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NSWC INDIAN HEAD
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RESPONSES TO COMMENTS REGARDING THE TECHNICAL MEMORANDUM DRAFT
SOLID WASTE MANAGEMENT UNIT 14 (SWMU 14) UNIFORM FEDERAL POLICY
SAMPLING AND ANALYSIS PLAN NSWC INDIAN HEAD MD

03/03/2015
CH2M HILL

Responses to Comments on Draft SWMU 14 UFP-SAP

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This memorandum provides responses to comments on the above referenced document. Comments are presented as received, followed by CH2M HILL's responses shown in italics. Please review the responses to ensure they address your comments.

Comments from Allison Cantu (NAVFAC Washington) – Received on November 20, 2014

General Comments

1. NSF-IH should be NSFIH.

Response: The acronym for Naval Support Facility Indian Head has been changed from NSF-IH to NSFIH throughout the document.

Specific Comments

1. Worksheet #2- Should something be listed for Site Number instead of a -? Even NA may be more appropriate.

Response: "SWMU 14" has been added as the Site Number.

2. Figure 4- Is there a reason that the injection wells are located at the upgradient end of the cobalt plume? If they were moved further south, couldn't they impact the entire plume better? I may not have been involved or remember the decision for the locations.

Response: Groundwater flow is generally from southwest to northeast, towards Mattawoman Creek. Therefore, the injection wells are actually located near the downgradient end of the plume. Creation of an in situ reactive zone to precipitate cobalt in this area is intended to mitigate migration of the cobalt towards the creek.

3. HASP Section 8- The maximum concentration of cobalt in surface soil is not listed.

Response: The maximum concentration of cobalt in surface soil is 19.9 mg/kg at location IU14SS06. It has been included in Table 12-1 in Section 12 of the SSHP (Appendix A to the Accident Prevention Plan).

4. HASP Section 17- Under “Potential emergency situations and response actions are identified below” the response action seem to not match the situation after the first one. They seem to be out of order by one item.

Response: With the HASP in the EM-385 format, this comment is overcome by events, and the information on emergency situations and response actions is now in Section 19 (Emergency Response Plan) of the SSHP, which is Appendix A to the Accident Prevention Plan.

Comments from John Burchette (EPA) - Received on January 6, 2015

EPA RPM

Specific Comments

1. Page 6. Executive Summary. Is the 400ppb treatment area a risk based number or is it arbitrary? Is the 400ppb treatment area (/number) going to be used for just the pilot study or is it likely (if found to be effective) the 400ppb and greater will be the only area that is treated (i.e. less than 400ppb not treated)?

Response: The 400 µg/L area was selected based on professional judgment and represents the most contaminated portion of the plume and a concentration approximately 10 times the 95 percent upper tolerance limit background concentration of 39.6 µg/L, from Background Soil Investigation Report for Indian Head and Stump Neck Annex. For a pilot test, it is reasonable to focus on the most contaminated portion of the plume to assess the effectiveness of the treatment method. No decisions have been made regarding the area of the plume that would be treated in a full-scale system using this technology.

2. Page 32. Is there no risk or is there no habitat (as indicated on page 5)?

Response: Based on a conversation with Mr. Burchette on 1/15/15, the text on page 5 indicates that there is “limited habitat” so the text on page 32 indicating that there is no risk shows consistency between the 2 entries. Therefore, no changes to the text on either page are necessary.

3. Page 33. #1. “Eight monitoring will”. Typo.

Response: The word “wells” has been added after “monitoring” in the 1st sentence of the paragraph under the first environmental question.

4. Page 34. Isn't it common practice to use ½ the detection limit if the PAL exceeds the DL?

Response: No.

Revised Comments from Robert Thomson (EPA) - Received on February 26, 2015

Mr. Thomson noted in his email “The attachment includes John’s earlier comments re-tweaked to make sense to me...” A 5th comment from Mr. Thomson was included in the attachment. The re-tweaked comments and the additional comment are shown below.

EPA RPM**Specific Comments**

1. Page 6. Executive Summary. Is the 400 ug/l cobalt isoconcentration boundary a risk based number or is it arbitrary? Is the 400ppb treatment area (/number) going to be used for just the pilot study or is it likely (if found to be effective) the 400ppb and greater will be the only area that is treated (i.e. less than 400ppb not treated)? Note that the tapwater RSL for cobalt is 0.6 ug/l, and the PAL for cobalt listed on page 34 is 39.6 ug/l. What does the 400 ug/l value represent?

