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Revised Hydrogeologic Report for the Envirocare Waste Disposal Facility Clive, Utah

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Table of Contents

1. Introduction 1
2. Previous studies 1
3. Site description 2
4. Geology 2
5. Hydrogeology 3
   5.1. Regional hydrogeology 3
   5.2. Site hydrogeology 3
      5.2.1. Hydrostratigraphic units 3
      5.2.2. Hydraulic conductivity 5
      5.2.3. Methods of performing fresh water equivalent head adjustments 5
      5.2.4. Horizontal ground water flow 9
      5.2.5. Vertical ground water flow 11
      5.2.6. Ground water chemistry 11
6. Summary and conclusions 13
7. References 15

List of Figures

Figure 1. Topographic facility map – October 1999.
Figure 2. Locations of monitoring wells, boreholes, and lysimeters – October 1999.
Figure 3. Regional geologic map.
Figure 4. Isopach map of Unit 4.
Figure 5. Structure contour map of the top of Unit 2.
Figure 6. Hydrogeologic cross-section location map.
Figure 7. Hydrogeologic cross-section A-A'.
Figure 8. Hydrogeologic cross-section B-B'.
Figure 9. Hydrogeologic cross-section C-C'.
Figure 10. Hydrogeologic cross-section D-D'.
Figure 11. Hydrogeologic cross-section E-E'.
Figure 12. Hydrogeologic cross-section F-F'.

Figure 13. Hydrogeologic cross-section G-G'.

Figure 14. Contour map of hydraulic conductivity for the shallow aquifer.

Figure 15. Examples of fresh water equivalent head calculations.

Figure 16. Phreatic surface elevation contour map for the shallow aquifer (saline water) – August 1999.

Figure 17. Potentiometric surface elevation contour map for the shallow aquifer (fresh water equivalent head at the midpoint of saturated filter pack) – August 1999.

Figure 18. Phreatic surface elevation contour map for the shallow aquifer (saline water) – July 1995.

Figure 19. Potentiometric surface elevation contour map for the deep aquifer (saline water) – August 1999.

Figure 20. Potentiometric surface elevation contour map for the deep aquifer (fresh water equivalent head at the midpoint of saturated filter pack) – August 1999.

Figure 21. Potentiometric surface elevation contour map for the deep aquifer (fresh water equivalent head at reference elevation) – August 1999.

Figure 22. Total Dissolved Solids isoconcentration contour map for the shallow aquifer – 1991 through 1998.

Figure 23. Isotopic composition of water.

List of Tables

Table 1. Summary of monitoring well, borehole, and lysimeter information.

Table 2. Hydrostratigraphic unit contact elevation and unit thickness.

Table 3. Hydraulic conductivity measurements for the shallow aquifer.

Table 4. Ground water elevation data for the shallow aquifer, August 1999.

Table 5. Ground water elevation data for the shallow aquifer, July 1995.

Table 6. Horizontal ground water gradient and velocity in the shallow aquifer, August 1999.

Table 7. Ground water elevation data for the deep aquifer, August 1999.

Table 8. Vertical ground water gradient and velocity using midpoint of saturated filter packs.

Table 9. Vertical ground water gradient and velocity using midpoint of Unit 2.

Table 10. Average Total Dissolved Solids for the shallow aquifer, 1991 through 1998.

Appendix

Appendix A. Monitor well, borehole, and lysimeter logs and completion diagrams.

1. Introduction

Envirocare of Utah, Inc. (Envirocare) operates a commercial landfill near Clive, Utah to dispose of Low Activity Radioactive Waste (LARW), 11e.(2) waste (uranium mill tailings), and mixed radioactive and hazardous waste.

The purpose of this report is to provide hydrogeologic information relevant to the renewal of Envirocare's Ground Water Discharge Permit issued by the State of Utah, Department of Public Health, Division of Water Quality (DWQ), Permit UGW450005.

This report includes updated geologic information for the area adjacent to the facility, hydrogeologic cross-sections, ground water elevation contour maps, and structure and isopach maps. The focus of this report is to evaluate current hydrogeologic conditions at the facility. References to previously submitted non-time-dependent information are included as appropriate.

A discussion of the theory, applicability, and impact of adjusting ground water elevation data by calculating fresh water equivalent head also is included.

2. Previous studies

A number of hydrogeologic studies have been conducted for the facility. The following is a summary of major documents supporting the preparation of this report which have been previously submitted to the regulatory agencies. Additional references are provided in Section 7.

1991 - Hydrogeologic Report (Bingham Environmental): Initial hydrogeologic report for the Ground Water Discharge Permit.

1993 - As-Built for Suction Lysimeters and Soil Resistivity Instruments (Bingham Environmental): In situ moisture content, bulk density, grain size analysis, laboratory hydraulic conductivity, and soil pore fluid analyses.

1993 - Laboratory analysis of Soil Hydraulic Properties of TP-1-4B and TP-2-4W Soil Samples (D.B. Stephens): Moisture content, bulk density, porosity, and hydraulic conductivity.

1995 - Additional Information: Suction Lysimeters and Soil Resistivity Instruments (Bingham Environmental): In situ moisture content, bulk density, grain size analysis, laboratory hydraulic conductivity, soil pore fluid analyses, and as-built installation diagrams.

1996 - Revised Hydrogeologic Report (Bingham Environmental): Hydrogeologic information and interpretation.

1997 - Final Slug Test Results, Envirocare of Utah South Clive Facility, Tooele County, Utah (Adrian Brown Consultants): Hydraulic conductivity measurements, methodology, and results.

1999 - Compilation and Analysis of Envirocare Groundwater Quality Data (Mayo and Associates): Time-series plots, contour maps, well logs, and statistical analyses of data from compliance wells.

1999 - Final Report for Slug Withdrawal Testing at Envirocare's Clive, Utah Facility, (EarthFax): Hydraulic conductivity measurements from bail tests.

1999 – Differential Leveling Survey for Envirocare of Utah, (Pentacore Resources): Well head elevation survey.

In addition, other reports and technical memoranda have been prepared for the facility. These documents include quarterly and semiannual monitoring reports, periodic ground water quality reports, and regional geologic and hydrogeologic studies.

3. Site description

The Envirocare facility is sited in Section 32, T1S, R11W near Clive, Utah approximately 80 miles west of Salt Lake City. Envirocare began waste disposal at the facility in 1988. At present, waste is placed in one of three disposal cells: (1) RCRA mixed waste, (2) LARW, or (3) 11e.(2). The RCRA mixed waste cell is currently being expanded to the north, the LARW cell is being expanded to the south, and the 11e.(2) cell is being expanded to the west and north. In the northeast part of the facility, the U.S. Department of Energy disposed of the Vitro uranium mill tailings; this area is now closed.

The facility is one square mile in size, encompassing all of Section 32. Figure 1 shows the disposal cells and major man-made and topographic features at the facility. The facility is located at an average elevation of approximately 4270 feet above mean sea level (amsl). The natural topography slopes slightly toward the southwest with approximately 10 feet of relief. The area is semi-arid, with an average precipitation of approximately 6-10 inches per year and average potential evapotranspiration of 60-70 inches per year (Bingham Environmental, 1996).

The locations of monitoring wells, boreholes, piezometers, and lysimeters are shown on Figure 2, and a data summary for these installations is presented as Table 1. Table 1 includes information on location, completion depth, well abandonment, and hydraulic tests.

4. Geology

The facility is located in the eastern margin of the Great Salt Lake Desert, part of the Basin and Range Province. This province is characterized by north-south trending mountain ranges with discontinuous alluvium-filled valleys found between the ranges. The mountains are mainly Paleozoic-age sedimentary and metamorphic rock, but can also be comprised of volcanic rocks. The intermountain troughs are primarily filled with unconsolidated alluvial, lacustrine, fluvial, and evaporite deposits, but pyroclastics, aeolian sediments, and basalt flows also occur (Bingham Environmental, 1996; Dames & Moore, 1982, 1987; Stephens, 1974). Sediments near the mountains are predominantly colluvial and alluvial, and are generally coarser grained than the lacustrine deposits found in the center of the valleys.

A geologic map of Section 32 and adjacent sections is presented as Figure 3, based on information in Solomon (1993). Figure 3 also shows major man-made features in the area that may affect ground water recharge. The facility is situated on Quaternary-age lacustrine lake bed deposits associated with the former Lake Bonneville. These surficial lacustrine deposits are generally comprised of low permeability silty clay. Surficial sand and gravel outcrops are mapped in the sections adjacent to the facility. The impact of these deposits on ground water movement beneath the facility is unknown.

Beneath the facility, the sediments consist predominantly of interbedded silt, sand, and clay with occasional gravel lenses. The depth of the valley fill beneath the facility is unknown. The deepest borehole at the facility (well SC-1) was drilled to a depth of 250 feet below ground surface (bgs) without encountering bedrock. An exploratory borehole for a potential water-supply well at the Broken Arrow facility to the north of Envirocare did not encounter bedrock at a depth of 700 bgs (Shrum, 1999).

The Grayback Hills begin approximately 4 miles north of the facility and are composed mainly of basalt flows and pyroclastics. The Cedar Mountains are found about 10 miles to the east-southeast and consist primarily of limestone, dolomite, and shale (Stephens, 1974).

A more complete description of the regional geology is given in Bingham Environmental (1996).

5. Hydrogeology

5.1. Regional hydrogeology

Ground water recharge to alluvium-filled valleys in the Basin and Range Province occurs primarily through the alluvial fan deposits along the flanks of the adjoining mountains. Because of the low precipitation and high evapotranspiration, direct infiltration of water into shallow aquifers is probably negligible. The regional ground water flow direction is presumably toward the Great Salt Lake to the east-northeast.

As the ground water flows through the valleys, the salinity of the water increases due to dissolution of evaporite deposits, and in shallow aquifers by concentration of salts due to evapotranspiration. A potential water-supply well installed at the Broken Arrow facility did not encounter fresh water to a depth of 700 feet (Shrum, 1999).

5.2. Site hydrogeology

5.2.1. Hydrostratigraphic units

Four hydrostratigraphic units are defined beneath the Envirocare facility:

- Unit 4: This uppermost unit is comprised of silt and clay. Unit 4 extends from the ground surface to a depth of 6 to 16.5 feet bgs, averaging approximately 10 feet in thickness. An isopach map showing the thickness of Unit 4 is presented as Figure 4.

This Unit is used as the lower liner and radon barrier for waste disposal cells at the facility. Unit 4 is unsaturated beneath the facility.

Unit 3: Unit 4 is underlain by Unit 3, composed predominantly of silty sand with interbedded silt and clay layers. Unit 3 ranges from 7 to 25 feet in thickness, averaging approximately 15 feet. The lower portion of Unit 3 is saturated beneath much of the western portion of the facility. The unconfined water-bearing zone occurring in Unit 3 (and the upper part of Unit 2) has been designated as the "shallow aquifer".

Unit 2: Unit 2 underlies Unit 3, and is typically composed of clay with occasional silty sand interbeds. Unit 2 ranges in thickness from 2.5 to 25 feet, averaging 15 feet. A structure contour map of the top of Unit 2 is shown as Figure 5. The upper part of Unit 2 is saturated beneath the facility, and along with the lower part of Unit 3, comprises the shallow aquifer.

Unit 1: The deepest hydrostratigraphic unit identified beneath the facility, Unit 1 typically consists of silty sand interbedded with clay and silt layers. Few borings penetrate this unit, and the thickness has not been determined. Unit 1 is saturated beneath the facility, and contains a locally confined aquifer, designated as the "deep aquifer".

Seven hydrogeologic cross-sections were constructed using stratigraphic information from well, borehole, piezometer, and lysimeter soil classification logs. The locations of these cross-sections are shown on Figure 6. The cross-sections are presented as Figures 7 through 13. Logs and completion diagrams for all monitor wells, boreholes, and lysimeters at the facility are included as Appendix A. Logs and completion diagrams included in Appendix A are as indicated in Table 1.

The stratigraphic contact elevation and unit thickness data used to construct the Unit 4 isopach map, Unit 2 structure contour map, and the hydrogeologic cross-sections are shown in Table 2.

Where several monitoring wells, boreholes, or lysimeters are located within a small area, a single log was selected to represent all logs in the immediate vicinity. The representative log was chosen based on log detail, quality, and total depth. Logs not included on the cross-sections, Unit 4 isopach map, or Unit 2 structure contour map are referenced to representative logs in Table 2.

On Figures 8 through 13 (cross-sections B-B' through G-G'), the saline ground water phreatic surface elevation is shown using water level data from August 4-6, 1999. On Figure 7 (cross-section A-A'), August 1999 water levels are not available for any of the wells in the line of section, but a pre-abandonment water level in well GW-8 measured on November 1, 1999 is shown. Water levels for the deep aquifer are essentially identical and are not shown.

The cross-sections and Unit 2 structure contour map indicate that the stratigraphic contacts generally dip gently toward the west. There is little variation in the thickness of the units beneath the facility, nor are there are no evident lateral trends in the attitude or thickness of the units. What variability in thickness occurs is more likely due to inconsistencies and uncertainties in soil classification during borehole logging, rather than to actual changes in thickness. Soil descriptions in many of the older boreholes were performed at 5-ft intervals, in contrast to more recent boreholes which were continuously cored.

The stratigraphy and structure presented in this report are consistent with interpretations presented in previous hydrogeologic reports (Bingham Environmental, 1991, 1996).

5.2.2. Hydraulic conductivity

Hydraulic tests were conducted on 84 wells completed in the shallow aquifer, and on one well completed in the deep aquifer (Adrian Brown Consultants, 1997; EarthFax, 1999). These tests were performed by bailing a known volume of water from the well and monitoring ground water level recovery. In the shallow aquifer, coefficient of hydraulic conductivity values estimated from these tests ranged from 0.01 to 14.97 ft/day, averaging approximately 2.70 ft/day. Table 3 summarizes these data. The data shown represent the average hydraulic conductivity value for all tests on a given well since 1997. The spatial distribution of hydraulic conductivity in the shallow aquifer is shown on Figure 14. A hydraulic conductivity of 39.7 ft/day was measured in well GW-27D, completed in the deep aquifer. There are no evident lateral trends in hydraulic conductivity.

In general, the hydraulic conductivity measurements included in this report should not be compared to values given in earlier hydrogeologic reports, due to changes in hydraulic testing methodology. Prior to 1997, hydraulic tests were performed by inducing a rise in water levels in the test wells (slug-in tests). Corrections for the resulting increase in saturated thickness of the aquifer were not made and the tests were redone.

5.2.3. Methods of performing fresh water equivalent head adjustments

Envirocare currently adjusts ground water elevations measured in the field to account for differences in salinity between monitor wells. This methodology involves calculating a fresh water equivalent head elevation for each well, which is then used to determine horizontal ground water flow direction and velocity and to calculate vertical hydraulic gradients at well pairs. Pentacore Resources has been requested to: (1) review the current methodology and compare it to other techniques, and (2) evaluate the impacts of using other techniques. The following is a discussion of the theoretical aspects, conceptual models, and application of fresh water equivalent head calculations. In Sections 5.2.4 and 5.2.5, horizontal and vertical ground water flow direction, gradient, and velocity estimates beneath the facility are evaluated and compared using different methodologies.

Background and theory:

Fresh water has a density of approximately 1.000 g/cm^3. Sea water is denser due to dissolved salts and has an average density of 1.025 g/cm^3. There is no "fresh" water beneath the Envirocare facility, and the density of the ground water ranges from 1.016 to 1.052 g/cm^3. In some cases, these density variations must be considered in ground water gradient and velocity calculations.

Potential or piezometric head controls ground water flow. The potential head at any point in a column of water is defined by the sum of the elevation head and the pressure head (Zil, 1993, Bear, 1999):

$$\varphi = z + (\rho_{sw}/\rho_{fw})h$$

This equation defines the potential head (φ) at a given point of interest as equal to the elevation head at that point (z) plus the pressure head, which is the product of the ratio of the densities of the saline water to fresh water (ρ_{sw}/ρ_{fw}) and the height of the water column above the point of interest (h). In common use, ρ_{fw} equals 1, the ratio (ρ_{sw}/ρ_{fw}) is approximated by the specific gravity (G_s) of the saline water, and the equation reduces to:

$$\varphi = z + G_s h$$

In a column of fresh water, potential heads are equal at all elevations within the column. At the top of the column, the pressure head ($G_s h$) equals zero (because h equals zero) and the total potential head is entirely due to elevation head (z). At the bottom of the column, the increase of pressure head is exactly offset by the decrease in elevation head. This is why water level measurements taken in a sounding tube placed in a monitoring well are independent of the depth to which the tube is lowered.

In a column of saline water (or any fluid with a density unequal to one), the potential head is the same at all elevations, but only when expressed in terms of that fluid. Potential head can be expressed in any measurement units desired (*i.e.*, feet of fresh water, feet of saline water, or inches of mercury). It is convenient to express the potential head of saline ground water in terms of feet of fresh water, or "fresh water equivalent head". Fresh water equivalent head becomes the standard by which potential head is measured, and can be used to compare potential head in fluids of different densities. An important point is that the fresh water equivalent head increases with depth in a saline water column, and does not have a unique value in a well. In a saline aquifer, fresh water equivalent head is always higher than the elevation of the phreatic (water table) surface of the saline water.

This concept is illustrated using hypothetical data in Figure 15. The fresh water equivalent head potential at point A is 463.20 feet, while the fresh water equivalent head at point B is lower (457.20 feet), due to the greater height of the column of saline water (h) at point A. Thus, to determine horizontal gradient it is important to specify the elevation at which fresh water equivalent head is calculated, and to compare this potential head only to other points with the same elevation.

Unconfined aquifers:

In an unconfined saline aquifer, it is possible to calculate and compare fresh water equivalent heads across any horizontal plane. Along the phreatic surface (the top of the water table) the potential head (and thus the ground water flow direction and velocity) of the ground water is defined solely by the elevation of the phreatic surface. These elevations can be represented on a phreatic surface elevation contour map. Fresh water equivalent head can also be calculated and mapped for any horizontal plane of interest, such as: (1) a specified arbitrary reference elevation below the phreatic surface, (2) the midpoints of the saturated filter packs (only if it is assumed that these midpoints lie in a horizontal plane), or (3) near the bottom of the aquifer (if this surface approximates a horizontal plane). A contour map constructed using saline phreatic surface elevation data is appropriate to determine flow direction and gradient of the uppermost portion of an aquifer, and will indicate the ground water migration path of any contaminants released at the ground surface or disposal cells. For the purpose of detecting any releases from the disposal cells, this is a more conservative approach than using flow direction and velocity at a deeper horizontal plane within the shallow aquifer. For example, if ground water at a

downgradient well has a higher density than at an upgradient well, the gradient calculated using fresh water equivalent head at any specified depth below the water table will be lower than that estimated from the phreatic surface of the aquifer, and may indicate a slower rate of ground water flow than is actually occurring along the upper surface of the aquifer. Constructing additional potentiometric surface elevation contour maps on an intermediate horizontal plane may be appropriate if contaminants are already present in the aquifer, and on the bottom of the aquifer if dense, non-aqueous phase liquids are present. However, in a relatively thin aquifer, such as that beneath the Envirocare facility, significant variations in flow direction and velocity at different depths within the aquifer are unlikely.

The method currently used at Envirocare to calculate fresh water equivalent head is to define a potentiometric surface through the midpoints of the saturated filter packs. There is a difficulty with this approach. The problem is that the elevations of the midpoints of the filter packs do not lie in a horizontal plane. Consider two wells, located adjacent to each other, with identical saline ground water elevations and density measurements but completed at different intervals (such as represented by points A and B on Figure 15). In the assumed absence of significant vertical flow within this hypothetical unconfined aquifer, the fresh water equivalent head values at the midpoints of the saturated filter packs are different and should not be compared to each other or placed on the same potentiometric surface elevation map.

Confined aquifers:

In a confined aquifer, there is no phreatic surface, and calculating fresh water equivalent head is necessary to define horizontal ground water flow gradient and direction. However, as mentioned previously, fresh water equivalent head potentials can only be compared at the same elevation, such as a specified arbitrary elevation surface within the aquifer or at the bottom of the overlying confining layer (if this surface approximates a horizontal plane).

Determining vertical gradients:

When evaluating vertical ground water gradient and flow, density contrasts must be considered, since density is defined by gravitational force and gravity operates only in the vertical direction. Comparing potential heads using fresh water equivalent head adjustments is appropriate. The current method used to calculate vertical gradient at Envirocare is to compare the fresh water equivalent head at the midpoints of the saturated filter packs of wells completed in the shallow and deep aquifers, then dividing by the vertical distance between the midpoints. This is illustrated on Figure 15 by comparing the fresh water equivalent head at point C to that at points A or B, and introduces difficulties because the midpoints are not on the same horizontal plane. An alternative method of calculating vertical gradient is to compare fresh water equivalent heads at a specified elevation of interest, such as the midpoint of an intermediate confining layer. This is illustrated on Figure 15 by comparing the fresh water equivalent head values at points D and E. The difference in fresh water equivalent head potential in the example (4.90 ft) would then be divided by the thickness of the confining layer to calculate the vertical hydraulic gradient (upward in this case).

Determining the appropriate conceptual hydrogeologic model:

Determining whether calculating fresh water equivalent head is appropriate to evaluate horizontal ground water flow also depends on the conceptual model used to describe the source of density contrasts. Fresh water equivalent head calculations are typically used in cases of salt

water intrusion, where it is desired to estimate the potential head required in fresh water injection wells to prevent the encroachment of sea water. In salt water intrusion, an interface is present between the saline water and fresh water, and the density gradient drives the salt water inland below the fresh water. There is significant vertical flow, and both the salt water and the fresh water are at constant head. In an unconfined aquifer, the analogous conceptual model is that: (1) there are interfaces between areas of different density, (2) vertical flow is significant, and (3) a constant potential head in each well is maintained by the injection or withdrawal of water of constant density. At the Envirocare facility, there are no data to indicate that these conditions are present, but three-dimensional data would be required to determine these parameters (*i.e.*, piezometric head and density measurements at different levels within the aquifer).

In a conceptual model for an unconfined aquifer where: (1) there is a gradational lateral variation in ground water density, (2) flow is essentially horizontal, and (3) there are no vertical variations in density, calculating fresh water equivalent head values is inappropriate and ground water flow is described by the saline water phreatic surface elevation. Lateral variations in ground water density are reflected in the slope of the saline water phreatic surface, analogous to the effect of lateral hydraulic conductivity variations on the hydraulic gradient.

At the Envirocare facility, it appears that the shallow unconfined aquifer is best described by gradational lateral variations in density, uniform density with depth within the aquifer, and by predominantly horizontal flow, rather than by the salt water intrusion conceptual model. The same conceptual model is also appropriate to describe the deep aquifer, except that appropriate fresh water equivalent head calculations are required to account for the lack of a phreatic surface and the presence of confined conditions.

Summary:

1. Fresh water equivalent head increases with depth in a saline water column, and is not a unique value for a given well.
2. Fresh water equivalent head is always higher than the elevation of the phreatic (water table) surface of a saline unconfined aquifer, or the potentiometric surface of a saline confined aquifer.
3. It is important to specify the elevation at which fresh water equivalent head is calculated, and to compare this potential head only to other points with the same elevation. Calculating fresh water equivalent head using the midpoints of the saturated filter packs is correct if these midpoints lie in a horizontal plane.
4. For the purpose of detecting any releases from the disposal cells, evaluating ground water flow direction and velocity using the phreatic (water table) surface of the shallow aquifer is more conservative than using fresh water equivalent head calculations for a deeper horizontal plane within the aquifer.
5. In a confined aquifer, calculating fresh water equivalent head is appropriate to define horizontal ground water flow gradient and direction. However, fresh water equivalent head potentials can only be compared at the same reference elevation.
6. To determine vertical gradients, it is appropriate to calculate and compare fresh water equivalent head values at a specified elevation of interest, such as the midpoint of an

intermediate confining layer. Fresh water equivalent head values calculated at the midpoints of the saturated filter packs are not directly comparable.

7. Only two-dimensional data are available for the shallow aquifer, and the appropriate conceptual model should include: (1) gradational lateral variations in density, (2) uniform density with depth within the aquifer, and (3) predominantly horizontal flow. Lateral variations in ground water density are reflected in the slope of the saline water phreatic surface, and no fresh water equivalent head calculations are required. Fresh water equivalent head calculations are required in the deep aquifer.

Conclusions:

Based on our evaluation of the methodologies available to Envirocare to adjust ground water elevation data for density variations, we conclude:

1. In the shallow aquifer, unadjusted saline water elevation measurements should be used to generate ground water elevation maps and to calculate horizontal gradient and velocity.
2. In the deep aquifer, fresh water equivalent head should be calculated at a specified reference elevation. These values should be used to generate ground water elevation maps and to calculate horizontal gradient and velocity.
3. To determine vertical gradient and velocity, fresh water equivalent head values should be calculated and compared at a specified reference elevation.

5.2.4. Horizontal ground water flow

5.2.4.1. Shallow aquifer

Ground water in the shallow aquifer beneath the facility flows generally toward the northeast. An unadjusted saline water phreatic surface elevation contour map for the shallow aquifer using data from August 4-6, 1999 is presented as Figure 16. A similar map using fresh water equivalent head elevation at the midpoints of the saturated filter packs is shown as Figure 17. Ground water elevation data used to construct these maps are shown in Table 4. At the Envirocare facility, the differences between the elevation of the unadjusted saline water phreatic surface elevation and the calculated fresh water equivalent head elevation at the midpoints of the saturated filter packs are relatively minor, averaging 0.15 feet. Similarly, the ground water flow directions and gradients as seen on the ground water elevation contour maps are essentially identical.

Shallow ground water flow is affected by recent infiltration of water from the surface water retention pond in the southwest corner of the facility near wells GW-19A and GW-19B in the spring of 1999. Surface water drainage to the pond has since been rerouted, eliminating the possibility of future overflow and resultant infiltration of storm water (Shrum, 1999).

From March 1993 to spring 1997 a borrow pit was excavated near the 11e.(2) cells to provide low permeability clay for adjacent disposal cell construction. The pit occasionally filled with rain water and the resulting infiltration resulted in a ground water mound near wells GW-37 and GW-38. This mound is shown graphically on a phreatic surface elevation contour map constructed using data from July 17-20, 1995 (Table 5, Figure 18). The mound reached its

greatest height at that time, and has diminished since. Little evidence of the mound can be observed at the present.

Horizontal ground water gradients in the shallow aquifer range from 0.0004 near well GW-77 to 0.004 near well GW-19A. The sitewide average gradient is 0.001. Horizontal ground water flow velocity was calculated by multiplying the gradient by the hydraulic conductivity and dividing by the porosity. Hydraulic conductivity values are presented in Table 3. The porosity was assumed to be 0.30. In order to illustrate the range of ground water flow velocity at the site, areas of highest hydraulic gradient and hydraulic conductivity were chosen, as well as lowest gradient. These ranges are shown in Table 6. The velocity in the area of lowest hydraulic conductivity was not included because the calculated velocity is intermediate to the velocity extremes. Using gradients based on the unadjusted phreatic saline ground water elevation, velocity ranged from 0.003 to 0.03 ft/day. The velocity calculated using sitewide average gradient and hydraulic conductivity is 0.009 ft/day. Detailed information on ground water gradient and velocity are provided to the DRC in semiannual reports.

Velocity estimates using the midpoint of the saturated filter pack method of determining hydraulic gradients are essentially identical to those estimated using the unadjusted saline water elevations, and are well within the anticipated range of variability due to uncertainties in porosity and hydraulic conductivity. In particular, hydraulic conductivity values calculated from single-well hydraulic tests cannot be expected to be more accurate than one-half an order of magnitude, especially considering the heterogenous nature of the sediments beneath the facility.

Ground water flow direction, gradient, and velocity are generally comparable to those presented in earlier hydrogeologic reports (Bingham Environmental, 1991, 1996). Fresh water equivalent head adjustments were not made in the 1991 report. Except for the local recharge events noted above, there are no evident time-related trends in ground water flow in the shallow aquifer.

5.2.4.2. Deep aquifer

Ground water in the deep aquifer also flows toward the northeast. Water level data for the deep aquifer are summarized in Table 7. Three potentiometric surface elevation contour maps are presented for the deep aquifer using data from August 1999. Figure 19 is constructed using the unadjusted elevation of the potentiometric surface of saline ground water, Figure 20 using the fresh water equivalent head at the midpoints of the saturated filter packs, and Figure 21 using the fresh water equivalent head at a reference elevation of 4225.88 ft amsl, near the top of the deep aquifer.

The horizontal hydraulic gradient in the deep aquifer using both the unadjusted saline water elevation and the fresh water equivalent head at a reference elevation of 4225.88 ft amsl are essentially identical at approximately 0.0003. The gradient using the fresh water equivalent head at the midpoints of the saturated filter packs is approximately 0.0004.

Using gradients calculated at a reference elevation, the horizontal flow velocity in the deep aquifer is approximately 0.04 ft/day (using a hydraulic gradient of 0.0003, a hydraulic conductivity of 39.7 ft/day from well GW-27D, and an assumed porosity of 0.30). This velocity is comparable to that estimated for the shallow aquifer. The velocity using gradients at the midpoints of the saturated filter packs is 0.05 ft/day.

As discussed in Section 5.2.3, calculating the fresh water equivalent head at a reference elevation is the more appropriate approach to describe horizontal ground water flow in the deep aquifer. However, since the gradient and flow direction using the unadjusted elevation of the saline water is essentially identical to that obtained by calculating fresh water equivalent head at a reference elevation, either method can be used without introducing significant error.

Ground water flow direction, gradient, and velocity are generally comparable to those presented in earlier hydrogeologic reports (Bingham Environmental, 1991, 1996). There are no evident time-related trends in ground water flow in the deep aquifer.

5.2.5. Vertical ground water flow

Vertical ground water gradient and velocity were estimated by comparing the potential head between monitor wells completed in the shallow and deep aquifers: (1) at the midpoint of the saturated filter packs (the current method), and (2) the midpoint of intervening Unit 2. The vertical hydraulic conductivity was assumed to be 0.00283 ft/day (10^{-6} cm/sec), and the porosity to be 0.30, for consistency with previous estimates (Bingham Environmental, 1996). Vertical hydraulic gradient and velocity calculations are shown in Tables 8 and 9. Both methods resulted in a downward vertical gradient near well pair GW-19A/GW-19B, located in the southwest corner of the facility, and an upward gradient near wells I-3-30/I-3-100, north of the RCRA Landfill. Calculating differences in fresh water equivalent head using the midpoints of the saturated filter packs resulted in a slight upward vertical gradient at well pairs GW-27/GW-27D and I-1-30/I-1-100, while using the midpoint of intervening Unit 2 resulted in a slight downward gradient at those well pairs. Because of the difficulties in comparing fresh water equivalent head between the midpoints of the saturated filter packs discussed in Section 5.2.3, using the midpoint of Unit 2 as the reference datum is more appropriate.

The magnitude of the downward gradient near the GW-19A/GW-19B well pair is likely artificially enhanced by the infiltration of overflow from the surface water retention pond in the southwest corner of the site, and by the past ground water mound near wells GW-37 and GW-38. These influxes of water may also have caused or increased the downward gradient at the other well pairs, and may diminish over time. The low magnitude of the vertical gradient elsewhere beneath the facility indicates that the two aquifers are likely subsets of a continuous aquifer system separated by low conductivity clay strata, and that vertical flow is not significant either upward or downward.

Except for the current downward gradient in the southwest portion of the facility caused by infiltration of water from: (1) the area near GW-37 and GW-38, and (2) the surface water retention pond, vertical gradients are comparable to those presented in previous reports (Bingham Environmental, 1991, 1996). There are no other evident time-related trends in vertical ground water gradient or velocity.

5.2.6. Ground water chemistry

Ground water at the site is extremely saline. In the shallow aquifer, the average Total Dissolved Solids (TDS) concentration ranges from approximately 24,000 to 53,000 mg/L. The sitewide average is 40,500 mg/L. Average TDS from 1991 to 1998 for wells completed in the shallow aquifer is included as Table 10, and the spatial distribution is shown on Figure 22. TDS data from wells GW-3, GW-11, GW-12, GW-13, GW-16, and GW-67 are not considered in

contouring because these wells are completed at a relatively deep depth and may not be representative of the shallow aquifer. Few TDS data are available for the deep aquifer. Mayo (1999) and Bingham Environmental (1996) indicate that the TDS of the deep aquifer is less than that of the shallow aquifer, but is greater than 20,000 mg/L. Specific gravity is also an indicator of the relative salinity of ground water samples. In the shallow aquifer, specific gravity ranges from 1.018 to 1.052 g/cm^3, averaging 1.033 g/cm^3. Specific gravity in the deep aquifer is somewhat lower, and ranges from 1.016 to 1.022 g/cm^3 with an average of 1.019 g/cm^3. Specific gravity data for August 1999 are included in Tables 4 and 7. The higher salinity of the shallow aquifer is likely due to: (1) concentration of salts through evapotranspiration, and/or (2) localized dissolution of evaporite deposits in the unsaturated soil in areas of local vertical recharge to the ground surface (such as near GW-19A in response to infiltration of water that overflowed from the surface water retention pond). TDS and specific gravity measurements are comparable to those presented in previous reports (Bingham Environmental, 1991, 1996), except at those monitoring wells affected by local infiltration. There are no other evident lateral or time-related trends in TDS or salinity across the facility.

Sodium and chloride dominate the major ion composition of shallow ground water beneath the facility. On average, sodium typically constitutes up about 90 percent of the total cations by weight, with lesser amounts of calcium, potassium, and magnesium. Chloride comprises approximately 86 percent of the anions; the remainder is primarily sulfate. Carbonate and bicarbonate are negligible (Mayo, 1999). A review of major ion data collected since the previous Revised Hydrogeologic Report (Bingham Environmental, 1996) revealed no significant time-related changes since 1996. There are no evident lateral or time-related trends in major ion chemistry across the facility.

Bingham Environmental (1996) performed an analysis of stable and unstable isotope data to characterize ground water recharge sources, ground water age, and ground water geochemical evolution. The evaluation indicated that ground water in the shallow aquifer beneath the south central, southwestern, and west central margins of the facility (wells GW-3, GW-18, and GW-19A) appears to have been subjected to excessive evaporation prior to recharge. Figure 23 shows the deuterium (δ^2H) and oxygen-18 ($\delta^{18}O$) isotopic composition of ground water samples at the site. Bingham Environmental concluded that recharge of surface water that had been concentrated by evaporation most likely occurred at some distance from the facility, except for local recharge near wells GW-37 and GW-38. Ground water age dating using tritium indicated that most ground water beneath the facility was recharged prior to 1953. The geochemical evolution study evaluated major ions primarily using Piper and Stiff diagrams, and found that except for TDS, the ionic composition of the shallow and deep aquifers were comparable. The study also indicated that the ionic composition of ground water at the facility was consistent with very slow horizontal flow rates.

Ground water beneath the facility is classified as a Class IV aquifer under the State of Utah Groundwater Quality Protection Regulations standards for TDS (exceeding 10,000 mg/L). Concentrations of many naturally-occurring parameters exceed EPA drinking water standards (Mayo, 1999; Bingham Environmental, 1996).

6. Summary and conclusions

Envirocare of Utah, Inc. (Envirocare) operates a commercial landfill near Clive, Utah to dispose of Low Activity Radioactive Waste (LARW), 11e.(2) waste (uranium mill tailings), and mixed radioactive and hazardous waste. The facility is located in Section 32, T1S, R11W near Clive, Utah approximately 80 miles east of Salt Lake City. At present, the waste is placed in one of three cells: (1) RCRA mixed waste, (2) LARW, or (3) 11e.(2). All three disposal areas are currently being expanded.

The facility is situated on Quaternary-age lacustrine lake bed deposits associated with the former Lake Bonneville. These surficial lacustrine deposits are generally comprised of low permeability silty clay. Four hydrostratigraphic units are defined beneath the Envirocare facility, in order of increasing depth:

Unit 4: Predominantly silt and clay, Unit 4 is used as the lower liner and radon barrier for waste disposal cells at the facility. Unit 4 is unsaturated beneath the facility.

Unit 3: Predominantly silty sand. The unconfined water-bearing zone occurring in Unit 3 (and the upper part of Unit 2) has been designated as the "shallow aquifer".

Unit 2: Predominantly clay. The upper part of Unit 2 is typically saturated beneath the facility, and along with the lower part of Unit 3, comprises the shallow aquifer.

Unit 1: Predominantly silty sand. Unit 1 is saturated beneath the facility, and contains a locally confined aquifer, designated as the "deep aquifer".

All stratigraphic unit contacts dip slightly toward the west. There is little variability in the thickness of the units.

Hydraulic tests have been conducted on 84 wells completed in the shallow aquifer. Coefficient of hydraulic conductivity values estimated from these tests ranged from 0.01 to 14.97 ft/day, averaging approximately 2.70 ft/day. One hydraulic conductivity value is available for the deep aquifer: 39.7 ft/day in well GW-27D.

Pentacore Resources reviewed the current methodology used at the facility to calculate fresh water equivalent head, compared this methodology to other techniques, and evaluated the effects on the interpretation of ground water flow direction, velocity, and vertical gradient. Based on our evaluation we concluded that regardless of the methodology used, the magnitude of the differences in horizontal ground water flow direction and velocity and in vertical gradient are relatively minor, and no major reinterpretation of the hydrogeology at the facility is indicated.

Future hydrogeologic studies for the facility should consider the following:

1. In the shallow aquifer, unadjusted saline water elevation measurements should be used to generate ground water elevation maps and to calculate horizontal gradient and velocity.
2. In the deep aquifer, fresh water equivalent head should be calculated at a specified reference elevation. These values should be used to generate ground water elevation maps and to calculate horizontal gradient and velocity. However, gradients using unadjusted saline water elevations are essentially identical and can be used without introducing significant error.

3. To determine vertical gradient and velocity, fresh water equivalent head values should be calculated and compared at a specified reference elevation.

Ground water in the shallow aquifer beneath the facility flows generally toward the northeast. The differences between the elevation of the unadjusted saline water phreatic surface elevation and the calculated fresh water equivalent head elevation at the midpoints of the saturated filter packs are relatively minor, averaging 0.15 feet. Shallow ground water flow is affected by recent infiltration of water from the surface water retention pond in the southwest corner of the facility near wells GW-19A and GW-19B. From March 1993 to spring 1997 a borrow pit excavated near the 11e.(2) cells to provide low permeability clay for adjacent disposal cell construction occasionally filled with rain water, and the resulting infiltration resulted in a ground water mound near wells GW-37 and GW-38. The mound reached its greatest height in 1995, and has diminished since. Little evidence of the mound can be observed at the present.

Horizontal ground water velocity in the shallow aquifer ranges from 0.003 to 0.03 ft/day. Velocity estimates using the midpoint of the saturated filter pack method of determining hydraulic gradients are essentially identical to those calculated using unadjusted gradients, and are well within the anticipated range of variability due to uncertainties in porosity and hydraulic conductivity.

Ground water flow direction in the deep aquifer is also toward the northeast. The horizontal ground water flow velocity in the deep aquifer using both the unadjusted saline water elevation and the fresh water equivalent head at a reference elevation of 4225.88 ft amsl is approximately 0.03 ft/day. The velocity using the midpoint of the saturated filter packs is 0.05 ft/day.

Vertical ground water gradient and velocity were estimated by comparing the potential head between monitor wells completed in the shallow and deep aquifers: (1) at the midpoints of the saturated filter packs (the current method), and (2) at the midpoint of intervening Unit 2. Both approaches resulted in a downward vertical gradient near well pair GW-19A/GW-19B, located in the southwest corner of the facility, and an upward gradient near wells I-3-30/I-3-100, north of the RCRA Landfill cell. Calculating differences in fresh water equivalent head using the midpoints of the saturated filter packs resulted in a slight upward vertical gradient at well pairs GW-27/GW-27D and I-1-30/I-1-100, while using the midpoint of intervening Unit 2 resulted in a slight downward gradient at those well pairs.

Except for the local and time-related variations in ground water flow resulting from artificial recharge in the southwestern part of the facility, the ground water flow regime is comparable to that described in previous hydrogeologic reports.

Total Dissolved Solids and specific gravity are higher in the shallow aquifer than in the deep aquifer. Sodium and chloride dominate the major ion composition of shallow ground water beneath the facility. On average across the facility, sodium typically constitutes up about 90 percent of the total cations by weight, with lesser amounts of calcium, potassium, and magnesium. Similarly, chloride comprises approximately 86 percent of the anions; the remainder is primarily sulfate. Carbonate and bicarbonate are negligible. There are no evident lateral or time-related trends in TDS, specific gravity, or major ion chemistry, except those resulting from artificial recharge in the southwestern part of the facility.

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TABLES

Table 1. Summary of monitoring well, borehole, and lysimeter information.

Location	Type	Date installed	Date abandoned	Northing (ft)	Easting (ft)	Ground surface elev. (ft amsl)	Measurement point elev. (ft amsl)	Total depth of boring (ft)	Depth to top of filter pack (ft)	Depth to bottom of filter pack (ft)	Depth to top of screened interval (ft)	Depth to bottom of screened interval (ft)	Well/boring log?	Hydraulic test?
I-1-30 (a)	Monitoring well (a)	5/10/90 (a)	na	859236.92 (e)	1553995.12 (e)	4277.29 (c)	4279.39 (c)	35.0 (a)	24.0 (a)	35.0 (a)	25.0 (a)	35.0 (a)	Yes (a)	Yes (d,j)
I-1-50 (a)	Monitoring well (a)	5/14/90 (a)	na	859236.58 (e)	1553990.25 (e)	4277.17 (c)	4279.15 (c)	49.5 (a)	37.0 (a)	49.5 (a)	39.0 (a)	49.5 (a)	Yes (a)	No
I-1-100 (a)	Monitoring well (a)	5/2/90 (a)	na	859232.60 (e)	1553993.21 (e)	4277.29 (c)	4279.15 (c)	101.5 (a)	72.0 (a)	101.5 (a)	90.0 (a)	100.0 (a)	Yes (a)	No
I-2-30 (a)	Monitoring well (a)	6/11/90 (a)	na	860484.50 (e)	1553712.45 (e)	4277.78 (c)	4279.92 (c)	37.4 (d)	24.0 (a)	37.4 (a)	25.0 (a)	37.4 (a)	Yes (a)	Yes (d,j)
I-2-50 (a)	Monitoring well (a)	5/23/90 (a)	na	860489.37 (e)	1553714.87 (e)	4277.75 (c)	4279.86 (c)	51.0 (a)	40.0 (a)	51.0 (a)	41.0 (a)	51.0 (a)	Yes (a)	No
I-3-30 (a)	Monitoring well (a)	5/9/90 (a)	na	861259.10 (e)	1554388.66 (e)	4278.50 (c)	4281.37 (c)	35.0 (a)	23.0 (a)	35.0 (a)	24.5 (a)	34.5 (a)	Yes (a)	Yes (d,j)
I-3-50 (a)	Monitoring well (a)	5/9/90 (a)	na	861261.35 (e)	1554392.95 (e)	4278.63 (c)	4281.41 (c)	55.0 (a)	44.0 (a)	55.0 (a)	45.0 (a)	55.0 (a)	Yes (a)	No
I-3-100 (a)	Monitoring well (a)	5/2/90 (a)	na	861264.26 (e)	1554388.79 (e)	4278.78 (c)	4281.50 (c)	101.5 (a)	84.0 (a)	101.5 (a)	90.0 (a)	100.0 (a)	Yes (a)	No
I-4-30 (a)	Monitoring well (a)	5/15/90 (a)	June - July 1994 (d)	859925.70 (d)	1554725.50 (d)	4277.60 (d)	4280.67 (d)	35.0 (a)	24.0 (a)	35.0 (a)	25.0 (a)	35.0 (a)	Yes (a)	Yes (d)
I-4-50 (a)	Monitoring well (a)	5/16/90 (a)	June - July 1994 (d)	859926.30 (d)	1554720.60 (d)	4277.70 (d)	4280.72 (d)	52.5 (a)	41.0 (a)	52.5 (a)	42.0 (a)	52.0 (a)	Yes (a)	No
SC-1 (a)	Piezometer (a)	8/23/81 (a)	Nov. 1-2, 1999 (k)	861926.20 (d)	1552264.50 (d)	4275.40 (d)	4278.88 (d)	250.3 (a)	100.0 (d)	229.8 (d)	Not available (a)	Not available (a)	Yes (a)	na
SC-2 (a)	Piezometer (a)	8/28/81 (a)	Nov. 1-2, 1999 (k)	859552.00 (d)	1549899.60 (d)	4268.70 (d)	4272.08 (d)	50.0 (a)	16.0 (d)	48.5 (d)	Not available (a)	Not available (a)	Yes (a)	na
SC-3 (a)	Piezometer (a)	8/28/81 (a)	June - July 1994 (d)	859445.60 (d)	1554613.90 (d)	4277.10 (d)	4280.35 (d)	50.5 (a)	23.0 (d)	50.5 (d)	Not available (a)	Not available (a)	Yes (a)	na
SC-4 (a)	Piezometer (a)	8/29/81 (a)	na	864211.50 (d)	1554800.30 (d)	4280.50 (d)	4284.53 (d)	51.5 (a)	29.5 (d)	51.5 (d)	Not available (a)	Not available (a)	Yes (a)	na
SC-5 (a)	Piezometer (a)	8/31/81 (a)	na	864273.40 (d)	1549949.90 (d)	4273.50 (d)	4276.10 (d)	51.5 (a)	29.0 (d)	51.5 (d)	31.0 (a)	51.0 (a)	Yes (a)	na
SC-6 (a)	Piezometer (a)	2/16/82 (a)	Nov. 1-2, 1999 (k)	862919.10 (d)	1549841.60 (d)	4272.50 (d)	4276.96 (d)	45.3 (a)	30.0 (d)	46.0 (d)	30.0 (a)	45.0 (a)	Yes (a)	na
SC-7 (a)	Piezometer (a)	2/17/82 (a)	na	Not available	Not available	4270.12 (a)	Not available	43.5 (a)	32.0 (a)	55.0 (a)	43.0 (a)	55.0 (a)	Yes (a)	na
SC-7A (d)	Not available	1981-1982 (d)	na	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	No	No
SC-7B (d)	Not available	1981-1982 (d)	na	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	No	No
SC-8 (a)	Piezometer (a)	2/18/82 (a)	na	Not available	Not available	4277.80 (a)	Not available	52.5 (a)	Not available	Not available	Not available (a)	Not available (a)	Yes (a)	No
SC-8A (d)	Not available	1981-1982 (d)	na	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	No	No
SC-8B (d)	Not available	1981-1982 (d)	na	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	No	No
SC-9 (a)	Piezometer (a)	2/19/82 (a)	na	862992.00 (d)	1553137.10 (d)	4278.80 (d)	4283.20 (d)	45.5 (a)	28.5 (d)	45.0 (d)	Not available (a)	Not available (a)	Yes (a)	na
SC-10 (a)	Piezometer (a)	2/22/82 (a)	Nov. 1-2, 1999 (k)	864206.80 (d)	1553152.20 (d)	4279.80 (d)	4284.41 (d)	48.0 (a)	32.5 (d)	48.0 (d)	Not available (a)	Not available (a)	Yes (a)	na
SC-11 (a)	Piezometer (a)	2/23/82 (a)	na	864278.40 (d)	1551419.80 (d)	4275.80 (d)	4280.81 (d)	45.0 (a)	29.0 (d)	45.0 (d)	30.0 (a)	45.0 (a)	Yes (a)	na
SC-12 (a)	Piezometer (a)	2/24/82 (a)	Nov. 1-2, 1999 (k)	862912.70 (d)	1551480.30 (d)	4274.90 (d)	4277.50 (d)	58.0 (a)	47.5 (d)	58.0 (d)	Not available (a)	Not available (a)	Yes (a)	na
SC-13 (a)	Piezometer (a)	2/25/82 (a)	Nov. 1-2, 1999 (k)	861449.10 (d)	1551546.70 (d)	4274.10 (d)	4277.08 (d)	56.0 (a)	45.5 (d)	55.0 (d)	Not available (a)	Not available (a)	Yes (a)	na
SLC-201 (a)	Monitoring well (a)	2/3/84 (a)	Nov. 1-2, 1999 (k)	863094.60 (d)	1550650.20 (d)	4274.00 (d)	4275.69 (d)	50.0 (a)	36.5 (d)	52.0 (d)	Not available (a)	Not available (a)	Yes (a)	No
SLC-202 (a)	Monitoring well (a)	2/3/84 (a)	Nov. 1-2, 1999 (k)	863032.60 (d)	1551125.50 (d)	4274.40 (d)	4275.81 (d)	50.0 (a)	36.5 (d)	52.0 (d)	Not available (a)	Not available (a)	Yes (a)	No
SLC-203 (a)	Monitoring well (a)	2/2/84 (a)	Nov. 1-2, 1999 (k)	862914.00 (d)	1552014.80 (d)	4276.00 (d)	4277.42 (d)	50.0 (a)	37.5 (d)	52.0 (d)	Not available (a)	Not available (a)	Yes (a)	No
SLC-204 (a)	Monitoring well (a)	2/1/84 (a)	Nov. 1-2, 1999 (k)	861565.20 (d)	1550447.40 (d)	4271.80 (d)	4273.21 (d)	50.0 (a)	34.5 (d)	52.0 (d)	Not available (a)	Not available (a)	Yes (a)	No
SLC-205 (a)	Monitoring well (a)	2/2/84 (a)	Nov. 1-2, 1999 (k)	861560.70 (d)	1551051.10 (d)	4273.80 (d)	4275.45 (d)	50.0 (a)	35.0 (d)	52.5 (d)	Not available (a)	Not available (a)	Yes (a)	No
SLC-206 (a)	Monitoring well (a)	2/3/84 (a)	Nov. 1-2, 1999 (k)	861655.20 (d)	1551988.80 (d)	4274.80 (d)	4275.94 (d)	50.0 (a)	37.5 (d)	52.0 (d)	Not available (a)	Not available (a)	Yes (a)	No
DH-16A (a)	Exploratory hole (a)	1/15/92 (a)	1/15/92 (a)	861335.70 (d)	1553741.50 (d)	4277.60 (d)	na	41.0 (a)	NA (a)	NA (a)	na (a)	na (a)	Yes (a)	na
DH-30 (a)	Exploratory hole (a)	11/27/91 (a)	11/17/91 (a)	859402.90 (d)	1553573.00 (d)	4276.30 (d)	na	34.5 (a)	NA (a)	NA (a)	na (a)	na (a)	Yes (a)	na
DH-31 (a)	Piezometer (a)	12/9/91 (a)	na	861255.00 (d)	1554402.10 (d)	4278.30 (d)	4280.95 (d)	32.0 (a)	24.8 (d)	32.0 (a)	27.0 (a)	31.5 (a)	Yes (a)	Yes (d,j)
DH-32 (a)	Piezometer (a)	12/10/91 (a)	na	859949.50 (d)	1553703.10 (d)	4276.70 (d)	4278.46 (d)	32.0 (a)	25.0 (a)	32.0 (a)	27.0 (a)	31.5 (a)	Yes (a)	Yes (d,j)
DH-33 (a)	Piezometer (a)	12/10/91 (a)	na	860518.60 (d)	1554624.40 (d)	4277.90 (d)	4280.23 (d)	32.0 (a)	26.0 (a)	32.0 (a)	27.0 (a)	31.5 (a)	Yes (a)	Yes (d,j)
DH-34 (a)	Piezometer (a)	12/11/91 (a)	June - July 1994 (d)	859445.70 (d)	1554630.60 (d)	4277.30 (d)	4279.88 (d)	32.0 (a)	25.6 (d)	32.0 (a)	27.0 (a)	31.5 (a)	Yes (a)	Yes (d)
DH-47 (a)	Exploratory hole (a)	1/12/92 (a)	1/12/92 (a)	862031.50 (d)	1549956.00 (d)	4271.00 (d)	na	46.0 (a)	na	na	na (a)	na (a)	Yes (a)	na
DH-48 (a)	Exploratory hole (a)	2/10/92 (a)	2/10/92 (a)	859609.00 (d)	1553855.20 (d)	4277.00 (d)	na	29.0 (a)	na	na	na (a)	na (a)	Yes (a)	na
DH-49 (a)	Exploratory hole (a)	2/10/92 (a)	2/10/92 (a)	859598.90 (d)	1554641.20 (d)	4276.90 (d)	na	28.0 (a)	na	na	na (a)	na (a)	Yes (a)	na
DH-50 (a)	Exploratory hole (a)	2/10/92 (a)	2/10/92 (a)	859986.50 (d)	1553863.00 (d)	4277.00 (d)	na	30.0 (a)	na	na	na (a)	na (a)	Yes (a)	na
DH-51 (a)	Exploratory hole (a)	2/11/92 (a)	2/11/92 (a)	859985.50 (d)	1554677.80 (d)	4277.80 (d)	na	28.0 (a)	na	na	na (a)	na (a)	Yes (a)	na
DH-52 (a)	Exploratory hole (a)	2/11/92 (a)	2/11/92 (a)	859241.50 (d)	1553692.00 (d)	4276.30 (d)	na	28.0 (a)	na	na	na (a)	na (a)	Yes (a)	na
DH-53 (a)	Exploratory hole (a)	2/19/92 (a)	2/19/92 (a)	859600.80 (d)	1554314.90 (d)	4277.00 (d)	na	28.0 (a)	na	na	na (a)	na (a)	Yes (a)	na
DH-54 (a)	Exploratory hole (a)	2/19/92 (a)	2/19/92 (a)	859212.20 (d)	1554698.70 (d)	4277.10 (d)	na	28.0 (a)	na	na	na (a)	na (a)	Yes (a)	na
DH-59 (a)	Piezometer (a)	2/3/93 (a)	na	859307.60 (d)	1550721.70 (d)	4270.20 (d)	4272.06 (d)	25.0 (a)	16.5 (a)	25.0 (a)	20.0 (a)	24.5 (a)	Yes (a)	Yes (j)
DH-61 (a)	Piezometer (a)	2/2/93 (a)	June - July 1994 (d)	859965.80 (d)	1551626.00 (d)	4273.50 (d)	4275.49 (d)	27.0 (a)	20.0 (a)	27.0 (a)	22.0 (a)	26.5 (a)	Yes (a)	na
DH-62 (a)	Piezometer (a)	2/1/93 (a)	na	860708.30 (d)	1551616.20 (d)	4270.80 (d)	4272.98 (d)	26.0 (a)	19.0 (a)	26.0 (a)	21.0 (a)	25.5 (a)	Yes (a)	Yes (j)
DH-65 (a)	Exploratory hole (a)	9/28/93 (a)	9/28/93 (a)	859942.70 (d)	1553703.00 (d)	4276.70 (d)	na (d)	43.0 (a)	na	na	na (a)	na (a)	Yes (a)	na
GW-1 (a)	Monitoring well (a)	3/3/88 (a)	na	859278.50 (d)	1551641.10 (d)	4273.00 (d)	4275.06 (d)	41.5 (a)	18.0 (a)	40.0 (a)	20.0 (a)	40.0 (a)	Yes (a)	No
GW-2 (a)	Monitoring well (a)	3/4/88 (a)	na	860773.50 (d)	1554887.20 (d)	4277.90 (d)	4279.98 (d)	41.5 (a)	18.0 (a)	40.0 (a)	20.0 (a)	40.0 (a)	Yes (a)	No
GW-3 (a)	Monitoring well (a)	3/2/88 (a)	na	862016.50 (d)	1549956.00 (d)	4271.00 (d)	4273.14 (d)	41.5 (a)	18.0 (a)	40.0 (a)	20.0 (a)	40.0 (a)	Yes (a)	Yes (d)
GW-4 (a)	Monitoring well (a)	1988 (d)	prior to 1989 (a)	861292.90 (d)	1552841.80 (d)	4274.30 (d)	4276.57 (d)	40.0 (g)	18.0 (d)	40.0 (d)	20.0 (a)	40.0 (a)	No	No
GW-5 (a)	Monitoring well (a)	3/8/88 (a)	Nov. 1-2, 1999 (k)	862724.70 (d)	1552330.50 (d)	4276.60 (d)	4278.64 (d)	41.5 (a)	18.0 (a)	40.0 (a)	20.0 (a)	40.0 (a)	Yes (a)	Yes (d)
GW-6 (a)	Monitoring well (a)	3/4/88 (a)	na	863088.90 (d)	1554967.40 (d)	4279.80 (d)	4282.01 (d)	41.5 (a)	18.0 (a)	40.0 (a)	20.0 (a)	40.0 (a)	Yes (a)	No
GW-7 (a)	Monitoring well (a)	Not available	prior to 1989 (a)	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	No	No
GW-8 (a)	Monitoring well (a)	3/8/88 (a)	Nov. 1-2, 1999 (k)	864417.60 (d)	1553081.70 (d)	4280.00 (d)	4282.03 (d)	41.5 (a)	18.0 (a)	40.0 (a)	20.0 (a)	40.0 (a)	Yes (a)	No
GW-9 (a)	Monitoring well (a)	6/9/88 (a)	na	864027.40 (d)	1552466.30 (d)	4278.80 (d)	4281.47 (d)	40.0 (a)	18.0 (a)	40.0 (a)	20.0 (a)	40.0 (a)	Yes (a)	No
GW-10 (a)	Monitoring well (a)	6/10/88 (a)	prior to 1989 (a)	Not available	Not available	Not available	Not available	40.0 (a)	18.0 (a)	40.0 (a)	20.0 (a)	40.0 (a)	Yes (a)	No
GW-11 (d)	Monitoring well (d)	1988, 1990 (d)	June - July 1994 (d)	859935.80 (d)	1553702.90 (d)	4276.60 (d)	4280.17 (d)	55.0 (g)	44.0 (d)	55.0 (d)	Not available	Not available	No	Yes (d)
GW-12 (d)	Monitoring well (d)	1988, 1990 (d)	June - July 1994 (d)	859977.90 (d)	1553892.10 (d)	4276.90 (d)	4279.95 (d)	55.0 (g)	44.0 (d)	55.0 (d)	Not available	Not available	No	Yes (d)
GW-13 (d)	Monitoring well (d)	1988, 1990 (d)	June - July 1994 (d)	859962.00 (d)	1554214.30 (d)	4277.20 (d)	4280.11 (d)	55.0 (g)	44.0 (d)	55.0 (d)	Not available	Not available	No	Yes (d)
GW-16 (a)	Monitoring well (a)	2/12/91 (a)	na	861349.80 (d)	1553727.40 (d)	4277.60 (d)	4279.76 (d)	41.0 (a)	20.3 (d)	41.0 (d)	23.5 (a)	38.0 (a)	Yes (a)	Yes (d)
GW-16R (a)	Monitoring well (a)	2/4/93 (a)	na	861223.02 (e)	1553727.83 (e)	4279.64 (c)	4281.08 (c)	36.0 (a,h)	20.0 (a)	36.0 (a,h)	Not available	Not available	Yes (a)	Yes (j)
GW-17A (a)	Monitoring well (a)	2/8/91 (a)	na	861507.20 (d)	1552426.10 (d)	4276.50 (d)	4278.64 (d)	34.5 (a)	18.8 (d)	34.5 (d)	23.5 (a)	32.5 (a)	Yes (a)	Yes (d,j)

Table 1. Summary of monitoring well, borehole, and lysimeter information.

Location	Type	Date installed	Date abandoned	Northing (ft)	Easting (ft)	Ground surface elev. (ft amsl)	Measurement point elev. (ft amsl)	Total depth of boring (ft)	Depth to top of filter pack (ft)	Depth to bottom of filter pack (ft)	Depth to top of screened interval (ft)	Depth to bottom of screened interval (ft)	Well/boring log?	Hydraulic test?
GW-18 (d)	Monitoring well (d)	2/9/91 (d)	Nov. 1-2, 1999 (k)	859283.10 (d)	1552418.20 (d)	4274.30 (d)	4276.61 (d)	39.2 (g)	18.5 (d)	39.2 (d)	23.5 (a)	37.5 (a)	Yes (a)	Yes (d)
GW-19A (a)	Monitoring well (a)	2/7/91 (a)	na	859343.47 (e)	1549663.47 (e)	4269.37 (c)	4270.84 (c)	31.5 (a)	14.8 (d)	31.5 (d)	18.0 (a)	27.5 (a)	Yes (a)	Yes (d,j)
GW-19B (a)	Monitoring well (a)	2/6/91 (a)	na	859335.65 (e)	1549663.13 (e)	4269.14 (c)	4270.76 (c)	102.0 (a)	75.0 (a)	102.0 (a)	78.5 (a)	97.5 (a)	Yes (a)	Yes (d)
GW-20 (a)	Monitoring well (a)	12/2/91 (a)	na	860324.77 (e)	1552416.02 (e)	4275.29 (c)	4276.60 (c)	35.0 (a)	21.0 (a)	35.0 (a)	25.0 (a)	34.5 (a)	Yes (a)	Yes (d,j)
GW-21 (a)	Monitoring well (a)	2/13/91 (a)	na	864463.30 (d)	1555001.00 (d)	4280.50 (d)	4283.23 (d)	44.5 (a)	21.0 (a)	42.0 (a)	27.0 (a)	41.5 (a)	Yes (a)	Yes (d,j)
GW-22 (a)	Monitoring well (a)	12/5/91 (a)	na	861266.20 (e)	1553261.74 (e)	4276.39 (c)	4277.23 (c)	32.0 (a)	19.0 (a)	32.0 (a)	22.0 (a)	31.5 (a)	Yes (a)	Yes (d,j)
GW-23 (a)	Monitoring well (a)	12/5/91 (a)	na	861271.09 (e)	1552851.65 (e)	4275.31 (c)	4276.63 (c)	32.0 (a)	18.0 (a)	32.0 (a)	22.0 (a)	31.5 (a)	Yes (a)	Yes (d,j)
GW-24 (a)	Monitoring well (a)	12/3/91 (a)	na	861174.24 (e)	1552435.30 (e)	4275.50 (c)	4276.70 (c)	31.8 (d)	20.2 (d)	31.8 (d)	22.0 (a)	31.5 (a)	Yes (a)	Yes (d,j)
GW-25 (a)	Monitoring well (a)	12/19/91 (a)	na	861399.29 (e)	1551452.26 (e)	4274.52 (c)	4276.20 (c)	34.0 (a)	22.0 (a)	34.0 (a)	24.0 (a)	33.5 (a)	Yes (a)	Yes (d,j)
GW-26 (a)	Monitoring well (a)	12/20/91 (a)	na	861412.36 (e)	1550713.42 (e)	4272.91 (c)	4274.60 (c)	30.0 (a)	18.0 (a)	30.0 (a)	20.0 (a)	29.5 (a)	Yes (a)	Yes (d,j)
GW-27 (a)	Monitoring well (a)	12/11/91 (a)	na	861432.06 (e)	1549878.50 (e)	4270.72 (c)	4272.42 (c)	32.0 (a)	18.2 (d)	30.1 (d)	20.0 (a)	29.5 (a)	Yes (a)	Yes (d,j)
GW-27D (e)	Monitoring well (e)	12/29/98 (a)	na	861407.39 (e)	1549877.80 (e)	4270.88 (c)	4273.67 (c)	100.0 (a)	81.0 (a)	100.0 (a)	85.0 (a)	100.0 (a)	Yes (a)	No
GW-28 (a)	Monitoring well (a)	12/17/91 (a)	na	860488.38 (e)	1549863.30 (e)	4269.91 (c)	4271.29 (c)	30.0 (a)	18.0 (a)	30.0 (a)	20.0 (a)	29.5 (a)	Yes (a)	Yes (d,j)
GW-29 (a)	Monitoring well (a)	11/26/91 (a)	na	859435.90 (e)	1552401.15 (e)	4274.71 (c)	4276.29 (c)	32.0 (a)	19.8 (d)	32.0 (d)	22.0 (a)	31.5 (a)	Yes (a)	Yes (d,j)
GW-36 (a)	Monitoring well (a)	12/23/91 (a)	na	859978.64 (e)	1550498.23 (e)	4270.25 (c)	4271.97 (c)	30.0 (a)	18.0 (a)	30.0 (a)	20.0 (a)	29.5 (a)	Yes (a)	Yes (d,j)
GW-37 (a)	Monitoring well (a)	12/17/91 (a)	na	860361.86 (e)	1551055.11 (e)	4269.30 (c)	4271.02 (c)	32.0 (a)	17.2 (d)	29.8 (d)	20.0 (a)	29.5 (a)	Yes (a)	Yes (d,j)
GW-38 (a)	Monitoring well (a)	12/24/91 (a)	na	860723.04 (e)	1551623.93 (e)	4271.34 (c)	4273.42 (c)	32.0 (a)	18.0 (d)	29.8 (d)	20.0 (a)	29.5 (a)	Yes (a)	Yes (d,j)
GW-41 (a)	Monitoring well (a)	2/12/92 (a)	na	859717.09 (e)	1554662.19 (e)	4277.58 (c)	4279.56 (c)	38.0 (a)	18.5 (a)	36.0 (a)	20.5 (a)	35.0 (a)	Yes (a)	Yes (d,j)
GW-42 (a)	Monitoring well (a)	2/13/92 (a)	na	859856.43 (e)	1554665.05 (e)	4278.16 (c)	4279.34 (c)	36.0 (a)	18.0 (a)	36.0 (a)	20.5 (a)	34.5 (a)	Yes (a)	Yes (d, j)
GW-43 (a)	Monitoring well (a)	2/14/92 (a)	na	859974.80 (d)	1554549.70 (d)	4278.20 (d)	4280.42 (d)	38.0 (a)	18.5 (a)	36.0 (a)	21.0 (a)	35.5 (a)	Yes (a)	Yes (d,j)
GW-44 (a)	Monitoring well (a)	2/17/92 (a)	na	859967.80 (d)	1554370.70 (d)	4277.30 (d)	4279.14 (d)	38.0 (a)	18.0 (a)	36.0 (a)	20.5 (a)	35.0 (a)	Yes (a)	Yes (d,j)
GW-45 (a)	Monitoring well (a)	2/18/92 (a)	na	859970.86 (e)	1554221.19 (e)	4277.74 (c)	4279.50 (c)	36.0 (a)	18.5 (a)	36.0 (a)	20.5 (a)	35.0 (a)	Yes (a)	Yes (d,j)
GW-46 (a)	Monitoring well (a)	2/25/92 (a)	na	859978.22 (e)	1554075.48 (e)	4277.65 (c)	4279.50 (c)	36.0 (a)	18.0 (a)	36.0 (a)	20.5 (a)	35.0 (a)	Yes (a)	Yes (d,j)
GW-55 (a)	Monitoring well (a)	2/26/92 (a)	na	859892.55 (e)	1553858.80 (e)	4278.20 (c)	4279.95 (c)	25.0 (a)	18.0 (a)	25.0 (a)	20.0 (a)	24.5 (a)	Yes (a)	No
GW-56 (a)	Monitoring well (a)	3/16/92 (a)	June - July 1994 (d)	860914.20 (d)	1553834.90 (d)	4275.90 (d)	4278.05 (d)	34.0 (a)	18.6 (d)	34.0 (d)	24.0 (a)	33.5 (a)	Yes (a)	No
GW-56R (a)	Monitoring well (a)	2/5/93 (a)	na	860827.90 (e)	1553751.48 (e)	4277.63 (c)	4279.16 (c)	35.0 (a)	18.0 (a)	35.0 (a)	25.0 (a)	34.5 (a)	Yes (a)	Yes (j)
GW-57 (a)	Monitoring well (a)	3/18/92 (a)	na	860964.79 (e)	1549871.14 (e)	4269.97 (c)	4271.92 (c)	30.0 (a)	17.4 (d)	30.0 (d)	20.0 (a)	29.5 (a)	Yes (a)	Yes (j)
GW-58 (a)	Monitoring well (a)	3/19/92 (a)	na	860015.26 (e)	1549883.25 (e)	4269.65 (c)	4271.15 (c)	30.0 (a)	18.5 (d)	30.0 (d)	20.0 (a)	29.5 (a)	Yes (a)	Yes (j)
GW-60 (a)	Monitoring well (a)	2/2/93 (a)	na	859278.94 (e)	1551630.83 (e)	4273.03 (c)	4274.65 (c)	28.0 (a)	19.5 (a)	28.0 (a)	22.5 (a)	27.0 (a)	Yes (a)	Yes (j)
GW-63 (a)	Monitoring well (a)	7/7/93 (a)	na	859306.89 (e)	1550735.80 (e)	4270.22 (c)	4272.00 (c)	30.0 (a)	17.5 (a)	30.0 (a)	20.0 (a)	29.0 (a)	Yes (a)	Yes (j)
GW-64 (a)	Monitoring well (a)	9/29/93 (a)	na	859959.31 (e)	1553703.11 (e)	4277.26 (c)	4278.85 (c)	35.0 (a)	22.0 (a)	35.0 (a)	25.0 (a)	34.5 (a)	Yes (a)	Yes (j)
GW-66 (a)	Monitoring well (a)	6/15/94 (a)	na	859584.98 (e)	1553967.23 (e)	4277.51 (c)	4279.62 (c)	35.0 (a)	16.5 (a)	35.0 (a)	19.5 (a)	34.5 (a)	Yes (a)	Yes (j)
GW-67 (a)	Monitoring well (a)	9/24/96 (a)	na	860018.97 (e)	1554673.12 (e)	4278.15 (c)	4282.23 (c)	39.0 (a)	20.0 (a)	39.0 (a)	22.0 (a)	37.0 (a)	Yes (a)	Yes (i,j)
GW-67R (a)	Monitoring well (a)	11/14/98 (a)	na	860013.28 (e)	1554679.67 (e)	4278.19 (c)	4281.49 (c)	39.0 (a)	27.0 (a)	39.0 (a)	29.0 (a)	39.0 (a)	Yes (a)	Yes (i)
GW-68 (a)	Monitoring well (a)	9/23/96 (a)	na	860167.33 (e)	1554676.54 (e)	4279.27 (c)	4282.40 (c)	39.0 (a)	22.0 (a)	39.0 (a)	24.0 (a)	38.5 (a)	Yes (a)	Yes (i,j)
GW-68R (a)	Monitoring well (a)	11/14/98 (a)	na	860162.97 (e)	1554682.86 (e)	4279.29 (c)	4282.25 (c)	39.0 (a)	22.0 (a)	39.0 (a)	24.0 (a)	39.0 (a)	Yes (a)	Yes (i)
GW-69 (a)	Monitoring well (a)	9/20/96 (a)	na	860317.59 (e)	1554680.14 (e)	4277.99 (c)	4281.64 (c)	37.5 (a)	25.0 (a)	37.5 (a)	27.0 (a)	37.0 (a)	Yes (a)	Yes (i,j)
GW-69R (a)	Monitoring well (a)	11/15/98 (a)	na	860310.43 (e)	1554686.87 (e)	4278.69 (c)	4281.59 (c)	39.0 (a)	22.0 (a)	39.0 (a)	24.0 (a)	39.0 (a)	Yes (a)	Yes (i)
GW-70 (a)	Monitoring well (e)	9/19/96 (a)	na	860468.68 (e)	1554684.24 (e)	4278.76 (c)	4281.58 (c)	40.0 (a)	27.0 (a)	40.0 (a)	29.0 (a)	39.0 (a)	Yes (a)	Yes (i,j)
GW-71 (a)	Monitoring well (e)	9/20/96 (a)	na	860577.67 (e)	1554547.42 (e)	4278.44 (c)	4281.70 (c)	40.0 (a)	23.0 (a)	40.0 (a)	25.0 (a)	39.0 (a)	Yes (a)	Yes (i,j)
GW-75 (a)	Monitoring well (a)	4/23/97 (a)	January 1998 (f)	859343.70 (a)	1553709.50 (a)	4276.25 (a)	4279.01 (a)	31.3 (a)	18.0 (a)	31.3 (a)	21.3 (a)	30.8 (a)	Yes (a)	Yes (j)
GW-76 (a)	Monitoring well (a)	4/23/97 (a)	January 1998 (f)	859320.40 (a)	1553082.20 (a)	4274.94 (a)	4278.01 (a)	33.1 (a)	20.0 (a)	33.1 (a)	23.1 (a)	32.6 (a)	Yes (a)	Yes (j)
GW-77 (a)	Monitoring well (a)	1/23/98 (a)	na	859405.32 (e)	1553696.71 (e)	4279.54 (c)	4282.97 (c)	40.0 (a)	27.0 (a)	40.0 (a)	29.0 (a)	39.0 (a)	Yes (a)	Yes (i)
GW-78 (a)	Monitoring well (a)	1/23/98 (a)	Nov. 1-2, 1999 (k)	859399.88 (e)	1553082.13 (e)	4278.37 (c)	4281.41 (c)	40.0 (a)	26.9 (a)	40.0 (a)	29.0 (a)	39.0 (a)	Yes (a)	Yes (i)
GW-79 (a)	Monitoring well (a)	7/20/98 (a)	na	860591.98 (e)	1554276.63 (e)	4277.10 (c)	4279.85 (c)	34.0 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)
GW-80 (a)	Monitoring well (a)	7/20/98 (a)	na	860598.72 (e)	1554100.07 (e)	4273.58 (c)	4275.85 (c)	34.0 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)
GW-81 (a)	Monitoring well (a)	7/14/98 (a)	na	862999.31 (e)	1550242.17 (e)	4274.18 (c)	4276.70 (c)	34.0 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)
GW-82 (a)	Monitoring well (a)	7/13/98 (a)	na	862992.28 (e)	1550573.37 (e)	4274.35 (c)	4276.72 (c)	34.0 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)
GW-83 (a)	Monitoring well (a)	7/13/98 (a)	na	862985.98 (e)	1550902.77 (e)	4274.51 (c)	4276.82 (c)	34.0 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)
GW-84 (a)	Monitoring well (a)	7/13/98 (a)	na	862979.53 (e)	1551235.63 (e)	4274.78 (c)	4277.14 (c)	34.0 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)
GW-85 (a)	Monitoring well (a)	7/10/98 (a)	na	862973.14 (e)	1551559.04 (e)	4275.16 (c)	4277.79 (c)	34.3 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)
GW-86 (a)	Monitoring well (a)	7/9/98 (a)	na	862965.78 (e)	1551955.18 (e)	4275.83 (c)	4278.23 (c)	39.0 (a)	21.4 (a)	39.0 (a)	23.4 (a)	38.4 (a)	Yes (a)	Yes (i)
GW-88 (a)	Monitoring well (a)	7/5/98 (a)	na	862958.18 (e)	1552343.08 (e)	4276.86 (c)	4279.45 (c)	34.0 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)
GW-89 (a)	Monitoring well (a)	7/15/98 (a)	na	862564.41 (e)	1552337.53 (e)	4276.85 (c)	4279.28 (c)	34.0 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)
GW-90 (a)	Monitoring well (a)	7/16/98 (a)	na	862173.19 (e)	1552331.49 (e)	4276.04 (c)	4278.77 (c)	34.0 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)
GW-91 (a)	Monitoring well (a)	7/16/98 (a)	na	861778.51 (e)	1552325.45 (e)	4276.04 (c)	4278.77 (c)	34.0 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)
GW-92 (a)	Monitoring well (a)	7/16/98 (a)	na	861379.65 (e)	1552318.54 (e)	4276.35 (c)	4278.95 (c)	34.0 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)
GW-93 (a)	Monitoring well (a)	7/6/98 (a)	na	861389.47 (e)	1551930.99 (e)	4275.02 (c)	4277.85 (c)	34.0 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)
GW-94 (a)	Monitoring well (a)	7/7/98 (a)	na	861405.32 (e)	1551131.92 (e)	4273.98 (c)	4276.25 (c)	34.0 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)
GW-95 (a)	Monitoring well (a)	7/7/98 (a)	na	861419.95 (e)	1550303.22 (e)	4271.57 (c)	4274.65 (c)	29.0 (a)	12.0 (a)	29.0 (a)	14.0 (a)	29.0 (a)	Yes (a)	Yes (i)
GW-96 (a)	Monitoring well (a)	7/8/98 (a)	July 1998 (f)	Not available	Not available	Not available	Not available	29.0 (a)	12.0 (a)	29.0 (a)	14.0 (a)	29.0 (a)	Yes (a)	Yes (i)
GW-97 (a)	Monitoring well (a)	7/8/98 (a)	July 1998 (f)	Not available	Not available	Not available	Not available	31.0 (a)	12.0 (a)	30.0 (a)	15.0 (a)	30.0 (a)	Yes (a)	Yes (i)
GW-98 (a)	Monitoring well (a)	7/8/98 (a)	July 1998 (f)	Not available	Not available	Not available	Not available	29.1 (a)	12.0 (a)	29.1 (a)	14.1 (a)	29.1 (a)	Yes (a)	Yes (i)
GW-99 (a)	Monitoring well (a)	7/17/98 (a)	na	861825.67 (e)	1549885.08 (e)	4270.89 (c)	4273.67 (c)	29.0 (a)	12.0 (a)	29.0 (a)	14.0 (a)	29.0 (a)	Yes (a)	Yes (i)
GW-100 (a)	Monitoring well (a)	7/17/98 (a)	na	862218.82 (e)	1549893.66 (e)	4271.27 (c)	4274.21 (c)	29.0 (a)	12.0 (a)	29.0 (a)	14.0 (a)	29.0 (a)	Yes (a)	Yes (i)
GW-101 (a)	Monitoring well (a)	7/14/98 (a)	na	862612.18 (e)	1549901.93 (e)	4272.32 (c)	4275.01 (c)	34.0 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)
GW-102 (a)	Monitoring well (a)	7/14/98 (a)	na	863006.22 (e)	1549910.78 (e)	4273.17 (c)	4275.40 (c)	34.0 (a)	17.0 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	Yes (i)

Table 1. Summary of monitoring well, borehole, and lysimeter information.

Location	Type	Date installed	Date abandoned	Northing (ft)	Easting (ft)	Ground surface elev. (ft amsl)	Measurement point elev. (ft amsl)	Total depth of boring (ft)	Depth to top of filter pack (ft)	Depth to bottom of filter pack (ft)	Depth to top of screened interval (ft)	Depth to bottom of screened interval (ft)	Well/boring log?	Hydraulic test?
GW-103 (a)	Monitoring well (a)	8/3/99 (a)	na	859219.02 (a)	1552546.69 (a)	4275.20 (c)	4278.30 (c)	39.0 (a)	26.4 (a)	39.0 (a)	29.0 (a)	39.0 (a)	Yes (a)	Yes (i)
GW-104 (a)	Monitoring well (a)	8/3/99 (a)	na	859211.21 (a)	1553039.26 (a)	4275.40 (c)	4278.70 (c)	39.0 (a)	26.5 (a)	39.0 (a)	29.0 (a)	39.0 (a)	Yes (a)	Yes (i)
GW-105 (a)	Monitoring well (a)	8/2/99 (a)	na	859203.08 (a)	1553529.71 (a)	4276.25 (c)	4279.08 (c)	39.0 (a)	26.5 (a)	39.0 (a)	29.0 (a)	39.0 (a)	Yes (a)	Yes (i)
PZ-1 (a)	Monitoring well (a)	8/4/99 (a)	na	859229.02 (a)	1549564.18 (e)	4269.70 (a)	4269.70 (a)	30.0 (a)	16.5 (a)	30.0 (a)	19.0 (a)	29.0 (a)	Yes (a)	Yes (i)
PZ-2 (a)	Monitoring well (a)	8/4/99 (a)	na	865345.68 (a)	1553611.78 (e)	4282.00 (a)	4282.00 (a)	37.0 (a)	23.0 (a)	37.0 (a)	26.5 (a)	36.5 (a)	Yes (a)	No
SL-1 (b)	Suction lysimeter (b)	7/16/93 (b)	na	861013.00 (b)	1552428.00 (b)	4274.50 (b)	na	24.0 (b)	na	na	na (a)	na (a)	Yes (b)	No
SL-2 (b)	Suction lysimeter (b)	7/19/93 (b)	na	860813.00 (b)	1552424.00 (b)	4275.10 (b)	na	24.0 (b)	na	na	na (a)	na (a)	Yes (b)	No
SL-3 (b)	Suction lysimeter (b)	7/20/93 (b)	na	860643.00 (b)	1552420.00 (b)	4275.30 (b)	na	24.0 (b)	na	na	na (a)	na (a)	Yes (b)	No
SRS-1 (b)	oil resistivity senso (b)	7/16/93 (b)	na	861023.00 (b)	1552428.00 (b)	4274.70 (b)	na	22.5 (b)	na	na	na (a)	na (a)	Yes (b)	No
SRS-2 (b)	oil resistivity senso (b)	7/19/93 (b)	na	860823.00 (b)	1552424.00 (b)	4275.30 (b)	na	22.5 (b)	na	na	na (a)	na (a)	Yes (b)	No
SRS-3 (b)	oil resistivity senso (b)	7/20/93 (b)	na	860653.00 (b)	1552420.00 (b)	4275.00 (b)	na	22.5 (b)	na	na	na (a)	na (a)	Yes (b)	No
P3-95 NEC (a)	Monitoring well (a)	12/10/98 (a)	na	862309.14 (a)	1554153.60 (a)	4280.51 (c)	4282.86 (c)	39.0 (a)	20.6 (a)	39.2 (a)	24.2 (a)	39.2 (a)	Yes (a)	No
P3-95 SWC (a)	Monitoring well (a)	12/9/98 (a)	na	862053.86 (a)	1553913.00 (a)	4277.48 (c)	4280.22 (c)	36.0 (a)	19.0 (a)	36.0 (a)	21.0 (a)	36.0 (a)	Yes (a)	No
P3-97 NEC (a)	Monitoring well (a)	12/11/98 (a)	na	862629.13 (a)	1554159.58 (a)	4279.54 (c)	4281.91 (c)	34.0 (a)	15.5 (a)	34.0 (a)	19.0 (a)	34.0 (a)	Yes (a)	No
LSW - 104S (d)	Monitoring well (d)	prior 2/96 (d)	na	Not available	Not available	Not available	Not available	Not available	15.0 (a)	32.0 (a)	20.0 (a)	30.0 (a)	No	No

Note:

All available well logs and completion diagrams are included in Appendix A.

