direct Exposure and GB mobility criteria, to mention the use of Alternative Direct Exposure Criteria and the derivation of PRGs in Section 2.0, and to add the statement quoted in the response to Comment No. 2.

The following statement will also be added to the description of each remedial alternative in Section 4.0 (other than No Action): "*It is extremely unlikely that the site would ever be used for residential purposes as it lies within the Explosive Safety Quantity Distance (ESQD) arc of the Torpedo Shops. However, a Land Use Restriction would be obtained from the State and maintained by the Navy.*"

A statement will also be added to the detailed evaluation of each remedial alternative (other than No Action) under the *Compliance With ARARs and TBCs* criterion mentioning how the State of Connecticut's Remediation Standards would be complied with.

5. Other Contaminants

Comment: It is appropriate to focus remedial efforts on DDTR but also important to note that there are other chemicals on site which may also pose risk to ecological receptors. The Navy must make sure that remedial actions address these issues and do not increase the concentrations of these compounds, such as metals, thereby increasing risk to human or ecological receptors.

Response: The Navy acknowledges the presence of potential COCs other than DDTR, such as inorganics. Section 1.3.6 (Summary of Ecological Risk Assessment) discusses metal COCs. As noted in Table 1-13, inorganics in the soil and sediment are insignificant contributors to the human health risk. Section 2.1.2.2 presents and discusses the development of PRGs for these contaminants for protection of ecological receptors. See responses to Comments No. 19 through 24 (comments on Appendix A) for further details on the development of PRGs for ecological receptors.

As agreed during the April 8 meeting, the following statement will be added to the description of Alternative 4 in Section 4.2.4 of the FFS Report to address CTDEP's concerns about a possible increase in the concentration of organic contaminants in the soil as a result of the thermal desorption process:

"*Depending on the final concentrations of inorganics in the treated soil, some of that soil may be amended with imported topsoil and organic matter to compensate for any loss in naturally-occurring organic material as a result of the thermal desorption process.*"

6. Application of Soil Criteria to Sediments

Comment: Although the RSRs present the Direct Exposure Criteria as applicable to soils, it is also appropriate to apply these standards to sediments which can come in contact with human receptors. Sediment data should be evaluated for consistency with the Direct Exposure Criteria.

Response: As shown in Section 9.6 (Area A Downstream Human Health Risk Assessment) of the Phase II RI Report (B&R Environmental, March 1997) submitted for review to CTDEP, sediment data have been included for evaluation of direct exposure risks to the receptors of concern. A statement will be included in Section 1.3.5 (Summary of Baseline Human Health Risk Assessment) of the FFS Report to clearly state this fact.

7. Reuse of Treated Soil

Comment: Treated soils would be replaced onsite under Alternative 4. Section 22a-133k-2(h)(1-4) of the Remediation Standard Regulations specifies the circumstances under which treated soils may be reused on the site. Treated soils may be reused at any location on the site or another site if any naturally-occurring substance is present in the soils in concentrations not exceeding the background concentration for soil of such substance at the release area from which such soil is removed; and no other substance is detectable in such soil at a concentration greater than its analytical detection limit.

Soils which are treated to comply with both the Direct Exposure and Pollutant Mobility Criteria, but still have detectable contamination may be reused only above the water table, in an area which is not subject to erosion. This would preclude replacement of any treated soil or sediment within wetland or watercourse areas. Prior to placement of soils in upland areas, a map showing the location and depth of proposed placement must be submitted to the Commissioner. In addition, any soil which does not meet the GA Pollutant Mobility Criteria may not be placed over soil and groundwater which has not been affected by a release on the parcel where placement has been proposed.

For Alternatives 3 and 4, the Navy draws a distinction between sediments which would be dredged from ponds and streams, and soils which would be excavated from upland areas. Sediments would be shipped off site for disposal under either of these alternatives. This approach would eliminate concerns regarding replacement of treated sediments below the water table. Treated soils would be replaced onsite under Alternative 4. Replacement of treated soils in areas above the water table would be acceptable to the State providing it is done in accordance with the requirements of the Remediation Standard Regulations.

Response: As agreed during the April 8 meeting, thermally-treated soil would be reused at an NSB-NLON location where the seasonal high-water table elevation is below ground surface rather than at the site and imported clean soil would be backfilled at the site. The term *onsite reuse* will be changed to *onbase reuse* and appropriate changes will be made throughout Sections 3,0, 4.0, and 5.0 of the FFS Report.

