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COMMONWEALTH OF PUERTO RICO
Office of the Governor
Environmental Quality Board

Environmental Emergencies Response Area

December 2, 2008

Mr. Kevin Cloe, P.E.
Remedial Project Manager
Commander Atlantic Division
Naval Facilities Engineering Command
6506 Hampton Boulevard
Norfolk, VA 23508-1278

RE: Draft Pre-Removal Waste Characterization Human Health Risk Assessment and Ecological Risk Assessment for AOC J, AOC R, SWMU 6 and SWMU 7, Former Naval Ammunition Support Detachment, Vieques

Dear Mr. Cloe:

The Puerto Rico Environmental Quality Board (PREQB) has completed its review of the Navy's Draft Pre-Removal Waste Characterization Human Health Risk Assessment and Ecological Risk Assessment for AOC J, AOC R, SWMU 6 and SWMU 7, Former Naval Ammunition Support Detachment, Vieques, Puerto Rico. Enclosed our comments.

If you have any questions or comments, please contact me at (787) 767-8181 X.6141.

Cordially,

Wilmarie Rivera
Federal Facilities Coordinator

cc: Daniel Rodríguez - EPA
Richard Henry - FWS
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Christopher Penny - Navy

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PREQB Comments on Pre-Removal Waste Characterization Human Health Risk Assessments for AOCs J and R and SWMUs 6 and 7, Former Naval Ammunition Support Detachment, Vieques, Puerto Rico

Due to the similarities between the human health risk assessments (HHRAs) for these sites, the comments for all four reports are presented herein.

Comments Applicable to All Sites

1. Section 1.1. This document relies on the approach and assumptions presented in the *Technical Memorandum for the Interim Deliverable for the "Waste Characterization" Human Health Risk Assessment – RAGS (Risk Assessment Guidelines for Superfund) Part D Tables – AOC J, Vieques, Puerto Rico* (CH2M HILL, 2008a). Therefore, please ensure that the HHRA reports include all the information presented in the Technical Memoranda because they are not considered public documents. The public does not have access to the technical memoranda, so they should not be referred to other than to indicate that the information presented therein and agreed upon by the agencies has been incorporated into these documents.

2. Section 2.1. For clarity, this section should include a discussion of the rationale for using total soil as the dataset for all receptors. The discussion should clarify that the soil will be excavated, resulting in mixing of surface and subsurface soil. Also, this section should state that samples collected from below excavation depth were also not included in the dataset.

3. Section 3.2.1. The Navy proposes to use the maximum detected concentration when there are less than two detects in a dataset. This approach was not presented in the Interim Deliverable nor does it appear to be consistent with USEPA's ProUCL Version 4.00.02 guidance, which states in Section 1.10.1:

   > When all of the sampled data values are reported as nondetects, the EPC term should also be reported as a nondetect value, perhaps by the maximum reporting limit (RL) or maximum RL/2. Statistics (e.g., UCL95) computed based upon only a few detected values (e.g., < 4 to 6) cannot be considered reliable enough to estimate the EPC terms having potential impact on the human heath and the environment. ..

   USEPA recommends a minimum of 4 detects in a dataset to calculate a 95% UCL of the mean. For datasets less than eight samples or for datasets of at least eight samples where less than 4 datapoints are nondetects, the maximum detected concentration should be used. Please revise the HHRA accordingly.

4. Table 6.1. If the soil will be used as daily landfill cover rather than be placed back on-site, please include a sensitivity analysis for the size of the impacted soil area's affect on the particulate emission factor and discuss the overall contribution to total site cancer risks and hazards associated with the inhalation of volatiles exposure pathway. This exposure pathway is of concern to the public and a quantitative

