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MCB CAMP LEJUENE
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RESPONSE TO COMMENTS ON THE DRAFT SUPPLEMENTAL REMEDIAL INVESTIGATION FOR OPERABLE UNIT 21 (OU 21) SITE 73 THE AMPHIBIOUS VEHICLE MAINTENANCE FACILITY AT MCB CAMP LEJEUNE NC

12/13/2008

CH2M HILL

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Response to Comments
Draft Supplemental Remedial Investigation
Operable Unit 21, Site 73
Amphibious Vehicle Maintenance Facility

MCB Camp Lejeune, North Carolina

PREPARED FOR:	Bob Lowder, MCB Camp Lejeune Gary Tysor, NAVFAC Mid-Atlantic Gena Townsend, EPA Region 4 Beth Hartzell, NCDENR
PREPARED BY:	CH2M HILL
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Introduction

The purpose of this document is to address comments on the Draft Supplemental Remedial Investigation Report for Site 73, Operable Unit No. 21. The United States Environmental Protection Agency (USEPA) provided the comments listed. The responses to comments are provided in bold.

United States Environmental Protection Agency Comments (dated November 3, 2008)

General Comments

1. The presence of vinyl chloride in several wells across the site is evidence that the chlorinated volatile organic compounds (CVOCs) are degrading naturally at Site 73. Also, by comparing the data presented from the previous investigations with this most recent data, one may see the downward trend in concentrations of the various contaminants of concern (COC). Of concern however, is the eastward delineation of the CVOC plume. The most obvious example is the distribution of vinyl chloride in cross section C-C', Figure 5-12. The line of this section parallels the shore of Courthouse Bay involves the easternmost monitoring wells. The implication of the cross section is that a fairly wide and deep plume of vinyl chloride extends out underneath Courthouse Bay and perhaps discharges to the bay. It is not practical to install monitoring wells in a bay and this is an active operational area for the amphibious vehicles. Section 5.2.2 of this report states that the original Remedial Investigation performed by Baker between 1995 and 1996 concluded that Courthouse Bay had not been impacted by CVOCs. In reviewing the historical data from the Baker investigation presented in Appendix B, it is apparent that the CVOC plume did not have as extensive a foot print close to the bay as the most recent data, ten years later. The twelve year old statement that there have been no impacts to the bay may

no longer be valid. There is a possibility that future surface water and sediment data will show an impact, therefore, a remedial action should be evaluated to minimize this risk.

Current groundwater data (July 2008) presented in the Site 73 Feasibility Study indicates vinyl chloride extends below Courthouse Bay and potentially discharges into the Bay. The potential discharge of vinyl chloride into Courthouse Bay is addressed in the Feasibility Study.

2. The water levels on the figures do not represent the gradients that are present in the well pairs. It gives the impression that the water levels in all two or three wells are the same. It would be useful in understanding the forces driving the migration of the contamination if the wells in the figures indicated the unique water levels.

   Water table elevations for monitoring wells screened from 0 to 25 feet below ground surface are represented on the cross section figures. Due to the vertical scale of the cross section figures adding the potentiometric surfaces of the intermediate and deep aquifers would not be distinguishable from the surficial aquifer due to the relatively small difference in potentiometric surface elevations between the aquifer zones. The potentiometric surface represented in the figures will be clarified in the legend.

3. It would be useful if the cross sections would indicate the top of the Castle Hayne Aquifer. The text refers to this unit and the overlying unit numerous times. Labeling the aquifer units on the cross sections would improve the understanding of the aquifer units at Site 73.

   The approximated top of the Castle Hayne Unit will be identified on the cross section figures.

SPECIFIC COMMENTS

1. Section 2.4.1 – This section discusses the results of previous soil investigations that were conducted between 1985 and 2005, however, the report does not identify the final actions/decisions, specifically, the PCB contaminated soils (4th bullet). This report should include a section that addresses the soil contaminated areas and the rationale (if warranted) of why soils concerns should not be included in the FS.

