

NAVY RESPONSE TO EPA COMMENTS DATED OCTOBER 14, 2010
DRAFT CORRECTIVE ACTION OBJECTIVES DEVELOPMENT FOR TERRESTRIAL
AVIAN OMNIVORES AND PRELIMINARY DELINEATION INVESTIGATION
SWMU 1 (ARMY CREMATOR DISPOSAL SITE) AND
SWMU 2 (LANGLEY DRIVE DISPOSAL SITE)

EPA COMMENTS DATED OCTOBER 14, 2010

(EPA comments are provided in italics, while Navy responses are provided in regular print.)

GENERAL COMMENTS

- 1. The Report does not provide a complete discussion of how precision, accuracy, representativeness, completeness, comparability and sensitivity (PARCCS) criteria were met. For example, Section 4.1.5 only discussed samples rejected based on field duplicate exceedances. A discussion of all field and laboratory quality control (QC) exceedances should be included in Section 4.1.5. Revise the Report to include a more detailed data usability discussion.*

Navy Response to EPA General Comment No. 1: All data from the laboratory was certified by a Puerto Rican Chemist and laboratory data was validated by a third party to ensure data usability. Only usable data were included in the evaluation and the conclusions and recommendations sections of the report. Data validation reports are included as an appendix to the Full RFI report and discuss:

- Overall Evaluation of the Data/Potential Usability Issues
- Data Completeness
- Sample Condition
- Technical Holding Times
- GC/MS Tuning and GC Performance
- Initial and Continuing Calibrations
- ICSA/ICSAB Standards
- CRDL Standards
- Method and QC Blanks
- Surrogate and Matrix Spike Recoveries
- Matrix Duplicate RPDs
- Serial dilutions
- Field Duplicates
- Blanks
- Identification/Quantitation
- Reporting Limits
- TICs

- 2. The data validation reports (DVRs) do not always provide the extent of the QC exceedance. For example, in SDG 68050730-4, Page 3 states that due to slightly low internal standard recoveries the following samples were qualified as estimated. However, the DVR does not provide the percent recoveries for the internal standards. Without this information, it cannot be verified whether data was qualified appropriately. Revise the DVRs to include the extent of all QC exceedances.*

Navy Response to EPA General Comment No. 2: The data validation report narratives included in the appendices are summaries of the validation process. Additional information can be found in the

validation worksheets portion of the data validation report. The complete validation report for each SDG is available on request.

- 3. It appears that multiple matrix spike (MS) samples had percent recoveries vastly outside the acceptance criteria. For example, in sample delivery group (SDG) 6850689-2, the percent recovery (%R) for mercury in MS sample 2SS11N was -87/-90%. Additionally, in SDG 68050730-2 the %R for lead in MS sample 2NEWSS04-01 was 480/326%. According to Region II data validation guidelines, SOP HW-02: Evaluation of Metals Data for the CLP Program, dated September 2006, if the matrix spike recovery is less than 10% all associated data should be rejected. If the %R is greater than 200%, all associated data above the MDL should be rejected. However, the DVRs indicate that results were only qualified as estimated (J/UJ). Revise the Report to reject data outside Region II acceptance criteria and to include a discussion of any rejections in Section 4.1.5 of the Report.*

Navy Response to EPA General Comment No. 3: When assessing matrix spike recoveries, the validator will generally apply the USEPA Region II recommendations providing both spike aliquots show the same degree and direction of bias. However, if there are more than one spike pairs associated with the same SDG then the validator will look at all spike pairs and make qualification decisions based on the whole of these spike samples, rather than just one pair. Specific examples are highlighted below.

Regarding tin (Sn): SWMU 1, Sample 1SS06A (8%/5%) – This spike pair exhibited very low recoveries for tin, however other spike pairs from SWMU 1 samples exhibited either acceptable tin recoveries or variable (1 high, 1 low) recoveries. Also, post digestion spike recoveries for tin were acceptable in associated spike pairs. Therefore, the professional judgment validation decision was to flag all tin results J/UJ in associated samples. A notation was made to indicate that tin results should be considered biased low. SWMU 2, Sample 2SS03-01 (3%/11%) – this spike pair exhibited very low recoveries for tin; however, other spike pairs from SWMU 2 samples exhibited either acceptable or slightly non-compliant tin recoveries. Also, post digestion spike recoveries for tin were acceptable in associated spike pairs. Therefore, the professional judgment validation decision was to flag all tin results J/UJ in associated samples and a notation was made to consider tin results as biased low.

