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NAS CECIL FIELD
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LETTER AND COMMENTS FROM U S EPA REGION IV REGARDING REMEDIAL INVESTIGATION/FEASIBILITY STUDY OPERABLE UNIT 1 (OU1) NAS CECIL FIELD FL
8/29/1994
U S EPA REGION IV

4.1.2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

August 29, 1994

Commanding Officer
Attn. Mr. Steve M. Wilson
Code 18-B-9
Department of the Navy
Naval Facilities Engineering Command
Southern Division
P.O. Box 190010
North Charleston, South Carolina 29419-9010

RE: EPA Comments on RI/FS, BRA for OU 1
NAS Cecil Field

This transmittal supersedes the letter of August 15, 1994. The August 15 letter omitted the final 12 comments (last two pages). Please forgive this oversight.

Should you have any comments please contact me at the letterhead address or at 404-347-3016.

Sincerely,

Bart Reedy
Senior Remedial Project Manager

GENERAL COMMENTS

Numerous errors were identified in the Draft RI which need to be corrected. Erroneous sample labels, locations and rationale were identified in tables and figures, such as Figure 1-3 and Table 2-2. For example, sample CEF-2-SS6 is shown in Figure 4-2 as having a total PAH concentration of 652 ug/kg. This does not agree with Table 4-1. In addition, several concentrations shown in summary tables do not correspond with the analytical data presented in Appendix M. Another example, levels shown in Table 4-10 for 2-butanone, toluene and chlorobenzene do not reflect the levels shown in Appendix M. At page 4-57 the text discusses sample concentrations that were in excess of the MCL for chromium; however, sample CF1MW15S was not included. The concentration of chromium in sample CF1MW15S was 134 ug/l, which exceeds the MCL for chromium of 100 ug/l.

It is imparitive that the information generated by these investigations conducted at NAS Cecil Field be presented accurately and completely. It is requested that all data tables be justified with the figures and both be justified with the data as reported by the laboratory. The importance of accurate transcription can not be overstated.

Include a brief discussion specifying how contaminant detections were defined in the Draft RI. For example, state if detections were determined by comparison to background levels, practical quantitation limits or other values.

Filtered and unfiltered groundwater samples were collected during the RI, and a conclusion was drawn from these analytical results which indicated that turbidity appeared to influence the concentrations of metals in the groundwater. Although this conclusion is reasonable, filtered sample data is not accepted by EPA Region IV for selecting contaminants of concern. For this Draft RI, Draft BRA and Draft FS it is not clear if only unfiltered groundwater sample analytical data were used in screening contaminants of concern.

The cost and effectiveness of a landfill cap consisting of compacted soil with a permeability of 2×10^{-3} centimeters per second (cm/sec) is a concern because this permeability is too high to act as a barrier to surface water infiltration. Dynamac believes that it is also cost-prohibitive to transport desirable, lower permeability material to the site; therefore, it appears that capping may not be a reasonable technology for consideration in the landfill closure risk reduction alternative. DR

Please elaborate on the utilization of EPA Region III's Risk Based Concentration (RBC) values in the Draft BRA as screening criteria in the selection of CPCs. Based on the RBC values, numerous contaminants detected in the site media were not retained as CPCs

and therefore could not be quantitatively evaluated in the BRA process. The RBC values are meant to be used as general approximations to compare with the quantitative risk assessment results. The soil RBC values were developed by assuming that exposure is contributed by only one chemical under one form of contact (i.e., ingestion) and may be neither sufficiently conservative nor appropriate to apply to circumstances where multiple chemical exposures in a combination of exposure routes (i.e., inhalation, ingestion and dermal contact) are encountered.

The baseline risk assessment may include risks from filtered groundwater. However, these risk estimates may underestimate chemical concentrations in water from an unfiltered tap. Only risks from the unfiltered samples will be included in the risk assessment. Risks from filtered samples may be used for comparitive purposes in the Risk Management decisions for this site. See *Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (Part A)* Section 6.5.2 for more information.

Remedial Investigation Report

1. Page 1-1, Sec. 1.1
Include a figure showing the locations of all of the Operable Units/Sites at this facility, so that OU1 can be evaluated appropriately. For example, it is important to know at the beginning of the OU1 evaluation that OU10 is located on the opposite side of Rowell Creek.

2. Page 1-8, Para. 2
Sentence states that the majotity of the site is covered with soil. What is the remainder if the site covered with ?

3. Page 1-9, Para. 2
The seep discussed at this location is not shown on figure 1-2.

4. Page 1-9, Para. 1
State how the historical information was secured and how any judgments were made to retain or dismiss the information.

5. Page 1-18, item 1 and figure 1-3
Monitor Well CEF-1-1, labelled as a deep well, is defined as being constructed in the upper zone of the Hawthorn Group; however, it is described on page 1-18 as being a shallow, surficial aquifer monitor well. Please correct the discrepancy. Also, provide the monitor well number for the deep monitor well discussed.

6. Page 2-6, Sec.2.4
For future reference, dissolved oxygen should be included in the field measurements for surface water, for use in the ecological risk assessment.