Response: The response is the same as that provided to John's comment #1 above. The 400 µg/L area was selected based on professional judgment and represents the most contaminated portion of the plume and a concentration approximately 10 times the 95 percent upper tolerance limit background concentration of 39.6 µg/L, from Background Soil Investigation Report for Indian Head and Stump Neck Annex.

2. Page 32. The draft Work Plan states that there is no unacceptable ecological risk at SWMU 14. Is this true? Page 5 of the draft Work Plan states that there is "limited" habitat for ecological receptors, therefore the RI concluded that no further action was recommended for surface soil.

Response: Please see response to John's comment #2 above. It is true that there is no unacceptable ecological risk, as noted on page 32.

3. Page 33. #1. "Eight monitoring will". Typo. No revisions to this comment.

Response: Response is the same as that to John's comment #3 above.

4. Page 34. How do the PALs relate to the PRGs for SWMU 14? Did the RI establish PRGs for SWMU 14?

Response: The PAL for cobalt is the site remediation goal (SRG) that was determined in the draft FS. The PALs for non-COC metals are the base-wide background concentrations, Regional Screening Levels (RSLs), or federal Maximum Contaminant Levels (MCLs), whichever is higher. The non-COC metals are not based on PRGs or SRGs because they were not identified as COCs.

The RI did not establish the PRGs. Human health risk-based PRGs were calculated and presented in the draft FS not the RI. Following the PRG calculation, the SRG was determined as described in the text below, which is taken from the draft FS:

"Table 3-2 presents the determination of the SRG for cobalt in shallow groundwater. Typically, federal maximum contaminant levels are included for SRG consideration, but a maximum contaminant level has not been established for cobalt. Because the risk-based PRG for the residential child (4.7 µg/L) is lower than the PRGs for the residential adult (11 µg/L) and industrial worker (31 µg/L), the risk-based PRG for the residential child was selected as the human health risk-based PRG. However, this value is lower than the 95 percent upper tolerance limit facility-wide background value of 39.6 µg/L for cobalt. Because the Navy prohibits remediation to below background conditions (Navy, 2001), the facility-wide background value for cobalt (39.6 µg/L) was selected as the SRG."

5. It is unclear whether there is any evaluation to determine whether monitored natural attenuation and/or augmented in-situ bioremediation will be effective as a remedy for the groundwater at SWMU 14.

QUESTION – if the injection of organic carbon substrate and sulfate reagent proceeds, is there any possibility of the injectates destroying the naturally existing microbial population in the groundwater beneath SWMU 14? Would a bench scale study be able to determine this?

Response: *A wide variety of bacteria are naturally present in shallow aquifers of this type. Injection of organic carbon substrate and sulfate are not expected to destroy existing bacteria. The substrate and organic carbon will provide an electron donor and an electron acceptor to stimulate the growth of naturally occurring existing bacteria, particularly sulfate-reducing bacteria and other anaerobic bacteria. The relative populations of different bacterial groups may change after injection but the full spectrum of naturally occurring bacteria will remain present at the site.*

EPA Chemist – Received on February 10, 2015

General Comments

1. SAP Worksheet #14-Summary of Project Tasks Subsection Analytical Tasks fifth bullet reads, “Although all sample results will be reported in Level IV data packages, only percent of the definitive data will be undergo Level IV data validation (i.e. recalculation of results). Refer to worksheets #34–#36 for more information.” This sentence contains what the reviewer believes to be an inadvertent omission of the percentage of data that will undergo Level IV validation and the extra word (be) after the phrase data will.

Response: *It should be 10 percent of the definitive data that will undergo Level IV data validation. “10” has been added to the 5th bullet.*

2. SAP Worksheet #34-36-Data Verification and Validation (Steps I and IIa/IIb) Process Table references the use of Region III Modifications to the National Functional Guidelines. It should be noted Region III Modifications to the National Functional Guidelines is no longer used, National Functional Guidelines is now the standard used throughout Region III for all data validation.

