NAVY RESPONSE TO EPA COMMENTS (JANUARY 8, 1993) ON DRAFT PHASE II REMEDIAL INVESTIGATION WORK PLAN (NOVEMBER 1992)

PROPOSED WORK PLAN
GENERAL COMMENTS

1. The text frequently refers to "to be considered (TBC) values". Revise the work plan to include an explanation of this acronym and a description how these proposed values will be used to evaluate the data generated from the investigation.

   TBC is an acronym for "to be considered." TBCs are non-promulgated advisories or guidance issued by Federal or State government that are not legally binding and do not have the status of potential ARARs. The most significant TBC regarding this project are CTDEP's soil cleanup guidance values. TBCs will be used primarily as a screening tool to identify potential areas of concern. In addition, TBCs will be considered along with ARARs and the risk assessment in determining remedial action objectives. The work plan text will be revised to include the above discussion regarding TBC.

2. The draft work plan does not adequately define the analytical methods. Examples of the lack of specificity include:

   - "the samples will be analyzed by NET methods"
   - two methods are listed for determining the total organic carbon (TOC) content of the soils
   - incomplete description of the methods to be used for the Toxicity Characteristic Leaching Procedure (TCLP) (the work plan lists Method 1311, yet this is only a preparatory method)

   Revise the work plan to include all of the site-specific analytical methods and the quantitation limits for all of the proposed methods.

   Site-specific analytical methods will be highlighted in the tables provided in the laboratory QA/QC plan, and text will be checked to ensure consistency.

3. The Quality Assurance/Quality Control (QA/QC) Plan does not contain all the site-specific proposed methods or their respective quantitation limits (e.g., dioxins and radiologicals).

   Revise the work plan to include all of the site-specific analytical methods and the quantitation limits for all of the proposed methods.

Site-specific methods and their quantitation limits for dioxins and radiological parameters will be clarified in the text.

4. The QA/QC Plan does not clearly indicate that sediment samples must contain greater than 30 percent solids in order for the samples to be considered valid. Revise the work plan accordingly.

   The work plan will be revised accordingly.

5. The proposed work plan does not present a discussion of the data reporting/data submission procedures. Revise the work plan to include the data reporting procedures. This description should include the format in which the results will be presented and the presentation of the field screening data.

   Attachment 1 to these comments are proposed data reporting sheets. The summary tables will be presented in the body of the report and the comprehensive data reports will be included in the appendix.

   Regarding field screening, qualitative results such as those from the photoionization detector will be shown in boring or sample logs. Quantitative results (XRF and GC) and soil gas data will be summarized in the body of the report with complete results tabulated in an appendix.

   Complete data packages for any analytical results will be available upon request of a reviewer. For CLP parameters, the data packages will be adequate to allow EPA Level IV data validation.

6. Based on the information presented in the draft work plan, air pathway analyses for pollutants, in addition to VOCs, are required. EPA suggests that the U.S. Navy revise the work plan to include, at a minimum, the monitoring of the air pathways for lead, polychlorinated biphenyls (PCBs), DDT, and other semi-volatiles.

   The U.S. Navy should develop and air monitoring plan for the site investigation. For reference, the U.S. Navy should review the four volume Air/Superfund National Technical Guidance Study (NTGS) Series, as well as the attached Air Sampling Plan guidance (see Attachment A).

   The inhalation pathway has been evaluated for all of these constituents in the risk assessment conducted during the Phase I RI. In the human health risk assessment, we addressed the inhalation pathway for exposure to fugitive dust for all appropriate receptors. Based upon surficial soil data and PM10 information, the exposure point concentrations for dust were calculated. Conservative exposure assumptions were used in the calculation of risk to receptors at the site. Even under these conservative conditions, all of the carcinogenic risks and non carcinogenic hazard indices calculated for receptor exposure to site contaminants found in dust resulted in de minimus health risks. However, as we discussed, air monitoring for these constituents during any remediation activities,

as part of a health and safety plan, may be warranted and will be considered at that time.

EPA's Comment on Navy Response

A review of the Navy's response to the need to conduct routine air monitoring, and the statement by the Navy of *de minimus* risk associated with inhalation pathway exposure via fugitive dust, EPA agrees that at this time, routine monitoring of air exposure is not required. However, during invasive remedial activities, additional monitoring of the inhalation pathway exposure, via fugitive dust, may be required.

The Navy states that a Standard Operating Procedure (SOP) for air sampling will be provided, however, this has not yet been submitted for review. It has been EPA's experience that the submitted SOP's are often deficient. Therefore, the Navy should consider submitting, and receive approval for, an air monitoring SOP prior to the initiation of sampling activities.

7. The draft work plan includes only brief references to the previously detected contamination, resulting in inadequate justification to support the proposed sampling locations. Additional figures which depict the extent of contamination are necessary to support the proposed sampling plan.

   Provide maps which show the aerial and vertical extent of contamination which has been previously detected at the Step II Sites.

   This information is provided in the Phase I RI Report. Rationale for sample selection based on Phase I RI results are indicated in Section 7.0 of the work plan. This comment and several subsequent comments either request detailed data previously presented in the Phase I RI Report be repeated in this work plan (e.g., present all previous data) or request presentation in the work plan of items that will be produced from implementation of the work plan (e.g., provide a bedrock contour map). If the Phase I RI Report had not been prepared, we agree that all available data should be presented in the work plan. However, we have summarized the findings of the Phase I RI Report in this work plan and have referred to the Phase I RI Report for details. Listed below is a summary of comments in these categories.

   - *General Comment 12: Provide ground water elevation maps.*
   - *General Comment 13: Provide a discussion of release mechanisms.*
   - *General Comment 21: Include specific values for the exceedance of the ARAR/TBC values.*
   - *General Comment 23: Include a discussion of the restrictions imposed by each location-specific ARAR.*

- *Specific Comment 3: Include a summary tabulation and data interpretation narrative of previous analytical results.*

- *Specific Comment 63: Provide maps showing ground water elevation, bedrock elevation and extent of contamination.*

Phase I information was summarized in the work plan. It could be repeated in the work plans, however, its inclusion provides no constructive use as it is readily available in the Phase I report. More importantly, providing any of the requested information that is out of the scope of the existing contract will delay the start of field work due to contractual requirements. In the responses that follow, we have indicated when the requested information is provided in the Phase I RI Report or where we feel it is a product of this work plan.

EPA's Comment on Navy Response

Modify the tables in Section 7.0 to include a column of "Data Gaps" which will provide additional support for the various sampling efforts.

8. Modify the work plan to include descriptions of the Supplemental Step I investigations. Provide the rationale for not including the investigative plans for the CBU Drum Storage Area or the OBDANE in this work plan.

The investigation work plans for these two sites are presently being prepared. It is our intention to include these in the final work plan. The work plan for these sites will be submitted for review when completed. They were not included in this version of the work plan as a contract modification could not be completed in time to allow their inclusion.

9. Several references to inorganic background concentration levels are made throughout the work plan. These references include discussions of nature and extent (e.g., page 18, ¶4, page 35, ¶1, page 38, ¶2, etc.) and risk (e.g., page 70, ¶5) without recognizing the fact that these levels have not been approved by EPA.

Qualify the references to inorganic background concentration levels with a statement which indicates that these levels have not yet been finalized.

All references to background will be qualified as suggested.

10. There are numerous references throughout the work plan to contamination present at a particular unit which may "possibly be associated" with some other adjacent unit, or that "ground water flow is projected to be generally to the southwest (page 29, ¶1)" but there are no maps which portray the surface or subsurface flow relationships.

EPA suggests that the U.S. Navy consolidate the investigation of the Rubble Fill at Bunker A-86, the Area A Landfill, CBU Drum Storage Area, Area A Wetland, Area A Downstream, Weapons Center, Over Bank Disposal Area, and the Torpedo Shops to help

optimize the sampling activities outside of the immediate source areas.

We agree that sampling activities at all sites should be optimized by evaluating these sites in relationship to each other. Plate 1 (Field Sampling Plan - Area A) was prepared for this purpose. This plate shows all existing and proposed sample locations and the ground water flow direction. We do not agree, however, that consolidating the investigation and changing the designation of operable units are appropriate at this time. The current site designations allow the work plan to address the perceived risk and contaminants at each site, which are different, in an organized manner.

11. Revise the work plan to include the installation of additional ground water monitoring wells immediately upgradient of the Downstream Watercourse located along Triton Road. These shallow ground water monitoring wells shall be installed between the Pistol Range and the downstream watercourse. In addition, modify the work plan to include the collection of both upgradient and downgradient surface water samples from both of these drainpipes. These samples should be analyzed for metals; in particular lead. These ground water and surface water samples will identify potential releases of hazardous constituents from upgradient sources.

    Evaluation at the Pistol Range under CERCLA is presently under negotiation as part of the FAA between EPA, CTDEP, and the Navy. The Navy will comply with the final FAA.

12. Present ground water elevation maps (i.e., contouring of the potentiometric surface) with the interpreted direction of ground water flow for all Step II sites.

    These are provided in the Phase I RI Report and the interpreted direction of ground water flow is indicated in the work plan.

13. Modify the Site Dynamics section of the work plan to include discussions of the source areas and release mechanisms. The conceptual model approach should follow RI/FS guidance.

    As we discussed during our phone conference, Section 3.0 does include a conceptual site model, a summary of contaminants detected (which includes source areas) and an evaluation of potential migration pathways of chemicals in the environment. Minor revisions will be made to the text to clarify source areas. Potential receptors are identified in Sections 4.0 and 5.0 regarding human health and ecological risk assessment. Release mechanisms were presented in Section 5.0 of the Phase I RI Report and have been summarized in the work plan.

14. Without a basewide understanding of the bedrock elevation contours, it is not possible to fully understand potential migration pathways.

    Modify the work plan to include the development of a basewide bedrock elevation map. This modification should also include the use of seismic refraction surveys to obtain the bedrock elevation data where there are no borings.

The work plan will be revised to include development of a base-wide bedrock elevation map. Elevations to construct this map will be from existing and proposed borings/wells, bedrock outcrops, and available borings from Navy files. As this database will provide a large number of data points, we are not proposing seismic refraction surveys. We will have enough bedrock elevations to adequately construct a bedrock contour map.

15. Modify the work plan to clearly explain the procedures used to determine the potential target remediation levels, as presented in Section 6.0 and Appendix C. The work plan should also cite the appropriate guidance (e.g., Human Health Evaluation Manual, Part B: "Development of Risk-Based Preliminary Remediation Goals". OSWER Directive 9285.7-01B. December 13, 1991).

    Present, if applicable, sample calculations showing exposure assumptions used to develop each target remediation level need to be presented. For target levels based on ARARs rather than on risk assessment, provide the appropriate references for the use of the target level.

    Appendix C will be modified to include more detail regarding the derivation of risk-based remediation levels and a table will be included in this section which provides chemical-specific ARAR values.

16. The proposed work plan makes general references to numerous locations regarding analytical parameters. Modify the work plan to reference the U.S. EPA Contract Laboratory Program (CLP) Target Analyte List (TAL) and Target Compound List (TCL) whenever appropriate).

    The work plan text will be clarified to make it clear that constituents being tested are from the CLP, TAL and TCL whenever appropriate. This clarification, for example, will make it understood that when we specify VOC, we mean all VOC listed in the CLP TCL.

17. Modify the work plan to ensure that the ecological risk assessment includes the analysis of full TAL and TCL Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), pesticides and PCBs for all surface water and sediment samples, as well as Total Organic Carbon (TOC) and grain size analyses in sediments. Fresh water samples also require the analysis of hardness.

    We have excluded several CLP parameters from the scope of this work plan based on an evaluation of Phase I results. As the Phase I database is fairly extensive, we feel the exclusion of these parameters from further testing is justified. Approximately 32 sediment samples were collected during Phase I in Area A and analyzed for all CLP parameters and an ecological risk assessment was performed. Based on this extensive sampling and the risk assessment, the only concerns identified with sediments was regarding DDTR concentrations. The purpose of the Phase II work is to define the extent of this contamination and the risk it presents; not to determine if Area A may be contaminated with other hazardous constituents. The work plan will be revised to include analysis for TOC and grain size in all sediment samples. The work plan presently requires analysis of

hardness; however, the text will be clarified regarding this analysis.

EPA's Comment on Navy Response

It is agreed that sampling in the Area A Wetlands has been extensive, and the full TAL/TCL analysis is not necessary. Since previous sampling efforts in the Area A Downstream/OBDA have been sparse, additional sampling requires the full TAL/TCL analysis.

