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MCRD PARRIS ISLAND
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U S NAVY RESPONSES TO U S EPA REGION IV COMMENTS ON REMEDIAL INVESTIGATION/RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION FOR SITE 1 AND SITE 41 MCRD PARRIS ISLAND SC

6/1/2001

NAVAL FACILITIES ENGINEERING COMMAND SOUTHERN DIVISION

USEPA Comments on RI/RFI Report (Rev. 1)

Site 1/SWMU 1 Incinerator Landfill and SWMU 41 Former Incinerator

U.S. Marine Corps Recruit Depot, South Carolina

EPA ID# SC6170022762

General Comments:

1. **Comment:** The description of site history and site conditions is unclear on several key issues, such as: were wastes landfilled or buried in pits at the site, how were wastes disposed after the incinerator closed, and how much, if any, fill/cover overlies waste at the site.

   Response: The site history section (Page 1-3) identifies Site 1 "as the disposal site for combustion residues from the incinerator" until 1959. After 1959, wastes continued to be disposed at the site until 1965. The details on how the waste was placed is uncertain.

   There are no reports that fill/cover was placed over the waste. Also, since aged ash in many cases resembles soil, a clear distinction between ash and soil could not be made reliably in the field. Notes collected during the field program are presented in Appendix A and indicate that at some locations, waste was encountered at a depth of one foot, implying that a cover may be present at the site.

2. **Comment:** The composition and appropriateness of the background data set is unclear. The use of the picnic area samples and the use of data, which includes several organic compounds (indicating at least some disturbance), are not clearly explained. Further, the use of background values, however derived, as a primary data screen, rather than as a comparative value, will require additional justification as well as supplemental discussion of any results exceeding RBC's, regardless of background.

   Response: The background locations were selected by the partnering team in the work plan stage and are discussed on Page 4-2 of the report. Additional details on the background data are presented in Appendix A of the report. As discussed during the September 2000 partnering team and used in the report, these results are only being used to identify background concentrations for inorganics. It is recognized that most organic compounds represent contamination, however, some of these organics may be present because of anthropogenic sources. The two samples collected at the picnic area were collected to help identify non site related anthropogenic levels of select organic compounds. To clarify this point, the last sentence of the first full paragraph on page 4-2 will be deleted.

The human health risk assessment and ecological risk assessment use the background data set in accordance with appropriate guidance.

3. **Comment:** The data collected during the RI did not include sufficient characterization of waste materials or subsurface soils at the site to define the nature of the waste, the vertical extent of the waste, subsurface soil exposure risk, or future pathway risks.

   Response: The data was collected to support a presumptive remedy of landfill capping in place. The design of remedial options and selection of a remedy will need to address these uncertainties.

4. **Comment:** Field documentation processes need improvement. Sample data sheets tend to provide incomplete or sketchy information, and custody on many of the samples collected is suspect.

   Response: The field data or this site was collected at the same time as that for the Site 2 and Site 3 RI's. The EPA commented on specific instances in the Site 2 report and detailed responses were prepared. The same responses to the Site 2 RI comments and responses were incorporated into the Site 1 RI.

5. **Comment:** Please add a list of appendices to the table of contents.

   Response: Agreed.

6. **Comment:** Section 7.1 to Section 7.3.1 represent a screening-level ecological risk assessment following current EPA guidance. However, Section 7.3.2 through 7.5, if included at all, should be added to the Section 7.6 (Step 3a - Refinement of COPCs).

   Response: The ecological risk assessment text was organized following standard procedures for ecological risk assessments at MCRD Parris Island. The reviewer's comment reflects recently amended guidance from U.S. EPA Region IV regarding the implementation of EPA's (1997) *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments*. Under the amended guidance (EPA, 2000), most topics currently presented in Sections 7.3.2 through 7.5 (e.g., food chain modeling methodology) would be presented in Step 3 of the risk assessment process. However, the ecological risk assessment for Site 1 and SWMU 41 was conducted prior to dissemination of EPA's amended guidance. According to Lynn Wellman (2000) of U.S. EPA Region IV, reorganization of risk assessments

already in process will not be required. The Navy will organize future ecological risk assessments as requested and this change will be discussed in the RI report.

7. **Comment:** There is a general flaw in the logic presented in Section 7.4.2. A food chain model is selected as the method to evaluate all COPCs with screening HQs of 1 or more. However, since food chain models are used primarily to evaluate contaminants that bioaccumulate (and/or biomagnify), the risk posed by contaminants that act primarily as direct toxins may be overlooked or underestimated. It is recommended that the ecological risk assessment subgroup (with the assistance of the trustees) review the screening level risk assessment and present a more appropriate way to evaluate risk from all contaminants.

   Response: Food chain modeling was conducted for contaminants (excluding VOCs) whose concentrations exceeded ecological screening values. Until recently amended guidance from U.S. EPA Region IV was disseminated (see response to general comment # 6), this has been a standard procedure for ecological risk assessments in EPA Region IV and at MCRD Parris Island. The Navy concurs that unnecessary evaluation should be prevented to the maximum extent possible, and food chain modeling in future ecological risk assessments will follow EPA's (2000) guidance.

   Nevertheless, the food chain HQs were not the sole criteria for evaluating COPCs. Instead, as explained in Section 7.6 (pages 7-22 and 7-23), several factors were considered in a weight of evidence approach to assess potential risks posed by COPCs. These factors included habitat quality, toxicological evaluation of COPCs, frequency of detection, background concentrations, and comparisons of COPC concentrations to alternate guidelines.

8. **Comment:** Toxicity profiles should be added for all COPCs to assist in determining appropriate assessment endpoints to evaluate for the risk assessment. This information should be added to the Sections discussing Step 3 of EPAs ecological risk assessment process.

   Response: The Navy believes that the assessment endpoints are appropriate as presented. As mentioned at the end of Section 7.2.4, toxicological profiles for COPCs are presented in Appendix F.

Specific Comments:

1. **Comment: Page ES-2, 2nd paragraph, 2nd sentence.** Please clarify whether the waste disposed between 1959 and 1965 was landfilled, disposed by open burning, or both.

Response: The records are not clear on this practice.

2. **Comment: Page ES-2, 2nd paragraph, 4th sentence.** Consider revising this statement to clarify that a thin cover soil appears to have been placed over wastes at the site.