Regarding mercury (Hg): SWMU 1, Sample 1SS11C (208%/194%) – This spike pair exhibited very high recoveries for mercury; however, results were not rejected because both spike aliquots were not >200%. Other mercury recoveries for SWMU 1 were acceptable or out slightly. Also, post digestion spike recoveries for mercury were acceptable in associated spike pairs. Therefore, the professional judgment validation decision was to flag all positive mercury results associated with this spike pair as estimated J. SWMU 2, Sample 2SS11N (-87%/-90%) – this spike pair exhibited very low recoveries for mercury, However other spike pairs from SWMU 2 samples exhibited either acceptable or slightly non-compliant recoveries. Also, post digestion spike recoveries for mercury were acceptable in associated spike pairs. Therefore, the professional judgment validation decision was to flag all mercury results J/UJ in associated samples and a notation was made to consider mercury results as biased low.

Regarding lead (Pb): SWMU 2, Sample 2 NEWSS04-01 (480%/326%) – This spike pair exhibited very high recoveries for lead; however, results were not rejected because other spike pairs for SWMU 2 exhibited acceptable lead results (out of six spike pairs only one showed high recoveries) and the post digestion spike recoveries were acceptable. Therefore, the professional judgment validation decision was to flag all lead results J in associated samples and a notation was made to consider lead results as biased high.

Based on the above discussion, the Navy does not believe that revisions to validation decisions regarding matrix spike recoveries are necessary.

4. Sections 4.1.3.3 and 4.1.3.4 discuss the frequency of collection of field blanks and equipment rinsate blanks, but do not discuss how detected results were considered during validation of the data. For example, copper, lead, and zinc were noticeably higher than the sample quantitation limit for field blank 1FB03. It is not clear if any of the sample results were qualified in accordance with the Region II SOP for Validation of Metals for the Contract Laboratory Program (SOP # HW-2, Revision 13, September 2006). Revise the Report to appropriately qualify sample results based on field blanks and equipment rinsate blanks and include a discussion in Sections 4.1.3.3 and 4.1.3.4 of the Report.

Navy Response to EPA General Comment No. 4: The Navy offers the following points of clarification relative to this comment. Field blank FB03 consisted of NAPR potable water. As evidenced by the analytical data summarized in Appendix G, Table G-3, this field blank had high copper, lead, and zinc concentrations (180 µg/L, 12 µg/L, and 71 µg/L, respectively). The contamination exhibited within this field blank is most likely attributable to leaching of metals from piping, fittings, valves, and appurtenances associated with the water distribution system at NAPR. Since operational closure in March 2004, potable water usage at NAPR is minimal. As a result, water sits within the distribution system for extended periods, likely resulting in the leaching of metals from piping, fittings, valves, and/or appurtenances.

NAPR potable water was used in the bucket auger decontamination procedure at each SWMU:

SWMU 1

1. Cleaned with potable water and a non-phosphate detergent (i.e., Liqui-Nox®) using a brush to remove soil clumps.
2. Potable water rinse
3. 10 percent nitric acid (reagent grade) rinse
4. Distilled water rinse
5. Methanol (pesticide grade) rinse
6. Distilled water rinse
7. Air dried prior to use

SWMU 2

1. Cleaned with potable water and a non-phosphate detergent (i.e., Liqui-Nox®) using a brush to remove soil clumps.
2. Potable water rinse
3. 10 percent nitric acid (reagent-grade) rinse
4. Distilled water rinse
5. Air dried prior to use

Although analytical data for FB03 indicates that NAPR potable water contains elevated metal concentrations, analytical data for equipment rinsate blanks collected by passing laboratory-grade deionized water through field-cleaned bucket augers (1ER01, 1ER03, and 2ER02) show that the potable water had no impact on the soil analytical data. As evidenced by Appendix G, Table G-3, ecological COCs, including copper, lead, and zinc, were not detected in 1ER01, 1ER03, and 2ER02. Based on these considerations, it was decided that validation procedures would not include an evaluation of the potable water field blank (FB03). Section 4.1.3.3 will be revised to include the information presented above and acknowledge that the FB03 field blank was omitted from data validation activities.

It is noted that the data validation evaluation using analytical data for all equipment rinsate blanks (1ER01, 1ER02, 1ER03, 2ER01, 2ER02, 2ER03, and 2ER03), as well as the distilled water and laboratory-grade deionized water field blanks (FB01 and FB03, respectively), did not result in any qualification action by the validator. Therefore, additional text revisions to Section 4.1.3.3 or text revisions to 4.1.3.4 are not deemed necessary.