Data sources:

(a) Boring and completion logs provided by Envirocare or in Revised Hydrogeologic Report, Bingham Environmental, February 1996.
(b) As-Built Diagrams for Suction Lysimeters and Soil Resistivity Instruments, Bingham Environmental, November 1993.
(c) Pentacore Resources Survey, August, September 1999.
(d) Revised Hydrogeologic Report, Bingham Environmental, February 1996.
(e) Excel File provided by Envirocare (Certified well location tables 1999).
(f) Information provided by Mr. Daniel Shrum (Envirocare).
(g) Where no total depth of boring is available, depth at bottom of filter pack is assumed to be total depth of boring.
(h) Depth of boring and bottom of filter pack are assumed to be the bottom of a 10 foot screen.
(i) Final Report for Slug Withdrawal Testing at Envirocare's Clive, Utah Facility, EarthFax, August 1999.
(j) Final Slug Test Results, Adrian Brown Consultants, October 1997.
(k) Abandonment of monitoring wells in the vicinity of the Proposed LARW 200-foot expansion and the Proposed LARW Embankment, Envirocare, 11/12/99.

Abbreviations:

na = Not applicable
amsl = above mean sea level

Table 2. Hydrostratigraphic unit contact elevation and unit thickness.

Location	Top of Unit 4[1] (ft amsl)	Unit 4 thickness (ft)	Top of Unit 3 (ft amsl)	Unit 3 thickness (ft)	Top of Unit 2 (ft amsl)	Unit 2 thickness (ft)	Top of Unit 1 (ft amsl)
GW-76	See GW-104						
GW-77	See GW-105						
GW-78	See GW-104						
GW-79	4277.10	9.00	4268.10	12.50	4255.60		
GW-80	4277.08[2]	10.00	4267.08	11.00	4256.08		
GW-81	4274.18	9.00	4265.18				
GW-82	4274.35	8.00	4266.35	22.50	4243.85		
GW-83	4274.51	7.00	4267.51	22.00	4245.51	2.51	4243.00
GW-84	4274.78	7.50	4267.28	19.50	4247.78		
GW-85	4275.16	7.50	4267.66	19.50	4248.16		
GW-86	4275.83	8.50	4267.33	19.00	4248.33		
GW-88	4276.86	9.00	4267.86	16.00	4251.86		
GW-89	4276.85	8.50	4268.35	17.50	4250.85		
GW-90	4276.04	9.00	4267.04	15.00	4252.04		
GW-91	4276.10	9.00	4267.10	18.10	4249.00		
GW-92	4276.35	9.50	4266.85	15.50	4251.35		
GW-93	4275.02	8.00	4267.02	24.00	4243.02		
GW-94	4273.94	8.94	4265.00	18.00	4247.00		
GW-95	4271.57	11.50	4260.07	16.00	4244.07		
GW-96	Not found						
GW-97	Not found						
GW-98	Not found						
GW-99	4270.89	12.00	4258.89	14.00	4244.89		
GW-100	4271.27	12.27	4259.00	16.00	4243.00		
GW-101	4272.32	9.00	4263.32	20.00	4243.32		
GW-102	See SC-6						
GW-103	4275.29	13.00	4262.29	10.29	4252.00		

Table 2. Hydrostratigraphic unit contact elevation and unit thickness.

Location	Top of Unit 4[1] (ft amsl)	Unit 4 thickness (ft)	Top of Unit 3 (ft amsl)	Unit 3 thickness (ft)	Top of Unit 2 (ft amsl)	Unit 2 thickness (ft)	Top of Unit 1 (ft amsl)
GW-104	4275.42	13.00	4262.42	11.42	4251.00		
GW-105	4276.23	13.00	4263.23	15.50	4247.73		
PZ-1	4269.70	13.50	4256.20	12.50	4243.70		
PZ-2	4282.00	12.50	4269.50	16.00	4253.50		
SL-1	See SRS-1						
SL-2	See SRS-2						
SL-3	See SRS-3						
SRS-1	4274.50	8.80	4265.70	13.00	4252.70		
SRS-2	4275.10	9.30	4265.80	12.50	4253.30		
SRS-3	4275.30	9.80	4265.50	12.50	4253.00		
P3-95 NEC	4280.51	16.50	4264.01	7.50	4256.51		
P3-95 SWC	4277.48	9.00	4268.48	11.50	4256.98		
P3-97 NEC	4279.54	12.00	4267.54	11.50	4256.04		
LSW - 104S	Not found						
	Maximum	16.50	4272.80	25.00	4260.50	25.00	4245.50
	Minimum	6.00	4255.50	7.00	4239.50	2.51	4221.50
	Average	9.84	4265.57	14.70	4250.88	14.66	4237.97

[1]Where several monitoring wells, boreholes, or lysimeters are located within a small area, a single log was selected to represent all logs in the immediate vicinity. The representative log was chosen based on log detail, quality, and total depth.

[2]Adjusted upward 3.5 feet to reflect pre-excavation ground surface elevation.

Table 3. Hydraulic conductivity measurements for the shallow aquifer.

Location	Hydraulic conductivity[1] (ft/day)	Location	Hydraulic conductivity[1] (ft/day)
I-1-30	2.32	GW-63	2.09
I-2-30	0.49	GW-64	1.96
I-3-30	0.80	GW-66	0.22
I-4-30	0.08	GW-67	1.11
DH-31	2.48	GW-67R	4.93
DH-32	0.03	GW-68	0.29
DH-33	0.01	GW-68R	7.62
DH-34	2.69	GW-69	0.13
DH-59	0.58	GW-69R	3.07
DH-62	2.92	GW-70	0.52
GW-3	5.39	GW-71	2.98
GW-5	0.51	GW-75	0.05
GW-11	1.36	GW-76	0.16
GW-12	0.62	GW-77	4.92
GW-13	0.62	GW-78	4.85
GW-16	0.22	GW-79	2.70
GW-16R	1.59	GW-80	6.19
GW-17A	2.32	GW-81	1.21
GW-18	0.82	GW-82	1.36
GW-19A	0.22	GW-83	7.70
GW-20	5.73	GW-84	9.36
GW-21	4.93	GW-85	10.51
GW-22	2.25	GW-86	4.30
GW-23	1.58	GW-88	2.07
GW-24	0.70	GW-89	1.26
GW-25	2.98	GW-90	5.71
GW-26	0.94	GW-91	4.10
GW-27	0.10	GW-92	2.64
GW-28	0.56	GW-93	14.97
GW-29	1.45	GW-94	9.16
GW-36	1.82	GW-95	0.85
GW-37	1.02	GW-99	0.72
GW-38	1.65	GW-100	1.44
GW-41	1.81	GW-101	1.85
GW-42	2.39	GW-102	2.38
GW-43	2.71	GW-103	7.74
GW-44	2.00	GW-104	7.61
GW-45	0.61	GW-105	2.17
GW-46	0.31	PZ-1	0.64
GW-56R	5.27	**Minimum**	**0.01**
GW-57	0.44	**Maximum**	**14.97**
GW-58	1.29	**Average**	**2.70**
GW-60	9.64		

[1]Values shown are the average of all hydraulic tests for each well since 1997.

Table 4. Ground water elevation data for the shallow aquifer, August 1999.

Location	Top of casing elevation (ft amsl)	Depth to water (ft)	Saline water elevation (ft amsl)	Top of filter pack elevation (ft amsl)	Bottom of filter pack elevation (ft amsl)	Mid-point of saturated filter pack elevation (ft amsl)	Specific gravity (g/cm3)	Fresh water equivalent head at midpoint of saturated filter pack (ft amsl)	FWEH[1] minus saline water (ft)
I-1-30	4279.39	29.33	4250.06	4253.29	4242.29	4246.18	1.032	4250.19	0.12
I-2-30	4279.92	29.99	4249.93	4253.78	4242.78	4246.36	1.028	4250.03	0.10
I-3-30	4281.37	32.07	4249.30	4255.50	4243.50	4246.40	1.022	4249.36	0.06
GW-16R	4281.08	31.59	4249.49	4259.64	4244.64	4247.06	1.036	4249.58	0.09
GW-19A	4270.84	16.55	4254.29	4254.37	4237.87	4246.08	1.052	4254.71	0.43
GW-20	4276.60	25.80	4250.80	4254.29	4240.29	4245.54	1.038	4250.99	0.20
GW-22	4277.23	27.41	4249.82	4258.34	4244.39	4247.11	1.030	4249.90	0.08
GW-23	4276.63	26.50	4250.13	4257.00	4243.00	4246.56	1.038	4250.26	0.14
GW-24	4276.70	26.19	4250.51	4254.50	4243.00	4246.76	1.036	4250.65	0.14
GW-25	4276.20	25.40	4250.80	4252.52	4240.52	4245.66	1.044	4251.03	0.23
GW-26	4274.60	24.04	4250.56	4254.91	4242.91	4246.73	1.040	4250.71	0.15
GW-27	4272.42	22.41	4250.01	4252.72	4240.72	4245.37	1.040	4250.20	0.19
GW-28	4271.29	20.32	4250.97	4251.91	4239.91	4245.44	1.038	4251.18	0.21
GW-29	4276.29	25.50	4250.79	4254.71	4242.71	4246.75	1.040	4250.95	0.16
GW-36	4271.97	20.41	4251.56	4252.25	4240.25	4245.91	1.036	4251.77	0.20
GW-37	4271.02	19.56	4251.46	4251.80	4239.30	4245.38	1.038	4251.69	0.23
GW-38	4273.42	22.16	4251.26	4253.34	4241.34	4246.30	1.038	4251.45	0.19
GW-41	4279.56	29.79	4249.77	4259.08	4242.58	4246.17	1.034	4249.89	0.12
GW-42	4279.34	29.60	4249.74	4260.16	4243.16	4246.45	1.028	4249.83	0.09
GW-45	4279.50	29.65	4249.85	4259.24	4241.74	4245.79	1.040	4250.01	0.16
GW-46	4279.50	29.45	4250.05	4259.65	4241.65	4245.85	1.040	4250.22	0.17
GW-55	4279.95	dry							
GW-56R	4279.16	29.49	4249.67	4259.63	4242.63	4246.15	1.034	4249.79	0.12
GW-57	4271.92	20.98	4250.94	4252.47	4239.97	4245.45	1.040	4251.15	0.22
GW-58	4271.15	19.52	4251.63	4251.15	4239.65	4245.40	1.040	4251.88	0.25
GW-60	4274.65	23.55	4251.10	4253.53	4245.03	4248.07	1.036	4251.21	0.11
GW-63	4271.97	20.51	4251.46	4252.72	4240.22	4245.84	1.030	4251.62	0.17
GW-64	4278.85	28.64	4250.21	4255.26	4242.26	4246.24	1.036	4250.35	0.14
GW-66	4279.62	29.40	4250.22	4261.01	4242.51	4246.36	1.024	4250.31	0.09
GW-67	4282.23	32.48	4249.75	4258.20	4239.15	4244.45	1.022	4249.87	0.12
GW-67R	4281.49	31.75	4249.74	4251.19	4239.19	4244.47	1.022	4249.86	0.12
GW-68	4282.40	32.72	4249.68	4257.27	4240.27	4244.97	1.034	4249.84	0.16
GW-68R	4282.25	32.56	4249.69	4257.29	4240.29	4244.99	1.030	4249.83	0.14
GW-69	4281.64	32.10	4249.54	4253.00	4241.00	4245.27	1.034	4249.68	0.15
GW-69R	4281.59	32.08	4249.51	4256.69	4239.29	4244.40	1.030	4249.66	0.15

Table 4. Ground water elevation data for the shallow aquifer, August 1999.

Location	Top of casing elevation (ft amsl)	Depth to water (ft)	Saline water elevation (ft amsl)	Top of filter pack elevation (ft amsl)	Bottom of filter pack elevation (ft amsl)	Mid-point of saturated filter pack elevation (ft amsl)	Specific gravity (g/cm3)	Fresh water equivalent head at midpoint of saturated filter pack (ft amsl)	FWEH[1] minus saline water (ft)
GW-70	4281.58	32.55	4249.03	4251.80	4239.80	4244.42	1.022	4249.13	0.10
GW-71	4281.70	32.21	4249.49	4255.40	4238.44	4243.97	1.022	4249.61	0.12
GW-77	4282.97	32.73	4250.24	4252.54	4239.54	4244.89	1.034	4250.42	0.18
GW-78	4281.41	31.00	4250.41	4251.47	4238.37	4244.39	1.036	4250.63	0.22
GW-79	4279.85	30.30	4249.55	4260.10	4243.10	4246.33	1.028	4249.64	0.09
GW-80	4275.85	26.22	4249.63	4256.58	4239.58	4244.61	1.028	4249.77	0.14
P3-95 NEC	4282.86	33.80	4249.06	4259.90	4241.51	4245.28	1.032	4249.18	0.12
P3-95 SWC	4280.22	31.09	4249.13	4258.50	4241.50	4245.31	1.040	4249.28	0.15
P3-97 NEC	4281.91	32.96	4248.95	4264.00	4245.50	4247.22	1.022	4248.98	0.04
GW-81	4276.70	27.72	4248.98	4257.18	4240.18	4244.58	1.032	4249.12	0.14
GW-82	4276.72	27.58	4249.14	4257.35	4240.35	4244.74	1.032	4249.28	0.14
GW-83	4276.82	27.59	4249.23	4257.51	4240.51	4244.87	1.028	4249.35	0.12
GW-84	4277.14	27.82	4249.32	4257.78	4240.78	4245.05	1.036	4249.48	0.15
GW-85	4277.79	28.37	4249.42	4258.16	4240.86	4245.14	1.036	4249.57	0.15
GW-86	4278.23	28.70	4249.53	4254.49	4236.83	4243.18	1.036	4249.76	0.23
GW-88	4279.45	29.74	4249.71	4259.86	4242.86	4246.29	1.034	4249.83	0.12
GW-89	4279.28	29.31	4249.97	4259.85	4242.85	4246.41	1.036	4250.10	0.13
GW-90	4278.77	28.59	4250.18	4259.04	4242.04	4246.11	1.030	4250.30	0.12
GW-91	4278.68	28.25	4250.43	4259.10	4242.10	4246.27	1.022	4250.52	0.09
GW-92	4278.95	28.25	4250.70	4259.35	4242.35	4246.52	1.018	4250.77	0.08
GW-93	4277.85	27.17	4250.68	4253.02	4241.02	4245.85	1.040	4250.88	0.19
GW-94	4276.25	25.77	4250.48	4256.98	4239.98	4245.23	1.038	4250.68	0.20
GW-95	4274.65	24.74	4249.91	4259.57	4242.57	4246.24	1.040	4250.06	0.15
GW-99	4273.67	24.29	4249.38	4258.99	4241.89	4245.64	1.034	4249.51	0.13
GW-100	4274.21	25.19	4249.02	4259.27	4242.27	4245.64	1.032	4249.13	0.11
GW-101	4275.01	26.07	4248.94	4255.32	4238.32	4243.63	1.032	4249.11	0.17
GW-102	4275.40	26.51	4248.89	4256.17	4239.17	4244.03	1.032	4249.04	0.16
								Average	0.15

[1]Fresh water equivalent head.

Water levels measured August 4-6, 1999.

Table 5. Ground water elevation data for the shallow aquifer, July 1995.

Location	Top of casing elevation (ft amsl)	Depth to water (ft)	Saline water elevation (ft amsl)
I-2-30	4279.92	30.32	4249.60
GW-19A	4270.84	21.18	4249.66
GW-20	4276.60	25.16	4251.44
GW-22	4277.23	27.57	4249.66
GW-23	4276.63	26.38	4250.25
GW-24	4276.70	25.45	4251.25
GW-25	4276.20	25.70	4250.50
GW-26	4274.60	25.22	4249.38
GW-27	4272.42	23.50	4248.92
GW-28	4271.29	21.58	4249.71
GW-29	4276.29	25.81	4250.48
GW-36	4271.97	19.75	4252.22
GW-37	4271.02	15.30	4255.72
GW-38	4273.42	18.94	4254.48
GW-57	4271.92	22.58	4249.34
GW-58	4271.15	21.05	4250.10
GW-63	4271.97	20.78	4251.19
GW-64	4278.85	29.08	4249.77

Ground water elevations measured July 17-20, 1995.

Table 6. Horizontal ground water gradient and velocity for the shallow aquifer, August 1999.

Area and approach	Gradient[1]	Hydraulic conductivity[2] (ft/day)	Porosity	Velocity (ft/day)
Well GW-19A area (highest gradient)				
Gradient using saline phreatic surface	0.004	0.22	0.30	0.003
Gradient using FWEH at midpoint of saturated filter packs	0.004	0.22	0.30	0.003
Well GW-93 area (highest hydraulic conductivity)				
Gradient using saline phreatic surface	0.0006	14.97	0.30	0.03
Gradient using FWEH at midpoint of saturated filter packs	0.0006	14.97	0.30	0.03
Well GW-77 area (lowest hydraulic gradient)				
Gradient using saline phreatic surface	0.0004	5.32	0.30	0.007
Gradient using FWEH at midpoint of saturated filter packs	0.0005	5.32	0.30	0.01
Wells GW-19A to P3-97NEC (sitewide average gradient and hydraulic conductivity)				
Gradient using saline phreatic surface	0.001	2.70	0.30	0.009
Gradient using FWEH at midpoint of saturated filter packs	0.001	2.70	0.30	0.009

[1]Gradient determined from water level elevation contour maps.

[2]Hydraulic conductivity from Table 3.

Gradient and velocity rounded to one significant figure to be consistent with porosity estimate.
Water levels measured August 4-6, 1999.

Table 7. Ground water elevation data for the deep aquifer, August 1999.

Location	Top of casing elevation (ft amsl)	Depth to water (ft)	Saline water elevation (ft amsl)	Top of filter pack elevation (ft amsl)	Bottom of filter pack elevation (ft amsl)	Mid-point of saturated filter pack elevation (ft amsl)	Specific gravity (g/cm3)	Fresh water equivalent head at midpoint of saturated filter pack (ft amsl)	Fresh water equivalent head at reference elevation[1] (ft amsl)
I-1-100	4279.15	29.22	4249.93	4192.29	4175.79	4184.04	1.018	4251.12	4250.36
I-3-100	4281.50	32.11	4249.39	4194.79	4177.29	4186.04	1.016	4250.40	4249.77
GW-19B	4270.76	20.43	4250.33	4194.14	4167.14	4180.64	1.018	4251.58	4250.77
GW-27D	4273.67	23.79	4249.88	4189.88	4170.88	4180.38	1.022	4251.41	4250.4!

[1]Reference elevation is the lowest elevation of the top of the deep aquifer encountered in the four wells shown (4225.88 ft amsl in well GW-27D).
Water levels measured August 4-6, 1999.

Table 8. Vertical ground water gradient and velocity using midpoint of saturated filter packs.

Location	Top of casing (ft amsl)	Depth to water (ft)	Saline water elevation (ft amsl)	Midpoint of saturated filter pack (ft amsl)	Specific gravity (g/cm^3)	FWEH at midpoint of saturated filter pack (ft amsl)
Shallow aquifer wells:						
I-1-30	4279.39	29.33	4250.06	4246.18	1.032	4250.19
I-3-30	4281.37	32.07	4249.30	4246.40	1.022	4249.36
GW-19A	4270.84	16.55	4254.29	4246.08	1.052	4254.71
GW-27	4272.42	22.41	4250.01	4245.37	1.040	4250.20
Deep aquifer wells:						
I-1-100	4279.15	29.22	4249.93	4184.00	1.018	4251.12
I-3-100	4281.50	32.11	4249.39	4186.00	1.016	4250.41
GW-19B	4270.76	20.43	4250.33	4180.60	1.018	4251.59
GW-27D	4273.67	23.79	4249.88	4180.40	1.022	4251.41

Well pair	Head difference[1] (feet)	Vertical distance (feet)	Vertical gradient[1]	Porosity	Vertical hydraulic conductivity (ft/day)	Velocity[1] (ft/day)
I-1-30, I-1-100	-0.93	62.18	-0.01	0.30	0.00283	-0.0001
I-3-30, I-3-100	-1.05	60.40	-0.02	0.30	0.00283	-0.0002
GW-19A, GW-19B	3.13	65.48	0.05	0.30	0.00283	0.0005
GW-27, GW-27D	-1.21	64.97	-0.02	0.30	0.00283	-0.0002

[1] Positive is downward.

Ground water elevations measured August 4-6, 1999.

FWEH: Fresh water equivalent head

Table 9. Vertical ground water gradient and velocity using midpoint of Unit 2.

Location	Top of casing (ft amsl)	Depth to water (ft)	Saline water elevation (feet)	Bottom of shallow aquifer elevation (ft amsl)	Top of deep aquifer elevation (ft amsl)	Midpoint of Unit 2 elevation (ft amsl)	Specific gravity (g/cm^3)	FWEH at midpoint of Unit 2 (ft amsl)
Shallow aquifer wells:								
I-1-30	4279.39	29.33	4250.06	4251.00		4242.50	1.032	4250.30
I-3-30	4281.37	32.07	4249.30	4256.70		4246.60	1.022	4249.35
GW-19A	4270.84	16.55	4254.29	4240.50		4233.75	1.052	4255.36
GW-27	4272.42	22.41	4250.01	4242.88		4234.38	1.040	4250.64
Deep aquifer wells:								
I-1-100	4279.15	29.22	4249.93		4234.00	4242.50	1.018	4250.06
I-3-100	4281.50	32.11	4249.39		4236.50	4246.60	1.016	4249.44
GW-19B	4270.76	20.43	4250.33		4227.00	4233.75	1.018	4250.63
GW-27D	4273.67	23.79	4249.88		4225.88	4234.38	1.022	4250.22

Well pair	Head difference[1] (ft)	Thickness (ft)	Vertical gradient[1]	Porosity	Vertical hydraulic conductivity (ft/day)	Velocity (ft/day)
I-1-30, I-1-100	0.24	17.00	0.01	0.30	0.00283	0.00013
I-3-30, I-3-100	-0.08	20.20	0.00	0.30	0.00283	-0.00004
GW-19A, GW-19B	4.73	13.50	0.35	0.30	0.00283	0.00330
GW-27, GW-27D	0.41	17.00	0.02	0.30	0.00283	0.00023

[1] Positive is downward.

Ground water elevations measured August 4-6, 1999.

FWEH: Fresh water equivalent head

Table 10. Average Total Dissolved Solids in the shallow aquifer, 1991 through 1998.

Well ID	Average[1] TDS (mg/L)	Number of samples
GW-3[2]	29,727	11
GW-11[2]	24,222	9
GW-12[2]	25,750	8
GW-13[2]	24,875	8
GW-16[2]	23,133	15
GW-16R	41,282	22
GW-19A	52,613	47
GW-20	47,850	43
GW-22	43,692	34
GW-23	43,265	32
GW-24	46,402	42
GW-25	48,469	40
GW-26	46,949	38
GW-27	46,023	38
GW-28	44,092	39
GW-29	46,717	46
GW-32	39,000	1
GW-36	40,123	38
GW-37	46,689	34
GW-38	41,003	46
GW-41	39,162	13
GW-42	30,953	15
GW-43	37,692	12
GW-44	47,658	12
GW-45	49,060	15
GW-46	48,343	14
GW-56	45,067	15
GW-56R	41,414	19
GW-57	42,819	37
GW-58	41,390	38
GW-60	40,029	22
GW-63	37,817	23
GW-64	35,036	17
GW-66	27,811	9
GW-67[2]	27,300	6
GW-68	41,800	5
GW-69	43,060	5
GW-70	25,400	5
GW-71	26,817	6
GW-75	40,900	2
GW-76	44,850	2
GW-77	42,000	1
GW-78	42,800	1
I-1-30	24,112	17
I-2-30	33,348	44
I-3-30	27,250	8
I-4-30	32,875	8
Minimum	24,112	
Maximum	52,613	
Average	40,576	Total: 962

[1]Average of all samples collected 1991 through 1998.

[2]Not included in statistics or contouring. May not be representative of the shallow aquifer due to deeper completion depth.

Table 2. Hydrostratigraphic unit contact elevation and unit thickness.

Location	Top of Unit 4[1] (ft amsl)	Unit 4 thickness (ft)	Top of Unit 3 (ft amsl)	Unit 3 thickness (ft)	Top of Unit 2 (ft amsl)	Unit 2 thickness (ft)	Top of Unit 1 (ft amsl)
I-1-30	See I-1-100						
I-1-50	See I-1-100						
I-1-100	4276.64	10.14	4266.50	15.50	4251.00	17.00	4234.00
I-2-30	See I-2-50						
I-2-50	4277.17	9.17	4268.00	12.80	4255.20	19.70	4235.50
I-3-30	See I-3-100						
I-3-50	See I-3-100						
I-3-100	4278.79	8.79	4270.00	13.30	4256.70	20.20	4236.50
I-4-30	See I-4-50						
I-4-50	4277.69	9.69	4268.00	10.00	4258.00	13.00	4245.00
SC-1	4276.40	7.00	4269.40	23.00	4246.40	15.00	4231.40
SC-2	See GW-19B						
SC-3	See DH-54						
SC-4	See GW-21						
SC-5	4273.50	9.00	4264.50	23.00	4241.50	20.00	4221.50
SC-6	4272.50	8.00	4264.50	25.00	4239.50		
SC-7	4270.12	10.00	4260.12	19.00	4241.12		
SC-7A	See SC-7						
SC-7B	See SC-7						
SC-8	4277.82	9.02	4268.80	15.00	4253.80	22.00	4231.80
SC-8A	See SC-8						
SC-8B	See SC-8						
SC-9	4278.80	9.00	4269.80	18.00	4251.80		
SC-10	See GW-8						
SC-11	4275.80	9.00	4266.80	15.00	4251.80		
SC-12	4274.90	7.00	4267.90	20.00	4247.90	20.00	4227.90
SC-13	See GW-25						

Table 2. Hydrostratigraphic unit contact elevation and unit thickness.

Location	Top of Unit 4[1] (ft amsl)	Unit 4 thickness (ft)	Top of Unit 3 (ft amsl)	Unit 3 thickness (ft)	Top of Unit 2 (ft amsl)	Unit 2 thickness (ft)	Top of Unit 1 (ft amsl)
SLC-201	See GW-82						
SLC-202	4274.40	7.50	4266.90	21.00	4245.90		
SLC-203	See GW-86						
SLC-204	4271.80	13.50	4258.30	10.00	4248.30	25.00	4223.30
SLC-205	See GW-94						
SLC-206	See GW-93						
DH-16A	See GW-16						
DH-30	See GW-105						
DH-31	See I-3-100						
DH-32	See GW-64						
DH-33	See GW-70						
DH-34	See SC-3						
DH-47	4271.00	9.50	4261.50	18.00	4243.50	13.50	4230.00
DH-48	4277.00	10.50	4266.50	11.20	4255.30		
DH-49	See GW-41						
DH-50	4277.00	10.50	4266.50	10.70	4255.80		
DH-51	See GW-67						
DH-52	4276.30	11.00	4265.30	14.00	4251.30		
DH-53	4277.00	9.50	4267.50	11.50	4256.00		
DH-54	4277.10	9.50	4267.60	12.60	4255.00		
DH-59	See GW-63						
DH-61	4273.50	10.50	4263.00	16.00	4247.00		
DH-62	See GW-38						
DH-65	See GW-64						
GW-1	See GW-60						
GW-2	4277.90	9.50	4268.40	13.50	4254.90		
GW-3	See DH-47						

Table 2. Hydrostratigraphic unit contact elevation and unit thickness.

Location	Top of Unit 4[1] (ft amsl)	Unit 4 thickness (ft)	Top of Unit 3 (ft amsl)	Unit 3 thickness (ft)	Top of Unit 2 (ft amsl)	Unit 2 thickness (ft)	Top of Unit 1 (ft amsl)
GW-4	See GW-23						
GW-5	4276.60	8.00	4268.60	20.00	4248.60		
GW-6	4279.80	10.00	4269.80	18.80	4251.00	9.00	4242.00
GW-7	Not found						
GW-8	4280.00	10.00	4270.00	18.00	4252.00		
GW-9	4278.80	6.00	4272.80	14.50	4258.30		
GW-10	Not found						
GW-11	See GW-64						
GW-12	See DH-50						
GW-13	See GW-45						
GW-16	4277.56	9.56	4268.00	13.00	4255.00		
GW-16R	See GW-16						
GW-17A	4276.53	10.03	4266.50	15.00	4251.50		
GW-18	See GW-103						
GW-19A	See GW-19B						
GW-19B	4268.91	13.41	4255.50	15.00	4240.50	13.50	4227.00
GW-20	4275.04	9.54	4265.50	15.00	4250.50		
GW-21	4281.00	13.50	4267.50	7.00	4260.50	21.50	4239.00
GW-22	4275.48	8.98	4266.50	12.00	4254.50		
GW-23	4274.73	8.23	4266.50	13.50	4253.00		
GW-24	4274.91	8.91	4266.00	14.00	4252.00		
GW-25	4273.99	8.49	4265.50	16.50	4249.00		
GW-26	4272.71	10.21	4262.50	16.50	4246.00		
GW-27	See GW-27D						
GW-27D	4270.88	11.50	4259.38	16.50	4242.88	17.00	4225.88
GW-28	4269.36	12.86	4256.50	12.50	4244.00		
GW-29	See GW-103						

Table 2. Hydrostratigraphic unit contact elevation and unit thickness.

Location	Top of Unit 4[1] (ft amsl)	Unit 4 thickness (ft)	Top of Unit 3 (ft amsl)	Unit 3 thickness (ft)	Top of Unit 2 (ft amsl)	Unit 2 thickness (ft)	Top of Unit 1 (ft amsl)
GW-36	4269.84	12.34	4257.50	12.00	4245.50		
GW-37	4268.75	7.25	4261.50	14.50	4247.00		
GW-38	4270.75	6.75	4264.00	16.00	4248.00		
GW-41	4277.04	9.54	4267.50	11.00	4256.50	11.00	4245.50
GW-42	4277.24	9.24	4268.00	11.00	4257.00		
GW-43	4278.24	11.24	4267.00	10.00	4257.00	15.00	4242.00
GW-44	4277.32	10.32	4267.00	11.50	4255.50	13.50	4242.00
GW-45	4277.59	10.59	4267.00	12.00	4255.00	10.00	4245.00
GW-46	4277.16	10.16	4267.00	12.00	4255.00	12.00	4243.00
GW-55	4277.85	10.35	4267.50	11.50	4256.00		
GW-56	4275.90	8.50	4267.40	11.00	4256.40	12.50	4243.90
GW-56R	4277.54	9.54	4268.00	12.00	4256.00		
GW-57	4269.30	11.80	4257.50	16.50	4241.00		
GW-58	4268.90	11.90	4257.00	14.00	4243.00		
GW-60	4272.70	10.00	4262.70	12.70	4250.00		
GW-63	4269.90	10.40	4259.50	14.00	4245.50		
GW-64	4276.70	9.70	4267.00	12.50	4254.50	9.50	4245.00
GW-66	4276.70	9.70	4267.00	12.00	4255.00	10.00	4245.00
GW-67	4278.15	9.15	4269.00	10.50	4258.50	15.50	4243.00
GW-67R	See GW-67						
GW-68	4279.01	9.01	4270.00	11.00	4259.00	16.00	4243.00
GW-68R	See GW-68						
GW-69	4278.03	9.03	4269.00	13.00	4256.00	11.00	4245.00
GW-69R	See GW-69						
GW-70	4278.72	8.72	4270.00	14.00	4256.00	12.00	4244.00
GW-71	4278.35	9.85	4268.50	12.00	4256.50	13.50	4243.00
GW-75	See GW-105						

FIGURES

SECTION 29

SECTION 31

SECTION 33

SECTION 32

SECTION 5

NORTH

Graphic Scale

600 300 0 600

(feet)
1 inch = 600 ft.

PROPOSED LARW DISPOSAL CELL

VITRO EMBANKMENT

11e.(2) DISPOSAL CELL

LARW DISPOSAL CELL

RCRA LANDFILL AREA

PHASE (1d)

PHASE (1e)

Evap. Pond

Evap. Pond

Pond

Surface Water Retention Pond

SECTIONAL BOUNDARY LINE

SECTIONAL BOUNDARY LINE

SECTIONAL BOUNDARY LINE

NORTH 1/4 CORNER

N88°57'33"W 5279.86'

N89°07'15"W 5284.37'

N00°05'27"E 5288.66'

FOUND ORIGINAL BRASS CAP "CUVE"

FOUND ORIGINAL 1913 SECTIONAL BRASS CAP

FOUND ORIGINAL 1913 SECTIONAL BRASS CAP

PROTR 1/4 CORNER

SC-5-WELL BOX Elev=4276.09'

LEGEND

- ESTABLISHED SECTION CORNER
- FOUND REBAR AND/OR ALUMINUM CAP
- BRASS PLUG IN CONCRETE
- SURVEYED PROPERTY LINE
- SURVEY CONTROL POINT
- UTILITY POLE
- FIRE HYDRANT
- GUY WIRE
- LIGHT POLE
- BARBED WIRE FENCE
- ELECTRIC TRANSFORMER
- STEEL POST
- REGULATORY SIGN

TOPOGRAPHIC SURVEY

SHOWN ARE 10' CONTOUR INTERVALS COMPILED FROM FIELD DATA AND FROM AERIAL CONTOUR MAPS AND OVERLAYS.

PROJECT BENCH MARK = FOUND SECTION CORNER

ELEVATION = 4269.76'

NOTE: TOPOGRAPHIC SURVEY IN SECTION 32 WAS PERFORMED BY AERO-GRAPHICS, INC. 12/98

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ENVIRONMENTAL AND NATURAL RESOURCES MANAGEMENT
76 EAST 6790 SOUTH
MIDVALE, UTAH 84047 (801) 562-2521

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Figure 1. Topographic facility map – October 1999.

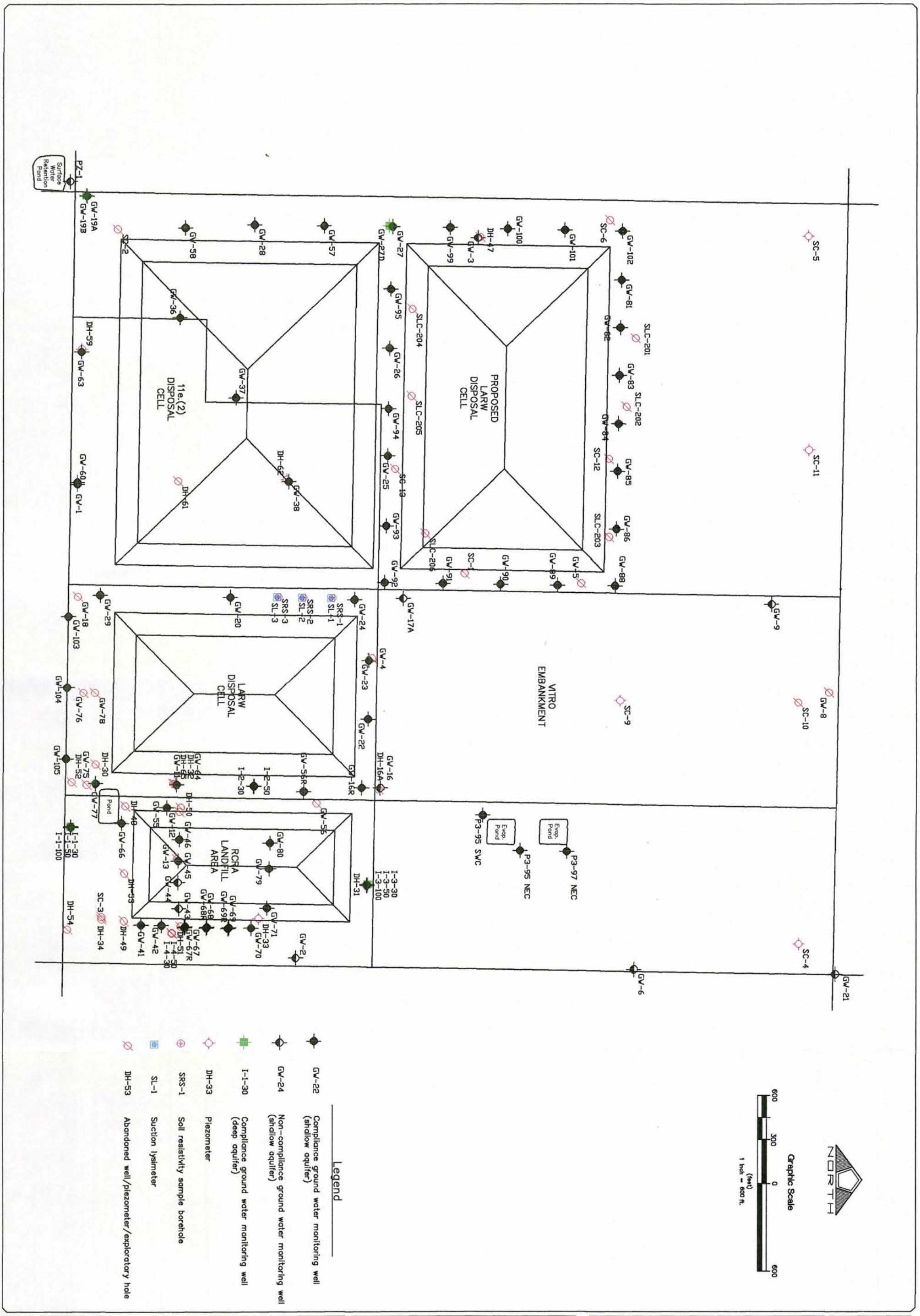

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Figure 2. Location of monitoring wells, boreholes, and lysimeters – October 1999.

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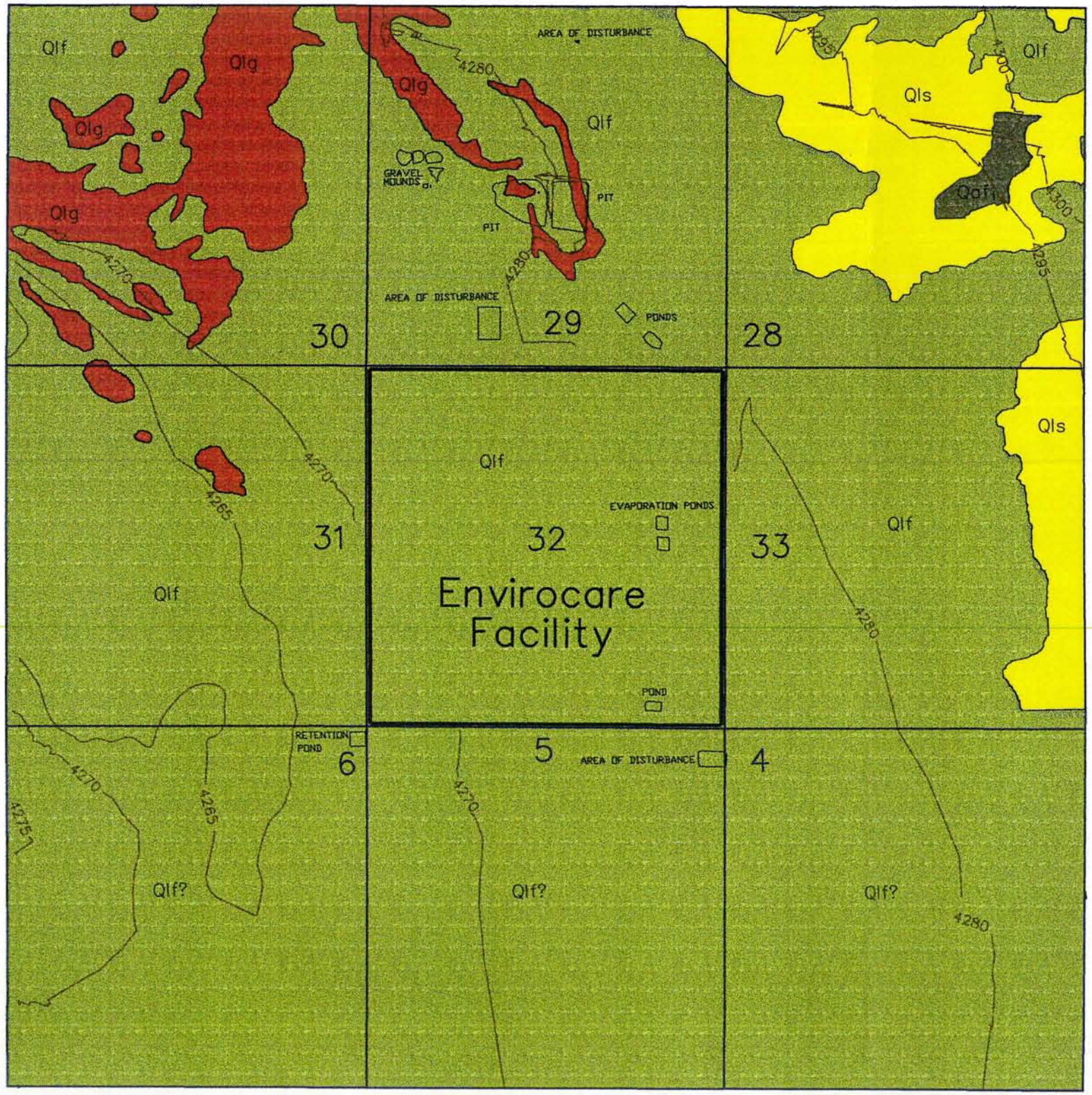

NORTH

Graphic Scale

0 0.5 1.0 miles

Legend

- Qlg — Quaternary lacustrine gravel
- Qls — Quaternary lacustrine sand
- Qlf — Quaternary lacustrine mud
- Qaf1 — Quaternary younger alluvial fan deposits

Adapted from Solomon (1993)

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Figure 3. Regional geologic map.

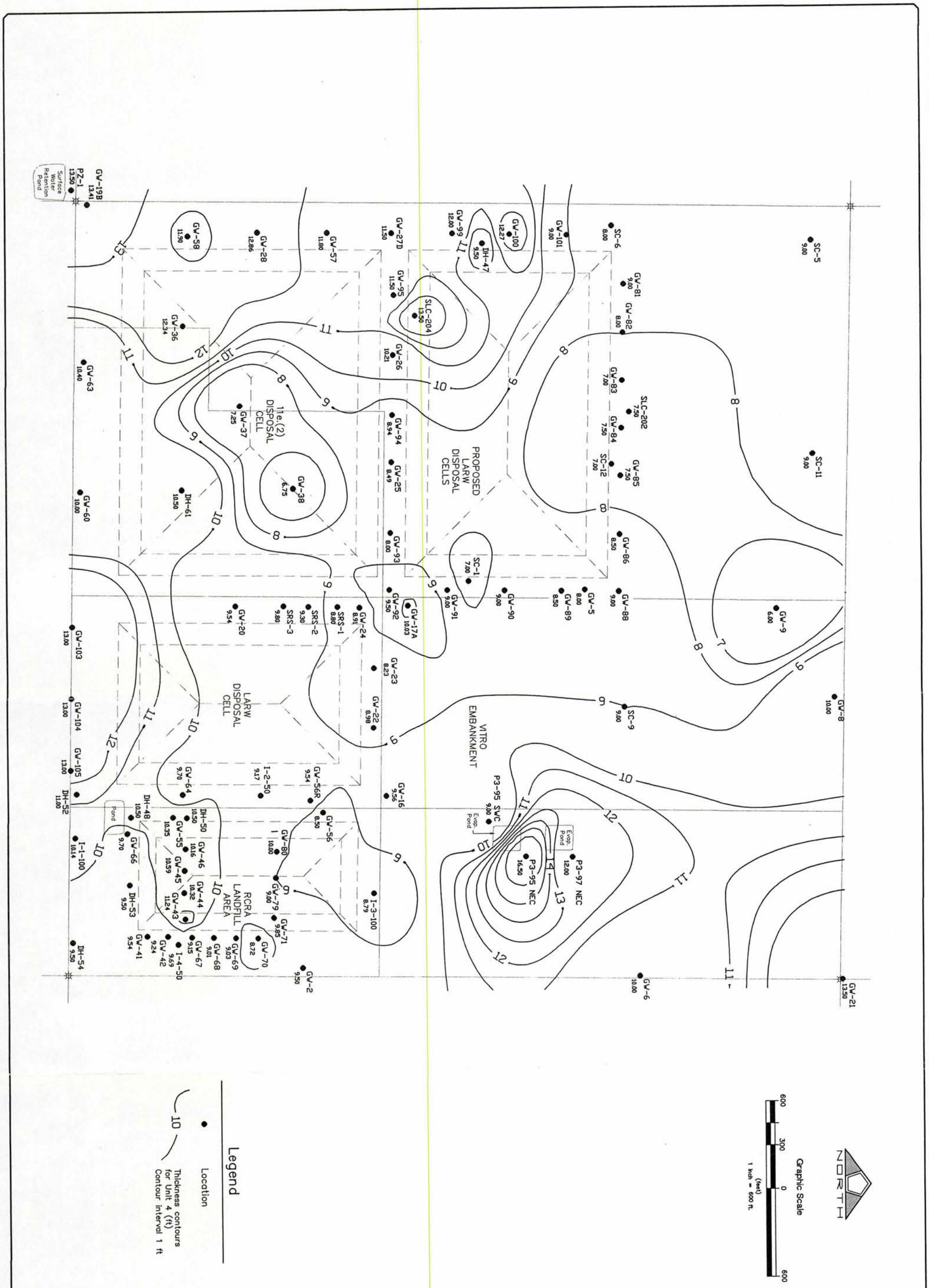

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Figure 4. Isopach map of Unit 4.

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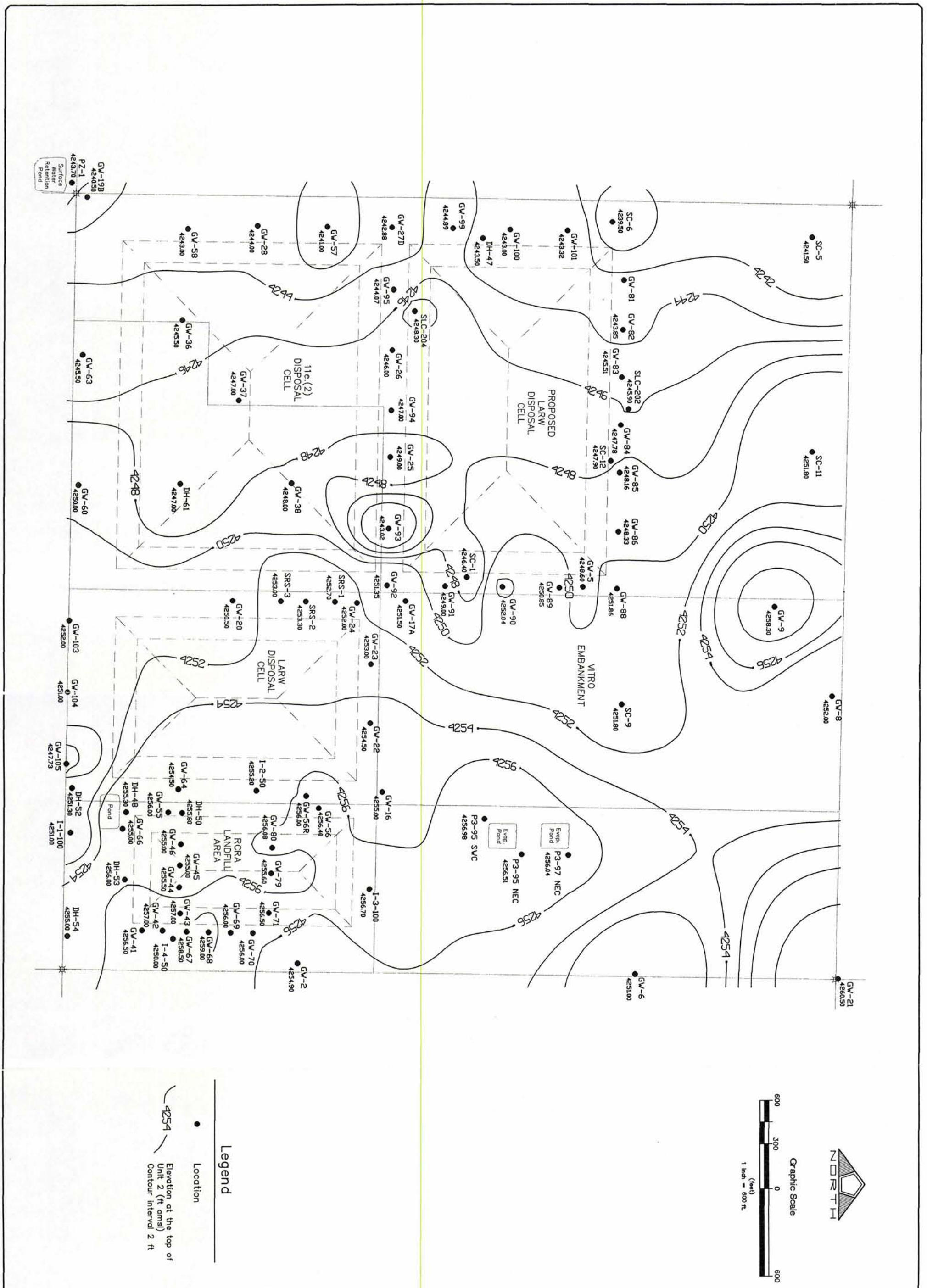

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Figure 5. Structure contour map of the top of Unit 2.

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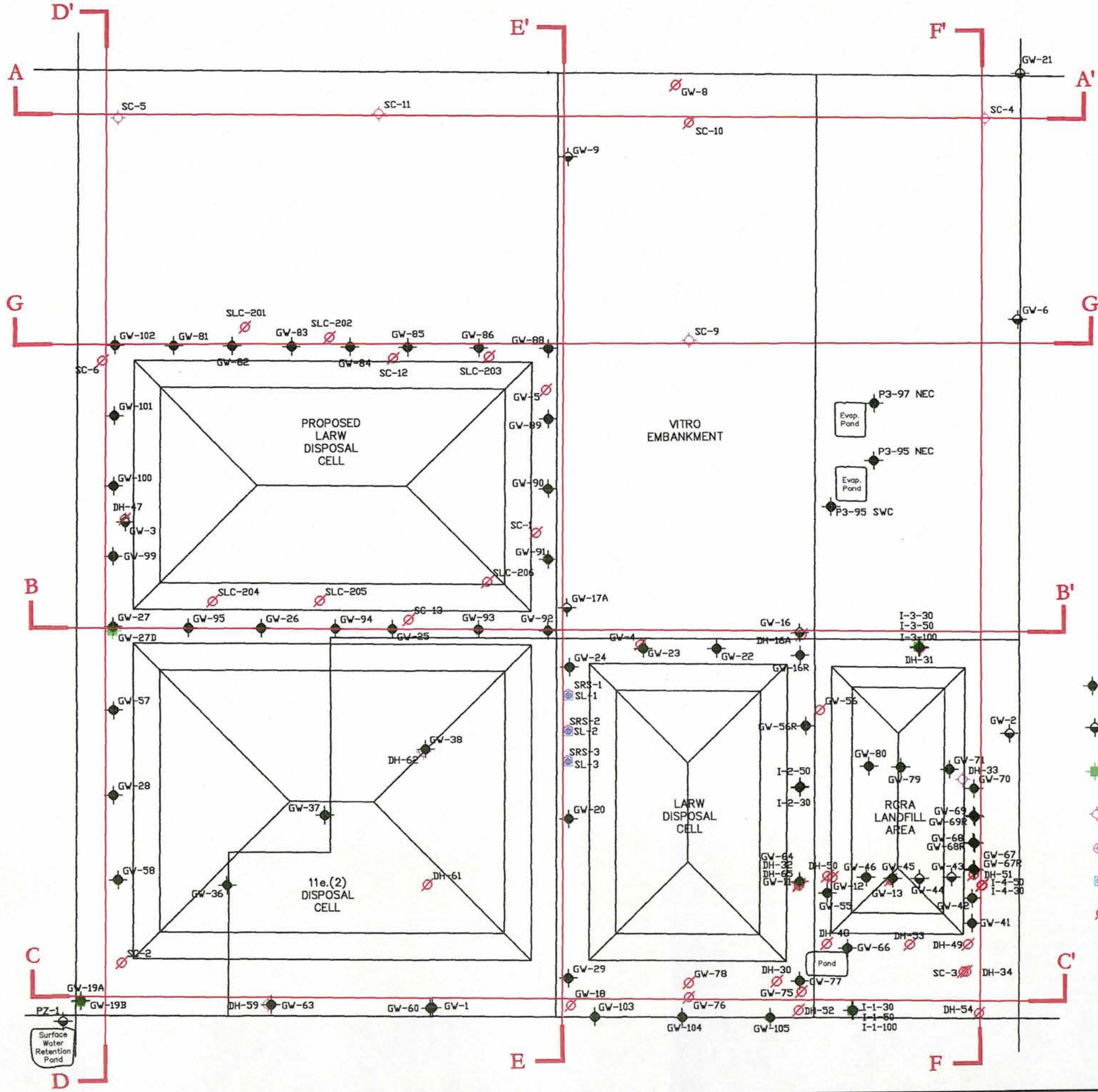

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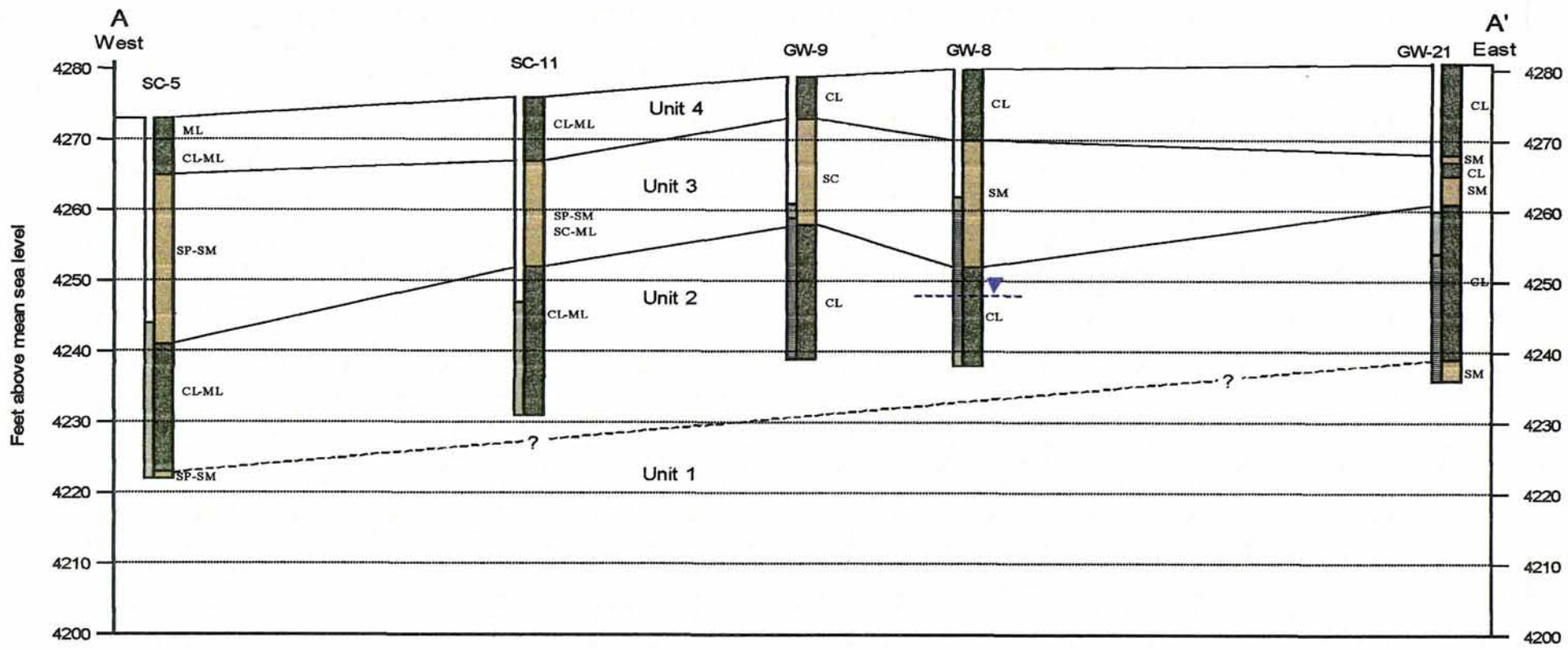
Figure 6. Hydrogeologic cross-section location map.



Legend

- Sediments with moderate to high estimated hydraulic conductivity
- Sediments with low estimated hydraulic conductivity

GW - Well graded gravel
GP - Poorly graded gravel
GM - Silty gravel
GC - Clayey gravel
SW - Well graded sand
SP - Poorly graded sand
SM - Silty sand
SC - Clayey sand
ML - Silt
CL - Clay

- Phreatic surface, shallow aquifer, November 1999
- Filter pack of well
- Screened interval of well

Note: Some logs are offset from section line as shown on Figure 6.

0 500
Horizontal scale (feet)

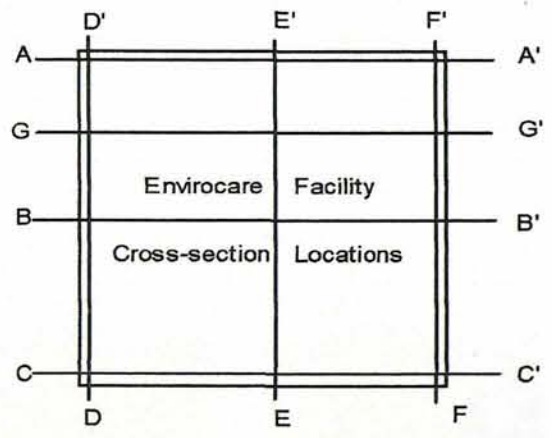


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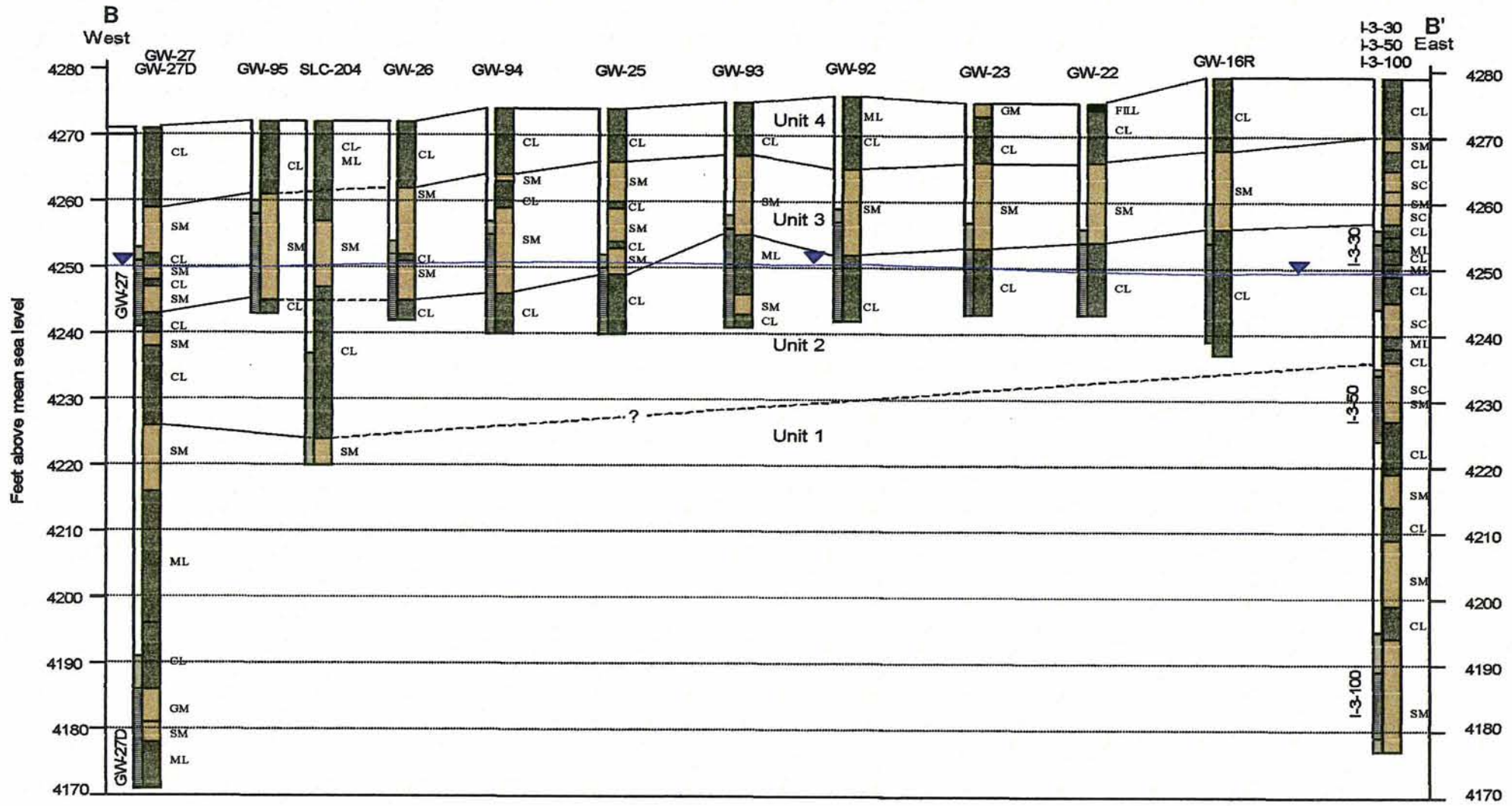
Figure 7. Hydrogeologic cross-section A-A'.



Legend

- Sediments with moderate to high estimated hydraulic conductivity
- Sediments with low estimated hydraulic conductivity
- Phreatic surface, shallow aquifer, August 1999
- Filter pack of well
- Screened interval of well

GW - Well graded gravel
GP - Poorly graded gravel
GM - Silty gravel
GC - Clayey gravel
SW - Well graded sand
SP - Poorly graded sand
SM - Silty sand
SC - Clayey sand
ML - Silt
CL - Clay

Note: Some logs are offset from section line as shown on Figure 6.

0 500
Horizontal scale (feet)

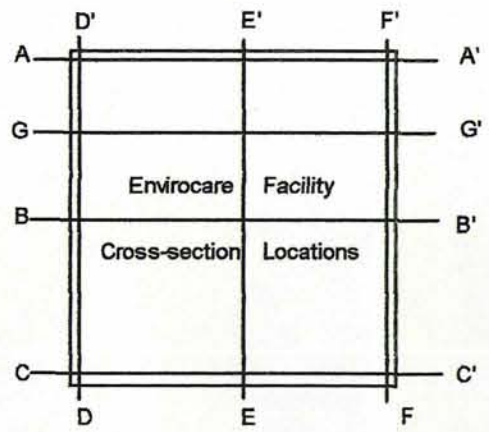


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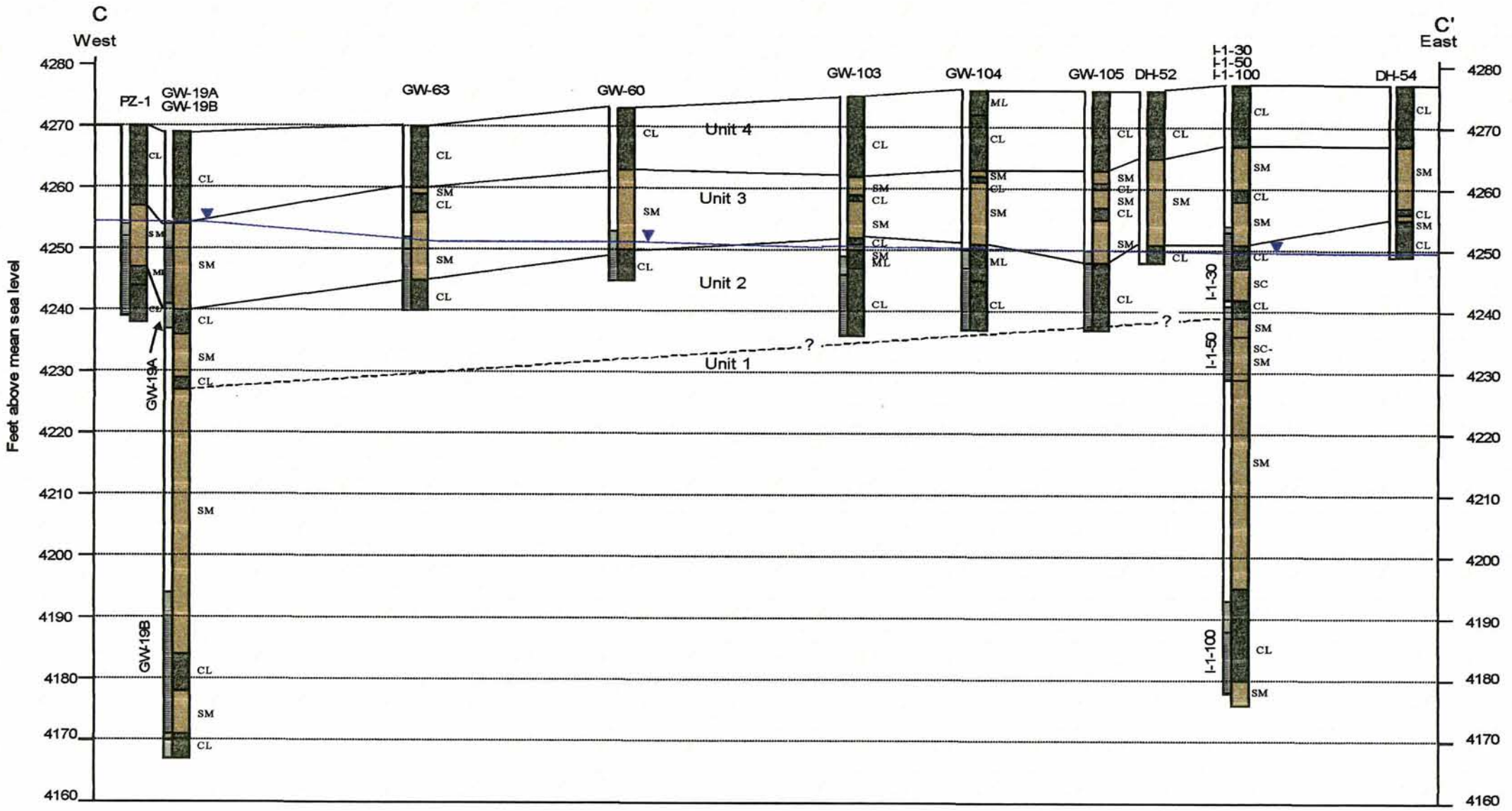
Figure 8. Hydrogeologic cross-section B-B'.



Legend

- Sediments with moderate to high estimated hydraulic conductivity
- Sediments with low estimated hydraulic conductivity
- Phreatic surface, shallow aquifer, August 1999
- Filter pack of well
- Screened interval of well

GW - Well graded gravel
GP - Poorly graded gravel
GM - Silty gravel
GC - Clayey gravel
SW - Well graded sand
SP - Poorly graded sand
SM - Silty sand
SC - Clayey sand
ML - Silt
CL - Clay

Note: Some logs are offset from section line as shown on Figure 6.

0 500
Horizontal scale (feet)

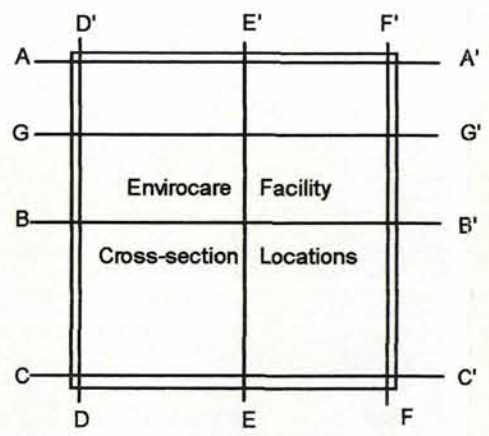


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Figure 9. Hydrogeologic cross-section C-C'.

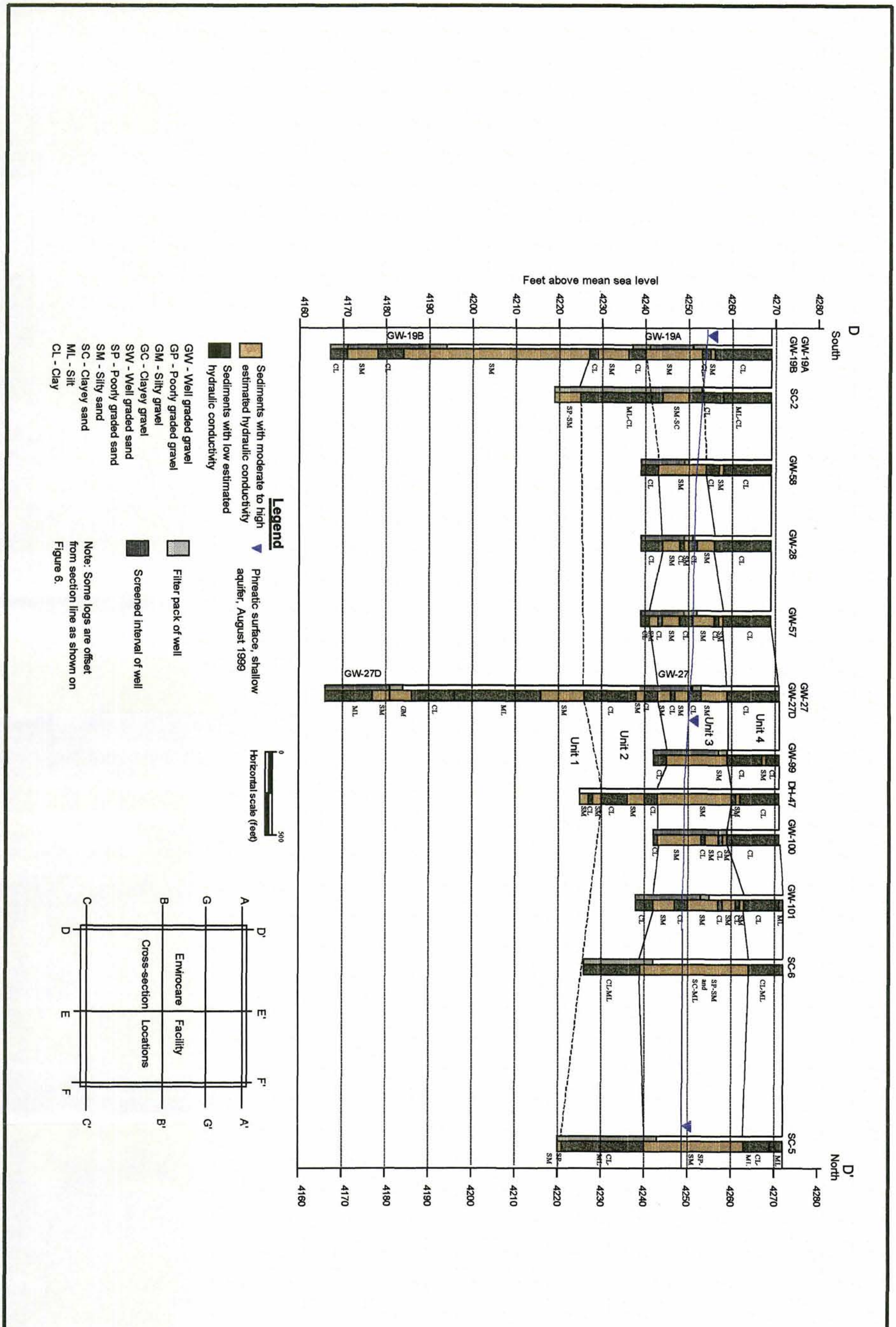

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Figure 10. Hydrogeologic cross- section D-D'.

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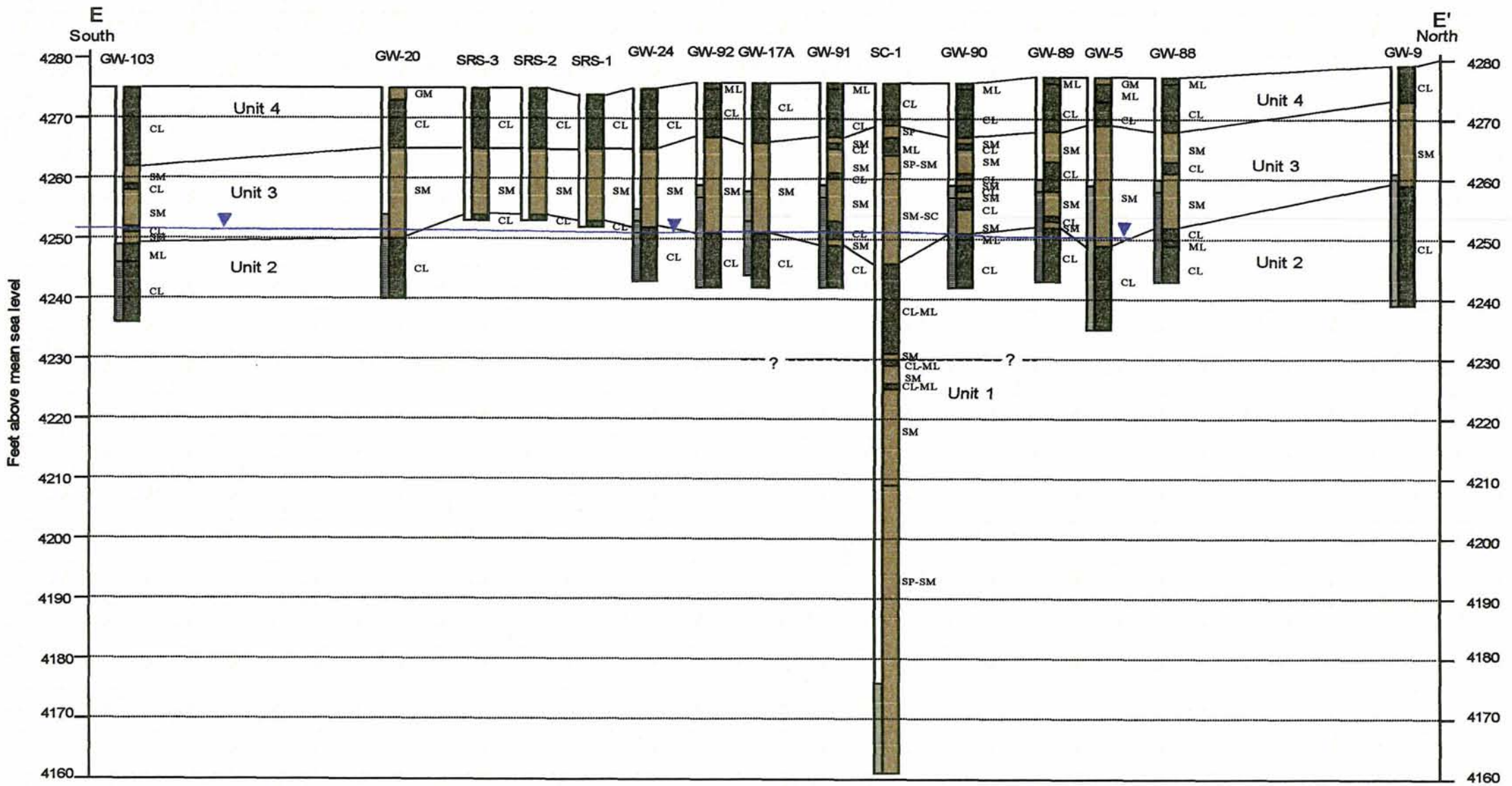
MIDVALE, UTAH 84047 (801) 562-2521



Legend

- Sediments with moderate to high estimated hydraulic conductivity
- Sediments with low estimated hydraulic conductivity
- Phreatic surface, shallow aquifer, August 1999
- Filter pack of well
- Screened interval of well

GW - Well graded gravel
GP - Poorly graded gravel
GM - Silty gravel
GC - Clayey gravel
SW - Well graded sand
SP - Poorly graded sand
SM - Silty sand
SC - Clayey sand
ML - Silt
CL - Clay

Note: Some logs are offset from section line as shown on Figure 6.

0 500
Horizontal scale (feet)

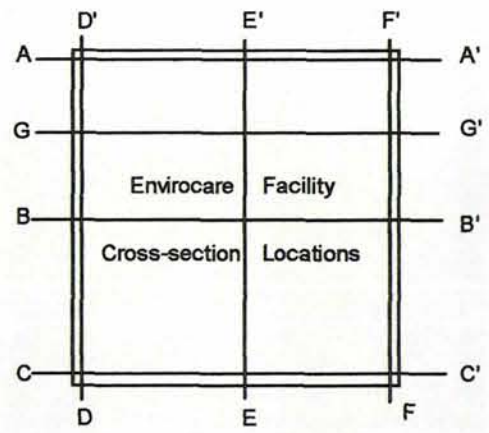


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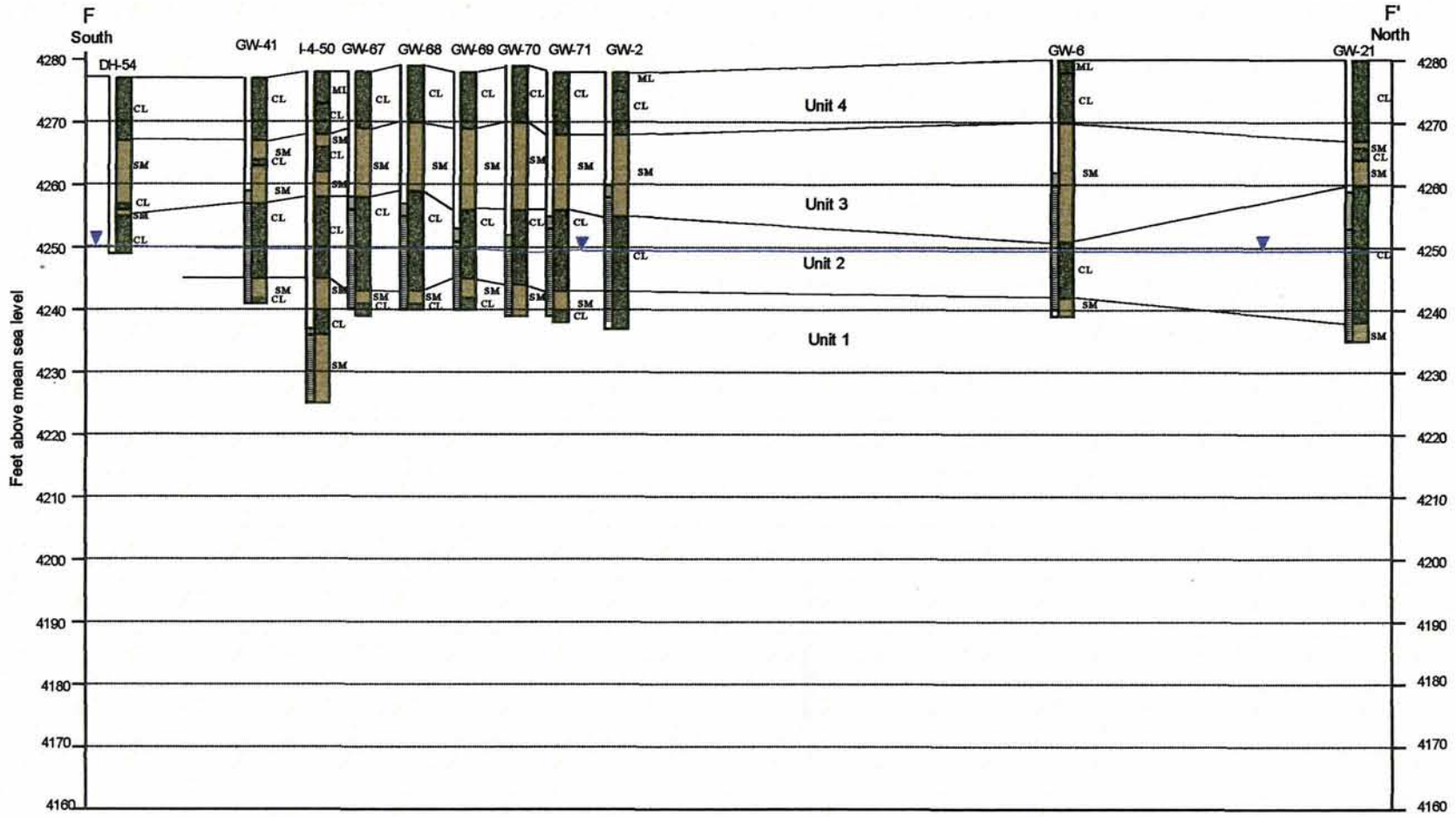
Figure 11. Hydrogeologic cross-section E-E'.



Legend

- Sediments with moderate to high estimated hydraulic conductivity
- Sediments with low estimated hydraulic conductivity

GW - Well graded gravel
GP - Poorly graded gravel
GM - Silty gravel
GC - Clayey gravel
SW - Well graded sand
SP - Poorly graded sand
SM - Silty sand
SC - Clayey sand
ML - Silt
CL - Clay

- Phreatic surface, shallow aquifer, August 1999
- Filter pack of well
- Screened interval of well

Note: Some logs are offset from section line as shown on Figure 6.