AOC R HHRA Comments

1. Attachment 3.
   a. In general, the results reported from the November/December 2000 and February 2008 data set for metals appear to be reported down to the MDL instead of the quantitation limit. The metals results in the December 2005 and March 2006 data sets were correctly reported down to the quantitation limit. Typically, the MDL is a statistically derived value that is not accurately verified by the laboratory analysis. EPA states that "Because SQLs take into account sample characteristics, sample preparation and analytical adjustments, these values are the most relevant [quantitation limits] for evaluating non-detected chemicals (EPA, 1989)." In addition, the SQLs are accurately verified by laboratory analyses of standards at the unadjusted quantitation limit. It should be noted that SQLs are typically 3-5 times higher than MDLs prior to adjustment for sample-specific solutions, etc. The use of the MDL, unless equivalent to EPA's SQL, will likely underestimate potential risks by assuming a lower surrogate concentration for non-detects than a surrogate based on an SQL. The use of the MDL is inappropriate for determining representative concentrations and is inconsistent with EPA guidance (Risk Assessment Guidance for Superfund Volume I, Human Health Evaluation Manual (Part A) Interim Final, December 1989).
   b. For the November/December 2000 data set, an explanation is needed as to why results for only three explosives were reported. All other data sets included results for 14 explosives.
   c. Please explain why the depth range for sample VWAR-SO0009 is listed as 6-2 in Attachment 3. This appears to be an error.

SWMUs 6 and 7 HHRA Comments

1. Table 11.1a. Please revise the following information:

   Was soil sample taken from top 2 cm? If not, why? No. Surface soil and subsurface data set was used to represent subsurface soil.

   The underlined word should be surface soil.

2. Attachment 3, SWMU 6.
   a. In general, the results reported from the April 2000 and August 2003 data set for metals appear to be reported down to the MDL instead of the quantitation limit. The metals results in the February 2008 data set were correctly reported down to the quantitation limit. Typically, the MDL is a statistically derived value that is not accurately verified by the laboratory analysis. EPA states that "Because SQLs take into account sample characteristics, sample preparation and analytical adjustments, these values are the most relevant [quantitation limits] for evaluating non-detected chemicals (EPA, 1989)." In addition, the SQLs are accurately verified by laboratory analyses of standards at the unadjusted quantitation limit. It

PREQB Comments on Draft Pre-Removal Waste Characterization Ecological Risk Assessments for AOCs J and R and SWMUs 6 and 7, Former Naval Ammunition Support Detachment, Vieques, Puerto Rico

General Comments

1. Soil screening values such as Ecological Soil Screening Levels (EcoSSLs) were used both to select contaminants of potential concern (COPCs) and to assess potential risks to plants and soil invertebrates from direct exposures to surface soil. Although EcoSSLs are available for several avian and mammalian feeding guilds, these EcoSSLs were not used as screening values to develop a list of COPCs for birds and mammals, nor as measurement endpoints to calculate preliminary, screening level hazard quotients (HQs) for these wildlife receptor groups. However, for several chemicals, the lowest available EcoSSLs for birds or mammals are lower than the EcoSSLs for plants or soil invertebrates. Using only the plant and soil invertebrate EcoSSLs resulted in the elimination of additional chemicals (among the 4 sites) that should have been identified/retained in the screening-level ecological risk assessment (SERA) as COPCs for wildlife receptors, for which food chain exposures then should be assessed in the baseline ERA (BERA). Use of these avian and mammalian EcoSSLs in a separate COPC screening step for wildlife also would have eliminated several COPCs from the assessment of food chain exposure risks (e.g. most PAHs at one or more sites). Please: **(a)** add a measurement endpoint to the exposure assessment endpoints and risk hypotheses for birds and mammals, to compare the maximum detected soil chemical concentrations to the bird and mammal EcoSSLs, where available, in the SERA; **(b)** screen the COPCs and calculate screening-level HQs for each wildlife receptor group, either for each of the herbivore, omnivore, and carnivore feeding guilds, or using the lowest EcoSSL for the most sensitive of these guilds; and **(c)** calculate dietary doses and exposure risks to birds and mammals only for those COPCs that either exceed or lack wildlife EcoSSLs in the BERA. This will assure that no COPCs are overlooked for sensitive wildlife and help eliminate some COPCs earlier in the process, while providing valuable context for the food chain exposure assessment and a helpful cross-check for the HQs based on estimated dietary doses in the BERA.

