WSRC-TR-98-00296
October 1, 1998
Revision 0

A/M Area DNAPL Characterization Report

For

Cores Collected in FY97 and 1Q98 and 2Q98

October 1998

Westinghouse Savannah River Company
Savannah River Site
Aiken, South Carolina 29808
Prepared for the United States Department of Energy under Contract No. DE-AC09-96-SR18500

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Summary

Drilling activities were conducted in FY97 and early FY98 in the A/M Area to further identify areas of pure phase DNAPL below the water table. The purpose of the work was to further understand the subsurface contaminant distribution and to identify locations below the water table where aggressive DNAPL remediation technologies should be pursued. This work consisted of using rotosonic drilling to complete 13 borings to either the top of the Green Clay or the top of the Crouch Branch Confining Unit. Results of the drilling activities do not support implementation of an aggressive groundwater remediation technology at this time. No large pools of pure phase DNAPL were identified based on the results of the soil core samples. In all cores except those drilled at the 311-M Solvent Storage Tank, measurable levels of PCE and TCE were found in a clay or sandy clay located at an elevation ranging from 210 ft msl to 220 ft msl (150 ft to 160 ft depth). The highest contaminant levels are found in relatively thin layers (less than 1 foot thick). Findings specific to each of the four source areas evaluated are outlined below.

- Data collected at the A-014 outfall suggest two things: 1) the soil vapor extraction units are effectively remediating the vadose zone and 2) contaminants are being transported along the middle clay of the water table aquifer and then penetrate deeper into water bearing zones.
- Data collected at the M Area Settling Basin suggest that contaminants are migrating from the basin toward the west and also to the southwest along structural "depressions" on the surfaces of low permeability intervals. The concentrations measured in these cores indicate that the highest DNAPL source concentrations were present immediately adjacent to the source and do not indicate that a large volume of DNAPL is present at the locations further from the source.
- Data collected near manholes along the process sewerline contained contaminated intervals, primarily TCE, below the water table. This suggests lateral dissolved plume migration at depth rather than vertical migration from an overlying source.
- Data collected from the former solvent storage tank location confirm the presence of a significant volume of DNAPL in the vadose zone (Jarosch, 1998). The data do not indicate the presence of a large volume of DNAPL in the water table aquifer underlying the solvent storage tank area. Further, the core data suggest vertical penetration of limited quantities of contaminant below the Green Clay into the Lost Lake Aquifer.

Background

The A/M Area, a reactor fuel and target assembly area of the Savannah River Site, discharged approximately 3.5 million pounds of waste industrial solvents (primarily trichloroethylene, TCE, and tetrachloroethylene, PCE) from the 1950's to early 1980's. These discharges occurred at two locations – the A-014 Outfall and the M Area Settling Basin. Additional releases of solvent at the solvent storage tank were also documented during this period. Releases of large amounts of industrial solvent resulted in subsurface

contamination present in an undissolved phase (DNAPL) above and below the water table. This source DNAPL evaporates and dissolves, generating contaminated vapors/gas and a large dissolved plume. Presently, the dissolved phase and vadose zone are being addressed though a phased characterization/remediation program. Field activities specifically related to DNAPL characterization were initiated in 1991 (see Looney et al., 1992 and Jackson et al., 1996). Specific field activities related to the DNAPL remediation were initiated in FY97 with a demonstration of a remediation technology for destroying the DNAPL below the water table at a location of known DNAPL (Jerome et al., 1997).

Late FY97 and FY98 DNAPL characterization activities centered around further identifying areas of pure phase DNAPL below the water table. Goals of this work were to further understand the subsurface contaminant distribution within the M-Area and to identify locations below the water table where aggressive DNAPL remediation technologies should be pursued. Areas examined were the process sewerline from M-Area to the A-014 outfall, the A-014 outfall, the solvent storage tanks, the M-Basin and a suspected migration pathway southwest from the M-Basin towards wells MSB10 and MSB 12. Borings were completed using the rotosonic drilling method and then grouted to surface. Core was collected continuously from surface to total depth. Dependent on the location, total depth was either the top of the Green Clay (260 ft msl, depth of 100 ft) or the top of the Crouch Branch Confining Unit (200 ft msl, depth of 160 ft).

Selection of Drilling Locations

Based on available information, residual DNAPL above the water table is within fine grained (silt and clay) layers. Residual DNAPL below the water table will migrate toward, and collect in, structural lows on top of fine grained layers. Gravitational movement of the DNAPL below the water table results in thin (but laterally extensive) layers of contaminant migration toward the accumulation areas. In an effort to identify locations where the probability of finding DNAPL is high, a review of historical information, time trend data for monitoring wells, and structural features was conducted. The following material was used as references:

Gordon, D.E. (1982). Preliminary Technical Summary M-Area Groundwater Cleanup Facility. DPST-82-0069, E.I. duPont de Nemours & Co., Savannah River Laboratory, Aiken, South Carolina 29808.

Jackson, D.G., T.H. Payne, B. B. Looney, and J. Rossabi. (1996). Estimating the Extent and Thickness of DNAPL within the A/M Area of the Savannah River Site (U), WSRC-RP-96-0574, Westinghouse Savannah River Company.

Marine, I.W. and H.W. Bledsoe (1984). Supplemental Technical Summary M-Area Groundwater Investigation. DPSTR-84-112, E. I. duPont de Nemours & Co., Savannah River Laboratory, Aiken, South Carolina 29808.

Figure 1 identifies the resulting borings by location. Each location is identified and the basis for selection presented below. Drilling activities were centered adjacent to suspected sources of solvent discharge.

MRS6 and MRS6A. These borings are located adjacent to the solvent storage tanks. This area is a known source of discharge to the subsurface due to spills associated with filling the storage tanks. Large concentrations of PCE and TCE have been detected in the vadose zone at this location. However, little data is available below the water table. One boring, MRS6, was planned for this location. Due to poor recovery below the water table, an additional boring (MRS 6A) was drilled to provide the necessary data.

MRS8. This boring is located adjacent to the M-Area Basin, a known source of discharge to the subsurface. DNAPL has been bailed from well MSB3D periodically over the last 7 years. In an effort to determine what the soil plug concentration would look like in an area from which DNAPL has been bailed from a well, this boring location was selected.

MRS9, MRS10, MRS11. These three borings are located adjacent to the M-Area process sewerline that runs from within the M-Area facilities to the A-014 outfall. The manholes along the process sewerline are believed to be potential DNAPL source areas due to leakage. These three borings were drilled in an effort to confirm this theory.

MRS12. This boring is located adjacent to well MSB23-B. Data from Marine and Bledsoe (1984) identify 12,000µg of solvent/g of soil at 220 ft msl, indicating the presence of DNAPL. This boring will be drilled to verify the presence of DNAPL at this location. However, it is quite possible that concentrations will be much lower than recorded in 1984. This would indicate the DNAPL has migrated from this location towards an area downgrade. Boring MRS12 was drilled to an approximate depth of 210 feet (top of the Crouch Branch Confining Unit).

MRS13. This boring is located between RWM 10 and MSB 59D. Data from Jackson, et al. (1996) identify both wells having PCE concentrations greater than 10% of solubility, indicating the presence of DNAPL in the vicinity. The location of this boring is in an area where results of surface geophysics indicate the probable presence of a subsurface channel has been identified by surface geophysics. This boring was drilled to a depth of 210 feet using rotosonic drilling.

MRS14. This boring is located adjacent to the A-014 Outfall. Approximately 1.5 million pounds of waste solvent were released through this outfall. The original outfall discharge was a riprap lined drainage area. A xerox copy of a photo attached to a 1988 letter shows the absence of a concrete drainage ditch at that time. Historical records indicate discharge of waste solvents to the outfall and basin were discontinued in 1982. Thus, during the discharge period the drainage area was unlined. It is very likely that significant levels of TCE and PCE will be present at this location. Boring MRS14 was drilled to a depth of 210 feet using rotosonic drilling.

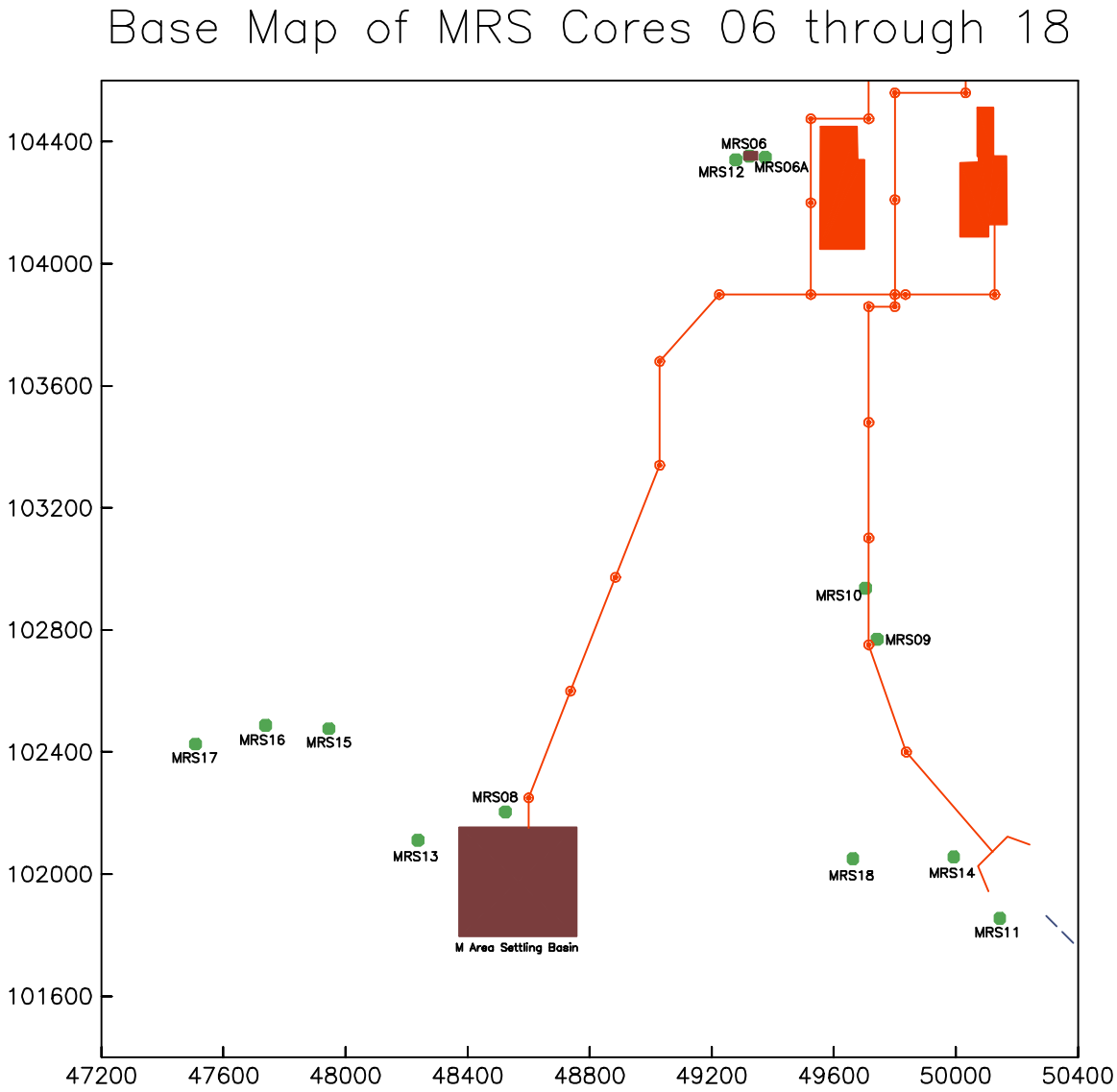

Figure 1: Location Map of FY97 Borings to Support Characterization of DNAPL Sources in the A/M Area

MRS15, MRS16 and MRS17. These borings are located equidistant along a line running from wells MSB 10 to MSB12. Time trend data reported in Jackson et al. (1996) shows marked increases in PCE concentrations in groundwater concentrations above the Green Clay in 1995. These indicate the possibility of a DNAPL front moving into this area. These borings will be drilled to a depth of 165 feet using rotosonic drilling.

MRS18. This boring is located west of the A-014 outfall. It has been noted at both the solvent storage tank location and the M-Area basin that the migration of the DNAPL has been observed to the west. Assuming the confining zones affecting the movement of the DNAPL in A/M Area all tend to grade to the west, this location was chosen. This boring WAS drilled to a depth of 165 feet using rotosonic drilling.

Field Activities

The above identified thirteen soil borings were drilled using the rotosonic drilling technology for purposes of DNAPL characterization within the A/M Area. The drilling occurred from July 1997 through April 1998. The drilling centered adjacent to the A-014 outfall, the Solvent Storage Tanks, the M-Area Basin and a subsurface depression leading west from the M-Area Basin. Total depths of the holes varied dependent on knowledge of the lithology of the area and groundwater concentrations from nearby monitoring wells. The holes were either drilled to a total depth equivalent to the top of the Green Clay or the top of the Lost Lake confining unit. Table 1 is a list of all borings, latitude, longitude, northing, easting, elevation and total depth.

Table 1: Location Data for FY97 Borings to Support Characterization of DNAPL Sources in the A/M Area

Boring ID	Latitude	Longitude	Northing	Easting	Elevation	Total Depth
MRS-6	33.3370	81.7397	104352.3	49323.9	368.7	160
MRS-6A	33.3371	81.7395	104349.4	49375.0	370.1	165
MRS-8	33.3310	81.7376	102204.3	48524.4	358.7	165
MRS-9	33.3342	81.7355	102769.4	49741.5	360.9	226
MRS-10	33.3345	81.7359	102936.8	49704.3	363.9	236
MRS-11	33.3328	81.7326	101855.5	50144.2	341.1	206
MRS-12	33.3369	81.7397	104340.8	49279.2	370.6	245
MRS-13	33.3303	81.7382	102110.8	48236.9	354.1	227
MRS-14	33.3330	81.7334	102055.7	49993.0	348.5	216
MRS-15	33.3306	81.7396	102476.3	47945.8	355.4	157
MRS-16	33.3303	81.7402	102487.0	47737.8	352.8	167
MRS-17	33.3298	81.7407	102425.9	47508.4	348.8	157
MRS-18	33.3325	81.7343	102050.0	49662.8	352.3	157

Soil plug samples were collected from surface to total depth for each location and analyzed for TCE and PCE concentrations using a static (equilibrium) headspace method (Looney et al., 1993, EPA, 1995). Sampling intervals for each hole were determined based on distance from a source (i.e. M-Area Basin) and previous characterization information.

Sediment samples are collected by taking a 2 cc plug sample from the center of the core using a modified plastic syringe. The plug is transferred to a 22 ml vial containing 5 ml of nano-pure water and the vial is sealed with a crimped septum top for later head space analysis. Duplicate samples are collected at each depth and all samples are stored at 4°C until analysis. Twenty percent (20%) of the duplicate samples will be analyzed as a quality control check.

Each sample is weighed and then analyzed on a HP 5890 Series gas chromatograph (GC) equipped with flame ionization detector (FID) and electron capture detector (ECD). Equilibrated headspace gas was subsampled and transferred to the GC using an automated head space sampler. Equivalent water concentrations were calculated using

the appropriate detector (ECD for low concentrations, FID for high concentrations). Mass soil concentrations (ppb, µg/kg) are calculated based on an equal head space volume from 7.5 ml of water standards and approximately 7.5 ml of water/soil matrix and are corrected for the mass difference between soil and water. The gas chromatograph is calibrated using certified solvent mixtures in methanol diluted to specific concentrations. Standard concentrations used are 3, 5, 10, 50, 250, 500, and 1000 ppb (µg/l). The standards are analyzed for vinyl chloride, freon-11, freon-113, 1,1-DCE, trans-DCE, cis-DCE, 1,1,1-TCA, CCl_4, TCE, and PCE.

Results of Characterization

Results of samples collected in the vadose zone are reported under separate cover (Jarosch et al., 1998). Figures 2 through 14 are depth concentration profiles of TCE and PCE for each boring and the associated field core descriptions presented as geological logs. The bulk soil concentrations, x-axis of each figure, are graphed on a scale of 0 to 25 µg/g to provide uniformity/consistency for review purposes. This leads to the concentrations going off the scale in some cores where concentrations in the vadose zone are much higher than below the water table. In two cases, Borings MRS8 and MRS12, concentrations below the water table are greater than 25 µg/g. Field core description, lithology data used in creating graphical logs and contaminant concentration data are provided in appendices.

A/M Area data collected from the early 1980's through the present supports a conceptual model in which: residual DNAPL above the water table is present primarily in discrete lenses within low permeability layers, while residual DNAPL below the water table collects as thin lenses immediately above low permeability soil layers. The depth concentration profiles and the core logs from this work are consistent with this conceptual model and confirm that it is useful in planning characterization and remediation activities for A/M Area. The expected contaminant distribution can be seen in Boring MRS 8 at an elevation of 218 ft msl consisting of a sandy clay with TCE concentrations at 50 µg/g; Boring MRS 10 at an elevation of 209 ft msl consisting of a clay with TCE concentrations at 10 µg/g; Boring MRS 12 at an elevation of 230 ft msl consisting of a clayey sand with PCE concentrations at 764 µg/g; Boring MRS 13 at elevations of 200 ft msl through 198 ft msl and 195 ft msl consisting of a clayey sand with PCE concentrations at 16µg/g and 22.6 µg/g, respectively; and Boring MRS 15 at an elevation of 201 ft msl consisting of a sandy clay with a PCE concentrations of 21 µg/g.

Three cores, MRS 11, 14, and 18, were collected near the A-014 outfall. This outfall received solvent wastes from 1952 through 1980 (Marine and Bledsoe, 1984). Early releases (through 1962) contained only TCE. From 1962 through 1969 A-014 solvent releases contained TCE and PCE. From 1970 through 1978 releases were larger and contained only PCE. Releases from 1979 through 1980 contained small quantities of 1,1,1 trichloroethane. The timing of the solvent use/releases provides an important tool in interpreting the relative amount of the source solvents in the various cores and depth intervals.

Data indicate significant contaminated intervals (ranging from 5 μg/g to 10 μg/g of PCE) are located at an elevation of approximately 220 ft msl in borings MRS 14 and 18, located adjacent to the outfall and to the west of D-Road . Contamination in this interval is controlled by a clay and a clay/sandy clay with gravel for MRS 14 and 18, respectively. TCE was found at an elevation of 215 ft msl at a concentration of 5 μg/g in a sandy clay in boring MRS 11 which is east of the A-014 outfall. Approximately 95% of the MRS 11 samples contained less than 0.3 μg/g of PCE with the highest concentration at 1.3μg/g.

Importantly, this particular core contained higher levels of TCE than PCE. Thus, the data suggest that contaminant movement was downward through the vadose zone, with accumulation and lateral migration on top of clay lenses in the middle of the water table aquifer. Lateral migration in this interval was observed to the west, across D-Road. The TCE dominated contaminant profile in MRS 11 is indicative of earlier releases. The peak contamination in this location is deeper indicating that contaminants are penetrating the middle water table aquifer clay and the Green Clay confining zone and migrating to this location (east of the A-014 outfall).

The data from MRS 11, 14, and 18 suggest that a significant quantity of the residual contaminant is present below the water table near the A-014 outfall. Concentrations in the vadose zone (especially in near elevation 290 ft msl and in the deep vadose zone below 240 ft msl) were lower than the values measured in 1990 (Westinghouse, 1990). This “reduction” may indicate clean-up by operation of the full scale SVE system , as well as heterogeneity in the system. The presence of relatively thin intervals (approximately 10 ft thick) of elevated PCE concentrations below the water table indicate that DNAPL accumulation areas in the vicinity are probable. The concentrations measured in these cores, however, do not indicate sufficient DNAPL quantities in these particular locations to justify targeted DNAPL specific remediation activities (see Jerome et al., 1997).

Another area evaluated for DNAPL presence and transport was the M-Area Basin. This was accomplished by drilling borings MRS 8, 13,15, 16 and 17. MRS 8 was drilled approximately 10 ft from Well MSB3D from which pure DNAPL has been bailed periodically over the last 7 years. Data from this recent drilling indicate contaminant concentrations in the upper 85 feet of the vadose zone are less than 0.001 μg/g of both TCE and PCE, on average. From 85 feet to the water table concentrations of both TCE and PCE were recorded above 25 μg/g and peaking at 30 μg/g TCE and 309 μg/g PCE at elevations of 239 ft msl and 254 ft msl, respectively. Below the water table, PCE was the prominent contaminant with the highest concentration of 50 μg/g at 218 ft msl in a sandy clay. Concentrations of PCE in the 5 μg/g to 15 μg/g range were measured from the water table to the top of the Green Clay. Predominantly PCE and some TCE were measured in samples collected from MRS 13 which was located west of the M-Area Basin. The highest concentrations were found from 220 ft msl to 190 ft msl. The concentrations ranged from 1 μg/g to 23 μg/g of PCE and 1 μg/g to 5 μg/g of TCE in this 30 ft interval. The highest concentrations were found in sandy clay, clayey sand and sand

above a clay layer. High concentrations of PCE and TCE ranged from 14μg/g to 20 μg/g and 5 μg/g to 9 μg/g, respectively, in MRS 15, 16, and 17. The concentrations were measured at elevations ranging from 210 ft msl to 200 ft msl, within sandy clay and clayey sand layers. The data suggest that contaminants are migrating from the M-Area Basin to the west and also to the southwest along structural "depressions" on the surfaces of low permeability intervals. The concentrations measured in these cores indicate that the highest DNAPL source concentrations were present immediately adjacent to the source and do not indicate that a large volume of DNAPL is present at the locations further from the source.

Two borings, MRS 9 and 10, were drilled adjacent to the process sewerline running from the M-Area buildings to the A-014 outfall. There was one PCE measurement and no TCE measurements above 1 μg/g in MRS9 located at one of the manholes of the process sewerline. The one measurement above 1 μg/g was at elevation 211 ft msl in a sand above a sandy clay. There were two TCE measurements and no PCE measurements above 1 μg/g in MRS10 located between two of the manholes of the process sewerline. TCE was measured at 10 μg/g at an elevation of 209 ft msl in a clay. Data collected near manholes along the process sewerline contained contaminated intervals containing primarily TCE below the water table. This suggests lateral dissolved plume migration at depth rather than vertical migration from an overlying source. This data indicate no large DNAPL source at these locations along the process sewerline.

The last area evaluated was near the 311-M solvent storage tank. The data associated with the vadose zone is discussed in depth in the Jarosch *et al*, 1998. Three borings were drilled adjacent to the tank area, MRS 6, 6A, and 12. The highest PCE and TCE concentrations below the water table in boring MRS 6 were 3.7 μg/g and 1.5 μg/g, respectively. These concentrations were measured at an elevation of 231 ft msl in a clayey sand. The highest PCE and TCE concentrations below the water table in boring MRS 6A were 7.0 μg/g and 3.2 μg/g, respectively. These concentrations were measured at an elevation of 207 ft msl in a clay. An interval containing very high PCE concentrations (764 μg/g) was measured in boring MRS12 at an elevation of 230 ft msl in a clayey sand. This is at the water table or within the capillary fringe.

Below the water table, the highest PCE concentration was 5.2 μg/g at an elevation of 224 ft msl in a sand. Two samples measured TCE at 3.9 μg/g and 4.7 μg/g at elevations 162 ft msl and 147 ft msl, respectively. These measured TCE concentrations were found in clayey sands. Importantly, the deep measurements in MRS12 were the highest concentrations measured below the water table at the former solvent storage tank location and these intervals are below the Green Clay confining zone. This observation is consistent with previous data (Jackson et al., 1996) and suggests that contaminants are penetrating the Green Clay. The data from these three cores confirm the presence of a significant volume of DNAPL in the vadose zone (Jarosch, 1998). However, the data does not suggest the presence of a large volume of DNAPL in the water table aquifer underlying the solvent storage tank area. Further, the core data suggest the presence of limited quantities of contaminant below the Green Clay in the Lost Lake Aquifer.

Based on the results of all samples collected below the water table, no sufficient volumes of pure phase DNAPL were detected to warrant implementation of an aggressive remediation technology at this time in these locations (see Jerome et al., 1997). In all cores except those drilled at the 311-M Solvent Storage Tank, measurable levels of PCE and TCE were found in a clay or sandy clay located at an elevation ranging from 210 ft msl to 220 ft msl. The highest contaminant levels are found in relatively thin layers (less than 1 foot thick) of clay or sandy clay.

Future Work

Additional cores were collected in 4QFY98. These cores were centered around the 311-M Solvent Storage Tank and the M-Area Basin. The data in this report and the newly acquired data will be digitally imaged and volumetric estimates of the amount of contaminants and their spatial distributions will be accomplished in the first half of FY99.

In an attempt to support selection of a site for an aggressive source remediation in the A/M Area it is recommended that directional drilling at the M-Area Basin be conducted to enable estimation of an approximate volume of DNAPL remaining beneath the basin. It is also recommended that the use of directional drilling beneath the M-Area process building be evaluated for characterizing these buildings as being source terms for the solvent plume.

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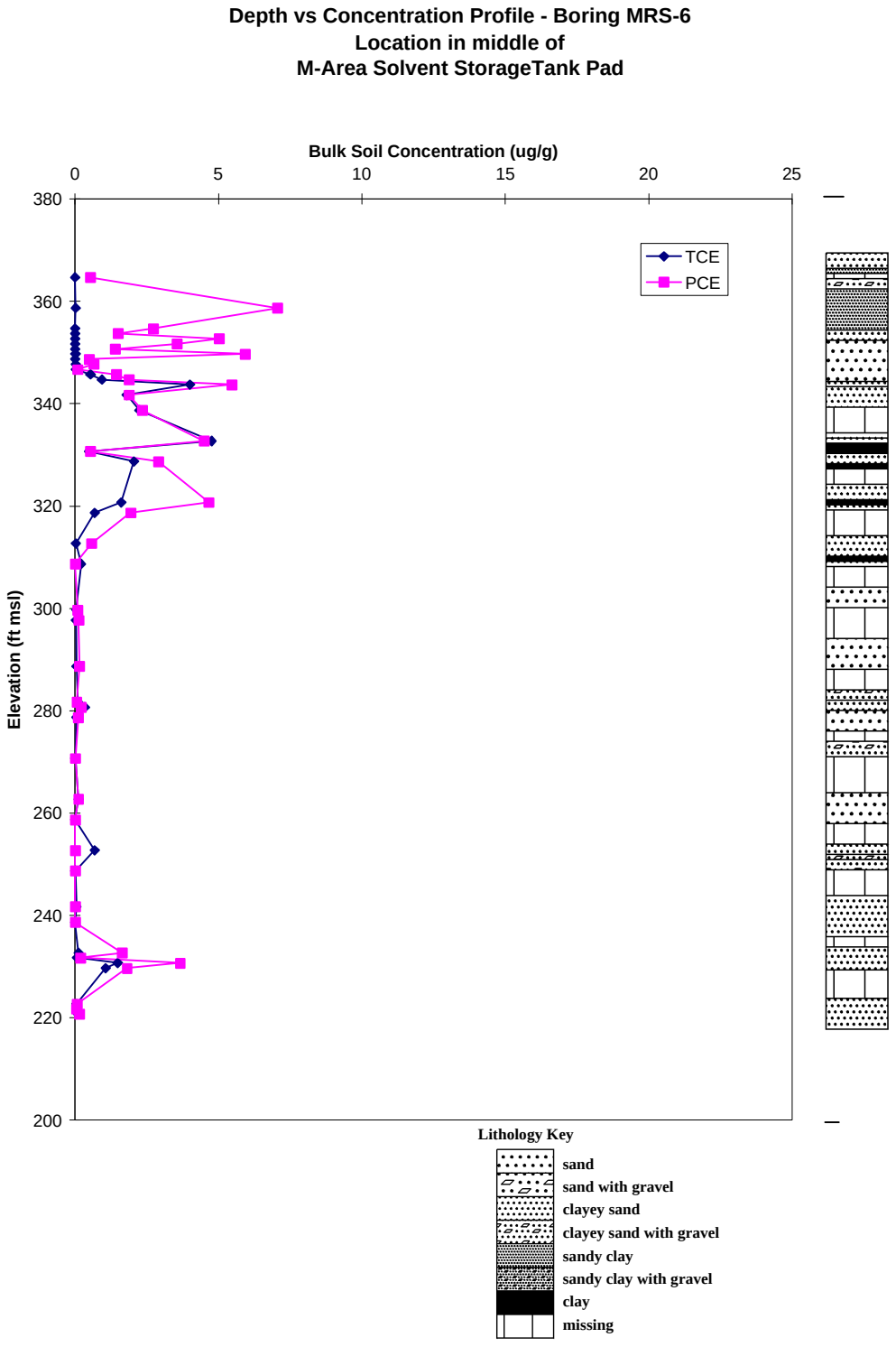
Depth vs Concentration Profile - Boring MRS-6
Location in middle of
M-Area Solvent StorageTank Pad
Bulk Soil Concentration (ug/g)
0
5
10
15
20
25
380
360
340
320
300
280
260
240
220
200
Elevation (ft msl)
TCE
PCE
Lithology Key
sand
sand with gravel
clayey sand
clayey sand with gravel
sandy clay
sandy clay with gravel
clay
missing

Figure 2.

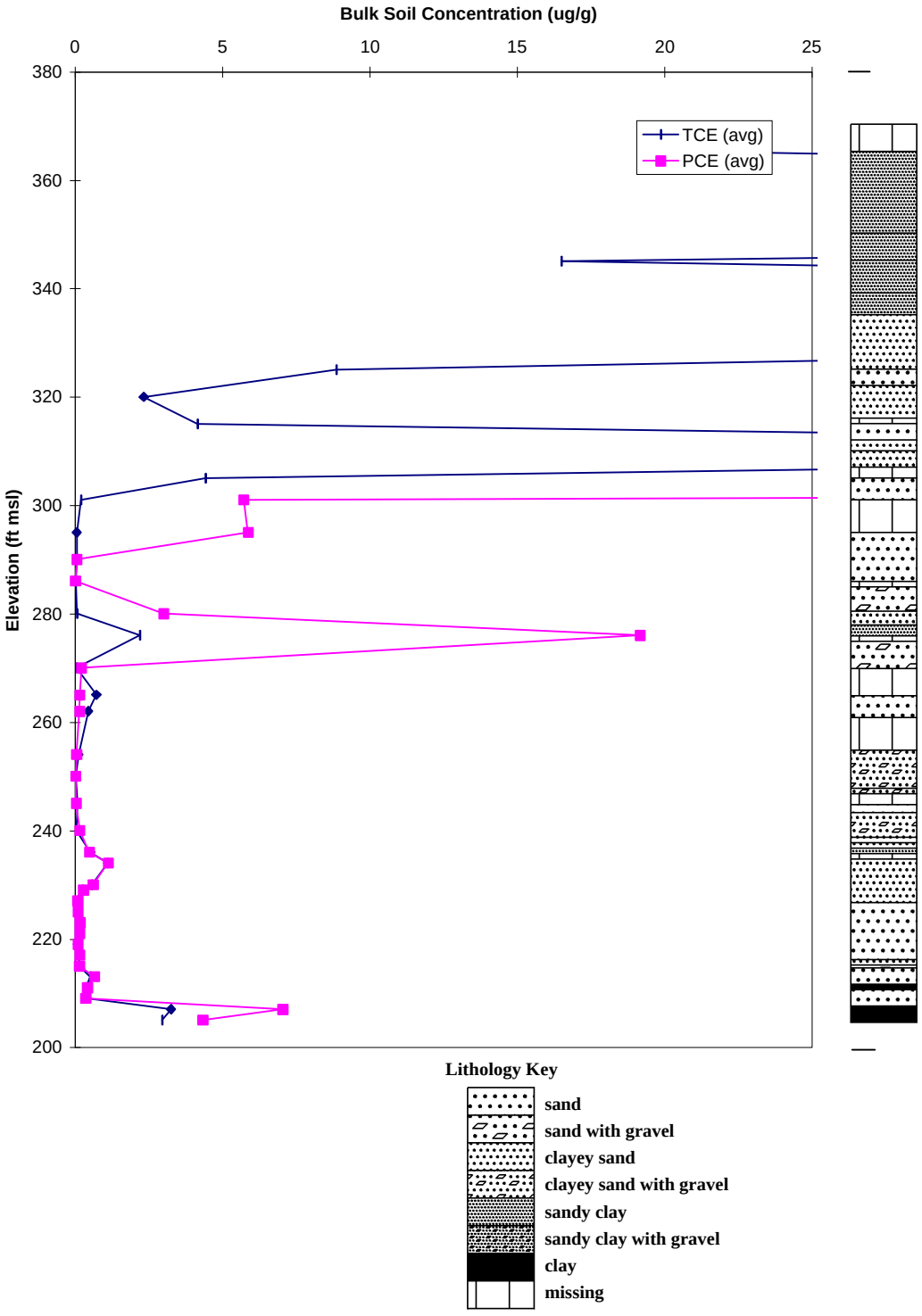
Depth vs Concentration Profile - Boring MRS6A
Adjacent to Solvent Storage Tank Pad
Bulk Soil Concentration (ug/g)
0
5
10
15
20
25
380
360
340
320
300
280
260
240
220
200
Elevation (ft msl)
TCE (avg)
PCE (avg)
Lithology Key
sand
sand with gravel
clayey sand
clayey sand with gravel
sandy clay
sandy clay with gravel
clay
missing

Figure 3.

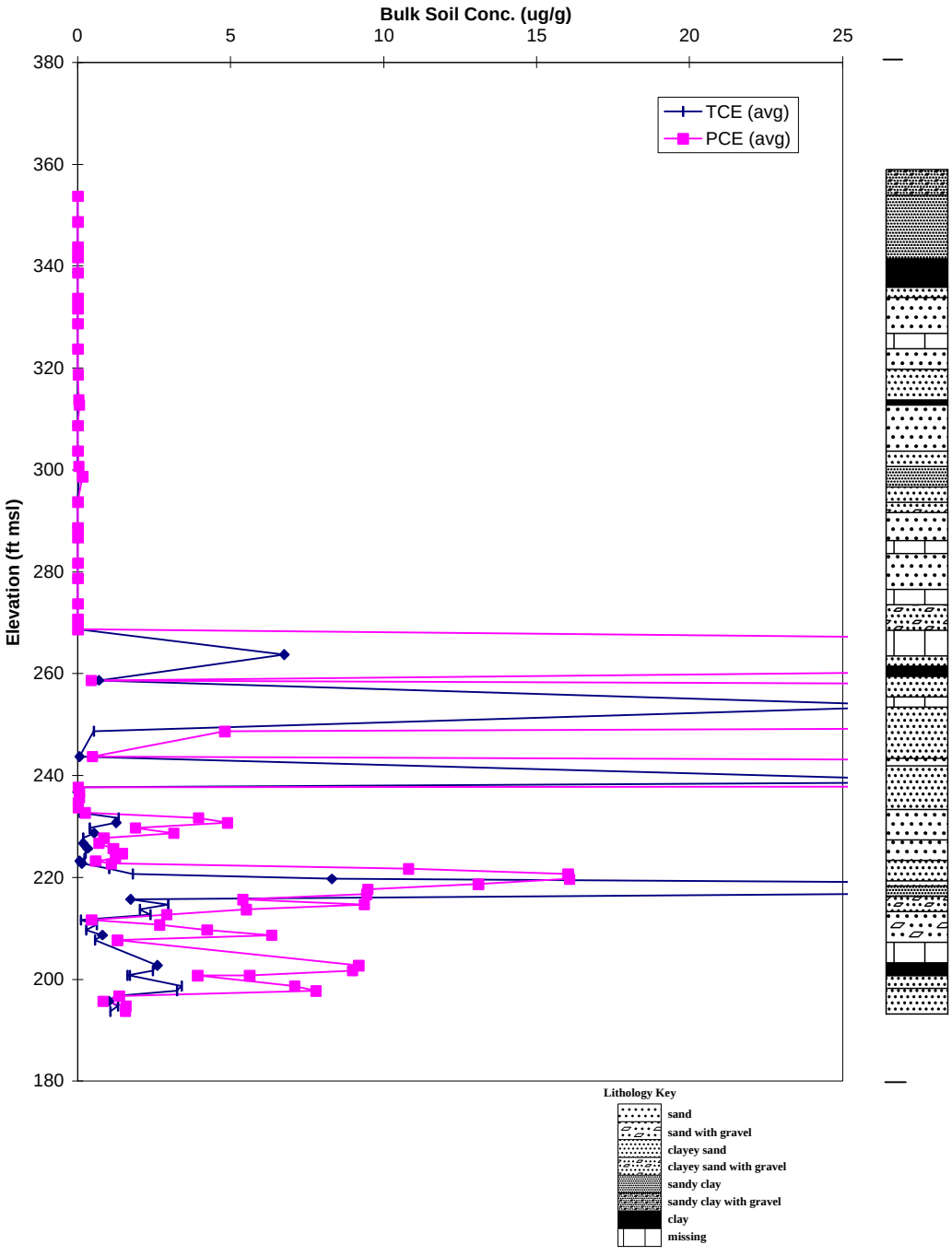
Depth vs Concentration Profile - Boring MRS 8
Adjacent to Well MSB 3D
Bulk Soil Conc. (ug/g)
0
5
10
15
20
25
380
360
340
320
300
280
260
240
220
200
180
Elevation (ft msl)
TCE (avg)
PCE (avg)
Lithology Key
sand
sand with gravel
clayey sand
clayey sand with gravel
sandy clay
sandy clay with gravel
clay
missing

Figure 4.

