

N00213.AR.000178
NAS KEY WEST
5090.3a

EMAIL OF TRANSMITTAL FOR U S EPA REGION IV DRAFT COMMENTS ON HUMAN
HEALTH RISK ASSESSMENT AND RESOURCE CONSERVATION AND RECOVERY ACT
FACILITY INVESTIGATION WITH ATTACHMENT NAS KEY WEST FL
11/26/1996
U S EPA REGION IV

file 07-7
7046-0 0011
IC /

From: J Dudley Patrick

To: BBRM769; BBRI897

Subject: fwd: NAS Key West RFI

Date: Tuesday, November 26, 1996 3:41PM

Chuck/Kevin:

For your info and action.

Dudley

Original Text

From: BERRY.MARTHA@epamail.epa.gov, on 11/26/96 3:35 PM:

To: <casparj@dep.state.fl.us>, <jdpatrick@efdsouth.navfac.navy.mil>

BeyondMail(R). This message is too large to be displayed entirely in the message body. Please see the attachment beyond.txt.

Hi, Dudley and Jorge. The 18th is fine w/ me as a meeting date. I've attached a copy of EPA's draft comments on the RFI and human health BRA - unfortunately our comments on the eco-risk are not ready. Hopefully, we can get these faxed to Dudley the week of 12/2 - Lynn's going to try, but as usual, he's buried. I'll be back in on 12/9 - talk to you then!

Martha

EPA COMMENTS (DRAFT)

DRAFT SUPPLEMENTAL RCRA FACILITY INVESTIGATION AND REMEDIAL INVESTIGATION REPORT FOR NAVAL AIR STATION KEY WEST HIGH PRIORITY SITES BOCA CHICA KEY, FLORIDA

For convenience, this technical review comments report has been organized into three sections. Section 1.0 presents EPA's comments on the Draft Supplemental RFI/RI Report. Sections 2.0 and 3.0 present EPA's comments on the human health BRA and ERA portions of the document. Each section is further divided into subsections presenting general and specific comments, as appropriate. These sections and subsections are presented below.

1.0 DRAFT SUPPLEMENTAL RFI/RI REPORT

GENERAL COMMENTS

1. The Supplemental RFI/RI sampling investigation appears, in general, to have been adequately designed and implemented to achieve the stated goals of the program, which are "to delineate the nature and extent of contamination and to define Boca Chica Key and Key West background levels" (Page 1-1). However, the analysis and presentation of the acquired site and background data does not achieve these goals. Specifically, the report addresses the nature and extent of contamination and the background levels as if they are independent, unrelated issues, and does not integrate the background information into the determination of the nature and extent of contamination. On Page 2-39, Paragraph 1, the text states that "Knowledge of levels of constituents in background areas is necessary in order to evaluate whether contaminants detected at a site have been released from that source or were previously present." It appears from a cursory review of the report presented in Appendix J, that although the current investigation included a great deal of effort towards defining those background conditions, this information has not been used within the Supplemental RFI/RI Report to "evaluate whether contaminants detected at a site have been released from that source or were previously present." The data and maps presented in the nature and extent portions of Section 4 (before the risk assessment portions) do not include any integration of the background information into the interpretation of the extent of site-related contamination. The background information is used within the risk assessment as a screening tool, but by being used along with, or even after, risk and applicable or relevant and appropriate requirement (ARAR)-based screening factors, the report

does not adequately define and map the actual extent of site-related contamination. This treatment of the background results does not allow the reader to determine, first, the distribution of contaminants that are related to site activities, and then, second, the risk presented by that contamination. It is recommended that the background results be compared to the site results earlier in each of the four Section 4 subsections, and that maps be included to only show the extent of contamination in excess of background (two times background or the standard that has been selected).

2. An additional concern related to background conditions is that the Supplemental RFI/RI Report does not include a description of the locations of the background samples relative to the solid waste management units (SWMUs), or the strategy for characterizing background conditions. Although Appendix J shows the background locations, they are not shown with respect to the four SWMUs under investigation, so the reader cannot judge the relationship of the background information to the site information. The maps in Appendix J (Figures 3-1, 3-2, and 3-3) should be revised to show the relationship of the background samples to the SWMUs. In addition, a single map showing the locations, a summary of the numbers of samples from each media, and one paragraph describing the background strategy in the report itself would summarize this information for the reader.