2. Several inorganic and organic COPCs (e.g., lead, pesticides) were eliminated at one or more sites using a screen against background concentrations in the SERA, despite their average and/or maximum soil concentrations exceeding screening benchmarks for plants and soil invertebrates. Please clarify why compounds were eliminated at the SERA stage based on a comparison to background, and clarify why background concentrations were established for pesticides, considering that these sites were uncontrolled waste dump sites. Pesticides and/or containers with pesticide residues could have been dumped at any one of the sites.

3. The report uses the misnomer "ingestion screening values" for what are actually TRVs. TRVs include dose-related toxicity thresholds such as No Observed

Adverse Effect Levels (NOAELs) and Lowest Observed Adverse Effect Levels (LOAELs). Screening values are chemical concentrations in physical media above which an adverse biological or ecological effect may occur to a specific receptor group (e.g. AWQC or EcoSSLs). While EcoSSLs can be considered as "ingestion-based" screening values because they are based on comparisons of ingested dietary doses of a chemical to a TRV for that chemical, TRVs are not used, *per se*, as screening values. Please globally replace the term "ingestion screening values" with TRV, LOAEL, or NOAEL.

4. It appears that several chemicals (e.g., antimony, lead and vanadium) were prematurely eliminated as COPCs for birds and mammals at one or more sitesbased on comparisons to EcoSSLs for plants and soil invertebrates. These metals were dropped despite having average and/or maximum concentrations higher than their avian and mammalian EcoSSLs. Because no bird and/or mammal TRVs are presented for some metals, it appears that they were not eliminated based on a dietary dose being lower than the lowest NOAEL. This underscores the importance of using the bird and mammal EcoSSLsin a separate COPC screening step for wildlife receptors in the SERA.

5. For several COPCs (e.g., copper, nickel, silver, zinc and PAHs), the bird and mammal NOAELs and/or LOAELs proposed for use in the food web risk calculations are too high and exceed the TRVs that were rigorously scrutinized and used by USEPA to develop EcoSSLs for birds and mammals. Use of these higher NOAELs and/or LOAELS, as well as the maximum acceptable toxicant concentrations (MATCs) calculated from these TRVs, will significantly underestimate food chain exposure risks to birds and mammals. Specific comments are provided below about the choice of TRVs for selected COPCS and general guidelines are offered for the selection of more appropriate and more protective TRVs from recent USEPA guidance on ERA.

6. Many soil-plant bioconcentration factors (BCFs) and soil-invertebrate or soil-small mammal bioaccumulation factors (BAFs) used to calculate food chain mediated exposure doses and risks to birds and mammals are too low and thus insufficiently protective (e.g., PAHs, pentachlorophenol, dieldrin and DDT compounds). Use of unrealistically low BAFs will underestimate the COPC dietary doses ingested by birds and mammals. Many BAFs are based on outdated literature that has been superseded by more recent USEPA compilations of BAFs and related EcoSSL/ERA guidance, such as *Attachment 4-1 of the Guidance for Developing Ecological Soil Screening Levels (EcoSSLs): Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs* (USEPA OSWER Directive 9285.7-55, Revised April 2007). This EcoSSL document provides a wealth of peer-reviewed BAFs for plants, soil invertebrates, and small mammals, as well as regression equations for calculating BAFs based on soil concentrations. These compiled BAFs and regressions were used by USEPA in food chain exposure assessment models to derive the EcoSSLs for avian and mammalian herbivores, omnivores, and carnivores. Thus, it was not necessary to assume a

default soil-invertebrate BAF of 1 nor assume a diet-small mammal whole body BAF of 1 to estimate COPC burdens in soil invertebrates and small mammal prey. When available, the compiled BAFs and chemical-specific regressions should be used in the ERA to calculate COPC concentrations in the food items of avian receptors. Please reassess and revise, as needed, the BAF selections using BAFs from the EcoSSL documents for specific COPCs and/or calculated using the regressions prescribed for inorganic and organic contaminants in the EcoSSL bioaccumulation guidance.

7. Data Assessment
   a. The data appear to be validated as qualifiers such as "UJ" are present on the data.
   b. In order to adequately assess the quality of the data being used in the risk assesment, copies of the data validation reports should be provided.

Page-specific Comments

8. **Page iii, Acronyms** – Please add EcoSSL, TRV, low molecular weight (LMW) and high molecular weight (HMW).

