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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

May 9, 1991

Mr. James Shafer (Code 1421)
Northern Division
Naval Facilities Engineering Command
U.S. Naval Base, Bldg. 77 Low
Philadelphia, PA 19112-5094

Subj: U.S. EPA Comments
Draft Focused Feasibility Study
Sites 1 and 3
Naval Air Station Brunswick
Brunswick, Maine

Dear Mr. Shafer:

The United States Environmental Protection Agency (EPA) has received and reviewed the document entitled "Draft Focused Feasibility Study (FFS), Sites 1 and 3" dated April 1991, for the Naval Air Station Brunswick in Brunswick, Maine. The comments provided are divided into two attachments.

Attachment I contains general comments on the FFS. Attachment II outlines specific comments regarding the report. Also attached are two sets of tables, which serve as examples, and are discussed further in the comments. A letter containing comments from the National Oceanic and Atmospheric Administration (NOAA) is also included with the comment package.

EPA requests that the Navy submit a comment by comment response, as well as incorporate the necessary changes into the Draft Final Focused Feasibility Study.

If you have any questions regarding the enclosed comments or would like to discuss the comments further, please contact Meghan Cassidy, the EPA Remedial Project Manager, at (617)573-5785.

Sincerely,

Michael Jasinski
for Mary Jane O'Donnell, Chief
ME & VT Superfund Section

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ATTACHMENT I

The comments provided below are general comments which pertain to the report entitled "Draft Focused Feasibility Study, Sites 1 and 3" (April 1991). This report was submitted by the U.S. Department of the Navy for the Naval Air Station Brunswick in Brunswick, Maine. The report was prepared for the Navy by E.C. Jordan.

1. The narrative for each alternative in Section 3 and the presentation in Table 4-1 (page 4-2) do not adequately address the specific elements of each of the nine criteria. Figure 6-2 of the EPA Guidance for Conducting Remedial Investigations and Feasibility Studies (October 1988) (RI/FS Guidance) lists all of the elements. Each of these elements should be addressed for each alternative. This should be done in a table, with discussion of significant issues in the narrative. Attachment A to these comments is an example of a table which contains sufficient information.

2. The narrative discussion for the ARARs is not adequate. All of the ARARs for each alternative should be identified in a table and there should be a statement of how each ARAR is attained or not attained. This should be done in table form. Significant issues should be discussed in the narrative. Attachment B to these comments is an example of a table which contains sufficient information.

3. Since the narratives for each component of an alternative (i.e., cap, discharge, etc.) are presented only once and then referred to later in the report, comments made regarding each component pertain to each alternative which incorporates that component.

4. A No-Action alternative is evaluated in the FFS. There does not seem any reason why a minimal action alternative should be evaluated as well. The minimal action alternative does not meet remedial response objectives, is not protective of human health or the environment, and will not comply with ARARs. Instead of the minimal action alternative, an alternative that incorporates source control and pumping and treatment of groundwater should be evaluated. See also comment No. 6 below.

5. Discuss specifically the need for gas phase treatment of emissions from the air stripping tower. The State of Maine should be consulted regarding existing and proposed VOC emission limitations for air strippers, and the degree of source control required if gas phase treatment is necessary. If gas phase treatment is required, the effectiveness and implementability of air stripping will need to be reevaluated. As explained in the specific comments that follow,

the emissions rates of VOCs from the stripper tower appear underestimated. If the emissions rates exceed State limits, then gas phase treatment will be necessary.

6. In the detailed evaluation of the remedial alternatives, there is understandable uncertainty regarding the time required to comply with remedial action objectives. However, if the source of contamination is left in place, the time required for treatment will be considerably longer than if the source were removed or treated. Consequently, at least one alternative should address treatment of the waste in conjunction with treatment of the contaminated groundwater. Despite the fact that the volume of waste and the amount of hazardous materials are not accurately known, even partial treatment of the waste should allow attainment of the remedial action objectives within a relatively shorter period of time than without source treatment.

7. The contaminants of concern for which treatment will be required should be clearly indicated. In addition, influent contaminant levels (concentrations that can be expected in the extracted groundwater) should be presented in the FFS. This will allow comparisons between the groundwater treatment technologies with respect to their ability to remove or destroy the contaminants of concern. In the description of each technology, anticipated influent and discharge levels should be presented along with the design parameters so that the effectiveness of the technology in achieving the discharge criteria can be evaluated. Contaminants removal efficiencies for air stripping, UV/oxidation, and metals precipitation are not shown. This information should be included to enable an evaluation of the effectiveness of each technology in complying with cleanup objectives.

8. Removal of iron and manganese is addressed in the FFS. However, the FFS should discuss whether arsenic, chromium, lead and nickel are expected in the extracted groundwater and if additional metals treatment will be required to meet the applicable discharge limitations.

9. Obtain information from a recent SITE demonstration using UV/oxidation at a Superfund site with VOC-contaminated groundwater and include the information in the FFS to show that the technology has been demonstrated in the field.

ATTACHMENT II

The comments provided below are specific comments which pertain to the report entitled "Draft Focused Feasibility Study, Sites 1 and 3" (April 1991). This report was submitted by the U.S. Department of the Navy for the Naval Air Station Brunswick in Brunswick, Maine. The report was prepared for the Navy by E.C. Jordan.

SECTION 1.0 - INTRODUCTION

1. Page 1-1, Paragraph 2: Include some discussion regarding ongoing work at Sites 5, 6 and 12 in order to provide an accurate portrayal of the status of work at the site.

SECTION 2.0 - SUMMARY OF RESPONSE OBJECTIVES AND REMEDIAL ALTERNATIVES DEVELOPED FOR SITES 1 AND 3

2. Page 2-1, Paragraph 2: The description of material disposed of in the Site 1 landfill is not consistent with what was reported in the Remedial Investigation (RI) Report. Specifically, this paragraph omits pesticides and petroleum products which were reported in the original site history. Include these materials in this paragraph.