0 200
Horizontal scale (feet)

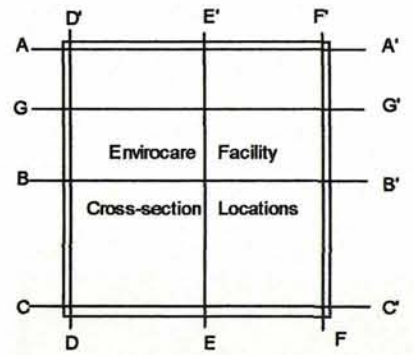


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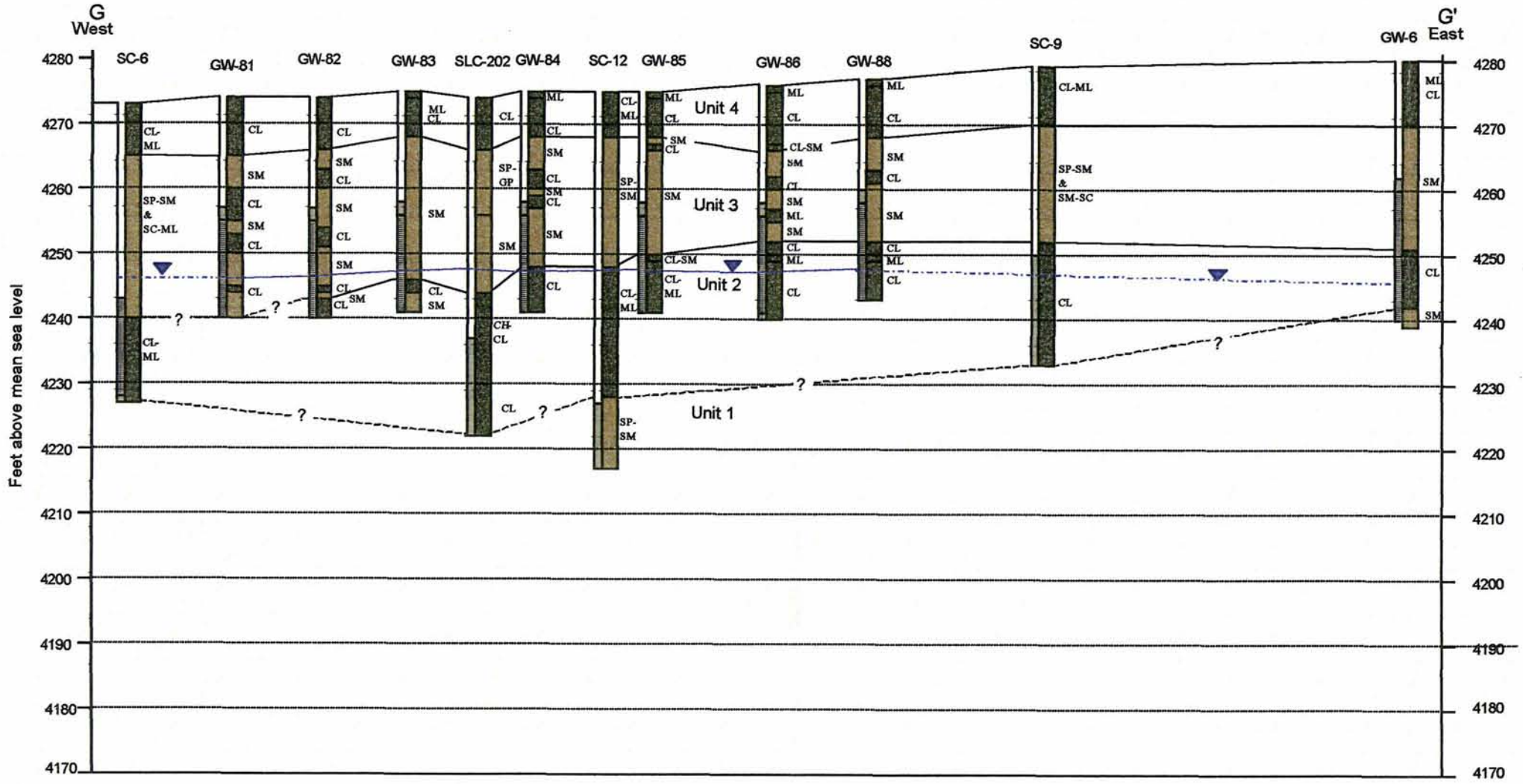
Figure 12. Hydrogeologic cross-section F-F'.



Legend

- Sediments with moderate to high estimated hydraulic conductivity
- Sediments with low estimated hydraulic conductivity

GW - Well graded gravel
GP - Poorly graded gravel
GM - Silty gravel
GC - Clayey gravel
SW - Well graded sand
SP - Poorly graded sand
SM - Silty sand
SC - Clayey sand
ML - Silt
CL - Clay

- Phreatic surface, shallow aquifer, August 1999
- Filter pack of well
- Screened interval of well

Note: Some logs are offset from section line as shown on Figure 6.

0 500
Horizontal scale (feet)

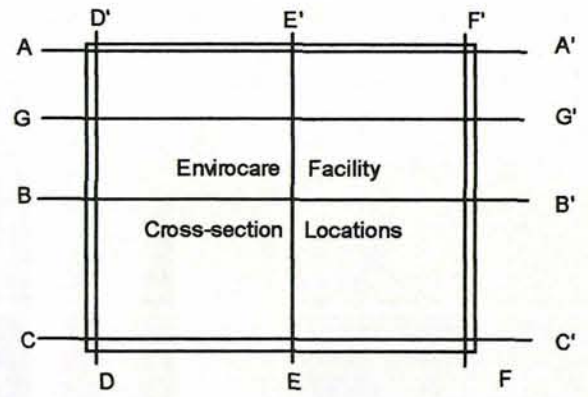


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Figure 13. Hydrogeologic cross-section G-G'.

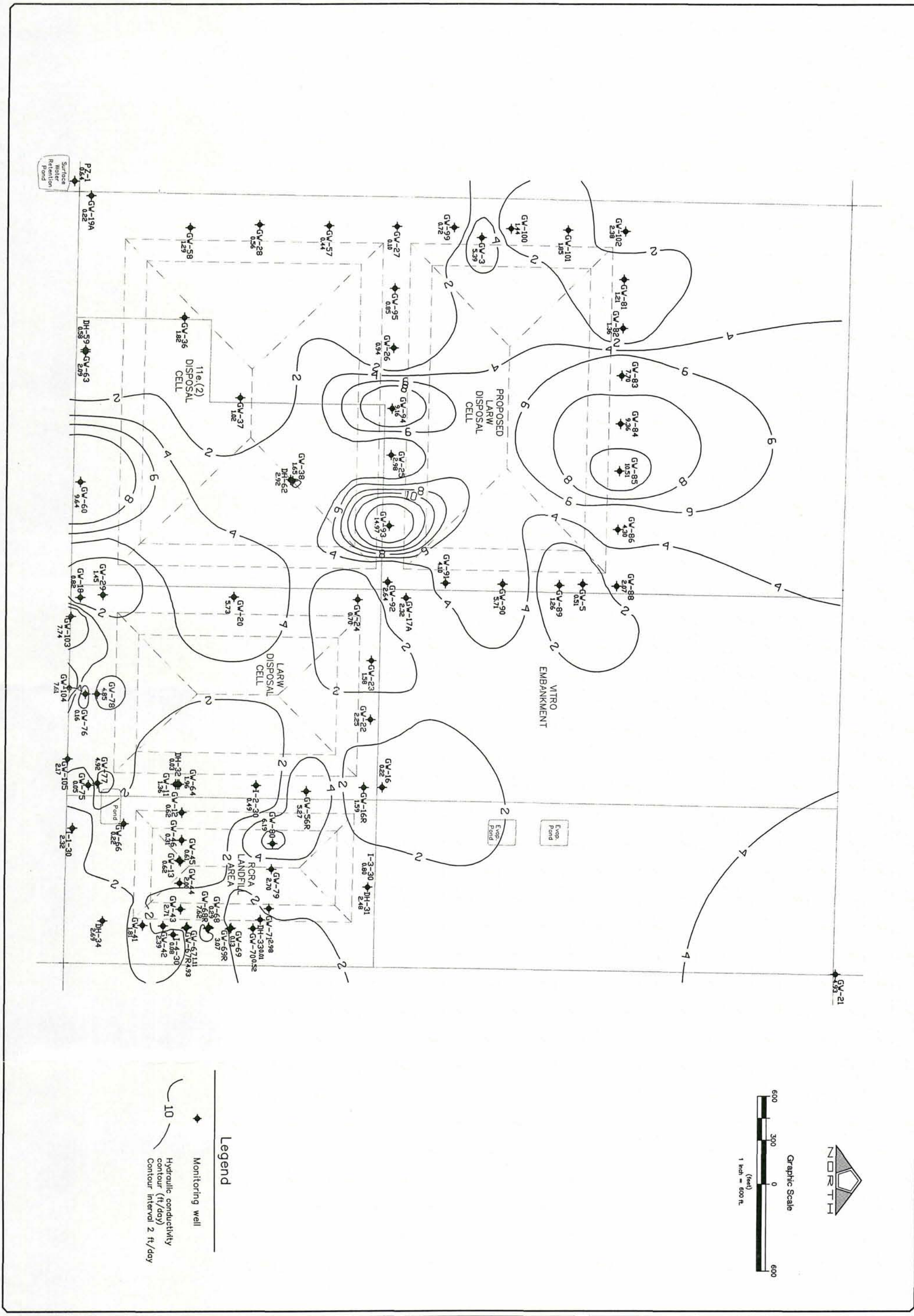

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Figure 14. Contour map of hydraulic conductivity for the shallow aquifer.

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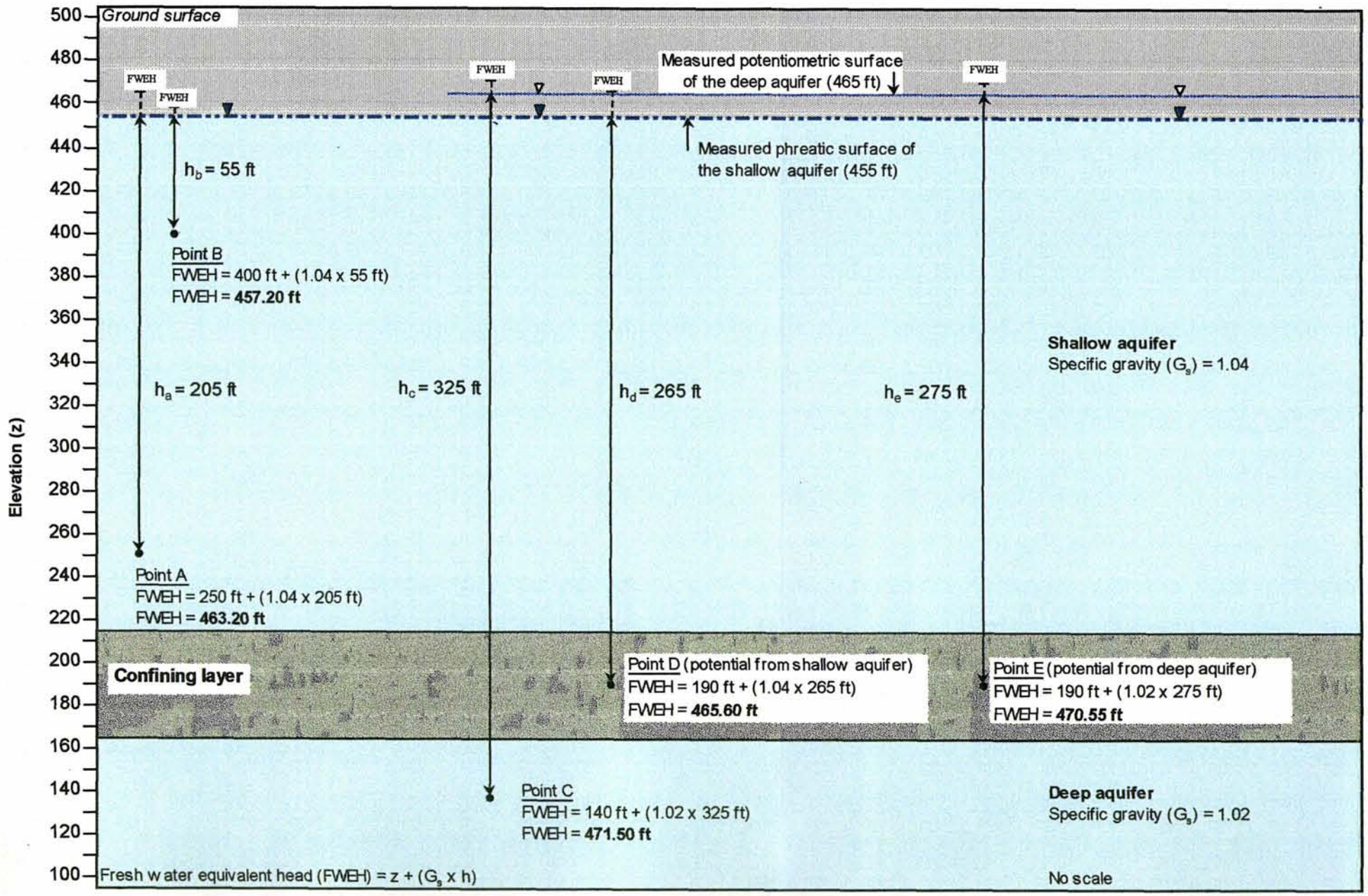

Figure 15. Examples of fresh water equivalent head calculations.

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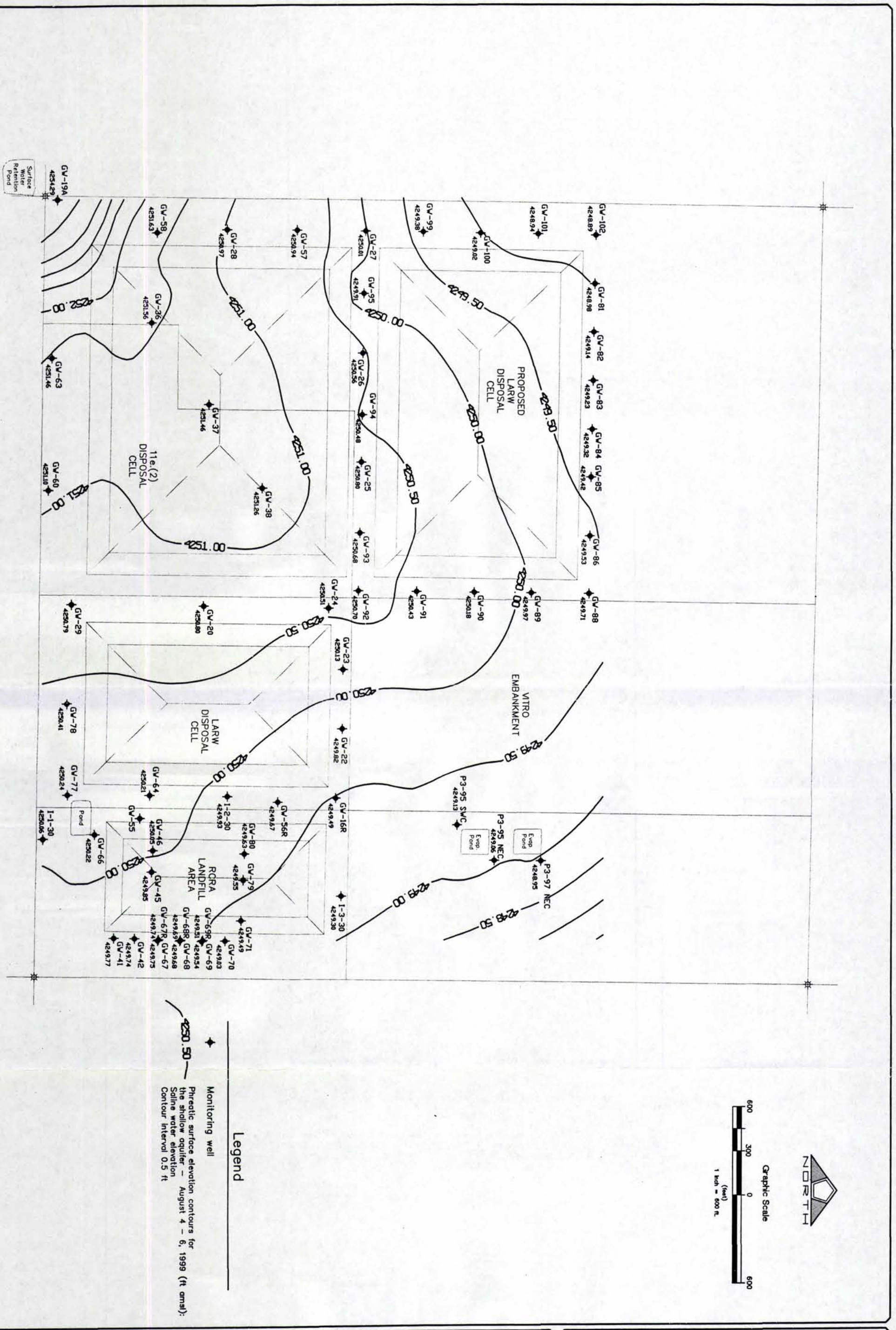

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Figure 16. Phreatic surface elevation contour map for the shallow aquifer (saline water) – August 1999.

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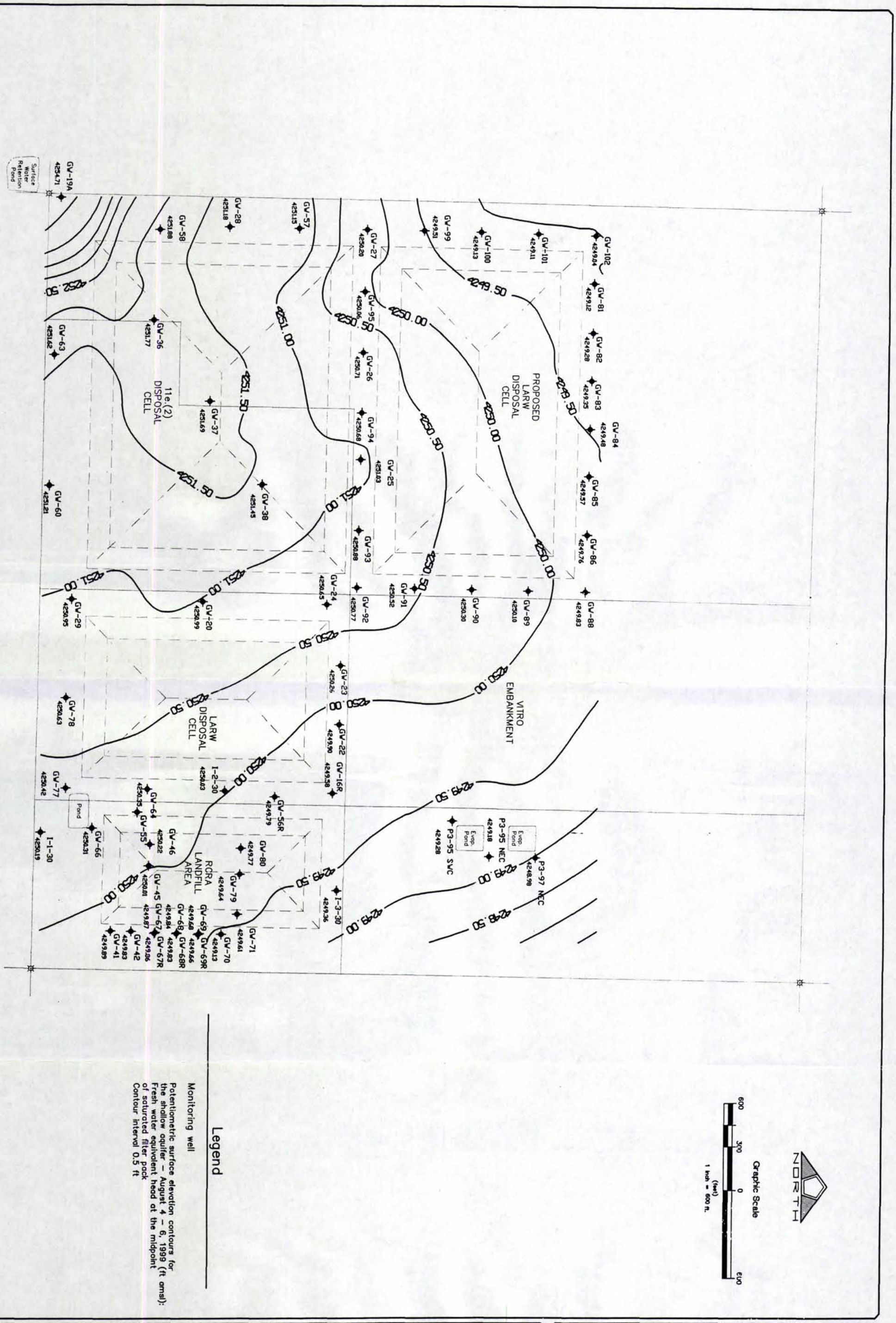

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Figure 17. Potentiometric surface elevation contour map for the shallow aquifer (fresh water equivalent head at the midpoint of saturated filter pack) – August 1999.

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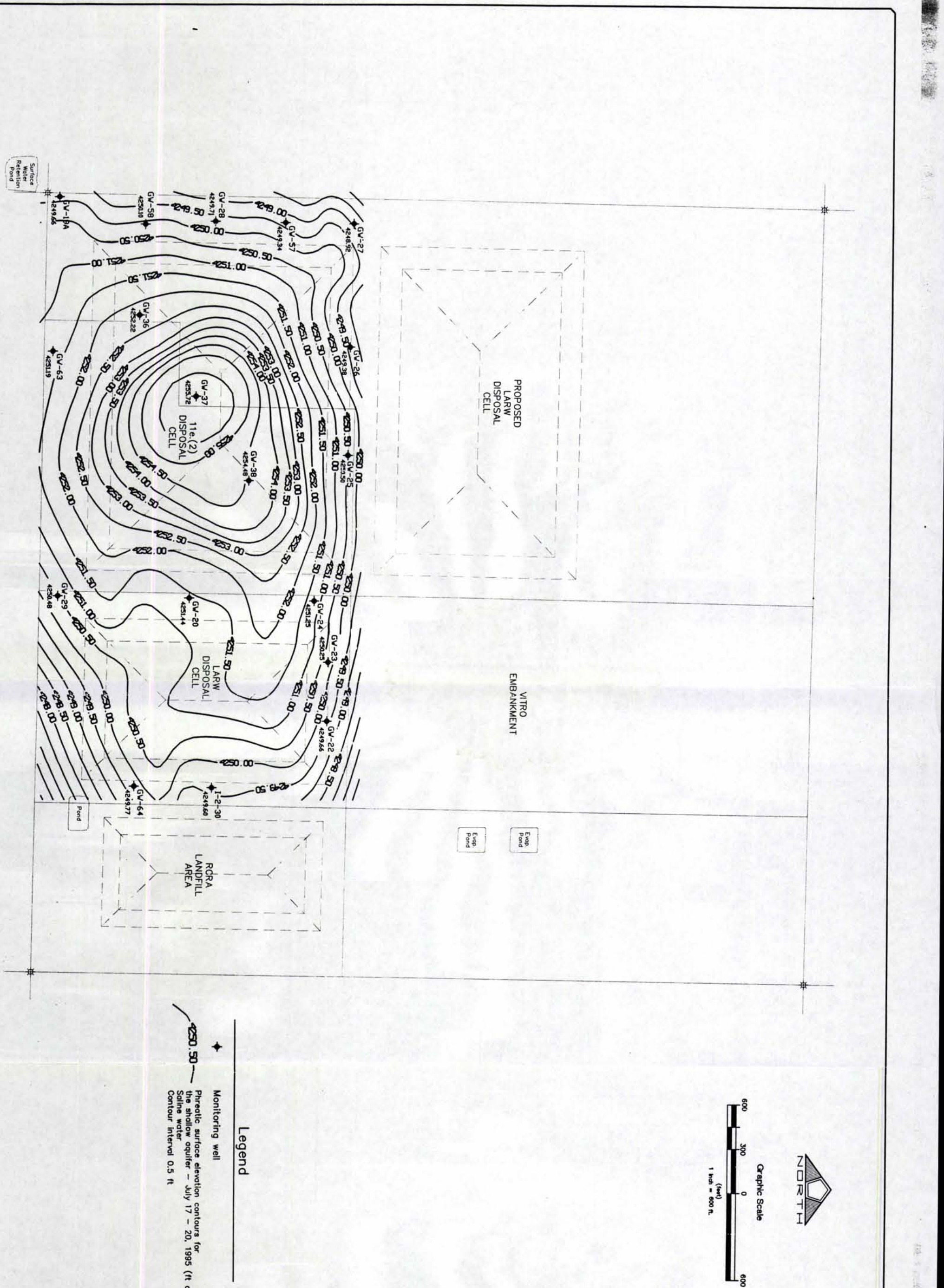

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Figure 18. Phreatic surface elevation contour map for the shallow aquifer (saline water) – July 1995.

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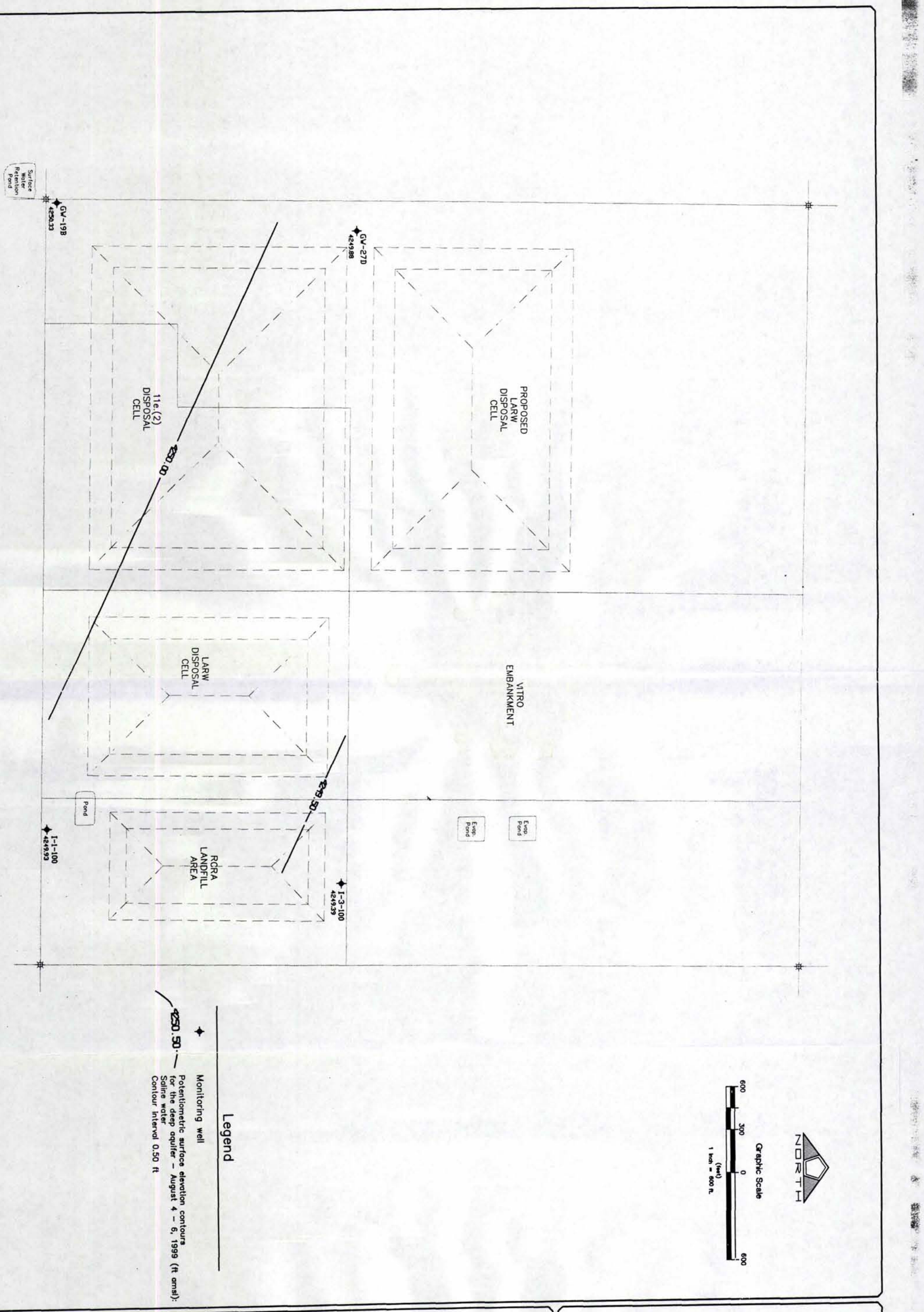

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Figure 19. Potentiometric surface elevation contour map for the deep aquifer (saline water) – August 1999.

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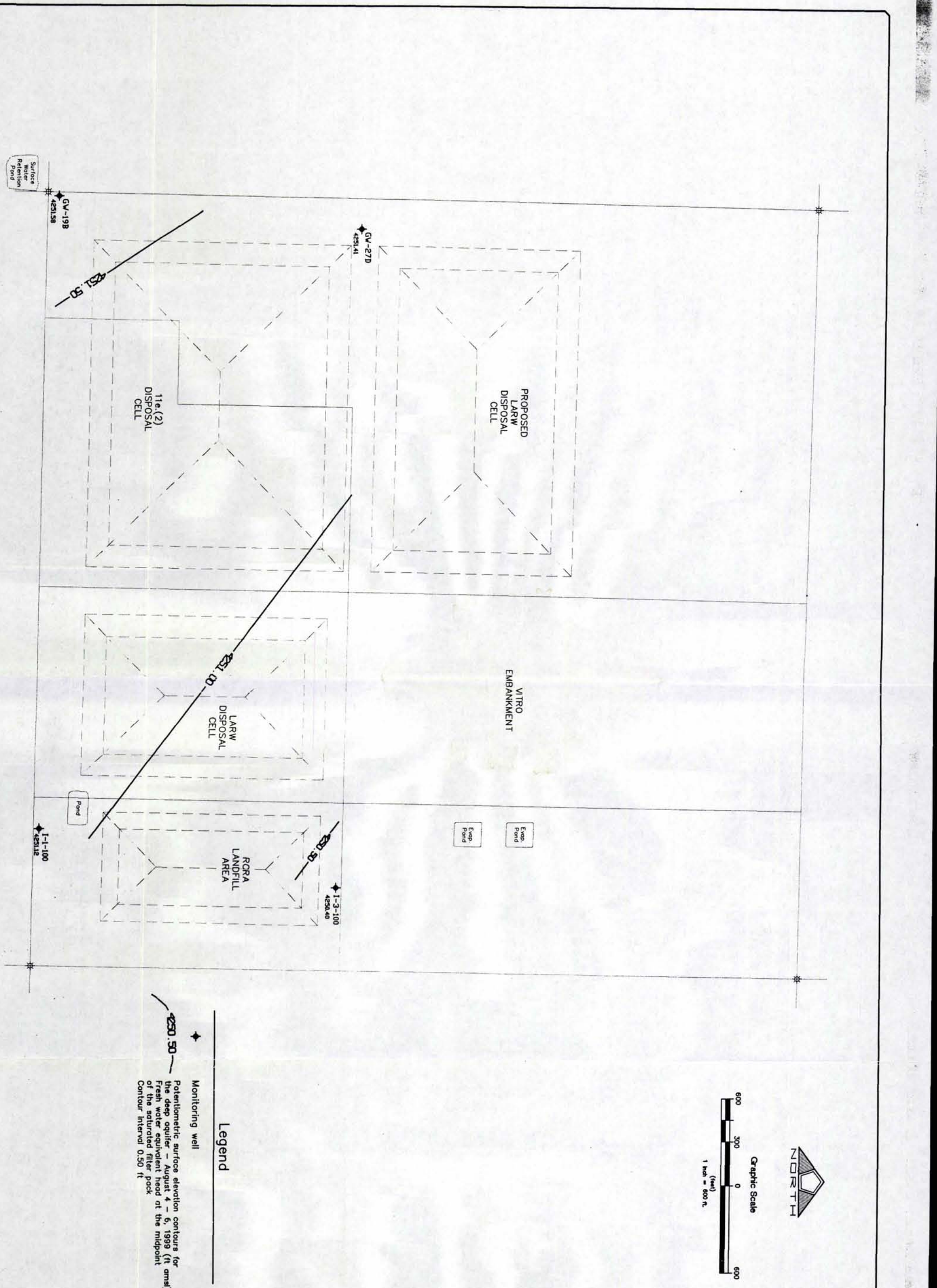

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Figure 20. Potentiometric surface elevation contour map for the deep aquifer (fresh water equivalent head at the midpoint of saturated filter pack) – August 1999.

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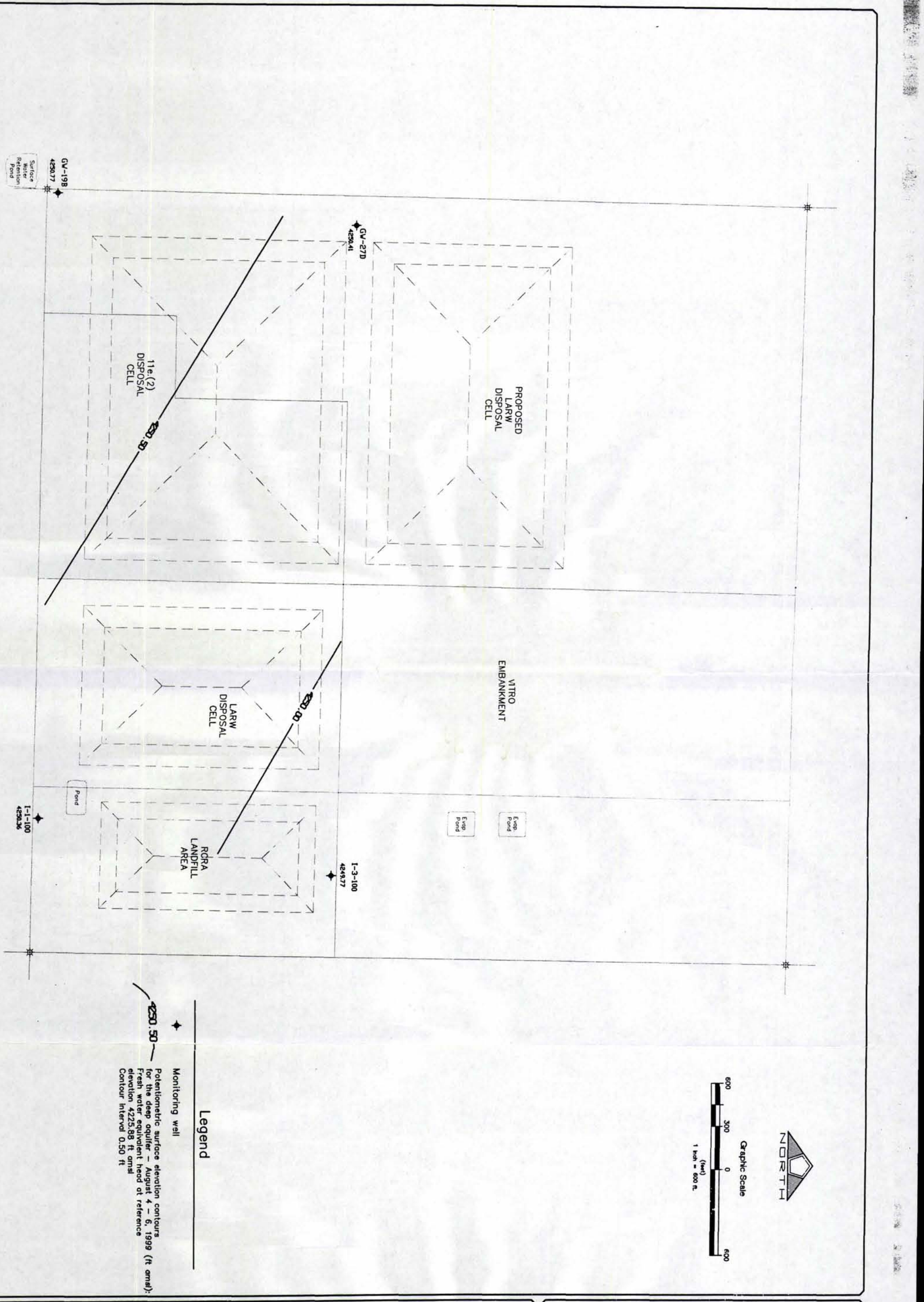

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Figure 21. Potentiometric surface elevation contour map for the deep aquifer (fresh water equivalent head at reference elevation) – August 1999.

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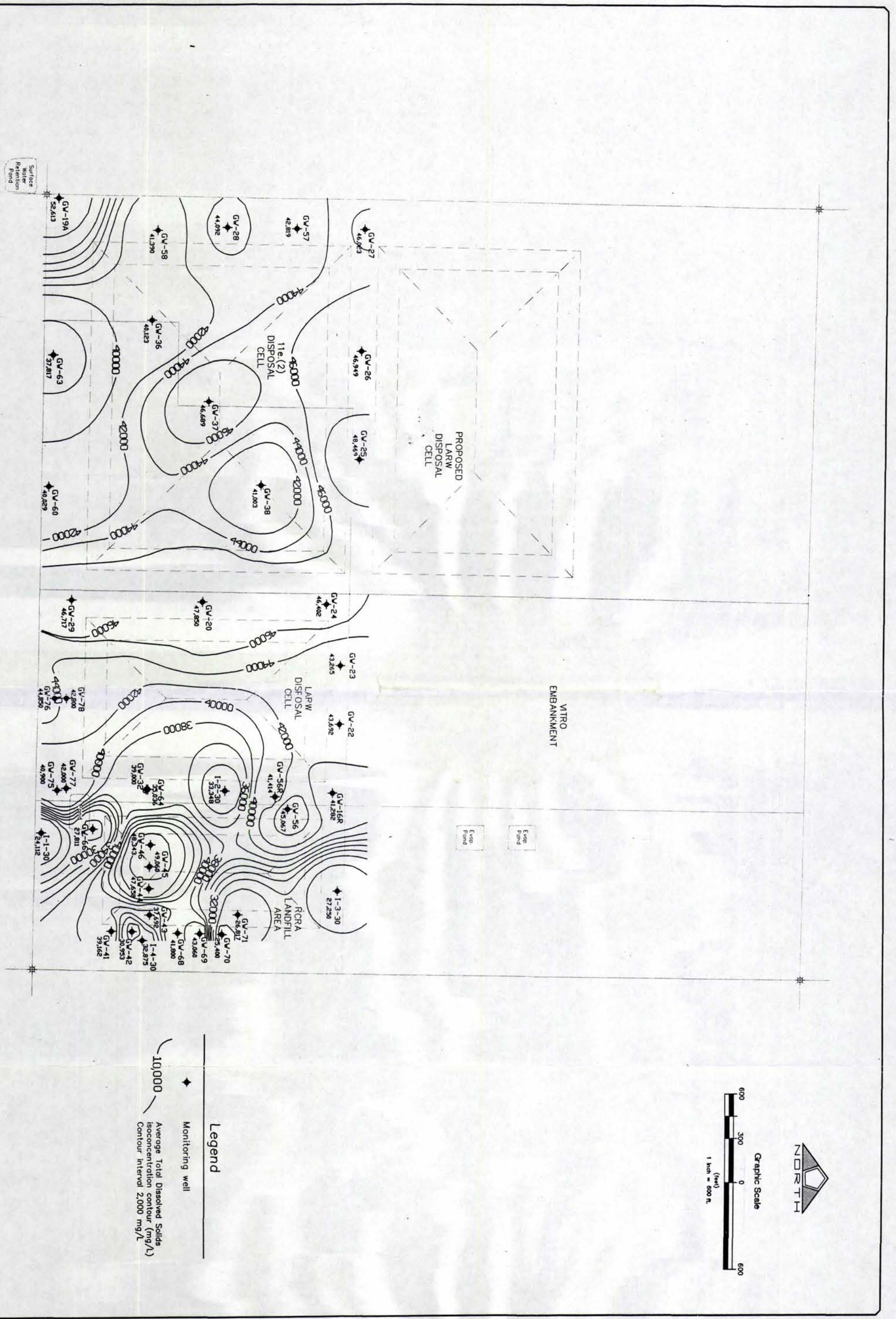

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Figure 22. Total Dissolved Solids isconcentration contour map for the shallow aquifer – 1991 through 1998.

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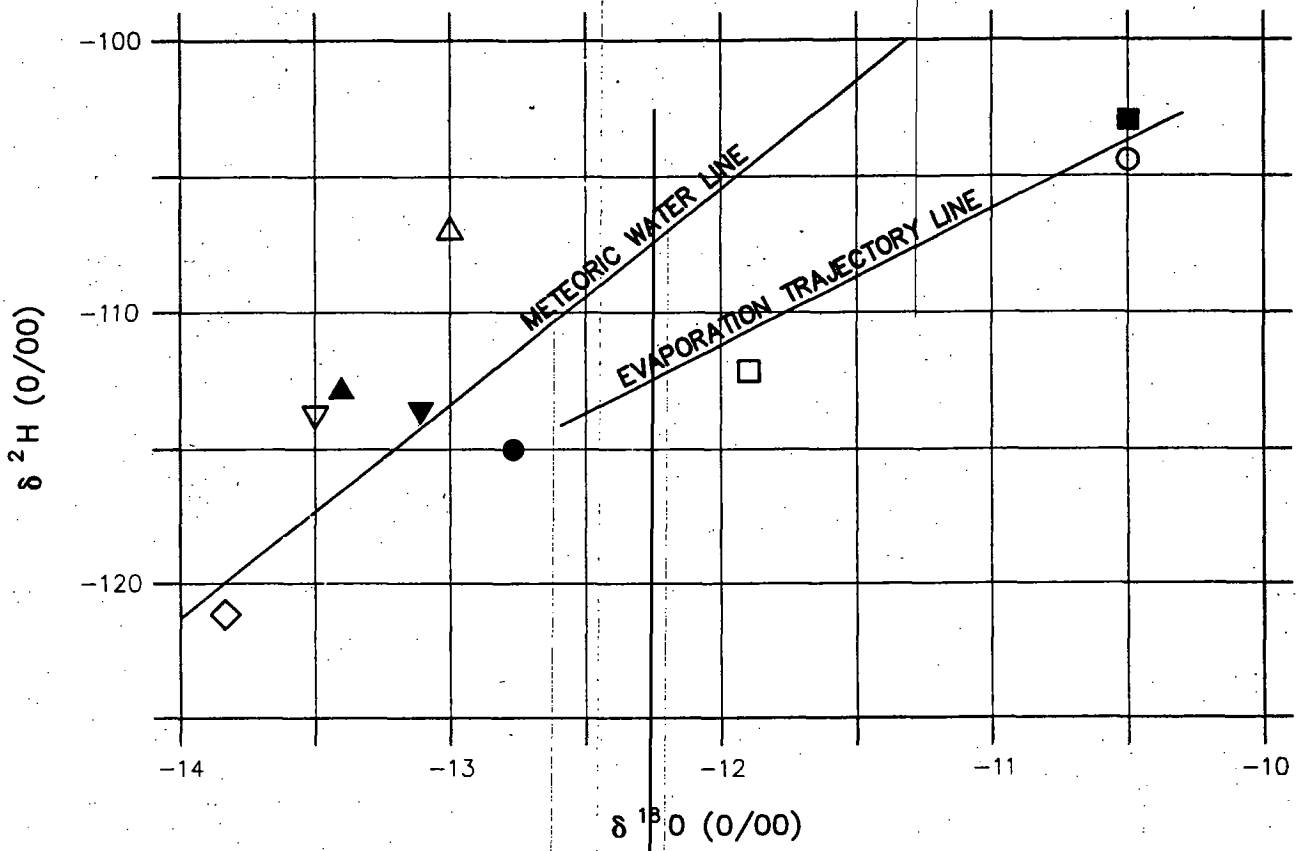

Legend

- ○ GW−3
- ● GW−5
- ▽ GW−16
- ▼ GW−17A
- □ GW−18
- ■ GW−19A
- △ GW−19B
- ▲ GW−21
- ◇ I−1−100

NO SCALE

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Figure 23.
Isotopic composition of water.

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APPENDIX A

Appendix A

Monitor Well, Borehole, and Lysimeter Logs

and Completion Diagrams.

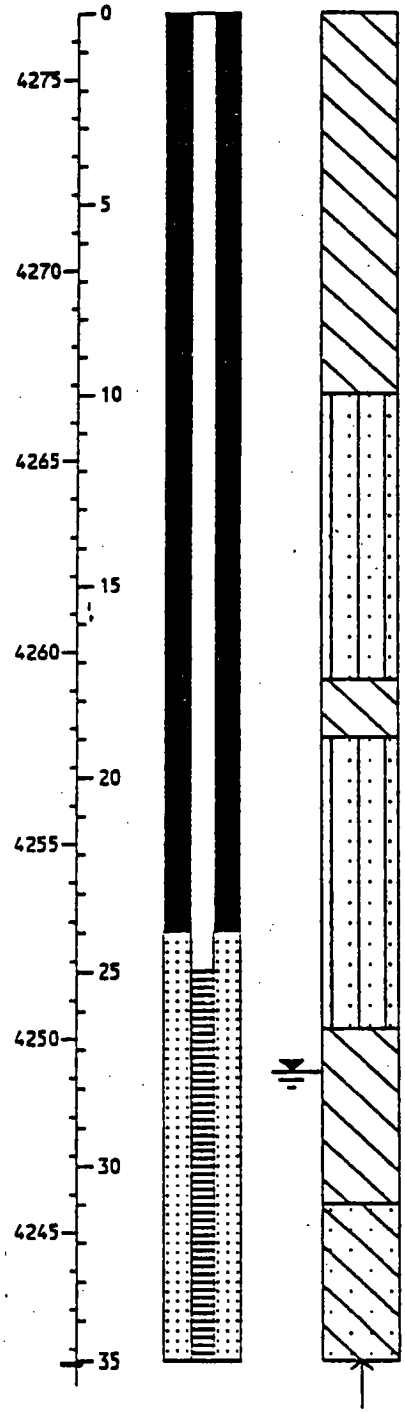
I-1-30*
I-1-50
I-1-100*
I-2-30*
I-2-50
I-3-30*
I-3-50
I-3-100*
I-4-30
I-4-50
SC-1
SC-2
SC-3
SC-4
SC-5
SC-6
SC-7
SC-8
SC-9
SC-10
SC-11
SC-12
SC-13
SLC-201
SLC-202
SLC-203
SLC-204
SLC-205
SLC-206
DH-16A
DH-30
DH-31
DH-32
DH-33
DH-34
DH-47
DH-48
DH-49
DH-50
DH-51
DH-52
DH-53
DH-54
DH-59
DH-61
DH-62
DH-65
GW-1
GW-2
GW-3
GW-5
GW-6
GW-8
GW-9
GW-10
GW-16
GW-16R*
GW-17A
GW-18
GW-19A*
GW-19B*
GW-20*
GW-21
GW-22*
GW-23*
GW-24*
GW-25*
GW-26*
GW-27*
GW-27D*
GW-28*
GW-29*
GW-36*
GW-37*
GW-38*
GW-41*
GW-42*
GW-43
GW-44
GW-45*
GW-46*
GW-55*
GW-56
GW-56R*
GW-57*
GW-58*
GW-60*
GW-63*
GW-64*
GW-66*
GW-67*
GW-67R*
GW-68*
GW-68R*
GW-69*
GW-69R*
GW-70*
GW-71*
GW-75
GW-76
GW-77*
GW-78*
GW-79*
GW-80*
GW-81*
GW-82*
GW-83*
GW-84*
GW-85*
GW-86*
GW-88*
GW-89*
GW-90*
GW-91*
GW-92*
GW-93*
GW-94*
GW-95*
GW-96
GW-97
GW-98
GW-99*
GW-100*
GW-101*
GW-102*
GW-103*
GW-104*
GW-105*
PZ-1
PZ-2
SL-1
SL-2
SL-3
SRS-1
SRS-2
SRS-3
P3-95 NEC*
P3-95 SWC*
P3-97 NEC*

*Indicates compliance well

DRILL HOLE LOG
DRILL HOLE NO.: I-1-30

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: South Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 27.6' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-10-90
TOC ELEV.: 4278.82
GS ELEV.: 4276.72
LOGGED BY: Delta
HOLE NO.: I-1-30



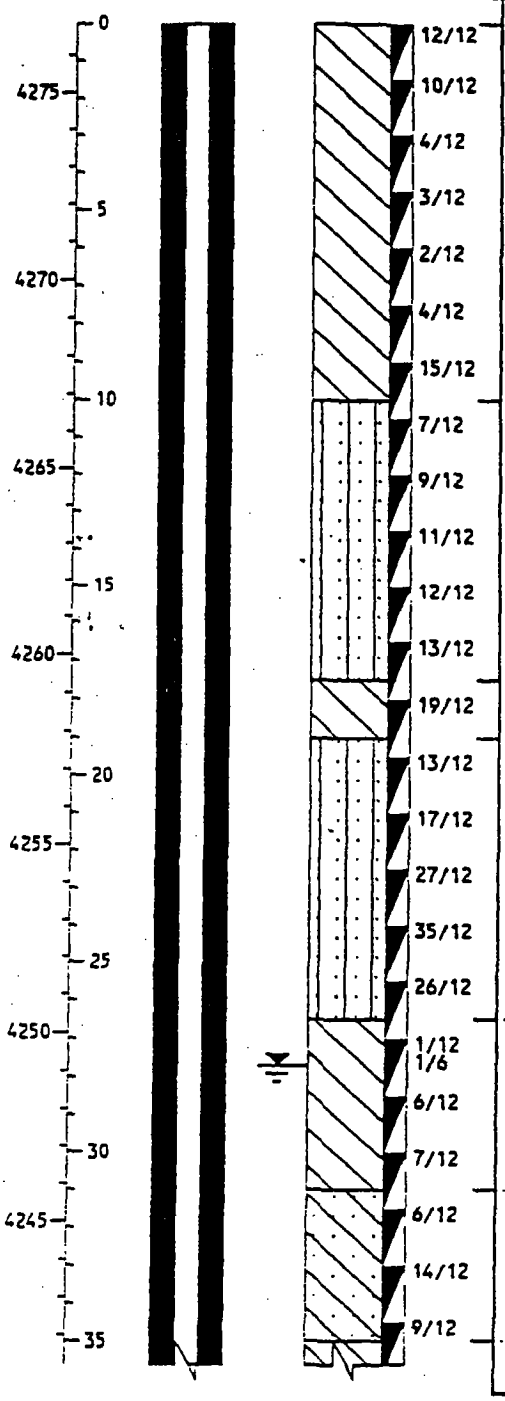
USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	CLAY: Tan to light green, silty, sandy, salt crystals, silt lenses, soft to stiff, dry to very moist.			
SM	SAND: Brown to gray with iron staining, silty, fine grained, clayey sand lenses, loose to medium dense, moist.			
CL	CLAY: Greenish brown, sandy, stiff, moist.			
SM	SAND: Tan, brown and white, silty with silt layers, clayey zones, medium dense to dense, moist.			
CL	CLAY: White with brown streaks, sandy, silt seams, soft to medium stiff, very moist.			
SC	SAND: White to light green, clayey with clay lenses, loose to medium dense.			

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-1-50

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: South Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 27.7' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-14-90
TOC ELEV.: 4278.60
GS ELEV.: 4276.85
LOGGED BY: Delta
HOLE NO.: I-1-50



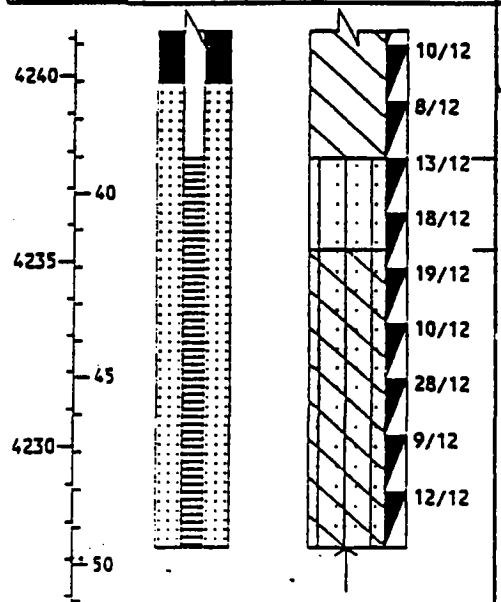
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	CLAY: Tan to light green, silty, sandy, salt crystals, silt lenses, soft to stiff, dry to very moist.		0.0-1.5	
						1.5-3	
						3.0-4.5	
						4.5-6	
						6.0-7.5	
						7.5-9	
						9.0-10.5	
			SM	SAND: Brown to gray with iron staining, silty, fine grained, clayey sand lenses, loose to medium dense, moist.		10.5-12	
						12.0-13.5	
						13.5-15	
						15.0-16.5	
						16.5-18	
			CL	CLAY: Greenish brown, sandy, stiff, moist.		18.0-19.5	
			SM	SAND: Tan, brown and white, silty with silt layers, clayey zones, medium dense to dense, moist.		19.5-21	
						21.0-22.5	
						22.5-24	
						24.0-25.5	
						25.5-27	
			CL	CLAY: White with brown streaks, sandy, silt seams, soft to medium stiff, very moist.		27.0-28.5	
						28.5-30	
						30.0-31.5	
			SC	SAND: White to light green, clayey with clay lenses, loose to medium dense.		31.5-33	
						33.0-34.5	
						34.5-36	

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-1-50

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: South Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 27.7' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-14-90
TOC ELEV.: 4278.60
GS ELEV.: 4276.85
LOGGED BY: Delta
HOLE NO.: I-1-50



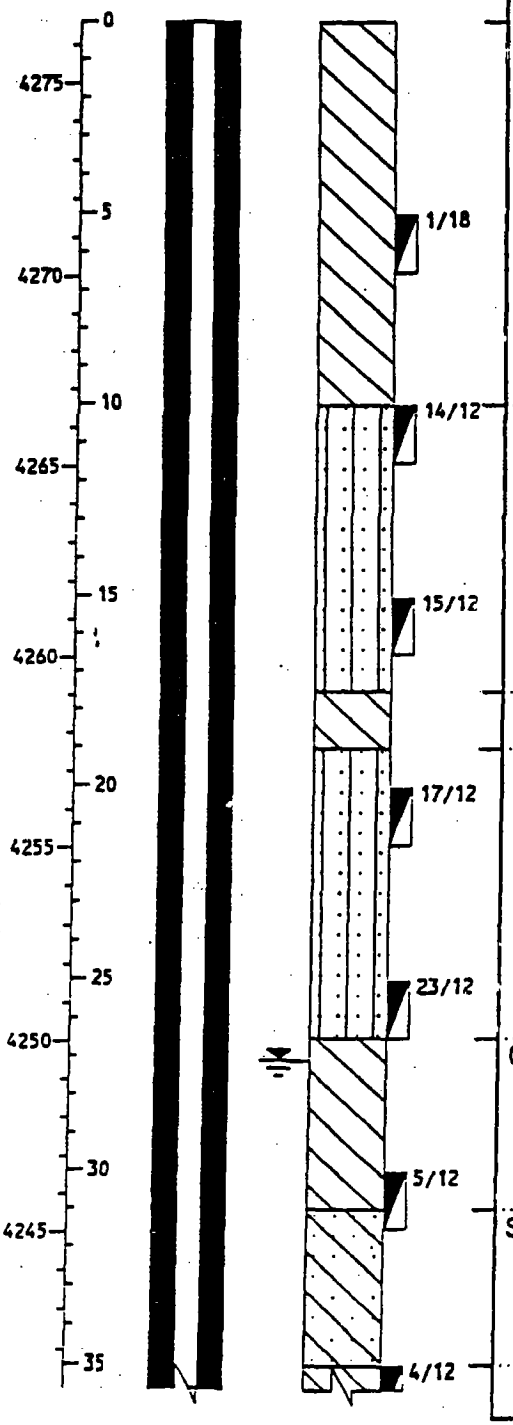
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		10/12	CL	CLAY: Greenish gray, sandy, stiff, wet.		36.0-37.5	
		8/12				37.5-39	
		13/12	SM	SAND: Brown, silty, fine grained, medium dense, wet.		39.0-40.5	
		18/12				40.5-42	
		19/12	SC-SM	SAND: Tan, clayey to silty, fine grained, loose to medium dense, wet.		42.0-43.5	
		10/12				43.5-45	
		28/12				45.0-46.5	
		9/12				46.5-48	
		12/12				48.0-49.5	

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-1-100

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: South Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 27.1' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-2-90
TOC ELEV.: 4278.72
GS ELEV.: 4276.64
LOGGED BY: Delta
HOLE NO.: I-1-100



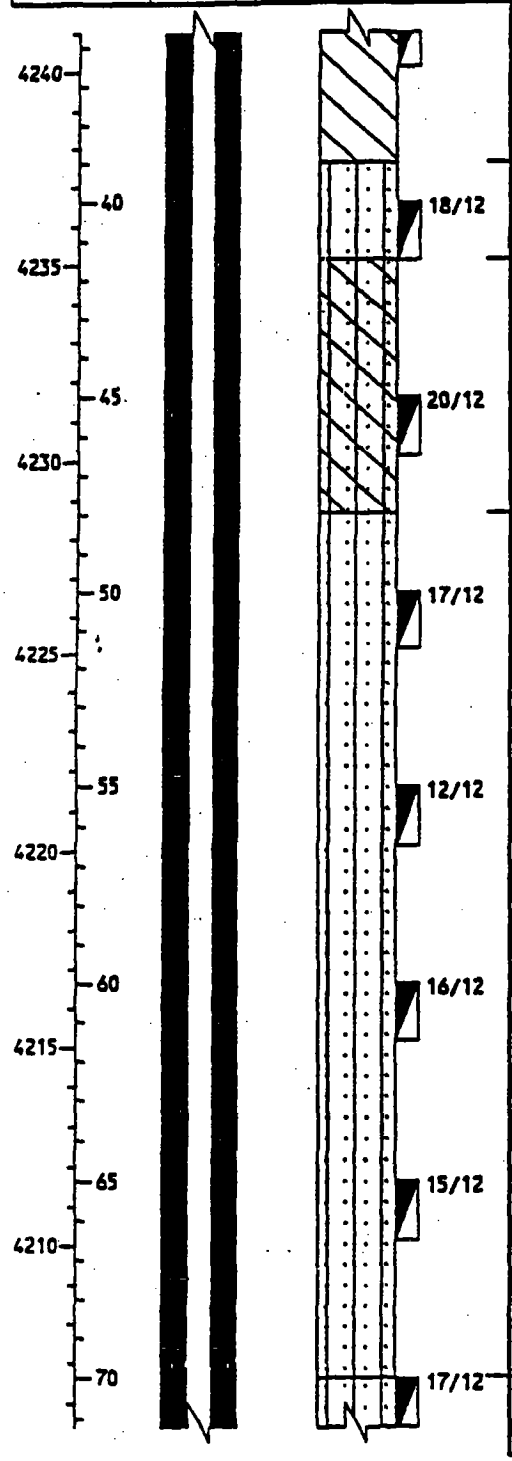
USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	CLAY: Tan to light green, silty, sandy, salt crystals, silt lenses, soft to stiff, dry to very moist.		5.0-6.5	
SM	SAND: Brown to gray with iron staining, silty, fine grained, clayey sand lenses, loose to medium dense, moist.		10.0-11.5	
			15.0-16.5	
CL	CLAY: Greenish brown, sandy, stiff, moist.			
SM	SAND: Tan, brown and white, silty with silt layers, clayey zones, medium dense to dense, moist.		20.0-21.5	
			25.0-26.5	
CL	CLAY: White with brown streaks, sandy, silt seams, soft to medium stiff, very moist.			
			30.0-31.5	
SC	SAND: White to light green, clayey with clay lenses, loose to medium dense.			
			35.0-	

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-1-100

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: South Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 27.1' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-2-90
TOC ELEV.: 4278.72
GS ELEV.: 4276.64
LOGGED BY: Delta
HOLE NO.: I-1-100



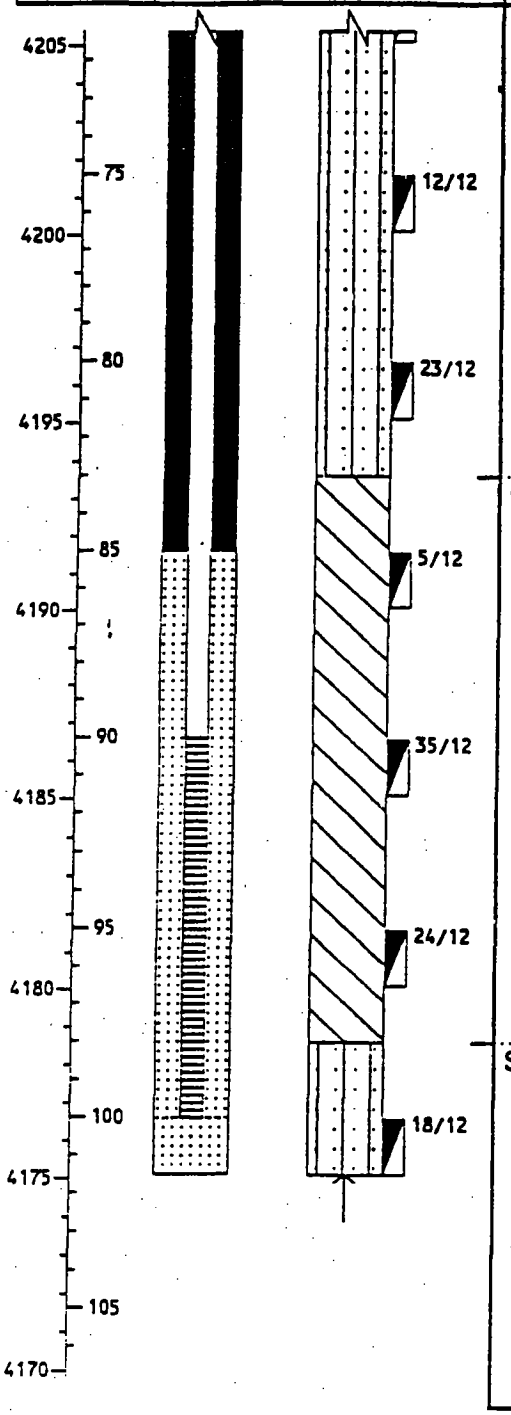
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recover (in/in)
			CL	CLAY: Greenish gray, sandy, stiff, wet.		38.5	
		18/12	SM	SAND: Brown, silty, fine grained, medium dense, wet.		40.0-41.5	
			SC-SM	SAND: Tan, clayey to silty, fine grained, loose to medium dense, wet.			
		20/12				45.0-46.5	
			SM	SAND: Tan, silty with lenses of silt and clay, fine grained, wet.			
		17/12				50.0-51.5	
		12/12				55.0-56.5	
		16/12				60.0-61.5	
		15/12				65.0-66.5	
		17/12	SM	SAND: Tan, silty, with clayey lenses,		70.0-71.5	

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-1-100

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: South Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 27.1' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-2-90
TOC ELEV.: 4278.72
GS ELEV.: 4276.64
LOGGED BY: Delta
HOLE NO.: I-1-100



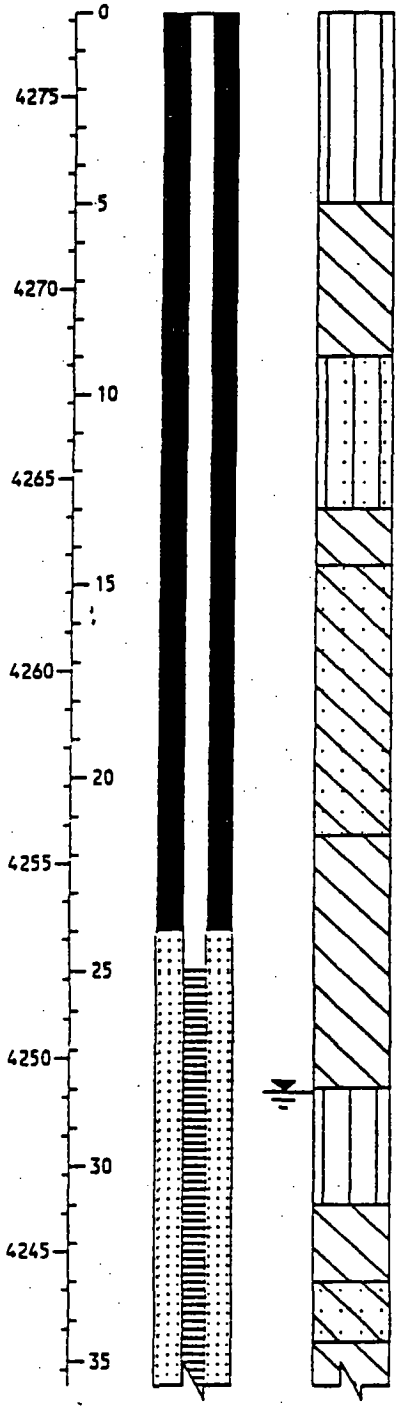
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
				medium dense, wet.			
		12/12				75.0-76.5	
		23/12				80.0-81.5	
			CL	CLAY: Tan, sandy, silty, medium stiff to very stiff, moist to wet.			
		5/12				85.0-86.5	
		35/12				90.0-91.5	
		24/12				95.0-96.5	
			SM	SAND: Tan, silty, fine grained, medium dense, wet.			
		18/12				100.0-101.5	

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-2-30

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: West Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 28.1' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 6-11-90
TOC ELEV.: 4279.30
GS ELEV.: 4277.21
LOGGED BY: Delta
HOLE NO.: I-2-30



ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			ML	SILT: Tan to reddish brown, clayey, sandy, clay lenses, loose to medium dense, dry.			
			CL	CLAY: Green, silty, sandy, silt seams and sand lenses, medium stiff to stiff, moist.			
			SM	SAND: Green, silty, clayey lenses, some fine gravels, medium dense, moist.			
			CL	CLAY: Green, sandy, with sand lenses, stiff, moist.			
			SC	SAND: Light green, clayey, medium to fine grained, loose to medium dense, moist.			
			CL	CLAY: Tan, silty, sandy, silt seams, stiff to very stiff, moist.			
			ML	SILT: White to gray, sandy, very loose, moist.			
			CL	CLAY: Gray to white with iron staining, sandy, silt seams, medium stiff, wet.			
			SC	SAND: White, clayey, loose, wet.			
			CL	CLAY: White, sandy, sand lenses, some			

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-2-30

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: West Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 28.1' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 6-11-90
TOC ELEV.: 4279.30
GS ELEV.: 4277.21
LOGGED BY: Delta
HOLE NO.: I-2-30

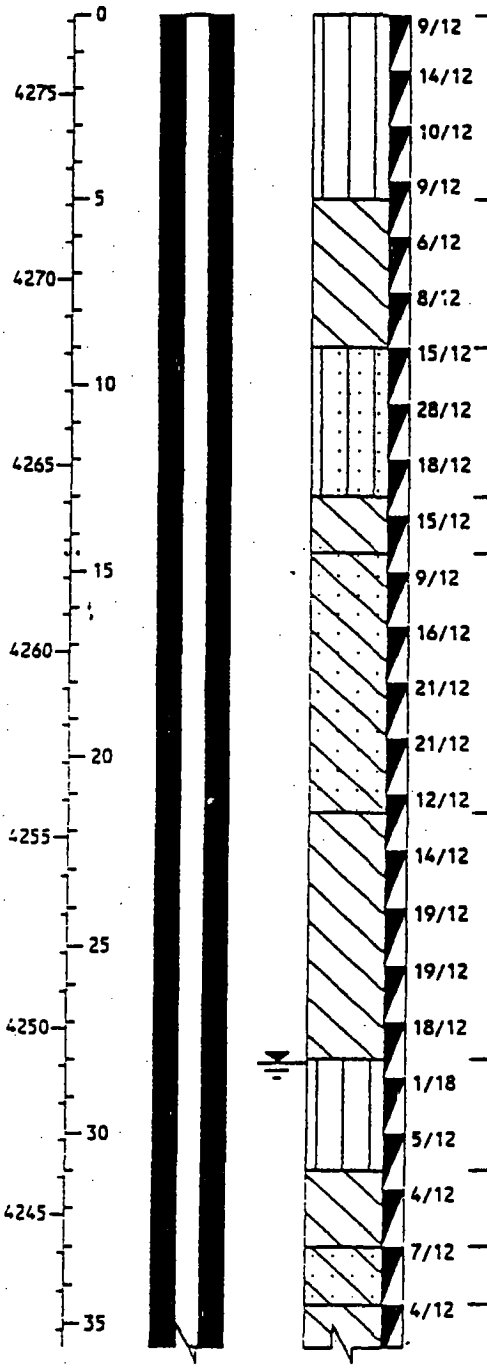
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
4240 / 40				cementing, loose to medium dense, wet.			
4235 / 45							
4230 / 50							
4225 / 55							
4220 / 60							
4215 / 65							
4210 / 70							

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-2-50

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: West Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 28.1' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-23-90
TOC ELEV.: 4279.24
GS ELEV.: 4277.17
LOGGED BY: Delta
HOLE NO.: I-2-50



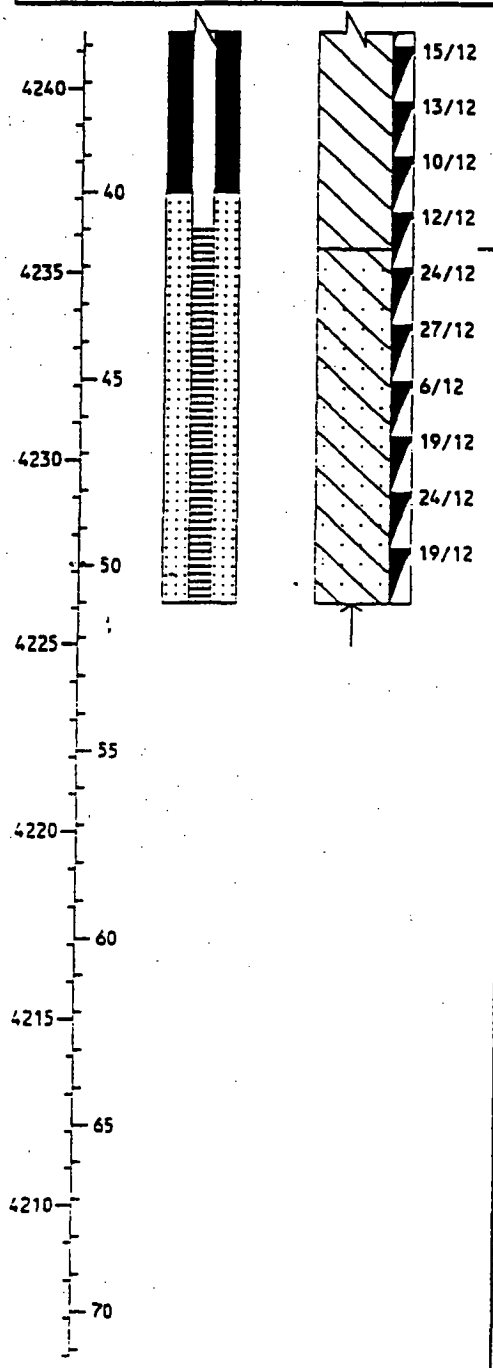
ELEVATION / DEPTH	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
	ML	SILT: Tan to reddish brown, clayey, sandy, clay lenses, loose to medium dense, dry.		0.0-1.5	
				1.5-3	
				3.0-4.5	
				4.5-6	
	CL	CLAY: Green, silty, sandy, silt seams and sand lenses, medium stiff to stiff, moist.		6.0-7.5	
				7.5-9	
	SM	SAND: Green, silty, clayey lenses, some fine gravels, medium dense, moist.		9.0-10.5	
				10.5-12	
				12.0-13.5	
	CL	CLAY: Green, sandy, with sand lenses, stiff, moist.		13.5-15	
	SC	SAND: Light green, clayey, medium to fine grained, loose to medium dense, moist.		15.0-16.5	
				16.5-18	
				18.0-19.5	
				19.5-21	
				21.0-22.5	
	CL	CLAY: Tan, silty, sandy, silt seams, stiff to very stiff, moist.		22.5-24	
				24.0-25.5	
				25.5-27	
				27.0-28.5	
	ML	SILT: White to gray, sandy, very loose, moist.		28.5-30	
				30.0-31.5	
	CL	CLAY: Gray to white with iron staining, sandy, silt seams, medium stiff, wet.		31.5-33	
	SC	SAND: White, clayey, loose, wet.		33.0-34.5	
	CL	CLAY: White, sandy, sand lenses, some		34.5-36	

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-2-50

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: West Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 28.1' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-23-90
TOC ELEV.: 4279.24
GS ELEV.: 4277.17
LOGGED BY: Delta
HOLE NO.: I-2-50



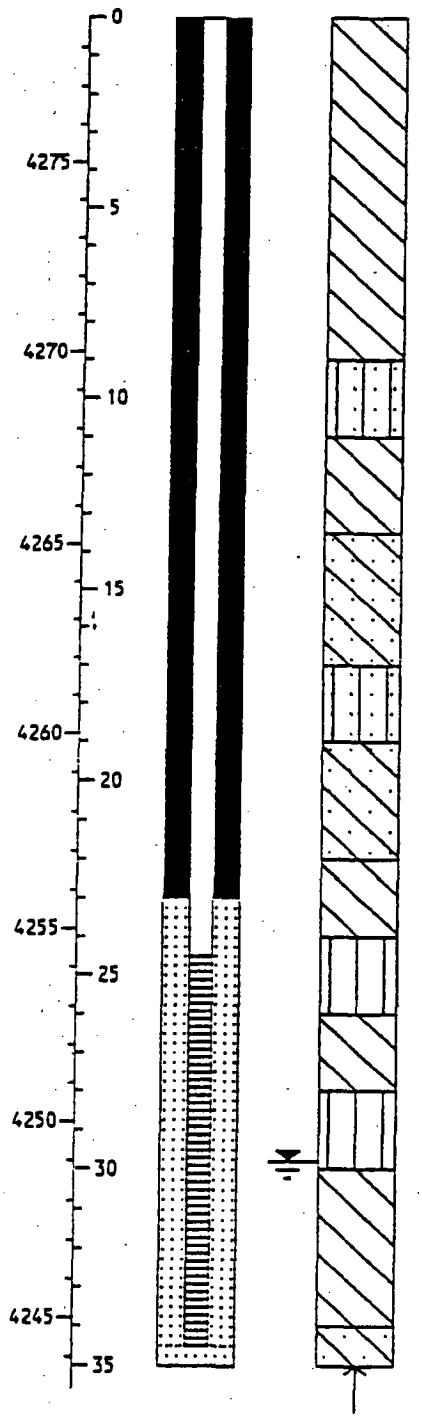
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
				cementing, loose to medium dense, wet.		36.0-37.5	
						37.5-39	
						39.0-40.5	
						40.5-42	
			SC SM	SAND: Tan to brown, clayey to silty, fine grained, some cementing, medium dense.		42.0-43.5	
						43.5-45	
						45.0-46.5	
						46.5-48	
						48.0-49.5	
						49.5-51	

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-3-30

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 29.8' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-9-90
TOC ELEV.: 4281.18
GS ELEV.: 4278.80
LOGGED BY: Delta
HOLE NO.: I-3-30



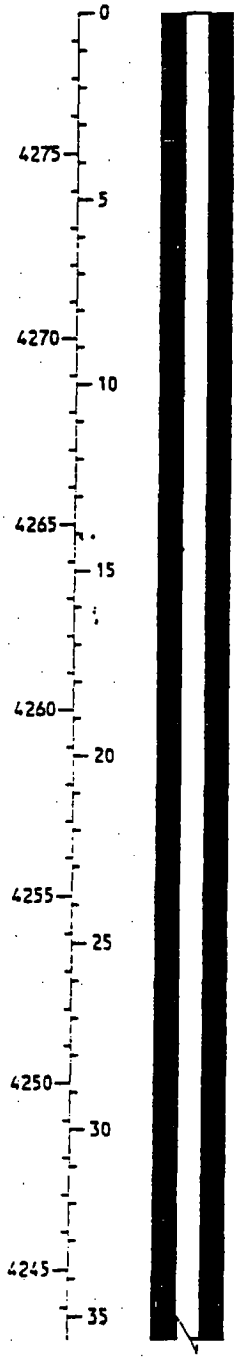
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	CLAY: Tan, sandy, soft to stiff, dry to moist.			
			SM	SAND: Tan, silty, fine to medium grained, some fine gravel, medium dense, moist.			
			CL	CLAY: Green, silty, medium stiff, moist.			
			SC	SAND: Tan, clayey, clay lenses, medium stiff, moist.			
			SM	SAND: Tan, silty, loose to medium, dense, moist.			
			SC	SAND: Tan, clayey, clay lenses, scattered fine gravel, medium dense, moist.			
			CL	CLAY: Tan, silty, medium stiff, moist.			
			ML	SILT: Brown, sandy, medium dense, moist.			
			CL	CLAY: Brown, silty with silt lenses, stiff, moist.			
			ML	SILT: Green, clayey, loose, moist.			
			CL	CLAY: Green with iron staining, silty, cemented lenses, soft to medium stiff, very moist.			
			SC	SAND: Green, clayey, fine grained, silt seams and clay lenses, med. dense, wet.			

