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NWS EARLE
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19 February 1993

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wo#. 1771-15-03

Dear John:

Enclosed are the responses to EPA's comments for the Phase III - Remedial Investigation/Feasibility Study, March 1992, Draft Report, for Naval Weapons Station Earle, New Jersey.

If you have any questions concerning this submittal, please contact me at (215) 430-7256.

Very truly yours,

ROY F. WESTON, INC.

John A. Williams, Jr.
Senior Project Geologist
Geosciences Department

JAW/jaw

Enclosures, as Stated

cc: R. Johnson - WESTON
K. Sheedy - WESTON

Attachment 1

1.0 Introduction

1. This letter report has been prepared to provide review comments relative to the Phase III Remedial Investigation Report for the Naval Weapons Station (N.W.S.) Earle in Colts Neck, New Jersey. The document is being submitted to the USEPA, Region II by the PRP contractor as Volume I (Technical Data) of the Draft Interim Report for the 11 sites investigated in this study.

2. Section I of the document indicates that baseline risk assessment data, ARAR development and a screening of remedial alternatives will be added to the report at a later date. Due to the data gaps indicated in the report comments, which follow this introduction, there is some doubt that a complete baseline risk assessment can be satisfactorily prepared at this time. The screening of remedial alternatives is also dependent, in part, on completion of the baseline risk assessment; therefore, it is critical to address these data gaps at the earliest possible time.

3. Most of the data deficiencies addressed herein concern the lack of sufficient data for use in defining the extent of contamination at various sites. However, the methods through which analytical data is presented and interpreted in the report also contribute to the difficulties encountered in assessing the degree of impacts to various site media.

4. In order to expedite the progress of CERCLA activities at the N.W.S. site in accordance with mileposts in the Federal Facility Agreement, it is recommended that a prioritization scheme be developed for addressing those data gaps which are believed to be most critical. In this manner, a response strategy plan could be developed to avoid long delays in the implementation of remedial actions, where these may be needed most.

1.1 General Comments

1. The RI Report is missing several of the key components of a remedial investigation recommended in Guidance for Conducting RI/FS Under CERCLA. Specifically, the report does not clearly define the extent of contaminant plumes, and does not adequately evaluate potential migration pathways.

2. The report provides multiple tables of analytical data but lacks any detailed discussion relative to the interpretation of this data.

3. Comparison of data to "background" conditions at a number of sites is questionable, because a sampling point that is considered upgradient from one well or boring may be downgradient from another site. A true comparison of site-related contaminants to background conditions should allow a comparison to an area which has not been impacted by any site-related activities.

4. The report makes several references to a "normal background range" for metals found within soils, however, no reference is made to the fact that some of the metals concentrations are in excess of NJDEPE guidelines. For example, several soil samples taken from Site 2 exceed NJDEPE cleanup guidelines for chromium, but no reference to these guidelines is made in Section 4.1.2.1 (page 4-6) of the report.

5. All data summary tables should be clearly labeled. For example, Table 4-3b present three types of information within each column, but there is no explanation as to what these different numbers represent.

1.2 Strategy in Conducting the Remedial Investigation

1. The segmentation of the Remedial Investigation at Naval Weapons Station Earle (N.W.S.) precludes the presentation of a holistic perspective of contaminant distribution trends. A grouping of contiguous sites into common operable units may present an entirely different interpretation of extent of contamination than when viewed separately. For example, the wells at site 2 lie downgradient of site 5 and are presumably in the same aquifer. Chromium and lead concentrations are present in ground water samples at both sites but there is no discussion of the possible interrelationship of these plumes.

2. Partly because of this a la carte study of individual sites, no graphical presentations of contaminant trends are made on the site as a whole. Each report section discusses contaminant levels and causative factors at a given site but no definition of actual plume geometries is provided. In this respect, the document falls short on meeting one of the primary objectives of the Phase III study which is to determine the extent of contamination. The lack of detail on contaminant distribution in various site media weaken the basis for performing a baseline risk assessment.

1.3 Hydrogeologic Characterization

1. Water table maps are presented for 11 sites described as occurring in at least 5 distinct formations. No reference is made to which lithologic units

in any of these formations constitutes an aquifer per se at each site. Aside from the generic description of the regional hydrostratigraphic framework in the beginning of the report, site specific aquifer relationships are not evaluated.

2. The "composite" water ground water table map presented in Figure 2-1 represents water table elevations not in a single aquifer, but in multiple aquifers. Interpretation of contaminant transport patterns on a site-wide basis is difficult, if not impossible, when a knowledge of ground water flowpaths in the aquifer system have not been established.

3. An example of this is sites 2, 5 and 11. The water table for each of these sites is described as occurring in the Vincentown formation. All are located within the outcrop belt of the Vincentown formation and are characterized as areas of recharge to aquifers in this formation, yet hydraulic gradients in this area decrease in a northerly, or updip direction. If static water levels in wells downdip in the Vincentown (just north of the ground water divide at N.W.S.) are higher than those observed in wells in the outcrop area, then the latter is not an area of regional recharge. This being the case, interformational leakage from the overlying Kirkwood formation recharges the Vincentown aquifers in the area north of the divide (see also page 2-13, paragraph 2 of the RI document).

4. The ramifications of this are that contaminants entering the Kirkwood formation and associated aquifer(s) may be transported from sites such as 10 and 22 into the underlying Vincentown formation. In the absence of any data relative to vertical gradients and ground water movement, or water quality data from intermediate and deep aquifer segments, such transport pathways cannot be evaluated. This same concern applies to other formational contacts like the Hornerstown/Kirkwood. References in the report to rapid infiltration, areas of recharge and well screens gone dry all suggest that interpretation of vertical components of ground water flow may be critical to an accurate assessment of contaminant transport at N.W.S.

5. No basis exists upon which correlations between water quality parameters in surface and ground water samples can be made. Examples of sites where surface water and ground water relationships have not been established include sites 4, 10 and 19.

1.4 Data Quality[1]

1. Site piezometric data appears to be generally acceptable, with the exception of some minor concerns about well development. Well development of very limited duration in some wells may not assure total communication between well screen intervals and the aquifer. There are also instances where proper allowance was not given for significant water table fluctuations resulting in well screens going completely dry. The placement of well screens at slightly greater depths may have avoided this problem and its effects on the acquisition of piezometric and water quality data.

2. The placement of well screens at water table depths very near to the ground surface also introduces another problem: bentonite seals (some only 0.5 feet in total thickness according to the report appendices) placed immediately below grade are often disturbed and sometimes breached during the installation of the outer protective casings under these conditions. Analytical data quality may be jeopardized in wells such as these. Infiltration of surface water along the well annulus could produce false positive or negatives and not be reflective of contaminant transport from the source areas of concern.

3. Site boring and well logs indicate a broad range of soil types at N.W.S., thus the range of hydraulic conductivities might be expected to reflect this variability. However, of 22 slug tests conducted, all reported hydraulic conductivities were within the same order of magnitude (i.e. 0.5 to 5 feet per day) except those for MW2-1 and MW2-5. A variety of filter packs were installed (some as mixtures of more than one gradation) which may have affected rising head measurements. The performance of one or more pump tests at strategic locations on the site may have generated hydraulic conductivity data both for larger aquifer volumes and lithologic variations between Cretaceous and Tertiary formations. Such data would enhance ground water velocity calculations used in contaminant transport interpretations.

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[1] Applies to data quality concerns associated with several types of well construction techniques employed over time in developing the current complement of site monitoring wells. Comparability of analytical (chemical) data from wells of varying construction is a quality control issue which warrants some discussion in the final RI report.

1.5 Specific Comments

1. Page 1-5/Paragraph 2:

- Stated objective to quantify extent of contamination has not been met.

2. Page 2-14 Paragraph 2:

- The meaning of the terms residential and municipal wells is unclear. Are these terms meant to distinguish between private and public well supplies? If so, are the extensive residential wells nearby the site possible receptors? A plate indicating water supply wells contiguous to N.W.S. would present a more reliable basis for risk assessment purposes.

3. Page 2-14/Paragraph 3:

- Information on exact location and details of construction of supply wells should be provided. This data could have some bearing on contaminant transport in sites contiguous to the well's capture zone and the potential for cross contamination via the well's annular space.

4. Page 3-20/Paragraph 4:

- Reference is made to a silt/clay used as the limiting factor in determining well screen depths. Three wells in the site 3 area are later reported (page 3-22/paragraph 2) to have gone dry between sampling rounds which suggests leakage may occur through this silt unit and deeper sampling intervals may be warranted.

5. Page 3-34/Paragraph 2:

- The Phase II study determined (horizontal components of) ground water flow for the site.

6. Page 3-40/Paragraph 3:

- Ground water flow directions are poorly defined due to the limited head differentials and the positioning of site wells.

7. Page 4-3/Paragraph 3:

- The calculated ground water velocities span two orders of magnitude thus do not facilitate contaminant transport estimation for comparison with actual water quality data observed in downgradient site wells.

8. Page 4-4/Figure 4-1:

- MW2-1 is the upgradient (background water quality) well for site 2 but is also downgradient of the landfill at site 5. Background water quality at site 2 is therefore questionable.

9. Page 4-13/Paragraph 4:

- There appears to be some inconsistencies in the use of the term "normal background" levels. This paragraph states that levels of metals appear to be within normal background ranges, but on page 3-14 the report argues that metals in ground water are attributable to soil conditions that have been broadly impacted by human activities. Conditions that have been broadly impacted by human activities are not naturally occurring.

10. Page 4-16/Paragraph 1:

- Surface water and ground water interrelationships are unknown thus impacts observed in ground water samples cannot be used to determine any stream sampling requirements.

11. Page 4-16/Paragraph 3:

- Ground water level may have dropped more rapidly at this site than at others due to recharge to the lower portions of the aquifer. Water quality assessment at deeper aquifer segments at this site is probably warranted.

12. Figure 4-2:

- Lithologies from the seven boring logs used in the preparation of the cross section have not been posted for each well. Correlations cannot therefore be evaluated and the interpretation presented (i.e. a thin near surface aquifer underlain by a confining unit) cannot be verified. Hydraulic properties of the confining, if present, would provide better justification for limiting the depth of well screen placement at this site.

13. **Page 4-19/Figure 4-3**

- **The water level for MW3-7 of 115.2, should be on the north side of equipotential contour line of 114 feet not south as in indicated in figure 4-3.**

14. Page 4-27/Paragraph 2:

- Arsenic was elevated by 4 orders of magnitude in the second round of ground water sampling as compared to round 1 data.

15. Page 4-27/Paragraph 4:

- The concentrations of leachate indicators (or other parameters) detected in site ground water monitoring wells has no bearing on the volumes of leachate being generated by the landfill. Low level concentrations are more likely related to the age of the landfill as the leachate becomes more dilute with time.

16. Page 4-29/Paragraph 4:

- What is the relationship between ground water flow and these surface water bodies?

17. Page 4-30/Paragraph 3:

- The lateral ground water flow velocity is calculated. Are vertical ground water velocities comparable?

18. Page 4-32/Paragraph 3:

- Do historical records indicate that fly ash disposal occurred at or near site 4?

19. Page 4-41/Paragraph 3:

- There are no wells located downgradient of MW 4-05 to define the extent of TCE contamination in this area.

20. Page 4-44/Figure 4-5:

- MW5-5 shows an incorrectly posted water table elevation.

21. Page 4-52/Paragraph 1:

- There are no wells located downgradient of MW 5-06 to define the extent of TCE, DCE and xylene contamination in this area.

22. Page 4-52 /Paragraph 6:

- The limits of contamination at the landfill boundaries are not fully defined (see comment above). Comments regarding the absence of a major release at this location, therefore, are not based on factual data.

23. Page 4-55/Paragraph 3:

- There are no wells located downgradient of MW7-5 to define the extent of TCA contamination in this area. The occurrence of this compound at sites 4, 5 and 7 suggests that solvents may have been used or disposed of during past site history. A broader perspective on the occurrence of this specific parameter may be warranted at N.W.S.

24. Page 4-64/Paragraph 5:

- See comment two with reference to page 4-27.

25. Page 4-66/Figure 4-7

- Contour lines need to be redrawn to better reflect groundwater elevations in relation to equipotential contour lines. MW10-6 with a groundwater elevation of 101.4 feet is too close to equipotential line 101.0 when compared to MW10-1's 101.1 feet. Their locations in relation to equpotentiual lines should be switched.

26. Page 4-84/Paragraph 3:

- The occurrence of TPH concentration in site soils may be a factor to be considered in the baseline risk assessment relative to the endangered plant species described for this site.

27. Page 4-89/Paragraph 1:

- The occurrence of metals in unfiltered ground water samples provides little information regarding dissolved contaminant transport for risk assessment purposes. Do future plans exist to evaluate metal concentrations in filtered water samples?

28. Page 4-91/Figure 4-9:

- A number of ground water elevations appear to be posted erroneously; also the interpreted ground water flow patterns are unusual and warrant further explanation.

29. Page 4-104/Paragraph 4:

- The occurrence of lead and chromium in unfiltered ground water samples is reported at this and a number of other sites in the RI report. Dissolved metal concentrations should perhaps be evaluated on a site wide basis for risk assessment purposes. Without a baseline of analytical metals data for filtered ground water samples, the question of metals distribution and mobility in the aquifer system cannot be adequately addressed. This appears to be a significant data gap in the RI report.

30. Page 4-109/Paragraph 2:

- See comment above.

31. Page 4-113/Last Paragraph:

- The naturally occurring range of metals in site soils has been alluded to explain nearly every occurrence of metals in all site media tested. Data acquisition methods have apparently failed to distinguish between naturally occurring metals and any which may have been introduced during past site operational activities.

32. Page 4-114/Paragraph 1:

- The section states that semi-volatile compounds detected are constituents of gasoline, motor oils and coal tar. The significance of this remark should be provided.

33. Page 4-115/Paragraph 3:

- There are no wells located downgradient of MW 26-1 to define the extent of TCE contamination in this area. See also last paragraph on page 4-123.

34. Page 5-1/Paragraph 2:

- The grouping of sites for the analysis of contaminant transport analysis and risk assessment is a good strategy and was addressed earlier under the general comments section of this document review. One factor left out of the grouping criteria here, however, is common hydrogeologic/aquifer setting and site proximities to each other. The following bar graph presentations for selected contaminant concentrations at each of the various sites investigated is a step in the right direction towards creating a graphical representation of contaminant distributions at the site. An alternate, and perhaps more interpretable method is to present a specified contaminant's concentrations in bar graph form on a map of the entire site. Computer modeling software packages are available to facilitate the presentation of data in this format, one of which overlays this information on a site water table map for extrapolation of transport pathways. This mapping tool is particularly useful for risk assessment objectives.

35. Page 5-9/Paragraph 4:

- It is indicated here that the extent of contamination is well defined by sampling results. While this may be apparent to the author, the extent should be clearly defined in the report through the presentation of contaminant plume maps.