9. **Page 2-3, Section 2.2 Conceptual Model - Endpoints and Risk Hypotheses and Table 2-2.** As requested above in GC #1, please add a measurement endpoint to the exposure assessment endpoints and risk hypotheses for birds and mammals, to compare the maximum detected soil chemical concentrations to the bird and mammal EcoSSLs, where available, in the SERA.

10. **Page 2-3, Section 2.2 Conceptual Model - Endpoints and Risk Hypotheses and Table 2-2.** Please add birds as a prey item for the red-tailed hawk or discuss uncertainties about the assumed diet of the red-tailed hawk at each AOC and SWMU to acknowledge that hawks are unlikely to prey solely on rats. Hawks also are likely to prey on smaller birds and perhaps reptiles, such as lizards, for which COPC uptake and food chain exposures of the hawks were not evaluated.

11. **Page 3-1, Section 3.1.1 Exposure Point Concentrations and Table 3-2.** It is stated that "*Default factors of 1.0 were used only when data were not available for a chemical in the literature.*" However, as noted in the preceding general comments, BAFs, BCFs or chemical-specific regressions are available for many of the chemicals for which a default factor of 1.0 was used. Please update all of the BAFs and BCFs using the referenced USEPA guidance documents or other current sources, so that default BAFs/BCFs of one are used only as a last resort.

12. **Pages 3-1 to 3-4, Section 3.1.1 Exposure Point Concentrations, and Table 3-2.** As noted in the General Comments, many of the soil-plant, soil-invertebrate and soil-small mammal BAFs used to calculate chemical concentrations in the diet of birds and mammals are too low and were derived from outdated literature sources.

Please revise the BCFs and BAFs for food items in Table 3-3 using a combination of the chemical-specific, median values or regression equations presented in *Attachment 4-1 of the Guidance for Developing Ecological Soil Screening Levels (EcoSSLs): Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs* (USEPA, April 2007). Because the soil-to-small mammal BAFs used for organic COPCs do not appear in Table 3-2, no attempt was made to provide examples of the more recent small mammal BAFs presented in the EcoSSL guidance or other ERA guidance (e.g. Combustion Facility Guidance HHRAP Database with biotransfer factors for vegetation, grains, poultry, beef, pork). Please revise Table 3-2 to include BCF and BAF median values or regressions from the EcoSSL guidance to recalculate bird and mammal dietary doses. An explanation of the source and derivation method for each BAF should be included, such as use of chemical specific BCF/BAF values or regressions from the EcoSSL bioaccumulation guidance (USEPA 2007), a median values from other published sources, or "assumed" values.

13. **Page 3-2, Section 3.1.1 Exposure Point Concentrations – Terrestrial Plants and Table 3-2.** Please revise the text to indicate that the sediment-to-plant BCF "*algorithm provided in EPA (2005)*" will be used only when COPC-specific BCFs or BCF regression equations are not available in the EcoSSL bioaccumulation guidance (USEPA, 2007). As discussed in the general comments, please revise and update the BCFs in Table 3-2 accordingly. Some examples of the soil-to-plant BCFs in Table 3-2 that are too low to confidently estimate plant uptake include:
(a) Proposed pentachlorophenol BCF of 0.7213 *vs*. the EcoSSL guidance median BCF of 5.93;
(b) Proposed acenaphthene BCF of 1.3367 *vs*. the EcoSSL guidance median BCF of 2.0;
(c) Proposed anthracene BCF of 0.958 *vs*. EcoSSL median BCFs ranging up to 23; and
(d) Proposed benzo(a)pyrene BCF of 0.4212 *vs*. EcoSSL median BCFs ranging up to 3.3

14. **Page 3-2, Section 3.1.1 Exposure Point Concentrations – Soil Invertebrates and Table 3-2.** Please revise the text to indicate that where available, the soil invertebrate BAFs or BAF regressions presented in the EcoSSL bioaccumulation guidance discussed previously will be used. Please revise and update the soil invertebrate BAFs in Table 3-2 accordingly.