3. Page 2-1, Paragraph 3: According to the RI Report, DANC (which is composed primarily of tetrachloroethane) was disposed of at Site 3. DANC is not included in this paragraph. Revise the paragraph to be consistent with information previously reported.

4. Page 2-2, Figure 2-1: Show all sites mentioned on pages 1-1 and 1-2 on this figure or include a figure showing all sites in Section 1.

5. Page 2-4, Paragraph 2: Include the basis for estimating the depth of waste presented in this paragraph.

6. Page 2-4, Paragraph 3: The contaminants of concern for groundwater, listed on page 2-6, are not limited to volatile organic compounds. This paragraph must be corrected to include all contaminants of concern.

7. Page 2-4 and 2-10: The last paragraph on page 2-4 states that contamination was observed in the following media: soils, groundwater, leachate/sediment, and surface water/ sediment, yet only two media are addressed in Table 2-2. Page 2-10 states that remedial action objectives were not developed to reduce iron and zinc concentrations because these metals were detected at elevated levels upgradient of

the site. Provide further justification for not including a remedial action objective for surface water. Is the Navy undertaking any actions to investigate the upstream sources.

In the ARAR analysis section, discuss the need for an ARAR waiver since AWQC for zinc and iron will not be met.

8. Page 2-5, Paragraph 2: As indicated in comments of the Draft Baseline Risk Assessment, institutional controls should not be considered when evaluating risk in the baseline risk assessment. According to the preamble of the National Contingency Plan (NCP) (pp. 8710-8711), "The role of the baseline risk assessment is to address the risk associated with a site in the absence of any remedial action or control, including institutional control". The preamble further states, "The effectiveness of the institutional controls in controlling risk may appropriately be considered in evaluating the effectiveness of a particular remedial alternative, but not as part of the baseline risk assessment".

   Based on these references from the NCP, the second sentence of this paragraph is misleading. This paragraph <u>must</u> include a discussion regarding the risk based on current exposure to soils, sediments and surface water. Also indicate whether additional clean-up levels (particularly for surface soils) are required base on current exposure assuming no limited access.

9. Page 2-5, Paragraph 3: Were human health risks associated with exposure to soils under a future land-use scenario considered? If not, they must be considered.

10. Page 2-5, Paragraph 3: Include a discussion here regarding whether any and all contaminants which exceeded a state guideline or a federal drinking water standard were considered "contaminants of concern".

11. Page 2-6, Paragraph 2: Were the carginogenic risks mentioned here in excess of 10^{-4} when associated with exposure to certain contaminants beneath Sites 1 and 3?

    Include a discussion explaining that clean-up levels for groundwater are set at chemical-specific ARARs (i.e., MCL or non-zero MCLG). In the absence of promulgated ARARs, proposed MCLs or proposed MCLGs are used to set clean-up goals. State standards or guidelines may supersede EPA's standards or guidelines if they are more stringent. Clean-up levels are risk based if there are no standards or guidelines available.

12. Page 2-6, and Table 2-1: The first full paragraph on page 2-6 and Table 2-1 list only contaminants of concern. The selected remedial alternative must meet MCLs and other ARARs for **all** contaminants, not just contaminants of concern.

13. Page 2-7, Paragraph 2: During the first three sampling rounds, iron and lead exceeded their chronic AWQC in Mere Brook. In addition, zinc exceeded it acute AWQC, whereas in the fourth round of sampling cadmium, chromium, copper, lead, mercury and zinc exceeded their respective acute AWQC and iron and nickel exceeded their chronic AWQC. These exceedances were discussed in the National Oceanic and Atmospheric Administration's (NOAA) comments on the Draft Remedial Investigation, Risk Assessment and Post-Screening Work Plan. Clarify this paragraph which indicates that only zinc and iron were detected above their AWQC. See also NOAA's comment letter which is attached to these comments.

14. Page 2-7, Paragraph 3: The statement "For contaminants detected in surface water, Target Clean-up Levels were proposed at the contaminants' AWQC;...", indicates that Target Clean-up Levels were presented for all contaminants detected. However, later discussions indicate that clean-up levels were established for zinc and iron only based on their AWQC. The statement as presented above is misleading and must be revised to state that only iron and zinc were evaluated for Target Clean-up Levels.

15. Page 2-7, Paragraph 3: A statement regarding the impact of Site 2 on the surface water in Mere Brook should be included in this paragraph.

16. Page 2-8, Paragraph 3: The second sentence of the third paragraph needs to be modified. The sentence should read "The 10^{-6} risk level and hazard index of 1 is suggested by USEPA as the point of departure for developing remedial goals for carcinogens and noncarcinogens, respectively.

17. Page 2-8 and 2-10: The remedial action objectives are not sufficiently specific. The contaminants of concern and the exposure routes and receptors should be specified. See discussion on page 4-10 of the EPA RI/FS Guidance and Table 4-1 of the guidance. Table 2-2 should be revised to conform to Table 4-1 of this guidance. Also, all media are not covered in the remedial action objectives.

18. Page 2-9, Paragraph 1: Add the statement "or the hazard index of 1" to the last sentence of this paragraph.

19. Page 2-9, Paragraph 2: Clarify this paragraph to indicate that Target Clean-up Levels were developed based on exposure and risk considerations only for contaminants <u>for which no chemical-specific ARAR exists</u>.

20. Page 2-9, Paragraph 2: This paragraph is misleading. The second and third sentences of this paragraph need to be rewritten as follows:

    "Risk-based target clean-up levels were developed for individual chemicals at the carcinogenic risk level of 10^{-6} or noncarcinogenic hazard index of 1. The remedial goal is set this way such that the residual risk will fall within 10^{-4} to 10^{-6} risk range for total carcinogens and hazard index of 1 for individual noncarcinogens with different toxicity endpoints."

21. Page 2-10, Paragraph 2: Provide further explanation in the text, regarding the remedial action objective for leachate soil/sediment remediation. Why is it only necessary to reduce mercury contamination to levels considered protective of higher trophic organisms?