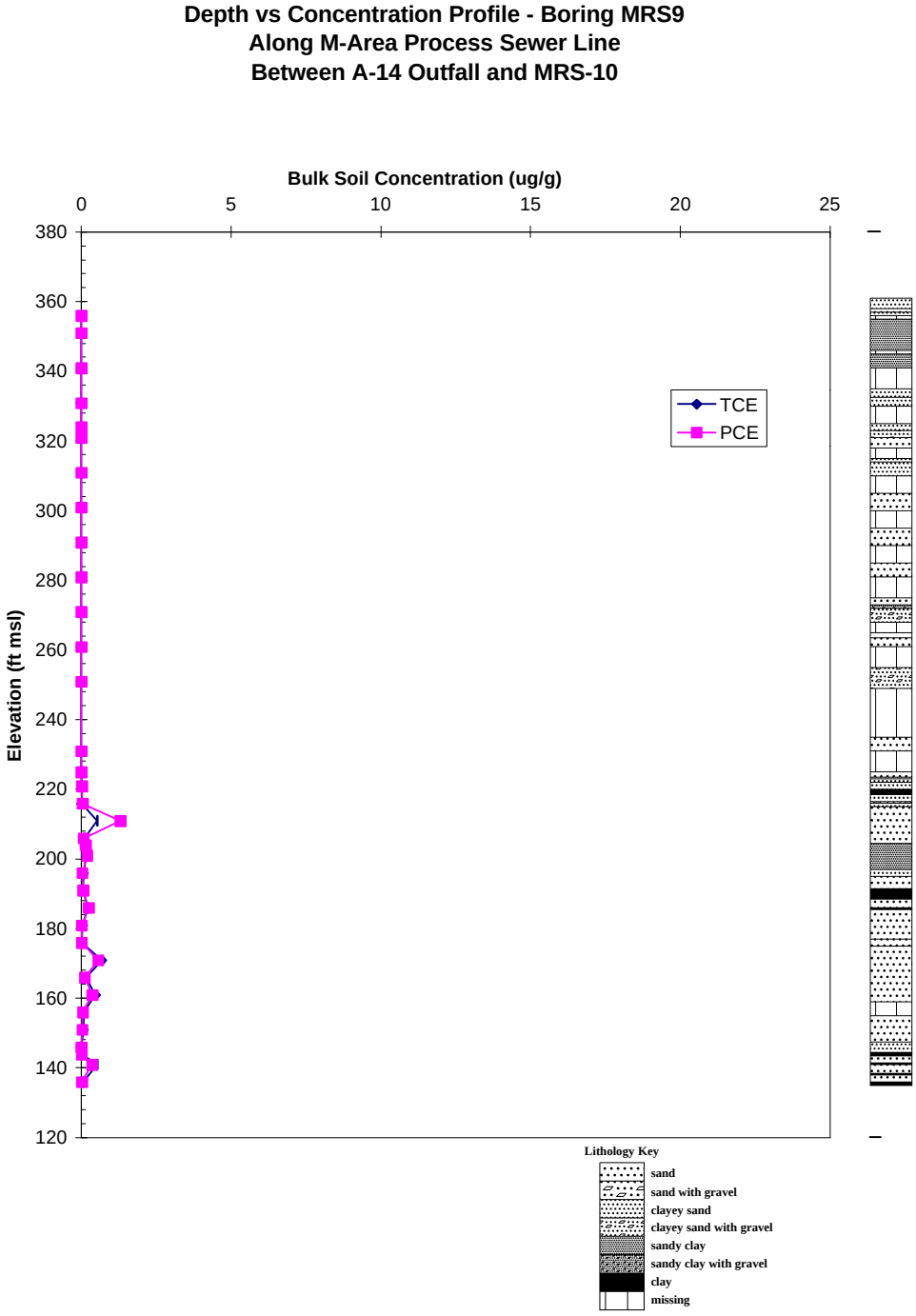
Depth vs Concentration Profile - Boring MRS9
Along M-Area Process Sewer Line
Between A-14 Outfall and MRS-10
Bulk Soil Concentration (ug/g)
0
5
10
15
20
25
380
360
340
320
300
280
260
240
220
200
180
160
140
120
Elevation (ft msl)
TCE
PCE
Lithology Key
sand
sand with gravel
clayey sand
clayey sand with gravel
sandy clay
sandy clay with gravel
clay
missing

Figure 5.

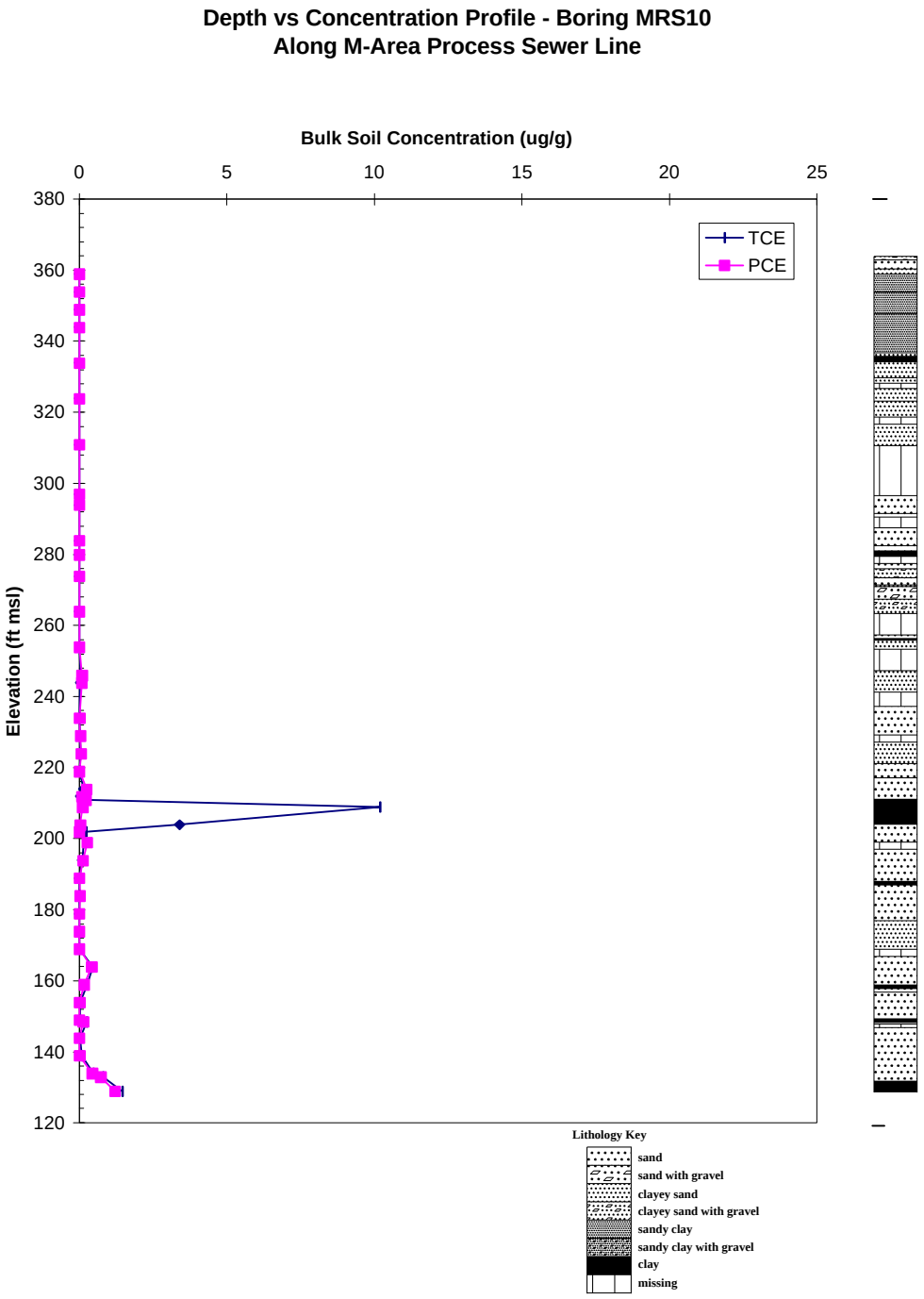
Depth vs Concentration Profile - Boring MRS10
Along M-Area Process Sewer Line
Bulk Soil Concentration (ug/g)
0
5
10
15
20
25
380
360
340
320
300
280
260
240
220
200
180
160
140
120
Elevation (ft msl)
TCE
PCE
Lithology Key
sand
sand with gravel
clayey sand
clayey sand with gravel
sandy clay
sandy clay with gravel
clay
missing

Figure 6.

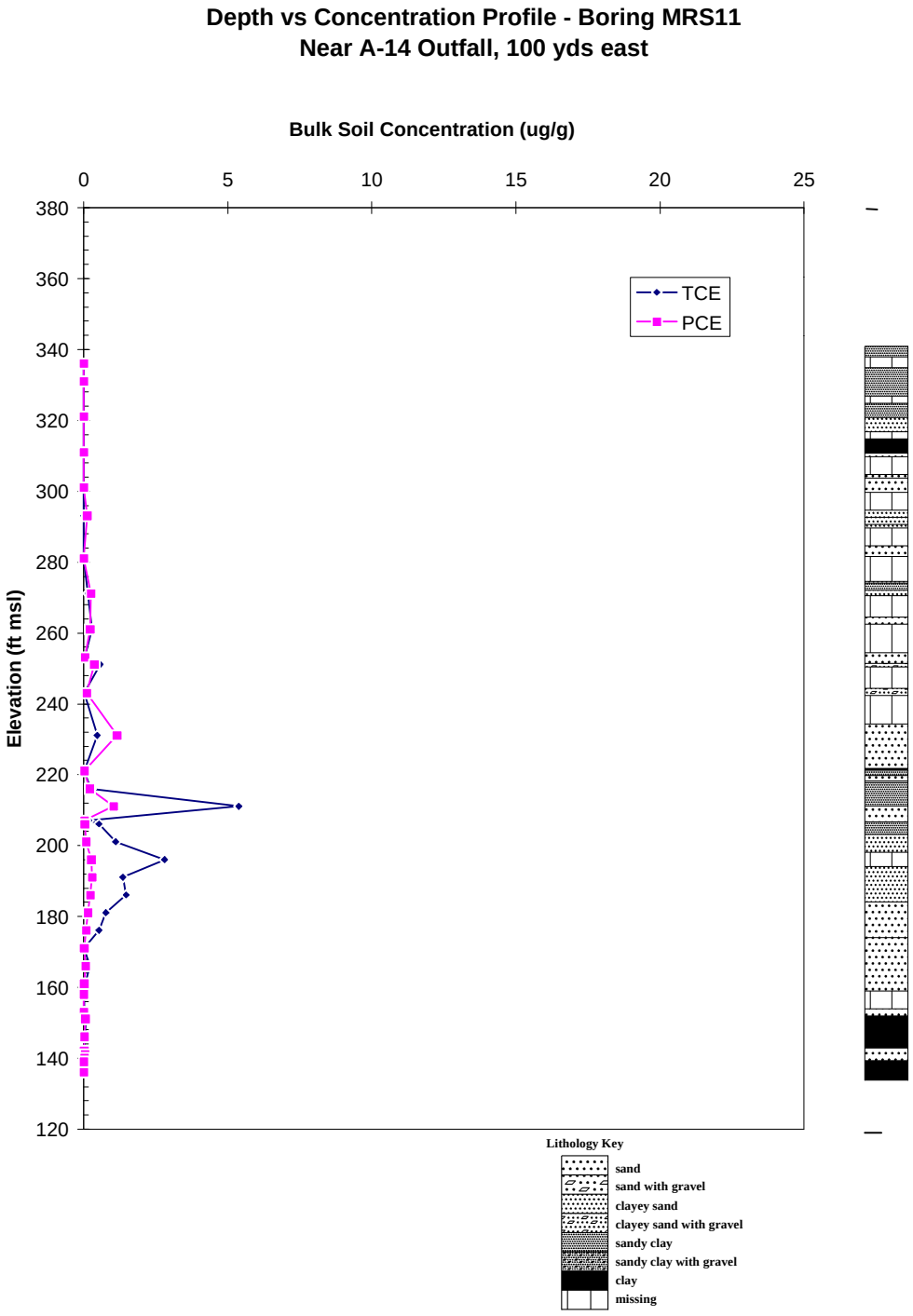
Depth vs Concentration Profile - Boring MRS11
Near A-14 Outfall, 100 yds east
Bulk Soil Concentration (ug/g)
0
5
10
15
20
25
380
360
340
320
300
280
260
240
220
200
180
160
140
120
Elevation (ft msl)
TCE
PCE
Lithology Key
sand
sand with gravel
clayey sand
clayey sand with gravel
sandy clay
sandy clay with gravel
clay
missing

Figure 7.

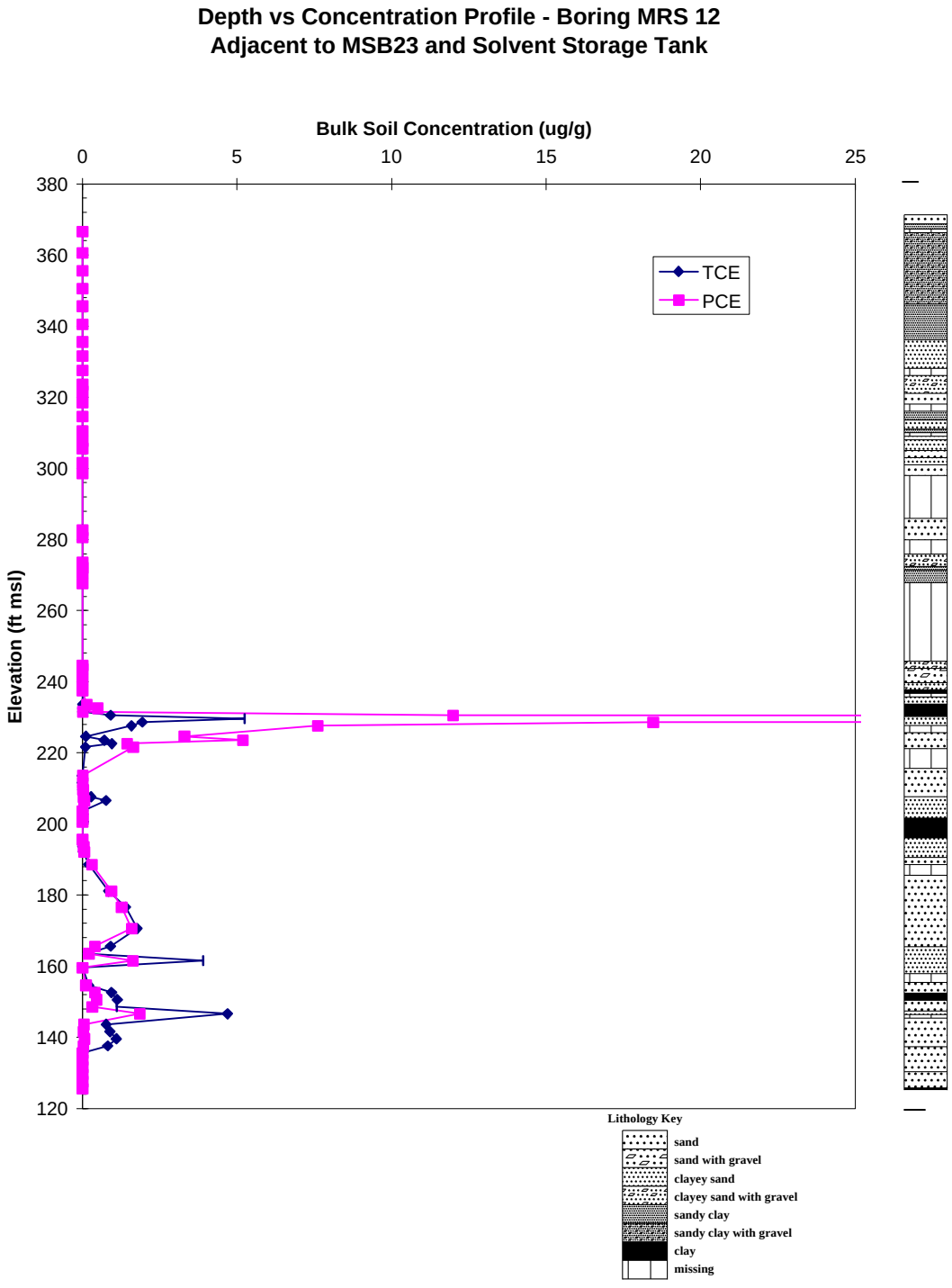
Depth vs Concentration Profile - Boring MRS 12
Adjacent to MSB23 and Solvent Storage Tank
Bulk Soil Concentration (ug/g)
0
5
10
15
20
25
Elevation (ft msl)
380
360
340
320
300
280
260
240
220
200
180
160
140
120
TCE
PCE
Lithology Key
sand
sand with gravel
clayey sand
clayey sand with gravel
sandy clay
sandy clay with gravel
clay
missing

Figure 8.

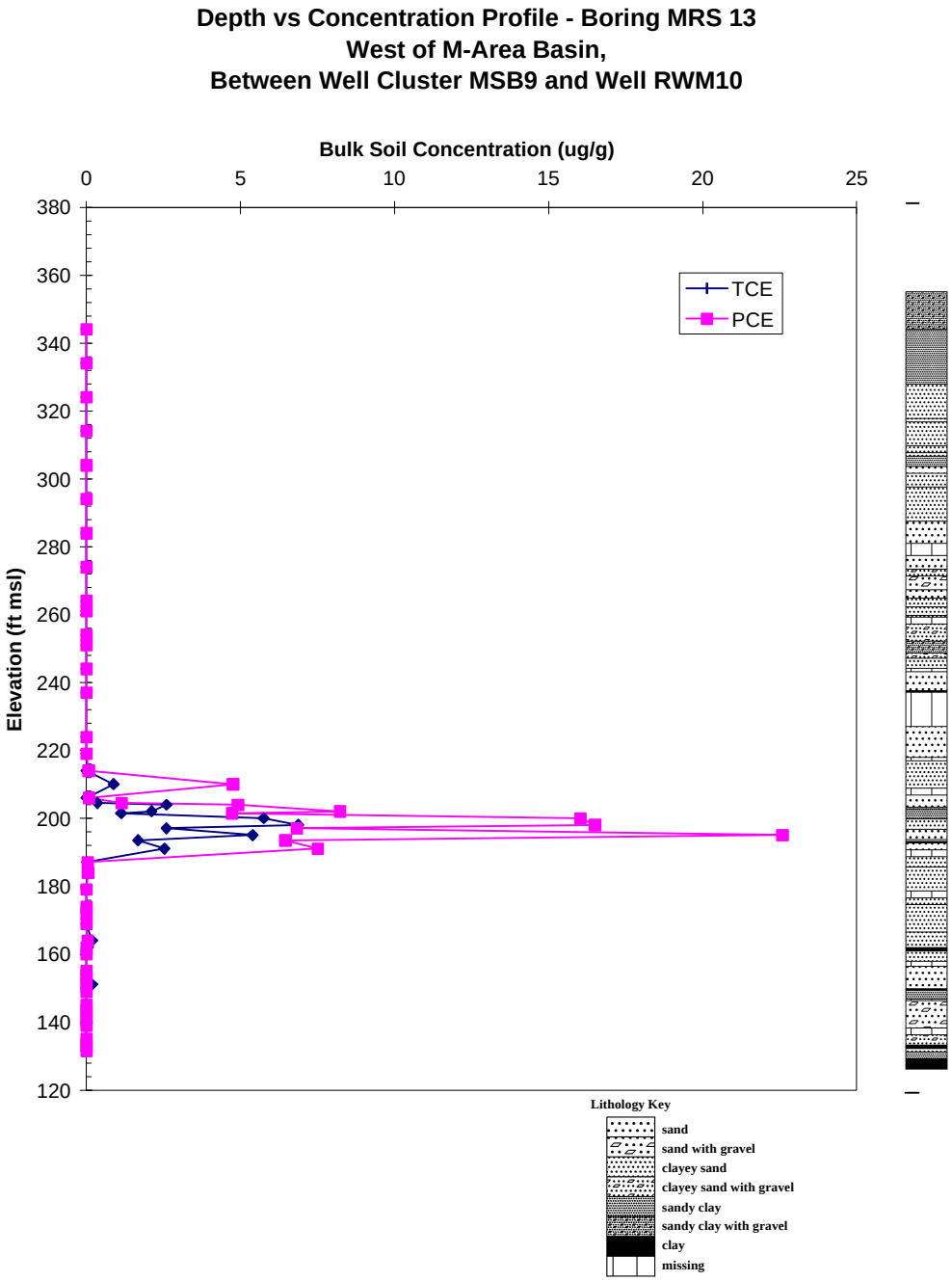
Depth vs Concentration Profile - Boring MRS 13
West of M-Area Basin,
Between Well Cluster MSB9 and Well RWM10
Bulk Soil Concentration (ug/g)
0
5
10
15
20
25
Elevation (ft msl)
380
360
340
320
300
280
260
240
220
200
180
160
140
120
TCE
PCE
Lithology Key
sand
sand with gravel
clayey sand
clayey sand with gravel
sandy clay
sandy clay with gravel
clay
missing

Figure 9.

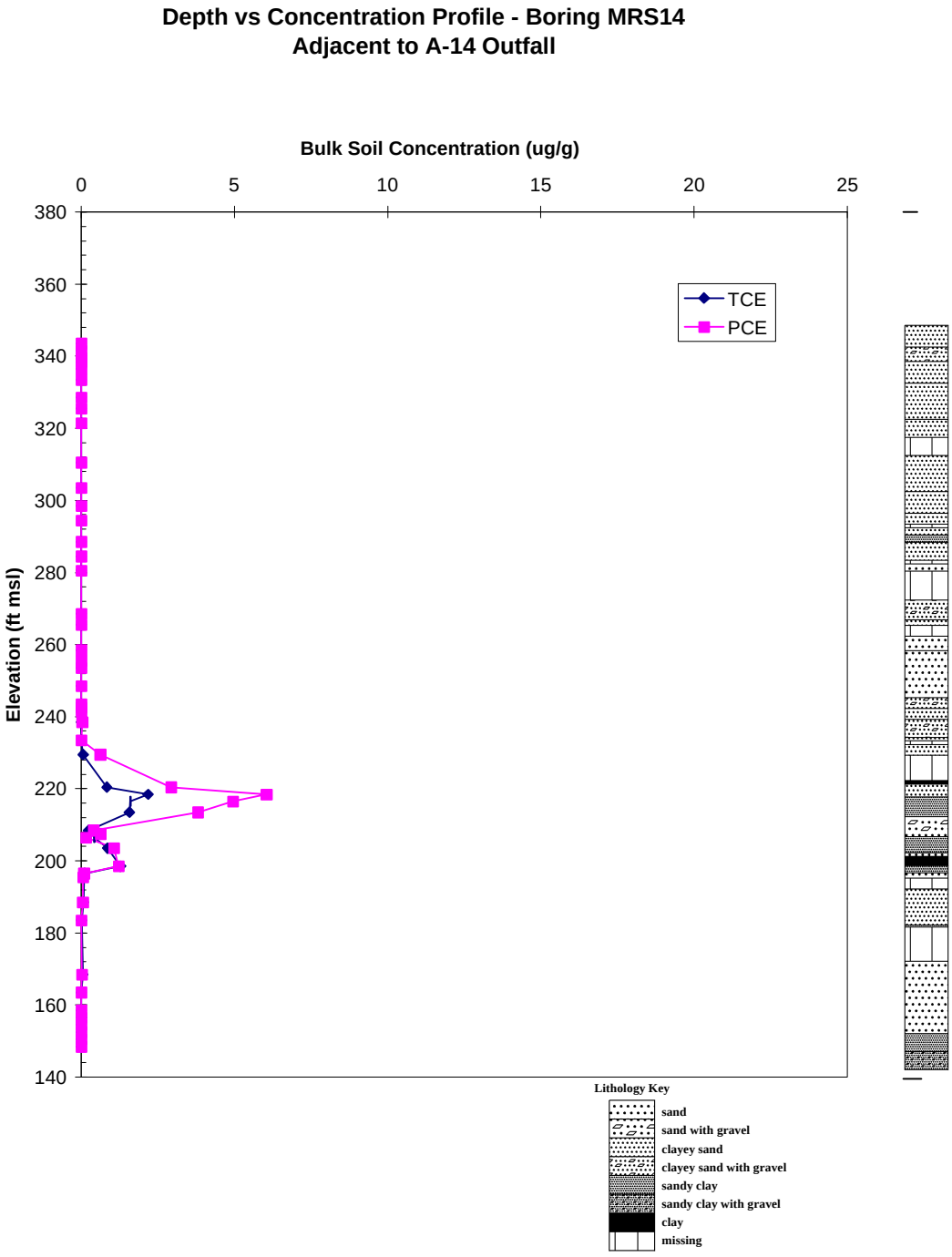
Depth vs Concentration Profile - Boring MRS14
Adjacent to A-14 Outfall
Bulk Soil Concentration (ug/g)
0
5
10
15
20
25
380
360
340
320
300
280
260
240
220
200
180
160
140
Elevation (ft msl)
TCE
PCE
Lithology Key
sand
sand with gravel
clayey sand
clayey sand with gravel
sandy clay
sandy clay with gravel
clay
missing

Figure 10.

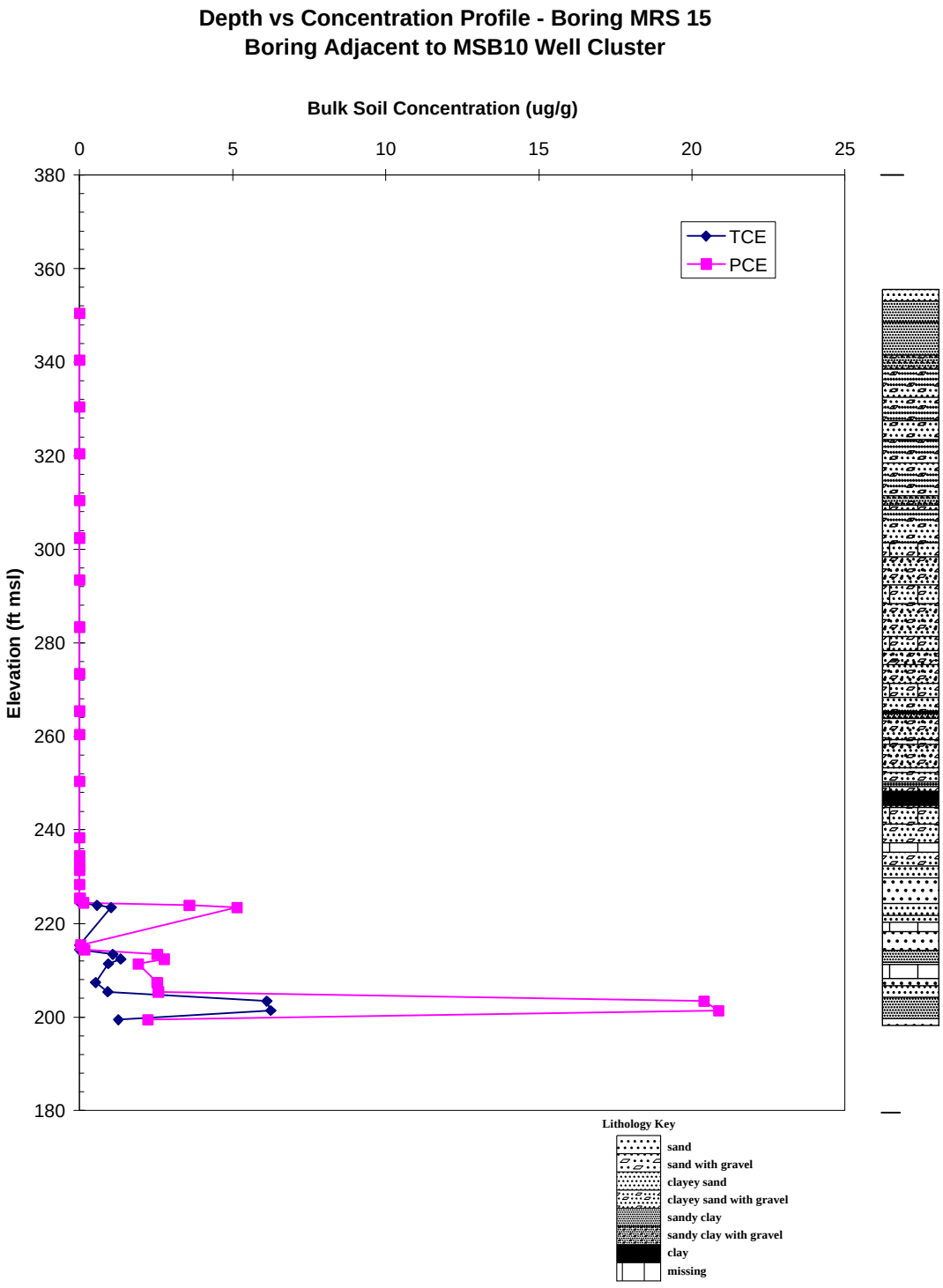
Depth vs Concentration Profile - Boring MRS 15
Boring Adjacent to MSB10 Well Cluster
Bulk Soil Concentration (ug/g)
0
5
10
15
20
25
380
360
340
320
300
280
260
240
220
200
180
Elevation (ft msl)
TCE
PCE
Lithology Key
sand
sand with gravel
clayey sand
clayey sand with gravel
sandy clay
sandy clay with gravel
clay
missing

Figure 11.

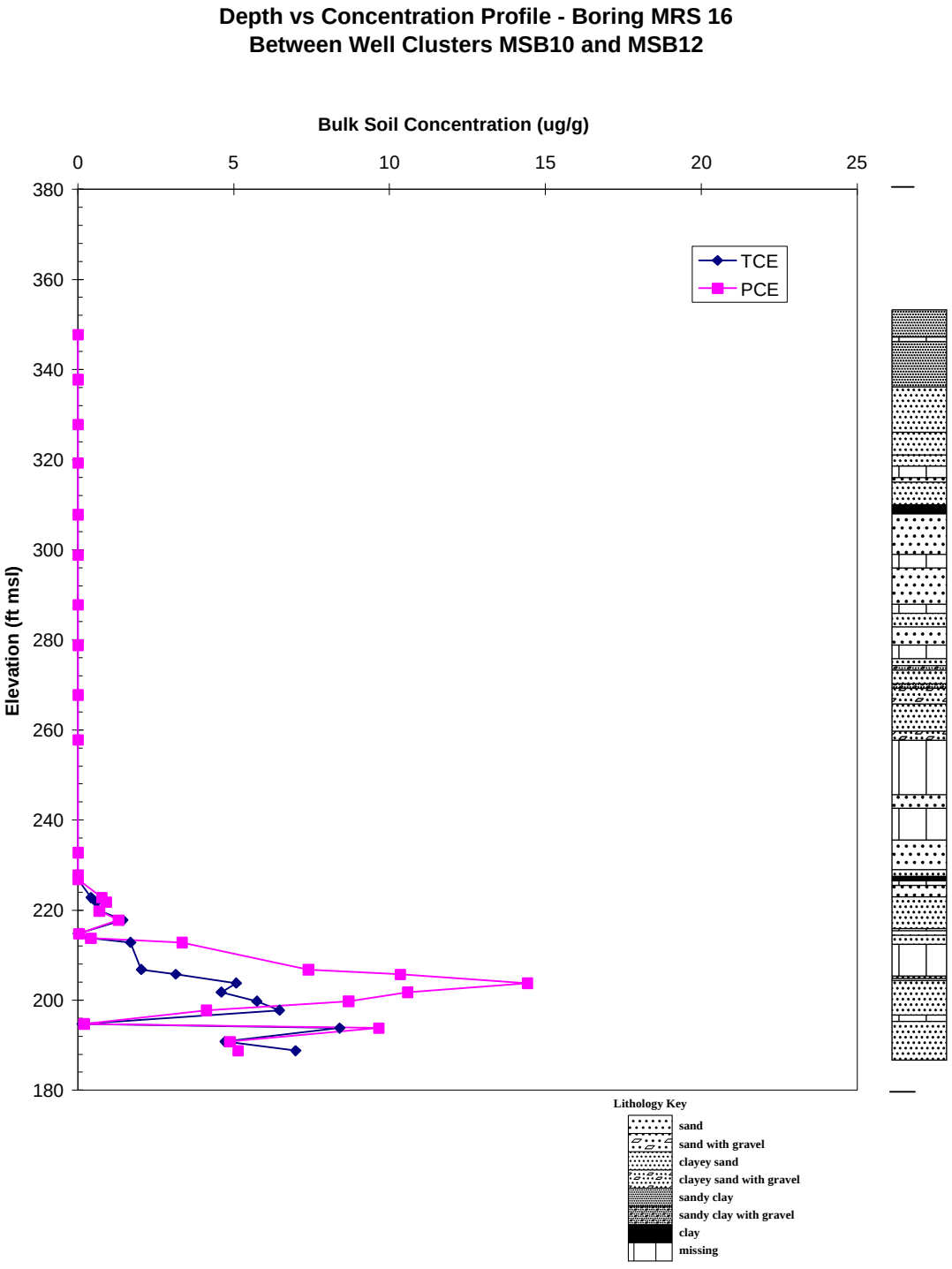
Depth vs Concentration Profile - Boring MRS 16
Between Well Clusters MSB10 and MSB12
Bulk Soil Concentration (ug/g)
0
5
10
15
20
25
380
360
340
320
300
280
260
240
220
200
180
Elevation (ft msl)
TCE
PCE
Lithology Key
sand
sand with gravel
clayey sand
clayey sand with gravel
sandy clay
sandy clay with gravel
clay
missing

Figure 12.

