UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
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MAY - 1 1996

Mr. John Kolicius, Project Manager
Naval Facilities Engineering Command
10 Industrial Highway
Code 1821, Mail Stop 82
Lester, PA 19113-2090

Re: EPA Review of the Navy's draft *Remedial Investigation Report* (March, 1996), Naval Weapons Station (NWS) Earle, Colts Neck, New Jersey

Dear Mr. Kolicius:

In accordance with the Federal Facilities Agreement (FFA) entered into between the Environmental Protection Agency (EPA) and the Navy for the NWS Earle facility, EPA has reviewed the Navy's draft *Remedial Investigation Report* (March, 1996). Our comments are attached. The effort made in putting together this report is commendable; it is well organized and includes thoughtful interpretation and discussion of the data. Our main concerns are: (1) an inadequate integration of existing data from previous reports, (2) a lack of formulation of objectives and sampling rationale for each site, and (3) the necessity for more rigorous site-specific evaluations of human health and ecological risk. These concerns have a direct impact on our ability to make informed decisions regarding the need for remedial action at individual sites at NWS Earle.

If you have any questions please call me at (212) 637-4320.

Sincerely,

Jeffrey Gratz, Project Manager
Federal Facilities Section

Attachment

cc: B. Marcolina, NJDEP
G. Goepfert, NWS Earle
L. Jargowsky, Monmouth Co. Heath Dept.

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EPA Comments on the Navy's draft
***Remedial Investigation Report* (March, 1996)**

General Comments:

1. The "Previous Investigations" Chapter for many sites needs to be expanded. This is especially true for those sites where the objective of this study was to fill data gaps (where there is a significant amount of existing data). Summary tables of existing data should be provided, and either figures should show previous sample locations, or the text should clearly describe the geographic location of the samples. Where the text states the elevated concentrations of "X" was found, also include the highest concentration and location, or make reference to a table or figure.

2. For each site, the objectives of this study were somewhat different. For some sites the purpose was to confirm earlier reports of contamination; for others it was to further delineate the area of contamination, or to show that contamination did not leach into the subsurface. The "RI Field Investigation" section for each site should discuss the purpose and objectives of this investigation. It should include the sampling rationale (similar to that provided in the workplan) for the different sample locations. If a medium was not sampled, a reason should be provided. Reference should be made to previous investigations, if relevant. This information is especially crucial for sites with very limited data sets. When human health and ecological risk analyses are based on one or just a few samples, we need to know whether the sample was biased (e.g., taken at what is thought to be the most contaminated area at the site) or random. This information should then be included in the discussion of risk.

3. The "Nature and Extent of Contamination" chapters contain discussions on different classes of contaminants that were detected at each site. Miscellaneous parameters, however, are not discussed and data tables are relegated (in most instances) to an appendix. These parameters were analyzed because of concerns particular to each site. The results should be discussed in this chapter for each site.

4. *Non-detect data* - Data tables should be modified to clearly show whether an empty space represents "non-detected" or "not analyzed" for a particular analyte. For non-detects, the detection limit and a "U" should be placed in the space. (Without this information, it is not possible to verify the calculated representative concentration.)

5. The term "Applicable or Relevant and Appropriate Requirements" or "ARARs" is used incorrectly throughout the document. Very few of the numerical values shown in comparison tables are ARARs. Many are considered screening levels or guidelines. Please correct the text and tables.

6. In addition to the AWQC used for screening surface water, New Jersey Surface Water Quality Standards (NJDEP, Office of Land and Water Planning, April 1994 NJAC7:9B) should also be referenced. All surface water samples were to have been analyzed for hardness and salinity. An assumed hardness of 100 mg/l may under- or overestimate screening criteria. Salinity concentrations are necessary to ascertain whether surface water samples should be screened against freshwater or saltwater criteria.

7. The physiography of many areas on NWS Earle are similar to the New Jersey pine barrens. The very sandy soil and very high metals concentrations are indicative of this environment. This description should be detailed throughout the report because it has implications regarding "natural" versus industrial causes for elevated concentrations of some elements. Certain sites are described as being void of vegetation. One questions whether this might be an effect of contamination. However, if the site shows characteristics of a pine barrens-type environment, then an alternative cause can be suggested.

8. In the individual site sections, the text often states that "samples were screened with an HNu and visually inspected for evidence of contamination (such as staining and odors)..." Then the reader is referred to the drill logs in the appendix for a description of findings. Any findings should be included in the text.

General Ecological Comments:

1. Although the site location maps are much improved over previous efforts, in some cases they invite questions over sampling rationale. Many of the site figures show adjacent wetlands that were not sampled. While there may be good reason for this (e.g., the wetlands are uphill from the site, ditches carry surface water runoff elsewhere, although groundwater discharges to surface water, the groundwater is not contaminated, etc.), it is not clear either in the figure or associated text. "Site Background," "Fate and Transport," and "Risk Assessment" chapters should include more detailed information on the physical description and potential contaminant migration pathways of each site. The text should provide explanation as to why certain media (or certain locations) were not sampled.