Logging and well completion details were transferred directly from Delta Geotechnical's drill logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-3-50

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 29.7' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-9-90
TOC ELEV.: 4281.28
GS ELEV.: 4278.76
LOGGED BY: Delta
HOLE NO.: I-3-50



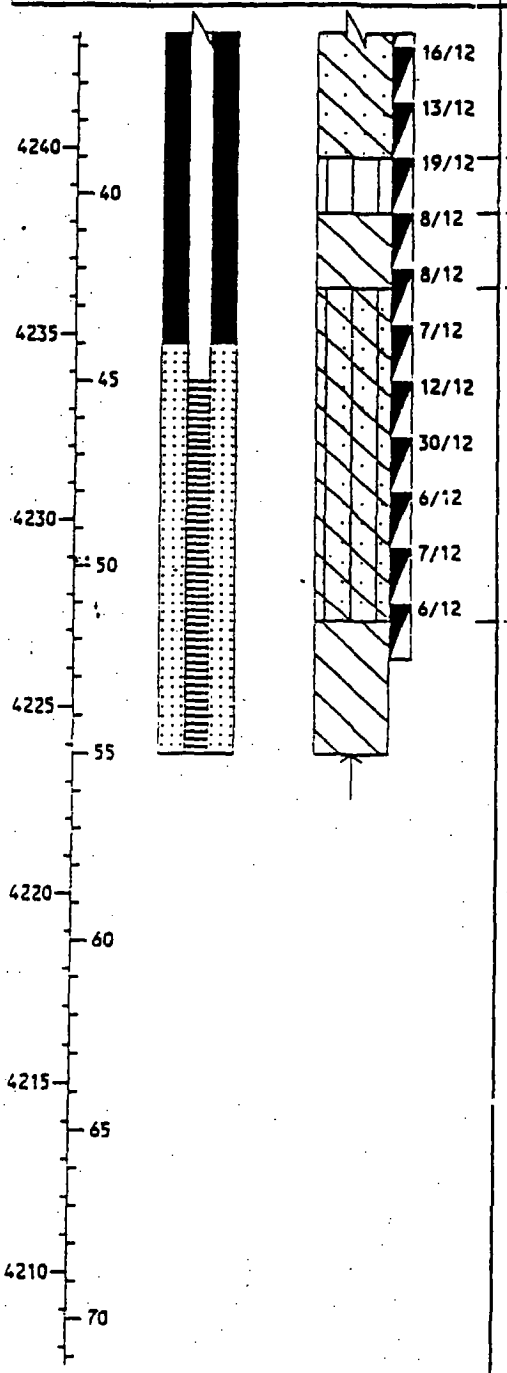
USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	CLAY: Tan, sandy, soft to stiff, dry to moist.		0.0-1.5	
			1.5-3	
			3.0-4.5	
			4.5-6	
			6.0-7.5	
			7.5-9	
SM	SAND: Tan, silty, fine to medium grained, some fine gravel, medium dense, moist.		9.0-10.5	
			10.5-12	
CL	CLAY: Green, silty, medium stiff, moist.		12.0-13.5	
SC	SAND: Tan, clayey, clay lenses, medium stiff, moist.		13.5-15	
			15.0-16.5	
			16.5-18	
SM	SAND: Tan, silty, loose to medium dense, moist.		18.0-19.5	
SC	SAND: Tan, clayey, clay lenses, scattered fine gravel, medium dense, moist.		19.5-21	
			21.0-22.5	
CL	CLAY: Tan, silty, medium stiff, moist.		22.5-24	
ML	SILT: Brown, sandy, medium dense, moist.		24.0-25.5	
			25.5-27	
CL	CLAY: Brown, silty with silt lenses, stiff, moist.		27.0-28.5	
ML	SILT: Green, clayey, loose, moist.		28.5-30	
CL	CLAY: Green with iron staining, silty, cemented lenses, soft to medium stiff, very moist.		30.0-31.5	
			31.5-33	
			33.0-34.5	
SC	SAND: Green, clayey, fine grained, silt seams and clay lenses, medium dense,		34.5-36	

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-3-50

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 29.7' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-9-90
TOC ELEV.: 4281.28
GS ELEV.: 4278.76
LOGGED BY: Delta
HOLE NO.: I-3-50



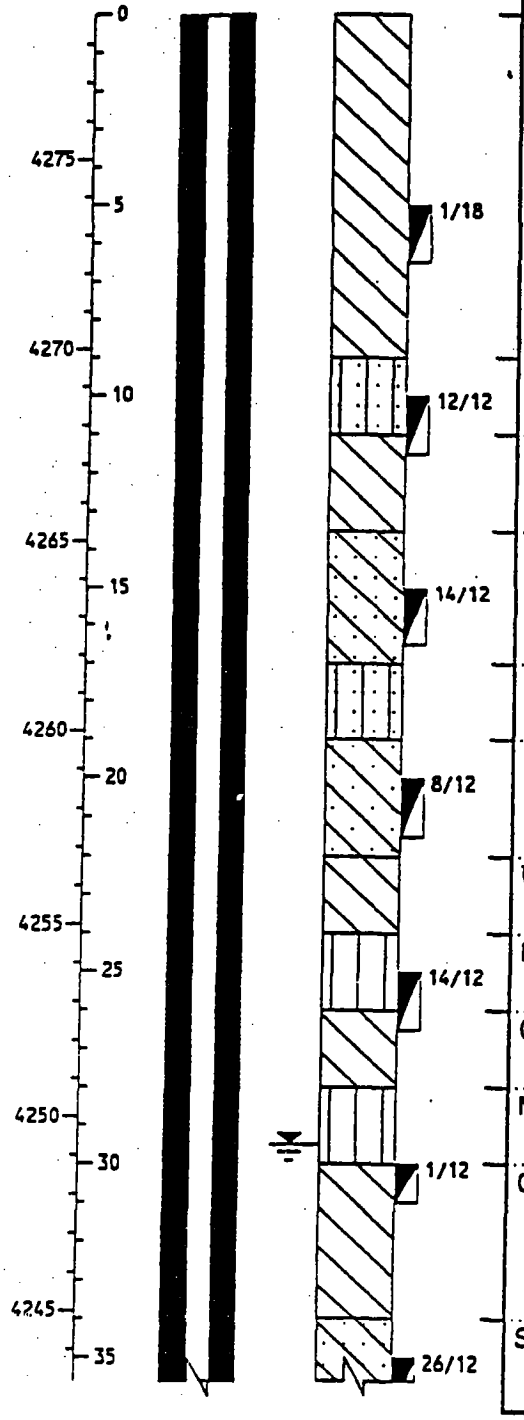
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
				wet.		36.0-37.5	
						37.5-39	
			ML	SILT: Light gray, sand seams, medium dense, wet.		39.0-40.5	
			CL	CLAY: Grayish brown with iron staining, silty, calcareous layers, medium stiff, moist.		40.5-42	
						42.0-43.5	
			SC-SM	SAND: Grayish brown with some iron staining, clayey to silty, fine grained, loose to medium dense, wet.		43.5-45	
						45.0-46.5	
						46.5-48	
						48.0-49.5	
						49.5-51	
			CL	CLAY: Tan to gray, silty, sandy, medium stiff, very moist.		51.0-52.5	

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-3-100

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 29.5' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-2-90
TOC ELEV.: 4281.32
GS ELEV.: 4278.79
LOGGED BY: Delta
HOLE NO.: I-3-100



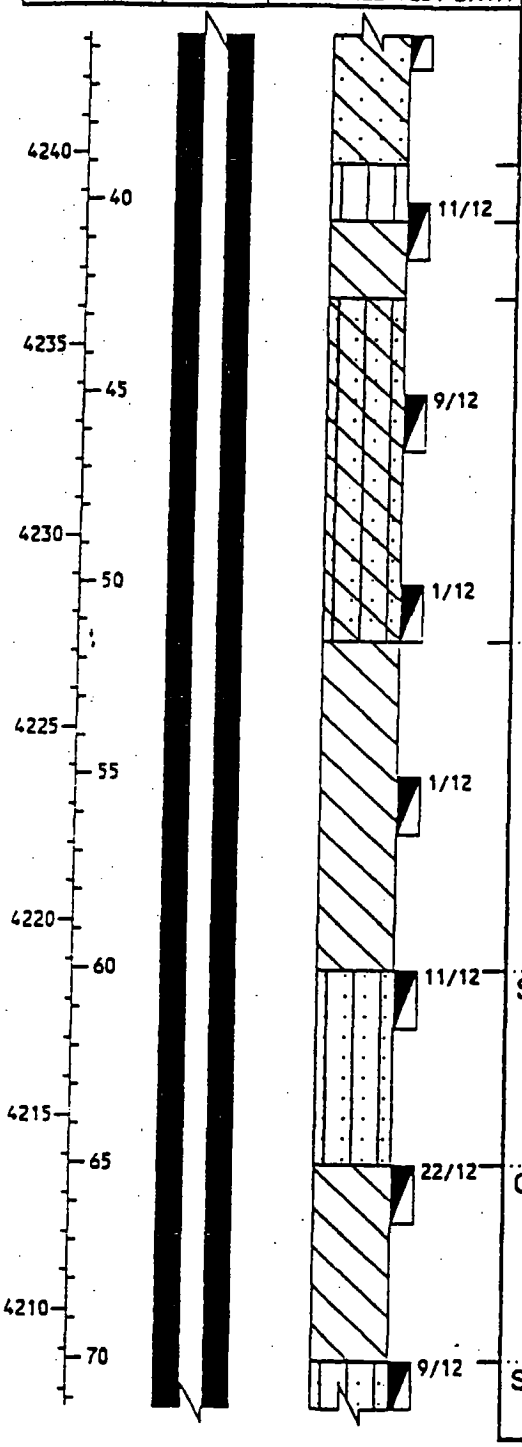
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	CLAY: Tan, sandy, soft to stiff, dry to moist.			
						5.0-6.5	
			SM	SAND: Tan, silty, fine to medium grained, some fine gravel, medium dense, moist.		10.0-11.5	
			CL	CLAY: Green, silty, medium stiff, moist.			
			SC	SAND: Tan, clayey, clay lenses, medium stiff, moist.		15.0-16.5	
			SM	SAND: Tan, silty, loose to medium dense, moist.			
			SC	SAND: Tan, clayey, clay lenses, scattered fine gravel, medium dense, moist.		20.0-21.5	
			CL	CLAY: Tan, silty, medium stiff, moist.			
			ML	SILT: Brown, sandy, medium dense, moist.		25.0-26.5	
			CL	CLAY: Brown, silty with silt lenses, stiff, moist.			
			ML	SILT: Green, clayey, loose, moist.			
			CL	CLAY: Green with iron staining, silty, cemented lenses, soft to medium stiff, very moist.		30.0-31	
			SC	SAND: Green, clayey, fine grained, silt seams and clay lenses, medium dense,		35.0-	

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-3-100

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 29.5' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-2-90
TOC ELEV.: 4281.32
GS ELEV.: 4278.79
LOGGED BY: Delta
HOLE NO.: I-3-100



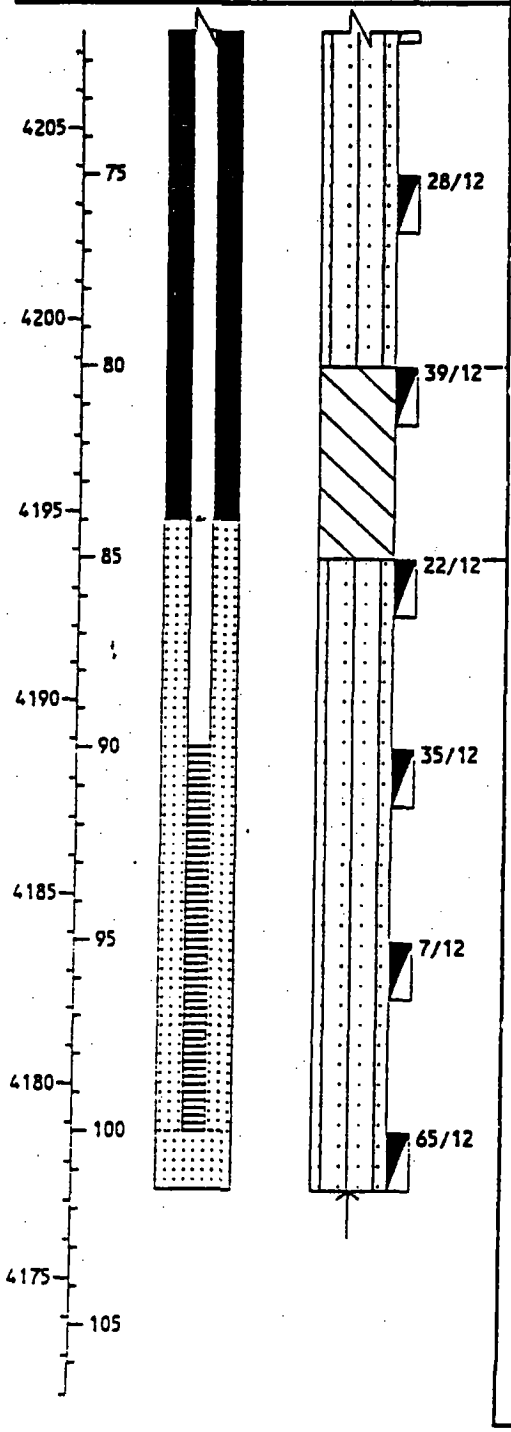
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
				wet.		38.5	
			ML	SILT: Light gray, sand seams, medium dense, wet.		40.0-41.5	
			CL	CLAY: Grayish brown with iron staining, silty, calcareous layers, medium stiff, moist.			
			SC-SM	SAND: Grayish brown with some iron staining, clayey to silty, fine grained, loose to medium dense, wet.		45.0-46.5	
						50.0-51.5	
			CL	CLAY: Tan to gray, silty, sandy, medium stiff, very moist.			
						55.0-56.5	
			SM	SAND: Tan to brown, silty with clayey lenses, fine grained, medium dense, wet.		60.0-61.5	
			CL	CLAY: Green and white, sandy, silty with silt lenses, some cementation, very stiff, moist.		65.0-66.5	
			SM	SAND: Reddish brown to tan, silty, fine		70.0-71.5	

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-3-100

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 29.5' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-2-90
TOC ELEV.: 4281.32
GS ELEV.: 4278.79
LOGGED BY: Delta
HOLE NO.: I-3-100



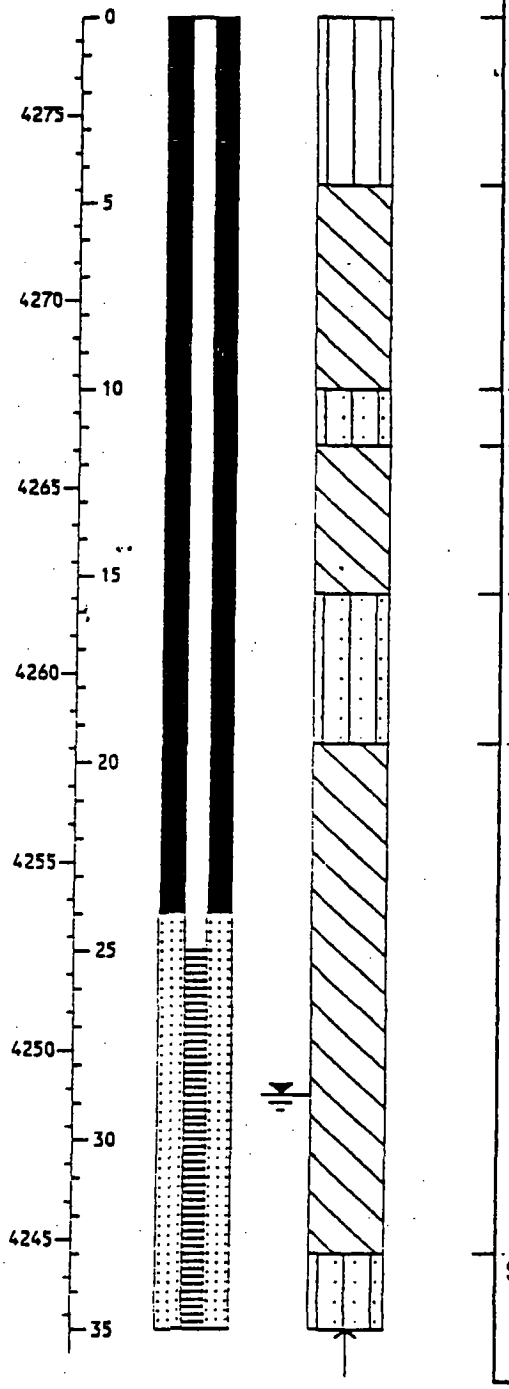
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
				grained, loose to medium dense, wet.			
		28/12				75.0-76.5	
		39/12	CL	CLAY: Reddish brown to tan, sandy, silty, very stiff, moist.		80.0-81.5	
		22/12	SM	SAND: Gray to reddish brown, silty, fine to medium grained, some fine gravels, loose to very dense.		85.0-86.5	
		35/12				90.0-91.5	
		7/12				95.0-96.5	
		65/12				100.0-101.5	

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-4-30

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: East Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 28.8' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-15-90
TOC ELEV.: 4280.03
GS ELEV.: 4277.62
LOGGED BY: Delta
HOLE NO.: I-4-30



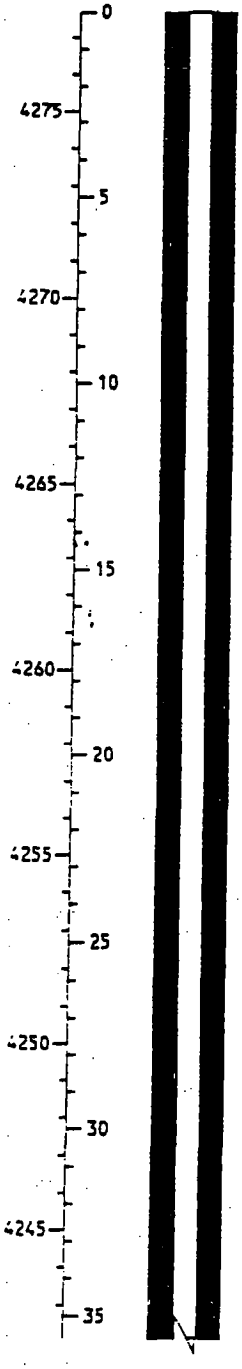
ELEVATION / DEPTH	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
0	ML	SILT: Tan, sandy, salt crystals, clay seams, stiff, dry.			
5	CL	CLAY: Tan to white, silty, sandy, with silt seams, soft to very stiff, moist.			
10	SM	SAND: Brown, silty, fine grained, moist.			
	CL	CLAY: Green with iron staining, sandy with clayey sand lenses, some silt, stiff, moist.			
15	SM	SAND: Tan, silty, fine to medium grained, medium dense, moist.			
20	CL	CLAY: White, silty, sandy, silt seams and lenses, soft to stiff, very moist.			
35	SM	SAND: White, silty, fine grained, clay lenses, loose to medium dense, wet.			

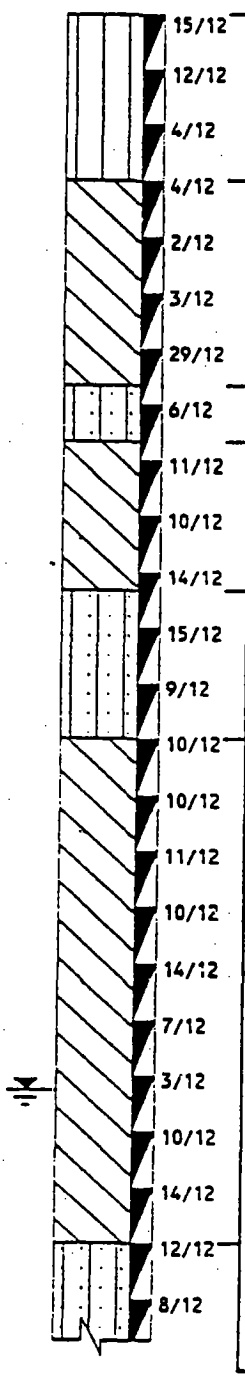
Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-4-50

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: East Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 28.9' HOLE DIAMETER:

PROJECT NO.: 1416-020
DATE: 5-16-90
TOC ELEV.: 4280.09
GS ELEV.: 4277.69
LOGGED BY: Delta
HOLE NO.: I-4-50





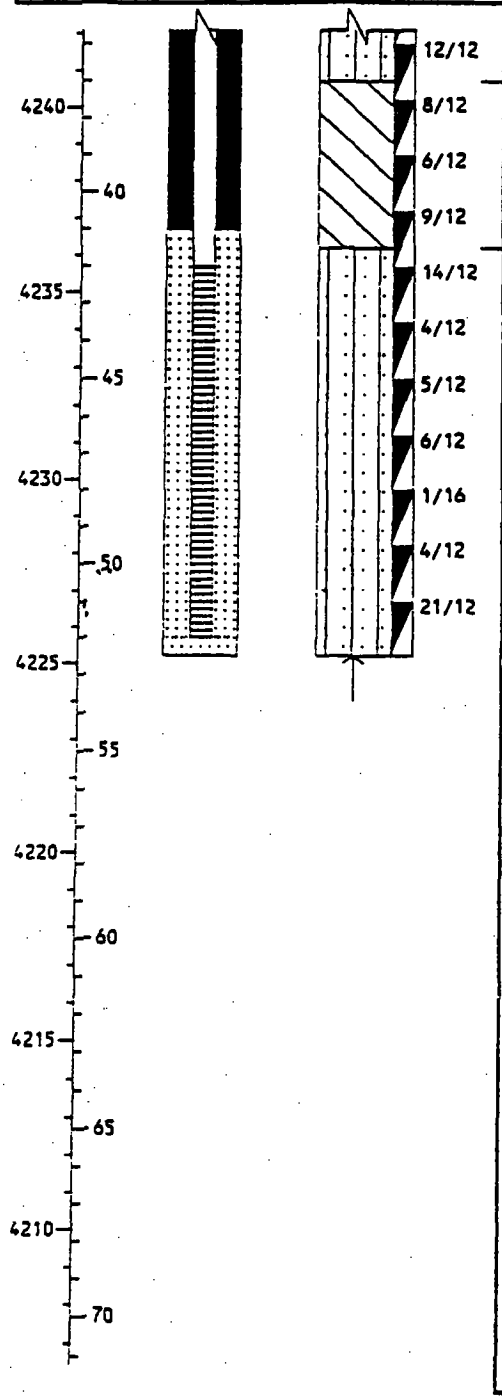
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			ML	SILT: Tan, sandy, salt crystals, clay seams, stiff, dry.		0.0-1.5	
						1.5-3	
						3.0-4.5	
			CL	CLAY: Tan to white, silty, sandy, with silt seams, soft to very stiff, moist.		4.5-6	
						6.0-7.5	
						7.5-9	
						9.0-10.5	
			SM	SAND: Brown, silty, fine grained, moist.		10.5-12	
			CL	CLAY: Green with iron staining, sandy with clayey sand lenses, some silt, stiff, moist.		12.0-13.5	
						13.5-15	
			SM	SAND: Tan, silty, fine to medium grained, medium dense, moist.		15.0-16.5	
						16.5-18	
						18.0-19.5	
			CL	CLAY: White, silty, sandy, silt seams and lenses, soft to stiff, very moist.		19.5-21	
						21.0-22.5	
						22.5-24	
						24.0-25.5	
						25.5-27	
						27.0-28.5	
						28.5-30	
						30.0-31.5	
						31.5-33	
			SM	SAND: White, silty, fine grained, clay lenses, loose to medium dense, wet.		33.0-34.5	
						34.5-36	

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

DRILL HOLE LOG
DRILL HOLE NO.: I-4-50

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: East Boundary of RCRA Disposal Area
DRILLER: Delta Geotechnical
DRILL RIG:
DEPTH TO WATER: 28.9' HOLE DIAMETER:

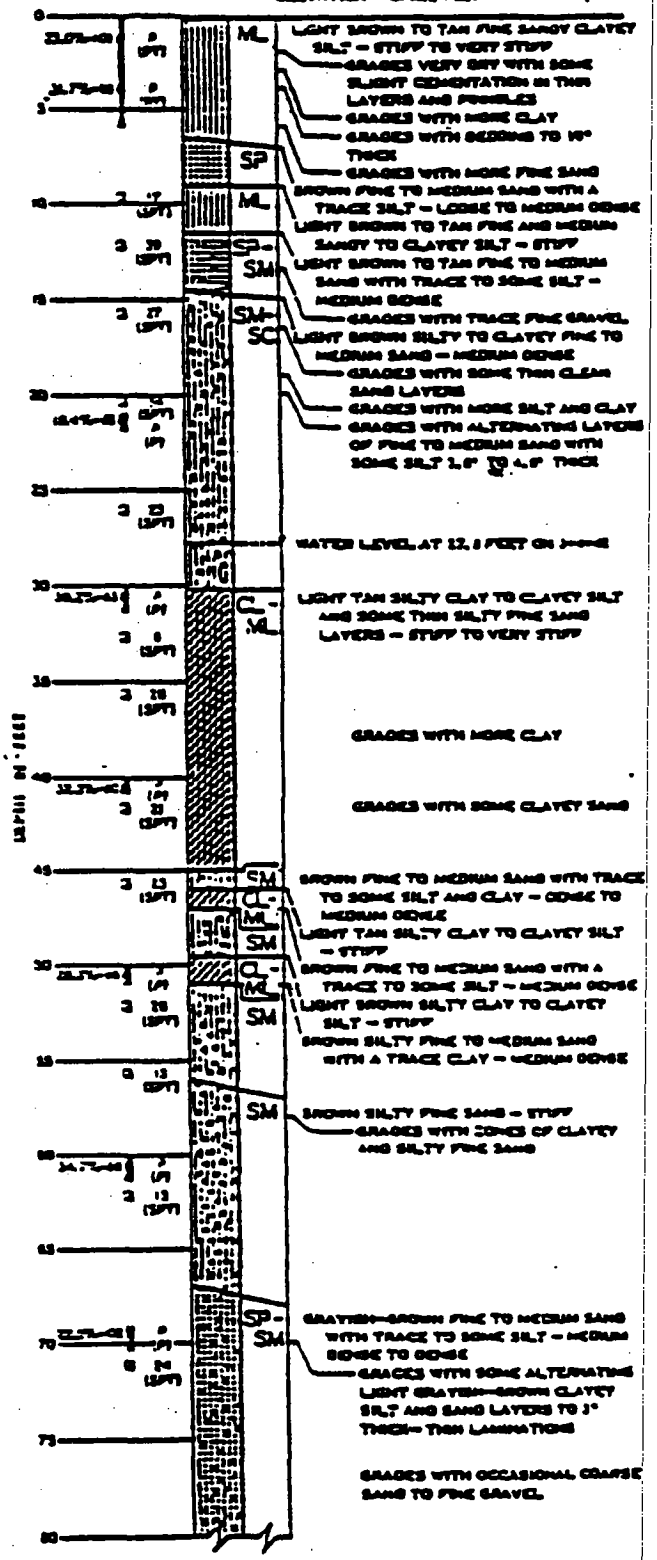
PROJECT NO.: 1416-020
DATE: 5-16-90
TOC ELEV.: 4280.09
GS ELEV.: 4277.69
LOGGED BY: Delta
HOLE NO.: I-4-50



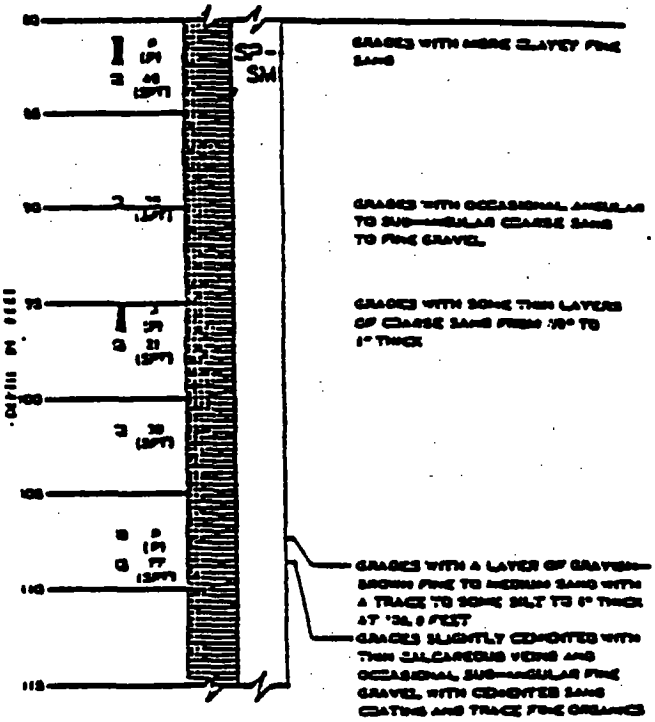
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
						36.0-37.5	
			CL	CLAY: Light green, sandy, medium stiff to stiff, wet.		37.5-39	
						39.0-40.5	
						40.5-42	
			SM	SAND: Brown, silty, fine grained, very loose to medium dense, wet.		42.0-43.5	
						43.5-45	
						45.0-46.5	
						46.5-48	
						48.0-49.5	
						49.5-51	
						51.0-52.5	

Logging and well completion details were transferred directly from Delta Geotechnical's drill hole logs and well completion reports.

BORING SC-1



(CONTINUED)



KEY

A – B C
D

A FIELD MOISTURE EXPRESSED AS A PERCENTAGE OF THE DRY WEIGHT OF SOIL

B DRY DENSITY EXPRESSED IN LBS. PER CUBIC FOOT

C BLOWS PER FOOT OF PENETRATION USING A 140 LB. HAMMER DROPPING 30 INCHES

P PUSHED SAMPLER WAS ADVANCED HYDRAULICALLY

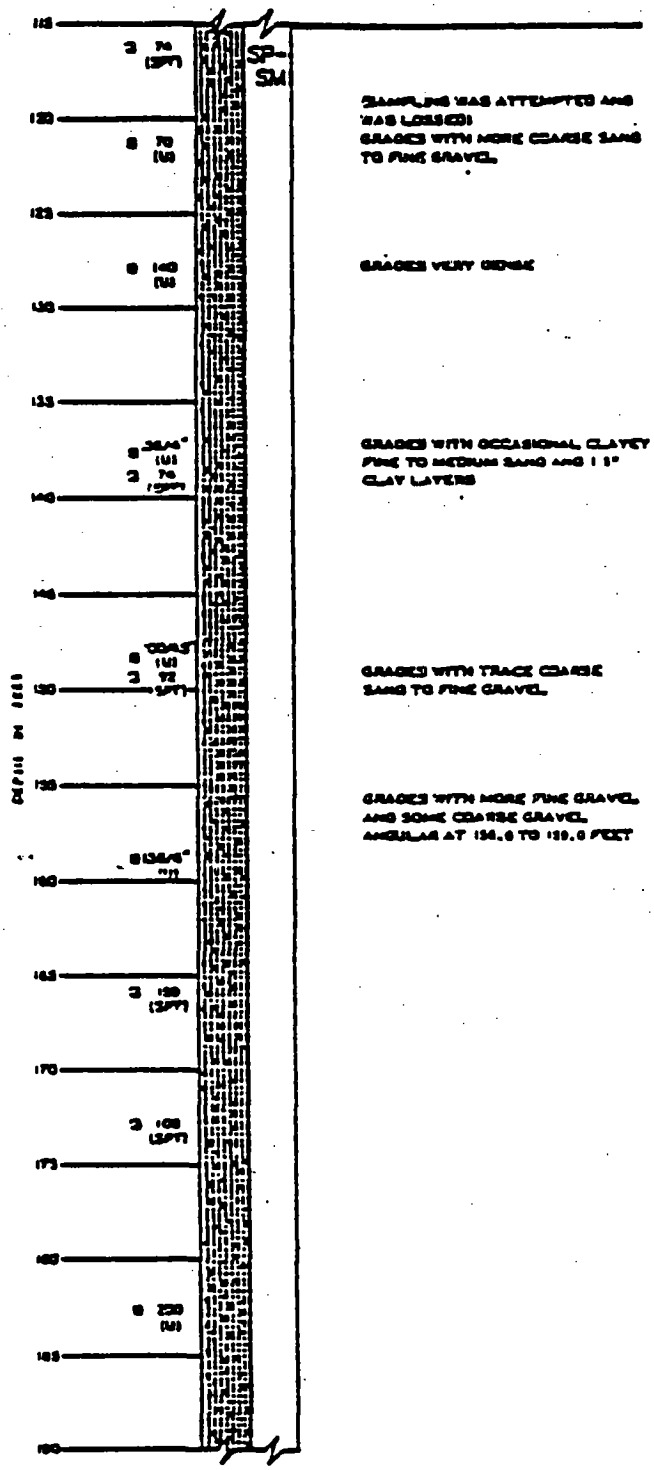
D TYPES OF SAMPLER
(PT) – PISTON SAMPLER
(PT) – PITCHER SAMPLER
(SH) – SHELBY SAMPLER
(SPT) – STANDARD PENETRATION TEST
(D) – CAMES & MOORE SAMPLER WITH "D" TYPE DRIVE SHOE
(S) – CAMES & MOORE SAMPLER WITH "S" TYPE DRIVE SHOE

E DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED

D STANDARD PENETRATION TEST

NOTE:
THE DISCUSSION IN THE TEXT UNDER THE SECTION TITLED, "SITE CONDITIONS, SUBSURFACE", IS NECESSARY TO A PROPER UNDERSTANDING OF THE NATURE OF THE SUBSURFACE MATERIALS.

BORING SC-1 (CONTINUED)



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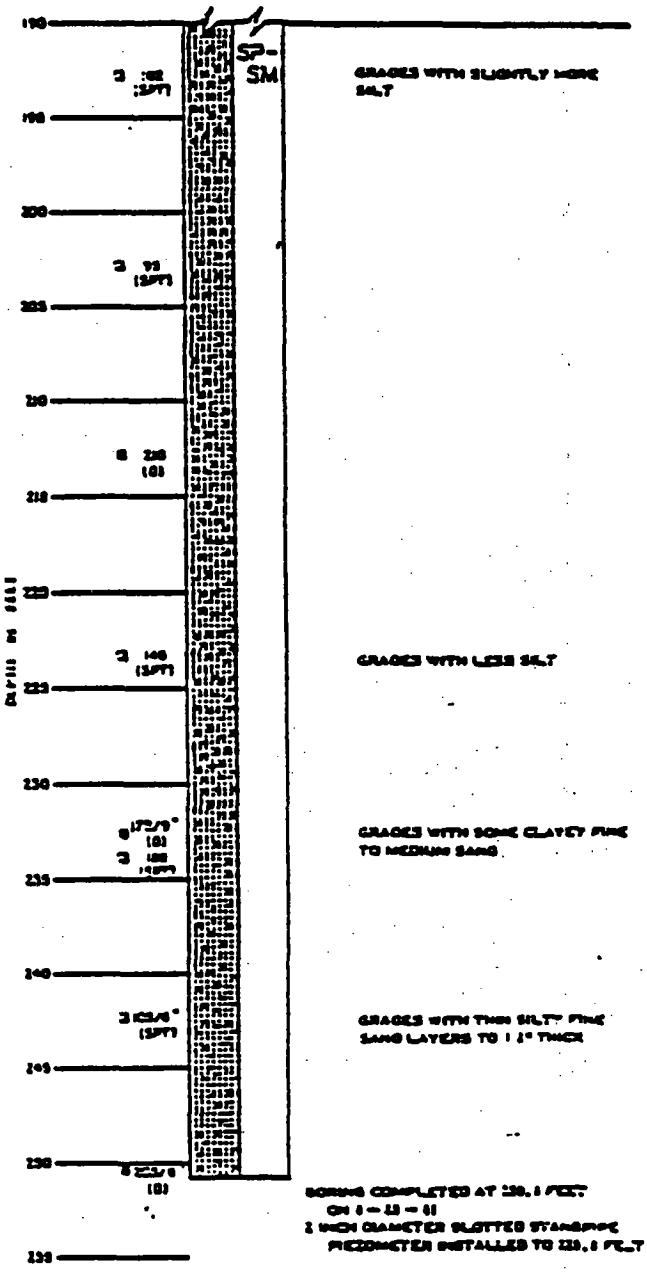
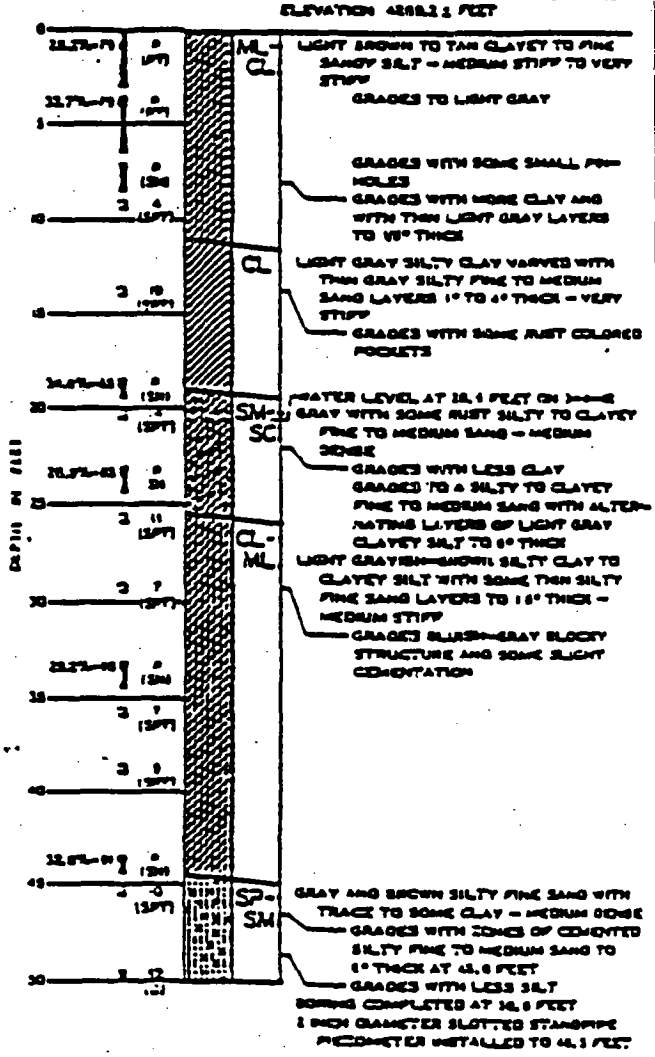


KEY

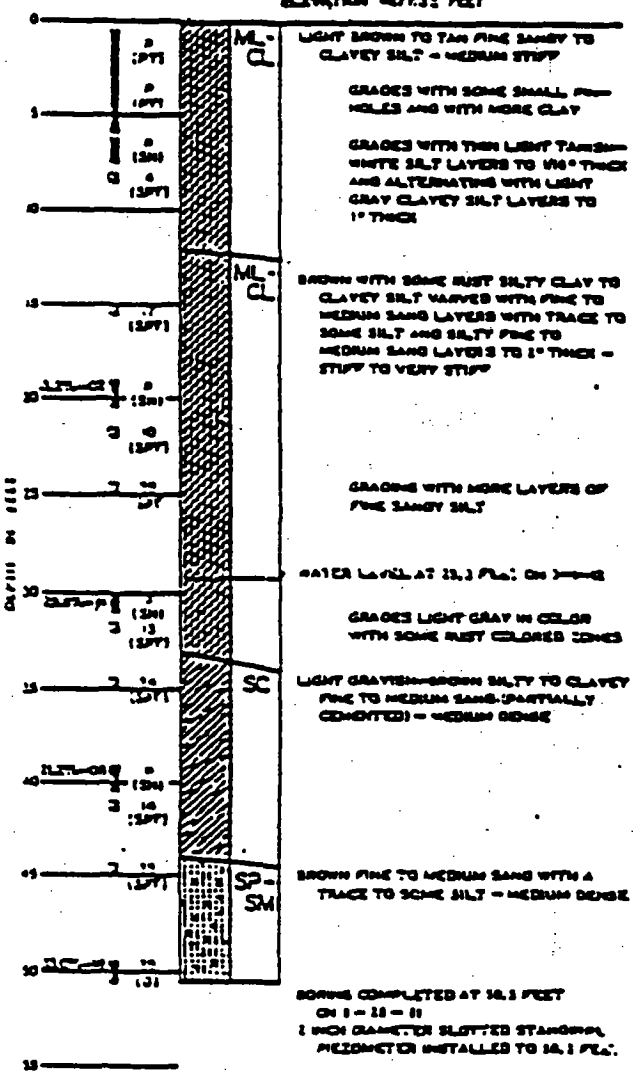
A - B C
D

A FIELD MOISTURE EXPRESSED AS A PERCENTAGE OF THE DRY WEIGHT OF SOIL
B DRY DENSITY EXPRESSED IN LBS. PER CUBIC FOOT
C BLOWS PER FOOT OF PENETRATION USING A 140 LB. HAMMER DROPPING 30 INCHES
P PUSHED SAMPLER WAS ADVANCED HYDRAULICALLY
D TYPES OF SAMPLER
(P) - PISTON SAMPLER
(PT) - PITCHER SAMPLER
(SH) - SHELBY SAMPLER
(SPT) - STANDARD PENETRATION TEST
(U) - CAMES & MOORE SAMPLER WITH "U" TYPE DRIVE SHOE
(S) - CAMES & MOORE SAMPLER WITH "S" TYPE DRIVE SHOE
E DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED
S STANDARD PENETRATION TEST

BORING SC-2



BORING SC-3



KEY

A – B C
D

A FIELD MOISTURE EXPRESSED AS A PERCENTAGE OF THE DRY WEIGHT OF SOIL

B DRY DENSITY EXPRESSED IN LBS. PER CUBIC FOOT

C BLOWS PER FOOT OF PENETRATION USING A 140 LB. HAMMER DROPPING 30 INCHES

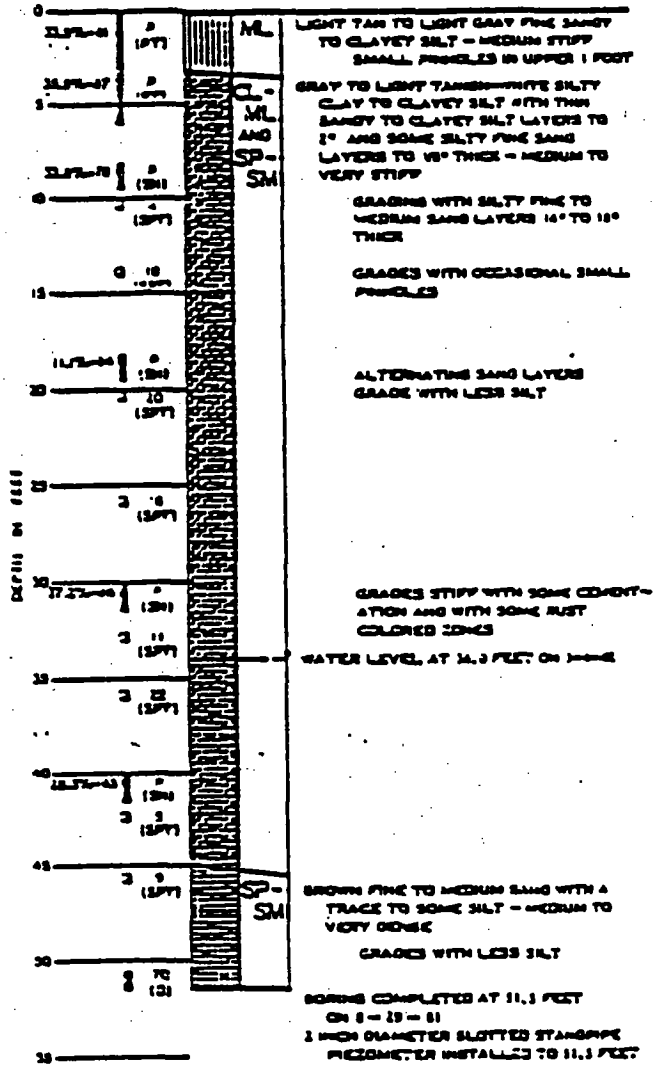
P PUSHED SAMPLER WAS ADVANCED HYDRAULICALLY

D TYPES OF SAMPLER
(P) – PISTON SAMPLER
(PT) – PITCHER SAMPLER
(Shl) – SHELBY SAMPLER
(SPT) – STANDARD PENETRATION TEST
(M) – RAMEL & MOORE SAMPLER WITH "U" TYPE DRIVE SHOE
(Ms) – RAMEL & MOORE SAMPLER WITH "S" TYPE DRIVE SHOE

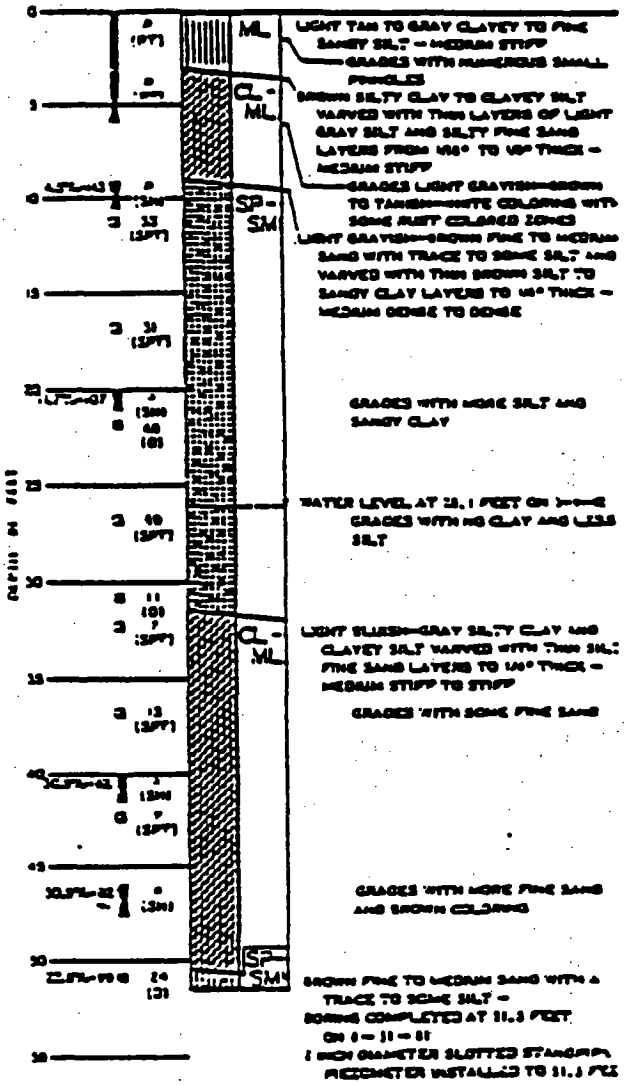
E DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED

3 STANDARD PENETRATION TEST

BORING SC-4



BORING SC-5

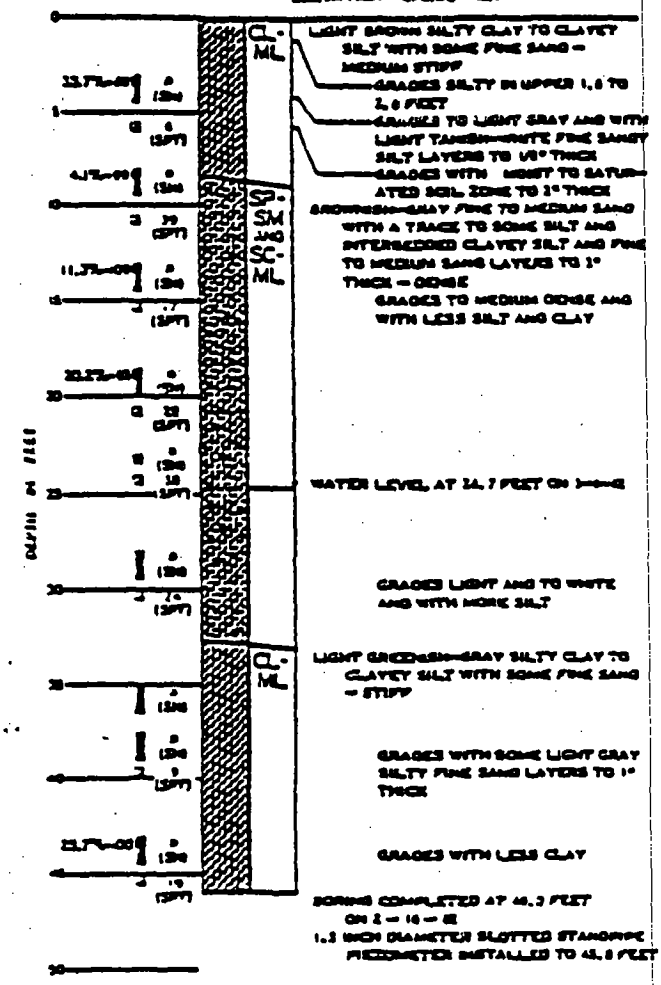


SOIL

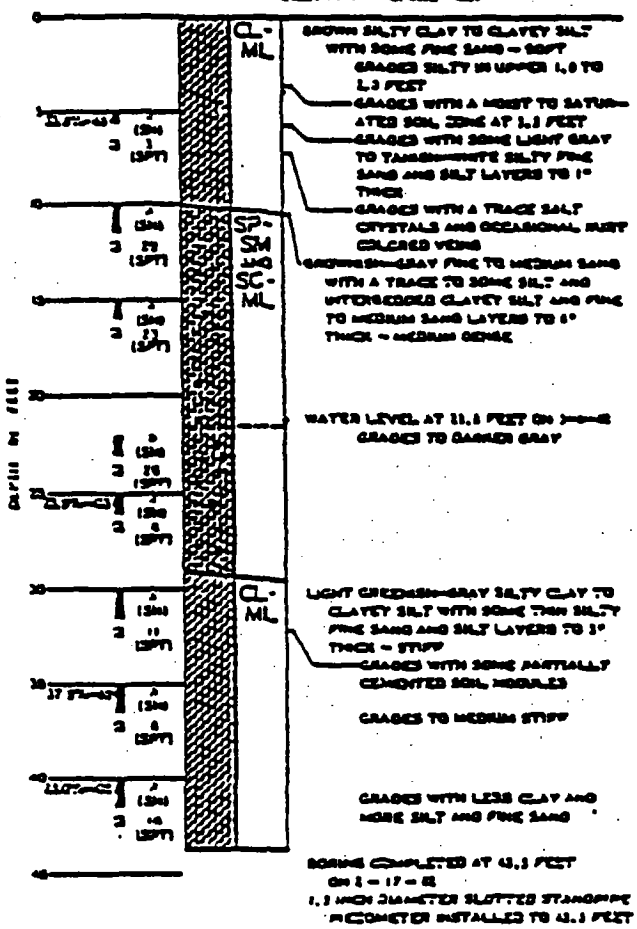
A – B C
D

- A FIELD MOISTURE EXPRESSED AS A PERCENTAGE OF THE DRY WEIGHT OF SOIL
- B DRY DENSITY EXPRESSED IN LBS. PER CUBIC FOOT
- C BLOWS PER FOOT OF PENETRATION USING A 140 LB. HAMMER DROPPING 30 INCHES
- P PUSHED SAMPLER WAS ADVANCED HYDRAULICALLY
- D TYPES OF SAMPLER
  - (P) – PISTON SAMPLER
  - (FT) – FITZGER SAMPLER
  - (3in) – SHELBY SAMPLER
  - (3PT) – STANDARD PENETRATION TEST
  - (D) – DENNIS & MOORE SAMPLER WITH "D" TYPE DRIVE SHOE
  - (B) – DENNIS & MOORE SAMPLER WITH "B" TYPE DRIVE SHOE
- E DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED
- G STANDARD PENETRATION TEST

BORING SC-6



BORING SC-7



KEY

A — B & C

B

A FIELD MOISTURE EXPRESSED AS A PERCENTAGE OF THE DRY WEIGHT OF SOIL

B DRY DENSITY EXPRESSED IN LBS. PER CUBIC FOOT

C BLOWS PER FOOT OF PENETRATION USING A 140 LB. HAMMER DROPPING 30 INCHES

P PUSHED SAMPLER WAS ADVANCED HYDRAULICALLY

D TYPES OF SAMPLER
(P) — PISTON SAMPLER
(PT) — PITCHER SAMPLER
(SH) — SHELBY SAMPLER
(SPT) — STANDARD PENETRATION TEST
(D) — DAMES & MOORE SAMPLER WITH "D" TYPE DRIVE SHOE
(B) — DAMES & MOORE SAMPLER WITH "B" TYPE DRIVE SHOE

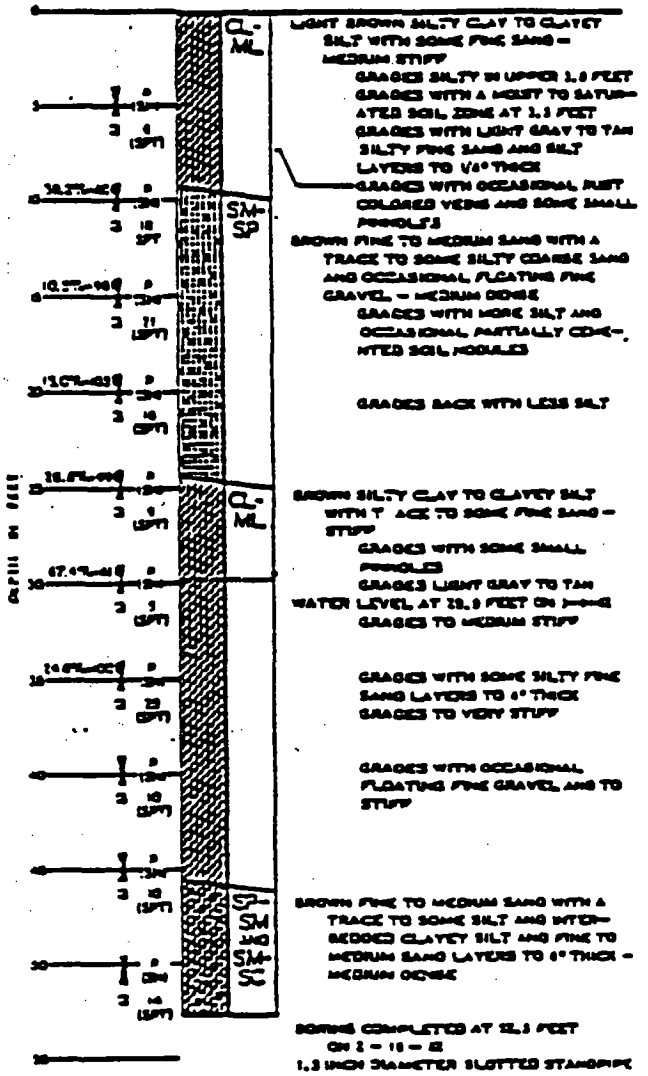
E DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED

G STANDARD PENETRATION TEST

BORING SC-8

COORDINATES N 12238.3
E 13633.4

ELEVATION 4877.82 FEET



LIGHT BROWN SILTY CLAY TO CLAYEY SILT WITH SOME FINE SAND – MEDIUM STIFF
GRADES SILTY IN UPPER 1.0 FEET
GRADES WITH A MOIST TO SATURATED SOIL ZONE AT 1.3 FEET
GRADES WITH LIGHT GRAY TO TAN SILTY FINE SAND AND SILT LAYERS TO 1/4" THICK
GRADES WITH OCCASIONAL RUST COLORED VEINS AND SOME SMALL PEBBLES

BROWN FINE TO MEDIUM SAND WITH A TRACE TO SOME SILTY COARSE SAND AND OCCASIONAL FLOATING FINE GRAVEL – MEDIUM DENSE
GRADES WITH MORE SILT AND OCCASIONAL PARTIALLY CEMENTED SOIL NODULES

GRADES BACK WITH LESS SILT

BROWN SILTY CLAY TO CLAYEY SILT WITH TRACE TO SOME FINE SAND – STIFF
GRADES WITH SOME SMALL PEBBLES
GRADES LIGHT GRAY TO TAN
WATER LEVEL AT 28.8 FEET ON [illegible]
GRADES TO MEDIUM STIFF

GRADES WITH SOME SILTY FINE SAND LAYERS TO 6" THICK
GRADES TO VERY STIFF

GRADES WITH OCCASIONAL FLOATING FINE GRAVEL AND TO STIFF

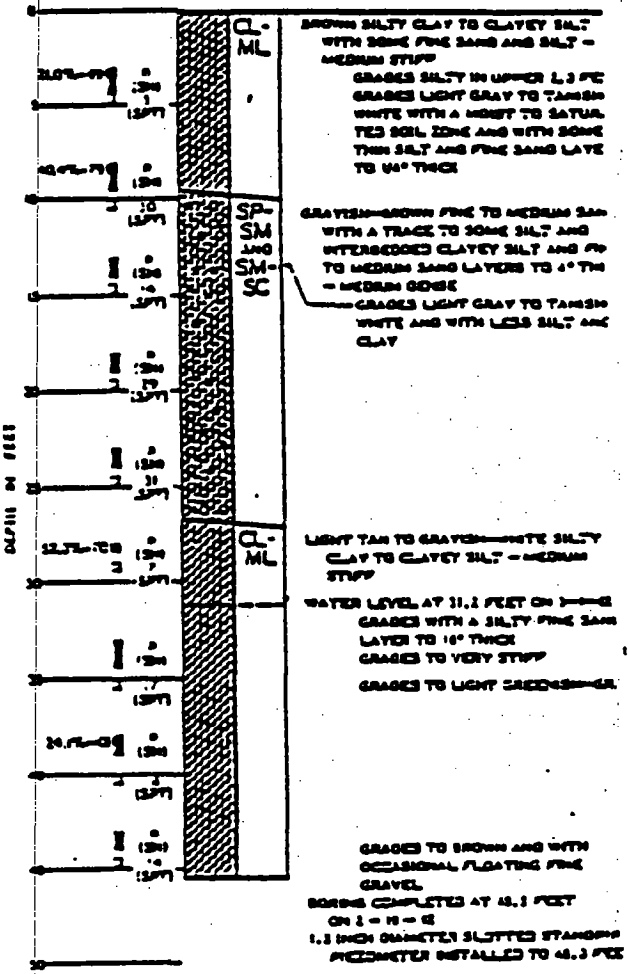
BROWN FINE TO MEDIUM SAND WITH A TRACE TO SOME SILT AND INTERBEDDED CLAYEY SILT AND FINE TO MEDIUM SAND LAYERS TO 6" THICK – MEDIUM DENSE

BORING COMPLETED AT 51.5 FEET
ON 2 – 10 – 82
1.5 INCH DIAMETER SLOTTED STANDPIPE PIEZOMETER INSTALLED TO 49.1 FEET

BORING SC-9

COORDINATES N 13697.3
E 13468.1

ELEVATION 4878.62 FEET



BROWN SILTY CLAY TO CLAYEY SILT WITH SOME FINE SAND AND SILT – MEDIUM STIFF
GRADES SILTY IN UPPER 1.3 FEET
GRADES LIGHT GRAY TO TAN/GRAY WITH A MOIST TO SATURATED SOIL ZONE AND WITH SOME THIN SILT AND FINE SAND LAYERS TO 1/4" THICK

GRAVELLY BROWN FINE TO MEDIUM SAND WITH A TRACE TO SOME SILT AND INTERBEDDED CLAYEY SILT AND FINE TO MEDIUM SAND LAYERS TO 4" THICK – MEDIUM DENSE
GRADES LIGHT GRAY TO TAN/GRAY WITH LESS SILT AND CLAY

LIGHT TAN TO GRAY/WHITE SILTY CLAY TO CLAYEY SILT – MEDIUM STIFF
WATER LEVEL AT 31.2 FEET ON [illegible]
GRADES WITH A SILTY FINE SAND LAYER TO 10" THICK
GRADES TO VERY STIFF
GRADES TO LIGHT GREEN/GRAY

GRADES TO BROWN AND WITH OCCASIONAL FLOATING FINE GRAVEL

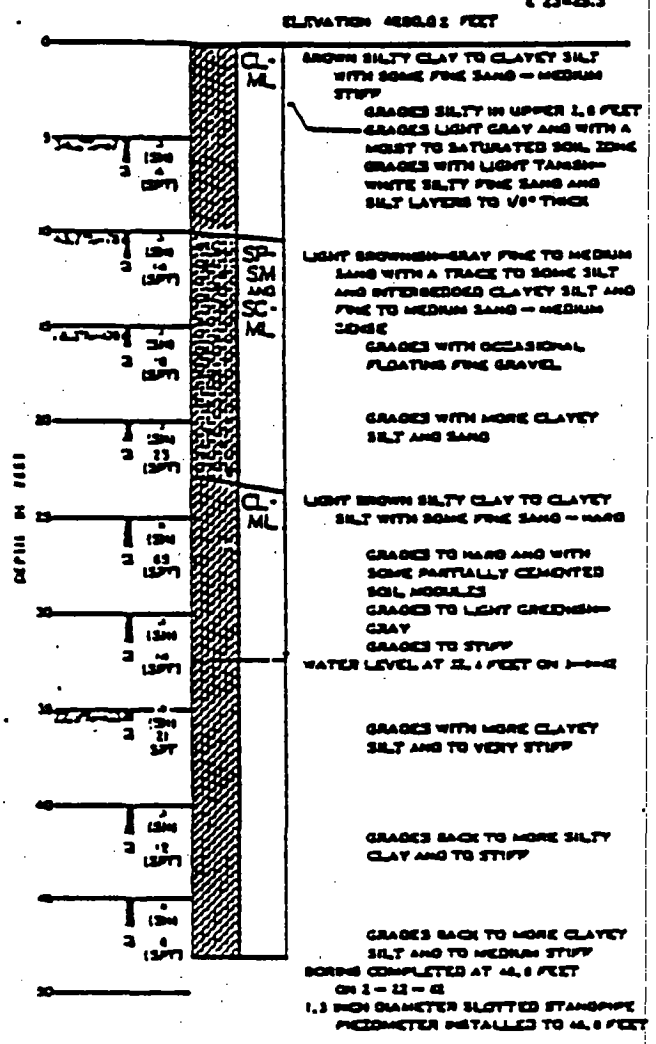
BORING COMPLETED AT 48.3 FEET
ON 2 – 10 – 82
1.5 INCH DIAMETER SLOTTED STANDPIPE PIEZOMETER INSTALLED TO 48.3 FEET

LEGEND

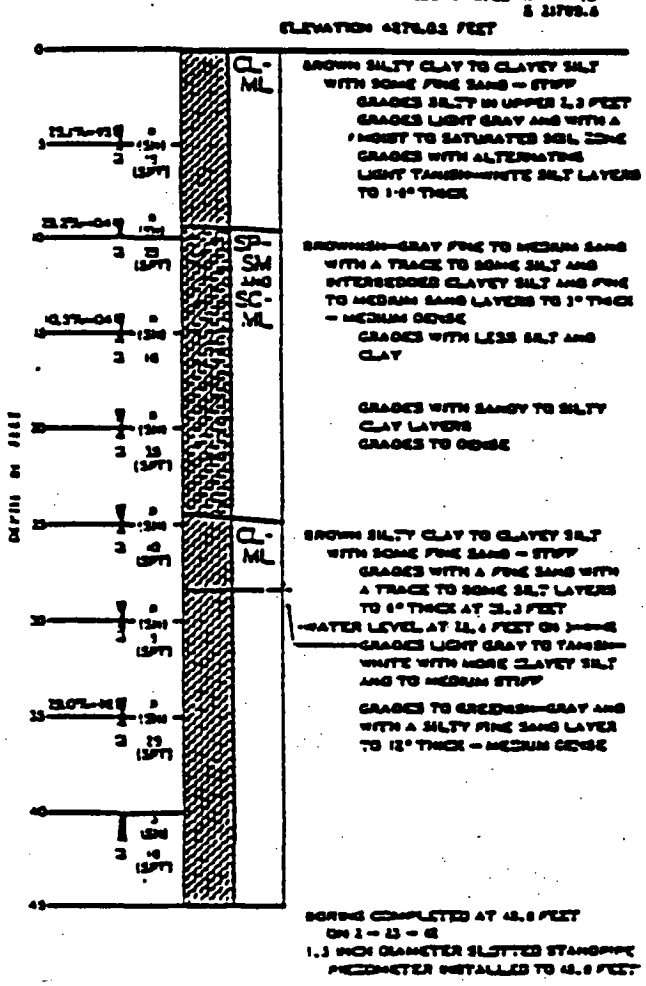
A – B B C
D

A FIELD MOISTURE EXPRESSED AS A PERCENTAGE OF THE DRY WEIGHT OF SOIL
B DRY DENSITY EXPRESSED IN LBS. PER CUBIC FOOT
C BLOWS PER FOOT OF PENETRATION USING A 140 LB. HAMMER DROPPING 30 INCHES
P PISTON SAMPLER WAS ADVANCED HYDRAULICALLY
D TYPES OF SAMPLER
(P) – PISTON SAMPLER
(PT) – PITCHER SAMPLER
(SH) – SHELBY SAMPLER
(SPT) – STANDARD PENETRATION TEST
(D) – DAKOTA & MODIFIED SAMPLER WITH "D" TYPE DRIVE SHOE
(D) – DAKOTA & MODIFIED SAMPLER WITH "D" TYPE DRIVE SHOE
E DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED
D STANDARD PENETRATION TEST

BORING SC-10



BORING SC-11



KEY

A — B C
D

A — FIELD MOISTURE EXPRESSED AS A PERCENTAGE OF THE DRY WEIGHT OF SOIL

B — DRY DENSITY EXPRESSED IN LBS. PER CUBIC FOOT

C — BLOWS PER FOOT OF PENETRATION USING A 140 LB. HAMMER DROPPING 30 INCHES

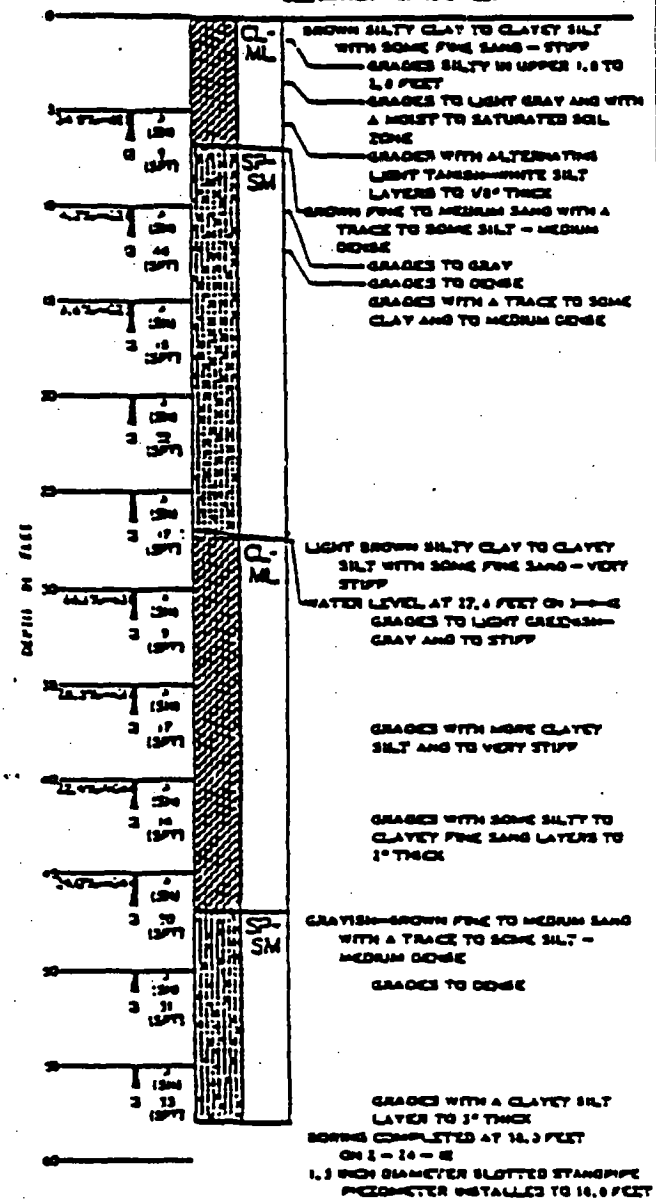
P — PUSHED SAMPLER WAS ADVANCED HYDRAULICALLY

D — TYPES OF SAMPLER
(P) — PISTON SAMPLER
(PT) — PITCHER SAMPLER
(SH) — SHELBY SAMPLER
(S.P.T.) — STANDARD PENETRATION TEST
(U) — DAMES & MOORE SAMPLER WITH "U" TYPE DRIVE SHOE
(D) — DAMES & MOORE SAMPLER WITH "D" TYPE DRIVE SHOE

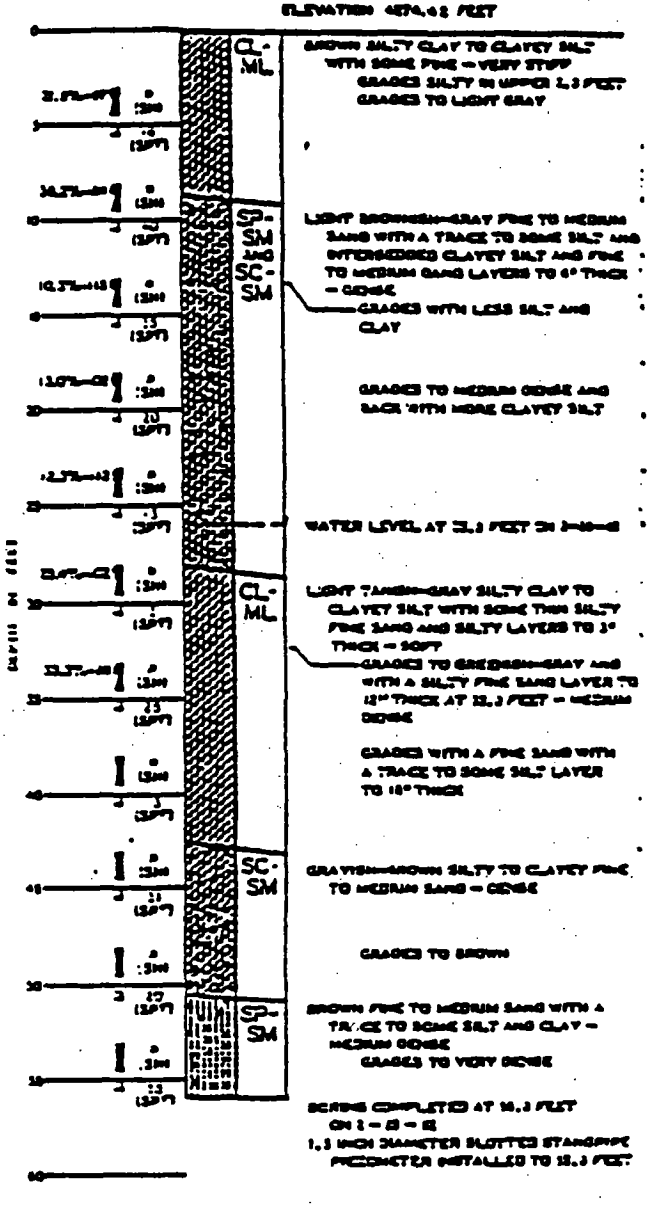
E — DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED

G — STANDARD PENETRATION TEST

BORING SC-12



BORING SC-13



KEY

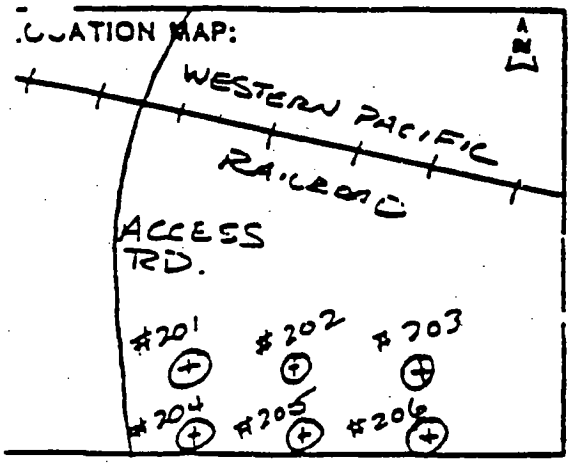
A — B © C
D

- A FIELD MOISTURE EXPRESSED AS A PERCENTAGE OF THE DRY WEIGHT OF SOIL
- B DRY DENSITY EXPRESSED IN LBS. PER CUBIC FOOT
- C BLOWS PER FOOT OF PENETRATION USING A 140 LB. HAMMER DROPPING 30 INCHES
- P PUSHED SAMPLER WAS ADVANCED HYDRAULICALLY
- D TYPES OF SAMPLER
  - (P) — PISTON SAMPLER
  - (PT) — PITCHER SAMPLER
  - (SH) — SHELBY SAMPLER
  - (SPT) — STANDARD PENETRATION TEST
  - (U) — SAMPLE & MOORE SAMPLER WITH "U" TYPE DRIVE SHOE
  - (D) — SAMPLE & MOORE SAMPLER WITH "D" TYPE DRIVE SHOE
- E DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED
- G STANDARD PENETRATION TEST

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG

LOCATION MAP:



SITE ID: CLIVE LOCATION ID: SLC-201-84
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: 6¼" H.S.A.
DRILLER: F. MARTINEZ
DATE STARTED: 2/3/84
DATE COMPLETED: 2/3/84
FIELD REP.: P. SMITH

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
2/4/84	11 AM	23'
2/6/84	12 NOON	26.1'

LOCATION DESCRIPTION ~1000' E. OF ACCESS RD., ~4000' S. OF R.R.
SITE CONDITION 1½' SNOW

DEPTH (ft.)	SAMPLE INT.	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
0		T		CL	SILTY CLAY, St lime-cmtd., Low-Med PI, lt br. note: moist
5		T		ML	SANDY SILT, Sand U. fn-grad., St. lime-cmtd., NP-low PI, v. lt. br. note: moist
10		T		SP	SAND, U fn-grad., some silt, St. lime-cmtd., NP, v. lt br. to lt mdm br. note: moist, hard
15		T		SP	SAND, v. fn. grad., v. limey sand, NP, v. lt. y/wsh br. note: H_2O-cmtd, firm
20					note: 1st H_2O at 25'.
25		S	21-21-34 (55)		note: Cons. H_2O at 35'.
30					

SAMPLE TYPE

A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG

LOCATION MAP:

SITE ID: CLIVE LOCATION ID: SLC-201-84
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLER: _____
DATE STARTED: _____
DATE COMPLETED: _____
FIELD REP.: _____

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____
SITE CONDITION _____

DEPTH (ft.)	SAMPLE INT.	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
30		S 5-13-15 (18)		SM	SILTY SAND, v. fn. - fn grad., md. lime-cmtd., NP, lt. gray to brnsh-gray note: H_2O-satd., hard
35		S 29-50/2 1/2"		CL	SILTY CLAY, some med.-coarse grav w/.-rndd., v. st. lime-cmtd., med. PI, lt grnsh.-gray note: H_2O-satd., firm, some v. hard caliche(?) crust
40		S 8-9-12 (21)			
45		S 7-9-16 (25)		ML-CL	CLAYEY SILT, st. lime-cmtd, low-med PI, lt. rdsh-br. note: H_2O-satd., firm
50		S 4-4-4 (8)			STOPPED AUGER AT 50' STOPPED SAMPLER AT 51.5'.

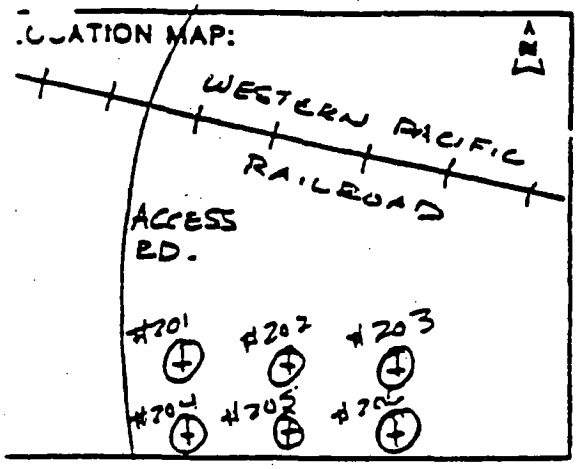
SAMPLE TYPE

A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG

LOCATION MAP:



SITE ID: CLIVE LOCATION ID: SLC-202-84
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: 6 5/8" H.S.A.
DRILLER: E MARTINEZ
DATE STARTED: 2/3/84
DATE COMPLETED: 2/3/84
FIELD REP.: P SMITH

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
2/3/84	1 PM	26'
2/6/84	11:35 AM	26.2'

LOCATION DESCRIPTION ~1500'E: OF ACCESS RD., ~400' S. OF R.R
SITE CONDITION 1½" SNOW.

DEPTH (ft.)	SAMPLE INT.	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
0				CL	CLAY, some silt, st. lime-cmtd., med PI, v lt. br. note: v. moist
5		T		SP/GP	SAND, pred v. fn.-grnd, some med.-coarse wl.-rndd., mod. lime-cmtd., NP, lt. rdsh.-br. note: moist, firm note: interbdd with SANDY GRAVEL, fn.-grnd., wl.-rndd., 12.5'-18.5'
10		T			
15		S	10-11-14 (25)	SM	SILTY, CLAYEY SAND, v. fn.-grnd., st. lime-cmtd, NP-low PI, lt. br.-lt rdsh-br. note: moist, firm
20		S	7-11-10 (21)	CH/CL	CLAY, st. lime-cmtd, H. PI, lt. br.-lt blnish-grey note: moist, md firm note: Changing to SILTY CLAY, med-H. PI, 35.5'-38.5'
25		S	10-10-16 (26)		
30					

SAMPLE TYPE

A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG

LOCATION MAP:

SITE ID: CLIVE LOCATION ID: SLC-202-84
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLER: _____
DATE STARTED: _____
DATE COMPLETED: _____
FIELD REP.: _____

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____
SITE CONDITION _____

DEPTH (ft.)	SAMPLE INT.	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
30		S 3-4-8 (12)			SILTY CLAY, St lime-cmtd., med PI, lt. rdsh-br. note: moist, firm
35		S 12-13-14 (27)		CL	STOPPED AUGER AT 50'. STOPPED SAMPLER AT 51.5'
40		S 7-6-7 (13)			
45		S 9-11-9 (20)			
50		S 7-10-5 (15)			

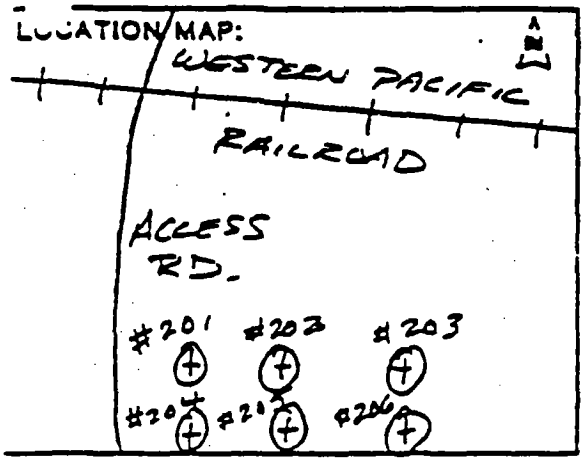
SAMPLE TYPE

A – Auger cuttings
S – 2" O.D. 1.38" I.D. drive sample
U – 3" O.D. 2.42" I.D. tube sample
T – 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG

LOCATION MAP:



SITE ID: CLIVE LOCATION ID: SLC-203-84
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: 6 5/8" H.S.A.
DRILLER: F. MARTINEZ
DATE STARTED: 2/2/84
DATE COMPLETED: 2/2/84
FIELD REP.: P. SMITH

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
2/2/84	5 PM	21'
2/6/84	11:20 AM	26.8'

LOCATION DESCRIPTION ~2000'E OF ACCESS RD, ~4000'S OF R.R.
SITE CONDITION 1½' SNOW

DEPTH (ft.)	SAMPLE INT.	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
0		S 5-13-12 (25)		CL	CLAY, minor silt, st. lime-cmtd., low PI, v. lt. rdsh. to y'wsh br. note: S/moist, firm
5		S 3-2-2 (4)			note: changing to CLAY, med PI, lt. br.-gray, moist, soft, 3.5'-8.5' note: Some groundwater, ~5'.
10		S 6-6-15 (21)		CL-ML	SANDY CLAY, fn.-med grnd., st lime-cmtd., low PI, v lt. br. to lt. y'wsh. br. note: moist, firm
15		S 6-N-D (37)		SM	SILTY SAND, fn-med. grnd., wl. rndd., st. lime-cmtd., NP, v. lt. br. to lt. y'wsh-br. note: moist, v. firm
20		S 8-10-13 (23)		CL	SILTY CLAY, st lime-cmtd, med PI, v. lt. br. note: moist, firm
25		S 7-11-15 (26)		SP	SAND, v. fn. grnd, st. lime-cmtd, NP, rdsh-br. note: v. moist, firm
30					

SAMPLE TYPE

A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG

LOCATION MAP:

SITE ID: CLIVE LOCATION ID: SLC-203-B4
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLER: _____
DATE STARTED: _____
DATE COMPLETED: _____
FIELD REP.: _____

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____
SITE CONDITION _____

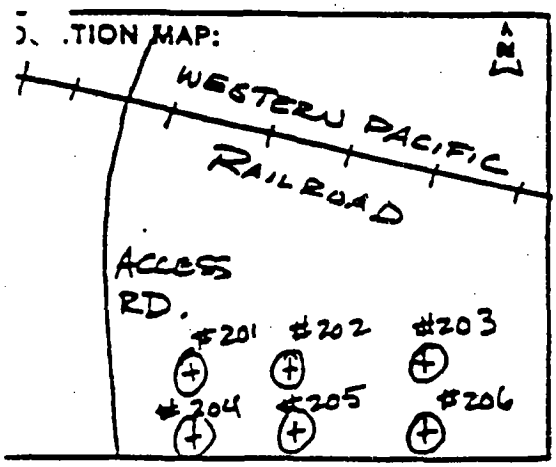
DEPTH (ft.)	SAMPLE INT.	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
30		S 3-3-4 (7)			CLAY, St. lime-cmtd., Hi PI, lt ylwsh-gray to ylwsh-br. note: mo. st. calc. note. Changing to SILTY CLAY lt. bluish-grnsh. gray or brnsh.-gray, firm, 38.5'- 48.5'.
35		S 5-5-6 (11)		CH/CL	
40		S 7-13-13 (26)			note: changing to SILTY CLAY, some v. fn sand, med.-Hi PI, mdsh-br., firm, 48.5'- 51.5'
45		S 6-8-12 (20)			STOPPED AUGER AT 50'. STOPPED SAMPLER AT 51.5'.
50		S 6-6-10 (16)			

SAMPLE TYPE

A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JE JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG



SITE ID: CLIVE LOCATION ID: SLC-204-84
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: 6 5/8" H.S.A.
DRILLER: E. MARTINEZ
DATE STARTED: 2/1/84
DATE COMPLETED: 2/1/84
FIELD REP.: P. SMITH

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
2/1/84	2PM	26'
2/6/84	9AM	23.1'

LOCATION DESCRIPTION ~1000' E. of Access rd. ~5000' S. of
SITE CONDITION 1.5' SNOW. Western Pacific R.R.

