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TECHNICAL MEMORANDUM RESPONSE TO COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION REPORT AT STUMP NECK ANNEX SOLID WASTE MANAGEMENT UNIT 14 (SWMU 14) NSWC INDIAN HEAD MD

06/06/2013

CH2M HILL

Response to Comments on the Draft *Remedial Investigation Report at Stump Neck Annex – SWMU 14, Naval Support Facility Indian Head, Indian Head, Maryland*

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DATE: June 6, 2013

This memorandum provides responses to comments on the document referenced above. The responses provided below have been incorporated into a final version of the work plan that will be submitted upon acceptance of these responses. Comments are presented as received, followed by CH2M HILL's responses shown in italics. Nick Carros and Curtis DeTore had no comment. Please review the responses to ensure they address your comments.

Comments from Nathan Delong (NAVFAC Atlantic - Received on March 19, 2013)

1. Executive Summary – Conclusions and Recommendations, page IV: Potentially unacceptable risks from cobalt are associated with future industrial and hypothetical residential use of the site through exposure to or use of groundwater as a potable water supply. – "This is confusing. How can there be no risk for current industrial workers, but a risk for future industrial workers?"

   Response: *The potentially unacceptable risk to industrial workers is associated with using groundwater as a potable source in the future. Current industrial workers do not use the groundwater as a potable water supply, and therefore do not have the same risk.*

2. Section 2.8 Hydrogeology, page 2-4: A thin layer of the Tertiary deposits overlie the Upper Patapsco confining unit along the upland. – "this sounds like an incomplete sentence. Maybe add the 'area'."

   Response: *The word "area" has been added after "upland".*

3. Section 3.1.6 Investigation-derived Waste Management, page 3-3: IDW generated during the field activities consisted of soil cuttings, purged groundwater, decontamination water, and disposable sampling equipment, such as polyethylene tubing, acetate macro-core liners, and trowels." the first part of this list should

probably be referred to as Investigative Derived Material. I don't think we need another section, just a couple of changes to this section to differentiate the two."

Response: *In accordance with guidance from Maryland Department of the Environment, the sentence has been revised to read: "Investigation derived media consisting of soil cuttings and purged groundwater and investigation derived waste consisting of decontamination water and disposable sampling equipment, such as gloves, polyethylene tubing, acetate macro-core liners, and trowels was generated during the SWMU 14 RI field activities."*

4. Section 4.5 Nature and Extent of Contamination, page 4-3: constituents of potential concern (COPCs) – "when has this changed from contaminants of potential concern, or have I been wrong this whole time?

   Response: *The word "constituents" is preferred over contaminants because "contaminants" implies contamination. Use of this term has been in all previous documents.*

5. Section 4.5.1 Surface Soil, page 4-3: COPCs – "need an apostrophe"

   Response: *An apostrophe is not needed; however, the space between "COPC" and "s" will be deleted.*

6. Figure 4-4: if hexavalent chromium was not found at this location, take it out of the table (referring to textbox for SS08)

   Response: *The row for "Hexavalent Chromium" will be deleted from the data box as suggested.*

7. Section 6.2.2.2 Groundwater, page 6-2: During the July 2012 sampling event, groundwater samples were collected from the eight monitoring wells sampled during the September 2011 sampling event, and from the additional monitoring well installed after the first sampling event. – "this additional monitoring well isn't mentioned earlier in this paragraph, although I'm pretty sure it was mentioned earlier in the report. I thought there were 9 wells, but we only sampled 8 since one of the wells from the SSP investigation was dry and abandoned.

