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COMMENTS FOR THE FINAL VERIFICATION REPORT FOR ADDITIONAL WORK AT SIX PREVIOUSLY IDENTIFIED SITES NCBC GULFPORT MS
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COMMENTS FOR THE FINAL VERIFICATION REPORT
NAVAL CONSTRUCTION BATTALION CENTER (NCBC)
GULFPORT, MISSISSIPPI

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INTRODUCTION

We have recently reviewed the Final Verification Report for the Naval Construction Battalion Center (NCBC) located at Gulfport, Mississippi. The purpose of this review is to evaluate the analytical data and recommend additional work that will satisfy the requirements under the Comprehensive Environmnetal Response Compensation and Liability Act (CERCLA). Six sites are included in this study and include a fire fighting training area, a disaster recovery disposal area, and four other landfill/disposal areas. Figure 1 shows the location of these sites and table 1 lists the chemical parameters identified for analysis of sediment, soil, and water samples at NCBC for this study.

HYDROGEOLOGICAL SETTING

The stratigraphy beneath the NCBC facility consists of, in descending order, a thin topsoil layer, the surficial aquifer, which consisits of up to 27 feet of unconsolidated sand with varying amounts of clay and silt, and a lower confining clay layer. Below this confining clay are deeper groundwater aquifers that are divided into two major systems: 1) the Citronelle Formation and 2) the Miocene aquifer system. These two deeper aquifers are the primary sources of water for individuals and municipalities in the Gulf Coast area. While the Citronelle aquifer is the source of water for some individual and municipal water supplies, higher yields can be obtained from the Miocene aquifer system. As a result, the majority of wells in this area are completed in the Miocene aquifers.

The aquifer of concern in this verification study is the surficial aquifer, which, according to this report, is closely interrelated with surface water bodies at NCBC Gulfport. The main focus of the verification study is the surficial aquifer and its related surface water bodies. However, samples were also collected from the Miocene aquifer water supply wells for analyses.

REVIEW OF ANALYTICAL RESULTS FOR WATER SUPPLY WELLS AT NCBC

Five wells supply potable water from the Miocene aquifer system to the NCBC facility. The report indicates that the Miocene aquifer system underlies the clay interval that serves as the surficial aquifer's lower confining unit. As a result, the Miocene aquifers are presumed to be protected from potential contamination that may occur in the surficial aquifer. However, groundwater samples were taken from each of the potable water wells on the base in order to determine if chemical contamination of the Miocene aquifer has occurred.

Analytical data (table 2) for groundwater samples collected from the NCBC water supply wells indicate that only one groundwater sample had a concentration of chromium above detection limits. The sample

from well No. 5 had a concetration of 9 ppb chromium, significantly below the MCL of 50 ppb. The other metals analyzed for in this study, cadmium and lead, were below detection limits.

Traces of toluene were detected in groundwater samples from all five water supply wells, and ranged in concentration from 6 ppb to 11 ppb. Phenol was detected in well No. 1 at 12 ppb, and Bis (2-Ethylhexyl) phthalate was found at 24 ppb and 227 ppb in well Numbers 1 and 3, respectively. The concentrations of toluene, phenol, and Bis (2-Ethylhexyl) phthalate were all below RFI health based criteria. The report states that the presence of toluene and phenol at such low concentrations may be attributable to the presence of phase separated hydrocarbons associated with oils used in well pumping equipment. The Bis (2-Ethylhexyl) phthalate is presumed to be associated with the use of PVC piping.

The report recommends resampling the potable wells for confirmation of analytical results. Such sampling and analysis could also be used to verify the sources of contamination. If the presumed sources are verified, remediation could be achieved by removing phase separated hydrocarbons at the groundwater surface in the wells, improving maintenance procedures, and replacing equipment where necessary. The report also recommends that additional geotechnical and/or hydrogeological investigations be conducted to fully characterize the confining clay that separates the surficial aquifer from the deeper aquifers. This course of action should be adequate with respect to the base water supply wells.

GENERAL CONCERNS AND RECOMMENDATIONS

Only one round of water level measurements were taken in the surficial aquifer at the NCBC facility. These measurements indicate that the hydraulic gradient slopes in a direction different than originally presumed (figure 2). This has resulted in the placement of an inadequate number of downgradient monitoring wells at Sites 1 through 5, and possibly at Site 6. The Final Verification Report recommends that before additional monitoring wells are installed at these locations, further rounds of water level measurements should be collected. It was noted in the report that several inches of precipition had occurred at the facility in the weeks that preceeded the water level measurements. This rainfall had the effect of raising water levels to above normal and may have also affected the slope of the potentiometric surface. Quarterly water level measurements would determine if seasonal and/or local effects cause significant variations in the hydraulic gradient and the direction in which it slopes. This information is necessary to determine if future monitoring wells are correctly placed and that an adequate number are installed.