7. Page 2-6, Para. 1
Explain how data from investigations at adjacent sites was incorporated or disregarded. The data from adjacent sites seems to be an approptiate inclusion.

8. Page 2-6, Para. 3
Text states that lower detection limits were used. What were they lower than ?

9. Page 2-9, Table 2-2
Samples RCSD8A and RCSW8A are described as being located downstream of sample RCSD/SW8 when in fact they are located upstream. Revise appropriately.

10. Page 2-10, Para. 1
Explain the rationale for selection of which samples to run for hexavalent chrome.

11. Page 2-15
A limited number of subsurface soil samples were collected around

the periphery of the landfills. The subsurface samples were not contaminated as would be expected outside the boundary of the landfill. The fate and transport chapter of the document does not discuss subsurface soils as a potential source of contamination because no contaminants were detected in offsite subsurface soil samples. It is possible that subsurface soils within the boundary of the landfills are contributing to contamination of ground water. This potential source should be discussed in the text. Also, subsurface soil samples should be collected within the boundary of the landfill to determine if the soils serve as a source to ground water.

12. Page 2-20, Table 2-6
The well placement rationale for sample CF1MW13S states that the location is southeast of the Site 1 landfill; however, the location is actually south. The location of sample CF1MW15S is listed as east; however, it is actually northeast. Please correct the discrepancies.

13. Page 2.21 Table 2-6
The rationale section of the table does not state the location of well CEF-2-10D. State that the well is located west of Site 2 landfill. The location of well CEF-2-11I is stated as being east of the Site 2 landfill; however, it is actually located northeast. Please correct the discrepancies.

14. Page 2-28, Para. 2
Could not locate the rationale section for the placement of background wells.

15. Page 3-2, Fig 3-1
Show the drainage ditch located south of Site 1, as mentioned in Section 3.1, paragraph 5, page 3-4.

16. Page 3-16, Para. 1
The differentation between the upper and lower zones of the upper aquifer warrents some additional discussion. Is the distinction based upon information secured for this RI/FS or is available information from the entire base used ? It appears that only information from this RI is utilized.

17. Page 3-21, Table 3-3
Table 3-3. 'October 1994' should be 'October 1993'.

18. Page 3-35 - 3-38
Significant conclusions are made concerning the difference between the upper zone waters on site and the upper zone waters from back ground wells. The same conclusions are made concerning water from the lower zones. Some additional information (eg head differences) should be presented to support these conclusions. Differences in water chemistery alone does not conclusively support the conclusions put forth in this report.

19. Page 3-43, Para. 3

The text states that there are additional wells on Cecil field that tap the upper zone and this water is used for irrigation and sanitary purposes. At these locations, is public (or base) water available for consumption ? Are there water lines running to these locations ?

20. Page 3-52, Para. 2
If the confirmation information regarding rare, endangered, and threatened species is available, it should be included in the revision of this document. JD

21. Page 4-4, Para. 2
Is the debris discussed at this location construction debris or misselanous trash ?

22. Page 4-8 - 4-9
Lacking pertanent and relevent information on Site 10 (i.e., contaminants and concentrations in different media, migration pathways), it is difficult to evaluate the biological effects in Rowell Creek in relation to OU1 contamination. Hoe many more sites are located suck that they could impact Rowell Creek ?

23. Page 4-15, Para. 2
The results from the split analysis should be in by now and should be included in the next iteration of this report.

24. Page 4-16, Fig 4-2
Sample CEF-2-SS6 is shown in Figure 4-2 as having a total PAH concentration of 652 ug/kg. This does not agree with Table 4-1. Please correct this discrepancy. **All data tables and figures should be reviewed to insure that the information has been transcribed correctly. Accurate transcription of data while mundane is of the upmost importance. See General comment number 1.**

25. Page 4-16, Fig. 4-2
The number of semivolatile organic compound (SVOC) detections and the total concentration of SVOCs for sample CEF-2-SS6 are presented in Figure 4-2 as 8 and 652 micrograms per kilogram (ug/kg), respectively. These values do not agree with Table 4-1 which lists seven SVOCs with a total concentration of 382 ug/kg. Please correct this discrepancy.

26. Page 4-17, Para. 1
The sample at Site 1 that deviated from the pattern of high polynuclear aromatic hydrocarbon (PAH) concentrations is shown as 2SS8. The sample should actually be 1SS8. Please correct this discrepancy.

27. Page 4-21, Fig. 4-3
The polychlorinated biphenyl (PCB) concentration shown in Figure 4-3 for samples CEF-2-SS1 and CEF-1-SS12 are 2.2 and 8.8 ug/kg, respectively. These concentrations are presented in Table 4-2 as being 22 and 52 ug/kg, respectively. Please correct this discrepancy.

28. Page 4-41, Fig. 4-9
The concentration of bis(2-ethylhexyl)phthalate is shown as 0.6 (J) micrograms per liter (ug/l). Table 4-7 lists the concentration as 0.5 (J) ug/l. Please correct this discrepancy.