In Section 3.0, Table 3-1 and Sections 3.2.6.2 and 3.3 will be modified.

In Table 3-1, the following screening comment would be added to the *Thermal Desorption* process option: "*Would not meet the State's requirement for contaminant concentrations to be reduced to background levels.*".

In Section 3.2.6.2, the title will be changed to *Onbase Reuse* and the opening statement will be modified to discuss the reuse of the treated soil at other acceptable locations within NSB-NLON. The first sentence of the discussion under the *Effectiveness* criterion will be replaced by the following two sentences: "*Onsite reuse would be effective in meeting the ecological PRG of 5 mg/kg DDTR following treatment. However, it would not be effective in meeting the State's requirement for non-detectable concentrations of organic contaminants.*". The second sentence will be modified to read: "*Similarly, onsite reuse of sediment is not expected to be effective because treatment of inorganic contaminants would be required in order to meet the State's requirement for concentrations to be down to background levels.*". The third and fourth sentences will be replaced by the following sentence: "*Onbase reuse of the treated soil at another location within NSB-NLON where the seasonal high-water table elevation would not rise above the ground surface would be effective.*" The conclusion of this section will be modified to eliminate onsite reuse of treated soil and retain onbase reuse at another NSB-NLON location to be determined during the remedial design.

In Section 3.3, *Onsite reuse* will be changed to *Onbase reuse* in the *Disposal* bullet on page 3-22 and the last sentence of that page will be deleted.

In Section 4.0, the title of Alternative 4 will be modified to replace *Onsite Reuse of Treated Soil* with *Onbase Reuse of Treated Soil* and Section 4.2.4 would be modified.

In Section 4.2.4, the end of the second sentence of the description of Alternative 4 would be changed to read: "*..and treated soil would be stockpiled offsite for potential reuse at another NSB-NLON location.*". Sequential activity (6) will be changed to *backfilling of clean borrow soil with placement of topsoil cover and revegetation.* A new sequential activity would be added: *backfill of treated soil at an appropriate NSB-NLON location.* Throughout the balance of this section, the mention of *onsite backfilling* will be replaced by *onbase backfilling.* The cost of Alternative 4 will be adjusted to include the procurement of clean borrow soil and the stockpiling of treated soil and its transportation over a distance of one mile.

Also in Section 4.2.4, the following statement will be added:

"*The residual levels of DDTR and dieldrin in the treated soil are expected to be protective of ecological receptors and the human receptors of concern (i.e., older child trespassers and construction workers) and, therefore, the treated soil would be suitable for reuse as backfill on base at a location where industrial land use is planned. This location would also have to satisfy the State's requirement that ground surface elevation be above the seasonal high-water table level. A suitable location would be selected during remedial design.*"

For Alternative 4, under the *Overall Protection of Human Health and Environment* criterion, the following sentence will be added: "*By treating to meet PRGs for ecological receptors and the human receptors of concern, the residual levels of contaminants in the treated soil are expected to be protective of potential receptors at the the suitable onbase location where they would be placed.*".

Changes to Section 4.0 will be carried through to Section 5.0.

8. Groundwater and Surface Water Issues

Comment: It is expected that groundwater and surface water issues will be evaluated at a later date, as part of the planned Basewide Groundwater Operable Unit, or other appropriate studies.

Response: The Navy agrees with this statement. This FFS is focused on remediation of soil and sediment to address direct exposure risks and for minimization of any potential impact on other media. Section 1.3.4 will be modified to expand the discussion of cross-media impacts.

As discussed during the April 8 meeting. revised ARARs tables will be prepared (a preliminary draft of which was E-mailed and faxed to CTDEP) in which the discussion of how action-specific ARARs would be met will mention the minimization of cross-media impact to surface water.

In the detailed analysis of each remedial alternative (except No Action) a statement will be added under the *Compliance with ARARs and TBCs* criterion mentioning how surface water protection will be achieved. Under the *Short-Term Effectiveness* criterion: "*Erosion and sediment controls, such as sheet piling, silt fences or curtains, etc., would be used to minimize the migration of contaminant from the area of excavation.*".

See the response to Comment No. 17 for additional discussion of cross-media impact on groundwater.

