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**TECHNICAL REVIEW OF THE
DRAFT CORRECTIVE MEASURES STUDY INVESTIGATION SWMU 73
DATED FEBRUARY 4, 2010**

**NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO
EPA ID NO. PR2170027203**

Submitted to:

**U.S. Environmental Protection Agency
Region 2
290 Broadway
New York, NY 10007-1866**

Submitted by:

**TechLaw, Inc.
The Wannalancit Mills
175 Cabot Street, Suite 415
Lowell, MA 01845**

EPA Task Order No.	002
Contract No.	EP-W-07-018
TechLaw TOM	Cathy Dare
Telephone No.	315-334-3140
EPA TOPO	Timothy Gordon
Telephone No.	212-637-4167

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The following comments were generated based on review of the February 4, 2010 *Draft Corrective Measures Study Investigation SWMU 73* (Study Investigation), Naval Activity Puerto Rico (NAPR) Ceiba, Puerto Rico.

GENERAL COMMENTS

1. The rationale for the selected subsurface sampling depths of over ten (10) feet below ground surface (bgs) is unclear. Several instances of samples collected at depths that appear to be below the water table and/or saturated zone were noted. For example, a sample was collected from location 73SB27 at 17 to 19 feet bgs. According to the Final Corrective Measures Study Work Plan for SWMU 73 (CMS WP), samples should have been collected from one (1) to three (3) feet bgs and at a depth shallower than the water table or ten (10) feet bgs, whichever comes first. It is unclear if contamination was suspected at the 17 to 19 foot interval or why a sample was not selected at a shallower depth. Further, no soil boring log was provided for boring 73SB24; therefore, it is unclear why the 17 to 19 feet interval was selected for sampling at 73SB24. It should be noted that a sample was collected from 73SB02 at seven (7) to nine (9) feet bgs; however, according to the soil boring log, a strong odor was detected at 12.5 to 15 feet bgs. In this case, it appears that the CMS WP was followed, in that the sample from the most contaminated interval was not collected since the interval was below the water table and/or saturated zone. Revise the Study Investigation to provide a rationale for each subsurface sampling depth (other than one (1) to three (3) feet bgs) selected. Comment on whether the selected sampling depth allowed the objective of the Study Investigation (i.e., to define the extent of contamination) to be met.

USAPHC Response: The rationale for the 17-19 foot sample collected in boring 73SB24 is probably related to the fact that this boring penetrated below the water table before the presence of groundwater was detected. In terms of the general study objective of defining the extent of contamination, the text will be modified to better explain how the samples that were collected and the data provided were sufficient to meet general study objectives.

2. According to the CMS WP, groundwater samples collected from 73MW01 (corresponding to location 19E-03) and 73MW03 (corresponding to location 19E-SS06) were to be analyzed for volatile organic compounds (VOCs), semivolatile organic compounds, low level polynuclear aromatic hydrocarbons (PAHs), and metals. Based on review of the Study Investigation, it does not appear that sample 73MW01 was analyzed for low level PAHs. In addition, it appears that sample 73MW03 was analyzed for select metals and low level PAHs

MCHB-TS-EGW

**SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES
STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010**

only. Provide an explanation for these deviations from the CMS WP. In addition, discuss how the deviations affect the Navy's ability to meet the objectives of the investigation.

USAPHC Response: Semivolatiles were analyzed in 73MW01 in 2008 samples. Soil samples from boring SB2 were analyzed for low level PAH at depths of 7-9' with no detections. Soil samples from SB2 were analyzed for VOCs to depths of 7-9' with only J value detections of acetone. The text will be modified to better explain how available data is sufficient to meet the objectives of the investigation.

3. It does not appear that soil data was compared to the EPA Protection of Groundwater Soil Screening Levels (SSLs). A comparison of soil data to SSLs will aid in determining what constituents in soil, if any, may be contributing to groundwater contamination. Revise the Study Investigation to include a comparison of soil data to the SSLs. Provide a discussion detailing the potential for the soil contaminants to impact groundwater.

USAPHC Response: Text will be modified.

4. The Laboratory Data Validation Summary presented in Section 6.4 is lacking in detail. For example, the section does not specify the extent of all the quality control exceedances. Without providing the extent of the exceedances it cannot be verified if data were qualified appropriately. Additionally, a discussion of how precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters were met has not been included. Further, according to Appendix D, the data validation report for the 2009 sampling event indicates that representativeness, as displayed in field blanks, cannot be properly assessed and that comparability for aqueous field samples is not acceptable. However, the study does not discuss how these deficiencies affect data usability. Revise the section to provide a more detailed discussion of data usability.

USAPHC Response: Text will be modified.

5. It appears that several results were rejected in both the 2008 and 2009 sampling events affecting completeness goals. However, neither Section 6.0 of the text nor Appendix D specify how much of the data were rejected or how this did or did not impact site decisions. Revise the Study Investigation to discuss the laboratory and field completeness achieved. If the completeness goals were not achieved, ensure either the text of the Study Investigation or Appendix D addresses how site decisions were or were not impacted.

USAPHC Response: Text will be modified.