Therefore, modify the work plan to include, at a minimum, full TAL and TCL analysis at proposed sampling locations 2DSD24, 2DSD25, and 2DSD27.

In the OBDA area, previous analytical results, specifically at sampling location 3SD4, showed elevated levels of arsenic (39.9 ppm), cadmium (30.1 ppm), copper (105 ppm), lead (189 ppm), selenium (3.2 ppm), and zinc (416 ppm). Elevated levels of PAHs were also noted. This would indicate that proposed additional samples would require the analysis of the full TAL and TCL.

In order to confirm the extent of contamination, revise the work plan to include full TAL and TCL analysis for additional samples taken at five additional locations 2DSD24 through 2DSD29.

18. EPA suggests that the U.S. Navy consider the Connecticut Arboretum across the Thames River in New London as one of the possible sources of surface water, soil and sediment background data. Although this area is separated from the base by the river, it is possible that it may resemble background conditions of the area.

The Navy did consider use of the Connecticut Arboretum as a background sample location. However, we decided that sediment and surface water should be collected upstream for background determination. Regarding soil samples, it was decided that these samples should be collected on the base or as close to the base as possible in similar soils. Based upon TRC comments, proposed background soil sample locations have been revised to move three sample locations offsite as shown in Attachment 2.

EPA's Comment on Navy Response

The Navy has decided that sediment and surface water samples will be collected upstream for background determination. In order to evaluate the entire sampling plan, it is essential to know the specific proposed locations for background samples for surface water and sediment.

On page 101 of the work plan, the Navy stated that prior to initiating the quantitative benthic survey, approval for the reference locations will be sought from BTAG. These locations have not been approved by the BTAG to this date.

In order to avoid any delays with the proposed field work, the approval process should be

initiated shortly. Identify the specific reference locations to be used for the quantitative benthic survey and incorporate these into the work plan to avoid any delays at a later date.

19. The Remedial Action Objectives (RAOs) in the work plan do not adequately describe the contaminants of concern for ground water, the remediation levels and the remedial technology data requirements. Each remedial technology must have a corresponding list of data requirements specific to the technology.

    In addition, the draft work plan does not clearly describe whether the remedial investigation objectives tables fulfill the information requirements of the preliminary action objectives tables.

    Modify the work plan to ensure that each remedial technology has a corresponding list of data requirements specific to the technology and present the RAOs in the format specified in the Guidance for Remedial Investigations and Feasibility Studies under CERCLA (EPA 1988). The modified RAOs should include the following components:

    - contaminant(s) of concern
    - exposure route(s) and receptors
    - acceptable contaminant level or range of levels for each exposure route

    The identification of the specific compounds and the preliminary remediation levels are needed to identify which technologies actually apply and to determine which contaminants require further delineation.

    There are several issues brought up in this comment. To address a few of these issues, the following modifications will be made to the work plan.

    - *A table providing chemical-specific ARARs will be added to the work plan.*

    - *A table containing remedial technology data requirements which will include rationale regarding parameters selected on a site-specific basis will be included in the work plan.*

    RAO regarding ground water at a few sites (DRMO, Goss Cove and Lower Subase) were not presented as the Navy does not feel it is an objective to remediate these areas to provide potable water and as the contaminant levels do not appear to be having an adverse impact on water quality in the Thames River. As stated previously, ground water is not a potential source of drinking water at DRMO, Goss Cove and Lower Base due to salt water intrusion. However, as the effects on the Thames River have not been verified, the remedial action objectives will be revised to include ground water remediation as necessary to protect water quality.

20. The investigative objectives of the work plan indicate that the selection of screen settings in the shallow and deep wells will be determined by the stratigraphic data gathered from the test borings. The screen placement should also consider the different physical

characteristics and mobilities of the contaminants at each unit.

For sites which are lacking information regarding the nature of the contaminants, such as the Rubble Fill at Bunker A-86, the work plan should consider the installation of well clusters, screened at various depths.

Modify the work plan to consider the physical characteristics and mobilities of the contaminants at each unit during the placement of the well screens and the installation of well clusters screened at various depths to help characterize inadequately defined areas.

The text will be revised to clarify that screen placement did consider the different physical characteristics and mobilities of the contaminants at each unit.

The work plan will be revised to include the installation of one bedrock well at Bunker A-86. If ground water is present in the overburden at the location of the bedrock well, a nested well will be installed in the overburden.

21. Modify the work plan to include the specific values (e.g., maximum values, average values, etc.) for the exceedance of the ARAR/TBC values, etc.) for the exceedance of the ARAR/TBC values in Tables 6-2, 6-4, 6-7, 6-9 and 6-11.

    This data is presented in the Phase I RI Report; however, we will provide a table showing chemical-specific ARARs in this report.

22. The sampling for engineering properties must be reviewed on a site-specific basis. The present work plan proposes the same set of analyses at each site, yet certain analyses may not be necessary at all sites.

    Modify the work plan to ensure that the sampling for the engineering properties will correspond to each specific area and the specific technologies which will be evaluated during the Feasibility Study at each specific site.

    A table containing remedial technology data requirements will be provided. This table will be site-specific and include rationale regarding selection of specific parameters.

23. The location-specific ARAR restrictions must be identified in order to evaluate whether certain actions may not be implementable. The various remedial alternatives must consider such items as vehicular and equipment access, staging areas, need for temporary roads or sewers, etc.

    Modify the work plan to include a discussion of the restrictions imposed by each location-specific ARAR. Include in the work plan modification a map which illustrates where each restriction applies. This information should be integrated into the preliminary remedial alternatives identification process.

This discussion regarding location-specific ARARs is provided in the Phase I RI Report.

24. The following are general comments regarding the attached memo on target soil cleanup levels, prepared by Menzie-Cura and Associates, Inc. addressed to Barry Giroux (March 9, 1992).

- Provide the rationale for the proposed cleanup levels based on a worker scenario rather than a residential scenario? The proposed cleanup levels based on a worker scenario are often orders of magnitude greater than a residential scenario. These levels can not adequately protect the general public.

- Most of the proposed cleanup levels are based on target cleanup levels of 10^{-4}. EPA requires each chemical use 10^{-6} as the target risk level such that total risk from all the chemical mixtures will fall within the acceptable risk range of 10^{-4} to 10^{-6}. Modify the work plan accordingly.

- Since no equations and calculations are presented along with the memo, it is unknown if the cleanup levels are accurately derived. Revise the work plan to include the equations and assumptions used in the development of the proposed cleanup levels.

Appendix C will be modified to provide the requested information.

25. Revise the work plan to ensure that Standard Operating Procedures (SOPs) are prepared for all aspects of sampling, analysis and instrument calibration. An SOP is defined as a complete description of a sample collection, analysis or other operation whose mechanisms are thoroughly prescribed and which details a commonly accepted method of performing routine or repetitive tasks. See Attachment B for additional information regarding the development of these SOPs.

SOPs will be prepared for the following activities:

- *field analysis for PCB and DDTR using GC methods*
- *field analyses for lead using XRF methods*
- *air sampling for VOCs using EPA Method TO1*

SPECIFIC COMMENTS

1. **Section 1.0 - Introduction (Page 1)**

The purpose and scope of the Phase II Remedial Investigation are not stated in the text. The narrative of the Draft Work Plan should begin with a clearly defined "Purpose and Scope" of the proposed RI.

Modify the work plan to include a purpose and scope which reflects the objectives of this investigation.

A purpose and scope section will be added to the work plan.

2. **Section 1.0 - Introduction (Page 4)**

Modify this figure to include the location of the former incinerator, Pier 33, Berth 16/Former Incinerator, the fuel farm, and the Area "A" Downstream zone f investigation. Include in the work plan modification a brief discussion of the known and suspected contamination at these sites.

The figure will be included to show the location of the Former Incinerator/Berth 16, Pier 33 sites and Area A downstream. The fuel farm is not part of the RI at this site, and therefore will not be shown. Information regarding contamination at this site will consist of a reference to the appropriate report.

EPA's Comment on Navy Response

Modify the work plan to include a map of all potential source areas. Since many of the non-IRP sites are located upgradient or adjacent to sites being investigated under the IRP, it is important to identify the location of other potential sources of contamination. Sufficient sampling locations should be positioned to separate ground water and surface water contamination from adjacent sites.

3. **Section 2.0 - Evaluation of Existing Data (Page 8)**

Modify the work plan to include a summary tabulation and data interpretation narrative of the site-specific analytical results of the previous investigations. The work plan should summarize the site-specific geological and chemical contaminant conditions.

This information is provided in the Phase I RI Report. A summary of contaminants detected and site-specific geology was provided in the work plan.

4. *No EPA comment provided.*

5. **Section 2.3.1.2 - Site-Specific Geology and Hydrology (Rubble Fill at Bunker A-86) (Page 18, ¶3)**

This section describes local ground water flow to the northwest. Modify the work plan to include a local ground water map, with the potentiometric surface contours and flow directions, which reflects the ground water flow directions discussed in the text.

Figure 2-8 shows the inferred ground water flow direction. No data is available to prepare a ground water contour map at this location.

6. **Section 2.3.1.3 - Nature and Extent of Contamination (Rubble Fill at Bunker A-86) (Page 18, ¶4)**

EPA has previously questioned the source of the "To Be Considered" (TBC) values listed in the previous report (i.e., Table 4-2: Summary of Chemical-Specific ARARs and TBCs by Media in Draft RI, August 1992). In particular, EPA was concerned with the soil TBC values which listed exactly the same values as drinking water ARARs and the source is listed as CTDEP. The values of TBCs in soil are risk-based concentrations (i.e., based on risk level or hazard index).

For the purpose of this investigation, the concentration of the chemicals in the soil is obtained through the Contract Laboratory Program (CLP) chemical analysis for solid waste; not the product of the TCLP. Therefore, the results of this method cannot be compared to RCRA regulatory levels and cannot be compared to the CTRL (which is based on and equal to drinking water standard) as is currently proposed for this site.

Modify the work plan to clearly define the "TBC" values in soil.

This issue has previously been discussed several times. Each time the Navy, EPA and CTDEP agreed that classification of the CTDEP guidelines regarding soil remediation as a TBC is appropriate.

7. **Section 2.3.2.1 - Site Background (Torpedo Shops) (Page 19, ¶2)**

EPA has not reviewed the 1989 GZA report, and therefore can not evaluate or support the conclusions which have been presented in this section. Based on the portion of the report included in Appendix A, it appears that samples were not collected in accordance with EPA protocol (e.g., samples consisted of auger cuttings and the analytical data was not validated).

Revise the work plan to include confirmatory sampling in accordance with EPA-approved methods and add dioxin to the list of analytes.

EPA and CTDEP will be provided with copies of the GZA report. Samples are proposed to be collected from 7MWSD and will be used to confirm the GZA results.

The Navy has not proposed sampling for dioxin at this site as no dibenzofuran were detected during the Phase I RI and chlorinated materials were not burned at this site. Further detail regarding this issue is presented in the responses to Comment 51 below.

8. **Section 2.4.1.1 - Site Background (Page 33, ¶8)**

This section references the collection and analysis of samples from the Weapons Center. EPA has not previously reviewed this data, and it is not clear what sampling protocols were used to obtain the samples.

Modify the work plan to provide a full discussion of the Appendix B sample results, include a map of the sample locations and describe the sample locations denoted as "above table" and "below table" and "below grade".

The work plan will be revised to include all available information regarding collection of these samples. As the purpose of this sampling was to determine whether structurally unsuitable soils removed during a construction project were contaminated, any available information is limited.

9. **Section 2.4.1.1 - Site Background (Page 33, ¶1)**

Modify the work plan to remove the reference to "published background levels" since these "background" levels are not relevant to this investigation.

The reference to background levels will be removed.

10. **Section 2.4.1.3 - Residential Well Analytical Results (Page 42, ¶5,6)**

Revise the work plan to incorporate the newly promulgated MCL for cadmium at 5 ppb. (Federal Register, January 1991) and reevaluate the concentration of this metal in relation to this standard.

Revise the work plan to reflect the regulatory status of sodium. Sodium does not have a secondary MCL, but the Office of Water of the EPA has set a drinking water equivalent level (DWEL) of 20 mg/L as guidance for persons who have hypertension problems.

Phase I data will be re-evaluated in light of the new MCL for cadmium. The table of chemical-specific ARARs in the work plan will include this new value.

This table (chemical-specific ARARs) will include the EPA DWEL of 20 mg/l and the CTDOHS notification level of 28 mg/l for sodium.