   Response: *Groundwater samples were collected from nine wells total, seven new monitoring wells (IU14MW04 through IU14MW09 and IU14MW11) and two existing monitoring wells (IU14MW01 and IU14MW03). The paragraph will be revised to read: "Seven monitoring wells were installed during the RI within the shallow water-bearing unit throughout SWMU 14; six of the monitoring wells were installed in August 2011, and an additional monitoring well was installed in June 2012. Monitoring well locations were based on site hydrogeology and in situ groundwater analytical results from the SSP (CH2M HILL, 2009). As part of the SSP, two permanent monitoring wells were previously installed at SWMU 14, one within the older septic system drain field and one in the newer drain field. During the September 2011 RI field event, groundwater samples were collected from eight wells total, six newly installed monitoring wells (IU14MW04 through IU14MW09) and two previously installed monitoring wells (IU14MW01 and IU14MW03). Following the installation of the additional monitoring well in June 2011, samples were collected from nine wells total, seven new monitoring wells (IU14MW04 through IU14MW09 and IU14MW11) and two existing monitoring wells (IU14MW01 and IU14MW03) in July 2012. All groundwater samples collected during the September 2011 and July 2012 sampling event*

were analyzed for total and dissolved TAL metals (including mercury and cyanide). Monitoring well locations are shown on Figure 3-2."

8. Section 6.3.3.2 Estimation of Chemical Intakes for Individual Pathways, page 6-6: These assumptions, based on estimates of body weights, media intake levels, and exposure frequencies and duration, are provided in EPA guidance (1989, 1991, 1997a, 2002, and 2004a) and Virginia Department of Environmental Quality (2003). – "any reason why we're using VA guidance? Does MD not have guidance?"

   Response: *VDEQ was cited in error. The text "…and Virginia Department of Environmental Quality (2003)." has been deleted because only EPA guidance was used.*

9. Section 6.3.3.2 Estimation of Chemical Intakes for Individual Pathways, page 6-6: The values for parameters used in this model were obtained from this guidance document and are included in the RAGS Part D Table 7 series – "was the RAGS acronym explained earlier? I don't remember seeing it."

   Response: *The acronym RAGS is defined previously in Section 6.2.3 Selection of Chemicals of Potential Concern, where it states, "The selection of COPCs was based on the criteria presented in the EPA Region III Technical Guidance Manual, Selection of Exposure Routes and Contaminants of Concern by Risk-Based Screening (EPA, 1993b), and the Risk Assessment Guidance for Superfund (RAGS) Part D (EPA, 2001)."*

10. Section 6.5.2.6 Future Lifetime Resident (Table 9.6RME, Appendix G), page 6-11: EPA target risk range 1x10-6 to 1x10-6 - change the -6 to a -4

    Response: *The risk range "1x10-6 to 1x10-6" has been changed to "1×10^{-6} to 1×10^{-4}".*

11. Section 6.7 Summary, third paragraph, page 6-13: I assume this paragraph is for carcinogenic risk? The first bullet says the opposite

    Response: *The following sentence will be added to the end of the third paragraph of section 6.7: "There are non-carcinogenic hazards for future industrial and hypothetical residential use of the site associated with exposure to groundwater."*

12. Section 7.2.2.1 Preliminary CSM, Exposure Pathways and Routes, page 7-5: is it called drinking water when we're talking about eco risk?

    Response: *This statement refers to a drinking water source for animals such as a non-saline creek; however the words drinking water will be replaced with groundwater.*

13. Section 8.1.1 Site Characterization, page 8-1: the shallow groundwater is limited to the area beneath the site and not hydraulically connected to the local shallow aquifer – "could this be an argument against risk, that it is basically perched water and is not suitable as a drinking water source? "

Response: *The shallow groundwater at SWMU 14 cannot be classified as non-potable because the Maryland Department of the Environment requires all water sources to be defined as potentially potable water sources.*

Comments from Nicholas Carros (NSF-Indian Head - Received on May 14, 2013)

Mr. Carros had no comments on the subject document.

Comments from Mindi Snoparsky (EPA Region III Hydrogeologist- Received on March 20, 2013)

1. Section 2.2.1 SWMU 14 Description, page 2-1: I would like some information regarding how the original septic tank was abandoned. Additionally, with respect to the pipes from this old system, was any video inspection to detect cracks performed? Were these pipes abandoned as well? How deep were the tank and pipes? These could be conduits for contamination to surface water as well as groundwater. This is also important to know for the nature and extent of contamination.