Attachment 2

<u>Groundwater</u>

1. The N.W.S. Earle sites are all located within the boundaries of the <u>New Jersey Coastal Plain Sole Source Aquifer</u>, a groundwater protective designation conferred by Section 1424(e) of the Safe Drinking Water Act. Groundwater at the sites is therefore classified as at least Class IIA <u>Current Source of Drinking Water</u>. Consequently, MCLs are Applicable or Relevant and Appropriate Requirements (ARARs). SDWA is both a chemical and location specific ARAR.

2. As a result of the site's groundwater classification, sub-MCL volatile organic compound (VOC) concentrations determined by an analysis in which the detection limit was greater than the federal MCL should be verified on samples from the same location utilizing the drinking water 500 series analytical method.

3. Apparently, almost all field and blank groundwater VOC and BNA samples collected at the site during each of the three sampling rounds were contaminated by acetone, methylene chloride, bis(2-ethylhexyl)phthalate, or carbon disulfide. The Region II CERCLA QA Manual presents decontamination, glassware, collection, storage, and handling procedures which were developed expressly to prevent this type of contamination and the subsequent inconclusive results. These procedures are considered mandatory for Superfund work within the Region. The persistence of sample and blank contamination through three rounds of sampling strongly suggests sloppy performance of field and laboratory work and/or that inappropriate field and/or laboratory procedures were followed. Also, a few cases do exist where one or more of these compounds were detected in high concentrations in the absence of blank contamination. Nevertheless, the detections are disregarded as probable field or laboratory contamination. The ambiguity which remains regarding organic compound contamination at the Earle site after three sampling rounds emphasizes the necessity of following Region II CERCLA QA procedures without deviation. Since only summary data has been provided, EPA can not ascertain the effect that the persistent sample contamination has had on detection limits for other parameters. It is likely that other contaminants may have been masked, or that dilution raised detection limits far beyond an acceptable range. The previous comment discusses the necessity of utilizing a drinking water methodology for confirming "J" qualified or sub-MCL analytical results. Another groundwater sampling event is clearly required to assess organic compound contamination at the site. In order to assure that interpretable, reliable results are obtained, all field and laboratory procedures must be performed in concurrence with Region II CERCLA QA protocols.

4. The RI report should contain a table listing the analytical methods and method and instrument detection limits.

5. Groundwater contour maps are provided for all individual sites except Sites 20 and 22, and no explanation for the omission of these two areas is advanced. Contour maps should be included in the final RI report for sites 20 and 22, or the reason for their omission should be justified.

6. Raw data used to develop Table 3-3 Summary of Groundwater Elevation Data should be provided in the RI report appendices to permit validation of the calculations and interpretations.

7. The first paragraph of Section 2.1.6.2 Local Hydrogeology at NWS Earle on page 2-14 notes the importance of the Vincentown and Kirkwood formations as sources of potable water. There is no indication of the presence or absence of off-site potable wells proximate to the site. A well survey focusing on wells within a one mile radius of the site should be conducted, and the results provided in the RI report.

8. The second paragraph of Section 2.1.6.2 Local Hydrogeology at NWS Earle on page 2-14 notes the presence of two potable water wells screened in the PRM on the main base. These wells are reported to be currently out of service. The reason for these wells being taken out of service should be discussed. Also, groundwater analytical results from these wells obtained as a part of this or any other sampling event should be included.

9. The final paragraph of Section 2.1.7 Groundwater & Surface Water Quality on page 2-16 states that high levels of nitrate/nitrite "... are generally associated with higher population densities". This statement conflicts with the results presented in the recently published EPA groundwater pesticide survey. The survey results indicate that nitrate/nitrite detections in groundwater samples are generally associated with agricultural areas, which tend to have low population densities. This finding is consistent with the use of nitrogen fertilizers in agriculture. The statement in the document should be amended to reflect the most recent, comprehensive data.

10. Appendix A Boring Logs and Well Construction Summaries does not contain information regarding OVA or HNu results obtained during drilling at all drilling locations. Monitoring for organic vapors during drilling is a Region II SOP. These results should be incorporated into the drilling summaries.

11. The third sentence of the first paragraph of Section 4 Results of the Field Investigation on page 4-1 states that "Data tables summarize significant 'hits'....". However, no criteria for determining "significant" is presented. Moreover, no potential ARARs/TBCs are presented. Consequently, it is not possible to independently validate the conclusions regarding contaminant's distributions. Data tables should be modified to show all contaminant hits. Significance should subsequently be proposed by comparison to potential ARARs/TBCs. A formal risk assessment will ultimately determine whether the detected contaminants pose a hazard to public health and/ or the environment. The "significance" of detected concentrations must not be a subjective parameter determined by the contractor.

12. The discussion of Site 2 results in Section 4.1.2.1 Analysis of Soils and Sediments proposes to compare metal detections to background, but - while noting the heterogeneity of background concentrations at the N.W.S. sites, states that no background samples were collected from Site 2. A surrogate background is then proposed based on literature values for crustal rocks, sediments, and soils in the eastern U.S.. This approach is unacceptable for the determination of site associated contamination. If no background data exists, detections should be compared to potential ARARs/TBCs.

13. The National Primary Drinking Water Standards presented in the Groundwater Sample Analytical Results in Section 4 require correction or enhancement as follows. Groundwater sampling data summaries should also be revised accordingly.

Contaminant	MCL	Non-Zero MCLG
bis(2-ethylhexyl)phthalate[1]	.004	
Methylene Chloride[1]	.005	
Chloroform	.1	
Barium	2	
Beryllium[1]	.001	
Cyanide[1]	.2	
Nickel[1]	.1	
Antimony[1]	.01/.005	.003

1. Proposed MCL therefore a potential TBC.

14. Note that the 15 ug/l value for lead and the 1300 ug/l value for copper are Action Levels (AL) - not MCLs - determined at the tap and thus representing these metals contributions from all sources in drinking water. The AL values are nevertheless ARARs at NPL sites where groundwater is classified as drinking water.

15. The second paragraph on page 4-14 of Section 4.1.3 discusses chromium and lead detections in soils and groundwater at Site 2, where both were detected at concentrations exceeding the federal MCL and AL, respectively. The second sentence states a federal MCL for lead of 50 mg/l which is erroneous: the AL should be substituted.

    The final sentence and the following paragraph inaccurately accuses the analysis of unfiltered samples for the detection of chromium and lead in groundwater. An increasing body of independent, peer reviewed evidence suggests that filterable colloidal metal complexes are highly mobile in groundwater: this is also the justification for mandatory analysis of unfiltered samples in the Region II CERCLA QA manual. The potential for metal species mobility is also increased at lower pH values, and the pH values for Site 2 groundwater were acidic. Arguments should not be advanced which attempt to justify metal contaminant immobility due to the analysis of unfiltered samples. Rather, the evidence supporting the mobility of metals at Site 2 should be presented.

    While metals may not be a component of the explosives detonated at Site 2, containers harboring explosives may have been composed solely or partially of these metals. Also, chromate is an oxidizer, and may be a component of the detonant. These issues may elucidate the source of lead and chromium at Site 2, and therefore demand additional investigation.

16. Metal contaminants have been detected throughout the site. Interpretations of metal mobility presented in the document do not reflect either site specific conditions or current concepts of metal mobility. The U.S. EPA metals speciation model MINTEQ A2 utilizes a thermodynamic data base to predict metal speciation, and is likely the most widely used model for this purpose. MINTEQ A2 can be applied to a variety of environmental problems including aquifer contamination. EPA strongly recommends that the speciation and transport of metal contaminants detected on-site be evaluated via the MINTEQ modeling approach. Use of the predictive tool can provide support for use during the evaluation of remedial action alternatives. The model and extensive user support have been available free of charge. Information and MINTEQ A2 diskettes can be obtained from Dr. David S. Brown, U.S. EPA Environmental Research Laboratory, Athens, GA 30613.

17. Summary tables of analytical sampling results use the NR (Not Requested) qualifier for most replicate samples. It is unclear whether this indicates that replicates were not included in the workplan, or whether the replicate results were not requested. The consistency between replicates is a

principal indicator of the quality of the results. All replicate data should be included.

18. The groundwater elevation for MW3-7 shown on figure 4-2 Generalized Cross Section A-A' is incorrect: the value shown in Table 3-3 indicates that the elevation is 113.3 ft MSL.

19. In the final sentence of Section 4.2.3 Summary of Site 3 Characterization on page 4-27 the word **contaminated** should be inserted before the word **leachate**.

20. Section 4.2.2.2 Analysis of Groundwater at Site 3 discusses arsenic contamination in groundwater samples, but fails to note detection of cadmium, chromium, and lead at concentrations exceeding federal MCLs in several wells. Note that chromium concentrations increased from sub-MCL concentrations to a concentration over six times the federal MCL in MW3-1 between the first and second sampling events, suggesting an existing source. The chromium in this well decreased to about 2.5 times the federal MCL in the third round, suggesting mobility of the contaminant. Table 3-2 only provides data for relatively up-gradient MW3-6, and the pH of the purged water was slightly acidic. Further acidification of groundwater within the waste pile can not be ruled out. Cadmium, chromium, and lead should be considered contaminants of concern (COCs) for Site 3.

21. With respect to Table 4-7a, the federal MCL for cis-1,2-dichloroethylene is 70 ug/l and for trans-1,2 dichloroethylene is 100 ug/l.

22. The final sentence of the third paragraph of Section 4.3.3 Summary of the Site 4 Characterization misinterprets the data. TCE concentrations within the range detected suggest a relatively nearby source of TCE contamination. A general rule regarding concentrations of DNAPL is that 1% (1/100th) of the solubility suggests the presence of a DNAPL pool. For TCE, these values are about 100 and 50 ug/l respectively. Consequently, the possibility of the presence of perched DNAPL or another source at Site 4 must be considered.

23. Table 4-7c on page 4-40 indicates the detection of lead in replicate third round groundwater samples from MW4-4 at concentrations exceeding the federal Action Level of 15 ug/l. Lead was detected in lower concentrations in samples from the first and second sampling round. The potential exists in landfills for the loss of integrity of containers, with resulting contaminant release. The increase in lead concentrations should be considered a red flag signaling that present lead concentrations at this well should be investigated.

24. The second paragraph on page 4-36 of Section 4.3.2.3 Analysis of Groundwater Site 4 discusses the detection of lead in MW4-5. Table 4-7c indicates a lead detection of .014ug/l in a round three sample from this well; zinc was detected at .062ug/l. Either the text or the data summary is incorrect.

25. Figure 4-5 utilizes the groundwater elevation at MW5-1 to support a complicated representation of groundwater flow at Site 5. Additionally, the interpretation encompassing all of the wells appears to violate the laws of physics. The fourth sentence of Section 4.4.1 Physical Characteristics states that the site slopes to the southwest. Well logs from the site indicate generally uniform marine sediments. Figure 2-1 Composite Shallow Groundwater Surface Contour Map for the Main Base shows groundwater at site 5 to be flowing south -southeast to north. In figure 4-5 groundwater is shown to flow to the southeast. Given that the data provided in Table 3-3 and on the figure are correct, and that field personnel accurately determined and recorded the data, EPA concurs that interpretation is difficult. The drilling logs eliminate the possible existence of an underlying depositional formation of relatively high hydraulic conductivity which slopes to the southeast, thereby creating a physical basis for flow "uphill". A possibility for consideration is that groundwater has mounded at the bottom of the hill in response to a physical barrier off the page to the south-west. Contributions to net groundwater flow from another source should also be considered. Wells which are not drilled or installed plumb, or which are screened at different depths relative to a constant datum in cases where vertical flow is significant also impair determination of groundwater elevations. Since a topographical map for the site has not been provided, it is difficult to speculate. EPA does strongly recommend that this violation of physical laws be the subject of additional investigation. Methods for further characterization include investigation of the topography and installation of additional piezometers to the west, east, and south-southeast.

26. Figure 4-5 should be re-oriented so that north is towards the top of the page rather than towards the bottom.

27. The groundwater elevation for MW5-5 on figure 4-5 is given as 193.1 ft MSL. The data in Table 3-3 indicates that the correct value is 93.1 ft MSL.

28. The presentations of results in Section 4.4.2.2 Analysis of Groundwater at Site 5 and Section 4.4.3 Summary of Site 5 Characterization suggest that the author never looked at the data. No mention is made of metal contamination at site 5.

However, throughout the three rounds of sampling, chromium and lead were detected in up to six wells at concentrations exceeding their respective federal MCL/AL. Chromium concentrations were reported at up to 60 times the federal MCL (MW5-6, round 2); lead was detected at concentrations up 6.5 times the Action Level (MW5-6, round 2). Cadmium and Beryllium were also detected in numerous wells at concentrations exceeding their respective federal MCL and proposed MCL. Lead, chromium, cadmium, and beryllium have severely contaminated groundwater at Site 5, and should be COCs. Discussions of groundwater results should primarily focus on the metal contamination.

29. Table 4-9 on page 4-57 indicates bis(2-ethylhexyl)phthalate detections at up to 110 ug/l, but below the detection limit of the analytical method (J qualifier). There is a proposed federal MCL of 4 ug/l for this compound, and the detection limit should be sensitive to at least this value.

30. Sections 4.5.2.2 Analysis of Groundwater at Site 7 and Section 4.5.3 Summary of Site 7 Characterization do not note the detection of arsenic at values which exceed its federal MCL by a factor of almost 4. Arsenic should be added as a COC at site 7.

31. The discussions in Section 4.6.2.3 Analysis of Groundwater at Site 10 on page 4-71, 4-72 notes lead and chromium contamination but fail to note detections of arsenic, beryllium, and cadmium at concentrations exceeding their federal MCL. These contaminants should be added as COCs at site 10.

32. Section 4.6.3 Summary of the Site 10 Characterization proposes that detections of chromium and lead are probably "... a function of ambient soil conditions (natural or broadly impacted by human activities) plus the unfiltered sample protocol, than any past site activities." This use of double-speak is highly misleading. First, lead and chromium are generally not associated with marine sediments thereby ruling out the naturally occurring supposition. Second, to our knowledge the only documented human activities at the site were site activities - operation of a scrap waste landfill. Last, EPA commented previously on the erroneous nature filtered sample argument. Groundwater at this area is moderately acidic which likely supports soluble metal species. Since there is no evidence that only non soluble scrap waste was deposited at Site 10, and since there is no valid off-site background sampling location, contaminants must be assumed to have been associated with past site activities.

33. Figure 4-8 Site 11 Groundwater Surface Contours should be reoriented so that north is toward the top of the page.

34. Chromium and lead were detected at high concentrations, and the argument presented in Section 4.7.3 Summary of the Site 11 Characterization on page 4-89 regarding the source of metals is again inapplicable.