6. Tables 4-17 do not appear to contain the data qualifiers as discussed in Appendix D, Laboratory Validation Reports. For example Appendix D discusses qualifying results as "J-" or "J+" depending on whether there is a negative or positive bias. However, the tables only qualify results as "J." Revise the tables to reflect the qualifiers used by the data validator.

MCHB-TS-EGW

**SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES
STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010**

USAPHC Response: Text will be modified.

7. The Screening-Level Ecological Risk Assessment (SLERA) and Step 3a of the Baseline Ecological Risk Assessment (BERA) do not fully present the groundwater risk assessment. The SLERA in Section 7.3.4 on Page 28 does not describe the assessment and measurement endpoints, or the components to the conceptual site model associated with potential exposure to groundwater. Furthermore, the SLERA does not include a food-chain assessment of groundwater chemicals of potential concern (COPC) that may enter nearby Bahia de Puerca. It is understood that this pathway has not been quantified, however, at a minimum, the SLERA should describe this pathway and clarify why the food chain was not assessed. In addition, the risk conclusions as presented in Section 7.10.1.3, on Page 50 need to discuss the high COPC hazard quotients (HQs) (e.g., for DDT the HQ = 100), which suggests the potential for risk. Note that this specific risk conclusion is discussed further in the specific comments. In summary, revise the text to acknowledge the groundwater exposure medium in a consistent manner and integrate it into each facet of the ecological risk assessment (ERA). In addition, provide further discussion in Section 7 to detail information pertinent to the groundwater medium.

USAPHC Response: Groundwater was not completely run through the ERA in terms of identifying assessment and measurement endpoints, drafting a conceptual site model, or including a food-chain assessment of groundwater COPCs since it was not viewed as a media of concern based on various reasons to include:

1. Maximum cadmium, cobalt, copper, nickel, silver, and zinc concentrations were below background concentrations.
2. DDT and DDD HQs (based on maximum concentrations) were based on "J" values (estimated values below the analytical method detection limit) from a single 2004 sampling event. Additionally, DDT and DDD concentrations were considerably lower in soil depths greater than 3 inches (refer to Tables 10 and 11 in the Report).
3. Chemical concentrations would be diluted considerably once entering Puerca Bay surface water.

Text will be included in the front of the report to indicate the reasons for not performing a complete ERA for groundwater based on the points above.

8. The SLERA does not clearly define the treatment of subsurface soil as an exposure media. The document addresses the potential risk to community level receptors (plants and invertebrates) and wildlife receptors (birds), even though the exposure potential associated with this media is not defined. Further, it is not clear if subsurface soil is consistently defined by depth, or to what depth receptors can be exposed (including the red-tailed hawk). The SLERA should indicate whether the depth was defined based on plant root zones, invertebrate burrowing depth, or some other variable. Revise the Exposure Estimate

MCHB-TS-EGW

**SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES
STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010**

presented in Section 7.6.2 on Page 32 and the supporting pertinent sections to clearly describe the subsurface soil exposure assumptions and their relevance to the ERA.

USAPHC Response: The Work Plan identified subsurface soil as 1-3 feet in depth (Section 5.2.1) and identified soil screening values for this media thus was included into the SWMU 73 Report (Section 7.4.1). However, the relevance for including subsurface soil in the risk assessment wasn't clearly identified in the Work Plan since Section 5.3.1 (Selection Criteria for Analytical Data) only mentioned using the analytical data for surface soil (0 to 1 foot in depth) since the depth range is most relevant to ecological receptors. Typically, surface soil is the main focus and most relevant in ERA's, since this depth range is the most active biological zone and most terrestrial receptors are exposed to the surface soil. It is unlikely that most of the ecological receptors (i.e., avians and invertebrate) at SWMU 73 will burrow into the subsurface soil. However, the Cobana negra, a threatened species, could potentially exist at SWMU 73 since they may be found in coastal scrub forest areas. This particular evergreen's roots are likely to pass into or through the subsurface soil. Text will be included in Section 7.6.2.1 of the report to describe the relevance of accessing subsurface soil based on the potential presence of the threatened plant species, in this ERA.

9. The ERA does not bring the endangered species risk conclusions to closure. The American robin was chosen to represent the endangered yellow-shouldered blackbird. An "individual" assessment point was selected to address this species; however the measurement endpoint is the same as the population measurement endpoints for the two other, non-listed avian receptors. Also, the SLERA does not present conclusions for the robin, and an endpoint for the species was therefore not identified in the BERA (see the "Refined Hazard Quotients for Wildlife Populations at SWMU 73" on pages 42 and 43). Revise the text to summarize and clearly present the risk conclusions for this species.

USAPHC Response: Table 29 identifies the COPCs identified in the SLERA for the robin and other ecological receptors, however, additional text will be included in Section 7.7.2.4 in order to summarize those chemicals that will be retained for further evaluation for each receptor.

10. The Study Investigation does not present any risk assessment of non-detected chemicals evaluated as part of the COPC process. As per Section 7.7.1, Page 35, non-detected chemicals lacking media-specific screening values should be identified as ecological COPCs. The document does not provide data summaries or discuss the outcome of non-detected chemical screening. At a minimum, both the SLERA and BERA uncertainty assessments should be revised to include non-detected chemical screening information. Revise the document accordingly.