Response: Agreed. The statement will be revised to read, "A thin cover soil appears to have been placed over the fill material...".

3. **Comment: Pages ES-2 and ES-3**. The depth of the surface soil samples at each location relative to cover soil thickness is critical to evaluating the significance of the analytical results. The data can be used to evaluate current exposure risk, but may not be suitable to characterize the waste material. Please elaborate on the significance of the surface soil data.

Response: As discussed under the general comment responses, the site was investigated with an assumption that a presumptive remedy would be selected. Therefore, waste characterization was not a goal, and the surface soil data was collected primarily to evaluate whether a significant current risk is present.

4. **Comment: Page ES-3.** Please clarify the use of surface soil data collected from the adjacent picnic area for background comparison. Note that the suitability of this location for background data may be questionable, as waste disposal operations do not appear to have been well documented or well controlled.

Response: The data collected from the picnic area were not considered for use as background data. Background data was collected from remote locations that are unlikely to have been associated with waste disposal practices. Rather, the picnic sample locations were selected to generate data for evaluation of pesticide and PAH results that may be present due to historic control of insects and road use. Both of these scenarios represent anthropogenic sources that are not related to either waste disposal or hazardous waste disposal. There is no evidence of waste disposal in the areas evaluated. The collection of these samples were discussed with the partnering team and presented in the work plan addendum for this site.

5. **Comment: Page ES-3, last paragraph.** Given the local topography, it would be expected that only the upper portion of the shallow aquifer would discharge subaerially to nearby creeks and tidal channels. For this reason, surface water data may not reflect contaminant loading in groundwater. Please clarify that all shallow groundwater may not discharge in the immediate area.

Response: This statement can neither be confirmed or refuted with the data available.

6. Comment: Page 1-3, section 1.4.2, 5th paragraph, 2nd sentence. Clarify how the un-incinerated wastes were disposed.

Response: The records are not clear on this practice.

7. **Comment: Page 2-1, 1st paragraph.** The discussion of environmental setting should also include site-specific information, such as stratigraphy, depth to water, and habitats.

Response: The following statements will be added to this section.

Section 2.2: "The elevation at Site 1 ranges from sea level to approximately 12 feet above mean sea level.

Section 2.3: " Surface water at Site 1 drains into Archers Creek. "

Section 2.5: "The geology of this site is detailed in Section 3.3."

Section 2.6: "The hydrogeology of this site is detailed in Section 3.4."

Section 2.7: "A discussion of the site specific ecology is provided in Section 7.2.

8. **Comment: Page 2-2, section 2.6, 2nd paragraph, 5th sentence.** Please clarify whether, and to what extent, water table fluctuations are tidally influenced.

Response: The following will be added to this section: "Water table elevations were measured to fluctuate by up to 1.75 feet during a tidal study conducted at Site 1. "

9. **Comment: Page 3-3, 1st paragraph, last sentence, and Appendix A-4.** Please elaborate on the well development criteria and method used to measure water volume removed.

Response: The following text will be added to this section.

Development of the groundwater monitoring wells was performed using a surge block and electric pump with discharge tubing. The surge block was used to sweep the screen interval (and filter

pack) several times throughout the development process. The well water was pumped into 55-gallon drums and labeled as IDW. Water was collected for monitoring in a stainless steel beaker and a Horiba U-10 was used to measure field parameters consisting of temperature, specific conductance, pH, salinity, dissolved oxygen, and turbidity. At least three times the calculated well volume of water was removed during development. If potable water was used to fill the augers during drilling to prevent sand from flowing into the augers or to remove a sand bridge during installation of the sand pack, the amount of water used (measured in five-gallon buckets) was noted in the field book and five times the water added was removed prior to removing the minimum of three well volumes. Readings were collected until the field parameters, with the exception of dissolved oxygen, stabilized and the required removal volume of water for each well was removed. A target turbidity of 10 NTUs was used in an attempt to reduce the turbidity as much as possible during the development phase. Time pumped, volume of water pumped, and the turbidity of the water were used to determine whether to suspend development once stabilization had been achieved.

10. **Comment:** Page 3-3, section 3.2.3, 1st paragraph, 1st sentence. Since the wells were located around the perimeter of the site, is it correct to assume that no subsurface data from the waste disposal area is available.

Response: That is correct, the wells were installed and samples were collected in accordance with procedures for evaluating a presumptive remedy. Therefore, direct characterization of the waste material was not an objective. However, contaminant leachability and migration characteristics of the waste can be evaluated based on the groundwater results.

11. **Comment: Page 3-4, section 3.2.4, 2nd paragraph, last sentence.** The excess turbidity in two surface water samples (Table 3-5) was attributed to sampling difficulties. However, the data from these locations was not qualified, and includes the maximum detected concentrations of 15 of nineteen detected inorganics. Please explain.

Response: The human health and ecological risks assessments generally factor in uncertainties in the data especially for a transient media such as surface water. Since surface water was not identified as a primary risk driver, there was no need to qualify the data.

12. **Comment: Page 3-4, section 3.2.4, 3rd paragraph.** This paragraph states that, AAll surface water samples were taken during the receding tide@. RAGS section 4.5.4 states, ATo obtain a representative sample, sampling should be conducted through a tidal cycle by taking three sets of samples on a given day: (1) at low tide; (2) at high tide; and (3) at "half tide." Each layer of salinity

should be sampled" (U.S. EPA, 1989). A justification for the deviation from procedure should be provided. This paragraph also states that,@ The samples were obtained by dipping the appropriate containers in the surface water.@ The type of sampling container should be specified and the sample volume, head space, sample depth, and location that the sample was taken in the body of water (i.e., mid-stream or edge) should be specified, or reference should be made to the section of the work plan that contains this information. Table 3-4 lists the sample as Asurface@; however, the table and text in Section 3.2.4 should specify the depth in centimeters (cm).

Response: The following text will be added to Section 3.2.4.

"As presented in Section 7.2.1 of the work plan, surface water samples were collected during a receding tide to conservatively bias sample results to evaluate potential contaminant migration from the site. Normally, surface water samples can also be collected at mid tide and low tide to eliminate some of the bias. However, based on the site conditions, surface water at the site is normally only 4 to 12 inches high at high tide, and at mid tide and low tide, standing water is not present within several hundred feet of the site and therefore samples could not be collected under these conditions.