2. The watershed sampling program was an important part of this investigation, yet the data have not been adequately integrated into the report. The only information that may be gleaned from the assessment is whether contaminants are migrating off the facility and potentially impacting other areas. In order to evaluate contaminant migration and potential impact on watersheds and wetland areas on the facility, all data, including that from individual sites should be evaluated. The following changes should be made:

   A. A detailed discussion as to the purpose and objectives of the watershed sampling program should be included.

B. The rationale for each sampling location should be included (as well as a physical description of the area).

C. It would be much more effective to discuss the results on a watershed by watershed basis. In this way, cumulative risk and the potential impact from individual sites can be evaluated. Included with each discussion should be a qualitative ecological risk assessment which draws in receptor and pathway issues. It is crucial that the data from individual sites be brought into the discussion to determine whether one or more sites may be contributing to contamination (if found) at the base boundaries and whether elevated concentrations are anthropogenic or natural (regardless of "background" levels). Currently, the text contains statements such as, "The contamination has no relation with nearby Earle sites" and "... metals may be associated with non-point sources unrelated to specific NWS Earle sites/activities." This is inadequate and is not substantiated by any specific information in the text. To draw these conclusions, all surface water and sediment data should be taken into consideration, and the potential contribution of groundwater contaminants to surface water and wetland samples should be evaluated.

D. Consistent with comment "C," above, we recommend that an integrated discussion of groundwater and surface water/sediment results for Sites 6, 12, 17, and 15 be presented. New maps should be prepared that can show the results from these 4 sites as well as any relevant background and watershed samples. Maps should also be prepared that combine the results from multiple sites in the Hockhockson watershed (Sites 4, 22, 23, 10, and 20 - for example).

E. A more realistic description of home ranges for species can be evaluated on a macro (watershed) scale. When individual sites are discussed, the ecological assessment often has to consider fractional home ranges.

3. The appropriate sediment screening criteria to be used are: the Ontario guidelines for freshwater sediment and NOAA guidelines for estuarine sediments. Therefore, screening the Mainside sediments against Ontario guidelines would be most appropriate. The salinity of the sediments in the Waterfront should be evaluated to determine if the NOAA criteria are applicable. The Ontario guidelines should be used for SVOCs (PAHs), pesticides, and PCBs where data tables do not contain screening criteria for comparison purposes. The Ontario and/or NOAA screening criteria appear to be more conservative than many of the Region IV guidance criteria for organics, which further justifies their preference. The NJDEP Soil Residential and Non-Residential Direct Contact Cleanup Criteria, are based on human health not ecological effects and should <u>not</u> be used. Further, TOC data should be provided in the site-specific data tables, and be used when determining the effective Ontario screening criteria for organic substances.

4. All contaminants that exceed screening criteria should be considered contaminants of potential concern (COPCs). Using background concentrations to screen out COPCs in ecological risk assessments is not appropriate. Maximum concentrations should be used in the screening assessment rather than representative concentrations. Further, when only one sample is collected, making assumptions on the statistical distribution of contaminants in that medium is not possible (e.g., sites 7 & 19). When screening criteria do not exist, contaminants should be carried through to the ERA. For example, the justification that 2,4,6-TNT was the only explosive to be included as a COPC because toxicity criteria were not available for other detected explosives (page 2-40) is not valid.

5. There does not appear to have been an evaluation of ecological receptors that use or potentially use the site(s). Many birds probably utilize the wetlands, as well as small mammals. Organisms such as the black duck and great blue heron should be selected as ecological receptors to represent the aquatic food chain. A comprehensive survey of species present and/or expected to be present at the facility should be conducted. This may also help identify the potential for specific receptors at individual sites. A receptor, such as the woodcock or shrew, which consumes earthworms should be added to the list. To be more conservative, a meadow vole, which has a higher ingestion rate and a smaller home range than the rabbit, may be modeled.

6. Inadequate information has been provided for several sites at which "no further action" is recommended. Previous sample data, along with figures identifying the areas that were previously sampled, would have been useful to determine whether sufficient information was available to warrant no additional studies. These data are also required for those sites at which the document states an ERA is underway. In addition, information on the impact of groundwater on surface water and the flow of surface water on site should be included in the description for all sites.

General Human Health Comments:

1. Only data acquired during this investigation were used in the risk assessments. Depending upon the purpose of the individual site investigation, this may not have been appropriate. For example, at those sites where there are existing data confirming the presence of contamination, this investigation may have included only biased sampling to look for contamination boundaries. Thus, a risk assessment would have to include the previous data for it to be useful. The Navy should look at the rationale for sampling at each site to ensure that the risk assessment is using a relevant data set. If the Navy does not intend to use the data from previous investigations, then it must state that the risk calculations include the assumption that previously found contamination will be removed. The biasness of the sampling plan and its effects on the risk analysis must be discussed in each site risk summary.

2. *Risk Uncertainties* - The risk discussion for each individual site should be expanded to include mitigating factors and uncertainties associated with the risk assessment performed for each site. Issues to consider include: (1) how the number and distribution of results may have an impact on the assessment, (2) were there high concentrations of contaminants for which there were no toxicity data, (3) were the generic risk assumptions relevant to the site, etc.

3. In accordance with the National Contingency Plan, EPA uses an acceptable risk range of 10^{-4} to 10^{-6}. Statements as to whether the risk at each site falls within or outside EPA's acceptable range should reflect these numbers. If the risk assessment shows numbers at the high end of the range (1 to 4 x 10^{-4}), *central tendency values* should be presented. The text should include a discussion of this process in the appropriate sections.