SPECIFIC COMMENTS

9. Page 1-54, Section 1.3.4: Comparison of Site Data with Federal & State Standards

Comment: The last sentence in the first paragraph cites the January 1992 version of the Department's Water Quality Standards. Please note that the revised Ground Water Quality Standards became effective April 12, 1996. The Surface Water Quality Standards, which became effective on May 15, 1992, continue to apply. Please revise the citation accordingly.

The last sentence in the second paragraph discusses "Direct Contact" and "Groundwater Protection" criteria for soil. The Ground Water Protection Criteria are not directly applicable to soil. The Direct Exposure Criteria and the GB Pollutant Mobility Criteria are the appropriate standards which should be cited here.

This sentence also states that neither criteria was exceeded, and the accompanying Table 1-10 notes that Remediation Standards for these compounds are not available. This statement ignores the fact that significant concentrations of DDT, DDD and DDE, as well as manganese, are present at the site. Direct Exposure and Pollutant Mobility Criteria should be calculated for each of these substances, as discussed above in General Comments 2-5. Please revise this paragraph to discuss the derivation of Direct Exposure and Pollutant Mobility Criteria for these substances.

The second paragraph of Section 1.3.4 states also that the current ground water classification of the site is GAA/GA. The same requirements under the remediation standard regulations apply to GA areas as apply

to GAA areas. However, GAA areas are not the same as GA areas. The GAA classification applies to groundwater within the area of influence of public water supply wells or within a public water supply watershed. This is not the case at the Sub base. The actual classification of the site is GA. As noted in the text, the Navy expects that the ground water classification for the base will be changed to GB.

Response: The citation in the last sentence of the first paragraph will be revised to indicate a May 1992 date for CTDEP's Surface Water Quality Standards. The May 1992 revision of CTDEP's Surface Water Quality Standards was reviewed for any changes in the concentrations for the detected contaminants in surface water at this site. No changes were observed for the contaminants listed in Table 1-10.

As indicated in the responses to Comments No. 2 and 4, Section 1.3.4 will be modified to add a statement in support of a waiver of the GB mobility criteria (quoted in response to Comment No. 2) and remove discussion related to GB mobility criteria. Also Table 1-10 will be deleted.

Also, as CTDEP indicated during, the April 8 meeting, newer surface water standards are available for 1997 and will be incorporated as soon as received from the State.

10. Page 1-56, Table 1-11

Comment: Please revise this table to include aquatic life criteria for aluminum (EPA 440/5-86-008; 750 ppb CMC & 87 ppb CCC) as well as the Connecticut water quality criteria designated human health: consumption of organisms. These criteria are applicable to surface waters within the state in addition to the aquatic life criteria. Health criteria are available for several of the compounds in the table including DDT, DDE and DDD.

Response: Table 1-11 will be revised to include criteria for protection of aquatic life for aluminum. Table 1-11 will also be revised by adding a column indicating Connecticut's human health quality criteria for the ingestion of surface water and organisms. The Navy had previously indicated that State human health water quality criteria for the consumption of organisms would not be included in Table 1-11 because the water bodies at this site cannot support game fishing activities as they are either too shallow or dry up seasonally. However, as discussed during the April 8 meeting, there are no separate standards for the ingestion of surface water alone. Table 1-11 will also be revised to correct the State continuous concentration for nickel from 80 to 88 μg/L and the maximum detected concentration for dissolved zinc from 21.1 to 29.0 μg/L.

Section 1.3.5 (page 1-57) will also be modified to include the following statement:

"Surface water exposure has been addressed in the Phase II RI Report (B&R Environmental, March 1997). As noted in Table 9-31 of that report, none of the COCs are expected to pose an unacceptable individual levels of health hazard or ICRs or contribute significantly to the cumulative effect."

11. Page 1-59, Table 1-13

Comment: Does this table contain all chemicals which may contribute risk at the site? At a minimum, should lead be included in this table?

Response: As discussed in Section 1.3.5, Table 1-13 presents a summary of those chemicals that contribute the most to the quantitative risk estimates (i.e. risk drivers). Based on revisions to the human health risk assessment, although lead is considered to be a COC for Zone 2, exposure to lead is not considered to result in adverse health effects. Using the average lead concentration for this zone and USEPA IEUBK Model results in an estimated blood lead level of 4.2 μg/L, which is below the established level of concern.

During the April 8 meeting, CTDEP indicated that they would evaluate this approach as part of their review of the recently-submitted revised Phase II RI Report (B&R Environmental, March 1997).