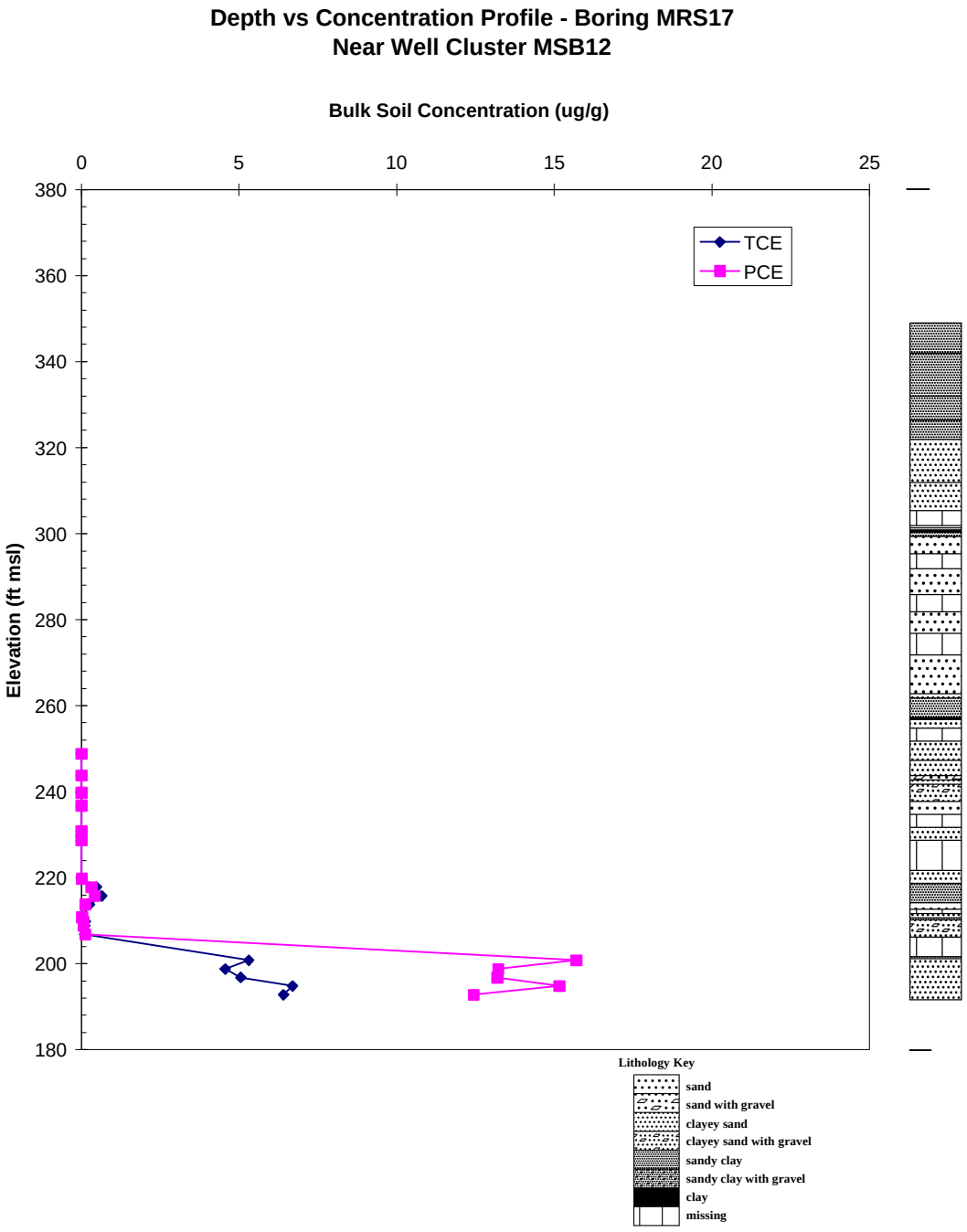
Depth vs Concentration Profile - Boring MRS17
Near Well Cluster MSB12
Bulk Soil Concentration (ug/g)
0
5
10
15
20
25
380
360
340
320
300
280
260
240
220
200
180
Elevation (ft msl)
TCE
PCE
Lithology Key
sand
sand with gravel
clayey sand
clayey sand with gravel
sandy clay
sandy clay with gravel
clay
missing

Figure 13.

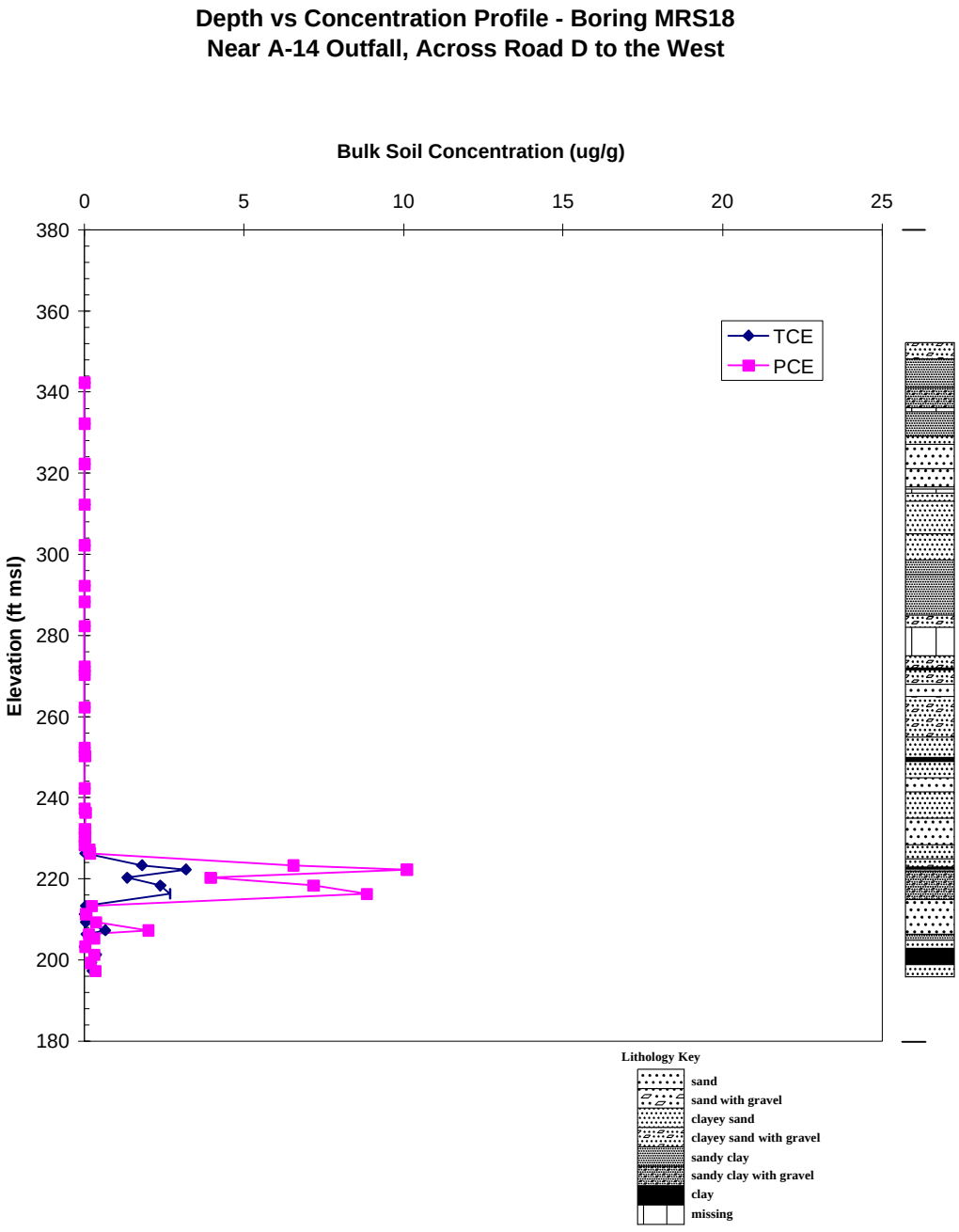
Depth vs Concentration Profile - Boring MRS18
Near A-14 Outfall, Across Road D to the West
Bulk Soil Concentration (ug/g)
0
5
10
15
20
25
380
360
340
320
300
280
260
240
220
200
180
Elevation (ft msl)
TCE
PCE
Lithology Key
sand
sand with gravel
clayey sand
clayey sand with gravel
sandy clay
sandy clay with gravel
clay
missing

Figure 14.

Appendices

Appendix A: Depth Concentration Data Tables

Table A.1: Depth Concentration Data for Boring MRS6

ID		Elevation (ft msl)	Soil Conc. TCE (ug/g)	Soil Conc. PCE (ug/g)
MRS-6	00	365	0.00E+00	5.35E-01
MRS-6	01	359	1.96E-02	7.05E+00
MRS-6	02	355	0.00E+00	2.73E+00
MRS-6	03	354	0.00E+00	1.50E+00
MRS-6	04	353	0.00E+00	5.02E+00
MRS-6	05	352	0.00E+00	3.55E+00
MRS-6	06	351	0.00E+00	1.40E+00
MRS-6	07	350	1.68E-02	5.92E+00
MRS-6	08	349	0.00E+00	4.85E-01
MRS-6	09	348	2.53E-02	6.56E-01
MRS-6	10	347	3.18E-02	8.20E-02
MRS-6	11	346	5.35E-01	1.43E+00
MRS-6	12	345	9.27E-01	1.88E+00
MRS-6	13	344	4.00E+00	5.46E+00
MRS-6	14	342	1.80E+00	1.87E+00
MRS-6	15	339	2.24E+00	2.34E+00
MRS-6	16	333	4.76E+00	4.49E+00
MRS-6	17	331	4.82E-01	5.23E-01
MRS-6	18	329	2.05E+00	2.90E+00
MRS-6	19	321	1.61E+00	4.66E+00
MRS-6	20	319	6.86E-01	1.93E+00
MRS-6	21	313	2.67E-02	5.77E-01
MRS-6	22	309	2.13E-01	3.40E-04
MRS-6	23	300	3.35E-02	9.35E-02
MRS-6	24	298	2.97E-02	1.21E-01
MRS-6	25	289	4.27E-02	1.54E-01
MRS-6	26	282	9.28E-02	5.48E-02
MRS-6	27	281	3.41E-01	2.03E-01
MRS-6	28	279	5.36E-02	1.09E-01
MRS-6	29	271	9.01E-03	1.18E-02
MRS-6	30	263	1.24E-01	1.17E-01
MRS-6	31	259	3.42E-03	3.07E-04
MRS-6	32	253	6.84E-01	0.00E+00
MRS-6	33	249	1.07E-02	1.02E-03
MRS-6	34	242	4.81E-02	2.14E-03
MRS-6	35	239	3.04E-03	1.16E-03
MRS-6	36	233	1.23E-01	1.64E+00
MRS-6	37	232	7.29E-02	1.84E-01
MRS-6	38	231	1.48E+00	3.66E+00
MRS-6	39	230	1.07E+00	1.81E+00
MRS-6	40	223	4.62E-02	6.56E-02
MRS-6	41	222	3.40E-02	4.68E-02
MRS-6	42	221	1.10E-01	1.44E-01

Table A.2: Depth Concentration Data for Boring MRS6A

ID		Elevation (ft msl)	Soil Conc. TCE (ug/g)	Soil Conc. PCE (ug/g)
MRS-6A	01	365	2.34E+01	1.35E+03
MRS-6A	02	360	7.47E+01	1.12E+03
MRS-6A	03	355	3.52E+01	6.35E+02
MRS-6A	04	350	8.83E+01	1.55E+03
MRS-6A	05	345	1.65E+01	1.21E+03
MRS-6A	06	340	7.24E+01	1.77E+03
MRS-6A	07	335	1.43E+02	3.60E+03
MRS-6A	08	330	5.91E+01	2.41E+03
MRS-6A	09	325	8.85E+00	5.39E+02
MRS-6A	10	320	2.32E+00	6.16E+02
MRS-6A	11	315	4.15E+00	4.92E+02
MRS-6A	12	310	7.02E+01	3.95E+03
MRS-6A	13	305	4.41E+00	7.06E+02
MRS-6A	14	301	1.91E-01	5.71E+00
MRS-6A	15	295	4.99E-02	5.86E+00
MRS-6A	16	290	6.24E-02	5.33E-02
MRS-6A	17	286	1.59E-02	1.00E-02
MRS-6A	18	280	6.57E-02	3.00E+00
MRS-6A	19	276	2.19E+00	1.92E+01
MRS-6A	20	270	3.68E-02	2.14E-01
MRS-6A	21	265	7.24E-01	1.53E-01
MRS-6A	22	262	4.39E-01	1.45E-01
MRS-6A	23	254	1.10E-01	4.06E-02
MRS-6A	24	250	1.36E-02	1.26E-02
MRS-6A	25	245	7.35E-02	3.05E-02
MRS-6A	26	240	4.42E-02	1.56E-01
MRS-6A	27	236	5.12E-01	4.74E-01
MRS-6A	28	234	1.11E+00	1.11E+00
MRS-6A	29	230	5.70E-01	6.07E-01
MRS-6A	30	229	2.55E-01	2.75E-01
MRS-6A	31	227	7.67E-02	7.82E-02
MRS-6A	32	225	1.05E-01	8.62E-02
MRS-6A	33	223	9.79E-02	1.62E-01
MRS-6A	34	221	1.25E-01	1.45E-01
MRS-6A	35	219	8.57E-02	8.38E-02
MRS-6A	36	217	1.32E-01	1.52E-01
MRS-6A	37	215	1.18E-01	1.37E-01
MRS-6A	38	213	5.07E-01	6.45E-01
MRS-6A	39	211	3.69E-01	4.06E-01
MRS-6A	40	209	4.05E-01	3.60E-01
MRS-6A	41	207	3.25E+00	7.04E+00
MRS-6A	42	205	2.95E+00	4.32E+00

Table A.3: Depth Concentration Data for Boring MRS8

ID		Elevation (ft msl)	Soil Conc. TCE (ug/g)	Soil Conc. PCE (ug/g)
MRS-08	00	354	0.00E+00	3.80E-04
MRS-08	01	349	0.00E+00	1.56E-04
MRS-08	02	344	0.00E+00	1.70E-04
MRS-08	03	342	0.00E+00	2.85E-04
MRS-08	04	339	0.00E+00	1.11E-03
MRS-08	05	334	0.00E+00	1.52E-04
MRS-08	06	332	0.00E+00	6.90E-04
MRS-08	07	329	0.00E+00	1.78E-04
MRS-08	08	324	0.00E+00	6.74E-04
MRS-08	09	319	0.00E+00	3.88E-03
MRS-08	10	314	6.42E-04	3.88E-02
MRS-08	11	313	4.76E-04	5.01E-02
MRS-08	12	309	0.00E+00	3.21E-04
MRS-08	13	304	0.00E+00	3.63E-04
MRS-08	14	301	3.18E-03	2.79E-02
MRS-08	15	299	3.47E-02	1.58E-01
MRS-08	16	294	1.95E-03	3.43E-03
MRS-08	17	289	0.00E+00	1.35E-04
MRS-08	18	287	0.00E+00	2.49E-04
MRS-08	19	282	0.00E+00	2.96E-04
MRS-08	20	279	0.00E+00	2.56E-04
MRS-08	21	274	3.59E-04	5.48E-04
MRS-08	22	271	5.55E-04	4.98E-04
MRS-08	23	269	0.00E+00	2.66E-04
MRS-08	24	264	6.76E+00	8.49E+01
MRS-08	25	259	6.95E-01	4.37E-01
MRS-08	26	254	2.78E+01	3.09E+02
MRS-08	27	249	5.18E-01	4.81E+00
MRS-08	28	244	6.29E-02	4.77E-01
MRS-08	29	239	3.04E+01	3.05E+02
MRS-08	30	238	8.59E-04	1.47E-02
MRS-08	31	237	2.73E-03	4.72E-02
MRS-08	32	236	8.40E-04	5.05E-02
MRS-08	33	235	2.76E-04	1.26E-02
MRS-08	34	234	7.10E-04	5.35E-03
MRS-08	35	233	4.92E-02	2.36E-01
MRS-08	36	232	1.33E+00	3.95E+00
MRS-08	37	231	1.26E+00	4.89E+00
MRS-08	38	230	3.76E-01	1.89E+00
MRS-08	39	229	5.37E-01	3.14E+00
MRS-08	40	228	1.66E-01	8.47E-01

ID		Elevation (ft msl)	Soil Conc. TCE (ug/g)	Soil Conc. PCE (ug/g)
MRS-08	41	227	1.79E-01	6.79E-01
MRS-08	42	226	3.35E-01	1.16E+00
MRS-08	43	225	2.51E-01	1.45E+00
MRS-08	44	224	2.17E-01	1.22E+00
MRS-08	45	223	6.26E-02	5.81E-01
MRS-08	46	223	1.34E-01	1.09E+00
MRS-08	47	222	1.01E+00	1.08E+01
MRS-08	48	221	1.79E+00	1.60E+01
MRS-08	49	220	8.32E+00	1.61E+01
MRS-08	50	219	3.60E+01	1.31E+01
MRS-08	51	218	5.05E+01	9.48E+00
MRS-08	52	217	2.54E+01	9.44E+00
MRS-08	53	216	1.73E+00	5.38E+00
MRS-08	54	215	2.94E+00	9.36E+00
MRS-08	55	214	2.03E+00	5.51E+00
MRS-08	56	213	2.37E+00	2.91E+00
MRS-08	57	212	9.17E-02	4.41E-01
MRS-08	58	211	6.16E-01	2.67E+00
MRS-08	59	210	2.74E-01	4.23E+00
MRS-08	60	209	8.08E-01	6.33E+00
MRS-08	61	208	5.52E-01	1.30E+00
MRS-08	62	203	2.61E+00	9.18E+00
MRS-08	63	202	2.45E+00	8.98E+00
MRS-08	64	201	1.61E+00	5.61E+00
MRS-08	65	201	1.69E+00	3.91E+00
MRS-08	66	199	3.39E+00	7.08E+00
MRS-08	67	198	3.24E+00	7.78E+00
MRS-08	68	197	1.22E+00	1.35E+00
MRS-08	69	196	1.01E+00	8.21E-01
MRS-08	70	195	1.31E+00	1.58E+00
MRS-08	71	194	1.06E+00	1.56E+00

Table A.4: Depth Concentration Data for Boring MRS9

ID		Elevation (ft msl)	Soil Conc.	
			TCE (ug/g)	PCE (ug/g)
MRS-09	00	356	5.00E-04	2.27E-03
MRS-09	01	351	5.00E-04	5.00E-04
MRS-09	02	341	5.00E-04	5.00E-04
MRS-09	03	331	5.00E-04	5.00E-04
MRS-09	04	324	5.00E-04	5.00E-04
MRS-09	05	321	5.00E-04	5.00E-04
MRS-09	06	311	3.67E-03	1.08E-03
MRS-09	07	301	5.00E-04	5.00E-04
MRS-09	08	291	5.00E-04	5.00E-04
MRS-09	09	281	5.00E-04	5.00E-04
MRS-09	10	271	5.00E-04	5.00E-04
MRS-09	11	261	5.00E-04	1.98E-03
MRS-09	12	251	5.00E-04	5.00E-04
MRS-09	13	231	1.88E-03	1.43E-03
MRS-09	14	225	5.00E-04	5.00E-04
MRS-09	15	221	1.09E-02	1.92E-02
MRS-09	16	216	1.35E-02	3.71E-02
MRS-09	17	211	5.21E-01	1.30E+00
MRS-09	18	206	1.00E-01	7.00E-02
MRS-09	19	204	2.14E-01	1.42E-01
MRS-09	20	201	1.65E-01	2.00E-01
MRS-09	21	196	6.51E-02	2.73E-02
MRS-09	22	191	6.26E-02	5.85E-02
MRS-09	23	186	2.31E-01	2.46E-01
MRS-09	24	181	3.95E-02	1.24E-02
MRS-09	25	176	2.35E-02	5.18E-03
MRS-09	26	171	6.83E-01	5.67E-01
MRS-09	27	166	1.60E-01	1.13E-01
MRS-09	28	161	4.73E-01	3.70E-01
MRS-09	29	156	7.91E-02	4.78E-02
MRS-09	30	151	6.66E-02	3.08E-02
MRS-09	31	146	2.01E-03	5.00E-04
MRS-09	32	144	1.81E-02	1.15E-02
MRS-09	33	141	5.21E-01	3.54E-01
MRS-09	34	136	4.99E-02	1.97E-02

Table A.5: Depth Concentration Data for Boring MRS10

ID		Elevation (ft msl)	Soil Conc. TCE (ug/g)	Soil Conc. PCE (ug/g)
MRS-10	00	359	0.00E+00	3.08E-04
MRS-10	01	354	0.00E+00	2.96E-04
MRS-10	02	349	0.00E+00	4.72E-04
MRS-10	03	344	0.00E+00	2.89E-04
MRS-10	04	334	0.00E+00	1.24E-03
MRS-10	05	324	0.00E+00	1.69E-03
MRS-10	06	311	0.00E+00	1.67E-03
MRS-10	07	297	0.00E+00	4.21E-04
MRS-10	08	294	0.00E+00	2.82E-04
MRS-10	09	284	0.00E+00	2.91E-04
MRS-10	10	280	2.15E-03	1.24E-03
MRS-10	11	274	0.00E+00	3.23E-04
MRS-10	12	264	8.84E-04	5.63E-04
MRS-10	13	254	1.36E-02	1.09E-02
MRS-10	14	246	4.46E-02	9.20E-02
MRS-10	15	244	3.78E-02	8.41E-02
MRS-10	16	234	1.63E-02	1.65E-02
MRS-10	17	229	2.77E-02	4.09E-02
MRS-10	18	224	5.55E-02	7.09E-02
MRS-10	19	219	6.71E-03	7.38E-03
MRS-10	20	214	1.45E-01	2.55E-01
MRS-10	21	212	4.14E-02	8.70E-02
MRS-10	22	211	1.23E-01	2.19E-01
MRS-10	23	209	1.02E+01	1.18E-01
MRS-10	24	204	3.40E+00	3.27E-02
MRS-10	25	202	2.31E-01	5.70E-04
MRS-10	26	199	1.55E-01	2.65E-01
MRS-10	27	194	1.12E-01	1.24E-01
MRS-10	28	189	2.69E-03	2.84E-03
MRS-10	29	184	1.79E-02	2.60E-02
MRS-10	30	179	1.80E-03	5.61E-04
MRS-10	31	174	1.52E-02	6.96E-03
MRS-10	32	169	5.37E-03	1.35E-03
MRS-10	33	164	4.64E-01	4.22E-01
MRS-10	34	159	2.74E-01	1.70E-01
MRS-10	35	154	3.58E-02	1.74E-02
MRS-10	36	149	1.97E-02	7.17E-03
MRS-10	37	148	2.64E-01	1.37E-01
MRS-10	38	144	2.50E-02	4.31E-03
MRS-10	39	139	8.34E-02	1.37E-02
MRS-10	40	134	4.83E-01	4.47E-01
MRS-10	41	133	7.99E-01	7.34E-01
MRS-10	42	129	1.46E+00	1.21E+00

Table A.6: Depth Concentration Data for Boring MRS11

ID		Elevation (ft msl)	Soil Conc. TCE (ug/g)	Soil Conc. PCE (ug/g)
MRS-11	00	336	0.00E+00	1.51E-04
MRS-11	01	331	0.00E+00	1.55E-04
MRS-11	02	321	0.00E+00	2.12E-04
MRS-11	03	311	0.00E+00	0.00E+00
MRS-11	04	301	0.00E+00	1.35E-03
MRS-11	05	293	0.00E+00	1.05E-01
MRS-11	06	281	0.00E+00	2.45E-04
MRS-11	07	271	1.39E-01	2.40E-01
MRS-11	08	261	2.89E-01	2.17E-01
MRS-11	09	253	3.91E-02	4.12E-02
MRS-11	10	251	5.70E-01	3.53E-01
MRS-11	11	243	1.94E-02	1.01E-01
MRS-11	12	231	4.66E-01	1.15E+00
MRS-11	13	221	1.36E-02	1.26E-02
MRS-11	14	216	2.51E-01	2.07E-01
MRS-11	15	211	5.38E+00	1.03E+00
MRS-11	16	207	1.76E-01	1.36E-02
MRS-11	17	206	5.19E-01	2.79E-02
MRS-11	18	201	1.10E+00	8.11E-02
MRS-11	19	196	2.80E+00	2.58E-01
MRS-11	20	191	1.35E+00	2.82E-01
MRS-11	21	186	1.47E+00	2.26E-01
MRS-11	22	181	7.67E-01	1.37E-01
MRS-11	23	176	5.19E-01	7.23E-02
MRS-11	24	171	2.04E-02	6.29E-03
MRS-11	25	166	2.02E-01	5.49E-02
MRS-11	26	161	5.23E-02	9.47E-03
MRS-11	27	158	5.17E-03	8.75E-04
MRS-11	28	153	1.23E-02	3.51E-03
MRS-11	29	151	7.28E-02	4.69E-02
MRS-11	30	146	3.34E-02	1.53E-02
MRS-11	31	142	1.35E-02	1.17E-02
MRS-11	32	141	3.85E-02	4.00E-02
MRS-11	33	140	7.81E-03	2.05E-02
MRS-11	34	139	1.62E-03	1.40E-03
MRS-11	35	136	0.00E+00	0.00E+00

Table A.7: Depth Concentration Data for Boring MRS12

ID		Elevation (ft msl)	Soil Conc. TCE (ug/g)	Soil Conc. PCE (ug/g)
MRS-12	00	367	0.00E+00	1.11E-04
MRS-12	01	361	0.00E+00	1.19E-04
MRS-12	02	356	0.00E+00	0.00E+00
MRS-12	03	351	0.00E+00	8.45E-05
MRS-12	04	346	0.00E+00	0.00E+00
MRS-12	05	341	0.00E+00	8.40E-05
MRS-12	06	336	0.00E+00	8.98E-05
MRS-12	07	332	0.00E+00	3.74E-04
MRS-12	08	328	0.00E+00	3.31E-04
MRS-12	09	324	0.00E+00	9.68E-05
MRS-12	10	322	0.00E+00	9.63E-05
MRS-12	11	319	0.00E+00	0.00E+00
MRS-12	12	315	0.00E+00	1.22E-04
MRS-12	13	311	0.00E+00	8.93E-05
MRS-12	14	308	0.00E+00	1.14E-04
MRS-12	15	306	0.00E+00	1.61E-04
MRS-12	16	302	0.00E+00	1.43E-04
MRS-12	17	299	0.00E+00	8.89E-05
MRS-12	18	283	0.00E+00	1.50E-04
MRS-12	19	281	0.00E+00	1.44E-04
MRS-12	20	274	0.00E+00	4.73E-04
MRS-12	21	272	0.00E+00	2.24E-04
MRS-12	22	271	8.62E-04	3.62E-03
MRS-12	23	268	0.00E+00	3.29E-04
MRS-12	24	245	0.00E+00	1.60E-04
MRS-12	25	244	0.00E+00	1.43E-04
MRS-12	26	241	0.00E+00	1.24E-04
MRS-12	27	238	0.00E+00	2.67E-04
MRS-12	28	234	6.01E-03	1.42E-01
MRS-12	29	233	8.63E-03	4.95E-01
MRS-12	30	232	1.23E-02	1.02E-02
MRS-12	31	231	9.08E-01	1.20E+01
MRS-12	32	230	5.24E+00	7.64E+02
MRS-12	33	229	1.93E+00	1.85E+01
MRS-12	34	228	1.59E+00	7.61E+00
MRS-12	35	225	1.13E-01	3.29E+00
MRS-12	36	224	7.06E-01	5.19E+00
MRS-12	37	223	9.55E-01	1.44E+00
MRS-12	38	222	9.76E-02	1.64E+00
MRS-12	39	214	6.65E-04	4.86E-03
MRS-12	40	212	8.54E-04	4.13E-03
MRS-12	41	210	7.55E-03	1.73E-02
MRS-12	42	208	2.72E-01	2.85E-02
MRS-12	43	207	7.63E-01	5.47E-02
MRS-12	44	204	1.82E-02	2.06E-03
MRS-12	45	203	1.26E-02	1.29E-03
MRS-12	46	202	2.41E-03	4.61E-04

ID		Elevation (ft msl)	Soil Conc. TCE (ug/g)	Soil Conc. PCE (ug/g)
MRS-12	47	201	2.92E-02	3.16E-03
MRS-12	48	196	2.40E-03	3.49E-04
MRS-12	49	194	1.52E-02	3.70E-02
MRS-12	50	192	2.96E-02	5.58E-02
MRS-12	51	189	2.01E-01	3.02E-01
MRS-12	52	181	8.51E-01	9.31E-01
MRS-12	53	177	1.39E+00	1.27E+00
MRS-12	54	171	1.77E+00	1.60E+00
MRS-12	55	166	9.09E-01	3.93E-01
MRS-12	56	164	1.75E-01	2.04E-01
MRS-12	57	162	3.90E+00	1.64E+00
MRS-12	58	160	0.00E+00	0.00E+00
MRS-12	59	155	1.98E-01	1.12E-01
MRS-12	60	153	9.39E-01	3.98E-01
MRS-12	61	151	1.12E+00	4.56E-01
MRS-12	62	149	1.10E+00	3.16E-01
MRS-12	63	147	4.69E+00	1.85E+00
MRS-12	64	144	7.67E-01	4.51E-02
MRS-12	65	142	8.98E-01	2.45E-02
MRS-12	66	140	1.09E+00	6.51E-02
MRS-12	67	138	8.23E-01	2.83E-02
MRS-12	68	136	1.36E-02	3.31E-04
MRS-12	69	134	1.65E-03	3.03E-04
MRS-12	70	132	5.61E-04	1.54E-04
MRS-12	71	130	0.00E+00	1.45E-04
MRS-12	72	128	0.00E+00	1.59E-04
MRS-12	73	126	0.00E+00	1.29E-04

Table A.8: Depth Concentration Data for Boring MRS13

ID		Elevation (ft msl)	Soil Conc. TCE (ug/g)	Soil Conc. PCE (ug/g)
MRS-13	00	344	0.00E+00	7.27E-04
MRS-13	01	334	0.00E+00	3.17E-04
MRS-13	02	324	0.00E+00	1.91E-04
MRS-13	03	314	0.00E+00	2.17E-04
MRS-13	04	304	0.00E+00	1.53E-04
MRS-13	05	294	0.00E+00	2.09E-04
MRS-13	06	284	0.00E+00	2.85E-04
MRS-13	07	274	0.00E+00	1.92E-04
MRS-13	08	264	0.00E+00	1.67E-04
MRS-13	09	261	0.00E+00	1.89E-04
MRS-13	10	254	0.00E+00	1.02E-04
MRS-13	11	251	0.00E+00	1.85E-04
MRS-13	12	244	0.00E+00	1.94E-04
MRS-13	13	237	0.00E+00	2.85E-04
MRS-13	14	224	0.00E+00	1.17E-03
MRS-13	15	219	0.00E+00	5.62E-04
MRS-13	16	214	4.96E-03	6.64E-02
MRS-13	17	210	8.81E-01	4.75E+00
MRS-13	18	206	9.20E-03	6.81E-02
MRS-13	19	205	3.52E-01	1.14E+00
MRS-13	20	204	2.60E+00	4.91E+00
MRS-13	21	202	2.11E+00	8.23E+00
MRS-13	22	202	1.13E+00	4.72E+00
MRS-13	23	200	5.75E+00	1.60E+01
MRS-13	24	198	6.87E+00	1.65E+01
MRS-13	25	197	2.59E+00	6.83E+00
MRS-13	26	195	5.39E+00	2.26E+01
MRS-13	27	194	1.68E+00	6.46E+00
MRS-13	28	191	2.53E+00	7.50E+00
MRS-13	29	187	1.79E-02	4.13E-02
MRS-13	30	184	3.50E-02	4.71E-02
MRS-13	31	179	4.17E-04	4.81E-04
MRS-13	32	174	7.87E-04	3.49E-04
MRS-13	33	172	0.00E+00	2.76E-04
MRS-13	34	169	3.95E-04	3.26E-04
MRS-13	35	164	1.77E-01	3.61E-02
MRS-13	36	162	5.20E-02	7.86E-04
MRS-13	37	160	7.04E-04	3.31E-04
MRS-13	38	155	1.25E-03	5.53E-04
MRS-13	39	153	4.13E-03	6.63E-04
MRS-13	40	151	1.73E-01	3.19E-04
MRS-13	41	149	2.38E-03	3.64E-04
MRS-13	42	145	5.03E-04	3.34E-04
MRS-13	43	143	1.61E-03	2.32E-04
MRS-13	44	141	0.00E+00	3.45E-04
MRS-13	45	139	0.00E+00	3.31E-04
MRS-13	46	135	1.97E-03	3.54E-04
MRS-13	47	133	3.25E-03	3.34E-04
MRS-13	48	132	1.08E-03	3.20E-04

Table A.9: Depth Concentration Data for Boring MRS14

ID		Elevation (ft msl)	Soil Conc. TCE (ug/g)	Soil Conc. PCE (ug/g)
MRS-14	00	344	0.00E+00	2.36E-03
MRS-14	01	342	0.00E+00	3.25E-04
MRS-14	02	340	0.00E+00	7.56E-04
MRS-14	03	339	0.00E+00	3.56E-03
MRS-14	04	337	0.00E+00	2.68E-03
MRS-14	05	334	0.00E+00	8.05E-03
MRS-14	06	329	0.00E+00	4.84E-03
MRS-14	07	326	0.00E+00	0.00E+00
MRS-14	08	322	0.00E+00	1.19E-03
MRS-14	09	311	0.00E+00	0.00E+00
MRS-14	10	304	0.00E+00	0.00E+00
MRS-14	11	299	0.00E+00	4.32E-04
MRS-14	12	295	0.00E+00	2.55E-04
MRS-14	13	289	0.00E+00	2.74E-04
MRS-14	14	285	0.00E+00	3.41E-04
MRS-14	15	281	0.00E+00	0.00E+00
MRS-14	16	269	0.00E+00	1.58E-04
MRS-14	17	266	0.00E+00	3.28E-04
MRS-14	18	259	0.00E+00	2.16E-04
MRS-14	19	256	0.00E+00	1.52E-04
MRS-14	20	254	0.00E+00	2.73E-04
MRS-14	21	249	0.00E+00	3.57E-03
MRS-14	22	244	0.00E+00	1.48E-04
MRS-14	23	243	1.54E-03	4.09E-03
MRS-14	24	242	0.00E+00	3.22E-04
MRS-14	25	239	3.05E-03	3.05E-02
MRS-14	26	234	0.00E+00	2.63E-04
MRS-14	27	230	6.17E-02	6.28E-01
MRS-14	28	221	8.40E-01	2.93E+00
MRS-14	29	219	2.18E+00	6.04E+00
MRS-14	30	217	1.60E+00	4.95E+00
MRS-14	31	214	1.57E+00	3.81E+00
MRS-14	32	209	2.43E-01	4.02E-01
MRS-14	33	208	5.41E-01	6.34E-01
MRS-14	34	207	4.20E-01	1.56E-01
MRS-14	35	204	8.57E-01	1.06E+00
MRS-14	36	199	1.28E+00	1.23E+00
MRS-14	37	197	1.07E-01	9.34E-02
MRS-14	38	196	8.99E-02	6.30E-02
MRS-14	39	189	7.54E-02	5.45E-02
MRS-14	40	184	1.62E-02	4.60E-03
MRS-14	41	169	5.26E-02	2.33E-02
MRS-14	42	164	2.96E-03	6.65E-03
MRS-14	43	159	1.27E-03	2.20E-03
MRS-14	44	157	4.11E-03	1.74E-03
MRS-14	45	155	0.00E+00	2.21E-04
MRS-14	46	153	3.76E-04	2.03E-04
MRS-14	47	151	2.38E-03	4.03E-04
MRS-14	48	149	1.51E-03	3.28E-04
MRS-14	49	147	0.00E+00	1.53E-04
MRS-14	50	145	0.00E+00	1.17E-04
MRS-14	51	143	0.00E+00	1.27E-04