29. Page 4-42, Para 1
The text states that benzo(a)pyrene was a nonphthalate ester reported during analysis of water samples from the upper surficial aquifer; however, benzo(a)pyrene is not shown in Table 4-7, which summarizes SVOCs in groundwater. Please correct this discrepancy.

30. Page 4-46, Para 3
As written, the subsection on Inorganics in Groundwater implies that inorganic contaminants in ground water are a concern only for human health. This implication is an oversimplification. Ground water contaminants are also a concern from an ecological perspective, since ground water at OU1 discharges into Rowell Creek and a spring is located at Site 2 (Section 4.1, page 4-8). This is addressed in the Ecological Assessment portion of the Baseline Risk Assessment for OU1.

31. Page 4-47, Table 4-8: The analytical data shown for sample CF1MW4 is not documented in Appendix M, Complete Validated Data Set. Appendix M only lists data for mercury for this sample. Please correct this discrepancy.

32. Page 4-53 - 4-58
Section 4.3, Groundwater, Upper Surficial Aquifer, page 4-53, indicates that the MCL for aluminum is 200 ug/l. There is no MCL for aluminum, there is a secondary MCL of 50-200 ug/l (56 FR, January 30, 1991). Page 4-57 indicates that the MCL for iron is 300 ug/l. There is no MCL for iron, there is a secondary MCL of 300 ug/l (NPDWR). Page 4-58 indicates that the MCL for lead is 15 ug/l - this value corresponds to the treatment technique action level not the MCL.

33. Page 4-53 - 4-62
Discussion of the inorganics in ground water are made throughout section. The MCLs for each constituent are mentioned. It should be noted that values for the following constituents are secondary MCLs (SMCLs), not MCLs as discussed in the text:

aluminum, 200 ug/l (SMCL)
iron, 300 ug/l (SMCL)
lead, 15 ug/l (action level).

34. Page 4-54, Para. 2
The text refers to two groundwater samples, CEF-2-8I and CEF-2-4S, which contained aluminum at concentrations above the maximum contaminant level (MCL). See comment no 29.

35. Page 4-54, Para. 4
The concentration shown for sample CEF-2-5S is 5.1 (J) ug/l. Table 4-8 lists the concentration as 5.3 (J) ug/l. Please correct the

discrepancy.

36. Page 4-57, Para. 4
The text discusses sample concentrations that were in excess of the MCL for chromium; however, sample CF1MW15S was not included. The concentration of chromium in sample CF1MW15S was 134 ug/l, which exceeds the MCL for chromium of 100 ug/l. Please correct this discrepancy.

37. Page 4-59, Para. 4
The text states that chromium was detected in three intermediate monitor well groundwater samples; however, a fourth sample, CF1MW12I, also contained chromium at 20.8 ug/l. Later in the paragraph, the text states that chromium was not detected in excess of the MCL in lower surficial aquifer groundwater samples; however, sample CF2MW8I contained chromium at 135 ug/l, which exceeds the MCL for chromium of 100 ug/l. Please correct these discrepancies.

38. Page 4-62, Para. 5
The text states that antimony, cadmium and selenium were not detected in any lower surficial aquifer groundwater samples; however, sample CF2MW8I contained cadmium at 5.34 ug/l, which is above the MCL of 5 ug/l for cadmium, and sample CF2MW9I contained selenium at 49 ug/l. Please correct this discrepancy.

39. Page 4-65 through 4-67.
A discussion of the inorganics detected in ground water is provided. The argument is made that the high concentrations of inorganics in the ground water samples are the result of the collection of turbid samples. As stated in the text, silt grains, clay particles, and colloids are agitated during purging and are included in the ground water sample. The preservation process causes constituents adsorbed to these particles to enter into solution resulting in higher than normal detections of inorganics. As stated on page 4-66, the comparison of filtered and unfiltered samples shows that elevated inorganic levels present in unfiltered samples were not present in the filtered samples. It should be noted that although turbid samples may have been collected (this appears to be the case for OU1), the ground water data available does not confirm whether or not a metals problem exists in the upper zone of the surficial aquifer. When a sample is filtered, colloidal particles greater than the mesh size are removed. Colloids should be included in sample analysis since these particles often migrate at ground water velocities. The filtered samples exclude colloid particles resulting in substantial underestimates of metal concentrations. Confirmatory ground water samples should be collected using techniques that will not cause turbid samples. Measures should be taken to ensure that non turbid samples are collected such as redeveloping the wells if necessary, using low flow velocity pumps, and taking precautions not to excessively purge the well.

40. Page 4-69, Sec. 4.4
The field measurements for surface water and the total organic carbon content of the sediment should be included in tables and briefly discussed in the text. The results of the wet chemistry analyses for surface water (Appendix M) should also be summarized.

41. Page 4-72, Table 4-10
Values listed for 2-butanone, toluene and chlorobenzene in Table 4-10 do not correspond with concentrations shown in Appendix M. Please correct this discrepancy. shown in the analytical summary tables and correct discrepancies.