35. The depiction of groundwater flow presented in Figure 4-9 Site 19 Groundwater Surface Contours and the description provided in Section 4.8.1.3 Hydrogeology fails to comprehend the likely nature of flow at the site. The data shown does not support any generalized groundwater flow pattern. Since the predominant lithology at the site is sand with some silty sand, the piezometric head anomalies shown across the site are not directly interpretable from the information provided in the text or on the figure. The likely source of the anomalies is the borehole/well construction. Deviations from plumb are well known sources of piezometric elevation errors. Most likely, however, is the difference in depth of the wells. With the exception of MW19-5, wells showing high elevations are screened at greater depths than wells showing lower elevations. MW19-5 appears to be located under asphalt which may act as a cap thereby reducing the head at that location. Overall, the data suggests that a substantial upward vertical hydraulic gradient exists at the site. The location of the marsh supports this interpretation. Careful installation of a piezometer nest would provide the data necessary to support this likely scenario. EPA recommends that in the absence of a piezometer nest, that groundwater flow be represented with straight lines rather than the bell-shaped contours. The likelihood of a strong upward vertical flow component and groundwater discharge to the marsh should be discussed as supported by the well depth and piezometric head data.

36. Section 4.8.2.2 Analysis of Groundwater at Site 19 on page 4-92, 4-104 does not note the detection of cadmium at concentrations exceeding the federal MCL in each sampling round. Cadmium should be included as a COC.

37. The next to last sentence in Section 4.8.3 Summary of the Site 19 Characterization states that "... the concentrations of these metals in unfiltered samples from the shallow groundwater do not imply significant mobility." The data provided in Table 3-2 indicate that groundwater in this area is acidic, a primary factor in mobilization of metals in water. The statement should be changed to note the high likelihood that metals are relatively mobile at the site.

38. No groundwater sampling was conducted at site 20. However, as opposed to the argument provided in Section 4.9.3 Summary

of Site 19 Characterization on page 4-109, the concentrations of semivolatile organic compounds and metals in the waste pile and sediment do not preclude mobilization to groundwater. Groundwater wells should be installed and sampling of groundwater is justified by the provided results.

39. Section 4.9.3 Summary of the Site (19) Characterization states that organic compounds detected at the site will "naturally degrade over time." Biological mineralization of organic compounds is a complex process which requires the presence of substrates, proper electron donors and acceptors, and nutrients as well as conditions of temperature and pH. The plethora of semivolatile organic compounds detected at this site suggests that at least some enhancement of conditions will be necessary to effect rapid mineralization of contaminants. Also, it will be necessary to provide evidence that the detected contaminants will degrade under similar conditions, e.g., aerobic vs anaerobic. No presumptions regarding the biotransformation of site associated contaminants should be advanced without - at the least - independent peer reviewed documentation.

40. Results presented in Table 4-20a on page 4-118 indicate that cadmium was not analyzed in groundwater samples. The omission of cadmium should be justified.

41. Tables 4-20a requires insertion of the federal MCL for cis-1,2-DCE of 70ug/l and trans-1,2 DCE of 100ug/l.

42. Note that cadmium, chromium, lead, and beryllium were detected at concentrations slightly exceeding the federal MCL in several groundwater samples.

43. The final sentence of Section 4.11.3 Summary of Site 26 Characterization on page 4-123 notes a "... possible tank associated with Building GB-1." there is no indication of whether the tank is still there, whether it is a subsurface or surface tank, whether it is enclosed in the building, the nature of its contents, age, etc. To determine the source of the detected 1,2 DCE contamination in groundwater, this data is essential and should be provided in the site discussion. The location of the tank should be provided on Figure 4-11.

44. Summary tables and figures provided in Section 5 Contaminant Fate and Transport show varying concentrations of metal contaminants in "up-gradient" locations, and proceeding from up-gradient to down-gradient. Due to the anomalies associated with the determinations of groundwater flow directions noted in previous comments, the validity of some "up-gradient" locations remains highly circumspect. The

geology of the Atlantic coastal Plain does not reasonably support high background metal contamination. Discussions with the USGS support our contention that chromium, lead, cadmium, and arsenic are, at most, present at very low parts per billion concentrations in groundwater in the vicinity of the site. Consequently, it appears that groundwater throughout large parts of the facility are moderately to highly contaminated with one or more metals.

Wetlands

1. Site 3 is a 5-acre landfill that was active between 1960 and 1968. A broad drainage swale exists near the southeastern site boundary, and the water table here is about 8 to 12 feet bgs. The swale may be subject to Section 404 and should be described further (e.g., vegetation).

2. Site 4 is a 5-acre landfill that was active between 1943 and 1960. A small stream originates from springs adjacent to the site. An area of common reed (Phragmites) is found along the eastern side of the landfill. Ground water ranges between 0 and 25 feet bgs. EPA suggests that on-site wetlands, as well as off-site wetlands potentially impacted by remediation, be delineated using the 1989 Federal manual.

3. Site 5 is a 13-acre landfill that was active between 1968 and 1978. Hockhockson Brook is about 1000 feet east of the site, but Figure 3-5 shows a possible channel on the site. Ground water occurs 15 to 23 feet bgs. The possible existence of a drainage channel on the site should be clarified.

4. Site 10 is a 2-acre scrap-metal landfill that received wastes from 1953 to 1965. The site is bordered on the east and northeast by a small stream, and groundwater beneath the site occurs at depths between 6 and 12 feet. EPA suggests that any off-site wetlands potentially disturbed by remedial activities be delineated.

5. Site 11 is a 2-acre ordnance disposal area. Groundwater is only 1 to 7 feet bgs, and the Federally Threatened plant species Rhynchospora knieskernii (beaked rush) is present. The site should be examined for wetlands using the 1989 Federal manual.

6. Site 19 is a paint chip and sludge disposal area bordered on the west by a branch of Mingamahone Brook and on the north/northwest by wetlands. The water table on the site is 10 to 14 feet bgs. EPA suggests that off-site wetlands potentially disturbed by remedial activities be delineated.

7. Site 20 is a paint chip disposal area bordered on the northeast by wetlands. EPA recommends that off-site wetlands potentially impacted by remediation be delineated.

8. Site 22 is a paint chip disposal area approximately 25 feet from a possible wetland. EPA suggests that this wetland be delineated if it will be disturbed by remedial activity.

9. Site 26 is a munitions recycling facility bordered on the west by a branch of Mingamahone Brook and on the north by wetlands. Groundwater occurs 10 to 15 feet beneath the site. EPA recommends delineation of off-site wetlands if remedial impacts are anticipated.

10. The Section 404 ARAR requires that impacts to wetlands and other aquatic habitats be avoided or minimized.

<u>Biological Technical Assistance Group</u>

General Comments

1. Using reference or background levels for inorganic compounds as a screening criteria is an established and appropriate methodology. However, these levels should be as local as possible to the sites being investigated. Using "Average Concentration in the Earth's Crust" or "Concentrations in Natural Soils in North America" (pg. 4-7) as screening criteria is inappropriate, especially when inorganics are potentially Contaminants of Concern. Even "...normal concentrations for...soils of the east coast of the United States" (pg. 4-6) is much too broad a range to be used as anything but general information. Reference levels used as general information should come from state or, preferably, county ranges. Screening criteria to be used for eliminating a contaminant from review as a potential risk requiring consideration during the remedial process should only be generated by collecting local samples for reference. A local sample is defined as a location similar to the site that is as close as possible while being beyond any potential influence of site contamination. It is also inappropriate to dismiss a contaminant because it was not "...observed in the form of anomalously high concentrations..." (pg. 4-6) without providing statistical validation that a certain level is or is not elevated. The use of proper reference samples for screening is also a concern for the investigation of the groundwater, as several exceedences of groundwater ARARs were attributed to ambient soil conditions. Care must also be taken that the text discussion of the analytical results does not overlook elevated levels which are reported in the tables.

2. There was inconsistency in the analysis of samples from this site. Some sites were analyzed for Total Petroleum Hydrocarbon (TPH) while others were analyzed for Base/Neutral/Acid

Extractables (BNAs), some for Volatile Organic Compounds but not Semi-Volatile Organic Compounds and vice versa, and some analyses included metals while others did not. This lack of consistency creates a difficulty in interpreting the data presented, and correlating contamination from different sites to broader ecological impacts. Also, variation of the parameters for analysis of samples between different sampling rounds can hinder determinations of the extent of impact from the site and the need for remedial activity.

3. By analyzing the contamination at NWS Earle on a site by site basis, a correlation of the effects of the individual sites on the base's ecosystem as a whole was not addressed. As an example, a definition of the surface water pathways within a specific watershed and the cumulative effects of the individual sites on the watershed was not provided. It would be appropriate to perform an analysis of the watershed itself to address this issue. The information gained from this analysis could then be evaluated considering contaminants associated with each site to investigate correlations between contamination from the sites and effects on the watershed. It would also allow for an examination of the potential for contaminants to migrate off of the site. Additional sediment and surface water sampling would be appropriate to adequately assess these possibilities. To assist in the review for any potential ecological risk from contamination of sediments, it is appropriate to also request analysis of the samples for Total Organic Carbon (TOC) and grain size. The availability of a contaminant to a biological receptor is affected by these parameters and, therefore, this influences the potential for risk.

4. Several references are made to "marshy," "low-lying," wet areas. These areas should be investigated to confirm the presence or absence of wetlands. Wetlands are areas of sensitive habitat which often act as contaminant "sinks" due to such factors as increased sedimentation and deposition of contaminants. The wetland areas on the base that are impacted or potentially impacted by site related contamination or proposed remedial activities should not only be clearly identified, but also delineated. In order to comply with federal wetland ARARs, the three-parameter method, as outlined in the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" (Federal Interagency Committee for Wetlands Delineation, 1989), should be used to delineate wetlands. Also note that a wetlands assessment and restoration plan will be needed for any wetlands impacted or disturbed by contamination or remedial activities.

5. A federally listed threatened species (Knierskern's beakrush) is referenced in the report (pg. 3-32). Although it appears that some investigation into the presence of threatened and endangered species has been made, it is important to note that compliance

with Section 7 of the Endangered Species Act is an ARAR. If it has not yet been initiated, an informal Section 7 Consultation will need to be requested from the United States Fish and Wildlife Service to identify endangered or threatened species which may be associated with these sites. This can be accomplished by contacting the USEPA.

6. The description of the ecological communities was rather meager, including only such references as "grasses," "scrub pines," or "woodlands." A better description, even if only qualitative, of the existing community at each site would be beneficial by allowing review of potential biological receptors and ecological contaminant migration pathways to be considered simultaneous to the review of the data. A concise list of the vegetational community and any wildlife observed or believed to be potentially present should be included. The base biologist referenced on page 3-32 may be able to provide such information without having to require additional field work.

Site Specific Comments

1. Site 2.

The levels of chromium should be compared to a local reference level. As general information, five samples (183 to 286 mg/kg) out of eight exceeded the upper boundary for the range of chromium in New Jersey soils of 5 to 100 mg/kg chromium (Shacklette, H.T. and J.G. Boernges, 1984. Chemical Analysis of Soils and Other Surficial Material of the Conterminous United States, U.S. Geological Survey Open-File Report 81-197), while the remaining three samples (71 to 93.5 mg/kg) all exceed the mean for chromium in New Jersey of 43 mg/kg (ibid.). This exemplifies the need for local rather than regional reference samples. If the soil levels detected on-site are shown to not be within local reference levels and to be site related, then this may call into question the document's conclusion on page 4-14 that "the presence of relatively elevated metals in groundwater samples...appears more a function of ambient soil conditions...than any past site activities."

2. Site 4.

The relation of the detection of PCBs in a sediment sample adjacent to the site is qualified as by the statement that "...PCBs were not found in the test pit samples" (pg. 4-41). A lack of detection of PCBs in the analysis of samples from two of six test pits on a five acre site does not seem to be appropriate justification for suggesting the PCBs may not be site related.

(pg. 4-41). The presence of the PCBs in the sediments of the adjacent stream, and the possibility of the discharge of groundwater containing TCE, DCE, elevated COD, and sulfates to

the stream (pg. 4-36), raises concerns for the potential for ecological impact. The "...broad, low-lying area (with a tall stand of Fragmites [sic]..." (pg. 4-28) should be reviewed as a potential wetland which may be receiving contaminated groundwater.

3. Site 11.

Analysis of samples from this site should be consistent with other sites, including scans for metals and a breakdown of TPH into specific compounds (e.g., PAHs, BNAs). With the presence of the threatened beakrush species, it would be appropriate to provide the ecological risk assessment prior to making the determination that "...impact on this site from past activities is negligible..." (pg. 4-84). While it may be correct that "...the residual hydrocarbons can be expected to naturally degrade over time" (pg. 4-84), a proper review of feasible alternatives for site remediation cannot be made without clarification of the risks involved.

4. Site 19.

It appears that the extensive contamination of this site may be impacting a wetland area. This area should be identified and delineated so that proper consideration of remedial alternatives and potential restoration can be considered during the selection of remedial goals. There should also be a clarification of why there was historical detection of cadmium as high as 31,900 mg/kg (pg. 3-34), yet cadmium was essentially undetected in the latest round of sampling.

5. Site 20.

Based on the elevated levels of metals in the waste piles on this site, and the potential for continued exposure of the environment to potential migration of these contaminants, this site should be reassessed as to the document's apparent dismissal of ecological concerns for this site. Examination of potential groundwater and surface water contamination associated with the site's waste piles should be performed.

<u>Air Programs</u>

1. The report was incomplete in analyzing the air pathway. While the low levels of organics detected should not pose an air problem, the impact of inorganics should be determined since suspension of shallow soils by wind erosion and mechanical disturbances are possible.

2. The emission rate of each semivolatile and non-volatile in the surface soil should be estimated. The emission rates should then be used to model contaminant air concentrations at potential

receptor locations. Attached are procedures EPA suggests be used to perform these analyses. (see Attachment 3).

3. The resulting contaminant concentrations at the receptors should be used as input to the inhalation pathway of the baseline risk assessment.

RESPONSES TO EPA COMMENTS
DATE AUGUST 1, 1992
ON THE RI REPORT FOR
NWS EARLE (MARCH 1992).

ATTACHMENT 1 (Versar's Comments)

Responses to General Comments on the RI Report are as follows:

1.1 **General Comments:**

The RI Report was prepared following the Guidance for Conducting Remedial Investigations and Feasibility Studies (RI/FS) Under CERCLA, EPA/540/G-89/004. Roy F. Weston, Inc. (WESTON®) agrees that the new information collected during the RI has characterized some sites and raised some questions at others. For example, the extent of lead contamination in the soils and sediments at Site 19 has been clearly defined as shown in Figure 4-10 of the RI report. In contrast, the extent of TCE contamination found in the groundwater at Site 26 is only partially defined.