Table A.10: Depth Concentration Data for Boring MRS15

ID		Elevation (ft msl)	Soil Conc. TCE (ug/g)	Soil Conc. PCE (ug/g)
MRS-15	00	350	0.00E+00	1.61E-04
MRS-15	01	340	0.00E+00	1.39E-04
MRS-15	02	330	0.00E+00	1.37E-04
MRS-15	03	320	0.00E+00	1.04E-04
MRS-15	04	310	0.00E+00	8.46E-05
MRS-15	05	302	0.00E+00	1.36E-04
MRS-15	06	293	0.00E+00	1.42E-04
MRS-15	07	283	0.00E+00	1.25E-04
MRS-15	08	273	0.00E+00	1.07E-04
MRS-15	09	265	0.00E+00	6.76E-05
MRS-15	10	260	0.00E+00	1.20E-04
MRS-15	11	250	0.00E+00	1.95E-04
MRS-15	12	238	0.00E+00	1.39E-04
MRS-15	13	234	0.00E+00	8.56E-05
MRS-15	14	232	0.00E+00	1.08E-04
MRS-15	15	231	0.00E+00	1.23E-04
MRS-15	16	228	0.00E+00	1.27E-04
MRS-15	17	225	5.37E-04	6.96E-03
MRS-15	18	224	2.18E-02	1.36E-01
MRS-15	19	224	5.78E-01	3.59E+00
MRS-15	20	223	1.03E+00	5.14E+00
MRS-15	21	215	1.02E-03	4.05E-02
MRS-15	22	214	9.10E-03	1.61E-01
MRS-15	23	213	1.09E+00	2.54E+00
MRS-15	24	212	1.35E+00	2.76E+00
MRS-15	25	211	9.47E-01	1.92E+00
MRS-15	26	207	5.26E-01	2.53E+00
MRS-15	27	205	9.25E-01	2.58E+00
MRS-15	28	203	6.12E+00	2.04E+01
MRS-15	29	201	6.25E+00	2.09E+01
MRS-15	30	199	1.27E+00	2.23E+00

Table A.11: Depth Concentration Data for Boring MRS16

ID		Elevation (ft msl)	Soil Conc. TCE (ug/g)	Soil Conc. PCE (ug/g)
MRS-16	00	348	0.00E+00	2.53E-04
MRS-16	01	338	0.00E+00	2.00E-04
MRS-16	02	328	0.00E+00	2.05E-04
MRS-16	03	319	0.00E+00	2.04E-04
MRS-16	04	308	0.00E+00	2.48E-04
MRS-16	05	299	0.00E+00	2.15E-04
MRS-16	06	288	0.00E+00	2.05E-04
MRS-16	07	279	0.00E+00	1.69E-04
MRS-16	08	268	0.00E+00	1.82E-04
MRS-16	09	258	0.00E+00	1.83E-04
MRS-16	10	233	0.00E+00	3.23E-04
MRS-16	11	228	4.96E-03	6.17E-03
MRS-16	12	227	1.37E-03	1.24E-03
MRS-16	13	223	4.25E-01	7.63E-01
MRS-16	14	222	5.91E-01	9.00E-01
MRS-16	15	220	6.96E-01	6.80E-01
MRS-16	16	218	1.45E+00	1.30E+00
MRS-16	17	215	1.76E-02	2.84E-02
MRS-16	18	214	3.88E-01	4.16E-01
MRS-16	19	213	1.69E+00	3.33E+00
MRS-16	20	207	2.04E+00	7.40E+00
MRS-16	21	206	3.14E+00	1.03E+01
MRS-16	22	204	5.09E+00	1.44E+01
MRS-16	23	202	4.60E+00	1.06E+01
MRS-16	24	200	5.74E+00	8.68E+00
MRS-16	25	198	6.46E+00	4.12E+00
MRS-16	26	195	1.30E-01	1.96E-01
MRS-16	27	194	8.40E+00	9.65E+00
MRS-16	28	191	4.72E+00	4.87E+00
MRS-16	29	189	6.99E+00	5.14E+00

Table A.12: Depth Concentration Data for Boring MRS17

ID		Elevation (ft msl)	Soil Conc. TCE (ug/g)	Soil Conc. PCE (ug/g)
MRS-17	00	249	0.00E+00	1.14E-04
MRS-17	01	244	0.00E+00	1.54E-04
MRS-17	02	240	0.00E+00	1.49E-04
MRS-17	03	237	5.09E-04	4.78E-04
MRS-17	04	231	0.00E+00	3.83E-04
MRS-17	05	229	4.54E-04	3.78E-04
MRS-17	06	220	9.80E-03	8.67E-03
MRS-17	07	218	4.79E-01	3.09E-01
MRS-17	08	216	6.45E-01	4.19E-01
MRS-17	09	214	2.52E-01	1.22E-01
MRS-17	10	211	1.90E-02	1.40E-02
MRS-17	11	210	1.21E-01	6.07E-02
MRS-17	12	209	9.63E-02	6.25E-02
MRS-17	13	207	9.50E-02	1.08E-01
MRS-17	14	201	5.31E+00	1.57E+01
MRS-17	15	199	4.56E+00	1.32E+01
MRS-17	16	197	5.06E+00	1.32E+01
MRS-17	17	195	6.70E+00	1.52E+01
MRS-17	18	193	6.41E+00	1.24E+01

Table A.13: Depth Concentration Data for Boring MRS 18

ID		Elevation (ft msl)	Soil Conc. TCE (ug/g)	Soil Conc. PCE (ug/g)
MRS-18	00	342	0.00E+00	5.33E-04
MRS-18	01	332	0.00E+00	4.27E-04
MRS-18	02	322	0.00E+00	9.87E-04
MRS-18	03	312	0.00E+00	3.52E-04
MRS-18	04	302	0.00E+00	1.64E-04
MRS-18	05	292	0.00E+00	4.46E-04
MRS-18	06	288	0.00E+00	3.62E-04
MRS-18	07	282	0.00E+00	5.50E-04
MRS-18	08	272	0.00E+00	6.64E-04
MRS-18	09	270	0.00E+00	7.14E-04
MRS-18	10	262	0.00E+00	3.70E-04
MRS-18	11	252	0.00E+00	5.82E-04
MRS-18	12	250	3.37E-03	6.14E-03
MRS-18	13	242	5.55E-04	1.36E-03
MRS-18	14	237	6.08E-04	3.74E-03
MRS-18	15	236	8.99E-03	2.73E-02
MRS-18	16	232	0.00E+00	4.14E-03
MRS-18	17	230	0.00E+00	4.40E-03
MRS-18	18	228	0.00E+00	1.49E-03
MRS-18	19	227	5.61E-03	1.42E-01
MRS-18	20	226	2.87E-02	1.72E-01
MRS-18	21	223	1.79E+00	6.55E+00
MRS-18	22	222	3.18E+00	1.01E+01
MRS-18	23	220	1.33E+00	3.95E+00
MRS-18	24	218	2.38E+00	7.18E+00
MRS-18	25	216	2.68E+00	8.85E+00
MRS-18	26	213	3.91E-02	2.28E-01
MRS-18	27	211	5.07E-03	4.86E-02
MRS-18	28	209	3.86E-02	3.57E-01
MRS-18	29	207	6.51E-01	1.99E+00
MRS-18	30	206	6.69E-02	1.33E-01
MRS-18	31	205	1.67E-01	3.03E-01
MRS-18	32	203	2.22E-03	1.92E-02
MRS-18	33	201	3.72E-01	3.01E-01
MRS-18	34	199	2.09E-01	1.87E-01
MRS-18	35	197	2.54E-01	3.42E-01

Appendix B: Field Logs

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: A/M Vadose ZONE CAP		DATE: 11/10/97	SHEET: 1 OF 8
	REFERENCE DATUM	DRILLING CONTRACTOR: Alliance	
WELL NO.: MRS 6	SRP COORDINATES	DRILLER: Marty	
LOGGED BY: Jay Noonkester	COMPANY: USRC	DRILLING METHOD: rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
1	0–5		80%	Clayey, silty Sand, med, Mod sorted reddish yellow, 7.5YR 6/8, very thin gray lamina throughout, Firm Clay, light gray, hard. Sandy clay, 30% sand, red 2.5YR 4/8 hard with gray clay lamina.	
2	5–10		100	Clayey Sand Sand 80%-60%, yellowish red 5YR 4/6, very poorly sorted, many pebbles and occional cobble, angular, (Fill) Silty sandy clay, Clay 40-60%, poorly sorted reddish brn to light reddish brn., very hard, some Yellowish mottling occasional granules.	
3	5–20		100	Clayey sand, sand 85%-65% grading down to a very fine silty sand, red, 10R 4/8 to light red 10R 7/8, hard, grading to soft, mod sorted, mica present ~~already~~ 20ft to 25ft.	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: A/M Vadose Zone CAP		DATE: 11/10/97	SHEET: 2 OF 8
	REFERENCE DATUM	DRILLING CONTRACTOR: Alliance	
WELL NO.: MRS6	SRP COORDINATES	DRILLER: Marty Proctor	
LOGGED BY: Jay Noonkester	COMPANY: WSRC	DRILLING METHOD: Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
3	20–24		100	See above.	
4	25–34		50	Silty Sand, Sand 60-90%, Silt 10-30%, very fine sand, mod. sorted, much mica, light red 10R6/4 to light gray 10R 7/2, soft, some gray clay lamina (very thin).	
5	35–40		70	Sand 80-90% Fine, well sorted, mica present, red. sh. yellow 5YR 6/6. Sand med-Fine 75-80% mod sorted, Firm, red. sh. gray 10R 6/1, several light gray clay laminae.	

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FIELD GEOLOGIC LOG

PROJECT A/M Vadose Zone CAP		DATE 11/10/97	SHEET 3 OF 8
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 6.	SRP COORDINATES	DRILLER Marty Proctor	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	40			See above.	
	1				
5	42		70	Sand 75-80%, med-coarse, some pebbles hard, redd-st yellow to red with light gray clay laminae.	
	3				
	4				
	45			Sand 80-95%, fine-med, well sorted, some clayey laminae, many different colors yellows, pale yellow, purple, brn.	
	6				
6	7				
	8		50		
	9				
	50				
	1				
	2				
	3				
	4				
	55			Sand 80-90%, Fine-med, well sorted, pale red 2.5YR 6/2, red ~~sand~~ very thin ~~clay~~ sand laminae throughout.	
	6				
7	7		60		
	8				
	9				
	60			Sandy clay laminae grading down to a clayey sand, yellow purple at top, yellow at bottom.	

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FIELD GEOLOGIC LOG

PROJECT: A/M Vadose Zone CAP		DATE: 11/12/97	SHEET: 4 OF 8
	REFERENCE DATUM	DRILLING CONTRACTOR: Alliance	
WELL NO.: MRS6	SRP COORDINATES	DRILLER: Marty Proctor	
LOGGED BY: Jay Noonkester	COMPANY: WSRC	DRILLING METHOD: Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
7	60 – 65		60	See above.	
8	65 – 75		40	Sand, 93-95%, clay 5%±, med., well sorted, red 2.5YR 5/8 and reddish yellow 7.5YR 7/8.	
9	75 – 80		60	Sand, 94-98%, med-coarse, brownish yellow 10YR 6/8, well sorted, soft, subangular.	

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FIELD GEOLOGIC LOG

PROJECT A/M Vadose Zone CAP		DATE 11/12/97	SHEET 5 OF 8
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 6	SRP COORDINATES	DRILLER Marty Proctor	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
9	80		60	see above.	
	85			Sand, 80-85%, med-coarse, red 2.5YR 4/8, many very coarse and granules with occasional pebbles, poorly sorted, soft, subrounded-rounded.	
10	90		80	Clayey sand, med., 60-75% sand, clay 30+%, red 2.5YR 5/8 with some yellowish red sand interbedded, Th. in and Thick clay laminae, red, one clay lamina 3 in.	
				Sand coarse-very coarse, red 2.5YR 4/8, mod. sorted, soft, subangular.	
11	95		30	Sand, med.-coarse, 80-90%, brown, sl-yellow 10YR 6/8, poorly sorted, soft, many very coarse and granules.	
	100				

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FIELD GEOLOGIC LOG

PROJECT: A/M Vadose Zone CAP		DATE: 11/12/97	SHEET: 6 OF 8
	REFERENCE DATUM	DRILLING CONTRACTOR: Alliance	
WELL NO.: MRS 6	SRP COORDINATES	DRILLER: Marty Proctor	
LOGGED BY: Jay Noonkester	COMPANY: WSRC	DRILLING METHOD: Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
11	100		30		
	1				
	2				
	3				
	4				
	105			Sand, med., yellow (10YR 7/8, well sorted, subangular, soft, 3or4 light gray clay laminae (Thin).	
12	6		60		
	7				
	8				
	9				
	110				
	1				
	2				
	3				
	4				
	115			Sand, med-coarse, 80-90% qz, clay 10-20%, brownish yellow 10YR6/8, well sorted, soft, subangular, blosh-wack Thin sand laminae at 6.7'.	
13	6		50		
	7				
	8			Sand, med-fine, 70-80% qz, silt/clay 20-30% strong brn 7.5YR 5/8, very poorly sorted many coarse, very coarse and pebbles	
	9			Sand 80-90% med, with many pebbles, coarse sand, poorly sorted grading down to well sorted sand, pale brn. grading down to strong brn.	
	120				

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FIELD GEOLOGIC LOG

PROJECT: A/M Vadose Zone CAP		DATE: 11/12/97	SHEET: 7 OF 8
	REFERENCE DATUM:	DRILLING CONTRACTOR: Alliance	
WELL NO.: MRS 6	SRP COORDINATES:	DRILLER: Marty Proctor	
LOGGED BY: J Noonkester	COMPANY: WSRC	DRILLING METHOD: rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	120				
	1				
13	2		50		
	3				
	4				
	125			Sand, 80-85%, coarse - med., strong brn 7.5YR 6/8, mod sorted, occasional very coarse sand, two very thin light gray clay laminae, soft.	
	6				
	7				
	8				
	9				
14	130		80		
	1				
	2				
	3				
	4				
	135			Clayey, silty Sand, Sand 50-70%, Sand Fine-very Fine, yellow 10YR 7/8, poorly sorted, several light gray clay laminae, soft-firm.	
	6				
15	7		45		
	8				
	9				
	140				

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FIELD GEOLOGIC LOG

PROJECT: A/M Vadose Zone CAP		DATE: 11/12/97	SHEET: 8 OF 8
	REFERENCE DATUM:	DRILLING CONTRACTOR: Alliance	
WELL NO.: MRS 6	SRP COORDINATES:	DRILLER: Marty Proctor	
LOGGED BY: Jay Noonkester	COMPANY: WSRC	DRILLING METHOD: Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
15	140 1 2 3 4		45		
16	145 6 7 8 9 150 1 2 3 4		60	Sand, med., 80-85%, clay 15-20%, yellowish red, mod. sorted, soft, four clay laminae.	
17	155 6 7 8 9 160		0		

Second hole near -

Field Geologic Log

Project: A/M Vadose Zone CAP		Date: 11/22/97	Sheet: 1 of 9
Well Number: MVE 6A	Location: M-Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Marty Proctor	
Company: WSRC		Drilling Method: Rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	0		0	hand augered, no recovery.	
	1				
	2				
	3				
	4				
	5				
	6			Silty Sandy CLAY, Clay 40-60%, silt 20-30%, sand 10-20%, poorly sorted, red 2.5YR 4/8, hard.	
	7				
	8				
1	9		100		
	10				
	11				
	12				
	13				
	14				
	15			same as above	
	16				
	17				
2	18		100		
	19				
	20			Sandy clay, clay 30-70%, sand 30-50%, (cont.)	

OSR 30-23# (2-12-97)

Field Geologic Log

Project: A/M Vadose Zone CAP		Date: 11/22/97	Sheet: 2 of 9
Well Number: MVE 6A	Location: M-Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Marty Proctor	
Company: WSRC		Drilling Method: Rotosonic	

Frm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	20			red 2.5YR 4/8, hard-firm, mottled and white mottling, mica present.	
	1				
	2				
	3				
	4				
2	25		100	silty clay, red 2.5YR 5/8, much mica present bluish gray laminae throughout, laminae of same material,	
	6				
	7				
	8				
	9				
	30				
	1			Sandy silt, reddish brn. 2.5YR5/4, mod sorted, soft, mica present, sand v. fine.	
	2				
	3				
	4				
	35				
	6			silty sand, sand 20-85%, fine-medium with max v. fine and some coarse, poorly sorted, reddish brn. 2.5YR5/4 with some yellow at 39'-40' and 48'-44', soft.	
3	7		90		
	8				
	9				
	40				

OSR 30-278 (2-12-97)

Field Geologic Log

Project: A/M Vadose Zone CAP		Date: 11/22/97	Sheet 3 of 7
Well Number: MVE 6A	Location: M Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Marty Proctor	
Company: WSRC		Drilling Method: Rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
3	40–45		90	see above.	
4	45–48		90	Sand, coarse, 87-97%, light brn. 7.5YR6/4, wellsorted, soft.	
	48–54			Silty Sand, Sand 65-85%, sand increasing down, v. fine-fine, light brn. to light gray, mod. sorted, soft.	
5	55–58		85	Sand, coarse, 85-95% med-coarse with many v. coarse, reddish yellow 10YR6/6, mod sorted, subangular, soft.	
	58–60			Silty Sand, some clay present, Sand 50-65%, v. fine-fine, drk. gray 5YR4/1, poorly sorted.	
	60			next pg.	

Field Geologic Log

Project: A/M Vadose Zone CAP		Date: 11/22/97	Sheet: 4 of 9
Well Number: MVE 6A	Location: M-Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Marty Proctor	
Company: WSRC		Drilling Method: Rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
5	60–64		80	Clayey sand, sand 50-70%, v.fine-med., brownish yellow 10YR 6/8, very thin laminae (white) throughout of ~~sand~~ clayey sand.	
6	65–74		40	Sand, med-coarse, brownish yellow 10YR6/8, sand 95%, soft, ~~m~~ well sorted.	
7	75–80		90	Sand, 90-95%, med.-coarse, brownish yellow 10YR6/8, some v. coarse sand, mod sorted, soft.	

Field Geologic Log

Project: A/M Vadose Zone CAP		Date: 11/22/97	Sheet: 5 of 9
Well Number: MVE 6A	Location: M Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Marty Proctor	
Company: WSRC		Drilling Method: Rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
7	80–84		90	same as above except for color change, red 2.5YR 4/8.	
8	85–94		90	Sand 90-95%, v. coarse grading down to med., Strong brn. 7.5R 5/8, poorly sorted, many granules, soft, subrounded-subangular.	
	90–91			Sand 75-85%, silt 15-25%, fine-coarse with many v. coarse and granules, lt. red 2.5YR 3/6, poorly sorted, clayey sand 91' to 92'.	
	91–94			Clayey Sand, sand 50%, med., yellowish red 5YR 5/8, mod sorted, firm	
	95–100			Sand, 90-95%, med.-coarse, grading down to v. fine-fine, many v. coarse and granules, brownish yellow 10YR 6/8, poorly sorted, very thin black sand lamina at 96'.	

Field Geologic Log

Project: A/M Vadose Zone CAP		Date: 11/22/97	Sheet: 6 of 9
Well Number: MVE 6A	Location: M Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Marty Proctor	
Company: USRC		Drilling Method: Rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	100			see above.	
	1				
9	2		50		
	3				
	4				
	105				
	6			Sand, med. 85-95%, brownish yellow 10YR6/8, well sorted, several very thin white clay laminae.	
	7				
	8				
10	9		35		
	110				
	1				
	2				
	3				
	4				
	115				
	6			Sand coarse 80-90%, brownish yellow 10YR 6/8, poorly sorted, many v. coarse and granules, soft.	
	7				
	8				
	9				
	120				

Field Geologic Log

Project: A/M Vadose Zone CAP		Date: 11/22/97	Sheet: 7 of 9
Well Number: MVE 6A	Location: M Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Marty Proctor	
Company: WSRC		Drilling Method: Rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	120			see above.	
	1				
	2			Sand, med., 60-70%, silt/clay 20-40%, yellowish brn. 10YR 5/6, many v. coarse, granules and pebbles, poorly sorted	
	3				
	4				
	125				
	6			Sand, coarse, 90-95% yellowish brn 10YR 6/8, well sorted, soft, subangular – subrounded.	
	7				
	8			Sand, coarse, 85-90% dark yellowish brn. 10YR 4/6, poorly sorted, many v. coarse, granules, and pebbles mainly near top of run, soft.	
	9		90		
	130				
	1				
	2			Sand, grading down to a silty Sand, sand 85-90% Top down to 50% at bottom, sand grading down from med. to v. fine, yellowish brn. 10YR 5/8, mod. sorted, soft, one white sand lamina at 131.5' & v. thin	
	3				
	4				
	135				
	6			Sand, Fine-med, 75-85% brownish yellow 10YR 6/8, v. thin - thin clay laminae throughout, laminae are light gray and dark brn, some v. thin white sand laminae present.	
	7		100		
	8				
	9				
	140				

Field Geologic Log

Project	A/M Vadose Zone CAP	Date	11/22/97	Sheet	8 of 9
Well Number	MVE 6A	Location	M Area	Drilling Subcontractor	Alliance
Logs Prepared By	Jay Noonkester			Driller	Marty Proctor
Company	WSRC			Drilling Method	Rotosonic

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	140			see above.	
	1				
13	2		100		
	3				
	4			Sand, coarse grading down to muddy yellowish brn 10YR5/8, well sorted soft.	
	145				
	6			Sand, coarse, 85-95%, brownish yellow 10YR6/8, well sorted, soft, subangular.	
	7				
	8				
14	9		100		
	150				
	1				
	2				
	3				
	4			Silty Sand, v. fine, brownish yellow 10YR6/8, mica present	
	155			Sand, coarse, brownish yellow, granules, pebbles present.	
	6			Sand, coarse-med, 85-95%, brownish yellow 10YR6/8, with	
	7			some light gray clay laminae	
15	8		100		
	9				
	160				

Field Geologic Log

Project: A/M Vadose Zone CAP		Date: 11/22/97	Sheet: 9 of 9
Well Number: MVE 6A	Location: M Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Marty Rector	
Company: WSRC		Drilling Method: Rotoson	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	160				
	1		100		
15	2			dk. brn. sand above clay (thin).	
	3			Clay ~~yellowish brn 10YR~~ brownish yellow 10YR 6/8, within light gray clay laminae throughout, v. thin dk red sand laminae throughout	Green clay
	4				
	165			decreasing down, 5-10% sand in clay.	
	6				
	7				
	8				
	9				
	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

FIELD GEOLOGIC LOG

PROJECT: A/M Vadose Zone CAP (Near MSB3D)	REFERENCE DATUM	DATE: 11/14/97	SHEET: 1 OF 9
WELL NO.: MR58	SRP COORDINATES	DRILLING CONTRACTOR: Alliance	
LOGGED BY: Jay Noonkester	COMPANY: WSRC	DRILLER: Marty Proctor	
		DRILLING METHOD: Rotasonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
1	0–5		100	Clay 85-90% red 2.5YR 4/8, some sand and occasional pebbles, hard, poorly sorted.	
2	5–15		100	Clayey Silty sand, sand 40%-60% - silt 20-30%, clay 20-30%, sand med. - coarse, dark red 2.5R 3/6, hard, poorly sorted, subangular - subrounded, white clayey-silty mottling throughout, some very coarse sand.	
	15–17			Same as above.	
	17–20			Clay 95% silt 5%, reddish gray, 5YR 5/2, silty clay laminae, very thin, throughout, laminae are brownish yellow and dark red, mica flakes present, very hard.	

FIELD GEOLOGIC LOG

PROJECT: A/M Vadose Zone CAP	REFERENCE DATUM	DATE: 11/14/97	SHEET: 2 OF 9
WELL NO.: MRS 8	SRP COORDINATES	DRILLING CONTRACTOR: Alliance	
LOGGED BY: Jay Noonkester	COMPANY: WSRC	DRILLER: Marty Proctor	
		DRILLING METHOD: Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
3	20–34		100	See above ~~Sand~~ Silty Sand, sand 70%-85%, ~~poo~~ mod. sorted, sand fine-med, drk red 10R 3/6, soft-firm.	
4	25–39		70	Sand, med-coarse, 85%-95%, silt/clay 5-15%, mod sorted, soft, red 10R 5/8, subrounded-subangular.	
5	35–40		100	Sand 93-97%, coarse, yellow 10YR 7/8, with 2 different color zones of pale red 2.5YR 7/2 and red 2.5YR 5/8, well sorted, soft ~~Sand~~ Silty Sand, sand 50-70%, silt 30-50%, sand very fine-firm, banded colors of reddish gray 2.5YR 6/1 and red 2.5YR 4/6 (cont.)	

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FIELD GEOLOGIC LOG

PROJECT	REFERENCE DATUM	DATE	SHEET
A/M Vadose Zone CAP		11/14/97	3 OF 9

WELL NO.	SRP COORDINATES	DRILLING CONTRACTOR	DRILLER
MRS 8		Alliance	Marty Proctor

LOGGED BY	COMPANY	DRILLING METHOD
Jay Noonkester	WSRC	Rotosonic

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
5	40–45		100	banding is very thin, mod. sorted, firm.	
6	45–55		100	Sand, fine-very fine, 90-95%, silt 5-10%, well sorted, light reddish brn 2.5YR 6/4, soft, 3 gray clay very thin @ laminae.	
7	55–60		100	Silty Sand fining down to a Silty Clay then coarsing down to a very fine Silty Sand, mod sorted, reddish gray 2.5YR 5/1, 63'-65' yellow sand, firm to soft.	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: A/M Vadose Zone CAP		DATE: 11/14/97	SHEET: 4 OF 9
	REFERENCE DATUM:	DRILLING CONTRACTOR: Alliance	
WELL NO.: MRS 8	SRP COORDINATES:	DRILLER: Marty Proctor	
LOGGED BY: Jay Noonkester	COMPANY: WSRC	DRILLING METHOD: ROTOSONIC	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
7	60		100		
	61			Clayey Sand, Sand 65-75%, Clay 25-35%, poorly sorted, fine to med with many granules, firm, brownish yellow 10YR5/8.	
	62				
	63				
	64				
	65				
8	66		75	Sand 85-95%, silt 5-15%, brownish yellow 10YR5/8, Fine coursing down to med. coarse, firm to soft, well sorted.	
	67				
	68				
	69				
	70				
	71				
	72				
	73				
	74				
	75				
9	76		70	Sand 95-99%, Coarse, reddish yellow 7.5YR 6/8, well sorted, soft, subangular - subrounded.	
	77				
	78				
	79				
	80				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: A/M Vadose Zone CAP		DATE: 11/14/97	SHEET: 5 OF 9
	REFERENCE DATUM	DRILLING CONTRACTOR: Alliance	
WELL NO.: MRS 8	SRP COORDINATES	DRILLER: Marty Proctor	
LOGGED BY: Jay Noonkester	COMPANY: WSRC	DRILLING METHOD: Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	80			see above	
	1				
9	2		70		
	3				
	4				
	85			Sand - clayey Sand, med-coarse, reddish yellow 7.5YR, poorly sorted - To mod. sorted, many granules 86' to 87', clayey sand 85-87.5', firm to soft.	
	6				
	7				
	8				
	9				
10	90		50		
	1				
	2				
	3				
	4				
	95			Clayey Sand, Sand 60-75%, med, mod sorted, yellow 10YR 7/8, soft, some v. coarse sand, subangular.	
	6				
	7			Clay, yellow 10YR 7/8, with very thin sand laminae.	
	8				
	9			Sand, med-coarse, 80-85%, mod sorted, soft, yellow 10YR 7/8, subangular - subrounded.	
	100				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: A/M Vadose Zone CAP		DATE: 11/14/97	SHEET: 6 OF 9
	REFERENCE DATUM	DRILLING CONTRACTOR: Alliance	
WELL NO.: MRS 8	SRP COORDINATES	DRILLER: Marty Proctor	
LOGGED BY: Jay Noonkester	COMPANY: WSRC	DRILLING METHOD: Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	100		80	see above.	
	105		100	Sand 80-90%, med.-coarse, brownish yellow, 10YR 6/8, well sorted, soft, 2 ft. of this core is very dry, subangular-subrounded, one very thin clay lamina.	
	115		100	Sand, coarse with granulars, mod sorted, sand 93-97%, soft, reddish yellow, subangular. Sand, 80-90%, silt 10-20%, med-fine grading down to very fine-silt, well sorted, red 10R 4/6 changing at 120' to reddish yellow 7.5YR 6/8, soft, very dry between 122-124'.	
	120				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: A/M Vadose Zone CAP	REFERENCE DATUM	DATE: 11/15/97	SHEET: 2 OF 9
WELL NO.: MRS 8	SRP COORDINATES	DRILLING CONTRACTOR: Alliance	
LOGGED BY: Jay Noonkester	COMPANY: WSRC	DRILLER: Marty Proctor	
		DRILLING METHOD: Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
13	120		100	See above.	
	1				
	2				
	3				
	4				
	125			Sand coarse, 95%, yellowish brn, 10YR 5/8, well sorted, soft, subangular-subrounded, very thin white clay lamina at 127'.	
	6				
	7			Sand, 80-90%, silt 10-20%, very fine-med, Mod sorted, very fine grading down to mod at 131', 3 very thin white clay laminae at 131', soft, yellowish brn. 10YR 5/8.	
	8				
	9				
14	130		100		
	1				
	2			Sand, 85-95%, very fine-med, brownish-yellow 10YR 6/8, well sorted, very fine grading down to med sand, soft, subrounded.	
	3				
	4				
	135				
	6			Sand, 80-90%, silt 10-20%, very fine-med, yellowish brn. 10YR 5/8, med. sand at Top grading down to a very fine sand at 139, soft, 2 white clay laminae one .2 in thick, subrounded.	
	7		100		
15	8				
	9				
	140			Clayey sand grading down to sandy Clay, from 139' to 142', interbedded layering throughout, alternating yellowish brn, cont.	No green clays?