   - *Low-levels of VOCs were detected in surface and subsurface soils at concentrations generally below screening levels. The generally low concentrations suggested an absence of large-scale releases involving solvents, or possible volatilization, migration to the water table and dispersal or natural attenuation of VOCs. Since the distribution of contaminants at Site 73 did not appear to follow a discernible pattern, the RI concluded that past releases or disposal events had not resulted in long-term impacts to soil.*

     VOC-impacted soils will be discussed in detail in the POL-impacted soil section (see comment #2).

- *The SVOC 2,4-dinitophenol was detected at an estimated concentration of 200 micrograms per kilogram (µg/kg), exceeding the soil screening level of 100 µg/kg in the soil sample collected from sol boring 73-MW23. The remaining SVOC concentrations detected in soil samples were below the applicable soil screening levels.*

  Bullet will be revised: The SVOC 2,4-dinitrophenol was detected at an estimated concentration of 200 µg/kg, exceeding the soil screening level (USEPA Region III Soil Screening Level, October 1995) of 100 µg/kg in the soil sample collected from soil boring IR73-MW23 during the RI (Baker, 1997). The remaining SVOC concentrations detected in soil samples were below the applicable soil screening levels. The current USEPA Region IV Residential Regional Screening Level (RRSL) (June 2008) for 2,4-dinitrophenol is 12,000 µg/kg indicating the single detection of 2,4-dinitrophenol does not require further evaluation.

- *The generally low-level (below screening levels), widespread detection of pesticides in surface soil samples was determined to be the result of pest control applications and not disposal. However, one sample, collected from IR73-MW14 was reported to contain 4,4'-dichlorodiphenyldichloroethane (4,4'-DDD) (1,1'-[2,2-dichloroethylidene] bis [4-chlorobenzene]) in excess of the screening level, and was interpreted to be the result of a small surface spill. According to the RI, pesticides detected in subsurface soil were located in areas where the soils had been disturbed by excavation, construction, or training exercises.*

  Bullet will be revised: The generally low-level (below screening levels), widespread detection of pesticides in surface soil samples was determined to be the result of pest control applications and not disposal. However, one sample, collected from the soil boring IR73-MW14 was reported to contain 4,4'-DDD [1,1'-(2,2-dichloroethylidene)bis(4-chlorobenzene)] at a concentration of 9,100 µg/kg in excess of the screening level (USEPA Region III Soil Screening Level, October 1995) of 700 µg/kg, and was interpreted to be the result of a small surface spill. The concentration detected in the soil sample collected from IR73-MW14 also exceeds current USEPA Region IV RSLs (June 2008) for 4,4'-DDD (2,000 µg/kg - RSSL and 7,200 µg/kg - Industrial RSL). Based on the limited extent (single exceedance) and location of the 4,4'-DDD-impacted soil (below the concrete parking lot), no further investigation was recommended

- *PCBs were detected in an area of the site where POL spills and releases had been reported, suggesting the contamination was site-related.*

  The polychlorinated biphenyl (PCB) Aroclor 1254 was detected in soil borings (approximately 2 to 4 feet bgs) collected during the installation of monitoring well IR73-MW14 (35 J mg/kg) and during the installation of soil boring 73-SB07 (56 mg/kg) (adjacent to monitoring well IR73-A47/3-22) during the initial RI. Based on the current RRSL for Aroclor 1254 of 110 mg/kg, limited extent of Aroclor 1254-impacted soil, location of the impacted soils (below concrete parking lot and adjacent to fence line area), no further evaluation is required.

- *Naturally high detections of metals were prevalent throughout the site (greater than 2 times base background concentrations) and were attributed to site-specific conditions.*

  Naturally high detections of metals were present across the site (greater than two times base background concentrations) and were attributed to site-specific conditions. Based on the Human Health Risk Assessment (Baker, 1997), only aluminum and iron were retained as Chemicals of Potential Concern (COPCs) and neither pose an unacceptable risk to human health according to the HHRA.

2. Section 2.5 - This section discusses data gaps from previous investigations. The third bullet mentions the free product in IR73-MW14 and the need to identify and delineate this free product. This report does not address this data gap. If this report is intended to completely define the nature and extent of the contamination, this data gap should be filled. The other two data gaps in this section appear to have been filled.

