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U S NAVY ADDITIONAL COMMENTS TO DRAFT SITE INSPECTION REPORT AREAS OF
CONCERN 1, 2, 6, 7 AND 8 NWS FISC WILLIAMSBURG VA
1/2/2012
U S NAVY

Additional Response To Comments

Draft Site Inspection Report

Areas of Concern 1, 2, 6, 7, and 8

**Naval Weapons Station Yorktown Cheatham Annex
Williamsburg, VA**

January 3, 2012

(Revised 4/30/12)

Initial and additional comments were received by email on August 15, 2011 and December 2, 2011, respectively, from John Burchette, U. S. Environmental Protection Agency (USEPA) Region 3. The Navy's initial and additional responses were provided October 4, 2011 and January 3, 2012, respectively. (A correction to the response for Comment 34 was necessary, as well as, EPA agreement on the response to Comment 35; both were added May 21, 2012.)

Comment provided via email (8/15/11): I have a number of issues with this. Although the general HH Risk screening process provided in appendix A is generally an acceptable and common approach, the document doesn't necessarily follow the process. Many of the chemicals are screened out based on inappropriate screening techniques (inconsistent with EPA Guidance) or judgment calls and not based on scientific evidence. While judgement call may be an acceptable way of proceeding as a site progresses through the CERCLA process, the high level of uncertainty (limited sample coverage) associated with a PA/SI makes these decisions premature.

Response (10/4/11): The human health and ecological risk screenings conducted were carried out under the current USEPA and/or Navy ERA guidance. Based on a review of the available SI analytical data, the proposed paths forward for the various AOCs followed a logical scientific decision analysis and were not based on opinion. While there will always be a certain amount of uncertainty associated with any PA/SI, the Navy believes that the proposed recommendations were made based on sound scientific evidence; for those AOCs where uncertainty exists, further investigation has been proposed.

EPA Email Response (12/2/11): Noted

EPA RPM General Comment 1 (8/15/11): There are a multiple instances in this document that are inconsistent with EPA Guidance and some revisions will need to be made or an explanation should be provided as to why they would be appropriate. Examples would be: averaging groundwater samples, applying dilution attenuation factors directly to groundwater samples (typically DAFs are used for and applied to soil migration to groundwater), screening risks from individual chemical against the 5x10⁻⁵ cancer and 0.5 HQ screening level (should be cumulative risk for the site not on a per chemical basis), and taking the mean HQ of soil samples and screening them out.

Further, much of the above is not consistent with the Human Health Screening Methodology (A.2) in Appendix A of this document.

Response (10/4/11): The ecological risk screening methodology was outlined in Appendix B, Section B.2, on which there were no comments. Three of the four examples provided in the comment appear to apply to the ecological screenings. The rationale for using mean groundwater concentrations and dilution factors (not DAFs) in the refined step of the ecological groundwater screenings, and mean soil concentrations in the refined step of the ecological soil screenings, are provided in Appendix B, Section B.2. None of the methods used are known to be precluded in EPA or Navy ERA guidance.

In terms of the HHRA, the only time the average groundwater (or soil) concentration is used is when considering lead. This is because the method used to evaluate lead (the IEUBK model) uses the average concentration of lead as the input value for the model. The identification of the potential for carcinogenic risk or hazard is based on the cumulative risk and cumulative hazard (per target organ). However, to understand which constituents contribute the most to these cumulative risks or hazards, we do point out if individual constituents exceed these levels or not, but it is not used to identify if the site may pose an unacceptable risk or hazard or not. These discussions are presented to supply further information about the site and potential contamination detected at the site.

EPA General Comment 1 Response (12/2/11): EPA's initial belief was that the sole purpose of the report was to determine whether further action would be needed at these AOCs. EPA BTAG will now be reviewing the document and appendices due to the potential ramifications of the report (eliminating COPC etc...).

Additional Response (1/3/12): Noted. Also, please note that the draft final document reflects items (e.g., no longer comparing results to maximum background values; explaining the substitute values used when a constituent does not have an ecological screening value; etc.) from the October 26, 2011 and November 7, 2011 conference calls and the November 2011 Partnering meeting discussion. While a refinement of the COPCs (Step 2b) is presented in the report, the recommendations for each AOC (Step 3) are adequate. For example, Step 2b for AOC 8 surface soil did not retain chromium and arsenic as COPCs, based on the argument that chromium was evaluated as hexavalent but is likely in the trivalent form; however, an RI is the recommend path for AOC 8, including collecting soil samples for inorganic analysis.

EPA RPM General Comment 2 (8/15/11): *A number of chemicals which did not have screening values were screened out by being compared to screening values of other similar explosives. Please provide the actual compound they were compared to, the actual screening value used, and how that number was developed. Please revise each instance of this in the document for transparency purposes (note that not all instances of this are noted in the comments).*

Response (10/4/11): For the ecological screenings, there were five instances (all in soil) where this occurred. In these cases, the soil concentrations for the explosives without a screening value were compared with the range of screening values for all other explosives with such values. These values, which are provided in Table B-1, ranged from 2,260 to 80,000 µg/kg (not including perchlorate, which is not technically an explosive). This explanation will be added to the bullets for the five relevant occurrences.

EPA General Comment 2 Response (12/2/11): See EPA General Comment 1 Response.

Additional Response (1/3/12): Noted. Also, please see the “Additional Response” to EPA General Comment 1. In addition, the explanations have been added to the draft final.

EPA RPM General Comment 3 (8/15/11): *Please include risk screening tables similar to the Example Risk Screening tables (attached) at the end of each Section for transparency purposes. These tables should include all COPCs that passed through the screening process.*

Response (10/4/11): Summary tables listing the COPCs that passed through the screening process at each AOC are included as the final table in each AOC section of the report. Specifically, these COPCs are included in the Decision Summary tables, which include Tables 3-7, 4-4, 5-12, 6-4, and 7-4.

The Decision Summary tables were prepared to consolidate the results of the human health and ecological risk screenings steps. Detailed tables listing the risk screening calculations are included in Appendices A and B.