DEPTH (ft.)	SAMPLE INT.	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
0		S 3-5-18 (23)		CL-ML	SILTY CLAY, some v fn Sand, md.-st lime-cmtd, low PI, br.-rdsh br. note: sl moist, firm
5		S 2-2-2 (4)		CL-ML ~~CH~~	CLAY, md.-st lime cmtd, ~~H~~ low PI, v H. ylwsh to wtsh. br. note: moist, v soft.
10		S 4-12-21 (33)		~~MH~~ CL	CLAYEY SILTY Sand v. fn Sand, md.-st. lime-cmtd, low PI, V. lt ylwsh br. note: sl. moist, v. firm
15		S 25-26 (58)	53	SM	SILTY, CLAYEY SAND, Sand v fn-fn. Sand, st lime-cmtd, NP-low PI, v. lt ylwsh br. note: sl. moist, hard note: V. moist, 20'-25'.
20		S 12-24-26 (50)		CL/CH	SILTY, SANDY CLAY, Sand v fn grnd, st. lime-cmtd, low PI, gray to gray brown. note: sl. moist, firm. note. Changing to SILTY CLAY, H. br. to H. rdsh. brn. md. firm, sl. moist, 24'-25', 43.5'-48.5' note: Changing to CLAY, H. PI, H. blush to grnsh. gray, md firm, moist, 28.5'-53.5'
25		S 3-13-12 (24)			
30					

SAMPLE TYPE

A – Auger cuttings
S – 2" O.D. 1.38" I.D. drive sample
U – 3" O.D. 2.42" I.D. tube sample
T – 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG

OCATION MAP:

SITE ID: CLIVE LOCATION ID: SLC-204-84
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLER: _____
DATE STARTED: _____
DATE COMPLETED: _____
FIELD REP.: _____

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

.OCATION DESCRIPTION _____
SITE CONDITION _____

DEPTH (ft.)	SAMPLE INT.	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
30		S 2-4-6 (10)		SM	SILTY, CLAYEY SAND, st lime-cmtd., NP, rdsh.-br. note: moist, firm
35		S 2-8-12 (18)			STOPPED AUGER AT 50'.
40		S 3-5-6 (11)			STOPPED SAMPLER AT 51.5'.
45		S 9-14-20 (34)			
50		S 7-6-12 (18)			

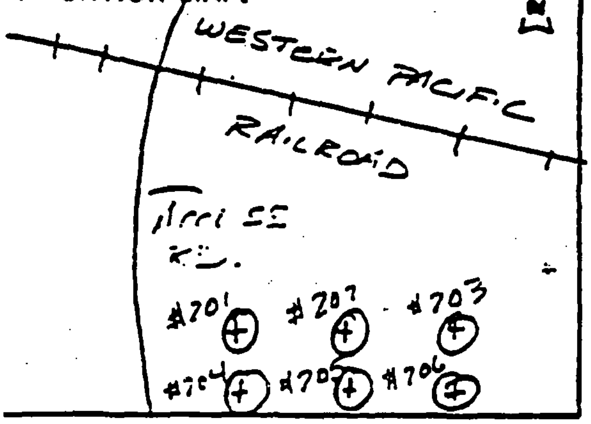
SAMPLE TYPE

A = Auger cuttings
S = 2" O.D. 1.38" I.D. drive sample
U = 3" O.D. 2.42" I.D. tube sample
T = 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG

LOCATION MAP:



SITE ID: CLIVE   LOCATION ID: SLC-205-84
APPROX. SITE COORDINATES (ft.):
N ______ E ______
GROUND ELEVATION (ft, MSL): ______
DRILLING METHOD: 6 5/8" H.S.A.
DRILLER: F MARTINEZ
DATE STARTED: 2/2/84
DATE COMPLETED: 2/2/84
FIELD REP.: B. SMITH

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
2/2/84	4 PM	25'
2/6/84	10:45AM	25.6'

LOCATION DESCRIPTION ~1500' E. OF ACCESS RD., ~500' S OF RR
SITE CONDITION 1½' SNOW

DEPTH (ft.)	SAMPLE INT.	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
0	X	S 3-8-12 (20)		CL ~~to ML~~ to CL-ML	CLAY, some silt, st lime-cmtd, ~~med~~ low PI, lt. br. note: sl. moist, firm. note: becoming silty ~~CLAY, H PI~~, v. lt. br., moist, v. soft, at 3.5'.
5	X	S 3-2-2 (4)			
10	X	S 13-10-11 (26)		SM/CL	SILTY SAND, v. fn. grnd., st. lime-cmtd, NP, rdsh-br. note: sl. moist-moist, firm interlayered with SILTY, SANDY CLAY, sand v. fn.-grnd., low PI, v. lt. br., moist, firm, 8.5'-13.5'. note: Color changing to lt. ylwsh. br. to lt. br. at 13.5'.
15	X	S 10-11-15 (26)			note: interlayered with SILTY CLAY, low PI, v. lt. br., moist, firm, 13.5'-18.5'
20	X	S 7-6-7 (13)			
25	X	S 7-16-16 (32)		ML	SILT, some clay and v. fn. sand, st. lime cmtd, NP, lt. br. note: sl. moist, md firm - v. firm
30					CLAY, st lime-cmtd, H PI, bluish gray - grayish br. note: moist, soft.

SAMPLE TYPE

A – Auger cuttings
S – 2" O.D. 1.38" I.D. drive sample
U – 3" O.D. 2.42" I.D. tube sample
T – 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG

LOCATION MAP: A N

SITE ID: CLIVE LOCATION ID: SLC-205-84
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLER: _____
DATE STARTED: _____
DATE COMPLETED: _____
FIELD REP.: _____

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____
SITE CONDITION _____

DEPTH (ft.)	SAMPLE INT.	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
30		S 1-2-3 (5)		CH/CL	note: groundwater at 30!
35		S 24-12-14 (26)			note: Changing to SILTY CLAY st. lime-cmtd, med-Hi PI, bluish-gray to lt. br. to sl rdsh br., 33'-37.5', 42.5'-47.5'
40		S 7-8-7 (15)		ML	SANDY SILT, st. lime-cmtd, NP, rdsh-br. note: v. moist, firm
45		S 9-8-12 (20)			STOPPED AUGER AT 50!
50		S 7-18-19 (29)			STOPPED SAMPLER AT 51.5!

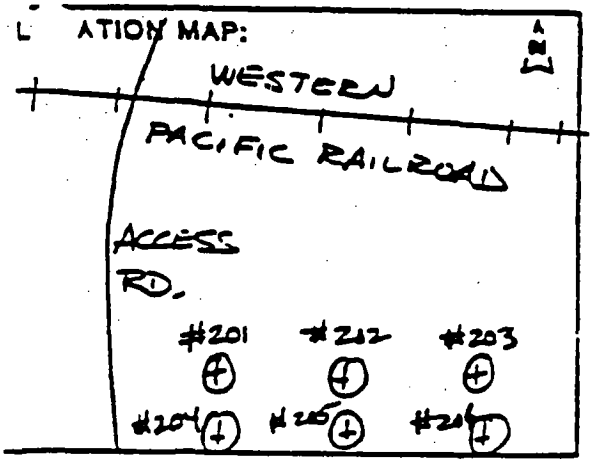
SAMPLE TYPE

A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG

L ATION MAP:



SITE ID: CLIVE LOCATION ID: SLC-206-84
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: 6 5/8" H.S.A.
DRILLER: F. MARTINEZ
DATE STARTED: 2/3/84
DATE COMPLETED: 2/3/84
FIELD REP.: P. SMITH

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
2/2/84	4 PM	23'
2/6/84	11 AM	26.2'

LOCATION DESCRIPTION ~2000' E. OF ACCESS RD., ~5000' S. OF R. 12.
SITE CONDITION 1.5' SNOW.

DEPTH (ft.)	SAMPLE INT.	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
0		S 8-24-35 (61)		CL	CLAY, some Silt, St. lime-cmtd., Med PI, v. lt. br. note: Moist, Hard (frozen) low-med
5		S 3-3-3 (6)		CL	CLAY, St lime-cmtd., Hi PI, v. lt. br. note: Moist, Soft
10		S 5-11-22 (33)		ML	SANDY, CLAYEY SILT, v. fn.-fn. grnd, St. lime-cmtd., NP-low PI, v. lt. br.-lt. ylwsh. br. Note: Sl. moist, v. firm-firm
15		S 13-17-12 (29)		CL	SILTY, SANDY CLAY, St. lime-cmtd., med. PI, v. lt. br.-wtsh.-br. note. Moist, md. firm
20		S 6-7-8 (15)		ML	SANDY, CLAYEY SILT, St. lime-cmtd., low PI-NP, v. lt. br. to lt. ylwsh.-br. note: Moist, v. firm
25		S 13-15-16 (31)		CL	CLAY, minor Silt, St. lime-cmtd., Hi PI, v. lt. grnsh. gray note: V. moist, Soft
30				H_2O	

SAMPLE TYPE

A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG

LOCATION MAP:

SITE ID: CLIVE LOCATION ID: SLC-20-84
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLER: _____
DATE STARTED: _____
DATE COMPLETED: _____
FIELD REP.: _____

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____
SITE CONDITION _____

DEPTH (ft.)	SAMPLE INT.	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
30		S 2-2-4 (6)		CH	SILTY CLAY, St. lime-cmtd., Hi PI, lt. bluish gray note: moist, firm
35		S 4-8-13 (21)		CH	CLAY, St. lime-cmtd., Hi PI, lt. ylwsh.-gray note: moist, firm
40		S 6-9-12 (21)		ML	CLAYEY SILT, St. lime-cmtd., low PI, v. lt. rdsh.-br. note: moist, firm
45		S 6-14-16 (24)			STOPPED AUGER AT 50!
50		S 5-12-17 (29)			STOPPED SAMPLER AT 51.5'

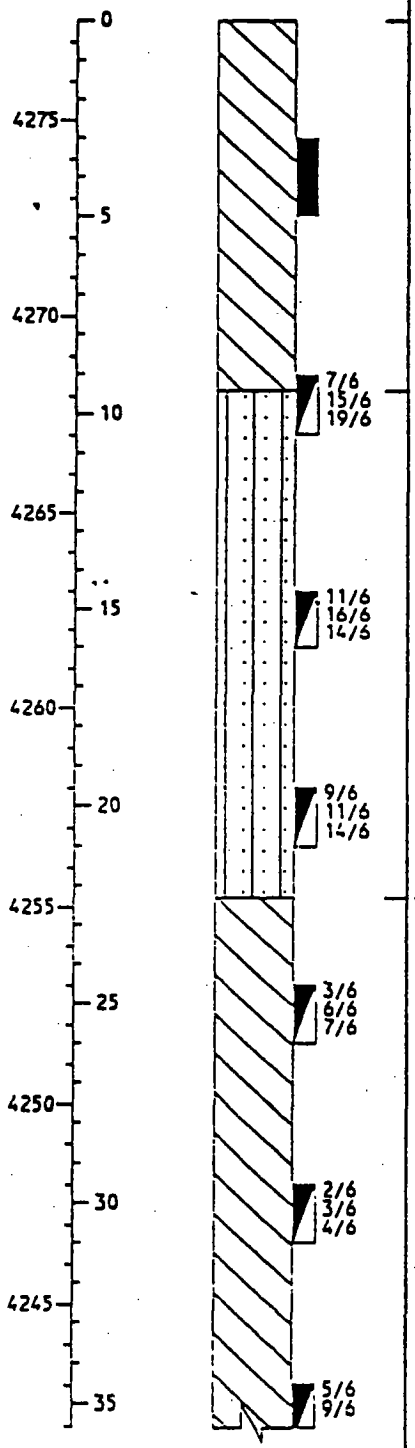
SAMPLE TYPE

A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

DRILL HOLE LOG
DRILL HOLE NO.: DH-16A

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Northeast corner of LARW cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-005
DATE: 1-15-92
TOC ELEV.: NA
GS ELEV.: 4277.56
LOGGED BY: MT
HOLE NO.: DH-16A



USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: Tan, sandy, stiff, moist.			
	...grades to tannish gray, silty, iron oxide staining, medium stiff, moist.	S-1	3-5	24/24
		B-2	9-10.5	18/18
SM	SILTY SAND: Tan, silty, fine, dense, slightly moist.			
	...trace of gravel.			
		B-3	14.5-16	15/18
	... grades to reddish tan sand, clayey, with occasional sandy clay lenses, medium dense, slightly moist.			
		B-4	19.5-21	18/18
CL	SILTY CLAY: Reddish tan, very sandy, medium stiff, moist.			
		B-5	24.5-26	18/18
	...grades to light gray, silty, medium soft, moist.			
		B-6	29.5-31	18/18
	...grades to light gray sandy clay,	B-7	34.5-36	18/18

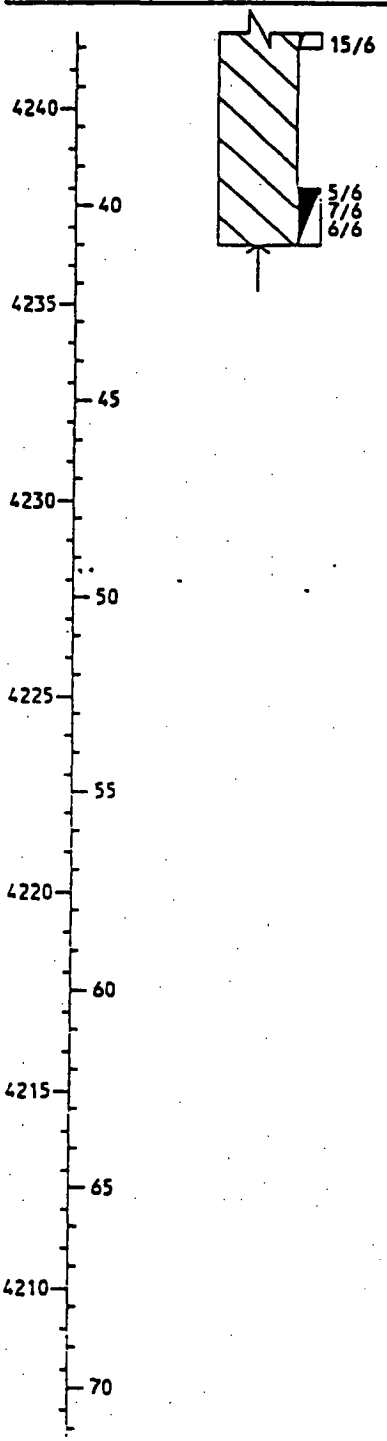
Backfilled with bentonite chips

DRILL HOLE LOG
DRILL HOLE NO.: DH-16A

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Northeast corner of LARW cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER:

HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-00
DATE: 1-15-92
TOC ELEV.: NA
GS ELEV.: 4277.56
LOGGED BY: MT
HOLE NO.: DH-16A



ELEVATION / DEPTH	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			stiff, wet.			
			...grades to tan clay, sandy, silty, stiff, moist.	B-8	39.5-41	18/18

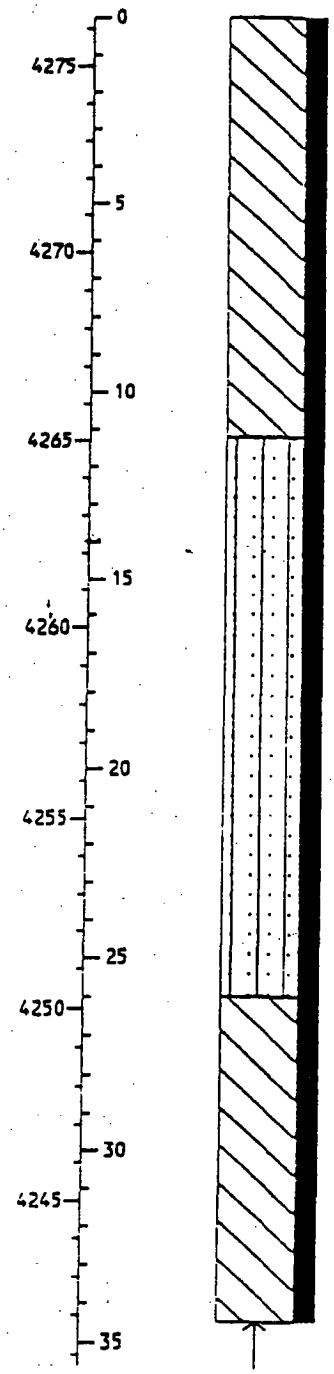
Backfilled with bentonite chips

DRILL HOLE LOG
DRILL HOLE NO.: DH-30

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Southeast Corner of LARW Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER:

HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 11-27-91
TOC ELEV.: N/A
GS ELEV.: 4276.31
LOGGED BY: DCH
HOLE NO.: DH-30



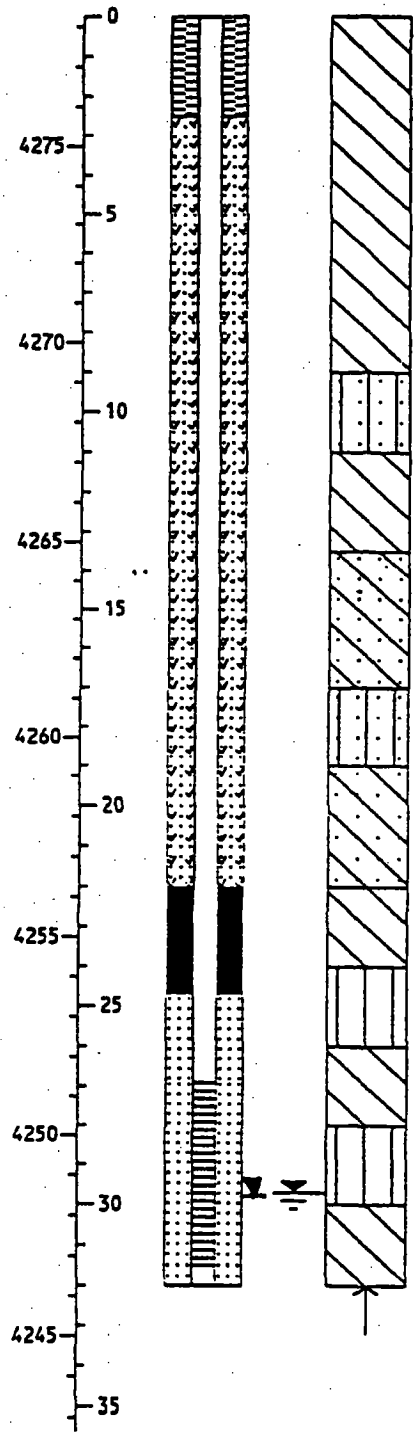
ELEVATION / DEPTH	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		CL	SILTY CLAY: Brown, slightly sandy, moist.	L-1	0-2	24/24
			...grades to light gray with iron oxide staining.	L-2	2-4.5	30/30
			...grades to light brown.	L-3	4.5-7	30/30
			...grades to light gray, iron oxide staining.	L-4	7-9.5	30/30
				L-5	9.5-12	25/30
		SM	SILTY SAND: Tan, fine to medium, occasional silty clay lenses, moist.	L-6	12-14.5	0/30
				L-7	14.5-17	19/30
				L-8	17-19.5	0/30
				L-9	19.5-22	25/30
				L-10	22-24.5	0/30
			...grades clayey.	L-11	24.5-27	28/30
		CL	SILTY CLAY: Reddish tan, sandy, stiff, moist.	L-12	27-29.5	0/30
			...grades to light gray, soft, moist.	L-13	29.5-32	29/30
			...grades very moist.	L-14	32-34.5	30/30

Backfilled with bentonite chips.

DRILL HOLE LOG
DRILL HOLE NO.: DH-31

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: At Drill Hole I-3
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 29.7'
HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 12-9-91
TOC ELEV.: 4279.76
GS ELEV.: 4278.27
LOGGED BY: DCH
HOLE NO.: DH-31



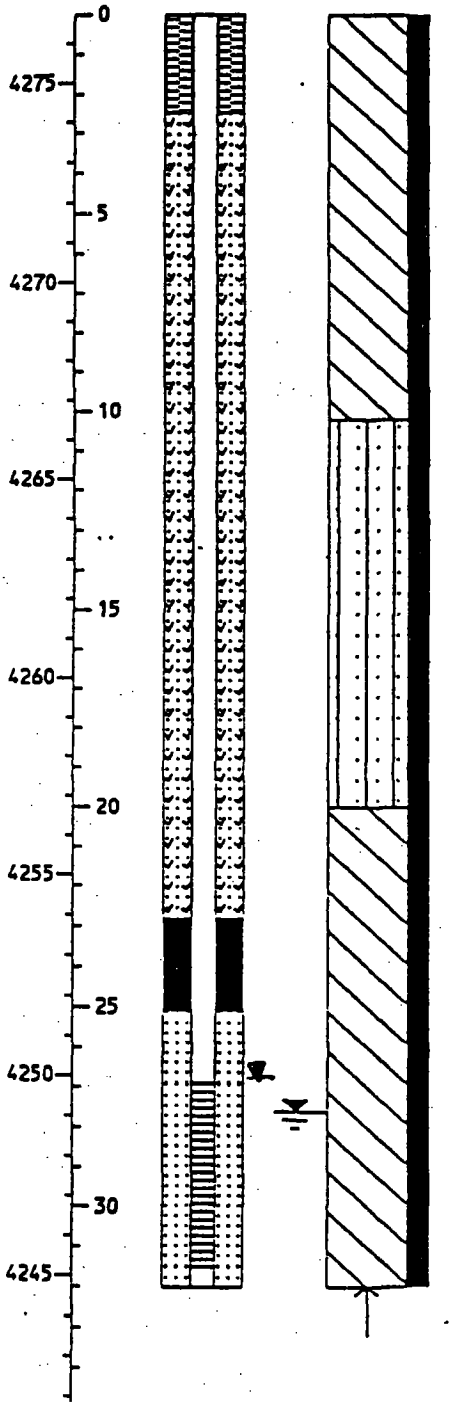
USCS	Description	Sample Number	Sample Depth (ft)	Recover (in/in)
CL	CLAY: Tan, sandy, soft to stiff, dry to moist.			
SM	SAND: Tan, silty, fine to medium grained, some fine gravel, medium dense, moist.			
CL	CLAY: Green, silty, medium stiff, moist.			
SC	SAND: Tan, clayey, clay lenses, medium stiff, moist.			
SM	SAND: Tan, silty, loose to medium dense, moist.			
SC	SAND: Tan, clayey, clay lenses, scattered fine gravel, medium dense, moist.			
CL	CLAY: Tan, silty, medium stiff, moist.			
ML	SILT: Brown, sandy, medium dense, moist.			
CL	CLAY: Brown, silty with silt lenses, stiff, moist.			
ML	SILT: Green, clayey, loose, moist.			
CL	CLAY: Green with iron staining, silty, cemented lenses, soft to medium stiff, very moist.			

Subsurface profile obtained from drill hole I-3-30.

DRILL HOLE LOG
DRILL HOLE NO.: DH-32

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Approximately 10' to 15' North of GW-11
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 27.6' HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 12-10-91
TOC ELEV.: 4278.50
GS ELEV.: 4276.72
LOGGED BY: DCH
HOLE NO.: DH-32

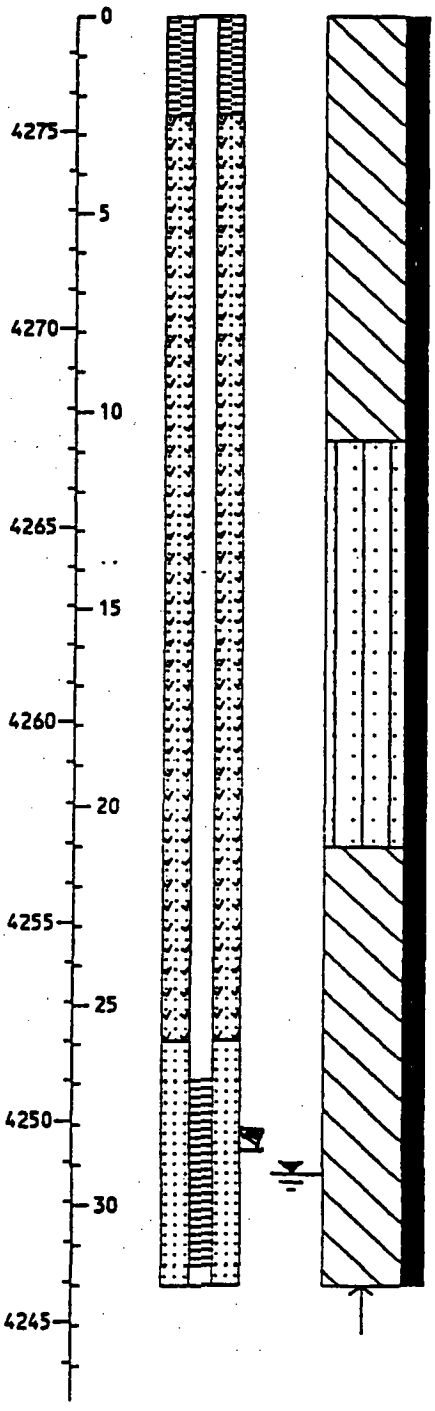


ELEVATION / DEPTH	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
	CL	SILTY CLAY: Tannish brown with iron oxide staining, trace of fine sand, moist.	L-1	0.0-2	24/24
		... grades to tannish gray	L-2	2.0-4.5	30/30
			L-3	4.5-7	30/30
		... grades to gray	L-4	7.0-9.5	30/30
			L-5	9.5-12	17/30
	SM	SILTY SAND: Tan, fine to medium, moist.	L-6	12.0-14.5	0/30
			L-7	14.5-17	9/30
		... occasional silty clay lenses.	L-8	17.0-19.5	30/30
			L-9	19.5-22	30/30
	CL	SILTY CLAY: Reddish tan, sandy, moist.	L-10	22.0-24.5	0/30
			L-11	24.5-27	4/30
		...grades to light gray, trace of fine sand, very moist.	L-12	27.0-29.5	30/30
			L-13	29.5-32	30/30

DRILL HOLE LOG
DRILL HOLE NO.: DH-33

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Approximately 400' Southwest of GW-2
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 29.2 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 12-10-91
TOC ELEV.: 4279.72
GS ELEV.: 4277.90
LOGGED BY: DCH
HOLE NO.: DH-33

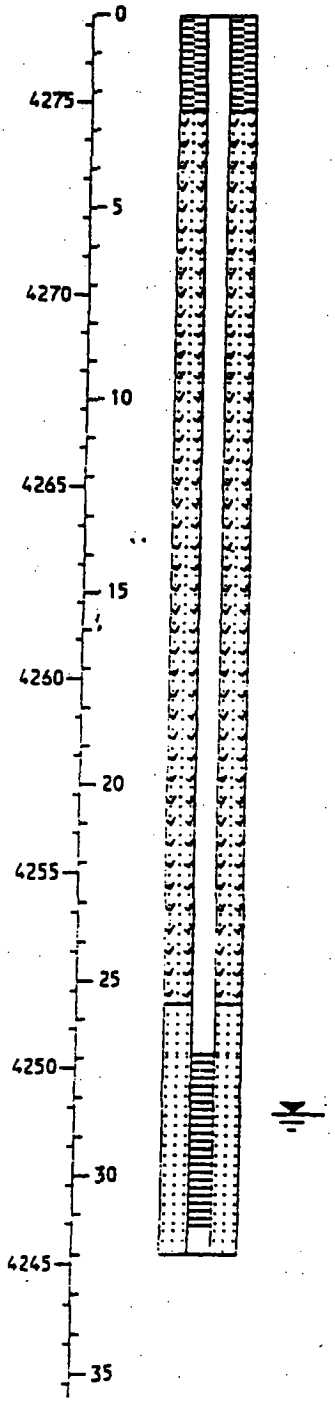


ELEVATION / DEPTH	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
	CL	SILTY CLAY: Tannish brown with iron oxide staining, trace of fine sand, moist.	L-1	0.0-2	20/24
		... grades to tan.	L-2	2.0-4.5	30/30
		... grades to gray.			
		... grades to tan.	L-3	4.5-7	20/30
		... grades to gray.	L-4	7.0-9.5	30/30
			L-5	9.5-12	29/30
	SM	SILTY SAND: Tan, fine to medium course, moist.			
		... silty clay lens.	L-6	12.0-14.5	0/30
			L-7	14.5-17	28/30
			L-8	17.0-19.5	0/30
		... grades to interbedded gray silty sand and reddish tan silty clay lenses.	L-9	19.5-22	30/30
	CL	SILTY CLAY: Reddish tan, sandy, moist.	L-10	22.0-24.5	0/30
			L-11	24.5-27	30/30
			L-12	27.0-29.5	0/30
		...grades to light gray, moist.	L-13	29.5-32	30/30

DRILL HOLE LOG
DRILL HOLE NO.: DH-34

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Located near Drill Hole SC-3
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 28.4'
HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 12-11-91
TOC ELEV.: 4279.81
GS ELEV.: 4277.25
LOGGED BY: DCH
HOLE NO.: DH-34

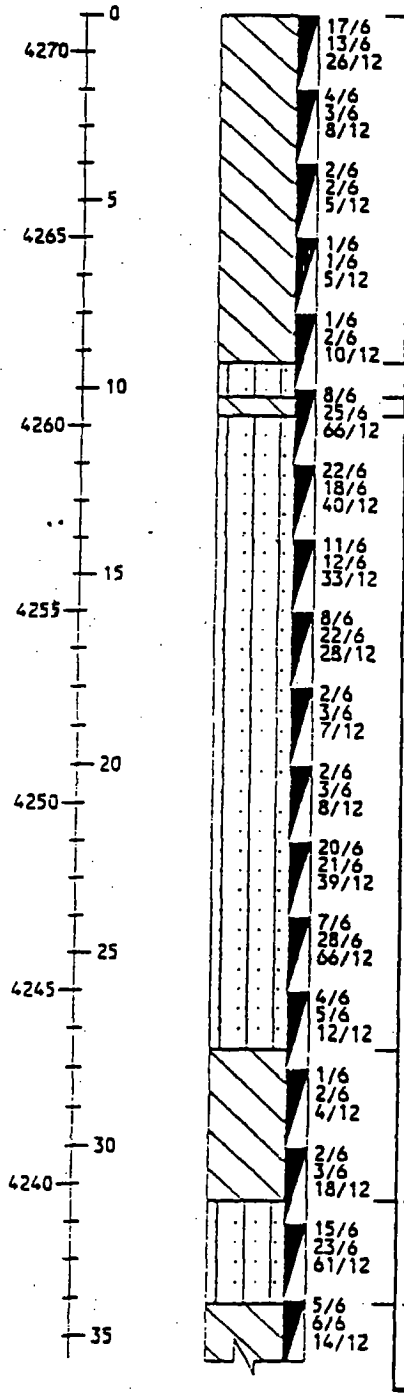


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
				The prime purpose of DH-34 was to install a piezometer and therefore the drill hole was not sampled or logged. DH-34 is located near SC-3 and it's log can be used to evaluate the hydro-stratigraphy at DH-34.			

DRILL HOLE LOG
DRILL HOLE NO.: DH-47

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Approximately 15' North of GW-3
DRILLER: Overland Drilling
DRILL RIG: CME 75
DEPTH TO WATER: HOLE DIAMETER: 8.25"

PROJECT NO.: 1416-020
DATE: 1-12-92
TOC ELEV.: N/A
GS ELEV.: 4271.01
LOGGED BY: DCH
HOLE NO.: DH-47



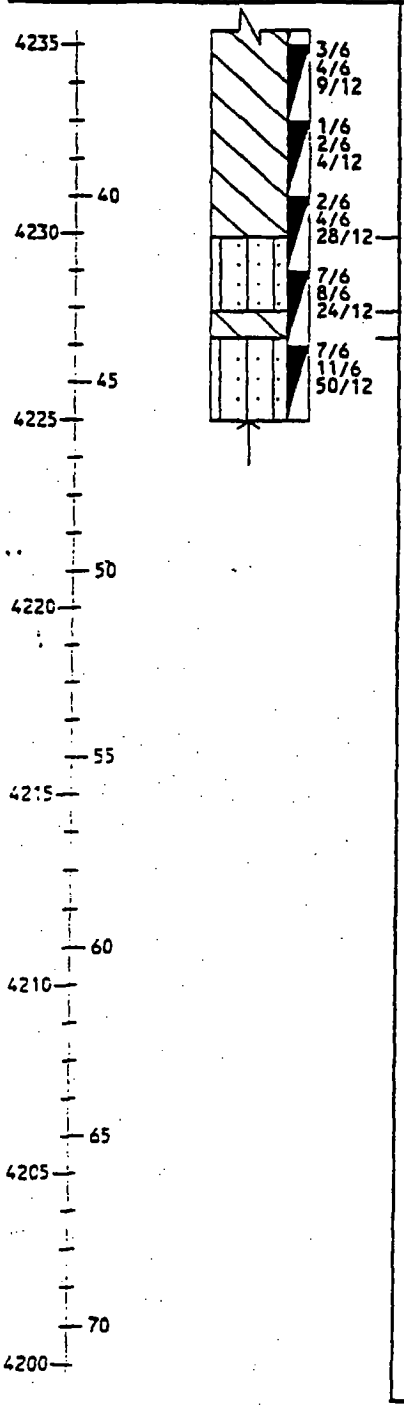
USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: Tan, trace fine sand, moist.	B-1	0.0-2	8/24
	...iron oxide staining.	B-2	2.0-4	12/24
		B-3	4.0-6	24/24
	...grades to light gray, horizontal bedding, roots.	B-4	6.0-8	24/24
		B-5	8.0-10	22/24
SM	SILTY SAND: Tan, fine to medium, moist.	B-6	10.0-12	23/24
CL	SILTY CLAY: Tan, stiff, moist.			
SM	SILTY SAND: Tan, fine to coarse, trace gravel, moist.	B-7	12.0-14	24/24
		B-8	14.0-16	24/24
		B-9	16.0-18	24/24
		B-10	18.0-20	20/24
	...grades to greenish tan, iron oxide staining.	B-11	20.0-22	15/24
	...grades to wet.			
	...grades to dark tan.	B-12	22.0-24	15/24
		B-13	24.0-26	24/24
		B-14	26.0-28	24/24
CL	SILTY CLAY: Greenish gray, soft, wet.	B-15	28.0-30	24/24
		B-16	30.0-32	24/24
SM	SILTY SAND: Greenish gray, fine to medium, wet.	B-17	32.0-34	24/24
CL	SILTY CLAY: Greenish gray, silty sand lenses, moist.	B-18	34.0-36	24/24

Backfilled with bentonite chips.

DRILL HOLE LOG
DRILL HOLE NO.: DH-47

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Approximately 15' North of GW-3
DRILLER: Overland Drilling
DRILL RIG: CME 75
DEPTH TO WATER: HOLE DIAMETER: 8.25"

PROJECT NO.: 1416-02
DATE: 1-12-92
TOC ELEV.: N/A
GS ELEV.: 4271.01
LOGGED BY: DCH
HOLE NO.: DH-47



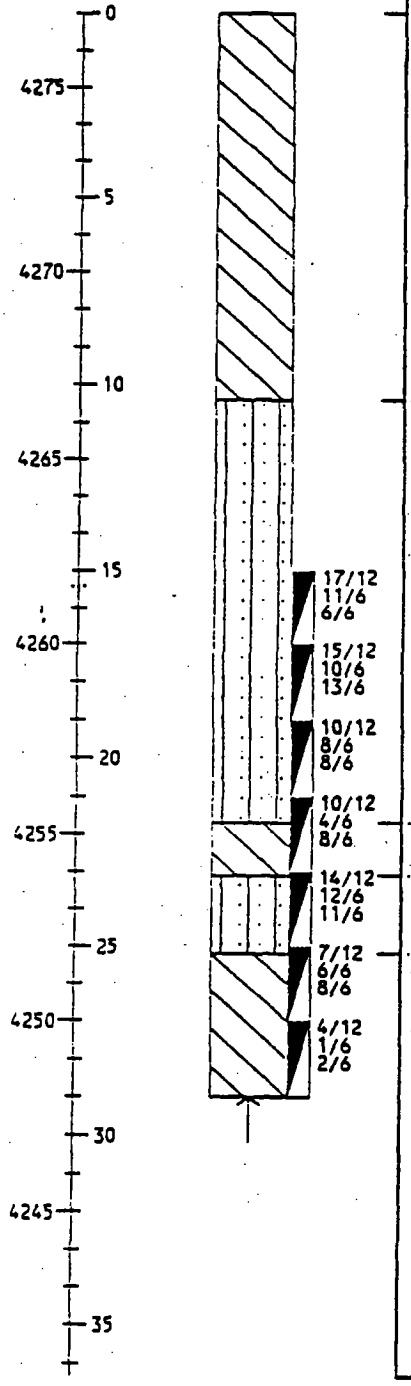
ELEVATION / DEPTH	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
				B-19	36.0-38	24/24
				B-20	38.0-40	24/24
				B-21	40.0-42	24/24
		SM	SILTY SAND: Greenish gray, fine to coarse, wet.	B-22	42.0-44	24/24
		CL	CLAY: Tan, silty, moist.			
		SM	SILTY SAND: Tan, fine to coarse, moist. ...grades to greenish gray. ...grades to tan.	B-23	44.0-46	24/24

Backfilled with bentonite chips.

DRILL HOLE LOG
DRILL HOLE NO.: DH-48

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: SW Corner of RCRA Waste Disposal Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: NM HOLE DIAMETER: 8.25"

PROJECT NO.: 1416-022
DATE: 2-10-92
TOC ELEV.: NA
GS ELEV.: 4277.0
LOGGED BY: DCH
HOLE NO.: DH-48



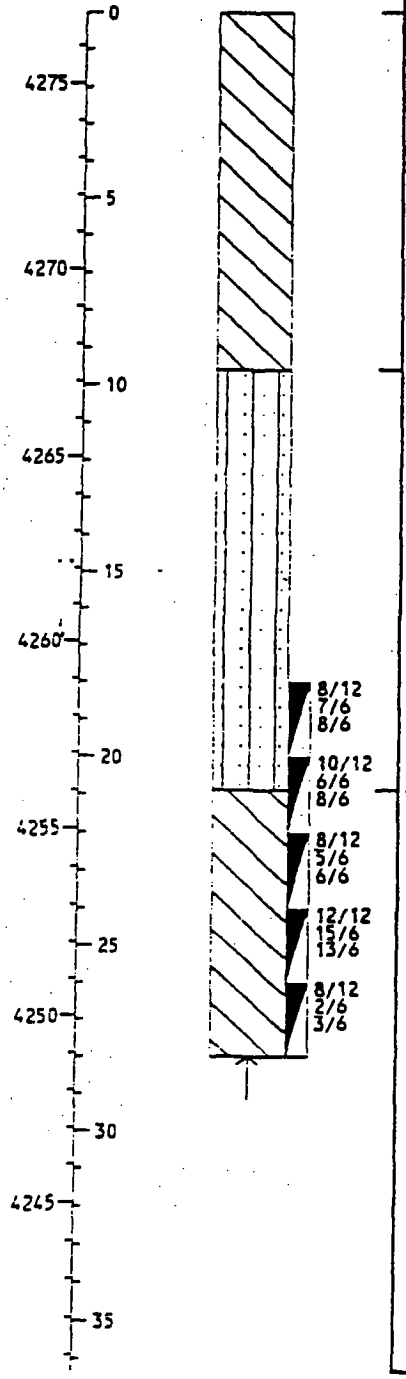
SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
	CL	UNIT 4, SILTY CLAY: Tan to tannish brown.			
	SM	UNIT 3, SILTY SAND: Tan, fine to medium, moist. (Contact estimated from GW-55)			
			B-1	15-17	20/24
			B-2	17-19	22/24
			B-3	19-21	24/24
		...grades to reddish tan.	B-4	21-23	24/24
	CL	UNIT 2, SILTY CLAY: Tan, sandy, fine, roots, moist.			
	SM	SILTY SAND: Reddish tan, clayey, moist.	B-5	23-25	24/24
	CL	SILTY CLAY: Reddish tan, sandy, moist.	B-6	25-27	24/24
		...grades to gray, silty clay, very moist.	B-7	27-29	24/24

Soil description from 0 to 15 feet taken from GW-55, approximately 225 feet to the north.

DRILL HOLE LOG
DRILL HOLE NO.: DH-49

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: SE corner of RCRA Waste Disposal Cell.
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: NM HOLE DIAMETER: 8.25"

PROJECT NO.: 1416-02
DATE: 2-10-92
TOC ELEV.: NA
GS ELEV.: 4276.9
LOGGED BY: DCH
HOLE NO.: DH-49



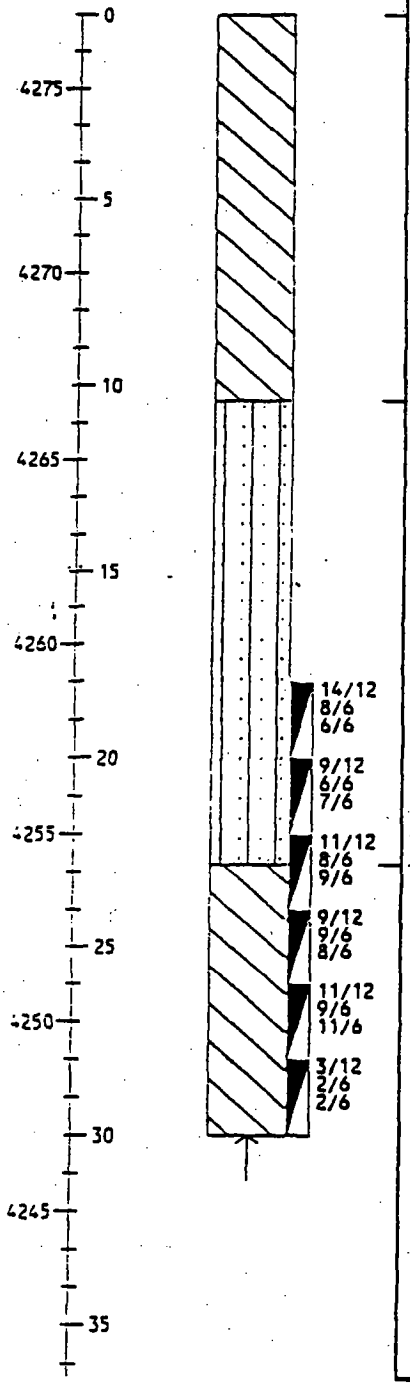
USCS	Description	Sample Number	Sample Depth (ft)	Recover (in/in)
CL	UNIT 4, SILTY CLAY: Tan.			
SM	UNIT 3, SILTY SAND: Tan, fine to medium, moist. (Contact estimated from GW-41)			
	...grades to reddish tan.	B-1	18-20	23/24
		B-2	20-22	22/24
CL	UNIT 2, SILTY CLAY: Reddish tan, sandy, fine, moist.	B-3	22-24	24/24
	...grades to trace of sand.	B-4	24-26	24/24
	...grades to gray, silty clay, very moist.	B-5	26-28	20/24

Soil description from 0 to 18 feet taken from GW-41, approximately 100 feet to the north.

DRILL HOLE LOG
DRILL HOLE NO.: DH-50

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: NW corner of RCRA Waste Disposal Cell.
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: NM
HOLE DIAMETER: 8.25"

PROJECT NO.: 1416-022
DATE: 2-10-92
TOC ELEV.: NA
GS ELEV.: 4277.0
LOGGED BY: DCH
HOLE NO.: DH-50



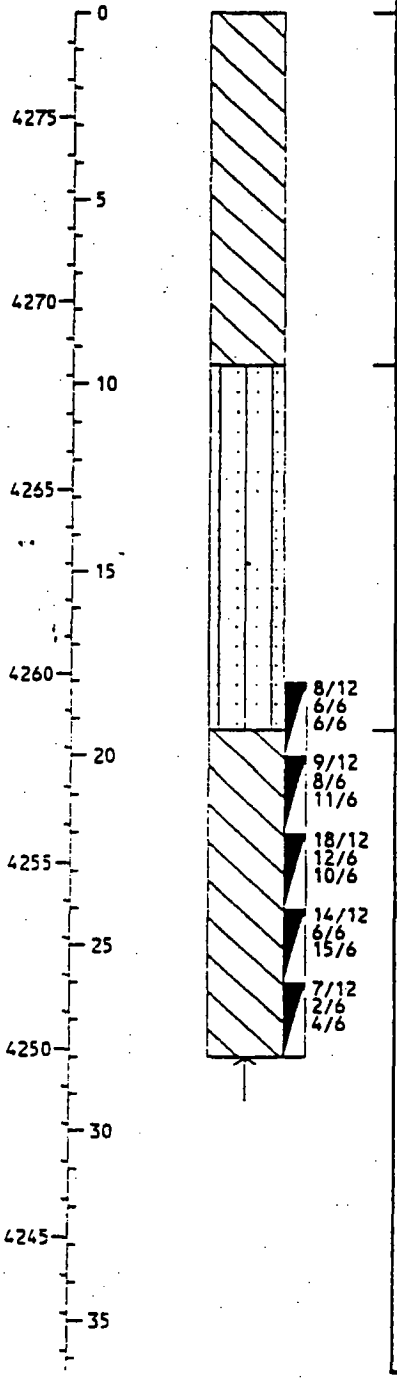
USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	UINT 4, SILTY CLAY: Tan to Tannish brown.			
SM	UINT 3, SILTY SAND: Tan, fine to medium, moist. (Contact estimated from GW-55)			
		B-1	18-20	18/24
		B-2	20-22	23/24
	...grades to reddish tan.	B-3	22-24	24/24
CL	UNIT 2, SILTY CLAY: Reddish tan, sandy, fine, moist.	B-4	24-26	24/24
	...grades to trace of sand.	B-5	26-28	24/24
	...grades to gray, silty clay, very moist.	B-6	28-30	24/24

Soil description from 0 to 18 feet taken from GW-55, approximately 75 feet to the south.

DRILL HOLE LOG
DRILL HOLE NO.: DH-51

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: NE corner of RCRA Waste Disposal Cell.
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: NM HOLE DIAMETER: 8.25"

PROJECT NO.: 1416-02
DATE: 2-11-92
TOC ELEV.: NA
GS ELEV.: 4277.8
LOGGED BY: DCH
HOLE NO.: DH-51



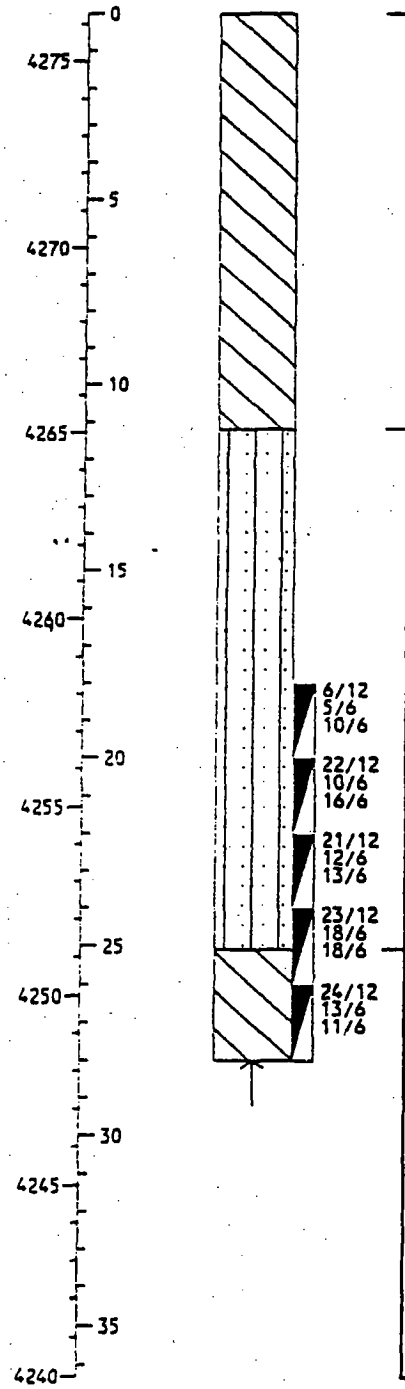
USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	UNIT 4, SILTY CLAY: Tan.			
SM	UNIT 3, SILTY SAND: Tan, fine, moist. (Contact estimated from GW-42)			
	...grades to reddish tan.	B-1	18-20	23/24
CL	UNIT 2, SILTY CLAY: Reddish tan, sandy, fine, moist.	B-2	20-22	24/24
		B-3	22-24	24/24
	...grades to trace of sand.	B-4	24-26	24/24
		B-5	26-28	24/24
	...grades to gray, silty clay.			

Soil description from 0 to 18 feet. taken from GW-42, approximately 120 feet the the south.

DRILL HOLE LOG
DRILL HOLE NO.: DH-52

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: South of the RCRA Disposal Cell
DRILLER: Overland Drilling
DRILL RIG: CME
DEPTH TO WATER: NM HOLE DIAMETER: 8.25"

PROJECT NO.: 1416-022
DATE: 2-11-92
TOC ELEV.: NA
GS ELEV.: 4276.3
LOGGED BY: DCH
HOLE NO.: DH-52



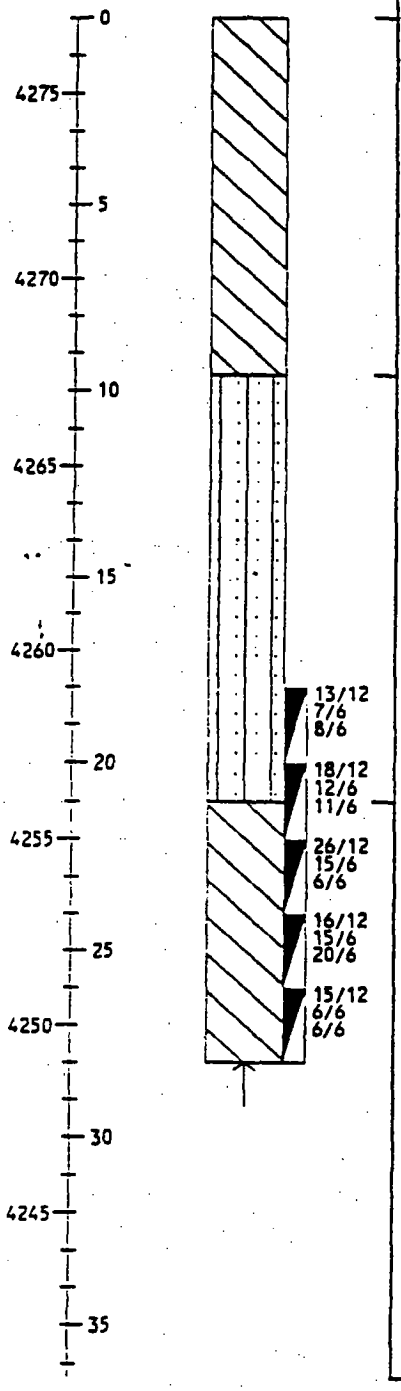
USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	UNIT 4, SILTY CLAY: Brown.			
SM	UNIT 3, SILTY SAND: Tan, fine, moist. (Contact estimated from DH-30)	B-1	18-20	22/24
		B-2	20-22	14/24
	...grades to reddish tan.			
	...grades to tan.	B-3	22-24	20/24
		B-4	24-26	23/24
CL	UNIT 2, SILTY CLAY: Reddish tan, sandy, fine, moist.	B-5	26-28	24/24
	...grades to gray, silty clay, moist.			

Soil description from 0 to 18 feet taken from DH-30, approximately 200 feet the the north west.

DRILL HOLE LOG
DRILL HOLE NO.: DH-53

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: South of the RCRA Disposal Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: NM HOLE DIAMETER: 8.25"

PROJECT NO.: 1416-02
DATE: 2-19-92
TOC ELEV.: NA
GS ELEV.: 4277.0
LOGGED BY: DCH
HOLE NO.: DH-53



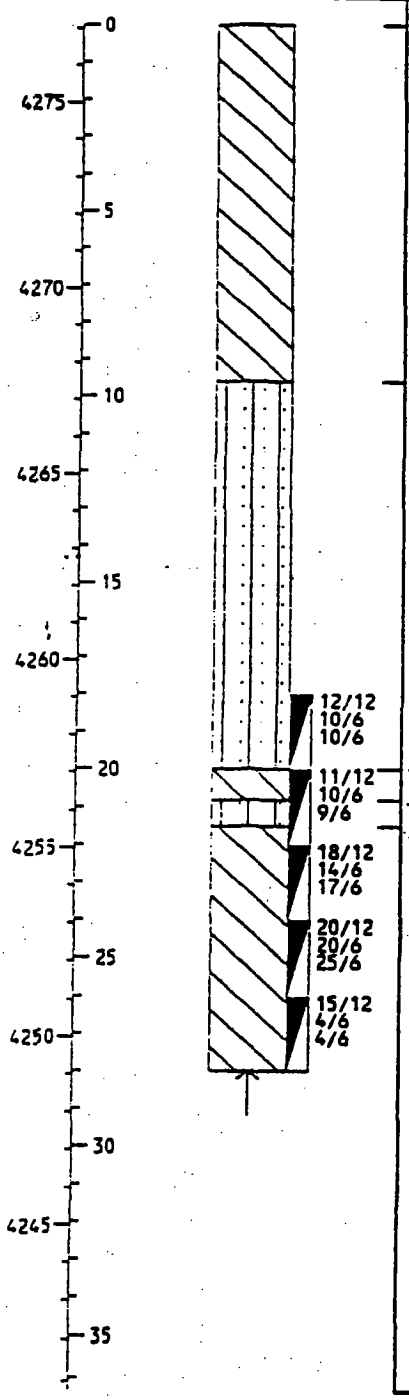
ELEVATION / DEPTH	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		CL	UNIT 4, SILTY CLAY: Tan.			
		SM	UNIT 3, SILTY SAND: Tan, fine, moist. (Contact estimated form GW-41)			
			...grades to reddish tan.	B-1	18-20	24/24
				B-2	20-22	24/24
		CL	UNIT 2, SILTY CLAY: Reddish tan, sandy, fine, moist.	B-3	22-24	24/24
				B-4	24-26	24/24
			...grades to gray, silty clay, moist. ...grades to very moist.	B-5	26-28	24/24

Soil description from 0 to 18 feet taken from GW-41, approximately 400 feet to the east.

DRILL HOLE LOG
DRILL HOLE NO.: DH-54

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: South of RCRA Desposal Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: NM
HOLE DIAMETER: 8.25"

PROJECT NO.: 1416-022
DATE: 2-19-92
TOC ELEV.: NA
GS ELEV.: 4277.1
LOGGED BY: DCH
HOLE NO.: DH-54



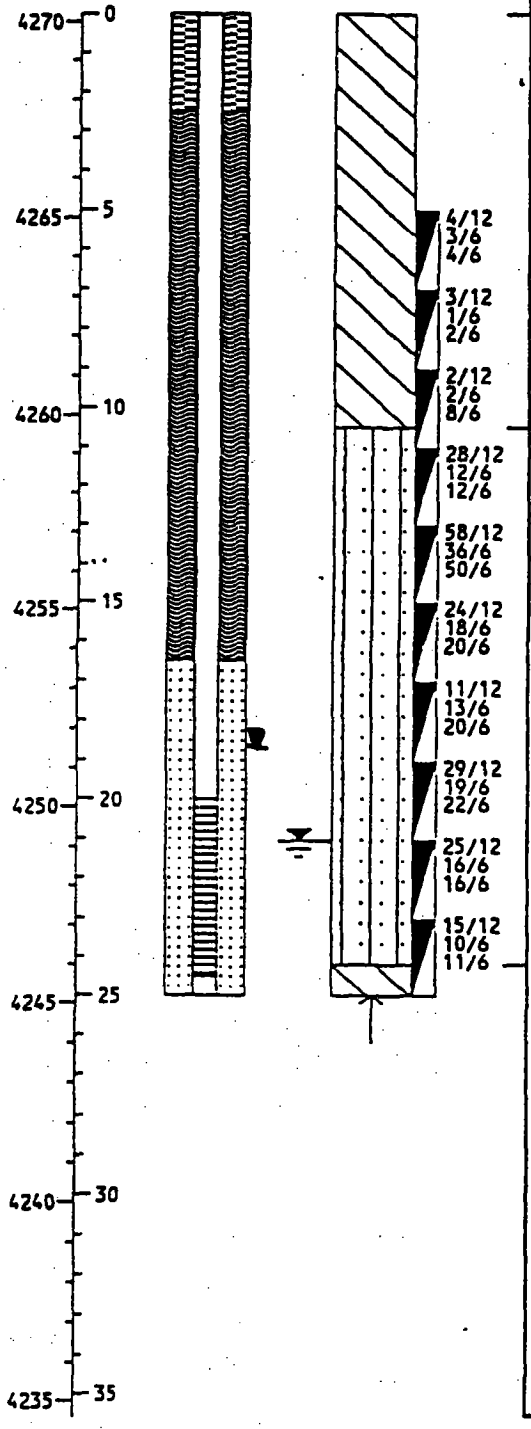
ELEVATION / DEPTH	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
	CL	UNIT 4, SILTY CLAY: Tan.			
	SM	UNIT 3, SILTY SAND: Tan, fine, moist. (Contact estimated form GW-41)			
		...grades to reddish tan.	B-1	18-20	22/24
	CL	UNIT 2, SILTY CLAY: Reddish tan, sandy, fine, moist.	B-2	20-22	24/24
	SM	SILTY SAND: Reddish tan, fine, moist.	B-3	22-24	24/24
	CL	SILTY CLAY: Reddish tan, sandy, fine, moist.	B-4	24-26	24/24
		...grades to gray, silty clay, moist. ...grades to very moist.	B-5	26-28	24/24

Soil description from 0 to 18 feet taken from GW-41, approximately 550 feet to the north.

DRILL HOLE LOG
DRILL HOLE NO.: DH-59

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Between GW-1 & GW-19
DRILLER: Overland Drilling Inc.
DRILL RIG: CME 750
DEPTH TO WATER: 21.04' HOLE DIAMETER: 7.75"

PROJECT NO.: 1534-007
DATE: 2-3-93
TOC ELEV.: 4272.01
GS ELEV.: 4270.2
LOGGED BY: DCH
HOLE NO.: DH-59

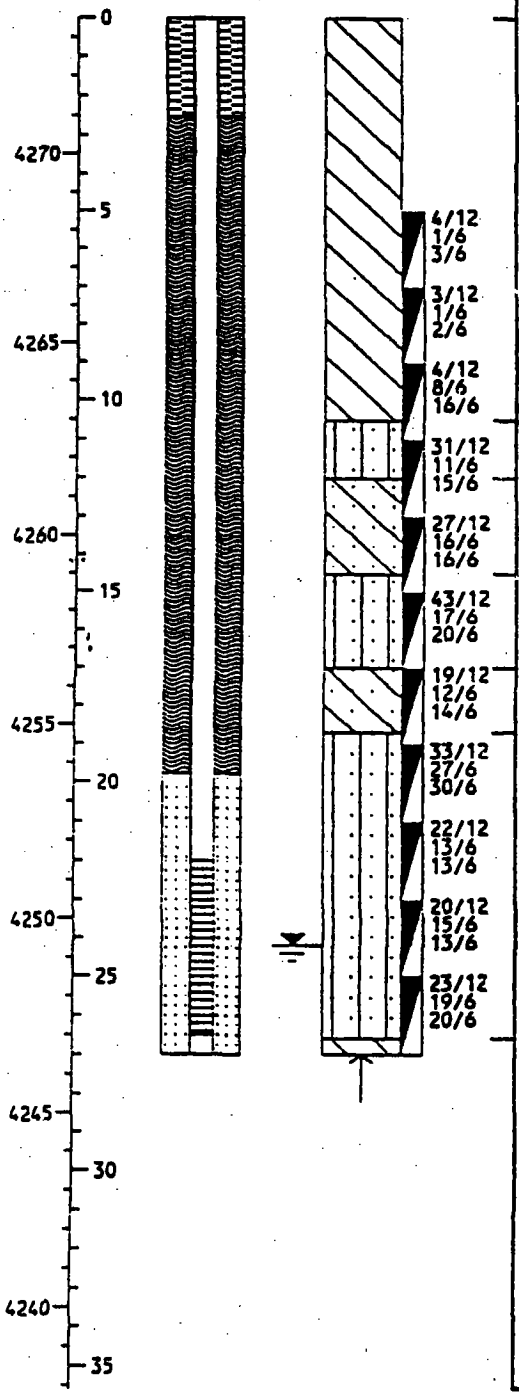


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Tan, roots in upper 12-inches, soft to medium stiff, moist.			
				...grades with iron oxide staining.	B-1	5-7	24/24
				...grades to light gray, thin horizontal bedding.	B-2	7-9	24/24
					B-3	9-11	24/24
			SM	SILTY SAND: Tan, fine to medium, medium dense to dense, moist.	B-4	11-13	24/24
					B-5	13-15	24/24
					B-6	15-17	18/24
				...grades reddish tan.	B-7	17-19	12/24
				...grades very moist.	B-8	19-21	19/24
				...grades wet.	B-9	21-23	18/24
					B-10	23-25	24/24
			CL	SILTY CLAY: Reddish tan, sandy, fine, stiff, moist.			

DRILL HOLE LOG
DRILL HOLE NO.: DH-61

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Between GW-1 & GW-38
DRILLER: Overland Drilling Inc.
DRILL RIG: CME 750
DEPTH TO WATER: 24.19' HOLE DIAMETER: 7.75"

PROJECT NO.: 1534-007
DATE: 2-2-93
TOC ELEV.: 4275.37
GS ELEV.: 4273.5
LOGGED BY: DCH
HOLE NO.: DH-61

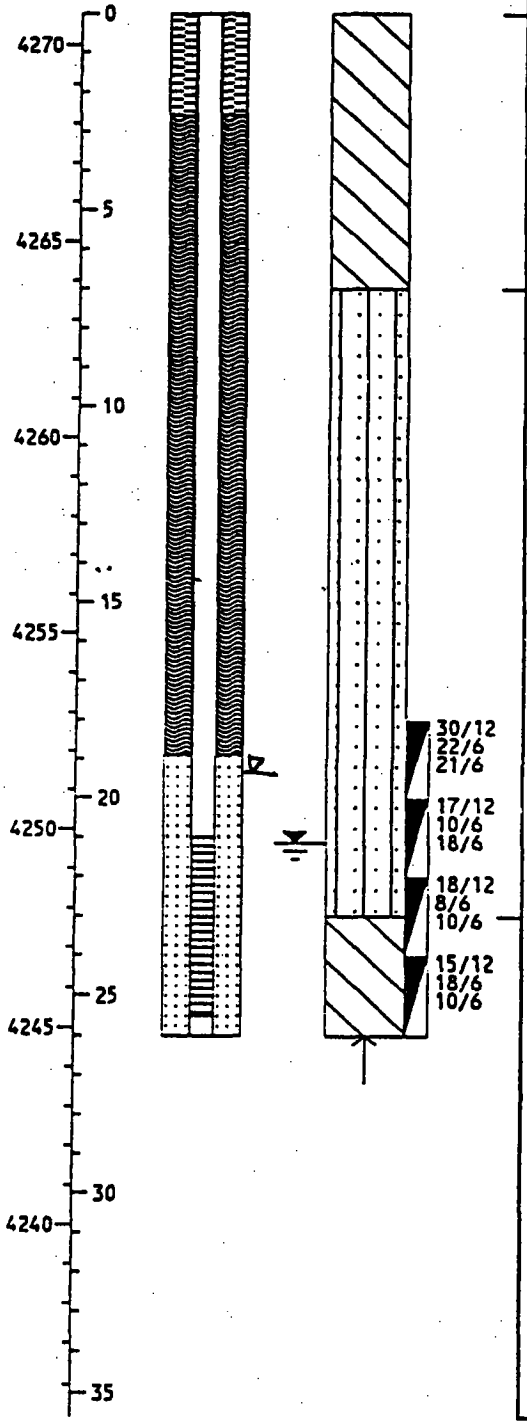


USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: Tan, roots in upper 12-inches, iron oxide staining, soft to medium stiff, moist.			
		B-1	5-7	24/24
	...grades to light gray, thin horizontal bedding.	B-2	7-9	24/24
		B-3	9-11	24/24
SM	SILTY SAND: Tan, fine to medium, dense, moist.	B-4	11-13	18/24
SC	CLAYEY SAND: Tan, fine, very dense, moist.	B-5	13-15	19/24
SM	SILTY SAND: Tan, fine, dense, moist.	B-6	15-17	22/24
SC	CLAYEY SAND: Tan, fine, dense, moist.	B-7	17-19	23/24
SM	SILTY SAND: Tan, fine to medium, very dense, moist.	B-8	19-21	24/24
		B-9	21-23	24/24
	...grades very moist.	B-10	23-25	24/24
	...grades wet.	B-11	25-27	24/24
CL	SILTY CLAY: Reddish tan, sandy, fine, very moist.			

DRILL HOLE LOG
DRILL HOLE NO.: DH-62

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: 15 feet southwest of GW-38
DRILLER: Overland Drilling Inc.
DRILL RIG: CME 750
DEPTH TO WATER: 21.14' HOLE DIAMETER: 7.75"

PROJECT NO.: 1534-007
DATE: 2-1-93
TOC ELEV.: 4272.78
GS ELEV.: 4270.8
LOGGED BY: DCH
HOLE NO.: DH-62



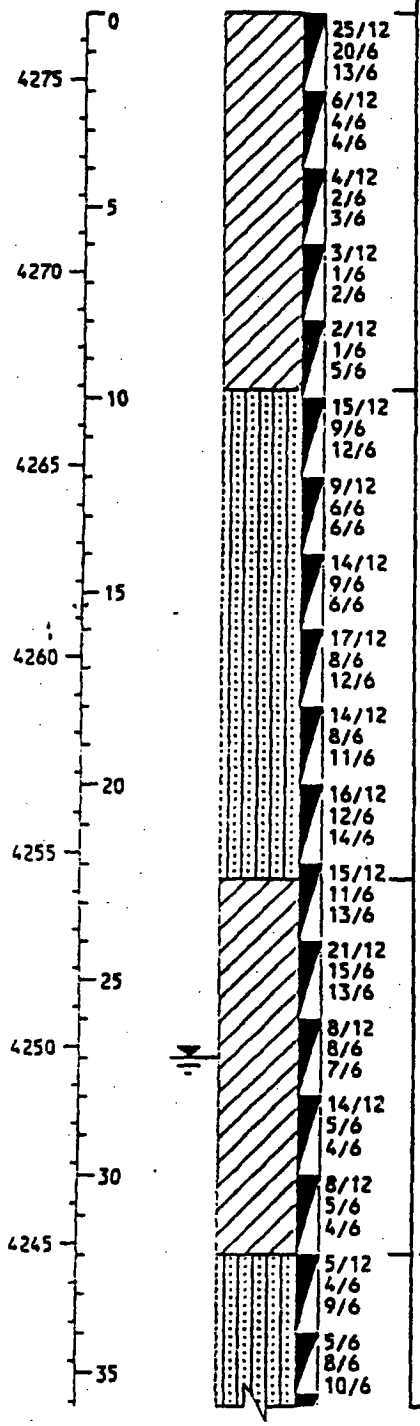
USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: Tan, trace of sand, moist.			
	...grades gray.			
	...grades to light gray.			
SM	SILTY SAND: Tan, fine to medium with a trace of coarse, moist.			
	...grades with occasional silty clay lenses.			
	...grades to tannish gray, very moist.	B-1	18-20	24/24
		B-2	20-22	24/24
	...grades wet.	B-3	22-24	24/24
CL	SILTY CLAY: Reddish tan, very stiff, moist.	B-4	24-26	24/24

Subsurface information (0-18 feet) was utilized from the drill hole log for GW-38.

DRILL HOLE LOG
DRILL HOLE NO.: DH-65

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: 7 Feet North of GW-11
DRILLER: Overland Drilling
DRILL RIG: CME 75
DEPTH TO WATER: 27.0' HOLE DIAMETER: 8.25"

PROJECT NO.: 1416-045
DATE: 9-28-93
TOC ELEV.:
GS ELEV.: 4276.7
LOGGED BY: DCH
HOLE NO.: DH-65



USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: Tan, slightly sandy, fine, iron oxide staining, moist.	B-1	0-2	10/24
		B-2	2-4	24/24
	...grades gray.	B-3	4-6	24/24
		B-4	6-8	24/24
		B-5	8-10	24/24
SM	SILTY SAND: Tan, fine to medium, occassional very silty lenses, moist.	B-6	10-12	24/24
		B-7	12-14	20/24
	...grades reddish tan.	B-8	14-16	24/24
		B-9	16-18	24/24
		B-10	18-20	22/24
		B-11	20-22	24/24
		B-12	22-24	24/24
CL	SILTY CLAY: Reddish tan, sandy, fine, moist.	B-13	24-26	24/24
		B-14	26-28	24/24
	...grades light gray, wet.	B-15	28-30	24/24
	...grades with iron oxide staining.	B-16	30-32	24/24
SM	SILTY SAND: Light gray, fine, very silty, wet.	B-17	32-34	24/24
		B-18	34-35.5	18/18

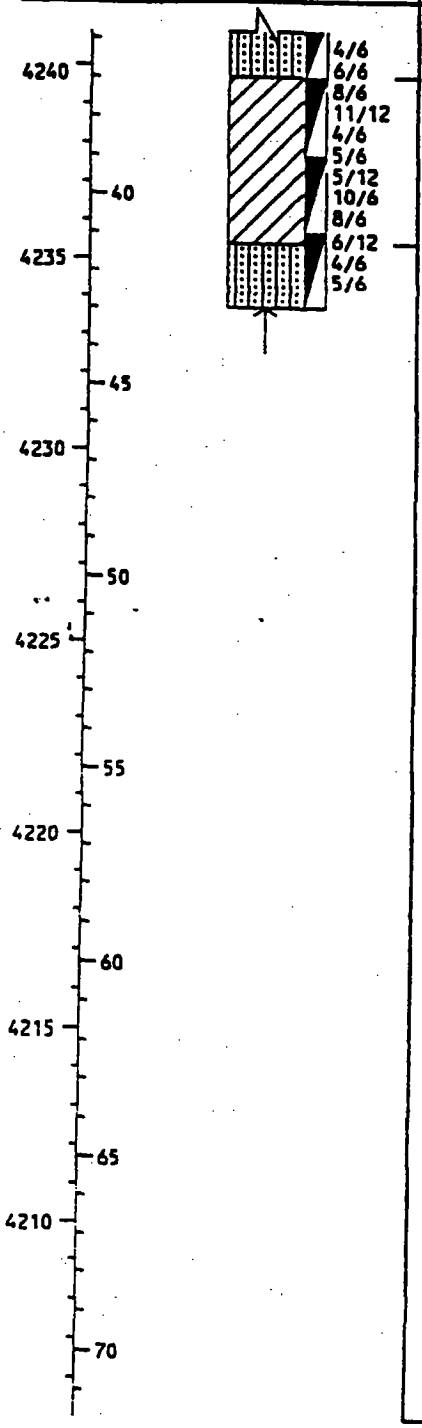
Exploratory drill hole was grouted with bentonite slurry.

DRILL HOLE LOG
DRILL HOLE NO.: DH-65

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: 7 Feet North of GW-11
DRILLER: Overland Drilling
DRILL RIG: CME 75
DEPTH TO WATER: 27.0'

HOLE DIAMETER: 8.25"

PROJECT NO.: 1416-04:
DATE: 9-28-93
TOC ELEV.:
GS ELEV.: 4276.7
LOGGED BY: DCH
HOLE NO.: DH-65



ELEVATION / DEPTH	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
				B-19	35.5-37	12/18
		CL	SILTY CLAY: Gray, stiff, very moist to wet.	B-20	37-39	24/24
				B-21	39-41	24/24
		SM	SILTY SAND: Brown, fine, clayey, very moist to wet.	B-22	41-43	24/24

Exploratory drill hole was grouted with bentonite slurry.

Test Hole GW-1

Form 113-84-1149

Examined ______
Recorded: S. C. ______ T. S. ______
Inspection Sheet ______
Copied ______

REPORT OF WELL DRILLER

STATE OF UTAH

Application No. 88-16-01 MW
Claim No. ______
Coordinate No. ______

GENERAL STATEMENT: Report of well driller is hereby made and filed with the State Engineer, in accordance with the laws of Utah. (This report shall be filed with the State Engineer within 30 days after the completion or abandonment of the well. Failure to file such reports constitutes a misdemeanor.)

(1) OWNER & ADDRESS

Name: Hart Envirocare Inc.
Address: 175 S West Temple Suite 500, Salt Lake City, Utah 84116

(2) LOCATION OF WELL: #1

County: Tooele — Ground Water Basin ______ (leave blank)

North 54.11 feet, East 2004.09 feet from SW Corner of Section 32, T. 1 N, R. 11 W (strike out words not needed)

(3) NATURE OF WORK (check):

New Well ☒ Replacement Well ☐ Deepening ☐ Repair ☐ Abandon ☐

If abandonment, describe material and procedure: ______

(4) NATURE OF USE (check): Monitoring Well x

Domestic ☐ Industrial ☐ Municipal ☐ Stockwater ☐
Irrigation ☐ Mining ☐ Other ☐ Test Well ☐

(5) TYPE OF CONSTRUCTION (check):

Rotary ☐ Dug ☐ Jetted ☐
Cable ☐ Driven ☐ Bored ☒

(6) CASING SCHEDULE: Threaded ☒ Welded ☐

2" Diam. from 0 feet to 20 feet Gage PVC
______" Diam. from ______ feet to ______ feet Gage ______
______" Diam. from ______ feet to ______ feet Gage ______
New ☐ Rebuilt ☐ Used ☐

(7) PERFORATIONS: Perforated? Yes ☐ No ☒

Type of perforator used ______
Size of perforations ______ inches by ______ inches
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet

(8) SCREENS: Well screen installed? Yes ☒ No ☐

Manufacturer's Name: Hydrophilic
Type: II Model No. ______
Diam. 2" Slot size .020 Set from 20 ft. to 40
Diam. ______ Slot size ______ Set from ______ ft. to ______

(9) CONSTRUCTION:

Was well gravel packed? Yes ☒ No ☐ Size of gravel: 8-12
Gravel placed from 40' feet to 18' feet
Was a surface seal provided? Yes ☒ No ☐
To what depth? 18' feet
Material used in seal: Bentonite Pellets & Grout
Did any strata contain unusable water? Yes ☐ No ☐
Type of water: ______ Depth of strata ______
Method of sealing strata off: ______

Was surface casing used? Yes ☒ No ☐
Was it cemented in place? Yes ☒ No ☐

(10) WATER LEVELS:

Static level 23.1 feet below land surface Date 3/9/88
Artesian pressure ______ feet above land surface Date ______

LOG RECEIVED:

(11) FLOWING WELL:

Controlled by (check) Valve ☐
Cap ☐ Plug ☐ No Control ☐
Does well leak around casing? Yes ☐ No ☐

(12) WELL TESTS:

Drawdown is the distance in feet the water level is lowered below static level.

Was a pump test made? Yes ☐ No ☒ If so, by whom? ______
Yield: ______ gal./min. with ______ feet drawdown after ______ hours
Bailer test ______ gal./min. with ______ feet drawdown after ______ hours
Artesian flow ______ g.p.m. Date ______
Temperature of water ______ Was a chemical analysis made? No ☒ Yes ☐

(13) WELL LOG:

Diameter of well 6.5 inches
Depth drilled 41.5 feet. Depth of completed well 40 feet.

NOTE: Place an "X" in the space or combination of spaces needed to designate the material or combination of materials encountered in each depth interval. Under REMARKS make any desirable notes as to occurrence of water and the color, size, nature, etc., of material encountered in each depth interval. Use additional sheet if needed.

From	To	Clay	Silt	Sand	Gravel	Cobbles	Boulders	Hardpan	Conglomerate	Bedrock	Other	REMARKS
0	3		x									Sandy
3	9	x										Sandy
9	14		x									Sandy
14	29			x								Silty
29	41.5	x										Sandy

Work started March 3 19 88 Completed March 3 19 88

(14) PUMP:

Manufacturer's Name ______
Type: ______ H. P. ______
Depth to pump or bowls ______ feet

Well Driller's Statement:

This well was drilled under my supervision, and this report is true to the best of my knowledge and belief.

Name: Delta Geotechnical Consultants / Robert E. Barto (Person, firm, or corporation) (Type or print)
Address: 137 W 2260 S Salt Lake City, Utah 84115
(Signed) [signature] (Well Driller)
License No. 575 Date February 16 19 88

Delta

TEST HOLE NO. GW-1

ELEVATION.

DEPTH IN FEET	LL	PI	W	DD	OTHER TESTS	SOIL DESCRIPTION
0						TOPSOIL: 2"
						SILT(ML), sandy, moist, brown
5						CLAY(CL), sandy, calcareous,
						4/12 soft, wet, light brownish-gray
10						SILT(ML), sandy, medium dense,
						20/12 moist, light brown
15						SAND(SM), silty, medium dense,
						23/12 moist, light brown
20						12/12
						9 ▽
25						
30						CLAY(CL), sandy, calcareous,
						5/12 medium stiff, wet, light grayish brown
35						CLAY(CL), sandy, stiff, wet,
						gray
40						9/12
						BOTH @ 41'6"
45						Groundwater @ 23'3"

LOG OF TEST HOLE

Form [illegible]

Examined ______
Recorded: B. C. ______ T. S. ______
Inspection Sheet ______
Copied ______

REPORT OF WELL DRILLER
STATE OF UTAH

Application No. 88-16-01 MW GW-2
Claim No. ______
Coordinate No. ______

GENERAL STATEMENT: Report of well driller is hereby made and filed with the State Engineer, in accordance with the laws of Utah. (This report shall be filed with the State Engineer within 30 days after the completion or abandonment of the well. Failure to file such reports constitutes a misdemeanor.)

(1) Name Hart Envirocare Inc
Address 175 S West Temple Suite 500
Salt Lake City, Utah 84116

(2) LOCATION OF WELL: #2
County Tooele Ground Water Basin ______ (leave blank)
North/South 1608.04 feet, East/West 5225.32 feet from SW corner
of Section 32, T. 1 S, R. 11 W, SLBM (strike out words not needed)

(3) NATURE OF WORK (check): New Well ☒
Replacement Well ☐ Deepening ☐ Repair ☐ Abandon ☐
If abandonment, describe material and procedure: ______

(4) NATURE OF USE (check): Monitoring Well X
Domestic ☐ Industrial ☐ Municipal ☐ Stockwater ☐
Irrigation ☐ Mining ☐ Other ☐ Test Well ☐

(5) TYPE OF CONSTRUCTION (check):
Rotary ☐ Dug ☐ Jetted ☐
Cable ☐ Driven ☐ Bored ☒

(6) CASING SCHEDULE: Threaded ☐ Welded ☐
2" Diam. from 0 feet to 20 feet Gage PVC
______" Diam. from ______ feet to ______ feet Gage ______
______" Diam. from ______ feet to ______ feet Gage ______
New ☒ Rejected ☐ Used ☐

(7) PERFORATIONS: Perforated? Yes ☐ No ☒
Type of perforator used ______
Size of perforations ______ inches by ______ inches
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet

(8) SCREENS: Well screen installed? Yes ☒ No ☐
Manufacturer's Name Hydrophilic
Type II Model No. ______
Diam. 2" Slot size 020 Set from 20 ft. to 40
Diam. ______ Slot size ______ Set from ______ ft. to ______

(9) CONSTRUCTION:
Was well gravel packed? Yes ☒ No ☐ Size of gravel: 8-12
Gravel placed from 40 feet to 18 feet
Was a surface seal provided? Yes ☒ No ☐
To what depth? 18 feet
Material used in seal: Bentonite pellets & grout
Did any strata contain unusable water? Yes ☐ No ☐
Type of water: ______ Depth of strata ______
Method of sealing strata off: ______

Was surface casing used? Yes ☒ No ☐
Was it cemented in place? Yes ☒ No ☐

(10) WATER LEVELS:
Static level 29.5 feet below land surface Date 3/9/88
Artesian pressure ______ feet above land surface Date ______

LOG RECEIVED: APR [illegible] 19[illegible]
WATER RIGHTS
SALT LAKE

(11) FLOWING WELL:
Controlled by (check) Valve ☐
Cap ☐ Plug ☐ No Control ☐
Does well leak around casing? Yes ☐ No ☐

(12) WELL TESTS: Drawdown is the distance in feet the water level is lowered below static level.
Was a pump test made? Yes ☐ No ☒ If so, by whom? ______
Yield: ______ gal./min. with ______ feet drawdown after ______ hours
Bailer test ______ gal./min. with ______ feet drawdown after ______ hours
Artesian flow ______ g.p.m. Date ______
Temperature of water ______ Was a chemical analysis made? No ☒ Yes ☐

(13) WELL LOG: Diameter of well 6.5 inches
Depth drilled 41.5 feet. Depth of completed well 40 feet.

NOTE: Place an "X" in the space or combination of spaces needed to designate the material or combination of materials encountered in each depth interval. Under REMARKS make any desirable notes as to occurrence of water and the color, size, nature, etc. of material encountered in each depth interval. Use additional sheet if needed.

DEPTH From	DEPTH To	Clay	Silt	Sand	Gravel	Cobbles	Boulders	Hardpan	Conglomerate	Bedrock	Other	REMARKS
0	2		X									Sandy
2	9	X										Sandy
9	22			X								Silty
22	41½	X										Sandy

Work started March 3 19 88 Completed March 4 19 88

(14) PUMP:
Manufacturer's Name ______
Type: ______ H. P. ______
Depth to pump or bowls ______ feet

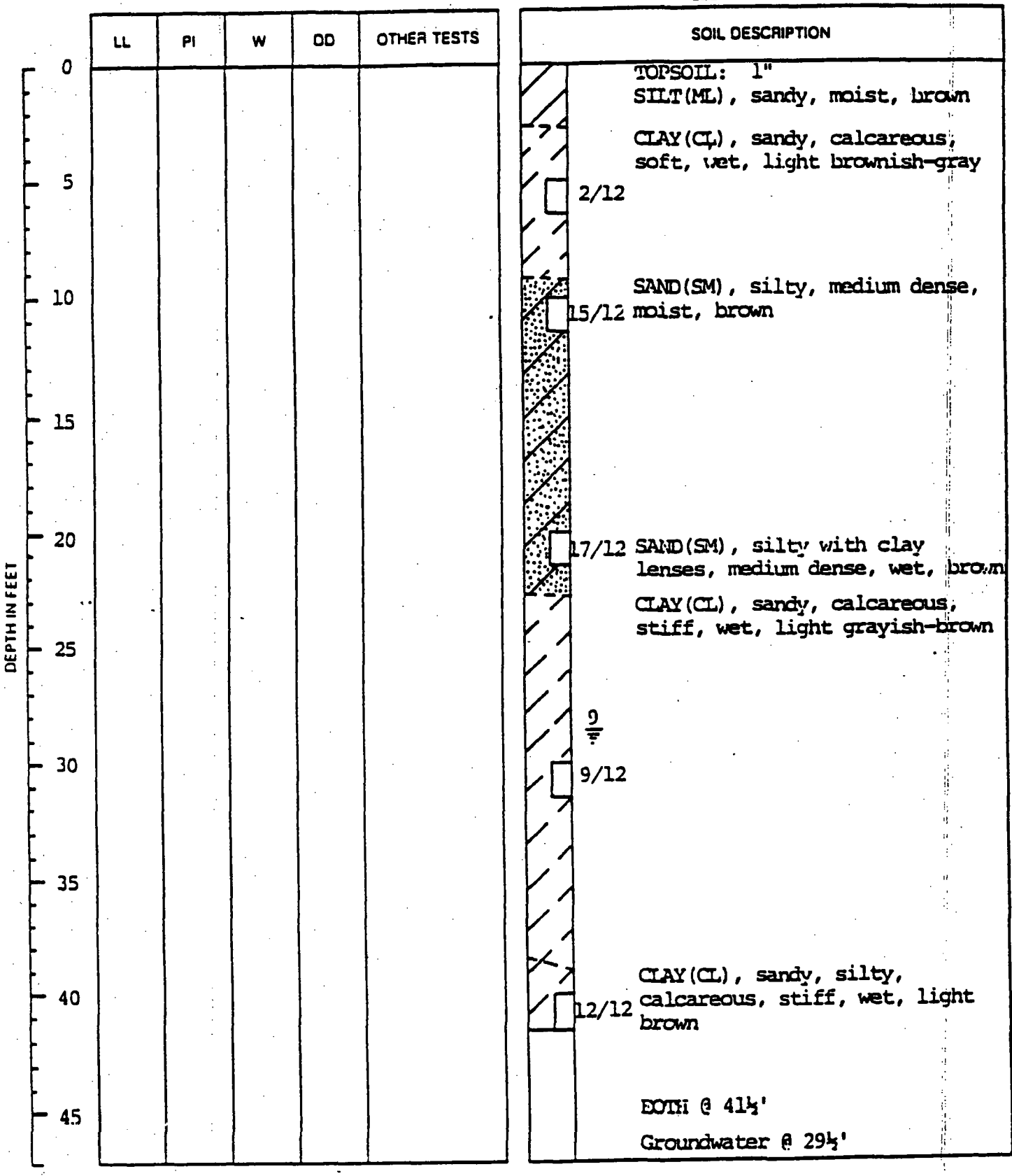
Well Driller's Statement:
This well was drilled under my supervision, and this report is true to the best of my knowledge and belief.
Name Delta Geotechnical Consultants / Robert E. Barton (Person, firm, or corporation) (Type or print)
Address 137 W 2260 S Salt Lake City, Utah 84115
(Signed) [signature] (Well Driller)
License No. 575 Date February 16 19 88

USE OTHER SIDE FOR ADDITIONAL REMARKS

Delta

TEST HOLE NO. GW-2

ELEVATION:



LOG OF TEST HOLE

FIGURE

GW-3

Form 113-114-11-46

Examined ____
Recorded: B. C. ____ T. R. ____
Inspection Sheet ____
Copied ____

REPORT OF WELL DRILLER
STATE OF UTAH

Application No. 88-16-01 MW
Claim No. ____
Certificate No. ____

GENERAL STATEMENT: Report of well driller is hereby made and filed with the State Engineer, in accordance with the laws of Utah. (This report shall be filed with the State Engineer within 30 days after the completion or abandonment of the well. Failure to file such reports constitutes a misdemeanor.)