Based on the shallow depth of surface water at the site, stratification of surface water was not observed and therefore individual samples collected. "

Relevant information on the type of sample containers used are presented on the sample log sheets and chain of custody forms.

13. **Comment: Page 3-4, section 3.2.5, 2nd paragraph, 3rd sentence and last sentence.** No notations on the test holes were included with the log sheets for the June 98 sampling event. Also, there was no indication of the impacted area or limits of waste was indicated on Figure 3-3. Please explain.

Response: Test holes were not conducted during the June 1998 sampling event, only during the April 1999 sampling event were test holes dug.

The reference to Figure 3-3 will be deleted from this paragraph. A figure showing the extent of visible waste will be provided in the Feasibility Study.

14. **Comment: Page 3-5, section 3.2.5, 2nd paragraph, 3rd sentence.** The text indicates three sediment samples were analyzed for grain-size and bulk density, but Table 3-6 shows four

samples (PAI-01-SD-01-01 included). Additionally, Appendix A-5 shows four samples for geotechnical analysis, but one is not included in the text or table (01SD00201) and 01-SD-03-01-D is omitted, please clarify.

Response: The text and Table 3-6 will be revised to reflect that four samples from three locations were tested for particle size analysis.

15 **Comment: Page 3-5, sections 3.2.5 and 3.2.6, 2nd and 4th paragraphs**. Sediments and surface soils were not analyzed for redox potential. As redox state can greatly affect availability of contaminants bound to sediment and soil particles, it should be a part of the analytical procedures (EPA, 1989 sec. 9.2.1).

Response: Redox potential for solid matrices are difficult to measure reliably and obtain useful results. Therefore, redox potential measurements were not specified in the work plan for soils and sediments. Please note that the redox potential was measured for the surface water and groundwater samples.

16. **Comment: Figures 3-1, 3-2, 3-3, 4-1, 4-2, and 4-3.** These figures do not have an entry in the key for the fence line. While the fence line is drawn on the map there is no key entry for it and one should be included (EPA, 1989 sec. 2.4.1, 9.1).

Response: The figure does not reference a fence at the site. A two or three strand wire fence is located along the southern tree line of the site.

17. **Comment: Sections 3.2.4, 3.2.5, 3.2.6, and Figures 3-2 and 3-3.** It should be noted in the text that background and picnic area sampling locations are not shown on the referenced figures. An overall map showing the three sampling areas and how they relate to one another should be included.

Response: A reference to Appendix A-12 for background locations will be added to the text in these sections. A figure in Appendix A-12 shows the location of all the background sample locations. The locations for the picnic area sample would not fit on Figures 3-2 and 3-3. However, a new figure will be developed that shows the location of these samples. This figure will be added to Appendix A-12.

18. **Comment: Page 3-5, section 3.2.6, 1st paragraph.** It appears surface soil samples were collected primarily along the margins of the site. Please further justify the rationale for this

sampling approach. Additionally, please specify whether the sampling interval at each sampling location was in cover material, waste material, or both. Based on the boring logs, only three samples encountered waste material, and this was at the base of the sampling interval. Please clarify what these samples represent.

Response: The following will be added to the last paragraph of the section. "In accordance with the U.S. EPA's Presumptive Remedy for CERCLA Municipal Landfill Sites (U.S. EPA 1993), these surface soil sample locations were biased toward potential contaminant migration pathways, with the understanding that a presumptive remedy would be used at this site to contain waste materials. The samples were collected to determine whether current site conditions represent a potential threat to human health or the environment, through direct contact or erosion pathways."

19 **Comment: Page 3-5, section 3.2.6, 3rd paragraph; Table 3-1, Page 3-18.** All surface soil samples were taken around the perimeter of the site and none were taken in the interior portion of the site. As explained in Section 2.3.2 of the Soil Screening Guidance: Users Guide (U.S.EPA, 1996), ideally the site should be divided into exposure areas (EA) and composite samples should be taken from each EA. The lack of samples from the middle of the site may underestimate the contamination of the site. If feasible, samples should be collected from the middle of the site to adequately characterize contamination, if any, in this area (i.e., Ahot spots@ or other contaminated areas may exist in the middle of the site). At a minimum, justification should be provided for sampling only around the perimeter of the site.

Response: The response to comment 18 will be added to the report.

20. **Comment: Page 3-6, section 3.2.7, 2nd paragraph, last sentence.** Monitoring well locations are shown on Figure 3-1 not Figure 3-2.

Response: The text will be changed as indicated.

21. **Comment: Page 3-27, Table 3-9.** Please footnote that these are the last measurements taken prior to sampling.

Response: Agreed. The following footnote will be added to the table.

"Results presented represent the last reading prior to sample collection. "

22. **Comment: Page 3-12, section 3.2.13, 1st paragraph, 4th sentence.** Laboratory analytical data sheets (form 1's) should be included within all decision documents, such as RI Reports, in addition to summary tables.

    Response: Electronic copies of the form 1's have been supplied to the EPA.

23. **Comment: Page 3-13, section 3.3, 1st paragraph, 3rd sentence.** Please clarify where the soil survey data is correlated to site specific lithologies. If the soil types at Site 1 were mapped, please provide a figure.

    Response: Since none of the material at Site 1 is native, a site specific soil survey was not conducted.

24. **Comment: Page 3-13, section 3.3, 3rd paragraph, 3rd sentence.** As previously noted, only 3 of 19 surface soil sample log sheets note observation of trash or debris (near the base of the sample interval). The prevalence of waste material in the surface interval of the site has not been demonstrated. Please elaborate on the waste materials noted during field reconnaissance and sampling to more fully describe site conditions.

    Response: In general, the investigation is based on an assumption that waste materials are present throughout the site. However, except for select areas where metal and glass fragments are present, the presence of waste material is not obvious throughout most of the Site. The waste materials may be covered with soil, or they may be present on the surface, but cannot be distinguished from soil.

25. **Comment: Page 3-14, section 3.3, 1st paragraph, last sentence.** Notations in the boring logs indicate the presence of plastic, wood, glass, and rock fragments/debris in the upper 6 feet of some borings (also a creosote odor was noted in SB-03). Are these materials interpreted as washout, or are these borings/wells within the limits of waste at this site.