Since all of the COPCs that passed through the screening process are included in the general Decision Summary tables, as well as in detail within Appendices A and B, the Navy believes that no revision of the risk screening tables is necessary.

EPA RPM General Comment 3 Response (12/2/11): ok

Section 2

EPA RPM Comment 1 (8/15/11): *Page 2-1. Although the investigation methodology etc... from the previous investigation are not included in the report, I assuming all sample data are. Correct?*

Response (10/4/11): The available historical sample data from previous investigations at AOC 1, AOC 2, AOC 6, and AOC 8 are included in Appendix G, Historical Analytical Data. For clarification, the text on page 3-3 will be revised to state:

“With the exception of arsenic (7.4 mg/kg) in sediment, only low, estimated levels of phthalates, ethylbenzene and xylenes near reporting limits were detected in historical surface water and sediment samples (**Tables G-3 and G-4, Appendix G**).”

EPA RPM Comment 1 Response (12/2/11): Please indicate whether the data was included in the risk evaluation.

Additional Response (1/3/12): The report text has been revised to identify the data that was included in the risk evaluations by adding the following sentence to the end of the 3rd paragraph on page 2-1:

“With the exception of the AOC 2 historical data, only the 2008 SI analytical data were used in the human health and ecological risk screenings conducted for AOCs 1, 6, 7, and 8.”

Section 3

EPA RPM Comment 2 (8/15/11): Page 3-13. *This is an incorrect application of dilution attenuation factors. DAF are utilized the project what we may see in groundwater from a soil sample value. Applying a DAF directly to a groundwater sample makes no sense and is not consistent with EPA guidance. Please revise.*

Response (10/4/11): These are dilution factors, not DAFs, as described in Appendix B, Section B.2. Please see the response to General Comment 1.

EPA RPM Comment 2 Response (12/2/11): Please see EPA General Comment 1 Response.

Additional Response (1/3/12): Noted. Also, please see the “Additional Response” to EPA General Comment 1.

EPA RPM Comment 3 (8/15/11): Page 3-15. *Groundwater. It is unclear as to why we would average groundwater samples. Wells should be evaluated on a per well basis.*

Response (10/4/11): The rationale is provided in Appendix B, Section B.2. Please see the response to General Comment 1.

EPA RPM Comment 3 Response (12/2/11): Please see EPA General Comment 1 Response.

Additional Response (1/3/12): Noted. Also, please see the “Additional Response” to EPA General Comment 1.

EPA RPM Comment 4 (8/15/11): Page 3-17. *Eco Risk Evaluation. Eco Risks should be calculated for these sites. Although the size of the sites may be small, they are essentially all habitat (forested cover etc... not a parking lot).*

Response (10/4/11): Potential ecological risks were evaluated for these sites, as provided in Section 3.2.4 and Appendix B. The page referenced in the comment provides a summary of the results. The small size of the sites was included as a factor explaining why the risks are likely to be low (i.e., they would be limited, spatially). Consideration of such factors is consistent with the ecological risk screening methodology provided in Appendix B, Section B.2.

EPA RPM Comment 4 Response (12/2/11): Please see EPA General Comment 1 Response.

Additional Response (1/3/12): Noted. Also, please note that the Step 3 recommendation does include sampling for inorganics, which covers all of the COPCs for ecological risk at AOC 1, except two - endrin and endrin aldehyde. The highest detections of endrin (3.3J µg/kg) and endrin aldehyde (3.1J µg/kg) in the AOC 1 surface soil are slightly above the ecological screening value (1.95 µg/kg for both) and are well below 50 µg/kg, indicating normal pesticide application.

EPA RPM Comment 5 (8/15/11): Page 3-17. *It is highly unlikely that an Arsenic hit of nearly 50ppm at CAA01-SO04 from Table 3-1 is attributed to background. This is almost an order of magnitude above our background number. Please carry Arsenic through as a COPC.*

Response (10/4/11): While the maximum arsenic concentration of 47.5 L mg/kg in surface soil at CAA01-SO04 exceeded the respective base background UTL for arsenic (6.36 mg/kg) by almost an order of magnitude, the maximum arsenic concentration in this sample did not exceed the maximum base background for arsenic (63.9 mg/kg). As such, the maximum concentration detected in surface soil is likely attributable to natural background conditions, as documented in the first bullet on page 3-5. Based on this information, arsenic was not carried through as a COPC during the risk screening process.

EPA RPM Comment 5 Response (12/2/11): EPA does not agree with eliminating Arsenic as a COPC as part of a SI risk screening process. Please carry through arsenic as a COPC or elevate the issue to tier 2.

Additional Response (1/3/12): As agreed to by the Partnering Team on Nov. 16, 2011, the SI analytical data will not be compared against the maximum background UTLs. The text in Sections 3.2.4, 3.3.2 and 3.3.3 has been revised to remove the former maximum background argument, and arsenic and chromium are now identified as COPCs.

(NOTE: Comment 6 was not provided by the USEPA. Comments proceeded from Comment 5 to Comment 7)

Section 4

EPA RPM Comment 7 (8/15/11): *AOC 2 should be considered a solid waste landfill which would be subject to Virginia State regulations.*

Response (10/4/11): AOC 2 is excluded from regulation under 9 VAC 20-81 by 9 VAC 20-81-35(E) and 9 VAC 20-81 45(B)(2)(f) since it is being remediated under CERCLA and ceased disposal operations prior to regulation.

EPA RPM Comment 7 Response (12/2/11): Noted.

EPA RPM Comment 8 (8/15/11): Page 4-3. *A number of drums were found in the area of AOC2TT05-AOC2TT10, AOC2TT13 and AOC2TT14, yet no samples were collected in this area according to Figures 4-4, 4-5, and 4-6. Please collect samples from this area.*

Response (10/4/11): As documented in Attachment B of the *Final Trenching Letter Report, Site 1, Site 4, and AOC 2* (Baker, 2002), empty 55-gallon drums were observed only in test

trenches AOC2TT13 and AOC2TT14; no drums were observed in test trenches AOC2TT05 through AOC2TT10. No samples were collected during the most recent AOC 2 field investigation in 2001.