3. An additional background concern is that the results of the background analyses are not summarized in the text of the report or in Appendix J. They are only presented as statistical summaries in Appendix J, and as a statistical average in the report. Because some of the background samples were collected in SWMU-specific locations and some were collected in designated background areas, it would be helpful to present the sample-by-sample background analysis results to compare the SWMU-specific background analyses to the SWMU-site sample results.

4. One of the notes in the Section 4 maps showing the chemical results for soil, surface water, groundwater, and sediment states that "This figure indicates the Chemicals of Interest at this site. Other chemicals in excess of ARARs and Screening Action Levels (SALs) are the following." It is not clear how the Chemicals of Interest have been selected for presentation on these maps. The term "Chemicals of Interest" has not been defined, and does not appear to be related to a comparison to background levels, a comparison to ARARs or SALs, or the later comparison to risk based concentrations (RBCs). It appears that some of the contaminants which exceed ARARs or SALs have been mapped, while others have not, and the reason for mapping some and not others has not been discussed. This matter is complicated by the text of Section 4, which discusses the aerial extent of contamination for both the Chemicals of Interest and the other

contaminants as if they were all mapped. As an example, the text from Page 4-19 states that "Soil in the area of V16 and U19 appears to contain the highest pesticide levels with peak values of 4,4'-DDT (4.7 milligrams per kilogram [mg/kg]) and 4,4'-DDD (1.4 mg/kg) occurring at V16." Figure 4-3 shows that the distribution of 4,4'-DDT has been mapped, while that of 4,4'-DDD has not, even though both exceed background, ARARs or SALs, and RBCs.

It is recommended that a method for identifying Chemicals of Interest be defined (preferably one that integrates background levels, ARARs, and SALs), and that the aerial distribution of all of them be presented on the maps and discussed. If this becomes cumbersome for one map, then it is recommended that separate maps for inorganics and organics be presented. As the maps currently exist, with no comparison to background and no rationale for including or excluding contaminants, the reader does not receive a full picture of the nature and extent of contamination.

5. Because of the similarity of the analysis and presentation for each of the four SWMUs, and the limited time available for review, detailed specific comments on the data analysis and presentation methods have only been provided for SWMU 1. In general, most of these comments (such as concerns with the use of background or the method of presentation) are applicable to the text, tables, and figures for the other three SWMUs as well. In addition, a large number of errors in transcription of sample results and dates between text, figures, and tables were found. Again, the limited time available for review was not sufficient to comprehensively identify these throughout the document. The types of errors that are common are discussed in some of the specific comments, and it is recommended that a detailed quality assurance/quality control review of the document be performed to identify others.

SPECIFIC COMMENTS

The specific comments listed below are organized by section, page, paragraph, table, figure, and appendix numbers, as appropriate.

1. Section 2.1.2, Page 2-4, Table 2-1: The terminology for the soil samples is inconsistent. The header refers to "SS" and "SB" for surface and subsurface soil samples, but no samples are listed as "SB". However, two items refer to "SBS", which is not in the header. The terminology should be made consistent.

2. Section 2.1.2, Page 2-5, Table 2-2: The Sample ID column suggests that a soil sample S1SS-4 was collected and analyzed. However, no results from this sample are listed in Table 4-2, and the location of the sample is not indicated on Figure 4-3. It is not clear if the sample was really analyzed, or if the analysis actually did not detect any of the analytes (this is unlikely, since the analytes included major elements such as calcium and iron). If the sample was analyzed and

did not detect any analytes, then the data point should be presented on the figure to show a negative control point. If the sample was not analyzed, then some form of explanation should be provided in the text.

3. Section 2.4, Page 2-39: It is recommended that, rather than stating (very briefly) what background levels can be used for, this section should describe, in greater detail, exactly how the background levels were used in this Supplemental RFI/RI Report. Alternatively, the reader can be referenced to the more detailed presentation requested under General Comment #3.