MCHB-TS-EGW

**SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES
STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010**

USAPHC Response: Non-detected chemicals were included in ERA as indicated in Section 7.7.1. The SLERA and BERA uncertainty assessments will be revised to include non-detected chemical screening information.

11. Section 8.3.1, Data Reduction, describes a background analysis that was conducted to determine which inorganics detected at SWMU 73 could be screened out on the basis of background. The section states, “[i]norganics that were found to be statistically within background levels were excluded from the analysis. The inorganic substances screened out in this step include barium, cobalt, and vanadium in surface soil.” This issue was previously raised in a comment letter dated January 23, 2009 on the Draft Final Correctives Measure Study for SWMU 68. The June 12, 2009 Navy responses to the EPA comment letter stated that chemicals detected above risk-based screening criteria would be retained as COPCs and assessed under total baseline conditions. The Navy responses further stated that those chemicals at, or below, background levels (non-site related) would be discussed as part of the risk characterization and then exit the risk assessment process. This approach is consistent with U.S. Navy Human Health Risk Assessment Guidance (available at <http://www-nmcphe.med.navy.mil/downloads/ep/Chapters%201-12.pdf>). It is noted that this approach was considered acceptable (see August 6, 2009 EPA approval letter on the Final Corrective Measure Study for SWMU 68 (reference citation Baker, 2009b)).

Revise the Study Investigation to ensure that all inorganic compounds that exceed residential or industrial health-based screening criteria are evaluated in the quantitative risk analysis to demonstrate consistency among all human health risk assessments performed at NAPR SWMUs and compliance with EPA-recommended risk assessment methodologies. In addition, update Section 8.11, Uncertainty, to include a refinement of risk as described above. Further, Section 8.3.1 should be revised to cite the Navy response letter of June 12, 2009. Finally, the Navy response letter and risk assessment document identified in Section 8.3.1 should be added to Section 8.14, References.

USAPHC Response: The USAPHC (CHPPM) was not provided this correspondence prior to conducting the evaluation, nor was this approach evident in the previously approved work plan for SWMU 73. However, if this approach is acceptable to all parties, the report will be modified accordingly.

12. The COPC selection process appears to use surrogate compounds for chemicals lacking December 2009 EPA Regional Screening Levels (RSLs) (e.g., bis (2-ethylhexyl) phthalate was used as a surrogate for di (2-ethylhexyl) phthalate (DEHP)). This approach is generally acceptable; however, the HHRA should discuss the use of surrogate chemicals in the COPC selection process, and clarify why the selected surrogates are considered appropriate. Revise Section 8.0, Human Health Risk Assessment and Development of corrective action objectives (CAOs), to indicate that surrogates were used in the COPC selection process and to discuss the structure activity relationship between chemicals lacking toxicity criteria and any identified surrogates.

MCHB-TS-EGW

**SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES
STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010**

USAPHC Response: Text will be added to describe any surrogates used

13. A conceptual site model (CSM) was not included in the Study Investigation to support the Human Health Risk Assessment (HHRA). Revise the Study Investigation to include a human health CSM that illustrates potential exposure pathways at SWMU 73.

USAPHC Response: CSM diagram will be added.

14. Section 8.5, Exposure Assessment, presents the exposure pathways evaluated in the HHRA. Additional exposure pathways should be quantitatively evaluated in the HHRA:

Incidental ingestion of groundwater should be evaluated for construction workers. At the shallowest location on-site, groundwater is encountered at 7.5 feet bgs. Construction workers may encounter groundwater during trenching activities. Revise the HHRA to quantitatively evaluate incidental ingestion of groundwater for construction workers.

USAPHC Response: This pathway is likely to be rather trivial in terms of its contribution to potential risk even if it were complete. However, if the reviewer would like to provide a reference for suitable exposure parameters for use in evaluating this pathway (primarily an ingestion rate) we will include it in the evaluation.

Inhalation of dust and vapor should be evaluated for construction workers. Inhalation of dust-derived soil is a possible exposure pathway at SWMU 73 given that a portion of the site is covered by gravel and not vegetated. Additionally, inhalation of vapor should be evaluated due to the fact that VOCs were detected in groundwater and construction workers may encounter groundwater during trenching activities. Revise the HHRA to quantitatively evaluate inhalation of dust and vapor for construction workers, or provide adequate justification for not evaluating these exposure pathways.

USAPHC Response: As discussed in the report, the inhalation pathways were not included in this evaluation as they tend to be minor in relation to ingestion and direct contact. This approach is supported by the 2001 Soil Screening Guidance which states that the inhalation pathway "does not need to be routinely considered as the resulting risk levels are often several orders of magnitude lower than those produced by the ingestion and dermal pathways."

Ingestion of groundwater should be evaluated for future hypothetical residents. While it is acknowledged that there is no current (or planned) potable use of groundwater, risks and hazards associated with ingestion of groundwater should be evaluated for future hypothetical residents to fully evaluate baseline conditions unless land use restrictions and controls (LUCs) are instituted to prevent residential development (or if the Puerto Rico Environmental Quality Board (PREQB) has classified and/or designated groundwater

MCHB-TS-EGW

**SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES
STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010**

beneath SWMU 73 as solely for non-potable uses). An assessment of baseline conditions is necessary to assist in making risk management decisions.