Test trenches AOC2TT13 and AOC2TT14 are located within Area 2 (Figures 4-4 and 4-5). Prior to finalization of the Final SI Work Plan, during a phone conversation with CH2M HILL, the Navy RPM, and USEPA on September 12, 2008, the USEPA agreed that no additional sampling at AOC 2 was required during the SI as long as the respirator cartridges were removed. The Navy agreed, and as documented in the Response to Comments on the Draft Final Work Plan submitted to the WPNSTA Yorktown/CAX Partnering Team, "...the Navy plans on conducting a removal action to address the existing respirator cartridges, ...".

Test trenches AOC2TT13 and AOC2TT14 are located within Area 2 that contains the respirator cartridges (Figures 4-4 and 4-5) that will be removed during an EE/CA that will be performed at AOC 2. Since confirmation sampling is planned as part of the EE/CA, the Navy believes sampling of the area where the drums were observed is not necessary.

EPA RPM Comment 8 Response (12/2/11): The text currently states, "In eight of these trenches (AOC2TT05 through AOC2TT10, AOC2TT13, and AOC2TT14) dextrose bottles, some clothing, metal debris, and empty 55-gallon tar coated drums were observed". If drums were only found in two locations, please revise the text. Soil samples should be collected beneath the location of the drums. This can be done as part of the confirmation samples following the removal action discussed on page 4-12.

Additional Response (1/3/12): The drums were only found at two of the test trench locations, AOC2TT13 and AOC2TT14. The text has been revised as follows:

"In six of these trenches (AOC2TT05 through AOC2TT10) dextrose bottles, some clothing, and metal debris were observed and empty 55-gallon tar-coated drums were observed in trenches AOC2TT13 and AOC2TT14."

The locations of test trenches AOC2TT13 and AOC2TT14 are within Area 2 recommended for an interim removal action. As requested, confirmation sampling will be conducted beneath the two locations where the empty drums were observed.

EPA RPM Comment 9 (8/15/11): Page 4-5. "Not considered a CERCLA Source". This is still improper disposal which would be subject to Virginia State regulations.

Response (10/4/11): The debris in Area 1b and Area 3 consists of dextrose bottles, deer carcasses, and military clothes and are not CERCLA-related wastes. Under 9VAC20-81-45(B)(2)(f), the open dump criteria does not apply to sites that are undergoing remediation per the requirements of CERCLA or the RCRA Corrective Action Program and are doing so with the department's and/or the Environmental Protection Agency's oversight. At this time, the Navy believes that the CERCLA action being taken at AOC 2 constitutes sufficient remedial action for the non-CERCLA wastes that were disposed of at the site.

EPA RPM Comment 9 Response (12/2/11): ok

***EPA RPM Comment 10 (8/15/11):** Page 4-6. The PCB discussion states that PCBs were detected above residential screening at the duplicate of A2-TP01, but then goes on to say that Aroclor 1260 was not detected in the soil at A2-TP01. Presumably the original A2-TP01 and its' duplicate were taken from the same location and not separate samples correct? I do realize it is possible for an original sample and a dup. to have different detections, but the paragraph implies one sample was within the waste and one was from the native soil below the waste. Also, it appears an interim removal action will be prepared to remove the waste from Area 2. This should be used as the rationale as to why the Aroclor 1260 detection is not of concern. Confirmation samples following the removal should include PCB analysis due to a high degree of uncertainty associated with the contaminants distribution.*

Response (10/4/11): The report text will be revised to clarify the PCB detection as follows:

“One PCB (Aroclor-1260) was detected in only one subsurface soil sample (310 µg/kg in the duplicate A2-TP01F **at Test Pit TP01**), slightly above the residential RSL (220 µg/kg) (Figure 4-7). However, the primary sample from this location was below screening criteria. **Both of these subsurface soil samples, A2-TP01F and its duplicate,** were collected within the debris zone at approximately 3.5 feet bgs. **However,** Aroclor-1260 was not detected in the native soil sample (A2-TP01N) collected from the bottom of Test Pit TP01 at 5 feet bgs. Therefore, Aroclor-1260 is likely a localized occurrence and not migrating from the debris material. PCBs tend to bind to soil and are not readily mobile.”

While the interim removal action at AOC 2 precludes the Aroclor 1260 detection from being a concern, the interim removal action for AOC 2 is not introduced in the report until p. 4-12. Since mention of this removal action on p. 4-6 would disrupt the logical progression of information being presented in Section 4, this rationale has not been included on p. 4-6.

EPA RPM Comment 10 Response (12/2/11): ok

(NOTE: Comment 11 was not provided by the USEPA. Comments proceeded from Comment 10 to Comment 12)

***EPA RPM Comment 12 (8/15/11):** According to Figure 4-3 there is a “Significant Geophysical Anomaly” in the North West corner of the site that was not investigated.*

Response (10/4/11): Noted. During the 1998 geophysical investigation, a significant metallic response was identified in the EM-61 data in the northwest corner of the AOC 2 geophysical investigation area, as shown in Figure 4-3 of the SI report. However, as documented in Appendix A of the Final Field Investigation Report, Site 1 and AOC 2 (Baker, 1999), this anomaly was not identified as an anomaly that could not be explained by a surface object. Furthermore, the EM-31 quadrature data for AOC 2, also collected during the 1998 geophysical investigation, complemented most of the EM-61 and in-phase responses, but with less resolution. Based on review of the EM-31 data, “increases in terrain conductivity can be seen along the entire western edge of the grid. Although there are no metallic anomalies corresponding to this

feature it was suggested by Baker personnel on site that this is the possible location of an abandoned railroad. The changes in terrain conductivity may be due to a nonmetallic but relatively conductive material that was used for the railroad bed” (Baker, 1999). While the Final Field Investigation Report does not state specifically why this northwest area was not investigated, it is assumed that the northwest anomaly was likely associated with the abandoned railroad bed.

