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NAS WHITING FIELD  
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LETTER REGARDING REMEDIAL INVESTIGATION REPORT FOR SITES 3, 4, 6, 30, 32 AND  
33 NAS WHITING FIELD FL  
3/16/1999  
U S EPA REGION IV



UNITED STATES ENVIRONMENTAL PROTECTION  
REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

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March 16, 1999

4WD-FFB

Ms. Linda Martin  
Southern Division  
Naval Facilities Engineering Command  
P.O. Box 190010  
2155 Eagle Drive  
North Charleston, South Carolina 29419-9010

SUBJ: RI Report for Sites 3, 4, 6, 30, 32 and 33

Dear Ms. Martin:

The United States Environmental Protection Agency (EPA) has received and reviewed the Remedial Investigation (RI) Report for Sites 3, 4, 6, 30, 32 and 33, at NAS Whiting Field, dated September 1998. Enclosed are EPA's comments based on this review.

If you should have any questions or comments, please contact me at (404) 562-8555.

Sincerely,

A handwritten signature in cursive script that reads "Craig A. Benedikt".

Craig A. Benedikt  
Remedial Project Manager  
Federal Facilities Branch

Enclosure

cc: Jim Cason, FDEP

**EPA Review Comments Report for  
Remedial Investigation Report for  
Sites 3, 4, 6, 30, 32 and 33  
September 1998**

**General Comments**

1. In Section 5, tables were used to summarize the data for each site and compare maximum detected concentrations to federal and state screening criteria. The screening criteria utilized were EPA Region III Risk-Based Concentrations (RBCs), adjusted to a Hazard Quotient = 0.1, and Florida Department of Environmental Protection residential and industrial soil cleanup goals. It appears that many of the values utilized as screening criteria were rounded. In most instances the rounding would not likely have a significant effect on the evaluation of the data. However, in some instances where the screening criteria value is relatively high, as in the case for aluminum, the rounding is significant. For example, the EPA Region III RBC for aluminum based on an industrial setting is 87,000 milligrams per kilogram (mg/kg). In the tables presented in Section 5, the screening criteria was rounded to 100,000 mg/kg. It is not clear why rounding was utilized. It is recommended that actual screening values be used.
2. Figures depicting sampling locations and results in the RI Report do not identify the key features (ie. suspected source areas) of the site such as locations of former underground storage tanks (USTs), wash racks, etc., which would allow for an adequate evaluation of the sampling data relative to these suspected source areas. All key features of the sites should be identified within all figures of the report which depict sampling results.
3. Although the purpose of the RI Report was to focus exclusively on the soils at the respective sites and not on groundwater, groundwater issues cannot be totally ignored when evaluating soils. Surface and subsurface soil data were evaluated to assess impacts to human health and ecological receptors through direct contact, ingestion, inhalation, etc. Surface and subsurface soil risks were evaluated by comparing maximum concentrations to federal and state soil screening levels for residential and industrial scenarios. In addition, human health and ecological risk assessments were performed. However, the ability of soil contamination to contribute to groundwater contamination was not evaluated. Several sites had soil volatile organic contamination (VOC), both chlorinated and benzene, toluene, ethylbenzene and xylene (BTEX), as well as polycyclic aromatic hydrocarbon (PAH) contamination in the parts per million (ppm) range. These areas may be contributing to the groundwater contamination noted at several of these sites. In particular, Sites 4, 32, and 33 had BTEX contamination, and sites 30 and 32 had chlorinated VOC contamination at specific locations in the ppm range within the soils. It is recommended that soil screening levels be developed as outlined in the EPA guidance

document *Soil Screening Guidance: Users Guide, April 1996, Publication 9355.4-23* which evaluates the potential for soil to leach contaminants to groundwater. These levels should then be compared to the levels of contamination found at the sites to assess/evaluate the soil contamination's potential to impact groundwater.