22. Page 2-10, Paragraph 3: Include groundwater extraction as one of the general response actions that may be employed to reduce the amount of groundwater and leachate discharging to Mere Brook.

23. Page 2-11, Table 2-1: The following comments pertain to table 2-1.

    - Provide a citation for the Arsenic MCL presented.
    - Methylene chloride (i.e., dichlormethane) has a proposed MCL of 5 ug/L (<u>Federal Register</u>, July 1990). This proposed MCL should replace the risk-based level as the clean-up level.
    - Indicate whether 1,2-Dichloroethylene is cis or trans since the MCLs are different for these two compounds.
    - According to a November 1990 summary of Drinking Water Regulations and Health Advisories prepared by EPA's Office of Drinking Water, the MCLs presented for both 1,2-Dichloroethylene and Chromium(total) are proposed rather than final. Correct this in the table or provide a citation for establishing these MCLs as final.
    - This table should also indicate that the MCLGs for 1,2-dichloroethylene, chromium(total) and nickel are the same as the MCLs presented in this table.

- No hardness data were presented in the Remedial Investigation Report, so it is not known if the criteria for zinc which is base on 100 mg/L $CaCO_3$ is appropriate to surface waters at NAS Brunswick. Discuss this further. Also, see additional comments regarding this issue in the attached letter from NOAA.

24. Page 2-12, Paragraph 3: The Containment alternative listed in the second bullet should be clarified to explain what this option would include.

3.0 DETAILED EVALUATION OF REMEDIAL ALTERNATIVES

25. Page 3-1, Paragraph 1: The purpose of the detailed evaluation is not adequately stated. The purpose as stated under the "Proposed Rule" on page 8719 of the NCP should either be quoted or paraphrased.

26. Page 3-1, Paragraph 2: After the "RI/FS" in line 3, insert "and proposed plan" and replace "by" with "from". In line 5 insert "RI/FS and" before "proposed plan". See RI/FS Guidance, page 6-13.

    Also, since the state is a party to the Federal Facility Agreement (FFA) and is reviewing and commenting on this Focused Feasibility Study, EPA recommends that a statement to that effect be included in the report in regard to the state acceptance criterion.

27. Page 3-2, Table 3-1: This table should conform to the descriptions contained on page 6-6 of the RI/FS Guidance. For example, the fourth criterion should include "through treatment" and the descriptions for criteria 2, 3, 8 and 9 should match the guidance descriptions.

Alternative 1,3-B: Minimal Action

28. Page 3-8, Paragraph 3: The existing monitoring well network was not designed to provide long-term monitoring data on ground-water quality for these sites. Rather it was a network, iteratively arrived at, to estimate the magnitude of contamination emanating from the sites. Portions of the current network will most likely be used for long-term monitoring purposes, but the utility of the current network and the need for additional monitoring locations will have to be evaluated during Remedial Design. This includes seeps, surface water, sediment and wells. Add discussion to the existing text to reflect the considerations above.

29. Page 3-9, Paragraph 1: Provide the rationale for including MW-213, which is located on the opposite side of Mere Brook from the landfill, in the proposed long-term monitoring program.

30. Page 3-14, Paragraph 3: Change wording in first sentence. Media other than groundwater are not mentioned, and the existing well network will have to be evaluated during Remedial Design to determine if it is adequate. The use of existing wells should be for cost purposes only. This should be stated clearly in the text.

31. Page 3-16, Paragraph 1: Include the basis for the five-year review cost estimate.

32. Page 3-17, Table 3-3: The following comments relate to this table.

    - A breakdown of equipment costs indicate the use of only one bailer. Groundwater samples collected for monitoring wells must be taken with dedicated bailers.
    - Add a note to this table indicating that costs are rounded to the nearest $1,000.
    - Add a line item showing the total cost per sampling episode.
    - The discount rate used, 5%, is incorrect. The Office of Management and Budget (OMB) in Circular A-94 has established a 10% discount rate which must be used to determine the net present value of a remedy (see also, page 8722 of the Preamble to the NCP). Revise the costs in the table to reflect the 10% discount rate.

Alternative 1,3-C: Containment

33. Page 3-18, Paragraph 2: There is no indication as to the depth of the waste mass below ground surface. Is lowering the water table 6 to 8 feet sufficient?

    Do the numbers used in discussions regarding the water table and the waste account for seasonal highs?

    Could a slurry wall be designed to lower the water table so that the groundwater will not be in contact with the landfill waste?

34. Page 3-18, Paragraph 2: Discuss the possibility of causing new seeps as a result of depressing the groundwater table 6 to 8 feet. In addition, will these new seeps increase contamination in Mere Brook since new seeps will be at a lower level on the bank (i.e., closer to the elevation of Mere Brook)?

35. Page 3-18, Paragraph 2: The sentence which states, "natural attenuation factors would eventually reduce contaminant concentrations..." should be revised to more accurately reflect discussions in later sections which indicate that higher contaminant levels may be expected for approximately 5 to 10 years.

36. Page 3-19, Paragraph 1: Will provisions be made to install an interceptor trench upgradient of the slurry wall if needed? What information indicates that a trench would not be needed during high water periods?

37. Page 3-19, Paragraph 3: Add a statement regarding the purpose of installing a cap over the landfill areas.

38. Page 3-19, Paragraph 3: The proposed cap is for Site 1 alone yet in Section 2.1 the text indicates Sites 1 and 3 cannot be separated. What are the objective criteria to be used to determine the lateral extent of the cap?

39. Page 3-19, Paragraph 3: The proposed total acreage of the cap, 7.4 acres, cannot be assessed at this point. EPA will have to review the extent of the cap after the Navy has responded to comments.

40. Page 3-20, Paragraph 1: Discuss and justify which part of Site 3 will be covered with a cap.

41. Page 3-20, Paragraph 2: As previously stated, the extent to which the cap will cover Site 3 cannot be assessed and will be evaluated once the Navy responds to comments.