Response: *Per Worksheet #36, Region III modifications are listed only as the source for which qualifiers will be used (i.e. B, K, L, UL, etc.). These Region III-specific qualifiers are familiar to project teams working in Region III. Otherwise, data validation will be performed as already described in Worksheet #36, using analytical methods, SOPs, the UFP-SAP, and guidance from the NFGs as appropriate. Therefore, no changes are necessary as only Region III qualifiers are used.*

Recommendations

3. SAP Worksheet #27-Sample Custody Requirements Table Subsection 1. Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to lab) third sentence reads, “Samples will be cushioned with packaging material and placed into coolers containing enough ice to keep the samples below 4°C until they are received by the laboratory.” It is recommended that each sample be placed in

individual Ziploc type bags to prevent the possibility of sample contamination due to ice melt or broken sample containers. Each Chain of Custody (CoC) should also be protected from water damage by placing each in a sealed Ziploc type bag.

Response: The recommended approach is documented in SOP A.10 (Packaging and Shipping Procedures for Low- Concentration Samples) in Appendix A. There is no change to the text.

3. SAP Worksheet #11-Project Quality Objectives/Systematic Planning Process Statements fourth environmental question reads, “Nine months following the injection, a final sampling event will be conducted. All site monitoring wells (17) will be sampled for cobalt (total and dissolved); a subset of 9 wells will also be analyzed for the geochemistry parameters.” This section should be made to agree with all other sections in the SAP that include the sample collection and analysis of samples for the Total Analyte List of Metals (TAL) plus Mercury for both the total and dissolved fractions.

Response: The sample collection for “current geochemical conditions and cobalt distribution in the shallow groundwater” is from 20 wells. The sample collection for “site-wide geochemical condition and changes in the cobalt distribution in the shallow groundwater over time indicate natural attenuation is occurring at the site”, as noted in the 4th environmental question, is from 17 wells for cobalt (total and dissolved) and a subset of 9 wells for the geochemistry parameters. The sampling program is different based on the environmental questions. The table in WS #14 shows the breakdown of the number of wells that will be sampled and parameters for each sampling event. Therefore, the requested change cannot be made in other sections in the SAP that include sample collection and analyses.

EPA Hydrogeologist (Mindi Snoparsky) – Received on February 26, 2015

1. Executive Summary: Regarding the precipitation of cobalt sulfide as the end-product of the process:
 - a. Will the precipitate remain in the groundwater or will it be collected and disposed of?
 - b. If the precipitate remains, what is the chemistry and or kinetics of the compound in terms of it remaining in this state? Or to put it another way – how long will it remain as cobalt sulfide and what are the possible factors that could cause it to change?

Response: The precipitate will remain in the subsurface. The duration of it remaining as a precipitate is difficult to predict but depends on how long the aquifer remains in a generally reducing state. If the oxidation-reduction potential remains low, the precipitate will have good long term stability. The emulsified oil vegetable substrate to be used as an organic carbon source is typically effective in maintaining reducing conditions for up to about two years. Over time, if dissolved oxygen enters the treatment zone, some of the precipitated sulfide minerals could be oxidized to sulfate, releasing some of the cobalt back into solution. In the event this were to occur, it is possible that cobalt concentrations will remain below the SRG, due to continued dilution and dispersion. Alternately, additional organic substrate could be injected to further maintain reducing conditions. Post-injection monitoring will be needed to assess longer term cobalt concentrations.

2. Worksheet 9: As a recommendation, since there are some uncertainties at the site with respect to the geochemistry, it may be more cost-effective and scientifically sound to perform a bench-scale test before proceeding with the pilot test.

Response: We agree that a bench-scale test would likely generate useful information. However, even if a bench-scale test was successful, a subsequent pilot test would still be needed to fully demonstrate the effectiveness of the process at a full-scale since bench-scale tests cannot mimic the full range of dynamic environmental variables that occur in a field-scale system nor expose the injected reagents to the full range of bacteria naturally present within an aquifer. Conducting a bench-scale test would also push back the schedule and increase the cost. A decision to conduct a bench-scale test first would have to factor in the increased cost and schedule impacts to the project.