11. **Section 2.4.1.3 - Residential Well Analytical Results (Page 43, ¶1)**

Revise the work plan to include a discussion of the analytical uncertainty associated with

the existing boron data.

This revision will be made.

12. <u>Section 2.4.3.3 - Nature and Extent of Contamination (Page 51, ¶6)</u>

This section references the discovery of thin layers of free product in MH83.

Present the location of MH83 on Figure 2-15.

Manhole MH-83 will be shown in Figure 2-15.

13. <u>Section 3.2.1 - Rubble Fill at Bunker A-86 (Page 54)</u>

Modify this figure in the work plan to depict the possibility of direct contact between the fill and bedrock, since bedrock is exposed at the surface near this site.

This figure will be revised to show the potential for fill directly in contact with bedrock.

14. <u>Section 3.2.2 - Torpedo Shops (Page 56)</u>

Modify this figure in the work plan to include all source areas, including the Otto fuel tanks. The modification to this figure should also include a transport pathway to bedrock and pathway of discharge to surface water and sediment.

Modify this figure to provide an illustration of the location and depth of the tanks, drainage lines, leach fields, existing and proposed monitoring wells and borings, the bedrock geologic unit contact, previous sample locations which have been determined to be contaminated, and any other pertinent site features. These data are fundamental to the conceptual model.

Figure 3-2 will be modified to show source areas and the potential transport pathway to bedrock. The transport pathway to sediments and surface waters is shown.

Figure 7-4 will be revised to show drainage lines. It is not feasible to show the information in Paragraph 2 of this comment in a conceptual diagram.

15. <u>Section 3.2.3 - Goss Cove Landfill (Page 57)</u>

Modify this figure to include a ground water flow path into the bedrock where the fill is, or is suspected of, being in direct contact with bedrock.

We will revise this figure to better depict the bedrock surface. As this is a discharge area, bedrock contamination is only possible in the eastern portion of this site, and any such contamination will be localized and quickly discharged to the overburden. Deep overburden wells have been provided to detect any such contamination.

16. **Section 3.3 - Supplemental Step II investigations (Page 60, ¶5)**

Revise this work plan to reflect the fact that the proposed inorganic background levels have not yet been approved by EPA.

The work plan will be revised to reflect this fact.

17. **Section 3.3 - Supplemental Step II Investigations (Page 61)**

Modify this figure to include the CBU Drum Storage Area, the Torpedo Shops, and, if applicable, any offsite contamination.

The location of those sites will be added to this figure.

18. **Section 4.1 - Introduction (Page 68, ¶6)**

While carcinogenic risk can be explained in probability terms, non-carcinogenic risk should be described as a hazard index. Modify the work plan accordingly.

We will revise the text of the work plan as follows: "The risk assessment will provide estimates of potential risks to human health. Risks will be estimated for representative groups...."

19. **Section 4.2 - Data Evaluation and Hazard Identification (Page 70, ¶5)**

Revise the work plan to explain the source of the background concentrations referenced in this paragraph and used to select compounds of potential concern.

This comment is directed towards paragraph 4, not 5.

We feel that it is premature to state the background concentrations at this point as they will be determined by additional sampling. However, we will revise the text of the work plan as follows: "Sampling is required for supplemental investigations at these Step II sites. The outcome of the sampling will dictate the final list of compounds of concern. Prior to implementation of this work plan, sampling and analysis to define inorganic concentrations in soils will be conducted. Background sampling is conducted to distinguish site-related contamination from naturally occurring or other non-site-related levels of compounds. In addition, compounds of concern will be selected for the Rubble Fill ....."

In addition: 4.2.1 Evaluation of the Quality of Available Data (Page 70, ¶1)

"The selection..... field blank concentrations (USEPA, 1992).

U.S. EPA, 1992. Guidance for Data Useability in Risk Assessment (Part A). Office of Emergency and Remedial response. 9285.7-09A.

20. **Table 4-1 - Compounds of Concern for Step II Sites (Page 71)**

Compounds of concern should be presented as medium-specific. It is illogical to evaluate risk or develop cleanup level if the threat posed by these various contaminants are unknown in each of the affected media.

Revise this table to clearly indicate the compounds of concern for each of the various media at this site.

We will present the compounds of concern as media specific in the work plan.

21. **Section 4.2.3 - Selection of Compounds of Concern (Page 73, ¶3)**

This section of the work plan is not clearly written. Revise the work plan to clearly define the frequency of detection and the spatial extent of contamination which is proposed to select compounds of potential concern. Include in this revision how the "natural range of elemental abundance" for each inorganic compound will be determined.

We will revise the text of the work plan as follows:

The compounds of potential concern are those judged to be important site-related contaminants with regard to potential human health risks. Selection of compounds of potential concern was made based on a review of available data and consideration of the following criteria:

- *Only compounds for which positive data (i.e., analytical results for which measurable concentrations are reported) were available in at least one sample from each medium were considered as compounds of concern for the site. If there were no positive data and information existed to indicate that the compound was present (e.g., fate and transport characteristics of the compound, or detection of the compound in other media) then that compound was included.*

- *The quantitation limit of a compound must have been less than corresponding standards, criteria, or concentrations derived from toxicity reference values.*

- *The presence of an inorganic compound was at concentrations above its natural range of elemental abundance (Shacklette and Boerngen, 1984).*

- *The spatial extent of contamination was considered by the evaluation of the selection of sampling locations, presence of potential hot spots and a sufficient number of samples collected over the time frame of the investigation.*

22. **Section 4.3.2 - Identification of Potentially Exposed Populations (Page 74, ¶ 1 & 3)**

Revise the work plan to include a statement that the identification of exposed populations

and exposure routes under current and future land use conditions will be explained and justified in the Phase II Remedial Investigation risk assessment report.

We will revise the text of the work plan as follows: "The identification of exposed populations and exposure routes under current and future land conditions will be explained and justified in the Phase II Remedial Investigation risk assessment report. Future receptor at the sites include: workers....."

23. **Table 4-2 - Exposure Summary for Potential Human Receptors (Page 75)**

Since all the contact rates in the exposure equations in the risk assessment guidance are based on per day consumption (except for swimming scenario), revise this table to eliminate the column for exposure duration (i.e., time/event) with the unit hour/day except for the swimming scenario.

Provide the rationale for the lack of future receptors associated with the Torpedo Shops, although the text of paragraph 2 of page 74 states that potential future receptors at the Torpedo Shops include workers involved in excavation and construction activities.

Table 4-2 will be revised to reflect EPA's comments.

24. **Section 4.3.4 - Estimation of Average Daily Doses (Page 80)**

Revise the exposure equations of this section of the work plan to Exhibits 6-11, 6-12 through 6-18 of the Risk Assessment Guidance from Superfund (RAGs), Volume 1 Human Health Evaluation Manual (Part A) 1989.

Except for site-specific data, exposure parameters should be referenced in the following hierarchy: 1) Supplemental Guidance to RAGs: Standard Default Exposure Factors, 2) RAGs, 1989, 3) Dermal guidance, 4) Region 1's guidance, and 5) Exposure Handbook.

The exposure equations in this section of the work plan will be revised.

We will revise the text of the work plan to read:

"Exposure assumptions used in the calculation of average daily doses will be developed based on discussions with USEPA Region I personnel and guidance presented in: 1) Supplemental Guidance to Risk Assessment Guidance: Standard Default Exposure Factors (1991); 2) Risk Assessment Guidance (USEPA 1989); 3) Dermal Exposure Assessment: Principles and Applications (USEPA 1992); 4) Region I specific guidance; and 5) the Exposure Factors Handbook (USEPA 1989).

25. **Section 4.4.1 - Toxicity Assessment for Non-Carcinogenic Effects (Page 82, ¶1)**

Based on the document provided to EPA Region I by ECAO, entitled "Evaluate the appropriateness of using proposed surrogate RfDs (U.S. Naval Submarine Base, New

London/Groton, Connecticut), Part 1, 2 and 3", the statements in this paragraph are incorrect.

In Part II, Attachment 2 - "Feasibility of developing an RfD for Acenaphthylene by Analogy to potential Surrogates (Phenanthrene, Acenaphthene)", ECAO concluded that it is inappropriate to use the RfD from Phenanthrene or Acenaphthene for Acenaphthylene. In Part III, Attachment 1 - "Risk Assessment Issue Paper for Status of Polyaromatic Hydrocarbons", ECAO further updated the toxicity for all the PAHs. Neither attachment includes the statement of the first paragraph of page 82 of this work plan.

In addition, EPA Region I has previously advised Menzie-Cura & Associates, regarding the Region I interim policy to use the RfD of Naphthalene as the surrogate RfD for the non carcinogen PAHs which do not yet have verified RfDs.

Revise this section of the work plan to incorporate the use of the RfD of naphthalen as the surrogate RfD for the non-carcinogen PAHs which do not yet have verfied RfDs.

Although we do not agree with EPA, we will change the text of the work plan as follows:

As reference doses for phenanthrene and acenaphthylene are not available, following Region I guidance, the RfD for naphthalene will be used as a surrogate RfD for the noncarcinogenic PAHs which do not yet have verified RfDs.

26. <u>Section 4.4.1 - Toxicity Assessment for non-Carcinogenic Effects (Page 82, ¶4)</u>

The lead uptake/biokinetics model is developed for evaluation of lead exposure in children, and therefore should not be used for evaluation of adult population.

Revise the work plan to delete the reference to the use of the lead/uptake/biokinetics model for the adult population.

Although we discussed this point with EPA, we are not satisfied with the explanation. It is agreed that the most sensitive population to the adverse health effects of lead are children and that the IU/BK model was derived for evaluation of lead exposure in children, however, by adjusting the input parameters to reflect adult pharmacokinetics data, a similar approach can be used to evaluate lead exposures in adults. By eliminating this receptor group, a potential risk might go unnoticed. We will contact toxicologist Anne Marie Burke at Region 1 for discussion of this point.

<u>EPA's Comment on Navy Response</u>

If the Navy would like to submit, for EPA review, the proposed modifications to the IU/BK Model of lead in an adult, then this would be acceptable. At this time, however, the IU/BK Model cannot be modified to simulate lead exposures in adults and therefore, the use of this model should be limited to the section defining uncertainty.

In addition, it should be noted that children under the age of six years, rather than adults, are the subpopulation of concern due to the nature of the adverse health effects of very low blood lead levels for this age group.

27. <u>Section 4.4.1 - Toxicity Assessment for Non-Carcinogenic Effects (Page 83, ¶1)</u>

Revise the work plan to cite the Dermal Exposure Assessment Guidance for the dermal exposure pathway. Include in this revision the use of the absorption factors for a few chemicals in soil and the recommended permeability constants for surface water.

We will revise the text of the work plan as follows:

"...until further guidance is recommended. For dermal exposures from soils, the percentages of 2,3,7,8-tetrachlorodibenzo-p-dioxin, 3,3,4,4-tetrachlorobiphenyl and cadmium absorbed are 0.1-3%, 0.6-6%, and 0.1-1.0%, respectively (USEPA 1992). For the percentage of other compounds absorbed through the dermal route from soil, EPA Region 1 will be contacted. For estimating the dermally absorbed dose per event from water, the permeability coefficient from water through skin (cm/hr) can be obtained from Table 5-7 in the dermal guidance document (EPA, 1992). If there are no published values for specific compounds, the default value of 10^{3} cm/hr will be used for an inorganic compound. For absorption of organics from water, the partition coefficient between octanol and water will be used as determined first, from Table 5-7 or second, from other databases".

NOTE: This paragraph should also be added to the dermal guidance for noncarcinogenic effects. (Page 82, ¶3).

<u>EPA's Comment on Navy Response</u>

EPA - Region I has previously recommended the use of the upper-bound of percent absorbed for polychlorinated compounds (e.g., 3% for polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans, 6% for all polychlorinated biphenyls and aroclors). Other compounds, such as TCCD, TCB and cadmium, should be assessed qualitatively in the uncertainty section.

28. <u>Section 4.4.1 - Toxicity Assessment for Non-Carcinogenic Effects (Page 83, ¶2)</u>

Revise the work plan to incorporate the oral cancer potency factor for benzo(a)pyrene. The standard is 7.3 per mg/kg/day (as opposed to 5.8 per mg/kg/day recommended earlier; the change is due to the detection of a mathematical error) which is currently on IRIS.

Since the relative toxicity equivalent factor approach has not been finalized by EPA, it should not be presented in this work plan. Revise the work plan to reflect the status of the toxicity factor and delete references to other regions' approaches to risk assessment.