42. Page 3-20, Paragraph 3: The RCRA document cited is outdated the correct publication to reference for construction of the cap is "Final Covers on Hazardous Waste Landfills and Surface Impoundments" (USEPA, July 1989).

43. Page 3-21, Figure 3-2: This figure does not show the extent of the proposed cap. The figure must be revised.

44. Page 3-21, Paragraph 2: Provide a table showing contaminants and concentrations detected to support the statement "contaminants detected in soil samples from this part of the site are relatively immobile in subsurface soils and present at low concentrations.

45. Page 3-23, Paragraph 1: Describe how sections of the cap will be connected to maintain the integrity of the cap.

46. Page 3-23, Paragraph 3: Describe what material will be used for the buffer layer.

47. Page 3-25, Paragraph 2: In the discussion of the inspection and maintenance of the cap for Sites 1 and 3, discuss whether periodic testing of moisture content of the clay layer is necessary. If it is not necessary, explain why.

48. Page 3-25, Paragraph 3: The slurry wall would be constructed sidegradient of the landfill, as well as upgradient. The text should be revised to reflect this.

49. Page 3-27, Figure 3-5: Put groundwater flow arrows on the figure.

    Why is the slurry wall not carried out to the limits of Site 1 & 3? Provide sufficient discussion in the text to address this issue.

50. Page 3-27, Figure 3-5: Add cross-sections (NE-SW and NW-SE) showing the following site conditions:

    - land surface elevation
    - current water-table elevation
    - proposed water-table elevation
    - slurry wall
    - waste mass bottom elevation
    - major stratigraphic breaks

51. Page 3-28, Paragraph 2: In the technical description of slurry walls, discuss the fact that for soil bentonite slurry walls, the site will have to be graded to nearly level to prevent slurry and backfill flow. In light of this, discuss whether the technology can be implemented at the site.

52. Page 3-28, Paragraph 2: Is there any information (collected during the remedial investigation) regarding the clay in this area which could be examined to provide an indication of its compatibility with the slurry wall material?

53. Page 3-28 Paragraph 4 and Page 3-29, Paragraph 2: How do both of the proposed techniques assess the depth of the clay layer at a particular location? Due to the varying depth of the clay (28 to 62 feet bgs), this issue will be critical when attempting to seal the slurry wall and the clay layer.

54. Page 3-29, Paragraph 2: The approximate maximum depth for the Geo-Con technique is very close to the deepest documented depth of the clay layer in the area. What contingencies would be put in place to ensure that problems would not be encountered in the middle of construction should the clay layer be at a depth beyond the reach of the equipment?

55. Page 3-29, Paragraph 2: This paragraph states that soils below 40 feet bgs are suitable for use in the slurry mix. This indicates that soils above forty feet bgs will require excavation. Include a discussion regarding screening of excavated materials for contamination and management of any contamination soil.

56. Page 3-31, Paragraph 3: Indicate that the existing environmental monitoring network will be evaluated during Remedial Design.

57. Page 3-32, Paragraph 3: Include a statement indicating that institutional controls would be required for the capped area as well as to restrict use of groundwater.

58. Page 3-32, Paragraph 4: The paragraph states that a "small volume of contaminated water left beneath the cap would migrate to the brook". What is a "small volume" of water?

    This alternative does not deal with the volume of water left beneath the cap that would migrate to Mere Brook, and continue to contaminate the brook as well as produce leachate seeps for 5 to 10 years. Discuss future impacts on the brook and seeps.

59. Page 3-32, Paragraph 4: Provide the basis for using a seepage velocity of 75 feet per year.

60. Page 3-33, Paragraph 1; Indicate what criteria will be used to evaluate adverse impacts to the environment.

61. Page 3-33, Paragraph 2: It cannot be assumed that ARARs pertaining to groundwater (i.e., MCLs, MCLGs, or TBCs) will be achieved. On what basis is this statement made?

    The statement "contaminant concentrations in these media may exceed their respective ARARs" is misleading. The sentence must be revised to indicate that for some contaminants ARARs are already exceeded.

62. Page 3-34, Paragraph 2: In the discussion of action-specific ARARs, discuss permits and appropriate regulatory compliance for transportation and disposal of contaminated soil that is unfit for use as backfill material. The potential exists that unsuitable backfill material will be encountered. This backfill could potentially contain hazardous substances that will have to be disposed of at an approved landfill.

63. Page 3-34, Paragraph 2: List which action-specific ARARs pertaining to hazardous waste operations must be addressed for this remedy.

64. Page 3-34, Paragraph 3: As stated previously, the RCRA guidance cited is outdated.

65. Page 3-34, Paragraph 5: This paragraph states that no discharge permits are required under this alternative because the groundwater being diverted away from the landfill is not contaminated. What is the basis for assuming that this groundwater will not be contaminated? It seems possible that some of the groundwater being diverted could be coming from Sites 4, 11 and 13, or the Eastern Plume.

66. Page 3-35, Paragraph 2: The first sentence indicates that the water table would be lowered "6 to 8 feet below levels of the buried waste (bottom?), but on page 3-18, paragraph 2, the indication is "6 to 8 feet below its current level (water table)". Resolve this conflict.

67. Page 3-35, Paragraph 3: What is an acceptable time frame to achieve "appropriate" decreases in groundwater contaminant concentrations (which then discharge to the brook)?

68. Page 3-35, Paragraph 3: This paragraph states that concentrated leachate may be produced because a reduced volume of water would pass through the waste. The preceding paragraph states that this remedy would lower the water table to a point below the waste. Clarify this apparent discrepancy.

69. Page 3-36, Paragraph 1: Long-term effectiveness should consider magnitude of residual risks, and reliability and adequacy of controls. There should be some discussion regarding what will happen if the slurry wall (or parts of it) fails.

70. Page 3-36, Paragraph 2: Indicate whether there are enough monitoring wells/piezometers in the source area to adequately assess the success of efforts to lower the water table. Cite which locations will be used for this purpose.

