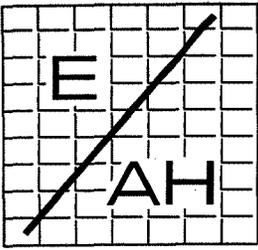


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TECHNICAL MEMORANDUM REGARDING ADDITIONAL SAMPLING AT SOUTHSIDE
LANDFILL SOLID WASTE MANAGEMENT UNIT 2 AND BIG CREEK DRAINAGE CANAL
REVISION 1 MILLINGTON SUPPACT TN
7/22/1997
ENSAFE ALLEN AND HOSHALL



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Technical Memorandum

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TO: NSA Memphis BRAC Clean-Up Team

FROM: Alison Choate/Robert Smith, E/A&H

DATE: July 22, 1997

RE: Additional Sampling at Southside Landfill (SWMU 2) and Big Creek Drainage Canal, Revision 1

This technical memorandum outlines additional groundwater sampling activities required to complete the RCRA Facility Investigation (RFI) at Solid Waste Management Unit (SWMU 2), the Southside Landfill, which is located at the southeast corner of Naval Support Activity (NSA) Memphis, Millington, Tennessee. The Southside Landfill is bounded on the south by Big Creek Drainage Canal, on the east by NSA Memphis Perimeter Road, on the north by a wooded area and the NSA Memphis Skeet Range, and on the west by Seventh Avenue and the NSA Memphis South Gate. The SWMU 9 Sewage Lagoons are southwest of the South Gate. Figure 1 shows SWMU 2 and surrounding features.

Groundwater samples collected during the Assembly E RFI at SWMU 2 indicate the presence of chlorinated solvents in alluvial groundwater. Figure 1 shows the locations and maximum chlorinated solvent concentrations detected in groundwater during three sampling events at SWMU 2 and the initial sampling event at SWMU 9. As shown on the figure, the chlorinated solvents bromodichloromethane, chlorobenzene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, methylene chloride, tetrachloroethene, 1,1,2-trichloroethane, trichloroethene (TCE), and vinyl chloride were detected in groundwater samples collected from SWMU 2 monitoring wells and Direct-Push Technology (DPT) sampling locations. TCE was also identified in two DPT sampling locations and one monitoring well at SWMU 9.

Based on the analytical data and the southwesterly groundwater flow direction at SWMU 2 (shown on Figure 1), the nature and extent of chlorinated solvents in groundwater has not been determined, and a potential exists for their off-base migration. It is unknown whether groundwater in the deep alluvium flows off-base beneath Big Creek Drainage Canal.

Sampling Rationale

The proposed groundwater sampling locations will focus on the area downgradient and side-gradient of the Southside Landfill. Two types of samples are proposed; the sampling rationale is provided below.

- Groundwater samples collected from the alluvium directly beneath the bed of Big Creek Drainage Canal south of SWMU 2 will indicate whether groundwater contamination in the deep alluvium may be discharging to Big Creek Drainage Canal.
- Groundwater samples from monitoring wells to be installed east, south, and southwest of the landfill will indicate whether chlorinated solvents or other groundwater contaminants from SWMU 2 have migrated off-base. The proposed wells also will yield stratigraphic and hydrogeologic information for the areas east, south, and southwest of the landfill.

The following sections summarize the groundwater sampling procedures.

Groundwater Samples Beneath Big Creek Drainage Canal

Six groundwater samples will be collected from beneath Big Creek Drainage Canal (Figure 2). Information obtained from the U.S. Geological Survey indicates that, through erosion, the bed of Big Creek Drainage Canal has incised the silty sand and sand units of the deep alluvium (Figure 3). Samples will be collected from 3 feet below the bed of the creek using DPT, as described below, to determine if groundwater contamination associated with SWMU 2 may be discharging to Big Creek Drainage Canal.



LEGEND

- EXISTING MONITORING WELL LOCATION
- PROPOSED MONITORING WELL LOCATION
- PROPOSED DPT GROUNDWATER SAMPLE POINT



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FIGURE 2
PROPOSED OFFSITE WELL LOCATIONS AND
GROUNDWATER SAMPLING POINTS
SWMU 2 - SOUTHSIDE LANDFILL