    Response: Although the original intent was to select well locations outside of the waste area, the soft sediments in the marsh made this impractical. Therefore, some of the wells are located in possible areas of waste materials.

26. **Comment: Page 3-14, section 3.3, 1st paragraph, 3rd sentence.** If the statement "material was buried in pits" is based on interview or operational records, please cite the reference. Also, if this

is suspected to be the primary method of disposal at the site, should additional investigation (e.g., geophysics) be conducted to delimit the pits/waste areas.

Response: Although it is likely that materials may have been buried in pits, the practice is not substantiated by reports and will therefore be deleted from the report. Since the whole site is a landfill and will be addressed through the presumptive remedy, delineation of pits (if present) is not necessary.

27. **Comment: Page 3-14, section 3.3, 2nd paragraph.** The absence of subsurface data from the central portion of the site is a significant impairment to assessing the vertical limits of waste, the physical and chemical properties of the waste, and the stratigraphy and hydrogeology beneath the waste. Since this site encompasses a significant stratigraphic facie transition, stratigraphic projection from existing borings/wells may be of limited utility at this site.

Response: The vertical limit of waste will be based on historic photographs of the site coupled with boring data as needed during remediation in accordance with a presumptive remedy approach.

28. **Comment: Page 3-14, section 3.4, 2nd paragraph, 3rd sentence.** Identification of the Hawthorne Formation beneath the waste material, nor the presence of "phosphates" at the top of the Hawthorne Formation can be validated from the boring logs presented in Appendix A-2. Please clarify.

Response: The first sentence of paragraph 3 on p. 3-14 will be revised to read "The sand is underlain by a gray-green silty to clayey, fine sand which locally is believed to be the top of the Hawthorn Formation."

The Hawthorn is not thought to be very thick at this site. At Site 12 located nearby on Jericho Island, the Hawthorn was not encountered prior to reaching the confined aquifer. Archer Creek is thought to have eroded away a portion of the Hawthorn at this site, therefore explaining the lack of phosphates in the subsurface material. The Hawthorn (NEESA 1986) thought to be 20 to 30 feet thick, averaged approximately 6.5 feet thick at this site.

29. **Comment: Page 4-1, section 4.0, 3rd paragraph, 8th sentence.** Should this be rephrased to state that figures show results exceeding background or RBC's. Also, please tabulate and present the screening values used (background and RBC's) by media and source for each analyte (including Total PAHs).

Response: The description is accurate as presented. Since Section 4.0 relates to contamination, and therefore detections at concentrations less than background are not presented in these figures. As requested and was conducted for Site 2, relevant screening and background values will be added to the figures. The use of Total PAH screening values is being evaluated.

30. **Comment: Page 4-2, section 4.0, 2nd paragraph.** Please elaborate on how background samples with positive detections for organic compounds are qualified (i.e., are they rejected due to the presence of anthropogenic compounds). Also, why were "background values" for organic compounds presented in Table 4-1? Were these used as a screening criteria? Finally, please specify how the two picnic area "background" sample results were aggregated with the project data (i.e., included with the background data set or used separately for comparison of pesticide levels).

Response: Table 4-1 presents a summary of all detected analytes in the background data set. The organic results are presented for information only and were not used to screen data. However, during the detailed risk assessments, some of the organic detections in background data set were used qualitatively. The organics may be present in the background results because of anthropogenic, laboratory/sampling contamination, and/or natural sources.

The picnic area samples are not "background" and were never intended to represent background concentrations. Rather, they were collected to support an anthropogenic evaluation of "typical" pesticide use at the site. The picnic area was selected, because it is adjacent to a marsh and represents a likely area where pesticides would have been routinely used for insect control in the past. In addition, it is remote enough from the site, that disposal of solid wastes at the site would not impact these areas. As indicated in a previous response, a new figure will be prepared to show the location of these samples.

31. **Comment: Page 4-12, Table 4-2.** Please elaborate on and provide an explanation for the "Range of Non-detects" shown as NA.

Response: NA in this column will be modified with a footnote to indicate that: "A range non detect values was not determined for chemicals in which the chemical was detected in all samples tested."

32. **Comment: Page 4-6, section 4.1.3, 1st paragraph, 2nd sentence.** Should this be rephrased to state that figures show results exceeding background or RBC's.

Response: The description is accurate as presented. Since Section 4.0 relates to contamination, and therefore detections at concentrations less than background are not presented in these figures.

33. **Comment: Page 4-7, section 4.1.3, 2nd paragraph, 4th sentence.** Cobalt, Lead, and Nickel should be included in the series of inorganics detected above background levels.

Response: Agreed, since these chemicals were not detected in the background data set, any detection would exceed background.

34. **Comment: Page 4-7, section 4.1.3, 4th paragraph.** Please clarify whether the maximum levels in water samples refer to filtered, unfiltered, or both. Also, filtered samples should be presented for comparison purposes only.

Response: The sentence references both, although unfiltered results generally exceeded filtered results. The unfiltered results are generally used for human health evaluations, whereas the filtered results are used for ecological evaluations.

35. **Comment: Page 4-7, section 4.1.4, 1st paragraph, 2nd sentence.** Please clarify/rephrase this statement, it appears a line is missing.

Response: The sentence is complete, but will be reworded as follows.

"Detected chemicals that exceed background and human health or ecological screening values are presented on Figure 4-4. Human health screening values assume that sediment is the same as surface soils and consist of U.S. EPA Region 3 human health RBCs (1 x 10 -6 ILCR - Residential, HQ equal to 1). Ecological screening values are the EPA Region 4 sediment ecological screening values."

36. **Comment: Table 4-5, Figure 4-4, and Appendix C-2.** The maximum lead concentration tabulated and shown on the figure is 194 mg/kg at SD-009, but the appended summary analytical results show lead values of 201 mg/kg at SD-03 and 563 mg/kg at SD-A-01, please explain.

Response: The referenced lead result of 201 mg/kg in SD-03 is a field duplicate result. The original sample result is 138 mg/kg. For the summary statistic table, the average of the original

and duplicate result was used. This average is less than the maximum value of 194 mg/kg presented.

The following text will be added to the fourth paragraph of Section 4.0.