4. *Non-Cancer Assessment.* The summary of risk information provided in Chapter 2 lacks identification of the critical effects associated with the Reference Doses and Reference Concentrations used throughout the document. In addition, the summary of non-cancer health effects fails to identify chemicals with similar endpoints since the target organs only are listed. It is suggested that Table 2-11 be expanded to include this information. Further, the evaluation of non-cancer health effects should indicate the total risks associated with all chemicals and, for chemicals with Hazard Indices greater than 1, the chemicals should be grouped according to similar critical effects associated with the specific Reference Doses and Reference Concentrations. (Currently the evaluation is probably overly conservative.)

   The critical effects for each Rfd should be listed where appropriate in each site-specific risk discussion.

   An inhalation Reference Dose is presented for several chemicals throughout the document. For clarification, a footnote should indicate that these values are based on the Reference Concentration with modifications to reflect specific exposure assumptions. A discussion of reference concentrations is presented in EPA's "Interim Methods for Development of Inhalation Reference Concentrations" (EPA/600/8-90/066A).

5. *Lead* - Throughout the document the results from the Integrated Environmental Uptake Biokinetic Lead Model (IEUBK) are presented as the basis for determining whether the lead levels in soil and/or water are associated with unacceptable lead levels in children. It is suggested, that for lead, the screening soil values be compared to a value of 400 ppm as discussed in OSWER Directive #9355.4-12. In addition, groundwater concentrations should be compared to values of 15 ug/l (the EPA Action Level). In part, by using the IEUBK with standard default values, the Navy has recreated the information presented in the OSWER directive. For soil values above this level, a discussion should be presented.

The discussion indicating that the Agency could not reach consensus on a slope factor/Reference Dose for lead presented throughout the document should be revised to indicate the information presented in the OSWER directive and the lead Action Level. The discussion of the results from the IEUBK model should also highlight the uncertainties associated with the model (e.g., only appropriate for children from ages 0 to 6, lack of site-specific blood lead level data from children from the surrounding community, etc.).

6. *Exposure Scenarios.* The Navy should describe the activities associated with the "industrial scenario." In most risk assessments we evaluate specific work activities e.g., utility workers, construction workers, lawn maintenance, etc. It would be helpful if more specifics concerning the types of activities planned under the industrial scenario could be presented and discussed at each site.

7. *Dermal Toxicity* - The Navy evaluated all chemicals of concern in soil and water based on dermal contact. This procedure did not fully consider the recommendations for assessing this pathway outlined in EPA's Interim Report "Dermal Exposure Assessment: Principles and Applications" (EPA/600/8-91/011B) and a subsequent memo in which the Agency supports using Dermal Absorption Factors from soil contaminants for only five chemicals. Specific points are discussed below:

A. Dermal Absorption Through Soil - Dermal absorption from soils appears to be more significant than direct ingestion for those chemicals which have a percent absorbed exceeding about 10%. Based on a review of the scientific literature and the guidance mentioned above, assessing dermal exposures quantitatively for compounds other than dioxins, PCBs, cadmium, pentachlorophenol and arsenic in soil is not recommended. Rather potential dermal exposures for other chemicals should be discussed qualitatively in the uncertainty/risk characterization section highlighting the considerable uncertainties associated with dermal absorption studies.

Table 2-15 in the risk assessment indicates that the Navy modified the absorption factors for the chemicals of concern based on chemical classes using data from Feldman and Maibach (1970), Webster and Maibach (1985) and EPA (1984). We recommend that the more recent guidance should be used as stated above. In addition, the document should include a more detailed discussion of the uncertainties associated with this pathway.

For the 5 above-mentioned chemicals, the scientific literature indicates that dioxins and PCBs are very well absorbed from the gastrointestinal tract, therefore no adjustment in the oral toxicity value is necessary. For cadmium, the data suggests that cadmium is approximately 10% absorbed when ingested. Using the oral RfD for cadmium the dermal RfD should be 5×10^{-5} (this was listed in table 2-11).

B. Dermal Exposure Through Showering - Current studies suggest that dermal exposure may be expected to contribute no more than 10% to the total body burden of those compounds present in the vapor phase. Thus risks through inhalation would pose the greatest risks. The Shower Model used in the assessment assumes approximately 75% volatilization. We recommend that this pathway be treated qualitatively.

C. Dermal Exposure Through Surface Water - For most contaminants dermal contact with water during bathing or swimming will generally pose less a threat than direct consumption of water. The calculations presented in the tables basically confirmed this.

8. *Background Concentrations.* The maximum concentration in the background samples is listed for the chemicals of concern. Region II uses the arithmetic mean of the background and compare it to 2x the arithmetic mean for the samples to determine if a chemical is below background - and therefore not a contaminant of concern (except for volatile organics and Class A carcinogens). In addition, background values are also evaluated based on the frequency of detection in the samples, toxicity, presence in field and trip blanks, and other criteria listed in EPA's Risk Assessment Guidance.

For those contaminants such as arsenic, beryllium, thallium, and cadmium, where "background" concentrations show an elevated risk, this information should be clearly highlighted in the document and discussed. (A background "risk assessment" should not have been performed since the background samples were taken from disparate areas of the base.) Chapter 2 should include a discussion of elevated metals results (see the pine barrens issue) and each site chapter, where appropriate, should include a discussion as to whether elevated metals are due to contamination at the site or to natural conditions- with reasons provided.

9. Although Section 2 indicates the importance of discussing uncertainties, the site-specific risk characterizations fail to discuss the uncertainties associated with each site. This information should be included with each site chapter where appropriate.

