9/5/06-03941

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September 5, 2006

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Daniel Hood
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Code: OPCEV
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6506 Hampton Blvd
Norfolk, VA 23508-1273

Subject: TO 10 – Draft Site 86 Pilot Study Report

Dear Daniel:

CH2M HILL is pleased to submit the final Site 86 Pilot Study Report. Copies have been sent to the following: MCB Camp Lejeune, US Environmental Protection Agency, North Carolina Department of Environment and Natural Resources, and Shaw Group. The report has also been placed on the Enterprise System for review. If you have any questions or comments, feel free to contact me at (704) 329-0073 ext. 291.

Sincerely,

CH2M HILL

Christopher F. Bozzini, P.E.
Project Manager

CLT\Cover Letter - Final Site 86 PS 9-5-06.doc
c: Bob Lowder, MCB Camp Lejeune
Randy McElveen, NCDENR
Ginny Henderson, NCDENR, Wilmington
Gena Townsend, EPA Region 4
Joe Colella, Shaw Group
Matt Louth, CH2M HILL - VBO

Response to Comments
Draft Pilot Study Report
Operable Unit 20, Site 86
MCB Camp Lejeune, North Carolina

Introduction

The purpose of this document is to address comments to the Draft Pilot Study Report for Site 86, Operable Unit No. 20. The North Carolina Department of Environment and Natural Resources (NCDENR) Superfund Section and Division of Water Quality provided the comments listed. The responses to comments are provided in bold. Comments were solicited from the United States Environmental Protection Agency (USEPA) and Marine Corps Base (MCB) Camp Lejeune; however, they both indicated they had no comments on the subject report. Following acceptance of these responses, the document will be revised and provided as Final.

North Carolina Department of Environment and Natural Resources Superfund Section Comments (dated July 27, 2006)

General Comment

So far it looks like a successful remedy for the Site.

Comment noted.

Specific Comments

1. Please include more details about the groundwater quality results in the Executive Summary, such as those included in the VOC summary on page 3-7. The report should also clarify that monitoring well MW-36IWC at the middle section of the horizontal sparge well never reached the NCAC 2L Groundwater Quality Standards (NCGWQS) for TCE. Vinyl chloride also rebounded several times and remains above the NCGWQS as of May 2006 in this well. This should also be included in the VOC Summary Section.

   The following bullets have been added to the Executive Summary and to the Observations in Section 4.1:

   - **Groundwater analytical data collected in May 2006, approximately three months after the system had been shut down, showed contaminant "rebound" was generally limited or non-existent, as TCE concentrations remained below the NCGWQS in 12 of the 16 monitoring wells sampled as part of the pilot study. The exceptions to this were at MW-35IWC (15 µg/L), MW-37IWB (12 µg/L), and MW-38IWB (200 µg/L), in which the concentration of TCE had increased above the NCGWQS (2.8 µg/L), and at MW-36IWC (26 µg/L), in which the concentration of TCE had remained above the NCGWQS for the duration of the pilot study.**

   - **Groundwater analytical data collected in May 2006, approximately three months after the system had been shut down, showed the concentration of vinyl chloride in MW-36IWC (0.35 J µg/L) and MW-38IWB (0.54 µg/L) remained above the NCGWQS (0.015 µg/L).**

In addition, Section 3.2.1.5 has been revised to read, "Within one year of operation TCE removal exceeded 99 percent in all monitoring wells with baseline TCE concentrations above 50 µg/L. Groundwater samples collected approximately three months after the system had been deactivated indicated that contaminant "rebound" was generally limited or non-existent. The exceptions to this were at MW-35IWC, MW-37IWB, and MW-38IWB, in which TCE concentrations had increased above the NCGWQS, and at MW-36IWC, in which the concentration of TCE had remained above the NCGWQS for the duration of the pilot study. Groundwater samples collected approximately three months after the system had been deactivated also showed the concentration of vinyl chloride in MW-36IWC and MW-38IWB remained above the NCGWQS."

2. Section 3.4 discusses the Soil Vapor Analytical Results. Since TCE concentrations in two shallow soil gas samples exceeded the EPA's secondary screening criteria as described in this section of the report, we should do indoor air sampling for TCE and the degradation products in building AS312 as an added precaution.

   As stated in Section 3.4 page 3-15, the vapor intrusion pathway at Building AS312 is not a concern, thus indoor air samples are not deemed necessary for the following reasons:

   - **Soil vapor sample SV07 is located in a parking lot approximately 150 feet away from Building AS312; and TCE was not detected in soil vapor samples collected from SV05 and SV06 located in the same parking lot at distances less than 60 feet from AS312. This indicates that the impacted area represented by SV07 is relatively small.**
   - **TCE concentrations in soil vapor samples collected between 60 and 75 feet from SV03 were not detected above 57 µg/m^3, below the secondary screening level of 320 µg/m^3.**
   - **The attenuation factors used to develop screening values are highly conservative generic values that probably overstate the potential for vapor intrusion. Attenuation factors that take site-specific considerations into account probably will provide lower estimates of potential vapor intrusion.**
   - **Groundwater analytical results show a significant reduction in TCE concentrations over the course of air sparging activities, which indicates the likely source for VOCs in soil gas has been removed. As a result, groundwater is unlikely to represent a continuing source for soil gas concentrations, and these concentrations are expected to decrease over time.**

3. The second tick mark of the Conclusions Section 4.1 states that within a year [of the start of air sparging], the NCGWQS for TCE had been achieved in 13 of the 16 monitoring wells sampled as part of the pilot study. This is true, however, three months later (May 2006) due to rebound and the fact that monitoring well MW-36IWC never attained the NCGWQS for TCE there were actually only 12 of the 16 wells that still remain below the NCGWQS for TCE.

   Comment noted.

4. In the Lessons Learned Section on page 4-2, we should also discuss the extreme and extensive groundwater elevation changes that occurred in the area during the air/ozone sparging process. The shallow (not the Castle Hayne) groundwater flow direction changed significantly in the area of Site 86 extending all the way out to the 303/318 Solid Waste Management Unit (SWMU) plume. This issue (groundwater elevation changes) is briefly noted in the site hydrology section on pages 1-2 and 1-3 and should also be discussed in the water level measurements section. How soon after shut down of the sparging system did the groundwater elevations return to normal?

   CH2M HILL will issue a separate Technical Memorandum regarding the water level study completed at Site 86. This memo will evaluate the significance and extent of hydraulic responses resulting from operation of the horizontal sparge well.

North Carolina Department of Environment and Natural Resources – Division of Water Quality Comments (dated July 14, 2006)

Specific Comments

1. DWQ would recommend quarterly monitoring for three more quarters to continue tracking possible rebound issues.

   Site 86 is currently in the RI/FS stage. All future groundwater monitoring conducted as part of the investigation process will include the monitoring wells within the pilot study area. As a result, quarterly monitoring of the pilot study area is not scheduled to be conducted at this time.

2. On page 3-4, paragraph 3, sentence 1, were should be inserted between samples and collected.

   The sentence in question has been revised as requested.

3. On page 3-10, paragraph 3, the last sentence is missing punctuation.

   The sentence in question has been revised as requested.