   Response: *As documented in section 2.2.1, the septic tank is documented to have been abandoned in place; however, the abandonment procedures are not documented and it is unknown if associated piping was abandoned as well. There is no historical documentation of a video inspection of the pipes from the old system to detect cracks; so it is assumed that this inspection was not performed. Figure 2-2 shows the extent of the septic system piping; the depth is approximately 8 to 10 ft bgs. Based on the risk assessment that was completed, there were no risks identified for the surface water so it can be assumed that the tank and pipes are not conduits for contamination to Mattawoman Creek or Potomac River. On the other hand, it is possible that the tank and pipes could be conduits for contamination to the groundwater because of identified risks from the risk assessment.*

2. Section 3.1.4 Monitoring Well Installation and Development, page 3-2: According to the boring logs and associated cross-section and description here, all of the wells seem to be located in very low permeability units. Deeper wells in actual aquifers are recommended. Perhaps this should be discussed.

   Response: *Deeper wells are not required because the shallow groundwater is not hydraulically connected to the underlying aquifer. Precipitation which infiltrates the unpaved areas of the site accumulates within the silty clayey sand and silt unit within the hill. The underlying clay layer, which is thicker than 5feet, limits the vertical and lateral migration of contamination from the limited extent water-bearing zone into an actual deeper aquifer.*

3. Radioactive Cobalt (Cobalt 60) - Section 2.2.2 Previous Investigations, page 2-2: the analysis for cobalt-60 is noted because of the radiographic facility adjacent to the site. I am unclear whether this facility is still in operation. In any event, in 5.1 Fate and Transport of Cobalt in Groundwater, p. 5-1, radiographic cobalt is not mentioned at all. It is also not described/shown in Figure 4-6, Interpreted Cobalt Isoconcentration Contour Map. I am unclear whether the cobalt-60 was found, since the only section

in the report where it was mentioned was 2.2.2 Previous Investigations p. 2-2. It is also not mentioned in 6.3.2.1 Contaminant Sources, p. 6-4.

Response: *Cobalt 60 was not detected in the samples collected. The last sentence of the third paragraph of section 2.2.2 will be revised to read "…been used and disposed, however, cobalt-60 was not detected above detection limits."*

4. Conclusions, page 8-1: The cobalt (radioactive? A mixture?) in the "groundwater" clearly indicates a plume. The reason why I have put quotes around groundwater is that although the wells have provided sample information, it seems that all of these wells were completed in a very low permeability layer, not an aquifer, per se. Additionally, there is nothing to substantiate the claim that this clayey groundwater is not hydraulically connected to the local shallow groundwater. First of all, it is unclear to which "local shallow groundwater" the report refers to- below the site or lateral to the site? No data for either noted here.

   Response: *The clay layer limits the vertical and lateral migration of the not radioactive cobalt plume due to the low hydraulic conductivity ($10^{-7}$and thickness of the clay layer (greater than 5 feet). The shallow groundwater is limited to that which infiltrates from the unpaved areas of the site and is not hydraulically connected to the local shallow aquifer, which occurs beneath the underlying clay layer. The end of the second paragraph of Section 4.4 will be revised to read: "…boundary of the site; however the vertical and lateral migration of the shallow groundwater is limited by the underlying clay layer, such that shallow groundwater is not hydraulically connected to the local shallow aquifer which occurs beneath the underlying clay layer. An additional cross section (Figure 4-3) will also be included to further aid the illustration.*

Comments from Bruce Pluta (EPA BTAG - Received on April 23, 2013)

1. Section 7.5 Refinement of Conservative Exposure Assumptions, page 7-12: Please remove language indicating that the use of average concentrations is more relevant to population level impacts than maximum concentrations. This is an overly simplistic assumption and requires further definition and evaluation of population dynamics. However, BTAG recognizes the value of using central tendency exposure estimates in addition to maximum concentrations as part of the ERA.