### **Specific Comments**

1. **Page 3-1, Section 3.1 First Paragraph.** This section indicates that soil gas samples were collected from 220 sampling points. However, Page 3-2 indicates only 206 locations (106 locations at Sites 3 and 32, 56 locations at Site 30, and 44 locations at Sites 5,6, and 33). This discrepancy should be addressed.
2. **Page 3-4, Figure 3-1.** This figure depicts soil boring locations for Sites 3, 4, and 32. However, soil boring 3SB07 is not depicted on this figure. The figure should be modified to include 3SB07.
3. **Page 5-2, Section 5.2.1.1 First Paragraph.** Section 5.2.1.1 indicates that Table 5-2 includes EPA Region III residential RBCs. This section and the table should be modified to indicate that 1/10th of the RBCs was used for screening purposes for non-carcinogenic contaminants.
4. **Page 5-6, Section 5.2.1.1, Fifth Paragraph.** This section states that pesticides were detected in four samples (3SB1-0-2, 3SB2-1-1, W035B01301, and 3SB13). It appears that W035B01301 should be changed to W03SB01301, and 3SB2-1-1 should be changed to 3SB2-1-2.
5. **Page 5-8, Section 5.2.1.1, First Paragraph.** This paragraph indicates that 14 analytes were detected above background soil concentrations. However, Figure 5-2 does not include five of the analytes (calcium, iron, magnesium, potassium, and sodium) which exceeded background soil concentrations. For example, according to Table 5-2, iron (maximum concentration 12,900 mg/kg) exceeded its residential RBC screening value (2,300 mg/kg). While these contaminants are essential nutrients, they either should be factored into discussions concerning comparisons to background, or the report should clearly state that these essential nutrients are not considered under the contaminant evaluation. The report should also note when any of these essential nutrients exceeds a risk based criteria.
6. **Page 5-30, Section 5.2.2.1, Second Paragraph.** This paragraph states that vanadium exceeds its EPA Region III RBC. However, according to Table 5-6, vanadium exceeded only the state criteria, not the EPA criteria. Additionally, iron (maximum concentration 14,800 mg/kg) exceeded its residential RBC screening value (2,300 mg/kg). The RI Report should address these issues.

7. **Page 5-40, Section 5.2.2.3, First Paragraph.** This section summarizes findings of analytical data from Site 4. However, the adequacy of the Site 4 investigation is difficult to assess. Analytical data are depicted on figures with scales much too large to assess the sampling locations with respect to the former underground storage tank (UST) locations. Background information indicates that nine USTs and shallow disposal areas for sludge tank bottoms were located at Site 4. If available, historical maps/blue prints should be used to identify the location and orientation of these tanks. Site 4 reportedly covers an area of 2.5 acres. It appears that only three soil borings were placed within the area where the former USTs were located, with the remainder of the borings located on the periphery. Analytical data from these three soil borings (4SB01, 4SB03, and 4SB06) indicate residual contamination, including VOC, semi-volatile organic contamination (SVOC), and PAH is still present. It is not clear whether these soil borings were located in areas expected to contain the highest concentrations of contaminants. Given this, it does not appear that three soil boring locations are adequate to assess residual contamination from nine USTs in an area covering 2.5 acres. In addition, the data should be presented on smaller scale maps which depicts the suspected former UST locations as well as the shallow tank bottom sludge disposal areas.

Additionally, while soil data were screened against residential and industrial risk based screening criteria, the data were not screened against screening levels designed to evaluate the potential for soils to impact groundwater. Background data indicate groundwater contamination with BTEX constituents. These constituents were detected in soil samples in the part per million range, which may indicate a potential continuing source for groundwater contamination. It is recommended that the soil screening levels be developed as outlined in EPA guidance document *Soil Screening Guidance: Users Guide, April 1996, Publication 9355.4-23* to assess/evaluate the soil contaminations potential to impact groundwater.