(1) WELL OWNER: Hart Envirocare Inc
Name 175 S West Temple
Suite 500
Address Salt Lake City, Utah

(2) LOCATION OF WELL: #3
County Tooele Ground Water Basin ____ (leave blank)
North 2761.56 feet East 272.91 feet from SW Corner of Section 32, T. 1 S, R. 11 W (strike out words not needed)

(3) NATURE OF WORK (check): New Well ☒ Replacement Well ☐ Deepening ☐ Repair ☐ Abandon ☐
If abandonment, describe material and procedure: ____

(4) NATURE OF USE (check): Monitoring Well X
Domestic ☐ Industrial ☐ Municipal ☐ Stockwater ☐
Irrigation ☐ Mining ☐ Other ☐ Test Well ☐

(5) TYPE OF CONSTRUCTION (check):
Rotary ☐ Dug ☐ Jetted ☐
Cable ☐ Driven ☐ Bored ☒

(6) CASING SCHEDULE: Threaded ☒ Welded ☐
2" Diam. from 0 feet to 20 feet Gage PVC
____" Diam. from ____ feet to ____ feet Gage ____
____" Diam. from ____ feet to ____ feet Gage ____
New ☐ Reject ☐ Used ☐

(7) PERFORATIONS: Perforated? Yes ☐ No ☒
Type of perforator used ____
Size of perforations ____ inches by ____ inches
____ perforations from ____ feet to ____ feet
____ perforations from ____ feet to ____ feet
____ perforations from ____ feet to ____ feet
____ perforations from ____ feet to ____ feet
____ perforations from ____ feet to ____ feet

(8) SCREENS: Well screen installed? Yes ☒ No ☐
Manufacturer's Name Hydrophilic
Type II Model No. ____
Diam. 2" Slot size .020 Set from 20 ft. to 40
Diam. ____ Slot size ____ Set from ____ ft. to ____

(9) CONSTRUCTION:
Was well gravel packed? Yes ☒ No ☐ Size of gravel: 8-12
Gravel placed from 40 feet to 18 feet
Was a surface seal provided? Yes ☒ No ☐
To what depth? 18 feet
Material used in seal: Bentonite pellets & grout
Did any strata contain unusable water? Yes ☐ No ☐
Type of water: ____ Depth of strata ____
Method of sealing strata off: ____
Was surface casing used? Yes ☒ No ☐
Was it cemented in place? Yes ☒ No ☐

(10) WATER LEVELS:
Static level 21.8 feet below land surface Date 3/9/88
Artesian pressure ____ feet above land surface Date ____

LOG RECEIVED:
17 APR - 1988
WATER RIGHTS

(11) FLOWING WELL:
Controlled by (check) Valve ☐ Cap ☐ Plug ☐ No Control ☐
Does well leak around casing? Yes ☐ No ☐

(12) WELL TESTS: Drawdown is the distance in feet the water level is lowered below static level.
Was a pump test made? Yes ☐ No ☒ If so, by whom? ____
Yield: ____ gal./min. with ____ feet drawdown after ____ hours
Bailer test ____ gal./min. with ____ feet drawdown after ____ hours
Artesian flow ____ g.p.m. Date ____
Temperature of water ____ Was a chemical analysis made? No ☐ Yes ☐

(13) WELL LOG: Diameter of well 6.5 inches
Depth drilled 41.5 feet. Depth of completed well 40 feet.

NOTE: Place an "X" in the space or combination of spaces needed to designate the material or combination of materials encountered in each depth interval. Under REMARKS make any desirable notes as to occurrence of water and the color, size, nature, etc., of material encountered in each depth interval. Use additional sheet if needed.

From	To	Clay	Silt	Sand	Gravel	Cobbles	Boulders	Hardpan	Conglomerate	Bedrock	Other	REMARKS
0	3		X									Sandy
3	9	X										Sandy
9	16		X									Sandy
16	29			X								Silty
29	39			X								Clayey, Silty
39	41½			X								Silty, Clayey

Work started March 2, 19 88 Completed March 2, 19 88

(14) PUMP:
Manufacturer's Name ____
Type: ____ H. P. ____
Depth to pump or bowls ____ feet

Well Driller's Statement:

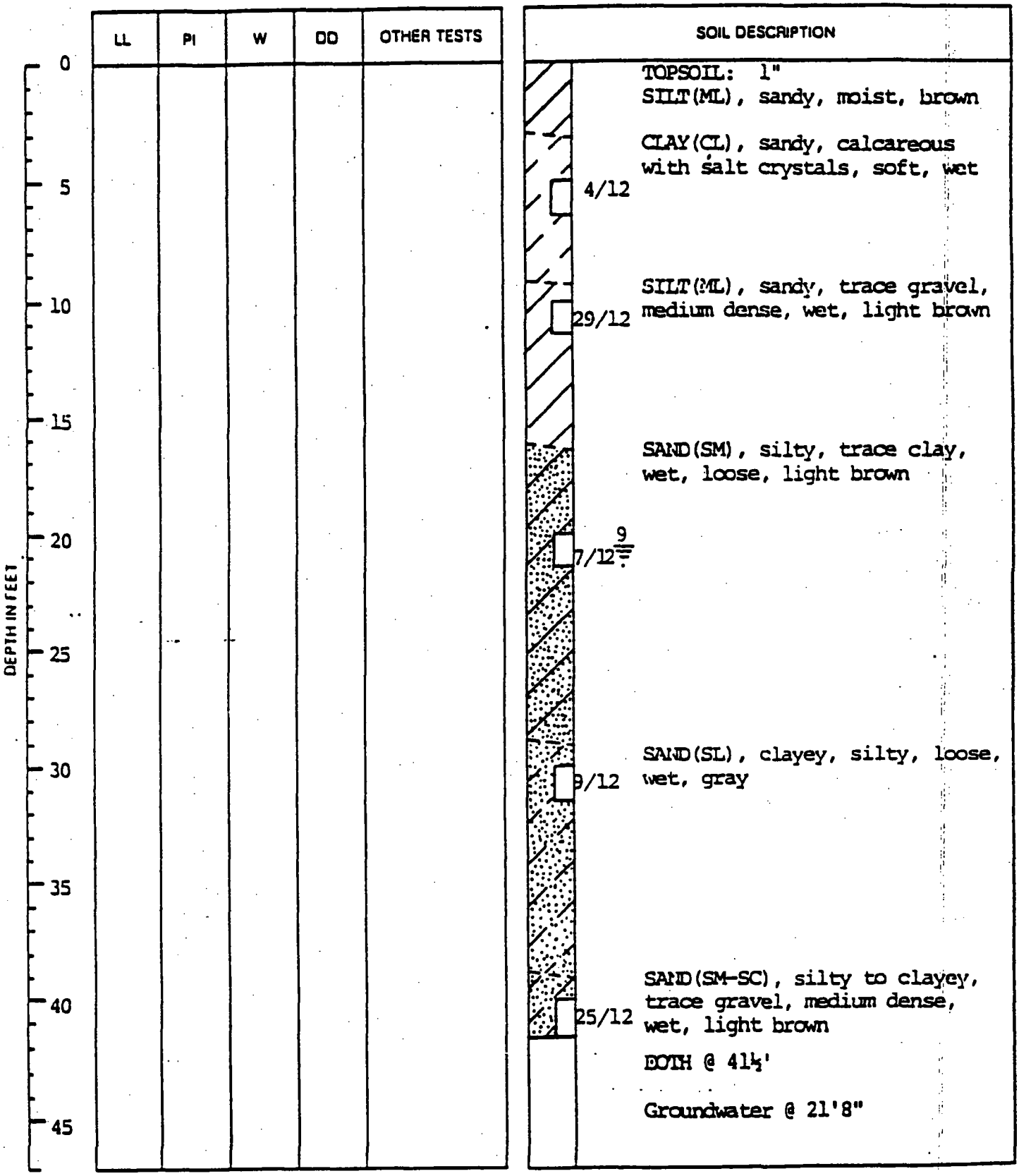
This well was drilled under my supervision, and this report is true to the best of my knowledge and belief.

Name Delta Geotechnical Consultants / Robert E Barton (Person, firm, or corporation) (Type or print)
Address 137 W 2260 S Salt Lake City, Utah 84115
(Signed) [signature] (Well Driller)
License No. 575 Date February 16, 19 88

Delta

TEST HOLE NO. GW-3

ELEVATION:



LOG OF TEST HOLE

FIGURE

GW-4

GW-4 was installed between the Vitro Pile and the NORM Waste Disposal Cell. No well logs, reports or other documentation are available for this well. Wells GW-9 and GW-10 are wells with documentation on the report to the state, but no wells corresponding to the surveyed points are to be found. It is suspected that GW-4 was installed by Delta Geotechnical with the same design as other GW wells. The well has been fitted with a dedicated bladder pump. Results of the depth to ground water and other data are,included for this well in various reports. This well is locked to prevent tampering.

GW-5

Form 113-384-12-40

Examined ____
Recorded: R. C. ____ T. R. ____
Inspection Sheet ____
Copied ____

REPORT OF WELL DRILLER

STATE OF UTAH

Application No. 88-16-01 MW
Claim No. ____
Certificate No. ____

GENERAL STATEMENT: Report of well driller is hereby made and filed with the State Engineer, in accordance with the laws of Utah. (This report shall be filed with the State Engineer within 30 days after the completion or abandonment of the well. Failure to file such reports constitutes a misdemeanor.)

(1) WELL OWNER:
Name: Hart Envirocare Inc
Address: 1175 S West Temple #500, SLC, Utah 84116

(2) LOCATION OF WELL: #5
County: Tooele Ground Water Basin ____ (leave blank)
North/South 3512.95 feet, East/West 2635.56 feet from SW Corner of Section 32, T. 1 S, R. 11 W, SLBM (strike out words not needed)

(3) NATURE OF WORK (check): New Well X Replacement Well ☐ Deepening ☐ Repair ☐ Abandon ☐
If abandonment, describe material and procedure: ____

(4) NATURE OF USE (check): Monitoring Well X
Domestic ☐ Industrial ☐ Municipal ☐ Stockwater ☐
Irrigation ☐ Mining ☐ Other ☐ Test Well ☐

(5) TYPE OF CONSTRUCTION (check):
Rotary ☐ Dug ☐ Jetted ☐
Cable ☐ Driven ☐ Bored ☒

(6) CASING SCHEDULE: Threaded ☒ Welded ☐
2" Diam. from 0 feet to 20 feet Gage PVC
____" Diam. from ____ feet to ____ feet Gage ____
____" Diam. from ____ feet to ____ feet Gage ____
New ☐ Reject ☐ Used ☐

(7) PERFORATIONS: Perforated? Yes ☐ No ☒
Type of perforator used ____
Size of perforations ____ inches by ____ inches
____ perforations from ____ feet to ____ feet
____ perforations from ____ feet to ____ feet
____ perforations from ____ feet to ____ feet
____ perforations from ____ feet to ____ feet
____ perforations from ____ feet to ____ feet

(8) SCREENS: Well screen installed? Yes ☒ No ☐
Manufacturer's Name: Hydrophilic
Type: II Model No. ____
Diam. 2" Slot size .020 Set from 0 ft. to 20
Diam. ____ Slot size ____ Set from ____ ft. to ____

(9) CONSTRUCTION:
Was well gravel packed? Yes ☒ No ☐ Size of gravel: C-12
Gravel placed from 40 feet to 18 feet
Was a surface seal provided? Yes ☒ No ☐
To what depth? 18 feet
Material used in seal: Bentonite pellets & grout
Did any strata contain unusable water? Yes ☐ No ☐
Type of water: ____ Depth of strata ____
Method of sealing strata off: ____

Was surface casing used? Yes ☒ No ☐
Was it cemented in place? Yes ☒ No ☐

(10) WATER LEVELS:
Static level 27.5 feet below land surface Date 3/9/88
Artesian pressure ____ feet above land surface Date ____

LOG RECEIVED: ... - 10 ... WATER RIGHTS

(11) FLOWING WELL:
Controlled by (check) Valve ☐ Cap ☐ Plug ☐ No Control ☐
Does well leak around casing? Yes ☐ No ☐

(12) WELL TESTS: Drawdown is the distance in feet the water level is lowered below static level.
Was a pump test made? Yes ☐ No ☒ If so, by whom? ____
Yield: ____ gal./min. with ____ feet drawdown after ____ hours
Bailer test ____ gal./min. with ____ feet drawdown after ____ hours
Artesian flow ____ g.p.m. Date ____
Temperature of water ____ Was a chemical analysis made? No ☒ Yes ☐

(13) WELL LOG: Diameter of well 6.5 inches
Depth drilled 41.5 feet. Depth of completed well 40 feet.

NOTE: Place an "X" in the space or combination of spaces needed to designate the material or combination of materials encountered in each depth interval. Under REMARKS make any desirable notes as to occurrence of water and the color, size, nature, etc., of material encountered in each depth interval. Use additional sheet if needed.

Depth From	Depth To	Clay	Silt	Sand	Gravel	Cobbles	Boulders	Hardpan	Conglomerate	Bedrock	Other	Remarks
0	1				X							Silty
1	3		X									Sandy
3	8	X										Sandy
8	26			X								Silty
26	38	X										Sandy
38	41½	X										Sandy with silt

Work started March 7, 19 88 Completed March 8, 19 88

(14) PUMP:
Manufacturer's Name ____
Type: ____ H. P. ____
Depth to pump or bowls ____ feet

Well Driller's Statement:

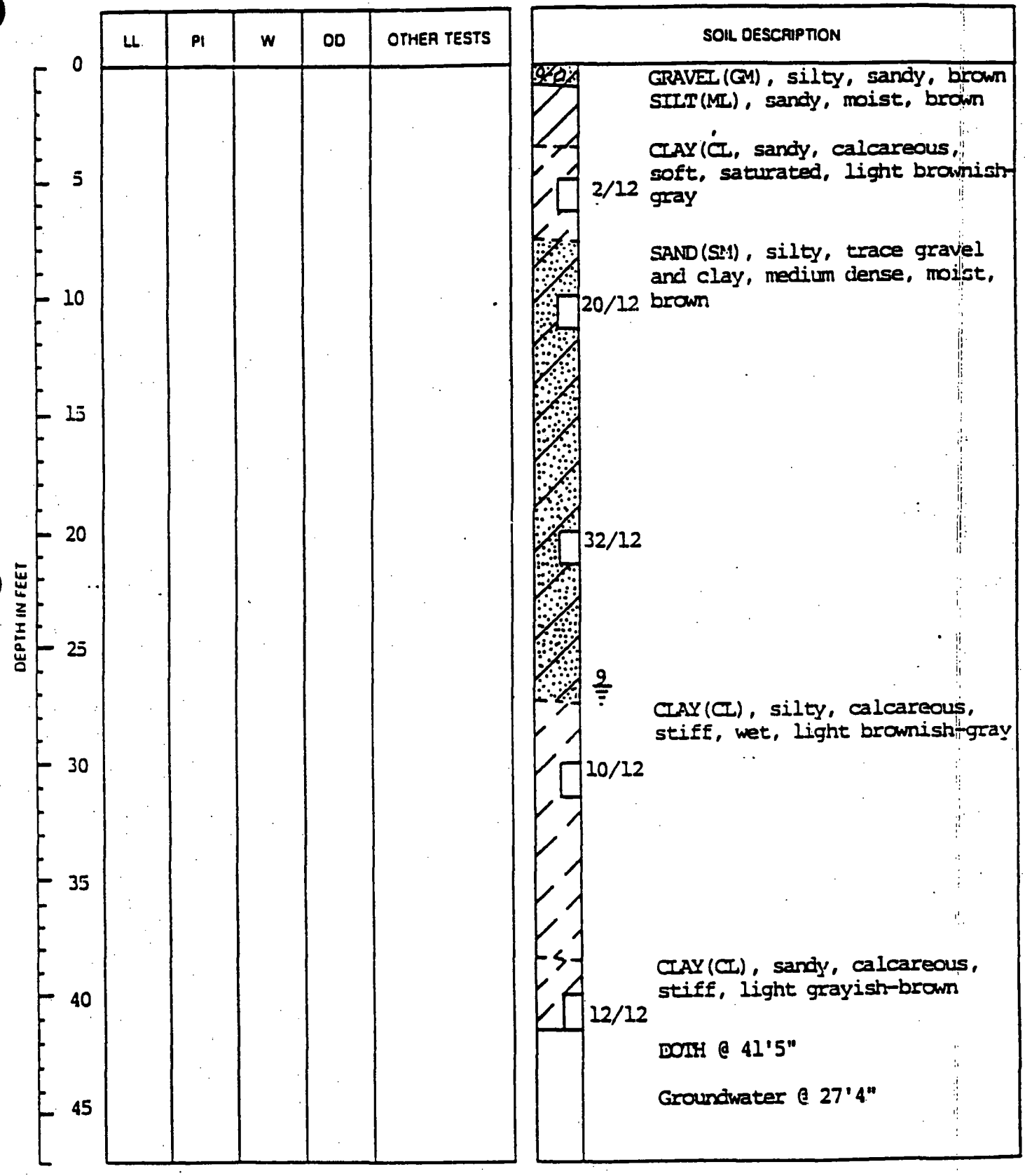
This well was drilled under my supervision, and this report is true to the best of my knowledge and belief.

Name: Delta Geotechnical Consultants / Robert E. Barton (Person, firm, or corporation) (Type or print)
Address: 137 W 2260 S Salt Lake City, Utah 84115
(Signed) [signature] (Well Driller)
License No. 575 Date February 15, 1988

Delta

TEST HOLE NO. GW-5

ELEVATION:



LOG OF TEST HOLE

Form 113-[illegible]

6W-6

Examined ______
Recorded: B. C. ______ T. B. ______
Inspection Sheet ______
Coded ______

REPORT OF WELL DRILLER

STATE OF UTAH

Application No. 88-16-01 MW
Claim No. ______
Coordinate No. ______

GENERAL STATEMENT: Report of well driller is hereby made and filed with the State Engineer, in accordance with the laws of Utah. (This report shall be filed with the State Engineer within 30 days after the completion or abandonment of the well. Failure to file such reports constitutes a misdemeanor.)

(1) WELL OWNER
Name Hart Envirocare Inc
Address 175 S West Temple #500
SLC, Utah 84116

(2) LOCATION OF WELL: #6
County Tooele Ground Water Basin ______ (leave blank)
North 3924.87 feet, East 5266.16 feet from SW Corner of Section 32, T. 1 S., R. 11 W. SLBM (strike out words not needed)

(3) NATURE OF WORK (check): New Well ☒
Replacement Well ☐ Deepening ☐ Repair ☐ Abandon ☐
If abandonment, describe material and procedure: ______

(4) NATURE OF USE (check): Monitoring Well X
Domestic ☐ Industrial ☐ Municipal ☐ Stockwater ☐
Irrigation ☐ Mining ☐ Other ☐ Test Well ☐

(5) TYPE OF CONSTRUCTION (check):
Rotary ☐ Dug ☐ Jetted ☐
Cable ☐ Driven ☐ Bored ☒

(6) CASING SCHEDULE: Threaded ☒ Welded ☐
2" Diam. from 0 feet to 20 feet Gage PVC
______" Diam. from ______ feet to ______ feet Gage ______
______" Diam. from ______ feet to ______ feet Gage ______
New ☐ Reject. ☐ Used ☐

(7) PERFORATIONS: Perforated? Yes ☐ No ☒
Type of perforator used ______
Size of perforations ______ inches by ______ inches
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet

(8) SCREENS: Well screen installed? Yes ☒ No ☐
Manufacturer's Name Hydrophilic
Type II Model No. ______
Diam. 2" Slot size .020 Set from 20 ft. to 40
Diam. ______ Slot size ______ Set from ______ ft. to ______

(9) CONSTRUCTION:
Was well gravel packed? Yes ☒ No ☐ Size of gravel: 8-12
Gravel placed from 40 feet to 18 feet
Was a surface seal provided? Yes ☒ No ☐
To what depth? 18 feet
Material used in seal: Bentonite pellets & grout
Did any strata contain unusable water? Yes ☐ No ☐
Type of water: ______ Depth of strata ______
Method of sealing strata off: ______
Was surface casing used? Yes ☒ No ☐
Was it cemented in place? Yes ☒ No ☐

(10) WATER LEVELS:
Static level 31.9 feet below land surface Date 3/9/88
Artesian pressure ______ feet above land surface Date ______

LOG RECEIVED:
[illegible] 1988
WATER RIGHTS
SALT LAKE

(11) FLOWING WELL:
Controlled by (check) Valve ☐
Cap ☐ Plug ☐ No Control ☐
Does well leak around casing? Yes ☐
No ☐

(12) WELL TESTS: Drawdown is the distance in feet the water level is lowered below static level.
Was a pump test made? Yes ☐ No ☒ If so, by whom? ______
Yield: ______ gal./min. with ______ feet drawdown after ______ hours
Bailer test ______ gal./min. with ______ feet drawdown after ______ hours
Artesian flow ______ g.p.m. Date ______
Temperature of water ______ Was a chemical analysis made? No ☒ Yes ☐

(13) WELL LOG: Diameter of well 6.5 inches
Depth drilled 41.5 feet. Depth of completed well 40 feet.

NOTE: Place an "X" in the space or combination of spaces needed to designate the material or combination of materials encountered in each depth interval. Under REMARKS make any desirable notes as to occurrence of water and the color, size, nature, etc. of material encountered in each depth interval. Use additional sheet if needed.

Depth From	Depth To	Clay	Silt	Sand	Gravel	Cobbles	Boulders	Hardpan	Conglomerate	Bedrock	Other	Remarks
0	2		X									Sandy
2	9	X										Sandy
9	29			X								Silty
29	38	X										Sandy
38	41½			X								Clayey to silty, trace gravel

Work started March 4 19 88 Completed March 4 19 88

(14) PUMP:
Manufacturer's Name ______
Type: ______ H. P. ______
Depth to pump or bowls ______ feet

Well Driller's Statement:
This well was drilled under my supervision, and this report is true to the best of my knowledge and belief.
Name Delta Geotechnical Consultants / Robert E. Barton (Person, firm, or corporation) (Type or print)
Address 137 W 2260 S Salt Lake City, Utah 84115
(Signed) [signature] (Well Driller)
License No. 575 Date February 16 1988

USE OTHER SIDE FOR ADDITIONAL REMARKS

Delta

TEST HOLE NO. GW-6

ELEVATION:

LL	PI	W	DD	OTHER TESTS

DEPTH IN FEET: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45

SOIL DESCRIPTION	
TOPSOIL: 1"	
SILT(ML), sandy, moist, brown	
CLAY(CL), sandy, calcareous, soft, wet, light brownish-gray	
	4/12
SAND(SM), silty, with sandy clay lenses, medium dense, moist to wet, brown	7/12
	23/12
CLAY(CL), sandy, calcareous, very stiff, wet, light brown	9 17/12
SAND(SL), clayey to silty, trace gravel, wet, brown	22/12
BOTH @ 41'5"	
Groundwater @ 31'8"	

LOG OF TEST HOLE

GW-7

GW-7 could not be located during the 1989 ground water monitoring characterization project. The well only appears on some in-house documents at Envirocare. The location on a site map of this well is roughly in the same location as GW-10 is on the report of a ground-water well to the state of Utah.

Test Hole GW-8

Form 113-...

Examined ______
Recorded: S. C. ______ T. S. ______
Inspection Sheet ______
Copied ______

REPORT OF WELL DRILLER

STATE OF UTAH

Application No. 88-16-01 MW
Claim No. ______
Contractors No. ______

GENERAL STATEMENT: Report of well driller is hereby made and filed with the State Engineer, in accordance with the laws of Utah. (This report shall be filed with the State Engineer within 30 days after the completion or abandonment of the well. Failure to file such reports constitutes a misdemeanor.)

(1) WELL OWNER: Hart Envirocare Inc
Name ______ 175 S West Temple, #500
Address ______ SLC, Utah 84116

(2) LOCATION OF WELL: #8
County Tooele Ground Water Basin ______ (leave blank)
North/South 5219.15 feet, East/West 1357.86 feet from SW Corner of Section 32, T. 1 N/S, R. 11 E/W SLBM (strike out words not needed)

(3) NATURE OF WORK (check): New Well X
Replacement Well ☐ Deepening ☐ Repair ☐ Abandon ☐
If abandonment, describe material and procedure: ______

(4) NATURE OF USE (check): Monitoring Well X
Domestic ☐ Industrial ☐ Municipal ☐ Stockwater ☐
Irrigation ☐ Mining ☐ Other ☐ Test Well ☐

(5) TYPE OF CONSTRUCTION (check):
Rotary ☐ Dug ☐ Jetted ☐
Cable ☐ Driven ☐ Bored X

(6) CASING SCHEDULE: Threaded X Welded ☐
2" Diam. from 0 feet to 20 feet Gage PVC
" Diam. from ______ feet to ______ feet Gage ______
" Diam. from ______ feet to ______ feet Gage ______
New ☐ Reject ☐ Used ☐

(7) PERFORATIONS: Perforated? Yes ☐ No ☐
Type of perforator used ______
Size of perforations ______ inches by ______ inches
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet

(8) SCREENS: Well screen installed? Yes X No ☐
Manufacturer's Name Hydrophilic
Type II Model No. ______
Diam. 2" Slot size .020 Set from 20 ft. to 40
Diam. ______ Slot size ______ Set from ______ ft. to ______

(9) CONSTRUCTION:
Was well gravel packed? Yes X No ☐ Size of gravel: 8-12
Gravel placed from 40 feet to 18 feet
Was a surface seal provided? Yes X No ☐
To what depth? 18 feet
Material used in seal: Bentonite pellets & grout
Did any strata contain unusable water? Yes ☐ No ☐
Type of water: ______ Depth of strata ______
Method of sealing strata off: ______

Was surface casing used? Yes X No ☐
Was it cemented in place? Yes X No ☐

(10) WATER LEVELS:
Static level 31.5 feet below land surface Date 3/9/88
Artesian pressure ______ feet above land surface Date ______

LOG RECEIVED: ... - 133

WATER RIGHTS SALT LAKE

(11) FLOWING WELL:
Controlled by (check) Valve ☐
Cap ☐ Plug ☐ No Control ☐
Does well leak around casing? Yes ☐ No ☐

(12) WELL TESTS: Drawdown is the distance in feet the water level is lowered below static level.
Was a pump test made? Yes ☐ No X If so, by whom? ______
Yield: ______ gal./min. with ______ feet drawdown after ______ hours
Bailer test ______ gal./min. with ______ feet drawdown after ______ hours
Artesian flow ______ g.p.m. Date ______
Temperature of water ______ Was a chemical analysis made? No X Yes ☐

(13) WELL LOG: Diameter of well 6.5 inches
Depth drilled 41.5 feet. Depth of completed well 40 feet.

NOTE: Place an "X" in the space or combination of spaces needed to designate the material or combination of materials encountered in each depth interval. Under REMARKS make any desirable notes as to occurrence of water and the color, size, nature, etc., of material encountered in each depth interval. Use additional sheet if needed.

Depth From	Depth To	Clay	Silt	Sand	Gravel	Cobbles	Boulders	Hardpan	Conglomerate	Bedrock	Other	REMARKS
0	2		X									Sandy
2	10	X										Sandy
10	28			X								Silty
28	41½	X										Sandy

Work started March 8, 19 88 Completed March 8, 19 88

(14) PUMP:
Manufacturer's Name ______
Type: ______ H. P. ______
Depth to pump or bowls ______ feet

Well Driller's Statement:

This well was drilled under my supervision, and this report is true to the best of my knowledge and belief.

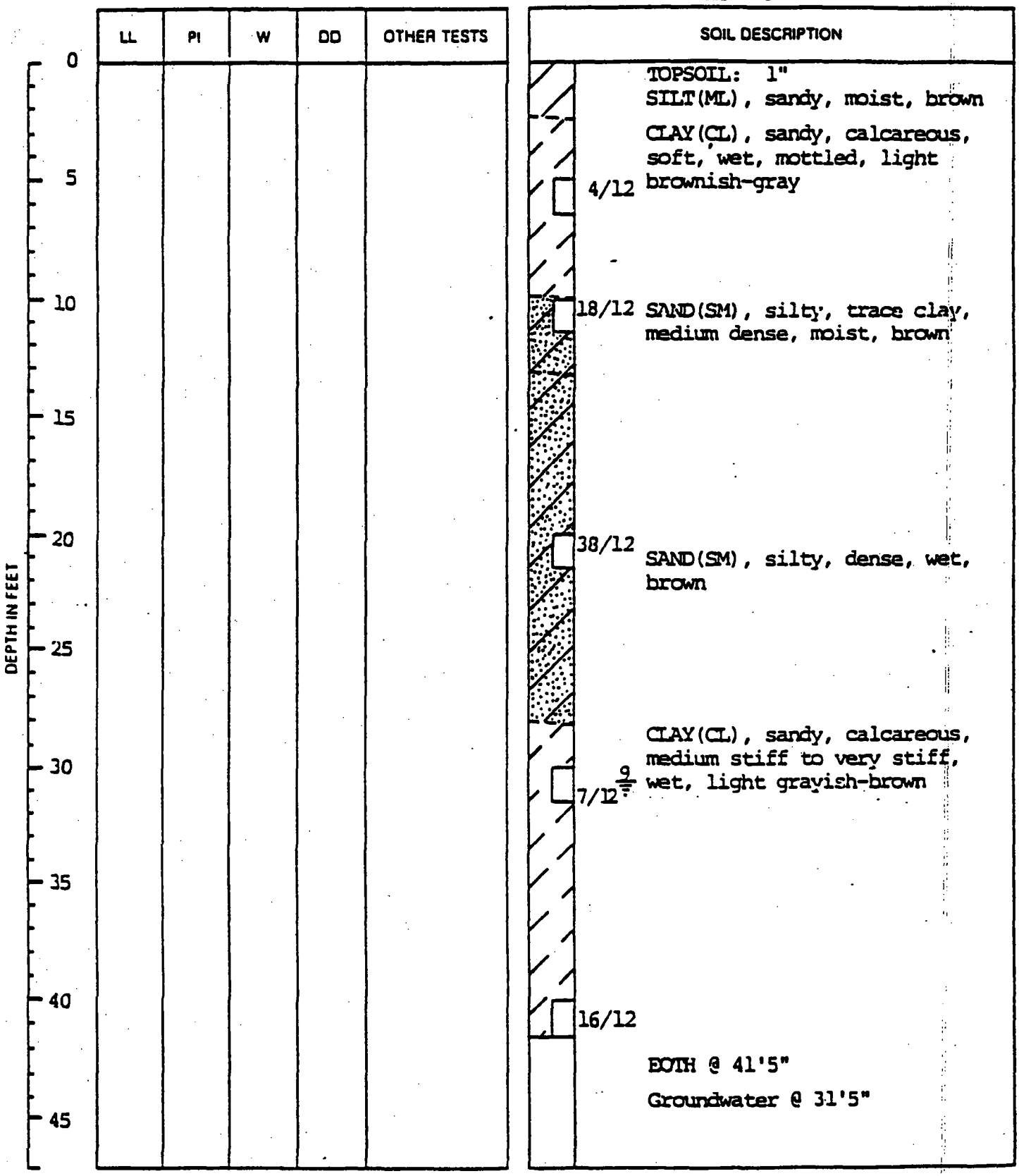
Name Delta Geotechnical Consultants / Robert E Barton
(Person, firm, or corporation) (Type or print)
Address 137 W 2260 S Salt Lake City, Utah 84115
(Signed) [signature]
(Well Driller)
License No. 575 Date February 16, 19 88

USE OTHER SIDE FOR ADDITIONAL REMARKS

Delta

TEST HOLE NO. GW-8

ELEVATION:



LOG OF TEST HOLE

FIGURE

GW-9

Form ...

Received ______
Recorded: B. C. ______ T. B. ______
Inspection Sheet ______
Copied ______

REPORT OF WELL DRILLER
STATE OF UTAH

Application No. 88-16-01 M
Claim No. ______
Coordinates No. ______

GENERAL STATEMENT: Report of well driller is hereby made and filed with the State Engineer, in accordance with the laws of Utah. (This report shall be filed with the State Engineer within 30 days after the completion or abandonment of the well. Failure to file such reports constitutes a misdemeanor.)

(1) WELL OWNER:
Name: Hart Environmental Inc.
Address: 170 S. West Temple - 500 [illegible]

(2) LOCATION OF WELL: #7
County: Tooele   Ground Water Basin ______ (leave blank)
North 2700 feet, East 4195 feet from S.W. Corner of Section 32, T. 1 S, R. 11 W, SLBM (strike out words not needed)

(3) NATURE OF WORK (check): New Well ☒
Replacement Well ☐ Deepening ☐ Repair ☐ Abandon ☐
If abandonment, describe material and procedure: ______

(4) NATURE OF USE (check):
Domestic ☐ Industrial ☐ Municipal ☐ Stockwater ☐
Irrigation ☐ Mining ☐ Other ☐ Test Well ☒

(5) TYPE OF CONSTRUCTION (check):
Rotary ☐ Dug ☐ Jetted ☐
Cable ☐ Driven ☐ Bored ☒

(6) CASING SCHEDULE: Threaded ☒ Welded ☐
2" Diam. from 0 feet to 20 feet Gage 40
______" Diam. from ______ feet to ______ feet Gage ______
______" Diam. from ______ feet to ______ feet Gage ______
New ☒ Reheat ☐ Used ☐

(7) PERFORATIONS: Perforated? Yes ☒ No ☐
Type of perforator used: Factory slotted
Size of perforations ______ inches by ______ inches
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet
______ perforations from ______ feet to ______ feet

(8) SCREENS: Well screen installed? Yes ☒ No ☐
Manufacturer's Name: Hydrophilic
Type: P.V.C. (II)   Model No. ______
Diam. 2" Slot size .020 Set from 20 ft. to 40
Diam. ______ Slot size ______ Set from ______ ft. to ______

(9) CONSTRUCTION:
Was well gravel packed? Yes ☒ No ☐ Size of gravel: 8-12
Gravel placed from 40 feet to 18 feet
Was a surface seal provided? Yes ☒ No ☐
To what depth? 15 feet
Material used in seal: Bentonite Pellets & Grout
Did any strata contain unusable water? Yes ☐ No ☐
Type of water: ______ Depth of strata ______
Method of sealing strata off: ______

Was surface casing used? Yes ☒ No ☐
Was it cemented in place? Yes ☒ No ☐

(10) WATER LEVELS:
Static level 25 feet below land surface Date 6-9-88
Artesian pressure ______ feet above land surface Date ______

LOG RECEIVED: DEC 1 1988 WATER RIGHTS SALT LAKE

(11) FLOWING WELL:
Controlled by (check) Valve ☐
Cap ☐ Plug ☐ No Control ☐
Does well leak around casing? Yes ☐ No ☐

(12) WELL TESTS: Drawdown is the distance in feet the water level is lowered below static level.
Was a pump test made? Yes ☐ No ☒ If so, by whom? ______
Yield ______ gal./min. with ______ feet drawdown after ______ hours
Bailer test ______ gal./min. with ______ feet drawdown after ______ hours
Artesian flow ______ g.p.m. Date ______
Temperature of water ______ Was a chemical analysis made? No ☐ Yes ☐

(13) WELL LOG: Diameter of well 6 inches
Depth drilled 40 feet. Depth of completed well 40 feet

NOTE: Place an "X" in the space or combination of spaces needed to designate the material or combination of materials encountered in each depth interval. Under REMARKS make any desirable notes as to occurrence of water and the color, size, nature, etc. of material encountered in each depth interval. Use additional sheet if needed.

Depth From	Depth To	Clay	Silt	Sand	Gravel	Cobbles	Boulders	Hardpan	Conglomerate	Bedrock	Other	Remarks
0	6	X										
6	20.5			X								clayey
20.5	40	X										

Work started 6-7-88 19__ Completed 6-9-88 19__

(14) PUMP:
Manufacturer's Name ______
Type ______ H. P. ______
Depth to pump or bowls ______ feet

Well Driller's Statement:
This well was drilled under my supervision, and this report is true to the best of my knowledge and belief.
Name: Delta Geotechnical Consultants (Person, firm, or corporation) (Type or print)
Address: 1370 W 2260 S Salt Lake City, Utah
(Signed) [signature] (Well Driller)
License No. 575 Date 12 79 1988

USE OTHER SIDE FOR ADDITIONAL REMARKS

Test Hole GW-10/4

Form 113-S14-12-68

Examined ______
Recorded: B. C. ______ T. B. ______
Inspection Sheet ______
Coded ______

REPORT OF WELL DRILLER

STATE OF UTAH

Application No. 88-16-01

Claim No. ______

Certificate No. ______

GENERAL STATEMENT: Report of well driller is hereby made and filed with the State Engineer, in accordance with the laws of U (This report shall be filed with the State Engineer within 30 days after the completion or abandonment of the well. Failure to file reports constitutes a misdemeanor.)

(1) WELL OWNER:

Name: Intel Earthscape Inc

Address: 175 S. West Temple #500 S.L.C. UT 84101

(2) LOCATION OF WELL: #10

County: Tooele Ground Water Basin ______ (leave blank)

North 4010 feet, East 4195 feet from SW Corner of Section 32, T. 1 S, R. 11 W SLBM (strike out words not needed)

(3) NATURE OF WORK (check): New Well ☒ Replacement Well ☐ Deepening ☐ Repair ☐ Abandon ☐

If abandonment, describe material and procedure: ______

(4) NATURE OF USE (check): Domestic ☐ Industrial ☐ Municipal ☐ Stockwater ☐ Irrigation ☐ Mining ☐ Other ☐ Test Well ☒

(5) TYPE OF CONSTRUCTION (check): Rotary ☐ Dug ☐ Jetted ☐ Cable ☐ Driven ☐ Bored ☒

(6) CASING SCHEDULE: Threaded ☒ Welded ☐

2" Diam. from 0 feet to 20 feet Gage 40

______" Diam. from ______ feet to ______ feet Gage ______

______" Diam. from ______ feet to ______ feet Gage ______

New ☒ Reborn ☐ Used ☐

(7) PERFORATIONS: Perforated? Yes ☒ No ☐

Type of perforator used: Factory Slots

Size of perforations ______ inches by ______ inches

______ perforations from ______ feet to ______ feet (×5)

(8) SCREENS: Well screen installed? Yes ☒ No ☐

Manufacturer's Name: Hydrophillic

Type: PVC (40) Model No. ______

Diam. 2" Slot size .020 Set from 20 ft. to 40

Diam. ______ Slot size ______ Set from ______ ft. to ______

(9) CONSTRUCTION:

Was well gravel packed? Yes ☒ No ☐ Size of gravel: 8-12

Gravel placed from 18 feet to 40 feet

Was a surface seal provided? Yes ☒ No ☐

To what depth? 18 feet

Material used in seal: Bentonite Pellets & Grout

Did any strata contain unusable water? Yes ☐ No ☐

Type of water: ______ Depth of strata ______

Method of sealing strata off: ______

Was surface casing used? Yes ☒ No ☐

Was it cemented in place? Yes ☒ No ☐

(10) WATER LEVELS:

Static level 27 feet below land surface Date 6-9-88

Artesian pressure ______ feet above land surface Date ______

(11) FLOWING WELL:

Controlled by (check) Valve ☐ Cap ☐ Plug ☐ No Control ☐

Does well leak around casing? Yes ☐ No ☐

(12) WELL TESTS: Drawdown is the distance in feet the water level is lowered below static level.

Was a pump test made? Yes ☐ No ☒ If so, by whom? ______

Yield: ______ gal./min. with ______ feet drawdown after ______

Bailer test ______ gal./min. with ______ feet drawdown after ______

Artesian flow ______ g.p.m. Date ______

Temperature of water ______ Was a chemical analysis made? No ☐ Yes

(13) WELL LOG: Diameter of well 6

Depth drilled 40 feet. Depth of completed well 40

NOTE: Place an "X" in the space or combination of spaces needed to designate the material or combination of materials encountered in each depth interval. Under REMARKS make desirable notes as to occurrence of water and the color, size, nature, etc. of materials encountered in each depth interval. Use additional sheet if needed.

Depth From	Depth To	Clay	Silt	Sand	Gravel	Cobbles	Boulders	Hardpan	Conglomerate	Bedrock	Other	Remarks
0	14	X										
14	16			X								Silty
16	18	X										
18	28			X								Silty
28	40	X										

Work started 6-9-88, 19___ Completed 6-10-88

(14) PUMP:

Manufacturer's Name ______

Type: ______ H. P. ______

Depth to pump or bowls ______ feet

Well Driller's Statement:

This well was drilled under my supervision, and this report is true to the best of my knowledge and belief.

Name: Terra Geotechnical Consultants (Person, firm, or corporation) (Type or print)

Address: 1376 E 7260 S, Salt Lake City, Ut

(Signed) [signature] (Well Driller)

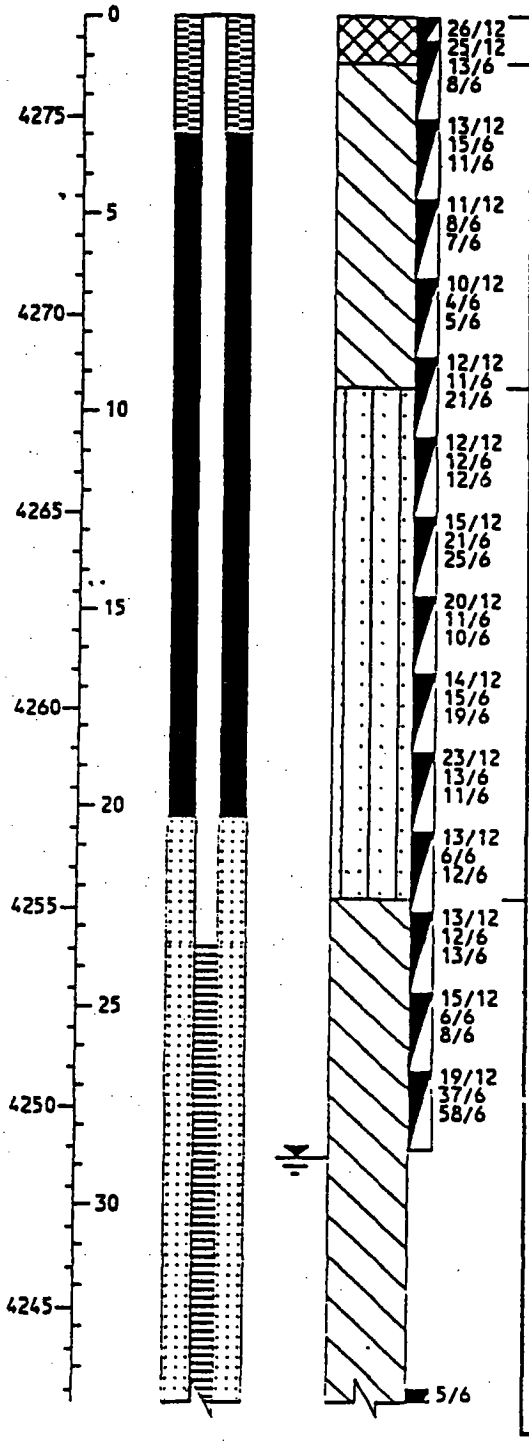
License No. 575 Date 12/?

GW-10 appears in documentation on the report to the state, but no well corresponding to the surveyed point is to be found. It is suspected that GW-4 was installed by Delta Geotechnical with the same design as was intended for GW-10. GW-10 could not be located during the 1989 ground water monitoring characterization project.

DRILL HOLE LOG
DRILL HOLE NO.: GW-16

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Northeast corner of LARW cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 28.8 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 2-12-91
TOC ELEV.: 4279.36
GS ELEV.: 4277.56
LOGGED BY: DCH
HOLE NO.: GW-16



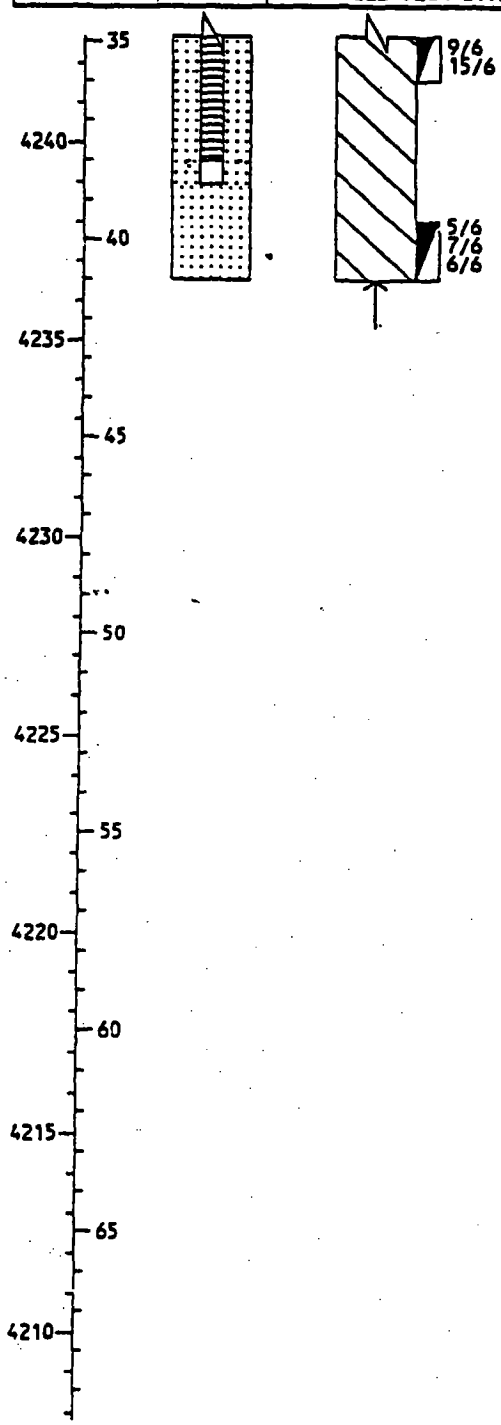
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	FILL: Gray and tan, silty clay, trace of fine to medium sand, hard, moist.	B-1	0.0-1	10/12
					B-2	0.6-2.6	12/24
			CL	SILTY CLAY: Tan with iron oxide staining, trace of fine sand, very stiff, moist.	B-3	2.6-4.6	23/24
					B-4	4.6-6.6	23/24
				... grades to light gray very silty clay horizontal bedding.	B-5	6.6-8.6	24/24
					B-6	8.6-10.6	22/24
			SM	SILTY SAND: Tan with occasional iron oxide staining, fine to medium, medium dense to dense, moist.	B-7	10.6-12.6	23/24
				... grades with trace of coarse sand.	B-8	12.6-14.6	24/24
					B-9	14.6-16.6	24/24
				... grades to reddish tan silty sand.	B-10	16.6-18.6	24/24
					B-11	18.6-20.6	24/24
					B-12	20.6-22.6	24/24
			CL	SILTY CLAY: Reddish tan, very sandy, medium stiff to very stiff, moist.	B-13	22.6-24.6	24/24
					B-14	24.6-26.6	24/24
					B-15	26.6-28.6	24/24
				...grades to light gray, silty, very stiff to hard, moist.			
						34.5-36	

From 30' to 42.5', soil and SPT sample data were taken from DH-16A.

DRILL HOLE LOG
DRILL HOLE NO.: GW-16

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Northeast corner of LARW cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 28.8 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 2-12-91
TOC ELEV.: 4279.36
GS ELEV.: 4277.56
LOGGED BY: DCH
HOLE NO.: GW-16



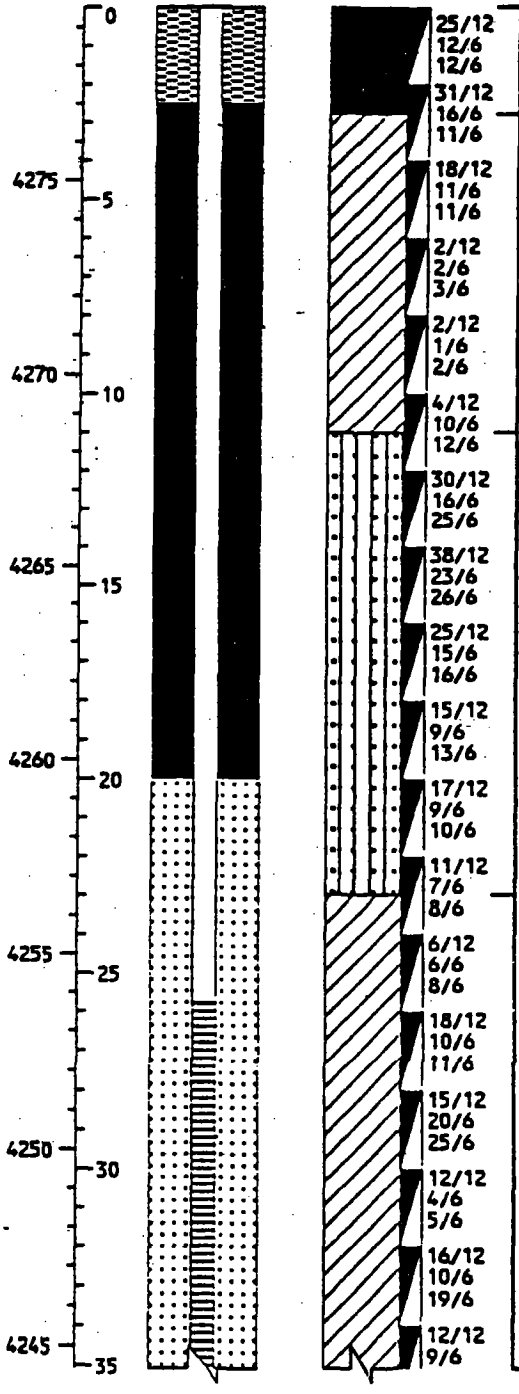
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
				... grades to light gray sandy clay, stiff, wet.			
				... grades to tan clay, sandy, silty, stiff, moist.		39.5-41	

From 30' to 42.5', soil and SPT sample data were taken from DH-16A.

DRILL HOLE LOG
DRILL HOLE NO.: GW-16R

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION:
DRILLER: Overland Drilling Inc.
DRILL RIG: CME 750
DEPTH TO WATER: HOLE DIAMETER: 7-3/4"

PROJECT NO.: 1416-022
DATE: 2/4/93
TOC ELEV.: 4281.05
GS ELEV.: 4279.50
LOGGED BY: DCH
HOLE NO.: GW-16R

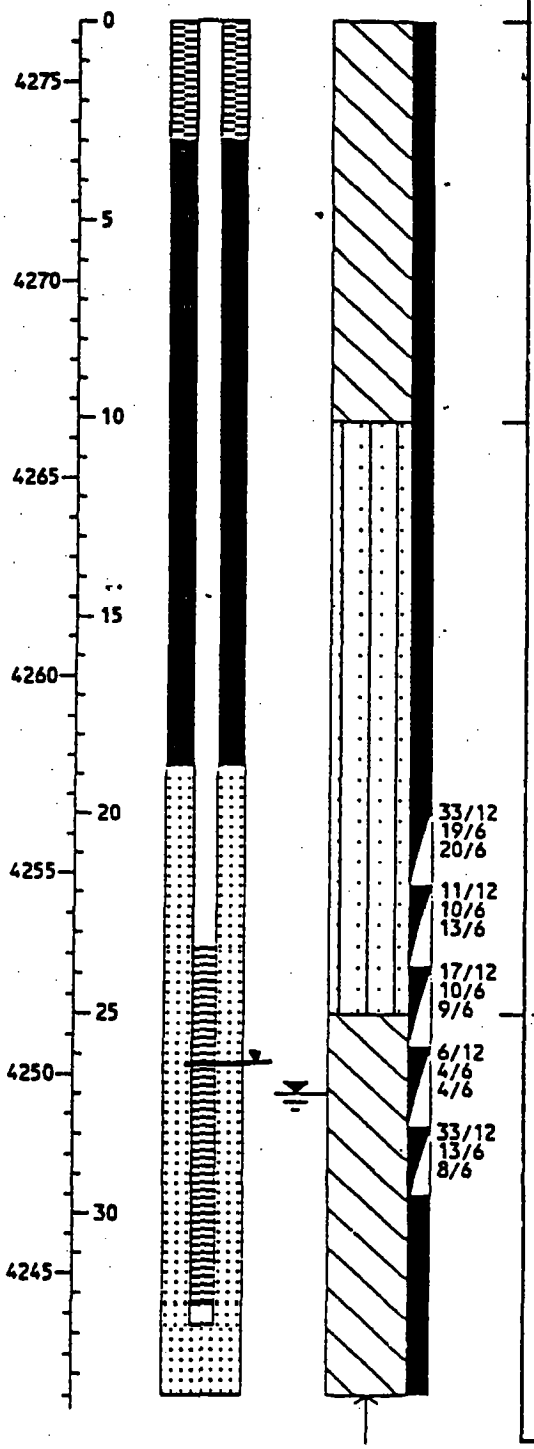


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		25/12, 12/6, 12/6	CL	SILTY CLAY: Tan & gray, very stiff, moist. (fill)	B-1		20/24
		31/12, 16/6, 11/6			B-2		16/24
			CL	SILTY CLAY: Tan, roots, very stiff, moist.	B-3		20/24
		18/12, 11/6, 11/6					
		2/12, 2/6, 3/6		...grades medium stiff to soft.	B-4		22/24
		2/12, 1/6, 2/6		...grades light gray very silty clay, thin horizontal bedding.	B-5		24/24
		4/12, 10/6			B-6		24/24
		12/6	SM	SILTY SAND: Tan, fine to medium, iron oxide staining, medium dense, moist.	B-7		24/24
		30/12, 16/6, 25/6		...grades with trace of coarse sand.	B-8		24/24
		38/12, 23/6, 26/6			B-9		24/24
		25/12, 15/6, 16/6					
		15/12, 9/6, 13/6		...grades to medium dense. ...grades reddish tan.	B-10		24/24
		17/12, 9/6, 10/6			B-11		24/24
		11/12, 7/6, 8/6		...grades very silty & clayey.	B-12		24/24
		6/12, 6/6, 8/6	CL	SILTY CLAY: Reddish tan, sandy, fine, stiff, moist.	B-13		24/24
		18/12, 10/6, 11/6		...grades to very stiff.	B-14		24/24
		15/12, 20/6, 25/6		...grades tan.	B-15		24/24
		12/12, 4/6, 5/6		...grades light gray, stiff, wet.	B-16		24/24
		16/12, 10/6, 19/6			B-17		24/24
		12/12, 9/6			B-18		24/24

DRILL HOLE LOG
DRILL HOLE NO.: GW-17A

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Northwest corner of LARW cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 27.0 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-005
DATE: 2-8-91
TOC ELEV.: 4278.22
GS ELEV.: 4276.53
LOGGED BY: MT
HOLE NO.: GW-17A



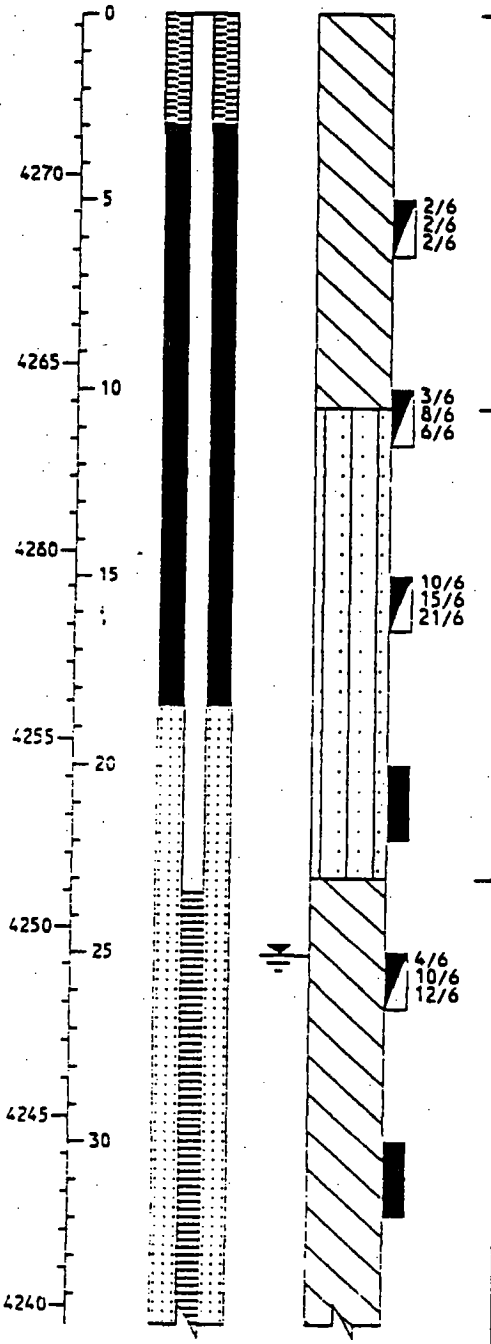
USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: Light brown grades to tannish gray, slightly silty and sandy, iron oxide staining, soft, moist.	L-1	0.0-4.5	48/54
		L-2	4.5-9.5	48/60
	...grades to light gray clay, with silt lenses, iron oxide staining, very moist.			
		L-3	9.5-14.5	24/60
SM	SILTY SAND: Tan, very silty, fine, medium dense, moist.			
		L-4	14.5-19.5	14/60
		L-5	19.5-24.5	30/60
		B-1	19.8-21.8	24/24
		B-2	21.8-23.8	22/24
		B-3	23.8-25.8	24/24
		L-6	24.5-29.5	40/60
CL	SILTY CLAY: Reddish tan, very sandy, medium stiff, moist.	B-4	25.8-27.8	24/24
		B-5	27.8-29.8	23/24
	...sand and clay interbedding ...grades to light gray to white, stiff, moist.	L-7	29.5-34.5	60/60
	...grades to greenish gray clay, stiff, very moist.			

Soil and sample data from 19.8' to 29.8' came from exploratory drill hole adjacent to GW-17A to verify soil stratigraphy.

DRILL HOLE LOG
DRILL HOLE NO.: GW-18

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Near SW Corner of LARW Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 25.1 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-005
DATE: 2-9-91
TOC ELEV.: 4276.17
GS ELEV.: 4274.31
LOGGED BY: MT
HOLE NO.: GW-18

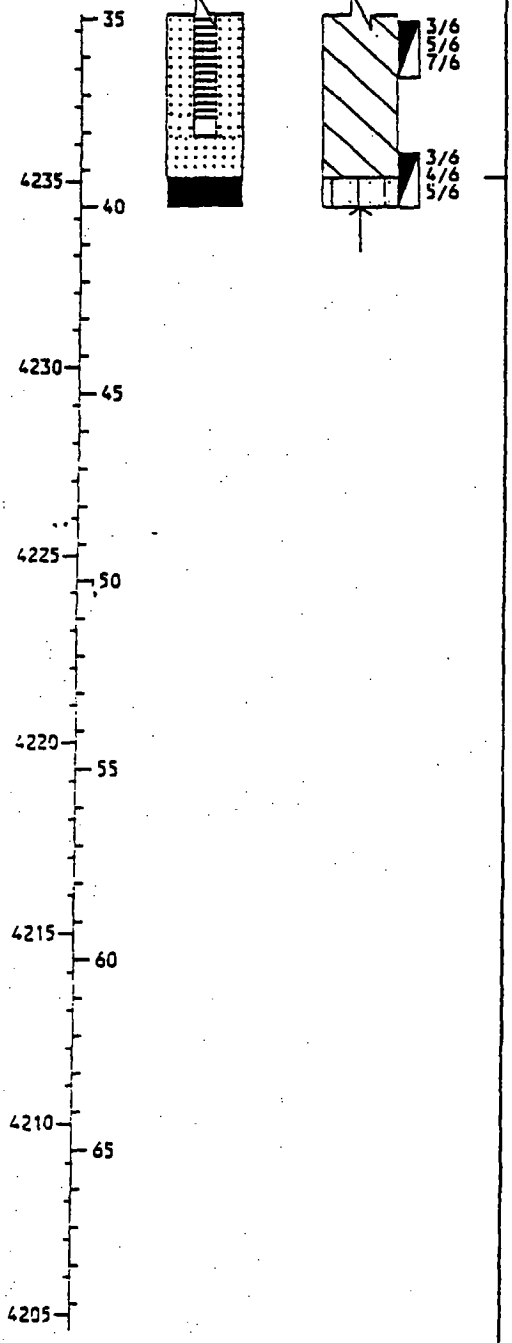


ELEVATION / DEPTH	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
	CL	SILTY CLAY: Light brown grading to tannish gray, slightly silty and sandy, iron oxide staining, soft, moist.			
		...grades to tan gray clay with iron oxide staining, moist.	B-1	5-6.5	18/18
			B-2	10-11.5	18/18
	SM	SILTY SAND: Tannish gray, clayey, silty with occasional clay lenses, medium dense, slighlty moist.			
			B-3	15-16.5	17/18
			S-4	20-22	24/24
	CL	SILTY CLAY: Reddish tan, with sand lenses, stiff, slightly wet.			
			B-5	25-26.5	18/18
		...grades to white/light gray, silty lenses, defined bedding, soft, wet.	S-6	30-32	24/24

DRILL HOLE LOG
DRILL HOLE NO.: GW-18

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Near SW Corner of LARW Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 25.1 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-005
DATE: 2-9-91
TOC ELEV.: 4276.17
GS ELEV.: 4274.31
LOGGED BY: MT
HOLE NO.: GW-18

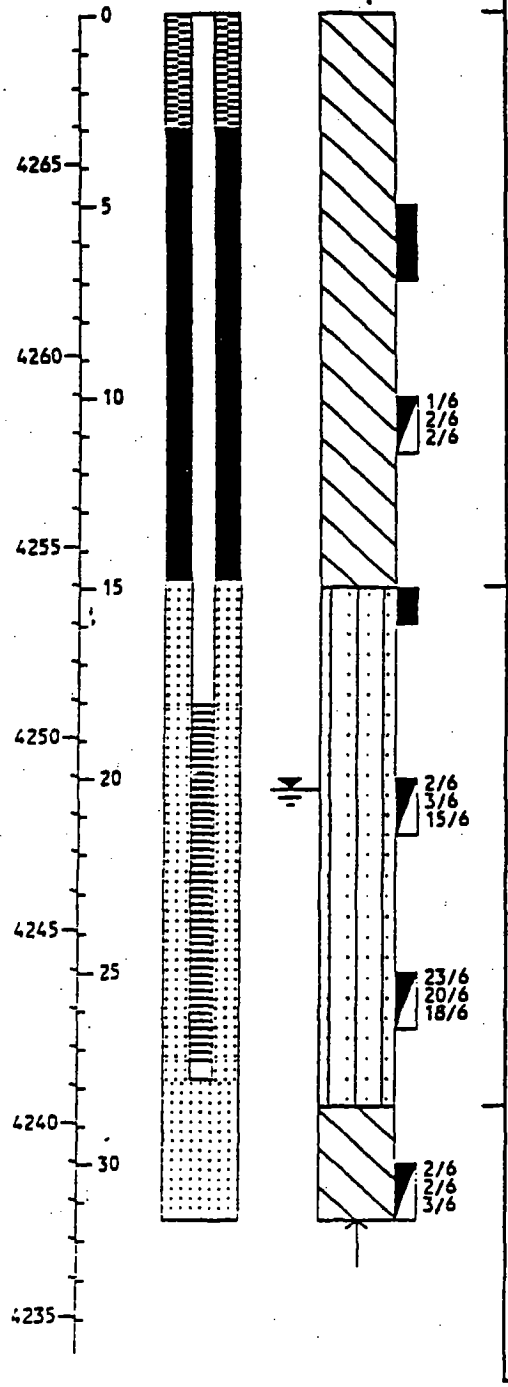


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
				...grades to light greenish gray clay with clayey sand lenses, very moist.	B-7	35-36.5	18/18
					B-8	36.5-40	18/18
			SM	SILTY SAND: Greenish gray, clayey, medium dense, moist.			

DRILL HOLE LOG
DRILL HOLE NO.: GW-19A

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: SW Corner of Section 32
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 20.3 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-005
DATE: 2-7-91
TOC ELEV.: 4270.41
GS ELEV.: 4268.89
LOGGED BY: MT
HOLE NO.: GW-19A

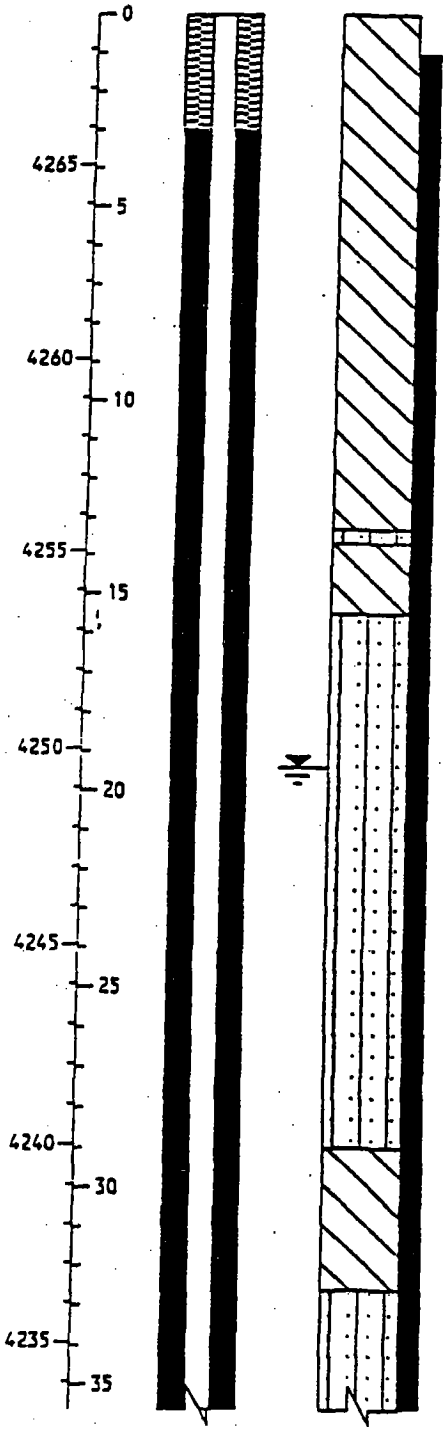


USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: Light brown, silty, sandy, dry.			
	...grades to light gray clay with silt lenses, soft, moist.	S-1	5-7	24/24
		B-2	10-11.5	18/18
SM	SILTY SAND: Tan, silty, dense, moist. * Shelby sample S-3 refused after 12 inches.	S-3	15-16	12/12
		B-4	20-21.5	18/18
	...grades to gray silty sand, medium dense, wet.			
	...grades to tan silty sand with occasional sandy clay lenses, dense, wet.	B-5	25-26.5	18/18
CL	SILTY CLAY: Greenish gray, slightly silty, medium stiff, very moist.	B-6	30-31.5	18/18

DRILL HOLE LOG
DRILL HOLE NO.: GW-19B

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: SW Corner of Section 32
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 19.4 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-005
DATE: 2-4,6-91
TOC ELEV.: 4270.43
GS ELEV.: 4268.91
LOGGED BY: MT
HOLE NO.: GW-19B

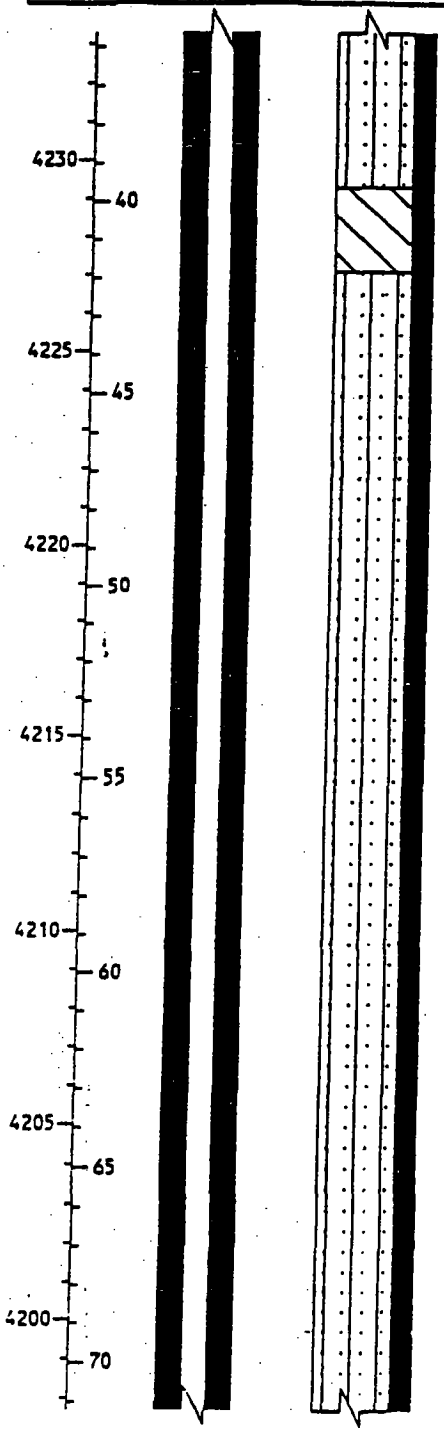


USCS	Description	Sample Number	Sample Depth (ft)	Recover (in/in)
CL	SILTY CLAY: Light brown grading to light gray, slightly silty and sandy, gypsum crystals, moist.	L-1	1-4.5	37/42
	...grades to light gray clay with occasional sand lenses, gypsum crystals, moist.	L-2	4.5-9.5	59/60
		L-3	9.5-14.5	60/60
SM	SILTY SAND: Tan, silty, loose, moist.			
CL	SILTY CLAY: Light gray, silty lenses, bedding, moist.	L-4	14.5-19.5	42/60
SM	SILTY SAND: Tan, silty, occasional silt lenses, fine to medium course, loose, moist.			
		L-5	19.5-24.5	58/60
	...grades to brownish gray sand, wet.			
		L-6	24.5-29.5	50/60
CL	SILTY CLAY: Greenish gray, silty, stiff, moist.	L-7	29.5-34.5	56/60
SM	SILTY SAND: Light greenish gray, fine to medium course, medium dense, wet.			
		L-8	34.5-39.5	60/60

DRILL HOLE LOG
DRILL HOLE NO.: GW-19B

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: SW Corner of Section 32
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 19.4 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-005
DATE: 2-4,6-91
TOC ELEV.: 4270.43
GS ELEV.: 4268.91
LOGGED BY: MT
HOLE NO.: GW-19B

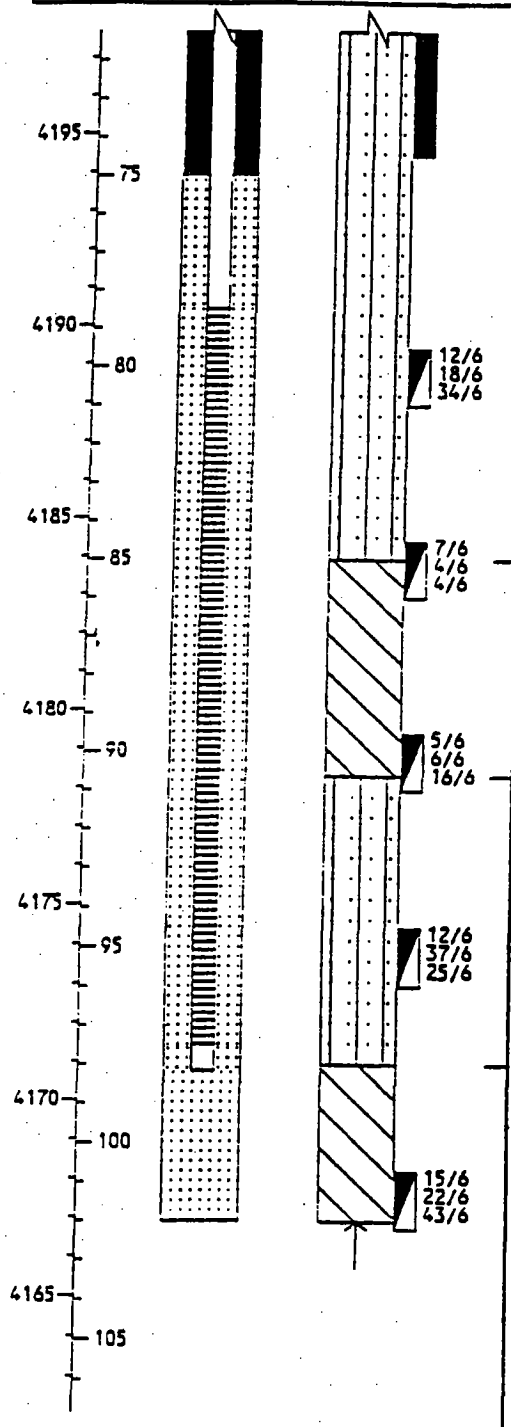


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Light gray, slightly silty, with occasional sand lenses, very moist, stiff.	L-9	39.5-44.5	60/60
			SM	SILTY SAND: Greenish gray, silty, fine, medium dense, wet.			
				...grades to tan sand, wet.	L-10	44.5-49.5	35/60
				...hard drilling between 47.0' and 49.5' (cemented sands).			
					L-11	49.5-54.5	60/60
					L-12	54.5-59.5	54/60
					L-13	59.5-64.5	41/60
					L-14	64.5-69.5	60/60
				...grades to a greenish gray sand with cemented silty clay lenses, wet.	L-15	69.5-74.5	48/60

DRILL HOLE LOG
DRILL HOLE NO.: GW-19B

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: SW Corner of Section 32
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 19.4 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-005
DATE: 2-4,6-91
TOC ELEV.: 4270.43
GS ELEV.: 4268.91
LOGGED BY: MT
HOLE NO.: GW-19B

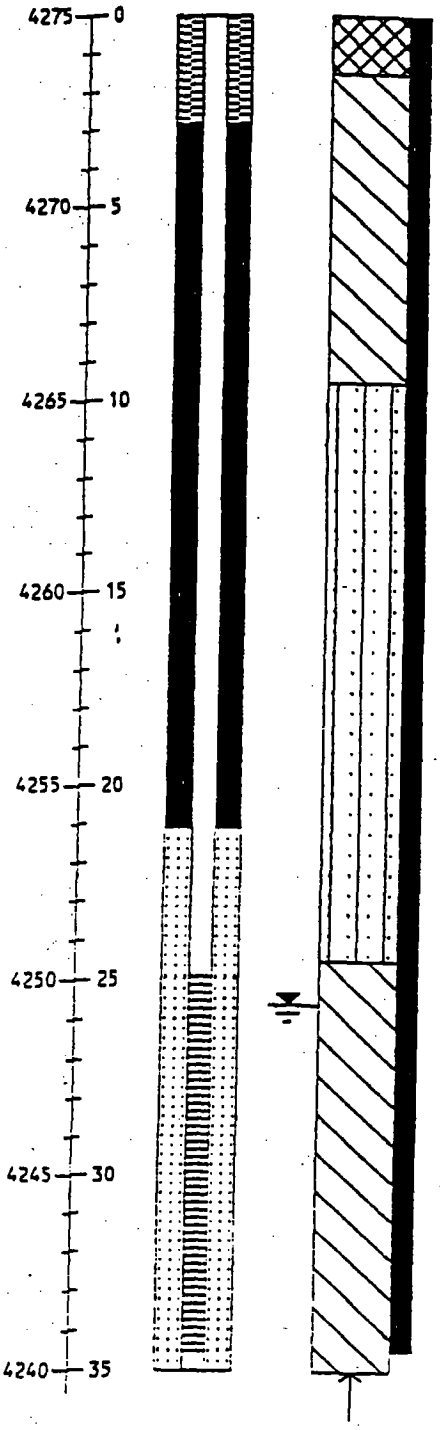


ELEVATION / DEPTH	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		...very hard drilling between 73.0' and 79.0', out of cemented sand lenses at 79.0'.			
			B-16	79.5-81	17/18
	CL	SILTY CLAY: Light gray, slightly silty, stiff, plastic, very moist.	B-17	84.5-86	2/18
			B-18	89.5-91	18/18
	SM	SILTY SAND: Tan, silty, fine, dense, wet.			
			B-19	94.5-96	18/18
	CL	SILTY CLAY: Light tan, very silty, slightly sandy, very stiff, cemented lenses, very moist.			
			B-20	100.7-102.2	18/18

DRILL HOLE LOG
DRILL HOLE NO.: GW-20

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: SW Corner of Controlled Area
DRILLER: Overland Drilling Company
DRILL RIG: CME 750
DEPTH TO WATER: 25.6 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 12-2-91
TOC ELEV.: 4276.59
GS ELEV.: 4275.04
LOGGED BY: DCH
HOLE NO.: GW-20

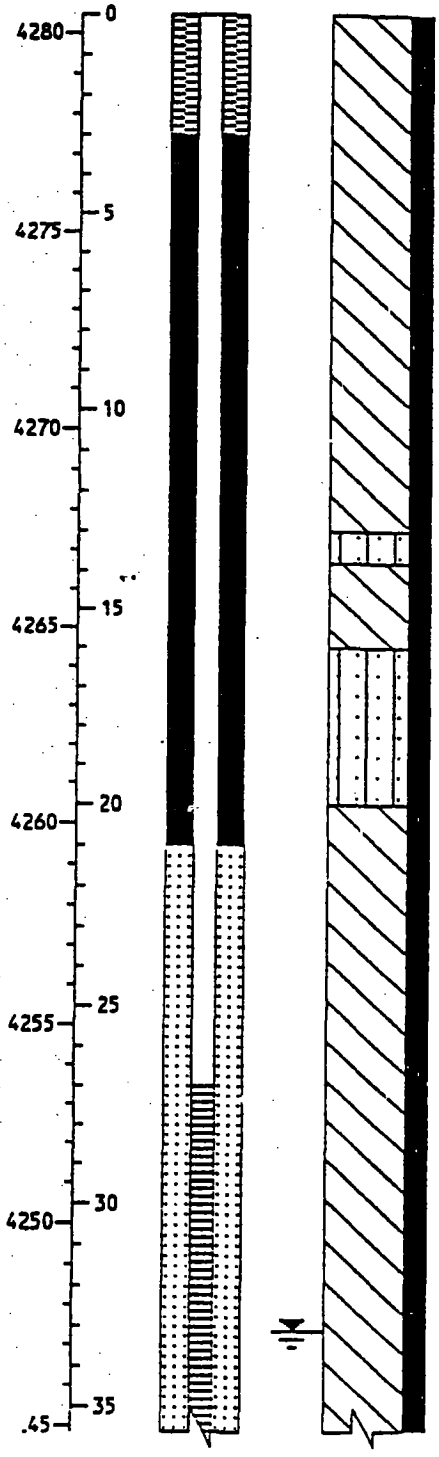


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			GM	FILL: Gray and light tan, gravelly sand, slity, moist.	L-1	0-2	6/24
			CL	SILTY CLAY: Brown, slightly sandy, iron oxide staining.	L-2	2-4.5	30/30
				...grades to light gray.	L-3	4.5-7	27/30
					L-4	7-9.5	30/30
			SM	*SILTY SAND*: Tan, fine to medium, moist.	L-5	9.5-12	11/30
					L-6	12-14.5	0/30
					L-7	14.5-17	18/30
					L-8	17-19.5	0/30
					L-9	19.5-22	13/30
				...grades clayey.	L-10	22-24.5	30/30
			CL	SILTY CLAY: Reddish tan, sandy, medium stiff, moist.	L-11	24.5-27	13/30
					L-12	27-29.5	30/30
				...grades to light gray/white, stiff, moist.	L-13	29.5-32	30/30
					L-14	32-34.5	30/30
				...grades very moist.			