The text of the work plan will be changed to include the current CPF for benzo(a)pyrene as follows:

"As per EPA Region I guidance, the EPA-derived cancer potency factor of 7.3 $(mg/kg/day)^{-1}$, or the most current CPF will be used as a surrogate for all polyaromatic hydrocarbon carcinogens until further guidance is recommended.".

We will be presenting the relative toxicity equivalent factor approach to provide a complete picture of potential risks due to exposures of receptors to carcinogenic PAHs. Since Region I is adamant about its inappropriateness, we would like to present this approach in the uncertainty section.

EPA's Comment on Navy Response

Although two sets of Toxicity Equivalent Factor (TEF) values have been listed in the 1991 Drinking Water Criteria for Polynuclear Aromatic Hydrocarbons (PAHs), the document does not recommend the use of the TEF approach before EPA has completed a critical review and analysis of the approach.

Furthermore, according to Part III, the Navy should evaluate the appropriateness of using the proposed surrogate RfDs issued by ECAO. More specifically, on page 3 of the risk assessment issues paper for the status of PAHs, ECAO also recommends that the use of the TEF approach at this time would be inappropriate. Thus, it is the interim policy of EPA - Headquarters, not Region I, which prohibits the acceptance of the TEF approach.

29. Section 5.3.2.3 - Additional Terrestrial Field Assessments (Page 99, ¶3)

In order to assess pesticide bioaccumulation, the draft work plan proposes to analyze the tissue concentrations of healthy earthworms after the 28-day bioassay is completed. It would appear that earthworms exhibiting sub-lethal effects (e.g., coiling, swelling) should also be analyzed for pesticide tissue concentrations as these individuals may represent worms most exposed to soil pesticide concentrations.

Revise the work plan to provide the rationale for not including these individuals in the tissue analyses.

Sterile silica sand does not appear to be optimal substrate for the earthworm. A combination of silica sand, peat and reagent grade lime may be a better choice of substrate.

Provide the rationale for use of sterile silica sand, or modify the work plan to include a different substrate.

The work plan will be revised to include analysis of earthworms exhibiting sub-lethal effects as well as healthy earthworms. The first sentence on page 99, paragraph 3 will be amended as follows:

Introduced Earthworm Bioaccumulation: After 28 days, the remaining living earthworms and approximately 0.5 kg of soil will be removed from the site chambers for five of the bioassay stations.

The substrate for the reference earthworm bioassays will be revised. The fourth sentence in paragraph 2 on page 99 will be amended as follows:

A reference chamber is also employed using an artificial soil composed of sterile silica sand (68%), kaolin clay (20%), peat moss (10%), and pulverized calcium carbonate (2%) as substrate (Callahan and Wilborn, 1988).

The reference is:

Callahan, C.A. and D.C. Wilborn, 1988. Earthworm Toxicity Test for Solid Waste and Superfund Sites, Health and Environmental Review Division, Office of Solid Wastes, Office of Hazardous Wastes/Superfund, Environmental Protection Agency, Washington, D.C.

30. **Section 5.3.2.4 - In-Field Earthworm Bioassays Using Sediment (Page 100, ¶2)**

The text proposes to use terrestrial (as opposed to aquatic) worms in bioassay chambers placed at the pond bank. There are several concerns with this approach:

- The method proposes to use terrestrial earthworms to assess the toxicity of an aquatic substrate.
- The sediments for the test will be relocated from within the pond to the pond bank, where the sediments are not truly *in-situ*.

Provide further justification for this approach, including references which describe previous studies where terrestrial earthworms have been used to assess aquatic sediment toxicity.

Clarify the methodology proposed for performing in-field bioassays, in particular, explain why standard ASTM laboratory sediment toxicity tests are not being performed.

Earthworms were chosen for the sediment bioassays to provide a cost effective survey in terms of time and equipment. The sediment bioassays can be performed at the same time using the same equipment as the terrestrial earthworm bioassays.

The earthworm bioassays are intended to provide an indication of the toxicity of the sediments to biological systems in general, not to a particular organism. Earthworms may be used as a surrogate organism in this manner because they are sensitive to the primary contaminant in the sediments, DDT isomers, and they are known to bioaccumulate it.

The sediment bioassays will occur concurrently with chemical analyses, terrestrial earthworm bioassays, and with sediment sampling for benthic organisms. Therefore, there will be a basis of comparison among contaminant concentrations, results of the soil and sediment bioassays, and the benthic analyses. The results of these different methods will provide a weight of evidence as to the toxicity of the sediments.

Lumbricus terrestris have been used for toxicity testing in a wide range of moisture conditions including total submersion. Mac et al. (1990) performed bioaccumulation assays with freshwater sediments using L. terrestris. They chose this organism as a surrogate for freshwater benthic organisms because of its size and its physiological similarity to aquatic organisms. The size is an important factor because larger organisms provide more mass for chemical analysis. Physiologically, earthworms need a moist environment for respiration and excretion functions which make them similar to aquatic organisms.

One of the problems with using earthworms for toxicity testing in media with greater than optimum moisture content is the depletion of oxygen during the test rather than the presence of excess moisture (Callahan, C.A., personal communication, 1993). Since the sediments to be tested are expected to be aerobic, this is unlikely to represent a problem during the test. Frequent observations will be made during the bioassay to ensure that the worms are burrowing into the sediment and that their exposure is more representative of organisms living in the medium. If the sediment is too moist or too rocky and the worms don't burrow into it, it will be mixed with a known amount of artificial soil.

Mac, M.J., Noguchi, G.E., Hesselberg, R.J., Edsall, C.D., Shoesmith, J.A. and J.D.Bowker, 1990. A bioaccumulation bioassay for freshwater sediments, Environmental Toxicology and Chemistry, Volume 9, pp. 1405-1414.

<u>EPA's Comment on Navy Response</u>

There is still some questions as to the validity of using earthworms for sediment bioaccumulation assays. The response cited the need for sufficient tissue mass for chemical analysis. While that need is recognized, it is questionable as to whether earthworms are appropriate surrogates for benthic invertebrates. It is felt that assessment of the benthic environment may better be served through the use of actual benthic inhabitants.

Since the required tissue mass for DDT analysis is only approximately 1 gram dry weight, other species more suited to the benthic environment may serve the purpose.

As an example, bioassays have been performed using <u>Chironmus tentans</u> larvae, placed in Nytex envelopes, submerged in the sediments for the duration of the test period. Sufficient numbers of larvae could produce the tissue mass required for analysis.

Although it is recommended that <u>Lumbricus terrestris</u> not be used, the following suggestions on its use are made based on a conversation with Clarence Callahan (EPA)

on March 5, 1993.

Although L. terrestric may survive in a submerged situation, they will be stressed, and such a test will not reflect their normal metabolism. The organisms may actually accumulate additional contaminants due to absorbing and excreting large quantities of water.

The removal of sediments to the banks of the wetland cannot be correctly called an *in situ* test. This is not simply a problem of semantics. The sediments may compact and dry once out of the water, forming and impermeable mass that the earthworms cannot penetrate. This test could be performed better in a laboratory setting where better monitoring of the test could be done. In either setting, consideration should be given to mixing in 50/50 ratio of samples and reference sediment to prevent hardening of the sediment, depending upon the expected DDTR concentrations. In addition, it is suggested that the containers be opened at 24 hours, and every 7 days to ensure that the worms are in fact burrowing into the sediment.

Therefore, if *in situ* tests are to be performed, the test species used should be Chironomous tentans. However, if laboratory tests are performed, another species of Lumbricus should be used, not terrestris.

31. Section 5.3.2.4 - Additional Assessment of Freshwater Systems in Area A (Page 100, ¶4)

Revise the work plan to indicate that the species of frog collected will be recorded, and it is recommended that a potential year-round resident frog species (i.e., green frog, pickerel frog) be collected.

Page 100, ¶ 4 of the work plan will be revised to indicate the species of frog collected. The following sentences will be added to this section after the first sentence:

The species of frog will be recorded. The collection effort will focus on year-round resident species such as Green Frog. This species was observed in Area A during previous work at the site in April 1990.

What is now the second sentence in this section will begin a new paragraph.

32. Section 5.3.2.4 - Additional Assessment of Freshwater Systems in Area A (Page 101, ¶5)

A biotic index will provide additional insight into the relative health of the aquatic benthic communities. Revise the work plan to indicate that a biotic index (i.e., Hilsenhoff Biotic Index) will be determined for each of the benthic sampling stations.

The work plan will be revised to indicate that the Hilsenhoff Biotic Index will be used to assess the relative health of the aquatic communities. The following sentences will be

inserted after the second sentence in ¶ 5 on page 101:

In addition, the Hilsenhoff Biotic Index will be calculated for each sampling station. Information will be obtained from the Connecticut DEP regarding the use of this index in Connecticut and tolerance values assigned to particular taxa in this geographic area.

33. <u>Section 5.3.3 - Wetlands Delineation (Page 102)</u>

In order to be in agreement with the Army Corps of Engineers, EPA requires the use of the 1987 version of the "Corps of Engineers Wetlands Delineation Manual", rather than the referenced 1989 version.

Revise the work plan to reference the 1987 version of the "Corps of Engineers Wetlands Delineation Manual".

The reference to the Federal Manual for Identifying and Delineating Jurisdictional Wetlands on page 102, paragraph 1 will be changed to 1987, rather than 1989.

34. <u>Table 5-2 - Thames River Field Sampling Plan (Page 105)</u>

The use of upgradient and downgradient sampling locations as comparison for the evaluation of NLON Submarine Base impact dictates that surface water at these locations be analyzed for pesticides also.

Revise the work plan to include the sampling of surface waters and include the analysis of pesticides to the analyte list for the upgradient station. This information is necessary to provide data on background concentrations that are not attributable to the subase.

Table 5-2 on page 105 will be revised to include the analysis of the two upriver (upgradient) water samples for pesticides.

35. <u>Section 5.3.4.4 - Caged Oyster Study (Page 108)</u>

Revise the work plan to include a detailed description of the preparation techniques for the VOC analysis, in particular, discuss the efforts to be taken to ensure that the volatile constituents will not be lost in the process leading to low recoveries and useless results.

In regards to the freezing of tissue for later analyses, according to the CLP protocols, the sample holding times will be a limiting factor. Revise the work plan to include an expanded discussion of the time required from the collection of the sample to the time of the analysis.

Revise the work plan to provide the rationale for the selection of oysters as the test species and not mussels.

Page 108, ¶3 under Section 5.3.4.4 will be revised. The fourth sentence of this

paragraph will be revised to read:

At the end of the deployment period, the oysters will be shucked immediately and frozen. Samples will be delivered frozen to the analytical laboratory.

The following sentence will be added at the end of the paragraph:

Sampling holding times will conform to CLP protocols.

The tissue samples will be analyzed for VOCs by a modified Method 8240. In place of a purge and trap method, the tissue is first sonicated with a small amount of reagent water. The VOCs driven from the sample in this manner are then captured in a liquid nitrogen cold trap. From this point on, the analysis follows standard GC/MS methods. Sample handling is kept to a minimum with this method

The work plan will be revised to provide the rationale for using oysters rather than mussels as the test species. The following will be inserted on Page 108 after the first sentence of the third paragraph under Section 5.3.4.4:

Oysters will be used as test organisms rather than mussels (the organisms traditionally used in this type of test), because oysters are more tolerant of variations in salinity. There is a salinity gradient with depth in the Thames River near the subase and the use of oysters as test organisms will allow the cages to be placed in shallower, less saline water, if necessary.

36. <u>Section 5.4.1 - Identification of Contaminants of Concern (Page 109)</u>

The statement is made in the first paragraph that the contaminants of concern have been identified for Area A. This is incorrect; EPA's comments from the last review clearly indicated that there are some areas of disagreement in the contaminants of concern list.

Revise the work plan to either eliminate or qualify this statement accordingly.

This section gave the mistaken impression that the contaminants of concern have been chosen for the site. The second, third, and fourth sentences of Section 5.4.1 will be replaced with:

The previous investigation performed for Area A provides a preliminary list of contaminants of concern identified at the site. This list will be amended depending on the results of the analyses conducted under this work plan.

The first bullet in this section will be revised as follows:

- *Concentration in sediments, surface waters, and ground water that may discharge to the Thames River. Concentrations of contaminants in Area A surface soil, sediments, surface water, and ground water.*

37. **Section 5.5.2.1 - Estimating Exposure in Soils and Sediments From Organic Contaminants - Equilibrium Partitioning (Page 112)**

This is only discussion on the use of the Equilibrium Partitioning (EP) approach.