12. Page 2-5, Table 2-1; Page 2-6, Table 2-2; and Page 2-23 Table 2-6

Comment: These tables list respectively the Chemical Specific, Location Specific, and Action Specific ARARs and TBCs which would apply at this site. The Department agrees that all of the listed state ARARs and TBCs would apply at this site. However, several additional state ARARs should be listed. We will forward under separate cover a complete list of state ARARs which we believe would apply.

Response: The Navy acknowledges the receipt of a site-specific list of ARARs, dated April 18, 1997, from CTDEP. These will be evaluated for inclusion in the Draft Final FFS Report.

13. Page 3-19, Section 3.2.6.1: Offsite Landfill

Comment: This section discusses various types of landfills being considered for disposal of contaminated soils and sediments. It should be noted that under Section 22a-209-7(o) of the Department's Solid Waste Regulations, disposal of hazardous waste (as defined in RCSA §22a-209-1) at a landfill is prohibited. However, Section 22a-133k-2(h)(2) of the Remediation Standard Regulations specifies that in accordance with RCSA §22a-209-8, the Commissioner may authorize polluted soil, which is not hazardous waste as defined pursuant to CGS §22a-449(c), to be disposed of as special waste as defined in RCSA §22a-209-1. Please contact me if you wish assistance in making arrangements for disposal at an in- state landfill.

Response: It is the Navy's opinion that the contaminated soil and sediment at this site are not RCRA-hazardous wastes. DDT contamination arose from application of this product for its intended use as a pest control agent and, therefore, the contaminated media cannot be regarded as a listed RCRA waste. Also, TCLP analysis of samples show concentrations below the threshold for RCRA toxicity characteristic. Therefore, contaminated soil and sediment would be disposed of as special waste, if authorized by the Commissioner. At the time of remedial design, the Navy would be interested in receiving information from CTDEP for the selection of a suitable in-state landfill to dispose of the wastes from this site.

As discussed during the April 8 meeting, the Navy will provide in the Draft Final FFS a detailed regulatory analysis in support of the classification of the contaminated soil and sediment as non-hazardous and a separate phone conference may be held to further discuss this issue with CTDEP and USEPA.

14. Page 3-21, Section 3.2.6.2: Onsite Reuse- Implementability

Comment: As discussed above in General Comment 7, replacement of treated soils and sediments in wetland areas or areas below the water table is prohibited under the remediation standard regulations unless the soil is treated so that no substances are present at concentrations exceeding detection limits, except for naturally occurring substances which do not exceed background concentrations. Under Alternative 4, the Navy would ship all sediments off site for disposal, while treating and replacing soils on site. Would this restriction have any effect on the implementability of Alternative 4? Please add a sentence noting that treated soils would be replaced only in areas above the water table, which are not subject to erosion, as specified in the regulations.

This comment applies also to the discussion on pages 4-24 and page 4-29 regarding Alternative 4.

Response: See response to Comment No. 7. As agreed during the April 8 meeting, thermally-treated soil would be reused at an NSB-NLON location where the seasonal high-water table elevation is below ground surface rather than at the site and imported clean soil would be backfilled at the site. The term *onsite reuse* will be changed to *onbase reuse* and appropriate changes will be made throughout Sections 3,0, 4.0, and 5.0 of the FFS Report to reflect this agreement.

15. Page 3-22, Containment Bullet

Comment: Please replace "sheet piping" with "sheet piling".

Response: This error will be corrected.

16. Page 3-23, Section 3.4: Screening of Technologies and Selection of Representative Process Options for Wastewater

Comment: An individual NPDES permit would be required for discharge of dewatering wastewater to surface water. Although a general permit is available for storm water and construction dewatering wastewater, the potential presence of DDT and its breakdown products in the water would make this discharge ineligible for the general permit. It is likely that this discharge would be eligible for an abbreviated NPDES permit known as a "Temporary Authorization" (TA). A TA allows certain types of discharges to surface water for up to one year. As with regular NPDES discharges, effluent limitations for TAs are set on a case- by- case basis, based on the chemical characteristics and flow rate of both the discharge and the receiving water body. The Department would require that the proposed discharge comply with individual effluent limitations for a suite of contaminants, as well as acute and chronic toxicity requirements. The second paragraph on page 3-23 cites specific limits for gross particulate matter and DDT, DDD, and DDE. The limits cited are useful for the purpose of comparing various alternatives proposed in the FS. However, the Navy should be aware that the actual limits may be different. To allow as much processing time as possible, we encourage the Navy to contact the Department regarding permitting requirements as soon as a final remedy is selected.