DRILL HOLE LOG
DRILL HOLE NO.: GW-21

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: NE Corner of Section 32
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 33.1 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-005
DATE: 2-13-91
TOC ELEV.: 4282.80
GS ELEV.: 4280.47
LOGGED BY: MT
HOLE NO.: GW-21

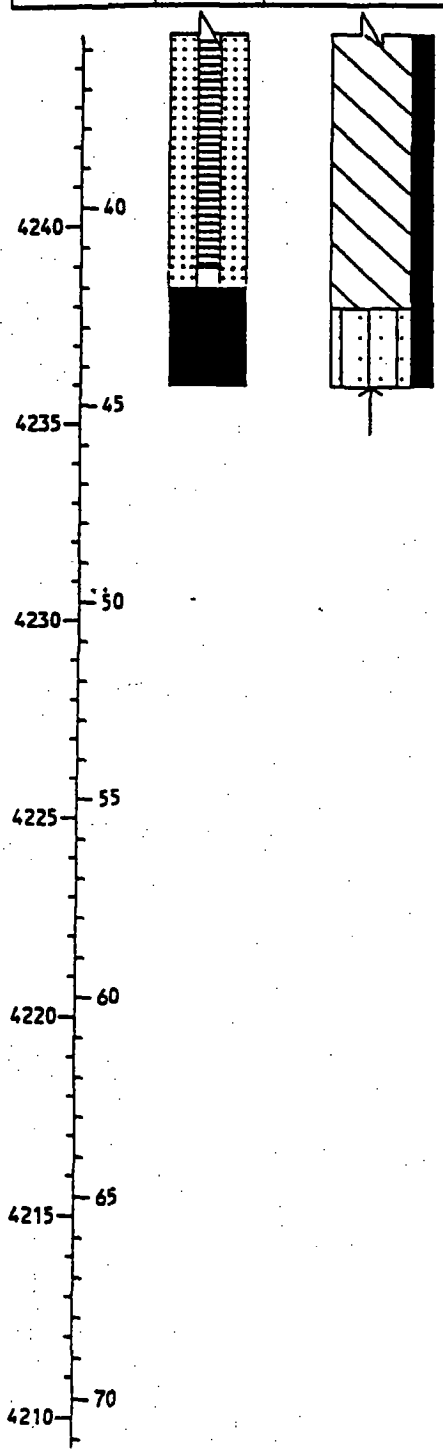


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Light brown, sandy, slightly moist.	L-1	0-4.5	48/54
				...grades to tannish gray clay, very silty, dry.	L-2	4.5-9.5	60/60
				...grades to light gray clay, horizontal bedding, very silty, iron oxide staining, moist.	L-3	9.5-14.5	38/60
			SM	SILTY SAND: Tan, silty, loose, slightly moist.			
			CL	SILTY CLAY: Tan, gray, iron oxide staining, moist.	L-4	14.5-19.5	55/60
			SM	SILTY SAND: Tan, silty, loose, fine, occasional clay lenses, slightly moist.			
			CL	SILTY CLAY: Reddish tan, sandy, stiff, moist.	L-5	19.5-24.5	60/60
				...grades to light gray, cemented lenses, very moist.	L-6	24.5-29.5	60/60
				...occasional sand lenses.	L-7	29.5-34.5	46/60
					L-8	34.5-39.5	38/60

DRILL HOLE LOG
DRILL HOLE NO.: GW-21

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: NE Corner of Section 32
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 33.1 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-005
DATE: 2-13-91
TOC ELEV.: 4282.80
GS ELEV.: 4280.47
LOGGED BY: MT
HOLE NO.: GW-21

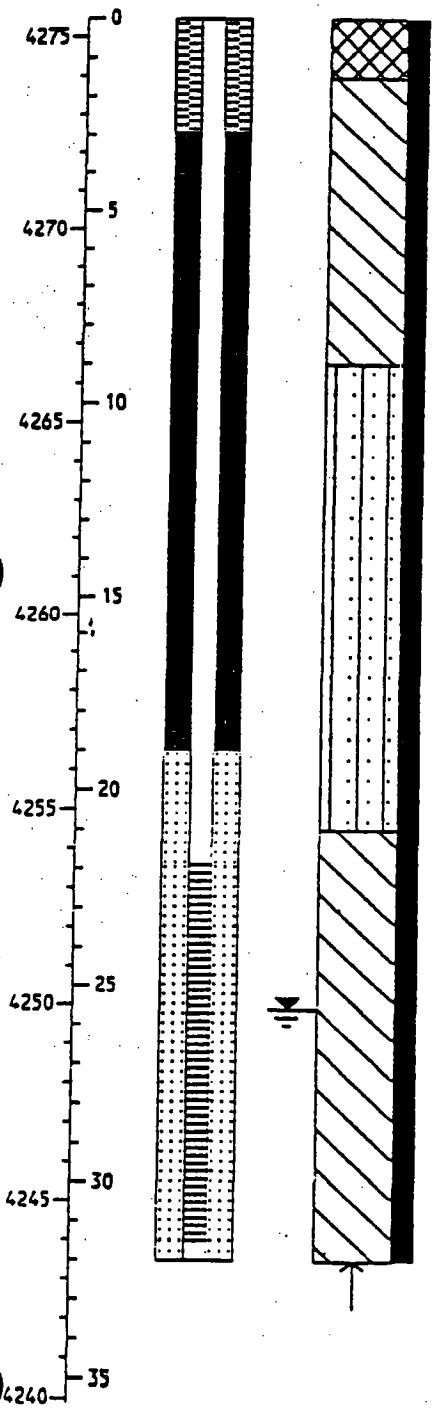


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recove (in/in)
					L-9	39.5-44.5	60/60
			SM	SILTY SAND: Light brown, silty, fine, loose, moist.			

DRILL HOLE LOG
DRILL HOLE NO.: GW-22

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North Boundary of LARW Disposal Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 25.6 HOLE DIAMETER: 7.75

PROJECT NO.: 1416-020
DATE: 12-5-91
TOC ELEV.: 4277.19
GS ELEV.: 4275.48
LOGGED BY: DCH
HOLE NO.: GW-22

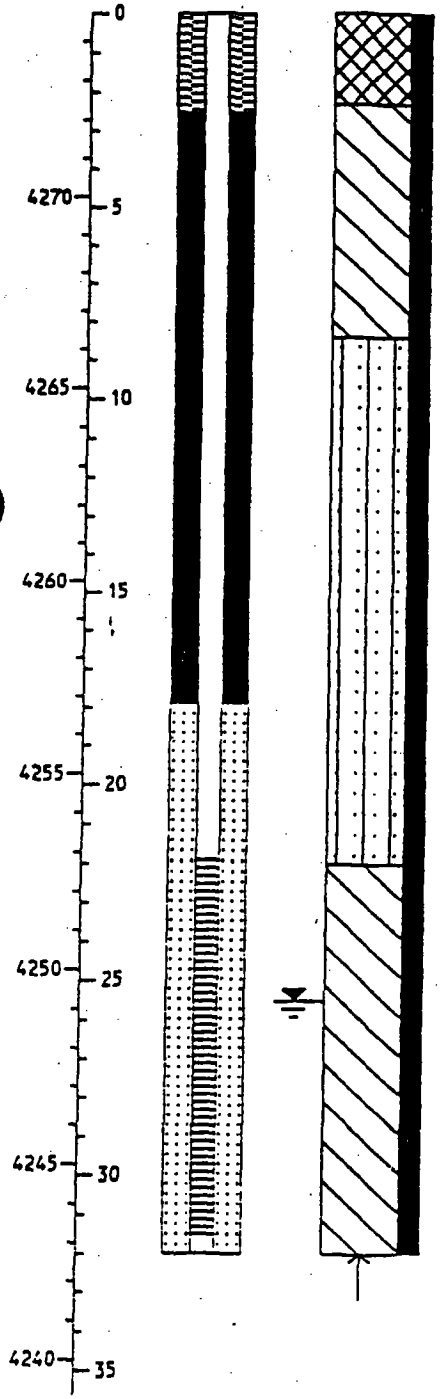


ELEVATION / DEPTH	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
	CL	FILL: Tannish gray silty clay with fine to medium sand, moist.	L-1	0-2	18/24
	CL	SILTY CLAY: Light gray, silty, trace of fine sand, iron oxide staining, moist.	L-2	2-4.5	30/30
			L-3	4.5-7	21/30
			L-4	7-9.5	30/30
	SM	SILTY SAND: Tan, fine to medium, moist.	L-5	9.5-12	13/30
			L-6	12-14.5	0/30
			L-7	14.5-17	18/30
		...trace of gravel.	L-8	17-19.5	0/30
		...grades to reddish tan sand with sandy clay lenses.	L-9	19.5-22	7/30
	CL	SILTY CLAY: Reddish tan, sandy, medium stiff, moist.	L-10	22-24.5	30/30
			L-11	24.5-27	27/30
			L-12	27-29.5	0/30
		...grades to light gray, very moist. ...grades wet	L-13	29.5-32	27/30

DRILL HOLE LOG
DRILL HOLE NO.: GW-23

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North Boundary of LARW Disposal Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 25.5 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 12-5-91
TOC ELEV.: 4276.51
GS ELEV.: 4274.73
LOGGED BY: DCH
HOLE NO.: GW-23

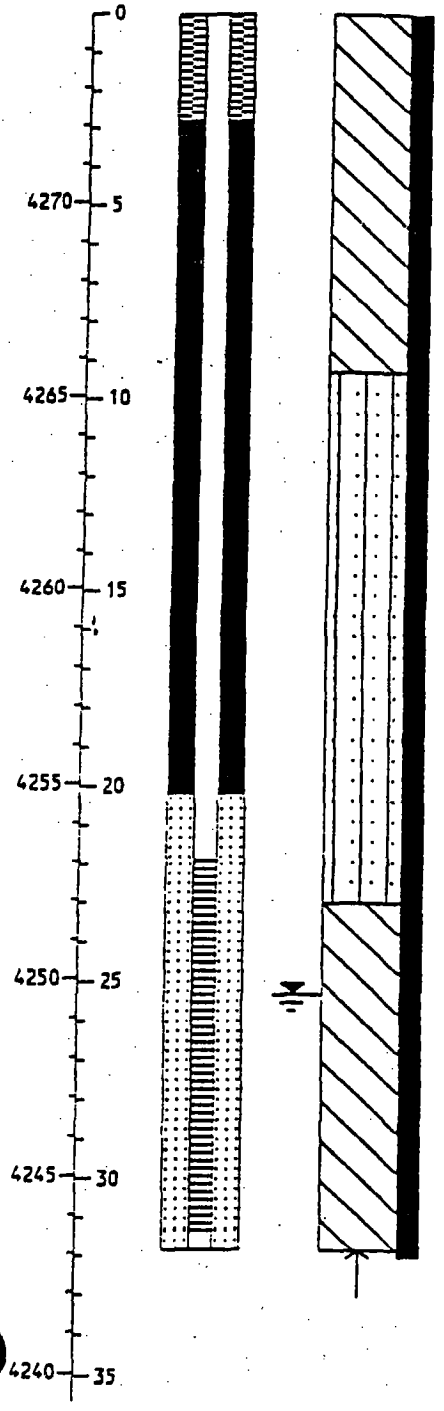


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			GM	FILL: Tan and brown gravel, some cobbles, moist.	L-1	0-2	18/24
			CL	SILTY CLAY: Gray with iron oxide staining, trace fine sand, moist.	L-2	2.0-4.5	30/30
				sand, moist.	L-3	4.5-7	16/30
					L-4	7-9.5	30/30
			SM	SILTY SAND: Tan, fine to medium, occasional sandy silt lenses, moist.	L-5	9.5-12	12/30
					L-6	12-14.5	0/30
				...occasional gray sandy clay lenses.	L-7	14.5-17	24/30
					L-8	17-19.5	0/30
				...grades to reddish tan sand with occasional clay lenses.	L-9	19.5-22	15/30
			CL	SILTY CLAY: Reddish tan, sandy, medium stiff, moist.	L-10	22-24.5	30/30
					L-11	24.5-27	10/30
				...grades to light gray, soft, moist.	L-12	27-29.5	30/30
				...grades wet.	L-13	29.5-32	30/30

DRILL HOLE LOG
DRILL HOLE NO.: GW-24

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Northwest Corner of LARW Disposal Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 25.3 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 12-3-91
TOC ELEV.: 4276.59
GS ELEV.: 4274.91
LOGGED BY: DCH
HOLE NO.: GW-24

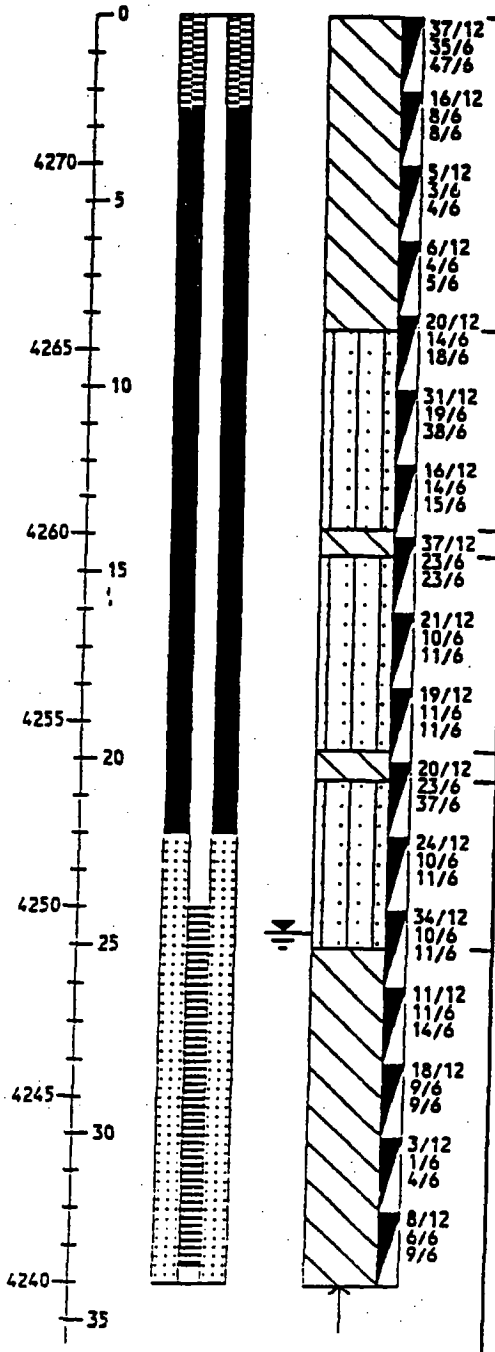


ELEVATION / DEPTH	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
	CL	SILTY CLAY: Brown, trace of fine sand, moist.	L-1	0-2	17/24
		...grades to light gray with iron oxide staining.	L-2	2-4.5	30/30
			L-3	4.5-7	30/30
			L-4	7-9.5	30/30
	SM	SILTY SAND: Tan, fine to medium, moist.	L-5	9.5-12	12/30
			L-6	12-14.5	0/30
		...grades less silty.	L-7	14.5-17	15/30
		...grades silty.	L-8	17-19.5	0/30
		...interbedded reddish tan and tan silty sand.	L-9	19.5-22	28/30
			L-10	22-24.5	0/30
	CL	SILTY CLAY: Reddish tan, sandy, medium stiff, moist.	L-11	24.5-27	30/30
			L-12	27-29.5	30/30
		...grades to light gray, soft, moist.	L-13	29.5-32	30/30
		...grades to wet.			

DRILL HOLE LOG
DRILL HOLE NO.: GW-25

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North Boundary of Future Disposal Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 24.6 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 12-19-91
TOC ELEV.: 4275.74
GS ELEV.: 4273.99
LOGGED BY: DA
HOLE NO.: GW-25

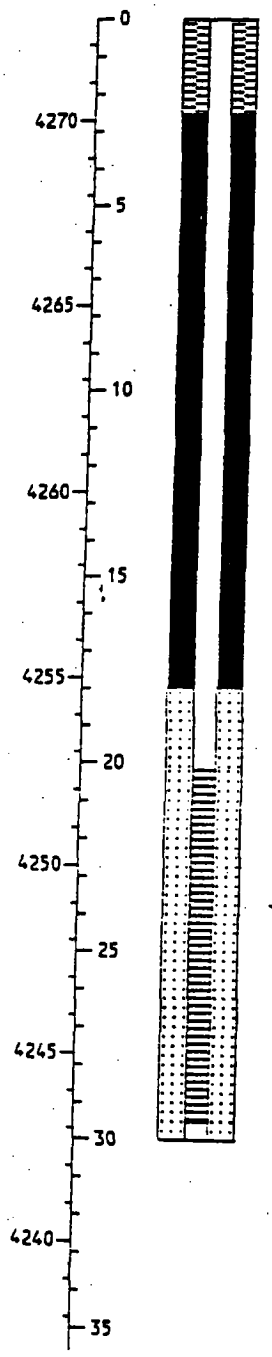


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Brown, slightly sandy, very hard, moist.	B-1	0-2	16/24
				...grades to very stiff.	B-2	2-4	18/24
					B-3	4-6	23/24
				...grades to grayish white and stiff.	B-4	6-8	24/24
			SM	SILTY SAND: Light brown, fine, medium dense, moist.	B-5	8-10	24/24
					B-6	10-12	24/24
				...trace of fine gravel.	B-7	12-14	20/24
			CL	SILTY CLAY: Sandy clay lense.	B-8	14-16	24/24
			SM	SILTY SAND: Light gray, fine, dense, moist.	B-9	16-18	21/24
				...grades to light brown.	B-10	18-20	24/24
			CL	SILTY CLAY: Brown, some fine sand, stiff, moist.	B-11	20-22	24/24
			SM	SILTY SAND: Brown, fine, very dense, moist.	B-12	22-24	24/24
				...grades to light gray, medium dense.	B-13	24-26	24/24
			CL	SILTY CLAY: Light brown, sandy, very stiff, moist.	B-14	26-28	24/24
				...grades to light gray and wet.	B-15	28-30	24/24
				...grades to soft and wet.	B-16	30-32	24/24
					B-17	32-34	24/24
				...trace of fine sand, very stiff, wet.			

DRILL HOLE LOG
DRILL HOLE NO.: GW-26

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North Boundary of Future Disposal Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 23.7 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 12-20-91
TOC ELEV.: 4274.16
GS ELEV.: 4272.71
LOGGED BY: DA
HOLE NO.: GW-26

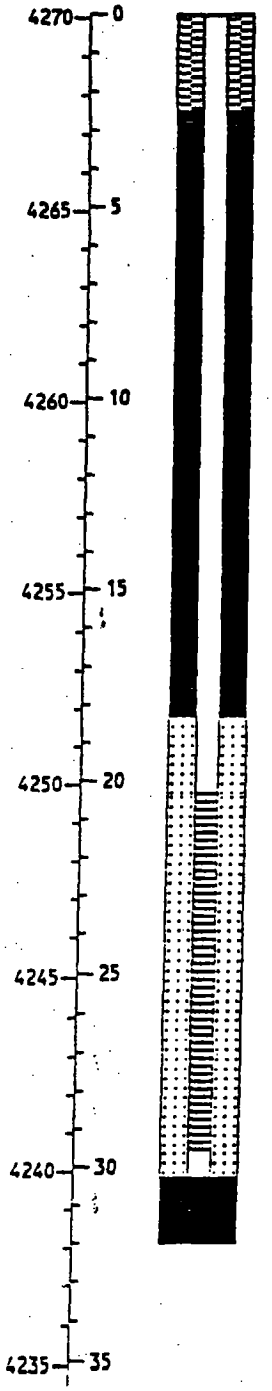


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		52/12 43/6 30/6	CL	SILTY CLAY: Brown, slightly sandy, very hard, moist.	B-1	0-2	12/24
		10/12 4/6 4/6		...grades to light gray, stiff, moist.	B-2	2-4	21/24
		12/12 7/6 8/6			B-3	4-6	24/24
		4/12 3/6 4/6		...grades to grayish white with a trace of fine sand.	B-4	6-8	24/24
		2/12 2/6 3/6			B-5	8-10	23/24
		15/12 9/6 14/6	SM	SILTY SAND: Brownish gray, fine, medium dense, moist.	B-6	10-12	19/24
		21/12 21/6 17/6		...grades to light gray, dense.	B-7	12-14	24/24
		45/12 58/6 67/6			B-8	14-16	24/24
		55/12 28/6 23/6			B-9	16-18	24/24
		29/12 20/6 18/6			B-10	18-20	24/24
		11/12 10/6 34/6	CL SM	SILTY CLAY: Light gray, fine sandy, stiff, moist.	B-11	20-22	24/24
		65/12 60/6 46/6		SILTY SAND: Light gray, fine, dense, moist. ...grades to light brown and very dense.	B-12	22-24	18/24
		47/12 42/6 30/6			B-13	24-26	24/24
		12/12 9/6 8/6			B-14	26-28	24/24
		3/12 6/6 7/6	CL	SILTY CLAY: Light gray, slightly sandy, very stiff, wet. ...grades to grayish green with a trace of fine sand.	B-15	28-30	24/24

DRILL HOLE LOG
DRILL HOLE NO.: GW-27

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Northwest Corner of Future Disposal Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 21.6 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 12-11-91
TOC ELEV.: 4272.05
GS ELEV.: 4270.12
LOGGED BY: DH & DA
HOLE NO.: GW-27



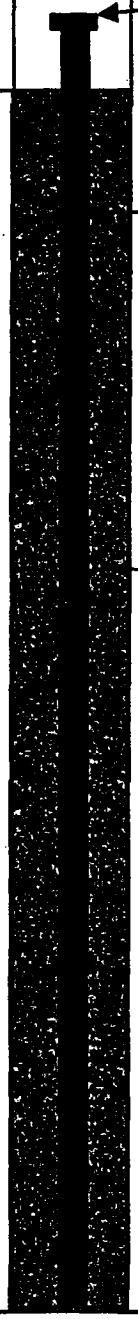
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		56/12 31/6 36/6	CL	SILTY CLAY: Brownish tan with iron oxide staining, silty, slightly sandy, moist.	B-1	0-2	6/24
		27/12 16/6 15/6			B-2	2-4	5/24
		9/12 6/6 7/6		...grades gray.	B-3	4-6	10/24
		5/12 2/6 3/6		...thin bedding, roots.	B-4	6-8	24/24
		4/12 3/6 3/6			B-5	8-10	24/24
		2/12 5/6 8/6			B-6	10-12	24/24
		20/12 12/6 21/6	SM	SILTY SAND: Tan, fine to medium course, dense, moist.	B-7	12-14	22/24
		60/12 18/6 21/6			B-8	14-16	21/24
		19/12 32/6 19/6		...grades light gray.	B-9	16-18	22/24
		9/12 4/6 9/6			B-10	18-20	24/24
			CL	SILTY CLAY: Light gray, slightly sandy, stiff, moist.			
		18/12 10/6 11/6	SM	SILTY SAND: Light gray, fine, medium dense, moist grading to very moist.	B-11	20-22	24/24
		18/12 31/6 29/6	CL	SILTY CLAY: Light gray, slightly sandy, very stiff, moist.	B-12	22-24	24/24
		23/12 35/6 58/6	SM	SILTY SAND: Gray, fine, dense, very moist.	B-13	24-26	22/24
		26/12 15/6 15/6			B-14	26-28	24/24
		6/12 4/6 4/6	CL	SILTY CLAY: Green, trace of fine sand, medium stiff, wet.	B-15	28-30	24/24
		2/12 3/6 6/6			B-16	30-32	24/24
			SM	SILTY SAND: Greenish gray, clayey, medium dense, wet.			

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: Deep Well Nest	Boring Number: GW-27 Deep
Date Drilled: 12/28/98 Date Completed 12/29/98	Northing: 861,407.39 Easting: 1,549,877.80
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4,270.88
Groundwater Elevation (ft): 4252.09	Measuring Point (MP) Elevation (ft): 4,273.67
Date Measured: 12/29/99	MP is top of Protective Casing
Total Depth (ft): 100.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 100.0 to 85.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 85.0 to 0.0 feet Type PVC Sch. 40
Sand 100.0 to 81.0 feet Bentonite Seal 81.0 to 77.5 feet Cement Grout Seal 77.5 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log
0				NA	CC		CL	Silty Clay; brownish tan with iron oxide staining, silty, slightly sandy, moist.
								grades to gray.
5				NA	CC			thin bedding, roots.
10				NA	CC			
							SM	Silty sand; tan, fine to medium course, dense, moist.
15				NA	CC			grades to a light gray.
							CL	Silty Clay; light gray, slightly sandy, stiff, moist.
20				NA	CC		SM	Silty Sand; light gray, fine, medium dense, moist to v. moist.
							CL	Silty Clay; light gray, sl. Sandy, very stiff, moist.
							SM	Silty Sand; gray, fine, dense, very moist.
25				NA	CC			
							CL	Silty Clay; green, trace of find sand, medium stiff, wet.
30				NA	CC			
							SM	Silty Sand; greenish gray, clayey, medium dense, wet.
							CL	Silty Clay; green, occ. stringers of sand, high plasticity, moist.
35				NA	CC			Silty Clay; green, sand stringers, moist.



Elevation (feet): 4270.88; 4260.88; 4250.88; 4240.88

CC Continuous Core Barrel

GW-27 Deep

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: Deep Well Nest	Boring Number: GW-27 Deep
Date Drilled: 12/28/98 Date Completed 12/29/98	Northing: 861,407.39 Easting: 1,549,877.80
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4,270.88
Groundwater Elevation (ft): 4252.09	Measuring Point (MP) Elevation (ft): 4,273.67
Date Measured: 12/29/99	MP is top of Protective Casing
Total Depth (ft): 100.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 100.0 to 85.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 85.0 to 0.0 feet Type PVC Sch. 40
Sand 100.0 to 81.0 feet Bentonite Seal 81.0 to 77.5 feet Cement Grout Seal 77.5 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
40				NA	CC		CL	Silty Clay; green w/ mottled tan, highly plastic, v. moist, sand stringers.	4230.88
45				NA	CC		SM	Silty sand; dark brown, very fine grain sand, wet.	
50				NA	CC			Sand; reddish tan. v. fine grain sands, very moist.	4220.88
55				NA	CC		ML	Silt; tan to whitish tan, very fine grained silt, occ. gravel, very wet.	
60				NA	CC			Silt; lt. tan, bands of black rock fragments, loose and friable, moist.	4210.88
65				NA	CC			Silt; tan to light tan, very fine grain, some clay in matrix, very wet.	
70				NA	CC			Silt; light tan to light green, very fine grained, occ. bedded with calcite nodules up to 2 cm in diameter, wet.	4200.88
75				NA	CC		CL	Silty clay; light tan, banded with silt, small pebble conglomerate, poorly sorted with occ. large particles up to 3 cm, moist.	

2" Schedule 40 PVC Casing

Cement-Bentonite Grout Seal

Bentonite Seal

CC Continuous Core Barrel

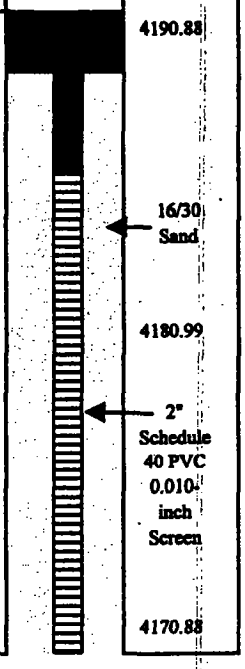
GW-27 Deep

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: Deep Well Nest	Boring Number: GW-27 Deep
Date Drilled: 12/28/98 Date Completed 12/29/98	Northing: 861,407.39 Easting: 1,549,877.80
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4,270.88
Groundwater Elevation (ft): 4252.09	Measuring Point (MP) Elevation (ft): 4,273.67
Date Measured: 12/29/99	MP is top of Protective Casing
Total Depth (ft): 100.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 100.0 to 85.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 85.0 to 0.0 feet Type PVC Sch. 40
Sand 100.0 to 81.0 feet Bentonite Seal 81.0 to 77.5 feet Cement Grout Seal 77.5 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log
80				NA	CC		GM	Gravel; light tan to dark brown, fine grained gravel, with occ. larger clasts, well rounded, majority are basalt (60%), quartzite (20%), and limestone (5%), remainder sand, loose, wet.
85				NA	CC		SM	Silty sand; light tan, banded with thin clay layers, moist.
90				NA	CC		ML	Silt; light gray with white bands, varved clay layers in a red, small bands of FeO staining, moist.
95				NA	CC			Silt; green, small reddish bands, very fine grained, occ. Bands of very thin clay, very wet.
100								



TD of boring - 100.0 feet bgs

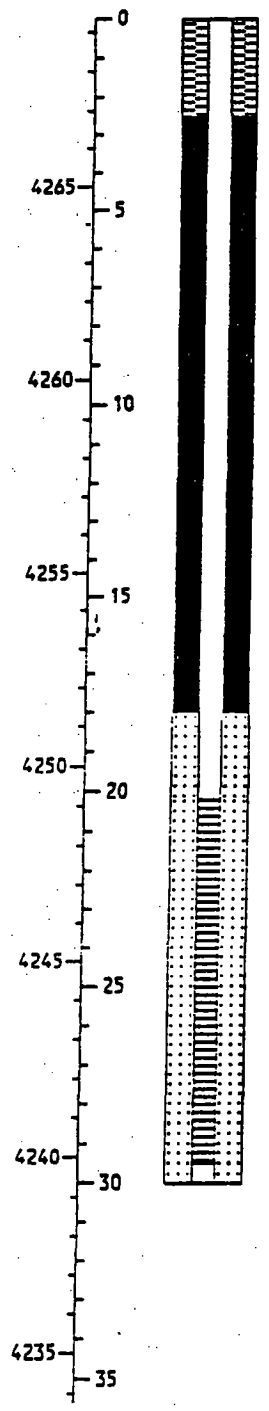
CC Continuous Core Barrel

GW-27 Deep

DRILL HOLE LOG
DRILL HOLE NO.: GW-28

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: West Boundary of Future Disposal Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 20.8 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 12-17-91
TOC ELEV.: 4271.13
GS ELEV.: 4269.36
LOGGED BY: DA
HOLE NO.: GW-28

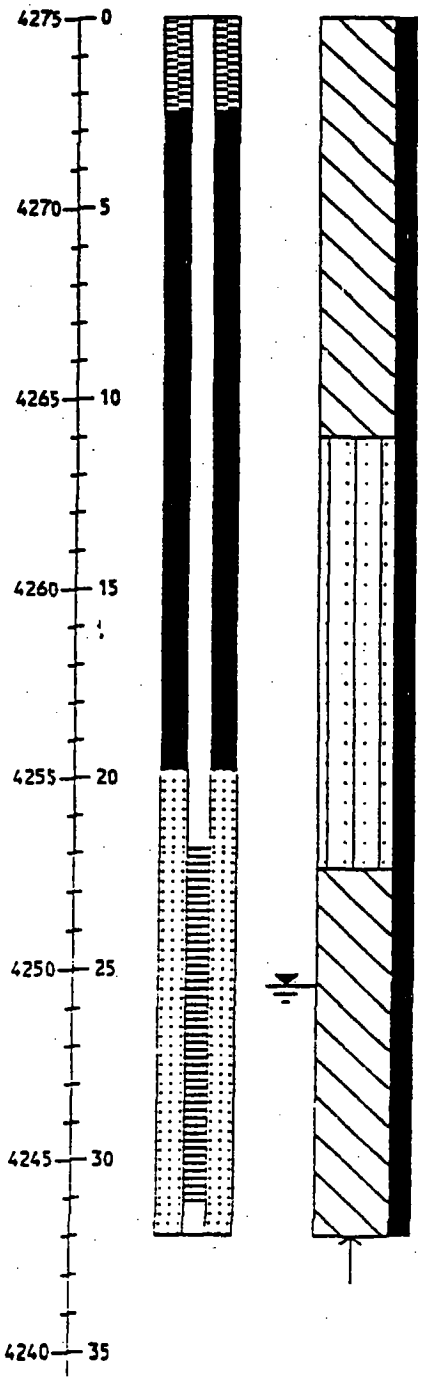


USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: Light brown, slightly sandy, very stiff, moist.	B-1	0-2	10/24
		B-2	2-4	14/24
		B-3	4-6	19/24
		B-4	6-8	24/24
	...grades to light gray, soft, very moist.	B-5	8-10	24/24
		B-6	10-12	24/24
	...grades stiff.	B-7	12-14	22/24
SM	SILTY SAND: Light gray, fine, medium dense, moist. ...grades wet.	B-8	14-16	22/24
		B-9	16-18	23/24
CL	SANDY CLAY: Light gray, with sand lenses, soft, wet.	B-10	18-20	24/24
SM	SILTY SAND: Fine, dense, moist.	B-11	20-22	24/24
CL	SANDY CLAY: Light gray, soft, wet.			
SM	SILTY SAND: Light brown, fine, very dense grading to medium dense, moist grading to wet.	B-12	22-24	24/24
		B-13	24-26	24/24
CL	SILTY CLAY: Light gray, slightly sandy, moist.	B-14	26-28	24/24
	...grades to grayish green, soft, very moist. ...grades wet.	B-15	28-30	24/24

DRILL HOLE LOG
DRILL HOLE NO.: GW-29

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Southwest Corner of LARW Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 25.4 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 11-26-91
TOC ELEV.: 4276.59
GS ELEV.: 4275.04
LOGGED BY: DCH
HOLE NO.: GW-29

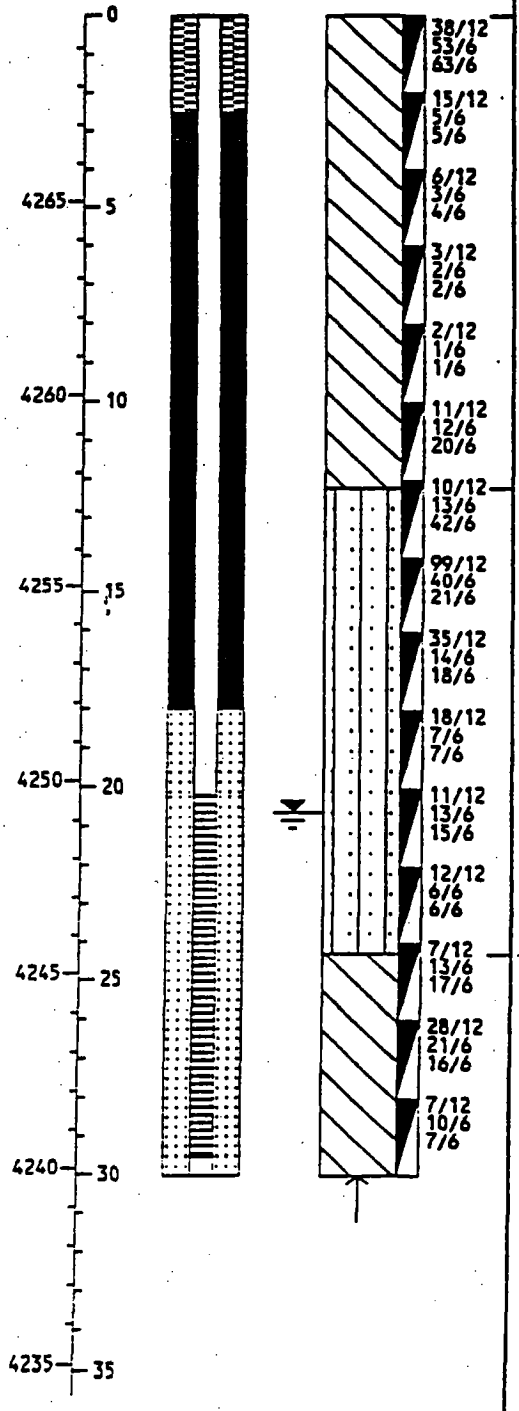


ELEVATION / DEPTH	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
	CL	SILTY CLAY: Brown with iron oxide staining, moist.	L-1	0-2	24/24
			L-2	2-4.5	30/30
			L-3	4.5-7	30/30
		...grades light gray.	L-4	7-9.5	30/30
			L-5	9.5-12	28/30
	SM	SILTY SAND: Tan, fine to medium, occasional clay lenses, moist.	L-6	12-14.5	0/30
			L-7	14.5-17	20/30
			L-8	17-19.5	0/30
			L-9	19.5-22	7/30
			L-10	22-24.5	30/30
	CL	SILTY CLAY: Reddish tan, slightly sandy, fine, occasional fine sand lenses.	L-11	24.5-27	2/30
			L-12	27-29.5	30/30
		...grades to light gray, medium stiff, wet.	L-13	29.5-32	30/30

DRILL HOLE LOG
DRILL HOLE NO.: GW-36

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Future Disposal Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 20.6 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 12-23-91
TOC ELEV.: 4271.59
GS ELEV.: 4269.84
LOGGED BY: DA
HOLE NO.: GW-36

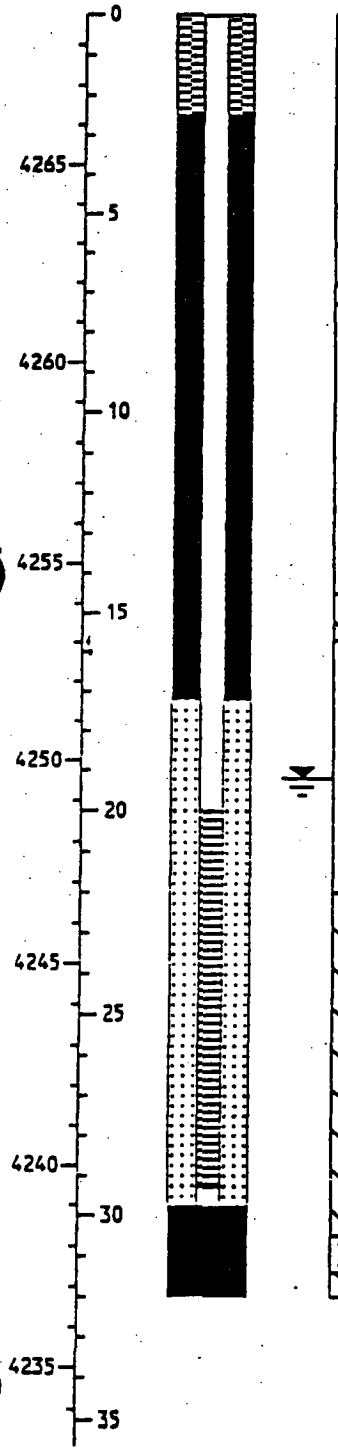


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Brown, slightly sandy, very hard, moist.	B-1	0-2	12/24
					B-2	2.0-4	16/24
				...grades to light gray.	B-3	4.0-6	24/24
				...grades very moist.	B-4	6.0-8	24/24
				...grades to almost white.	B-5	8.0-10	24/24
					B-6	10.0-12	24/24
			SM	SILTY SAND: Light gray, fine, medium dense to dense, moist.	B-7	12.0-14	24/24
					B-8	14.0-16	19/24
					B-9	16.0-18	21/24
				...grades to brown, wet.	B-10	18.0-20	23/24
					B-11	20.0-22	22/24
					B-12	22.0-24	24/24
			CL	SILTY CLAY: Light gray, slightly sandy, stiff, very moist.	B-13	24.0-26	24/24
				...grades silty, less plastic.	B-14	26.0-28	24/24
				...grades clayey, more plastic.	B-15	28.0-30	24/24
				...grades to dark gray with green clay, stiff, wet.			

DRILL HOLE LOG
DRILL HOLE NO.: GW-37

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Future Disposal Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 19.2 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 12-17-91
TOC ELEV.: 4270.48
GS ELEV.: 4268.75
LOGGED BY: DA
HOLE NO.: GW-37

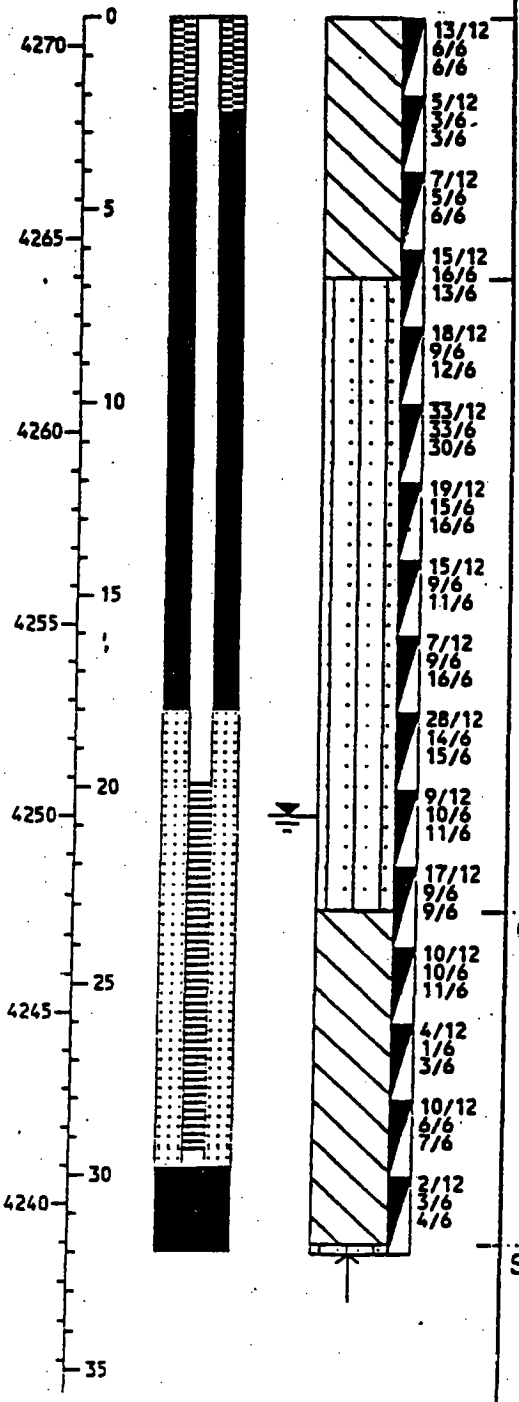


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Light gray, trace of fine sand, stiff, very moist.	B-1	0-2	24/24
					B-2	2-4	22/24
					B-3	4-6	24/24
					B-4	6-8	24/24
			SM	SILTY SAND: Light gray, fine, medium dense, moist. ...occasional thin clay lenses.	B-5	8-10	21/24
					B-6	10-12	19/24
					B-7	12-14	24/24
					B-8	14-16	24/24
			CL	SILTY CLAY: Light gray, sandy, very stiff, moist.			
			SM	SILTY SAND: Grayish brown, fine, dense, very moist.	B-9	16-18	24/24
					B-10	18-20	22/24
					B-11	20-22	19/24
			CL	SILTY CLAY: Brown, fine, stiff, wet.	B-12	22-24	24/24
				...grades to grayish white, soft, moist.	B-13	24-26	24/24
					B-14	26-28	24/24
				...grades to grayish green, medium stiff, very moist.	B-15	28-30	24/24
					B-16	30-32	24/24
			SM	SILTY SAND: Grayish green, fine, dense, very wet.			
			CL	CLAY: Grayish green, fine sandy, very stiff, very wet.			

DRILL HOLE LOG
DRILL HOLE NO.: GW-38

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Future Disposal Cell
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 20.7 HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-020
DATE: 12-24-91
TOC ELEV.: 4273.28
GS ELEV.: 4270.75
LOGGED BY: DCH
HOLE NO.: GW-38

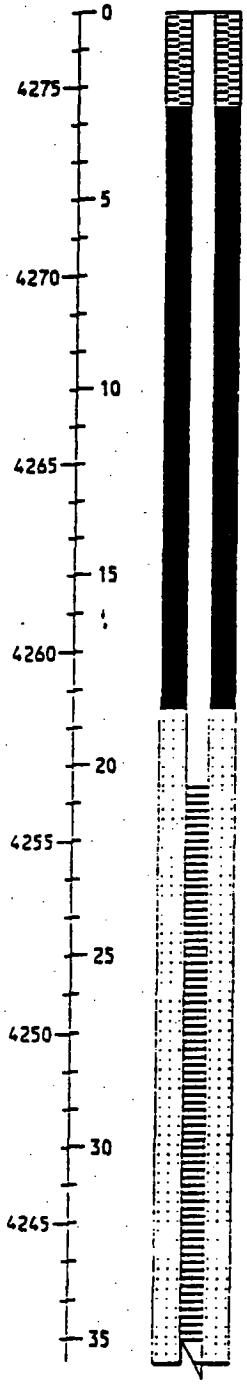


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Tan, trace of fine sand, moist.	B-1	0-2	23/24
				...grades to gray.	B-2	2-4	22/24
				...grades to light gray, very silty.	B-3	4-6	24/24
					B-4	6-8	22/24
			SM	SILTY SAND: Tan, fine to medium with a trace of course, moist.	B-5	8-10	15/24
				...grades with occasional silty clay lenses.	B-6	10-12	24/24
					B-7	12-14	24/24
				...grades to tannish light gray, fine, moist.	B-8	14-16	19/24
					B-9	16.0-18	24/24
					B-10	18-20	24/24
					B-11	20-22	24/24
				...roots.	B-12	22-24	24/24
			CL	SILTY CLAY: Reddish tan, sandy, moist.	B-13	24-26	24/24
					B-14	26-28	24/24
				...grades to light gray, soft, moist.	B-15	28-30	24/24
				...grades to grayish green, wet.	B-16	30-32	24/24
			SM	SILTY SAND: Grayish green, fine to course, wet.			

DRILL HOLE LOG
DRILL HOLE NO.: GW-41

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Near SE corner of RCRA Disposal Cell.
DRILLER: Overland Drilling Company
DRILL RIG: CME 75
DEPTH TO WATER: 28.6 HOLE DIAMETER: 8.25

PROJECT NO.: 1416-022
DATE: 2-12-92
TOC ELEV.: 4279.37
GS ELEV.: 4277.04
LOGGED BY: DCH
HOLE NO.: GW-41

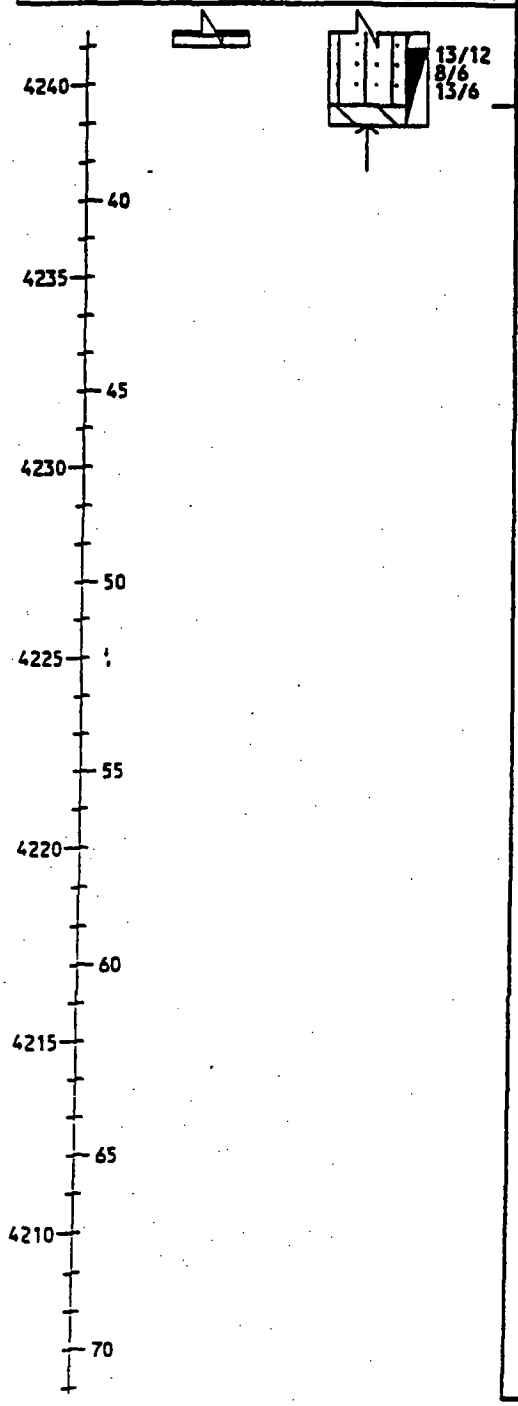


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		20/12 15/6 12/6	CL	SILTY CLAY: Tan, slightly sandy, moist.	B-1	0-2	20/24
		10/12 7/6 9/6		... grades to gray silty clay.	B-2	2-4	24/24
		2/12 2/6 2/6		... grades to tan.	B-3	4-6	24/24
		5/12 3/6 3/6		... grades to gray. ... horizontal bedding.	B-4	6-8	23/24
		4/12 3/6 7/6			B-5	8-10	24/24
		18/12 9/6 9/6	SM	SILTY SAND: Tan, fine-medium, moist.	B-6	10-12	14/24
		8/12 7/6 9/6		...sandy clay lense.	B-7	12-14	23/24
			CL	SANDY CLAY: Tan, fine, moist.	B-8	14-16	24/24
		13/12 9/6 11/6	SM	SILTY SAND: Tan, fine, moist.	B-9	16-18	23/24
		12/12 7/6 9/6			B-10	18-20	24/24
		8/12 8/6 9/6		... grades to reddish tan.	B-11	20-22	24/24
		13/12 9/6 11/6	CL	SILTY CLAY: Reddish tan, sandy to slightly sandy, moist.	B-12	22-24	19/24
		6/12 7/6 6/6			B-13	24-26	24/24
		7/12 7/6 10/6			B-14	26-28	24/24
		12/12 6/6 5/6		... grades to light gray silty clay, moist.	B-15	28-30	24/24
		2/12 2/6 4/6		... grades wet.	B-16	30-32	24/24
		3/12 2/6 4/6			B-17	32-34	24/24
		10/12 7/6 11/6	SM	SILTY SAND: Tannish gray, fine, clayey, wet.	B-18	34-36	24/24
		15/12 13/6 19/6					

DRILL HOLE LOG
DRILL HOLE NO.: GW-41

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Near SE corner of RCRA Disposal Cell.
DRILLER: Overland Drilling Company
DRILL RIG: CME 75
DEPTH TO WATER: 28.6 HOLE DIAMETER: 8.25

PROJECT NO.: 1416-022
DATE: 2-12-92
TOC ELEV.: 4279.37
GS ELEV.: 4277.04
LOGGED BY: DCH
HOLE NO.: GW-41

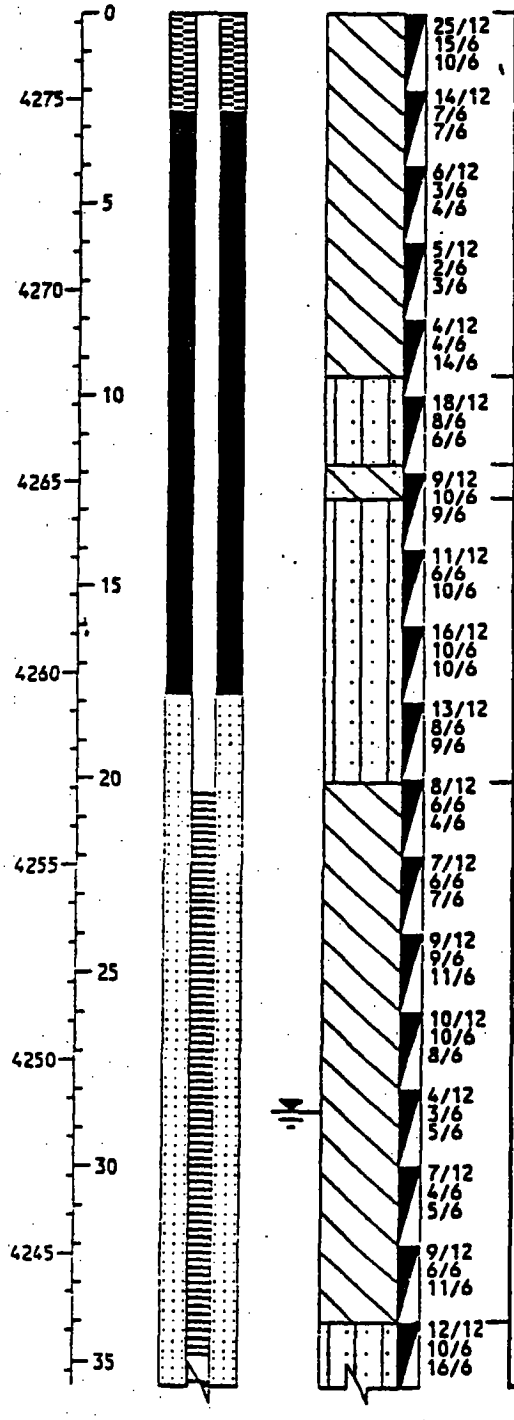


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		13/12 8/6 13/6			B-19	36-38	24/24
			CL	SILTY CLAY: Tannish gray, slightly sandy, wet.			

DRILL HOLE LOG
DRILL HOLE NO.: GW-42

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Near the NE corner of RCRA Waste Disposal Cell.
DRILLER: Overland Drilling Company
DRILL RIG: CME 75
DEPTH TO WATER: 28.6 HOLE DIAMETER: 8.25

PROJECT NO.: 1416-022
DATE: 2-13-92
TOC ELEV.: 4279.16
GS ELEV.: 4277.24
LOGGED BY: DCH
HOLE NO.: GW-42

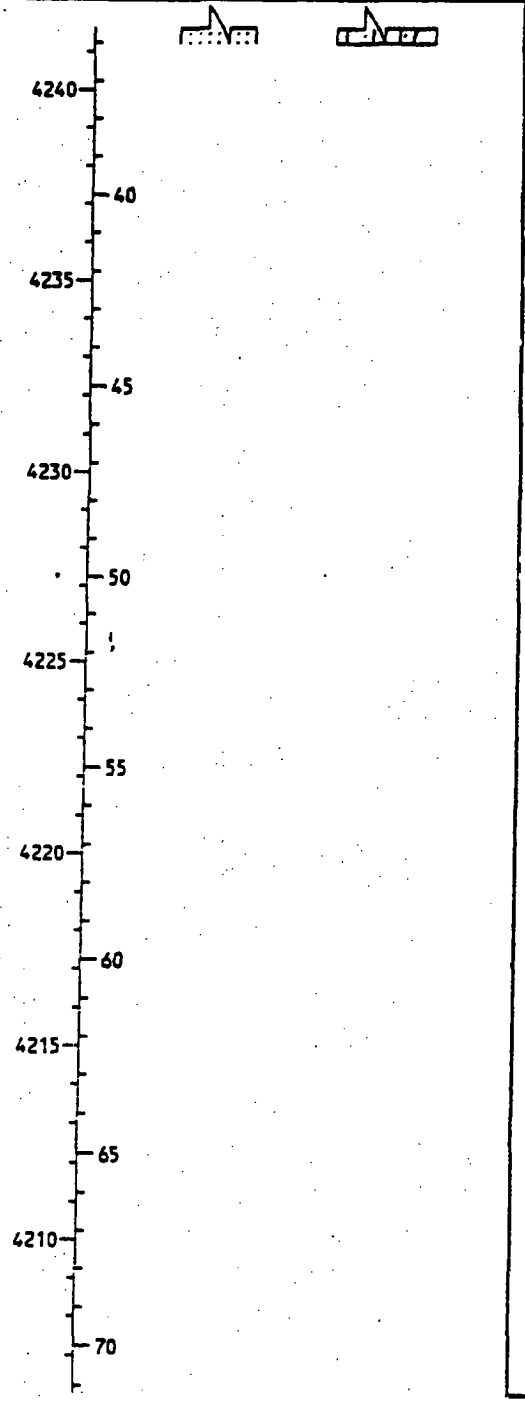


Depth	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
	CL	SILTY CLAY: Tan, slightly sandy, fine, moist.	B-1	0-2	14/24
		... grades to tannish gray.	B-2	2-4	24/24
		... grades to tan.	B-3	4-6	15/24
		... grades to gray, silty, horizontal bedding.	B-4	6-8	23/24
			B-5	8-10	16/24
	SM	SILTY SAND: Tan, fine to medium, moist.	B-6	10-12	24/24
	CL	SANDY CLAY: Tan, fine to medium, silty, moist.	B-7	12-14	23/24
	SM	SILTY SAND: Tan, fine to medium, moist.	B-8	14-16	22/24
		... grades to reddish tan silty sand, moist.	B-9	16-18	24/24
		... grades clayey.	B-10	18-20	24/24
		... sandy clay lense.			
	CL	SILTY CLAY: Reddish tan, sandy to slightly sandy, fine, moist.	B-11	20-22	24/24
			B-12	22-24	24/24
			B-13	24-26	24/24
			B-14	26-28	24/24
		...grades to light gray silty clay, moist.	B-15	28-30	24/24
		...grades wet.	B-16	30-32	24/24
		...grades more sandy	B-17	32-34	24/24
	SM	SILTY SAND: Tannish gray, fine, clayey, wet.	B-18	34-36	24/24

DRILL HOLE LOG
DRILL HOLE NO.: GW-42

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Near the NE corner of RCRA Waste Disposal Cell.
DRILLER: Overland Drilling Company
DRILL RIG: CME 75
DEPTH TO WATER: 28.6 HOLE DIAMETER: 8.25

PROJECT NO.: 1416-022
DATE: 2-13-92
TOC ELEV.: 4279.16
GS ELEV.: 4277.24
LOGGED BY: DCH
HOLE NO.: GW-42

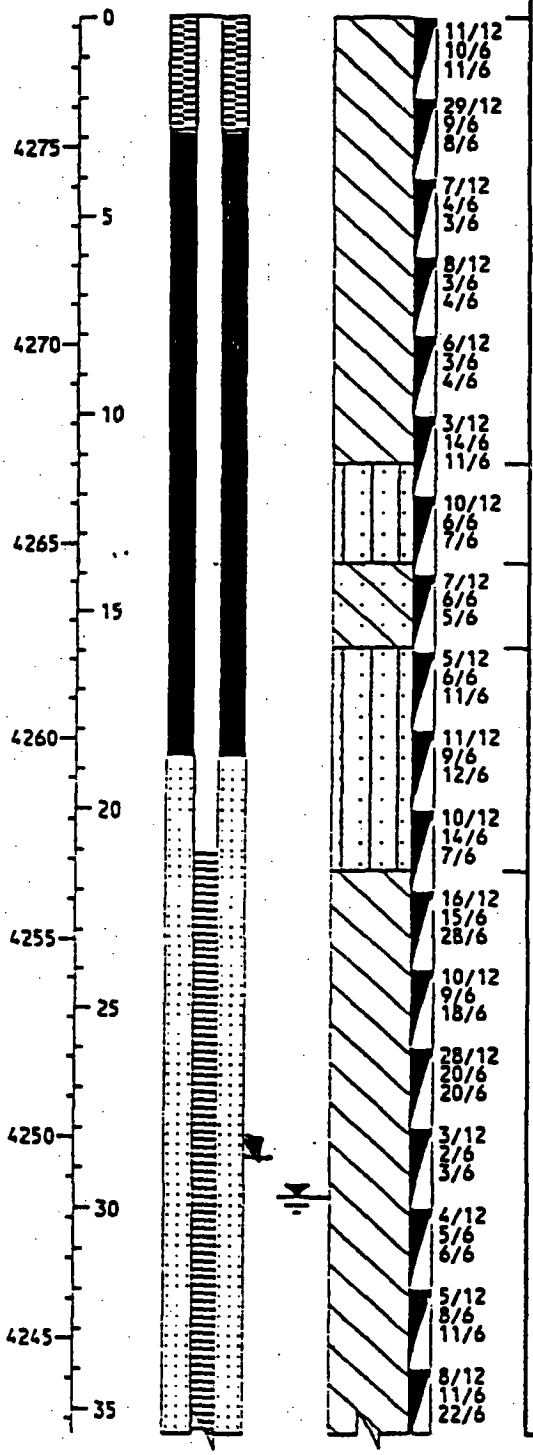


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)

DRILL HOLE LOG
DRILL HOLE NO.: GW-43

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Near the NE corner of RCRA Waste Disposal Cell.
DRILLER: Overland Drilling Company
DRILL RIG: CME 75
DEPTH TO WATER: 29.7 HOLE DIAMETER: 8.25

PROJECT NO.: 1416-022
DATE: 2-14-92
TOC ELEV.: 4280.25
GS ELEV.: 4278.24
LOGGED BY: DCH
HOLE NO.: GW-43



USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: Tan, slightly sandy, fine, moist.	B-1	0-2	20/24
		B-2	2-4	15/24
	... grades to gray, very silty, horizontal bedding, moist.	B-3	4-6	2/24
		B-4	6-8	2/24
		B-5	8-10	2/24
		B-6	10-12	24/24
SM	SILTY SAND: Tan, fine, moist.	B-7	12-14	19/24
CL	SANDY CLAY: Tan, fine, moist.	B-8	14-16	24/24
SM	SILTY SAND: Tan, fine to medium, occasional sandy clay lenses, moist.	B-9	16-18	24/24
		B-10	18-20	24/24
		B-11	20-22	24/24
CL	SILTY CLAY: Reddish tan, sandy to slightly sandy, fine, moist.	B-12	22-24	24/24
		B-13	24-26	24/24
		B-14	26-28	24/24
	... grades to light gray silty clay.	B-15	28-30	24/24
	... grades wet.	B-16	30-32	24/24
		B-17	32-34	24/24
	...grades more sandy	B-18	34-36	24/24

DRILL HOLE LOG
DRILL HOLE NO.: GW-43

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Near the NE corner of RCRA Waste Disposal Cell.
DRILLER: Overland Drilling Company
DRILL RIG: CME 75
DEPTH TO WATER: 29.7 HOLE DIAMETER: 8.25

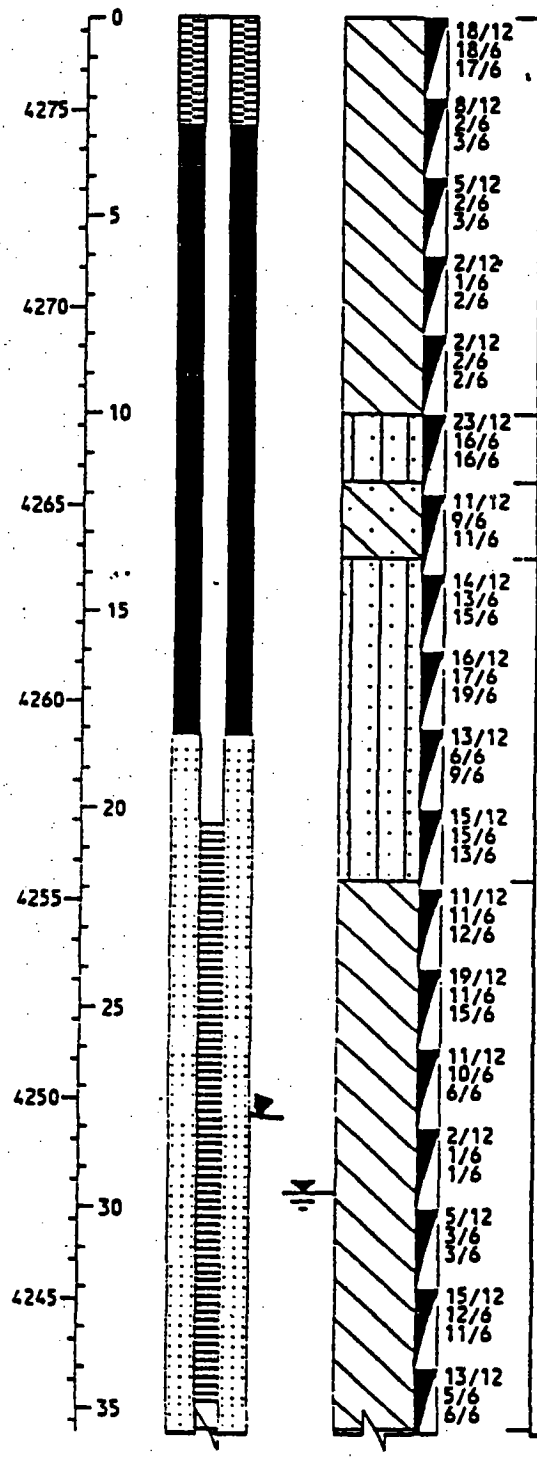
PROJECT NO.: 1416-022
DATE: 2-14-92
TOC ELEV.: 4280.25
GS ELEV.: 4278.24
LOGGED BY: DCH
HOLE NO.: GW-43

ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
4240 / 40		14/12 7/6 18/6	SM	SILTY SAND: Tannish gray, clayey, iron oxide staining, wet.	B-19	36-38	24/24
4235 / 45			CL	SILTY CLAY: Tannish gray. wet.			
4230 / 50							
4225 / 55							
4220 / 60							
4215 / 65							
4210 / 70							

DRILL HOLE LOG
DRILL HOLE NO.: GW-44

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North side of RCRA Waste Disposal Cell.
DRILLER: Overland Drilling Company
DRILL RIG: CME 75
DEPTH TO WATER: 29.6 HOLE DIAMETER: 8.25

PROJECT NO.: 1416-022
DATE: 2-17-92
TOC ELEV.: 4278.89
GS ELEV.: 4277.32
LOGGED BY: DCH
HOLE NO.: GW-44

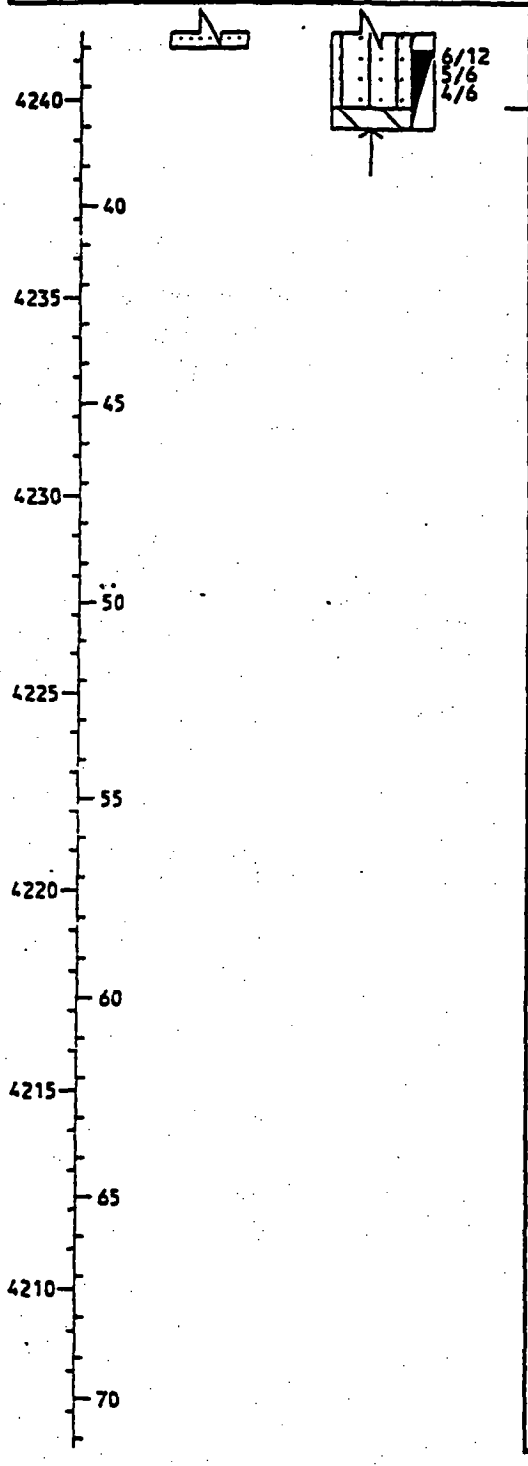


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Brownish tan, slightly sandy, fine, moist.	B-1	0-2	15/24
					B-2	2-4	0/24
					B-3	4-6	2/24
				...grades to gray silty clay, roots, horrizontal bedding.	B-4	6-8	24/24
					B-5	8-10	24/24
			SM	SILTY SAND: Tan, fine to medium, moist.	B-6	10-12	24/24
			CL	SANDY CLAY: Tan, fine to coarse, moist.	B-7	12-14	20/24
			SM	SILTY SAND: Tan, fine to coarse, occasional sandy clay lenses, moist.	B-8	14-16	24/24
					B-9	16-18	24/24
				... grades to reddish tan silty sand, moist.	B-10	18-20	24/24
					B-11	20-22	24/24
			CL	SILTY CLAY: Reddish tan, sandy to slightly sandy, fine, moist.	B-12	22-24	24/24
					B-13	24-26	24/24
					B-14	26-28	19/24
				...grades to gray silty clay, very moist. ...grades wet.	B-15	28-30	24/24
					B-16	30-32	24/24
					B-17	32-34	24/24
				...grades more sandy	B-18	34-36	24/24

DRILL HOLE LOG
DRILL HOLE NO.: GW-44

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North side of RCRA Waste Disposal Cell.
DRILLER: Overland Drilling Company
DRILL RIG: CME 75
DEPTH TO WATER: 29.6 HOLE DIAMETER: 8.25

PROJECT NO.: 1416-022
DATE: 2-17-92
TOC ELEV.: 4278.89
GS ELEV.: 4277.32
LOGGED BY: DCH
HOLE NO.: GW-44

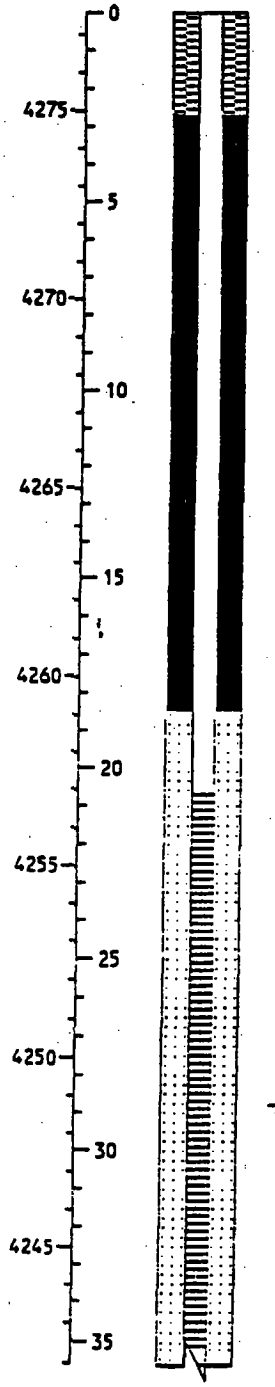


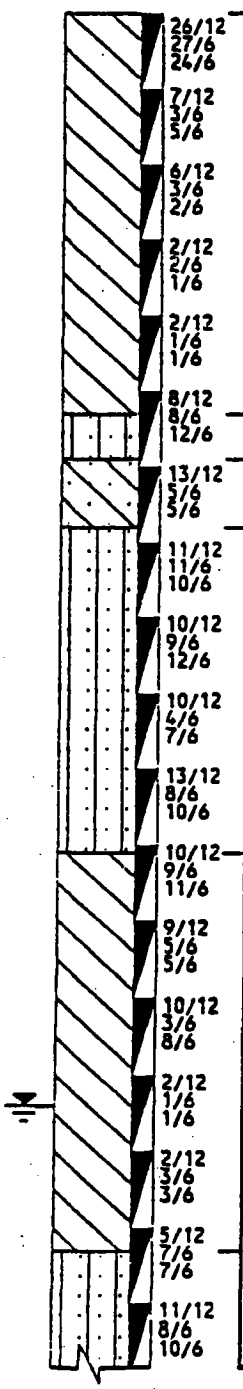
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		6/12 5/6 4/6	SM	SILTY SAND: Gray, fine, clayey, wet.	B-18	36-38	24/24
			CL	SILTY CLAY: Gray, moist.			

DRILL HOLE LOG
DRILL HOLE NO.: GW-45

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North side of RCRA Waste Disposal Cell.
DRILLER: Overland Drilling Company
DRILL RIG: CME 75
DEPTH TO WATER: 28.8 HOLE DIAMETER: 8.25

PROJECT NO.: 1416-022
DATE: 2-18-92
TOC ELEV.: 4279.25
GS ELEV.: 4277.59
LOGGED BY: DCH
HOLE NO.: GW-45



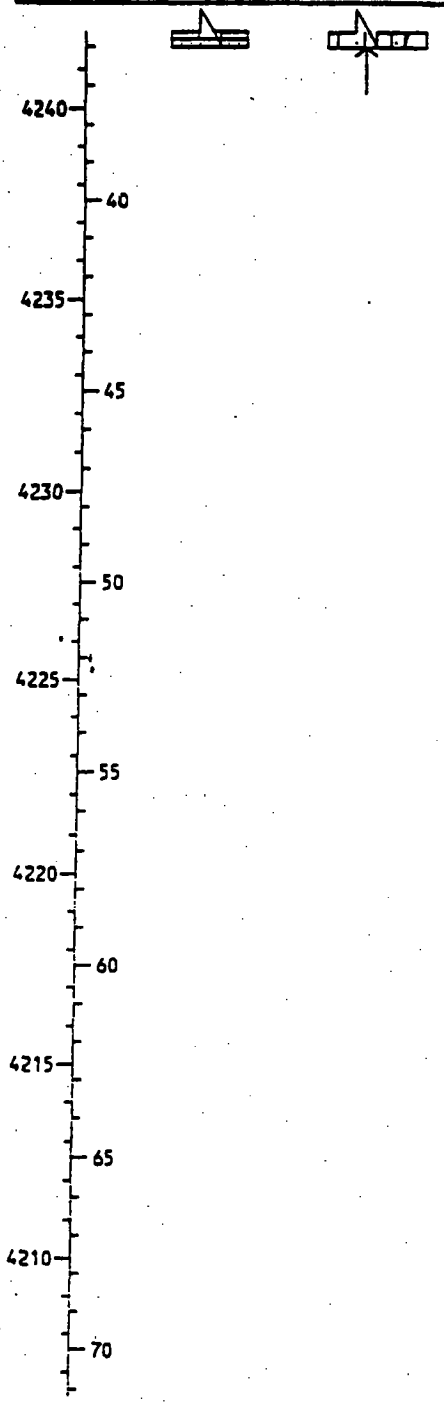


USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: Brownish tan, slightly sandy with occassional silty sand lenses, iron oxide staining, moist.	B-1	0-2	15/24
		B-2	2-4	1/24
		B-3	4-6	24/24
	...grades to gray, very silty, horizontal bedding, moist.	B-4	6-8	24/24
		B-5	8-10	24/24
		B-6	10-12	19/24
SM	SILTY SAND: Tan, fine to medium, moist.			
SC	SANDY CLAY: Tan, fine to medium, moist.	B-7	12-14	23/24
SM	SILTY SAND: Tan, fine to coarse, occasional sandy clay lenses, moist.	B-8	14-16	24/24
		B-9	16-18	24/24
	...grades to reddish tan.	B-10	18-20	24/24
		B-11	20-22	24/24
CL	SILTY CLAY: Reddish tan, trace sand, fine, moist.	B-12	22-24	24/24
		B-13	24-26	24/24
		B-14	26-28	24/24
	...grades to gray silty clay, very moist.	B-15	28-30	24/24
	...grades to wet.	B-16	30-32	24/24
	... occassional silty sand lenses.	B-17	32-34	24/24
SM	SILTY SAND: Tannish gray, fine, occasional sandy clay lenses, moist.	B-18	34-36	24/24

DRILL HOLE LOG
DRILL HOLE NO.: GW-45

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North side of RCRA Waste Disposal Cell.
DRILLER: Overland Drilling Company
DRILL RIG: CME 75
DEPTH TO WATER: 28.8 HOLE DIAMETER: 8.25

PROJECT NO.: 1416-022
DATE: 2-18-92
TOC ELEV.: 4279.25
GS ELEV.: 4277.59
LOGGED BY: DCH
HOLE NO.: GW-45

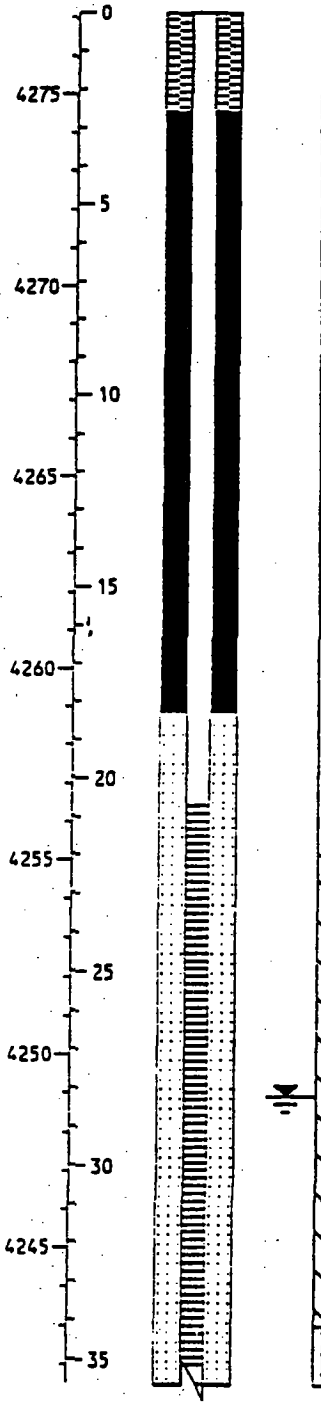


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)

DRILL HOLE LOG
DRILL HOLE NO.: GW-46

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North side of RCRA Waste Disposal Cell.
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 28.2 HOLE DIAMETER: 8.25

PROJECT NO.: 1416-022
DATE: 2-25-92
TOC ELEV.: 4279.26
GS ELEV.: 4277.16
LOGGED BY: DCH
HOLE NO.: GW-46

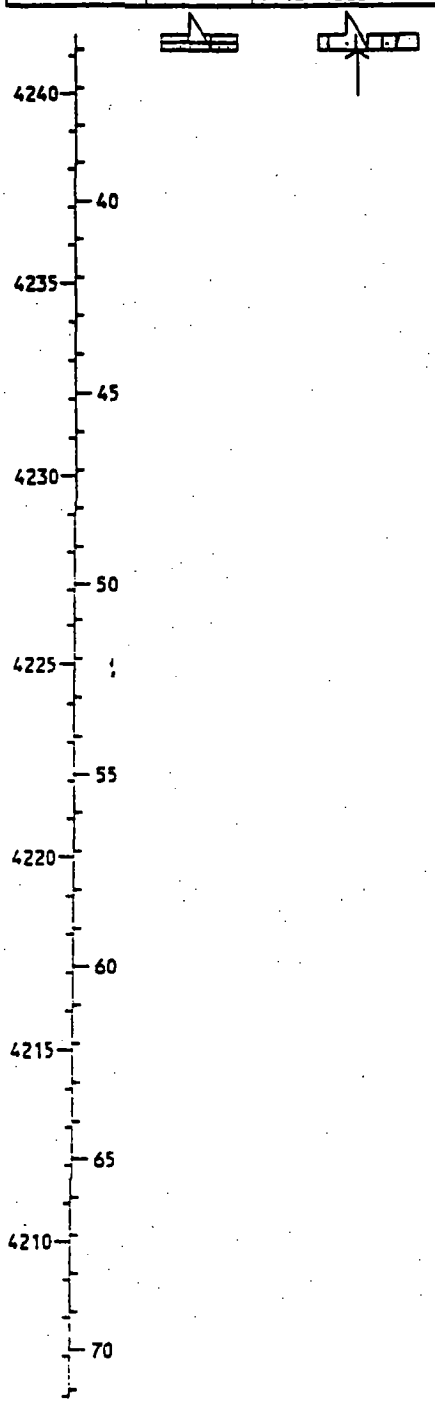


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		28/12 17/6 19/6	CL	SILTY CLAY: Tannish brown, slightly sandy, fine, moist.	B-1	0-2	22/24
		9/12 3/6 6/6		...grades to gray.	B-2	2-4	21/24
		4/12 3/6 4/6		...grades to tannish brown.	B-3	4-6	24/24
		3/12 1/6 2/6		...grades to gray, iron oxide staining. ...horizontal bedding.	B-4	6-8	24/24
		8/12 3/6 4/6			B-5	8-10	2/24
		20/12 9/6 14/6	SM	SILTY SAND: Tan, fine to medium, occasional sandy clay lenses, moist.	B-6	10-12	24/24
		28/12 11/6 11/6			B-7	12-14	19/24
		16/12 10/6 10/6		...gravely silty sand lense, .3' thick	B-8	14-16	24/24
		11/12 9/6 11/6		...grades to reddish tan.	B-9	16-18	24/24
		8/12 5/6 7/6			B-10	18-20	24/24
		13/12 7/6 10/6			B-11	20-22	24/24
		8/12 5/6 6/6	CL	SILTY CLAY: Reddish tan, slightly sandy, fine, moist.	B-12	22-24	24/24
		10/12 6/6 9/6			B-13	24-26	24/24
		11/12 6/6 5/6			B-14	26-28	24/24
		3/12 3/6 7/6		...grades to gray silty clay. ...grades to wet.	B-15	28-30	24/24
		6/12 4/6 5/6		... occasional sandy lenses.	B-16	30-32	24/24
		5/12 8/6 7/6		...grades more sandy.	B-17	32-34	24/24
		11/12 8/6 7/6	SM	SILTY SAND: Gray, fine, clayey, iron oxide staining.	B-18	34-36	24/24

DRILL HOLE LOG
DRILL HOLE NO.: GW-46

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North side of RCRA Waste Disposal Cell.
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 28.2 HOLE DIAMETER: 8.25

PROJECT NO.: 1416-022
DATE: 2-25-92
TOC ELEV.: 4279.26
GS ELEV.: 4277.16
LOGGED BY: DCH
HOLE NO.: GW-46

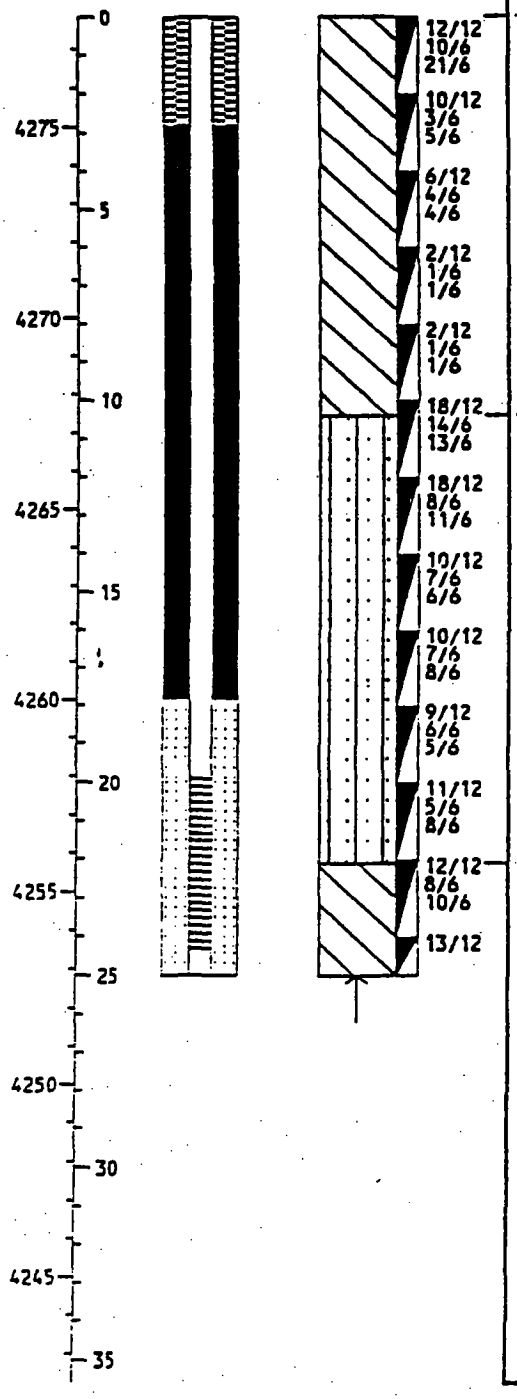


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)

DRILL HOLE LOG
DRILL HOLE NO.: GW-55

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: NW Corner of RCRA Waste Disposal Cell.
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: Dry HOLE DIAMETER: 8.25

PROJECT NO.: 1416-022
DATE: 2-26-92
TOC ELEV.: 4279.79
GS ELEV.: 4277.85
LOGGED BY: DCH
HOLE NO.: GW-55



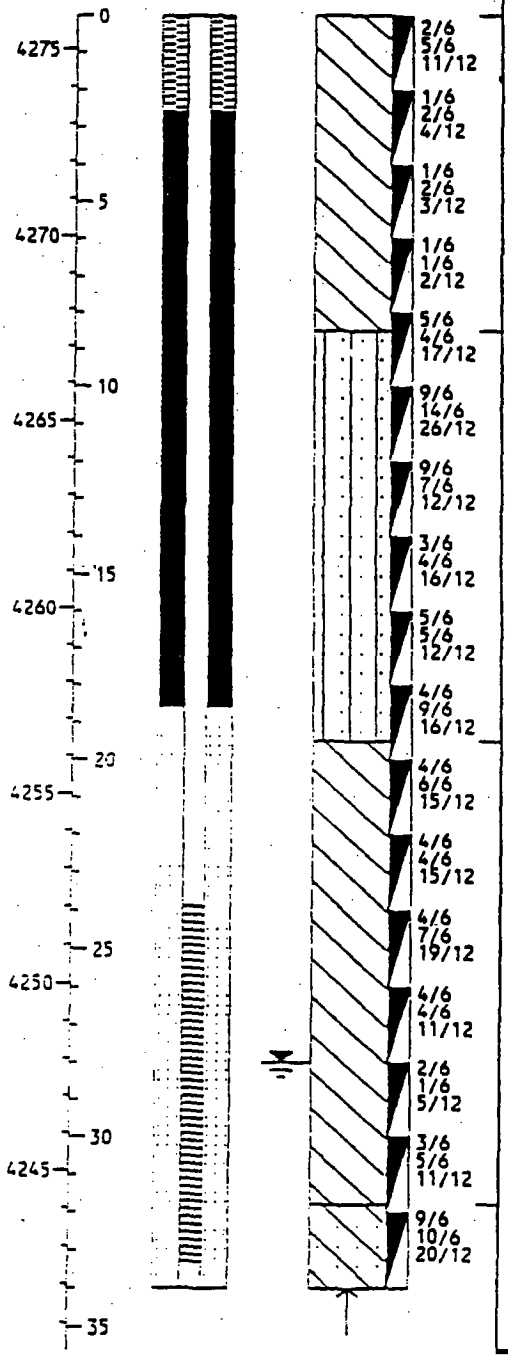
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Tan to tannish brown, slightly sandy, fine, moist.	B-1	0-2	23/24
					B-2	2-4	12/24
				...grades to tannish gray, iron oxide staining	B-3	4-6	24/24
					B-4	6-8	24/24
				...grades to gray, roots, horizontal bedding.	B-5	8-10	24/24
					B-6	10-12	24/24
			SM	SILTY SAND: Tan, fine to medium, moist.	B-7	12-14	24/24
					B-8	14-16	24/24
					B-9	16-18	24/24
				...grades reddish tan.	B-10	18-20	24/24
					B-11	20-22	24/24
					B-12	22-24	24/24
			CL	SILTY CLAY: Reddish tan, slightly sandy, fine, moist.	B-13	24-25	12/24

Well completed above groundwater level to detect leachate migrating along top of Unit 2 clay.