The screened intervals of all monitoring wells at the NCBC facility extend entirely through the surficial aquifer. During future sampling events, groundwater samples should be collected from discrete intervals in the wells in order to minimize the effects of dilution. Some wells at the facility (discussed in detail later in

these comments) detected relatively low concentrations of TCE, a denser than water compound. Concentrations of contaminants in such cases would likely have been greater if well screens had been shorter in length and if they had been placed at the bottom of the aquifer. Dilution of other contaminants is also a possibility when aquifers are screened over large intervals. In the future, well screens at the NCBC facility should be constructed in such a way as to optimize the possiblilty of collecting samples from intervals having the greatest potential contaminant levels.

The report states that methyl ethyl ketone (MEK) was disposed of at sites 4, 5, and 6. However, this compound is not listed as one of the chemical parameters analyzed for in this report. It is recommened that MEK be added to the list of constituents to be analyzed for in future sampling events.

Additional surface water and sediment sampling is recommended. The report states that the surficial aquifer is probably interconnected with surface water bodies at NCBC Gulfport. If it is found that the slope of the potentiometric surface of the shallow aquifer changes seasonally, or is affected by local conditions, then further surface water and sediment sampling will be needed.

No hydraulic data has been included with the Final Verification Report. Parameters such as hydraulic conductivity, transmissivity, or average linear velocity have not been determined. Slug tests, single well pump tests, multiple well pump tests, or other appropriate tests should be conducted to determine hydraulic characteristics of the surficial aquifer and the confining nature of the confining clay before a final risk assessment can be made.

If contaminant levels are confirmed to be above health base levels, it will be necessary to perform additional work to define contaminant plumes and levels of contamination.

SITE SPECIFIC CONCERNS AND RECOMMENDATIONS

Site 1

Site 1 is currently used as a disaster recovery training area. From 1942 to 1948, before being used as a training area, chemical wastes were disposed of at this site primarily by trench burial of containerized materials, reportedly 55 gallon drums. The principal wastes disposed of include paints, oils, solvents, paint strippers and cleaning compounds. Excavation in this area is 1984 revealed several drums containing xylene, toluene, and 1,2 dichloroehtane.

Analytical results for groundwater samples taken from all three monitoring wells at site 1 indicate that levels of chromium and lead are above the Maximum Concentration Levels (MCLs) as specified in the Safe Drinking Water Act (figure 3). The highest concentrations of chromium and lead were encountered in well GPT-1-2. As stated previously, the report recommends that the wells be resampled to verify contaminant concentrations. The installation of additional

downgradient well are necessary pending confirmation of the potentiometric surface configuration.

Site 2

Site 2 was originally defined as two separate areas (Sites 2 and 7). These sites were combined after reconnaissance indicated that Site 7 was larger than originally anticipated and actually overlapped Site 2.

Site 2 was used for the burning and burial of chemical wastes from 1948 to 1966. The principal wastes disposed of include ash from combustible solid waste and noncombustible solid waste and liquid wasted (paints, point thinners, solvents, oils, and fuels).

Site 7 is currently used for rubble disposal and has been in operation since 1978. Disposal of chemical wastes have not been reported at this site.

Analytical results for groundwater samples at Site 2 indicate an elevated concentration of chromium in well GPT-2-2 (figure 4). The value obtained was 73 ppb, which is in excess of the MCL of 50 ppb. Lower concentrations of chromium and lead were detected in wells GPT-2-1 and GPT-2-3, but did not exceed the MCL.

Trichloroethylene (TCE) was detected at a concentration of 5 ppb (equal to the MCL) in a sample from well GPT-2-3. This well is screened at the shallowest interval of any well at the facility and was presumed in the report to encounter the lower confining clay at a depth of 13 feet. Most wells at the facility encounter the lower confining clay at depths in excess of 20-25 feet. The possibility exists that well GPT-2-3 encountered a discrete clay lense above the lower confining clay unit. Because TCE is denser than water, and if there is additional sand below a shallow clay layer, there is a possibility that TCE may be contaminating groundwater at a deeper interval at this site. Further characterization of the clay unit in this area will be necessary to determine if such contamination has occurred.

In addition, 1,2-trans-Dichloroethylene was detected in well GPT-2-3 at a concentration of 37 ppb, as was a trace of toluene and chloroform. The Bureau concurs with the report which recommends additional sampling in order to evaluate the significance of the contamination in these wells.

Low levels of lead and chromium were detected in the sediment sample at the site. The level of chromium detected in this sample is below the RFI health-based criteria for systemic toxicants. There is no RFI level for lead.