42. Page 4-72, Table 4-10
Some of the concentrations in this table are incorrect, based upon the sediment data in Appendix A of the Baseline Risk Assessment for OU1. For example, for sample 2SD2, acetone should be 190J ug/kg, 2-butanone should be 30J ug/kg, and toluene should be non-detect.

43. Page 4-73, Para. 3
The text lists the concentration of toluene in surface water samples as being below 10 ug/kg; however, sample 2SD2 contained toluene at 30 ug/kg.

44. Page 4-75, Para. 3
The first sentence states that three surface water and sediment samples (RC-SD3, RC-SD4 and RC-SD5) were collected between Rowell Creek and OU 1. The three sample locations shown in Figure 4-20 are actually between Rowell Creek and Lake Fretwell. Please correct this discrepancy.

45. Page 4-79, Para. 3
The text states that the sample collected at location 2-SD3 contained anthracene; however, Table 4-10 lists the contaminant as acenaphthene. Please correct the discrepancy.

46. Page 4-81, Fig. 4-22
Anthracene is shown as detected at 70 (J) ug/kg in Figure 4-22; however, Table 4-10 lists acenaphthene as the constituent with a concentration of 70 (J) ug/kg. Please correct this discrepancy.

47. Page 4-84, Para. 1
Provide more details concerning the PCBs in upstream samples RC-SD3 and RC-SD4. Discuss possible sources and the relevance of the upstream PCB contamination to OU 1.

48. Page 4-84, Para. 3
Cyanide concentrations are not shown in Table 4-10 for samples 2-SW1, 2-SW2 and 2-SW3; however, cyanide detections are discussed in the text. Please clarify this discrepancy.

49. Page 4-84, Para. 3
The text at this citation and at Section 2.4, pages 2-6 and 2-10,

state that AVS (acid volatile sulfide) and hexavalent chromium analyses would be done for selected samples. The data should be presented and discussed in this section.

50. Page 4-88, Para. 1
Provide hypothsis or conclusions pertaining to the origin of the PCBs detected in sediment samples collected upstream from OU 1.

51. Page 5-8
Lead and selenium should be included in the discussion of persistence and fate of OU1 contaminants in ground water. These constituents were detected above MCLs in unfiltered ground water samples.

52. Section 6
Summary of Baseline Risk Assessment, (Section 6 of this report) must be edited appropriately in response to the comments on the Baseline Risk Assessment.

53. Page 7-16, Para. 5
An additional data gap which should be included in the Draft RI Report is the further characterization of the upper zone of the Hawthorne Group (UZH) at Site 2. Based on Figure 3-7, groundwater flows east. The single well screened in the upper zone of the UZH at Site 2 is located west of Site 2 and is therefore located upgradient from the site; there is no downgradient well. In order to achieve the objective stated in Table 2-6 of investigating "possible contamination and extent of contamination in the upper zone of the Hawthorne Group," groundwater samples from the UZH east of Site 2 should be collected and analyzed.

54. Page 7-16 - 7-17, Sec. 7.3
With respect to this data gap summaryand conclusions section, reffer to General Comment number 1 and Specific Comment number 20.

55.
Throughout the document the spring located at Site 2 is discussed and is plotted on every figure. The spring has not been sampled in the past, nor in the recent sampling event. The spring should be sampled to determine the contribution of contaminants from ground water to surface water at the Site 2 landfill.

Feasibility Study Report

56.
One of the alternatives for source control at the site involves grading and capping the landfills. This alternative is the best measure for controlling contaminated leachate from discharging to ground water and adjacent streams. The disadvantage of implementing the alternative is the destruction of the wetland that covers approximately 70% of Site 1. Before an alternative is

selected, more information is necessary to determine the extent to which subsurface soils act as a continuing source to ground water contamination and to determine if the inorganics detected in ground water samples are truly representative. The information presented thus far indicates that organic contamination in ground water is limited, and inorganics are elevated in the surficial aquifer. The levels detected may be the result of turbid samples, but the data presented does not confirm whether or not elevated inorganic concentrations are present in ground water. Elevated levels of organics and inorganics were detected in the surface water/sediment samples and surface soil samples. Detections of inorganics were higher at surface soil sample locations where the soil cover was not present. The distribution of inorganics in the various media occurs sporadically, and based on the data available, a conclusion cannot be made as to whether a significant adverse impact on the wetlands and streams exist to warrant capping the site. Additional sampling should be conducted to determine extent of contamination in the subsurface soils and to determine whether contaminant concentrations in this medium could be a continuing source to ground water, the wetlands and ultimately surface water and sediment. Monitoring wells should be resampled using techniques that will yield nonturbid/representative ground water samples. Once this data is obtained, a better description can be made of the geochemical processes occurring at the site. These data are pertinent for selecting the most appropriate remedial alternative for OU1.

57. Page 2-9, Para.8

Regardless of the apparent presence and possible influence of turbidity in groundwater, only unfiltered groundwater sample results are accepted by EPA Region IV in identifying contaminants of concern. It is unclear if inorganic contaminants were eliminated from consideration based on filtered sample results. All inorganic constituent analytical data considered in the Draft RI, Draft FS and Draft BRA must be from unfiltered groundwater samples collected during the RI. Please clarify.