As stated in the Guidance (Subsection 3.2.4), "the final objective of the field investigations is to characterize the nature and extent of contamination such that informed decisions can be made as to the level of risk presented by the site and the appropriate types of remedial responses. It goes on to say that the sampling and analysis approach consists of, where appropriate, initially taking a large number of samples using field screening type techniques and then, based on the results of these samples, taking additional samples - to be analyzed more rigorously - from those locations that showed the highest concentration in the previous round of sampling." Additional sampling is planned at those sites requiring further characterization.

Potential migration/exposure pathways are discussed in Section 6, (Baseline Risk Assessment).

1.2 **Strategy in Conducting the Remedial Investigation:**

1 and 2 - The Guidance for Conducting Remedial Investigations and Feasibility Studies (RI/FS) Under CERCLA notes, "that the approach in conducting an RI should be viewed as a dynamic, flexible process that can and should be tailored to specific circumstances of individual sites; it is not a rigid step-by-step approach that must be conducted identically at

every site." The investigation approach was outlined in the RI Work Plan January, 1991), which was developed with input from the EPA, NJDEPE and other TRC members, and subsequently approved by EPA.

The suggestion to group sites into common operable units is appropriate and was introduced in Section 5 where sites were arranged according to past activities and type of waste. None of the sites are physically contiguous nor does contamination appear to overlap so the grouping by past activities appears to be the most useful approach for the FS.

The reference to further discussion on the interrelationships and geometries of contaminant plumes does not lend itself to the analytical data. The data show that there is no widespread organic contamination that would provide a meaningful isoconcentration plot at the station and the number of monitoring wells is limited.

1.3 Hydrogeologic Characterization:

1. Figure 2-2 gives a plan view of the site location relative to the Hydrogeologic unit. Table 2-2 references site number, site location, stratigraphic unit, and depth to first Saturated Zone. Site-specific lithologies, aquifer relationships, and characteristics are discussed in detail in Section 4.

2. Although the outcropping lithologic formations change across the base, water table conditions prevail, actual sediment differences are not extreme and shallow groundwater flow is greatly influenced by topography and surface drainage as depicted in Figure 2-1. The figure provides a useful base-wide overview of shallow groundwater conditions based on a very standard interpretation of Coastal Plain hydrogeology.

3. Groundwater data are consistent over the monitoring periods; survey data, groundwater measurement data and calculations have been rechecked. The presentation of the hydraulic gradients remain as presented. The groundwater level elevations and flow directions are controlled locally by topography and drainage. Hydraulic gradients generally trend towards groundwater discharge zones coincident with surface drainages (i.e., Pine Brook and Hockhockson Brook at Sites 2 and 5).

4. The program was designed with the intent to install deep wells, if warranted, pending the results of the initial RI sampling and analysis. It was generally agreed by the TRC that, based on the results, a single deep well could be installed downgradient of the landfills to assess any potential

impact to the lower groundwater zone (refer to 14 September 1990, TRC meeting minutes). This issue was discussed again at the 20 January 1993 meeting between EPA, NJDEPE, NORDIV and WESTON. Based on RI results and the outcome of that meeting, WESTON is preparing a work scope which includes the installation of deeper monitoring wells. This would provide vertical information on both the groundwater chemistry and aquifer characteristics.

5. Generally, the streams adjacent to Sites 4, 10 and 19 are gaining streams. As described in the report, the stream at Site 4 is a small tributary which originates as a spring next to the landfill. Contribution to base flow from Sites 10 and 19 to stream flow are a minor component to total flow. Quantitative measurement of base flow and stream flow was not part of the work plan scope and we do not think that the results warrant it be done in the future. We are not sure what the reviewer's opinion is in this regard. EPA needs to clarify this if it desires any additional action in relation to this comment.

1.4 **Data Quality:**

1, 2, and 3. Well placement, construction (including methods for shallow water table conditions) and well development were conducted following the specifications presented in the Work Plan. The Plan was developed with input from the Agencies and the TRC members (including Versar) and approved by both EPA and NJDEPE. This comment seems to raise questions regarding items that were agreed to prior to the start of the RI.

In the case where monitoring wells went dry, two of the four were existing wells. The other two wells (installed during this RI effort) were screened consistent with a pre-existing well network or were limited by an underlying silt/clay layer.

1.5 **Specific Comments:**

Responses to the specific comments on the RI Report are as follows:

1. **Page 1-5 / Paragraph 2:**

The stated objective to quantify the extent of contamination has been met at several sites (i.e., 19 - soils, 20 and 22). However, WESTON agrees with EPA that at some sites (i.e., 4 and 26) the extent of contamination has

not been quantified as a result of new and additional information. As per the meeting with EPA on 20 January 1993, additional work is proposed at those sites requiring further characterization.

2. **Page 2-14 / Paragraph 2:**

The terms residential and municipal are used to distinguish between private and public wells. Perhaps the use of private wells, public non-community (PNC) wells, and municipal will be more appropriate. The Navy, in the past, completed a supply well inventory. A plate indicating the water supply wells surrounding the station is on file at WESTON. Based on the data collected at the RI sites, and the distance of the supply wells from the base, we do not see any off base supply wells as critical receptors.

3. **Page 2-14 / Paragraph 3:**

There are no known high yield wells currently operating either on or immediately adjacent to NWS EARLE. Considering the relative concentrations and limited distribution of "contaminants", and the remote locations of the sites, we do not feel that a discussion of capture zones from offsite wells and the impact of contaminant transport is warranted.

4. **Page 3-20 / Paragraph 4:**

This is a technical issue which is currently under consideration with the proposed installation of additional (deep) monitoring wells.

5. **Page 3-34 / Paragraph 2:**

Comment noted.

6. **Page 3-34 / Paragraph 3:**

As the reviewer noticed, when plotted, the limited head differences at Site 26 reflect a very gentle hydraulic gradient. As to the reference concerning the accurate positioning of the monitoring wells, the locations of the monitoring wells were identified in the Work Plan for the purpose of intercepting possible contaminants as well as measuring gradient. The current well locations were approved by EPA, NJDEPE, VERSAR,

NORDIV and WESTON. Additional site monitoring is being discussed by the TRC and we expect specific input from EPA regarding the need for additional wells.

7. **Page 4-3 / Paragraph 3:**

The reviewer is correct in noting that the calculated groundwater velocities do span two orders of magnitude from 1.2 X 10-5 cm/sec (in monitoring well MW 2-1) to 0.8 X 10-7 (in monitoring well MW 2-6). This is not surprising since a review of the lithologic logs shows a coarser fraction (M. to C. sand) in MW 2-1 and a finer fraction (v.f. sand and silt) in MW 2-6. Slug tests by their nature measure properties only immediately around the well. The size of the wells and well spacing make a full pump test impractical.

8. **Page 4-4 / Figure 4-1:**

The data do not suggest that the upgradient water quality at Site 2 is impacted by Site 5. In fact, inorganic constituent concentrations (see background monitoring well data in Section 5) in the upgradient monitoring well MW 2-1 were comparable to, or lower than upgradient wells at most of the other sites. With the exception of trace concentrations of chloroform (8 ug/l), no other organics were detected in MW 2-1.

9. **Page 4-13 / Paragraph 4:**

The issue regarding natural and ambient background ranges in both soils and groundwater has been discussed in detail by several of the TRC members. Additional sampling will be proposed to the TRC to collect background samples to establish a base-specific range from which to compare site surface sample and groundwater results. It is our opinion that "background" should include environmental contaminants from non-point sources (e.g., airborne lead and pesticides from spraying activities)

10. **Page 4-16 / Paragraph 1:**

Since the paragraph referenced by EPA does not discuss groundwater quality, we do not understand the comment.

11. **Page 4-16 / Paragraph 4:**

If anything, the clay horizon underlying the site inhibits vertical leakage; however, further consideration will be given to additional monitor wells at the site. See comment number 4.

12. **Page 4-4 / Figure 4-1:**

The lithologies from the seven wells used in the preparation of the cross section have been provided in detail in Volume 2 (Appendix A - Boring Logs And Well Construction Summaries). Hydraulic properties for the underlying silt/clay layer are not available.

13. **Page 4-19 / Figure 4-3:**

Comment is noted. The figure will be corrected.

14. **Page 4-27 / Paragraph 2:**

Matrix spike recovery for arsenic in the second round of groundwater sampling was below the control limit. Therefore, the data were estimated.

15. **Page 4-27 / Paragraph 4:**

The wording ....generating "large quantities of" leachate should be changed to ....generating "highly concentrated" leachate. This correction will be made in the final report.

16. **Page 4-29 / Paragraph 4:**

Because TCE was detected in MW-4-5, it will be recommended that Lake Earle be sampled and its elevation established. The lake appears to be an old gravel pit with no outlet.

17. **Page 4-30 / Paragraph 3:**

The lateral groundwater velocity is calculated. The vertical groundwater velocity was not calculated since it was not within the scope of this phase

of the RI. As stated in the response to comment 1.3 (above), based on RI results and the outcome of our recent discussions, WESTON is preparing a work scope which includes the installation of deeper monitoring wells. This would provide vertical information on both the groundwater chemistry and aquifer characteristics. Since the sediments are stratified, permeability is more continuous laterally than vertically. Thus, vertical flow velocity is expected to vary with depth.

18. **Page 4-32 / Paragraph 3:**

Historical records do not indicate that no large scale fly ash disposal occurred at or near Site 4.

19. **Page 4-41 / Paragraph 3:**

It was suggested at the 12 January 1993 meeting at EARLE, that the issue of TCE (particularly at Sites 4, 5 and 7) be evaluated to determine what ramifications this has with respect to risk levels. There is implication of long-term continuous monitoring or additional characterization at the locations where low levels of TCE and/or other similar compounds were detected.

20. **Page 4-44 / Figure 4-5:**

Comment is noted. This is an editorial correction which will be made.

21. **Page 4-52 / Paragraph 1:**

See response to Comment 19.

22. **Page 4-52 / Paragraph 6:**

The statement is based on the working assumption that the levels of contamination suggest the presence of a DNAPL pool.

23. **Page 4-55 / Paragraph 3:**

See response to Comment 19.

24. **Page 4-64 / Paragraph 5:**

This comment is unclear.

25. **Page 4-66 / Figure 4-7:**

Comment is noted. This is an editorial correction which will be made and included in the final RI report.

26. **Page 4-84 / Paragraph 3:**

Although there is no current EPA guidance for quantitatively evaluating potential adverse effects to plants growing in contaminated soils, the Risk Assessment did assess the "phytotoxic potential" of site-related contaminants for data that reported toxicity based on growth medium concentrations. The suggestion to look at TPH concentrations relative to the endangered plant species (at Site 11) will be considered.

27. **Page 4-89 / Paragraph 1:**

The collection of unfiltered groundwater samples was conducted in accordance with the prescribed Work Plan. EPA and NJDEPE have insisted on the use of unfiltered sample results. We are surprised to receive this comment from EPA.

28. **Page 4-91 / Figure 4-9:**

Comment is noted. This is an editorial correction which will be made and will be included in the final RI report.

29. **Page 4-104 / Paragraph 4:**

WESTON agrees that unfiltered groundwater samples (in themselves) present difficulties in adequately addressing the distribution and mobility of metals in the groundwater. The collection of unfiltered groundwater samples was insisted upon by EPA and NJDEPE. It was suggested at the 12 January 1993 meeting at EARLE, that the future sampling effort include the collection of groundwater samples at a few select monitoring

wells using techniques other than filtering to reduce sample turbidity. This should provide the data to establish a baseline from which to evaluate the metals in the groundwater.

30. **Page 4-109 / Paragraph 2:**

See response to above comment.

31. **Page 4-113 / Last Paragraph:**

The issue regarding background soils concentrations was discussed at the 20 January 1993 meeting between EPA, NJDEPE, NORDIV and WESTON. Based on RI results and the outcome of that meeting, WESTON is preparing a work scope which will include proposed locations for the collection and analysis of background soil samples. This will provide the necessary information to establish a baseline and to support or refute documented background data. This will establish a basis from which to compare contaminant concentrations in field samples at specific sites.

32. **Page 4-114 / Paragraph 1:**

The significance of this was merely an observation to point out potential sources other than paint residues.

33. **Page 4-115 / Paragraph 3:**

The issue of TCE in monitoring well MW 26-1 at Site 26 discussed at the 12 January 1993 meeting at EARLE. There is an implication that a potential source is an underground structure of unknown construction which is covered by a steel plate adjacent to the monitoring well. The station is to investigate this to determine what this underground structure is. This will assist in directing future action.

34. **Page 5-1 / Paragraph 2:**

Comment noted. (See response to Comment 1.2 related to common operable units.)

35. **Page 5-9 / Paragraph 4:**

This paragraph refers to the distribution of surface sediments contaminants. "Plume" maps do not apply to these cases.

ATTACHMENT 2 (EPA's Comments)

(The following comments include those resolutions achieved during the 12 January 1993 meeting at EARLE, and the 20 January 1993 conference call between EPA, NORDIV, and WESTON.)

Groundwater:

1. This information is included in **Section 7** - Applicable or Relevant and Appropriate Environmental and Public Health Requirements (ARAR's) which was submitted under separate cover on 1 May 1992.

2. As agreed, the drinking water 500 series analytical method will be used on sites requiring no further action. (CLP is deemed not sensitive enough from the standpoint of the ROD.)

3. The presence of acetone, methylene chloride, and chloroform contamination in the field and blank samples was identified during the first round of sampling. This artifact prompted WESTON to take precautionary measures in the field equipment decontamination procedures during the two successive sampling rounds. This included strictly following the Region II CERCLA procedures, allowing more time for complete air drying after the acetone rinse and, at EPAs request, adding a final rinse using HPLC water. WESTON's field procedures (including sampling and equipment decontamination) were audited by EPA a minimum of two times during the RI and SI investigations and never was there any indication from the auditors suggesting "sloppy performance" by WESTON. The suggestion of "sloppy or inappropriate field performance" as stated in this comment is incorrect. An additional effort was made to eliminate acetone as a potential contaminant by substituting acetone with a hexane and methanol decon rinse during the subsequent SI effort.

   WESTON provided summary tables of the (voluminous) data using the elements presented in Subsection 3.7 of the Guidance for Remedial Investigations and Feasibility Studies Under CERCLA as a guide. If EPA requires the raw data, they are available.

   Regarding the effect that the persistent sample contamination (primarily by acetone) could have had on the detection limits for other parameters, WESTON's laboratory was aware of the problem early in the sampling program and took steps to ensure that detection limits of other VOC

compounds would not be affected by dilution for acetone. Following our conference call with Navy and EPA on 18 February, WESTON conducted a follow-up brief review of the raw data packages. This was done to determine the likelihood that other contaminants may have been masked, or that dilution raised detection limits beyond an acceptable range. It was confirmed that in situations where acetone was present at high concentrations, the sample was analyzed using several dilution factors and undiluted. Based on the results, it is evident the CRQL is the detection limit and that the results of the undiluted sample analysis show no effect on other target compounds from the occasional occurrence of high concentrations of acetone. WESTON analytics will provide a follow-up to Navy and EPA.