10. *Total Petroleum Hydrocarbons.* Throughout the document, Total Petroleum Hydrocarbons were identified as a analytical parameter, but concentration data is not presented. In addition, toxicity values for this group of chemicals is not presented. It is suggested that the Navy explain their approach for addressing TPHs more fully and indicate the values found at each site. Each site risk discussion should mention how TPH values were evaluated in the risk assessment. (Also see General Comment #3.)

Chapter-Specific Comments:

page	comment
ES-	The document lacks a central section that combines the data from the various parts and provides a "Big Picture Analysis" of the human health and ecological risks for the 27 AOCs. It is suggested that the Executive Summary provide a "Big Picture" evaluation of the facility including the uncertainties. The conclusion that the sites do not pose a risk is not appropriate for a few Areas of Concern. It would be helpful to identify the few areas where further investigation and remediation may be necessary.
ES-1	The "federal Department of Justice" is not part of any agreement to investigate this site.
1-1	A brief discussion on how 27 AOCs were determined should be included.
1-2	Section 1.3: Include a discussion of present land use (and anticipated future land use) at different areas of the base.
2-33	Section 2.3.1.8: The EPA source for the BCFs should be identified. If non-EPA BCFs are used the reference to the specific BCF should be listed.
2-35	A brief description of pesticide usage at the base should be included i.e., common pesticides, usage patterns, etc.
2-38	¶2: References to EPA's Exposure Guidelines, recent EPA memo on Risk Characterization (March 21, 1995), Land Use policy, and lead directive (previously identified) should be included. Include a discussion of the selection of critical non-cancer effects in the development of Reference Doses.
2-29	A discussion of the RME and Central Tendency (or average) exposures should be presented.
2-40	Was the Superfund Technical Support Center at EPA's National Center for Environmental Assessment in Cincinnati (NCEA-Cin.) contacted for information on the toxicity of 2,4,6-Trinitrotoluene?

¶3: Note that the U.S. Army Biomedical Research and Development Laboratory has issued water quality guidance criteria for several explosive compounds.

2-41 The discussion of the statistical measures fails to address the limitations associated with evaluating data sample sets of less than 10 samples.

2-44 Section 2.4.2 (*Toxicity*): It is unclear whether the authors contacted NCEA-Cin. to determine whether provisional values were available for any of the chemicals of concern lacking data. These interim values would help reduce the uncertainty associated with the risk assessment.

2-45 Table 2-11: The list of carcinogens fails to identify the specific Weight of Evidence Grouping for each of the carcinogens. This information is discussed in Table 2-12 but the specific groupings should be presented in Table 2-11.

The toxicity values for several chemicals of concern are listed with "W" or withdrawn values. Before using these values it is important to evaluate the reasons why the toxicity values were withdrawn and discuss the impacts on the risk assessment.

Several chemicals also had an "A" notation associated with the toxicity values. It would be helpful to identify the source of these alternative values from the HEAST Tables.

Table 2-11 identifies inhalation cancer slope factors that were developed based on the Unit Cancer Risk Values presented in IRIS. A footnote should be added to the Table indicating that the Unit Cancer Risk Values have been modified using several exposure parameters e.g., inhalation rate of 20 cubic meters/day, exposure duration of 30 years, etc. to develop an inhalation cancer slope factor.

The recommended oral reference dose for mercury is 1×10^{-4}.

The dates on which IRIS and HEAST values were obtained should be identified.

A discussion of the Toxicity Equivalency Factor (TEF) for PAHs should be referenced as the source for these values.

The inhalation RfD value for beryllium should be checked.

The value for nitrobenzene should be checked.

2-48 It may be helpful to provide a definition for Reference Dose including the statements that the RfD spans perhaps an order of magnitude. The discussion should also indicate that associated with each RfD is a critical study and critical endpoint that are selected and associated with the value.

A discussion of Reference Concentrations and conversions to inhalation Reference Dose should be included here.

2-49 The discussion of cancer slope factors should also reference the Agency's cancer guidelines and use of the Unit Cancer Risk Factor for inhalation risks. The approach used to extrapolate from the UCRF to inhalation cancer slope factor should be presented.

2-51 The discussion of ARARS would be more appropriate in a section separate from the risk assessment.

2-56 A better description of the assumed activities of workers should be presented (see General Human Health Comment #6).

2-58 ¶3: The 30 year residence on site is based on national census data for the general population. Is more site-specific information available that may allow better characterization of the population's activities or discussion of the uncertainties?

2-59 Is it possible that people may fish on-base or in the surrounding waters? A brief description of why this pathway was not considered should be included.

2-60 ¶4: The discussion of the 9 year old child requires clarification. It appears that an assumption is being made that the child may be exposed from years 6 through 12 and that the mean body weight and age were selected for this 6 year period. This should be clarified.

2-67 ¶1: What is the basis for assuming a cover factor of 80%?

2-71 Table 2-18: See previous comments on dermal absorption fractions.

2-77 ¶2: Further explanation is required concerning the assumption that employees will not shower at work. It seems probable that based on outdoor activities, workers may shower before going home.

¶4: Why was 25 kilograms used for the child when previously a value of 30 kilograms was selected?

2-81 See General Human Health Comment #5 on the IEUBK model. In addition, the citation of data from 1976 through 1980 on blood lead levels is not the most up-to-date information. Refer to several papers on blood lead levels published related to the NHANES II and III studies. A discussion of the advantages and limitations of the IEUBK model should be provided.