58. Page 2-11, Table 2-3

The observations section describes the influence of turbidity in groundwater based on analytical results for filtered and unfiltered groundwater samples. It is unclear if inorganic contaminants were eliminated from consideration based on filtered sample results. Concentrations of inorganic constituents in groundwater considered in the Draft FS must be derived from unfiltered samples only. D

59. Page 2-13, Sec. 2.2.4

In order to support the statement that "The wetlands area associated with the Site 2 tributary between sampling location 2-SD-3 and Rowell Creek is acting as an effective sink for metals," chemical analysis would be needed for sediment samples from that wetlands area. Bullet #3 in Section 7.2, page 7-13, of the Draft Remedial Investigation Report for OU1 discusses this wetland as

being a probable sink for contaminants. The need for both surface water and sediment sampling in this wetland area is included in the recommendations of Section 2.2.5, pages 2-18 and 2-19. JD

60. Page 2-17 - 2-18,. Sec. 2.2.5.

a) The orange-red flocculent material has been found in the drainage structure and in the Site 2 tributary. Since it is thought that this material "is derived from oxidized iron in groundwater from the Site 2 landfill," and ground water is reaching the surface at the spring, it is also important to know whether the flocculent material is present in the wetland along the overland flow path between the spring and the drainage structure. This information, in conjunction with the surface water and sediment sampling of this wetland (as recommended on pages 2-18 and 2-19), is important in evaluating the Remedial Action Alternatives for this site.

b) The wetlands located between the spring and the drainage structure at Site 2 and those located in the Site 2 tributary along Rowell Creek are described as palustrine emergent persistent wetlands (Figures 1-4, page 1-14, 1-5, page 1-17, and 1-6, page 1-19). Since these wetlands tend to remain inundated with water, many of the ecological receptors using these wetlands would differ from those using the other types of wetlands present at OU1. It would help to have more information on the receptors present in these two wetland areas.

c) Two other possible contaminant migration areas that have not yet been investigated are the ditch draining the south side of Site 1 and the wetland area between the large berm breach at Site 1 and Rowell Creek (Section 1.5.1, page 1-13). However, sampling results for Rowell Creek downstream from these two areas seem to indicate that there are no ecological problems in Rowell Creek related to OU1 contaminants in these areas.

d) More information is needed concerning the hydrological connection of ground water and surface water at the spring and in the two emergent persistent wetlands, in relation to current conditions and possible changes that might result from implementation of the proposed Remedial Alternatives. (This is partially addressed in Section 6.6.1, page 6-44.) For example, it is not clear whether the flocculent material is forming only in the vicinity of the spring and is then being carried downstream via surface water flow, or whether direct discharge of ground water to the Site 2 tributary and its associated emergent persistent wetland is also causing the production of flocculent material in these two areas.

e) Section 6.7.2, page 6-57, mentions destruction of the

benthic community in the drainage structure in relation to implementation of Risk Reduction Alternative RR-3. Information on the nature of the benthic community in this drainage structure should be obtained, if such information is not currently available.

f) Since Risk Reduction Alternative #3 includes treatment of contaminated surface water, and the surface water contamination is apparently related to the discharge and oxidation of contaminated ground water, it is important to determine the extent of ground water contamination of concern, in order to estimate the time period needed for surface water remediation.

g) If possible, surface water and sediment samples for chemical analysis should be collected at the Site 2 spring.

61. Page 3-3, Table 3-1
Human health CPCs for groundwater must be derived from unfiltered samples. Filtered sample results are not acceptable for evaluating human health CPCs, and it is not clear if data from filtered or unfiltered samples were used to assess contaminants.

62. Page 3-8, Sec. 3.4.3
The evaluation of OU1 impacts on ecological receptors in Rowell Creek should also address any possible contribution from OU10, located on the opposite side of Rowell Creek, in relation to potential remediation for OU1. JD

63. Page 3-9, Para.1
Ecological CPCs must be selected based on the analytical results of unfiltered groundwater samples only, and it is not clear if data from filtered or unfiltered samples were used to assess contaminants.

64. Page 3-10, Para. 2.
The next-to-last sentence in paragraph 2 should state that "Risks were identified for small mammals...."
(See Section 6.3.4.3, page 6-81 of the Draft Baseline Risk Assessment.)

65. Page 3-11, Table 3-2
See Specific Comment No. 33.

66. Page 5-5, Sec. 5.1.2
Clarify whether the ground water seep is the same as the spring mentioned in Section 2.3.2.2, page 2-10.

67. Page 5-10, Para. 2
PCBs were not considered as "hot spots" in the Draft FS. Ensure that PCBs are considered in the identification of surface soil "hot spots" at OU 1.

68. Page 5-15, Sec. 5.2.2.1

The monitoring proposed as Risk Reduction Alternative RR-1 does not clearly indicate that chemical analyses will be conducted for surface water and sediment samples. Please clarify this point.