4. Section 4.1.2.1.1, Page 4-3, Paragraph 1: The comparable text for the other previous investigations lists their date. To help the reader correlate the sample table and maps (where results are listed by date) to the appropriate investigation, the date of this investigation should be presented in the text.

5. Sections 4.1.2.1.2 and 4.1.2.1.3, Pages 4-3 and 4-4: The comparable text describing the Initial Investigation (Section 4.1.2.1.1) states that four monitoring wells were installed, and even lists their numbers. The groundwater maps (Figures 4-2, 4-7, and 4-8) show that there were also wells installed during the Preliminary RI and RFI/RI described in these sections. For consistency, the number of wells installed during each phase of investigation should be mentioned in the text.

6. Section 4.1.3.1, Page 4-5: The numbers of soil, surface water, sediment, and groundwater samples (and numbers of installed wells) collected and analyzed for the current investigation should be presented in the text in this section, and in comparable sections for the other SWMUs. The text should clearly describe what samples were collected and analyzed in the efforts to determine the nature and extent of contamination, background conditions, and toxicity.

7. Section 4.1.3.1, Page 4-5, Paragraph 3: The text states that "Groundwater sampling was conducted to characterize background (hydraulically upgradient) groundwater quality and areas hydraulically downgradient as necessary . . . A monitoring well hydraulically upgradient from the site was installed to characterize background groundwater quality." As stated in Specific Comment 6, the total number of wells installed in the current investigation should be mentioned in the text.

The final sentence suggests that a well was specifically located upgradient of this SWMU to provide a site-specific background analysis. This is corroborated by the text in Appendix J, Section 4.2.5, which shows that well S1MW-3 was intended to provide a site-specific background for SWMU 1. However, the results from this well (in fact, from all of the background samples) are not presented in the text of the report, in Table 4-5, in Figure 4-9, or in Appendix J. The results are apparently included in the statistical analysis in Table 9-1 of Appendix J, but this treatment of

the background results (presenting only the statistical summary for a group of background locations) does not allow the reader to directly evaluate the adequacy of the background location, or compare its results to the site-specific results. For instance, S1MW-3 is only 75 feet (and only slightly upgradient) from the boundary of the excavated area, and presentation of the results in Table 4-5 and Figure 4-9 would allow the reader to verify that the location is unaffected by site operations. The issue is further complicated because some of the background samples also acted as duplicate sample locations.

8. Section 4.1.4.2, Page 4-7, Paragraph 1: The text states that "Eleven monitoring wells have been installed at SWMU 1. Five wells were installed during the Preliminary RI, two wells during the RFI/RI, and four wells during the Supplemental RFI/RI." However, Figure 4-2 shows the locations of a total of 15 wells. Please clarify.

9. Section 4.1.5.1, Page 4-18, Figure 4-3: The title of this (and all other comparable nature and extent figures) should be revised to state exactly what is being mapped. The current title ("Surface Soil Chemical Concentrations SWMU 1") is not accurate, since this map does not include all chemical concentration results. It appears to show the results for the "Chemicals of Interest" (which have not been defined, see General Comments), and as such should have been titled "Surface Soil Concentrations of Chemicals of Interest", with an appropriate definition (or reference to a definition) of the term "Chemicals of Interest". As stated in the General Comments, the map should actually include concentrations for all chemicals which exceed both ARARs (or SALs) and background concentrations.

The map does not include the locations of samples S1SS-4 or U25, nor are results from these samples presented in Table 4-2. For S1SS-4, this is apparently because this sample is considered to be a background sample. The reason for not including results from U25 is not clear. Even though the results from S1SS-4 are properly included in the statistical analysis in Appendix J, they should also be included separately on this map, so that the reader can compare the site-specific background results to the site results. This comment also applies to all other background samples which are located within map limits, but not shown, throughout Section 4.

The "1996" date for the results from sample H25 on this map is incorrect. This was a 1995 sample.