Revise the work plan to expand the discussion to include the evaluation of the inorganic contaminant exposure assessments.

A new section (Section 5.5.2.2) will be added on page 113 of the work plan to discuss exposure assessment to inorganic contaminants. The existing Section 5.5.2.2 will become Section 5.5.2.3.

Section 5.5.2.2 *Estimating Exposure in Soils and Sediments from Inorganic Contaminants*

Direct measurements of concentrations will be used to estimate exposures to inorganic contaminants in soil and sediments. These will be used on a location by location basis.

For Area A soils and sediments, inorganics with concentrations greater than background (as determined in a separate on-going study) will be treated as contaminants of concern. Soil concentrations will be compared to available information on phytotoxicity and soil invertebrate toxicity data on a location by location basis. Sediment concentrations will be compared with toxicity benchmarks developed by Long and Morgan (1990).

Exposure of benthic organisms to inorganic contaminants in Thames River sediments will be assessed via comparisons with upstream and downstream concentrations, literature concentrations for the Thames River estuary in particular and urban estuaries in general, and Long and Morgan data.

38. **Section 5.7.3 - Presentation of Risk (Page 118, ¶3)**

Sediment concentrations of contaminants are proposed to be compared with both NOAA sediment benchmarks and EPA sediment criteria. Revise the work plan to clearly state that the Equilibrium Partitioning method will be used to calculate sediment criteria for those non-polar organic contaminants that do not have EPA sediment criteria.

The following sentence will be added as the second sentence to the last paragraph on page 118:

For non-polar organic compounds for which no EPA sediment criteria are available, the Equilibrium Partitioning approach will be used to calculate sediment based on EPA and/or Connecticut water quality criteria.

39. **Section 6.1.1.1 - Potential ARARs (Page 119)**

Revise the work plan to present the comparison of the detected contaminant concentrations to the current federal drinking water standards; this may result in additional contaminant concentrations exceeding ARARs. If this comparison results in additional contaminant concentrations exceeding ARARs, then incorporate this information into the narrative. This revision should also ensure that only the most recent federal drinking water standards are used in this investigation.

We will screen the Phase I data regarding any recent changes in ARARs and revise this section of the report as necessary.

A table containing the most recent chemical-specific ARARs will be provided in the work plan and we will clarify that it is our intent to use the most recent ARAR data to evaluate all Phase II data.

40. **Section 6.1.4.1 - Potential ARARs (Page 123, ¶6)**

This paragraph contains an example of the inappropriate comparison of the lead concentration in soil (in solid form, mg/kg) from routine CLP chemical analysis to the concentration of RCRA TCLP regulatory level (i.e., 5 mg/L in solution) and CRDL (0.05 ug/L, in solution). This approach is incorrect.

Under the Resource Conservation and Recovery Act (RCRA) program, the leached concentration of a chemical in the soil, after conducting the Toxicity Characteristics Leaching Procedure (TCLP) analysis, is compared to a regulatory level to determine if the excavated soil is to be handled as a hazardous waste. This comparison is not to be used to determine if the soils pose a risk to human health or the environment based on a risk level or a hazard index.

Revise the work plan to reflect the correct approach to evaluating ARARs.

Please refer to our response to Comment 5 above.

41. **Table 6-5 - Preliminary Remedial Action Objectives and Alternative Process Options (Page 124)**

Revise this table to include a Remedial Action Objective (RAO) which addresses ground water contamination, since ground water has been determined to be contaminated with, at a minimum, vinyl chloride, benzene, toluene, ethylbenzene, xylene and PAHs.

Please refer to our response to General Comment 19 above.

42. **Section 7.2.1 - Rubble Fill at Bunker A-86 (Page 136, ¶2)**

Revise this list of contaminants for which the source, nature and extent will need to be

defined to include chlorinated solvents.

This revision will be made.

43. **Section 7.2.1 - Rubble Fill at Bunker A-86 (Page 136, ¶4)**

Given that bedrock is exposed in the area, it is possible that contaminants may be released directly to bedrock, and therefore may not be detected in the overburden, if present.

Revise the work plan to include one shallow bedrock well clustered with an overburden well in order to determine the vertical flow gradient and contaminant levels in this area.

Please refer to our response to General Comment 20 above.

44. **Table 7-8 - Rationale for Selection of Constituents for Analysis (Page 138)**

Revise the engineering characteristics of the work plan to include the measurement of the subsurface soils and/or fill material pH in the contaminated area.

Definition of parameters such as compaction, percent moisture, permeability, strength, pH, etc. need to be proposed for the fill material and surrounding soils. The feasibility of capping may be greatly affected should the fill need compaction, or the fill not be strong enough to support the heavy machinery needed or the weight of the cap over time.

Revise the work plan to include efforts to characterize and delineate the fill material.

The engineering characteristics will be revised to include pH.

For the materials believed to be present, consolidation tests do not appear to be necessary. Standard penetration tests will be performed for borings in this area. The results of the penetration tests along with the parameters proposed will be adequate to predict the ability of soils in this site to support heavy equipment or a cap.

The work plan will be revised to include a task to identify the extent of fill based on visual observations.

45. **Table 7-9 - Rubble Fill at Bunker A-86, Field Sampling Plan (Page 139)**

Revise the work plan to include the addition of a surface water sample at location 4SD2 to measure the level of sediment contamination leaving the site.

Sample 2WSW13 was proposed for this purpose. Its location and designation will be changed to location 4SW2.

46. **Figure 7-3 - Rubble Fill at Bunker A-86, Field Sampling Plan (Page 141)**

Geophysical work or additional borings need to be proposed to confirm the interpreted extent of fill material. This information will be needed to determine the volume of material which will require treatment.

Provide the rationale for the collection of only one surface soil sample (of eight proposed) from the suspected source area. Revise the work plan to include two additional surface soil samples from the suspected source area.

As stated above, the extent of fill will be determined by visual observations and its depth will be determined by a soil boring. As we discussed, this will be adequate to determine the volume of fill.

The work plan will be revised to include the collection of two additional surface soil samples.

47. **Section 7.2.2 - Torpedo Shops (Page 142, ¶1)**

Revise the work plan to include Otto fuel and PCBs in the list of contaminants for which the source, nature and extent need to be defined.

This section will be revised to include as an objective, the determination of the extent of Otto fuel spillage; however, we don't feel delineation of PCB contamination is a goal of this investigation as PCBs have not been detected in ground water and only twice in soils at levels below 1 ppm.

48. **Section 7.2.2 - Torpedo Shops (Page 142, ¶4)**

Revise the work plan to indicate how the results of the soil gas surveys will be used (e.g., indicate whether any of the proposed sample locations will be re-positioned, or new locations will be added based on survey results, etc.). Include in this revision the criteria that will be used to decide these issues.

This will be provided.

49. **Section 7.2.3 - Goss Cove (Page 142)**

This section of the work plan proposes the measurement of air quality for the risk assessment, yet there is no mention of air pathway in the risk assessment section of this work plan.

Revise the work plan to clarify the status of the air pathway investigation.

Inhalation is indicated as an exposure pathway in the risk assessment work plan.

50. <u>Table 7-11 (Page 144)</u>

Revise the work plan to include the measurement of the heat content of soils (BTU analysis), porosity, and hydraulic conductivity in the engineering characteristics parameter.

Engineering parameters have been re-evaluated and a table will be provided containing our rationale. For the reasons presented below, we do not propose to add certain parameters:

- *BTU - No free oil or other organic product contamination is present and organic content is being measured. Typically, soils have no significant BTU value.*
- *Porosity - This parameter can be estimated to the accuracy necessary for any calculations in which it may be used.*
- *Hydraulic Conductivity - In situ tests are proposed to measure this characteristic.*

51. <u>Table 7-12 (Page 145)</u>

The U.S. Navy has indicated in the response to EPA comments regarding the August 1992 RI Report (Navy Summary of Resolutions Reached Regarding EPA Comments (May 20, 1992) on Draft IR Report (August 1991), Comment No. 1, for Page 29, Response 6, located on Page 8 of Navy Response), that samples would be obtained for dioxins at this site.

Revise the work plan to include the addition of the collection and analysis of samples for dioxins.

Revise the work plan to include engineering analysis at sample location 7MW2D.

The torpedo shops were listed in our previous response as dibenzofurans were detected in sample 2WSD9. We now classify this area as the Weapons Center site and have proposed dioxin analyses for sample 2WCSD11 near the location of 2WSD9.

The work plan will be revised to include engineering analysis at sample location 7MW2D.

52. <u>Figure 7-4 (Page 147)</u>

Revise the work plan to include the addition of a monitoring well hydraulically downgradient of monitoring well 7MW3 to determine the downgradient extent of contamination which has been observed in monitoring well 7MW3.

Include in the revision to this figure the location and discharge point of the floor drains

which have been determined to contain volatile organic compounds.

Revise this figure to indicate the areas referred to as "where chemicals were stored (Page 142, ¶4)."

The revision to this figure should also include the sample locations from the GZA study in order to evaluate the sample locations around the Otto Fuel Tank Area.

Since the GZA study identified contamination around Building 450, revise the work plan to include additional soil and ground water sampling location around Building 450 to determine the nature and extent of the contamination identified in the GZA study.

There are already several wells (7MW9S, 2DMW29S and 2DMW28S and 2DMW28D) downgradient of 7MW3 that will be analyzed for VOC. These wells are shown on Plate 1. Due to the existence of these wells and as VOC levels in 7MW3 were below ARAR values, we do not feel any additional wells are necessary.

The floor drains discharged to the Otto fuel tank. Their location will be shown in Figure 7-4.

The areas where chemicals have been stored are at boring locations 7TB9 and 7TB7. These locations will be shown in Figure 7-4.

The former GZA sample locations, which are all at the Otto fuel tank, will be shown. Wells 7MW5S and 7MW5D, borings 7TB11, 7TB12, 7TB13 and supplemental borings were proposed for this purpose and should adequately make this determination.

53. <u>Section 7.2.3 - Goss Cove (Page 148)</u>

One of the stated objectives for Goss Cove is to confirm that radiological constituents in ground water are from natural sources. However, analysis for radiological parameters in ground water is only planned for the existing 8MW1 and 8MW4. Confirmation sampling at these locations will not determine whether the previously observed levels of radiological analytes are occurring at "natural levels".

Revise the work plan to include sampling of upgradient wells to help determine the background level of the previously detected radioisotopes.

As we discussed in our phone conference, the background determination regarding radiological parameters will be made by performing a gamma spectrum analysis rather than by background comparison.

The text will be clarified regarding performance of the gamma spectrum analysis.

54. <u>Section 7.2.3 - Goss Cove (Page 148, ¶4)</u>

Revise the work plan to clearly state the specific criteria which will be employed in determining how the results from the field screening will be used to determine if additional borings are required.

Composited samples may be used to generally characterize the nature of the fill material as a potential source of any contaminants detected in the area of the landfill. However, composited samples will not "properly characterize the nature, extent and degree of contamination". Composited samples would potentially result in the dilution of contaminants and therefore, would be an inappropriate representation of the degree of contamination.

Revise the work plan to ensure that all subsurface soil samples (especially samples for VOC analysis) will be collected as discrete grab samples.

The details regarding sample selection are provided in the Field Sampling Plan (FSP). Please refer to Section 4.2.2.3 in the FSP.

Vertical composite sampling (except for VOCs) was proposed; it is our opinion that due to the heterogeneous nature of the landfill contents, the risk of missing significant contamination is much greater than masking significant levels of contamination due to dilution. Dilution levels assuming one sample is contaminated and all others are clean will not exceed a factor of 10. As we discussed, we feel compositing is a better approach; however, if EPA feels strongly that we collect grab samples instead, the work plan will be revised accordingly. The number of samples analyzed does not change either way. It should be noted that surface samples are not being composited.

The work plan does not propose the compositing of VOCs and is clear on this point.

<u>EPA's Comment on Navy Response</u>

Revise the work plan to state that samples will not be composited. Samples should be collected based on visual observation and field screening measurements. Compositing of samples for parameters, other than Volatile Organic Compounds (VOCs), may be acceptable only if insufficient volume is available for all of the analyses.

55. <u>Table 7-15 - Goss Cove Landfill, Field Sampling Plan (Page 151)</u>

Revise the work plan to include the rationale that was used to select the locations and depths from which samples will be collected for the analysis of engineering properties.

Include in this revision, the analysis of pesticides in ground water since pesticides were detected in soils at this site.