Response: It is the Navy's opinion that, although any surface discharge of treated water from the site would have to meet the substantive requirements of an NPDES permit, no such permit or Temporary Authorization would actually be required. This opinion is based upon an USEPA guidance ("Overview of ARARs, Focus on ARAR Waivers", EPA Fact Sheet, Publication 9234.2-03/FS) which states that discharge of treated water to a water body which eventually leaves a CERCLA site is still considered to be an "on site" action and therefore does not need to meet permitting administrative requirements.

During the April 8 meeting, CTDEP agreed with this opinion and stated that, during the remedial design, the appropriate State agencies will provide guidance for the preparation of discharge standards to meet water quality criteria taking into account a mixing factor for the selected receiving stream.

17. Page 4-1, Section 4.1: Assembly of Alternatives

Comment: Section 22a-133k-3(g) of the RSRs requires that a ground water monitoring plan be prepared and implemented as part of any remedial action. This requirement would apply to each of the 3 alternatives (with the exception of no action). The goal of groundwater monitoring, in a GB area is to determine the following: (A) the effectiveness of soil remediation in preventing further pollution of ground water (B) the effectiveness of any remediation taken to eliminate or minimize identified health or safety risks associated with such release; (C) whether applicable Ground-water Protection Criteria, Surface-water Protection Criteria, and Volatilization Criteria have been met; and (D) whether the ground-water plume interferes with any existing use of the ground water for a drinking water supply or with any other existing use of the ground water, including but not limited to industrial, agricultural or commercial purposes. Goals (C) and (D) would not apply to the presently proposed remedy, since it is not designed to address ground water issues. However, these issues must be addressed as part of the planned separate base- wide ground water study.

Monitoring of "contaminated media" is discussed on page 4-2 in Section 4.12 as part of Alternative 2. This monitoring would be ongoing, since wastes would be left in place under this alternative. However, ground water monitoring should also be included as an element of Alternatives 3 and 4. RCSA Section 22a-133k-3(g)(3)(B) specifies that in a GB area ground water monitoring may be discontinued two years after

completion of remediation if the surface water and ground water protection criteria are met and ground water is suitable for all existing uses. Please revise sections 4.1.3 and 4.1.4 to include ground water monitoring.

Response: As agreed upon during the April 8 meeting, groundwater monitoring need not be included in Alternatives 3 and 4. As also agreed during this meeting, mentions will be made throughout the FFS Report that groundwater will be evaluated later as a separate Operable Unit (OU).

The following statement will be added to Section 1.1 (Purpose and Scope of Report): "*Groundwater is not included in the scope of this FFS and only cross-media impacts from soil or sediment will be addressed. Groundwater and any impacts from groundwater contaminants on surface water will be addressed later as a separate operable unit.*".

The following statement will be added to Section 1.3.3 (Nature and Extent of Contamination): "*DDTR were not detected in the groundwater despite being present at elevated concentrations in the soil and sediment. Although certain chlorinated alkenes were detected in the groundwater, none are present in appreciable levels in the soil or sediment. The Phase II RI Report (B&R Environmental, March 1997) indicated that the high concentrations of inorganics and traces of PAHs detected in the groundwater are most likely to have originated from the Thames River dredge spoil which is present at the site. However, compared to adjacent upgradient sites such as the Area A Landfill and Area A Wetland, only a relatively small quantity of dredge spoil is present at the Area A Downstream and, thus, any contribution from this site to the inorganic contaminant in the groundwater is believed to be relatively minor.*".

The following statement will be added to Section 4.1: "*Groundwater is not the subject of this FFS and no remedial alternatives have been assembled to address this medium.*".

The following statement will be added to the description of Alternative 2 in Section 4.2.2: "*Groundwater monitoring is included in this alternative to assess and confirm that soil and sediment contaminants are not migrating. Any additional studies or remedial actions for groundwater would be considered as a separate operable unit.*".

18. Page 4-23, Section 4.2.3: Alternative 3 - Cost and Page 4-29, Section 4.2.4: Alternative 4-Cost

Comment: Cost estimates for these two alternatives are not provided due to the expected short duration of the work. However, as noted above in our comments regarding page 4-1, ground water monitoring would be required during and for a minimum of a two year period following completion of remediation. The cost of a ground water monitoring program should be included in the cost estimates provided in the report.