2-83 "Carcinogenic Risks": The discussion should indicate that separate oral and inhalation risks are calculated. Also indicate that the risks within a population of 1 million people are based on specific assumptions concerning the exposure frequency, duration, and dose. Note that the risk range is defined under the National Contingency Plan as 10^{-4} to 10^{-6}. The definition for the RME should be provided.

"Noncarcinogenic Risks": Discuss the critical endpoints.

2-84 "Data Evaluation": Include a discussion of additivity of risks for cancer and non-cancer.

2-85 "Exposure Assessment": The discussion of exposure assessment should also include the evaluation of average exposures (i.e., Central Tendency risks previously commented on).

2-86 ¶3: The text should probably state "overprotective."

"Risk Characterization": See pages 8-16 and 8-17 of RAGS for a discussion of the approach for assessing non-cancer hazards and cancer risks. Usually for non-carcinogens we calculate the total Hazard Quotient for each chemical, a Hazard Index for all pathways, and if an HI of 1 is exceeded, perform a more detailed HI evaluation based on the critical effects.

2-94 Include a discussion of the data validation process.

2-96 Change the references in Step 1 and Step 2 to "Section 2.6.1" and "Section 2.6.2."

2-97 The description of the NWS Earle ecological setting is provided in "Section 3.9."

2-99 Section 2.6.1.1.4: The text should note that terrestrial receptors (in addition to aquatic receptors) may come into contact with contaminants in sediments through incidental ingestion, and be exposed to contaminated groundwater flowing into surface water.

2-100 Section 2.6.1.1.5: Sites were excluded from consideration in the quantitative ERA if they met certain criteria. While some are valid, "the absence or limited abundance of ecological receptors" by itself, is not, since this absence may be due to contamination. Likewise, "localized or confined areas of contamination" may also not be a good criterium if the localized area is a valuable area and/or inhabited by endangered species.

2-102 Figure 2-3: The figure should illustrate the potential for terrestrial wildlife to have direct contact with surface water and sediment, and ingest sediment.

2-115 ¶1: The parameters used in calculating the dose to the red-tailed hawk are found in Table 2-30, not Table 2-33.

3-12 Section 3.5: It would be helpful to provide a list of the state-wide background levels of various metals for the readers information. In addition, a discussion of the unique aspects of the Pine Barrens and the metal values found should be included and related to relevant areas at NWS Earle.

3-24 ¶1: Is the local water supply well used for a residential or industrial purposes? Where is this well located - near which area of concern?

Site 1:

4-16 Section 4.5.1.2: State the concentration of nitrocellulose.

4-30 Section 4.6.1: The hydropunch results should be included in the discussion.

4-31 Section 4.6.3: Include a discussion of previous soil samples. What were the objectives of this sampling round and were they met? Did this investigation fill gaps in the data? How?

4-46 Section 4.8.1: It is not clear in the text why an open field would not be an ecological habitat. Why weren't the wetlands east of the site sampled? Is there overland flow or groundwater discharge to this area?

4-48 Section 4.8.2: Samples which were collected in 1993 indicated the presence of low levels of metals. However, the screening criteria that were utilized (NJDEP Soil Residential and Non-Residential Direct Cleanup Criteria), are based on human health risk, not ecological concerns. Ecological risks should be reevaluated using the correct screening criteria to determine whether this site poses a risk to ecological receptors.

Section 4.9.2: Previous study data must be better presented, integrated and discussed before we can concur with the Navy's recommendation for no further action.

Site 2:

5-5 Section 5.3.2: If there is no surface vegetation at the site, how could "surface vegetation" be "removed before sampling?"

5-8 Section 5.1: Be clear that the entire 11 acre site consists of a sand pit.

Section 5.5.1.2: Mention the explosives results.

Section 5.5.1.3: State the concentration of hexavalent chromium.

5-22 Section 5.6.1: The fact that low turbidity samples could not be obtained should be addressed in the risk assessment discussion.

5-39 Last ¶: Based on the groundwater contours, there does not appear to be a truly upgradient well.

5-40 The Subpart X sampling results should be included and discussed in this document (per the workplan).

Site 3:

6-13 Section 6.5.1.2: It is not clear what "background sediment samples at Site 3" refers to. Only 1 sediment sample was taken at Site 3 and presumably it was not a background sample.

Since only one sample is being used to defined ecological risks, the sampling strategy must be defined. This comment applies to many of the sites (see General Comment #2).

6-23 Section 6.5.2.2: The fact that 4 wells were dry and could not be sampled should certainly be mentioned, especially considering the high levels of organics found previously in well MW-4 (and confirmed by the soil gas readings taken during this investigation).

Section 6.6 (especially 6.6.3 and 6.6.4) should make mention of the lack of groundwater data, which can be just as important as the results. Are there still significant data gaps at this site?

6-38 The "more rigorous ecological risk assessment" should be submitted as soon as possible.

Site 4:

7-3 ¶1: State the concentration of Aroclor 1260. See general comments regarding importing existing data into this document and integrating it with the results of this report.

7-19 7.5.2: The hydropunch work was an important part of the investigation for this site. The results should be displayed and integrated into all discussions concerning groundwater contamination at the site.

7-20 Table 7-7: Change units to μg/l.

7-27 Table 7-9a: A definition of the qualifier "N" used for aldrin and dieldrin should be included.