3. Worksheet 10 – Conceptual Site Model. Scaled cross-sections based on the logs should be included in the final report. Figure 3 is a schematic, not a CSM. It would have been helpful if the vertical extent of the plume was also included as a separate figure. The depths of the proposed locations, with respect to the plume, would be helpful.

Response: The RI report has two cross sections, which were created based on geologic logs for the site. Figure 3 is a CSM because it provides information on the site geology, source of cobalt (COC), potential migration pathways, and ecological and human health exposures and receptors in groundwater (the medium of concern). Based on data collected to date, the lateral extent of cobalt contamination is depicted on Figure 4. The vertical extent of cobalt contamination in the groundwater is discussed in WS#10. Soil borings for monitoring well installation was down to 34 feet bgs, which was inside the clay layer at the site; this was to confirm that the clay was thick. Generally, the wells were installed down to a depth of approximately 30 feet bgs. The depths of the proposed monitoring wells and injection wells will be down to about 30 feet bgs (WS#14) based on previous well depths. An additional figure will not be created as Figure 3 provides all the information for a CSM rather than details of the characterization.

4. Worksheet 11.

1. The latest risk information regarding cobalt should be included.

Response: WS#11 is designed for “Project Quality Objectives/Systematic Planning Process Statements”. The latest risk information is presented in detail the RI report and summarized in WS#10 and Figure 3. The intent of the UFP-SAP format is to streamline the work plan by focusing on the rationale for the investigation, objectives of the investigation, and sampling and analytical program to accomplish the objectives.

2. The depths of the wells- and the plume- should be noted.

Response: WS#11 is designed for “Project Quality Objectives/Systematic Planning Process Statements”. The depths of wells and plumes are not applicable to this worksheet. The plume map is provided as Figure 4 and the depth of the wells to be installed is provided in WS#14. Information on previously installed wells are provided in the RI.

5. Worksheet 14. EPA realizes that cobalt is the main focus on the Pilot Study, but it is unclear why the full TAL/TCL analysis isn't proposed for at least one sampling round at the new wells.

Response: As noted in WS #9-2, per your recommendation, the Team agreed to analyze one round of samples for full TAL metals following the injection. TCL VOC and SVOC analyses were performed during the Site Screening Process investigation and were not determined to be COCs. The purpose of the pilot study is to evaluate the treatability of cobalt and no VOCs and SVOCs are to be addressed.

6. Worksheet 17 – Sampling Rationale: same comment as for worksheet 14.

Response: Please see response to comment #5 above.

Comments from Cathy Gardner (FEAD) – Received on January 15, 2015

1. Appendix C - Health and Safety Plan - Revised and Resubmit. Please submit a Health and Safety plan in accordance with EM 385-1-1 , Appendix A.

Response: The HASP has been converted to the EM 385-1-1 format and was submitted to FEAD on 2/16/15 for review. The following response was received from FEAD on 2/19/15:

“I have reviewed your submittal and it is approved as noted.

1. Min. PPE required at all times is as follows. Hard hat, Safety toe' d boots steel or composite, safety glasses, Safety vest or high vis shirts. Hearing protection, gloves or any other safety gear as required by activity.
2. Report ANY injury or damage to Gov.t. property immediately to myself William Lindsay 301-744-2182 or Cathy Gardner 301-744-2181. We have to do an investigation and file a report within 4 hrs. of the incident.”

CH2M HILL asked if the points in the bullets should be added to the EM-385 plan or should they be included in the project instructions and discussed during the kickoff meeting for the fieldwork. FEAD responded that the points should be included in the EM-385 and project instructions, and discussed at the kickoff meeting.

The EM-385 was revised, specifically the AHAs and the SSHP, and submitted to FEAD and the Navy on 2/23/15 for review and approval. FEAD approved the revisions on 2/23/15.

Comments from Nicholas Carros (NSFIH) – Received on February 18, 2015

Mr. Carros stated in an email “I believe the document accurately reflects spirit of the scoping sessions. Additionally, I believe Cathy Gardner has thoroughly evaluated the H&S issues associated with this project. I have no further comments.”

Comments from Curtis DeTore (MDE) – Received on January 20, 2015

Mr. DeTore stated in a letter that “This document was subjected to an on-board review during the December 2014 Indian Head Installation Restoration Team meeting in Philadelphia, PA. All offered comments were addressed at that time.”