Samples for engineering analysis were selected to be from the screened interval of a

monitoring well or in areas that may require remediation. This rationale will be provided in the work plan.

We did not include the analysis of pesticides at this site as they were not detected in previous analyses.

56. **Figure 7-5 - Goss Cove Landfill, Field Sampling (Page 154)**

The U.S. Navy should consider gathering an additional sample along the bank of the Thames River north and upstream of the pier, yet south and downstream of the storm drain outfall. It is recommended that the sample analysis include CLP TAL and TCL, TPH, TOC, and a grain size determination.

Revise the work plan to include, as a water quality parameter, the measurement of water hardness for surface water samples.

A sample location is already proposed just north of this location and as this area is subject to tidal currents, significant differences between adjacent sample locations are not expected. If this particular location is of concern, the plan will be revised to show the proposed Goss Cove sample location at this location.

The work plan proposes to measure hardness in surface water. The text will be clarified to make this clear.

EPA's Comment on Navy Response

No sample location is visible on the Goss Cove map (Figure 7-5, page 154 in the Field Sampling Plan) in the Thames River immediately north of the proposed location. This specific sampling location (north and upstream of the pier, yet south and downstream of the storm drain outfall) is of concern to EPA, as this area is suspected of potential discharges.

57. **Table 7-16 - Spent Acid Storage and Disposal Area Remedial Investigation Objectives (Page 156)**

Revise the work plan to include performing hydraulic conductivity testing in additional wells. This is necessary since many Phase I hydraulic conductivity pump test results were not useable.

Also include in this revision the specific criteria regarding the results of X-ray fluorescence screening. Describe how the samples will be selected for chemical analysis (e.g., highest detection, deepest detection, at the water table, etc.).

The plan will be revised to perform an additional hydraulic conductivity test in well 15MW3S.

The criteria for sample selection are provided in the FSP. Please refer to Section 4.2.2.4 in the FSP for these details.

58. **Table 7-18 - Spent Acid Storage and Disposal Area, Field Sampling Plan (Page 158)**

Revise the work plan to include a bedrock monitoring well to evaluate the transport pathway indicated in the conceptual model (Figure 3-4). In addition, provide the rationale used to select the locations and depths from which samples will be collected for analysis of engineering properties.

The installation of a bedrock well will be added at this site.

The work plan will be revised to provide rationale for selection of samples for engineering analysis. Further detail regarding this point is provided in the response to Comment 19 above.

59. **Section 7.3.1 - Area A (Page 161)**

The eighth bullet of this section proposes verification sampling to determine whether previously detected radiological contamination is naturally occurring; however, this repetitive effort will help further determine the background level of the radiological compounds.

Revise the work plan to include a series of background sampling locations to assist in this determination. These additional sampling points should be located upgradient of these areas known or suspected contamination.

Please refer to our response to Comment 52 above.

60. **Table 7-19 - Chemical Investigation, Surface Water North Lake (Page 164)**

This statement states that surface water will be taken "during non-summer months and/or when the lake is drained". Revise the work plan to ensure that the surface water samples will be collected prior to the actual draining of the lake.

The same logic would apply to the collection of sediment samples from the North Lake. Revise the work plan to ensure that the sediment samples will be collected prior to the actual draining of the lake.

As we discussed, the work plan will remain as proposed and provide for collection of samples when the lake is drained.

EPA's Comment on Navy Responses

For clarification purposes, the work plan should state that surface water and sediment

samples will be taken at proposed sampling locations prior to the actual draining of the lake.

61. **Table 7-20 - Area A, Rationale for Selection of Constituents for Analysis (Page 166)**

Subsection 2.4.1.3 of the work plan states that pesticides were detected in three subsurface soil samples and yet does not discuss whether or not they were detected (or analyzed for) in ground water.

Revise the work plan to include pesticides in the proposed ground water analyses.

Table 7-20, Page 166 states that pesticides were not detected in ground water and for that reason, are not proposed to be analyzed for in ground water.

62. **Table 7-21 - Area A, Field Sampling Plan (Page 168)**

Revise the work plan to include the analysis for PCBs in the ground water samples collected from monitoring wells 2WCMW1S, 2S, 3S.

Ground water analysis was not proposed for these wells as PCBs have not been detected in ground water in this area during the Phase I RI.

63. **Figure 7-7 - Area A Landfill, Wetland and Weapons Center, Field Sampling Plan (Page 173)**

The ground water flow arrows on this map are not accurate, and is not clear whether they depict flow in the overburden or bedrock. In addition, it is not possible to determine whether the proposed monitoring wells are optimally located.

Revise the "Ground Water Flow Direction" arrows to correspond to flow path lines which have been constructed based on potentiometric maps and add information to this map which will indicate the variation of the vertical gradient across the site. Include in the revised work plan, a ground water elevation map, a bedrock elevation map, and a map of the extent of contamination observed in previous studies.

The flow arrows are accurate; however, we agree to clarify that these arrows are for overburden ground water flow.

64. **Table 7-22 - DRMO, Remedial Investigation Objectives (Page 175)**

Revise the work plan to include the rationale for the selection of only wells 6MW4S and 6MW3D for hydraulic conductivity testing.

Confirmation sampling for radiological parameters at the proposed locations will not determine whether the previously observed levels of radiological analytes are occurring at "natural levels".

Revise the work plan to include a series of background sampling locations to assist in this determination. These additional sampling points should be located upgradient of these areas known or suspected contamination.

The rationale will be provided.

Radiological background levels will be determined by use of a gamma spectrum analyses. Please refer to the response to Comment 52 above for further detail.

65. <u>Section 7.3.3 - Lower Subase (Page 177, ¶3)</u>

The U.S. Navy has previously reported that VOCs such as vinyl chloride, benzene and floating product layers have been detected in ground water.

Revise the work plan to include the determination of the extent of VOC contamination in ground water as one of the goals of the Phase II RI.

VOCs have been detected in ground water, however, no recoverable floating product layers were detected during the Phase I RI investigation. The thin layer at 13MW5 which was more of a sheen, does not indicate the presence of a pool of floating product.

There are 24 existing wells at the Lower Subase which is located along the Thames River. This existing monitoring system does define the extent of contamination at this site as detailed in the Phase I RI Report.

<u>EPA's Comment of Navy Response</u>

They should review the proposed sampling approach for the area surrounding the former power house tanks and suggest an approach which will allow adequate characterization of the subsurface. Suggested investigative techniques include microwells, angle borings and geophysical methods.

66. <u>Figure 7-9 - DRMO, Field Sampling Plan (Page 180)</u>

Revise the work plan to include a figure defining the suspected extent of fill material.

The DRMO figure will be revised to show the extent of fill material.

67. <u>Table 7-25 - Lower Subase (Page 181)</u>

Revise the work plan to include the installation of additional ground water monitoring wells in the area of 13MW5 and the tanks in order to determine the extent of the floating layer observed at this location.

Revise the Remedial Investigation Objectives of the work plan to include determining the extent of VOC contamination in ground water.

As stated above, no floating oil was detected during the Phase I and the extent of VOC contamination has been identified.

EPA's Comment of Navy Response

They should review the proposed sampling approach for the area surrounding the former power house tanks and suggest an approach which will allow adequate characterization of the subsurface. Suggested investigative techniques include microwells, angle borings and geophysical methods.

68. **Figure 10-1 - Project Schedule (Page 196)**

Revise the project schedule to the schedule listed in the Federal Facility Agreement (FFA) or submit a petition for a schedule extension. This petition for schedule extension should include a detailed description of the level of effort that the U.S. Navy will be requiring to justify the additional time.

This was provided to EPA in a letter dated January 8, 1993.

PROPOSED FIELD SAMPLING PLAN

GENERAL COMMENTS

1. It appears that for many sediment samples, the "engineering" characteristics are not going to be examined. In order for the sediment sample to be useful for an ecological risk assessment, the total organic carbon (TOC) content and grain size distribution must be determined.

   The plan will be revised to provide for testing all sediment samples for TOC and grain size.

2. There seems to the lack of distinction between the use of terms "soils" and "wetland sediments" when analyses and sampling are discussed. "Wetland sediments" should be termed "wetland soils" and the term "sediments" should be used when referring to the samples below the surface of the water.

   Revise the work plan to ensure that these terms are not used interchangeably, especially in the tables.

   The work plan will be revised to use consistent terminology regarding soils, wetland soil, sediments and wetland sediments.

3. The air monitoring activities discussion in Section 4.1.12 of the Field Sampling Plan makes reference to U.S. EPA Method T01, a copy of which is included in Appendix A.

   Revise the work plan to include Standard Operating Procedures (SOPs) covering all aspects of sampling and analysis for volatile organic compounds (VOCs) and any other contaminants monitored at the site (see Attachment B).

   An SOP for air sampling will be provided.

SPECIFIC COMMENTS

1. **Section 2.1 - Supplemental Step II Investigation (Page 7)**

According to page 1 of the Field Sampling Plan, these sites are to be part of the Supplemental Step I, yet this page indicates that these are part of a Supplemental Step II Investigation.

Revise the work plan to clarify the status of these areas.

Section 2.1 will be revised to indicate that supplemental Step I (not Step II) investigations are proposed for CBU and OBDANE.

2. **Section 4.1.1.1 - Sample Headspace Screening for VOCs (Page 16, ¶3)**

Clarify the statement "Resulting data will not be used qualitatively".

This sentence should read "Resulting data will not be used quantitatively."

3. **Section 4.1.1.2 - PCBs and DDT Screening and Section 4.1.1.4 - Lead Screening (Page 18)**

Revise the work plan to include the detection limits for the field screening methods.

A discussion of detection limits for the field screening methods will be provided. Practical quantitation limits range from 1-10 ppm for DDT and PCB using GC methods and 100 - 500 ppm for lead analyses using XRF.

4. **Section 4.1.3 - Test Borings and Subsurface Soil Sampling (Page 19, ¶3)**

It is strongly recommended that the work plan be revised to include the use of an alternative method of collecting soil samples. The use of 5-foot Central Mining Equipment (CME) is not encouraged due to problems associated with sample recovery.

Revise the work plan to ensure that all test borings are advanced to bedrock to a minimum of five feet to verify the presence of bedrock.

The field sampling plan provides two alternatives to a CME sampler; split spoon samplers and saturated sand samplers. We recognize the limitations of a CME sample and will only use it at sites where it will successfully recover samples.

To define bedrock, the work plan will be revised to core five feet into bedrock at each site at specified locations. One location will be established at Rubble Fill and Spent Acid, two at Goss Cove, Torpedo Shops and DRMO, and four at Area A.

5. **Section 4.1.4.1 - Monitoring Well Construction (Page 19, ¶4)**

Revise the work plan to include a description of the type of well construction materials planned for the Spent Acid Disposal Area considering that the soil pH is low.

A description of well construction materials is provided in Section 4.1.4.1 and Appendix B of the Field Sampling Plan. PVC is compatible with low pH material.

6. **Section 4.1.4.1 - Monitoring Well Construction (Page 20, ¶3)**

Revise the work plan to ensure that the maximum well screen length will be no greater than 10 feet.

Revise the work plan to indicate that the mud rotary drilling method will only be used as a last resort if no other well installation methods are successful.

The work plan specifies that all well screens be 10 feet or less in length except at the Torpedo Shops. At this site, due to the shallow depth to bedrock and potential chlorinated VOC and petroleum contamination, it was felt that it was important to screen from above the water table to the bedrock surface even if more than 10' of screen are required. We do not anticipate any screens greater than 15' in length at this site and will specify a maximum of 15 feet at this site.

EPA's Comment of Navy Responses

No well screens shall be longer than 10 feet. If the thickness of the saturated overburden is such that longer well screens are desired, then additional wells should be installed.

Revise the work plan to state that mud rotary drilling will only be used after all other methods have failed. EPA - Region I only authorizes the use of mud rotary drilling in extremely deep wells (typically over 200 feet).

7. **Section 4.1.4.2 - Monitoring Well Development (Page 20, ¶4)**

Revise the work plan to indicate that well development will proceed until three successive measurements of specific conductance, temperature and pH have stabilized (i.e., vary less than 10 percent) and turbidity is less than 5 NTUs, or until three well volumes have been removed.

The development procedures will be revised as suggested, except that per our discussion, well development will continue until a minimum of seven well volumes have been removed or four hour have elapsed, which ever is greater.

8. **Section 4.1.4.3 - Monitoring Well Sampling (Page 20, ¶5)**

Revise the work plan to ensure that ground water samples will remain unfiltered prior

to analysis.