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT A/M Vadose Zone CAP		DATE 4/15/97	SHEET 8 OF 9
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 8	SRP COORDINATES	DRILLER Marty Proctor	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	140			at 142' dk reddish brn Sand laminae, very Thin,	
15	1				
~~15~~	142		100	Sand, coarse-Fine 85-95%, gallonial brn 10YR 5/8, poorly sorted, coarse grad.-s To Fine grading To coarse with very coarse and granules present, soft, subangular-subrounded.	
	3				
	4				
	145			Sand coarse grading down to Fine-very Fine, 90-98%, well sorted-mod sorted, brownish yellow, 10YR 6/8, subangular-subrounded, soft, occasional v. coarse and granules	
	6				
	7				
16	8		60		
	9				
	150				
	1				
	2				
	3				
	4				
	155			Clay, 95%, lt LT gray 5YR 7/1, with very thin sand and silt laminae, sand laminae is dk reddish brn silt lamina is reddish yellow Clay % decreases down at ~~@~~ 157.5 changes To a Clayey sand with Thin clay laminae, Sand very fine, soft, mod sorted.	
	6				
	7				
	8				
	9				
	160				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: A/M Vadose Zone CAP	REFERENCE DATUM	DATE	SHEET 9 OF 9
WELL NO.: MRS 8	SRP COORDINATES	DRILLING CONTRACTOR: Alliance	
LOGGED BY: J. Noonkester	COMPANY: WSRC	DRILLER: Marty Proctor	
		DRILLING METHOD: Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	160			Sand 85-90%, very fine, silt 10-15%,	
	1			reddish yellow 7.5YR 7/8, mod sorted	
	2			soft, clay lamina (thin) throughout,	
	3				
	4				
	165			end of hole,	
	6				
	7				
	8				
	9				
	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT A/m- Area Vadose and Groundwater Zones Characterization	REFERENCE DATUM	DATE 8/26/97	SHEET 1 OF 12
WELL NO. MRS 9	SRP COORDINATES	DRILLING CONTRACTOR Alliance	
LOGGED BY J. Noonkester	COMPANY WSRC	DRILLER Ben Grim	DRILLING METHOD Rotosonic

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
1	0–6		80%	Sand, med fine 75% clay 15%, silt 10% dark yellow brn (10YR 3/6) mod sorted, firm Sand, Med 95% clay <5%, ~~Olive brn~~ ~~(5Y 3/2)~~ Very dark Grey brn (2.5Y 3/2) very well sorted, subangular, soft Clayey sand 70% sand 20% clay 10% silt, dark red (2.5YR 3/6) ~~mod~~ sorted Sand, fine – very fine moist ~~to~~ firm	
2	6–16		90%	Sandy Clayey Silt, ~~red~~ (2.5YR 4/4) reddish brown, poorly sorted, med to fine sand. Sand 40% clay 25%, silt 35%, hard, moist-dry ~~PE~~ core temp 134°	
3	16–20		40%	Same as above Core Temp 99°	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/26/96	SHEET 2 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 9	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
3	20–26		40%	see above.	
4	26–30		50%	Sand med 85% clay 15% reddish brn (2.5YR 4/4) soft, moist, mod sorted, subangular, lamina about 4 cm thick of silty sandy clay of same color, hard Sand 75% at Top grading to 85% bottom, sand coarsing down from med. to fine sand, well sorted, color varies from brn red (Top), yellow, brownish yellow (bot.) soft, moist	
5	36–40		70%	Sand 85% clay 15%, med, well sorted, soft, light red (2.5YR 6/6), subangular Clayey sand 70% clay 30%, sand fine to med with occasional pebbles, reddish brown (2.5YR 5/4) poorly sorted, hard, moist	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE	SHEET 3 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 9	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
5	4 0 – 6		70%	Sand 90%, clay 10%, med, reddish brn (5YR 5/4) very well sorted, some mottling lt gray, yellow, very soft, subrounded	
6	4 6 – 5 6		50%	Sand 85% clay 15% mod yellowish brn (10YR 5/6) well sorted, soft, subangular Clayey sand 75%, clay 25%, reddish yellow (7.5YR 6/8) very fine laminae throughout, white and dark brn of same sand and clay% throughout, firm to soft, moist, some mica and very fine dark minerals	
7	5 6 – 6 0		5%	Sand 95%, Clay 5% med-coarse yellowish red (5YR 5/8) grading down to reddish yellow (5YR 7/8) very well sorted, very soft, moist, some dark minerals, some mottling (purple).	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/26/97	SHEET 4 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS-9	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	60			see above.	
7	1		50%		
	2				
	3				
	4				
	5				
	66			Sand med coarse 95%, clay 5%, reddish yellow (7.5YR6/8) well sorted, moist, soft	
8	7				
	8				
	9				
	70				
	1		50%		
	2				
	3				
	4				
	5				
	76			Sand med 90% clay 10%, yellow (10YR 7/6) Same coarse sand mod sorted, moist, soft, some dark minerals	
9	7				
	8		40%	Sand med 90%, clay 10% very pale (10R 7/3) very well defined color change, well sorted, soft, moist, subrounded.	
	9				
	80				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/26/97	SHEET 5 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 9	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
9	8 0 – 8 6		40%	see above	
	8 6 – 9 6		70%	Sand 98% Coarse-med, Clay <1% very pale brown, very well sorted, very soft, subrounded,	
				Clayey-sandy-Silt Clay 20% Sand 40% Silt 40% red (2.5YR 5/6) very poorly sorted, many pebbles and very coarse sand, hard	
10				Sand 85% Clay-silt 15% med sand, red (2.5YR 5/6) very mottled (yellow) occasional med pebbles, poorly sorted	
	9 6 – 10 0			Sand 99% med-coarse, very coarse yellow (10YR 7/8) well sorted, coarsing down to very coarse sand	
11				Sand 85%-95% med to fine, yellow (10YR 7/8) well sorted, sand starts fine for 6" med for 6", Then back to fine soft, moist.	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/27/97	SHEET 6 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. Mrs 9	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotasonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
11	100		40%		
	1				
	2				
	3				
	4				
	5				
	106				
12	7			Sand Med-Coarse, occasional pebble 85% Clay 15%, clay laminae ~~with~~ very thin, light grey, reddish yellow (7.5YR 6/8) well sorted, soft, subrounded, moist	
	8				
	9				
	110				
	1				
	2		30%		
	3				
	4				
	5				
	116				
	7				
	8				
	9				
	120				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/27/97	SHEET 7 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 9	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
12	120		30%		
	1				
	2				
	3				
	4				
	5				
	126			Sand 90-95% fine-very fine coarsing down to med, some coarse to very coarse towards the bottom, brownish yellow (10YR 6/8) mod. sorted, soft, ~~wet~~ saturated, subangular-subrounded.	
13	130		40%		
	1				
	2				
	3				
	4				
	5				
	136			Sand coarse 99%-85% clay increasing down, very pale brn (10YR 7/4), well sorted, subang, lar, saturated, soft occasional	
14	7		100%	silty sand, very fine 60% silt 30% ~~some~~ Mod sand.	
	8			Sandy clay 40% sand 60% Fine to very coarse,	
	9			Strong brn (7.5YR 5/8), poorly sorted, firm, mottling	
	140			Sand coarse-med 80% clay 20%, Strong brn (7.5YR 5/8) subangular, soft mod sorted	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE	SHEET 8 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 9	SRP COORDINATES	DRILLER Ben Grin	
LOGGED BY JayNoonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
14	140				
	141		100%	Silty Clay, Clay 50%, Silt 50%, strong brown (7.5YR5/8) coarsing down to Clayey Sand, Sand 75% clay 10%, silty 15%, subangular (sand) poorly sorted, mottling light brn	
	142				
	143				
	144				
	145			Sand with 40% shell fragments med-fine sand and shell with some larger shell frag. pinkish white (7.5YR8/2), poorly sorted	
	146			Sand med fining down to a very fine Sand and silt, Sand 95%, Clay 5% Several pinkish white clay laminae (very thin), well sorted subangular, very soft, some very fine dark minerals	
	147				
	148				
	149				
	150				
15	151		100%		
	152				
	153				
	154				
	155				
	156				
	157			Clay 60%, Sandy silty clay 40% Thin laminae throughout, more clayey at top grading down to a clayey silty Sand alternating colors reddish yellow (7.5YR6/8), pinkish grey (7.5YR7/2), with very thin red (10R4/6) fine sand, firm	
	158				
	159				
	160				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE	SHEET 9 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS-9	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
15	16 0		100%		
	1				
	2				
	3				
	4				
	5			Sand, very fine 85%, silt 15%, reddish yellow (7.5YR 6/8) with with clay laminae (thin); and pinkish white sand laminae (very fine) soft	
	16 6			Sand, med (90% silt 10%, reddish yellow (7.5YR 7/8) mottling (white) sm, sand fine - med at top grading down to med., well sorted, subangular, soft	
16	7				
	8				
	9		100%	rusty brn very thin sand lamina 1-2mm	
	17 0			Alternating Clay and ~~fine~~ very fine sand laminae. Clay is light Grey (7.5YR N7/) sand reddish yellow (7.5YR 7/8) grading down to better Clay and Sand to silt.	
	1			red med. sand (2.5YR 4/6) laminae very thin 1-2mm	
	2			Clay 100% Alternating colors as above	
	3			Sand Fine-very fine, silt 10% some very thin light Gry laminae. mod sort. some mottling white Grey sand	
	4				
	5			Clay 100% Light Grey (7.5YR N7/), 5cm.	
	6				
	7				
	8				
	9				
	18 0				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/27/97	SHEET 10 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 9	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	18 0			see above	
	1				
	2				
16	3		100%		
	4			Sand Fine to very fine some silt poorly sorted, very light brn, sub angular	
	5				
	18 6			Sand Med. - fine 95% silt and cl. 2% mellow (10YR 7/8) well sorted, subangular - Sub rounded, soft, Thinly - very thin laminae throughout (clay, light grey) also some white sand laminae, ~~very~~ occasional fine dark mineral.	
	7				
	8				
	9				
	19 0				
	1				
17	2		80%		
	3				
	4				
	5				
	19 6				
	7				
	8				
	9			← Sand, fine lamina darkened	
	20 0				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/27/97	SHEET 11 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Allvance	
WELL NO. MRS 9	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkeste	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
17	20 0		80%		
	1				
	2				
	3				
	4				
	5				
	20 6			Sand med.-Fine 95%, Clay 5%, yellow (10YR8/6) well sorted, subangular subround, soft, some thin clay laminae (light grey)	
	7				
	8				
	9				
	21 0				
	1				
	2				
	3		100%	Sand med, 95% Clay 5%, brownish red (10R4/6) some coarse sand, dark iron staining, mod sorted, subangular, soft	
18	4			Sand Fine 75%, Clay 25%, yellow (10YR8/6) very fine laminae Through of light grey clay and dark red sand. Coarsing down to a med. sand.	
	5				
	6				
	7			Clay 100%, light grey (7.5YR N7/) very fine sand laminae of yellow and dark red and dark brn, some cementing (hard pan) in the dark brn, sand laminae.	
	8				
	9			Sand Fine-coarse, coarsing down from Fine to coarse with some very coarse,	
	22 0			yellow brn mod sorted sand 90% clay 10% See next pg.	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE	SHEET 12 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR / Alliance	
WELL NO. MRS 9	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	220			Clay 100%, light gray (7.5YR N7/) dark red coarse sand laminae (Thin)	
	1				
	2			Coarse Sand 99% with light gray laminae, one thick lamina, well sorted subangular, Sand Yellow and light brn.	
18	3		100%		
	4				
	5			~~Silt~~ highly laminated (very thin) with coarse sand brn, dark purple, ~~fine~~ very fine sands dark yellow brn, light gray clay, light yellow silt	
	226				
	7				
	8				
	9				
	230				
	1				
	2				
	3				
	4				
	5				
	236				
	7				
	8				
	9				
	0				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: A/M-Area Vadose and Groundwater Zone Characterization (A/M Area Process Sewer Line)	REFERENCE DATUM	DATE: 8/20/97	SHEET: 1 OF 12
WELL NO.: MRS-10	SRP COORDINATES	DRILLING CONTRACTOR: Alliance	
LOGGED BY: Jay Noonkester	COMPANY: WSRC	DRILLER: Ben Grim	
		DRILLING METHOD: rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
1	0–2		100	Sand 88% med.-fine, clay 20% red (2.5YR 4/4) subrounded, moist, very large cobbles - from 5'11 Sand 98%, fine, clay 2%, reddish yellow subangular-subrounded, moist, well sorted.	
2	3–5		100	Same as above Sand 75% med.-fine, clay 25%, brown (2.5YR 4/4) subangular-subrounded, well sorted, moist Sand 75% med.-fine, clay 25%, red (10R 4/6), hard, mod sorted.	
3	6–9		100	Sandy clay 60%, sand 40%, red (10R 4/6), mod sorted, hard, occasional thin laminae of yellow sandy clay, moist	
4	10–12		100	Sandy clay, clay 50%, sand 50%, brown 2.5YR 4/4) mod sorted, subangular, mottling (very little) of yellow sandy clay moist, hard.	
5	13–15		100	Same as above (no mottling) core is hot	
6	16–20		100%	Sandy clay, clay 60%, sand 40%, brown (2.5YR 4/4), mod sorted, subangular-subrounded, occasional mottling (yellow), moist, hard. Core hot	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/20/97	SHEET 2 OF 13
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS-10	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY J. Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
6	20		100	see above.	
	21				
	22			Same as above	
	23			core hot	
7	24		100		
	25				
	26				
	27			Sand 80%, Clay 20%, Fine-med, brn rd (2.5YR4/4) well sorted, sub rounded	
	28				
	29			Sand 85%, Clay 15%, Fine-med, lt gry (10R6/8), well sorted, subrounded, Thickly laminated (yellow-orange) of sandy clay.	
8	30		85%		
	31				
	32			Sand 85-90%, Fine-med, Clay 10-15%, pinkish red to yellow-orange, some coarse sand, subangular-sub rounded, mod sorted, moist	
	33				
	34				
	35			Sand 70%-75%, Clay 25-30%, Fine-med with some coarse sand, pinkish red (10R6/8) with white sand laminae.	
	36				
	37			Sand 85-90%, Fine-med, reddish-yellow (7.5YR6/8), well sorted, subangular, very thin laminae of clay (light gray), soft.	
	38				
	39				
	40				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT A-014 outfall	REFERENCE DATUM	DATE 8/20/97	SHEET 3 OF 12
		DRILLING CONTRACTOR Alliance	
WELL NO. MRS 1D	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY J. Woonkester	COMPANY WSRC	DRILLING METHOD rotasonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	40			see above	
9	41–44		80%	Sand 75-85% clay 25-15% yellowish-red (5YR 5/8) with heavy mottling purple, yellow, and white; coarse-med, mod sorted subangular-subround, moist, hard - firm	
	45–46				
10	47–52		60%	Sand 85-90% Clay 10-15% fine, reddish yellow (7.5YR 7/8) well sorted, subangular-subrounded much laminated, very thin clay - white/tan)	
	53–56				
11	57–60		0%		

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: A-014 outfall	REFERENCE DATUM	DATE: 8/20/97	SHEET: 4 OF 12
WELL NO.: MRS-10	SRP COORDINATES	DRILLING CONTRACTOR: Alliance	
LOGGED BY: J Noonkester	COMPANY	DRILLER: Ben Grim	
		DRILLING METHOD	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
11	60–66		9%		
12	66–76		66%	Sand 99% Clay < 1% sand coarse-med, Brn-Yellow (10YR 7/6) very well sorted, sub-angular - subrounded occasional ~~heavy~~ dark mineral maybe garnet Sand 90% Clay 10% sand med., yellow-brown, well sorted - same as above ~~just~~ except more clay.	
13	76–90		80%	Sand 99% coarse-med brownish grey (10YR 3/3) subangular, very well sorted very clean sand, occasional dark mineral, moist, mottling of dark grey and brown. very soft	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE	SHEET 5 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS-10	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY USRC	DRILLING METHOD Rotasonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	80			see above	
	1			Sand 95% med, Clay 5% reddish yellow (5YR 5/8), very well sorted, subangular, moist grading down to more % clay Clay 95% with very thin laminae of fine Sand and white clay, reddish yellow (7.5YR 6/6), firm, moist,	
13	2		70%		
	3				
	4			76.8°	
	5				
	86			Sand 99% coarse-med light yellow brown (10YR 6/4) subangular-subrounded well sorted moist	
	7				
	8			Sand 90% med, Clay 10%, reddish yellow (5YR 6/6) occasional Fine pebble and dark minerals, Poorly sorted, subangular, moist, soft	
	9				
	90			Sand 95% med Clay 5% yellow (10YR 7/8), subangular, mod sorted, occasional coarse sand, very soft	
14	1		100%	grading down to a fine sand with 15% clay Then changing to a coarse sand 95%, Clay 5% yellow (10YR 7/8) with occasional Med pebbles, Subangular-Subrounded	
	2				
	3			76.8°	
	4				
	5				
	96			Sand 80-85% Clay 15-20	
	7				
15	8		40%	Brownish yellow (10YR 6/6), Sand med-Fine subangular-subround, occasional med pebbles, moist, Mod sorted, very soft	
	9				
	100				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/21/97	SHEET 6 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 10	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	100			see above	
	1				
15	2		40%		
	3				
	4				
	5				
	106			Sand 95% coarse-med clay 5%, very pale brown (10YR 8/4) well sorted clean sand, subangular-subround, moist Thin clay laminae, tan.	
	7				
	8				
	9			Sand 85-90% clay 10-15% brownish yellow (10YR 6/8) some very coarse sand, Mod. sorted, subangular-subrounded, moist	
	110				
	1				
16	2		40%		
	3				
	4				
	5				
	116			Sand-med (75-85%) clay 25-15% reddish yellow (7.5YR 6/8), The first ft. has some very coarse sand and is poorly sorted, well sorted, subangular-subrounded, moist. Thin laminae, white/grey (5Y 8/1), .5 to 3 cms.	
	7				
	8				
	9				
	120				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/21/97	SHEET 7 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 10	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD roto sonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	120			see above	
	1				
17	2		60%		
	3				
	4				
	5				
	126			Sand med to coarse (132-134)	
	7			sand 90-95% clay 10-5%, last 2.5 ft.	
	8			very clean, tan clay laminae at 129 FT	
18	9		80%	and 134 FT., yellow red (7.5YR 6/6)	
	130			mod-well sorted, subangular-subround	
	1			moist, soft. Saturated at 133.5 FT. (water table)	
	2				
	3				
	4				
	5				
	136			Sand med 75% clay 25% brn yellow	
	7			(10YR 6/8), sandy clay laminae	
19	8		100%	throughout first 6 FT. mod sorted	
	9			subround-subangular, firm,	
	0			moist saturated	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/21/97	SHEET 8 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 16	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	14 0			See above.	
	1				
19	2		100%	Sand Coarse 98% very clean, yellow orange (10YR 7/8), subangular, soft, saturated, well sorted	
	3				
	4				
	5				
	14 6			Sand Coarse 95% Clay 5%, pale yellow (2.5Y 7/8) mod sorted, some very coarse sand, soft, saturated, subrounded, several white thin laminae	
	7				
	8				
	9				
	15 0		100%		
20	1				
	2				
	3			Silty Clay 90% ~~silt and Sandy Fine sand 10%~~, clay 60% silt 30% very fine sand 10%, many colors - main color - brn-yellow (10YR 6/8) laminated very thin to thin with white, dark brn, dark red brown, firm	
	4				
	5				
	15 6			grading down from a silty-sandy Clay to a fine to very fine clean sand. This run is laminated with very fine to fine Clay (white stringers). Mottled Colors from dark brn, red brn, white, and light yellow brn as the main color. grain size is fining down from med to very fine, very fine is very well sorted while the (next pag)	
	7				
21	8		88%		
	9				
	16 0				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/21/97	SHEET 9 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 10	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
21	160		80%	Upper ~~part~~ is mod sorted.	
	166			Sand med 95% clay 5% reddish yellow (7.5YR 6/8) Clay laminae throughout, more dense near bottom of run. Sand well sorted, subangular soft. Clay laminus is white/Grey, very thin to thin.	
22	170		100%		
	176			Sand fine 99% very clean sand yellow (10YR 7/6), very well sorted, subangular, saturated, soft, some mottling of white sand, some very thin clay lamination (pale grey).	
	180				

QSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/22/97	SHEET 10 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 10	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY USRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	18 0			see above	
	1				
23	2		100%		
	3				
	4				
	5				
	18 6			very fine SAND 70% silt 5-10%, clay ≤ 5%, yellow (10YR 7/6), very well sorted, suba-subr, soft, saturated, some tan clay laminae	
	7				
	8				
	9				
24	19 0		85%		
	1				
	2				
	3				
	4				
	5				
	19 6			Sand med-Fin 98%, very clean sand yellow (10YR 7/8 suba-subr - subrounded, very well sorted, saturated, soft, some white sand, several Tan clay laminae throughout, ~~some~~ some dark brown staining at top of some of the clay laminae	
	7				
25	8		100%		
	9				
	20 0				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/22/97	SHEET 11 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 10	SRP COORDINATES	DRILLER Ben Grimm	
LOGGED BY J Dunkelberger	COMPANY WSRC	DRILLING METHOD Rotasonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
25	20 0			See above	
	1				
	2		100%		
	3				
	4				
	5				
	20 6			Sand med-fine 90% clay 10% yellow (2.5Y 7/6) well sorted, subangular-sub rounded, saturated, soft, some Grey laminae and brn red mottling	
	7				
	8				
	9				
26	21 0		90%		
	1				
	2				
	3			Coarse Sand same as above	
	4			~~Clay~~ 100% light Grey (2.5Y N8), Firm, very pure clay, well defined, some dark red med sand stringers in clay	
	5			Coarse Sand 95% yellow brn (10YR 5/8) poorly sorted, sub rounded, very soft, saturated, lots of very coarse sand and granule	
	21 6			Sand Coarse grading down To Fine-med, pinkish brn (7.5YR 7/4) To strong brn (7.5YR 6/6) well sort at Top 2FT 99% sand, remaing 8 FT mod sorted and 90% sand, sub angular, saturated, & light Grey stringers 3mm	
27	7		100		
	8				
	9				
	22 0				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE	SHEET 12 OF 12
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 1D	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY J. Noonkester	COMPANY WSRC	DRILLING METHOD Votosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
27	22 0		100%	see above	
	1				
	2				
	3				
	4				
	5				
	26			Coarse SAND, 95% Clay 5%, reddish yellow (7.5YR 6/6) to Dark brn (7.5YR 4/6) poorly sated, sub rounded, saturated, Many med. pebbles, 2 clay (Tan) stringers	
	7				
	8				
	9				
28	30				
	1		80%	Clay light grey (5YR8/2) laminated with thin bedding of fine clayey sand of 2 colors: reddish yellow (7.5YR 6/8) and dark purple brown	
	2				
	3				
	4				
	5				
	36				
	7				
	8				
	9				
	0				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/29/97	SHEET 1 OF 11
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 11	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
1	0–6		50%	Sandy clayey SiLT Silt 35%, Sand 40%, Clay 25%, brn red (2.5YR 4/4), hard, moist, mod sorted.	
2	6–16		80	Sandy Clayey SiLT, Sand 40%, Silt 35% Clay 25%, brn. red (2.5YR 4/4) hard, moist, some pebbles, poorly sorted.	
3	16–20		80	Sandy silty clay. Sand 30%, silt 25%, clay 45%, brn red (2.5YR 4/4) hard, moist,	
				Next pg	

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FIELD GEOLOGIC LOG

PROJECT		DATE 8/29/97	SHEET 2 OF 11
	REFERENCE DATUM	DRILLING CONTRACTOR: Alliance	
WELL NO. MRS-11	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
3	20–25		80	Silty Sand, med.-fine sand 70%, silt 20%, clay 10%, (10R 5/6) red, mod sorted, hard, moist, grading down more sand % content.	
4	26–35		50	Sand 70% fine-med, silt 15%, clay 15%, light red (2.5YR 6/8), very fine white clay laminae throughout, mod sorted, firm.	
	36–41			Sand, fine 90%, clay 5%, silt 5%, pink to reddish yellow, some sand laminae, yellow and reddish ~~yellow~~ brn, soft, well sorted	
5	36–40		50	Sand med-fine 95%, clay 5%, light red (2.5YR 5/6), soft, mod sorted, subangular	
	40–50			Sand fine 90%, clay-silt 10%, reddish yellow, well sorted, soft, moist, light tan very thin clay laminae, and 2 purple sand laminae.	

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/29/97	SHEET 3 OF 11
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS-11	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
5	0–6		50	See above	
6	6–10		50	Sand Fine 80%, Silt 15% Clay 5%, reddish yellow (7.5YR 7/6), ~~mod~~ mod sorted soft, sandy clay laminae, some purple and ~~to~~ light red-pink sand laminae. Sand 80%, Clay 15%, Sand med-occasional coarse sand, mottled throughout, white, reddish yellow, dark brn. mod sorted	
7	10–16		30	Sand ~~med~~ Fine-med 70%-90% Clay grading down in % content, reddish yellow, well sorted, SOFT moist Sand med 98%, yellowish red (5YR 5/8) well sorted, subangular, soft	

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FIELD GEOLOGIC LOG

PROJECT		DATE 8/29/97	SHEET 4 OF 11
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS-11	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
7	60		30%		
	61				
	62				
	63				
	64				
	65				
	66			Clayey Sand, sand 75%, clay 25, reddish yellow (7.5YR 6/8) poorly sort, Fine – pebble	
	67			Clay 100%-70%, grading down from a sandy	
	68			Clay to a clay laminated with very fine	
	69			Black fine sand and reddish brn fine sand,	
8	70			Clay pinkish white	
	71		40	Sand 80% med with much coarse sand clay	
	72			and silt 20% reddish yellow (6/8 7.5YR)	
	73				
	74				
	75				
	76				
9	77			Sand med grading down to Fine 95%	
	78			reddish yellow (7.5YR 7/6) some sandy clay	
	79		20	very thin laminae, well sort, soft	
	80				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 8/29/97	SHEET 5 OF 11
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS-11	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
9	80		20		
	1				
	2				
	3				
	4				
	5				
10	86		40	Sand med 99%, very pale brn (10YR 7/4) well sorted subang/sub-rounded, soft, grading down to a med. sand 80%, Clay 20% with some coarse sand.	
	7				
	8				
	9			Sand med 90% clay 10%, lots of coarse sand and occasional pebbles, reddish yellow (7.5YR 6/8) poorly sorted	
	90				
	1				
	2				
	3				
	4				
	5				
11	96		20%	Sand fine-very coarse, yellow (10YR 7/8) Sand 90%, silt-clay 10%, sand coarsing down first 1.5FT, then fine again, mod sorted, some fine pebbles, occasional Med. pebbles, occasional dark minerals (Fine), soft, a very thin clayey sand lamina seperating the coarse sand from the fine lower sand, firm	
	7				
	8				
	9				
	100				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 9/3/97	SHEET 6 OF 11
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 11	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
11	100		20		
	1				
	2				
	3				
	4				
	5				
12	106		100	Sand, fine-med 95% silt 5%, Yellow (10YR 7/6) fine, well sorted sand first 1.3 FT, then - very thin lamina of clay/sand, then med sand with light gray laminae near bottom of run, well sorted, soft, subangular-subrounded, some very fine dark minerals	
	7				
	8				
	9				
	110				
	1				
	2				
	3				
	4				
	5				
13	146		100	Sand fine, Yellow (10YR 7/6) well sorted, soft, well sorted, some white fine sand laminae	
	7				
	8				
	9			Sandy Clay 50%, Sand med-very coarse 40%, Silt 10%, strong brn (7.5YR 5/8) lamanae of same, dark brn, and light grey, poorly sorted	
	120				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 9/3/97	SHEET 7 OF 11
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 11	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	12-0			see above	
	1			Sand, coarse, 95%, strong brN (7.5YR 5/8) well sorted, soft, some dirk brN, and white sand laminae.	
13	2		← 100	Sand-shell fragments, pinkish white, very thin laminae	
	3			Sandy clay, 80% clay, Sand med-coarse 40% banded throughT, reddish yellow and white	
	4				
	5				
	126			Same as above grading down to a Clayey sand	
	7				
	8				
	9			Sand med-fine, brownish yellow (10YR 6/8) mottling of white and brown well sorted, subangular, soft	
	130				
14	1				
	2		80%		
	3				
	134			Clay 60%, Sandy Silty, Clay Sand 30-35% Silt 10-15% Alternating colors reddish yellow and light gray with very thin dark red sand laminae Through 134.5'-137' red sand laminae hardpan to some extent. Firm.	
	5				
	6				
	7			Clayey Sand, Sand 70%-60%, clay 15-20%, Silt 10-20%, reddish yellow (7.5YR 6/8) white sand mottling and 2 very thin light gray clay laminae. Sand Fine-med with some very coarse sand, Poorly sorted, Firm-soft	
	8				
	9				
	140				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 9/3/97	SHEET 8 OF 11
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 11	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
14	14 0			See above	
	1				
	2		80%		
	3				
	4				
	5				
	14 6			Sand 70% - 80% S:M 30-5% sand very fine-fine with 25-30% silt grading down to a very fine-fine clean sand, yellow (10YR 8/8) and very pale brown (10YR 8/3) mottled throughout with these two colors, some thin light gray clayey silt laminae in first 10 FT.	
	7				
	8				
	9				
15	15 0		100		
	1				
	2				
	3				
	4				
	15 5				
	15 6				
	7				
	8				
	9				
	16 0				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 9/4/97	SHEET 9 OF 11
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS 11	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
15	160		100	See above	
	161				
	162				
	163				
	164				
	165				
	166				
16	167		75%	Sand 95%, F.-vf.- very fine, yellow (10YR7/6) very clean sand, well sorted, occasional dark minerals, soft, several very thin light grey clay laminae near bottom of run, subangular, some mottling of white sand.	
	168				
	169				
	170				
	171				
	172				
	173				
	174				
	175				
	176				
	177				
	178				
	179				
	180				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 9/5/97	SHEET 10 OF 11
	REFERENCE DATUM	DRILLING CONTRACTOR Alliance	
WELL NO. MRS-11	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	180				
	181				
16	2		75		
	3				
	4				
	5				
	186				
	7			Sand 95%, med-fine, coarsing down, very pale brn (10YR 8/4), well sort, SOFT, sub rounded subangular	
	8				
	9			Clay, light gray (10YR 7/1) with very thin sand (very fine) laminae, brownish yellow and, dark reddish brn, and dark red hardpan. coarsing down to more sand and silt hard	
	190				
	1				
17	2		100		
	3				
	4				
	5				
	6				
	7				
	8			Sand fine-coarse, coarsing down, reddish yellow (7.5YR 6/8) mod sorted soft, some light gray clay laminae	
	9				
	200				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT		DATE 9/5/97	SHEET 11 OF 11
	REFERENCE DATUM	DRILLING CONTRACTOR Aviance	
WELL NO. MRS 11	SRP COORDINATES	DRILLER Ben Grim	
LOGGED BY Jay Noonkester	COMPANY WSRC	DRILLING METHOD Rotosonic	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
17	200		100	Clay, gray (7.5YR N6/) with dark gray very thin laminae and dark gray specks. dark gray laminae is a sandy clay with gold shiny flakes.	
	201				
	202				
	203				
	204				
	205				
	206				
	207				
	208				
	209				
	210				
	211				
	212				
	213				
	214				
	215				
	216				
	217				
	218				
	219				
	220				

Field Geologic Log

Project		Date	Sheet
DNAPL Characterization		3/24/98	1 of 13
Well Number	**Location**	**Drilling Subcontractor**	
MRS 12	786-6M UNIT	Alliance	
Logs Prepared By		**Driller**	
Jay Noonkester		Ed Miller	
Company		**Drilling Method**	
WSRC		rotasonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
1	0–5		80	Sand, 85-95%, med, light yellowish brn. 10YR6/4, well sort, soft, some red mottling. Sandy Clay, Clay 55-65%, red 10R 4/6, with light gray mottling, sand is med. to v. fine, hard-firm.	
2	5–15		100	Sandy Clay, clay 55-70%, red 2.5YR 4/8, sand med-coarse, with v. coarse and occasional granules, hard, poorly sorted.	
3	15–20		100	Sandy Clay grading into Clayey sand, red 10R 4/8 and yellowish red 5YR5/8 from 21FT to 25ft, Blu-Gray and yellow mottling from 15FT to 21ft, sand is coarse-med. with some granules, poorly sorted, hard-firm.	

Field Geologic Log

Project: DNAPL Characterization		Date: 3/24/98	Sheet: 2 of 13
Well Number: MRS 12	Location: 786-6M Unit	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: Rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	20			see above.	
	1				
3	2		100		
	3				
	4				
	25				
	6			Sandy Silt, silt 60-65%, red 2.5YR 5/6, sand v. fine, loaded w/ fine muscovite, some med. sand, mod. sorted, dark gray and yellow mottling throughout.	
	7				
	8				
4	9		100		
	30				
	1				
	2				
	3				
	4				
	35				
	6			Silty Sand, sand 55-70%, grading to a v. fine sand 75-85%, silt decreasing down, red 2.5R 5/6, sand v. fine, muscov. to present and decreasing down, dark gray mottling throughout, yellow mottling 42' to 43.5'.	
	7				
5	8		80		
	9				
	40				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/25/98	Sheet 3 of 13
Well Number: MRS 12	Location: 786-6m Unit	Drilling Subcontractor: Alliance	
Logs Prepared By: Joy Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
5	40–45		80	see above.	
6	45–50		80	Clayey sand, sand 60-70%, red 2.5YR 5/6, with some mottling of white, drk. gray, and yellow, sand is coarse with many fine, v. fine, and some v. coarse, occaional granules, poorly sorted, firm-hard, well rounded-subangular, clay decreasing down.	
	50–55			Sand, 90-95%, med., yellow 10YR 7/8, and light reddish brn 2.5YR 6/8 from 51 FT. to 52 FT., several clayey sand very thin laminae present, soft-firm.	
7	55–57		85	Sandy silt, red 2.5YR 4/6, sand v. fine-med., silt decreasing down, some drk. gray and yellow mottling, firm, mod. sorted	
	57–60			Sand, ~~80~~ 70%, silt 20-10% ~~[illegible]~~ ~~[illegible]~~ reddish brn 2.5YR 5/3, with some red 2.5YR 4/6 mottling, sand is med. with some fine and v. fine, mod. sorted, soft.	

Field Geologic Log

Project		Date	Sheet
DNAPL Characterization		3/25/98	4 of 13
Well Number	**Location**	**Drilling Subcontractor**	
MRS12	786-6M unit	Alliance	
Logs Prepared By		**Driller**	
Jay Noonkester		Ed Miller	
Company		**Drilling Method**	
WSRC		rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
7	60		85	see above;	
	1			Sandy Silt Silt 60-70%, dark red 2.5YR 3/6, hard-firm, sand v.fine,	
	62				
8	3		100	Sand 75-85%, Silt 15-25%, weak red 10R4/4, some brn. and black banding (v.Thin) present. Sand v.fine-med, firm-soft, poorly sorted.	
	4			Sand, 75-85% brownish yellow and yellowish red, v.fine-med., v.Thin clay laminae Throughout (white).	
	65			Sand, fine-med, yellowish brn, 10YR5/6, Clay/sand laminae present (purple) soft, very wet, mod sorted.	First 3FT of run 9 were disturbed by drilling water, description may not be accurate.
9	6				
	7				
	8				
	9			Clayey silty sand grading down to a sand, banded colors different shades of brn. down to yellow, firm-soft, sand is fine to med with some v.fine and coarse, also some red and purple banding, mod sorted to poorly sorted.	
	70		80		
	1				
	2				
	3				
	4				
	75				
10	6		0	NO recovery	
	7				
	8				
	9				
	80				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/25/98	Sheet: 5 of 13
Well Number: MRS 12	Location: 786-6 M	Drilling Subcontractor: Allwaste	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotasonic	

Frm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
10	80		0	NO recovery	
	1				
	2				
	3				
	4				
	85				
11	6			Sand, med.-coarse, brownish yellow 10YR 6/8, some fine sand, soft, mod-well sorted, occasional v. coarse sand pieces.	first 3 ft are washed out by drilling fluids.
	7				
	8				
	9		60	Same as above except red 2.5YR 4/8.	
	90				
	1				
	2				
	3				
	4				
	95				
12	6			Sand grading into a clayey sand, sand is coarse-med grading to fine-med. banding colors starting with light brown 7.5YR 6/4, reddish yellow, red, yellowish red, many v. coarse and granules, occasional pebbles. decreasing down, poorly sorted, soft-firm.	the first ft. of this run is washed out by drilling fluid.
	7		80		
	8				
	9			Clay, 75-80%, some fine-med sand, red 2.5YR 4/8, very good clay.	
	100			Sandy clay grading into a clayey sand, reddish yellow 7.5YR 6/8 grading into yellowish red, cont next pg.	

Field Geologic Log

Project: DNAPL Characterization		Date: 3/25/98	Sheet 6 of 13
Well Number: MRS 12	Location: 786-6M	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
12	100–105		80	sand is coarse-med with many fine and v. coarse, occasional granules, ~~the~~ from 102 ft to 103.5 ft grades into a sand 75 to 80%, firm-soft.	
13	105–115		0	No recovery	
14	115–120		0	No recovery	

Field Geologic Log

Project: DNAPL Characterization		Date: 3/26/98	Sheet: 7 of 13
Well Number: MRS 12	Location: 786-6 M	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
14	120		0		
	1				
	2				
	3				
	4				
	125			Silty Sand, Sand 60-70%, v fine - coarse, reddish yellow 7.5YR 6/8 and strong brn. 7.5YR 5/6, poorly sorted, fine - many v. coarse and granules, occasional pebble.	
	6				
	7				
15	8		90	Sand 90-95%, med-fine, banding colors of very white, pinkish white, pink, light brn., strong brn., very clean sand, soft, occasional v. coarse and granules increasing down. Subangular at Top, subangular - subrounded at bottom.	
	9				
	130				
	1			Clayey Silty Sand, Sand 65-75%, sand fine - v. coarse with many granules and pebbles, v. Thin white clay laminae around 133'-134 FT., fine, poorly sorted.	
	2				
	3				
	4				
	135				
16	6		80	Silty Sand, Sand 70-80%, Sand v.fine - med., banding colors starting at Top - strong brn, brownish purple, dk. brn., reddish yellow from 139-143 FT, sand fining down fm. med. - To v. fine. Many v. thin white clay laminae (see lithology for distribution), soft.	
	7				
	8				
	9				
	140				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/16/98	Sheet: 8 of 13
Well Number: MRS 12	Location: 786-6 M	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noorkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotasonic	

Frm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
16	140		80	see above.	
	1				
	2				
	3				
	4				
	145			Sand, ~~wet~~, 85-75%, reddish yellow 7.5YR6/8, several thin white clay laminae, v. fine-med., soft-firm.	
	6				
	7				
17	8		45		
	9				
	150				
	1				
	2				
	3				
	4				
	155			Sand, coarse-v. coarse, 95-100%, yellow 10YR8/6 down to brownish yellow 10YR6/8, well sorted, some gravel present.	
	6				
18	7		100		
	8				
	9				
	160				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/26/98	Sheet 9 of 13
Well Number: MRS-12	Location: 786-6M	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
18	160–163		100	see above.	
	163–165			Sand, med-coarse, 85-90%, strong brn 7.5YR5/8, several v. thin white clay laminae, at 164 ft a zone of v. fine silty sand, mod. sorted.	
19	165–169		100	Sand, 85-90%, coarse-med, reddish yellow 7.5YR6/8, soft-firm, several light gray clay laminae (v. thin-thin), some v. coarse and granules present.	
	169–170.5			Sandy silt, reddish yellow, 7.5YR6/8 with thin ~~bedding~~ laminae of light gray clay, also strong brn. bedding present.	green clay 170.5 ft
	170.5–175			Sandy clay, thinly bedded colors of reddish yellow, dk brn., strong brn., light gray and purple, thin light gray clay lamina throughout, muscovite present, sand is v. fine-med.	
20	175–180		70	~~Sand~~ Silty sand, sand 65-75%, some clay in first 2 feet, yellowish brn. 10YR5/8, sand med. fining down to fine-v. fine, thin light gray and purple clay laminae at 178.5 ft.	
	180			see next pg.	