15. **Page 2-4, Section 3.1.1 Exposure Point Concentrations – Small Mammals and Table 3-2.** The second paragraph states: "*Because most chemical exposure for small mammals occurs via the diet, it was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet, that is, a diet to whole-body BAF (wet-weight basis) of 1.0 was assumed.*" Although some chemical-specific BAF constants and regressions presented for small mammal BAFs in the EcoSSL bioaccumulation guidance are a

function of COPC concentration in the diet, a food-to-whole body COPC concentration ratio of 1.0 is not a valid default assumption. As reflected in the BAFs and regressions used to derive EcoSSLs, the mammal body burden will be lower than that in its food for some COPCs (e.g., some metals and most PAHs), while for lipophilic, organochlorine pesticides (e.g. dieldrin, DDT compounds), the mammal's body burden will accumulate higher levels than those found in its food. To derive the dieldrin EcoSSLs, USEPA used a soil-invertebrate BAF of 14.7 (*vs*. 8 proposed here) and a diet-to-mammal BAF of 1.2, resulting in a soil-mammal BAF of 17.64 (*vs*. the BAF of 8 proposed by default in this ERA). Since it is critical to use COPC-specific BAFs and regressions rather than assume a default food-body BAF of 1.0, please indicate in the text that this default approach will be used as a last resort, only when COPC-specific soil-mammal or food-mammal BAFs or regressions are not available in the EcoSSL guidance or from other sources. As discussed in the general comments, please revise and update the small mammal BAFs in Table 3-2 accordingly. Please also provide the published or calculated BAFs to be used for each COPC in Table 3-2, with source or derivation information, rather than leaving a blank and referring to the text.

16. **Page 4-1, Section 4.1 Medium-Specific Screening Values and Table 4-1.** Please rename this section and Table 4-1 as "Medium-Specific Screening Values for Plants and Soil Invertebrates" for greater accuracy and clarity. Please discuss the origin of the soil screening values compiled from CCME (1996), NHSPE (2000) and Beyer (1990), with specific information on the ecological receptor groups protected by these values. The sources cited include soil benchmarks designed to protect a variety of ecological receptors, including wildlife, rather than just plants or soil invertebrates (e.g., some of the CCME SQGs are designed to protect birds, such as the American robin). Please also clarify or correct the following in Table 4-1: **(a)** Add missing entries in the "Type" column to identify the receptor group to which the screening value applies (e.g., for what organism did Beyer, 1990, report the 100 ug/kg toxicity threshold used for several PAHs?); and **(b)** indicate that the values for carbon tetrachloride and hexachlorobenzene were originally cited by Efroymson et al. (1997a) as "*Toxicological threshold for soil microorganisms and microbial processes*," not for soil invertebrates.

17. **Page 4-1, Section 4.1 Medium-Specific Screening Values and Table 4-1.** Please explain why the screening value of 100 ug/kg (Beyer, 1990) was used for many PAHs instead of the much higher soil invertebrate EcoSSLs for both LMW (29,000 ug/kg) and HMW (18,000 ug/kg) PAHs. Unless there is good scientific rationale for using the much lower Beyer value, please consider applying only the LMW and HMW PAH EcoSSLs for selection of specific PAHs as invertebrate COPCs, as this should eliminate many PAHs at one or more of the four sites. This issue again underscores the importance of screening COPCs separately for soil invertebrates versus wildlife, because several PAHs that do not exceed these soil invertebrates EcoSSLs do exceed the avian or mammal EcoSSLs for the same chemical. Finally, please add the EcoSSLs for LMW and HMW PAHs to each of the PAHs in Table 4-1 and revise the single entry for Total PAHs as separate

LMW and HMW Subtotal entries for PAHs to accommodate the different EcoSSLs.