71. Page 3-36, Paragraph 2: Discuss provisions to be taken if alternative fails to lower the water table the desired amount.

72. Page 3-37, Paragraph 1: Provide greater detail on air quality impacts on the community from fugitive releases that could occur during the construction of slurry walls. This issue deserves more than one sentence that states: "the public would be at minimal risk during construction of the slurry wall and cap".

The FFS mentions that the exact source (waste) within the landfill is unknown. Discuss criteria to be used to ensure that waste will not be encountered during slurry wall construction (e.g., pretesting).

73. Page 3-37, Paragraph 2: If the leachate volume decreases will the concentrations increase?

74. Page 3-39, Paragraph 2: Discuss the need for treatability testing or compatibility testing of the slurry wall materials with the on-site soils and groundwater. This section should address conducting laboratory tests with contaminated soils and groundwater from the site.

75. Page 3-41, Table 3-4: The following comments pertain to this table.

    - It is not clear here, or in Appendix A, that labor costs for construction of the cap have been included. Indicate where a breakdown of labor costs can be found.
    - It is not clear whether any estimate of the transportation cost of bringing the clay to the site has been included. Indicate where these costs can be found.
    - Appendix A shows line items for Manpower (site manager only) under both the cap and the slurry wall. Table 3-4 does not include these costs.
    - Provide the basis for assuming health and safety costs based on slurry wall installation cost only.
    - As noted previously, the discount rate of 5% which was used here in incorrect. The discount rate must be 10%. Revise the cost estimate to reflect this change.
    - In general, the present worth cost for this alternative seems very low compared to other cost estimates at similar sites. Responses to several comments above may alter the bottom line cost and bring the estimate in line with actual construction costs at similar sites.

Alternative 1,3-D: Passive Groundwater Collection/Treatment

76. Page 3-46, Paragraph 1: Provide further discussion and present the rationale for the location of the interceptor trench. Why doesn't the trench encompass all of Site 3? Where will groundwater flowing from the portion of Site 3 not within the trench system discharge?

77. Page 3-46, Paragraph 1: Discuss what is meant by the "optimal location of the trench". Does the optimal location intercept primarily contaminated groundwater as opposed to clean water from the stream?

78. Page 3-46, Paragraph 1: This paragraph states that the total length of the trench is estimated to be 2,300 feet, and that the depth is assumed to be 25 feet bgs.

Why was 25 feet bgs chosen as the depth? According to the model, the top of clay is 15 feet above msl (use consistent terms, i.e., bgs <u>or</u> above msl). On page 3-82 the underlying clay surface is approximately 40 feet bgs. Additional clarifying discussion is needed regarding the location of the clay layer and how this information was used to determine the depth of the interceptor trench.

79. Page 3-46, Paragraph 1: If the hydraulic conductivities are 5:1 (horizontal to vertical) then the conditions are anisotropic. Have calculations been made which determine how much of the groundwater is going to flow under the interceptor trench considering anisotropic conditions? Appendix B indicates that no anisotropy was assigned to the water table aquifer during modeling. Since the computer model was used to determine the depth of the interceptor trench the model should examine the effects of anisotropy.

80. Page 3-46, Paragraph 2: Add cross-sections through the center of sites (one N-S and one E-W) showing site specific information on:

- land surface elevation
- water-table elevation (current)
- bottom of waste mass (elevation)
- major stratigraphic breaks (down into marine unit)
- proposed water-table maintenance level
- interceptor trench (bottom elevation)

81. Page 3-46, Paragraph 2: Using the same computer simulations or modeling employed to determine the optimal location of the trench, can the potential for flow from the adjacent stream to the trench be determined?

82. Page 3-46, Paragraph 3: Include a discussion regarding the possibility of producing contaminated water during dewatering and the handling/treatment of any contaminated water.

83. Page 3-47, Figure 3-8: The figure should be redrawn showing correct site stratigraphy instead of generic "natural sands".

84. Page 3-48, Paragraph 2: Provide references for construction techniques.

85. Page 3-48, Paragraph 3: This paragraph states that using the Industrial Builders excavation method may require digging a shallow trench first and then using the shallow trench as a base for further excavation. Was this two-tiered excavation assumed for costing purposes?

86. Page 3-48, Paragraph 3: Provide further explanation regarding how contaminated groundwater below the level of the trench would be drawn in the pipe.

87. Page 3-49, Paragraph 1: Provide the rationale supporting the use of one sump for the entire 2,300 feet of trench. Several sumps should be installed in case one location is not sufficient. These could also be used as clean-out and monitoring locations.

88. Page 3-49, Paragraph 1: Check trench width. The trench width using the same method has been reported as 14 inches in other documents reviewed by EPA.

89. Page 3-49, Paragraph 2: Are there any depth constraints with Geo-Con's method of trench installation?

90. Page 3-49, Paragraph 3: Include a discussion pertaining to how contaminated groundwater beneath the level of the trench would be collected.

91. Page 3-49, Paragraph 3: Include a diagram of the trench/ sump interface.

92. Page 3-50, Paragraph 1: Is the use of H_2O_2 to kill excess bacteria required?

93. Page 3-50, Paragraph 3: What are the threshold concentrations of inorganics that require pre-treatment?

94. Page 3-50, Paragraph 3: Discuss the rationale for assuming that pretreatment will be needed for removal of iron and manganese only.

95. Page 3-50, Paragraph 3: Only pretreatment of water for removal of iron and manganese is addressed. On Page 2-11, Table 2-1, the contaminants of concern in the groundwater include arsenic, chromium, lead and nickel. Discuss how treatment for these metals will be addressed.

    A comparison of the advantages and disadvantages of air stripping and UV/ oxidation would help the reader compare the adequacy and reliability of the two treatment technologies.

96. Page 3-51, Paragraph 1: Discuss using reducing agents to reduce the hexavalent chromium to trivalent chromium and subsequently precipitating the trivalent chromium. Discuss how arsenic will be treated to meet the cleanup levels.