> "Figures display the average analytical result for those locations where a normal and duplicate sample was collected. Statistics provided in the tables of this section utilize these average values."

Sample SD-A-01 is a QA/QC sample and will be deleted from the appendix result sheet. It was not used in the summary statistics presented.

37. **Comment:** **Page 4-9, section 4.2.** Since the location of the former incinerator is not well established and the potential COC's and media for SWMU 41 are identical to those for Site 1, it is unclear why these four surface soil samples are not aggregated with the Site 1 data and evaluated together. Are separate actions anticipated for these sites? If not, consider combining these data for ease of evaluation.

Response: The reason for collecting samples at SWMU 41 was to determine whether the SMWU characteristics were different than that for Site 1. Based on a comparison of the chemical results, it was concluded that there is no significant difference between the two sites. For the human health and ecological risk assessments, the data was combined prior to calculating site risks.

38. **Comment:** **Page 4-9, section 4.2.1, 1st paragraph, 2nd sentence.** Should this be rephrased to state that figures show results exceeding background or RBC's.

Response: The description is accurate as presented. Section 4.0 relates to contamination, and therefore detections at concentrations less than background are not presented in these figures.

39. **Comment:** **Page 4-9, section 4.2.1, 3rd paragraph.** Clarify which four sample locations are attributed to SWMU 41. Based on Figure 4-1, samples SS-001, SS-002, SS-004, and SS-007 are the closest spatially, but SS-003 is referred to in the text.

Response: Samples with a PAI-41 are associated with two possible SMWU 41 locations. Samples with a PAI-01 are associated with Site 1 locations. The samples collected close to the

concrete pad were collected for different reasons. Regardless, the samples were collected to support a presumptive remedy.

40. **Comment: Section 4.0.** The nature (source) and extent (vertical) of potential contamination has not been fully delimited. The data presented in this RI provides an assessment of current exposure only. Future exposure cannot be reliably determined from the data presented. Additionally, without characterizing the nature and extent of waste material, a decision as to the most appropriate remedy (removal, capping, NFA) cannot be made.

Response: The field data was collected with an assumption of implementing the presumptive remedy. To further clarify this position, the following statement will be added to the executive summary under investigative summary and Section 3.2.

"This investigation was conducted to support a presumptive remedy for Site 1 that includes covering/capping of landfill contents, evaluation of contaminant migration into the surrounding environmental, and potential environmental impacts associated with this migration."

In addition, a reference to the presumptive remedy will be added to the conclusion and recommendation section for capping/covering options for this landfill.

41. **Comment: Page 5-1, section 5.1, 1st paragraph, 4th sentence.** The reference cited for determining BCF's for inorganic constituents is not the most current or complete source for these constituents.

Response: Table 5-2 will be revised to include the BCFs used in the ecological risk assessment presented in Section 7.0, which were obtained from U.S. EPA, 1997 *304(a) Toxic Substances Spreadsheet*, Region 4 Water Quality Standards Section, Atlanta, Georgia.

42. **Comment:** Pages 5-5 through 5-7, section 5.3. This section provides a generic description of migration processes for classes of site related chemicals. No site specific information or modeling was presented. The geotechnical data collected (i.e., TOC, grain-size, moisture content, density, etc.) could be used to define pathway-specific migration rates. Since source characterization data is limited, exposure point concentrations through time cannot be reliably developed. However, based on migration rates, inferences as to whether current conditions are likely to be reflective of future conditions can be made. Please provide site specific migration rates for Sites 1 and 41 COPC's, and discuss estimated future exposure concentrations.

Response: This section is intended to present only general chemical migration properties that can be used in the human health and ecological risk assessment models and calculations as needed. Detailed modeling as requested is generally inaccurate for all chemicals except VOCs and then only in well defined geological settings.

Based on the time period since the unit was last in operation, (approximately 35 years), and the continual infiltration, flushing, and biodegradation of contaminants since that time, it is very likely that the results observed in the site groundwater represent maximum conditions, however, modeling cannot be used to support this position.

43 **Comment: Page 6-11, section 6.2.3.5, 1st paragraph**. Ingestion of fish was rejected as a route of exposure due to the fact that the immediate area adjacent to the site was dry part of the time due to tides; therefore, fish would originate from outside the area. Although fish move with the tide so does the potentially contaminated water and sediment thus extending the exposure period. The Exposure Factors Handbook (U.S. EPA, 1997) states that, APollutants are carried in the surface waters, but also may be stored and accumulated in the sediments as a result of complex physical and chemical processes@. Due to the shifting aerobic/anaerobic cycle contaminants may be released from the sediments and into in-flowing waters and provide exposure to fish. Although finfish may only be in the area for a portion of the day, shellfish, which are a food source for finfish, may inhabit the area constantly. Therefore, contaminants may pass up the food chain, potentially to human receptors. Fish may also bioaccumulate contaminants in the sediment and water and present consumers with an elevated level of contamination. Tidal influence of the area immediately adjacent to the site is not sufficient justification for eliminating this exposure route. However, if there is reason to believe that fish from this area are not consumed, or other justification for elimination of this route can be documented, then fish consumption should be eliminated on that basis.

Response: The investigation was conducted to specifically evaluate the potential for migration of significant contamination from the site. Initially, the samples were collected as near the site as possible to maximize the potential contaminant concentrations. In general, the most significant chemical concentrations were measured near the site and most of the detected chemical concentrations decreased to below screening levels/background away from the site within the tidal zone.

Based on the physical characteristics of the site, fish cannot live continuously within several hundred feet of the site. Archers Creek in the northwest corner of the map and another a narrow

branch of a tidal stream branch located north of the site are the nearest surface water bodies during low tide.

We recognize the potential concern with this pathway and will add this scenario to the human health risk assessment. However, based on the relatively low chemical concentrations detected in surface water, the evaluation will compare the surface water data to ambient water quality criteria for fish consumption only and factor in site averages and home range considerations. If necessary, a conservative fish consumption model will be generated.

44. **Comment:** **Page 6-14, section 6.2.5, 3rd paragraph** discusses the use of a Toxicity Equivalence Factor (TEF) for carcinogenic PAH=s as adopted by U.S. EPA Region 4, but does not present the equation for arriving at the TEF used in the risk characterization. The equation should be presented in the text or in the appendix.

Response: A sample calculation will be included Appendix E.