18. **Section 4.2 Ingestion Screening Values, page 4-1 and Tables 4-3 and 4-4.** Many of the proposed avian and mammalian TRVs (NOAELs, LOAELs and/or MATCs) are based on outdated ecotoxicity data sources and are much higher than the peer-reviewed and quality-assured NOAELs used more recently by USEPA to derive avian and mammalian EcoSSLs. In other cases, the proposed NOAELs are much lower than the TRVs used to derive EcoSSLs and may be overly conservative, possibly leading to an overestimate of food chain risk. Please reassess all of the TRVs proposed in Tables 4-3 and 4-4, compare them to the TRVs used in EcoSSL derivation, and revise them as appropriate. Please adhere to the following TRV selection or derivation guidelines and improve, correct or clarify the sources and derivation of TRVs, as follows:
(a) Whenever available, the preferred avian and mammalian TRVs should be those used by USEPA when developing the EcoSSLs for birds and mammals, based on a subset of TRVs compiled from the scientific literature that passed a rigorous quality assurance review.
(b) Whenever a reproductive or growth TRV is available, it should be used instead of a survival TRV. Instead of the survival NOAEL of 2.46 mg/kgBW/day for Arsenic, please use the NOAEL of 2.24 mg/kgBW/day chosen by USEPA as "the lowest NOAEL value for effects on reproduction, growth or survival" from six different Mortality, Growth and Reproduction NOAELs published in 4 studies. Please use the geometric mean Reproduction/Growth NOAEL of 6.71 mg/kgBW/day, derived by USEPA (2007d) in the EcoSSL document for nickel , instead of the proposed nickel growth/survival NOAEL of 77.4 mg/kgBW/day for the mallard from Sample (1996).
(c) All mammal NOAELs proposed for PAHs are much higher than the TRVs used by USEPA to derive EcoSSLs for PAHs, and should be replaced by those used to derive mammalian EcoSSLs for the LMW (65.6 mg/kgBW/day) and HMW (0.615 mg/kgBW/day) PAHs.
(d) USEPA should be cited as the original source only for those geometric mean LOAEL or NOAEL calculated from compiled TRV data and used by USEPA for EcoSSL derivation (e.g., avian NOAELs of 6.71 for nickel and 66.1 for zinc were calculated by USEPA).
(e) If an insufficient number of quality-assured studies was available for the USEPA to derive a TRV in the EcoSSL document, the compilation of those LOAELs and NOAELs deemed credible by USEPA should be consulted to identify the lowest of the ecologically relevant TRVs for each COPC and receptor group. If one TRV is chosen from these TRVs compiled by USEPA in an EcoSSL document, the original author of the study should be referenced (e.g., avian NOAEL of 1.63 mg/kgBW/day for lead should be referenced as "*Edens and Garlich (1983) as cited in USEPA 2005d*");
(f) When calculating an MATC and/or LOAEL-based HQ, use a geometric mean calculated from all relevant LOAELs cited by USEPA as an alternative to choosing one of the LOAELs compiled by USEPA for the central tendency

exposure assessment;
(g) While a LOAEL can be used to infer a (lower) NOAEL by extrapolation, the NOAELs published or calculated as geometric means by USEPA should not be used to *infer* (higher) LOAELs using an extrapolation factor. Only LOAELs reported in an original study should be used to calculate MATCs or HQs; and
(h) Several of the chlorinated benzene compounds are listed twice in Table 4-1, classified both as VOCs and SVOCs. Please remove the incorrectly classified, duplicate entries.

19. **Page 5-2, Section 5.1.1, AOC J, Comparison With Soil Screening Values –** Because this section only addresses screening-level risks to plants and soil invertebrates, please rename it as "Comparison With Soil Screening Values *for Plants and Soil Invertebrates*" for greater clarity and accuracy. Throughout this section, please also revise generic statements such as "*compared to screening values*" to more explicit phrases such as "compared to screening values *for plants and soil invertebrates*."

20. **Pages 5-2 to 5-3, Section 5.1.2, AOC J, Food Web Exposures and Tables 5-1 to 5-4** – As noted in prior comments, several COPCs were prematurely eliminated for evaluation in food chain exposures of birds and mammals by not having applied a separate COPC screen for these wildlife receptors using EcoSSLs, where available. Doing so would have identified 7 COPCs for birds and/or mammals not listed as food web COPCs in Table 5-4 for which the SERA should provide EcoSSL-based HQs (antimony, cadmium, chromium, copper, lead, and vanadium). Please provide a new table with average and maximum screening-level HQs for birds and mammals based on these EcoSSLs. Please then discuss these SERA results in relation to the food chain exposure assessment results of Tables 5-2 and 5-3 for the same COPCs. Also, please eliminate the duplicate entries for several COPCs as both VOCs and SVOCs in Table 5-2 (e.g., four chlorinated benzene compounds).

