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MCRD PARRIS ISLAND
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U S NAVY RESPONSES TO U S EPA REGION IV COMMENTS ON TECHNICAL
MEMORANDUM FOR SITE 3 CAUSEWAY LANDFILL MCRD PARRIS ISLAND SC
7/1/2008
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST

EPA GENERAL COMMENTS

1. **Comment: Adequacy of the Data.** EPA was requested to review whether or not sufficient data exists to make informed decisions regarding remedy selection. Based on a technical review of the Technical Memorandum (TM), at this time it appears that there is adequate data to arrive at an informed decision regarding remedy selection, except for the need to gather site-specific information from fisherpersons at Site 3 to determine what site-specific parameters to use in fish consumption calculations for off-base residents.

Furthermore, if it is determined, based on calculated fish tissue concentrations, that fish consumption restrictions are necessary in order to be protective, it may be necessary to take fish tissue samples to calculate exact restriction levels. It is EPA's position, and EPA's understanding of the agreed to pathforward for Site 3, that this may be done at some time after the Risk Assessment, preferably during the Proposed Plan (PP) and/or Record of Decision (ROD) process, but at least should be done in support of the Land Use Control Remedial Design (LUC RD) which establishes the specific requirements of LUC implementation. Additional guidance will be provided and a plan for gathering this data will need to be negotiated and approved if the decision is made that fish tissue samples are to be taken.

EPA recognizes SCDHEC has a different position as represented in their comments. The team can attempt to resolve this disagreement if the Risk Assessment Tech Memo revised calculated fish tissue numbers still indicate the need for fish consumption restrictions after SCDHEC and EPA's comments are addressed and incorporated. Otherwise, EPA understands that if calculated fish tissue concentrations result in no LUCs being required for fish consumption, the CERCLA process can move forward without fish tissue samples, and the Agencies' differences can be considered a mute point without the need for resolution.

Response: Based on discussions with U.S. EPA and SCDHEC, fish tissue samples will be collected from the 3rd Battalion Pond and from General's Landing Creek (reference location) to evaluate risks associated with consuming fish from the 3rd Battalion Pond. The results of the HHRA to be conducted in the Final Technical Memorandum using this data and the data from previously collected sediment samples will be used to evaluate the need for Land Use Controls.

2. **Comment: Use Of Post-IROD Data.** A question has been raised as to whether or not both 2001 and 2003 data should be used for Area 4. Previously EPA has instructed the Navy to use both. In the HHRA you could possibly have sufficient data for a 95% UCL without the 2001 data since the data is combined for a site-wide assessment. Alternatively, in the SLERA assessments were made by Area largely, resulting in a much smaller data set upon which a 95% UCL would be calculated. Granted, a 95% UCL may not be needed for the Eco Risk Assessment. However, EPA instructed the Navy to be consistent in their use of data unless there is guidance driving the need one way or the other between human health and eco assessments. SC DHEC has pointed out in their comments that the analysis for the Area 4 2003 data was not complete. This would be a compelling reason to use both 2001 and 2003 data collectively for Area 4 and Site-wide. Also, since the SLERA is being done on an Area Specific basis, it is doubtful that the 2003 data for Area 4 alone would be sufficient to obtain a 95% UCL, or sufficient to satisfy the risk assessors. EPA expects that Area 4 2001 and 2003 data should be used in the TM.

Response: The 2003 sediment data (collected from Area 4 of the Pond) were combined with the 2001 sediment data in the July 2008 Technical Memorandum and in the

revised Technical Memorandum. For selecting sediment COPCs that are to be analyzed for in the fish tissue samples to be collected, the 2003 sediment data were combined with the 2001 sediment data collected from Areas 1 through 4 of the pond. Samples collected from the marsh in 2001 were not included in this selection process, although the 2001 marsh samples were evaluated in the HHRA in the revised Technical Memorandum. The table used for identifying sediment COPCs for the HHRA (Table 10) was revised to indicate that the Associated Samples listed at the bottom of the table were collected from the four areas of the Pond in 2001 and from Area 4 in 2003.

The ecological risk assessment (ERA) evaluated the data separately for each area in the initial screening step, and collectively for the overall risks associated with exposure to all sediment. The ERA was revised to more clearly discuss the DDD and DDE results from the 2001 and 2003 sampling events and includes a discussion of possible reasons for the lower concentrations detected in the 2003 samples.