45. **Comment:** **Page 6-16, sections 6.2.6.1 and 6.2.6.2, 1st paragraph.** The exposure frequency for soil (EF_{soil}) is assumed to be 125 days per year for both ingestion and dermal exposure to soil. U.S. EPA (1991) set the default value to worker as 250 days per year. A more in depth explanation should be given for the deviation from default values.

Response: EPA does not have a recommended default exposure frequency for construction workers. The default exposure frequency of 250 days/year is for commercial and industrial workers who work 5 days a week for 25 years. The EPA 1991 guidance does not list a default exposure frequency for construction workers, although Appendix B of the guidance states that for construction activities where an ingestion rate of 480 mg/day is used the exposure frequency would be generally less than one year. EPA's Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure (EPA, 1993) recommends that a site-specific value be used for the exposure frequency for contact intensive scenarios.

46. **Comment:** **Table 6-10, Table 4.1(Appendix).** EF_{soil} is listed as 250 days/year on these tables; however, it is listed as 125 days/year in the text and in computations. The EF_{soil} should be consistent in the text, tables, and computations.

Response: The exposure frequency for the construction worker will be changed to 125 days/year in Table 6-10.

47. **Comment:** **Page 7-5, section 7.2.3, paragraph 1.** The text should be clarified so that it is clear that aquatic vegetation is included in Aquatic and semi-aquatic organisms. During the site visit, large areas around the edge of the marsh (where glass debris was visible) were sparsely vegetated indicating a potentially impacted vegetated community.

Response: The text will be revised as requested.

48. **Comment:** **Page 7-5, section 7.2.3, paragraph 2**. Direct contact should be included as a potential exposure route for terrestrial invertebrates and other burrowing species.

Response: The text will be revised as requested.

49. **Comment:** **Page 7-6, section 7.2.5.** Assessment and measurement endpoints should be selected only after the list of COCs have been agreed upon. Their selection is driven by the contaminants and exposure pathways present at a site. Until contaminants and pathways have been agreed upon by all parties, it is difficult to accurately select assessment and measurement endpoints. It is recommended that the selection of assessment endpoints be conducted by the ecological subgroup once problem formulation has been completed.

Response: Preliminary results of the screening ecological risk assessment for Site 1/SWMU 41 (including assessment and measurement endpoints and contaminants of potential concern [COPCs]) were presented to the Partnering Team on October 21, 1998. After additional samples had been collected and analyzed, further presentation and discussion of the in-process ecological risk assessment occurred at the Partnering Team meeting of October 5, 1999. These presentations and discussions were undertaken to gain concurrence by the Partnering Team regarding COPCs, exposure pathways, and endpoints. However, as suggested by the reviewer (agreement on COPCs and pathways, and selection of assessment endpoints by the ecological subgroup) can be re-evaluated a third time. Please note that the partnering team will be selecting the COPCs, and measurement/assessment endpoints based on the recommendation of the ecological subgroup.

50. **Comment:** **Page 7-7, section 7.3.1, paragraph 4**. The reference for the first sentence is a human health dermal risk assessment reference and should be corrected in the text. All screening values should be selected from EPA Region 4's ecological bulletins (EPA 1995, as updated on their webpage.)

Response: The reference for the ecological screening values is in error; the text will be revised as requested.

51. **Comment: Page 7-8, section 7.3.1, paragraph 1**. During the screening the most conservative screening value should be used. Since evidence exists that it may be unlikely that hexavalent chromium is present, this could be presented in the COPC refinement in Step 3.

Response: The text will be revised as requested.

52. **Comment: Page 7-8, section 7.3.2, paragraph 3**. Toxicity reference values should be reported using primary references together with a summary of test conditions that identify its applicability to the risk assessment process.

Response: Tables 7-1 and 7-2 will be revised to provide the requested information.

53. **Comment: Page 7-9, section 7.3.3, paragraph 1**. When food chain models are used to refine COPCs, it is imperative that only conservative assumptions are made. Therefore, the life history information to be included in the food chain models should be the lowest reported body weight, then highest reported ingestion rate, and the smallest reported home range.

Response: The Navy concurs with EPA guidance (EPA, 1997) that calls for the use of estimates of body weight and food ingestion rates to maximize the conservative nature of screening level risk assessments. In general, maximum food ingestion rates and minimum body weights were used to calculate daily doses. However, EPA's (1993) Wildlife Exposure Factors Handbook provides food ingestion rates as grams ingested per gram of body weight. In nearly all cases there are more body weight data than ingestion rate data, and often there are only one or two values for an ingestion rate. Arbitrary use of a maximum ingestion rate or a minimum body weight can result in doses that are less conservative than using averages. This result comes from using the minimum body weight to calculate ingestion. Therefore, professional interpretation of the data is sometimes required to select the most appropriate value. The wording in Section 7.3.3 did not clearly state this and will be revised.

Furthermore, the reviewer's comment addresses the use of food chain models to refine COPCs in Step 3 of the 8-step ecological risk assessment process. Section 3.2 of EPA (1997) states that Step 3 includes an assessment of doses and resulting hazard quotients that are calculated using more realistic assumptions. Therefore, it could be argued that doses initially calculated in Step 3 should not necessarily utilize the most conservative assumptions available. However, the Navy

concurs that the initial calculation of doses (via food chain modeling) and resulting hazard quotients should use conservative assumptions to the maximum practicable extent, whether the initial risk calculation is accomplished in Step 2 or Step 3. The requested approach will be incorporated in future risk assessments. (Note: A similar EPA comment and Navy response were previously made regarding the ecological risk assessment conducted for the Site 2/15 RI/RFI. The ecological risk assessment for Site 1 and SWMU 41 was drafted after the Site 2/15 comment was received. The requested approach was incorporated into the ecological risk assessment for Site 12/SWMU 10 (Jericho Island Disposal Area) and will be used in all future ecological risk assessments at MCRD Parris Island).

54. **Comment:** **Page 7-13, section 7.4.1, paragraph 3**. While the 0- to 1-foot surface soil rule generally is accepted for human health risk assessment this does not necessarily hold true for all sites in ecological risk assessments. This assumption could underestimate risk if the maximum concentrations are located below 1 foot deep, but have complete exposure pathways via burrowing animals. The text should indicate which depths reported the heaviest contamination and the rationale for not including deeper (possibly more contaminated) locations in the risk assessment.