USAPHC Response: Groundwater ingestion for future residents will be added

Inhalation of dust should be evaluated for future hypothetical residents. In order to evaluate baseline conditions, this exposure pathway should be evaluated in the HHRA. Given that a portion of the site is covered by gravel and not vegetated, revise the HHRA to evaluate inhalation of soil-derived dust at SWMU 73 for future hypothetical residents.

USAPHC Response: As discussed previously, this pathway was generally omitted from this assessment due to its typically minor significance to overall risk levels. In addition, though portions of the site may be devoid of vegetation currently, if the site were used for residential development it would likely be paved or covered with maintained lawns or other landscaping thereby minimizing any future dust emissions. ,

Additionally, revise Table 40, Potentially Complete Exposure Pathways, to show inhalation of dust-derived soil and vapor as a potentially complete exposure pathways, and revise Table 42, Toxicity Reference Values, to include inhalation toxicity criteria (i.e., inhalation reference dose and inhalation unit risk).

15. It appears that appropriate surrogates could be identified for a few compounds listed in Table 42, Toxicity Reference Values, as missing available toxicity criteria (e.g., pyrene is often used as a surrogate for acenaphthylene). Additional attempts to identify appropriate surrogates for compounds missing toxicity criteria should be made and the risk and/or hazard values updated accordingly. Also, revise the footnotes of Table 42 to identify which compounds utilize surrogate criteria and define "*" in the footnotes. Further, Table 42 indicates that toxicity criteria do not exist for Aroclor 1248; however, toxicity criteria for this compound are available in EPA's RSL Table. Finally, ensure that Table 42 is updated to include inhalation toxicity criteria.

USAPHC Response. Additional attempts to identify suitable surrogate toxicity reference information will be made and documented.

16. While the HHRA presents a discussion of noncarcinogenic compounds driving the hazard index, the HHRA does not include a discussion of the carcinogenic compounds that drive the cancer risk above 1E-06. Revise Section 8.0 and Section 9.2, Human Health, to include a discussion of the compounds that drive risk at SWMU 73.

USAPHC Response. Text will be added.

SPECIFIC COMMENTS

MCHB-TS-EGW

**SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES
STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010**

17. **Section 6.1.1, April 2008 Sampling Event, Page 15:** This section states that five VOCs were detected in surface soils samples 73SB01 through 73SB24 and that all data were J-qualified with a negative bias from failure to meet temperature preservation requirements. However, Table 4 does not show all VOC samples as being "J-qualified". Revise the Study Investigation to clarify this discrepancy in the text and tables and ensure all data are qualified correctly.

USAPHC Response: Text will be modified.

18. **Section 6.1.2, January 2009 Sampling Event, Page 16:** This section makes no reference to the fact that surface soil samples were collected in January 2009 for PAH analyses, as presented in Table 8, Chemical Results of Follow-up Surface Soil Samples from zero (0) to one (1) foot in depth at the 19E-03 Location (January 2009). Revise this section to provide a summary and discussion of the January 2009 PAH sampling results.

USAPHC Response: Text will be modified.

19. **Section 6.3.2, January 2009 Sampling Event, Page 19:** This section states that there were no significant detections of low-level polynuclear aromatic hydrocarbons (LLPAHs) at sample location 73MW03. However, the section also states that most LLPAH data were rejected during data validation due to very low recoveries of matrix spike samples. It appears that there may be matrix interference and that samples may be biased low. However, the section does not specify which samples were rejected, or if any samples were qualified as estimated. Revise the section to provide this information.

USAPHC Response: Text will be modified.

20. **Section 6.4.1, Field Duplicate Samples, Page 20:** This section states that field duplicate results generally indicated acceptable precision and representativeness. However, neither this section, nor Appendix D, specify which samples and what analyses had field duplicate results outside acceptable quality control (QC) criteria. Revise the section to identify which field duplicate results were outside QC criteria.

USAPHC Response: Text will be modified.

21. **Section 6.4.3, Field Blank Samples, Page 20:** This section states that many of the field blank LLPAH results from the January 2009 sampling event were rejected as a result of matrix failures. However, it unclear how it was concluded that QC exceedances in blanks were matrix failures. Further, it is not specified how many field blank results were rejected and how it was verified that no field blank contamination existed. Revise the section to discuss this further and to clarify how these rejections affected data quality.

USAPHC Response: Text will be modified.

MCHB-TS-EGW

**SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES
STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010**

22. **Section 7.2.4.2, Birds. Page 24:** The second full paragraph describing commonwealth species (Least tern, Least grebe, West Indian whistling duck, Caribbean coot and Snowy plover) in this section should provide a summary statement regarding the potential occurrence (or lack thereof) of these species at SWMU 73, similar to that provided in previous subsections of the Study Investigation. Revise the section of the report regarding birds accordingly.

USAPHC Response: Text will be added to indicate the likelihood of the commonwealth species occurrence at SWMU 73.