   Response: *The following sentence will be deleted from the first bullet in section 7.5.1: "The mean concentrations are also appropriate for evaluating potential risks to populations of soil invertebrates and aquatic receptors."*

2. Section 7.7.2 Groundwater, page 7-16: The groundwater exposure based risk characterization states that using a generic dilution factor of 10 is overly conservative because dilution is likely much greater than 10 upon discharge to the Potomac River. Receptors at the groundwater-surface water interface have no diluted exposure. The ERA also states that no sediment samples were collected along the shoreline because the substrate is composed of cobble and gravel. This likely increases the bioavailability of metals at the groundwater/surface water interface. More information should be provided as to whether this contaminant migration pathway is complete (i.e., are metals being discharged to the surface water) and if so,

what is the ultimate fate of these contaminants and where are potential depositional areas.

Response: *While we agree that receptors at the groundwater-surface water interface have no diluted exposure, the assessment was based on the lack of a direct transport pathway between site groundwater and the river bed. The site stratigraphy indicates that the underlying clay layer prevents downward migration of the shallow groundwater at the site and that groundwater discharge is occurring through seeps along the bluff at the edge of the site, above the river surface elevation. Therefore, the assessment reflects that exposure is occurring when the seep water mixes with the river water, rather than directly at a groundwater/surface water interface within the cobble and gravel substrate. The end of the second paragraph under the Exposure Pathways and Routes subsection of Section 7.2.2.1 will be amended as follows: "….gravel and cobble. However, based on the site stratigraphy (see Figure 4-3) this transport pathway is not complete because the confining clay layer prevents upwelling of groundwater directly to the riverbed. The silty clayey sand and silt unit represents a limited groundwater-bearing zone within the hill that discharges to the seeps at the base of the bluff, but above the river water surface elevation. Thus, although groundwater is discharging to the river through the seeps, there is no direct groundwater/surface water interface at the point of discharge. Thus, aquatic organisms are potentially exposed to chemicals in site groundwater after the seep water mixes with the river water."*

Comments from Dawn Ioven (EPA Region III Risk Assessor- Received on April 23, 2013)

1. Section 2.2.1 SWMU 14 Site Description, page 2-1: It's not clear to me if the on-site septic tanks are above or below ground surface (bgs). This could make a difference in the location of contamination and, therefore, the sampling strategy (surface vs. subsurface soil). (Note that only surface soil samples were collected for this RI.) The report should identify the position of the septic tanks.

   Response: *The septic tanks are below ground surface. The first sentence of the second paragraph of section 2.21 will be revised to read "The original septic tank system at Stump Neck SWMU 14 was constructed in approximately 1968 approximately 8 to 10 ft bgs. Only surface soil samples were collected during the RI because the low concentrations of metal detected in subsurface soils collected during the SSP were not expected to pose an unacceptable risk above background levels to human health Figure 2-2 shows the locations of the septic tanks.*

2. Section 2.2.2 Previous Investigations, page 2-2: According to the second paragraph, subsurface soil samples were collected during the Site Screening Process (2005-2008). Those samples were collected at a depth of 14-24 feet bgs (or 1 foot above shallow gw). This depth might provide some information about potential sources to gw, but does not assess the more likely location of subsurface contamination – within the first several feet of the ground surface (for spills)—which could contribute to direct contact threats. Further, the report does not provide the results of the deep subsurface sampling. In conclusion, 1) depending on the location of the septic tanks, the absence of soil data between the surface and 14-24 feet could represent a significant data gap at the site and 2) the analytical findings from the historical deep subsurface sampling should be presented in the RI report.

Response: *The subsurface soil samples were previously evaluated and documented in the SSP, which documented that there were no potential risks associated with subsurface soil at SWMU 14. The results from the SSP were not included in the RI report; however, the results were summarized in Section 2.2.2 and it is noted that no ecological and human health risks were identified for the subsurface soil. The subsurface soils were collected from below the depth of the septic tank (8-10ft bgs) to evaluate any releases from the septic tank. Although the subsurface soil samples were collected from depths that a human receptor would not typically contact, they were located as to detect the likely most contaminated soil, and were therefore used as representative of subsurface soil contamination that a human receptor could contact for the screening risk assessment.*