EPA RPM Comment 12 Response (12/2/11): ok

***EPA RPM Comment 13 (8/15/11):** Areas 1b and Area 3 are dumps that don’t appear to have to have been sampled according to the figures. Please provide rationale in a RTC as to why this would be acceptable. Presumably the response would be the types of materials disposed would not be expected to create contamination, however, it is highly that any disposing that occurred was an orderly disposal of specific material. Environmental sampling should be conducted to ensure there was no disposal of hazardous materials.*

Response (10/4/11): Based on the AOC 2 test pit and test trenching logs, the debris in Area 1b and Area 3 consists of dextrose bottles, deer carcasses, and military clothes, which are not CERCLA-related wastes. No debris or waste was observed during the trenching activities to propose that hazardous materials were disposed at AOC 2. As such, the Navy does not believe that environmental sampling is necessary.

EPA RPM Comment 13 Response (12/2/11): ok

Section 5

***EPA RPM Comment 14 (8/15/11):** Page 5-4. 1918 Drum Storage Area. EPA suggests samples are collected and analyzed for VOCs, PCBs and Pesticides.*

Response (10/4/11): The constituents sampled for and analyzed during the CAX AOC SI, as listed in the Final SI Work Plan agreed to by the WPNSTA Yorktown/CAX Partnering Team, were based on the review of constituents detected during Weston’s 1999 Site Inspection. As documented in the WPNSTA Yorktown/CAX Partnering Team Final 15 November 2007 Meeting Minutes, Rob Thomson (USEPA) requested that phthalates be added to the list of analytes to be sampled at AOC 6 during the SI. As such, SVOCs were added to the Final SI Work Plan. Based on the re-review of the 1999 and current AOC 6 SI analytical data, the Navy believes that no additional sampling and analysis for VOCs, PCBs, and Pesticides at the 1918 Drum Storage Area is necessary.

EPA RPM Comment 14 Response (12/2/11): Is there any historical evidence that suggests no drums or barrels containing any VOCs, PCBs, or Pesticides were not stored in this area (or is there any historical evidence to suggest what was stored onsite)?

Additional Response (1/3/12): Presently, no historical evidence has been found documenting the contents of the drums or barrels in the 1918 Drum Storage Area. Based on a power point presentation dated January 2004 (“Cheatham Annex Penniman AOC Desk Top Study & Discussion Update”,

unknown author), a review of a 1918 photograph indicates that wooden kegs, stacked on sides and empty, are observed. Additionally, the kegs were stored while the shell loading area was active and “Amatol records similar kegs used for storing Ammonium Nitrate”.

No documentation has been found verifying whether or not ammonium nitrate was originally stored in the wooden barrels observed in the 1918 Drum Storage Area. However, explosives were not detected in any of the surface soil, subsurface soil, or groundwater samples collected and analyzed during the 2008 SI.

***EPA RPM Comment 15 (8/15/11):** Page 5-10. Bis(2-ethylhexyl)phthalate. If the contaminant was likely attributed lab contamination, was it detected in the blanks?*

Response (10/4/11): The SVOC Bis(2-ethylhexyl)phthalate was not detected in any of the blanks and was inadvertently identified as exceeding the ecological screening value in the pre-Draft report, which listed the Screening Level Concentration (SLC) screening values as the ecological screening criteria for sediment. The organic chemicals in sediment were actually screened against both SCL screening values and Equilibrium Partitioning (EqP) screening values (adjusted based upon the mean site-specific total organic carbon concentration), if available, as listed in Appendix B, Table B-3. While the pre-draft tables included the SLC as the ecological screening value, the EqP was the actual screening value used for bis(2-Ethylhexyl)phthalate detected in the AOC 6 sediment samples, as listed in Table 5-11.

Specifically, as documented in Appendix B, pp. B-12 through B-13, Bis(2-ethylhexyl)phthalate exceeded the SLC screening value, but not the EqP screening value, based upon the maximum detected concentration. However, neither of these screening values was exceeded in the field duplicate of the one sample that exceeded the SLC screening value (the chemical was not detected in the field duplicate at a reporting limit less than the SLC screening value). Because the EqP screening value accounts for site-specific bioavailability and was not exceeded, this chemical was not identified as an initial COPC.

The text on p. 5-10, carried over from the pre-draft, inadvertently includes the SCL instead of the EqP. Based on this information, Bis(2-ethylhexyl)phthalate was not an initial COPC. Only one SVOC, 2,6-Dinitrotoluene, initially exceeded the ecological screening criteria. The text will be revised to state the following:

“SVOCs and Explosives

One SVOC, **2,6-Dinitrotoluene**, exceeded the **Equilibrium Partitioning (EqP) value of 187 µg/kg** in one **subsurface** sediment sample (**SD02**, near the **Ammonia Settling Pits**) at a concentration of **260 µg/kg**. However, **since the mean HQ for 2,6-Dinitrotoluene was less than one, this constituent was not identified as a refined COPC during the ecological risk screening**. No other SVOCs or explosives exceeded their respective screening criterion in surface and --subsurface sediment samples.”

EPA RPM Comment 15 Response (12/2/11): Please see EPA General Comment 1 Response.

Additional Response (1/3/12): Noted. Also, please see the “Additional Response” to EPA General Comment 1.

EPA RPM Comment 16 (8/15/11): Page 5-12 Ammonia Settling Pits. Check with Rob to make sure the correct chemicals were analyzed for.

Response (10/4/11): No response necessary. As instructed by the USEPA via email on August 23, 2011, this comment was a note by the USEPA reviewer and should be disregarded.

EPA RPM Comment 16 Response (12/2/11): ok

EPA RPM Comment 17 (8/15/11): Page 5-13. Ammonia Settling Pit. Groundwater Discussion. Averaging groundwater samples is not acceptable. See RPM General Comment.