69. Page 5-17, Table 5-6
For alternative RR-3, Surface Water Treatment and Sediment Removal, specify all contaminants that will be removed during treatment. It does not appear that aluminum and iron are the only constituents to be removed. For example, Table 3-2 lists other contaminants such as cyanide, lead and manganese.

70. Page 5-18, Para. 4
See Specific Comment No. 36.

71. Page 5-25, Table 5-10
This table indicates that several protected plant species are found at Sites 1 and/or 2. Were any soil/sediment samples collected in the vicinity of these plants, or are they located in areas which are contaminated? Proposed remedial actions should address the current and future status and include any measures necessary to protect these species if any measures are required.

72. Page 6-1, Para. 2
Groundwater conditions and risks to human health and the environment must be based on analytical data derived from unfiltered groundwater samples. It is unclear if data from filtered or unfiltered samples were used to assess contaminants.

73. Page 6-15, Para. 3
See Specific Comment 38.

74. Page 6-27, Para. 2
The permeability of the compacted soil layer portion of the cap is specified as being less than 2×10^{-3} cm/sec. Although lower than the permeability of the underlying subsurface soil, this permeability still appears high and most likely will not be an effective barrier to the infiltration of surface water. The use of a geotextile/natural clay liner may be a more efficient barrier to flow; however, cost may be a prohibitive factor.

75. Page 6-27, Para. 2
Provide volumes of soil, seed and other materials specified in alternative SC-3.

76. Page 6-40, Fig. 6-8
The locations shown for stations RC-SW/SD/BIO-6, RC-SW/SD/BIO-7, RC-SW/SD/BIO-8A, and RC-SW/SD/BIO-9 in this figure differ from those shown in Figure 2-4, page 2-16. The locations should be consistent. New sampling locations should have new station numbers. One station should be located in Rowell Creek downstream of the large breach in the Site 1 berm.

Baseline Risk Assessment

77. Executive Summary
Modify this section as needed, based upon the comments given below.

78. Page 2-4, Fig. 2-3
Show the ditch located at the southern end of Site 1 (as described in Section 2.3.2.2, p. 2-11).

79. Section 3.4.1, Surface Soil, para.
It is unclear why the surface soil data was compared statistically to subsurface soil samples from across the facility.

80. Page 3-10, Para. 3, and Page 3-11, Figure 3-5
Based on descriptions presented in this paragraph and the proximity of sample location SI to other site facilities at NAS Cecil Field (Figure 3-5), this sampling location, selected to establish surface soil background levels, appears to be unacceptable. This location is in an area that has been disturbed or reworked as a result of past trench and fill landfilling activities. Therefore, background levels based on surface soil samples collected from such a location may be elevated. As a result, risks could be underestimated. An ideal and true background sample should be collected from a location undisturbed and unimpacted by site-related activities. DR

81. Page 3-13, Sec. 3.4.3
One complicating factor in comparing surface water and sediment contaminant concentrations in Rowell Creek at OU1 to those found upstream is the presence of OU10 across the creek. Supplemental information concerning OU10 contaminants and migration pathways should be obtained and reviewed prior to the selection of Remedial Alternatives for OU1.

82. Section 3.5, para.
Item number 2 should be changed to reflect that data considered to be at background levels will not be included. The term "site related" should be eliminated since the risk assessment should address all chemicals present regardless of their connection with the site.

83. Table 4-1
The footnote on Table 4-1 (and all other appropriate tables) regarding USEPA Region III RBC table should include that the RBC table is for the risk level of 10^{-6} and hazard quotient of 0.1. This is necessary since there are three USEPA Region III RBC tables with different risk and hazard quotient levels. Clearly identify which table is being used and include the date of the table.

84. Table 4-4
This table, Selection of Human Health Chemicals of Potential Concern for Surficial Aquifer System, Unfiltered, includes a frequency of detection of 1/21 for benzo(a)pyrene, a range of detected concentrations of 0.0007 mg/l and an average of detected concentrations of 0.0029 mg/l. It is unclear how one detection of 0.0007 mg/l could result in an average of 0.0029 mg/l.

85. Section 4.2.2, Para.1
This text indicates that exposures to surface water and sediment evaluated under current land use are considered interchangeable with potential exposures that could be listed under future land use. This statement should be edited and the appropriate risk calculations reevaluated. While the exposure may exist under both the current and future scenarios, the current scenario includes a trespasser with appropriate exposure duration and frequency. For the future onsite resident the exposure duration and frequency should be changed to residential levels from the trespasser levels.

86. Page 4-30, Para. 20
This text indicates that occupational workers were not included in the evaluation of Site 1 surface soils because those individuals are considered persons that currently work in close proximity to a site a minimum of 250 days per year and those individuals do not currently exist. Exposures to onsite occupational workers should be considered as a future scenario.