23. **Section 7.2.4.3, Reptiles and Amphibians. Page 25.** This section should summarize if SWMU 73 provides any habitat suitable for the species of special concern. Revise Section 7.2.4.3 to indicate if any habitat suitable for the species of special concern exists at SWMU 73.

USAPHC Response: Text will be added to this section to indicate the presence of suitable habitat for the species of special concern.

24. **Section 7.2.4.5, Threatened and Endangered Species. Page 26:** This subsection fails to mention the presence or absence of the "Cobra negra", a threatened plant species (from Table 19). Either this section, or Section 7.2.2 Terrestrial Habitats, page 23, should address this species. Revise the text to include this information.

USAPHC Response: Text will be added to this section to include the threatened plant species.

25. **Section 7.3.4, Assessment Endpoints. Page 29.** This Section provides measurement and assessment endpoints for "individual" target avian receptors, as well as "wildlife populations". Since the measurement endpoint methods in the analysis phase do not distinguish between population or individual endpoints, there is no need to identify the individual endpoints as being a potentially separate endpoint. This Section should be consolidated to mention only the population endpoints. In the alternative, the text should be revised to mention that the population endpoints will address the threatened and endangered species concerns using a surrogate target receptor approach. Revise the text accordingly.

USAPHC Response: The assessment and measurement endpoints for the T&E species will be omitted and included in the assessment and measurement endpoints for wildlife populations. The robin was selected as the surrogate species to the yellow-shouldered blackbird as identified in Section 7.3.3; however, additional text can be added in the assessment endpoint section for wildlife populations to reiterate this point.

26. **Section 7.4.2, Ingestion-Based Screening Values. Page 29:** This subsection needs to mention that the screening values refer to "no observable adverse effect level" (NOAEL) values. Revise the text to include this information.

MCHB-TS-EGW

**SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES
STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010**

USAPHC Response: The Work Plan (in Appendix D) referred to in Section 7.4.2 of the SWMU 73 report indicates that NOAELs were used as ingestion-based screening values. However, text can be added to this section to indicate that the ingestion-based screening values were based on NOAELs.

27. **Section 7.7.2, Screening-Level Risk Calculation for Surface Soil, Subsurface Soil, Groundwater and Terrestrial Food Web Exposures, Pages 36 through 37.** This section summarizes the hazard quotient (HQ) assessments for each measurement endpoint. As per the rules for “Selection of Ecological Chemicals of Potential Concern” in Section 7.7.1, Page 35, non-detected chemicals without media-specific screening values should be identified as ecological COPCs. Hence, the subsections in Section 7.7.2 should also describe these COPCs. Revise the text accordingly.

USAPHC Response: Sections 7.7.2.1 – 7.7.2.3 do provide information on those chemicals that lacked screening values and were identified as ecological COPCs.

28. **Section 7.7.2.1, Screening-Level Risk Calculation for Surface Soil, Page 36.** The second sentence states that “no VOCs were retained as COPCs.” However, the last sentence recognizes that certain VOCs were retained since some of these chemicals lacked soil screening values. Revise the text to state that certain VOCs were retained as COPCs.

USAPHC Response: The text will be reworded for clarity purposes to include VOCs that lacked soil screening values as COPCs.

29. **Section 7.7.2.3, Screening-Level Risk Calculation for Groundwater, Page 37.** This section lists “silver” as a metal with an HQ above one (1). However, Table 28 shows that silver has an HQ less than one (1), but tin has an HQ above one (1). Revise the Study Investigation to correct the discrepancy.

USAPHC Response: The text will be revised as necessary.

30. **Section 7.10.1.1, Step 3a Risk Evaluation for Surface Soil, Page 42.** The risk characterization for chromium is not compelling enough to support the conclusion “that further evaluation for chromium is not recommended”. As per standard guidance, COPCs with HQs above 1 should be further assessed; therefore it is recommended that the summary statistics (as provided in Table 35) and spatial distribution of chromium be evaluated to determine if the nature and extent of this COPC is of concern. This information should also include a point-by-point comparison to background levels to help determine if hot-spots occur or to determine if the extent of chromium is significant. Revise this discussion by incorporating a spatial discussion in terms of chromium nature and extent as compared to thresholds and background levels.

USAPHC Response: This section will be reworked to address the above concerns for chromium.

MCHB-TS-EGW

**SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES
STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010**

31. **Section 7.10.1.1., Step 3a Risk Evaluation for Surface Soil, Page 43.** This subsection describes the risk characterization conclusions for the red-tailed hawk, yet the third sentence in the second paragraph refers to a screening criterion of 401 µg/kg, which is not relevant to this receptor. Revise this paragraph to focus strictly on the hawk receptor. Note that the same error appears in the subsections for the American robin on Page 43 and the mourning dove on Page 45, both of which should also be revised.

USAPHC Response: This section will be reworked to address the above concerns for the appropriate ecological receptors.