97. Page 3-51, Paragraph 1: The preliminary design of the metals pretreatment system comprises oxidation of iron and manganese. Without the addition of a hydroxide compound, such as lime, no other heavy metals will be removed. If only iron and manganese removal is necessary, were other treatment options, such as a greensand filter, considered?

98. Page 3-52, Figure 3-9: The process flow diagram should include an equalization tank upstream of the oxidation tank. If other heavy metals are to be removed, the process diagram should include a reduction step for hexavalent chromium and a lime addition step.

99. Page 3-53, Paragraph 2: Table 3-2 of the "Draft Final Phase I Feasibility Study" (E.C. Jordan, August 1990) outlines the identified groundwater contaminants at NAS Brunswick and the associated federal and state regulatory limits. Table 3-2 lists VOC contaminants that have been detected in groundwater underlying Sites 1 and 3 that are not identified in the FFS as VOCs to be removed from extracted groundwater. More specifically, contaminants such as benzene, toluene, ethylbenzene, and xylenes were detected in monitoring wells within Sites 1 and 3, based on Figure 6-25 of the "Draft Final RI Report" (E.C. Jordan, August 1990) and in Table 3-2 of the Phase I Feasibility Study. Provide a discussion why these contaminants are not considered as VOCs to be removed and include them in the discussion on water treatment.

100. Page 3-53, Paragraph 2: This paragraph states that "the VOCs to be removed are vinyl chloride, 1,1-DCA, 1,2-DCE and methylene chloride". Section 2 does not include 1,1-DCA as a contaminant of concern in groundwater. Establish a clean-up level for 1,1-DCA and include it in the discussions regarding contaminants of concern in Section 2.

101. Page 3-54, Paragraph 1: The FFS states that a total of 0.69 lb/day of VOCs would be expected from the air stripper emissions. Provide details on how this figure was derived. On the surface, it appears to be rather low. Was this estimate based on contaminants of concern only?

Discuss the State of Maine air regulatory requirements and the State of Maine requirement for off-gas treatment from an air stripper. Discuss whether catalytic incineration was considered for treatment of the air stripper off-gases.

Discuss whether the projected air emission concentrations and rates are acceptable.

It should be noted that the EPA guidance referenced indicates that the control levels (i.e., 15 lb/day) are applied on a facility basis. The guidance defines facility as a contiguous piece of property under common ownership. This definition will become very important as subsequent operable units at the Naval Air Station are addressed.

102. Page 3-54, Paragraph 2: The last sentence mentions that a treatability study would determine whether pretreatment or off-gas treatment is required. Discuss the criteria that will be used to determine if off-gas treatment is required.

103. Page 3-54, Paragraph 3: Do the costs presented for treatability testing assume both bench and pilot scale tests?

104. Page 3-56, Paragraph 1: Include a discussion regarding whether some of the by-products (i.e., acetone) of UV/ oxidation may have discharge requirements and effect discharge options.

105. Page 3-59, Paragraph 1: Provide the basis for using retention times of 50 an 67 minutes in the preliminary design of the two UV options.

106. Page 3-60, Paragraph 3: Discuss reinjection through the landfill to achieve source flushing.

107. Page 3-60, Paragraph 2: The sentence beginning, "Discharge to surface water would require compliance with effluent discharge permit limits for contaminants...", is somewhat vague. It should be clear that permits issued under Section 402 of the Clean Water Act, (National Pollution Discharge Elimination System) may include permit limits based on effluent limitation guidelines, water quality criteria, or Best Professional Judgement, whichever is more stringent.

In addition, any proposed new or increased discharge to surface waters must be in compliance with federal and state surface water antidegradation laws.

108. Page 3-62, Paragraph 1: Was an infiltration gallery (sub-surface infiltration) considered?

109. Page 3-62, Paragraph 2: Upgradient reinjection is being considered for cost estimating purposes. Discuss the impact of this option on groundwater flow patterns in the vicinity of the sites. Provide justification to show why this option was favored over other discharge options. The permitting

process for reinjection will be extensive, especially if the need for reinjection is not dictated by technical concerns. Surface water or storm water discharge should be investigated further.

110. Page 3-62, Paragraph 2: The discussion of the recharge alternative needs more detail. This discussion should respond to the following:

- Discuss the basis for selecting eight wells, flow rate, etc.
- What steps could be taken to ensure the groundwater is not being channelized?
- Would the injection wells be installed to the top of clay?
- Would all of the reinjection wells be screened at a similar depth or would the depths vary?
- Would there be any effect on the system by raising the hydraulic gradient in the area either by infiltration or reinjection.

111. Page 3-62: Discuss the possible effect of recharge and infiltration on the eastern plume.

112. Page 3-62, Paragraph 3: When costing the POTW discharge option was the additional fee which would be levied on the Navy for increased flow to the POTW included?

113. Page 3-63, Paragraph 3: The existing monitoring well network will have to be evaluated during Remedial Design (see comments for page 3-8).

114. Page 3-63, Paragraph 3: Environmental monitoring will also include compliance monitoring for the applicable discharge permit.

115. Page 3-64, Paragraph 1: Should the end of Sentence 4 be: ".... concentrations in <u>the landfill soils</u>"?

116. Page 3-64, Paragraph 3: Provide details on the Maine Air Regulations and whether they will be achieved by the treatment alternative.

117. Page 3-65, Paragraph 1: If ozone is used as an oxidant in the UV/oxidation process, off-gas treatment may be required to reduce ozone and VOC emissions from the unit.

118. Page 3-65, Paragraph 2: Be specific when discussing action-specific ARARs.

119. Page 3-65, Paragraph 3: Include handling and disposal of

contaminated soil and water, which may be produced during construction, in this discussion.

120. Page 3-65, Paragraph 4: The standards for surface and stormwater discharge should be identified here. Some preliminary information should be available, at least for the contaminants of concern.