SPECIFIC COMMENTS

1. **Section 2.3.2, Step 6 Evaluation of Terrestrial Avian Omnivore Dietary Exposures to Ecological Chemicals of Concern in SWMU 2 Surface and Subsurface Soil, Page 2-12:** *The sentence “As evidenced by Table 2-11, copper, lead, and mercury NOAEL-based HQ [Hazard Quotient] values using 95 percent UCL of the mean soil and earthworm tissue concentrations are greater than 1.0...” should reference Table 2-17 for the NOAEL-based HQ Values. The reference to Table 2-11 needs to be changed to Table 2-17.*

Navy Response to EPA Specific Comment No. 1: The reference to Table 2-11 will be changed to Table 2-17.

2. **Section 3.0, Development of Corrective Action Objectives for Terrestrial Avian Omnivore Dietary Exposures, Page 3-3:** *Equation 3-1 used either the 95% Upper Confidence Limit (UCL) of the mean values calculated from the sample-specific Bioaccumulation Factor (BAF) values listed in Tables 3-1 and 3-2, or the maximum BAF values as input parameters. It is recommended to add an additional row to Tables 3-1 and 3-2 to present the BAF retained for use in the Corrective Action Objective (CAO) equation and note if the value is the 95% UCL or maximum BAF. This addition will prevent any confusion as to which BAF value is used in the CAO calculations.*

Navy Response to EPA Specific Comment No. 2: Tables 3-1 and 3-2 will be revised to include the BAF values used in the derivation of corrective action objectives (CAOs) for each ecological chemical of concern (COC). Although not requested by any General or Page-Specific Comment, Appendix E (95 percent UCL of the mean soil-to-earthworm bioaccumulation factor calculations) was revised to eliminate the units (mg/kg) shown after each recommended 95 percent UCL of mean BAF value.

3. **Section 3.0, Development of Corrective Action Objectives for Terrestrial Avian Omnivore Dietary Exposures, Page 3-3:** *The text states that Table 3-3 presents the CAOs, even though this table is not available. Revise the Report to include Table 3-3 or remove the reference if a table does not exist for this information.*

Navy Response to EPA Specific Comment No. 3: Table 3-3 was inadvertently omitted from the electronic copy of the draft document. The electronic copy of the revised document will include this table. It is noted that Table 3-3 will be revised to reflect the Navy responses to EPA Specific Comment

No. 6 and PREQB General Comment No. 2 (i.e., revised CAOs for 4,4'-DDD, 4,4'-DDE, and 4'4-DDT, as well as an example CAO calculation).

4. **Section 4.1.5, Data Evaluation and Validation, Page 4-6:** *This section states that the validation was performed in accordance with EPA Region II Standard Operating Procedures (SOPs): SOP HW-22, Revision 2 (USEPA, 2005) for metals data and SOP HW-23, Revision 0 (USEPA, 2005) for organochlorine pesticide data. However, these SOPs appear to be outdated. The data should be evaluated against Region II SOP HW-02, Revision 13, dated September 2006, for metals data and SOP HW-44, Revision 1, dated October 2006, for organochlorine pesticides data. Ensure that data was validation against the most recent Region II data validation guidance.*

Navy Response to EPA Specific Comment No. 4: The analytical data were validated against SOP HW-02, Revision 13 (metals data) and SOP HW-44, Revision 1 (organochlorine pesticide data). Section 4.1.5 will be revised to reflect the actual SOPs used during data validation activities.

5. **Section 4.1.5, Data Evaluation and Validation, Page 4-6:** *This section states that several issues were identified that resulted in limited data being rejected during validation activities. However, the section does not specify how much data was rejected and if the amount of rejected data significantly affected the project completeness goals. Additionally, the project completeness goal has not been specified. Revise the section to specify the project completeness goal and if it was met.*

Navy Response to EPA Specific Comment No. 5: Section 4.1.5 will be revised to specify the project completeness goal (i.e., 95 percent of all sample data for a given analyte must be judged to be valid measurements at each SWMU). This section also will be revised to include the percentage of rejected data for a given analyte at each SWMU and whether the completeness goal was achieved.

6. **Section 4.2, Preliminary Delineation Analytical Results, Page 4-7:** *The sentence “A comparison of CAOs developed in Section 3.0 to the preliminary delineation analytical data is presented in Table 4-4 (SWMU [Solid Waste Management Unit] 1 surface soil) and 4-5 (SWMU 2 surface and subsurface soil)...” references incorrect tables. Table 4-5 compares CAOs for SWMU 1 surface soil to preliminary delineation investigation analytical results; whereas Table 4-6 compares CAOs for SWMU 2 surface and subsurface soil to preliminary delineation investigation analytical results. The references to these tables need to be corrected. Table 4-5 is also incorrectly referenced as Table 4-4 in section 4.2.1 SWMU 1 Surface Soil.*