32. **Section 7.10.1.1, Section 3a Risk Evaluation for Surface Soil, Page 43.** The subsection dedicated to the American robin should emphasize that this receptor is a surrogate for the yellow-shouldered blackbird, a legally-protected species. As mentioned in the General Comments, the ERA does not fully evaluate the risk to this target species and needs to be revised accordingly. The discussion in this subsection also “dilutes out” the potential risk to the yellow-shouldered blackbird by using HQs based on the maximum allowable toxicant concentration (MATC) and the lowest observed adverse effect level (LOAEL). These less stringent toxicological endpoints are not appropriate to assess the potential ecological risk to a protected species. Revise this subsection to provide a more thorough and conservative estimate of risk to the yellow-shouldered blackbird.

USAPHC Response: Section 7.3.3 describes the robin’s use as a surrogate to the yellow-shouldered blackbird, however, additional text that refers to Section 7.3.3 can be added in this section to reemphasize this point. A comparison of NOAEL versus MATC or LOAEL based HQs will be left in the report. However, conclusions for the robin will focus on NOAEL based HQs.

33. **Sections 7.10.1.1, 7.10.1.2 and 7.10.1.3, Step 3a Risk Evaluation for Surface Soil, Subsurface Soil and Groundwater, Pages 40 through 50.** The information in these sections could not be verified based on the HQs provided in Table 34. A summary of the discrepancies are noted as follows:

- As per Table 26, the SLERA COPCs for surface soil include benzo (a) anthracene, benzo (a) pyrene, benzo (b) fluoranthene, benzo (g,h,i) perylene, benzo (k) fluoroanthene, fluoranthene, indeno (1,2,3-cd) pyrene, dieldrin, heptachlor, heptachlor epoxide, barium, lead, nickel, selenium and zinc; which are not summarized in Table 34. Table 34 has a dashed line under the “surface soil” column for chromium, cobalt and copper (which should be defined in the footnotes) suggesting that these metals are not surface soil SLERA COPCs, even though they are identified as such in Table 26. The text that coincides with these data (refer to lines 1725 through 1728, page 42) indicates that these COPCs are not evaluated since the HQs are less than one (1). While this may be the case, the conclusions could not be verified without the tabular data. Only some of the

MCHB-TS-EGW

**SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES
STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010**

summary text in this section could be verified without information from Table 34. At a minimum, these chemicals need summary risk conclusions presented (similar to the summaries provided for Kepone, chlordane and others) in order to characterize their risk. This section also presents a frequency of exceedence discussion for Chlordane (beginning on line 1657) that could not be independently verified. A sample-by-sample summary data set needs to be included if this type of line of evidence is to be used. Revise the text accordingly.

- As per Table 27, the SLERA COPCs for subsurface soil include acetone, chlordane, selenium, vanadium and mercury which are not summarized in Table 34. Table 34 has a dashed line under subsurface soil for chlordane, cadmium, chromium, cobalt and mercury that needs to be defined. Section 7.10.1.2 also does not summarize risk conclusions for acetone, selenium, vanadium and zinc. Revise the text to include this information.
- As per Table 28, the SLERA COPCs for groundwater include nickel and tin which are not summarized in Table 34. Table 34 has a dashed line under ground water for cadmium, cobalt and zinc which needs to be defined. This table should also present available HQs, where appropriate. The risk characterization for the ground water COPCs is cursory. Further discussion about COPC attenuation, dilution and possible effects to the bay ecosystem need to be presented in order to bring this potential exposure pathway to closure. Revise the text accordingly.

USAPHC Response: Text will be revised as appropriate to address the above concerns. Data tables 1-13 will also be referenced in the text as indicated.

- 34. Section 7.10.2, Uncertainties Associated with Step 3a of the Baseline Ecological Risk Assessment, Page 51.** This section is incomplete given the amount of assumptions (both under- and over-conservative) used in Step 3.a. This section should be revised to revisit each major component to the Step 3a process and discuss the uncertainties inherent to the process. For instance, it was noted that certain partition factors applied to the food chain modeling of accumulative chemicals (i.e., the bioaccumulation factor of 1.0 for dichlorodiphenyldichloroethane (DDD), dichlorodiphenyldichloroethylene (DDE), and dichlorodiphenyltrichloroethane (DDT) are too generic in light of the available information for these chemicals (see Table 4.b in Attachment 4-1, Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs), *Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs*, OSWER Directive 9285.7-55). This issue is particularly important in light of the relatively high risks associated with DDD, DDE, and DDT to the wildlife receptors feeding at SWMU 73, including the surrogate for the yellow-shouldered blackbird (see Tables 36 and 37 in Section 7). Revise this section thoroughly to provide a more complete assessment of the uncertainty associated with Step 3a.

USAPHC Response: Additional text will be included in this section for completeness purposes.

MCHB-TS-EGW

SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010

35. **Section 8.3.1, Data Reduction, Page 55:** Section 8.3.1 indicates that ProUCL Version 4.00.04 was used for all distribution tests, outlier tests, and comparison of background to site data except for tests of proportion. It is unclear why ProUCL Version 4.00.04 was not used for tests of proportion when such tests are included in the software. Revise Section 8.3.1 to explain why StatXact was used in lieu of ProUCL for all tests of proportion. Further, include a citation for StatXact in the list of references at the end of Section 8.0.