21. **Page 5-3, Section 5.2.1, AOC R, Comparison With Soil Screening Values –** Because this section only addresses screening-level risks to plants and soil invertebrates, please rename it as "Comparison With Soil Screening Values *for Plants and Soil Invertebrates*" for greater clarity and accuracy. Throughout this section, please also revise generic statements such as "*compared to screening values*" to more explicit phrases such as "compared to screening values *for plants and soil invertebrates*."

22. **Page 5-4, Section 5.2.2, AOC R, Food Web Exposures and Tables 5-4 to 5-7** – As noted in prior comments, several COPCs were prematurely eliminated for evaluation in food chain exposures of birds and mammals by not having applied a separate COPC screen for these wildlife receptors using EcoSSLs, where available. Doing so would have identified 11 COPCs for birds and/or mammals, not listed as food web COPCs in Table 5-4, for which the SERA should provide EcoSSL-based HQs (antimony, chromium, copper, lead, selenium, vanadium,

zinc, HMW PAHs, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT). Please provide a new table with average and maximum screening-level HQs for birds and mammals based on these EcoSSLs. Please then discuss these SERA results in relation to the food chain exposure assessment results of Tables 5-6 and 5-7 for the same COPCs. Also, please add a discussion of the background risks/HQs for metals, comparable to that provided for AOC J, or explain why no such discussion was provided. Finally, please eliminate the duplicate entries for several COPCs as both VOCs and SVOCs in Table 5-2 (e.g., four chlorinated benzene compounds).

23. **Pages 5-4 to 5-5, Section 5.3.1, SWMU 6, Comparison With Soil Screening Values & Table 5-8** – Because this section only addresses screening-level risks to plants and soil invertebrates, please rename it as "Comparison With Soil Screening Values *for Plants and Soil Invertebrates*" for greater clarity and accuracy. Throughout this section, please also revise generic statements such as "*compared to screening values*" to more explicit phrases such as "compared to screening values *for plants and soil invertebrates*." Please clarify why 4,4'-DDE and 4,4'-DDT were eliminated based on a background comparison even though they were not detected in background soil samples and these sites are uncontrolled waste dump sites where these pesticides or containers containing pesticide residues could have been improperly disposed.

24. **Pages 5-4 to 5-5, Section 5.3.1, SWMU 6, Comparison With Soil Screening Values & Table 5-8** - Why were the worm toxicity data discussed here for carbazole and dibenzofuran not used as soil invertebrate screening values in Table 4-1 and applied to eliminate these chemicals as COPCs for soil invertebrates? Please consider doing so when revising the screening values in Table 4-1 and revising the COPC selection in the revised report. Finally, it was stated in the last sentence on page 5-5 that: "*All of the PAHs were grouped together as total PAHs for the purposes of COPC identification (Table 5-4)*." But as noted previously, it is more scientifically and toxicologically appropriate to assess risks from individual PAHs and/or subtotals of LMW and HMW PAHs separately using the different EcoSSLs developed for LMW and HMW PAHs. Please calculate separate HQs for LMW and HMW PAHs in Tables 5-8 through 5-10 to support a more precise accounting for these COPCs in Table 5-4 and comparative discussion in the text.

25. **Page 5-6, Section 5.3.2, SWMU 6, Food Web Exposures and Tables 5-4 and 5-8 to 5-10** – As noted in prior comments, several COPCs were prematurely eliminated for evaluation in food chain exposures of birds and mammals by not having applied a separate COPC screen for these wildlife receptors using EcoSSLs, where available. Doing so would have identified 13 COPCs for birds and/or mammals not listed as food web COPCs in Table 5-4 for which the SERA should provide EcoSSL-based HQs (antimony, cadmium, chromium, copper, lead, selenium, vanadium, zinc, HMW PAHs, dieldrin, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT). Please provide a new table with average and maximum screening-level HQs for birds and mammals based on these EcoSSLs. Please then discuss

these SERA results in relation to the food chain exposure assessment results of Tables 5-6 and 5-7 for the same COPCs. Also, please eliminate the duplicate entries for several COPCs as both VOCs and SVOCs in Table 5-2 (e.g., four chlorinated benzene compounds).