Field Geologic Log

Project: DNAPL Characterization		Date: 3/26/98	Sheet: 10 of 13
Well Number: MRS 12	Location:	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
20	180		70	Sand, v.fine-fine, 95-99%, yellow 10YR 7/8 and very weak pale brn. 10YR 8/4, well sorted, soft.	
	185				
21	190		100	Sand med.-fine, 90-95%, some silt, yellow, 2.5Y 7/8, 2 light gray clay laminae, well sorted, soft, some v.fine sand throughout.	
	195				
22	200		100	Sand, 90-95%, v.fine-med, yellow 10YR 8/8 grading into yellow 10YR 7/8 at bottom, well to mod. sorted, v.fine grading down to med at 197 feet, several thin light gray clay laminae at 201 feet.	

Field Geologic Log

Project: DNAPL Characterization		Date: 3/26/98	Sheet: 11 of 13
Well Number: MRS 12	Location: 786 6M Unit	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Woonkiester		Driller: Ed Miller	
Company: WSRC		Drilling Method: Roto Sonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
22	200		100	See above.	
	1				
	2				
	3				
	4				
	205				
23	6		75	Sand, 80-90%, fine-med., brownish yellow, 10YR6/8, much v. fine thread-like, some white mottling, soft, mod.-well sorted, soft.	
	7				
	8				
	9				
	210				
	1				
	2				
	3				
	4				
	215				
24	6		90	Sand, med-v. coarse, 89-93%, reddish yellow 7.5YR6/8, mod.-well sorted, some white mottling, several v. thin gray clay laminae Thin-bedded, soft, subangular-subrounded.	
	7				
	8				
	9				
	220				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/31/98	Sheet: 12 of 13
Well Number: MRS 12	Location: 786-6M Unit	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Woorkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Frn Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
24	220		90	see above	
	1				
	2				
	3			Silty, clayey sand, sand fine-med, Thin banded colors of reddish yellow 7.5YR6/8, strong brn and white, soft-firm, sand 70-80% Sand decreasing down, clay increasing down.	
	4				
	225				
25	6		100	Sand, 85-95%, med-coarse reddish yellow and dk brown, several Thin and Thick light gray clay laminae some v. Thin dk brn and purple solidified layers - adjacent to clays, soft to hard.	
	7				
	8				
	9				
	230				
	1				
	2				
	3				
	4			Sand, 95%, v. coarse gradis down to med, many granules and pebbles at top, soft, mod sorted, reddish yellow	
	235				
26	6		100	Sand 95% v coarse - med well sorted - mod. sorted, reddish yellow 7.5YR6/8, several v. Thin light gray clay laminae, many granules and pebbles, from 142 to 147.5 FT sand is fining down to fine-med sand.	
	7				
	8				
	9				
	240				

Field Geologic Log

Project	DNAPL Characterization	Date	3/31/98	Sheet	13 of 13
Well Number	MAS 12	Location	786-6m unit	Drilling Subcontractor	Alliance
Logs Prepared By	Jay Noonkester	Driller	Ed Miller		
Company	WSRC	Drilling Method	Rotosonic		

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	20			Sreahavs	
	1				
26	2		100		
	3				
	4				
TP	24 5			Clay, gray 2.5Y 5/1, dk grn 2.5Y 4/1, Ellenton clay and some olive brn 2.5Y 4/3, sulfer smell from core	
	6				
	7				
	8				
	9				
	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Characterization		Date: 3/2/98	Sheet: 1 of 12
Well Number: MRS13 (boring #3)	Location: adjacent to A/M basin	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: roto sonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
1	0–7		100	Sandy Clay, Clay 65-75%, red 2.5YR 4/6, some granules from 5 ft. to 7 ft., hard - v. hard, sand med - coarse.	
2	7–11		100	same as above.	
3	11–16		100	sandy clay, clay 60-70%, red 10R 4/8, yellow mottling from 14' down to 16', sand med., hard.	
4	16–17		100	same as above.	
5	17–20		100	Sand Clay grading down to a silty sand, sand grading down from med-coarse to fine - v. fine, color red 2.5YR 4/8, from 24-27 feet the color is light red 2.5YR 6/8, muscovite present from 21 ft. down, some white mottling in first 3 ft.	

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Characterization		Date: 7/2/98	Sheet: 7 of 12
Well Number: MRS 13	Location: adjacent to basin	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: roto sonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
5	20		100	see above.	
	1				
	2				
	3				
	4				
	5				
	6				
	27				
6	8		100	Silty Sand, fine-med with many v. fine and coarse, lightred 2.5YR 6/6, poorly sorted, soft-firm.	
	9			Silty Sand, sand 70-80%, coarse-med. fining down to v.fine-fine, occasional pebbles, some v. coarse throughout, heavy banding throughout banding is very thin, colors of reddish gray, red, yellow, and light red, much muscovite throughout, poorly sorted, hard.	
	30				
	1				
	2				
	3				
	4				
	5				
	6				
	37				
7	8		100	Sandy, med-coarse, 80-85%, reddish brn. 2.5YR 5/4, medcoarsing down, mod sorted, soft. Silty Sand, sand 65-75%, silt 20-30%, sand med-fine with much v.fine and some coarse, reddish brn 2.5YR 4/4, blwish gray and some yellow and white mottling, poorly sorted, firm.	
	9				
	0				

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Characterization		Date: 3/2/98	Sheet: 3 of 12
Well Number: MRS 13	Location: adjacent to basin	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
7	40		106	see above	
	41				
	42				
	43				
	44				
	45				
	46			Silty Sand, sand 70-75%, v fine-fine, heavy banding of blkish gray, red, white, yellow, and brown, poorly sorted, soft.	
	47			Sand, fine-coarse, 80-85%, reddish brn 2.5YR5/4, sand coarsing down, mod sorted.	washed out by drilling water
	48			Sandy clay, clay 50-60%, sand v fine-fine, reddish brn. 2.5YR5/4, blkish gray mottling throughout, firm-hard.	
	49				
8	50		100		
	51			Silty Sand, some clay, reddish brn 2.5YR5/4, sand fine-med, poorly sorted, soft- firm, sand increasing down.	
	52				
	53			Sand, 75-85%, silt 15-25%, v fine - fine, From 53 to 55 ft core is very dry, yellow 10YR7/8, soft, mod sorted	
	54				
	55				
	56				
	57			Sand, fine-coarse, strong brn 7.5YR5/8, sand 85-90%, well sorted, sand is fining down from fine to coarse, some banding of blkish gray and yellow. The last 3 feet of this run.	
9	58		100		
	59				
	60				

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Characterization		Date: 7/2/98	Sheet: 4 of 12
Well Number: MRS 13	Location: adjacent basin	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: roto sonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	60			see above.	
	1				
	2				
9	3		100		
	4				
	5				
	6				
	67				
	8			Sand, med-coarse, 85-75%, red 2.5YR 4/6, some fine and v. coarse present, poorly sorted, banded colors near bottom of bluish gray, yellow and weak red, soft.	
	9				
	70				
10	1		65		
	2				
	3				
	4				
	5				
	6				
	77				
	8			Sand, med-coarse, 93-97%, banded colors of dark reddish brn, yellow, reddish brn, at 78 FT a silty clayey Sand, mod sorted, soft.	
11	9		100		
	80				

Field Geologic Log

Project		Date	Sheet
DNAPL Characterization		3/3/98	5 of 17
Well Number	**Location**	**Drilling Subcontractor**	
MRS 13	adjacent basin	Alliance	
Logs Prepared By		**Driller**	
Jay Noonkester		Ed Miller	
Company		**Drilling Method**	
WSRC		rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	80			see above.	
	1				
	2			Clayey Sand, 65-75%, brownish yellow, 10YR 6/8 with some dark reddish brn (5YR 3/4) mottling. Clay percent decreasing down, fine-coarse with many v. coarse, granules and pebbles, poorly sorted, soft-firm.	
11	3		100		
	4				
	5			Sand, coarse-v. fine, reddish yellow 7.5YR 6/8, fining down to a silty sand, many granules and pebbles at top, soft-firm, mod sorted.	
	6				
	87				
	8			Sand med-v. coarse 90-95%, light brn. 7.5YR 6/4, mod sated, soft.	the first 2.5 ft ase wash out by drilling water, description may not be accurate.
	9				
	90			Sand grading down to a sandy clay, sand % decreasing down from 70% to 55%, sand fine-med with some v. coarse and granules, red 2.5YR 4/8 to brownish yellow 7.5YR 5/8, poorly sorted, soft-firm.	
12	1		80		
	2				
	3				
	4				
	5			Sand, 80%, v. fine-med with some v. coarse sand present, dry, poorly sorted, brownish yellow 7.5YR 5/8, soft.	
	6				
	97				
	8			Sand, 80-90%, med-fine, yellowish brn. 10YR 5/6, silt percent increasing down, occasional granules and pebbles abound 102 ft, soft-firm, mod. to poorly sorted.	
13	9		100		
	100				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/3/98	Sheet: 6 of 12
Well Number: MRS 13	Location: adjacent basin	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	100			seeahove.	
	1				
13	2				
	3		100	Sandy Clay, clay 45-55%, Sand med- v. coarse, strong brn. 7.5YR 4/6, sandy cl-y grades down to silty, fine sand, from 105.5 to 107 FT, moisture decreases down to dry ~~but wet~~ ~~boundary~~ at 155.5 FT, poorly sorted, granules and pebbles present and decreasing down, hard- v. hard, several light gray clay laminae present.	
	4				
	5				
	6				
	107				
	8			Sand, med- coarse, 85-90%, dk. reddish brn. 2.5YR 3/4, occasional v. coarse and some fine throughout, poorly sorted soft ~~but~~ v. hard from 109.5 To 110 FT.	
14	9		100		
	110				
15	111		0		
	2			Sand, med-coarse 93-97%, strong brn. 7.5YR 5/8, mod. sorted, The last 5 FT is a clayey sand with v. thin light gray clay laminae, soft.	
	3				
16	4		100		
	5				
	6				
	117				
	8			No recovery	
17	9		0		
	120				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/3/98	Sheet: 7 of 12
Well Number: MRS 13	Location: adjacent to basin	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	120			see above	
	1				
	2				
17	3		0		
	4				
	5				
	6				
	127				
	8			Sand, med, 95-78%, dyk. yellowish brn, 10YR4/6, well sorted – mod sorted, very wet, soft.	all of this core is washed out by drilling water, core description is suspect.
	9				
	130				
	1				
18	2		90		
	3				
	4				
	5				
	6				
	137				
	8			Sand, Fine-v. fine, 80-85%, silt 15-20%, strong brn, 7.5YR 4/6, many med., some coarse, and occasional v. coase, poorly sorted – mod-sorted, very dry from 139 to 141.5 ft. then very wet down, soft. The dry sections appears to have more v. fine and silt.	
19	9		80		
	140				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/4/98	Sheet: 8 of 12
Well Number: MRS 13	Location: adjacent to basin	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Frm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	14 0			See above.	
	1				
19	2		80		
	3				
	4				
	5				
	6				
	14.7			Sand, fine-v.fine, 90-95% brownish yellow 10YR6/8, grading down to a clayey silty sand, ~~one~~ at 150.5 ft a dk red and ~~red~~ clayey sand laminae.	
	8				
	9				
	15 0				
	1		100	Clay, 75-85%, grading down to a sandy clay at 151.2 feet, heavy banding of brownish yellow 10YR6/8, Tan, white, v.fine sand very thin laminae throughout of dk red and dk. brn, some of the sand laminae is solidified into v.thin hard layers, hard-firm.	Top of Green Clay
20	2				
	3				
	4				
	5			Clayey Sand, Sand 65-75%, reddish yellow 7.5YR6/8, sand fine-med, mod sorted, soft-Firm	
	6				
	15.7				
	8			Sand, fine-med. with some coarse, grading down to a clay sand at 160 ft to 161 feet, at 160.5 ft a thin light gray clay lamina is present, reddish yellow 7.5YR6/8, some white mottling throughout, soft-firm.	
21	9		75		
	16 0				

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Characterization		Date: 3/4/98	Sheet: 9 of 17
Well Number: MRS 13	Location: adjacent to basin	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
21	160		75	see above.	
	1				
	2				
	3				
	4				
	165				
22	6		100	Silty sand, v.fine, 80%, pale brn. 10YR 6/3, well sorted - mod sorted, soft,	
	7				
	168				
23	9		71	Sand, V fine-med, 80-90%, yellowish brn. 10YR 5/6, some v. thin 1/2" gray clay laminae near bottom, silt and clay increasing downward, soft.	
	170				
	1				
	2				
	3				
	4				
	5				
	6				
	177				
24	8		100	Sand, Fine-med., 87-90%, heavy banding throughout of yellow 10YR 7/8, and white, several thin-v.thin, light gray clay laminae present, also some brownish yellow 10YR 5/8 bandings present, some solidification occuring in the sands.	
	9				
	180				

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Characterization		Date: 3/3/98	Sheet: 10 of 12
Well Number: MRS 13	Location: adjacent to basin	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	180			see above.	
	1				
	2				
28	3		100		
	4				
	5				
	6				
	187				
	8			Sand, fine-med, 87-89%, heavy banding throughout of yellow 10YR7/8, white, and some brownish yellow 10YR5/8, several thin and v.thin lt gray clay laminae, soft-hard.	
24	9				
	190				
	1		85		
	2			Clay grading down to a med-fine sand, ~~some~~ clay is lt gray with some thin yellow banding, grading down to a yellow 10YR5/8 sand, hard-soft.	
	3				
	4				
	5				
	6				
	197				
	8			Sand, Fine-med, 90-95%, yellow 10YR7/8, well sorted, soft.	
25	9		95		
	200				

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Characterization		Date: 3/5/98	Sheet: 11 of 12
Well Number: MRS 13	Location: adjacent basin	Drilling Subcontractor: All. acct	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fin Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
25	200		95	see above.	
	1				
	2				
	3				
	4			clay grading down to Sand, yellow 10YR 7/8 (sand), clay is light gray with very thin sandy laminae of drk red and drk brown, good clay for about 0.5 feet, soft to hard.	
	5				
	6				
	207				
26	8		80	Sand, med - v. coarse, sand coarsing down, 95-100%, very clean sand, pale brn - pink, 10YR 6/3, some subangular granules and occasional pebbles concentrated around 212 feet, well sorted, soft, sand is subangular.	
	9				
	210				
	1				
	2				
	3				
	4				
	5				
	6				
	217				
27	8		100	Sand med-coarse, 80-90%, light reddish brn 5YR 6/4 with binding of drk reddish gray, several light gray clay laminae with dk brown sand on the boarder, many v. coarse, granules and occasional pebbles - subangular.	
	9				
	220			see following page.	

OSR 30-27# (2-12-97)

Field Geologic Log

Project	Date	Sheet
DNAPL Characterization	3/5/98	12 of 12

Well Number	Location	Drilling Subcontractor
MRS 13	adjacent to basin	Alliance

Logs Prepared By	Driller
Jay Noonkester	Ed Miller

Company	Drilling Method
WSRC	rotasonic

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	220			Clay, 90%, gray 5YR 5/1, with v. thin silty & fine sand laminae throughout yellowish 10YR 7/8, Sand, 80-85%, yellowish brn. 10YR 5/4, med, with muscovite present grading into sandy clay dark yellowish brn.	
27	1				Top of Eldorado clay 222.5 ft
	2				
	3		100	Sandy clay grading down to a clay, v. thin banding throughout of purplish red and white, banding become thicker down, sand coarse grading down to v. fine with muscovite present	
	4				
	5				
	6				
	7				T.D.
	8				
	9				
	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/11/98	Sheet: 1 of 14
Well Number: MRS 14	Location: A-14 OUTFALL	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: Rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
1	0–6		100	Sandy Clay, clay 55-65%, red 10R4/6, sand med-fine, firm-hard.	
2	6–16		100	Sandy Clay, clay 60-70%, red 10R4/6, sand med.-coarse, sand, is fining down, pebbles occuring from 6 to 10 feet, yellow mottling throughout, firm-hard.	
3	16–20		100	Clayey Sand, sand 65-75%, coarse-med, red 2.5YR 4/8, hard, some yellow and white mottling.	

Field Geologic Log

Project: DNAPL Characterization		Date: 3/16/98	Sheet: 2 of 11
Well Number: MRS 14	Location: A-14 outfall	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Rm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
3	20–26		100	see above.	
4	26–31		50	Silty Sand, Sand 60-70%, v fine - med., sand fining down, mod sorted, light red 2.5YR 6/8, some white and yellow mottling, hard-firm.	
5	31–40		100	Silty Sand, Sand 60-75%, coarse - v. fine, light reddish brown 2.5YR 6/4, poorly sorted, soft-firm, some white mottling.	

Field Geologic Log

Project: DNAPL Characterization		Date: 3/16/98	Sheet: 3 of 4
Well Number: MRS 14	Location: A-14 outfall	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	40			see above.	
	1				
5	2				
	3		100		
	4				
	5				
	46			Sand, 85-90%, med-coarse, light red 2.5YR 6/8, mod sorted, soft, subangular-subrounded.	
	7				
	8				
6	9			Sand grading down to a silty clay sand reddish yellow 7.5YR 7/8, med - v.f. ine, well sorted at top, pearl, sorted at bottom, some purple and white matting, soft-hard.	
	50				
	1				
	2		90		
	3				
	4				
	5				
	6				
	7			Clayey sand grading into a sandy clay, reddish yellow 7.5YR 6/8, sand is med, some purple mottling present.	
7	8		90		
	9				
	60				
				see next pg.	

Field Geologic Log

Project: DNAPL Characterization		Date: 3/19/98	Sheet: 4 of 11
Well Number: MRS-14	Location: A-14 outfall	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
7	60		90	Clayey Sand, sand 75-85%, brown 7.5 5/4 to ~~strong~~ brn. 7.5YR 5/8, clay decreasing down, sand mod. with some coarse and occasional v. coarse, mod-, poorly sorted, soft-firm.	
	1				
	2				
	3				
	4				
	5				
	66				
8	7		20	Sand, med-coarse, 85-95%, ~~reddish~~ yellowish brown 10YR 5/8, well sorted, subangular-subrounded, soft.	
	8				
	9				
	70				
	1				
	2				
	3				
	4				
	5				
	76				
9	7		70	Sand, 85-95% Fine-coarse, reddish yellow 7.5YR 6/8, sand is fine coarsing down to coarse with many v. coarse, granules and pebbles, well sorted to poorly sorted at 80.5 FT to 81.5 ft., at 81 feet the sand grades into a clayey sand, soft, pebbles and granules are well rounded, ~~The~~ from 81' to 81.5 ft. The color is dk red.	
	8				
	9				
	80				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/19/98	Sheet: 5 of 14
Well Number: MRS 14	Location: A-14 outfall	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	80			seeabove.	
	1				
9	2		70	Silty Sand, v. fine-med, strong brn. 7.5 YR 5/8, sand 70-80%, med. v. coase and granules present, poorly sorted.	
	3				
	4				
	5				
	86				
	7			Sand, coarse v. coarse, 93-97% Olive yellow 2.5YR 6/6, well sorted, soft, subangular - subrounded.	First 4 feet of this run was washed out by drilling fluid, core description may not be accurate.
10	8				
	9		100		
	90				
	1			Sand, 80-95%, red 2.5YR 4/8, fine - coarse, sand percent increasing down, occasional v. coarse and granules throughout, poorly sorted, some yellow mottling, soft - firm	
	2				
	3				
	4				
	5				
	96				
	7			Sand, 90-95%, yellowish red 5YR 5/6, med., well sorted, some dk. gray staining could be from drilling fluid, soft.	First 6 feets depeass to be partially washed out by drilling fluids.
11	8		100		
	9				
	100				

Field Geologic Log

Project		Date	Sheet
DNAPL Characterization		3/19/98	6 of 11
Well Number	**Location**	**Drilling Subcontractor**	
MRS 14	A-14 outfall	Alliance	
Logs Prepared By		**Driller**	
Jay Noonkester		Ed Miller	
Company		**Drilling Method**	
WSRC		Rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	100			see above.	
	1				
11	2		100		
	3			Sand, 75-90%, reddish yellow 5YR6/8, sand percent decreasing downward to a clayey sand, poorly sorted to mod. sorted, many granules and pebbles from 105 to 106 ft., occasional granules above, sand is v. f.ine - f.ine grading down to v. coarse at bottom, very dry 104.5' to 105'	
	4				
	5				
	106				
	7			Clayey Sand, fine, Strong brn. 7.5YR 5/8, granules and v. coarse at top,	
	8				
	9				
12	110			Clayey Sand, V. coarse, Strong brn 7.5YR 5/8, many granules and pebbles, poorly sorted, 3 Tk. in light gray clay laminae present, soft - firm.	
	1		90		
	2				
	3				
	4				
	5			Silty Sand, brown 7.5YR 4/3, V. f.ine - f.ine, hard-firm, part of core is very dry, mod. sorted	
	116				
	7			Sand, 75-85%, silt 15-25%, reddish yellow 7.5YR 6/8, medium Fine and V. Fine, occasional granules, poorly sorted, subangular-subrounded, soft.	
13	8		30		
	9				
	120				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/20/98	Sheet: 7 of 11
Well Number: MRS 14	Location: A-14 outfall	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
13	12 0 1 2 3 4 5 12 6		30	see above.	
14	12 6 7 8 9 13 0 1 2 3 4 5 13 6		100	Silty Sand. Sand 60-75%, fine-coarse, Strong brn 7.5YR5/4, coarsening grading down to coarse, many v.fine, v.coarse and occasional granules, poorly sorted, some v.thin gray clay laminae ~~throughout~~ at 126' - 127.6 feet, firm.	
				Clayey Sand grading into a sandy clay, reddish yellow 7.5YR6/8 with banded colors of white and brown, sand coarse with many v.coarse and occasional granules, sand is coarsing down.	
15	13 6 7 8 9 14 0		100	~~Clayey Sand~~ grading into ~~Sandy Clay~~ Sand, med.-coarse, 90-95%, reddish yellow 7.5YR6/8 with some wide banding colors of very pale brn and yellowish gray v.coarse, some granules and occasional pebbles, poorly sorted, soft, one v.thin lightgray clay lamina, Sand fining down.	

Field Geologic Log

Project: DNAPL Characterization		Date: 3/20/98	Sheet: 8 of 11
Well Number: MRS 14	Location: A-14 outfall	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: ROTOSONIC	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	140			See above.	
	1				
15	2		100	Sandy Clay, clay 50-75%, reddish yellow 7.5YR 6/8 with thin banding colors of light gray, reddish purple, and some v. thin drk brn., between 152.5 and 153 FT the core is silty sand then changes back to sandy clay, sand is v. fine - coarse, mostly fine, some fine muscovite present.	green clay formation 144.5 FT.
	3				
	4				
	5				
	146				
	7			Sand, 90-95% v. pale brn 10YR 7/4, v. fine - med, mod. with a v. fine v. thin layer at 146.5 ft, mod sorted.	
	8				
16	9			Clay grading into sandy clay to a sand, colors banded light gray, reddish purple, reddish yellow, 147 to 149.5 mostly light gray clay with laminae of ~~clayey~~ sandy clay ~~sand~~, grading into a ~~Sandy~~ clay to 151.5 FT then grading into a poorly sorted med. sand, reddish yellow, with fine, v. coarse, and occasional granules.	
	150		70		
	1				
	2				
	3				
	4				
	5				
	156				
	7			Clayey sand reddish yellow, light gray laminae throughout of silt and clayey sand which some show some silicifications, sand is v. fine to mod. hard - firm.	
17	8		100		
	9				
	160				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/20/98	Sheet: 9 of 14
Well Number: MRS14	Location: A-14	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
17	160–166		100	See above.	
18	166–176		4/6	Sandy silt, silt 60-70%, pale brn 10YR 6/3, sand is very fine.	
19	176–180		100	Sand 85-95%, v.f.-f.-med., yellow 10YR 8/8, from 176' TO 178 FT sand is mod. with occasional v. coarse, from 178 down v.f.-f., some white and strong brn mottling, soft.	

Field Geologic Log

Project: DNAPL Characterization		Date: 3/23/98	Sheet: 10 of 11
Well Number: MRS 14	Location: A-14 outfall	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Nowkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
19	180		100	see above.	
	1				
	2				
	3				
	4				
	5				
	186				
20	7		100	Sand, 85-95% fine-med, yellow 10YR 7/8, well sorted, some white mottling, soft, subangular - subrounded.	
	8				
	9				
	190				
	1				
	2				
	3				
	4				
	5				
	196				
21	7		100	Silty Clay, reddish yellow 7.5YR 6/8, not very moist, crumbly, firm, v. pale 10YR 7/4 clay clasts throughout.	
	8				
	9				
	200				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/23/98	Sheet: 11 of 11
Well Number: MRS 14	Location: A-14	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	200			see above	
21	1		100	silty clay, hardpan colors light gray 10YR 7/2 and dark yellowish brn. 10YR 4/6, dark to very dark at 203FT, subangular granules, pebbles and some cobbles at 204', cobbles are quartz sandstone, hard-v.hard, firm.	
	2				
	3				
	4				
	5				
	206			clay, gray, very good clay, speckled with dark gray and pyrite present.	Ellenton clay
22	7				
	8		100		
	9				
	0				
	211				
	2				
	3				
	4				
	5				
	216			T.D.	
	7				
	8				
	9				
	0				

Field Geologic Log

Project		Date	Sheet
A/M Characterization		2/17/98	1 of 8
Well Number / Core: MRS 15	Location: Adjacent to MSB 10	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: Rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
1	0–7		100	Sand, med 80-90%, dk yellow brn some sandy clay present, some roots present, firm, first 2.5 FT is disturbed by hand auger.	
				Sandy clay, clay 60-70%, red 2.5YR 4/8, some yellow mottling, hard.	
2	7–17		100	Sandy Clay, clay 60-70% grading down to Sandy Clay 40-50%, red 2.5YR 4/8, some yellow mottling, hard firm, granulars and occasional pebbles in top 3 FT.	
3	17–20		100	Clayey Sand, Sand 50-65%, red 2.5YR 4/8, med, well sorted, subangular-subrounded firm, some mica present at only 18 FT, Sand, 90 increasing down, yellow mottling 23'-24'.	

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Characterization		Date: 2/18/98	Sheet: 2 of 8
Well Number: MRS 15	Location: A/M area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: Rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	20			see above.	
	1				
	2				
3	3		100	Silty, sandy Clay, clay 55-70%, red 10R 4/8, mica present throughout, hard, white and yellow mottling throughout	
	4				
	5				
	6				
	27			Same as above	
	8				
	9			Clayey Silty Sand, Sand 90-60%, Clay 40-30%, med.-fine, red 2.5YR 4/8, sand % increasing down, occasional mica present.	
	30		100		
4	1				
	2			Silty Sand, Fine-very fine, Sand % increasing down, main color is red 2.6 YR 5/8 from 35' to 37 FT weak purple red 10R 5/3, white and some yellow mottling throughout, some very thin white clay laminae throughout, some clay near top, very fine mica present throughout.	
	3				
	4				
	5				
	6				
	37			Sand fine-very fine, sand 85-90% silt 10-15%, multiple color changes listed down: red, light red, purple and red, yellow, red, well sorted, mica present	
5	8		90%		
	9				
	40				

Field Geologic Log

Project	Date	Sheet
DNAPL Characterization	2/18/98	3 of 8

Well Number	Location	Drilling Subcontractor
MRS 15	M Area	Alliance

Logs Prepared By	Driller
Jay Woonkester	Ed Miller

Company	Drilling Method
WSRC	Rotasonic

Fin Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
5	40		90%	see above	
	41				
	42				
	43				
	44				
	45			silty sand, sand 50%, silt 40%, clay 10%, interbedded red and purple, mica present, sand very fine.	
	46				
	47				
6	48		70%	Sand, fine-med, 85-90%, red 10R 4/6, and interbedded with pale red 10R 6/3, well sorted, subangular.	
	49				
	50				
	51				
	52				
	53				
	54				
	55				
	56				
	57				
7	58		60	Sand, med, 90-95%, weak red 10R 5/4 with some interbedded red 10R 5/6, well sorted, one orange interbedded ~~sand bed~~ sand, area bottom (62.6ft), a very thin silty layer that is dry is ~~also~~ at 62.5'.	
	59				
	60				

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Char.		Date: 2/19/99	Sheet: 4 of 8
Well Number: MRS 25	Location: msB 10 cluster	Drilling Subcontractor: Alliance	
Logs Prepared By: J. NoonKester		Driller: Ed Miller	
Company: WSRC		Drilling Method: Rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
7	6 0 1 2 3 4 5 6		60	see above	
	6 7			Sand, med-coarse, 90-95%, weak red 10R 5/4 (purple), some v. coarse sand, mod. sorted, subangular - subrounded, soft.	
	7 0			← same as above but yellow 10YR 7/8	
8	1 2 3 4 5 6		70%	Sand, med-coarse, 90-98%, yellow 10YR 7/8, some v. coarse sand present, mod sorted, subangular - subrounded, soft, white mottling throughout.	
	7 7				
9	8 0 8 9		70%	Sand, med.-coarse 90-95%, yellow 10YR 7/8, mod. sorted, subangular - subrounded, granules and pebbles (well rounded) starting at 80 ft down to 83 ft., several thick sandy clay laminae (10-20 mm) of varying colors, white, purple, and brown.	

Field Geologic Log

Project		Date	Sheet
DNAPL Characterization		2/19/98	5 of 8
Well Number	**Location**	**Drilling Subcontractor**	
MRS-15	MSB10 well cluster	Alliance	
Logs Prepared By		**Driller**	
J. Noonkester		Ed Miller	
Company		**Drilling Method**	
WSRC		Rotosonic	

Fin Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
9	80		70	see above.	
	1				
	2				
	3				
	4				
	5				
	6				
	87				
10	8		90	Clayey Sand, med-coarse, Sand 70%-50% Sand % decreasing down, Strong brn 7.5YR 5/6, Two thin brn. clay laminae, mod sorted.	
	9				
	90			Clay grading down to a sandy clay, brownish yellow 10YR 6/8, some white mottling in clay, first 0.5FT is very good clay.	
	1				
	2			Sand, fine-med. with some v. fine, 85-95%, Sand % increasing down, reddish yellow 7.5YR 6/8, subangular-subrounded, mod sorted.	
	3				
	4				
	5				
	6				
	97				
11	8		96	Sand, coarse-v. coarse, 90-95% some fine and v. fin sand, mod-poorly sorted, color light Gellowish brn, increasing yellow down, subangular-subrounded, some ferromagnesian minerals present.	First 5FT appears as though it has been washed with drilling waters. The color and fines% may not be accurate.
	9				
	100				

Field Geologic Log

Project	Date	Sheet
DNAPL characterization	2/19/98	6 of 8
Well Number	**Location**	**Drilling Subcontractor**
MRS 15	MSB10 well cluster	Alliance
Logs Prepared By		**Driller**
J. Noonkester		Ed Miller
Company		**Drilling Method**
WSRC		Roto Sonic

Frm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	100			see above.	
	1				
	2				
11	3		90	clayey silty Sand, Sand 55-65%, silt & clay 45-35%, V. fine - coarse with many V. coarse, granules, and pebbles, strong brn 7.5YR 5/8, poorly sorted	
	4			Sand, med. - coarse, 75-90% sand & increasing downw, many pebbles & granules reddish yellow 7.5YR 6/8, poorly sorted, interbedded white sand.	
	5				
	6			Silty Sand, Sand 65-75%, V fine - med, poorly sorted, strong brn 7.5YR 5/6, silt decreasing downw.	
	107				
	8			Silt grad down to a coarse Sand, light yellowish brn, med - poorly sorted, at top silt is 70%, many V. coarse, granulars and pebbles, soft, saturated by drilling water.	This run is very disrupted by drilling water, description may not be accurate.
	9				
	110		50%	Silt, 70%, Sand 30%, Sand V. fine - med, poorly sorted, V. hard, color as above	
12	1				
	2				
	3				
	114				
	5			Silty Sand grading down to a V. coarse sand, first 3 FT, is pale yellow 2.5YR 7/4, from 117 to 118' the color is reddish yellow 7.5YR 6/8, many granules and pebble increasing down, light grey clay lamina at 117.5', clayey sand near bottom, some very fine ferromag. minerals throughout.	color of first 3 FT. is wash out, so color description may not be accurate.
	6				
13	7		66		
	8				
	9				
	120				

Field Geologic Log

Project: DNAPL Characterization		Date: 2/20/98	Sheet: 7 of 8
Well Number: MRS 15	Location: adjacent to SB10 well cluster	Drilling Subcontractor: Alliance	
Logs Prepared By: J. Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: Rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	120				
	1			Sand, 90-75%, sand fining down from coarse to med., silt and clay % increasing down, strong brn 7.5YR 4/6, mod-poorly sorted, many granules throughout, ferronag minerals (v.f.m.) throughout.	
14	2				
	3		100		
	4			Sandy Clay grading down to silty v. fine Sand dk. reddish brn. 5YR 3/4, poorly sorted	
	5				
	6			Sand, 85-95%, banding throughout, colors, brn, yellow, tan, orange, fine-med., one v. thin grey clay laring, with thin black sand adjacent.	
	127				
	8			Sand, 85-90%, med.-fine, some coarse, mod sorted, brownish yellow 10YR 6/8, Silt & clay % increasing down, subangular-subrounded.	
	9				
15	130		80		
	1				
	2			Sandy CLAY, clay % decreasing down, clay 40%-50%, Strong brn. 7.5YR 5/8, banding of light grey and reddish yellow sand is coarse-med with v. coarse and granules present, poorly sorted.	
	3				
	4			Clayey Silty Sand, Sand 60-80%, sand % increasing down, med-fine, with many coarse, poorly sorted, strong brn 7.5YR 5/8.	
	5				
	6				
	137				
	8			Sand 85-95%, fine-med, yellowish brn. 10YR 5/8, mod sorted, coarsing down, subangular to subrounded	
16	9		70		
	140				

Field Geologic Log

Project		Date	Sheet
DNAPL Characterization		2/20/98	8 of 8
Well Number	**Location**	**Drilling Subcontractor**	
MRS 15	adjacent to MSB10 well cluster	Alliance	
Logs Prepared By		**Driller**	
J. Noonkester		Ed Miller	
Company		**Drilling Method**	
WSRC		Rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	140			See above.	
	1			Clayey Sand grading down to Sandy Clay,	
	2			Clay percent increasing down to 142.5 then	
16	3		70	decreasing to 143.5', sand v.fine-coarse, poorly sorted, brownish yellow 10YR6/8, with	white banding
	4			and some purple banding around 142'. Sand, v.fine, 90-95%, brownish yellow 10YR6/8, well sorted, some silt.	
	5				
	6				
	147				
	8			Sand, 90%, med-coarse, brownish yellow 10YR6/8, grading down to a fine sand, well sorted.	
	9			Silty Sand, sand v.fine, sand 70-80%, brownish yellow 10YR6/8, banding (white)	
	150			Throughout, V.Thin Light Grey clay laminae present	
17	1		100	Sandy Clay, Clay 75-35%, clay % decreasing down, sand is v.fine, muscavite is present,	Green Clay Formation
	2			brownish yellow 10YR6/8 some dark yellowish	
	3			brn banding and some reddish purple banding	
	4			around 152', sand coarsing down to a coarse sand, at 154' The core is a clayey sand, several light grey Thin	
	5			clay laminae are present	
	6			Sand, 70%, fine-med, brownish yellow 10YR6/8, well sorted	TP
	157			END	
	8				
	9				
	0				

Field Geologic Log

Project: DNAPL Characterization		Date: 2/23/98	Sheet: 1 of 9
Well Number: MRS16 (boring 7)	Location: A/M Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: Rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
1	0–7		85%	Sandy Clay, Clay 65-75%, red 2.5YR 4/8, some granules around Sand 6', hard.	
2	7–17		100%	Sandy Clay, Clay 65-75% grading down To 40-50%, red 2.5YR 4/8, yellow mottling from #14'-#17'.	
3	17–20		100	Silty Sandy Clay, Clay 35-45% grading down To a Silty Clayey Sand, red 2.5 YR 5/8, some yellow and white mottling, occasional granules near bottom, some purple mottling last 2 Feet of this run.	