None of the monitoring wells at Site 2 were in the downgradient direction. Pending further water level measurements, additional monitoring wells will be necessary to fully assess this site.

Site 3

Site 3 is currently a training area for Navy Reserve personnel. From 1948 to 1966, prior to use as a training area, chemical wastes were disposed of at this site by burning and burial. The principal wastes disposed of included substantial amounts of solid wastes and liquid wastes (fuels, oils, solvents, paints, and paint thinners).

Metals were the only contaminants detected in the groundwater samples from Site 3 (figure 5), and all metals levels were below the MCL. Resampling to verify contaminant concentrations is recommended, as is installation of additional downgradient monitoring wells after confirmation of the configuration of the potentiometric surface.

Analytical results for surface water and sediment samples indicated no volitile organic, acid-extractable, or base-neutral constituents above the detection limits. All metals concentrations were found to be well within any health based criteria listed in the RFI guidance document.

Site 4

Site 4 is located on the base golf course and driving range. From 1966 to 1972, prior to construction of the golf course, chemical wastes were disposed of at this site by burning and burial. Some containerized chemical wastes were also buried. The principal wastes disposed of included solid wastes and liquid wastes (fuel, oils, solvents {toluene, xylene, MEK}, paints, and paint thinners). Combustion by products were also disposed of at Site 4.

There were no volatile organic, acid-extractable, or base-neutral contaminants above detection limits for all monitoring wells at Site 4 (figure 6). Chromium concentrations for samples taken from wells GPT-4-1 and GPT-4-3, however, were above the MCL of 50 ppb at concentrations of 72 ppb and 155 ppb, respectively. Lead concentrations for the same two wells were 50 ppb and 124 ppb (MCL = 50 ppb). Levels of chromium and lead below the MCL were detected at well GPT-4-2 and levels below the RFI health based criteria were found in sediment sample SD4-1. Resampling of all wells is recommended to confirm these contaminant levels. Additional downgradient wells are needed, but as always should be installed only after further groundwater measurements confirm slope of the potentiometric surface at this site.

Another area of concern involves the past practice of disposing of MEK at Site 4. This compound was not included in the list of chemical parameters analyzed for at this facility. MEK should be added to this list and analyzed for in any future sampling events.

Site 5

Site 5 is currently used as a training area for operating heavy equipment. From 1972 to 1976, before its use as a training area,

Site 5 was used as a landfill for the burial of containerized and noncontainerized chemical wastes. The principal wastes disposed of included liquid wastes (fuels, oils, solvents {MEK, toluene, xylene}, paints, and paint thinners), some solid wastes, and liquid dichlorodiphenyl-trichlorethane (DDT).

Elevated levels of chromium were detected at Site 5 (figure 7). Analytical results for groundwater samples from GPT-5-1, GPT-5-2 and GPT-5-3 indicate chromium concentrations of 79 ppb, 104 ppb, and 91 ppb, respectively. Lead levels were all below the MCL, but are high enough (38 to 48 ppb) to be of concern. As for the other sampling sites, resampling as recommended in the report should be done, but in a manner that reduces the dilution of groundwater samples. Additional downgradient wells are needed.

As at Site 4, the disposal of MEK is of concern and should be added to the list of chemical parameters analyzed for in future sampling events.

Site 6

Site 6 is currently a training area for electricians. From 1966 to 1975, prior to its current use, chemical wastes were disposed of at Site 6 by burning in unlined earth pits during fire fighting training. The principal wastes disposed of were free liquid wastes (fuels, oils, solvents (xylene, toluene, {MEK}, paints and paint thinners). Also, combustion by-products were present.

The concerns at Site 6 are much the same as those at Sites 4 and 5 (figure 8). Concentrations of chromium and lead in GPT-6-1 are 72 ppb and 70 ppb, repectively. Levels of these two metals are below the MCL of 50 ppb in each of the other two monitoring wells, but they are high enough to be of concern. As stated previously, sampling of discrete intervals is recommended to confirm the level of contamination and to determine if there is vertical variations in their concentrations.

The disposal of MEK at this site makes it necessary that it be included in the list of chemical constituents analyzed for in future sampling events.

CONCLUSIONS

The findings summarized in the Final Verification Report reveal that levels of some contaminants are higher than health based limits. Until the slope of the potentiometric surface is determined by additional rounds of water level measurements, it will be impossible to determine which contaminant levels detected, if any, represent background values, or if the contaminants detected represent releases from the sites. The recommendations included in these comments should be addressed as well as those in the Final Verification Report in order to fully assess the level and extent of contamination and to characterize the hydrogeology at the NCBC facility.