WESTON realizes the importance of these conference calls as a means of maintaining a verbal line of communication with EPA to help expedite the resolution or clarification on issues like the one above. We all share a common goal to assure that interpretable, reliable results are obtained through proper performance of field and laboratory procedures.

4. As referenced in the RI report, a table listing the analytical methods and method and instrument detection limits is included in the Quality Assurance Project Plan. This table can be reintroduced in the Final RI Report.

5. The reason that groundwater maps were not included for Sites 20 and 22 is, groundwater characterization was not required at these sites and therefore no wells were installed.

6. Please specify what raw data EPA is requesting (i.e., surveyor's data or water level measurements at well head).

7. EPA did not request a well survey in the Work Plan. A well survey was conducted in 1982 by the Navy. As noted earlier, no major supply wells are currently active on or near the base.

8. The base wells were taken out of service in 1989 when it was determined that the additional demands on these wells brought about by a new Base Housing Development would place too much draw on a critical aquifer. An agreement was reached between NWS EARLE, Colts Neck Township,

and the American Water Company (AWC), for AWC to supply water to the station.

9. The statement in the document on page 2-16 which states that high levels of nitrate/nitrite ".... are generally associated with higher population densities" will be amended to reflect those results presented in the recently published EPA Groundwater Pesticide Survey.

10. Information regarding HNu results obtained during the drilling is already included in the boring logs in Appendix A. No readings above background were observed during the drilling program.

11. This information is included in **Section 6** - Baseline Risk Assessment, and **Section 7** - Applicable or Relevant and Appropriate Environmental and Public Health Requirements (ARAR's) which were submitted under separate cover on 1 May 1992.

12. The issue regarding background concentrations was discussed at the 20 January 1993 meeting between EPA, NJDEPE, NORDIV and WESTON. Based on RI results and the outcome of that meeting, WESTON is preparing a work scope which will include proposed locations for the collection and analysis of background soil samples. This will provide the necessary information to establish a baseline and to support or refute documented background data. This will establish a basis from which to compare contaminant concentrations in field samples at specific sites.

13. Comment is noted. The appropriate editorial change will be made in the final report.

14. Comment is noted. The appropriate editorial change will be made in the final report.

15. The second paragraph on page 4-14 of Section 4.1.3 will be changed to substitute the AL.

The unfiltered groundwater samples (in themselves) present difficulties in adequately addressing the distribution and mobility of metals in the

groundwater. The collection of unfiltered groundwater samples was conducted in accordance with the prescribed Work Plan. It was suggested at the 12 January 1993 meeting at EARLE that the future sampling effort include the collection of groundwater samples at a few select monitoring wells using other methods to reduce turbidity such as low volume purging. This should provide the data to establish a baseline from which to evaluate the metals in the groundwater.

The reviewers point regarding chromate being an oxidizer, and being a potential component of the detonant is correct.

16. The comment is noted and WESTON will review information on the MINTEQ Model. However, we do not feel that modelling metal migration is appropriate until the significance of the data is better understood as discussed in the previous comment and elsewhere.

17. The use of NR in the data summary tables indicates that replicates for a certain sample were not included in the Work Plan.

18. Comment is noted. The figure will be corrected in the final report.

19. In reference to the final sentence of Section 4.2.3 Summary of Site 3 Characterization on page 4-27, the wording ....generating "large quantities of" leachate should be changed to ....generating "highly concentrated" leachate. This correction will be made in the final report.

20. The metals in groundwater results are discussed extensively in Section 6. Several metals concentrations increased in the second round, including levels in the upgradient well. Since this an old landfill, we think that seasonal variations may be a likely cause.

21. Comment is noted. This is an editorial correction which will be made in the final report.

22. See response No. 19 Attachment 1. It was suggested at the 12 January 1993 meeting at EARLE, that the issue of TCE (particularly at Sites 4, 5 and 7) requires further evaluation to determine what ramifications this has

with respect to risk levels. There is implication of long-term continuous monitoring or additional characterization at the locations where low levels of TCE and/or other similar compounds were detected.

23. As with comment 20, we feel that the changes in metal concentrations are likely seasonal effects since the trend appears at most of the site wells and includes a number of metals.

24. Comment is noted. The concentrations in the tables were reported in ug/l as shown. The concentrations in the text were discussed in mg/l for consistency. The text and the data summary are both correct.

25. Groundwater data is consistent over the monitoring periods; survey data, groundwater measurement data and calculations have been rechecked. The presentation of the hydraulic gradients remain as presented. The groundwater level elevations and flow directions are controlled locally by topography. Hydraulic gradients generally trend towards groundwater discharge zones coincident with surface drainages (i.e., Pine Brook and Hockhockson Brook at Sites 2 and 5).

26. Comment is noted. This is an editorial correction which will be made in the final report.

27. Comment is noted. This is an editorial correction which will be made in the final report.

28. This is a constructive comment which WESTON will use to re-evaluate the data tables and expand the discussion to include the observations noted in this comment. Lead, chromium, cadmium and beryllium are already considered as COC's. Please refer to Section 6 - Baseline Risk Assessment, discussions and tables pertaining to Site 5. (The comment suggesting that the author never looked at the data is inappropriate.)

29. Comment is noted. This is an editorial correction which will be made in the final report.

30. Comment is noted. This is an editorial correction which will be made in the final report.

31. Please refer to Section 6 - Baseline Risk Assessment, Tables 6-16, 6-63 and 6-84, and the discussions pertaining to Site 10. (It is assumed that the RI Report was not reviewed in its entirety.)

32. We do not share EPA's confidence that the data show that metal releases must be associated with past site activities. Established reasonable background levels for metals being made part of the Phase II RI activities.

33. Comment is noted. This is an editorial change which will be made in the final report.

34. The metals issue is being addressed by the TRC.

35. We regret some confusion over the survey data because correction problems with the 1986 survey were not resolved prior to publication. This has been resolved and Table 3-1 has been corrected. Figure 4-9 is actually correct.

36. Please refer to Section 6 - Baseline Risk Assessment, the discussions and tables pertaining to Site 19.

37. The proposed low volume purging should provide information to help better explain the relative mobility of certain metals.

38. Based on our discussion with EPA at the 20 January 1993 meeting, we think everyone agrees that interpretation of the metals results for groundwater is problematic and mobility has not be established.

39. Please refer to Section 8 - Identification and Screening of Technologies, Subsection **8.2.13 Bioreclamation.**

40. Tables list only those constituents detected in one or more site wells. Cadmium was not detected in any of the wells in the first round.

41. Comment is noted. This is an editorial correction which will be made in the final report.

42. It is noted that cadmium, chromium, lead, and beryllium were detected at concentration slightly exceeding the Federal MCL's in several groundwater samples. This is one of the criteria that was used to identify COC's presented in Section 6 - Baseline Risk Assessment. The nature of this comment is unclear.

43. The issue of TCE in monitoring well MW 26-1 at Site 26 discussed at the 12 January 1993 meeting at EARLE. There is an implication that a potential source is an underground structure of unknown construction which is covered by a steel plate adjacent to the monitoring well. The station is to investigate this to determine what this underground structure is. This will assist in directing future action. The location of this feature will be added to Figure 4-11.

44. This comment has been addressed in several of the previous responses to comments; see Attachment 1 Responses 1.3 (3), 1.5 (8) and (9).

Wetlands:

Comments 1 through 10. The Soil Conservation Service conducted a wetlands Survey at both the Mainside area and Waterfront area at NWS EARLE in 1989. NORDIV is pursuing this issue.

Biological Technical Assistance Group:

General Comments

1. The issue regarding background concentrations was discussed at the 20 January 1993 meeting between EPA, NJDEPE, NORDIV and WESTON. Based on the RI results and the outcome of that meeting, WESTON is

preparing a work scope which will include proposed locations for the collection and analysis of background soil samples. This will provide the necessary information to establish a baseline and to support or refute documented background data. This will establish a reference from which to compare contaminant concentrations in field samples at specific sites.

2. The sampling program was specifically designed to include those analytes likely to occur at a given site based on specific criteria including past waste practices, past sample results and Agency review and approval.

3. Please refer to Section 6 - Baseline Risk Assessment.

4. This comment is addressed above (see Wetlands).

5. Comment noted.

Site-Specific Comments

1. The issue regarding background concentrations was discussed at the 20 January 1993 meeting between EPA, NJDEPE, NORDIV and WESTON. Based on the RI results and the outcome of that meeting, WESTON is preparing a work scope which will include proposed locations for the collection and analysis of background samples. This will provide the necessary information to establish a baseline and to support or refute documented background data. This will establish a reference from which to compare contaminant concentrations in field samples at specific sites.

2. Please refer to Section 6 - Baseline Risk Assessment.

3. Please refer to Section 6 - Baseline Risk Assessment.

4. Please see comment above (concerning Wetlands). In addition, the anomalous differences in the concentration of cadmium are being researched.

5. Please refer to Section 6 - Baseline Risk Assessment.

Air Programs:

1. and 2. Please refer to Section 6 - Baseline Risk Assessment. Air exposure pathways are discussed in this section.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 11
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278

Gerald F. Hoover
Naval Facilities Engineering Command
10 Industrial Highway
Code 1821, Mail Stop 82
Lester, PA 19113-2090

Re: NWS EARLE Draft RI Report

Dear Mr. Hoover:

This is a follow-up to my letter dated August 11, 1992 regarding the above referenced subject. The U.S. Environmental Protection Agency (EPA) has completed the review of the remainder of the RI Report (SS1-5), dated March 1992 and all of (SS6-8), dated May 1, 1992.

After the U.S. Navy has had an opportunity to review and respond to these comments, a meeting will be held at either EPA's New York or Edison offices to discuss them.

If you have any questions concerning this matter, please contact me at 212-264-6609.

Sincerely yours,

Paul G. Ingrisano
Project Manager
Federal Facilities Section

Enclosure

cc: CPT W. M. Migrala, Jr., NWS Earle, LCDR J. P. Dell, NWS Earle, J. Freudenberg, DEPE
R. Johnson, Weston

ATTACHMENT 1

Groundwater (SS 7-8)

1. Screening of remedial alternatives appears premature at the site due especially to the extensive blank sample contamination discussed in our earlier comments. Until representative sampling data are evaluated, potential contaminants of concern cannot be identified with any degree of certainty. EPA recommends that alternatives be reevaluated depending on the results of additional comprehensive sampling.

   Response - Identification and Screening of Technologies presented in Section 8 was required by the FFA. The objective of this screening was to identify the remedial technologies best suited for further consideration in developing remedial alternatives for the sites at NWS EARLE. The focus of the screening process is to eliminate, based on information obtained in the remedial investigation, technologies that are not feasible because they may prove difficult to implement or have severe limitations that would prevent the achievement of remedial objectives. This is not the Remedial Alternatives Screening which will take place later in the program. A key example where an appropriate technology is presented is Subsection 8.2.3 **Excavation** related to Site 19. This technology is currently being developed as an Interim Remedial Measure (IRM) at Sites 19, 20, and 22 (as agreed with EPA and NJDEPE in the 12 January 1993 meeting).

2. The NWS EARLE sites are all located within the boundaries of the New Jersey Coastal Plain Sole Source Aquifer, a groundwater protective designation conferred by Section 1424(e) of the Safe Drinking Water Act. Groundwater at the sites is, therefore, classified as at least Class IIA Current Source of Drinking Water. Consequently, MCLs are Applicable or Relevant and Appropriate Requirements (ARARs). SDWA is both a chemical and location-specific ARAR.

   Response - Comment noted.

3. Location-Specific ARARs shown in Table 7-2 on page 7-4 should include the Safe Drinking Water Act (SDWA).

   Response - Comment noted.

4. Table 7-5 requires the following changes.

Contaminant	federal MCL (ug/l)	MCLG (u@l
cis-1,2- Dichloroethylene	70	70
trans-1,2-Dichloroethylene	100	100

   Response - Comment noted. Table 7-5 will be changed accordingly.

5. Final rules have been published in the Federal Register for contaminants flagged with the "b" qualifier in Table 7-5. These values are therefore promulgated.

Response - Comment noted. The "b" footnote in Table 7-5 will be changed accordingly.

6. Non-zero MCLGs are ARARs in areas where groundwater is classified as a current or potential source of drinking water. The "a" footnote in Table 7-5 should be changed accordingly.

Response - Comment noted. The "a" footnote in Table 7-5 will be changed accordingly.

7. Table 8-1 should expand Biological treatment to anaerobic biological treatment (eg. methanogenesis).

Response - Comment noted. This will be considered.

8. Column leaching tests are presented in the final paragraph on page 8-24 of Section 8.2.15 <u>In Situ Volatilization</u>. Column leaching tests are also valuable for estimating cleanup times and for assessing the potential of pulse pumping for site remediation. Contaminant partitioning between pore water and aquifer material is the major factor controlling the duration of pump-and-treat operations. Subsequent to extraction of the first few pore volumes, contaminant concentrations will likely attenuate, perhaps to analytical non-detect values. However, cessation of the extraction operation will reduce groundwater flow velocities, and will favor equilibrium partitioning between adsorbed contaminants and groundwater. Contaminant concentrations in groundwater will likely increase substantially after pumping has been discontinued. Even approaching the aquifer restoration remedial objective will almost assuredly require an extended period of pumping - far beyond that projected for removal of contaminated groundwater.

Pulse pumping - a scenario which utilizes the enhanced mass transfer of contaminants from the adsorbed phase to the aqueous phase after pumping has ceased - should be evaluated in design as an operational methodology. Utilization of this scenario has the potential of decreasing capital and operating costs since maintenance of hydraulic loadings during operation can be maintained by sequential pumping in discrete contaminated zones. Combinations of column and batch desorption studies utilizing samples of representative aquifer material from the site and background groundwater are the most useful methodologies for estimating the duration of remedial activities as well as simulating and optimizing pulse pumping operations. The EARLE site may be ideal for utilization of the pulse pumping scenario.

Performance of these studies is warranted as early in the remedy evaluation process as possible.

Response - Comment noted. This will be considered.

9. The potential presence of separate phase dense non-aqueous phase liquids (DNAPLs) may complicate remediation at the site. DNAPLs, such as PCE, DCE, and TCE, may pool on confining layers or in areas where the relative hydraulic conductivity decreases. DNAPL can migrate as a separate phase along the slope of relatively low hydraulic conductivity layers and therefore, potentially, in a different direction than groundwater flow. Also, DNAPL can penetrate into deeper aquifer zones via gaps or cracks in confining beds. All of these issues are at the technical forefront of contaminant hydrogeology and groundwater remediation, and are the subject of recent EPA technical reports and guidance.

Response - It was suggested at the 12 January 1993 meeting at EARLE, that the issue of TCE (particularly at Sites 4, 5 and 7) be evaluated to determine what ramifications this has with respect to risk levels. Additional groundwater investigations are being considered at the locations where low levels of TCE and/or other similar compounds were detected.