121. Page 3-65, Paragraph 4: Discuss action-specific ARARs pertaining to the transportation of hazardous waste (e.g, metal precipitation sludge).

122. Page 3-65, Paragraph 4: If treated groundwater is recharged to the underlying aquifer, the discharge will have to comply with underground injection control (UIC) regulations.

123. Page 3-65, Paragraph 4: It is noted that other federal and state regulations pertain to discharge requirements. The reference for Maine water quality standards is, M.R.S.A., Title 38, Article 4-A, Water Classification Program. Any new or increased discharge must comply with the **antidegradation policy** included in this statute.

124. Page 3-67, Paragraph 2: Since there is no actual comparision of flushing rates with or without capping this discussion is not pertinent.

125. Page 3-68, Paragraph 2: What is the basis for the statement "infiltration is not expected to affect the flushing process"? Why is infiltration not expected to affect the flushing rate? How could infiltration influence gradients and flow directions and what would be the outcome?

126. Page 3-68, Paragraph 2: Discuss any metals treatment that will be required to meet discharge limitations.

127. Page 3-68, Paragraph 2: Discuss the sludge expected from UV/oxidation. Discuss the adequacy and reliability of controls, including potential system problems that can be expected and measures that will be taken if these problems arise (i.e., trouble-shoot the treatment plant equipment). Discuss the resultant impact from the incorrect placement of extraction wells and the failure of one or all of the wells.

128. Page 3-68, Paragraph 3: What is the justification to support the statement "This alternative would meet the remedial action objectives because the downgradient interceptor trench or extraction wells would collect all contaminated groundwater and leachate before it migrates from the landfill and discharges to Mere Brook."

129. Page 3-70, Paragraph 1: Include the possibility of contam-

inated water from dewatering and contaminated soils from excavation in the discussion of short-term effectiveness.

130. Page 3-70, Paragraph 2: Discuss in greater detail air quality impacts on the community and the environment due to off-gas discharge from the air stripper tower.

131. Page 3-71, Paragraph 3: Discuss when in the process treatability tests would be performed. Also, how long would treatability tests take to complete?

132. Page 3-72, Paragraph 1: Discuss the potential for encountering unsuitable backfill that might contain hazardous waste, and discuss the appropriate screening and disposal of such waste.

133. Page 3-73, Paragraph 1: UV/oxidation is now a fairly well-developed technology. A discussion of the demonstration of UV/oxidation for treatment under EPA's SITE program would reflect positively upon the implementability of UV/oxidation.

134. Page 3-73, Paragraph 1: The availability and location of a disposal facility should be identified in the FFS in order to more accurately estimate the cost of sludge disposal.

135. Page 3-73, Paragraph 2: The FFS states that treatability studies would indicate whether the treatment technologies would be able to treat the water to surface water and stormwater discharge standards. Discuss these standards. The particular contaminants that may pose a risk to aquatic life should be identified so that the contaminants can be factored into the selection and design of an appropriate water treatment system.

136. Page 3-74, Paragraph 1: Environmental monitoring for discharge standards is more stringent than the program which was presented in this FFS for Alternative 1,3-B. Revise the monitoring program to more accurately reflect the likely monitoring requirements for discharge and include these costs in the cost estimate.

    Also, note that the environmental monitoring program would have to be evaluated during Remedial Design.

137. Page 3-76, Table 3-5: The following comments pertain to this table.

    - Appendix A includes $2500 for a site manager under the estimate for the downgradient trench. This cost does not appear to be in Table 3-5.
    - There is a line item under site preparation for grading 1

acre. Why will only 1 acre need grading? Which portion of the site does this represent?

- Why is replacement of road under this alternative estimated to cost only $5,000 when under Alternative 1,3-C the cost is $40,000 dollars?
- The cost breakdown for groundwater collection in the table and Appendix A are not consistent. The costs in Appendix A include much more than what is presented in the table. Clarify this discrepancy.
- There is not cost breakdown for discharge in Appendix A. Provide the information necessary to support what is presented in the table.
- Why is the health and safety cost based on 25% of the trench installation and treatment costs only?
- Indicate where labor costs are included in this table.
- The discount rate used is incorrect. A discount rate of 10% is the correct value.

138. Page 3-77, Paragraph 1: How were metals sludge disposal costs estimated if the location of an appropriate landfill is not known?

139. Page 3-78, Paragraph 1: Provide details on the additional costs of $7.3 million required for vapor-phase carbon.

140. Page 3-78, Paragraph 2: A typical effluent monitoring program can be assumed for costing purposes (e.g., monthly or quarterly, depending on the type of discharge permit).

141. Page 3-78, Paragraph 2: The three separate cost estimates for sensitivity analysis are not presented in Table 3-5 as indicated in the text.

142. Page 3-78, Paragraph 1: A cost estimate of discharge monitoring should be included.

Alternative 1,3-E: Cap/Groundwater Extraction/Treatment

143. Page 3-80, Paragraph 3: Figure 3-2 does not show the extent of the cap as indicated here.

144. Page 3-80, Paragraph 4: Indicate that the exact number and location of extraction wells and piezometers will be determined during Remedial Design. Indicate that quantities shown here are for cost purposes only.

145. Page 3-81, Figure 3-13: This figure suggests that the extraction wells will be inside the capped landfill? Include a discussion regarding how these wells will effect the integrity of the cap.

146. Page 3-82, Paragraph 1: Include a discussion indicating

what information was used to estimate a depth of 40 feet bgs for the depth of the borings.

147. Page 3-83, Paragraph 2: The first sentence of this paragraph indicates that pumping tests will be performed. Include a separate paragraph describing the purpose and procedures for the pump test.

148. Page 3-83, Paragraph 3: Provide justification for the last sentence of this paragraph. The report indicates that no actual modeling or calculations have been performed to support this statement. If this is the case, the sentence should be deleted.

149. Page 3-85, Paragraph 1: This paragraph indicates that some groundwater may migrate off base if not captured by the extraction system. This route of exposure has not been adequately discussed here or in descriptions of other alternatives. Discuss migration of contaminated groundwater, from Sites 1 & 3, off base.