10. Section 4.1.5.1.2, Page 4-19, Paragraph 1: The text states that "The highest degree of contamination was found in the most northeastern sample, S1SS-5/S1DPSS-1, in 1996. This sample contained all 11 semivolatile organic compounds (SVOCs) at the following levels:", and

then lists only 10 SVOCs. The 11th SVOC (benzo(k)fluoranthene) was not found in sample S1SS-5. The text should be revised.

11. Section 4.1.5.2.2, Page 4-21, Paragraph 1: The text states, ". . .the extent of SVOC contamination in the interior portions of the site, as indicated in sediment analyses, was generally less than that seen in soil in the outlying regions." The first is that the terms "interior portions" and "outlying regions" are not defined until Page 4-28, and are not clear to the reader who has not been onsite. Therefore, the text should discuss these issues with more reference to actual locations shown on the map.

12. Section 4.1.5.3, Page 4-31, Figure 4-5: The figure containing 1995 analytical results with a connecting line to location S1SW-01 is in error. The line should connect the results to location S1SS-6SW.

The locations of samples S1SW-01, S1SW-02, and S1SW-03 should not be on this figure, since these samples were not analyzed for chemical parameters.

13. Section 4.1.5.3.5, Page 4-32, Paragraph 1: The text states, "Consistent with soil and sediment analyses, S1SS-6SW contained the largest number of inorganics . . .". The statement is incorrect for two reasons. The first is that Figure 4-3 shows no soil samples anywhere near S1SS-6SW, so these sample results cannot be called "consistent" with any soil sample results. The second problem is that, although there is a corresponding sediment sample (S1SS-6SD) that contained inorganics, it contained different inorganics than were found in the surface water sample. The sediment contained arsenic and lead, while the surface water sample contained beryllium, copper, manganese, vanadium, and mercury. By using the terms "consistent with soil and sediment analyses", the text is implying a common source, which doesn't appear to be supported by the actual data.

15. Section 4.1.5.4, Pages 4-37 through 4-40, Figures 4-6 through 4-9: Although presenting four separate maps to show analytical results at four separate times is very useful, all of the wells should not be shown on every map. By including an apparent datapoint which was not actually sampled, the map appears to show a negative data point that does not actually exist. Figure 4-6 should include only the KWM wells. Similarly, Figures 4-7 and 4-8 should be revised to show only the wells sampled at those times, and Figure 4-9 to show only wells S1MW-4, S1MW-5, and S1MW-6. In addition, well S1MW-3, which was sampled in 1996, should be presented on Figure 4-9, along with its analytical results.

16. Section 4.1.5.5, Page 4-43, Paragraph 1: The text states that "Pesticide contamination probably resulted from mosquito control activities." A review of the background levels of

pesticides in soils from Table 4-9 shows that pesticides were routinely detected in background samples, with up to 50% of the background samples detecting 4,4'-DDT. This would appear to support the statement by showing that pesticides are widespread in background and onsite locations. However, this table also shows that the concentrations of pesticides in the SWMU 1 soil samples greatly exceeded the concentrations detected in the background locations. Therefore, the comparison of background and onsite concentrations may imply disposal or burning of pesticides at SWMU 1.

17. Section 4.1.6.1, Page 4-44, Paragraph 1: The text states, "Inorganics were detected in sediment, groundwater, surface soil, and surface water samples above background levels." The statement is, in general, true, but a comparison of site to background values in the tables in Section 4.1.7 shows that there are many inorganics for which the site maximum value does not exceed two times the average background (the standard used in those tables to compare site values to background). These include calcium, selenium, and sodium (for soil), aluminum, barium, calcium, iron, magnesium, and manganese (for sediment), and arsenic, barium, potassium, thallium, and vanadium (for surface water). Figure 4-5 shows vanadium to be a detected Chemical of Interest in surface water, when, in fact, it does not exceed the background comparison standard applied later in Section 4. It is recommended that the site data be compared to the background data so that the extent of actual site-related contaminants can be determined.

18. Section 4.1.6.1, Pages 4-44 and 4-45: This entire discussion is based on the potential for transport of contaminants by dissolution from soils and sediments into groundwater and surface water. The potential for mechanical transportation, such as erosion of contaminated soils into surface water bodies, should also be addressed here and in the comparable sections for the other SWMUs.