Navy Response to EPA Specific Comment No. 6: The Navy offers the following points of clarification relative to this comment. The electronic version of the draft document included a table that provided data qualifier definitions (i.e., Table 4-4). This table was inadvertently included within the electronic version of the draft document, causing incorrect numbering of subsequent tables. Table 4-4 (Data Qualifier Definitions) will be omitted from the electronic version of the revised document. In addition, the electronic version of the revised document will include correct table numbering for Tables 4-4 (Comparison of Corrective Action Objectives for SWMU 1 Surface Soil to Preliminary Delineation Investigation Analytical Results) and 4-5 (Comparison of Corrective Action Objectives for SWMU 2 Surface and Subsurface Soil to Preliminary Delineation Investigation Analytical Results). It is noted that Section 4.2.2 within the electronic version and hard copy of the draft document includes a reference to Table 4-6, which will be deleted from the text.

7. **Section 3.0, Development of Corrective Action Objectives for Terrestrial Avian Omnivore Dietary Exposures, Page 3-1, Equation 3-1:** *The NOAEL-based CAOs were checked using equation 3-1. None of the CAOs could be recreated using this equation. TechLaw recalculated the CAOs using the generic wildlife equation developed by the EPA to derive the Ecological Soil Screening Levels*

(EcoSSLs) (EPA, 2003). The values for antimony, copper, lead, mercury, and zinc in SWMU 1 and 2, and cadmium in SWMU 1, matched the CAOs provided in the report, indicating that the correct equation was used in the calculations but an incorrect equation was provided in the report. The values for tin, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT in SWMU 1 were calculated using the correct equation but do not match the values presented in the report (see **Table 1**). The CAO values for these four COPECs need to be corrected.

Table 1: Corrective action objectives calculated by TechLaw and NAPR for SWMU 1 & 2

SWMU	COPEC	TRV _{no effect}	BW	FIR	BAF	PD _{worm}	PD _{soil}	TL CAO	NAPR CAO	Correct?
1	DDD	0.227	0.0773	0.00383	6.5789	0.909	0.091	0.75	0.12	no
1	DDE	0.227	0.0773	0.00383	5.3571	0.909	0.091	0.92	0.20	no
1	DDT	0.227	0.0773	0.00383	3.8043	0.909	0.091	1.29	0.28	no
1	antimony	4750	0.0773	0.00383	0.3667	0.909	0.091	225928.12	224786.00	yes
1	cadmium	1.47	0.0773	0.00383	3.918	0.909	0.091	8.12	8.10	yes
1	copper	4.05	0.0773	0.00383	0.181	0.909	0.091	319.89	318.00	yes
1	lead	1.63	0.0773	0.00383	0.0827	0.909	0.091	197.97	197.00	yes
1	mercury	0.026	0.0773	0.00383	0.797	0.909	0.091	0.64	0.64	yes
1	tin	6.8	0.0773	0.00383	34.57	0.909	0.091	4.35	13.00	no
1	zinc	66.1	0.0773	0.00383	0.353	0.909	0.091	3239.03	3220.00	yes
2	antimony	4750	0.0773	0.00383	0.81	0.909	0.091	115882.15	114938.00	yes
2	copper	4.05	0.0773	0.00383	0.208	0.909	0.091	291.85	291.00	yes
2	lead	1.63	0.0773	0.00383	0.175	0.909	0.091	131.55	131.00	yes
2	mercury	0.026	0.0773	0.00383	3.123	0.909	0.091	0.18	0.18	yes
2	zinc	66.1	0.0773	0.00383	1.384	0.909	0.091	988.90	988.00	yes

formula: $CAO = HQ * TRV_{NOAEL} * BW / ((FIR * PD_{worm} * BAF) + (FIR * PD_{soil}))$

References:

Environmental Protection Agency. 2003. *Guidance for developing ecological soil screening levels. OSWER Directive 9285.7-55 (revised February 2005).*

Navy Response to EPA Specific Comment No. 7: Equation 3-1, as presented in the draft document, is incorrect. For a given ecological COC, the correct equation for calculating CAOs for terrestrial avian omnivore dietary exposures is as follows:

$$CAO_x = \frac{(HQ_d)(TRV_x)(BW)}{[(FIR)(BAF_x)(PDE) + (FIR)(PDS)][AUF]}$$

where:

- CAO_x = Corrective action objective for chemical x (mg/kg; dry weight)
- TRV_x = Toxicity reference value for chemical x (mg/kg-BW/day; dry weight)
- BW = American robin body weight (kg; wet weight)
- FIR = American robin food ingestion rate (kg/day; dry weight basis)
- BAF_x = Soil-to-earthworm BAF for chemical x (mg/kg; dry weight)
- PDE = Proportion of American robin diet composed of earthworms (unitless; dry weight basis)
- PDS = Proportion of American robin diet composed of soil (unitless; dry weight basis)
- AUF = Area Use Factor (unitless)

HQ_d = Default hazard quotient value (unitless)

Section 3.0 will be revised to include the correct formula. Although an incorrect formula was presented within the draft document, the correct version of the formula was used to calculate CAOs.