   The investigation of the free product observed in monitoring well IR73-MW14 and subsequent POL-impacted soil investigation, discussed in the POL Supplemental Soil Investigation Technical Memorandum dated March 27, 2008, will be incorporated into the Supplemental Remedial Investigation Report.

3. Figure 4-8 does not have a water level for 40% of the wells on this figure. The placement of the 3.4 foot contour is meaningless especially given the 3.35 foot water level of well MW49DW and the number of 'not measured' wells on both sides of the 3.4 foot contour. There are no data points to the southeast of the 2.4 foot contour. This contour does not honor the higher values for wells MW31DW and MW40DW. This figure may conform to the basic rules of contouring but very little useful information may be learned by reading this map. Please re-contour the map with a more appropriate and informative contour interval.

   Figure 4-8 was revised to include 2.6 ft and 3.2 ft elevation contours. Due to the relatively flat hydraulic gradient and slight differences in screen depth and lithology of the monitoring wells within the intermediate zone, further refinement of the potentiometric surface could not be reasonably depicted without distorting the overall groundwater flow direction, which is southeast towards Courthouse Bay.

4. Section 6.1.2 and Table 6-2 – There is a discussion about retardation factors that has effective porosity in the equation. The value in the table is 0.35. This value seems high given the variable lithology of the Site 73 area. The BIOCHOR model uses an effective porosity of 0.20 which seems more applicable. Please provide an explanation for the selection of the effective porosity value to be used in this report. Additionally, it is unclear what purpose of the retardation factor discussion serves as it does not appear to have been used later in the Section.

   The effective porosity value was revised in Table 6-2 to match the value used in the Biochlor model. In addition, a discussion of contaminant velocities utilizing the retardation coefficient will be added to Section 6.1.2.

5. Section 6.2.1 – This section on source areas mentions high concentration of contaminants associated with monitoring well IR73-MW14. This well was not sampled during this investigation. This well was not included in the contaminant cross sections. This well may be associated with a UST project and as such is handled under a different program. It is clear from the results of this investigation that the petroleum products in the groundwater are having a synergistic effect on the bioremediation of the CVOCs. As a mentioned source area, this well should have been sampled and the data reported so that the regulators may have a more complete picture of the contamination associated with Area 73. Please supply what information is available for this well and how the contamination in this well affects the understanding of the contaminant fate and transport.

Section 6.2.1 indicates that Oil & Grease- and Total Petroleum Hydrocarbon-Diesel Range Organics-impacts soils and LNAPL are present in the vicinity of monitoring well IR73-MW14. Monitoring well IR73-MW14 has been sampled only twice prior to the preparation of the RI due to the presence of LNAPL in the monitoring well. Analytical results indicated the only contaminant of concern present above the applicable North Carolina Groundwater Quality Standard was benzene. Groundwater sampling of monitoring well IR73-MW14 conducted after the issuance of the RI in support of the Feasibility Study (July 2008) did not indicate the presence of LNAPL or any target constituents above North Carolina Groundwater Quality Standards.

Table 1
Historic Petroleum-Related VOC Detections in IR73-MW14
Operable Unit No. 21 (Site 73)
MCB Camp Lejeune, North Carolina

IR73-MW14	4/25/1995	2/24/1996	7/22/2008
Benzene	3 µg/l	3 µg/l (J)	0.97 µg/l

J – concentration is estimated

6. Section 6.2.4, Page 6-9, Downgradient Groundwater – To avoid confusion about risk assessment terminology, in the second line, please replace "receptor" with "location" as Courthouse Bay is not a receptor in risk assessment terms.

The term "receptor" was replaced with "location" in Section 6.2.4, page 6-9.

7. Section 6.3.3 BIOCHLOR Model Prediction and Appendix H – This section does mention that the presence of petroleum products may increase the rate of dechlorination. Intuitively, the durations of the predicted plume lives seem long. It is unclear why a model would be run with no degradation when that clearly is at work in this system. Also, the graph of the model runs appears not to use the field data (as seen in Block 7 in first page of the appendix) as the starting point of the model

curves. In nearly every case, using the field data points would result in shorter plume lives. Please revise the model to calibrate with the field data and provide the revised results in the report.