19. Section 4.2.5.1, Pages 4-119 through 4-121, Table 4-36: The sampling date listed for most of these pesticide analyses is 4/96. These samples are not referenced in the discussion of previous and current investigations on Pages 4-111 and 4-112. It is not clear if these are the 1995 Bechtel Environmental, Inc. (BEI) delineation samples on a 25-by-25 foot grid (in which case the date on the tables is incorrect), or if they are the "additional data obtained from the confirmational sampling conducted by BEI after the interim remedial action" referenced in Section 4.2.2.2. If these are the "confirmational" samples, then an additional subsection (4.2.2.1.5) should be added to discuss this sampling, which was not part of the Supplemental RFI/RI.

20. Section 4.2.5.1, Page 4-123, Figure 4-14: It was very difficult to correlate the results presented on this map with the results from Table 4-36, until it was realized that the 1996 data points are averages of the multiple analyses per location discussed above. At a minimum, the

map should clearly state that some of the reported results are average values. However, it is preferable that the maximum detected values be presented. This same comment applies to the average values presented on Figure 4-19 for sediment, and to the average values presented for well MW5-1 on Figure 4-22.

21. Section 4.2.5.1, Page 4-124, Figure 4-15: Because the Bechtel 1996 samples were analyzed for only pesticides, the data points should not be included on this map of inorganic concentrations.
22. Section 4.2.5.4, Pages 4-139 through 4-145, Table 4-39 and Figure 4-23: Results from well S2MW-4 should have been included in this table and map. The results from this well (which is apparently considered to be a background location) are only included within the summary statistics in Appendix J, so are not available for review. The proximity of this well to the excavated area (about 60 feet) and the reported groundwater level (actually below S2MW-5, which is in the contaminated area) do not prove the sufficiency of this well as a background location, so the inclusion of the analytical data (even if as a negative control point) would provide a better picture of the nature and extent of contamination.
23. Section 4.2.5.4, Page 4-144, Figure 4-22: The source of the result for 1,2-dichloroethene in MW5-1 is not clear. This is not a direct or average result from Table 4-39. This value should be reviewed and corrected.
24. Sections 4.3.2.1.1 and 4.3.2.1.2, Page 4-209: The dates of the Initial and Preliminary Remedial Investigations should be listed in the text.
25. Section 4.3.2.2, Page 4-211, Paragraph 1: The text states, "Additional data were obtained from the confirmational sampling." Almost all of the data presented in Table 4-66 and Figure 4-28 is from this round of confirmational sampling. Because these data are so heavily used, a description of the sampling round compared to the other sampling rounds should be provided in a separate subsection 4.3.2.1.5.
26. Section 4.3.5.1, Pages 4-215 through 4-218, Table 4-66 and Figure 4-28: The dates of most of the samples are inconsistent between the map and the table. The table lists the sampling dates as 1996, and the map as 1995. Since the text does not define the date of the "additional confirmational sampling", it is not clear to the reader which is correct. Either the text or the table should be revised appropriately.
27. Section 4.3.5.3, Page 4-229, Figure 4-30: The date for sample S3SS-1 is incorrect, and should be changed to 1993. The antimony value for sample S3SS-3 is an average. The figure

should either designate that some results are averages, or only maximum results should be presented.

28. Section 4.3.5.4.5, Page 4-238, Paragraph 1: The text states, "Although metals were detected in excess of ARAR/SAL criteria in several wells during previous investigations, they were detected at lower concentrations during the Supplemental RFI/RI. No metals or other inorganics were detected in groundwater underlying the site above their respective ARARs/SALs during the Supplemental RFI/RI." As shown in Table 2-2 and Table 4-70, the Supplemental RFI/RI investigation did not include analyses for metals in groundwater at SWMU 3. Therefore, these statements are incorrect, and should be deleted.