Based on discussions with U.S. EPA and SCDHEC, average fish tissue concentrations will be used as the exposure point concentrations in the fish tissue HHRA in the final Technical Memorandum.

The ERA in the revised Technical memorandum used the maximum and mean concentrations in Steps 1 through 3A. The 95% UCL was to be used for calculations if the ERA needed to proceed past Step 3A. Note: the ERA as revised did not need to proceed past Step 3A and 95% UCLs were not needed for the ERA in the revised Technical Memorandum.

The State's concern over the completeness of the analytical parameters for the 2003 data is expressed in Susan Byrd's Specific Comment No. 1 where she indicates that although copper and zinc were identified as COCs in 2001, the 2003 sediment samples were not analyzed in 2003 for copper and zinc. However, the concentrations of copper and zinc in the 2001 samples from Area 4 did not exceed the Region 4 ESVs and were not identified as ecological COPCs for Area 4. The analytical program for the 2003 samples collected from Area 4 was based on the results of the 2001 samples collected in Area 4 and did not include copper and zinc.

3. Comment: Background Concentrations, Screening, and the Uncertainty Section.

Throughout the TM, sediment concentrations are compared to background or ½ background, however, it is unclear if the background is an upper tolerance limit, an average concentration or a maximum concentration. As written, the background comparison methodology presented in the TM is not consistent with EPA Region 4 risk assessment guidance which recommends comparing maximum site concentrations to twice the mean background sample result. Remove all references to ½ background from the TM text and tables. The TM should define background, should discuss if the background methodology used in the document was previously approved or if it follows EPA Guidance, and, should refer to and use background consistently throughout the document. Otherwise EPA Region 4 risk assessment guidance should be followed.

Further, discussion is needed to explain if the use of anthropogenic background was previously approved by EPA and DHEC in order to be used in the selection of chemicals of potential concern, as typically, anthropogenic background is not accepted as a screening tool especially when the contaminants are associated with disposal activities at the site. If the use of anthropogenic background was approved, the TM should specify exactly which anthropogenic background numbers have been approved for use in screening against background (e.g. typical facility pesticide concentrations). If the use of anthropogenic

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Lila Llamas – USEPA
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background has not been previously approved for this site (e.g. PAHs or any numbers such as mercury numbers from data sets other than the approved Site 3 background data set), a direct anthropogenic background comparison for screening purposes should not be included in the TM, however, discussions regarding the potential contribution of anthropogenic background should be included in the uncertainty analysis at the conclusion of the risk assessment to provide appropriate lines of evidence to support risk management decisions.

Similarly, the Range of Site 3 background data results (as approved) may be used to further refine COC selection and for discussion purposes in the Uncertainty Section. Furthermore, general data regarding the bioavailability of mercury in an estuarine environment may be used in a qualitative discussion in the Uncertainty Section, but the argument still needs to be reviewed and accepted by EPA in the final review of this document. Otherwise, the data is not to be used in risk assessment calculations.

Finally, if contaminants are proposed for elimination based on a determination that they are not site related by reasons other than an approved Site 3 background number, the information being used to make the determination should be communicated to EPA and DHEC prior to proceeding in the risk assessment process and approval should be obtained.

Response: Note – the response presented here incorporates responses to the following comments from SCDHEC and EPA (including discussion points on SCDHEC comments) pertaining to background:

- Susan Byrd (SCDHEC) – General Comment No. 1
- Susan Byrd (SCDHEC) – General Comment No. 2
- Susan Byrd (SCDHEC) – Specific Comment No. 3
- EPA General Comment No. 3
- EPA Specific Comment 13

Six background samples were collected for each media (except groundwater) at Parris Island. The background samples were collected from Pickney Island and an undeveloped area on the southern portion of Parris Island. The background data sets for Parris Island were presented in the RFI/RI for Site/SWMU 3 as Appendix C-1 (TtNUS, November 1999). The entire sediment background data set has been incorporated into the revised Technical Memorandum as Appendix D.

In addition to the background data set, typical facility pesticide concentrations were identified for soil/sediment. This data set was developed by compiling pesticide concentrations in soil/sediment samples collected at non-pesticide sites at Parris Island and was presented in the RFI/RI for SWMU 3 as Appendix F-4. This data has also been incorporated into the revised Technical Memorandum as part of Appendix D.