Response (10/4/11): The methodology used to screen and evaluate lead in the HHRS was described in Appendix A, page A-3, as follows “Lead is not evaluated in the same manner as the other COPCs, but is regulated by USEPA based on blood-lead uptake using a physiologically based pharmacokinetic model called the Integrated Exposure Uptake Biokinetic (IEUBK) Model. As a screening tool, lead is screened at 400 mg/kg in soil based on residential exposure. The model uses the average lead concentration, not the maximum detected lead concentration. If the average lead concentration is greater than 400 mg/kg, it is retained as a COPC for the AOC. For groundwater, the maximum detected concentration of lead is screened at 15 µg/L in groundwater based on the federal action level (USEPA, 2009a). If the lead concentrations are greater than the action level, it is retained as a COPC for the AOC.” The use of the average lead concentration is consistent with EPA guidance, as the average concentration is the concentration that is used when lead is evaluated using the IEUBK model.

EPA RPM Comment 17 Response (12/2/11): The maximum detect of lead in groundwater of 22 ug/L exceeds the federal action level. If the detection of lead was from a total metals analysis (and either not detected in the dissolved analysis or detected below the action level), then the case can be made for not carrying lead through as a COPC. However, this case is not presented above.

Additional Response (1/3/12): Lead was not detected in the dissolved phase and a sentence to clarify this has been added to the referenced section. Regardless, the recommended path forward for the Ammonia Settling Pit is to conduct an ESI for groundwater, to include permanent monitoring wells and inorganics analysis, so lead will be evaluated again.

EPA RPM Comment 18 (8/15/11): Page 5-17. Mean HQ for Aluminum and Lead. See RPM General Comment.

Response (10/4/11): Please see the response to General Comment 1.

EPA RPM Comment 18 Response (12/2/11): Please see EPA General Comment 1 Response.

Additional Response (1/3/12): Noted. Also, please see the “Additional Response” to EPA General Comment 1.

EPA RPM Comment 19 (8/15/11): Page 5-17. DAF applied directly to groundwater sample. See EPA RPM General Comment.

Response (10/4/11): Please see the response to General Comment 1.

EPA RPM Comment 19 Response (12/2/11): Please see EPA General Comment 1 Response.

Additional Response (1/3/12): Noted. Also, please see the “Additional Response” to EPA General Comment 1.

EPA RPM Comment 20 (8/15/11): Page 5-18. Mean HQ for HMX and Mercury. See EPA RPM General Comment.

Response (10/4/11): Please see the response to General Comment 1.

EPA RPM Comment 20 Response (12/2/11): Please see EPA General Comment 1 Response.

Additional Response (1/3/12): Noted. Also, please see the “Additional Response” to EPA General Comment 1.

EPA RPM Comment 21 (8/15/11): Page 5-18. Groundwater discussion. Please see EPA RPM General Comment 1.

Response (10/4/11): Please see the response to General Comment 1.

EPA RPM Comment 21 Response (12/2/11): Please see EPA General Comment 1 Response.

Additional Response (1/3/12): Noted. Also, please see the “Additional Response” to EPA General Comment 1.

EPA RPM Comment 22 (8/15/11): Page 5-19. Surface Soil. Bullets 1, 2, and 3. See EPA RPM General Comments.

Response (10/4/11): Please see the response to General Comment 1.

EPA RPM Comment 22 Response (12/2/11): Please see EPA General Comment 1 Response.

Additional Response (1/3/12): Noted. Also, please see the “Additional Response” to EPA General Comment 1.

EPA RPM Comment 23 (8/15/11): Penniman Lake Surface Water Discussion. The argument that the screening level of 4ppb for barium is conservative should be overcome by the fact that we

exceeded it by nearly 5x as well as it being detected at multiple locations. Please refine Barium as a COPC in surface water.

Response (10/4/11): The surface water screening value for barium (4 µg/L) is conservative because it is based upon a form of barium (barium ion) that is relatively uncommon in natural water bodies but very toxic, while the surface water sample was measured for total barium. For comparison, the USEPA Region 5 freshwater screening value for total barium is 200 µ/L, which is much higher than the concentrations found in the lake (which ranged from about 15 to 20 µ/L). This explanation will be added to the text of the SI and barium will not be identified as a COPC.

EPA RPM Comment 23 Response (12/2/11): Please see EPA General Comment 1 Response.

Additional Response (1/3/12): Noted. Also, please see the “Additional Response” to EPA General Comment 1. Also, please note, an RI for Penniman Lake is planned; therefore, any future surface water or sediment work would be conducted under that project and not as part of any follow-up investigation for AOC 6. The Partnering Team discussed and agreed to this approach during November 2011 Partnering.

Section 6

EPA RPM Comment 24 (8/15/11): Page 6-5. Lead 984ppm. See EPA RPM General Comments.

Response (10/4/11): Please see the response to Comment 17.

EPA RPM Comment 24 Response (12/2/11): Additional sampling should take place in the NW portion of the site near CAA07-SO03.

Additional Response (1/3/12): A removal action to address surface soil inorganic contamination around location SO03 is recommended. Confirmation samples will be collected.

EPA RPM Comment 25 (8/15/11): Page 6-6. Groundwater. Lead. See RPM General Comments.

Response (10/4/11): Please see the response to Comment 17.

EPA RPM Comment 25 Response (12/2/11): The maximum detect of lead in groundwater is 31 µg/L which exceeds EPAs screening value for lead. Typically the argument can be made that lead wasn't detected in the dissolved metals analysis. However, it doesn't appear dissolved lead was analyzed (?). Please carry through lead as a COPC, resample the wells for dissolved lead, or elevate the issue to tier 2.

Additional Response (1/3/12): The AOC 7 groundwater samples were analyzed for dissolved lead; however, the concentrations of dissolved lead were all “B” qualified, indicating that lead was not detected above the level reported in the blanks. Based on the average concentration of total lead, 10 ug/L, which is below the 15 ug/L lead screening level, lead was not carried through as a COPC in groundwater at AOC 7. Nonetheless, the recommended path forward for AOC 7 groundwater is an

ESI, including the installation of permanent monitoring wells and inorganic analysis, so lead will be evaluated again.

EPA RPM Comment 26 (8/15/11): Page 6-7. Subsurface Soil. See RPM General Comments.