87. Page 4-46, Para. 2
The text incorrectly states the ingestion rate of 0.13 milliliter/day and surface water consumption value of 50 ml/day - the correct ingestion rate should be 0.13 liters/day (2.6 hr/day X 50 ml/hr X 0.001 l/ml). JK

88. Page 4-52, Para.1
The text states that lead detected in the filtered groundwater samples exceeded the action level for lead. However, this statement is not accurate since the drinking water action level for lead is 0.015 milligrams per liter (mg/l), and the maximum detected concentration of lead was 0.0025 mg/1. Please revise the text accordingly. Also, the text appears to inadvertently state that risk from exposure to lead in groundwater was not "qualitatively" evaluated. The word "qualitatively" should be replaced with "quantitatively."

89. Page 4-56, Section 4.2.6
The sub heading on page 4-56 should be changed from "Removal Goal Options" to "Remedial Goal Options."

90. Page 5-15, Sec. 5.2.4
Include a figure (map) showing the location of Five Mile Creek and give the approximate distance between Five Mile Creek and OU1.

91. Sec. 5.3, pp. 5-23 to 5-24 and Table 5-10, pp. 5-25 to 5-26 - Section 5.1.2, page 5-8
These citations state that the bog button (Lachnocaulon anceps) is found at Site 2. Another bog button (Lachnocahlon digynum - incorrect spelling of genus?) was apparently ranked as a federal candidate for endangered/threatened species status around 1991. Please verify the species name and current status of the bog button.

92. Page 5-24, Sec. 5.3
If the confirmation information is received concerning endangered and threatened species, it should be included in the revision of this document.

93. Page 6-3, Fig. 6-1
In the contaminant pathway model, terrestrial wildlife can also be exposed to contaminants via the surface water - food - ingestion pathway. Aquatic receptors can also be exposed to contaminants via the sediment - food - ingestion pathway. These pathways should be added to the model.

94. Page 6-9, Sec. 6.1.2
Surface water analytes must also be compared to the Florida surface water quality standards (FAC 17-302), since they might be ARARs for this Operable Unit.

95. Page 6-10, Sec. 6.1.3.2
In sentence 3 of paragraph 3, it seems that the definition of Bioaccumulation Factors (BAFs) should be reversed, so that it reads "which are the ratio of the ECPC concentration in dietary items...to the concentration in surface soils." (See the definition in Table 6-2, page 6-11.)

96. Page 6-11, Table 6-2
The BAF values are presented in Appendix S, not Appendix Q. JD

97. Page 6-16, Sec. 6.1.4.3
Clarify that the toxicity benchmarks used to evaluate the potential adverse effects of ground water contaminants represent a worst-case scenario of ground water discharging into surface water without any dilution, attenuation, etc., or mention the calculation of a dilution factor (Section 6.2.2.4, page 6-33).

98. Page 6-16, Sec. 6.1.5
This section should also include food chain exposure, as mentioned in the subsections.

99. Page 6-19, Sec. 6.1.5.3
Mention the dilution factor used to determine the predicted concentrations of the ECPCs (Ecological Contaminants of Potential Concern) upon discharge of ground water to Rowell Creek.

100. Page 6-22, Table 6-3
Please check the average detected concentration of iron in surface soils; the average should be less than the maximum concentration.

101. Page 6-23, Table 6-4

a) Correct the concentration units for surface water ECPCs.

b) The Region IV screening value given for chromium is for trivalent chromium. The screening value for hexavalent chromium should also be included.

102. Page 6-24, Table 6-5
The ECPC selection process for sediment should also evaluate aluminum, based upon the sediment data in Appendix A.

103. Page 6-25, Sec. 6.2.1.4

a) The unfiltered ground water concentrations must be used for all contaminants (including metals) in the ecological risk assessment; use of the filtered ground water data is optional. Pertinent tables (e.g., Table 6-6, page 6-26) and text should be changed accordingly.

b) Colloidal particles in the ground water could be discharged into the surface water body. Therefore, the last part of paragraph 2 must be modified.

104. Sec. 6.2.2.1, pp. 6-27 to 6-28 and Sec. 6.2.2.2, pp. 6-31 to 6-32
Indicate which of the Representative Wildlife Species have been observed at OU1 and which ones have been observed in the county, as shown in Appendix O.

105. Page 6-32, Sec. 6.2.2.3
It seems that the evaluation of exposure of aquatic organisms to sediment contaminants might also take into account ingestion of sediment, especially with respect to the quantitative benthic macroinvertebrate sampling. (See Figure 6-1, page 6-3.)

106. Page 6-37, Sec. 6.2.3.2
If nutrient enrichment is thought to be related to the higher biological condition of the benthic macroinvertebrate community at station RC-Bio-8A, please discuss the wet chemistry results for nutrients shown in Appendix A.

107. Page 6-37 - 6-38, Sec. 6.2.3.2
The statement that sediment elutriates from Rowell Creek samples at Site 1 were not toxic to Ceriodaphnia dubia is incorrect. If "in general, results less than 80 percent survival and less than 15 offspring per adult are considered to be significant" for this type of study, then the data shown in Table 6-11, page 6-39, indicate toxicity for sample locations RC-Tox-6 (reproduction) and RC-Tox-7 (survival and reproduction) for C. dubia.