The text has been revised to indicate that the background sediment data set and the typical facility pesticide concentration data set are included in Appendix D in the revised Technical Memorandum. The Appendix provides information associated with the development of the background sediment data set and the typical facility pesticide concentration data set (as presented in the Site 3 RFI/RI).

The screening values (2 times the mean background/typical facility pesticide concentrations) have been incorporated into the appropriate screening tables and used in the screening of the Post-IRA sediment data to determine if contamination

present in the Post-IRA sediment at Site 3 is site related or not. Any reference to ½ the background/typical facility sediment concentration has been removed from the revised Technical Memorandum.

For the HHRA in the revised Technical Memorandum, any sediment contaminant whose maximum concentration does not exceed the screening value (2 times the mean background/typical facility pesticide concentration) was not selected as a sediment COPC and will not be analyzed for in the fish tissue samples that will be collected in October 2009. For those contaminants whose maximum concentration exceeds the screening values, comparison to the range of background/typical facility pesticide concentrations (Appendix D of the revised Technical Memorandum) will be made in the uncertainty section of the HHRA in the final Technical Memorandum (if the fish tissue data warrants the discussion).

For the ERA in the revised Technical Memorandum, background/typical facility pesticide concentrations were not considered in the initial determination of ecological COPCs (Steps 1 and 2 of EPA's 8-step ERA process). However, the Post-IRA sediment data were compared to 2 times the mean background/typical facility pesticide concentrations in Step 3A (COPC Refinement). The determination of COPCs remaining at the end of Step 3A was made using a lines of evidence approach and was not based solely on comparison to background/typical facility pesticide concentrations. Food chain modeling was to be performed only for those COPCs whose average concentration exceeded the 2 times mean background/typical facility pesticide concentration (food chain modeling was not performed in the revised Technical Memorandum because none of the average sediment concentrations exceeded the 2 times mean background/typical facility pesticide concentration).

Fish tissue samples are to be collected in October 2009 and the results of this sampling will be used to evaluate risks associated with human consumption of fish exposed to contaminants in the sediment in the 3rd Battalion Pond. Fish tissue samples are also being collected from General's Landing Creek (reference location) to try and differentiate chemicals present in the fish as a result of exposure to Site 3 contaminants from chemicals present in the fish as a result of exposure to background/anthropogenic sources.

Discussion on the bioavailability of mercury in an estuarine environment will be included in the uncertainty sections, if mercury in fish tissue presents a potential risk (human health or ecological) and can not be attributed to background conditions.

- 4. Comment: Pre-2001 Marsh-Side Sediment Samples.** The TM mentions in Section 2.2, Interim Response Action (Page 3) and Section 4.1, 2001 Sediment Samples (Page 5), that most if not all the pre-2001 marsh-side sediment sample locations were not covered during the interim response action, however, an explanation why these areas were not covered is not provided. To promote clarity in the understanding of the interim response action that was implemented, the TM needs to provide a discussion that explains why the marsh-side was not covered.

Response: The Site 3 RFI/RI indicated that sediment was a concern in four areas in the pond and not in the marsh. Consequently, these four areas in the pond (as shown on Figure 3 in the Technical Memorandum) were covered during the IRA. Figure 3 also shows the location of the Historical Edge of the Causeway, The 2001 Extent of Landfill Cover, and, although not labeled on the figure, the locations of the 1998 and 1999 sediment samples (pre-interim action samples). As indicated on this Figure, the marsh

side of the causeway was covered during the interim action (mainly for stabilization purposes) and that the samples collected on the marsh side before the interim action were collected far enough away from the historical edge of the causeway that the locations were not covered during the interim action.

The revised Technical Memorandum was revised as follows:

- **Section 2.1.5.4 – Summary of Site Risks – Sediment (new section).** The last paragraph in this sections states that “Four areas of sediment on the pond side of the causeway were identified as representing potentially significant risks that warranted remedial action (sediments on the marsh side did not present risks that warranted remedial action).”
- **Section 2.2 – Interim Response Action.** The last paragraph of this section was revised to read as follows: “Figure 3, in addition to showing contaminated sediment Areas 1, 2, 3, and 4 on the pond side of the causeway, also shows the locations of the Historical Edge of the Causeway, the 2001 Extent of Landfill Cover, the 1998 and 1999 pre-IRA sediment samples (not labeled on the figure), and the 2001 and 2003 post-IRA sediment samples. Based on localized site conditions, most if not all of the pre-IRA pond-side sediment sample locations were covered during the IRA. However, although the marsh side bank of the causeway was covered with a protective soil cover during the IRA as part of the causeway bank stabilization, the majority of the pre-IRA marsh-side sediment sample locations were not covered.