7-49 Table 7-23: References for the "EcoTox Threshold" should be provided. They are not the same as the screening criteria (AWQC Freshwater Chronic Aquatic Life) utilized in Table 7-9a. This table notes exceedances of copper, lead, mercury, and aldrin (no criterium).

7-50 Table 7-24: The screening criteria used for nitrobenzene is incorrect. The correct amount is 8,000 ppm (as per Table 7-5a). This results in a hazard quotient (HQ) of 8.25.

7-51 7.8.3: The potential for contaminant migration to Lake Earle should be evaluated.

7-52 In order to concur with the Navy's recommendations, previous data must be more thoroughly presented, integrated, and discussed. Otherwise, questions remain as to whether the area was adequately characterized and whether additional sediment/surface water samples should be taken. Previous data should be incorporated into the risk analysis.

Due to the poor current conditions of the landfill "cap", more than just "improvements" should be considered in the feasibility study for this site.

Site 5:

8-3 Section 8.3: It is not clear why samples were not taken in the drainage ditch or wetlands adjacent to the site. (These areas were not even mentioned in the site description.) These wetland areas should be included in the ecological discussion section. The drainage ditch leading from the landfill to the wetlands should be evaluated as a potential pathway for off-site migration of contaminants.. Surface water and sediment samples may need to be obtained in these areas to determine whether or not COPCs are present and available to ecological receptors. Prior to concurring with the Navy's recommendation, this issue must be addressed.

8-8 Section 8.5.1: The hydropunch work was an important part of the investigation for this site. The results should be displayed and integrated into all discussions concerning groundwater contamination.

8-30 Section 8.8.1.1.3 and 8.8.1.1.4: The text states that "previous investigations showed only low levels of surface soil contaminants." Only test pit samples have been taken at this site. The text should be corrected.

Site 6:

9-16 Section 9.5.2.1: State the concentration of manganese.

9-34 Section 9.7.2: Include in the risk discussion the absence of surface and subsurface soil sampling at this site.

9-42 "Ecological Risk": See General Ecological Comments 2C and 2D regarding incorporating information from nearby Sites 15, 17, and 12.

Site 7:

10-1 ¶2: State why "no vegetation exists" on a portion of the landfill. This may be a stressed area that needs to be sampled.

10-2 Figure 10-1: Watershed sampling location WSSW30 is shown on the figure, but the results are never discussed in the text. See General Ecological Comment #2C regarding integrating site and watershed data.

10-3 Section 10.3: Explain why sediment samples were not taken east of the landfill.

10-5 Section 10.3.2: Is this a sediment or a soil sample?

10-32 Section 10.9.1: The wetlands on the landfill and to the northwest of the landfill appear to be potential contaminant migration pathways that have not been adequately characterized. Further information on these areas must be provided before concurring that impacts from the landfill are minimal.

Section 10.9.2: An evaluation of the integrity and long-term stability of the existing landfill cover should be evaluated in the feasibility study for this site.

Site 9:

11-1 Section 11.3: It is not clear why samples in the wetlands northwest of the site were not taken.

11-5 Section 11.6.1: At least a qualitative risk discussion should be included in the text.

Section 11.6.2: An evaluation of the integrity and long-term stability of the existing landfill cover should be evaluated in the feasibility study for this site.

Site 10:

12-1 Section 12.1: Explain why there is an open area where no vegetation exists. Should this area be sampled?

Section 12.2: A more rigorous discussion of previous results is necessary. Figures with sample locations would help.

12-22 Section 12.7.2: Include in the risk discussion the absence of surface and subsurface soil sampling at this site.

12-24 Section 12.9.2: An evaluation of the integrity and long-term stability of the existing landfill cover should be evaluated in the feasibility study for this site.

Site 11:

13-1 Section 13.3: This site is surrounded by wetlands, yet, no samples have been taken. It does not appear that this site has been adequately characterized.

13-2 Figure 13-1: The Ordnance Disposal Area should be outlined.

13-22 Section 13.7.2: Include in the risk discussion the absence of surface and subsurface soil sampling at this site.

Section 13.8.1: The federally-listed threatened knieskern's beaked-rush (Rhynchospora knieskernii) is found at this site. The text is incorrect.

Site 12:

14-1 Section 14.2: An underground storage tank was removed in the area. Were any samples taken? If so, discuss the results. Any visual observations?

Section 14.3: Discuss why samples were not taken directly within the area known as the "battery storage area."

Were the sediment samples taken in areas where the highest values were anticipated?

14-2 Figure 14-1: The stormwater basin intake and discharge points should be indicated on the figure.

14-33 Section 14.9.2: Further delineation of lead contamination is necessary. A removal action should be considered.

Site 13:

15-18 Figure 15-4: The elevated PCB concentrations should be shown on the figure.

15-32 ¶4: Sediment sampling location SD-01 should not be considered "upgradient" or "upstream" from the site. Site 13 is a large storage area with substantial fill material at the north end. SD-01 is immediately adjacent to the storage area and could have received surface water runoff from the site.

15-50 Section 15.9.2: Since PCBs bioaccumulate further delineation of contamination is necessary to determine whether this contaminant is pervasive or is found in small, localized areas.

We concur that covering and stabilizing the fill area at the north end of the site is necessary. Runoff control should also be evaluated.

Options for monitoring the low levels of vinyl chloride contamination found at the site should be discussed. (The phrase "until it fades away" in the last sentence should be deleted.)