108. Page 6-40, Sec. 6.2.3.3.
Clarify that the biological effects information contained in the AQUIRE database is based on exposure to contaminants in surface water, but that the data are used with respect to ground water in relation to potential discharge to surface water, as a worst-case scenario.

109. Page 6-40 - 6-41, Sec. 6.2.4.1
Since surface soil samples for chemical analysis and toxicity testing were collected concurrently (Section 6.1.5.1, Terrestrial Plants and Soil Invertebrates, page 6-17), some reference should be made to the contaminants and their concentrations. It might help

to cite Table 6-3, pages 6-21 and 6-22, and Appendix A. JD

110. Page 6-42, Table 6-12
Correct the concentration units for the analytes.

111. Page 6-45, Sec. 6.2.4.2

a) The first statement in paragraph 2 about the AWQC is correct with respect to point source discharges. However, the AWQC are used for a different purpose in the ecological risk assessment. USEPA Region IV Waste Division uses the Ambient Water Quality Criteria as screening numbers for evaluating surface water concentrations of Contaminants of Potential Concern, to determine the potential for adverse effects on aquatic biota (Section 6.1.2, page 6-9). If warranted, site-specific toxicity testing can be conducted for surface waters exceeding the screening values. Therefore, paragraph 2 should be modified or deleted.

b) The toxicity data cited in paragraph 3 are taken from the AWQC document for aluminum and provide part of the basis for the AWQC. However, some of the data shown are incorrect. For example, the lowest acute concentration of aluminum for aquatic invertebrates shown in the AWQC document is 1900 ug/l, not 3900 ug/l. It is preferred that the AWQC be used (when available) for screening purposes, rather than citing the data used to determine the criteria. If no AWQC are available for particular contaminants, then toxicity data from available literature should be presented.

112. Page 6-50, Sec. 6.2.4.3
Give the basis for the statement in the last sentence of paragraph 1 concerning the toxicity of acetone in sediment as compared to surface water.

113. Page 6-53, Sec. 6.2.4.4

a) Although the predicted maximum and average exposure concentrations of aluminum resulting from ground water discharge to surface water both exceed the chronic AWQC, only the maximum exposure concentration exceeds the acute AWQC of 750 ug/l. This seems to indicate that any acute effects resulting from this exposure pathway might be localized. However, filtered ground water was apparently used for this comparison (Table 6-6, page 6-26). As mentioned above for Section 6.1.2.4, page 6-25, unfiltered ground water concentrations must be used in the Baseline Risk Assessment; use of filtered ground water data, in addition to the unfiltered data, is optional.

b) Since the highest surface water concentrations of aluminum in Rowell Creek were found at location RC-SW-7, it would help to indicate whether the highest aluminum concentrations in shallow ground water were found near RC-SW-7, to determine whether ground water might be contributing to the elevated

aluminum concentration found in surface water at that location.

c) For paragraph 4, see the comments given above for Section 6.2.4.2, page 6-45, and modify this paragraph accordingly.

114. Page 6-54, Sec. 6.2.5
Give the basis for the statement that "The model for predicting the dilution potential of Rowell Creek may underestimate the actual dilution."

115. Page 6-83, Sec. 6.3.4.3
Based upon the stated conservative assumption that "all of the [volatile] organics detected in sediments partition to the overlying surface water at an equal concentration," the exposure concentration given for acetone in surface water apparently should be 410 ug/l rather than 41 ug/l.

116. Page 6-84, Table 6-25
a) Many of the sediment analyte concentrations in Table 6-25 differ from those in Table 6-19, pages 6-63 to 6-64. It seems that the minimum and maximum concentrations should be the same in both tables (except where the duplicate concentrations have been averaged). Also, sediment data in this table are not consistent with the data in Table 4-10, page 4-72 of the Draft Remedial Investigation Report for OU1. The data in all three tables should be checked.

b) Toluene, acenaphthene, and chromium should be included in this table, based upon the chemicals listed in Table 6-19, pages 6-63 to 6-64.

117. Page 6-85, Sec. 6.3.4.3
Nickel was not detected at location 2-SD-3.
(See Appendix A.)

118. Page 6-87, Para. 3
Based on the sediment toxicity test results, potential ecological risks have been positively correlated to the amount of iron in sediments at Site 2. Therefore, the word "not" in the sentence, "Risks were not identified for small mammals which may forage in the stream," should be deleted. (See Section 6.3.4.3, page 6-81.)

119. Appendix C, Surface Water and Sediment
All of the historic data for detected chemicals should be presented in the tables. Also, Figure C-1 was not included in some review copies.

120. Appendix C, Biological Sampling
Although the text states that the test procedures used for the historic sampling differed from those used for the more recent sampling, the historic sampling methods and results should be summarized in this section.

121. Appendix C, Groundwater Sampling
See the comment given above concerning the inclusion of unfiltered ground water data.

122. Appendix H
These tables contain more significant figures than the data would indicate is appropriate.

123. Appendix H
It is unclear why the subchronic RfD's are include in Appendix H.

124. Appendix P
Page 4-7 is missing from some review copies.

125. Appendix W
Include the list of references.