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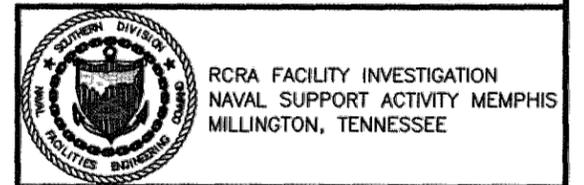
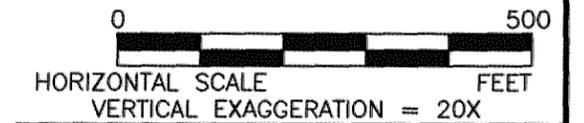
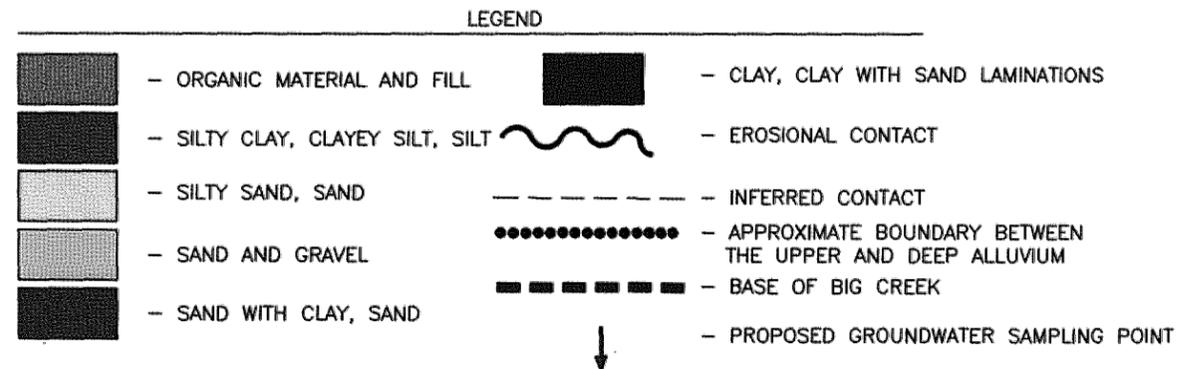
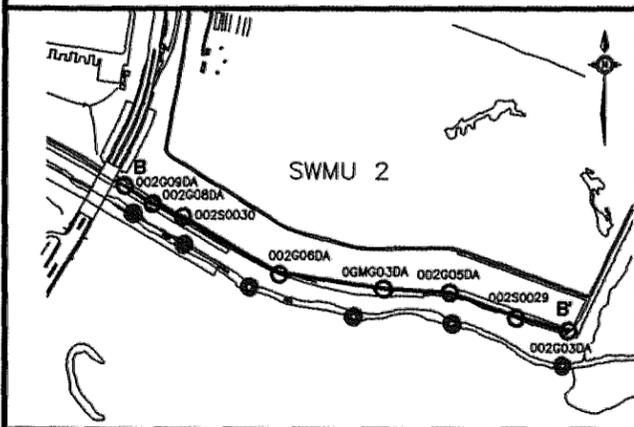
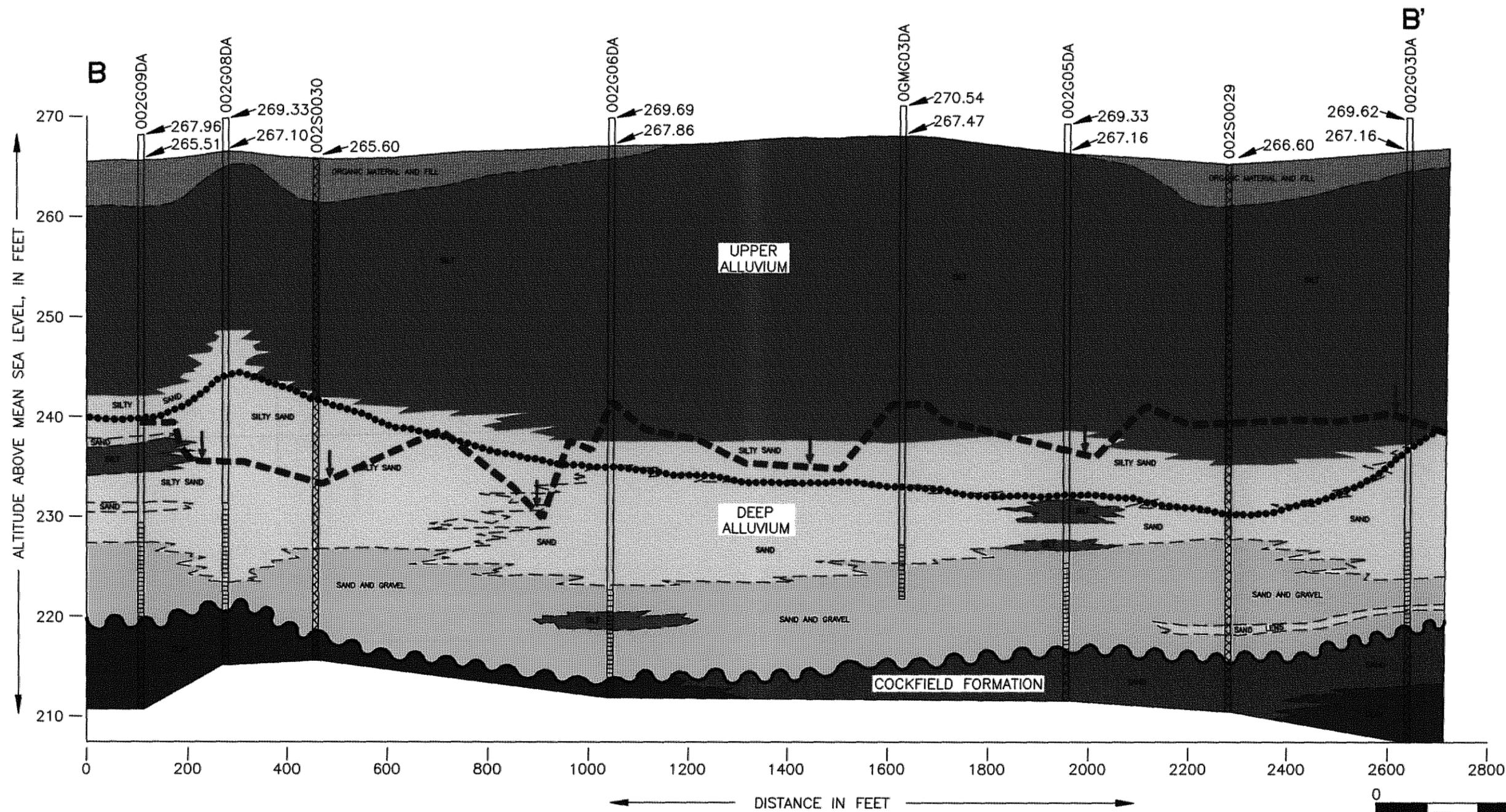