8. **Page 5-42, Section 5.2.3.1, Third Paragraph.** This paragraph indicates that eighteen of the nineteen detected SVOC were detected in sample 6SB3-02 or its associated duplicate sample. However, according to Table 6-9, nineteen of nineteen SVOCs were detected in 6SB3-02 or its associated duplicate. Table 6-9 indicates no other detections of SVOCs in any other samples. The text indicates that pyrene was detected in sample 6SB4-0-2. This discrepancy should be clarified.
9. **Page 5-47, Section 5.2.3.1, Fourth Paragraph.** This paragraph details the inorganic analytical results for soil samples from Site 6, with the text of the paragraph correctly indicating that manganese concentrations exceeded EPA Region III RBCs (at a level of 0.1HQ). However, manganese is not found on Figure 5-10, which depicts inorganic contamination at Sites 6 and 33. The figure should be revised to include the manganese detections.

10. **Page 5-49, Section 5.2.3.1, First Paragraph.** This paragraph indicates that the maximum detected concentration of chromium in Site 6 surface soils was 30 mg/kg in 6SB4-02. However, according to Table 5-10, sample 6SB3-0-2 contained a chromium concentration of 65 mg/kg. These discrepancies should be addressed.
11. **Page 5-49, Section 5.2.3.2, Third Paragraph.** This paragraph indicates that 14 SVOCs were detected at only one sampling location (6SB3). However, Table 5-11 indicates that 13 SVOCs were detected at 6SB3. This discrepancy should be resolved.
12. **Page 5-59, Figure 5-13.** This figure and subsequent figures specific to Site 30 should identify the location of the wash rack and waste oil tanks so that the adequacy of the soil sampling locations relative to these areas can be assessed.
13. **Page 5-85, Section 5.2.5.1, First Paragraph.** This paragraph discusses the results of inorganic analyses performed on surface soil samples collected at Site 32. This paragraph states that only two analytes (aluminum and vanadium) exceeded either Florida Department of Environmental Protection (FDEP) or EPA Region III soil screening levels for residential soil. However, according to Table 5-18, antimony, arsenic, and iron also exceeded one of the screening levels mentioned above. This discrepancy should be clarified.
14. **Page 5-86, Figure 5-18.** Figure 5-18 depicts inorganic contaminants found in surface soil at Site 32. Since iron was detected above EPA residential soil screening criteria, iron results should also be included on Figure 5-18.
15. **Page 5-85, Section 5.2.5.2, Second Paragraph.** This paragraph discusses the volatile organic analytical data detected in subsurface soil samples at Site 32. The relatively high VOC analytical data cited in this paragraph were from samples collected during July 1993 from soil borings designated with a "WR". However, these results are not included on Figure 5-19 which depicts surface soil analytical results for Site 32. Either the results from the July 1993 soil borings should be included in Figure 5-19 or an additional figure should be prepared so that a complete evaluation of the contamination identified at the site can be made.
16. **Page 5-88, Table 5-19.** Table 5-19 consists of eight pages. Page 2 of the table designated as Page 5-88 of the RI Report was not included in the report. The page should be included as part of the next submission of the report.
17. **Page 5-97, Section 5.2.5.2, Sixth Paragraph.** This paragraph discusses the results of total petroleum hydrocarbons (TPH) analyses. This section should note that the FDEP soil screening criteria (2,500 mg/kg) was exceeded in several samples.

