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MCRD PARRIS ISLAND  
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LETTER REGARDING U S EPA REGION IV COMMENTS ON DRAFT TECHNICAL  
MEMORANDUM POST-INTERIM RISK ASSESSMENT FOR SITE 3 CAUSEWAY LANDFILL  
MCRD PARRIS ISLAND SC  
9/8/2008  
U S EPA REGION IV



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4  
SAM NUNN ATLANTA FEDERAL CENTER  
61 FORSYTH STREET, S.W.  
ATLANTA, GEORGIA 30303

September 8, 2008

CERTIFIED MAIL  
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4SF-FFB

Naval Air Station, JAX  
Navy Facilities Engineering SE  
Installation Restoration, SC IPT  
Attn: Charles Cook  
PO Box 30  
North Ajax Street, Bldg 135  
Jacksonville, FL 32212-0030

And

Commanding General  
Marine Corps Recruit Depot  
Natural Resources & Environmental Affairs  
Attn: Heber Pittman  
PO Box 5028  
Parris Island, SC 29905-9001

SUBJ: Draft Technical Memorandum: Post-Interim Construction Risk Assessment, Site 3 –  
Causeway Landfill, MCRD Parris Island, South Carolina (July 2008)

Dear Sirs:

The U.S. Environmental Protection Agency Region 4 (EPA) has reviewed the **Draft Technical Memorandum: Post-Interim Construction Risk Assessment for Site 3 – Causeway Landfill, MCRD Parris Island, South Carolina, July 2008 (Tech Memo)**. Significant issues were identified and discussed with the Navy in a conference call on August 31, 2008, as well as September 8, 2008. As a result of the discussion of forthcoming comments to the Navy, the next draft of the document is expected to vary considerably from this version. Therefore, EPA has not made text-specific comments on this draft. Recognize that there may be the need for an additional round of comments on the next version.

The following comments should be addressed while revising the draft Tech Memo:

## I. EPA GENERAL COMMENTS

1. **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.

2. **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.
3. **Background Concentrations, Screening, and the Uncertainty Section.** Throughout the TM, sediment concentrations are compared to background or 1/2 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 1/2 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 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.

4. **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.
5. **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.

6. **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.)
7. **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.
8. **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.
9. **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.
10. **Tables and Text.** Please ensure that throughout the document Tables are properly referenced and titled.

## II. SPECIFIC COMMENTS

11. **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 7<sup>th</sup> paragraph of this Section.

12. **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.
13. **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 #2 above).
14. **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](http://www.epa.gov/esd/tsc/TSC_form.htm)
15. **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.

16. **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.
17. **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.
18. **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.

19. **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.
20. **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 DDX 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 8<sup>th</sup>, 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.

21. **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.

If you have any questions regarding these comments, feel free to contact me at 404-562-9969 or [koroma-llamas.lila@epa.gov](mailto:koroma-llamas.lila@epa.gov). EPA looks forward to continuing the exemplary working relationship with Marine Corps Recruit Depot Parris Island and Naval Facilities Engineering Command as we move toward a final remedy for Site 3.

Sincerely,

Lila Llamas  
Senior RPM  
Federal Facilities Branch  
Superfund Division

cc: Meredith Amick, SCDHEC  
Sommer Barker, SCDHEC  
Mark Sladic, TiNus