With regard to the CAOs presented within Section 3.0 of the draft report for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and tin, the Navy offers the following points of clarification. The TRV presented in Table 2-11 for 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT (0.227 mg/kg-BW/day) was not applied to the equation when CAOs were derived for these three organochlorine pesticides (a TRV of 0.05 mg/kg-BW/day was mistakenly applied to Equation 3-1). Use of the TRV specified in Table 2-11 yields CAOs equal to those provided within the USEPA comment: 751 mg/kg for 4,4'-DDD, 918 mg/kg for 4,4'-DDE, and 1,284 mg/kg for 4,4'-DDT. Sections 3.0 and 5.0 of the draft document, as well as Table 4-4 and Figure 4-5 will be revised to reflect the correct CAOs for 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.

The CAO for tin presented within EPA Specific Comment No. 7 above is based on a default hazard quotient (HQ) of 1.0. However, as discussed in Section 3.0 (see first paragraph beneath last bullet item on Page 3-3), a default hazard quotient (HQ) of 2.98 was applied to the CAO calculation since this HQ value represents the component of site risk attributable to the exposures at the reference area. As such, the CAO presented in Section 3.0 of the draft report is correct. However, to make the document more transparent, the bullet item defining HQ_d within Section 3.0 will be revised to include text specifying the default HQ value applied to each ecological COC.

MINOR COMMENT

- 1. Section 4.1.4, Decontamination and Investigation Derived Waste, Page 4-5 through 4-6: This section states that the procedure for decontaminating augers is included as Appendix H. However, Appendix H presents the Comparison of CAOs for Terrestrial Avian Omnivores to Baseline Ecological Risk Assessment Soil Data and does not contain any procedures or SOPs. Revise this section to provide the correct reference.*

Navy Response to EPA Minor Comment No. 1: The text in Section 4.1.4 will be revised by removing the reference to Appendix H. This section also will be revised to include the decontamination procedure applied in the field.

PREQB COMMENTS

(PREQB comments are provided in italics, while Navy responses are provided in regular print.)

I. GENERAL COMMENTS

- 1. Overall, the document was well organized and summarized the previous ecological risk assessment activities conducted at each SWMU. As discussed in the report, ecological risks are anticipated at both SWMUs 1 and 2 based on the results of the previously submitted Baseline Ecological Risk Assessment (BERA). Although risks to other ecological receptors at each of these SWMUs are predicted, the Corrective Action Objectives (CAOs) presented in this document address only terrestrial avian omnivores (represented by the American robin). It is unclear why CAOs are also not presented for other terrestrial receptors (i.e., plants and terrestrial invertebrates). Please briefly clarify how the CAOs for these other terrestrial receptors exhibiting risk will be evaluated or developed after the Interim Corrective Measures are implemented at each SWMU. It would appear that developing CAOs for all terrestrial ecological receptors would present the most efficient*

approach in developing and implementing Interim Corrective Measures rather than the approach proposed.

Navy Response to PREQB General Comment No. 1: The lines of evidence employed in the baseline ecological risk assessments (BERAs) at SWMUs 1 and 2 for terrestrial invertebrates included a comparison of ecological COC concentrations in soil to invertebrate-based screening values, as well as a comparison of site and reference area toxicity test results (earthworm survival, growth, and reproduction). A clear dose-response relationship between ecological COC concentrations and earthworm survival, growth, and reproduction was not established by the toxicity tests. For both SWMUs, it was concluded that modifying factors (i.e., soil characteristics such as grain size distributions, pH, and TOC) and/or additive, synergistic, or antagonistic effects of co-located ecological COCs prevented the establishment of a clear relationship between individual ecological COC concentrations in soil and earthworm responses in the toxicity tests. Therefore, the toxicity tests results could not be used to establish site-specific NOAELs for terrestrial invertebrate direct contact exposures. Given the available lines of evidence employed in the BERAs for terrestrial invertebrates, CAOs protective of terrestrial invertebrates would have to be based on soil screening values or background screening values (upper limit of the mean [ULM] background concentrations). Because CAOs based on soil or background screening values would likely be overprotective and result in excessive remediation, they were not established at this time. For example, invertebrate CAOs for mercury and zinc at SWMUs 1 and 2 would be 0.109 mg/kg (ULM background concentration) and 120 mg/kg (soil screening value), respectively. Given that sixty-one of ninety-four (61/94) mercury detections and sixty-three of ninety-four (63/94) zinc detections in SWMU 2 soil exceed these values, an extremely large surface area of SWMU 2 would require remediation.