Field Geologic Log

Project: DNAPL Characterization		Date: 2/23/95	Sheet: 2 of 9
Well Number: MRS 16	Location: A/M Area	Drilling Subcontractor: Alliance	
Logs Prepared By: J. Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: Rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
3	20–27		100	see above.	
4	27–30			~~Silty Sand~~ Silty Clayey Sand Sand 60-70%, Sand coarse grading down to med, yellow, white, and red mottling first foot of this run, granules in first foot, subangular to subrounded mod. sorted - poorly sorted.	
	30–32			Sandy, 85-90%, fine-med, first 6 inches is brownish yellow 10YR 6/8 The remaining is red 10R 5/6, well sorted, some white mottling.	
	32–37			Sand, 90-95%, fine grading down to coarse, well sorted, red 2.5YR 5/8. Sand, 85-70%, silt 10-15%, fine-med w/ much v. fine sand, mod sorted, banded color of red, weak red, and pale red with some white and yellow mottling, at 43 FT (cont)	

Field Geologic Log

Project: DNAPL Characterization		Date: 2/23/98	Sheet: 3 of 9
Well Number: MRS 16	Location: A/M Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: Rotosonic	

Fin Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
5	40–46		106	starts to grade down from a fine silty sand to a silty clay. Sand, 90-75%, med, well sorted, dk red 10R 3/6, some yellow & purple mottling.	
6	47–57		70	Sand, med-coarse, 95-97%, banded colors of l. gy red 2.5YR 6/8 and reddish brn. 2.5YR 5/3, well sorted, sub angular - sub rounded, each band of different color is approx. 1 ft. thick.	
7	57–70		80	Sand, med-coarse, 95-97%, reddish brn 2.5YR 5/4, with banding yellow and light reddish brn, some v. coarse, mod sorted.	

Field Geologic Log

Project	DNAPL Characterization	Date	2/23/98	Sheet	4 of 9
Well Number	MRS 16	Location	A/M Area	Drilling Subcontractor	Alliance
Logs Prepared By	J. Noonkester			Driller	Ed Miller
Company	USRC			Drilling Method	Rotosonic

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
7	60–67		80	see above.	
8	67–77		70	Sand, med-coarse, 80-93%, sand coarsing down. From med. to coarse, silt decreasing down, reddish brn. 2.5YR 5/4, med sorted, some yellow and purple mottling. 70 Sand, coarse, 90-75%, yellow 10YR 7/8, well sorted, some v. coarse, subangular-subrounded.	
9	77–80		100	Sand, coarse, 83-90%, yellow 10YR 7/8, well sorted, occasional v. coarse, subangular-subrounded, soft. Sandy Clay, clay 65-75%, clay increasing down, many well rounded granules and pebbles, yellow 10YR 7/8, white mottling. Sand, med-v. coarse, 80-85%, strong brn 7.5YR 5/8, poorly sorted.	

Field Geologic Log

Project: DNAPL Characterization		Date: 3/19/98	Sheet: 5 of 14
Well Number: MRS 14	Location: A-14 outfall	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	80			seeabove.	
	1				
9	2		70	Silty Sand, v. fine-med, strong brn. 7.5 YR 5/8, sand 70-80%, med. v. coase and granules present, poorly sorted.	
	3				
	4				
	5				
	86				
	7			Sand, coarse v. coarse, 93-97% Olive yellow 2.5YR 6/6, well sorted, soft, subangular - subrounded.	First 4 feet of this run was washed out by drilling fluid, core description may not be accurate.
10	8				
	9		100		
	90				
	1			Sand, 80-95%, red 2.5YR 4/8, fine - coarse, sand percent increasing down, occasional v. coarse and granules throughout, poorly sorted, some yellow mottling, soft - firm	
	2				
	3				
	4				
	5				
	96				
	7			Sand, 90±%, yellowish red 5YR 5/6, med., well sorted, some dk. gray staining could be from drilling fluid, soft.	First 6 feets depeass to be partially washed out by drilling fluids.
11	8		100		
	9				
	100				

Field Geologic Log

Project: DNAPL Characterization		Date: 2/24/98	Sheet: 6 of 9
Well Number: MRS16	Location: A/M Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: Votosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
11	100		0		
	1				
	2				
	3				
	4				
	5				
	6				
	107			Sand, v.fine - coarse, coarsing down from a v.fine to coarse sand, well sorted, brownish yellow 10YR 6/6, subangular - subrounded, soft.	
12	8		30		
	9				
	110				
	1				
	2				
	3				
	4				
	5				
	6				
	117			Sand, Fine - med (The first foot is coarse), 90-95%, yellow, 10YR 7/8, well sorted, occasional v.fine ferromag. minerals, subangular - subrounded, v. soft.	The first 3FT of core was wash out by drilling water.
13	8		90		
	9				
	120				

Field Geologic Log

Project: DNAPL Characterization		Date: 2/24/98	Sheet: 7 of 9
Well Number: MRS16	Location: 4/m area	Drilling Subcontractor: Alliance	
Logs Prepared By: J. Noonkester		Driller: Ed. Miller	
Company: WSRC		Drilling Method: Rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
13	12 0		90	See above.	
	1				
	2				
	3				
	4			Sand, med-coarse, 85-90%, strong brn 7.5YR 5/8, much fine and v. fine and some v. coarse, poorly sorted, soft-firm, some v. thin light gray clay laminae and one thick light gray clay lamina at bottom.	
	5				
	6				
	12 7				
14	8		95%	Sand, coarse, 90%, yellow 10YR 7/8, mod sorted, many v. coarse and some med sand, soft, subangular-subrounded.	
	9			Sand (Fine) grading down to a clayey silty Sand, Sand 90% at top to 60-70%, more silt than clay, sand grading down from fine to med-coarse, brownish yellow 10YR 6/8, one v. coarse thin sand lamina at 135.5 ft, some white mottling.	
	13 0				
	1				
	2				
	3				
	4				
	5				
	6				
	13 7				
15	8		30	Sand, fine grading down to v. coarse, 85-90%, brownish yellow 10YR 6/8, well sorted, subangular. Clayey Sand, Sand coarse 65-85%, grading down to a v. fine silty Sand, brownish yellow 10YR 6/8, two thin sandy clay gray laminae, mod sorted.	
	9				
	14 0				

Field Geologic Log

Project: DNAPL Characterization		Date: 2/25/98	Sheet: 8 of 9
Well Number: MRS 16	Location: A/M Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: roto sonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	14 0			see above	
	1				
	2		30		
15	3				
	4				
	5				
	6				
	14 7				
	8			Sand, coarse 80-90%, yellowish brn. 10YR 5/8, mod sorted.	
	9			Sandy Clay, Clay 45-55%, Sand med., yellowish brn 10YR 6/8, some white and purple mottling.	green clay? YES
	15 0			Clayey Silty sand, grading down to a silty very fine sand, sand coarse-med grading down to V. Fine, brownish yellow 10YR 6/8, From 148' TO	
16	1		85	151 feet some v. thin gray sandy clay laminae, some ferrugs. mineral, v. fine.	
	2				
	3				
	4				
	5				
	6				
	15 7				
	8			Sand, fine-v. fine, 70-90%, Silt 10-30%, reddish yellow 7.5YR 6/8,	
817	9		85	mod. sorted, white banding Throughout, some drk red banding, some v. thin	
	16 0			1-2 cm gray clay laminae.	

Field Geologic Log

Project		Date	Sheet
DNAPL Characterization		2/25/98	9 of 9
Well Number	**Location**	**Drilling Subcontractor**	
MRS 16	Almaraes	Alliance	
Logs Prepared By		**Driller**	
Jay Noonkester		Ed Miller	
Company		**Drilling Method**	
WSRC		rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	160			see above.	
	1				
	2				
17	3		85		
	4				
	5				
	6				
	167			T.D.	
	8				
	9				
	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Characterization		Date: 2/26/98	Sheet: 1 of 8
Well Number: MRS 17	Location:	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
1	0–7		100	Sandy Clay, clay 65-75%, sand fine-med, red 2.5YR 4/6, mod sorted.	
2	7–17		100	Sandy Clay, clay 45-55%, clay decreasing down, red 2.5YR 4/6, sand fine-med, some muscovite present, poorly sorted, silt and v.f.g. sand increasing down, some white mottling from 13ft. to 17ft.	
3	17–20		100	Sandy Clay, clay 50-60%, sand is coarse, some muscovite present red 2.5YR 4/8, some white and yellow mottling, hard.	

Field Geologic Log

Project: DNAPL Characterization		Date: 3/16/98	Sheet: 2 of 11
Well Number: MRS 14	Location: A-14 outfall	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Rm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
3	20–26		100	see above.	
4	26–31		50	Silty Sand, Sand 60-70%, v fine - med., sand fining down, mod sorted, light red 2.5YR 6/8, some white and yellow mottling, hard-firm.	
	31–36				
5	36–41		100	Silty Sand, Sand 60-75%, coarse - v. fine, light reddish brown, 2.5YR 6/4, poorly sorted, soft-firm, some white mottling.	

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Characterization		Date: 2/26/98	Sheet: 3 of 8
Well Number: MRS 17	Location: A/M Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: roto sonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
5	40		65	see above	
	47			Sand, med-coarse, weak red 10R5/4, soft, well sorted. Sandy clay grading down to clay at 58-ft? Then back to a sandy clay at 58.5 ft? reddish gray 10R6/1 with banding of dusky red 10R3/3, and yellow and white, hard-firm	
6	50		65	Sand, med-coarse, 90-99%, drk. red 10R3/6, soft-firm, well sorted. Sand, fine-med, 90-99%, weak red 10R5/4 with banding of yellow, and brown, soft, mod sorted.	
	57				
7	60		60	Sand, coarse-med., 95% banded colors of yellowish red 5YR5/8 and weak red 10R5/4, well sorted, soft.	

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Characterization		Date: 2/26/98	Sheet: 3 of 8
Well Number: MRS 17	Location: A/M Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: roto sonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
5	40		65	see above.	
	41				
	42				
	43				
	44				
	45				
	46				
	47				
6	48		65	Sand, med-coarse, weak red 10R5/4, soft, well sorted. Sandy clay grading down to clay at 58-ft? Then back to a sandy clay at 58.5 ft? reddish gray 10R6/1 with banding of dusky red 10R3/3, and yellow and white, hard-firm.	
	49				
	50				
	51			Sand, med-coarse, 90-95%, drk. red 10R3/6, soft-firm, well sorted.	
	52			Sand, fine-med, 90-95%, weak red 10R5/4 with banding of yellow, and brown, soft, mod sorted.	
	53				
	54				
	55				
	56				
	57				
7	58		60	Sand, coarse-med., 95% banded colors of yellowish red 5YR5/8 and weak red 10R5/4, well sorted, soft.	
	59				
	60				

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Characterization		Date: 2/26/98	Sheet: 4 of 8
Well Number: MRS 17	Location: A/M area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: roto sonic	

Fin Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
7	60–67		60	see above.	
8	67–77		50	Sand med-coarse, 90-95%, yellowish red 5YR4/6 with bands from 70FT to 72FT of yellow, purple, & yellowish red, well sorted, SOFT.	
9	77–80		100	Sand, med-coarse, 90-95%, reddish brn 5YR4/4, well sorted, SOFT, subangular-subrounded, occasional ferromag. minerals (v. fine).	

Field Geologic Log

Project		Date	Sheet
DNAPL Characterization		3/19/98	5 of 14
Well Number	**Location**	**Drilling Subcontractor**	
MRS 14	A-14 outfall	Alliance	
Logs Prepared By		**Driller**	
Jay Noonkester		Ed Miller	
Company		**Drilling Method**	
WSRC		rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	80			seeabove.	
	1				
9	2		70	Silty Sand, v. fine-med, strong brn. 7.5 YR 5/8, sand 70-80%, med. v. coase and granules present, poorly sorted.	
	3				
	4				
	5				
	86				
	7			Sand, coarse v. coarse, 93-97% Olive yellow 2.5YR 6/6, well sorted, soft, subangular - subrounded.	First 4 feet of this run was washed out by drilling fluid, core description may not be accurate.
10	8				
	9		100		
	90				
	1			Sand, 80-95%, red 2.5YR 4/8, fine - coarse, sand percent increasing down, occasional v. coarse and granules throughout, poorly sorted, some yellow mottling, soft - firm	
	2				
	3				
	4				
	5				
	96				
	7			Sand, 90-95%, yellowish red 5YR 5/6, med., well sorted, some dk. gray staining could be from drilling fluid, soft.	First 6 feets depeass to be partially washed out by drilling fluids.
11	8		100		
	9				
	100				

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Characterization		Date: 2/27/98	Sheet: 6 of 8
Well Number: MRS 17	Location: A/M area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	100			see above.	
	1				
11	2		100	Sandy Clay, strong brn. 7.5YR5/8, clay 9a 65-80%, at 105 ft core grades down to a sand which is solidified, granules and pebbles at bottom	
	3				
	4				
	5				
	6				
	107			Sand, v.fine - fine, 85%, 15% silt, dry at top (106 ft), well sorted, reddish yellow 7.5YR 6/8.	
	8			Sand, med. coarse, 85-90%, strong brn. 7.5YR 4/6, many v. coarse granules, and occasional pebbles, poorly sorted, firm, several light gray clay laminae	
	9				
	110				
12	1		70%	clayey sand grading down to sand, sand is med-coarse with v. coarse and granules, poorly sorted, strong brn 7.5YR 4/6, clay 9a greatest between 112 and 113 ft.	
	2				
	3				
	4				
	5				
	6				
	117				
	8			Sand, 85-90%, med-coarse, reddish yellow 7.5YR 6/8, mod. sorted, occasional v. coarse and granules, soft.	
13	9		30		
	120				

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Characterization		Date: 2/27/98	Sheet: 7 of 8
Well Number: MRS 17	Location: A/M Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fin Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
13	120		30	see above	
	1				
	2				
	3				
	4				
	5				
	6				
	127			Sand, fine-med, 85-90%, brownish yellow 10YR6/8, soft, mod sorted	
	8				
	9				
	130			Sandy clay, clay 40-60%, Sand med-coarse with occasional v. coarse and granules, white mottling throughout, poorly sorted, firm, brownish yellow 10YR6/8.	
14	1		90		
	2				
	3				
	4				
	5			Sand, v. fine-med with many v. coarse, brownish yellow 10YR6/8, poorly sorted, soft.	
	6				
	137				
	8			Sand 80-90%, v. fine-med, brownish yellow 10YR7/8, soft, mod sorted. Sandy clay from 138 to 138.5 ft Then Clayey Sand grading down to a Sand, Sand is med.-coarse with concentrations of granules and pebbles, some white mottling between 139 and 140 ft, soft, poorly sorted.	
	9				
	140				

OSR 30-27# (2-12-97)

Field Geologic Log

Project: DNAPL Characterization		Date: 2/27/98	Sheet: 8 of 8
Well Number: MRS 7	Location: A/M Area	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noakester		Driller: Ed Miller	
Company: USRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
15	14 0 1 2 3 4 5 6 14 7		55	see above.	
16	8 9 15 0 1 2 3 4 5 6 7		100	Sandy Clay, clay 70-75%, yellowish brn. 10YR 5/8, white and reddish purple banding. Clayey Sand grading down to a silty sand, brownish yellow, 10YR 6/8 grading down to Yellow 10YR 7/8. sand grading from a med-coarse TO fine - V. Fine, occasional v. coarse and granules, mod sorted, v. thin and thin light gray clay laminae throughout	green clay formation T.D.
	8 9 0				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/9/98	Sheet: 1 of 8
Well Number: MRS 18	Location: Near A-14 outfall	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noowkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
1	0–4		100	Clayey Sand grading down to a sandy clay, sand med., strong brn 7.5YR5/8, some granules present around 3 and 4 feet,	
	4–7			Sandy Clay red 10R4/8, sand med., hard, mod sorted.	
2	7–11		100	Sandy Clay, Clay 65-70%, red 2.5YR4/6, yello-mottling throughout, sand med., hard-firm.	
3	11–17		83%	Sandy clay, Clay 55-65%, red 2.5YR4/6, sand med.-coarse, with occasional granules, hard-firm.	
4	17–20		100	Sandy clay grading down to a clayey coarse sand, red 2.5YR4/6, sand grading down from med. to coarse, some white mottling, hard-firm.	

Field Geologic Log

Project: DNAPL Characterization		Date: 3/9/89	Sheet: 2 of 8
Well Number: MRS 18	Location: near A14 Outfall	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: roto sonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	20			see above.	
	1				
	2				
4	3		100	Clayey sand grading down to sand, red 10R 5/8, sand coarse, some bluish gray and white mottling, firm to soft, some med and fine sand present, poorly sorted.	
	4				
	5				
	6				
	27				
	8			Sand, coarse, 95-95%, red 2.5YR 4/8, well sorted, sub angular - subrounded, soft.	
	9				
	30				
	1		90		
5				Sand, coarse - fine, reddish yellow 7.5YR 6/8, sand fining down, well sorted, subangular - subrounded, several thin gray clay laminae, soft.	
	2				
	3				
	4				
	5				
	6			Silty sand, v.fine - fine, red 2.5YR 4/8, soft, mod sorted.	
	37				
	8			Sand coarse - v. coarse, 85-90%, strong brn. 7.5YR 4/6, subangular - subrounded, well sorted, soft.	
6	9		190		
	40			Clayey silty sand, sand coarse - v.fine, sand 60% - 85%, brown 7.5YR 5/4, see next pg.	

Field Geologic Log

Project		Date	Sheet
DNAPL Characterization		3/9/98	3 of 8
Well Number	**Location**	**Drilling Subcontractor**	
MRS 18	Near A-14 outfall	Alliance	
Logs Prepared By		**Driller**	
Jay Noonkester		Ed Miller	
Company		**Drilling Method**	
WSRC		Rotosonic	

Fin Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	40			Sand is fining down from coarse to ~~v.fine~~ fine, clay is decreasing down, silt is decreasing down, mottling throughout of bluish gray, yellow and reddish yellow, hard - soft,	
	1				
	2				
6	3		100		
	4				
	5				
	6				
	47			Silty Sand grading down to a clayey silty sand, sand fine grading down to v. fine, reddish brown 2.5YR 4/4, sand decreasing down from 80+-% to 60+-%, soft to hard, some bluish gray sandy clay laminae (v. thin), at 49.5 ft.	
	8				
7	9		100		
	50				
	1				
	2				
	3				
	4			Clayey Sandy Silt brownish yellow 10YR 6/8, Clay and silt increasing down, sand is v. fine, some pink and white mottling,	
	5				
	6				
	57				
	8			Sandy Clay grading down to a clayey sand, brownish yellow 6/8, sand med-fine, some white and purple mottling, soft - firm, some granules and pebbles around 64 feet, at 65 FT The core is sand.	
8	9		100		
	60				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/10/98	Sheet: 4 of 8
Well Number: MRS 18	Location: Near A-14	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
8	60		100	see above.	
	61				
	62				
	63				
	64				
	65				
	66				
	67				
9	67		30	Silty sand, sand 70-80%, brownish yellow 10YR 6/8, sand med., with many fines, poorly sorted, lots of granules and pebbles abound 68 feet	
	68				
	69				
	70				
	71				
	72				
	73				
	74				
	75				
	76				
	77				
10	77		100	Sand, med-coarse, 78-88% brownish yellow 10YR6/8, mod-poorly sorted, from 81 FT TO 82 FT many granules and pebbles well-rounded, at 80 feet several gray clay laminae, softy clay to increasing down.	
	78				
	79				
	80				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/10/98	Sheet: 5 of 8
Well Number: MRS 18	Location: Near A-14	Drilling Subcontractor: Alliance	
Logs Prepared By: Joy Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	80			see above.	
	1				
10	2		100	Sandy clay, clay 45-55%, sand fine - v. coarse with granules and occasional pebbles, poorly sorted, firm.	
	3				
	4			Sand, 93-98%, reddish yellow 7.5YR 6/8 from 84 TO 85.5FT Then red 2.5YR 5/8, med-fine, SOFT, well sorted.	
	5				
	6				
	87				
	8			Sand, Fine-med, 85-95%, reddish yellow 5YR6/8, mod sorted some granules and occasional pebbles around 91.6FT, SOFT,	
	9				
11	90		100		
	1				
	2				
	3				
	4				
	5				
	6				
	97				
	8			Sand, Fine-coarse, 80-85%, yellowish red 5YR 5/8, poorly sorted, some V. coarse present, subangular-subrounded, SOFT-firm.	
12	9		100		
	100				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/10/98	Sheet: 6 of 8
Well Number: MRS 18	Location: Near A-14	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: Rotosonic	

Run Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
12	100		100		
	1				
	2				
	3			Sand, 78-88%, med, red, 2.5YR 4/6, mod sorted, some v. coarse and granules increasing down, 2 thick bedded clays at 102 FT of a color weak red 10R 4/4, A very sand clay	
	4				
	5				
	6				
	107				
13	8		100	Sand, med, 87-95%, reddish yellow, 7.5YR 6/8, well sorted, soft, subangular-subrounded.	
	9				
	110				
	1			Clayey Sand, Fine-coarse, 70-85%, strong brn 7.5YR 5/8, From 115 To 117 FT grading To a v. fine-fine sand, poorly sorted, many v. coarse, granules and pebbles, one strong brown thin clay lamina at 115.5 FT.	
	2				
	3				
	4				
	5				
	6				
	117				
14	8		90	Sand, coarse-med, reddish yellow 7.5YR 6/8 sand 70-90%, subangular-subrounded, soft, some v. coarse and occasional granules, mod sorted.	First 6 feet are washed out by drillers water, core description may not be accurate.
	9				
	120				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/10/98	Sheet: 1 of 8
Well Number: MRS 18	Location: Near A-14	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: USRC		Drilling Method: rotosonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	120			see above.	
	1				
14	2		90		
	3				
	4			Silty sand, sand 65-75%, strong brn, 7.5YR 4/6, sand v.fine-fine, mod sorted, from 124.5 to 126 FT The core is complete dust dry, above and below very moist	
	5				
	6				
	127				
	8			Sand coarse-med, yellowish brn, 10YR5/8, sand 80-85%, poorly sorted, many v.coarse, granules and occasional pebbles, soft-firm, some silty clay ex laminae, v.thin at 129 feet	
15	9		100		
	130				
	1			Silty sand grading down to a sandy clay, yellowish brn, 10YR5/8, from 134 FT down Thin banded colors of yellowish brn, brown, and yellow, some shelly sandy lenses present, sand v.fine grading down to coarse, soft-firm, shell fragments are pinkish white.	
	2				
	3				
	4				
	5				
	6				
	137				
	8			Sand grading down to a silty sand and coarse grading down to v.fine, yellowish brn 10YR5/8, mod sorted 2 1/2 LT gray clay laminae, some v.coarse down to 140 FT.	
16	9		100		
	140				

Field Geologic Log

Project: DNAPL Characterization		Date: 3/10/98	Sheet: 8 of 8
Well Number: MRS 18	Location: near A-14	Drilling Subcontractor: Alliance	
Logs Prepared By: Jay Noonkester		Driller: Ed Miller	
Company: WSRC		Drilling Method: roto sonic	

Fm Number	Depth Below Ground Surface (Feet)	Lithology	Percent Recovery	Sample Description	Drilling Comments/Remarks
	14 0			see above	
	1				
	2		100		
16	3				
	4				
	5				
	6			Sandy Clay, clay 55-65% decreasing down to 35-45%, banding colors of dk red, brownish yellow, and light gray banding is v. thin	green clay
	14 7				
	8			Clayey Sand, sand 55-65%, strong brn 7.5YR 5/8, clay % increasing down, poorly sorted sand fine-coase with occasional granules.	
	9				
	15 0		90	Sandy clay grading into clay and the grading into sandy clay, banded colors of dk red, brownish yellow, and light gray.	green clay continues.
17	1				
	2				
	3			Clayey silty sand, brownish yellow, sand mod. v. fine, sand fining down.	
	4				
	5				
	6				
	15 7				
	8				
	9				
	0				

Appendix C: Borehole Location and Construction Data and Lithology Data

FY1997 A/M AREA MRS (M Area Rotosonic) BOREHOLE LOCATION AND CONSTRUCTION DATA, SAVANNAH RIVER SITE IN SOUTH CAROLINA

	srs coordinates (ft)		elevation (ft)			
Well ID	easting	northing	TVDSS	symbol	linecol	depth (ft)
MRS06	49323.88	104352.30	368.73	13	2	
MRS06	49323.88	104352.30	208.73			160
MRS06A	49374.98	104349.40	370.07	13	2	
MRS06A	49374.98	104349.40	205.07			165
MRS08	48524.40	102204.30	358.68	13	2	
MRS08	48524.40	102204.30	193.68			165
MRS09	49741.50	102769.40	360.88	13	2	
MRS09	49741.50	102769.40	134.88			226
MRS10	49704.30	102936.80	363.86	13	2	
MRS10	49704.30	102936.80	127.86			236
MRS11	50144.20	101855.50	341.07	13	2	
MRS11	50144.20	101855.50	135.07			206
MRS12	49279.18	104340.80	370.61	13	2	
MRS12	49279.18	104340.80	125.61			245
MRS13	48236.93	102110.80	354.15	13	2	
MRS13	48236.93	102110.80	127.15			227
MRS14	49993.04	102055.70	348.55	13	2	
MRS14	49993.04	102055.70	141.55			207
MRS15	47945.83	102476.30	355.41	13	2	
MRS15	47945.83	102476.30	198.41			157
MRS16	47737.80	102487.00	352.76	13	2	
MRS16	47737.80	102487.00	185.76			167
MRS17	47508.41	102425.90	348.79	13	2	
MRS17	47508.41	102425.90	191.79			157
MRS18	49662.75	102050.00	352.35	13	2	
MRS18	49662.75	102050.00	195.35			157

notes:
For each borehole the coordinates, and top and bottom elevations are listed.
The symbol and linecolor are used in plotting the data and the well depth is listed.

LITHOLOGY DATA FROM A/M AREA AT THE SAVANNAH RIVER SITE IN SOUTH CAROLINA
data are estimated percent clay and lithologic descriptions by Jay Noonkester during the FY 1997 M Area Rotosonic drilling activities (field logs). Notations of pebbles and granules listed as gravel, mud (i.e., fine grained sediments such as clays and silts) listed as clay, notations of laminae not listed.

Lithology Definitions (after Folk, Jour Geol 62:345-351, 1954)

sand	less than	10 percent clay and silt
clayey_sand	less than	50 percent clay and silt
sandy_clay	less than	90 percent clay and silt
clay	more than	90 percent clay and silt

Well ID	top (depth)	bot (depth)	lithology	percent clay	gravel	avg depth
MRS06	0.0	3.0	clayey_sand	25	FALSE	1.5
MRS06	3.0	4.0	sandy_clay	70	FALSE	3.5
MRS06	4.0	5.0	missing		FALSE	4.5
MRS06	5.0	7.0	clayey_sand_w_gravel	30	TRUE	6
MRS06	7.0	15.0	sandy_clay	50	FALSE	11
MRS06	15.0	17.0	clayey_sand	25	FALSE	16
MRS06	17.0	25.0	sand	0	FALSE	21
MRS06	25.0	26.0	clayey_sand	25	FALSE	25.5
MRS06	26.0	30.0	clayey_sand	25	FALSE	28
MRS06	30.0	35.0	missing		FALSE	32.5
MRS06	35.0	36.0	clayey_sand	15	FALSE	35.5
MRS06	36.0	37.0	clayey_sand	22	FALSE	36.5
MRS06	37.0	39.0	clay	90	FALSE	38
MRS06	39.0	41.0	clayey_sand	22	FALSE	40
MRS06	41.0	42.0	clay	90	FALSE	41.5
MRS06	42.0	45.0	missing		FALSE	43.5
MRS06	45.0	48.0	clayey_sand	12	FALSE	46.5
MRS06	48.0	49.0	clay	90	FALSE	48.5
MRS06	49.0	50.0	clayey_sand	12	FALSE	49.5
MRS06	50.0	55.0	missing		FALSE	52.5
MRS06	55.0	59.0	clayey_sand	15	FALSE	57
MRS06	59.0	60.0	clay	90	FALSE	59.5
MRS06	60.0	61.0	clayey_sand	25	FALSE	60.5
MRS06	61.0	65.0	missing		FALSE	63
MRS06	65.0	69.0	sand	6	FALSE	67
MRS06	69.0	75.0	missing		FALSE	72
MRS06	75.0	81.0	sand	4	FALSE	78
MRS06	81.0	85.0	missing		FALSE	83
MRS06	85.0	87.0	clayey_sand_w_gravel	18	TRUE	86
MRS06	87.0	89.0	clayey_sand	32	FALSE	88
MRS06	89.0	93.0	sand	0	FALSE	91
MRS06	93.0	95.0	missing		FALSE	94
MRS06	95.0	98.0	clayey_sand_w_gravel	15	TRUE	96.5
MRS06	98.0	105.0	missing		FALSE	101.5
MRS06	105.0	111.0	sand	0	FALSE	108

Well ID	top (depth)	bot (depth)	lithology	percent clay	gravel	avg depth
MRS06	111.0	115.0	missing		FALSE	113
MRS06	115.0	117.0	clayey_sand	15	FALSE	116
MRS06	117.0	118.0	clayey_sand_w_gravel	25	TRUE	117.5
MRS06	118.0	120.0	clayey_sand_w_gravel	15	TRUE	119
MRS06	120.0	125.0	missing		FALSE	122.5
MRS06	125.0	133.0	clayey_sand	18	FALSE	129
MRS06	133.0	135.0	missing		FALSE	134
MRS06	135.0	139.5	clayey_sand	40	FALSE	137.25
MRS06	139.5	145.0	missing		FALSE	142.25
MRS06	145.0	151.0	clayey_sand	18	FALSE	148
MRS06A	0.0	5.0	missing		FALSE	2.5
MRS06A	5.0	20.0	sandy_clay	50	FALSE	12.5
MRS06A	20.0	25.0	sandy_clay	60	FALSE	22.5
MRS06A	25.0	31.0	sandy_clay	75	FALSE	28
MRS06A	31.0	35.0	sandy_clay	50	FALSE	33
MRS06A	35.0	45.0	clayey_sand	23	FALSE	40
MRS06A	45.0	48.0	sand	10	FALSE	46.5
MRS06A	48.0	54.0	clayey_sand	25	FALSE	51
MRS06A	54.0	55.0	missing		FALSE	54.5
MRS06A	55.0	58.0	sand	10	FALSE	56.5
MRS06A	58.0	60.0	clayey_sand	42	FALSE	59
MRS06A	60.0	63.0	clayey_sand	40	FALSE	61.5
MRS06A	63.0	65.0	missing		FALSE	64
MRS06A	65.0	69.0	sand	0	FALSE	67
MRS06A	69.0	75.0	missing		FALSE	72
MRS06A	75.0	84.0	sand	8	FALSE	79.5
MRS06A	84.0	85.0	missing		FALSE	84.5
MRS06A	85.0	89.5	sand_w_gravel	8	TRUE	87.25
MRS06A	89.5	92.0	clayey_sand	20	FALSE	90.75
MRS06A	92.0	94.0	sandy_clay	50	FALSE	93
MRS06A	94.0	95.0	missing		FALSE	94.5
MRS06A	95.0	100.0	sand_w_gravel	8	TRUE	97.5
MRS06A	100.0	105.0	missing		FALSE	102.5
MRS06A	105.0	109.0	sand	10	FALSE	107
MRS06A	109.0	115.0	missing		FALSE	112
MRS06A	115.0	122.0	clayey_sand_w_gravel	13	TRUE	118.5
MRS06A	122.0	123.0	clayey_sand_w_gravel	35	TRUE	122.5
MRS06A	123.0	125.0	missing		FALSE	124
MRS06A	125.0	126.5	sand	8	FALSE	125.75
MRS06A	126.5	131.0	clayey_sand_w_gravel	12	TRUE	128.75
MRS06A	131.0	132.0	clayey_sand	12	FALSE	131.5
MRS06A	132.0	133.0	clayey_sand	25	FALSE	132.5
MRS06A	133.0	134.0	sandy_clay	50	FALSE	133.5
MRS06A	134.0	135.0	missing		FALSE	134.5
MRS06A	135.0	143.0	clayey_sand	20	FALSE	139
MRS06A	143.0	153.5	sand	10	FALSE	148.25

Well ID	top (depth)	bot (depth)	lithology	percent clay	gravel	avg depth
MRS06A	153.5	154.5	clayey_sand	25	FALSE	154
MRS06A	154.5	155.0	sand_w_gravel	0	TRUE	154.75
MRS06A	155.0	158.0	sand	10	FALSE	156.5
MRS06A	158.0	159.0	clay	90	FALSE	158.5
MRS06A	159.0	162.0	sand	10	FALSE	160.5
MRS06A	162.0	165.0	clay	90	FALSE	163.5
MRS08	0.0	5.0	sandy_clay_w_gravel	88	TRUE	2.5
MRS08	5.0	17.5	sandy_clay	50	FALSE	11.25
MRS08	17.5	23.0	clay	100	FALSE	20.25
MRS08	23.0	25.0	clayey_sand	22	FALSE	24
MRS08	25.0	32.0	sand	10	FALSE	28.5
MRS08	32.0	35.0	missing		FALSE	33.5
MRS08	35.0	39.0	sand	5	FALSE	37
MRS08	39.0	45.0	clayey_sand	40	FALSE	42
MRS08	45.0	46.0	clay	90	FALSE	45.5
MRS08	46.0	55.0	sand	8	FALSE	50.5
MRS08	55.0	58.0	clayey_sand	25	FALSE	56.5
MRS08	58.0	62.0	sandy_clay	75	FALSE	60
MRS08	62.0	65.0	clayey_sand	25	FALSE	63.5
MRS08	65.0	67.0	clayey_sand_w_gravel	30	TRUE	66
MRS08	67.0	72.5	sand	10	FALSE	69.75
MRS08	72.5	75.0	missing		FALSE	73.75
MRS08	75.0	82.0	sand	3	FALSE	78.5
MRS08	82.0	85.0	missing		FALSE	83.5
MRS08	85.0	90.0	clayey_sand_w_gravel	25	TRUE	87.5
MRS08	90.0	95.0	missing		FALSE	92.5
MRS08	95.0	97.0	clayey_sand	32	FALSE	96
MRS08	97.0	99.0	clay	100	FALSE	98
MRS08	99.0	103.0	clayey_sand	28	FALSE	101
MRS08	103.0	105.0	missing		FALSE	104
MRS08	105.0	115.0	clayey_sand	15	FALSE	110
MRS08	115.0	116.5	sand	5	FALSE	115.75
MRS08	116.5	125.0	clayey_sand	15	FALSE	120.75
MRS08	125.0	131.0	sand	5	FALSE	128
MRS08	131.0	135.0	sand	10	FALSE	133
MRS08	135.0	139.0	clayey_sand	15	FALSE	137
MRS08	139.0	140.0	clayey_sand	25	FALSE	139.5
MRS08	140.0	142.0	sandy_clay	75	FALSE	141
MRS08	142.0	145.0	clayey_sand_w_gravel	10	TRUE	143.5
MRS08	145.0	151.0	sand_w_gravel	6	TRUE	148
MRS08	151.0	155.0	missing		FALSE	153
MRS08	155.0	157.5	clay	95	FALSE	156.25
MRS08	157.5	160.0	clayey_sand	25	FALSE	158.75
MRS08	160.0	165.0	clayey_sand	12	FALSE	162.5
MRS09	0.0	3.0	clayey_sand	25	FALSE	1.5
MRS09	3.0	4.0	sand	5	FALSE	3.5