18. **Page 5-99, Section 5.2.5.3, Second Paragraph.** This section summarizes the results of the Site 32 investigation. The second paragraph discusses findings with respect to VOC contamination. A statement should be added to this section indicating that the majority of the VOC contamination was located within 20 feet below ground surface.
19. **Page 5-104, Section 5.2.6.1, First Paragraph.** This paragraph discusses the results of volatile organic compounds detected at the site. The paragraph states that all seven VOCs detected at Site 33 were detected in 33B00301. However, according to Table 5-21 only six of the seven VOCs were detected in this sample; xylenes were not detected in 33B00301. This discrepancy should be addressed.
20. **Page 5-115, Section 5.2.6.2, First Paragraph.** This paragraph discusses inorganic constituents detected in subsurface samples at Site 33. The paragraph specifies that 15 non-nutrient analytes were detected above background. However, only 14 were listed in the paragraph. The report should include copper as an analyte detected above background.
21. **Page 5-116, Figure 5-21.** Figure 5-21 should include the location of the former UST associated with Site 33. Additionally, the figure is labeled as representing "organics" in subsurface soil samples at Site 33. This figure label should be changed to indicate "inorganic".
22. **Page 6-60, Section 6.7, Third Paragraph.** This section indicates that the concentration of TPH in surface soils at Site 30 was (2,660 mg/kg). However, according to Table 5-14, concentrations as high as 9,610 mg/kg were detected. This discrepancy should be resolved, and the risk assessment re-evaluated if necessary.
23. **Page 9-1, Section 9.0.** The conclusions and recommendations should be re-evaluated to include any revisions required based on an evaluation of the potential for soil contamination to migrate to groundwater.

**Review and Comments for the Human Health  
& Ecological Risk Assessment Sections of the Remedial  
Investigation Report, Sites 3, 4, 6, 30, 32, and 33**

**GENERAL COMMENTS**

1. In general, the methods used in estimating the ecological risks from these sites are sufficiently conservative. However, the TRV tables (Tables 7-2 and 7-3) used in the risk assessment have numerous errors. Several of the chemicals have LOAEL derived TRVs that were calculated by multiplying NOAEL values by 10. While deriving NOAEL values from LOAEL values by dividing by ten is often conducted, deriving LOAELs from NOAELs is not an accepted practice. LOAELs that are not reported in Sample et al. (1996) should be reported as "NA" and not derived by multiplying the NOAEL by ten. Furthermore, many of the LOAELs indicated as "NOAEL\*10" are actually reported in Sample et al. (1996) and thus should be referenced accordingly.

The inaccuracies in Tables 7-2 and 7-3 are carried through in calculations for the Food Chain Modeling Hazard Quotients on Tables 7-6, 7-9, 7-12, 7-15, 7-18 and 7-21. These hazard quotients should be recalculated once the TRV values are corrected. Furthermore, a systematic error appears to occurring in the calculation of hazard quotients for the red fox and red-tailed hawk. The calculations for the red fox and red-tailed hawk should be verified.

2. The "Other Risk Characterization" tables (Tables 7-7, 7-10, 7-13, 7-16, 7-19 and 7-22) use the average concentration of each chemical at the sites rather than the highest detection at each site. In order to provide a conservative screening level assessment, either the maximum detected concentration or the 95% upper confidence limit (UCL) should be used, as well as the average.
3. Because the TRV tables, the Hazard Quotient tables and the Other Risk Characterization tables should be revised, a review of the discussion and conclusions was not performed. After revisions have been made to the affected tables the discussion and conclusions should be reviewed.
4. The data for the background samples was not included in the risk assessment. As a result it is unclear whether the selection of the background location(s) was appropriate. The locations and analytical data associated with the background should be presented in the document in summary form. Inclusion of this information in an Appendix would be sufficient.

5. The references used for this document are incomplete. Four citations in the text of Section 7 are not included in the reference section: Burt and Grossenheider 1980, Lancaster 1998, Sample et al. 1996, and Simon 1997. Furthermore, the citations to USEPA documents are not clearly referenced in cases where more than one USEPA document from the same year is used. The references should be corrected.
6. The references do not include the most recent USEPA "Guidelines for Ecological Risk Assessment" released April 1998. This document should be referenced.
7. The analytical protocols and methodology were not provided for any of the analytical parameters. Review of reporting limits in Appendix B and in Appendix C indicate that methodologies were appropriate. However, please provide specific information regarding the analytical protocols and methodology used at these sites.
8. There was no summary of the number or types and frequency of QC samples used during this investigation. Sample identifications were used in reviewing data in Appendix C to determine the number of QC samples utilized at each site. The results are as follows:

Site 3 (38 samples, not including QC) - 5 sets of Duplicates, no MS/MSD  
Site 4 (41 samples, not including QC) - no Duplicates, 2 sets of MS/MSD  
Site 6 (17 samples, not including QC) - 1 set of Duplicates, no MS/MSD  
Site 30 (59 samples, not including QC) - 4 sets of Duplicates, no MS/MSD  
Site 32 (84 samples, not including QC) - 7 sets of Duplicates, no MS/MSD  
Site 33 (48 samples, not including QC) - 4 sets of Duplicates, no MS/MSD

It appears that duplicate samples were collected roughly once per every 10 samples. However, only 2 sets of MS/MSD samples were done for the entire area, according to the sample identifications for each site. If this is true, the lack of MS/MSD data represent a weakness in the data set and should be discussed in the uncertainty sections. To verify the QC performed, please provide a summary table which indicates the number and frequency of QC samples used at each site.

#### **SPECIFIC COMMENTS**

1. **Chapter 4.** A discussion of Data Quality Objectives for Representativeness and Comparability were not included in Chapter 4 of the document. Representativeness is generally measured through the use of field QC, such as rinsate and trip blanks, and laboratory QC samples, such as method and preparation blanks. A Comparability assessment involves the documented use of consist sampling, shipping and analytical protocols. Since these parameters were included for other sites at Whiting Field, it is assumed that these DQO parameters are included in the Work Plan and should be included for this site.

2. **Page 6-15, Section 6.2.2.** This section presents the surface and subsurface soil sampling conducted at Site 4. The intended meaning of the sentence regarding the selection of polycyclic aromatic hydrocarbons (PAHs) as contaminants of potential concern (COPCs) is unclear due to a typographical error. The text states that "according to Section 2.5.5 of the GIR (General Information Report), was selected as a COPC [i.e., benzo(a)pyrene], all carcinogenic PAHs will be retained as COPCs." The text should be corrected to read "according to Section 2.5.5 of the GIR, if one carcinogenic PAH is selected as a COPC [i.e., benzo(a)anthracene], all carcinogenic PAHs will be retained as COPCs." The text should be corrected accordingly.
3. **Page 6-30, Figure 6-1 .** The figure presents the Conceptual Site Model for Sites 3, 4, 6, 30, 32, and 33. The figure lists the trespasser/adult receptor twice as a human receptor and fails to include the trespasser/older child receptor. The figure should be corrected accordingly.
4. **Table 7-2, page 7-12 and 7-13.** Table 7-2 does not appear to be complete or correct. Benzo(b)fluoranthene appears twice in the table. Acenaphthene, benzo(a)pyrene, 2,4-dimethylphenol, fluorene, naphthalene, and manganese are not included in the table but are chemicals detected at one or more sites. These chemicals should be included in Table 7-2.

The TRVs for 2-methylnaphthalene, carbazole, and phenanthrene are referenced to Sample et al. (1996). These values were not found in the referenced document. Butylbenzyl phthalate does not have a reference cited. These TRVs should be verified.

The TRVs reported in Table 7-2 do not correspond to values in Sample et al. (1996) for the following compounds: beryllium, copper, cyanide, selenium, zinc, pentachlorophenol, 4,4'-DDD, 4,4'-DDT and Aroclor-1254/1260. These TRVs should be verified.

5. **Table 7-3, pages 7-14 and 7-15.** Benzo(a)anthracene appears twice in the table. Acenaphthene, 2,4-dimethylphenol, fluorene, naphthalene, and manganese are not included in the table but are chemicals detected at one or more sites. These chemicals should be included in Table 7-3.

The TRVs for pentachlorophenol are attributed to Sample et al. (1996). These values were not found in the referenced document. These TRVs should be verified.