The work plan clearly specifies that ground water samples for metals analysis will be analyzed on both filtered and non-filtered samples and does not specify the filtering of any other ground water samples.

9. **Section 4.1.5 - Evaluation of Aquifer Hydraulic Properties (Page 22, ¶1)**

Revise the work plan to provide additional details regarding the Area A pump test. Include in this revision a description of which wells will be used as observation wells, how long the test will run, how the purge water will be managed (i.e., disposed), degree of recovery which will be measured (90 percent), frequency of measurement of water levels, etc. Ensure that the pumping test plan includes the monitoring of bedrock well water levels.

The additional detail regarding the proposed pump test will be provided.

10. **Section 4.1.14 - Sampling and Testing of Soils for Engineering Parameters (Page 24, ¶4)**

Revise the work plan to clearly state whether all of the proposed engineering analyses will be performed for all sites. Some of the engineering analyses may not be needed at all sites.

It is recommended that additional testing for compaction and strength be performed at Goss Cove, DRMO, and the Area A Landfill. As mentioned previously, this information may be critical in determining whether these areas will be capable of accepting some of the remedial alternatives.

The text suggests that the Walkley-Black method will be used to determine the Total Organic Carbon (TOC) content. However, the NET Quality Assurance Project Plan (QAPP) lists two other methods, 415.2 and 9060. Revise the work plan to clearly state the method that will be used for TOC determinations.

Revise the work plan to identify the laboratories that will perform the engineering analyses, the radiological analyses, and the air sample analyses. The NET QAPP does not list these methods on the qualifications statement.

Whether or not engineering analyses will be performed at a particular location is specified in the FSP and the specific parameters in the engineering analysis are presented in the rationale for selection of constituents for analysis tables.

Please refer to the response to Comment 44 above regarding the need for compaction tests.

The work plan will be clarified to specify only the Walkley-Black Method for TOC

analysis.

These subcontractors have not been selected at this time. When this contract amendment has been finalized, EPA will be notified as to who will do the work. Whoever does the work will follow the procedures specified.

11. <u>Section 4.2.2.4 - Spent Acid Storage and Disposal Area (Page 47, ¶5)</u>

Revise the work plan to include the collection of a complete round of monthly water level measurements for all monitoring wells on the base to produce a series of ground water elevation maps. These ground water maps would depict the ground water flow directions and flow divides.

The Navy has agreed to develop a basewide ground water contour map and proposes to measure elevations in all wells at the base once. The only areas where it is necessary to measure on a more frequent basis are those areas where there is some uncertainty regarding ground water flow direction such as North Lake and Area A Wetlands. Regarding these areas, after further evaluation, we are proposing to change the frequency specified in the work plan from monthly to quarterly.

<u>EPA's Comment on Navy Response</u>

A subset of 20 to 30 well clusters should be identified as candidates for monthly water level measurements. The objectives of the water level measurements are to determine: seasonal changes in vertical gradients; annual variation in water levels; hydraulic connection between the Thames River, overburden and bedrock; response of water levels to precipitation events.

In addition to aiding the characterization of the subsurface hydrogeology, this data will be required at any of the sites where capping or ground water treatment will be considered as a remedial alternative.

The list of proposed wells should be included in the revised work plan or submitted to EPA separately for review.

12. <u>Table 4-15 - Area A, Field Sampling Plan (Page 54)</u>

Table 4-15 proposes that *in situ* earthworm bioassays be used in "soils/wetland sediment". If the purpose of a bioassay is to assess the suitability of sediment for benthic organisms, then the use of earthworms in a soil bioassay is of questionable value.

If the U.S. Navy is proposing to use *in situ* earthworm bioassays to assess the suitability of sediment for benthic organisms, then provide the supporting rationale for this proposed method.

Earthworm bioassays are suitable for wetland sediment/soil where the soil may be dry

enough for part of the year to support these organism. Their use in this manner has been documented by Menzie et al. (1992) among others. Callahan (1993, personal communication) and research by Mac et al. (1990) indicate that it is possible to use earthworms to assess the toxicity of aquatic sediments. Refer to the response to comment number 30 on the work plan for additional information on the use of earthworms in sediment bioassays.

13. **Section 4.2.3.1 - Area A (Page 57, ¶1)**

Revise the work plan to ensure that all test borings are advanced to the water table.

This paragraph states that all borings will be advanced to a depth of 15 feet or the water table, whichever is greater.

14. **Section 4.2.3.1 - Area A (Page 58, ¶1)**

The objective of simulating residential well water withdrawal does not appear to be appropriate. The focus of the bedrock wells should be to determine whether ground water is contaminated. It is possible that the reason the residential wells have not previously contained organic contamination, is that they are open over long intervals potentially resulting in an off-gassing of the contaminants.

Revise the work plan to indicate that bedrock wells will be advanced until they are capable of providing a reasonable sustainable yield (e.g., over one gallon per minute).

Both the EPA and CTDEP commented on the bedrock well design. EPA suggested to drill the bedrock wells to the depth at which they are capable of providing a yield greater than 1 gpm and stated that the objective of simulating water withdrawal is not appropriate. CTDEP suggested that continuous packer tests be performed in one or two wells and that well screens be set in the highest water yielding zone. CTDEP also stated that the zones of highest yields will be representative of the primary source of water to residential wells. During our phone conference, EPA felt after discussion that the CTDEP packer testing approach was preferable. Packer testing would be capable of defining the highest yield zone in a well, however, whether or not this is the most appropriate zone to sample bears some discussion. The highest yielding zone may not be the most contaminated zone or contaminated at all. Sampling every zone is not feasible and will not substantially add to our understanding of the site. We disagree with EPA that the objective of simulating well water withdrawal does not appear to be appropriate. Remediation standard for this area will be based on MCLs which are measured at the tap not in situ. We feel the objectives of these wells should be to simulate residential wells and detect contamination. Packer testing and screening at the highest yielding zone may not detect contamination in low yielding zones. Drilling to the first water bearing zone could result in the non-detection of contaminants in deeper zones. The effects of dilution of any particular water bearing zone in a deep well must be evaluated regarding contaminant detection. In a hypothetical 100 foot deep bedrock well containing ten different zones, one yielding 1.0 gpm and the others yielding 0.1

gpm, dilution factors are 1.9 to 1 for contaminants in the high yield zone and 19 to 1 for each of the low yielding zones. With this in mind and after consideration of EPA and CTDEP comments, the design in the work plan, seems preferable to either alternative as it will detect any significant contamination and it accurately simulates a residential well for comparison to MCLs.

15. **Section 4.2.3.1 - Area A (Page 58, ¶3)**

Revise the work plan to indicate the proposed location of the observation wells and revise the narrative to include the gathering and analysis of ground water samples from the pumping well. These ground water samples would be analyzed for volatile organic compounds (VOCs) at the following intervals during the pump test: start, 1 hour, 2 hours, 4 hours, 8 hours, 16 hours and at the conclusion.

The work plan will be revised to show the location of the observation wells and will provide for collection of seven samples at the intervals indicated in the comment.

16. **Section 4.2.3.1 - Area A Wetland (Page 59, ¶3)**

It is unclear how the water levels in residential wells will be measured, since this will require removing pumping appurtenances, and discontinuing water removal for a period of time long enough to ensure stabilization of water levels.

Revise the work plan to include a discussion of how the water levels of the select residential wells will be measured.

We will perform the measurements at select locations which have well casings completed above grade at residents who agree not to use water for a minimum of an hour prior to the measurements. With casings above grade, the cover/seal can be removed. There is enough clearance in the well casing to allow insertion of a water level indicator without removing any pumping apparatus.

17. **Section 4.2.3.2 - Defense Reutilization and Marketing Office (DRMO) (Page 63, ¶5)**

Revise the work plan, if necessary, to ensure that soil samples gathered for VOC analysis are not composited.

Revise the work plan to ensure that deeper soil samples (below one foot) will be gathered for the risk assessment to evaluate exposure of construction workers.

The FSP is clear on the point that samples for VOC analysis will not be composited. The plan states that deeper soil samples will be used in the risk assessment.

18. **Section 5.0 - Sample Preservation and Shipping (Page 75)**

More detailed information needs to be provided in this section. Specifically, describe

the following:

- the method to confirm the pH of the samples
- describe the pH at which the samples will be preserved and the preservative(s) that will be used in this effort

Provide a table that includes this information. This information must also be incorporated into Section 3.3 of the QA/QC Plan.

This information will be provided. Samples will be acidified to a pH less than 2 using nitric acid. To verify pH, a sample that will not be sent to the lab will be analyzed for pH as increasingly larger volumes of acid are added to the sample until its pH is ≤2. This volume plus 25 percent will be used to preserve all other samples.

19a. <u>Appendix A - SOPs, Technical Procedures</u>

Revise the work plan to include a description of who will be performing these analyses and describe if all the methods listed in this table are to be performed in the field. For additional reference, see Attachment B.

All of the methods will be performed in the field except ASTM Methods D854, D2216, D2974 and possibly D422, SW-846 Methods 9045 and 9081 and EPA T01. Whoever performs the analyses will follow the procedures indicated. Presently, it is planned that Atlantic will perform all field analyses except XRF analyses which will be performed by a subcontractor.

19b. <u>SOP 1020 (Page 5, ¶1)</u>

Revise the work plan to ensure that samples will not be composited.

Neither the work plan or Atlantic SOPs allow VOC to be composited. Regarding the compositing for non-VOC analyses, please refer to our response to Comment 53 above.

19c. <u>SOP 1022 (Page 7)</u>

Revise the work plan to include the following statement to the text; "the samples will be immediately preserved after filtration".

The specified statement will be included in the work plan.

19d. <u>SOP 1023 (Page 7, ¶3)</u>

Revise the work plan to indicate that no filtering of ground water will be performed.

Samples for inorganic analyses will be analyzed for filtered and non-filtered metals. No other samples will be filtered.

19e. <u>SOP 1060</u>

Revise the work plan to ensure that this procedure will be modified to correspond to EPA Region I protocol.

To what extent does this SOP not agree with Region I protocol?

QUALITY ASSURANCE/QUALITY CONTROL
DATA MANAGEMENT PLAN

1. **Section 1.1 - Data Quality Objectives (DOO) (Page 1)**

   The references to both the SOWs and Data Validation Functional Guidelines are not current. The NET QAPP indicates that it follows the 3/90 CLP SOWs.

   Revise the text of the work plan to reflect the 3/90 SOW and the U.S. EPA Region I Laboratory Data Validation Functional Guidelines for Organic Analyses February 1, 1988, modified July 1988 and U.S. EPA Region I Laboratory Data Validation Functional Guidelines for Inorganic Analyses June 13, 1988, modified February 1989.

   The plan will be revised to reference the documents specified.

2. **Section 1.1 - Data Quality Objectives (DOO) (Page 1, ¶6)**

   The text cites the 7/88 and 2/88 Statements of Work for inorganics and organic CLP procedures, yet Section 8, Page 2 of the NET Quality Assurance Plan cites the 3/90 Statements of Work.

   Revise the text of the work plan to ensure consistency.

   The work plan will be revised to only reference the 3/90 SOW.

3. **Section 2.0 - Project Organization and Responsibilities (Page 4)**

   Modify Section 2.0 of the work plan to identify the individuals responsible for the validation of analytical chemical data and include their qualifications for this activity.

   The data validation subcontractor has not been selected; however, the qualification for META who will be validating the Phase I and Pier 33/Berth 16 data will be provided under separate cover.

4. **Section 3.3 - Sample Collection, Handling and Shipment (Page 8)**

   Potential interferences may be caused by some of the constituents that make up the flint glass products.

   Revise the work plan to ensure that soil samples will be collected in 40-ml vials unless information can be provided demonstrating that the 60-ml vials are made of borosilicate glass rather than flint glass.

   The text references the NET QAPP for sample containers, preservatives, and holding

times. The referenced table does not provide this information for all of the proposed analyses (e.g., dioxins and radiologicals).

Revise the work plan to provide this information in a table format with this information presented by method and matrix.

Use of borosilicate glass for these samples will be specified. The referenced table will be revised to include the required information for dioxins and gross alpha, gross beta and gamma spectrum analysis.

5. <u>Table 3-1 - Frequency of Field QC Samples (Page 9)</u>

Revise the work plan to ensure that equipment blanks will be collected at a frequency of one per day per matrix per piece of equipment for non-dedicated equipment.

The plan will be revised to provide for collection of equipment rinsate at a frequency of one per day per matrix per piece of equipment for non-dedicated equipment.