29. Section 4.4.5.1, Pages 4-292 through 4-294, Table 4-90: The listing of results for sample S9SS-3 is confusing, since it is presented twice, but out of sequence. In comparable tables, the duplicate sample is either listed in sequence (such as Table 4-93), or the duplicate number is used. Since one of these analyses is apparently duplicate sample S9DPSS-1, this sample number should be used in the table rather than S9SS-3 twice. The result for this location on Figure 4-38 is an average of the two samples, so the figure should either indicate where results are averages, or should include only maximum values.

2.0 HUMAN HEALTH BASELINE RISK ASSESSMENT

GENERAL COMMENTS

1. Brown & Root Environmental conducted a preliminary risk evaluation (PRE) to determine if each of the four SWMUs required a human health BRA.

Risk ratios were calculated in the PRE by dividing the maximum detected concentration of a chemical by its corresponding Region 3 RBC. If the risk ratios resulted in risks that exceeded those appropriate for the future use scenario for a particular site, then Brown & Root Environmental performed a quantitative human health BRA. However, if the PRE showed that chemical concentrations were present at de minimus levels, then no human health BRA was necessary.

RBCs were also used in the data evaluation phase of the BRA to help select chemicals of potential concern (COPCs). In this case, a chemical was selected as a COPC if its maximum detected concentration exceeded its corresponding RBC value. In accordance with EPA guidance (1995a), the RBC value was decreased by a factor of ten for noncarcinogenic compounds. However, the RBC values for noncarcinogenic compounds were not adjusted in the

PRE; therefore, the PRE screening process was less conservative than the COPC selection process in the BRA.

If the RBCs were adjusted in the PRE, the hazard sum for each scenario would be ten times greater. If a scenario had a hazard sum that was approaching 1, the noncarcinogenic threshold for conducting a human health BRA, this adjustment could make a difference in whether a particular site was further evaluated. Although making this adjustment for the noncarcinogenic RBCs would not have changed any of the overall conclusions of the PREs performed for these sites, the comment was worth noting and should be considered for future risk assessments.

2. A PRE was conducted for soil, sediment, and surface water samples collected at each SWMU. Appendix G, Section 3.2.1, presents the methodology and equations that were used to conduct the PRE. The risk ratios that were derived for soil and sediment appear to be correct; however, the reviewer could not duplicate any of the carcinogenic risk ratios for surface water.

Although the appendix lists only one equation for calculating a carcinogenic risk ratio for all media, it appears that a different equation was used for surface water. Appendix G, Section 3.2.1, should be checked to ensure that it contains the correct equation for calculating carcinogenic risk ratios for compounds detected in surface water.

3. The BRA for each SWMU contains tables presenting the distribution and selection of COPCs in each environmental medium. The sixth column in these tables lists the average concentration (both detected and nondetected) of each chemical. However, EPA guidance (1995a) states that the average detected concentration should be listed in the table. Therefore, the values listed in the tables should be recalculated to include only detected concentrations and the column should be titled "average detected concentration."

4. The COPC selection tables in the BRA contain a column titled "representative concentration," which lists the concentration of each COPC that will be used in the quantitative BRA. However, neither the tables nor the text discuss how the representative concentration was derived. The text should list the equation (or equations) that was (or were) used to derive the representative concentration and should provide either a brief description of the process or, at a minimum, refer the reader to an appendix in which this information can be found.

5. In approving the original ABB workplan, EPA approved the use of RBC values for tap water when selecting COPCs in the human health BRA. In fact, EPA guidance (1995a) states that the maximum detected concentrations in surface water should be compared to the Water Quality Standard (WQS) for human health (consumption of water and organisms).

6. Cumulative risk tables are presented in the risk characterization sections of the report. These tables present the total cancer risk and hazard index (HI) for each exposure route and the cumulative risk across all exposure pathways.

In order to verify the values listed in the cumulative risk tables, the chemical-specific cancer risks and hazard quotients (HQs) must be evaluated. The chemical-specific cancer risks and HQs, listed in Part 6 of Appendix A, are sorted by medium and presented in tabular form. Each table contains the following information: the applicable COPCs, exposure routes, receptors, and chemical-specific cancer risks and HQs for a given medium. The medium, exposure route, risk type, and receptor are listed in coded form at the top of each column. For example, a column titled "SSINCACA" represents ingestion of surface soil by a child/adult resident. As a result of the coding system, it is difficult to review these tables without regularly referring to a separate table that contains the key explaining the codes. Also, it is virtually impossible to assess whether the chemical-specific cancer risks and HQs are correct without the tables containing additional pertinent information that was used to derive the numbers (i.e., representative concentrations, intake values, toxicity values).