Response: See response to Comment No. 17. As agreed during the April 8 meeting groundwater monitoring will not be included as part of Alternatives 3 and 4. Therefore, no costs need be estimated for such monitoring.

19. Appendix A: Estimation of PRGs For Ecological Receptors - DDTR Contamination

Comment: What value is used for the variable TF (fraction of ingested contaminant converted to contaminant in shrew tissues)? Please provide justification.

Response: A factor of 0.2, as listed for DDT transfer in beef by Travis and Arms (1988; the DDT value is between the values listed for DDD and DDE), was used to predict the fraction of ingested contaminant converted to contaminant in short-tailed shrew tissue. No other pertinent data were located.

20. Appendix A: Estimation of PRGs For Ecological Receptors - DDTR Contamination

Comment: Further detail should be provided regarding the use of LOAEL values in place of NOAEL values in determining risk based RAOs. Please specify whether any uncertainty factors were applied to the LOAEL values prior to use. Provide example calculations.

Response: The Phase II RI ecological risk assessment used NOAELs to generate COCs for terrestrial receptors. NOAELs are conservative because they are the lowest dose that produce "no effect" in a toxicity study, or usually, a data base of several toxicity studies. The use of a NOAEL as a threshold toxicity value estimates a point below which effects are unlikely, and above which effects are uncertain. Hence their value in screening-level risk assessments. The uncertainty associated with site-related doses above a NOAEL is not acceptable to the Navy for setting RAOs at the Area A Downstream, because of the expense and habitat disruption that would probably be involved in remediating to these RAOs. Therefore, the Navy is using LOAELs, which when used as a threshold toxicity value, estimates a point above which effects are likely, and below which effects are uncertain. It is important to bear in mind that LOAELs generally reflect the most sensitive species and endpoints available, and therefore a level of conservativeness is retained. The level of conservativeness is a function of the size and quality of the toxicological data base. In addition, other conservative assumptions have to be maintained for RAO derivation (e.g., bioavailability of some contaminants) due to a lack of data. Also, NOAELs were used in some instances when LOAELs were not available. This discussion, plus examples of data base sizes used for the toxicity investigation, are included in the revised Appendix A.

Several uncertainly factors were employed in the Phase II RI ecological risk assessment to derive the final NOAELs used in the foodchain modeling, including factors for the following extrapolations: subchronic to chronic exposure, non-sensitive to sensitive endpoints, acute to chronic, LOAEL to NOAEL, within taxonomic order, and class to class. The use of these individual uncertainty factors, and in most cases multiple uncertainty factors, introduced a great deal of conservativeness into this screening-level risk assessment. In discussions with USEPA and CTDEP (phone conference of November 14, 1996), it was agreed that conservative uncertainty factors should not be used in RAO derivation unless significant extrapolations of data were necessary, such as applications across taxonomic classes. A between-class uncertainty factor of 0.1 was used in the FFS only for heptachlor, because no avian toxicity data were available. The LOAEL of 0.25 mg heptachlor/kg/day from a rat study was multiplied by the 0.1 uncertainty factor to derive a toxicity value of 0.025 mg/kg/day for avian species evaluated in the FFS. No further explanation of the derivation of reference toxicity values is needed, but an example calculation of exposure is included in the revised Appendix A.

21. Appendix A: Estimation of PRGs For Ecological Receptors - DDTR Contamination

Comment: The use of alternative water quality criteria for DDTR in deriving sediment quality criteria based on equilibrium partitioning is acceptable to DEP for this site.

Response: DEP's acceptance acknowledged. No action required.

22. Appendix A: Estimation of PRGs For Ecological Receptors - DDTR Contamination

Comment: ER-M values from NOAA have been proposed as sediment RAOs for inorganic contaminants. These values represent a concentration at or above which "effects would frequently occur" (Long *et al., Environmental Management* v. 19, No. 1, pp. 81-97). Additionally, the ER-M values for metals were compared with the Lowest Effect Levels and Severe Effect Levels established for freshwater sediments by the Ontario Ministry of the Environment. Sediment effect levels established by NOAA for arsenic, chromium and copper are two to more than three times greater than the Severe Effects Levels established by the Ontario Ministry of the Environment.