USAPHC Response: StatXact provides exact probability values for contingency table comparisons and therefore was chosen over ProUCL when performing tests of proportions (i.e. contingency tables). Exact methods, as opposed to asymptotic methods, are preferred if they are available, because they provide fewer erroneous results.

36. **Section 8.3.2, Screening of Sampling Data, Page 55:** For the purposes of determining risk and hazards to current and future site receptors, the Federal Maximum Contaminant Level (MCL) should not be used to eliminate COPCs. The MCL is regulation-based and is not a risk-based screening criterion. While this may not significantly impact the SWMU 73 CMS, ensure that future investigations at other SWMUs do not eliminate compounds from the quantitative risk assessment on the basis of their MCL values. Review the screening approach for groundwater at SWMU 73 and clarify that all compounds exceeding risk-based criteria (i.e., tap water RSLs) in groundwater were carried forward in the quantitative risk assessment.

USAPHC Response: Agreed.

37. **Section 8.5, Exposure Assessment, Page 56:** Section 8.5 does not clearly indicate if buildings are present on-site. It appears that currently no buildings exist on-site; however, this should be clarified in the Exposure Assessment of the HHRA. Revise Section 8.5 to clearly indicate whether buildings are present on the site or not.

USAPHC Response: Text will be revised to clarify the existence or absence of buildings on site.

38. **Section 8.9.3.2, Carcinogenic Risk Results, Page 65:** This section states, “[w]hile all of the calculated cancer risk levels were above the 1E-6 level, none exceeded 1E-4 indicating that an unacceptable cancer risk does not exist at the site under the conditions evaluated.” It should be noted that while cancer risks falling between the range of 1E-06 and 1E-04 may be deemed acceptable by the EPA, this decision is made on a site-specific basis. Revise Section 8.9.3.2 to indicate that the ultimate decision regarding an acceptable level of residual risk lies with EPA.

USAPHC Response: Text will be modified to acknowledge EPA’s decision authority.

39. **Section 8.10, Vapor Intrusion Modeling, Page 65:** Section 8.10 describes the vapor intrusion evaluation conducted at SWMU 73. The Johnson and Ettinger Model (JEM) was used to model indoor air concentrations, however, EPA does not support the use of the JEM

MCHB-TS-EGW

**SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES
STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010**

model as the sole line of evidence to discount the vapor intrusion pathway. Revise the SWMU 73 CMS to address the following:

- Revise the HHRA to compare groundwater data to groundwater target levels presented in Table 2c of the *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* dated November 2002 (Subsurface VI Guidance). Based on a cursory review, it appears that groundwater data do not exceed groundwater vapor intrusion criteria; therefore, it appears that the vapor intrusion pathway is incomplete. However, a comparison to Table 2c vapor intrusion criteria should be included in the HHRA as part of a complete vapor intrusion assessment to demonstrate whether vapor intrusion is a potentially complete pathway. USAPHC Response: Report will be modified to include this screening step.
- Given that buildings are not present on-site, indicate that the construction parameters used in the J&E model represent default values.

USAPHC Response: Agreed

- Delete Table 46, Vapor Intrusion Model Results – Subsurface Soil, and associated JEM data pages in Appendix I, JEM Data Tables. Conclusions regarding the applicability of the vapor intrusion pathway should not be based on soil data. The Subsurface VI Guidance indicates that “use of soil concentrations for assessment of [the VI] pathway is not encouraged...” due to the uncertainties with soil partitioning calculations, soil sampling and soil chemical analyses for volatile organic compounds.

USAPHC Response: Report will be modified accordingly.

40. **Section 8.13.3, Results, Page 68:** Section 8.13.3 does not reference Appendix H, which contains the corrective action objective (CAO) calculations. Revise Section 8.13.3 to reference Appendix H.

USAPHC Response: Text will be modified accordingly.

41. **Section 8.13.3, Results, Page 69:** Section 8.13.3 indicates that the Aroclor 1254 CAOs were compared with the reported site concentrations to determine the rate at which the CAOs were exceeded. Based on this comparison, only two (2) samples returned concentrations above the future hypothetical child resident CAO of 328 µg/kg, and the corresponding samples actually had non-detect results that were subsequently included at the reporting limit (RL) and remained in the dataset. This section indicates that the inclusion of these data appears to have affected the risk and hazard significantly. As such, the text should be revised to clarify if the sample quantitation limit (SQL) was also elevated for Aroclor 1254 (not sufficient to meet the risk-based screening level) and if so, identify the elevated SQL as a data gap and explain if the sample was diluted or if there were matrix interferences in the sample, etc.

MCHB-TS-EGW

**SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES
STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010**

Further, the text should be revised to describe how this data gap will be addressed. If additional sampling is not proposed, sufficient justification for why additional sampling is not required to fill this data gap should be provided. Risk and hazard values for Aroclor 1254 should be updated after the apparent data gap has been addressed, or sufficient rationale for not updating the risk and hazard values should be included in the HHRA uncertainty analysis. Revise the Study Investigation accordingly.

USAPHC Response: This data quality issue will be investigated further and the text will be revised accordingly.