Response: Tree roots extend deeper than one foot below the surface, and mammals such as moles, foxes, and skunks could burrow deeper than one foot. Other deep-burrowing terrestrial animals (e.g., armadillos, gopher tortoises, woodchucks) do not inhabit Site 1/SWMU 41. With the exception of moles, foxes, and skunks, most terrestrial animal species at the site would rarely (if ever) be exposed to soils deeper than one foot below the surface. Section 7.9 (Uncertainty Analysis) will be revised to address the uncertainties associated with not including sub-surface soil data in the ecological risk assessment. In addition, under the presumptive remedy, generally, two or more feet of cover material would be placed over wastes.

55. **Comment:** **Page 7-13, section 7.4.2, paragraph 4**. Since one of the assessment endpoints identified in Section 7.2.5 are benthic invertebrate communities and terrestrial and aquatic vegetation, it is not clear why these endpoints were not included in the evaluation. It is recommended that the ecological subgroup identify methods to evaluate risk to all agreed upon endpoints.

Response: The paragraph in question describes contaminant doses in the food chain model. Therefore, vegetation and benthic invertebrates were not discussed in that paragraph because potential risks to vegetation and benthic invertebrates are not investigated by a food chain model. As explained in the response to general comment # 7 and in Section 7.6 (pages 7-22 and 7-23) of

the RI/RFI, several factors were considered in a weight of evidence approach to assess potential risks posed by COPCs. These factors included habitat quality, toxicological evaluation of COPCs, frequency of detection, background concentrations, and comparisons of COPC concentrations to alternate guidelines.

56. **Comment:** **Page 7-14, section 7.4.2.1, paragraph 3**. It should be assumed that each predators diet is made up solely of the most contaminated food item. This helps to ensure that risks from exposure through the food web are not under estimated.

Response: A similar EPA comment was previously made regarding the ecological risk assessment conducted for the Site 2/15 RI/RFI. The Navy's response to that comment is repeated below:

"The current ecological risk assessment estimated the ingested doses to the hawk and fox by assuming that prey items consisted of equal amounts of shrews and mice. Although the incorporation of the requested revision would not significantly affect the results of the risk assessment, the Navy concurs that the requested approach would better maintain the conservative nature of the risk assessment. Thus, future ecological risk assessments will incorporate the requested approach."

The ecological risk assessment for Site 1 and SWMU 41 was drafted after the Site 2/15 comment was received. The requested approach was incorporated into the ecological risk assessment for Site 12/SWMU 10 (Jericho Island Disposal Area) and will be used in all future ecological risk assessments at MCRD Parris Island.

57. **Comment:** **Page 7-15, section 7.4.2.1, paragraph 2**. Reference EPA 1997d is not included in the reference list.

Response: The reference section will be revised to include the reference in question: U.S. Environmental Protection Agency, 1997, The Incidence and Severity of Sediment Contamination in Surface Waters of the United States, Volume 1: National Sediment Quality Survey, Office of Science and Technology, Washington, D.C. EPA 823-R-07-006.

58. **Comment:** **Section 7.8**. It is recommended that this section be rewritten once the ecological subgroup completes its evaluation of this site.

Response: Section 7.8 was written in accordance with the guidance that was in effective at the time. Ultimately, the ecological subgroup prescription for PRG development and ecological risk assessment will be considered as we move forward. In the absence of specific comments, this section will remain as written.

59. **Comment: Section 8.0, subsection 1.0 and subsection 9.0, 2nd paragraph, 2nd bullet.** The statements that observed pesticide concentrations may be site related (i.e., from routine applications) needs to be further substantiated.

Response: The statement was presented to indicate that the pesticide detected in the area may - not be related to waste disposal practices. Spraying at MCRD Parris Island for control of insects has been a long standing practice and continues to this day. The text will be revised as follows. "Because of the base-wide application, pesticides may not be site related.

60. **Comment: Section 8.0, subsection 10.0.** The soil, in particularly soil waste, data is probably not sufficient to proceed to an FS/CMS. Under a presumptive remedy scenario of capping, decisions can be made regarding current exposure risks from surface soils only. However, the necessity for and long-term effectiveness of the selected remedy cannot be fully assessed.

Response: The Navy disagrees. There is sufficient information to document the need for the presumptive remedy at this site. Wastes were known to have been disposed at the site and can be observed at several locations. In addition, at locations where waste is exposed, elevated chemical concentrations represent a potential threat to the environment under both existing and potential future scenarios.

To help clarify the recommendation, the reference to the presumptive remedy will be added to the statement. Long term effectiveness issues can be addressed by proper design of the remedy.

61 **Comment: Section 8.** The baseline human health risk assessment did not contain a remedial goal options (RGOs) section as recommended by EPA Region 4 guidance (EPA, 1995). EPA Region 4 recommends that a range of RGOs be presented for the risk managers use as the last component of the risk assessment. RGOs should be calculated for each chemical of concern (COC) in each land use scenario that either exceeds a 1×10^{-4} cumulative cancer risk or exceeds a total noncarcinogenic hazard index of 1.

Response: The RGO section will be added to Section 6.0 as requested.

62. **Comment: Page 8-2, section 8.60, 6th paragraph.** The ICR and HI are not stated separately for adults and children who may potentially inhabit the site in the future. The estimated HI and the ICR across all media should be stated separately for adults (HI=1.22, ICR=2.8×10^{-4}) and children (HI=10.7, ICR=1.4×10^{-4}).

Response: Agreed. The text will be revised as requested.

63. **Comment: Appendix A-2.** Boring logs were only included for six of the ten borings installed in the copy of the report provided. Please verify that all of the boring logs are included in later revisions.

Response: All boring logs are presented in the Appendix. Six shallow monitoring wells were installed at the same location as an intermediate depth monitoring well. As a result, a separate boring log was not generated.

64. **Comment: Appendix A-3.** Construction logs were presented for eleven wells in the copy of the report provided. Please clarify which, if any, of these is the existing well.

Response: PAI-MW4(s) was a monitoring well installed prior to the current sample event and is only presented so that all of the well construction details for the site can be found in one location. The construction date for this well is located on the sheet as 2-23-88.