Response (10/4/11): Please see the response to General Comment 2.

EPA RPM Comment 26 Response (12/2/11): Please see EPA General Comment 1 Response.

Additional Response (1/3/12): Noted. Also, please see the “Additional Response” to EPA General Comment 1.

EPA RPM Comment 27 (8/15/11): Page 6-8. Groundwater. See EPA RPM General Comment.

Response (10/4/11): Please see the response to General Comment 1.

EPA RPM Comment 27 Response (12/2/11): Please see EPA General Comment 1 Response

Additional Response (1/3/12): Noted. Also, please see the “Additional Response” to EPA General Comment 1.

EPA RPM Comment 28 (8/15/11): Page 6-8. Second to last word. Typo.

Response (10/4/11): Corrected. The second to last word in the final sentence on p. 6-8, “work”, has been revised to “word”.

EPA RPM Comment 28 Response (12/2/11): Thank you.

EPA RPM Comment 29 (8/15/11): Former Drum Pile. Was GPR preformed on this AOC (I may have missed it)?

Response (10/4/11): No, GPR has not been conducted in the vicinity of the Former Drum Disposal Area.

EPA RPM Comment 29 (12/2/11): ok

EPA RPM Comment 30 (8/15/11): Figure 6-4. From Figure 6-4 it does not appear that the actual nature of the pit has been characterized (although extent appears to have been defined). Since the path forward for the Site is a removal action, the only comment would be to analyze for a full suite of analytes during confirmation samples.

Response (10/4/11): An expanded SI is recommended for AOC 7 (Drum Disposal and Can Pit Area) in order to verify the groundwater flow directions and to verify and characterize the extent of inorganic contamination. As indicated by the current SI analytical data, no VOCs, SVOCs, pesticides, PCBs, or explosives were detected above screening criteria in soil, and no SVOCs, pesticides, PCBs, or explosives were detected above screening criteria in groundwater. Only one VOC exceeded screening criteria in groundwater.

Prior to preparing the expanded SI work plan, the current SI analytical data will be reviewed and a focused list of analytes will be recommended based on the recent detections.

EPA RPM Comment 30 Response (12/2/11): The “current analytical data” consists of what appears to be only 1 sample within the actual footprint of the can pit. Constituents should not be eliminated based on 1 sample.

Additional Response (1/3/12): Sorry that the previous response discussed the path forward for the AOC 7 groundwater and did not address Comment 30. Yes, there was one sample location within the can pit, from which two soil samples (surface and subsurface) were collected. The footprint of the can pit is rather small (~30 feet long and 20 feet wide); therefore, the sample is representative of conditions and can be considered “worst case scenario.” The recommendation for the can pit is a removal action with confirmation sampling. The recommended confirmation sampling is for inorganic constituents, not full suite. The Navy feels it is acceptable to leave the SI recommendations as they are and let the Partnering Team discuss the confirmation sample analyte list during the EE/CA preparation.

Section 7

EPA RPM Comment 31 (8/15/11): Page 7-7. Mean Zinc. See RPM General Comments.

Response (10/4/11): Please see the response to General Comment 1.

EPA RPM Comment 30 Response (12/2/11): Please see EPA General Comment 1 Response

Additional Response (1/3/12): Noted. Also, please see the “Additional Response” to EPA General Comment 1.

EPA RPM Comment 32 (8/15/11): Page 7-8. Groundwater. See RPM General Comments.

Response (10/4/11): Please see the response to General Comment 1.

EPA RPM Comment 32 Response (12/2/11): see the response to General Comment 1.

Additional Response (1/3/12): Noted. Also, please see the “Additional Response” to EPA General Comment 1.

Appendix A

EPA RPM Comment 33 (8/15/11): Page A-5. AOC 1 South. Lead 698ppm. See EPA RPM General Comment.

Response (10/4/11): Please see the response to Comment 17.

EPA RPM Comment Response 33 (12/2/11): Lead should be stepped out to the East.

Additional Response (1/3/12): The recommended path forward for AOC 1 South is an ESI to further verify and characterize the extent of SVOC (PAHs) and inorganic contamination “hot

spot” areas; therefore, lead will be evaluated again. As far as sample locations are concerned, those details will be worked out during the ESI scoping session and included in the ESI UFP-SAP. The Navy feels it is acceptable to leave the SI recommendations as they are and let the Partnering Team discuss the sample locations during the ESI scoping session.

EPA RPM Comment 34 (8/15/11): Page A-7. Iron discussion. This doesn't make sense. Although Iron is an essential human nutrient, there is some science that went in to the development HQ and screening values developed. If a chemical is exceeding the screening values we can't say "it is likely that exposure to iron at the concentrations present on the site would not result in any adverse health effects". That is essentially questioning the science that went in to the development of the risk numbers. Please revise.

Response (10/4/11): We will revise the paragraph discussing iron as follows to indicate that the maximum detected iron concentration would not result in an intake above the tolerable upper intake level (UL), the highest level of daily nutrient intake that is likely to pose no risk of adverse health effects to almost all individuals in the general population. The following text will be added to Page A-7:

“Iron, the only contributor to the potential noncarcinogenic hazard is considered an essential human nutrient, and although the concentrations indicate a potential unacceptable hazard, it is likely that exposure to iron at the concentrations present on site would not result in any adverse health effects. The potential unacceptable hazard is primarily associated with the iron concentration detected in sample CAA02-A2-DPB03-00-1098. Ingestion of soil at the maximum detected concentration of iron [44,000 mg/kg, which would result in ingestion of 8.8 mg/day iron for an adult (44,000 mg/kg x ingestion rate of 200 mg/day x conversion factor of kg/10⁶ mg)], is below the tolerable upper intake level (UL), the highest level of daily nutrient intake that is likely to pose no risk of adverse health effects to almost all individuals in the general population of 45 mg/day for adults. Ingestion of iron in soil by children would result in ingestion of 18 mg/day iron (44,000 mg/kg x ingestion rate of 400 mg/day x conversion factor of kg/10⁶ mg), which is below the UL of 40 mg/day for children.”