42. **Section 8.13.5, Conclusions and Recommendations, Page 69:** The HHRA concludes that remedial action at SWMU 73 is not necessary. However, given that risks to various site receptors fall within EPA's risk management range 1E-06 to 1E-04, the assertion that "any type of remedial action at SWMU 73 would not be necessary based on the findings of this human health evaluation" should be deleted from Section 8.13.5. Ensure this statement is deleted from Section 8.13.5 and similarly revise Section 10.0, Recommended Action. Additionally, it should be noted that EPA makes the final decision regarding the acceptable level of residual risk when site risks fall within 1E-06 and 1E-04.

USAPHC Response: Noted.

43. **Table 12, Chemical Results for Ground-Water Samples (April 2008):** The footnotes of Table 12 do not indicate that a surrogate compound was used to evaluate di (2-ethylhexyl) phthalate (DEHP). Revise Section 8.0, Human Health Risk Assessment and Development of CAOs, to discuss any compounds evaluated based on surrogate toxicity, and revise the footnotes of Table 12 to indicate that the tap water RSL for bis (2-ethylhexyl) phthalate was used to screen results for DEHP.

USAPHC Response: Agreed

44. **Table 27.** The HQs above one (1) need to be bolded, similar to the format presented in Table 26. Revise Table 27 accordingly.

USAPHC Response: HQs above 1 will be bolded to remain consistent with Table 26.

45. **Table 28.** The HQs above one (1) need to be bolded, similar to the format presented in Table 26. The concentration units need to be changed from $\mu\text{g}/\text{kg}$ and mg/kg to $\mu\text{g}/\text{L}$ and mg/L ; the second footnote at the bottom of Table 28 should reflect this adjustment. Finally, the table heading for the metals screening values needs to be changed from "surface soil" to "ground water." Revise Table 28 to address each of these items.

USAPHC Response: The units and text will reflect the media of interest (i.e., groundwater).

MCHB-TS-EGW

**SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES
STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010**

46. **Table 29.** The full chemical name for “Aroclor” (Aroclor-1254) should be provided within this table, and the table needs to define the meaning of the “dashed” lines within the table boxes (this same comment applies to Table 30). Revise Tables 29 and 30 accordingly.

USAPHC Response: The Table will be revised accordingly.

47. **Table 34.** This table includes information for chemicals that were eliminated as per information provided in Section 7.10.1.1 (i.e., kepone, chlordane, DDD, DDE, DDT, Hg, Zn and Cu). It is not clear why these chemicals are summarized in this table when they are eliminated from the risk assessment process. Either clarify in the text that the information was used as part of the risk characterization, or remove the eliminated chemicals from this table for consistency.

USAPHC Response: The Table will be revised accordingly.

48. **Table 35.** The text does not refer to this table, and it is not clear how or if this information is used. The information would help the risk characterization for chromium as mentioned in the Specific Comment on Section 7.10.1.1, Step 3a Risk Evaluation for Surface Soil, Page 42. Revise the text to incorporate the information contained in this table.

USAPHC Response: The text refers to Table 35 in various instances throughout the report (e.g., lines 1800, 1839, and 1867 to name a few) and eliminates chemicals in Section 7.10.1.1 – 7.10.1.3 (Step 3a Risk Evaluation for Surface Soil, Subsurface Soil, and Groundwater) from further evaluation based on background concentrations.

49. **Tables 36 and 37, Exposure Point Concentrations in Surface Soil and Subsurface Soil, respectively:** Tables 36 and 37 do not provide the concentration units (i.e., ug/kg or mg/kg). Revise these tables to include concentration units.

USAPHC Response: Tables will be modified.

50. **Appendix D, Laboratory Data Validation Reports:** Appendix D discusses major and minor anomalies in the data. However, it is unclear what QC data was reviewed. For example, calibration results and manual integrations are not discussed. Revise the Appendix D to clarify what QC criteria was analyzed for anomalies and to present all anomalies found.

USAPHC Response: Text will be clarified.

51. **Appendix H-5, CAO Calculations:** Appendix H-5 contains the construction worker CAO calculation, but not the hypothetical residential child CAO calculation. Revise Appendix H-5 to include the hypothetical residential child CAO calculation.

USAPHC Response: Appendix will be modified as appropriate.

MCHB-TS-EGW

**SUBJECT: TECHNICAL REVIEW OF THE DRAFT CORRECTIVE MEASURES
STUDY INVESTIGATION SWMU 73 DATED FEBRUARY 4, 2010**

MINOR COMMENTS

52. **Section 7.5, Analysis Methodology – Exposure Assessment. Page 31.** The text provided on line 1301 should refer to an “organic” COPC for clarification. Revise the text accordingly.

USAPHC Response: Text will be included to refer to “organic” COPCs for clarification purposes.

53. **Section 7.6.1, Selection Criteria for Analytical Data. Page 31.** The text in this section should be written in “past tense” rather than future. Revise the text accordingly.

USAPHC Response: Text will be revised accordingly.

54. **Tables 24 and 33.** The species “Red-tailed hawk” is misspelled in both Tables, and the small mammal “row” was inadvertently wrapped around in Table 33.

USAPHC Response: Text will be revised accordingly.