As discussed in Section 1.0 of the draft document, CAOs for terrestrial invertebrates will be developed as part of a Corrective Measures Study (CMS) conducted at each SWMU following completion of the Interim Corrective Measures (ICMs) addressing unacceptable risks to terrestrial avian omnivores (Baker, 2010a and 2010b). While the specific approach for developing CAOs for terrestrial invertebrates has not been established at this time (the approach will be provided within a future work plan), the following tasks will likely be conducted:

- Analytical data for sample locations not impacted by ICM activities and analytical data for samples collected during ICM activities (e.g., delineation and confirmation samples) will be combined into a unified data set and compared to soil screening values using the procedures presented within the BERA documents for SWMUs 1 and 2. The comparison will determine if the ICMs addressing terrestrial avian omnivores at each SWMU eliminated potential risks to terrestrial invertebrates from individual ecological COCs.
 - As discussed above, one potential reason for the lack of a clear dose-response relationship between ecological COC concentrations and earthworm survival, growth, and reproduction is additive, synergistic, or antagonistic effects of co-located ecological COCs. The ICMs at each SWMU will eliminate high concentrations of co-located chemicals. However, following completion of the ICMs, it is anticipated that ecological COCs (i.e., mercury and zinc) will still be present within unaffected areas of each SWMU at concentrations greater than soil and background screening values. For these ecological COCs, additional earthworm toxicity tests may be conducted to further refine risk estimates using site-specific NOAEL values. It is anticipated that these tests will not be impacted by high concentrations of co-located chemicals.
2. *The CAOs presented could not be verified based on Equation 3-1 and information provided in the report. Using lead at SWMU 1 as an example, the following input parameters for lead were identified in the report:*

TRV	=	1.63 mg/kg-day (NOAEL from Table 2-11)
BW	=	0.0773 kg (from Section 3 text)
FIR	=	0.00383 kg/day dry weight (from Section 3 text)
EC	=	95% UCL BAF (0.0827 in Appendix E) * 95% UCL soil (632.6 mg/kg)
	=	52.316 mg/kg
PDE	=	0.909 (from Section 3 text)
SC	=	632.6 mg/kg (from Table 2-9)
PDS	=	0.091 (from Section 3 text)
AUF	=	1.0 (from Section 3 text)
HQ	=	1.0 (from Section 3 text)

Substituting the above parameters into Equation 3-1 results in a lead CAO of 0.313 mg/kg while the text identifies a CAO for lead as 197 mg/kg. Please verify that Equation 3-1 and the input parameters are presented correctly. In addition, please provide an example CAO calculation using Equation 3-1 and SWMU specific values (can be presented in Table 3-3).

Navy Response to PREQB General Comment No. 2: Equation 3-1, as presented in the draft document, is incorrect. For a given ecological COC, the correct equation for calculating CAOs for terrestrial avian omnivore dietary exposures is as follows:

$$CAO_x = \frac{(HQ_d)(TRV_x)(BW)}{[(FIR)(BAF_x)(PDE) + (FIR)(PDS)][AUF]}$$

where:

CAO _x	=	Corrective action objective for chemical x (mg/kg; dry weight)
TRV _x	=	Toxicity reference value for chemical x (mg/kg-BW/day; dry weight)
BW	=	American robin body weight (kg; wet weight)
FIR	=	American robin food ingestion rate (kg/day; dry weight basis)
BAF _x	=	Soil-to-earthworm BAF for chemical x (mg/kg; dry weight)
PDE	=	Proportion of American robin diet composed of earthworms (unitless; dry weight basis)
PDS	=	Proportion of American robin diet composed of soil (unitless; dry weight basis)
AUF	=	Area Use Factor (unitless)
HQ _d	=	Default hazard quotient value (unitless)

Section 3.0 will be revised to include the correct formula. In addition, an example calculation using Equation 3-1 will be provided within the footnotes of Table 3-3. Also, please see the Navy response to PREQB Page-Specific Comment No. 2.

II. PAGE-SPECIFIC COMMENTS

1. Page 2-10, Section 2.3.1, Last Paragraph: The text states that in the case of non-detected chemicals, risk estimates were derived using maximum reporting limits. However, upon review of Tables 2-7 and 2-8, nondetect results for pesticides and metals were reported down to the method detection limit (MDL) and not the reporting limit. Typically, the MDL is a statistically derived value that is not accurately verified by the laboratory analysis. The reporting limits are accurately verified by laboratory analyses of standards at the unadjusted reporting limit. Please conduct the risk evaluation for non-detected chemicals using the reporting limits (not MDLs) due to the higher accuracy of these numbers.

