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Response to USEPA Comments on the Draft Five-Year Review Report for Sites 1, 2, 3, 6, 20, and 23 at Naval Station Norfolk

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Below is the response to the United States Environmental Protection Agency (USEPA) Toxicological comments on the *Draft Five-Year Review for Sites 1, 2, 3, 6, 20, and 23: Naval Station Norfolk, Norfolk, Virginia*. The responses to the comments will be incorporated in the final report.

General Comments

- A. **Site 1, Site 3, Site 20, and Site 23:** If MCLs are the identified cleanup goal, the MCL values may not be protected against cumulative risk. In addition, there is no published MCL value for chloroform and 1,1-dichloroethane.

Response: The MCLs goals will be reassessed when the concentrations reach the goals to determine if they are protective.

- B. **Site 1 and Site 3:** A minor issue is that of 1,4-dioxane. EPA has recently become aware that sites with VOCs sometimes have this solvent stabilizer as well. This can be of concern since, unlike VOCs, 1,4-dioxane is not removed by air stripping and carbon filtration. 1,4-dioxane can also travel ahead of a VOC groundwater plume. The VOC most closely associated with 1,4-dioxane is 1,1,1-trichloroethane, which has historically been detected at this site. Therefore, sampling for this contaminant is highly recommended to confirm that this chemical is not of concern at the site.

Response: Table 6-1 for Site 3 inadvertently included 1,1,1-trichloroethane which will be revised in the Final version of the report. Therefore, 1,4-dioxane is not considered a concern for Site 3.

The Navy acknowledges that 1,1,1-TCA has been detected in several monitoring wells at Site 1 during the RI and LTM. However, because 1,4-dioxane is highly mobile and does not sorb to soil particles, the pump and treat system is assumed to be effective in capturing 1,4-dioxane from the groundwater aquifer and preventing migration of this contaminant in groundwater at the site. Therefore, the Navy agrees to collect 1,4-dioxane samples from the treatment plant effluent. This sampling will be conducted based upon sampling and exit strategy that will be determined by the NSN Partnering Team prior to

the next Five Year Review.

- C. **Site 1, Site 3, and Site 20:** Current toxicity values may change again in the coming years, and protectiveness is best assessed at the time when it is believed that groundwater cleanup has been achieved. A full scan analysis and risk assessment is recommended when groundwater standards are achieved to ensure that no remaining chemicals pose unacceptable risks.

Response: The protectiveness of the selected remedy will be reassessed when the Groundwater concentrations reach the goals to support that the remedy has met the defined objective.

Site 1 - Camp Allen Landfill

Comments

1. Section 4.5.1, Groundwater Monitoring, page 4-6. The sentence reads, "Concentrations of constituents identified as contaminants of concern (COCs) at Site 1 are presented in Figures 4-3 and 4-4." However, the concentrations of constituents can not be located within the figure?

Response: The concentrations of constituents will be added to the figures and the detected concentrations that exceed MCLs values will be highlighted.

2. Section 4.5.1, Surface Water Monitoring, page 4-6. The sentence reads, "Figure 4-5 provides a comparison of the analytical data collected from the first round of sampling at each surface water sampling location and the most recent analytical data collected in 2007." This is not true. The analytical data nor comparison can be located within the figure.

Response: See response to Comment 1.

3. Figure 4-3 and 4.4. The legend indicates, "The detected concentration values that exceed MCL values are highlighted." However, these highlighted detected values can not be located within the figure?

Response: See response to Comment 1.

4. Figure 4-5. The legend indicates, "This figure only shows the detected VOCs from the first and last round of sampling at each sampling location." This is not true, since the detected VOC concentrations are not located within the figure.

Response: See response to Comment 1.

5. The major new route of concern would be vapor intrusion into local residences. Since the groundwater plume extends well beyond the site boundaries, some residents may be located over or near contaminated groundwater. Recently, EPA has become aware that in such situations, vapors from subsurface contamination can infiltrate buildings located on or near the contamination. Therefore, a vapor-intrusion assessment is recommended for this site. Previous vapor intrusion investigation/ analysis have been limited in scope since the investigations were limited to the Brig and Camp Allen

Elementary school and the associate figures (Figure 4-2 and 4-3) indicate three groundwater VOC plumes. Two of which are located at or near industrial and/or residential areas.

Response: As detailed in Section 4.6, page 4-8, the indoor air was evaluated as part of the human health risk assessment which included the collection of air samples (details provided in response to comment #3 below). The indoor air evaluation did not result in unacceptable risks for either the brig or elementary school. As indoor air samples have already been collected and an evaluation conducted, the Navy does not believe any additional activities are required for these buildings. The indoor air sampling was conducted as part of the remedial investigation and is summarized in that report (*Final Camp Allen Landfill RI Report, Norfolk Naval Base, Norfolk Virginia, July 1994*). The air monitoring results were evaluated as part of the risk assessment and is included in that report (*Revised Final Baseline Risk Assessment, Camp Allen landfill, Norfolk Naval Base, Norfolk Virginia, February 1995*).