The following provisions were also identified in the Interim ROD:

- Re-characterization of sediment after implementation of the IRA.
 - Implementation of land use controls (prohibition of unauthorized intrusive/construction activities, prohibition of swimming and wading, and prohibition of residential development of the site and the use of the site’s groundwater as potable water).
 - Long-term monitoring of the groundwater (annual groundwater testing for 5 years) (even though the groundwater at the site is not currently used as a potable water supply at the site nor is it expected to be used in the future as a potable water supply).”
5. **Comment: Threatened and Endangered Species.** Please clarify in the TM, specifically which threatened or endangered species need to be considered in this risk assessment. The presence of threatened and endangered species (perhaps the Bald eagle? Wood Storks? Alligators?) triggers the need to rely on conservative assessment and measurement endpoints that focus upon the protection of individuals, rather than groups of receptor organisms. It is recommended that individual-level endpoints be introduced in order to address species of special concern. In your discussions be sure to include a discussion of the historic surface water exposure and risk setting.

Response: As requested, the ERA has been revised in the revised Technical Memorandum to clarify information regarding the presence of threatened and endangered species at the site. To the extent that such species forage at the site, their presence triggers the need to protect individuals of these species, rather than groups of receptors as is typically done when evaluating ecological risk. This is now

discussed in the Uncertainties Section. In addition, the text was revised to discuss potential risks from exposure to surface water contaminants.

6. **Comment: Eco Risk - Fish Tissue Data.** The food chain modeling presented within Step 3a of the ecological risk assessment solely relies upon modeled results. If post-remedial fish tissue data becomes available in time for this Tech Memo, the results should be compared to tissue effect thresholds in order to provide an additional risk characterization line of evidence. Alternatively, this data may be used at the time it becomes available to modify either the PP or ROD, or for use in the LUC RD. (See Comment #1 above.)

Response: As agreed, food chain modeling was to be conducted in the ERA only if the average sediment concentrations exceeded 2 times the mean background/typical facility pesticide concentrations. Since the average sediment concentrations do not exceed 2 times the mean background/typical facility pesticide concentrations, food chain modeling was not performed in the revised Technical Memorandum.

As discussed with U.S. EPA and SCDHEC, the results of the fish tissue sampling to be conducted in October 2009 will be used only for the HHRA in the final Technical Memorandum. If the fish tissue results warrant it, the ERA will be revisited.

7. **Comment: Eco Risk - Exposure Areas.** The ecological risk assessment focused on apportioning the site into areas that may effectively dilute the exposures to wide ranging receptors that may come into contact to all areas of the site. Please consider inclusion of a site-wide assessment for large range receptors in addition to the area-specific analyses or include in an uncertainty discussion whether the current approach is conservative enough to capture potential risks to receptors that may be exposed throughout the entire Site 3.

Response: The ERA was revised to clarify the fact that wide ranging receptors such as piscivorous birds and mammals could be exposed to a large area such as that represented by the entire site-wide dataset, while receptors such as benthic invertebrates would be exposed to much smaller areas, such as those represented by Area 1-4. Potential risks were evaluated and clearly discussed as requested.

8. **Comment: Hazard Quotients versus Hazard Indices for the DDX Suite of Contaminants.** The presentation of hazard quotients (HQs) focused on individual contaminants (e.g. DDT, DDD, DDE) and did not include any sum-of-risks (e.g., hazard indices) associated with the suite of DDX contaminants. Presentation of hazard indices for the DDX suite may yield more significant risk conclusions than the chemical-specific HQs. The document should include a cumulative HI for the DDX suite to provide a more thorough risk analysis of this group of chemicals.

Response: Concur. The ERA was revised as requested in the revised Technical Memorandum.

9. **Comment: Surface Water Text.** The language addressing Surface Water is insufficient. This issue was discussed on the August 21 and September 8, 2008 Team conference calls. The Navy has since provided additional language. EPA will be submitting, separately, feedback regarding the proposed additional language. The text developed should be included in the body of the TM, not simply as an Appendix, AND specific conclusions and recommendations need to be discussed and included in Section 7.0 as well. Ensure that what is said in the Surface Water specific discussion is consistent with what limited discussion is included in the RFI/RI summary in Section 2.1.5.