The TRVs reported in Table 7-2 do not correspond to values in Sample et al. (1996) for the following compounds: bis(2-ethylhexyl)phthalate, dieldrin, selenium and vanadium. These TRVs should be verified.

Review of Sample et al. (1996) indicates there are more conservative TRVs for aluminum and 4,4'-DDT than those reported in Table 7-3. The most conservative TRVs should be

used.

6. **Section 7.5.1, page 7-22, paragraph 4.** There appears to be a typographical error in the third sentence: The magnitude of the HQs were also be evaluated. This error should be corrected.
7. **Table 7-6, page 7-27.** This table presents the Food Chain Modeling Hazard Quotients for Site 3. There appears to be an error in the hazard quotients for silver. Table 7-2 (mammals) does not report TRVs for silver, yet hazard quotients have been calculated for the mammals. Furthermore, Table 7-3 (birds) does report TRVs for silver yet hazard quotients are not calculated for the birds on Table 7-6. These inconsistencies should be corrected.
8. **Table 7-11, page 7-36.** This table presents the Selection of Surface Soil Contaminants of Potential Concern for Site 6. There appears to be errors for iron and manganese. Iron is not selected as a chemical of potential concern (COPC) even though its maximum detected concentration is two times the average background. In addition, manganese is selected as a COPC even though its maximum detected concentration is not two times the average background.
9. **Table 7-12, page 7-37.** This table presents the Food Chain Modeling Hazard Quotients for Site 6. There appears to be errors in the hazard quotients for butylbenzyl phthalate and vanadium. Table 7-12 does not report hazard quotients for butylbenzyl phthalate for the mammals even though Table 7-2 reports TRVs for butylbenzyl phthalate. There appears to be a mathematical error in the calculations of the mammalian hazard quotients for vanadium. These calculations should be verified.
10. **Table 7-15, page 7-42.** This table presents the Food Chain Modeling Hazard Quotients for Site 30. There appears to be errors in the hazard quotients for naphthalene, manganese and silver. Tables 7-2 and 7-3 do not report TRVs for naphthalene or manganese, yet hazard quotients have been calculated for these chemicals. Table 7-2 (mammals) does not report TRVs for silver, yet hazard quotients have been calculated for the mammals. Furthermore, Table 7-3 (birds) does report TRVs for silver yet hazard quotients are not calculated for the birds on Table 7-15. These inconsistencies should be corrected.
11. **Table 7-18, page 7-47.** This table presents the Food Chain Modeling Hazard Quotients for Site 32. There appears to be errors in the hazard quotients for acenaphthene, manganese and silver. Tables 7-2 and 7-3 do not report TRVs for acenaphthene, yet hazard quotients have been calculated for this chemical. Table 7-2 (mammals) does not report TRVs for silver, yet hazard quotients have been calculated for the mammals. Furthermore, Table 7-3 (birds) does report TRVs for silver yet hazard quotients are not calculated for the birds on Table 7-18. These inconsistencies should be corrected.

12. **Section 7.6.1, page 7-55.** This section discusses the uncertainty in the preliminary problem formulation. The section states, "Since active operations have not occurred at the site in several years, the potentially impacted areas at each sub-unit are difficult to initially define." This statement is counter to the repeated references to an actively used air field for propeller planes and helicopters in section 7.2. This apparent inconsistency should be corrected or clarified.
13. **Appendix B.** Appendix B presents the results of field QC samples such as trip blanks, field blanks, and rinsate blanks. These results are all reported in ug/kg (solid units), although all of these samples are assumed be DI water. The reporting limits also appear to indicate that a low concentration VOC analysis was performed, however, the methodology has not been provided. In addition, the data indicate that every compound was detected in every sample since none of the values have a U qualifier to indicate that they were not detected. Please provide a reference for the method of analysis, verify the reporting units for these QC samples and clarify the results as detects or nondetects.