The application of sediment effects ranges from estuarine and marine environments to freshwater ecosystems is generally accepted. However, two factors suggest a higher level of uncertainty regarding the anticipated level of environmental protection afforded by the use of the ER-M for a cleanup (RAO) value, as proposed by the Navy. First, the ER-M is less protective than the ER-L value, which is the level at which no effects are anticipated. The second factor is the discrepancy observed between these values and the freshwater levels established by Ontario. To address the uncertainties surrounding the use of ER-M values as opposed to ER-L values, the Navy has indicated that the maximum sediment concentrations should be compared with the RAO values to determine if adequate protection is provided. However, in the tables provided within the report which compare site data with proposed RAOs and in the calculation of hazard quotients for sediment exposures, average sediment concentrations were used, rather than maximum concentrations.

RAOs for sediment should be based either on background data from applicable reference sites or acceptable sediment effects levels, whichever is greater. It is preferable to use effects levels that are indicative of limited impacts to the ecosystem, such as ER-L and Lowest Effects Levels. However, if less conservative effects concentrations are used, the most restrictive of the ER-M and the Ontario Severe Effect Level values should be used and compared with maximum sediment concentrations. Tables within the report should be revised to reflect the use of maximum values. A more detailed discussion of the ability to achieve these RAOs should also be included.

Response: The Navy does not agree with this approach. As stated in Section 4.3.2 of Appendix A (page 20, last paragraph), ER-L values are generally believed to be quite conservative and, therefore, do not appear to be reasonably attainable RAO values. Since the range between the ER-L and the ER-M is considered the range in which adverse effects would "occasionally" be observed, The Navy believes that the use ER-M would only result in "limited impacts to the ecosystem", as acknowledged in the comment.

The use of the ER-M values for all inorganic COCs is preferable to the occasional use of the Ontario SELs if they are lower than the ER-M. First, since the ER values are all derived using the same methodology, the use of the SEL would result in RAOs for metals that were derived using different criteria. Second, the Oak Ridge National Laboratory (ORNL) has recently presented ecological remediation goals for sediment (Efroymson et al., 1996). Efroymson et al. (1996) suggest the use of SEL values only in the absence of ER-Ms. In addition, Efroymson et al. (1996) suggest the use of Florida Department of Environmental Protection Probable Effects Levels (PELs) as RAOs for metals. These values, which generally fall between the ER-L and the ER-M, may also be considered in the FFS. Additional evaluation and discussions between the Navy, USEPA, and CTDEP are necessary to determine the applicability of PELs as sediment RAO values for inorganics.

Table 10 in Appendix A presents inorganic sediment COCs identified in the Phase II RI from comparison of their average concentrations to their respective benchmark values. COCs identified from the comparison of maximum concentrations of inorganic contaminant in sediment to their benchmark values will be added to Table 10 or presented in a new table. Nonetheless, in an effort to reduce the conservatism and uncertainty inherent in the use of maximum concentrations, RAOs will be developed only for COCs that were identified from comparison of average concentrations to benchmark values since ecological receptors are more likely to be systematically exposed to the average, rather than the maximum, contaminant concentrations in soil and sediment. In addition, the use of the ER-M as the maximum possible concentration after remediation ensures that the average concentrations remaining will be below the ER-M. This approach was also followed to determine which organic COCs in soil and sediment warranted RAO values.

As agreed during the April 8 meeting, the following statement will be added to the description of Alternatives 3 and 4 in Sections 4.2.3 and 4.2.4: "*As part of remedial design (Design Basis Report) and remedial action (Remedial Action Work Plan), post-remedial action verification sampling would be specified to ensure that the 95 percent Upper Confidence limit (UCL) of the residual concentrations of inorganics in the sediment is less than or equal to the ER-M for each inorganic COC.*".

As also agreed during the April 8 meeting, a new table (Table 11) was added to Appendix A to provide maximum as well as average detected concentrations of COCs for comparison to potential ecological risk based RAOs.

23. Appendix A: Estimation of PRGs For Ecological Receptors - DDTR Contamination

Comment: It is not appropriate to dismiss the observed variability of TOC within the various water bodies. EPA has considered organic carbon content in the establishing sediment quality criteria based on equilibrium partitioning. This indicates that differences in TOC could affect the bioavailability of sediment contaminants to exposed organisms. In general there is an inverse correlation between TOC of a sediment and the degree to which DDT and its residues are bioavailable in that sediment.