FIGURE 3
 GEOLOGIC CROSS SECTION (B-B') VS
 BIG CREEK STREAM-BED PROFILE
 SWMU 2

Samples will be collected by driving a Geoprobe-type groundwater sampler through the Big Creek bed sediments, into the silty sand and sand units of the deep alluvium. The sampler will be advanced using a manual fence-post driver to a depth of about 3 feet below the bed of the Creek. Care will be taken to ensure that the push rods are water tight (using O-rings) to prevent infiltration of surface water into the sampler. The sampler will then be opened, exposing a stainless-steel screen, by back hammering the sampler 1 foot. A peristaltic pump and Teflon tubing will be used to purge approximately one-half gallon from the sampler. Once the sampler has been purged and the Teflon tubing is full of groundwater, the tubing will be crimped, forming an air-tight seal, then removed from the sampler/push rods. The contents of the tubing will then be drained into three 40- milliliter vials, labeled, pack on ice, and submitted to an offsite analytical laboratory for the analysis of volatile organic compounds (VOCs) by U.S. Environmental Protection Agency Solid Waste (SW)-846 Method 8240. The results will be presented in the SWMU 2 RFI report.

Groundwater Samples from Additional Monitoring Wells

Seven additional monitoring wells will be installed southwest, south, and east of the landfill. The proposed monitoring-well locations are shown on Figure 2. The wells will be installed using Rotasonic drilling equipment, as outlined in the *Comprehensive RFI Work Plan* (E/A&H 1994) and the *Assembly E Site Investigation Plans* (E/A&H 1995). Two upper/deep alluvium monitoring well pairs will be installed. One well pair is proposed on property immediately south of Big Creek Drainage Canal and southwest of the landfill. Groundwater analytical data from this well pair may indicate if chlorinated solvents at SWMU 9 (side- and downgradient of SWMU 2) have migrated from SWMU 2. The second well pair, east of the landfill on agricultural property, is intended to indicate whether contaminants detected on that side of the landfill may have migrated off-base and to obtain potentiometric data east of the tributary to Big Creek Drainage Canal. Three individual deep alluvium monitoring wells are proposed south of the landfill. These well locations were selected because they are the closest areas to the landfill south of Big Creek that

do not require clearing of trees, are near existing contaminated wells, and provide spacing and coverage that have been determined to be preliminarily adequate to meet the objectives of the proposed follow-on investigation.

The deep well will be installed first at each well-pair location. The soil boring associated with the deeper well will be advanced to the top of the Cockfield Formation and continuously sampled and logged for lithologic characterization. The deep alluvium monitoring well will be screened in the basal 10 feet of the alluvium just above the contact with the Cockfield Formation. Based on the lithology encountered, an upper alluvium monitoring well will then be installed approximately 10 feet from the deep alluvium well, and screened in the middle of the upper alluvium. The soil borings associated with the three single deep alluvium monitoring wells also will be advanced and sampled to the top of the Cockfield Formation. These monitoring wells then will be installed with screens in the basal 10 feet of the deep alluvium.

The monitoring wells will be developed, purged, and sampled as outlined in the *Assembly E Work Plan* (E/A&H 1995). Groundwater samples will be collected from the new wells with submersible electric pumps using low-flow sampling. The groundwater samples will be submitted to an offsite analytical laboratory for VOC analysis by SW-846 Method 8240. The results will be presented in the SWMU 2 RFI report.