According to EPA guidance (1995a), the risk characterization section should bring the toxicity data and exposure data together in an expression of quantitative risk estimates for all receptors considered in the BRA. Appropriate tabulations of this information are extremely important for clear communication to the reader. At a minimum, the following information should be provided in the body of the report: (1) a series of tables presenting chemical-specific, pathway, and cumulative cancer risk and hazard index values for all COPCs arranged by receptor and land use; (2) a series of tables that for chemicals of concern (COCs) gives carcinogenic slope factors, reference doses, representative concentrations, and calculated risk and HI values as indicated above; and (3) a single table that summarizes the individual pathway risks arranged by media and receptors.

7. The cancer risks and HIs presented in the report are expressed as three significant figures. According to EPA guidance (1995a), all HQs, HIs, and cancer risks should be expressed as one significant figure. Therefore, the risk and hazard values presented in the PREs, human health BRAs, and Appendix A should be expressed as one significant figure.

8. The report combines the HIs for a child and adult resident to obtain a total HI for a resident. However, unlike carcinogenic effects, it is believed that a range of exposures can be tolerated by a receptor with essentially no chance of expression of adverse effects. Since there is a threshold below which no adverse effects occur, noncarcinogenic effects only occur during the actual period

of exposure and are not converted to an equivalent lifetime exposure. Consequently, the HIs for a child resident and adult resident should be evaluated separately.

9. The Integrated Exposure Uptake Biokinetic (IEUBK) model was used to characterize risks to hypothetical future child residents from exposure to lead in soil, dust, and water. The model inputs assumed were default parameter values and the representative concentration for soil and groundwater. The representative concentration is either the maximum detected concentration or the 95 percent upper confidence limit on the arithmetic mean. It should be noted that the average concentration in soil and groundwater should be included in the model. Since the representative concentration is greater than the average concentration, the results obtained from the model overestimate the risks to children. The model should be rerun using average concentrations of lead in soil and groundwater to obtain a more realistic estimate of risk from exposure to lead.

10. The BRA presents reasonable maximum exposure scenarios for the three SWMUs. According to EPA guidance (1995a), quantitative risk values must also be developed for central tendency exposure assumptions with the resulting central tendency risk values presented and discussed in an uncertainty subsection of the risk characterization section. The central tendency analysis provides perspective for the risk manager and complies with EPA guidance.

SPECIFIC COMMENTS

1. Page 4-154, Table 4-9: This table presents the occurrence, distribution, and selection of organic COPCs in surface soil at SWMU 1. Chrysene should be listed as an SVOC, not a volatile organic compound (VOC).

2. Page 4-63, Section 4.1.7.5.1, Paragraph 1, Sentences 8 and 9: These sentences state, "Benzo(a)pyrene is a major contributor to the risk in surface soil and sediment; however, polynuclear aromatic hydrocarbons (PAHs) detected in SWMU 1 are associated with levels that may be attributable to sources other than site contamination. For example, PAHs detected in soil samples may be associated with runoff from asphalt parking lots or roads." However, since historical use of SWMU 1 included disposal and burning of waste oil and other organic material, past site activities are likely to be a source of PAHs. Since Section 4.1.7.5.1 characterizes the risk from exposure to environmental media at the site, the eighth and ninth sentences should be removed from the first paragraph. If there is indeed evidence that PAHs may be coming from another source, it should be discussed in the uncertainty section.

3. Page 4-71, Section 4.1.7.7.1, and Appendix A, Part 6: Section 4.1.7.7.1 lists the COCs for surface soil, sediment, and surface water. Based on the chemical-specific cancer risks and HIs presented in Appendix A, Part 6, it appears that the following COPCs should be listed as COCs in

surface soil: antimony, cadmium, and copper. Please reevaluate whether these metals should be listed as COCs.