Response: The additional surface water language provided by the Navy (with EPA revisions) was included in the text of the revised Technical Memorandum (as part of a revised Section 2.1.5). Section 2.1.5 was rewritten to include a discussion of the field investigation conducted in 1998 and includes new subsections on the summary of pre-interim action site risks (soil, sediment, surface water, and groundwater) as determined by the RFI/RI. This revised section clarifies why the post-interim action sampling consisted solely of sediment samples.

10. **Comment:** **Tables and Text.** Please ensure that throughout the document Tables are properly referenced and titled.

Response: The revised Technical Memorandum was reviewed to ensure that the Tables and Figures are referenced appropriately. In addition, the Tables were reviewed to ensure that proper references are included on the tables and that the tables are properly titled. The revised Technical Memorandum did not go through a Technical Edit. This will be done before the final Technical Memorandum is submitted.

SPECIFIC COMMENTS

11. **Comment:** **Section 2.1.5 RCRA Facilities Investigation/Remedial Investigation, Page 3:**

The second paragraph indicates that direct contact with sediments was evaluated for construction workers and maintenance workers and the risks for both receptors were acceptable as presented in the Resource Conservation and Recovery Act (RCRA) Facilities Investigation/Remedial Investigation (RFI/RI). It is unclear if the recreational users of the areas such as adults and children were also evaluated in the RFI/RI for direct sediment exposure since the recreational receptor was evaluated for the ingestion of fish. It is understood that a more detailed exposure analysis is presented in the RFI/RI, however, when this document is choosing receptors for further evaluation, adequate information should be pulled forward from the RFI/RI and presented to provide a transparent understanding of why the only exposure evaluated in the TM human health risk assessment (HRA) is the recreational fish ingestion pathway.

Also, please clarify what the TDS numbers were for Site 3 in the 7th paragraph of this Section.

Response: Section 2.1.5 in the revised Technical Memorandum includes a more detailed summary of the results of the 1999 RFI/RI and site risks associated with soil (2.1.5.1), groundwater (2.1.5.2), surface water (2.1.5.3) and sediment (2.1.5.4). Section 2.1.5.4 (Summary of Site Risks – Sediment) was added to the revised Technical Memorandum and includes the following paragraph:

“Direct contact with sediment by recreational users was not evaluated in the Site 3 RFI/RI HHRA because the sides of the causeway are steep making direct contact with surface water and sediment difficult. In addition, warnings are posted on the causeway prohibiting swimming/wading in the surface water adjacent to the causeway because of the presence of alligators in the area. The recreational user fishing scenario was evaluated because of the presence of fishing platforms at the site and because recreational fishing is known to occur there.”

Section 2.1.5.2 (Summary of Site Risks – Groundwater) includes the following paragraph pertaining to TDS:

“Total dissolved solids (TDS) present in groundwater averaged 10,050 mg/L in the four groundwater samples collected in 1998. According to the State of South Carolina, groundwater that exceeds a concentration of 10,000 mg/L TDS can be classified as Class GC (groundwater not considered potential sources of drinking water). Attempts to pump water from this area (with salt-water pond on one side of the causeway and a salt-water marsh on the other side of the causeway, and a limited precipitation infiltration area) would be more likely to draw water from these salt-water bodies and not from accumulated precipitation infiltration.”

12. **Comment:** Section 4 and throughout the document. The text refers to the Regional Screening Values as “Oak Ridge National Lab” or “Oak Ridge” screening values. While the site hosting the values is “maintained and operated through a cooperative agreement between the EPA Office of Superfund and Oak Ridge National Laboratory,” the values are EPA screening values and should be referenced accordingly. Changes should be made throughout the document.

Response: The text was revised to refer to the Regional Screening Values as U.S. EPA screening levels.

13. **Comment:** Section 4.1. The document describes the evaluation of the data set as compared to the site background established in the RI. Region 4 recommends the simple calculation of two times the arithmetic mean of the background sample results as a background screening value. However, this section and the associated tables refer to ½ the background. The discussion of the background data set should be clarified and expanded for clarity. (See General Comment #3 above).