26. **Page 5-6, Section 5.4.1, SWMU 7, Comparison With Soil Screening Values –** Because this section only addresses screening-level risks to plants and soil invertebrates, please rename it as "Comparison With Soil Screening Values *for Plants and Soil Invertebrates*" for greater clarity and accuracy. Throughout this section, please also revise generic statements such as "*compared to screening values*" to more explicit phrases such as "compared to screening values *for plants and soil invertebrates*." Some metals like barium and mercury may be appropriately eliminated as COPCs because their average soil invertebrate HQs are less than one. Elimination of dieldrin also is acceptable due to a single detection with a HQ of 3.9. However, other inorganics such as chromium, cobalt, selenium, and vanadium should be retained as COPCs because both their average and maximum HQs significantly exceed 1.0, indicating a potential for risk. These inorganic COPCs should not be eliminated because they exceed their maximum background levels.

27. **Pages 5-7 to 5-8, Section 5.4.2, SWMU 7, Food Web Exposures, Tables 5-4 & 5-11 to 5-13** – As noted in prior comments, several COPCs were prematurely eliminated for evaluation in food chain exposures of birds and mammals by not having applied a separate COPC screen for these wildlife receptors using EcoSSLs, where available. Doing so would have identified 11 COPCs for birds and/or mammals not listed as food web COPCs in Table 5-4 for which the SERA should provide EcoSSL-based HQs (antimony, cadmium, chromium, copper, lead, selenium, vanadium, zinc, HMW PAHs, 4,4'-DDE, and 4,4'-DDT). Please provide a new table with average and maximum screening-level HQs for birds and mammals based on these EcoSSLs. Please then discuss these SERA results in relation to the food chain exposure assessment results of Tables 5-6 and 5-7 for the same COPCs. Although it is proposed that no chemicals be retained as COPCs for food web exposures despite chromium and zinc having HQs greater than one, this conclusion is likely to change after the food chain exposure assessment is revised using higher, more appropriate BAFs/BCFs and lower, more protective avian and mammalian TRVs for many of the COPCs. Finally, please eliminate the duplicate entries for several COPCs as both VOCs and SVOCs in Table 5-2 (e.g., four chlorinated benzene compounds).

28. **Attachment 1.**
In general, select data sets for metals appear to be reported down to the method detection limit (MDL) instead of the quantitation limit. Typically, the MDL is a statistically derived value that is not accurately verified by the laboratory analysis. It should be noted that quantitation limits are typically 3-5 times higher than MDLs prior to adjustment for sample-specific solutions, etc. The use of the MDL, unless equivalent to the quantitation limit, will likely underestimate

potential risks by assuming a lower surrogate concentration for non-detects than a surrogate based on a quantitation limit. The use of the MDL is inappropriate for determining representative concentrations. The following data sets are affected:

i. AOC J: metals results reported from December 2000, August 2003 and February 2008
ii. AOC R: metals results reported from November/December 2000 and February 2008. It should be noted that the metals results in the December 2005 and March 2006 data sets were correctly reported down to the quantitation limit.
iii. SWMU 6: metals results reported from April 2000 and August 2003. It should be noted that the metals results in the February 2008 data set were correctly reported down to the quantitation limit.
iv. SWMU 7: metals results reported from April 2000, August 2003 and February

REFERENCES

USEPA. 2007. Attachment 4-1 of the Guidance for Developing Ecological Soil Screening Levels (EcoSSLs): Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs. United States Environmental Protection Agency, Office of Solid Waste and Emergency Response. OSWER Directive 9285.7-55, Revised April 2007.

USEPA. 2002. Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites. United States Environmental Protection Agency, Office of Solid Waste and Emergency Response. OSWER Publication 9285.7-41. EPA 540-R-01-003. September 2002.

USEPA. 2001. The Role of Screening-Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments. EcoUpdate. United States Environmental Protection Agency, Office of Solid Waste and Emergency Response. OSWER Publication 9345.0-14. EPA 540/F-01/014. June 2001.