6. <u>Section 3.4.4 - Field Duplicates (Page 10)</u>

Field duplicates are two separate samples collected from the same source.

Revise this section of the work plan to reflect this definition.

The work plan will indicate that field duplicates are two separate samples collected from the same source.

7. <u>Section 5.1.1 - Organic and Inorganic Analyses (Page 13)</u>

Section 5.0 of the QA/QC Plan lists several options for analysis of water and soil rather than clearly specifying the exact procedure to be analyzed for each of the analytes of interest. For example, it is unclear whether some water samples will be analyzed by CLP protocols and some by EPA Method 524.2 or whether all water samples will be subjected to the low level VOC procedure (Method 524.2). Boring analysis procedures are of particular interest, since boron is not on the CLP metals analyte list. Yet the QAPP refers to a list of manuals of which five provide several optional metals analysis procedures.

Revise the QA/QC Project Plan to include a table listing the analysis method and reference for each matrix and parameter of interest.

The specific methods used for this site for the "non-CLP" analyses must be specified since NET QAPP lists more than one method for the same parameter. Revise the work plan to specifically describe these above-mentioned methods.

Include in this revision a description specifying the time when the low-level VOC

samples are to be collected. Neither the FSP or the QAPP has discussed these samples prior to this section.

Project-specific methods will be highlighted in the QA/QC plan and the FSP table will be revised to indicate when low level VOC analyses will be performed.

8. <u>Section 5.2 - Field Procedures (Page 17)</u>

Reference is made in the text to EPA's Field Screening Methods Catalogue (EPA/540/2-88/005) for analytical procedures for PCB and metals screening. The document referenced is a compilation of available technologies which have been employed in onsite situations. It does not provide the SOPs which are necessary for conducting these analyses.

Revise the work plan to include the detailed SOPs for EPA to review. These SOPs should provide detailed descriptions of sample preparation, stock standard preparation, calibration standard preparation, instrument operating conditions, instrument calibration sequence, initial and continuing calibration acceptance criteria, instrument corrective action and maintenance, quality control sample preparation and acceptance criteria, example calculations and detection limits. See Attachment B for additional information regarding the development of SOPs.

SOPs will be provided for the following activities:

- *field analysis for PCB and DDTR using GC methods*
- *field analyses for lead using XRF methods*
- *air sampling for VOCs by EPA Method TO1*

9. <u>Section 6.0 - Data Validation (Page 18, ¶1)</u>

Revise the work plan to include the following dates of the Functional Guidelines:

- U.S. EPA Region I Laboratory Data Validation Functional Guidelines for Organic Analyses, February 1, 1988, modified July 1988

- U.S. EPA Region I Laboratory Data Validation Functional Guidelines for Inorganic Analyses, June 13, 1988, modified February 1989

Include a description of the personnel who will be performing the data validation and describe the data reporting methods.

The referenced dates will be included in the work plan. Please refer to the response to Comment 3 above regarding validation personnel.

10. **Section 6.0 - Data Validation (Page 18, ¶2 and 3)**

It is unclear which samples will be analyzed using CLP methods and consequently, validated using EPA Level IV validation protocols.

Revise the QA/QC Project Plan to specify which samples will be validated in accordance with EPA Level IV requirements.

Complete data packages for all constituents analyzed by CLP methods will be prepared and 10 percent of the CLP data will be validated using EPA Level IV validation protocols.

11. **Section 6.0 - Data Validation (Page 18, ¶5)**

Revise the work plan to include a detailed description of the calibration procedures to be utilized for soil gas analysis. Include in this description the source of reference standard, the concentrations of specific analytes in calibration standards and the acceptance criteria for calibration. Specify the number of duplicate samples to be evaluated in the laboratory.

This information will be provided.

12. **Section 7.0 - Data Quality Objectives (Page 19, ¶1)**

Contrary to the statement made in the text, data quality objectives cannot be found in Table 5-2 of Appendix A. Appendix A provides lists of QA objectives for several analysis procedures, but does not specify which objectives apply to samples to be collected during Phase II of the RI.

Revise the work plan in order to provide a table of project-specific QA objectives for each analysis parameter.

The project-specific QA/QC objectives will be highlighted in the applicable tables.

13. **Section 7.2 - Accuracy (Page 19, ¶3)**

The text makes generic statements about the assessment of accuracy which needs to be supported by summaries of the project-specific procedures. For example, the use of surrogate spikes to evaluate the accuracy of organics analysis is not cited although surrogate spiking is a typical requirement of analysis methods.

Revise this section of the work plan to cite or reference the accuracy objectives for the Phase II program.

This section will be revised to reference the accuracy objective for the Phase II program.

14. **Section 9.1 - Laboratory Data Management (Page 24, ¶4)**

Revise the work plan to include a description of the format in which laboratory data will be presented in the Phase II RI Report. This description should include the sample identification, the analysis method, the laboratory sample identification and date sampled.

The Phase I RI Report provided summaries of results only for those analytes detected at least once in the samples listed. No detection limits for undetected analytes were provided. This type of presentation is insufficient.

The Phase II RI Report should have, available upon EPA request, an appendix containing the complete validated analytical results for all parameters analyzed. The appendix should be formatted and cross-referenced such that specific analysis results can be located for review.

Revise the work plan to ensure that all of the analytical information is available to EPA for review.

Please refer to the response to Comment 5 in the work plan general comments section.

EPA's Comment on Navy Response

The response to the comment is answered by reference to Attachment 1 - Data Format Examples. These examples do not address all of EPA's concerns.

Modify the data format examples to include: the identification of the analytical methods (e.g., gross alpha, boron, CLP SOW identification); identify the detection limits; and identify the sample collection and analysis dates.

15a. **Appendix A - Section 7**

Revise this section of the work plan to cite the quality control objectives anticipated for this project. The quality control objectives anticipated for this project should be consistent with Section 7.0 of the QA/QC Plan.

The two sections will be coordinated and project-specific QA objectives will be highlighted in the laboratory QA/QC plan.

15b. **Appendix A - Section 7**

Revise Table 7-1 to specify control limits for boron and ensure that boron is included in all calibration verifications (initial and continuing), laboratory control samples, matrix spikes, interference check samples (for ICP analysis) and duplicate samples. Revise Table 7-1 to be consistent with the TPH analytical method and quality control requirements cited in Appendix C.

Table 7-1 will be revised as indicated.

15c. **Appendix A - Section 8**

This section provides a complete listing of all analytical methods utilized by NET, Inc.

Revise the work plan to include a project-specific listing of methods in this appendix or elsewhere in the QAPP. Boron should be added to Table 8-2.

All project specific analytical methods will be highlighted in this table.

15d. **Appendix A - Section 9**

Revise this section of the work plan in order to clarify the set of project-specific detection limits for all analytical protocols employed by NET, Inc.

All project-specific detection limits will be highlighted in this table.

15e. **Laboratory QA/QC Plan**

Addendum 4 contains a table that lists preservation and holding time requirements. The holding times listed must be from the time of sample collection (including those for CLP analyses). This table also lists the CLP requirements for metals, but no CLP designation has been provided for the organics, unless the NEESA designation is considered equivalent to the CLP for the purposes of this project.

Revise the work plan to clarify this discrepancy.

Holding times will be measured from the time the sample is collected and the wording regarding NEESA and CLP will be clarified.

ATTACHMENT A

AMBIENT AIR SAMPLING PLAN WITH QA/QC PROCEDURES

A work plan documenting all aspects of sampling, analysis and associated QA/QC must be prepared, reviewed and approved prior to any sampling effort:

1. Data quality objectives must be established, in order to determine whether any data collected will be relevant and useful. For example, if a risk assessment is to be performed, how many sampling stations and at which key locations will be required? Which species will be sampled for? Is the method to be utilized capable of quantifying those contaminants at the expected levels? Specify the detection limits expected under the proposed conditions.

2. Specification of the method to be utilized must include, for example, documentation of applicability to the species sought during sampling (provide a list of species expected to be found), and a detailed description of both sampling procedures and analytical procedures to be followed. Any deviations from referenced procedures must be thoroughly documented. Include the Standard Operating procedures specified by the method. In addition, data must be presented demonstrating the capability of the method to be used to attain the required quality of data under the actual sampling and analysis conditions anticipated (see Performance Criteria and Quality Assurance requirements delineated in each method).

3. Sampling and analytical procedures should be described in a sufficient level of detail to provide assurance that they will be performed in accordance with accepted quality control standards. The same general level of scientific rigor as adhered to in the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air (EPA-600/4-84-041) must be demonstrated for any technique utilized, in order to lend credibility to the results.

4. Sampling locations should be specified and identified on a site map, including sufficient detail to show sources and directions of potential receptors. The map should be north-oriented and include a scale. Specify the expected prevailing wind speed and direction during the proposed sampling period, including a wind rose. Address sampling station issues such as provisions for security and electrical power, as applicable. The sampling Standard Operating Procedure must list all necessary equipment and supplies.

   Specify how flow rates and sampling times will be established.

   - What is the rejection criteria for pre/pose flow-rate calibration?
   - How will the sampling equipment be cleaned, and how will the requisite degree of cleanliness be demonstrated?
   - Will flow rates be corrected to standard conditions of temperature, pressure and humidity?
   - Specify laboratory, trip and field blanks and quality control duplicates, as well

as backup (secondary) cartridges where applicable.

5. Delineate the collection procedures for concurrent onsite meteorological data (specify equipment, siting criteria, calibration procedures, data recording and reduction, etc.). Attempt to conduct baseline ambient air monitoring under worst-case conditions (high temperature, low humidity, low wind speeds).

6. Include procedures for sample collection, handling, storage and transportation, including preservation methods and holding times. Specify chain-of-custody procedures.

7. Additional Requirements

   - What are the calibration procedures for the analytical instruments to be used? How will standards be prepared?

   - How will data from blank analysis be utilized? What is the limit of blank contamination for which data will be acceptable?

   - Will backup (series) cartridges be utilized? What is the criteria of acceptance for breakthrough from primary to backup cartridge? Specify the acceptance criteria (precision and accuracy) for duplicate cartridges.

   - Will an internal standard be established by the spiking of blank, sample and calibration cartridges? Describe the spiking procedure.

   - Are recovery and precision data available for the selected contaminants to establish the validity of quantitative data? Present all such data and all numerical criteria for quality control purposes.

8. In general, the proposal for ambient monitoring of air toxics must establish the scientific legitimacy of the sampling. Inadequately documented sampling and analytical procedures may necessitate discarding the resulting data.

9. The data package submitted should include, along with the raw data, all the information necessary to perform data validation, including standards preparation, calibration curves, all calculations used for the determination of detection limits and acceptance criteria to be applied (including precision and accuracy limits).

ATTACHMENT B

STANDARD OPERATING PROCEDURES (SOPs)

Standard Operating Procedures (SOPs) must be prepared for all aspects of sampling, analysis and instrument calibration. An SOP is defined as a complete description of a sample collection, analysis, or other operation whose mechanisms are thoroughly prescribed and which details a commonly accepted method of performing routine or repetitive tasks. Its purpose is to ensure consistency of application of a method and repeatability and comparability of results, regardless of which qualified person is performing the operation.

An SOP for sampling and analysis would include the following information:

- method testing, including ruggedness testing
- configuration and maintenance of sampling equipment
- calibration of sampling equipment
- cleaning and demonstration of cleanliness of sampling equipment
- chain-of-custody
- sample collection, including quality control samples such as blanks, duplicates, backups, etc.
- sample handling/preservation/storage
- configuration and maintenance of analytical equipment
- tuning and calibration of analytical equipment
- cleaning and demonstration of cleanliness of analytical equipment
- standards preparation and control
- sample preparation
- spiking
- introduction of samples
- data reduction, processing (including uncertainty analysis), handling, storage and retrieval
- data validation
- reporting of results, including quality parameters
- retention of samples and data
- recordkeeping

A calibration SOP would include:

- a definition of terms used in the procedure
- a description of the specific equipment to which the procedure is applicable, including model number and specifications
- a brief description of the scope, principle and/or theory of the calibration method
- fundamental calibration specifications, such as environmental conditions, calibration points and tolerances

- a description f standards required to perform an effective calibration, including source, identifying serial number, specified tolerance and expiration date
- a list of equipment necessary to perform a calibration, including manufacturer, model number, specified accuracy and maintenance status
- a cautionary list of possible impediments to a successful calibration, such as common procedural errors or interferences
- a clear, concise step-by-step breakdown of the calibration operation from the beginning to end
- specific instructions for recording and reporting the calibration data and its use in qualifying the resultant experimental data.