65. **Comment: Appendix A-5.** Please clarify the method used to calculate porosity from the geotechnical data collected. Also, the text should refer the reader to the analytical data for the total organic carbon results.

Response: There is no method number associated with porosity. The geotechnical laboratory calculated porosity by the following equation (Al-Khafaji and Andersland, 1992):

$$1 - \gamma_m/[\gamma_w + G_s(1+w)]$$

Where:

γ_m = Bulk unit weight of soil (calculated by ASTM method D2937)

γ_w = Bulk unit weight of water

G_s = Specific gravity of soil (calculated by ASTM method D854)

w = water content of soil (calculated by ASTM method D2216)

ASTM methods for bulk unit weight, specific gravity, and water content of soil will be added to the report.

A reference to TOC data is presented in Section 3.2.3.

66. **Comment:** **Appendix A-6.** On numerous sample log sheets the analyses requested have been scratched out or overwritten with marker. Log entry errors should be crossed-out with a single line, and initialed and dated.

Response: The referenced cross-outs with a marking pen were not log entry errors, but were markups of a standardized form which listed all possible analytes. Analytes that were not to be tested for (as per the work plan) were crossed out. This action aided the field personnel in filling the correct number of sample bottles. This action is similar to a check mark or circle of information. Underlying information is readable on the original forms.

67. **Comment:** **Appendix A-8.** On numerous sample log sheets the analyses requested have been scratched out or overwritten with marker. Log entry errors should be crossed-out with a single line, and initialed and dated.

Response: The referenced cross-outs with a marking pen were not log entry errors, but were markups of a standardized form which listed all possible analytes. Analytes that were not to be tested for (as per the work plan) were crossed out. This action aided the field personnel in filling the correct number of sample bottles. This action is similar to a check mark or circle of information. Underlying information is readable on the original forms.

68. **Comment:** **Appendix A-10.** On numerous sample log sheets the analyses requested have been scratched out or overwritten with marker. Log entry errors should be crossed-out with a single line, and initialed and dated.

Response: The referenced cross-outs with a marking pen were not log entry errors, but were markups of a standardized form which listed all possible analytes. Analytes that were not to be tested for (as per the work plan) were crossed out. This action aided the field personnel in filling the correct number of sample bottles. This action is similar to a check mark or circle of information. Underlying information is readable on the original forms.

69. **Comment:** **Appendix A-13.** Chain-of-custody forms have numerous quality assurance/quality control discrepancies, such as: the absence of received by signatures when custody was released by the samplers (presumably to an overnight shipper); incomplete data fields (such as station no.);

incomplete line-outs (corrections not initialed, blank rows left open); and, incomplete entries for trip blanks. Chain-of-custody forms should be reviewed for completeness in the future.

Response: The samples were released to Fed Ex. Fed ex records are available. Station numbers are not relevant to the current program and the station location is used as a complete description of the sample.

Regarding the cross outs, most of the cross outs on the chain of custody forms were initialed. For the few remaining cross outs and the unchecked blank columns, proper cross out procedures will be discussed with the field samplers.

70. **Comment: Appendix G.** The Introduction to this Appendix indicates that one "sediment/ash" sample, one sediment sample, and one groundwater sample were collected. The documentation of field sampling suggests that a third sediment sample was also collected at station SD-16. Please explain. Also, it is difficult to assess the representativeness of the samples collected as the locations are fairly distal from the main waste area, the samples were surface only (current exposure), and of the three station descriptions only one mentions the word ash. Since the existing data indicate that there are dioxins associated with this site (positive detections), additional justification of the appropriateness and representativeness of the data should be made.

Response: The text will be revised to indicate that 2 sediment samples were collected at the site and one sediment sample was collected at a background location (SD-16). The locations were selected during a partnering team meeting and one of the samples was collected of exposed waste, within the main waste area. As discussed during partnering team meetings, the Navy does not necessarily consider a positive detection to be an association.

As discussed in Appendix G, TCDD would not be expected to be present at the Site because of site related activities. Rather its presence is probable because of regional anthropogenic sources. However, as requested in a partnering team meeting, a limited number of samples were tested. These samples were biased toward areas of probable contamination (e.g. waste and nearby sediments). As discussed in the Appendix, these results confirm that the presence of TCDD is not related to waste disposal practices.

Typographical Errors:

1. **Comment: ES-4, 2nd paragraph, 1st sentence.** Add "aquifer" or "hydrogeologic unit" between "surficial" and "is".

Response: Agreed.

2. **Comment: Page 3-2, 2nd paragraph, 3rd sentence.** Change “slug test” to “slug testing”.

Response: Agreed.

References:

U.S. EPA, 1989, Risk Assessment Guidance for Superfund: Volume 1- Human Health Evaluation Manual, (RAGS), Interim Final, EPA/540/1-89/002.

U.S. EPA, 1991, Risk Assessment Guidance for Superfund: Volume 1- Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors, Interim Final, OSWER Directive No. 9285.6-03, March 25, 1991.

U.S. EPA 1995. Supplemental Guidance to RAGS: Region 4 Bulletins. Ecological Risk Assessment. Draft. (As updated on EPA Webpage as of 5/00).

U.S. EPA, 1996, Soil Screening Guidance: User=s Guide Second Edition. OSWER Publication 9355.4-23.

U.S. EPA, 1997a, EXPOSURE FACTORS HANDBOOK: Update to Exposure Factors Handbook EPA/600/8-89/043 - May 1989.

U.S. EPA 1997b, Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments. Interim Final. June 5.

EPA (U.S. Environmental Protection Agency). 2000. Amended Guidance on Ecological Risk Assessment at Military Bases: Process Considerations, Timing of Activities, and Inclusion of Stakeholders. Memorandum from Ted. W. Simon, Region 4 EPA Office of Technical Services, Atlanta, Georgia, June 23.

EPA (U.S. Environmental Protection Agency). 1997. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, June 5, Edison, New Jersey.

EPA. 1993. Wildlife Exposure Factors Handbook: Volumes I and II. EPA/600/R-93/187. U.S. EPA Office of Research and Development, Washington, D.C.

Wellman, L. (U.S. Environmental Protection Agency, Waste Management Division, Atlanta, Georgia). 2000. Personal Communication with M.L. Whitten, April 13 (Tetra Tech NUS, Inc., Aiken, South Carolina).