It is acknowledged that this comment has been issued before and is pending EPA resolution, since PREQB defers to EPA position on this issue. Until EPA decision we will continue including the comment every time we notice it.

Navy Response to PREQB Page-Specific Comment No. 1: The Navy agrees that the non-detected results presented in Tables 2-7 and 2-8 are reported at the method detection limit (MDL). As such, the statement in Section 2.3.1 that 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT risk estimates were derived using maximum reporting limits will be revised to indicate that risk estimates for these three organochlorine pesticides were derived using maximum method detection limits (MDLs). As acknowledged within the PREQB comment above, this issue is currently awaiting USEPA resolution pending the outcome of the Response to Comment Letter for the Draft Phase I RFI for SWMU 60 (Former Landfill at the Marina) dated September 25, 2009. Once this issue is resolved, the final response will be applied to this document. The Navy position is that revisions to the draft document are not necessary.

- 2. Page 3-3, Section 3.0: The report states that the CAOs are also presented in Table 3-3. However, Table 3-3 was not presented in the report. Please provide this table. As discussed above under the general comments, the CAOs could not be verified using the information provided. Please verify that Equation 3-1 and the input parameters are presented correctly and provide an example CAO calculation (can be provided in Table 3-3).*

Navy Response to PREQB Page-Specific Comment No. 2: Table 3-3 was inadvertently omitted from the document. This table will be provided within the revised document. As discussed in the Navy response to PREQB General Comment No. 2, the formula presented within Section 3.0 of the draft document for Equation 3-1 is incorrect. Section 3.0 will be revised to include the correct formula. An example calculation (CAO for lead in SWMU 1 surface soil) also will be included within Table 3-3. Although an incorrect formula was presented within the draft document, the correct version of the formula was used to calculate CAOs. However, it is noted that the TRV presented in Table 2-11 for 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT (0.227 mg/kg-BW/day) was not applied to the equation when CAOs were derived for these three organochlorine pesticides. As such, the CAOs presented in Sections 3.0 and 5.0 of the draft document for 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT will be revised to reflect the TRV within Table 2-11. Table 4-4 and Figure 4-5 also will be revised to reflect the correct CAOs

- 3. Page 4-4, Section 4.1.2: Please revise the beginning of the last sentence in the last paragraph to state that additional evaluation is not presented for cadmium and tin.*

Navy Response to PREQB Page-Specific Comment No. 3: The last sentence in the last paragraph within Section 4.1.2 will be revised to state that additional evaluation is not presented for cadmium and tin.

- 4. Tables 2-7, 2-8, 2-9, 2-14, 2-15, 2-16, 2-18 and 4-5: Nondetect results for metals and pesticides in these tables are reported at the MDL. As commented on previously, the MDL is a statistically derived value that is not accurately verified by the laboratory analysis. Please revise the listed tables to reflect the reporting of nondetect results down to the reporting limit instead of the MDL. If the reporting limits exceed the comparison criteria, please include a discussion in Sections 2 or 4 of how these exceedances affect the achievement of the project objectives.*

Navy Response to PREQB Page-Specific Comment No. 3: Please see the Navy response to PREQB Specific Comment No. 1.

- 5. Tables 3-1 and 3-2: Please include the 95% UCL of the mean (or the maximum) BAF for each COC in these tables that was used to calculate the CAO for each COC.*

Navy Response to PREQB Page-Specific Comment No. 5: Tables 3-1 and 3-2 will be revised to include the BAF values used in the derivation of corrective action objectives for each ecological chemical of concern.

6. Table 4-1:

- a. *Historical Sample Location ISS10: Please include a note in the comments column for surface soil samples ISS10 K and ISS10 L as to why these two samples were not collected.*

Navy Response to PREQB Page-Specific Comment No. 6a: The comments column in Table 4-1 will be revised to include the rationale for not collecting surface soil samples ISS10 K and ISS10 L (sampling points for these two surface soil samples are located beneath a debris pile).

- b. *Historical Sample Location ISS13: Please revise the comments column for surface soil sample ISS13 G to state refusal at 7 inches instead of 9 inches, as per the field notes in Appendix F.*

Navy Response to PREQB Page-Specific Comment No. 6b: The comments column in Table 4-1 will be revised to indicate refusal at 7 inches for surface soil sample ISS13 G. Table 4-4 and Figure 4-5 also will be revised to show that surface soil at ISS13 G was collected from the 0.0-7.0 inch depth interval.