3. Section 2.2.2 Previous Investigations, page 2-2: The third paragraph indicates that two permanent wells were installed during the Site Screening Process (2005 -2008) and analyzed for cobalt-60 "because there is a radiographic processing facility adjacent to the site where radioactive cobalt may have been used and disposed." This is a significant piece of information that is buried in the report, considering that cobalt is the primary contaminant in soil and gw at the site. Cobalt-60 ultimately decays to non-radioactive nickel, which is also a contaminant of potential concern (in soil and gw) at this site; this finding seems to support the presence of radioactive cobalt at SWMU 14. If that is the case, the screening level for cobalt-60 in gw, 2.98E-09 ug/L (at an excess cancer risk of 1E-06), is much more stringent than the non-cancer screening level for elemental cobalt, 0.468 ug/L (at an HQ of 0.1). The results of the limited cobalt-60 analysis should be presented in the draft RI Report. Further, if cobalt-60 is present in gw, it is critical to determine the concentration and/or activity levels, as this could significantly impact risk predictions, as well as remediation strategies.

   Response: *Cobalt 60 was not detected in the samples collected; nor are the low level nickel concentrations consistent with the decay of Cobalt 60. The last sentence of the third paragraph of section 2.2.2 will be revised to read "…been used and disposed, however, cobalt-60 was not detected above detection limits."*

4. Section 4.5.1 Surface Soil, page 4-3 : The third paragraph states that "there is no discernible pattern to the distribution of site-related COPCs in the surface soil, indicating there is no significant source of elevated metals concentrations." This statement is a bit misleading, in my opinion. While surface soil contamination does seem to be scattered, metals at the site are, in fact, present at levels greater than risk-based screening levels and statistically greater than bg. Bottom line, soil at the site is contaminated, and there had to be an original source of that contamination. The sentence cited above would be more accurate if the last part ("… indicating there is no significant source of elevated metals concentrations") were deleted.

   Response: *The text "…indicating indicating there is no significant source of elevated metals concentrations" in the last sentence of the third paragraph has been deleted as suggested.*

5. Section 4.5.2 Groundwater, page 4-3: The discussion of groundwater findings should indicate whether radioactive cobalt was detected in samples collected from the site.

Response: *Cobalt 60 was not detected in the samples collected. The last sentence of the third paragraph of section 2.2.2 will be revised to read "…been used and disposed, however, cobalt-60 was not detected above detection limits."*

6. Section 6.3.1.2 Potential Future Land Use (page 6-4), 6.3.2.3 Potential Exposure Points and Exposure Routes (page 6-5), and Figure 6-1: Under a future land-use scenario, residential, commercial and construction exposures should consider potential risks associated with total soil (surface + subsurface). The Baseline Risk Assessment in this RI Report evaluated surface soil only. At the very least, a qualitative comparison of contaminant levels in surface vs. subsurface soil should be performed. (As noted in a previous comment, the absence of data between the surface and 14 – 24 feet bgs could represent a significant data gap, which may need to be addressed.)

   Response: *The SSP showed no potential unacceptable risks associated potential site-related contamination in subsurface soil in the RI (as stated on page 6-1). Therefore, subsurface soil was eliminated as a media of concern in the SSP and not evaluated in the RI. The maximum detected concentration of all metals was higher in the surface soil data set evaluated in the RI than in the subsurface soil data set evaluated in the SSP. Only inorganics were analyzed in the surface soil samples. Organics were analyzed in the subsurface soil sample, however, only two were detected (carbon disulfide and bis(2-ethylhexyl)phthalate)) and both were below screening levels.*
   The team agreed that based on the history and the layout of the site, that the samples collected during the SPP and RI are adequate and any potential contamination at SWMU 14 has been sufficiently characterized, and additional investigation is not warranted.

7. Table G3.2: In the calculation of exposure point concentrations for contaminants in groundwater, were only wells in the center of the plume used?

   Response: *All of the wells were used to calculate the groundwater EPC.*

Comments from Curtis DeTore (Maryland Department of the Environment) – Received on May 7, 2013

Mr. DeTore had no comments on the subject document.