The Navy acknowledges that indoor air samples were not collected from the Marine Barracks. The Five Year Review report included a qualitative evaluation of the groundwater concentrations in the vicinity of the Barracks to evaluate potential impacts on human health. Additionally, a direct push groundwater investigation was conducted in Area B adjacent to the Barracks to further delineate the VOC plume. As a result, the plume boundary was determined to be slightly smaller than that reflected in Figure 4-1 in the Draft Five Year Review Report, thus the VOC plume is estimated to be just over 100 feet from the Barracks and therefore, the Navy does not believe that vapor intrusion is a concern for the Barracks. However, the Navy acknowledges that additional assessment of the Marine Barracks will be required before the next Five Year Review.

6. Since the groundwater concentrations still exceed performance standards (MCLs), a final determination as to whether the performance standards are protective is premature. Therefore, it is recommended that the groundwater risks be evaluated at the end of the remedy, to ensure the protectiveness at the time.

Response: The protectiveness of the selected remedy will be reassessed when the Groundwater concentrations reach the goals to support that the remedy has met the defined objective.

Site 2 - NM Slag Pile

7. Section 5.3.1, Remedy Selection, last paragraphs. The report indicates the lead cleanup goal of 218 mg/kg for sediment was based on the Effects Range-Median (ERM) concentration. Please provide the source for ERM? Was this an approved EPA cleanup goal indicator? Why were the IEUBK and/or the Adult Lead Model not used?

Response: Guidance relevant to the lead contamination in sediment includes the ERM for lead, 218 mg/kg, dry weight. The source of this ERM is as follows: *Long, E.R., D.D.*

MacDonald, S.L. Smith and F.D. Calder. 1995. Incidence of Adverse Biological Effects Within Ranges of Chemical Concentrations in Marine and Estuarine Sediments. Environmental Management 19 (1): 81-97. The ERM is the concentration in sediment at which adverse biological effects to the living resources may be observed 50 percent of the time. This cleanup level was determined in conjunction with the USEPA and VDEQ as documented in the Site 2 Feasibility Document and the Site 2 ROD (October 2000) which both underwent reviews by the regulatory agencies.

There were no published toxicological values for lead; therefore, a HHRA qualitative evaluation for lead was performed. LUCs are in place to limit exposure to the subsurface soil.

Site 3 - Q Area Drum Storage Yard

8. Section 6.5.1, Long Term Monitoring Data Review, page 6-5. The first paragraph refers to Figure 6-4 which is not included within the report.

Response: Figure numbers will be corrected for Section 6.

9. It is assumed the groundwater under investigations is from the shallow aquifer since the report does not clearly indicate the aquifer under investigations. The depth of groundwater collections should be provided. Since Section 6.2, page 6-2 discusses how low level VOC concentrations were observed in the deep aquifer, additional information concerning these investigations should be provided to avoid reader confusion. If the deep groundwater was eliminated from further investigations, this information should be provided within the report.

Response: The text will be revised to explain why the deep groundwater was not included further in the investigation. Essentially, the VOC concentrations in the deep aquifer were low and below the groundwater standards.

10. Table 6-1 and Draft 2007 Annual Long-term Monitoring report for Four Sites, December 2007, Tables 4-2 and 4-3. Please explain why 1,1,1-trichloroethane, carbon tetrachloride, and chloroform are not included in the VOC analysis listing within Tables 4-2 and 4-3 when these contaminants were identified as COCs in Table 6-1? Since these contaminants are identified as COCs they should be included in the monitoring analysis listing.

Response: The Draft 2007 Annual Long-Term Monitoring report showed a summary of the detected constituents from the last round of 2007 LTM sampling. 1,1,1-trichloroethane, carbon tetrachloride, and chloroform were not shown in the 2007 LTM Report summary table because they were not detected.

11. Although Section 6.3.1 clearly indicates the RAO is to minimize the threat of exposure to the contaminated groundwater through inhalation of VOCs by potential human receptors (site worker and resident) in future buildings; the complete investigations of this pathway is in question since vapor intrusion investigations are relatively new to the risk assessment evaluation. Therefore, it is highly recommended the vapor

intrusion pathway be reevaluated to ascertain if these investigations meet current guidance.

Response: The risk assessment was conducted for potential future use of the site that included the construction of facilities for industrial purposes. As there are currently no occupied buildings, nor any projections to construct buildings for industrial use, vapor intrusion evaluation is not needed for Site 3. Additionally, according to the *USEPA OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater to Soils* (November 2002), VOCs located within "...100 feet laterally and vertically is a reasonable criterion when considering vapor migration fundamentals..." for exposure within a building. As there are no occupied buildings within 100 feet of the groundwater plumes at Site 3, vapor intrusion is not considered to be a pathway of concern under current or reasonable future use of the site.

Site 6 - CD Landfill

12. Section 7.3.3, System Operation and Maintenance, page 7-5. The paragraph indicates, "Surface water monitoring was ceased after analysis of the initial 2 years of sampling when COC levels dropped below screening criteria." Has this information been verified by EPA?