The RAO proposed was derived for DDT in sediments collected from Area 1. Total organic carbon reported for Area 1 is significantly greater than that reported for Areas 2 and 3. Therefore, the proposed RAO for DDTR may not be sufficiently protective for Areas 2 and 3. This hypothesis is further supported by the RAO values provided in Table 9. The proposed RAO of 3 mg/kg for DDTR is the highest of all the calculated RAO values for benthic macroinvertebrates for all DDTR components across the 3 areas. Additionally, within the discussion of the empirical approach to evaluating risk for benthic macroinvertebrates, the report (Appendix A, p. 21, 1st. paragraph) indicates that the lower threshold for DDTR effects observed within the streams is around 1 mg/kg. Based on these concerns, the applicability of the proposed RAO across the entire site needs to be technically justified or modified prior to concurrence by the Department.

Response: While it is agreed that bioavailability of DDTR may be related to TOC concentration in sediment and sediment TOC concentration differs among the waterways, there are several arguments indicating that differences in TOC among areas may be unimportant to determination of ecological risk and formulation of remedial strategies at the site.

One argument is the size of Area 1 relative to Areas 2 and 3. Area 1, which has the highest sediment TOC concentration and therefore the highest benthic RAO based on EqP, includes Upper Pond, Lower Pond, OBDA Pond, and Stream 1 and therefore constitutes the majority of the Area A Downstream. Although Area 1 represents most of the Area Downstream, other areas are represented in the biological data used to derive the proposed RAO for DDT in sediments. In the 1993 FFS data, three of the nine sampling locations (33 percent) are from Area 2; in the 1995 ecological study, three of the seven locations (43 percent) are from Areas 2 and 3.

Another argument addresses the significance of TOC data, both at the site and in the data USEPA used to verify EqP for several chemicals. TOC concentrations are available for the Area A Downstream locations sampled for biological analyses in 1995. When sediment "duad" scores (toxicity ranking plus macroinvertebrate taxonomic ranking) are plotted against corresponding TOC values (as shown on new Figure 5 in revised Appendix A), there is an indication of a downward trend in toxicity with increasing TOC. Although a negative trend is expected if increased TOC is lowering toxicity, there is no significant relationship (probability $p = 0.05$) for these data. USEPA based the EqP approach on data indicating that TOC is correlated with pore water concentrations of organic compounds, but a TOC relationship was not directly tested in the sediment toxicity experiments used to verify the approach (USEPA 1993a). In fact, the variation in TOC, which is typically in the range of two orders of magnitude, is equivalent to the variability in EC_{50} or LC_{50} between tests using the same species in similar sediment, and it is small compared to the five orders of magnitude range between tests on different species (e.g., endrin data in USEPA 1993b). In sum, the amount of variability in sediment toxicity explained by TOC content is very modest.

A theoretical approach like EqP is attractive because its basis is reasonable. Part of this basis is the use of water quality criteria for application to the benthos. This approach is relatively conservative, due to the

less sensitive nature of many benthic organisms. (USEPA [1993a] concludes otherwise, but USEPA data indicate a tendency for benthic organisms to be less sensitive.) It is even more conservative when applied to the streams in the Area A Downstream, which occasionally dry up. Such drastic changes in physical conditions favor less-sensitive organisms. The conservativeness of using water quality criteria and the very limited predictive capabilities of TOC indicate the need for biological field data to reduce uncertainty. When field data are available, they should be considered in that light, and not treated with suspicion because they differ from the results of a conservative, and very general, model.

In response to requests made at the April 8 meeting, the Navy has extended the analysis of the empirical relationship between DDTR content of the sediment and biological data. The new analysis includes regressions of biological scores on DDTR concentrations, done to help resolve the problem of having few data in the critical range of 0.1 to 3 mg/kg DDTR. These results show that a value of 2 mg/kg is a reasonable and protective RAO for DDTR content in sediment at the Area A Downstream. The new analysis is explained in some detail in the revised Appendix A, which also includes important aspects of the foregoing discussions.

24. Appendix A: Estimation of PRGs For Ecological Receptors - DDTR Contamination

Comment: As part of the ecological data collected in support of the risk assessment, frog tissues were analyzed for DDTR content. Please evaluate this data with respect to establishing a site specific bioaccumulation factor using this data. The frog BAF should then be compared with the site specific earthworm BAF developed and an evaluation made as to which BAF value is most appropriate for use in the risk assessment.

Response: As discussed during the April 8 meeting, frog tissue analyses showed no detectable concentrations of DDTR. Therefore, as agreed during this meeting, these data are not useful for the development of ecological PRGs.