The issue of TCE in monitoring well MW 26-1 at Site 26 was also discussed at the 12 January 1993 meeting at EARLE. There is an implication that a potential source is an underground structure of unknown construction which is covered by a steel plate adjacent to the monitoring well. The station is to investigate this to determine what this underground structure is. This will assist in directing future action (i.e., a deep well couplet).

Biological Technical Assistance Group (SS 6-8)

1. As discussed in the BTAG's earlier comments for Sections 1-5, the sampling program for these sites was inadequate to provide the data for a risk assessment. The inconsistency in the analyses chosen for samples, the number of samples collected, and the media chosen for sampling make it inappropriate to assume that the ecological risks for these sites have been adequately characterized.

Response - The sampling program developed by WESTON and agreed upon by EPA Region II was designed to evaluate contamination at the 11 discrete RI sites. It was never the intention of the RI program to conduct a base-wide ecological evaluation. The ecological risk at the RI sites has been adequately characterized in terms of the original work scope. If BTAG and EPA Region II believe it is necessary to conduct a base-wide, ecosystem study that considers trophic transfer and cross media transport, then the objectives of the RI will need to be redefined. It should be noted that a base-wide ecological evaluation is outside of the scope of work that was agreed upon by WESTON, the Navy, and EPA Region II and that the results of the current RI indicate that a base-wide evaluation is not necessary.

2. In Section 6, the risk assessment inappropriately dismissed certain sites from consideration, as well as specific exposure routes for areas which were considered. Several landfill sites were not reviewed for ecological risk because they were "covered" (e.g., Site 4). However,

Section 4 of the document repeatedly states that "cover material was thin to nonexistent, and ranged in thickness from 0 to 0.5 feet" (e.g., page 4-29) for most of these same landfills. The lack of an adequate cover, combined with the fact that the cover that was present consisted of "loose sand" (page 6-176), makes it inappropriate to dismiss these sites on the basis that covering material was isolating site-related contaminants from the ecological system. All sites should be evaluated for risk for at least one species if a determination of no ecological risk is to be considered appropriate.

Response - Thin to nonexistent cover at some landfill sites referred to those few landfills which had some exposed material, e.g., exposed metal bands at Landfill 4. A visit to the sites indicated that the potential for exposure to site contaminants was limited.

3. There was no attempt to investigate the risk present to the environment from the surface water systems. The collection of appropriate data, and an analysis of that data as to the risks presented to terrestrial and aquatic receptors would be appropriate. Another example of an inappropriately dismissed exposure pathway was the paved or graveled areas. Many species of avifauna indigenous to NWS EARLE regularly ingest grit typical of such areas. This creates an exposure pathway which should have been discussed in the document. Food chains and/or bioaccumulation are also pathways that were not considered, but that are appropriate to the determination of the ecological risks. The risks posed to the higher levels of a site's trophic structure should also be reviewed.

Response - Surface waters were not extensively sampled at the Station because there was little reason to believe they were affected by the 11 RI sites. A food chain/trophic level transfer analysis was not conducted because this type of evaluation was not deemed necessary and was outside of the RI scope. Grit ingestion by avifauna was not evaluated because the migration of landfilled material to paving/gravel and the adherence of site-related contaminants of concern to grit/gravel material was deemed low.

4. No risks to sensitive habitat systems, such as wetlands, were considered. The delineation of on-site wetlands, or off-site wetlands potentially impacted by migration of contaminants, is appropriate and recommended. As stated in the previous BTAG comments, in order to comply with federal wetland ARARS, the three-parameter method, as outlined in the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" (Federal Interagency Committee for Wetlands Delineation, 1989), should be used to delineate wetlands. Also note that a wetlands assessment and restoration plan will be needed for any wetlands impacted or disturbed by contamination or remedial activities.

Response - The Soil Conservation Service conducted a wetlands survey at both the Mainside area and Waterfront area at NWS EARLE in 1989. NORDIV is pursuing this issue.

5. Knieskern's beakrush (Rhynchospora Knieskernii), apparently documented on Site 11 by the station biologist, is no longer a federally listed candidate species, and is now a federally

listed endangered species.

Response - Comment noted.

6. The basis for the selection of the Contaminants of Concern listed in Tables 6-1 through 6-19 should be clarified.

   Explanation of the listing in Table 6-6 of Aroclor 1260 as having a minimum value = 1.60 and a maximum value = 1.60, yet having an arithmetic mean = 0.573 (mg/kg, page 6-16) should be provided. Also, clarification of the derivation and use of the safety factors discussed on page 6-209 and in Table 6-103 is recommended.

   Response - The average concentration of Aroclor-1260 differs from the only detected concentration because non-detected values were included in the calculation of the average concentration at one-half the detection limit.

<u>Air Programs</u>(S 6-8)

1. It was conservatively assumed for the baseline risk assessment, in a worst case scenario, that the concentrations of inorganics in airborne soil were the same as those in the surface soil. As a result, the total hazard index was above one. EPA suggests that the procedures that were attached to the previous Air Programs review of Sections 1-5 be used to obtain more refined, less conservative, air exposure data for the risk assessment.

   Response - A more refined analysis of the soil/dust inhalation pathway can be performed at such time as the risk assessment is finalized.

2. The potential for organics migrating to the atmosphere should have been determined for the Baseline Risk Assessment.

   Procedures are attached for determining emission rates and ambient air concentrations of organics (see Attachment 2).

   Response - Emissions of organic contaminants could be evaluated provided appropriate models exist for this type of analysis.

3. EPA does not have any problems with the identification and screening of technologies. Dust controls will be implemented during excavation activities so that air emissions will be in compliance with the National Ambient Air Quality Standards of the Clean Air Act. If it is decided that in-situ volatilization is the selected remedy for this site, vapor phase carbon treatment of the air stream will be implemented. Volatile organic air emissions

from possible air stripping of the groundwater were also identified as a major concern and tests will be performed to determine the required air emissions control.

Response - Comment noted.

Resource Conservation and Recovery Act (SS 1-5, 7 & 8)

1. Although the U.S. Navy ceased disposal operations at these sites prior to the enactment of RCRA Subtitle C, Subtitle C standards may be relevant and appropriate at the time of cleanup.

   Response - Comment noted.

2. No conclusive evidence exists that RCRA hazardous waste was disposed at NWS EARLE. Due to the lack of evidence of disposal of hazardous waste, the RCRA regulatory requirements would not be applicable. However, TCL organic compounds (the most common being the solvents TCE and TCA) were found in the groundwater at NWS EARLE. Since these constituents are similar to RCRA listed spent solvents, they may have originated from RCRA listed solvent and therefore RCRA standards are relevant and appropriate to the remediation of groundwater.

   Response - Comment noted.

3. Toxicity Characteristic Leachate Procedure (TCLP) testing is used to determine if a solid waste is a RCRA characteristic waste by setting calculated regulatory limits of contaminant concentrations which may not be exceeded. The soils at NWS EARLE exhibit concentrations of heavy metals which far exceed TCLP regulatory limits for leachate generated from solid waste and there is a high probability that, if tested, the soil would exceed TC regulatory levels. EPA believes that although TCLP testing should be considered, it is unnecessary since contamination of these soils has been acknowledged and clean-up is being proposed. RCRA standards are relevant and appropriate to remediation of the soil.

   Response - Comment noted.

4. Technologies being further considered as groundwater remedial alternatives involve no action with monitoring, institutional controls, extraction/removal, and extraction/treatment (air stripping, ion exchange, filtration, electrodialysis, reverse osmosis, etc.). Technologies being further considered as remedial alternatives for soil are no action, institutional controls, excavation and off-site landfilling, excavation and onsite landfilling, containment (capping, surface controls, etc.) and excavation and treatment (physical/chemical, biological, thermal, in situ, and pyrolytic).

Response - This is a statement of fact. As a comment, it is unclear.

5. A no-action alternative is inconsistent with 40 CFR 264.101 (RCRA Corrective Action) because it is not protective of human health and the environment.

   Response - Comment noted.

6. RCRA 40 CFR Part 262 standards are applicable to the off-site treatment/disposal of RCRA hazardous waste; they specify manifesting procedures, transportation and record keeping requirements.

   Response - Comment noted.

7. The shipment of hazardous waste off-site to a treatment facility should be consistent with OSWER Off-Site Policy Directive Number 9834.11. This directive is intended to ensure that facilities authorized to accept CERCLA waste are in compliance with RCRA operating standards.

   Response - Comment noted.

8. Part 264 of 40 CFR provides standards which are applicable to the on-site storage of the excavated soils and waste material if storage exceeds ninety (90) days. These standards specify permissible container types and storage area requirements. Part 265, Subparts I and J (container and tank standards) are relevant and may be appropriate if storage of waste on-site is less than 90 days.

   Response - Comment noted.

9. The analysis of groundwater and soil indicate the presence of RCRA characteristic and listed wastes. The presence of these solvents indicate land ban implications with respect to the selected remedial alternatives for this site. RCRA Land Disposal Restrictions (40 CFR Part 268) are applicable to any waste, or media contaminated with RCRA hazardous waste if placement on land occurs. The soils meet BDAT levels (40 CFR 268, Appendix III) before land placement of contaminated material can occur.

   Response - Comment noted.

10. RCRA Subpart N landfill standards are applicable to the alternative of capping of soils on-site. Closure and postclosure standards require that the final cover accommodate settling and subsidence to maintain cover integrity and that the final cover have permeability greater or equal to the permeability of the liner or natural sub-soils present.

Landfill closure requires that the closure performance standard of SS264.111 be met.

Response - Comment noted.

11. Standards specified in 40 CFR 264 Subpart X are applicable to the water treatment system the groundwater treatment system. RCRA Subpart AA standards are relevant and appropriate if air stripping units are used for the treatment of contaminated groundwater. RCRA groundwater monitoring standards identified in 40 CFR Part 264, Subpart F provide groundwater protection standards in those instances where groundwater contamination at a facility exists. MCLs are exceeded for several elements and compounds. In accordance with 40 CFR SS264.94, treatment below MCLs should be considered as an objective for remediation. Corrective action monitoring specifications are found at 40 CFR 254.100 and should be used in determining the effectiveness of any remedial activities.

Response - Comment noted.

12. If the contaminated soil is stabilized in-situ, RCRA standards do not apply to treatment of the soil, since the soil is not technically a hazardous waste until displaced from its original location. In this instance RCRA Subpart S requirements are relevant to remediation of the contaminated soil since the contaminated area is similar to a RCRA SWMU. If the soil is displaced and treated ex-situ, Subpart X standards are applicable to the on-site solidification/stabilization process being considered.

Response - Comment noted.

13. Subpart 0 incinerator standards are relevant and appropriate to any remedial action which involves incineration of a RCRA type hazardous waste material. These standards provide for incinerator waste feed analysis, and operating and monitoring requirements of the incinerator. Ash and scrubber water resulting from the incineration of a listed waste is also a listed hazardous waste. The ash resulting from the incineration of other wastes should be tested for TC prior to disposal.

Response - Comment noted.

Environmental Impacts (SS 1-8)

1. Coastal Zones: The Coastal Zone Management Act (CZMA, 16 USC 1451) and National oceanic and Atmospheric Administration (NOAA) Regulations on Federal Consistency with approved Coastal Management Programs (15 CFR 930) may apply for portions of NWS EARLE. If actions considered in the draft RI/FS affect any land or water use or natural resource in the coastal zone, a determination of consistency with New Jersey's Coastal Zone Management Plan may be needed. Consultation on coastal zone issues should be

initiated by contacting the New Jersey Department of Environmental Protection and Energy, Division of Coastal Resources, CN 401, Trenton, NJ 08625.

Response - Comment noted.

2. Cultural Resources: The National Historic Preservation Act (16 USC 470 et. seq.) is mentioned in the text and included in Table 7-2 as a site-specific ARAR. However, the status of the Stage 1A Cultural Resources Survey is not clearly presented. A Stage 1A Cultural Resources Survey should be conducted as part of the RI/FS process. Based upon the results of the 1A survey, additional work, including a 1B and Stage 2 surveys may be required. The cultural resources work should be coordinated with this office and Nancy L. Zerbe, Administrator, Office of New Jersey Heritage, CN 404, Trenton, NJ 08825.

Response - Comment noted.

3. Floodplains: Executive Order 11988 defines floodplains as "lowlands and relatively flat areas adjoining inland and coastal waters." Topography of portions of the NWS EARLE fits this description, as there are numerous creeks and tributaries to the Swimming River, the Shark River and the Manasquan River within the boundaries of NWS EARLE. Additionally, while the Flood Insurance Reference Maps for Monmouth County do not show floodplains zoning for federal properties, some of the 100 year and 500 year floodplains indicated on those maps abut on NWS EARLE and may continue onto NWS EARLE property. While the document states that there are few floodplains in the vicinity of NWS EARLE, a precise delineation of potentially impacted 500 year floodplains still needs to be made. If such floodplains are identified, the potential impacts of proposed remedial actions on those areas must be assessed and avoided, minimized, or mitigated.

Response - Comment noted.

4. Wetlands: The topographic quadrangles covering the NWS EARLE show numerous swamps. Moreover, individual site descriptions indicate wetlands in and adjacent to the sites. However, the documents do not provide a comprehensive analysis of potentially impacted wetlands within NWS EARLE. All such wetlands need to be delineated using the Federal Manual for Delineating Jurisdictional Wetlands.

Response - The Soil Conservation Service conducted a Wetlands Survey at both the Mainside area and Waterfront area at NWS EARLE in 1989. NORDIV is pursuing this issue.

5. Safe Drinking Water Act: NWS EARLE is situated in the recharge zone of the New Jersey Coastal Zone Aquifer, a sole source aquifer subject to the provisions of Section 1424(e) of the Safe Drinking Water Act. MCLs for clean-up must be the more stringent of either Federal Safe Drinking Water Standards and the State of New Jersey standards. These

regulations should be considered as chemical specific, site specific and action specific and should be listed in Tables 7-1, 7-2 and 7-3. Additionally, surface water paths of runoff from NWS EARLE sites enter streams which feed drinking water sources. Accordingly, the impacts of the site contamination and discharges from remedial actions to these streams should be evaluated for their impact on drinking water quality.

Response - The evaluation of contaminants in surface water which may migrate off-site to streams that eventually flow into drinking water sources is outside of the RI scope, which focuses on the impacts of the 11 RI sites.

6. Endangered Species: The Endangered Species Act of 1973 (16 USC 1531-1544) is listed as a site specific ARAR. The document references work that was done by the State concerning the swamp pink (Helonias bullata) which is present in major portions of Monmouth County. However, the Navy should also consider the findings and recommendations of the US Fish and Wildlife Service's (USFWS) "Swamp Pink Recovery Plan" (see Attachment 3). Additionally, as work proceeds on the selection and implementation of remedial actions, the Navy should continue to coordinate with USFWS through Mr. Clifford G. Day, Field Supervisor, US Fish and Wildlife Service, 927 North Main Street (Bldg. D), Pleasantville, NJ 08232.