4. Page 4-161, Section 4.2.7.2.1, Paragraph 1, Sentence 2: This sentence states, "Beryllium levels slightly exceeded background concentrations (by comparison of the average background to the average at the site) and the RBC screening value." However, according to EPA guidance (1995a), the maximum detected onsite concentration of inorganic constituents, not the average onsite concentration, should be compared to two times the average background concentration. The maximum detected concentration of beryllium in surface soil is 0.23 mg/kg and the average background concentration is 0.054 mg/kg. Since the maximum detected concentration is more than four times the average background concentration, it is incorrect to state that beryllium levels slightly exceed background concentrations. This sentence and the following sentence should be removed from the text.

5. Page 4-174, Section 4.2.7.7.2, Sentence 3: This sentence refers the reader to Table 4-55, which allegedly presents remedial goal options (RGOs) that were developed according to site-specific BRA assumptions. No such table is present in the BRA. However, as discussed in Section 4.2.7.7.1, it was not necessary to develop RGOs based on site-specific BRA assumptions since none of the scenarios exceeded a level of concern. Therefore, this sentence should be removed from the text.

6. Page G-72, Appendix G, Table G.3-3: This table presents the EPA weight-of-evidence categories for carcinogenic effects. However, the title of the table reads "Toxicity Equivalency Factors for Carcinogenic PAHs." The title should be changed since the table does not contain any information relating to carcinogenic PAHs.

7. Page G-75, Appendix G, Section 3.2.4.2, Bullet 4: A more detailed explanation should be provided concerning the use of 30 days as the exposure period for the future excavation worker scenario.

8. Page G-82, Appendix G, Table G.3-6: This table presents input parameters and the corresponding sources for current adolescent and adult trespassers. A few of the input parameter sources noted on the table are incorrect. The exposure durations for adolescent and adult trespassers and the body weight of the adolescent trespasser are not contained in the document cited. Therefore, either different input parameters should be selected or a different reference should be listed in the table.

9. Page G-83, Appendix G, Table G.3-7: This table presents the input parameters and the corresponding sources for site maintenance workers. A couple of the input parameter sources

noted on the table are incorrect. Although they are reasonable values to select, the soil ingestion rate (IR) and EF values listed on the table are not contained in the cited document. Therefore, a new source for these values should be cited in the table.

10. Page G-86, Appendix G, Table G.3-9: This table presents the input parameters for a site excavation worker. The IR is listed as 118 milligrams per day (mg/day), which is the same IR that is used for a maintenance worker. According to EPA guidance (1991c), a soil IR of 480 mg/day may be used for certain outdoor activities, such as construction or landscaping. Since construction or excavation activities are likely to involve a much higher contact rate with soil than maintenance activities, the IR for this scenario should be increased to 480 mg/day.

11. Page G-90, Appendix G, Section 3.2.4.5.4, and Page A-56, Appendix A: The equation for dermal contact with surface water on Page G-90 appears to be incorrect. The "PC" (permeability constant) value should represent a chemical-specific dermal PC with units of centimeters per hour (cm/hr). However, the "PC" value is listed in the equation as the diffusion depth per event with units of centimeters per event. Also, the equation is missing a value for exposure time, the units for which should be hours per event. However, the equation and input parameters are correctly listed on the example calculation provided on Page A-56 in Appendix A. Therefore, the equation listed on Page G-90 for calculating dermal contact with surface water should be replaced with the equation listed on Page A-56, and all calculations should be verified to ensure that the proper equation was used.

12. Page G-91, Appendix G, Table G.3-12: This table lists input parameters for a future resident's exposure to surface water. The event frequency (EV) values appear to be incorrect. The EV values listed for a child and adult are 0.25 and 0.33 minutes per hour, respectively. The units for these values should be events per day, and the values should be whole numbers. Also, the units for the PC value should be cm/hr.

13. Page G-92, Appendix G, Table G.3-13: This table lists input parameters for a trespasser's exposure to surface water. The units for the PC value should be cm/hr.