EPA RPM Comment 34 Response (12/2/11): ok

Additional Response (1/3/12): Also note that although the main text may state the exposure to iron is not likely to have adverse effects, iron is carried through as a COPC.

Correction (4/27/12): The original EPA comment and Navy response addresses the iron discussion for the AOC 2 surface soil; however, a similar discussion/revision is also necessary for the AOC 2 subsurface soil. While preparing a similar response for the subsurface soil, the human health risk assessor noticed the ingestion rates were incorrect, and they should be 100 and 200 for adult and children, respectively, and not 200 and 400, as previously reported. Therefore, the correction for surface soil is:

“Ingestion of soil at the maximum detected concentration of iron [44,000 mg/kg, which would result in ingestion of 4.4 mg/day iron for an adult (44,000 mg/kg x ingestion rate of 100 mg/day x conversion factor of kg/10⁶ mg)], is below the tolerable upper intake level (UL), the highest level of daily nutrient intake that is likely to pose no risk of adverse health effects to almost all individuals in the general population of 45 mg/day for adults. Ingestion of iron in soil by children would result in ingestion of 8.8 mg/day iron (44,000 mg/kg x ingestion rate of 200 mg/day x conversion factor of kg/10⁶ mg), which is below the UL of 40 mg/day for children.”

And the addition for subsurface soil is:

“Ingestion of soil at the maximum detected concentration of iron [45,300 mg/kg, which would result in ingestion of 4.5 mg/day iron for an adult (45,300 mg/kg x ingestion rate of 100 mg/day x conversion factor of kg/10⁶ mg)], is below the tolerable upper intake level (UL), the highest level of daily nutrient intake that is likely to pose no risk of adverse health effects to almost all individuals in the general population of 45 mg/day for adults. Ingestion of iron in soil by children would result in ingestion of 9.1 mg/day iron (44,000 mg/kg x ingestion rate of 200 mg/day x conversion factor of kg/10⁶ mg), which is below the UL of 40 mg/day for children.”

Also, the above 1/3/12 “Additional Response” is incorrect. Iron is NOT being carried through as a human health COPC in surface or subsurface soil because the daily ingestion rate for adults and children is below the tolerable upper intake level for both media, thus there would be adverse effect. (Note: iron is a COPC for ecological risk in surface and subsurface soil.)

EPA RPM Comment 35 (8/15/11): Page A-7. *Doesn't the RAGs Guidance caution against screening something out (Thallium) because it doesn't have a screening criteria? I believe it should be carried through.*

Response (10/4/11): Thallium was not carried through the screening tables because it was not possible to estimate any contribution to the cumulative hazard/risk associated with thallium. Between the draft and draft final document, the latest RSL update (June 2011) became available, and there are now RSLs for thallium. The thallium detections for all media for all AOCs were compared (not risk screened) to the new thallium RSLs:

- Res. Soil RSL: listed as .78 mg/kg, adjusted value .078 mg/kg
- Ind. Soil RSL: listed as 10 mg/kg, adjusted value 1 mg/kg
- GW Tapwater RSL: listed as .37 µg/L, adjusted value .037 µg/L
- SW RSL: listed as 3.7 µg/L, adjusted value 0.37 µg/L

The thallium concentrations exceeded the respective RSL for these AOCs and media and could potentially be a COPC:

AOC 2:

- Thallium in **SB** - sample CAA02-A2-TP02-N-1999 (0.84 L mg/kg)

- Total thallium in **GW** - samples CAA02-A2DPW01-1098 (1.2 L µg/L) and CAA02-A2DPW02-1098 (2 J µg/L)

AOC 6 – 1918 Drum Storage Area:

- Total thallium in **SB** - sample CAA06-SB16-1108 (0.08 J mg/kg)
- Total thallium in **GW** - samples CAA06-DW09-1108 (2.1 J UG/L), CAA06-DW10P-1108 (1.7 J µg/L), CAA06-DW11-1108 (2.2 J µg/L)
- Dissolved thallium in **GW** - sample CAA06-DW09-1108 (2 J µg/L)
-

AOC 6 TNT Areas:

- Thallium in **SS** – sample CAA06-SS03-1008 (0.18 J mg/kg)
- Thallium in **SW** - sample CAA06-SW01-1008 (1.7 J µg/L)

AOC 8:

- Thallium in **SS** - sample CAA08-SS01-1008 (0.08 J mg/kg)
- Dissolved thallium in **GW** - sample CAA08-DW04-1008 (1.9 J µg/L)

For AOC 2, thallium was not detected in the dissolved metals fraction in groundwater, thus the total results are likely attributable to suspended solids. The subsurface soil location where thallium exceeded the RSL is within the removal area that will be in the interim removal action area. Therefore, no change to the recommendations for AOC 2 is necessary.

For the AOC 6 – 1918 Drum Storage Area, since the SI recommendation was no further action, the human health risk screening for this area was re-run using the June 2011 RSLs (for all constituents, including thallium). Results of the updated risk screening continue to indicate that exposure to surface and subsurface soil within the 1918 Drum Storage Area would not result in any unacceptable risks. While exposure to groundwater could result in potential unacceptable human health risks, associated with exposure to metals, this potential risks is based on total inorganics detected in the groundwater; however, the DPT method generally results in higher total inorganic concentrations from the higher turbidity. Aluminum was the only inorganic detected in the dissolved fraction and is likely attributable to background; therefore, no unacceptable human health risk above background is expected for groundwater. The no further action recommendation is still appropriate and no change to the SI report is necessary.

For the AOC 6 – TNT Areas surface soil, an RI is the recommended path forward for the AOC; thus, thallium will be evaluated as part of the HH risk assessment. Regarding the surface water sample, the total thallium concentration exceeds the surface water screening level (adjusted tap water RSL times ten, 0.37 µg/L), but does not exceed the unadjusted screening level (tap water RSL times ten, 3.7 µg/L). In addition, thallium was not detected in the dissolved fraction. No change to the SI report is necessary.