- c. *Historical Sample Location ISS16: Please include a note in the comments column for surface soil sample ISS16 K to note refusal at 10 inches, as per the field notes in Appendix F.*

Navy Response to PREQB Page-Specific Comment No. 6c: The comments column in Table 4-1 will be revised to indicate refusal at 10 inches for surface soil sample ISS16 K. Table 4-4 and Figure 4-5 also will be revised to show that surface soil at ISS16 K was collected from the 0.0-10.0 inch depth interval.

7. Table 4-2:

- a. *Historical Sample Location 2SS02:*
 - i. *Surface soil samples 2SS02 B, C, I, J, K, and L are not included in the list of samples at this location. According to the sketch in the field notes, these locations existed. Please add these locations to the table and include a note in the comments column as to why these samples were not collected.*

Navy Response to PREQB Page-Specific Comment No. 7ai: The Navy offers the following points of clarification relative to this comment. The sketch in the field notes does not accurately reflect the number of preliminary delineation surface soil samples proposed in the vicinity of historical sample location 2SS02. Specifically, preliminary delineation surface soil samples 2SS02 B, C, I, J, K, and L were never intended to be collected due to spatial overlap with proposed samples associated with historical sample locations 2SS03 and 2SS05 (see Figure 1-4 in the [Final Phase I Interim Corrective Measures Work Plan for SWMUs 1 and 2](#) [Baker, 2010]). As they were never intended to be collected, these six samples were omitted from Table 4-2.

- ii. *Surface soil sample 2SS02 M: Please include a note in the comments column for surface soil sample 2SS02 M to note refusal at 10 inches, as per the field notes in Appendix F.*

Navy Response to PREQB Page-Specific Comment No 7aii: The comments column in Table 4-2 will be revised to indicate refusal at 10 inches for surface soil sample 2SS02 M. Table 4-5 and Figure 4-6 also will be revised to show that surface soil at 1SS13 G was collected from the 0.0-10.0 inch depth interval.

- b. *Historical Sample Location 2SS03: Surface and subsurface soil samples 2SS03 L are not included in the list of samples at this location. According to the sketch in the field notes, this location existed. Please add this location to the table and include a note in the comments column as to why these samples were not collected.*

Navy Response to PREQB Page-Specific Comment No. 7b: The Navy offers the following points of clarification relative to this comment. The sketch in the field notes does not accurately reflect the number of preliminary delineation surface soil samples proposed in the vicinity of historical sample location 2SS02. Specifically, preliminary delineation surface soil sample 2SS03 L was never intended to be collected due to spatial overlap with proposed samples associated with historical sample location 2SS05 (see Figure 1-4 in the [Final Phase I Interim Corrective Measures Work Plan for SWMUs 1 and 2](#) [Baker, 2010]). As 2SS03 L was never intended to be collected, it was omitted from Table 4-2.

- c. *Historical Sample Location 2SS10:*
 - i. *Surface soil samples 2SS10 K and L are not included in the list of samples at this location. According to the sketch in the field notes, these locations existed. Please add these locations to the table and include a note in the comments column as to why these samples were not collected.*

Navy Response to PREQB Page-Specific Comment No. 7ci: The Navy offers the following points of clarification relative to this comment. Surface soil samples 2SS10 K and L were collected (see Page 13 of the field notes prepared by Adam Gailey); however, they were mistakenly omitted from Table 4-2. As such, this table will be revised to include entries for surface soil samples 2SS10 K and L.

- ii. *Please correct the sample identifications for samples 2SS10 M-P from 1SS13 to 2SS10.*

Navy Response to PREQB Specific Comment No. 7cii: Table 4-2 will be revised to correct the sample identifications for surface soil samples 2SS10 M, N, O, and P.

- d. *No Association with Historical Sample Locations: The comments column for surface soil sample 2NEWSS03-00 should state refusal at 8 inches instead of 6 inches, as per the field notes in Appendix F.*

Navy Response to PREQB Page-Specific Comment No. 7d: The comments column in Table 4-2 will be revised to indicate refusal at 8 inches for surface soil sample 2NEWSS03-00. Table 4-5 also will be revised to show that surface soil at 2NEWSS03-00 was collected from the 0.0-8.0 inch depth interval.

Appendix B

- 1. *This appendix is incorrectly labeled as SWMU 2. Please correct to indicate this appendix presents the 95% UCL for surface soil samples within SWMU 1.*

Navy Response to PREQB Appendix B Comment No. 1: The fly sheet page for Appendix B will be revised to indicate that Appendix B presents 95% UCL of the mean calculations for SWMU 1 surface soil. The List of Appendices within the Table of Contents also will be revised to reflect that Appendix B presents 95% UCL of the mean calculations for SWMU 1 surface soil.