150. Page 3-83, Paragraph 3: This paragraph states that the objective of the pumping scheme is to draw water through the waste and thereby flush the contaminants from the source. A remedy that increases the volume of contaminated groundwater is fundamentally flawed. Discuss why the objective of pumping should not be to lower the groundwater table and then treat contaminated water as opposed to drawing water through the waste.

151. Page 3-88, Paragraph 3: Discuss in more detail the impacts of upgradient infiltration. How might this influence gradients, flow directions, and fate and transport.

152. Page 3-89, Paragraph 1: What are the concentration contours presented in Figure 3-14 based on? What round of data was used to produce these contours?

153. Page 3-90, Figure 3-14: This figure shows that the zone of capture for the proposed extraction system will allow some contaminated groundwater to continue to migrate towards Mere Brook. Discuss this issue further.

154. Page 3-92, Paragraph 1: This paragraph should discuss the fact that drilling through contaminated material may produce drill cuttings which must be screened and managed properly. In addition, contaminated soil may be produced during trenching activities to connect extraction wells to the treatment system, etc.

155. Page 3-92, Paragraph 3: Include a discussion of when treat-

ability tests would be performed and how long they would take.

156. Page 3-95, Table 3-6: The following comments pertain to this table.

- o See comments from Table 3-4 which pertain to the cost estimate for the cap.
- o Where can labor costs be found for the installation of Groundwater Extraction Wells?
- o See comments from Table 3-5 which pertain to cost estimates for Water Treatment and Discharge.
- o Include a cost estimate for management and disposal of contaminated soil generated during well installation and trenching (for placement of pipes).
- o A discount rate of 10% must be used.

Alternative 1,3-F: Cap/Passive Groundwater Collection/Treatment

157. Page 4-2, Table 4-1: This table should conform to Attachment B to these comments.

158. Comments made previously regarding individual components of this alternative must be addressed for this alternative as well.

4.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

159. Page 4-2, Table 4-1: This table should conform to Attachment A to these comments.

160. Page 4-3, Paragraph 1: There is no data presented to indicate that Alternative 1,3-C will meet chemical-specific ARARs.

161. Page 4-6, Paragraph 2: UV/oxidation is now a fairly well developed technology and is a commercially available technology from at least two U.S. vendors and one Canadian vendor.

162. Page 4-6, Paragraph 4: Capping of landfills in not considered difficult to implement.

APPENDIX B GROUNDWATER FLOW MODEL RESULTS, DETAILED EVALUATION OF REMEDIAL ALTERNATIVES

163. Page B-2, Paragraph 1: The last sentence indicates that the (bottom?) landfill waste materials are 8 to 10 feet into (below?) the water table. This does not appear to be

consistent with lowering the water table 6 to 8 feet below

the current water-table level (p.3-35, paragraph 2). Clarify this confusion.

164. Page B-3, Paragraph 1: No data or discussion are provided to justify the use of a single layer model. Provide this justification. In addition, discuss the sand unit and the two transition zone units more fully.

No data or discussion are provided regarding the nature and top elevation of the clay unit of the Presumpscot Formation. Provide a detailed discussion of this unit.

No discussion is presented regarding vertical gradients and the use of a two dimensional model. Provide further discussion on these issues.

165. Page B-4, Paragraph 3: When using a variable block sized grid it is usually recommended that the block size not change more than 1.5 times for adjacent blocks. It appears that some changes exceed 2.0 times on Figure B-1. Also, explain why a coarse grid was maintained in the Sites 1 and 3 area which is the focus of the report.

The elevation of the top of the clay surface (Fig. B-2) does not appear to match the data presented in Figure 19 of the "Round V Data Package". Discuss the differences and effects on modeling results.

166. Page B-5, Paragraph 2: Clarify which blocks were considered to be constant head.

Discuss the relationship between measured water-table values and average annual conditions. On what basis was it assumed that they were the same?

Show the final K distribution.

167. Page B-6, Paragraph 1: As mentioned above, no anisotropy was assigned to the water table aquifer. Provide justification for not examining an anisotropic scenario since the hydraulic conductivity is reported as 5:1.

168. Page B-6, Paragraph 2: Discuss the assumptions of a 3-foot thickness of sediments and provide data on the "calibrated" hydraulic conductivity of these sediments.

169. Page B-6, Paragraph 3: Discuss the use of 18 inches for recharge. Compare this value with work by other investigators.

170. Page B-7, Section B.6: Show final values for all parameters

used in the model. Provide information on mass balance for the final calibration run. Provide information on the magnitude and distribution of water-level residuals.

171. Page B-14, Figure B-1: Show locations and values for water levels used to construct this map.

Explain why there is no 20 foot water-level contour south of the brook.

172. Page B-15, Figure B-2: The elevation of the clay surface does not conform well (in magnitude or configuration) with Figure 19 of the "Round V Data Package".

Explain why the contour interval increases from 5 to 30 feet then back to 20 feet with decreasing altitude.

173. Page B-16, Figure B-3: Show constant head nodes. Why are there no river nodes in the southeast corner of the model? What are the river head values for each river node?

174. Figures B-1 and B-4: Figure B-1 is a groundwater surface contour map and Figure B-4 is the final steady-state groundwater surface contour map. The difference between the two is approximately 2 feet. Explain how this difference may effect the efficiency of the interceptor trench and the slurry wall.

Also, the groundwater flow pattern is flattened out by the model and the flow pattern changed as compared to the original groundwater surface contour map in Figure B-1. Explain how this difference may effect the remedial alternatives.

175. Page B-17, Figure B-4: Superimpose water levels from Figure B-1 on this map so that the reader can estimate the accuracy of the fit.

Is the 24 foot contour in the southeast corner correct or should it be 20 feet?

Explain apparent leakages out of the model on the west side at upstream river nodes and in the southeast corner where then are no river nodes.