Response: See the response to General Comment No. 3.

14. **Comment:** Section 5.1. This section describes the process for selecting the exposure point concentration for use in the risk assessment calculations. Two exposure point concentrations were selected, the maximum detection of each constituent and the arithmetic average. Rather than choose two exposure point concentrations, EPA recommends the use of a single exposure point concentration, the 95% UCL of the mean as determined using EPA’s ProUCL 4 software:

http://www.epa.gov/esd/tsc/TSC_form.htm

Response: Maximum sediment concentrations were used in the revised Technical Memorandum to identify those chemicals that are to be analyzed in the fish tissue samples. Maximum fish concentrations will be used in the screening of the data to determine those chemicals that will be evaluated in the HHRA in the final Technical Memorandum. As discussed with U.S. EPA and SCDHEC, average fish concentrations will be used as the exposure point concentration when evaluating the magnitude of the risks in the HHRA in the final Technical Memorandum.

The ecological risk assessment used the maximum and mean concentrations in Steps 1 through 3A in the revised Technical Memorandum. The 95% UCL was to be used for calculations if the ecological risk assessment needed to proceed past Step 3A. Note: the ERA as revised did not need to proceed past Step 3A and 95% UCLs were not needed for the ERA.

15. **Comment:** Section 5.2. This section describes the scenarios used to evaluate fish consumption. One scenario, the so-called “conservative scenario”, uses default exposure

values referenced in Region 4's supplemental guidance to RAGS. The guidance cited begin, "Fish ingestion is highly variable and site specific intake assumptions are most desirable since data vary greatly." The Region's preference is that exposure assumptions should be based upon site specific data collected through interviews with fishermen known to frequent the area, as opposed to default assumptions. As indicated in the August 18 conference call, Region 4 recommends deleting the "conservative scenario" as described in this report and replacing it with site-specific data collected from the civilian woman known to frequent the site. The data collected should focus on the amount (and type) of fish that is consumed that originates from the waters of Site 3, and whether or not any children are being fed the catch, by either herself or others in her group of fishing friends. EPA understands that the Navy will propose questions to be asked and specify data needs. Once the data has been gathered, the Navy should also submit updated information pertaining to the parameters which will be used in this site-specific scenario.

Note: The changes recommended in the last 2 comments will effectively reduce the # of scenarios evaluated: a site-specific civilian fisher and the military fisher scenarios. This will provide a site specific range within which risk management decisions can be made. If it is found that a child is being fed, an additional calculation for a child scenario should be added. Since there is little known about the group of resident fisherpersons, in order to be conservative, it may be appropriate to include a child scenario regardless.

Response: As per discussion with U.S. EPA and SCDHEC and based on the interview with the site-specific subsistence fisher person, the exposure parameters from **Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, EPA-823-B-00-007, Office of Water, Washington, DC. (U.S. EPA, November 2000)** will be used in the fish tissue HHRA in the Final Technical Memorandum to evaluate potential risks associated with consumption of fish from the 3rd Battalion Pond.

Exposure scenarios to be evaluated using fish tissue data in the HHRA in the final Technical Memorandum will include a military recreational user, a civilian recreational user, and a civilian subsistence fisher. Both child and adult receptors will be evaluated under each exposure scenario.

- 16. Comment: Section 6.2.1 Approach, Page 23:** According to this section, if the maximum sediment concentration exceeded the ecological screening value (ESV) or, an ESV was not available, the chemical was considered an ecological chemical of potential concern (COPC). According to Section 6.2.2, Screening Results (Page 15), a subset of metals and pesticides did exceed the ESV in these tables and were identified as COPCs. However, Tables 16 through 20, which depict the summary of the chemicals of potential ecological concern in sediment for the four areas (e.g., Marsh, Area 1, Area 2, Area 3 and Area 4) indicate that no COPCs were identified for 4 of the 5 areas. It appears that Step 3a, Refinement of Preliminary COPCs (Section 6.3), was also incorporated into Tables 16 through 20, however, this is not explained in the TM nor clearly presented in the Tables. For example, Table 16 presents the COPCs for the Marsh Side Sediment samples and the table indicates that none of the detected chemicals are retained as COPCs in sediment, yet Section 6.2.2 indicates that DDD, DDE, DDT, alpha-chlordane, arsenic, copper and total PAHs were greater than the ESVs, thus, at the screening step, these chemicals were identified as COPCs and evaluated further in Step 3a. Further, Table 16 includes a footnote that a maximum detected concentration exceeds the ESV but is less than an alternate screening value, however, the alternate ESV comparison is also part of Step 3a, however, this is not clearly explained in the table. It is recommended that the tables clearly indicate which chemicals are COPCs prior to Step 3a and which were further excluded following Step 3a of the ERA process and ensure the text is consistent with the tables.