   Response - Comment noted.

7. In a related manner, the National Marine Fisheries Service (NMFS) should be contacted to determine if there are any breeding grounds or habitats for endangered marine species which might be affected by site contamination or remediation activities. Site 7 would appear to be of most interest in this regard. The endangered species consultation with NMFS can be initiated by contacting Douglas Beach, Endangered Species Coordinator, National Marine Fisheries Service, Environmental Assessment Branch, 1 Blackburn Drive, Gloucester, MA 01930.

   Response - Comment noted.

8. Significant Agricultural Lands: The Farmland Protection Policy Act of 1981 (7 USC 4201, et. seq.) and the USDA Farmland Protection Policy (7 CFR 658) may apply to portions of *NWS EARLE*. Of particular note in this regard are the cranberry bogs (which appear on the topographic maps) at the headwaters of Yellow Brook and Marsh Bog Brook that may be impacted by Site 19.

   Response - Comment noted.

9. Reference Section: The ATSDR Toxicological Profile for Chromium, a chemical of concern at NWS EARLE, is not included with the other ATSDR references (pp. R-4 and R-5). Also, on page R-2, an EPA personal communication is cited as coming from Region

II, Philadelphia; no individual is referenced. The source of this communication should be identified and the reference corrected.

Response - Comment noted.

10. EPA has determined that its CERCLA/SARA remedial process is functionally equivalent with the National Environmental Policy Act (NEPA). To date, the Navy has not made such a determination about its process. Accordingly, the Navy will have to take action to ensure that its RI/FS and subsequent remedial action comply with NEPA.

Baseline Risk Assessment (SS 6)

General comment: The document is well organized and in many parts procedurally (i.e., Risk Assessment Guidance for Superfund [RAGS]) correct. However, there are a number of technical issues (marked with an *) that seriously impact the legitimacy of the conclusions. Until such time as a clarification as to why the contractor has deviated from EPA guidance/directives, the risk assessment cannot be accepted as the basis for the need to take a remedial action or not, at any of the eleven sites. Several comments previously made (see the 6 December 1991 letter) were not addressed, which had they been, might render this risk assessment useable.

Lastly, whereas the hunter scenario was made out to be a valid one, it has now been dropped from the risk assessment, although the more important and greater contributing residential scenarios have now been included.

Specific comments:

1) page 6-4, Figure 6-1: The text on page 6-3 implies that this figure is a schematic of both the human health baseline risk assessment as well as that of the ecological risk assessment. Though similar to the human health schematic, the ecological process has a few, albeit significant differences. A copy, taken from the second Eco-Update bulletin series (supplementary guidance to RAGS Vol. II) is attached (see Attachment 4).

Response - The schematic can be provided for the ecological risk assessment.

2)* page 6-8, bottom: As was commented on previously in the review of the draft Risk Assessment Protocol, the formula provided for the derivation of the upper 95% confidence limit on the arithmetic mean, appears to be incorrect. The formula used is for data that are normally distributed. RAGS guidance states that the formula for a lognormal distribution is to be used. (A copy of the correct formula was attached to the 6 December 1991 letter.) Had the author shown that the data are normally distributed, then the formula used would have been appropriate. However, there is no discussion on this in the document. The author is referred to: Gilbert, R.O., Statistical Methods for Environmental Pollution Monitoring, Van Nostrand Reinhold, New York, N.Y., 1987. The W-test is the statistical method that can be used to determine whether or not a data set is consistent with a normal or lognormal distribution. If the author can provide some relevant insight on the use of this statistic, the calculations may stand up. The assumption at this point is that the formula used was selected because it will tend to produce lower concentrations to be used in the risk calculations.

Response - The assumption that the formula used was selected because it will tend to produce lower concentrations to be used in the risk calculations is incorrect. EPA guidance on the issue of data evaluation is unclear. If the assumption of normality cannot be supported, the calculations can be revised.

3)* in the Potential Chemicals of Concern for Soil Tables (6-1 through 6-4), the use of the 'H' and

'E' codes is confusing. It's not clear which chemicals, if any, have been excluded from lists. A column in the tables stating the risk-based rationale for the exclusion of any one (e.g., through use of a concentration-toxicity screen), would have simplified the review.

Response - Tables 601 through 604 can be revised.

4) page 6-38, middle: The wording is most unusual in stating that "the future use scenario should be more conservative than the current use scenario." This is correct if the meaning is that: specifically for this site, in that a greater number of exposure scenarios are being considered for future residents than for the current workers (and that workers, as a rule, occupy a site for shorter durations than residents), that the greater component of the computed overall site risk is expected to be from the future land use considerations, i.e., the residential populations projected to be in the site vicinity.

Response - The wording can be deleted.

5)* pages 6-37 and 6-43: The document acknowledges its use of groundwater data only from the shallow "water table" aquifer. Presumably, this relates to the information in Table 2-2 of Volume I of the Phase III I.R.P. RI/FS. There, several different stratigraphic units are listed, with the maximum depth shown as 25 feet. Despite their overlap, none of the units are likely to be the ones from which water would be supplied for future residential drinking supply needs. The data of this aquifer are therefore not suitable for the purposes of evaluating the risk to future residents.] At the same time, the document acknowledges that this aquifer is not likely to be used as a potable supply for future residents, as its yield is low and because of its naturally occurring impurities. Data of the water supplies that would be expected to be tapped into futuristically should have been used in place of the data that were used. The data on the Raritan-Magothy aquifer system, discussed on page 2-14 of Vol. I, would appear to be relevant in the estimation of future risk, and should have been used!

The groundwater portion of this Baseline Risk Assessment is not acceptable. This is probably the most profound difficulty with the risk assessment.

Response - There is absolutely no reason to suspect that the Raritan-Magothy aquifer has been affected by contamination of the 11 RI sites. The shallow groundwater aquifer was evaluated in keeping with the original scope and intent of the RI, i.e., to evaluate risk from exposure to contaminants at the 11 RI sites.

6) 6-47, 1st paragraph: This site description should include a sentence similar to that found in the first paragraph of Site 5, wherein it clearly says that the potential for human exposure is limited, and therefore risk from 'current' site use is not evaluated. This is the case for Site 4, but one needs the associated Figure 6-5 (the conceptual site model) to confirm same. Five of the eleven sites are abandoned landfills. Since there is the possibility that not all

are adequately covered and/or access-limited, each site's description should address in its text whether or not current site use is a component of the site's risk assessment. Site 3, too, did not clearly state that current site risk would not be evaluated.

Response - Site models and additional text can be provided in a revised risk assessment.

7) page 6-63, 3rd paragraph: The standard default assumption is that a resident spends 350 days at home, not 250. This is a typographical error only; the risk equation used, incorporated the 13501 Figure.

Response - The typographical error can be corrected in a revised risk assessment.

8)* page 6-69, last paragraph - 6-70: Although Region II's consultation on dermal pathway issues is referenced, the document nevertheless, considered the effects of dermal exposure to many more chemicals than Region II indicated the Agency is currently prepared to evaluate, based upon the inadequacy of the science at the present time. Although the approach taken may have a valid science base, the author has deviated from the current Agency policy and incorporated chemicals it should not have. The approach followed is unacceptable; the dermal pathway computations (via soil exposure) would have to be redone, as these will affect the overall assessment of site risk (i.e., it will undoubtedly cause an overestimation of risk simply because more contributors/compounds are now included). The Uncertainty Section of the risk assessment is the area best suited to a discussion of any underestimates or overestimates of site risks. Rather than including the chemicals, there should have been a write-up addressing how these compounds' non-inclusion in the risk assessment would have produced a risk assessment that significantly underplays the actual site risk.

Response - Additional contaminants were evaluated in the interest of performing a conservative risk assessment and because absorption data were available from peer reviewed papers. The contaminants in question can be deleted from quantitative evaluation and discussed in the uncertainty analysis in a revised risk assessment.

9)* page 6-82 to 6-84: EPA's policy on dermal exposure from soils applies to **sediments** as well. Deriving absorption factors for other than the three compounds (PCB's, dioxin, and cadmium) for which Agency presently has such information, is inappropriate and at variance with Agency policy.

Response - See response No. 8.

10)* pages 6-100 to 6-104: EPA's hierarchy of chemical-specific toxicological information begins with the IRIS database. Secondarily, the Agency uses the HEAST tables. Thirdly, the Environmental Criteria Assessment Office (ECAO) is contacted should information still be lacking. The derivation of chronic RfD's described over these pages, for both the oral and

dermal routes, are inconsistent with Agency policy. In the event the above two databases do not provide the necessary toxicity values, a formal request should have been made with ECAO to either provide the values needed, or to be granted the approval to employ the derivation measures (especially cross-pathway ones) that were used in this document. Procedurally, there should first be an estimation of the approximate contribution to the overall risk attributable to each chemical. Requests to ECAO should only be for those chemicals whose inclusion are likely to impact on the overall site risk.

Response - IRIS and HEAST were used as the primary sources of toxicity criteria. ECAO was not consulted because at the time this document was being prepared they did not respond to requests from consultants. A list of chemicals of concern for which toxicity criteria are needed can be prepared and sent to ECAO before revising the risk assessment.

National Oceanic and Atmospheric Administration (SS 1-5)

General Response to NOAA Comments

Many of the comments received from NOAA fell into the following categories:

1. Reference to broad environmental impacts to the base waterways and their ecology. These issues were not addressed in the Remedial Investigation which addressed 11 individual sites and not the base drainage systems as a whole. Therefore, we do not feel that these issues fall within the scope of this RI Report, and we are unable to respond in this context. However, the Navy considers NOAA's comments important and intends to address these issues separately.

2. Presence of metals in groundwater and soils - The Navy and WESTON recognize that the interpretation of metals results in soils and groundwater requires further investigation to establish "background" values and mobility. Generally, additional field investigation is planned to establish at what sites, if any, these results represent releases caused by past activities.

3. Recommendations for Remedial Actions - Specific NOAA recommendations regarding site remedial actions are not appropriate at this time. It is the purpose of the Feasibility Study to develop remedial alternatives. However, Interim Remedial Actions are being considered for sites where exposed waste is observed. These actions will most likely be removal of the waste to a secured landfill.

   The above items address a majority of NOAA's individual comments and these comments will not be addressed individually. The following responses will only address issues not included above.

A. Resource and Habitat Summary

Resources and habitats of the drainages potentially impacted by the site investigated in the RI are summarized below:

1. Manasquan River - Mingamahone Brook and East Branch of Mingamahone Brook

   a. American eel, alewife, white perch, and blueback herring are likely present in the upper reaches of the Manasquan River and may migrate to Mingamahone Brook.

   b. Migration of fish may have been impacted by the construction of a reservoir located on a tributary and that also takes water from the Manasquan River. Although suspected, impacts of the reservoir have not been studied.

2. Navesink River

The Navesink River is a tidal embayment. NOAA trust species present in the Navesink River include striped bass, alewife, blueback herring, menhaden, bluefish, American eel, blue crab, and sea lamprey. Resource utilization is believed to be limited to foraging activity with the exception of winter flounder and blue crab spawning.

3. Swimming River - Pine Brook and Hockhockson Brook

   a. Hockhockson and Pine Brooks originate within NWS EARLE. Hockhockson Brook joins Pine Brook north of the facility. Pine Brook discharges to Swimming River about 2 km below the Swimming River Reservoir. Swimming River is tidally influenced below its confluence with Pine Brook and flows from there about 4 km to the Navesink River.

   b. Alewife and blueback herring are known to migrate in Swimming River and have been sampled in Pine Brook. Their presence in Hockhockson Brook is expected.

4. McClees Creek

   McClees Creek flows about 5 km to the Navesink River. The creek has not been studied, but is free-flowing and could provide habitat for blueback herring, alewife, American eel, white perch, and blue crab.

B. Site contaminants/Pathway Descriptions

1. Site 2 - Ordnance Demilitarization Site

a. Trace elements were measured in groundwater at concentrations of concern for the protection of aquatic life in a well downgradient from the site. Chromium was found in elevated concentrations in both sediments and groundwater. Except for areas of chromium contamination, trace elements were not found in soils at concentrations of concern. It is likely that contaminants are being flushed from the soils by precipitation infiltrating the porous sands at the site. The extent of groundwater contamination and discharge point (to surface water) has not been fully delineated. Additional wells northeast of the site and downgradient of Well 7 are needed to determine the extent of groundwater contamination. Surface water and sediment samples should be collected from the headwaters of Pine Brook to supplement Site 2 and Site 5 investigations.

Response - Pine Brook is 1/2 mile from Site 2. The map refers to "Pine Brook Road" not Pine Brook.

b. As the site is still in use, operations should be changed as necessary to prevent further groundwater contamination and monitoring of groundwater should be continued.

2. Site 3 - Landfill Southwest of 'IF" Group

Elevated concentrations of DDT and trace elements were found in groundwater. The landfill should be capped with an impervious cover and should have a leachate collection system to prevent further discharge of contaminants. Possible seepages to the swale below the landfill should be investigated.

Response - No drainage or seepage was observed at the Site 3 landfill.

3. Site 4 - Landfill West of "D" Group

Elevated trace element concentrations were not consistently measured in groundwater samples. The sediments were only moderately enriched in trace elements and PCBs. The extent of the elevated PCB and trace element concentrations in sediments should be delineated and cleaned up to prevent transport of contaminants downstream during major storm events. The landfill should be capped to prevent further contamination in the surface water and groundwater and to prevent leachate seepage. Trace elements and PCBs may have been transported downstream to depositional areas of the brook. Additional sampling in the brook would determine the extent of contamination.

Response - PCBs were found only in the most upstream of the three sediment samples, and at relatively low concentrations (1.4 mg/kg). Therefore, we feel that further downstream sampling is unnecessary.

4. Site 5 - Landfill West of Army Barricades

   a. Trace elements, particularly chromium, were found in groundwater at concentrations of concern. The source of the contamination should be investigated and the extent of the high chromium concentrations in groundwater should be determined. Further groundwater contamination should be prevented by site remediation. Sufficient information should be presented to determine if some of the wastes are below the water table. A possible drainage pathway during major storm events should be investigated. Surface water and sediment samples should be collected from the headwaters of Pine Brook to supplement Site 2 and Site 5 investigations.

   Response - See response above to Site 2.

   b. Section 4.4.1 incorrectly states that the site slopes southwest. It is customary and less confusing to have the site maps oriented with the top to the north.

5. Site 7 - Landfill South of "P" Barricades

   a. Groundwater discharge points to the creeks and the extent of groundwater contamination should be determined. The site should be remediated as necessary to prevent further groundwater contamination.

   Response - Site 7 contains no swales or other discrete avenues for surface runoff. When sites had these pathways they were sampled. The surface water body nearest to Site 7 is a branch of the headwater of Compton Creek, which is located approximately one-half mile east of Site 7.

   b. Section 4.5.1.3 states that groundwater flows northeast. The figure shows groundwater flows southwest.