The model calibration was updated with accurate field data and Table 6-3 was updated to reflect the results. In addition, Table 6-4 was updated to reflect the results of the predictions. This revision, however, did not alter the predicted plume lives. In fact, after revisiting the original model calibration, it was evident that the plume life was initially predicted incorrectly for vinyl chloride (VC). Actually, VC is not likely to attenuate below the NC2LGW standard of 0.015 mg/L until 2096, or 130 years from now. Also, it should be noted that the calibration and prediction model run results did account for degradation in the system.

8. Section 8.2.5 and 8.2.6 – The conclusions from the previous RI pertaining to Aluminum, Iron, Silver and Zinc stating that although they exceeded current standards they are not considered site related contaminants, is not a valid rationale for no further action. These sections should include a discussion of the daily operational activities (e.g. amphibious vehicle training) that occur in Courthouse Bay and the potential impact on the ecological receptors. This additional information can assist in providing the line of evidence required to make a final risk management decision.

Silver and zinc each exceeded NCWQSs in only one of eleven samples. Silver was detected in surface water sample SW-06 at a concentration of 6.4 µg/L, exceeding the NCWQS of 0.06 µg/L and zinc was detected in SW-04 at a concentration of 103 µg/L, exceeding the NCWQS of 50 µg/L. Surface water samples SW-06 and SW-04 were collected in Courthouse Bay along with six additional samples. Based on the isolated detections of silver and zinc at concentrations exceeding the NCWQS in Courthouse Bay, the inorganics in surface water are unlikely to pose a risk to populations of aquatic receptors in Courthouse Base. Additional lines of evidence include the following:

- **Silver was not detected in the sediment sample co-located with surface water sample SW-06.**

- **The analytical data are for total rather than dissolved metals. Federal ambient water quality criteria for most metals are expressed as dissolved concentrations because the dissolved fraction is the most representative of what is bioavailable (USEPA, 2008). Dissolved concentrations are often far lower than total concentrations.**

- **Surface water samples SW-04 and SW-06 were collected near the shoreline in relatively shallow water. Near shore samples would be expected to have a higher level of suspended solids in a tidal environment compared to those collected further offshore in deeper water.**

- **Silver and zinc detected in surface water are also not expected to be related to the use of amphibious vehicles in Courthouse Bay.**

Freshwater AWQC were available for iron and aluminum (USEPA, 2008). Iron exceeded the AWQC of 1,000 µg/L in only one of nine samples (SW-01 at a concentration of 4,540 µg/L). Surface water sample SW-01 is representative of surface water conditions upgradient of Site 73, therefore iron is not considered a site related contaminant. Aluminum exceeded the AWQC of 87 µg/L in three of eleven samples (SW-01 at 384 µg/L, SW-11 at 500 µg/L, and SW-12 at 324 µg/L). As indicated, surface water sample SW-01 is located upgradient of the site, and samples SW-11, and SW-12 were collected from the western tributary to Courthouse Bay. Again, we have detection of aluminum in the water column upgradient of the site, the analysis was for total metals, and the samples were collected from shallow watercourses. Aluminum is a common contaminant found in surface water samples at Camp Lejeune with natural or sampler-induced turbidity, as it frequently is in sediment and soil at naturally elevated concentrations. The western tributary, in which aluminum was detected, drains to the far western portion of the Courthouse Bay Boat Basin area. This is area would not likely be influenced by the Amphibious Vehicle Maintenance Facility or amphibious vehicle traffic. No aluminum was detected in surface water downgradient of the Amphibious Vehicle Maintenance Facility (Sites 73), indicating that aluminum found in the surface water is un-related to these vehicles or maintenance activities conducted at Site 73.

US Environmental Protection Agency (USEPA). 2008. Current National Recommended Water Quality Criteria.
http://www.epa.gov/waterscience/criteria/wqctable/index.html