Response: The ERA text and Tables 17-23 in the revised Technical Memorandum have been revised to clearly separate the initial screening and COPC refinement steps, and to include alternate screening values where applicable.

17. **Comment:** **Section 6.2.2 Screening Results, Page 24 and Table 20:** The last paragraph of this section summarizes only the 2001 results presented in Table 20 and does not discuss the 2003 results presented in Table 20. Table 20 indicates that the concentrations of DDD and DDE are lower than observed in 2001. This section should provide a more detailed summary of all results presented in Table 20 to include an explanation of why the results for DDD and DDE have decreased between 2001 and 2003 to promote clarity in the document.

Response: Section 6.2.2 (Screening Results) of the revised Technical Memorandum includes the 2003 results. Section 6.3.2 (COPC Refinement) was revised to include a more detailed discussion of DDD and DDE results from the 2001 and 2003 sampling events. A definite “explanation” of why the DDD and DDE concentrations have decreased between 2001 and 2003 cannot be provided; i.e., only speculation is possible, but the Navy understands EPA’s desire for more clarity in the document, and possible reasons for the decreased concentrations have been discussed.

18. **Comment:** **Section 6.3 Step 3A: Refinement of Preliminary Chemicals of Potential Concern, Page 24:** This section refines the initial list of chemicals of potential concern by addressing additional lines-of-evidence, one of which is to include a comparison against alternate ecological screening values (ESVs). The fourth paragraph indicates that alternate ESVs are usually less conservative guidelines to provide balance to the conservative screening-level assessment, however, there is no discussion that explains the applicability of the alternate ESVs to the site. The purpose of using alternate ESVs is to compare site concentrations to benchmarks that are considered more applicable to the site, and therefore represent more realistic ESVs, thus, an explanation should be included that describes the applicability of the alternate ESVs to the site to provide a higher level of confidence in the interpretation of the comparisons to these alternate values.

Response: Section 6.3 has been revised as requested.

19. **Comment:** **Section 6.3.2 Screening and Step 3a Discussion, Page 25:** This section includes a summary of the results of the alternate ESV comparison by study area and refers the reader to Table 21, however, this table has combined the data site-wide and compared the maximum and mean detections from the combined database to alternative ESVs rather than evaluating as separate areas (e.g., Landfill Marsh, Areas 1, 2, 3, and 4). As a result, Table 21 does not coincide with the text to discriminate the results of the alternate ESV comparison by study area. If all the data were below the alternate ESVs, combining the data as one data set is useful to avoid redundancy of the same conclusion for all 5 areas. However, as shown in Table 21, five pesticides exceed the alternate ESVs (e.g., DDE, DDD, DDT, alpha-chlordane, and gamma chlordane), therefore, combining the data into one data set does not allow for a clear understanding where the exceedances of the alternate ESVs occur to provide focus on where remedial measures may not have been as effective. The alternate ESV screening analysis should be divided into the individual exposure areas for contaminants which did not pass the site-wide alternative guidelines screen as well as site-wide (e.g., for the large range receptors) to provide a transparent understanding where alternate ESVs were exceeded to provide information useful in support of risk management decisions.

Response: Section 6.3.2 has been revised as requested.

20. Comment: **Section 6.3 and Food-Chain Modeling:**

Appendix F - Table of TRVs – Correct the reference from Table D-1 to Table F-1.
Exposure Models for Fish - For both mercury and DDT, bioaccumulation models should have been used instead of models generating a dose. Published bioaccumulation models exist for both classes of chemicals. The preferred mercury model (Evans and Engel 1994) is cited in the references for Appendix F but was not used. Many numerical bioaccumulation models are readily available for hydrophobic compounds such as DDT (e.g., Gobas). Please modify the TM to utilize these models as suggested for mercury and DDT when assessing fish.