Site 14:

16-3 Section 16.5.1: Although this is inside an industrial facility, it should be noted that the EPA value for residential levels of mercury in soil at an HI = 1 is 7.8 mg/kg.

Site 15:

17-30 ¶2: State the concentrations of PCBs found in the samples.

17-51 Last ¶: If the metals concentrations in groundwater are from prior hydropunch results, they should not have been used in the risk evaluation since these were from highly turbid samples.

17-53 First ¶: Typo - change "15" to "17."

Site 16:

18-15 ¶1: State why the referenced sampling event was canceled by NORTHDIV.

18-29 Figure 18-5: The high TPH results should be shown on the figure.

18-46 Figure 18-6: The high TPH results should be shown on the figure.

18-55 Section 18.5.4: The results from sampling GW-04 and GW-05 should at least be qualitatively discussed (and reference made to Table 18-5).

18-94 Section 18.8.2.1: A more detailed description of the "catch basin" is necessary in order to determine if it may act as habitat for ecological receptors or a source of contaminant migration.

18-95 Section 18.8.2: It should be noted that in addition to cadmium, lead also exceeded the screening criteria (ER-L).

Section 18.8.3: There were no surface water data for this site; therefore, the toxicity of water to organisms cannot be evaluated. The statement that contaminants from the groundwater that reach surface water "...will, for the most part, be accounted for in sediment risk assessment" is not necessarily true, especially for the water soluble contaminants that exist at this site.

18-98 Section 18.9.2: More reconnaissance of the wetlands north of the site is necessary. We believe that because of the history of industrial activities in the area along with the confirmation of a contaminant plume in groundwater flowing toward the wetlands, more sampling of the wetlands (surface water and sediment) should be considered.

Further groundwater plume delineation should be performed. Groundwater remediation options should then be considered.

Site 17:

19-1 Section 19.2: Were metals detected in the sediment. A more thorough discussion and presentation of existing data would be appropriate.

19-55 We look forward to receiving the more "rigorous environmental risk assessment." As an interim measure we believe it would be prudent for the Navy to institute erosion control at the toe of the landfill.

Site 19:

20-1 Sections 20.2 and 20.3: A significant amount of data from previous investigations exist and were used to develop the workplan for this site. See General Comments #1 and #2.

20-2 Figure 20-1: The location of the paint chip and sludge disposal area should be delineated.

20-34 ¶3: This statement is incorrect. The sediment contained high levels of lead, chromium, and arsenic.

20-37 Section 20.7: This purpose of this investigation was to determine whether confirmed metals contamination had leached into the subsurface. The sampling was biased and, without the existing data from previous work, leads to a highly inaccurate assessment of human health and ecological risk. Either the risk assessment should be redone using existing data, or the assumptions used in determining risk in this report need to be detailed. (One assumption would be that all contamination found previously is removed.)

20-59 Section 20.8.2: The entire drainage ditch, which goes through a forested area is contaminated with high levels of lead and chromium (and, in one area, cadmium) - certainly a sign of contaminant migration. This area appears to be a source area that can easily be spread to the surrounding wetlands during a heavy rain event.

20-60 Section 20.9.1: Based on the data presented, the extent of contamination in the wetlands has not been delineated. Sample WS-SD-08 is not depicted on a figure for this site and is not shown or described as being within a reasonable distance to use as a basis for concluding that migration of contaminants from the site is limited.

Section 20.9.2: A significant amount of metals contamination exists in the drainage ditch. A removal action should consider these soils as well.

Site 20:

21-1 Section 21.1 and 21.2: State when the removal activities were completed. This and the next section should provide more detail of the operation since this may be the basis of a no further action decision. It is not clear from the text (and not shown in the figure) where the 1993 contaminated sediment samples are located. Unless stated in the text, one can assume that they are in or near the wetlands and are still a concern.

Briefly describe the grit blasting process and the contaminants expected in the residue. State whether this process is ongoing.

21-2 Figure 21-1: The legend should show what an open circle represents.

21-3 Section 21.3.3: Discuss how one sediment sample is sufficient to determine whether or not residue from the grit-blasting operations had migrated to the adjacent wetlands. Further explanation of the topography (the migration pathway) and the extent of the removal action may help.

21-26 ¶2: Is the septic tank system a continuing source of potential contamination? Is the leachfield still operational? Is the septic tank emptied periodically? Please discuss.

21-43 Section 21.8: It is unclear whether the post-removal action samples were actually soil or sediment samples. This is important when selecting screening criteria. The soil sample results (Table 21-2a) indicated that beryllium was the only inorganic to exceed screening criteria. However, comparisons of COCs to background levels (Table 21-2) indicate elevated levels of chromium, copper, lead, magnesium, and zinc. As noted earlier, soil guidance values are based on protection of human health; these are not ecologically derived criteria. Soil values should be compared to literature values to determine if these levels are associated with ecological effects.

Site 22:

22-1 Section 22.2: A more thorough discussion of previous findings is necessary. (See General Comments #1 and #2.)

Section 22.3: Along with a discussion of the objectives of this investigation (including why samples were taken where they were) state why groundwater sampling was not performed.

22-3 Section 22.5.1: The subsurface sample locations are not shown on Figure 22-1 as implied.

22-17 Section 22.5.2.2: Change "metals" to "organics" in the first sentence.

22-19 Section 22.6.3: In the second ¶, include the stated reference in the bibliography.