   Response - Groundwater flow is towards the southwest as shown in Figure 4-6. The text will be corrected in the final report.

6. Site 10 - Scrap Metal Landfill Near Building 589

   a. The extent of the elevated trace element concentrations in groundwater should be delineated and groundwater discharge points to surface water should be determined. The source of the elevated chromium concentrations in the upgradient well should be investigated.

b. The site should be remediated as necessary to prevent further groundwater contamination and to contain the trace element contamination in groundwater.

c. The statement in Section 4.6.3 that the elevated trace element concentrations are a function of ambient soil conditions and unfiltered protocol was not supported by the data. Chromium concentrations found in groundwater from areas not impacted by facility contamination are at least two orders of magnitude below concentrations found at this site. Wells with high trace element concentrations were consistently elevated.

7. Site 11 - Contract Ordnance Disposal Area

a. From the description of the soils and the high water table at the site, surface water runoff from the site is expected. Possible surface water pathways should be investigated.

Response - See Section 4.7.1.2, Drainage. Site 11 has a closed drainage system since no direct discharge to surface water is evident. Site 11 contains no swales or other discrete avenues for surface water runoff. When sites had these pathways they were sampled.

b. Trace elements were found in groundwater at concentrations of concern. The wastes at the site were not adequately characterized. Information should be presented to determine the placement of wastes in respect to the water table. Surface and subsurface soil samples should be collected to determine the source of the elevated trace element concentrations. The extent of trace element contamination in groundwater should be determined.

Response - As noted in the report, no subsurface burial took place at Site 11, only surface burning. No visible evidence of burned residue was observed.

c. A few soil samples should be collected from the burn area and tested for dioxins.

Response - The "burn area" contains no visible evidence of residues. Please clarify why this comment applies to this particular site.

d. Remediation should be conducted as necessary to prevent further contamination of groundwater and discharge of site contaminants in soils and groundwater to surface water.

8. Site 19 - Paint Chip and Sludge Disposal Area Adjacent to Buildings S-34

a. Surface water and sediments from the drainage swale should be tested for DDT and other pesticides.

Response - The sediments at Site 19 were analyzed for the known contaminants, metals,

associated with the source. Sediment sampling established that the levels of metals (e.g. lead) decrease significantly downstream from the site source area to near background levels. Please clarify why pesticides are an issue at this site.

b. Contaminated soils and sediments should be removed at the site to prevent further groundwater and stream contamination. Groundwater should be remediated to prevent further discharge of contaminants to the stream. The large stone pile should be investigated as a possible source of contamination.

c. High concentrations of trace elements have been discharged to Mingamahone Brook in the past. Surface water and sediment samples should be collected from depositional areas downstream as necessary to determine the extent of contamination.

Response - Sediment sampling established that the levels of metals (e.g. lead) decrease significantly downstream from the site source area to near background levels. If concentrations of metals may occur elsewhere downstream, that needs to be addressed as a separate issue.

9. Site 20 - Grit Blasting Disposal Area Adjacent to Building S-34

a. Trace elements and PAHs were found in the drainage ditch at concentrations of concern. Surface water and sediment samples should be collected from the marsh and Hockhockson Brook as the marsh may overflow to the brook during storm events.

b. The waste pile should be removed and disposed of as hazardous waste. Sufficient soil samples should be collected from the site to determine the horizontal and vertical extent of contamination and should be analyzed for trace elements and SVOCs.

c. This site has likely caused groundwater contamination and could be the source of the elevated trace element concentrations found southwest of Site 10. Possible groundwater contamination from the site should be investigated and the extent of the contamination delineated.

d. Section 4.9.3 states that there is no visual or analytical evidence of extensive contamination of soils. Soils were not tested for trace elements or PAHs. The statements to the effect that the contaminant concentrations are low and would not be transported in groundwater are unsupported. Leachability tests are required to determine that the wastes are not a source of contamination.

Response - The Navy is considering a removal action for waste material at Site 20. This would be followed by confirmation of subsurface soils and sediments. A work plan will

be prepared that will address the above comments.

IRIS and HEAST were used as the primary sources of toxicity criteria. ECAO was not consulted because, at the time this document was being prepared, they did not respond to requests from consultants. A list chemicals of concern for which toxicity criteria are needed can be prepared and sent to ECAO before revising the risk assessment.

10. Site 22 - Paint Chip Disposal Area Adjacent to Building D-2

Lead and PAHs exceeded sediment ER-L concentrations in the ditch. Contaminants may have been transported from the site during storm events in the past. Surface water and sediment samples should be collected in the marsh and any discharge point from the marsh to Hockhockson Brook.

Response - Site 22 is a very small area of paint residue. The levels of PAH's and lead in the ditch sample appear similar to concentration found in other drainage areas during the RI and SI investigations and, therefore, we feel should be addressed with other general site drainage issues, not as part of Site 22.

11. Site 26 - Explosive "D" Washout Area Adjacent to Bldg. GB-l

a. Trace elements were found in concentrations of concern at the site in groundwater. Contaminated sediments in the depression should be removed to prevent further groundwater contamination.

b. It may have been possible for the depression to overflow from the ditch in the past when the wastewater was discharging. There was not enough information about the topography at the site to determine if a surface water pathway exists.

Response - Based on the size of the depression and the small discharge line, we feel it is very unlikely that the depression was ever filled faster than the soil could absorb the flow.

C. <u>Summary of Site Comments by Drainage Basin</u>

Note: The following comments are the same as the previous, except in different order. No further response is required.

1. Manasquan River - Mingamahone Brook

a. Site 3 - Landfill Southwest of "F" Group

Elevated concentrations of DDT and trace elements were found in groundwater. The landfill should be capped with an impervious cover and should have a leachate

collection system to prevent further discharge of contaminants. Possible seepages to the swale below the landfill should be investigated.

b. Site 19 - Paint Chip and Sludge Disposal Area Adjacent to Building S-34

i. Surface water and sediments from the drainage swale should be tested for DDT and other pesticides.

ii. Contaminated soils and sediments should be removed at the site to prevent further groundwater and stream contamination. Groundwater should be remediated to prevent further discharge of contaminants to the stream. The large stone pile should be investigated as a possible source of contamination.

iii. High concentrations of trace elements have been discharged to Mingamahone Brook in the past. Surface water and sediment samples should be collected from depositional areas downstream as necessary to determine the extent of contamination.

c. Site 26 - Explosive "D" Washout Area Adjacent to Building GB-1

i. Trace elements were found in concentrations of concern at the site in groundwater. Contaminated sediments in the depression should be removed to prevent further groundwater contamination.

ii. It may have been possible for the depression to overflow from the ditch in the past when the wastewater was discharging. There was not enough information about the topography at the site to determine if a surface water pathway exists.

2. Navesink River - Hockhockson Brook and Pine Brook (Swimming River)

a. Site 2 - Ordnance Demilitarization Site

i. Trace elements were measured in groundwater at concentrations of concern for the protection of aquatic life in a well downgradient from the site. Chromium was found in elevated concentrations in both sediments and groundwater. Except for areas of chromium contamination, trace elements were not found in soils at concentrations of concern. It is likely that contaminants are being flushed from the soils by precipitation infiltrating the porous sands at the site. The extent of groundwater contamination and discharge point (to surface water) has not been fully delineated. Additional wells northeast of the site and downgradient of Well 7 are needed to determine the extent of groundwater contamination. Surface water and sediment samples should be collected from the headwaters of Pine Brook to supplement Site 2 and Site 5 investigations.

ii. As the site is still in use, operations should be changed as necessary to prevent further groundwater contamination and monitoring of groundwater should be continued.

b. Site 4 - Landfill West of "D" Group

Elevated trace element concentrations were not consistently measured in groundwater samples. The sediments were only moderately enriched in trace elements and PCBs. The extent of the elevated PCB and trace element concentrations in sediments should be delineated and cleaned up to prevent transport of contaminants downstream during major storm events. The landfill should be capped to prevent further contamination in the surface water and groundwater and to prevent leachate seepage. Trace elements and PCBs may have been transported downstream to depositional areas of the brook. Additional sampling in the brook would determine the extent of contamination.

c. Site 5 - Landfill West of Army Barricades

i. Trace elements, particularly chromium were found in groundwater at concentrations of concern. The source of the contamination should be investigated and the extent of the high chromium concentrations in groundwater should be determined. Further groundwater contamination should be prevented by site remediation. Sufficient information should be presented to determine if some of the wastes are below the water table. A possible drainage pathway during major storm events should be investigated. Surface water and sediment samples should be collected from the headwaters of Pine Brook to supplement Site 2 and Site 5 investigations.

ii. Section 4.4.1 incorrectly states that the site slopes southwest. It is customary and less confusing to have the site maps oriented with the top to the north.

d. Site 10 - Scrap Metal Landfill Near Building 589

i. The extent of the elevated trace element concentrations in groundwater should be delineated and groundwater discharge points to surface water should be determined. The source of the elevated chromium concentrations in the upgradient well should be investigated.

ii. The site should be remediated as necessary to prevent further groundwater contamination and to contain the trace element contamination in groundwater.

iii. The statement in Section 4.6.3 that the elevated trace element concentrations are a function of ambient soil conditions and unfiltered protocol was not supported by the data. Chromium concentrations found in groundwater from areas not impacted by facility contamination are at least two orders of

magnitude below concentrations found at this site. Wells with high trace element concentrations were consistently elevated.

e. Site 11 - Contract Ordnance Disposal Area

i. From the description of the soils and the high water table at the site, surface water runoff from the site is expected. Possible surface water pathways should be investigated.

ii. Trace elements were found in groundwater at concentrations of concern. The wastes at the site were not adequately characterized. Information should be presented to determine the placement of wastes in respect to the water table. Surface and subsurface soil samples should be collected to determine the source of the elevated trace element concentrations. The extent of trace element contamination in groundwater should be determined.

iii. A few soil samples should be collected from the burn area and tested for dioxins.

iv. Remediation should be conducted as necessary to prevent further contamination of groundwater and discharge of site contaminants in soils and groundwater to surface water.

f. Site 20 - Grit Blasting Disposal Area Adjacent to Building S-34

i. Trace elements and PAHs were found in the drainage ditch at concentrations of concern. Surface water and sediment samples should be collected from the marsh and Hockhockson Brook as the marsh may overflow to the brook during storm events.

ii. The waste pile should be removed and disposed of as hazardous waste. Sufficient soil samples should be collected from the site to determine the horizontal and vertical extent of contamination and should be analyzed for trace elements and SVOCs.

iii. This site has likely caused groundwater contamination and could be the source of the elevated trace element concentrations found southwest of Site 10. Possible groundwater contamination from the site should be investigated and the extent of the contamination delineated.

iv. Section 4.9.3 states that there is no visual or analytical evidence of extensive contamination of soils. Soils were not tested for trace elements of PAHs. The statements to the effect that the contaminant concentrations are low and would not be transported in groundwater are unsupported. Leachability tests are required to determine that the wastes are not a source of contamination.

g. Site 22 - Paint Chip Disposal Area Adjacent to Building D-2

Lead and PAHs exceeded sediment ER-L concentrations in the ditch. Contaminants may have been transported from the site during storm events in the past. Surface water and sediment samples should be collected in the marsh and any discharge point from the marsh to Hockhockson Brook.

3. Navesink River - McClees Creek

a. Site 7 - Landfill South of "P" Barricades

i. Groundwater discharge points to the creeks and the extent of groundwater contamination should be determined. The site should be remediated as necessary to prevent further groundwater contamination.

ii. Section 4.5.1.3 states that groundwater flows northeast. The figure shows groundwater flows southwest.

Response - The above comments 1,2, and 3 are duplicates (verbatim) of earlier comments presented in a different outline format. Please refer to those responses presented earlier.

D. General Comments

1. Trace elements are the primary contaminants of concern found at the NWS EARLE sites reviewed. Other persistent compounds found at some sites include PAHs and PCBs. Pesticides were only found at concentrations of concern at a few sites, but may be present in areas that have not been investigated.

2. Surface water investigations were limited to the immediate vicinity of the sites and site topography was not shown on the figures.

3. Groundwater investigations were limited to shallow groundwater and did not determine the extent of possible groundwater plumes. In some cases, there was not enough information to determine if wastes at disposal sites are in contact with the groundwater.

4. Although few sites appeared to have extreme contamination, because of the widespread groundwater contamination in the Hockhockson and Pine Brook drainage basin and the possibility that NOAA resources may be present, additional surface water and sediment sampling of depositional areas in the brooks and Swimming River should be conducted to determine if areas of contamination are present in the streams. This is a recommendation that has been discussed on several occasions and has not been fully resolved.

Response - These are all general comment which have been addressed in connection with other specific comments.

National Oceanic at Atmospheric Administration (SS 6-8)

1. Risk Assessment

   a. Risks to aquatic biota having direct contact with contaminated sediments at the sites (benthic organisms) were evaluated. Contaminants measured in sediments at Sites 4, 10, and 19 were identified as risks to benthic organisms based on comparison to sediment ER-LS.

   b. Risks to aquatic organisms from past discharges of persistent compounds that may have been transported downstream were not considered. Risks to aquatic organisms and the degradation of water quality in the streams from groundwater transport of contaminants to downstream habitats were also not considered.

   Response - These statements are correct. Risk analysis was only performed in relation to specific sites.

2. Remedial Alternatives

   a. New Jersey surface water criteria were considered Applicable or Relevant and Appropriate Environmental and Public Health Requirements (ARARS) for discharge of treatment effluents. Federal water quality criteria will also be considered.

   b. A preliminary screening of soils and groundwater remedial technologies was developed for use at NWS EARLE. The remedial technologies include both containment and treatment alternatives. Remediation goals and alternatives for individual sites were not included.

   Response - These statements are correct, and no response is required.

3. Comments

   a. The assessment of environmental risks did not identify potential hazards from the cumulative effects of contaminants transported from the base via groundwater and surface water on downstream habitats. Contaminants of concern at the sites should be identified based on the potential for groundwater and surface water transport to downstream habitats as well as on-site risks.

   b. Specific recommendations for remediation and additional sampling at the individual sites were made previously (March 1992). Additional downstream sampling in Hockhockson and Pine Brooks and Swimming River were also recommended previously to determine the cumulative effects of past and present releases from individual sites at NWS EARLE.

c. In summary, NOAA has the same environmental concerns now as were indicated to the Navy on many separate occasions in the past. Although EPA has recognized NOAA's concerns at this site and has attempted to get NOAA's concerns addressed, the Navy continues to ignore NOAA's natural resource trustee informational needs. At this point in time, NOAA has no choice but to notify the U.S. Department of Justice and NOAA's Office of General Counsel that the Navy has not been cooperative in addressing NOAA's trustee concerns.

Response - Again, the above comments are being addressed in separate discussions with the Navy, and at this time are not part of the RI work scope.