Fish TRVs - The Tech. Memo failed to assess pesticide risks to fish citing the lack of dose-based TRVs (Tables 22 & 23). However, a recent journal article (Beckvar et al. 2005) identifies residue-based TRVs (NOAELs) for both mercury and DDT. A LOAEL can be estimated from data reported in this publication. Please use the residue-based TRVs for calculating exposure from pesticides with bioaccumulation models rather than a dose-based model for the Mummichog and Red Drum.

On the Team conference call on September 8th, 2008, the Navy inquired as to whether or not the bioaccumulative chemicals could be screened out first in Step 3A based on background before being run through a Food Chain Model. An inquiry was placed with an EPA Region 4 Eco Risk Assessor regarding this matter. The results were as follows: EPA Region 4 anticipates that at some time in the near future guidance regarding this issue will be updated to add clarity as to when this might be allowed or not. In the mean time, all parties were referred to an EcoUpdate – The Role of Screening Level Risk Assessments, which can be found at:

<http://www.epa.gov/oswer/riskassessment/ecoup/index.htm>

When referring to bioaccumulative contaminants, the List of Great Lakes Bioaccumulative Compounds should be referenced. This document can be found in the United States Environmental Protection Agency (USEPA). 1995. Final Water Quality Guidance for the Great Lakes System. 60 Federal Register: 15365 (March 23, 1995).

After reviewing the guidance and the TM, discussion among EPA, TechLaw Inc., and NOAA team members resulted in the decision that sufficient flexibility was allowed for in the current guidance to make a site-specific one time determination. Based on the level of confidence in the site data, the number of COPCs, and the nature of those COPCs, combined with the acceptance by NOAA representatives (prominent stakeholders), it would be acceptable for the screening to take place only in the recalculation of the Mummichog and Red Drum Food Chain Model using the residue-based TRVs in the bioaccumulative model, being sure to include both the 2001 and 2003 data for Area 4 (as instructed in the General Comments above)

However, those contaminants already addressed and included in the food chain models for the Mink, Heron, and Osprey in the Draft TM should remain and be included in the revised document as is. Furthermore, all future documents should not screen out bioaccumulative contaminants based on background in Step 3A unless site-specific case-by-case approval is requested and granted by EPA and DHEC, or until EPA Guidance instructs otherwise.

Lack of Parameters in Generic Dose-Model - The generic dose model in Appendix F fails to consider contaminant assimilation rate, excretion rate or growth dilution. For fish at least, these are important components to modeling exposure. This generic model also fails to

consider uptake of hydrophobic compounds dissolved in water. This is a very sensitive parameter for hydrophobic bioaccumulation models. Please modify the TM to address this concern.

Lack of Diverse Red Drum Diet - Appendix F indicates the red drum model assumes a mummichog-only diet. The Evans & Engel model assumes a more realistic diet consisting of crabs, small fish and other invertebrates. This model also estimates a mercury residue for mummichogs which can be used to calculate HQs. Please modify the TM to address this concern and to apply the Evans & Engel model as instructed above.

Response: Various aspects of this comment were discussed at length during a conference call on September 15, 2008. It was agreed by all parties involved in the conference call that food chain modeling for Site 3 would not be required for ecological COPCs whose average concentration in the site-wide dataset is less than the 2 times the mean background/typical facility pesticide concentration. Based on a subsequent review of the data, food chain modeling was not required. In addition, the ERA text now clearly discusses the various lines of evidence that support the decision of negligible risk to upper level receptors (e.g, fish, piscivorous birds, piscivorous mammals) in the absence of food chain modeling.

In the HHRA in the revised Technical Memorandum, the preferred bioaccumulation model for mercury (Evans and Engel, 1994) and the USACE BSAFs for DDx compounds (as recommended by U.S. EPA in subsequent discussions) were used to calculate fish tissue concentrations based on the maximum sediment concentrations.

Estimated fish tissue concentrations were then compared to the appropriate screening values to identify chemicals that would be analyzed for in the proposed fish tissue sampling to be completed in October 2009. Discussions on the BSAFs used for mercury and DDx compounds are included in the revised Technical Memorandum as Appendix E.

21. **Comment:** Section 7.0 Conclusions And Recommendations: Ensure that this entire section is updated after all recalculations and revised discussions have been incorporated. Be sure to include SW as well.

Response: This section will be rewritten based on the required revisions as discussed above, in response to the state's comments, and to incorporate the results of the October 2009 fish tissue sampling.