For AOC 8, the surface soil sample thallium concentration listed above was within the range of the residential RSL (considering significant figures). Regarding the AOC 8 groundwater, an RI is the recommended path forward; thus, thallium will be evaluated as part of the HH risk assessment and no change to the SI report is necessary.

The text in the individual AOC sections and Appendix A (the HH risk screen) will be revised, as appropriate, to reflect that there are now RSLs for thallium and the comparison to them and conclusions presented above. For the AOC 6 Drum Storage Area, the text, tables, and figures will be updated to reflect the revised HH risk screen.

EPA RPM Comment 35 Response (via the EPA's letter dated 5/21/12):

“EPA has reviewed the responses to comments and the in text revisions to the document and has found them to be acceptable.”

***EPA RPM Comment 36 (8/15/11):** Page A-7. Aroclor-1260. Should be cumulative risk. See EPA RPM General Comments.*

Response (10/4/11): Agree. However, the point of this paragraph is to show that the risk is primarily associated with chromium, based on the assumption that all of the chromium is in the hexavalent form, and to identify the relative contribution from each of the carcinogenic COPCs.

EPA RPM Comment 36 Response (12/2/11): Page A-7 Subsurface soil. I do not understand the point of the final paragraph on page A-7. The prior paragraph states Aroclor 1260, arsenic, chromium, copper and iron were retained as COPCs (which is fine). However, the following paragraph goes on to discuss the individual risk associated with each individual compound stating they are within the acceptable level. (I do not believe the cumulative risk was within the acceptable range? That is the primary issue). For clarification, were Aroclor 1260, arsenic, chromium, copper and iron retained as COPCs?

Additional Response (1/3/12): Yes, they are retained as COPCs (see main text, page 4-12).

***EPA RPM Comment 37 (8/15/11):** Page A-10. Ammonia Settling Pit Area. Lead. See RPM General Comments.*

Response (10/4/11): Please see the response to Comment 17.

EPA RPM Comment 37 Response (12/2/11): Please see the Comment 17 Response.

Additional Response (1/3/12): Please see the additional response provided to the Comment 17 Response.

***EPA Tox Comment 1 (8/15/11):** In Section 2.4 of the report, the text should confirm that surface and subsurface soil samples were collected from original soil (not fill material), where contamination, if any, would likely be found.*

Response (10/4/11): For clarification, the report text in Section 2.4 will be revised as follows:

“Surface soil samples were collected from **native soil** 0 to 6 inches below ground surface (bgs) and shallow subsurface samples were collected from 6 to 24 inches bgs. In addition, **non-native** deep subsurface soil samples were collected at AOCs 7 and 8 from the bottom of test pits considered to be most impacted by debris. The purpose of these additional subsurface samples was to determine the potential for vertical migration of contaminants from buried debris.”

EPA Tox Comment 1 Response (12/2/11): Thank you, the response to comment is acceptable.

Additional Response (1/3/12): The above text revision indicates non-native deep subsurface soil samples were collected at AOC 7 and that is not the case, as the vertical extent of waste was delineated at AOC 7. Therefore, the above revision has been further refined as follows:

“Surface soil samples were collected from native soil 0 to 6 inches below ground surface (bgs) and shallow subsurface samples were collected from 6 to 24 inches bgs. In addition, deep subsurface soil samples were collected at AOC 7 (native subsurface soil samples CAA07-SBTP04-1008, CAA07-SBTP06-1008, and CAA07-SBTO05-1008) and AOC 8 (native subsurface soil samples CAA08-SBTP14-1008 and CAA08-SBTP24-1008; non-native soil sample CAA08-SBTP19-1008) from the bottom of test pits considered to be potentially impacted by debris. The purpose of these additional subsurface samples was to determine the potential for vertical migration of contaminants from buried debris.”

***EPA Tox Comment 2 (8/15/11):** According to Table 2-1, in terms of organics, only TCL SVOCs were considered at AOC 6. Why wasn't the full TCL suite considered? This could represent a data gap. Fortunately, most of the subareas in AOC 6 will move forward for additional investigation; however, the 1918 Drum Storage Area dropped out. Unless strong justification can be provided for this omission, consideration should be given to collecting additional samples from the 1918 Drum Storage Area to rule out the presence of VOCs, PCBs and pesticides in soil.*

Response (10/4/11): Please see the response to Comment 14.

EPA Tox Comment 2 Response (12/2/11): Thank you, the response to comment is acceptable.

EPA Tox General Comment (12/2/11): As we've discussed (both in-house and on a conference call with the Navy), there seems to be a protocol in place for evaluating Cheatham sites at the SI stage. That's fine, assuming that all partners agree with the established decision tree. However, it seems that when sites fail the screening, the Navy introduces additional (and not necessarily scientifically-sound) screening parameters to justify NFA. I understand that no one wants to unnecessarily propel sites into an RI, but we also can't allow sites that pose potentially significant risks to slip through the cracks. Further, if data gaps exist, they need to be filled (perhaps through an Extended SI) before a final conclusion can be drawn. Bottom line, risk management calls should primarily be reserved for situations where a site is well characterized and informed decisions can be made.

Response to New EPA Tox General Comment (1/3/12): From the start of this project, the CAX Partnering Team has discussed and agreed upon the course of action for investigating these AOCs. Along the way, there have been three different Navy RPMs and three different EPA RPMs. It's possible successors did not have a clear understanding of past decisions, but the Navy has not acted as a sole decision agent. This SI evaluates five AOCs, which includes two subareas for one AOC (AOC 1) and four subareas for another (AOC 6). In total, eight areas are evaluated. Of these eight, only two have an NFA recommendation – AOC 2 (groundwater portion only) and AOC 6 1918 Drum Storage subarea (soil and groundwater). We feel sufficient data and scientifically-sound reasons for NFA do exist. In addition, at the November 2011 Partnering meeting, the Team discussed and agreed to conducting a risk assessment using existing data to demonstrate that NFA is appropriate; if there is a data gap, it will be presented and resolved. The SI recommendations are appropriate, and the details of the follow-on work can be ironed out later.