Well ID	top (depth)	bot (depth)	lithology	percent clay	gravel	avg depth
MRS09	4.0	5.0	clayey_sand	30	FALSE	4.5
MRS09	5.0	6.0	missing		FALSE	5.5
MRS09	6.0	15.0	sandy_clay	60	FALSE	10.5
MRS09	15.0	16.0	missing		FALSE	15.5
MRS09	16.0	20.0	sandy_clay	60	FALSE	18
MRS09	20.0	26.0	missing		FALSE	23
MRS09	26.0	28.5	clayey_sand	15	FALSE	27.25
MRS09	28.5	31.0	clayey_sand	20	FALSE	29.75
MRS09	31.0	36.0	missing		FALSE	33.5
MRS09	36.0	38.0	clayey_sand	15	FALSE	37
MRS09	38.0	40.0	clayey_sand_w_gravel	30	TRUE	39
MRS09	40.0	43.0	sand	10	FALSE	41.5
MRS09	43.0	46.0	missing		FALSE	44.5
MRS09	46.0	47.0	clayey_sand	15	FALSE	46.5
MRS09	47.0	51.0	clayey_sand	25	FALSE	49
MRS09	51.0	56.0	missing		FALSE	53.5
MRS09	56.0	61.0	sand	5	FALSE	58.5
MRS09	61.0	66.0	missing		FALSE	63.5
MRS09	66.0	71.0	sand	5	FALSE	68.5
MRS09	71.0	76.0	missing		FALSE	73.5
MRS09	76.0	80.0	sand	10	FALSE	78
MRS09	80.0	86.0	missing		FALSE	83
MRS09	86.0	88.0	sand	1	FALSE	87
MRS09	88.0	89.0	sandy_clay_w_gravel	60	TRUE	88.5
MRS09	89.0	93.0	clayey_sand_w_gravel	15	TRUE	91
MRS09	93.0	96.0	missing		FALSE	94.5
MRS09	96.0	97.5	sand	1	FALSE	96.75
MRS09	97.5	100.0	sand	10	FALSE	98.75
MRS09	100.0	106.0	missing		FALSE	103
MRS09	106.0	112.0	clayey_sand_w_gravel	15	TRUE	109
MRS09	112.0	126.0	missing		FALSE	119
MRS09	126.0	130.0	sand	8	FALSE	128
MRS09	130.0	136.0	missing		FALSE	133
MRS09	136.0	137.5	sand	8	FALSE	136.75
MRS09	137.5	138.0	clayey_sand	30	FALSE	137.75
MRS09	138.0	139.0	clayey_sand	40	FALSE	138.5
MRS09	139.0	141.0	clayey_sand	20	FALSE	140
MRS09	141.0	142.5	clay	100	FALSE	141.75
MRS09	142.5	144.5	clayey_sand	25	FALSE	143.5
MRS09	144.5	145.0	sand_w_gravel	0	TRUE	144.75
MRS09	145.0	146.0	clayey_sand	25	FALSE	145.5
MRS09	146.0	156.5	sand	5	FALSE	151.25
MRS09	156.5	164.0	sandy_clay	60	FALSE	160.25
MRS09	164.0	166.0	clayey_sand	15	FALSE	165
MRS09	166.0	169.5	sand	10	FALSE	167.75
MRS09	169.5	171.0	clay	90	FALSE	170.25

Well ID	top (depth)	bot (depth)	lithology	percent clay	gravel	avg depth
MRS09	171.0	172.5	clay	100	FALSE	171.75
MRS09	172.5	175.0	sand	10	FALSE	173.75
MRS09	175.0	175.5	clay	100	FALSE	175.25
MRS09	175.5	184.0	sand	10	FALSE	179.75
MRS09	184.0	186.0	sand	0	FALSE	185
MRS09	186.0	202.0	sand	2	FALSE	194
MRS09	202.0	206.0	missing		FALSE	204
MRS09	206.0	213.5	sand	5	FALSE	209.75
MRS09	213.5	216.5	clayey_sand	25	FALSE	215
MRS09	216.5	217.5	clay	100	FALSE	217
MRS09	217.5	219.5	sand	10	FALSE	218.5
MRS09	219.5	220.0	clay	100	FALSE	219.75
MRS09	220.0	222.5	sand	3	FALSE	221.25
MRS09	222.5	223.0	clay	100	FALSE	222.75
MRS09	223.0	225.0	sand	3	FALSE	224
MRS09	225.0	226.0	clay	90	FALSE	225.5
MRS10	0.0	1.0	clayey_sand_w_gravel	20	TRUE	0.5
MRS10	1.0	3.5	sand	2	FALSE	2.25
MRS10	3.5	5.0	clayey_sand	25	FALSE	4.25
MRS10	5.0	10.0	sandy_clay	60	FALSE	7.5
MRS10	10.0	16.0	sandy_clay	50	FALSE	13
MRS10	16.0	27.0	sandy_clay	60	FALSE	21.5
MRS10	27.0	28.0	clayey_sand	20	FALSE	27.5
MRS10	28.0	29.5	clay	90	FALSE	28.75
MRS10	29.5	34.0	clayey_sand	15	FALSE	31.75
MRS10	34.0	35.5	clayey_sand	28	FALSE	34.75
MRS10	35.5	37.0	missing		FALSE	36.25
MRS10	37.0	40.5	clayey_sand	12	FALSE	38.75
MRS10	40.5	45.0	clayey_sand	20	FALSE	42.75
MRS10	45.0	47.0	missing		FALSE	46
MRS10	47.0	53.0	clayey_sand	12	FALSE	50
MRS10	53.0	67.0	missing		FALSE	60
MRS10	67.0	72.0	sand	1	FALSE	69.5
MRS10	72.0	73.0	sand	10	FALSE	72.5
MRS10	73.0	76.0	missing		FALSE	74.5
MRS10	76.0	81.0	sand	1	FALSE	78.5
MRS10	81.0	82.5	sand	5	FALSE	81.75
MRS10	82.5	84.0	clay	95	FALSE	83.25
MRS10	84.0	86.0	missing		FALSE	85
MRS10	86.0	87.5	sand	1	FALSE	86.75
MRS10	87.5	90.0	clayey_sand_w_gravel	10	TRUE	88.75
MRS10	90.0	92.0	sand	5	FALSE	91
MRS10	92.0	92.5	clayey_sand	15	FALSE	92.25
MRS10	92.5	96.0	sand_w_gravel	5	TRUE	94.25
MRS10	96.0	100.0	clayey_sand_w_gravel	18	TRUE	98
MRS10	100.0	106.0	missing		FALSE	103

Well ID	top (depth)	bot (depth)	lithology	percent clay	gravel	avg depth
MRS10	106.0	107.0	sand	5	FALSE	106.5
MRS10	107.0	107.5	clay	90	FALSE	107.25
MRS10	107.5	110.0	clayey_sand	12	FALSE	108.75
MRS10	110.0	116.0	missing		FALSE	113
MRS10	116.0	122.0	clayey_sand	20	FALSE	119
MRS10	122.0	126.0	missing		FALSE	124
MRS10	126.0	134.0	sand	8	FALSE	130
MRS10	134.0	136.0	missing		FALSE	135
MRS10	136.0	142.0	clayey_sand	25	FALSE	139
MRS10	142.0	146.0	sand	2	FALSE	144
MRS10	146.0	152.0	sand	5	FALSE	149
MRS10	152.0	159.0	clay	90	FALSE	155.5
MRS10	159.0	164.0	sand	10	FALSE	161.5
MRS10	164.0	166.0	missing		FALSE	165
MRS10	166.0	175.0	sand	5	FALSE	170.5
MRS10	175.0	176.0	clay	90	FALSE	175.5
MRS10	176.0	186.0	sand	1	FALSE	181
MRS10	186.0	194.0	clayey_sand	12	FALSE	190
MRS10	194.0	196.0	missing		FALSE	195
MRS10	196.0	204.0	sand	2	FALSE	200
MRS10	204.0	205.0	clay	90	FALSE	204.5
MRS10	205.0	206.0	sand	2	FALSE	205.5
MRS10	206.0	213.5	sand	10	FALSE	209.75
MRS10	213.5	214.5	clay	100	FALSE	214
MRS10	214.5	215.0	sand	5	FALSE	214.75
MRS10	215.0	216.0	missing		FALSE	215.5
MRS10	216.0	231.0	sand	5	FALSE	223.5
MRS10	231.0	234.0	clay	100	FALSE	232.5
MRS11	0.0	3.0	sandy_clay	60	FALSE	1.5
MRS11	3.0	6.0	missing		FALSE	4.5
MRS11	6.0	14.0	sandy_clay	60	FALSE	10
MRS11	14.0	16.0	missing		FALSE	15
MRS11	16.0	20.0	sandy_clay	70	FALSE	18
MRS11	20.0	24.0	clayey_sand	30	FALSE	22
MRS11	24.0	26.0	missing		FALSE	25
MRS11	26.0	30.0	clay	90	FALSE	28
MRS11	30.0	31.0	sand	10	FALSE	30.5
MRS11	31.0	36.0	missing		FALSE	33.5
MRS11	36.0	37.0	sand	5	FALSE	36.5
MRS11	37.0	41.0	sand	10	FALSE	39
MRS11	41.0	46.0	missing		FALSE	43.5
MRS11	46.0	48.0	clayey_sand	20	FALSE	47
MRS11	48.0	50.0	clayey_sand	15	FALSE	49
MRS11	50.0	51.0	clayey_sand	20	FALSE	50.5
MRS11	51.0	56.0	missing		FALSE	53.5
MRS11	56.0	59.0	sand	2	FALSE	57.5

Well ID	top (depth)	bot (depth)	lithology	percent clay	gravel	avg depth
MRS11	59.0	66.0	missing		FALSE	62.5
MRS11	66.0	66.5	clayey_sand	25	FALSE	66.25
MRS11	66.5	68.5	sandy_clay	85	FALSE	67.5
MRS11	68.5	70.0	clayey_sand	20	FALSE	69.25
MRS11	70.0	76.0	missing		FALSE	73
MRS11	76.0	78.0	sand	5	FALSE	77
MRS11	78.0	86.0	missing		FALSE	82
MRS11	86.0	89.0	sand	1	FALSE	87.5
MRS11	89.0	90.0	clayey_sand_w_gravel	15	TRUE	89.5
MRS11	90.0	96.0	missing		FALSE	93
MRS11	96.0	98.0	clayey_sand_w_gravel	10	TRUE	97
MRS11	98.0	106.0	missing		FALSE	102
MRS11	106.0	118.5	sand	5	FALSE	112.25
MRS11	118.5	119.0	clay	90	FALSE	118.75
MRS11	119.0	120.5	sandy_clay	60	FALSE	119.75
MRS11	120.5	122.0	sand	5	FALSE	121.25
MRS11	122.0	122.5	sand_w_gravel	0	TRUE	122.25
MRS11	122.5	129.0	sandy_clay	50	FALSE	125.75
MRS11	129.0	133.5	sand	0	FALSE	131.25
MRS11	133.5	137.0	sandy_clay	60	FALSE	135.25
MRS11	137.0	142.0	clayey_sand	33	FALSE	139.5
MRS11	142.0	146.0	missing		FALSE	144
MRS11	146.0	156.0	clayey_sand	18	FALSE	151
MRS11	156.0	166.0	sand	0	FALSE	161
MRS11	166.0	181.0	sand	5	FALSE	173.5
MRS11	181.0	186.0	missing		FALSE	183.5
MRS11	186.0	188.0	sand	5	FALSE	187
MRS11	188.0	197.0	clay	100	FALSE	192.5
MRS11	197.0	200.5	sand	5	FALSE	198.75
MRS11	200.5	206.0	clay	100	FALSE	203.25
MRS12	0.0	2.5	sand	10	FALSE	1.25
MRS12	2.5	4.0	sandy_clay	60	FALSE	3.25
MRS12	4.0	5.0	missing		FALSE	4.5
MRS12	5.0	25.0	sandy_clay_w_gravel	62	TRUE	15
MRS12	25.0	35.0	sandy_clay	58	FALSE	30
MRS12	35.0	43.0	clayey_sand	25	FALSE	39
MRS12	43.0	45.0	missing		FALSE	44
MRS12	45.0	50.0	clayey_sand_w_gravel	35	TRUE	47.5
MRS12	50.0	53.0	sand	8	FALSE	51.5
MRS12	53.0	55.0	missing		FALSE	54
MRS12	55.0	57.5	sandy_clay	75	FALSE	56.25
MRS12	57.5	60.0	clayey_sand	15	FALSE	58.75
MRS12	60.0	61.0	sandy_clay	65	FALSE	60.5
MRS12	61.0	62.0	missing		FALSE	61.5
MRS12	62.0	63.0	clayey_sand	20	FALSE	62.5
MRS12	63.0	66.0	clayey_sand	20	FALSE	64.5

Well ID	top (depth)	bot (depth)	lithology	percent clay	gravel	avg depth
MRS12	66.0	68.0	sand	5	FALSE	67
MRS12	68.0	70.0	clayey_sand	25	FALSE	69
MRS12	70.0	73.0	sand	0	FALSE	71.5
MRS12	73.0	85.0	missing		FALSE	79
MRS12	85.0	91.0	sand	0	FALSE	88
MRS12	91.0	95.0	missing		FALSE	93
MRS12	95.0	98.5	clayey_sand_w_gravel	10	TRUE	96.75
MRS12	98.5	99.5	sandy_clay	82	FALSE	99
MRS12	99.5	103.0	sandy_clay	50	FALSE	101.25
MRS12	103.0	125.0	missing		FALSE	114
MRS12	125.0	127.0	clayey_sand_w_gravel	40	TRUE	126
MRS12	127.0	131.0	sand_w_gravel	5	TRUE	129
MRS12	131.0	133.0	clayey_sand_w_gravel	30	TRUE	132
MRS12	133.0	134.0	clay	90	FALSE	133.5
MRS12	134.0	135.0	missing		FALSE	134.5
MRS12	135.0	137.0	clayey_sand	25	FALSE	136
MRS12	137.0	140.5	clay	90	FALSE	138.75
MRS12	140.5	143.0	clayey_sand	25	FALSE	141.75
MRS12	143.0	145.0	missing		FALSE	144
MRS12	145.0	149.5	sand	10	FALSE	147.25
MRS12	149.5	155.0	missing		FALSE	152.25
MRS12	155.0	163.0	sand	0	FALSE	159
MRS12	163.0	169.0	clayey_sand	12	FALSE	166
MRS12	169.0	174.5	clay	90	FALSE	171.75
MRS12	174.5	180.0	clayey_sand	30	FALSE	177.25
MRS12	180.0	182.0	sand	3	FALSE	181
MRS12	182.0	185.0	missing		FALSE	183.5
MRS12	185.0	205.0	sand	5	FALSE	195
MRS12	205.0	212.5	clayey_sand	15	FALSE	208.75
MRS12	212.5	215.0	missing		FALSE	213.75
MRS12	215.0	218.0	sand	9	FALSE	216.5
MRS12	218.0	220.0	clay	90	FALSE	219
MRS12	220.0	223.0	sand	9	FALSE	221.5
MRS12	223.0	224.0	clayey_sand	25	FALSE	223.5
MRS12	224.0	225.0	missing		FALSE	224.5
MRS12	225.0	233.0	sand	10	FALSE	229
MRS12	233.0	240.0	sand	5	FALSE	236.5
MRS12	240.0	244.5	sand	5	FALSE	242.25
MRS12	244.5	245.0	clay	100	FALSE	244.75
MRS13	0.0	11.0	sandy_clay_w_gravel	70	TRUE	5.5
MRS13	11.0	27.0	sandy_clay	65	FALSE	19
MRS13	27.0	37.0	clayey_sand	25	FALSE	32
MRS13	37.0	38.0	clayey_sand	18	FALSE	37.5
MRS13	38.0	45.0	clayey_sand	25	FALSE	41.5
MRS13	45.0	47.0	clayey_sand	28	FALSE	46
MRS13	47.0	48.0	clayey_sand	18	FALSE	47.5

Well ID	top (depth)	bot (depth)	lithology	percent clay	gravel	avg depth
MRS13	48.0	51.0	sandy_clay	55	FALSE	49.5
MRS13	51.0	53.0	sand	5	FALSE	52
MRS13	53.0	57.0	clayey_sand	20	FALSE	55
MRS13	57.0	67.0	clayey_sand	12	FALSE	62
MRS13	67.0	73.5	sand	10	FALSE	70.25
MRS13	73.5	77.0	missing		FALSE	75.25
MRS13	77.0	81.0	sand	6	FALSE	79
MRS13	81.0	83.0	clayey_sand_w_gravel	30	TRUE	82
MRS13	83.0	87.0	sand_w_gravel	0	TRUE	85
MRS13	87.0	89.5	sand	8	FALSE	88.25
MRS13	89.5	92.0	clayey_sand	20	FALSE	90.75
MRS13	92.0	94.5	clayey_sand	38	FALSE	93.25
MRS13	94.5	95.0	clayey_sand	20	FALSE	94.75
MRS13	95.0	97.0	missing		FALSE	96
MRS13	97.0	102.0	clayey_sand_w_gravel	15	TRUE	99.5
MRS13	102.0	105.5	sandy_clay_w_gravel	50	TRUE	103.75
MRS13	105.5	107.0	clayey_sand_w_gravel	25	TRUE	106.25
MRS13	107.0	110.0	clayey_sand	12	FALSE	108.5
MRS13	110.0	111.0	missing		FALSE	110.5
MRS13	111.0	116.5	sand	6	FALSE	113.75
MRS13	116.5	117.0	clay	90	FALSE	116.75
MRS13	117.0	127.0	missing		FALSE	122
MRS13	127.0	136.0	sand	3	FALSE	131.5
MRS13	136.0	137.0	missing		FALSE	136.5
MRS13	137.0	145.0	clayey_sand	18	FALSE	141
MRS13	145.0	147.0	missing		FALSE	146
MRS13	147.0	150.5	sand	7	FALSE	148.75
MRS13	150.5	151.0	clayey_sand	25	FALSE	150.75
MRS13	151.0	154.0	sandy_clay	80	FALSE	152.5
MRS13	154.0	157.0	clayey_sand	30	FALSE	155.5
MRS13	157.0	160.0	sand	0	FALSE	158.5
MRS13	160.0	160.5	clayey_sand	25	FALSE	160.25
MRS13	160.5	161.0	clay	90	FALSE	160.75
MRS13	161.0	163.0	sand	0	FALSE	162
MRS13	163.0	165.0	missing		FALSE	164
MRS13	165.0	168.0	clayey_sand	20	FALSE	166.5
MRS13	168.0	175.0	clayey_sand	15	FALSE	171.5
MRS13	175.0	177.0	missing		FALSE	176
MRS13	177.0	179.0	clayey_sand	12	FALSE	178
MRS13	179.0	187.0	clayey_sand	12	FALSE	183
MRS13	187.0	191.5	clayey_sand	14	FALSE	189.25
MRS13	191.5	192.5	clay	100	FALSE	192
MRS13	192.5	195.5	clayey_sand	20	FALSE	194
MRS13	195.5	197.0	missing		FALSE	196.25
MRS13	197.0	203.5	sand	8	FALSE	200.25
MRS13	203.5	204.0	clay	100	FALSE	203.75

Well ID	top (depth)	bot (depth)	lithology	percent clay	gravel	avg depth
MRS13	204.0	206.5	sandy_clay	50	FALSE	205.25
MRS13	206.5	207.0	missing		FALSE	206.75
MRS13	207.0	215.0	sand_w_gravel	3	TRUE	211
MRS13	215.0	217.0	missing		FALSE	216
MRS13	217.0	220.0	clayey_sand_w_gravel	15	TRUE	218.5
MRS13	220.0	221.0	clay	90	FALSE	220.5
MRS13	221.0	222.0	clayey_sand	18	FALSE	221.5
MRS13	222.0	224.0	sandy_clay	75	FALSE	223
MRS13	224.0	227.0	clay	100	FALSE	225.5
MRS14	0.0	6.0	clayey_sand	40	FALSE	3
MRS14	6.0	10.0	clayey_sand_w_gravel	35	TRUE	8
MRS14	10.0	16.0	clayey_sand	35	FALSE	13
MRS14	16.0	26.0	clayey_sand	30	FALSE	21
MRS14	26.0	31.0	clayey_sand	35	FALSE	28.5
MRS14	31.0	36.0	missing		FALSE	33.5
MRS14	36.0	46.0	clayey_sand	32	FALSE	41
MRS14	46.0	52.0	clayey_sand	12	FALSE	49
MRS14	52.0	55.0	clayey_sand	25	FALSE	53.5
MRS14	55.0	56.0	missing		FALSE	55.5
MRS14	56.0	58.0	clayey_sand	20	FALSE	57
MRS14	58.0	60.0	sandy_clay	75	FALSE	59
MRS14	60.0	65.0	clayey_sand	20	FALSE	62.5
MRS14	65.0	66.0	missing		FALSE	65.5
MRS14	66.0	68.0	sand	10	FALSE	67
MRS14	68.0	76.0	missing		FALSE	72
MRS14	76.0	81.5	clayey_sand_w_gravel	10	TRUE	78.75
MRS14	81.5	83.0	clayey_sand	25	FALSE	82.25
MRS14	83.0	86.0	missing		FALSE	84.5
MRS14	86.0	90.0	sand	5	FALSE	88
MRS14	90.0	103.0	sand	10	FALSE	96.5
MRS14	103.0	106.0	clayey_sand_w_gravel	28	TRUE	104.5
MRS14	106.0	109.0	clayey_sand	25	FALSE	107.5
MRS14	109.0	114.0	clayey_sand_w_gravel	25	TRUE	111.5
MRS14	114.0	115.0	clayey_sand	25	FALSE	114.5
MRS14	115.0	116.0	missing		FALSE	115.5
MRS14	116.0	119.0	clayey_sand	20	FALSE	117.5
MRS14	119.0	126.0	missing		FALSE	122.5
MRS14	126.0	127.0	clay	90	FALSE	126.5
MRS14	127.0	130.5	clayey_sand	32	FALSE	128.75
MRS14	130.5	136.0	sandy_clay	50	FALSE	133.25
MRS14	136.0	141.5	sand_w_gravel	7	TRUE	138.75
MRS14	141.5	146.0	sandy_clay	62	FALSE	143.75
MRS14	146.0	147.0	sand	8	FALSE	146.5
MRS14	147.0	149.5	clay	100	FALSE	148.25
MRS14	149.5	151.5	sandy_clay	75	FALSE	150.5
MRS14	151.5	153.0	sand	0	FALSE	152.25

Well ID	top (depth)	bot (depth)	lithology	percent clay	gravel	avg depth
MRS14	153.0	156.0	missing		FALSE	154.5
MRS14	156.0	166.0	clayey_sand	25	FALSE	161
MRS14	166.0	166.5	sandy_clay	65	FALSE	166.25
MRS14	166.5	176.0	missing		FALSE	171.25
MRS14	176.0	196.0	sand	10	FALSE	186
MRS14	196.0	201.0	sandy_clay	75	FALSE	198.5
MRS14	201.0	206.0	sandy_clay_w_gravel	75	TRUE	203.5
MRS14	206.0	216.0	clay	100	FALSE	211
MRS15	0.0	2.5	clayey_sand	15	FALSE	1.25
MRS15	2.5	7.0	sandy_clay	65	FALSE	4.75
MRS15	7.0	17.0	sandy_clay	55	FALSE	12
MRS15	17.0	23.0	clayey_sand	42	FALSE	20
MRS15	23.0	28.0	clayey_sand	38	FALSE	25.5
MRS15	28.0	32.0	clayey_sand	35	FALSE	30
MRS15	32.0	37.0	clayey_sand	25	FALSE	34.5
MRS15	37.0	44.0	clayey_sand	12	FALSE	40.5
MRS15	44.0	46.0	sandy_clay	50	FALSE	45
MRS15	46.0	47.0	missing		FALSE	46.5
MRS15	47.0	54.0	clayey_sand	12	FALSE	50.5
MRS15	54.0	57.0	missing		FALSE	55.5
MRS15	57.0	63.0	sand	8	FALSE	60
MRS15	63.0	67.0	missing		FALSE	65
MRS15	67.0	74.0	sand	5	FALSE	70.5
MRS15	74.0	77.0	missing		FALSE	75.5
MRS15	77.0	80.0	sand_w_gravel	8	TRUE	78.5
MRS15	80.0	84.0	sand	8	FALSE	82
MRS15	84.0	87.0	missing		FALSE	85.5
MRS15	87.0	90.0	clayey_sand	40	FALSE	88.5
MRS15	90.0	90.5	clay	100	FALSE	90.25
MRS15	90.5	91.5	sandy_clay	75	FALSE	91
MRS15	91.5	96.0	sand	10	FALSE	93.75
MRS15	96.0	97.0	missing		FALSE	96.5
MRS15	97.0	102.0	sand	8	FALSE	99.5
MRS15	102.0	103.0	clayey_sand_w_gravel	40	TRUE	102.5
MRS15	103.0	105.0	clayey_sand_w_gravel	28	TRUE	104
MRS15	105.0	106.0	clayey_sand	30	FALSE	105.5
MRS15	106.0	107.0	missing		FALSE	106.5
MRS15	107.0	110.0	clay	90	FALSE	108.5
MRS15	110.0	110.5	sandy_clay	70	FALSE	110.25
MRS15	110.5	114.0	missing		FALSE	62.25
MRS15	114.0	118.0	clayey_sand_w_gravel	12	TRUE	66
MRS15	118.0	120.0	missing		FALSE	119
MRS15	120.0	123.0	clayey_sand_w_gravel	28	TRUE	121.5
MRS15	123.0	125.5	clayey_sand	25	FALSE	124.25
MRS15	125.5	131.0	sand	10	FALSE	128.25
MRS15	131.0	133.5	clayey_sand	45	FALSE	132.25

Well ID	top (depth)	bot (depth)	lithology	percent clay	gravel	avg depth
MRS15	133.5	135.0	clayey_sand	30	FALSE	134.25
MRS15	135.0	137.0	missing		FALSE	136
MRS15	137.0	141.0	sand	10	FALSE	139
MRS15	141.0	143.5	sandy_clay	50	FALSE	142.25
MRS15	143.5	144.0	sand	8	FALSE	143.75
MRS15	144.0	147.0	missing		FALSE	145.5
MRS15	147.0	148.5	sand	10	FALSE	147.75
MRS15	148.5	151.0	clayey_sand	25	FALSE	149.75
MRS15	151.0	155.5	sandy_clay	55	FALSE	153.25
MRS15	155.5	157.0	sand	10	FALSE	156.25
MRS16	0.0	6.0	sandy_clay	70	FALSE	3
MRS16	6.0	7.0	missing		FALSE	6.5
MRS16	7.0	17.0	sandy_clay	70	FALSE	12
MRS16	17.0	27.0	clayey_sand	40	FALSE	22
MRS16	27.0	32.0	clayey_sand	35	FALSE	29.5
MRS16	32.0	34.5	clayey_sand	12	FALSE	33.25
MRS16	34.5	37.0	missing		FALSE	35.75
MRS16	37.0	38.0	sand	8	FALSE	37.5
MRS16	38.0	43.0	clayey_sand	12	FALSE	40.5
MRS16	43.0	45.0	clay	90	FALSE	44
MRS16	45.0	54.0	sand	6	FALSE	49.5
MRS16	54.0	57.0	missing		FALSE	55.5
MRS16	57.0	65.0	sand	5	FALSE	61
MRS16	65.0	67.0	missing		FALSE	66
MRS16	67.0	70.0	clayey_sand	14	FALSE	68.5
MRS16	70.0	74.0	sand	7	FALSE	72
MRS16	74.0	77.0	missing		FALSE	75.5
MRS16	77.0	78.5	clayey_sand	13	FALSE	77.75
MRS16	78.5	79.5	sandy_clay_w_gravel	70	TRUE	79
MRS16	79.5	82.5	clayey_sand	18	FALSE	81
MRS16	82.5	83.5	sandy_clay_w_gravel	50	TRUE	83
MRS16	83.5	87.0	clayey_sand_w_gravel	10	TRUE	85.25
MRS16	87.0	93.0	clayey_sand	25	FALSE	90
MRS16	93.0	95.0	clayey_sand_w_gravel	18	TRUE	94
MRS16	95.0	107.0	missing		FALSE	101
MRS16	107.0	110.0	sand	0	FALSE	108.5
MRS16	110.0	117.0	missing		FALSE	113.5
MRS16	117.0	123.5	sand	7	FALSE	120.25
MRS16	123.5	125.0	clayey_sand	12	FALSE	124.25
MRS16	125.0	126.0	clay	90	FALSE	125.5
MRS16	126.0	127.0	missing		FALSE	126.5
MRS16	127.0	129.5	sand	10	FALSE	128.25
MRS16	129.5	136.5	clayey_sand	30	FALSE	133
MRS16	136.5	137.0	missing		FALSE	136.75
MRS16	137.0	138.0	sand	4	FALSE	137.5
MRS16	138.0	140.0	clayey_sand	25	FALSE	139

Well ID	top (depth)	bot (depth)	lithology	percent clay	gravel	avg depth
MRS16	140.0	147.0	missing		FALSE	143.5
MRS16	147.0	147.5	clayey_sand	15	FALSE	147.25
MRS16	147.5	148.0	sandy_clay	50	FALSE	147.75
MRS16	148.0	155.6	clayey_sand	25	FALSE	151.8
MRS16	155.6	157.0	missing		FALSE	156.3
MRS16	157.0	165.5	clayey_sand	20	FALSE	161.25
MRS17	0.0	7.0	sandy_clay	70	FALSE	3.5
MRS17	7.0	17.0	sandy_clay	50	FALSE	12
MRS17	17.0	22.5	sandy_clay	55	FALSE	19.75
MRS17	22.5	27.0	sandy_clay	75	FALSE	24.75
MRS17	27.0	37.0	clayey_sand	25	FALSE	32
MRS17	37.0	43.5	clayey_sand	18	FALSE	40.25
MRS17	43.5	47.0	missing		FALSE	45.25
MRS17	47.0	47.5	sand	0	FALSE	47.25
MRS17	47.5	48.0	sandy_clay	75	FALSE	47.75
MRS17	48.0	48.5	clay	90	FALSE	48.25
MRS17	48.5	49.5	sandy_clay	75	FALSE	49
MRS17	49.5	53.5	sand	8	FALSE	51.5
MRS17	53.5	57.0	missing		FALSE	55.25
MRS17	57.0	63.0	sand	5	FALSE	60
MRS17	63.0	67.0	missing		FALSE	65
MRS17	67.0	72.0	sand	8	FALSE	69.5
MRS17	72.0	77.0	missing		FALSE	74.5
MRS17	77.0	86.0	sand	8	FALSE	81.5
MRS17	86.0	87.0	clayey_sand	20	FALSE	86.5
MRS17	87.0	91.5	sandy_clay	50	FALSE	89.25
MRS17	91.5	92.0	clay	90	FALSE	91.75
MRS17	92.0	94.0	clayey_sand	12	FALSE	93
MRS17	94.0	97.0	missing		FALSE	95.5
MRS17	97.0	101.5	clayey_sand	18	FALSE	99.25
MRS17	101.5	105.0	clayey_sand	28	FALSE	103.25
MRS17	105.0	106.0	sand_w_gravel	0	TRUE	105.5
MRS17	106.0	107.0	clayey_sand	15	FALSE	106.5
MRS17	107.0	111.0	clayey_sand_w_gravel	18	TRUE	109
MRS17	111.0	114.0	sand	10	FALSE	112.5
MRS17	114.0	117.0	missing		FALSE	115.5
MRS17	117.0	120.0	clayey_sand	12	FALSE	118.5
MRS17	120.0	127.0	missing		FALSE	123.5
MRS17	127.0	130.0	clayey_sand	12	FALSE	128.5
MRS17	130.0	134.5	sandy_clay	50	FALSE	132.25
MRS17	134.5	136.0	sand	0	FALSE	135.25
MRS17	136.0	137.0	missing		FALSE	136.5
MRS17	137.0	138.0	clayey_sand	15	FALSE	137.5
MRS17	138.0	138.5	sandy_clay	75	FALSE	138.25
MRS17	138.5	142.5	clayey_sand_w_gravel	10	TRUE	140.5
MRS17	142.5	147.0	missing		FALSE	144.75

Well ID	top (depth)	bot (depth)	lithology	percent clay	gravel	avg depth
MRS17	147.0	147.5	sandy_clay	72	FALSE	147.25
MRS17	147.5	157.0	clayey_sand	12	FALSE	152.25
MRS18	0.0	4.0	clayey_sand_w_gravel	25	TRUE	2
MRS18	4.0	11.0	sandy_clay	68	FALSE	7.5
MRS18	11.0	16.0	sandy_clay_w_gravel	60	TRUE	13.5
MRS18	16.0	17.0	missing		FALSE	16.5
MRS18	17.0	23.0	sandy_clay	65	FALSE	20
MRS18	23.0	25.0	clayey_sand	25	FALSE	24
MRS18	25.0	31.0	sand	7	FALSE	28
MRS18	31.0	35.5	sand	7	FALSE	33.25
MRS18	35.5	36.0	clayey_sand	25	FALSE	35.75
MRS18	36.0	37.0	missing		FALSE	36.5
MRS18	37.0	39.0	clayey_sand	12	FALSE	38
MRS18	39.0	47.0	clayey_sand	28	FALSE	43
MRS18	47.0	53.5	clayey_sand	30	FALSE	50.25
MRS18	53.5	57.0	sandy_clay	75	FALSE	55.25
MRS18	57.0	67.0	sandy_clay	50	FALSE	62
MRS18	67.0	70.0	clayey_sand_w_gravel	25	TRUE	68.5
MRS18	70.0	77.0	missing		FALSE	73.5
MRS18	77.0	80.0	clayey_sand_w_gravel	17	TRUE	78.5
MRS18	80.0	80.5	clay	90	FALSE	80.25
MRS18	80.5	84.0	clayey_sand_w_gravel	45	TRUE	82.25
MRS18	84.0	87.0	sand	5	FALSE	85.5
MRS18	87.0	97.0	clayey_sand_w_gravel	10	TRUE	92
MRS18	97.0	102.0	clayey_sand	18	FALSE	99.5
MRS18	102.0	103.0	clay	90	FALSE	102.5
MRS18	103.0	107.0	clayey_sand	17	FALSE	105
MRS18	107.0	110.5	sand	9	FALSE	108.75
MRS18	110.5	117.0	clayey_sand	23	FALSE	113.75
MRS18	117.0	123.5	sand	5	FALSE	120.25
MRS18	123.5	127.0	clayey_sand	30	FALSE	125.25
MRS18	127.0	129.0	clayey_sand_w_gravel	18	TRUE	128
MRS18	129.0	129.5	clay	90	FALSE	129.25
MRS18	129.5	130.0	clayey_sand	18	FALSE	129.75
MRS18	130.0	137.0	sandy_clay_w_gravel	50	TRUE	133.5
MRS18	137.0	145.5	sand	10	FALSE	141.25
MRS18	145.5	147.0	sandy_clay	60	FALSE	146.25
MRS18	147.0	149.0	clayey_sand	40	FALSE	148
MRS18	149.0	153.0	clay	90	FALSE	151
MRS18	153.0	156.0	clayey_sand	25	FALSE	154.5