Response: The Surface water monitoring was ceased in accordance with the September 1998 CD Landfill OU-2 ROD and in conjunction with USEPA and VDEQ. As per the requirements of the ROD, quarterly surface water sampling at Site 6 was conducted for two consecutive years for chlorobenzene and 1,4-dichlorobenzene. As the concentrations of these constituents were below the USEPA Region III RBCs, surface water was eliminated from the site post-closure monitoring. This information is detailed in the Long-Term Monitoring reports that are submitted to and reviewed by USEPA as well as presented to the partnering team for discussion.

13. Shallow groundwater cleanup goals are not clearly defined throughout the report.

Response: Per agreement by USEPA and VDEQ, the long-term monitoring at Site 6 is being evaluated under the Virginia Solid Waste Monitoring Regulations as detailed in the ROD (September 21, 1998) and the Groundwater Monitoring Plan for Site 6 (March 2007).

Site 20 - Building LP-20

14. The major new route of concern would be vapor intrusion into local residences and/or industrial buildings. Since the groundwater plume extends well beyond the site boundaries, some residents and /or workers may be located over or near contaminated groundwater. Recently, EPA has become aware that in such situations, vapors from subsurface contamination can infiltrate buildings located on or near the contamination. Therefore, a vapor-intrusion assessment is recommended for this site. The collected air monitoring data should be reviewed to determine if it is sufficient to evaluate vapor intrusion.

Response: The Navy has provided that some air monitoring data has been collected from manholes during the pilot study and additionally air monitoring is conducted weekly as part of the AS/SVE operations from 16 locations in the vicinity of system. Based on that data, the Navy believes vapor intrusion is not a concern. However, the Navy understands that there is limited air monitoring information available for Site 20 and acknowledges that additional indoor air assessment will be required prior to the next Five Year Review.

15. Toxicity values may change again in the upcoming years, and protectiveness is best assessed at the time when it is believed that groundwater cleanup has been achieved. Therefore, it is recommended that the groundwater risks be evaluated at the end of the remedy to ensure protectiveness at that time.

Response: The protectiveness of the selected remedy will be reassessed when the Groundwater concentrations reach the goals to support that the remedy has met the defined objective.

Site 22 - Camp Allen Salvage Yard

16. Section 9.3.1, Remedy Selection. The second LUC bullet states, "Ensure no construction and maintenance activities, including activities that involve digging into existing soil cover, are undertaken until the Navy implements adequate base procedures to ensure the integrity of the soil cover." How will this LUC be maintained if VDOT is planning a highway expansion that includes the northern portion of this site? In addition, the next bullet states, "Ensure no work on the storm drainage system or around the pond occurs without the use of appropriate worker precautions." Will these LUCs be compromised by the intended VDOT highway expansion?

Response: Per the Remedial Design for Land Use Controls at Site 22 dated January 8, 2007, the Navy is required to notify USEPA and VDEQ prior to any projects that may impact the selected remedy. The Navy provided this notification in a letter to Mr. Todd Richardson, USEPA dated Marcy 1, 2005. Additionally, the Navy has been working closely with USEPA and VDEQ to provide VDOT with Technical Memoranda that details the construction restrictions associated with the IR site. These restrictions are to ensure protection of their workers as well as to ensure the remedy is restored. The Navy ensures that the remedy will be restored per the ROD requirements upon completion of the construction activities.

Site 23 - Building LP-20 Plating Shop

17. The report should include Figure 5-2 located within the Draft 2007 Annual Long- Term Monitoring Report for Four Sites, December 2007 in this section since it offers the concentrations of detected contaminants from the most recent analysis.

Response: Figure 5-2 shows the detected contaminants in groundwater at Site 20. The groundwater at Sites 20 and 23 is considered to be one hydrogeologic unit and therefore is being monitored as part of the LTM program at NSN for Site 20. Therefore, there is not a separate groundwater remedy associated with Site 23, but detailed in the groundwater evaluation for Site 20 which is provided in Section 8 of the Five Year Review report.

18. The major new route of concern would be vapor intrusion into local residences and/or industrial buildings. Since the groundwater plume extends well beyond the site boundaries, some residents and/or workers may be located over or near contaminated groundwater. Recently, EPA has become aware that in such situations, vapors from subsurface contamination can infiltrate buildings located on or near the contamination. Therefore, a vapor-intrusion assessment is recommended for this site. The collected air monitoring data should be reviewed to determine if it is sufficient to evaluate vapor intrusion.

Response: The groundwater at Sites 20 and 23 is considered to be one hydrogeologic unit and therefore, the Site 23 groundwater and vapor intrusion route would be included in the Site 20 discussion. Per the response to comment 14 above, the Navy has provided that some air monitoring data has been collected from manholes during the pilot study and additionally air monitoring is conducted weekly as part of the AS/SVE operations from 16 locations in the vicinity of system. Based on that data, the Navy believes vapor intrusion is not a concern. However, the Navy understands that there is limited air monitoring information available for Site 20 and acknowledges that additional indoor air assessment will be required prior to the next Five Year Review.