Site 23:

23-1 Section 23.1: Show on the figure the location of the "paint disposal area" described in the text. Is there any idea of how large this area was (was it a pile or residue on the ground surface)? When was it removed?

The text and the figure are not in agreement. According to the figure, the marshland is northeast of the site and uphill. (The berm shows the building and vicinity to be on the high ground.) The drainage ditch described in the text appears to be separated from Building D-5 by the 20 foot berm.

23-3 Section 23.3.1: Were "staining and odors" found in the borings? (See General Comment #8.)

Were any borings taken in the area of concern? Discuss.

23-37 ¶2: The last sentence is true only in high turbidity situations. In a clear sample, unfiltered samples should be more representative of formation conditions.

23-38 Section 23.6.3: State that concentrations of lead in 23SW03 also exceeded background data and that the sediment sample from this location exhibited elevated concentrations of metals (chromium and lead).

23-59 Section 23.8: The ERA should look at the potential impact on the wetlands areas to the east of the site and downstream of 23SW/SD05 to determine if contaminants are migrating from the site.

Section 23.9.1: Correct typos.

Sites 24 and 25:

24-1 Section 24.3: A better description of the sampling plan is necessary. (Why were surface soil samples taken at one site and subsurface samples taken at the other?)

Site 26:

25-1 Section 25.1: The location of interest should be shown on the figure.

25-3 Section 25.3: Figure 25-1 shows a wetland area adjacent to the site. Discuss why this area was not sampled. Because of the potential of contaminated groundwater discharging to this area, sampling should be considered.

Additional soil samples taken near the septic system should be listed and discussed in the appropriate sections of the text.

Section 25.3.1: Include a discussion of soil-gas sample results. What are the implications? How did the results add to our conceptual model for the site?

25-27 Section 25.6.4: Based on the position and screening depths of the monitoring wells, the Navy cannot state, with any assurance, that contaminant migration is "very limited." According to groundwater flow directions, MW26-01 does <u>not</u> appear to be downgradient of the contaminant source. Describe the data gaps in the conceptual model (e.g., potential for DNAPL - and implications, depth of well screens, and location, depth, and volume of the source, and monitoring wells).

25-42 Section 25.8.1.1.1: Describe the site's relationship to nearby streams, other sites, and the watershed. Does groundwater discharge to the adjacent wetlands?

25-43 Section 25.9.2: In order to delineate groundwater contamination, additional monitoring wells are necessary at this site. A plan should be developed to investigate and ultimately remediate or remove the source area. Currently we have little information concerning its specific location, volume, and depth.

Site 27:

26-1 Section 26.1: Over how long a period of time did disposal occur?

Section 26.2: Information from previous investigations must be brought into this report.

26-25 Section 26.9.1: The risk assessment did not consider the objectives of this investigation nor did it include results from previous investigations, thus biasing risk low. This should be clearly stated in the report.

Concentrations in samples from previous investigations <u>were</u> above NJ cleanup guidance levels.

Section 26.9.2: The recommendations are contradictory and require further discussion and clarification.

Site 29:

27-1 Section 27.1: Although the area of stained soil is mentioned, the text should state the volume of material spilled and whether it flowed toward any low lying areas (ditches, wetlands, etc...).

Section 27.2: Location of old wells and borings should be shown. More discussion of results is necessary.

Section 27.3: The soil boring/monitoring well locations are not the same as in the workplan and clearly have no relation to the site. Discussion is warranted.

27-5 ¶3: What is the direction of groundwater flow?

27-19 Section 27.6.3: A discussion of relevant results (particularly groundwater at MW-06) from Site 16/F should be included.

27-33 Section 27.8.1: The text implies that the spilled material was not removed. Prior to being remediated, how likely would it have been for material to migrate to adjacent ecosystems?

Site L:

28-21 Section 28.9.1: Risks under the future residential scenario were outside the acceptable risk range. More discussion regarding the use of the site and "background" is necessary before stating that no further action is warranted.

Site Q:

29-1 Section 29.1: Describe the direction of surface water flow from the concrete pad.

29-28 Section 29.9.2: Due to elevated levels of contaminants in the sediment, more control of runoff from the site is warranted and should be considered.

Watershed Sampling:

30-4 Table 30-1: It is unclear why sediment samples on the Waterfront (samples 18-20) did not undergo TOC analysis. Shark River sediment samples were the only watershed sediment samples to be analyzed for pesticides and PCBs. Only one sediment sample in Mingamahone Brook underwent TCL SVOC analysis (WSSD09), although surface water samples from this brook were analyzed for SVOCs. In Pine Brook, Mine Brook, and Hockhockson Brook, no sediment SVOC analysis was conducted. No sampling rationale has been presented and, furthermore, it is inconsistent with the agreed upon sampling parameters in the workplan.

30-8 Section 30.2: Sample-specific hardness data were used to screen surface water samples, which were subsequently screened against freshwater AWQC. This led to additional exceedances of inorganics in Waterfront samples (zinc in WSSW17, WSSW17-DUP, WSSW18, WSSW19) and Mainside samples (cadmium in WSSW15; copper in WSSW14, WSSW15, & WSSW16; lead in WSSW10, WSSW11, & WSSW13; nickel in WSSW5; and zinc in WSSW6 & WSSW7) which were not shown in Figure 30-3. Further, iron exceedances in sediment were noted for WSSW17, WSSW17-DUP & WSSW22 (Waterfront) when samples were screened against Ontario guidelines.