DRILL HOLE LOG
DRILL HOLE NO.: GW-56

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Between GW-16 & I-2-30
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 28.0 HOLE DIAMETER: 8.25

PROJECT NO.: 1416-022
DATE: 3-16-92
TOC ELEV.: 4277.90
GS ELEV.: 4275.9
LOGGED BY: DCH
HOLE NO.: GW-56



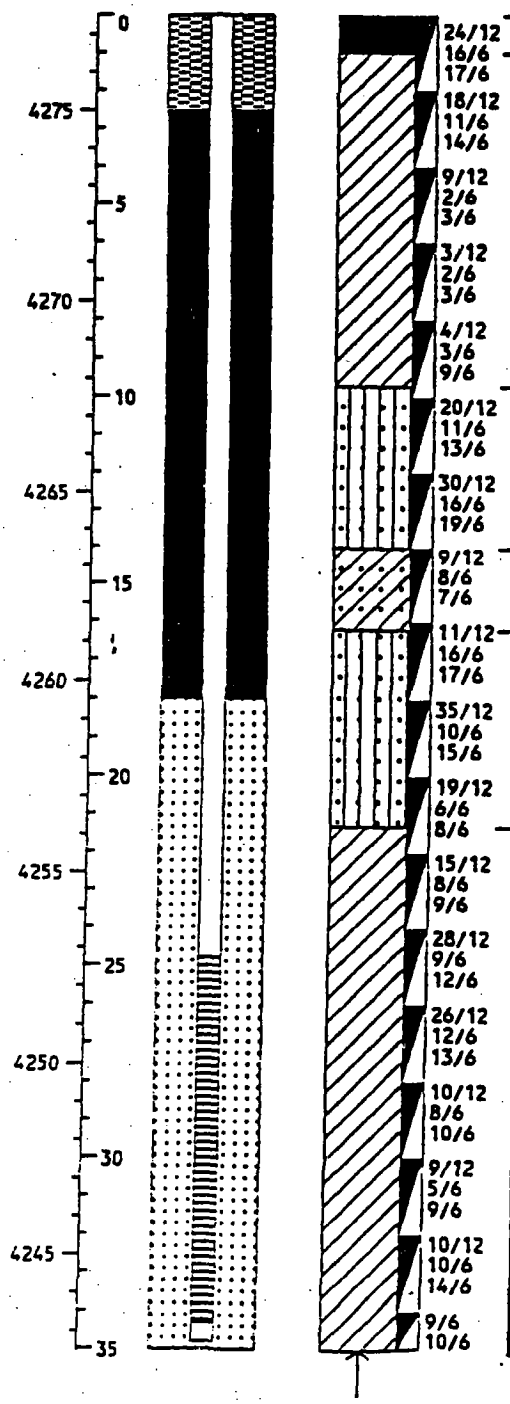
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		2/6 5/6 11/12	CL	SILTY CLAY: Tannish gray, sandy, fine, moist.	B-1	0-2	24/24
		1/6 2/6 4/12			B-2	2-4	24/24
		1/6 2/6 3/12		...grades to gray, iron oxide stainning, roots.	B-3	4-6	24/24
		1/6 1/6 2/12		...grades to very silty, horrizontal bedding	B-4	6-8	24/24
		5/6 4/6 17/12			B-5	8-10	12/24
		9/6 14/6 26/12	SM	SILTY SAND: Tan, fine to coarse, moist.	B-6	10-12	24/24
		9/6 7/6 12/12		...gravely silty sand lense.	B-7	12-14	24/24
		3/6 4/6 16/12			B-8	14-16	24/24
		5/6 5/6 12/12		...grades to reddish tan, fine to medium sand.	B-9	16-18	24/24
		4/6 9/6 16/12		...grades to very silty and clayey.	B-10	18-20	24/24
		4/6 6/6 15/12	CL	SILTY CLAY: Reddish tan, sandy, fine, moist.	B-11	20-22	24/24
		4/6 4/6 15/12			B-12	22-24	18/24
		4/6 7/6 19/12			B-13	24-26	24/24
		4/6 4/6 11/12		...grades to grayish tan. ...grades to gray, very moist.	B-14	26-28	24/24
		2/6 1/6 5/12		...grades to wet.	B-15	28-30	24/24
		3/6 5/6 11/12			B-16	30-32	24/24
		9/6 10/6 20/12	SC	CLAYEY SAND: Gray, fine, iron oxide stainning, wet.	B-17	32-34	24/24

DRILL HOLE LOG
DRILL HOLE NO.: GW-56R

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION:
DRILLER: Overland Drilling Inc.
DRILL RIG: CME 750
DEPTH TO WATER:

HOLE DIAMETER: 7-3/4"

PROJECT NO.: 1416-022
DATE: 2/5/93
TOC ELEV.: 4279.12
GS ELEV.: 4277.54
LOGGED BY: DCH
HOLE NO.: GW-56R

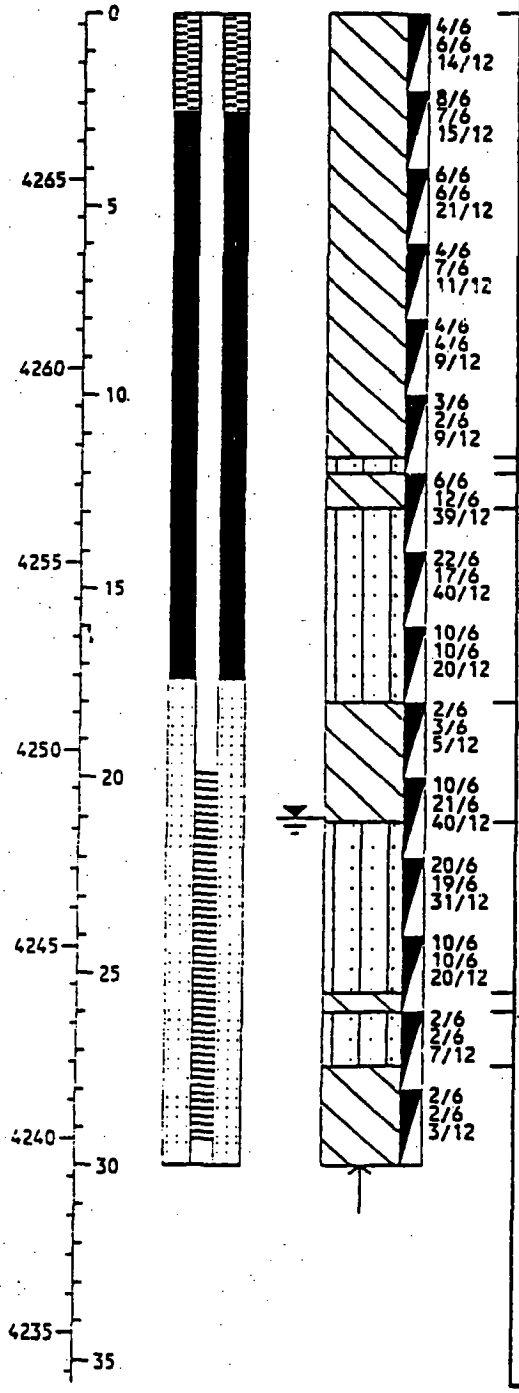


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		24/12 16/6 17/6	CL	SILTY CLAY: Tan & gray, very stiff, moist. (fill)	B-1		23/24
		18/12 11/6 14/6	CL	SILTY CLAY: Tan, roots, very stiff, moist.	B-2		24/24
		9/12 2/6 3/6		...grades medium stiff.	B-3		24/24
		3/12 2/6 3/6		...grades to light gray very silty clay, thin horizontal bedding.	B-4		24/24
		4/12 3/6 9/6			B-5		24/24
		20/12 11/6 13/6	SM	SILTY SAND: Tan, fine to medium, iron oxide staining, medium dense, moist.	B-6		24/24
		30/12 16/6 19/6		...grades dense	B-7		23/24
		9/12 8/6 7/6	CL	SILTY CLAY: Tan, sandy, fine, medium stiff, moist.	B-8		24/24
		11/12 16/6 17/6	SM	SILTY SAND: Tan, fine to medium, dense, moist.	B-9		24/24
		35/12 10/6 15/6			B-10		24/24
		19/12 6/6 8/6		...grades reddish tan, very clayey.	B-11		24/24
		15/12 8/6 9/6	CL	SILTY CLAY: Reddish tan, slightly sandy, fine, stiff, moist.	B-12		24/24
		28/12 9/6 12/6			B-13		24/24
		26/12 12/6 13/6			B-14		24/24
		10/12 8/6 10/6		...grades tan. ...grades gray. ...grades wet.	B-15		24/24
		9/12 5/6 9/6			B-16		24/24
		10/12 10/6 14/6		...grades with iron oxide staining. ...grades gray, sandy, wet.	B-17		24/24
		9/6 10/6			B-18		12/12

DRILL HOLE LOG
DRILL HOLE NO.: GW-57

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Between GW-27 & GW-28
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 21' HOLE DIAMETER: 8.25"

PROJECT NO.: 1416-022
DATE: 3-18-92
TOC ELEV.: 4271.57
GS ELEV.: 4269.3
LOGGED BY: DCH
HOLE NO.: GW-57

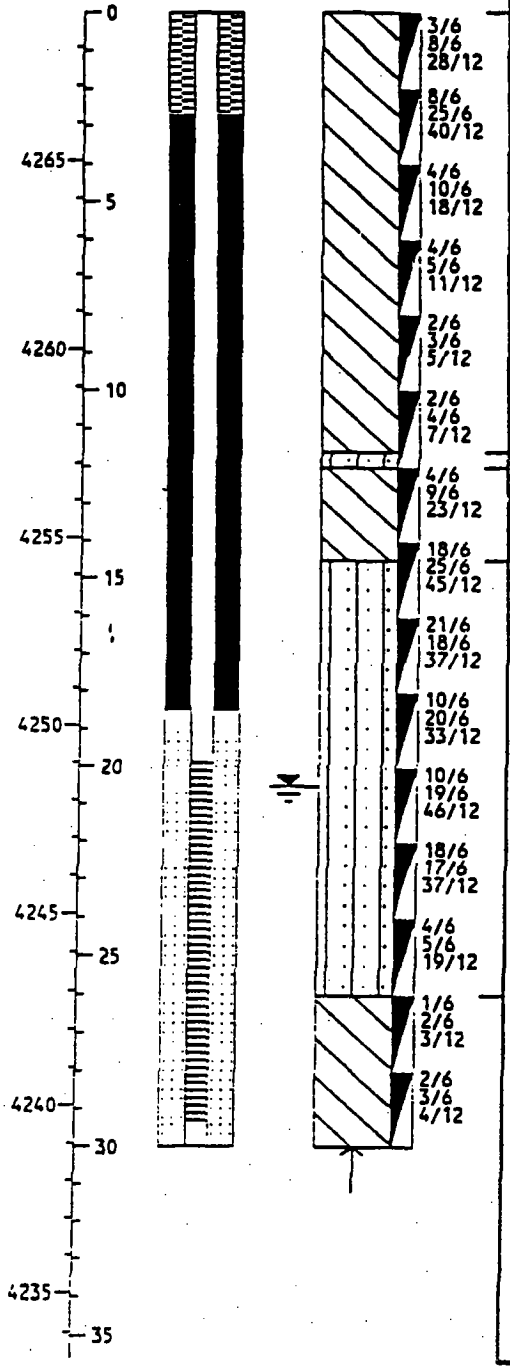


USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: Tannish brown, sandy, fine, to medium, moist.	B-1	0-2	24/24
		B-2	2-4	20/24
		B-3	4-6	24/24
	...grades to trace fine sand. ...grades to gray, iron oxide staining.	B-4	6-8	24/24
	...grades to tannish gray, very silty and sandy, fine, thin horizontal bedding moist.	B-5	8-10	24/24
		B-6	10-12	24/24
SM	SILTY SAND: Tan, fine to coarse, moist.	B-7	12-14	24/24
CL	SILTY CLAY: Tannish gray, sandy, fine, moist.			
SM	SILTY SAND: Tan, fine to coarse, moist.	B-8	14-16	24/24
		B-9	16-18	24/24
CL	SILTY CLAY: Tannish gray, sandy, fine, iron oxide staining, very moist.	B-10	18-20	24/24
		B-11	20-22	24/24
SM	SILTY SAND: Reddish brown, sandy, fine to medium, wet.	B-12	22-24	24/24
		B-13	24-26	24/24
CL	SILTY CLAY: Reddish brown, sandy, fine, very moist.	B-14	26-28	24/24
SM	SILTY SAND: Reddish brown, fine, clayey, wet.	B-15	28-30	24/24
CL	SILTY CLAY: Greenish gray to green, moist.			

DRILL HOLE LOG
DRILL HOLE NO.: GW-58

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Between GW-28 & SC-2
DRILLER: Overland Drilling
DRILL RIG: CME 750
DEPTH TO WATER: 20.5' HOLE DIAMETER: 8.25"

PROJECT NO.: 1416-022
DATE: 3-19-92
TOC ELEV.: 4271.01
GS ELEV.: 4268.9
LOGGED BY: DCH
HOLE NO.: GW-58

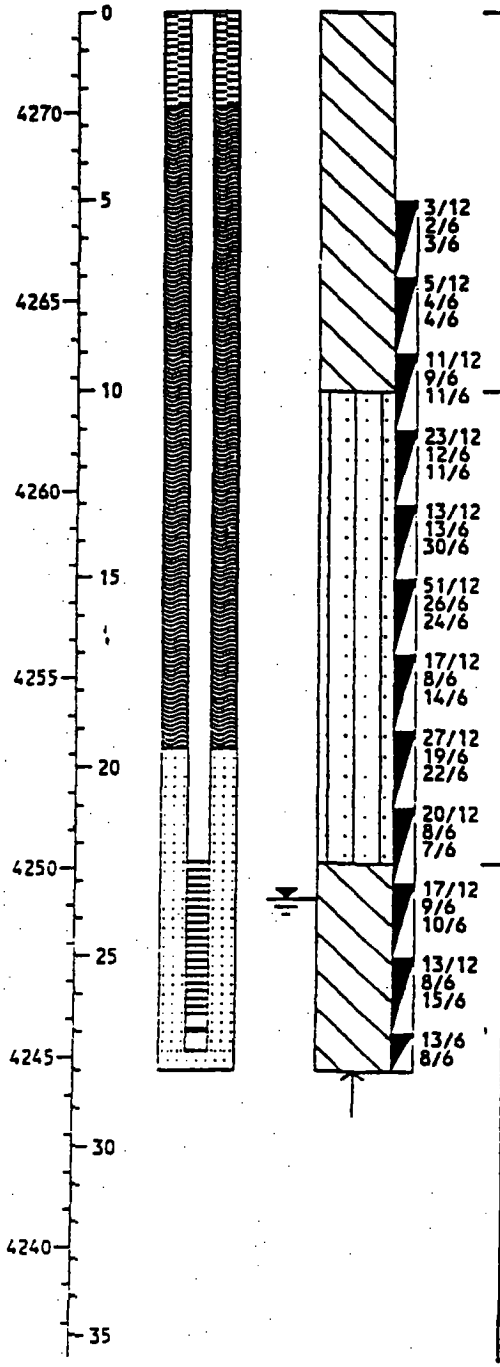


USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: Brownish tan, sandy, fine, moist.	B-1	0-2	24/24
		B-2	2-4	24/24
	...grades to tannish gray	B-3	4-6	24/24
		B-4	6-8	24/24
		B-5	8-10	24/24
	...grades to tannish gray to gray, fine, horizontal bedding, iron oxide staining, moist.	B-6	10-12	24/24
SM	SILTY SAND: Tan, fine to medium, moist.	B-7	12-14	24/24
CL	SILTY CLAY: Tannish gray, sandy, fine, silty, moist.	B-8	14-16	24/24
SM	SILTY SAND: Tan, fine to medium, moist.	B-9	16-18	24/24
		B-10	18-20	24/24
	...cemented sand lense, 2" thick.	B-11	20-22	24/24
	...grades to reddish brown, wet.	B-12	22-24	24/24
		B-13	24-26	24/24
CL	SILTY CLAY: Gray, iron oxide staining, very moist.	B-14	26-28	24/24
	...grades to greenish gray.	B-15	28-30	24/24

DRILL HOLE LOG
DRILL HOLE NO.: GW-60

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: 10 feet west of GW-1
DRILLER: Overland Drilling Inc.
DRILL RIG: CME 750
DEPTH TO WATER: 23.46' HOLE DIAMETER: 7.75"

PROJECT NO.: 1534-007
DATE: 2-2-93
TOC ELEV.: 4274.50
GS ELEV.: 4272.7
LOGGED BY: DCH
HOLE NO.: GW-60

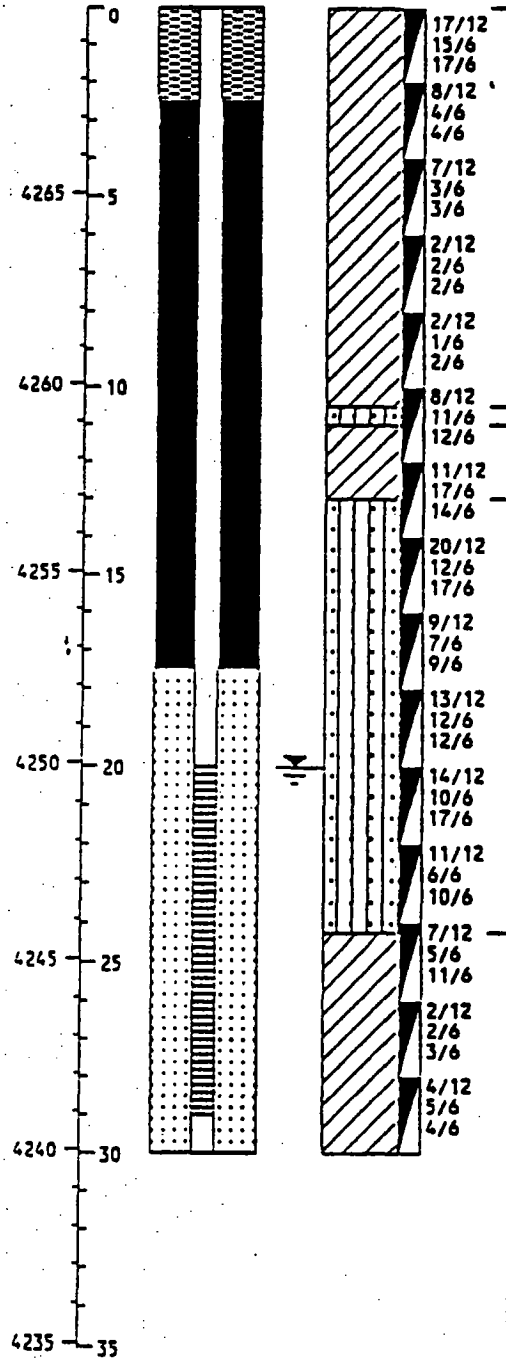


USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: Tan, roots in upper 12-inches, soft to medium stiff, moist.			
	...grades with iron oxide staining.	B-1	5-7	24/24
	...grades to light gray, thin horizontal bedding.	B-2	7-9	24/24
		B-3	9-11	24/24
SM	SILTY SAND: Tan, fine to medium, medium dense to dense, moist.	B-4	11-13	23/24
		B-5	13-15	12/24
		B-6	15-17	24/24
		B-7	17-19	23/24
	...grades reddish tan.	B-8	19-21	24/24
	...grades clayey.	B-9	21-23	24/24
CL	SILTY CLAY: Reddish tan, sandy, fine, stiff, moist.	B-10	23-25	24/24
	...grades wet.	B-11	25-27	24/24
		B-12	27.0-28	12/12

DRILL HOLE LOG
DRILL HOLE NO.: GW-63

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: 12' East of DH-59
DRILLER: Overland Drilling Inc.
DRILL RIG: CME 75
DEPTH TO WATER: 20.03' HOLE DIAMETER: 8.25"

PROJECT NO.: 1416-045
DATE: 7-7-93
TOC ELEV.: 4271.84
GS ELEV.: 4269.9
LOGGED BY: DEW
HOLE NO.: GW-63

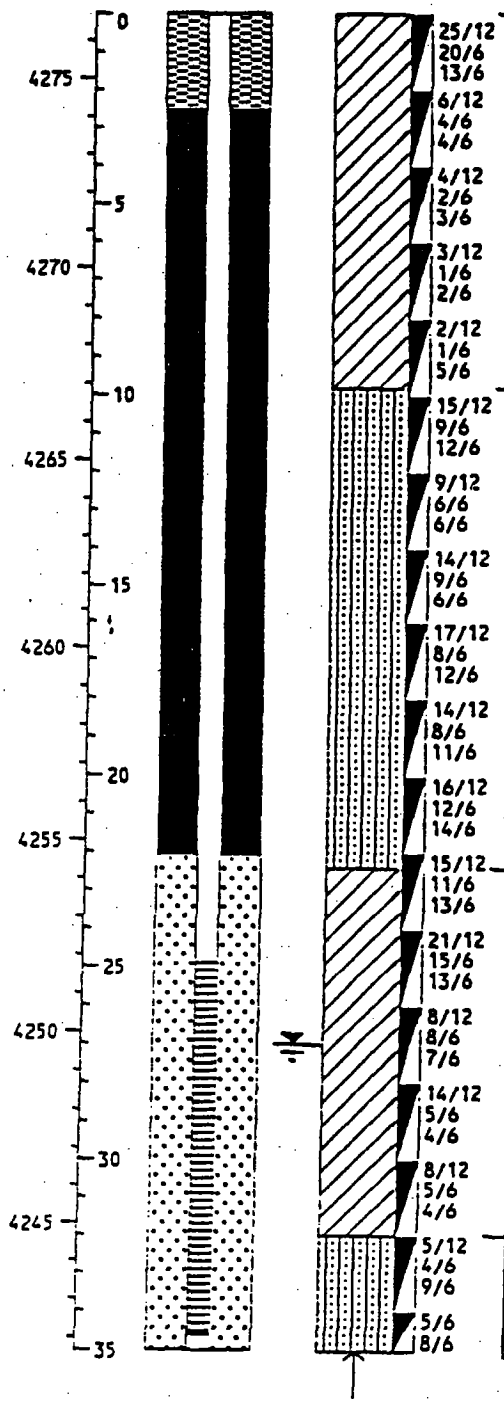


USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: tan, some roots, dry, grades to moist at 1', stiff low-plasticity.	B-1	0-2	20/24
		B-2	2-4	15/24
	...grades to light gray, grades to moderate plasticity. ...grades to tan with some iron oxide staining.	B-3	4-6	18/24
		B-4	6-8	24/24
	...very moist, soft to very soft.	B-5	8-10	24/24
		B-6	10-12	24/24
SM	SILTY SAND: oolitic sand, tan, fine to medium, loose.			
CL	SILTY CLAY: brown, some sand lenses, medium stiff, moist.	B-7	12-14	24/24
SM	SILTY SAND: tan, medium dense, slighty moist.	B-8	14-16	24/24
	...clay lense at 16', grades to loose.	B-9	16-18	24/24
		B-10	18-20	22/24
	...grades to very moist.	B-11	20-22	20/24
	...grades to gray-brown, grades to wet.	B-12	22-24	24/24
	... iron oxide staining at 23.5'.	B-13	24-26	24/24
CL	SILTY CLAY: reddish-brown clay, medium stiff, moist.	B-14	26-28	24/24
	...grades to greenish gray, soft, grades to wet, some horizontal layering	B-15	28-30	24/24

DRILL HOLE LOG
DRILL HOLE NO.: GW-64

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: 10 Feet North of GW-32
DRILLER: Overland Drilling
DRILL RIG: CME 75
DEPTH TO WATER: 27.0' HOLE DIAMETER: 8.25"

PROJECT NO.: 1416-045
DATE: 9-29-93
TOC ELEV.: 4278.73
GS ELEV.: 4276.7
LOGGED BY: DCH
HOLE NO.: GW-64



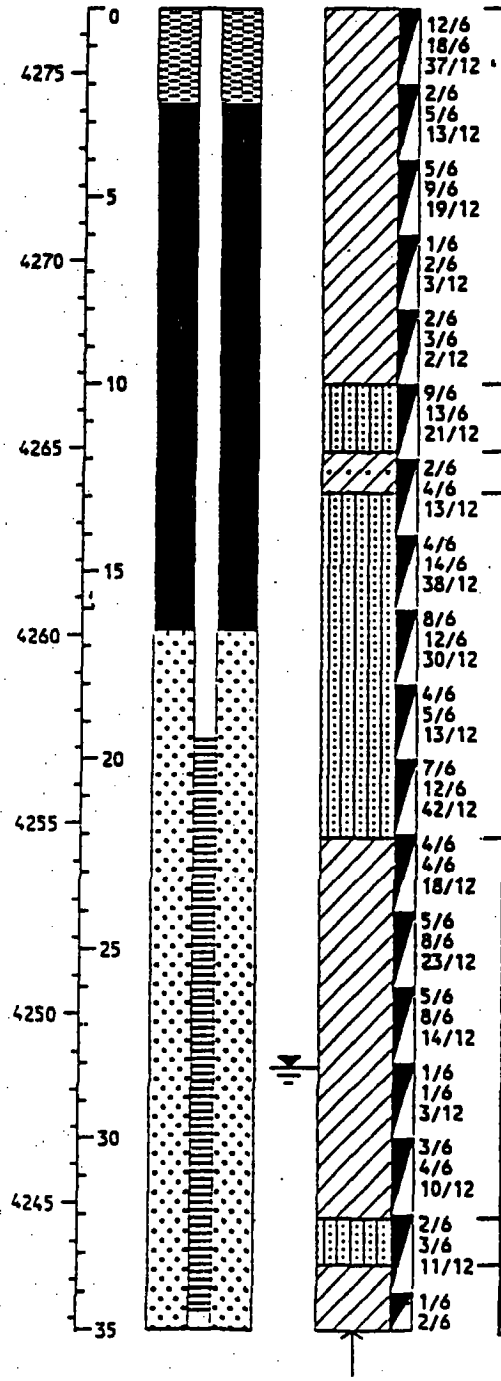
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Tan, slightly sandy, fine, iron oxide staining, moist.	B-1	0-2	10/24
					B-2	2-4	24/24
				...grades gray.	B-3	4-6	24/24
					B-4	6-8	24/24
					B-5	8-10	24/24
			SM	SILTY SAND: Tan, fine to medium, occassional very silty lenses, moist.	B-6	10-12	24/24
					B-7	12-14	20/24
				...grades reddish tan.	B-8	14-16	24/24
					B-9	16-18	24/24
					B-10	18-20	22/24
					B-11	20-22	24/24
					B-12	22-24	24/24
			CL	SILTY CLAY: Reddish tan, sandy, fine, moist.	B-13	24-26	24/24
					B-14	26-28	24/24
				...grades light gray, wet.	B-15	28-30	24/24
				...grades with iron oxide staining.	B-16	30-32	24/24
			SM	SILTY SAND: Light gray, fine, very silty, wet.	B-17	32-34	24/24
					B-18	34-35	12/12

Subsurface profile obtained from drill hole DH-65.

DRILL HOLE LOG
DRILL HOLE NO.: GW-66

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North of Treatment Lagoon
DRILLER: Overland Drilling, Inc.
DRILL RIG: CME 75
DEPTH TO WATER: 28.12' HOLE DIAMETER: 8.25"

PROJECT NO.: 1675-010
DATE: 6-15-94
TOC ELEV.: 4279.50
GS ELEV.: 4276.7
LOGGED BY: DCH
HOLE NO.: GW-66

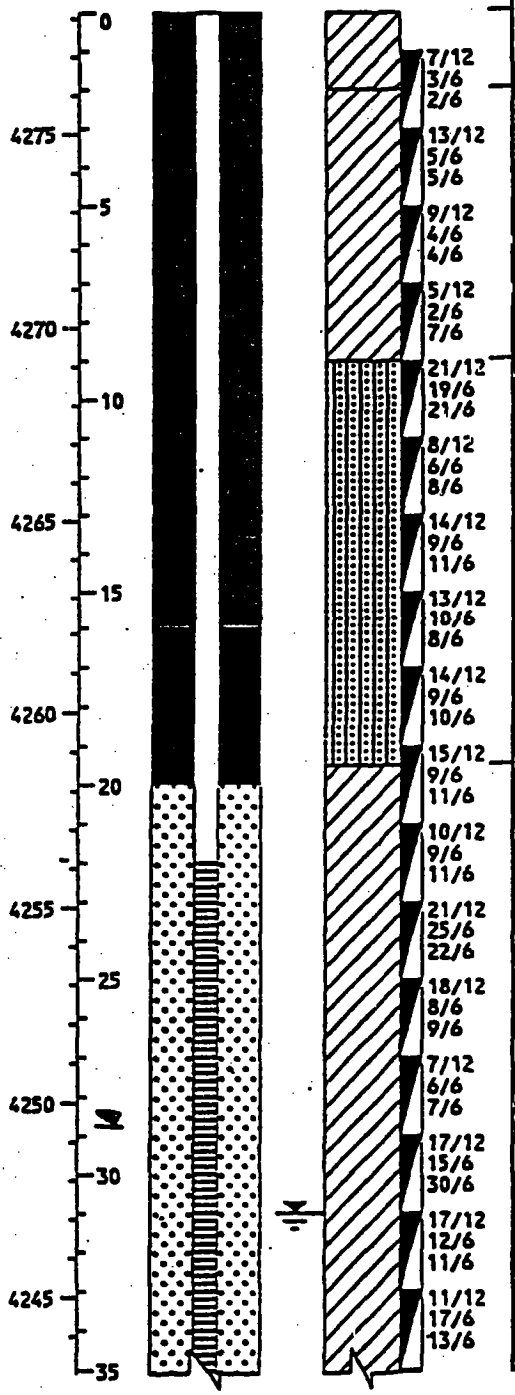


USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: Tan, slightly sandy, stiff to very stiff, moist.	B-1	0-2	15/24
		B-2	2-4	16/24
		B-3	4-6	2/24
	...grades to gray, very silty horizontal bedding, moist.	B-4	6-8	17/24
		B-5	8-10	14/24
SM	SILTY SAND: Tan, fine, dense, moist.	B-6	10-12	17/24
CL	SANDY CLAY: Tan, fine, soft, moist.	B-7	12-14	12/24
SM	SILTY SAND: Tan, fine to medium, occasional sandy clay lenses, medium dense to dense, moist.	B-8	14-16	20/24
		B-9	16-18	13/24
	...grades reddish tan.	B-10	18-20	24/24
		B-11	20-22	24/24
CL	SILTY CLAY: Reddish tan, slightly sandy in upper 24-inches, fine, soft to very stiff, moist.	B-12	22-24	24/24
		B-13	24-26	24/24
	...grades gray.	B-14	26-28	24/24
	...grades wet.	B-15	28-30	24/24
		B-16	30-32	24/24
SM	SILTY SAND: Gray, fine, clayey, medium dense, moist.	B-17	32-34	24/24
CL	SILTY CLAY: Gray, sandy, soft, wet.	B-18	34-35	12/12

DRILL HOLE LOG
MONITOR WELL NO.: GW-67

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: East side of RCRA landfill area
DRILLER: Earth Core
DRILL RIG: Hollow Stem Auger
DEPTH TO WATER: 31' HOLE DIAMETER: 8"

PROJECT NO.: 1675-021
DATE: 9-24-96
TOC ELEV.: 4282.22
GS ELEV.: 4278.15
LOGGED BY: JL
WELL NO.: GW-67



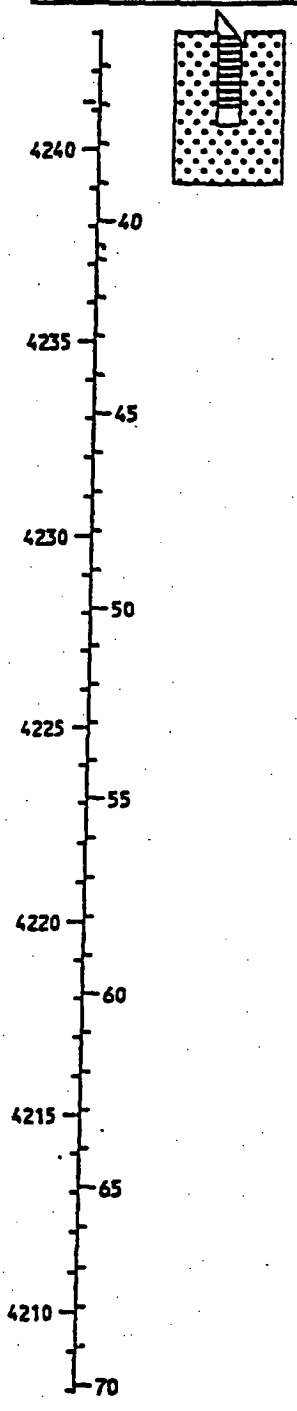
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Gray, occassional basalt cobbles, medium stiff, moist (reworked soil/fill).		1-3	0/24
			CL	SILTY CLAY: Brownish tan, medium stiff to stiff, moist.		3-5	1/24
						5-7	1/24
						7-9	18/24
				...grades to light gray.		9-11	18/24
			SM	SILTY SAND: Tan, fine, occasional sandy clay lenses, medium dense to dense, moist.		11-13	14/24
						13-15	19/24
						15-17	19/24
						17-19	22/24
				...grades reddish tan.		19-21	19/24
			CL	SILTY CLAY: Reddish tan, stiff to very stiff, moist.		21-23	19/24
						23-25	17/24
						25-27	22/24
				...grades light gray, very moist.		27-29	0/24
						29-31	19/24
						31-33	19/24
				...grades sandy, wet.		33-35	22/24

Logging and well completion details were transferred from Envirocare of Utah's drill logs and well completion reports.

DRILL HOLE LOG
MONITOR WELL NO.: GW-67

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: East side of RCRA landfill area
DRILLER: Earth Core
DRILL RIG: Hollow Stem Auger
DEPTH TO WATER: 31' HOLE DIAMETER: 8"

PROJECT NO.: 1675-021
DATE: 9-24-96
TOC ELEV.: 4282.22
GS ELEV.: 4278.15
LOGGED BY: JL
WELL NO.: GW-67



ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		17/12 10/6 16/6	SM	SILTY SAND: Gray, fine, clayey, dense, wet.		35-37	0/24
		13/12 12/6 13/6	CL	SILTY CLAY: Gray, stiff, very moist.		37-39	17/24

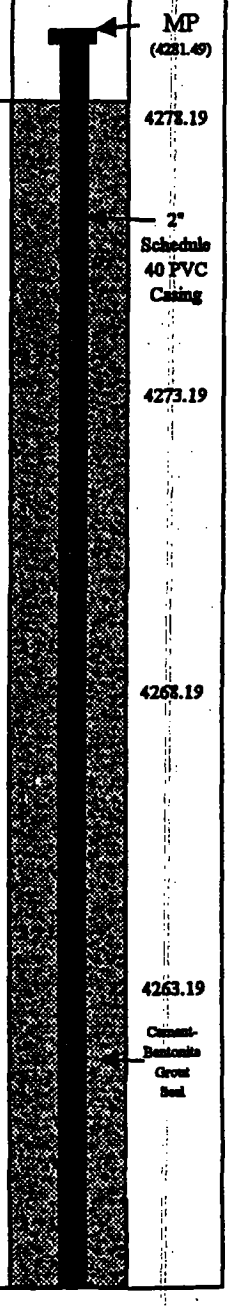
Logging and well completion details were transferred from Envirocare of Utah's drill logs and well completion reports.

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: Mixed Waste Replacement Wells	Boring Number: GW-67R
Date Drilled: 11-14-98 Date Completed: 11-14-9	Northing: 860,013.28 Easting: 1,554,679.67
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4,278.19
Groundwater Elevation (ft): 4,249.84	Measuring Point (MP) Elevation (ft): 4,281.49
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 39.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 29.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 29.0 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 27.0 feet Bentonite Seal 27.0 to 25.0 feet Cement Grout Seal 25.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log
0				NA	CC	2.0	ML	Clay/silt
1							CL	
2								
3								
4							CL	
5				NA	CC	5.0		Sandy clay
6								Clayey sand
7								
8								Clay, mottled, wet
9								
10				NA	CC	4.0		Clay
11								
12							SM	Loose Sand
13								
14								
15				NA	CC	1.0	CL	Clay
16							SM	Clayey Sand
17								
18								
19								



CC Continuous Core Barrel

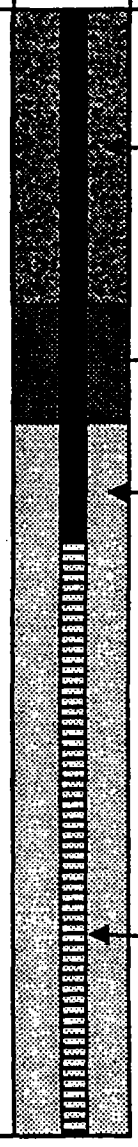
GW-67R

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: Mixed Waste Replacement Wells		Boring Number: GW-67R
Date Drilled: 11-14-98 Date Completed: 11-14-9		Northing: 860,013.28 Easting: 1,554,679.67
Logged By: Richard Poulson		Ground Surface Elevation (ft): 4,278.19
Groundwater Elevation (ft): 4,249.84		Measuring Point (MP) Elevation (ft): 4,281.49
Date Measured: 8/99		MP is top of Protective Casing
Total Depth (ft): 39.0		Drilling Contractor: RC Exploration
Diameter (in): 8.0		Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 29.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 29.0 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 27.0 feet Bentonite Seal 27.0 to 25.0 feet Cement Grout Seal 25.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20				NA	CC	4.0	CL	Clay	4258.19
21									
22									
23									
24									
25				NA	CC	4.0			4253.19
26									
27									
28									
29									
30				NA	CC	3.5			4248.19
31									
32									
33									
34								Clay/sand	
35				NA	CC	4.0			4243.19
36									
37									
38									
39									



TD of boring - 39.0 feet bgs

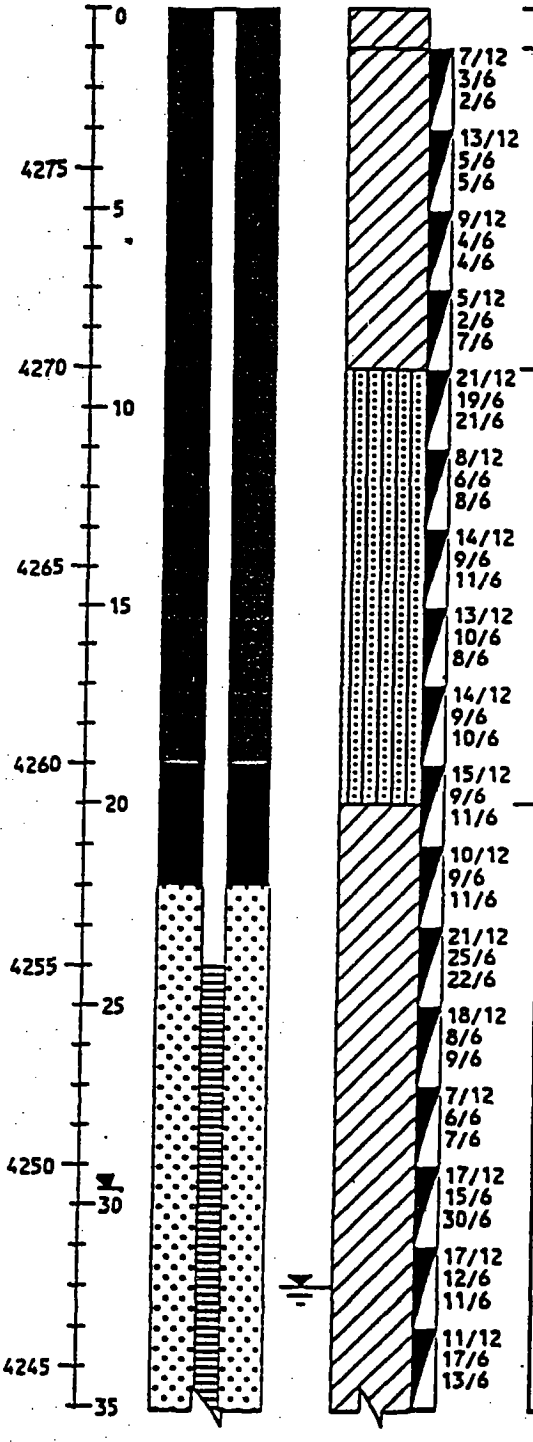
CC Continuous Core Barrel

GW-67R

DRILL HOLE LOG
MONITOR WELL NO.: GW-68

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: East side of RCRA Landfill area
DRILLER: Earth Core
DRILL RIG: Hollow Stem Auger
DEPTH TO WATER: 32' HOLE DIAMETER: 8"

PROJECT NO.: 1675-02
DATE: 9-23-96
TOC ELEV.: 4282.60
GS ELEV.: 4279.01
LOGGED BY: JL
WELL NO.: GW-68



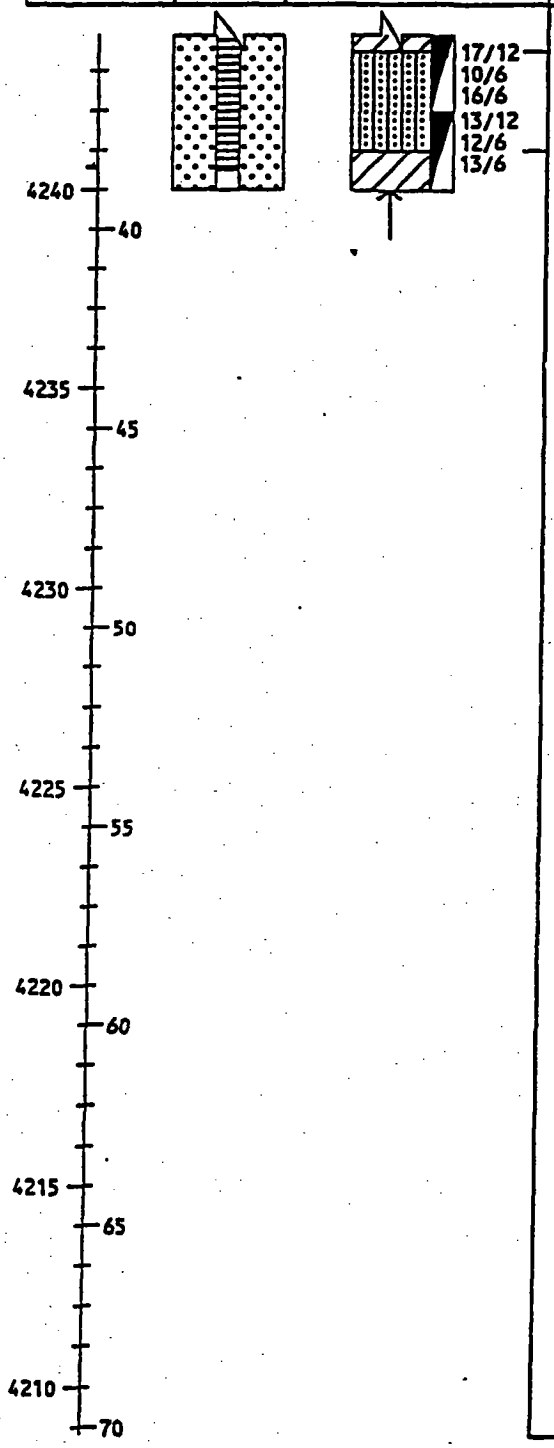
USCS	Description	Sample Number	Sample Depth (ft)	Recover (in/in)
CL	SILTY CLAY: Gray, occassional basalt gravels and cobbles, medium stiff, moist (reworked soil/fill).		1-3	1/24
	SILTY CLAY: Brownish tan, medium stiff to stiff, moist.		3-5	0/24
			5-7	1/24
			7-9	24/24
	...grades to light gray.			
SM	SILTY SAND: Tan, fine, occasional sandy clay lenses, medium dense to dense, moist.		9-11	7/24
			11-13	17/24
			13-15	19/24
			15-17	19/24
	...grades reddish tan.		17-19	0/24
			19-21	0/24
CL	SILTY CLAY: Reddish tan, stiff to very stiff, moist.		21-23	14/24
			23-25	10/24
			25-27	14/24
	...grades light gray.			
			27-29	19/24
			29-31	19/24
			31-33	22/24
	...grades sandy, wet.			
			33-35	22/24

Logging and well completion details were transferred from Envirocare of Utah's drill hole logs and well completion reports.

DRILL HOLE LOG
MONITOR WELL NO.: GW-68

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: East side of RCRA Landfill area
DRILLER: Earth Core
DRILL RIG: Hollow Stem Auger
DEPTH TO WATER: 32' HOLE DIAMETER: 8"

PROJECT NO.: 1675-021
DATE: 9-23-96
TOC ELEV.: 4282.60
GS ELEV.: 4279.01
LOGGED BY: JL
WELL NO.: GW-68



ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			SM	SILTY SAND: Gray, fine, clayey, dense, wet.		35-37	19/24
						37-39	19/24
			CL	SILTY CLAY: Gray, sandy, very stiff, very moist.			

Logging and well completion details were transferred from Envirocare of Utah's drill hole logs and well completion reports.

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: Mixed Waste Replacement Wells	Boring Number: GW-68R
Date Drilled: 11-14-98 Date Completed: 11-14-9	Northing: 860,162.97 Easting: 1,554,682,86
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4,279.29
Groundwater Elevation (ft): 4,249.72	Measuring Point (MP) Elevation (ft): 4,282.25
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 39.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 24.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 24.0 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 22.0 feet Bentonite Seal 22.0 to 20.0 feet Cement Grout Seal 20.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
0				NA	CC	2	CL	Clay	4,279.29
1									
2									
3									
4							CL		
5				NA	CC	0.0		no recovery	4274.29
6									
7									
8									
9							CL		
10				NA	CC	0.0		no recovery	4269.29
11									
12									
13									
14									
15				NA	CC	5.0		Clay, wet	4264.29
16									
17									
18									
19									

MP (4,282.25)

2" Schedule 40 PVC Casing

Cement-Bentonite Grout Seal

CC Continuous Core Barrel

GW-68R

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: Mixed Waste Replacement Wells	Boring Number: GW-68R
Date Drilled: 11-14-98 Date Completed: 11-14-9	Northing: 860,162.97 Easting: 1,554,682.86
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4,279.29
Groundwater Elevation (ft): 4,249.72	Measuring Point (MP) Elevation (ft): 4,282.25
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 39.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 24.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 24.0 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 22.0 feet Bentonite Seal 22.0 to 20.0 feet Cement Grout Seal 20.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20				NA	CC	5.0	SM	Sand	4259.29 Bentonite Seal
21									
22									
23							CL		
24									
25				NA	CC	5.0			4254.29
26									
27									
28									16/30 Sand
29									
30				NA	CC	5.0		Green clay with mottling	4249.29
31									
32								Clay with sand stringers	
33									
34									
35				NA	CC	5.0			4244.29 2" Schedule 40 PVC 0.010-inch Screen
36									
37									
38									
39									

TD of boring - 39.0 feet bgs

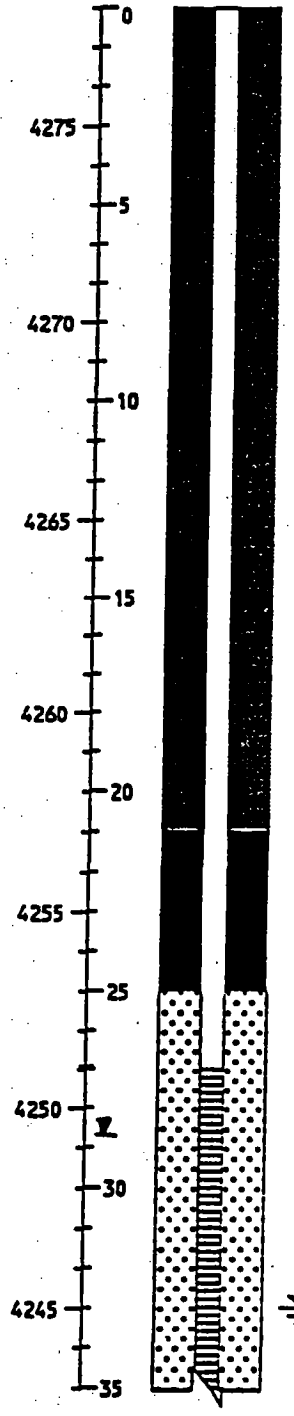
CC Continuous Core Barrel

GW-68R

DRILL HOLE LOG
MONITOR WELL NO.: GW-69

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: East side of RCRA Landfill area
DRILLER: Earth Core
DRILL RIG: Hollow Stem Auger
DEPTH TO WATER: 33' HOLE DIAMETER: 8"

PROJECT NO.: 1675-021
DATE: 9-20-96
TOC ELEV.: 4281.71
GS ELEV.: 4278.03
LOGGED BY: JL
WELL NO.: GW-69



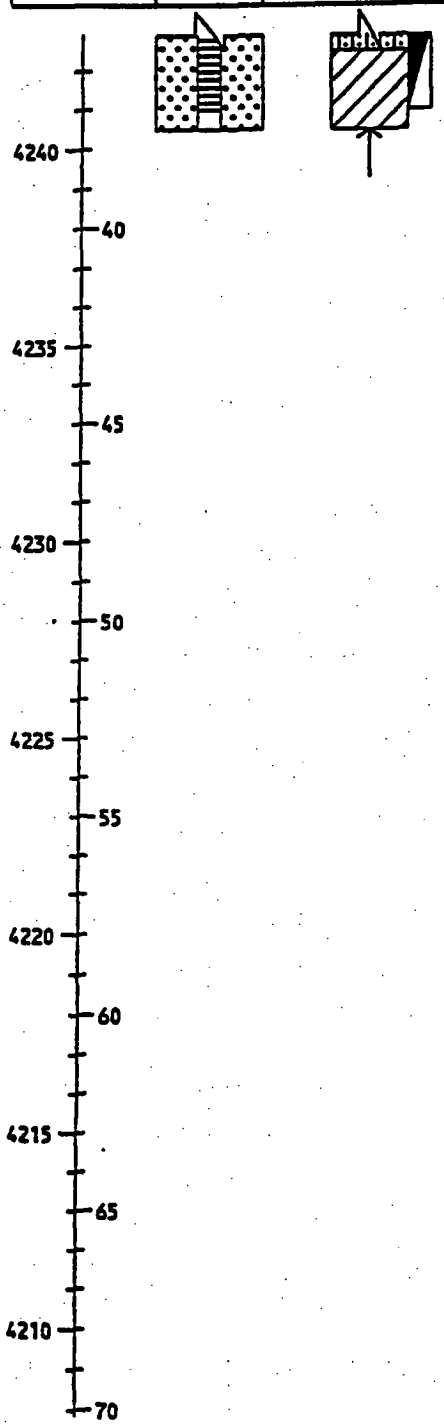
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		7/12 2/6 2/6	CL	SILTY CLAY: Gray. medium stiff to stiff, moist.		1-3	0/24
		4/12 7/6 8/6				3-5	10/24
		4/12 2/6 2/6		...grades to light gray.		5-7	5/24
		3/12 8/6 9/6				7-9	19/24
		15/12 4/6 5/6	SM	SILTY SAND: Tan, fine, occasional sandy clay lenses, medium dense to dense, moist.		9-11	19/24
		9/12 9/6 10/6				11-13	0/24
		15/12 11/6 11/6				13-15	14/24
		13/12 9/6 9/6				15-17	17/24
		11/12 7/6 12/6		...grades reddish tan.		17-19	19/24
		11/12 20/6 20/6				19-21	17/24
		13/12 6/6 6/6				21-23	0/24
		11/12 12/6 12/6	CL	SILTY CLAY: Reddish tan, stiff to very stiff, moist.		23-25	17/24
		33/12 30/6 40/6				25-27	14/24
		5/12 4/6 4/6				27-29	
		6/12 4/6 5/6		...grades light gray.		29-31	
		8/12 10/6 11/6				31-33	
		27/12 35/6 30/6		...grades sandy, wet.		33-35	
			SM	SILTY SAND: Gray, fine, clayey, very dense, wet.			

Logging and well completion details were transferred from Envirocare of Utah's drill logs and well completion reports.

DRILL HOLE LOG
MONITOR WELL NO.: GW-69

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: East side of RCRA Landfill area
DRILLER: Earth Core
DRILL RIG: Hollow Stem Auger
DEPTH TO WATER: 33'
HOLE DIAMETER: 8"

PROJECT NO.: 1675-021
DATE: 9-20-96
TOC ELEV.: 4281.71
GS ELEV.: 4278.03
LOGGED BY: JL
WELL NO.: GW-69



ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Gray, sandy, stiff, wet.		35-37	

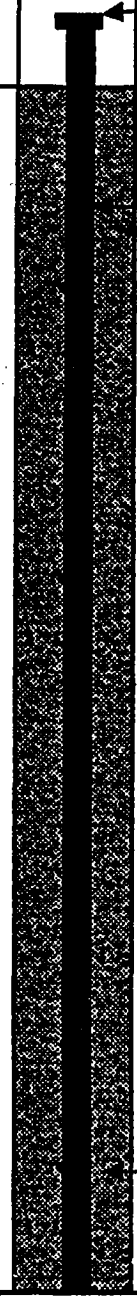
Logging and well completion details were transferred from Envirocare of Utah's drill logs and well completion reports.

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: Mixed Waste Replacement Wells	Boring Number: GW-69R
Date Drilled: 11-15-98 Date Completed: 11-15-9	Northing: 860,310.43 Easting: 1,554,686.87
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4,279.69
Groundwater Elevation (ft): 4,249.55	Measuring Point (MP) Elevation (ft): 4,281.59
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 39.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 24.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 24.0 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 22.0 feet Bentonite Seal 22.0 to 20.0 feet Cement Grout Seal 20.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	Grain Size % Sand	Grain Size % Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log
0				NA	CC	2	CL	Clay
1								
2								
3								
4							CL	
5				NA	CC	0.0		no recovery
6								
7								
8								
9							CL	
10				NA	CC	2.0		Clay
11								
12								
13								
14								
15				NA	CC	3.0	SM	Sand
16								
17								
18								
19								



CC Continuous Core Barrel

GW-69R

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: Mixed Waste Replacement Wells		Boring Number: GW-69R
Date Drilled: 11-15-98 Date Completed: 11-15-9		Northing: 860,310.43 Easting: 1,554,686.87
Logged By: Richard Poulson		Ground Surface Elevation (ft): 4,279.69
Groundwater Elevation (ft): 4,249.55		Measuring Point (MP) Elevation (ft): 4,281.59
Date Measured: 8/99		MP is top of Protective Casing
Total Depth (ft): 39.0		Drilling Contractor: RC Exploration
Diameter (in): 8.0		Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 24.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 24.0 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 22.0 feet Bentonite Seal 22.0 to 20.0 feet Cement Grout Seal 20.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20				NA	CC	5.0	SM	Sand	4259.69
21									Bentonite Seal
22									
23							CL	Clay	
24									
25				NA	CC	5.0		Clay	4254.69
26									
27									
28									16/30 Sand
29									
30				NA	CC	5.0		Green clay with mottling	4249.69
31									
32								Clay with sand stringers	
33									
34									
35				NA	CC	5.0			4244.69
36									2" Schedule 40 PVC 0.010-inch Screen
37									
38									
39									

TD of boring - 39.0 feet bgs

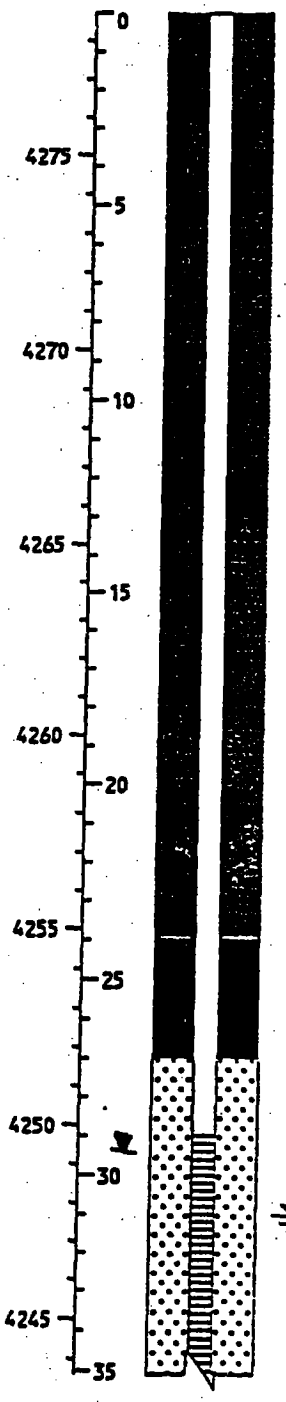
CC Continuous Core Barrel

GW-69R

DRILL HOLE LOG
MONITOR WELL NO.: GW-70

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: East side of RCRA Landfill area
DRILLER: Earth Core
DRILL RIG: Hollow Stem Auger
DEPTH TO WATER: 31' HOLE DIAMETER: 8"

PROJECT NO.: 1675-021
DATE: 9-19-96
TOC ELEV.: 4282.08
GS ELEV.: 4278.72
LOGGED BY: JL
WELL NO.: GW-70



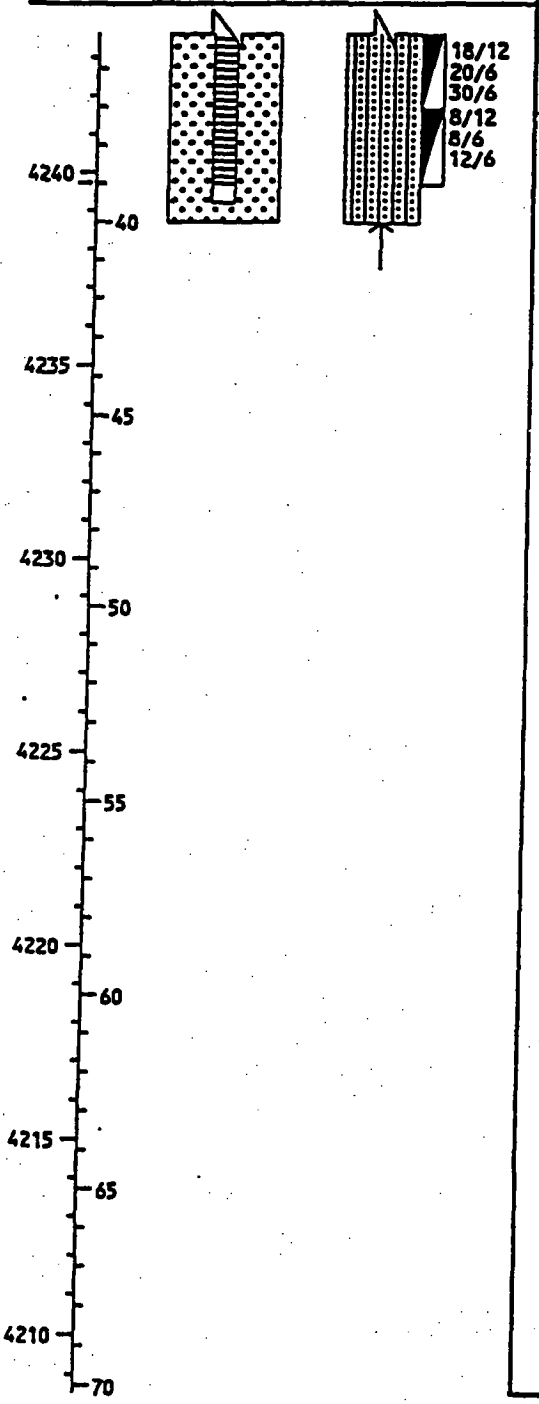
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
		6/12 3/6 3/6	CL	SILTY CLAY: Gray. medium stiff to stiff, moist.		1-3	0/24
		15/12 12/6 12/6				3-5	10/24
		5/12 3/6 3/6				5-7	17/24
		4/12 3/6 4/6		...grades to light gray.		7-9	0/24
		25/12 12/6 12/6	SM	SILTY SAND: Tan, fine, occasional sandy clay lenses, medium dense to dense, moist.		9-11	10/24
		25/12 12/6 11/6				11-13	0/24
		28/12 18/6 18/6				13-15	14/24
		24/12 12/6 13/6				15-17	0/24
		27/12 5/6 5/6		...grades reddish tan.		17-19	10/24
		32/12 25/6 27/6				19-21	17/24
		36/12 12/6 12/6				21-23	10/24
		26/12 15/6 16/6	CL	SILTY CLAY: Reddish tan, stiff to very stiff, moist.		23-25	17/24
		25/12 23/6 30/6				25-27	17/24
		7/12 5/6 4/6				27-29	18/24
		2/12 4/6 2/6		...grades light gray.		29-31	22/24
		12/12 12/6 12/6				31-33	22/24
		19/12 20/6 21/6		...grades sandy, wet.		33-35	22/24

Logging and well completion details were transferred from Envirocare of Utah's drill logs and well completion reports.

DRILL HOLE LOG
MONITOR WELL NO.: GW-70

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: East side of RCRA Landfill area
DRILLER: Earth Core
DRILL RIG: Hollow Stem Auger
DEPTH TO WATER: 31' HOLE DIAMETER: 8"

PROJECT NO.: 1675-021
DATE: 9-19-96
TOC ELEV.: 4282.08
GS ELEV.: 4278.72
LOGGED BY: JL
WELL NO.: GW-70



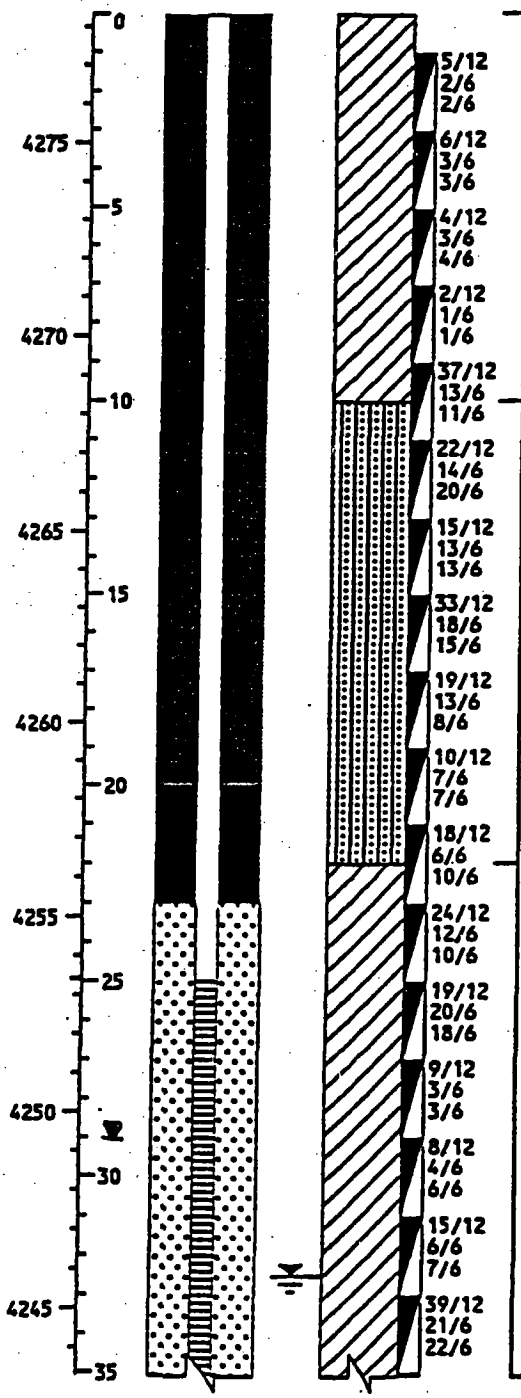
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			SM	SILTY SAND: Gray, fine, clayey, dense, wet.		35-37	22/24
						37-39	22/24

Logging and well completion details were transferred from Envirocare of Utah's drill logs and well completion reports.

DRILL HOLE LOG
MONITOR WELL NO.: GW-71

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North side of future RCRA Landfill area
DRILLER: Earth Core
DRILL RIG: Hollow Stem Auger
DEPTH TO WATER: 32.5' HOLE DIAMETER: 8"

PROJECT NO.: 1675-021
DATE: 9-20-96
TOC ELEV.: 4281.75
GS ELEV.: 4278.35
LOGGED BY: JL
WELL NO.: GW-71



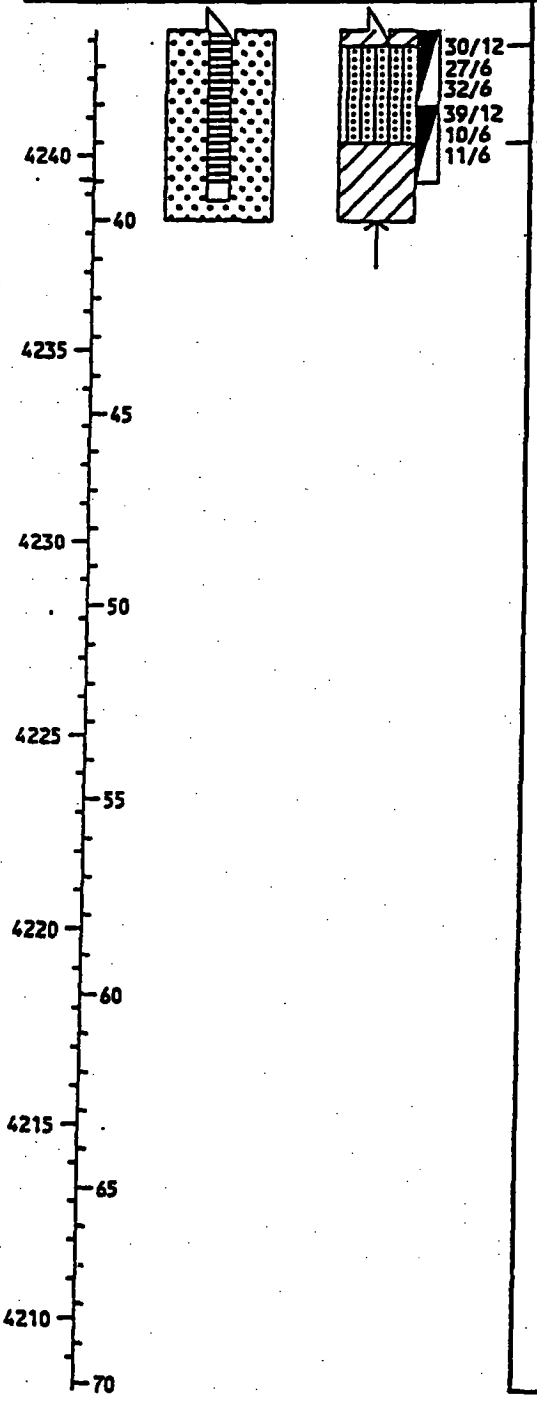
ELEVATION / DEPTH	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
0	CL	SILTY CLAY: Gray. medium stiff to stiff, moist.		1-3	0/24
				3-5	24/24
5				5-7	24/24
		...grades to light gray.		7-9	24/24
				9-11	12/24
10	SM	SILTY SAND: Tan, fine, occasional sandy clay lenses, medium dense to dense, moist.		11-13	0/24
				13-15	12/24
				15-17	12/24
15		...grades reddish tan.		17-19	12/24
				19-21	7/24
				21-23	12/24
20	CL	SILTY CLAY: Reddish tan, stiff to very stiff, moist.		23-25	23/24
				25-27	23/24
				27-29	24/24
25		...grades light gray.		29-31	24/24
				31-33	24/24
30		...grades sandy, wet.		33-35	23/24

Logging and well completion details were transferred from Envirocare of Utah's drill logs and well completion reports.

DRILL HOLE LOG
MONITOR WELL NO.: GW-71

PROJECT: Envirocare RCRA Mixed-Waste Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: North side of future RCRA Landfill area
DRILLER: Earth Core
DRILL RIG: Hollow Stem Auger
DEPTH TO WATER: 32.5' HOLE DIAMETER: 8"

PROJECT NO.: 1675-021
DATE: 9-20-96
TOC ELEV.: 4281.75
GS ELEV.: 4278.35
LOGGED BY: JL
WELL NO.: GW-71



ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			SM	SILTY SAND: Gray, fine, clayey, very dense, wet.		35-37	22/24
						37-39	22/24
			CL	SILTY CLAY: Gray, stiff, moist.			

Logging and well completion details were transferred from Envirocare of Utah's drill logs and well completion reports.

LOG OF MONITORING WELL
GW-75

Prepared by:

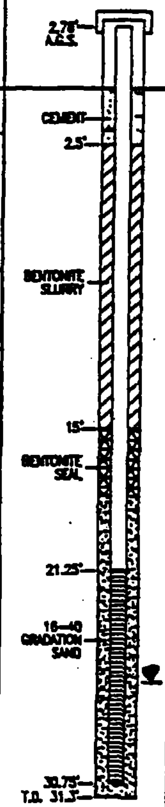
AdrianBrown

195 S. Madison Street – Suite 230 – Denver, Colorado 80209–3013

PROJECT NAME: ENVIROCARE OF UTAH PROJECT NO.: 3101B	BORING NUMBER: GW-75	COORDINATES OR LOCATION: E 1863708.8 N 880343.7	
LOGGED BY: DCR CHECKED BY:	MEASURING POINT ELEVATION: 4279.01	GW. DEPTH: 28.33' (ENCOUNTERED) DEPTH: 28.33' (STATIC)	CASING TYPE AND SIZE: PVC 2" ID FROM: 2.76' A.G.S. TO 31.3' B.G.S. SCREEN TYPE AND SIZE: PVC, 0.01" SLOT FROM: 21.25' TO 30.75'
DRILLING METHOD: HSA	HOLE DIAMETER: 7.75"	FLUID USED: NA	DATE STARTED: 4/21/97 COMPLETED: 4/23/97

DEPTH (FT)	SAMPLER TYPE AND NUMBER	SAMPLER DEPTH INTERVAL	RECOVERY LENGTH (%)	WATER	USCS CLASSIFICATION	GRAPHIC LOG	DESCRIPTION
0	SPT	0–2'	75		CL		SILTY CLAY: LIGHT TO MEDIUM BROWN WITH A TRACE OF FE-OXIDE STAINING, NONPLASTIC, BEDDING NONAPPARENT, DRY TO MOIST
	SPT	2–4'	75		CH		CLAY: LIGHT GRAY, PLASTIC TO VERY PLASTIC, THINLY LAMINATED (VARVED), SLIGHTLY MOIST
5	SPT	4–6'	75				CARBONACEOUS DETRITAL MATERIAL ALONG HIGH ANGLE FRACTURE AT 4.5' TO 5'
	SPT	6–7.5'	100				
	SPT	7.5–9'	100		SM		SILTY SAND: LIGHT REDDISH BROWN, ABOUT 75% FINE GRAINED SAND, 25% SILT, OOLITIC SANDS, POORLY GRADED, MODERATE FE-OXIDE STAINING, LAMINATED, LOOSE, SLIGHTLY MOIST
10	SPT	10.5–12'	50				
	SPT	12–13.5'	100		CH		CLAY: LIGHT GRAY, HIGHLY PLASTIC, THINLY LAMINATED (VARVED), INTERBEDDED WITH SOME SILTY SAND LENSES, MOIST
	SPT	13.5–15'	50		SM		SILTY SAND: LIGHT BROWN, ABOUT 75% VERY FINE TO FINE GRAINED SAND, 20% SILT, 5% CLAY, OOLITIC SANDS, LOOSE, BEDDING NONAPPARENT, SLIGHTLY MOIST
15	SPT	15–16.5'	50				
	SPT	16.5–18'	60				CLAY CONTENT INCREASES TO 15% – 20% WITH DEPTH
	SPT	18–19.5'	100				
20	SPT	19.5–21'	100				
	SPT	21–22.5'	100				MOTTLED LIGHT GRAY (CH) LENSE FROM 21' TO 22.5'
	SPT	22.5–24'	100				
25	SPT	24–25.5'	100				WET AT 24.5'
	SPT	25.5–27'	100		CH		CLAY: MEDIUM TO DARK BROWN, PLASTIC, THINLY LAMINATED (VARVED), SOME SILT AND SAND X–15%), WET
	SPT	27–28.5'	100	▼	CH		CLAY: LIGHT GRAY, HIGHLY PLASTIC, THINLY LAMINATED (VARVED), HIGH ANGLE FRACTURES COATED WITH FE-OXIDE STAINING, SATURATED
	SPT	28.5–30'	100				MOTTLED LIGHT BROWN SANDY CLAY LENSE FROM 29.5' TO 30'
30	SPT	30–31.5'	100				MOTTLED LIGHT BROWN/LIGHT GRAY SAND LENSE AT 31.3'
35							
40							
45							
50							
55							
60							

WELL COMPLETION DIAGRAM



3101B\MAY-97\GW-75.DWG, 05/27/97

Prepared by:

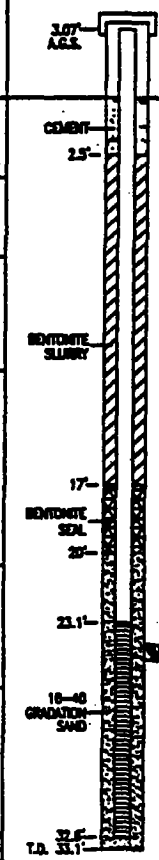
Adrian Brown

LOG OF MONITORING WELL
GW-76

PROJECT NAME: ENVIROCARE OF UTAH PROJECT NO.: 31018	BORING NUMBER: GW-76	COORDINATES OR LOCATION: E 1883083.2 N 889330.4	
LOGGED BY: DCR CHECKED BY:	MEASURING POINT ELEVATION: 4278.61	DRILL DEPTH: 34.84' DEPTH: 28.32'	(ENCOUNTERED) (STATIC)
CASING TYPE AND SIZE: PVC 7" ID SCREEN TYPE AND SIZE: PVC, 0.01" SLOT	FROM: 3.07' A.G.S. TO 33.1' B.G.S. FROM: 23.1' TO 33.0'		
DRILLING METHOD: HSA	HOLE DIAMETER: 7.75"	FLUID USED: NA	DATE STARTED: 4/22/97 COMPLETED: 4/23/97

SAMPLER TYPE AND NUMBER	SAMPLER DEPTH INTERVAL	RECOVERY LENGTH (%)	WATER	USCS CLASSIFICATION	GRAPHIC LOG	DESCRIPTION
SPT	0-1.5'	100		CL		SILTY CLAY: LIGHT BROWN, NONPLASTIC, BEDDING NONAPPARENT, SOME FE-OXIDE STAINING ALONG HIGH ANGLE FRACTURES, DRY
SPT	1.5-3'	100				
SPT	3-4.5'	100		CH		CLAY: MEDIUM TO LIGHT GRAY, HIGHLY PLASTIC, THINLY LAMINATED (VARVED), HIGH ANGLE FRACTURES FILLED WITH HALITE CRYSTALS AND PLANT DETRITAL MATERIAL, MOIST GRADES TO A LIGHT GRAY COLOR WITH DEPTH
SPT	4.5-6'	90				
SPT	6-7.5'	100				
SPT	7.5-8'	100		SP		SAND: LIGHT REDDISH BROWN, >85% FINE GRAINED SAND, POORLY GRADED, LOOSE, BEDDING NONAPPARENT, SOME FE-OXIDE STAINING, DRY
SPT	9-10.5'	80				LIGHT BROWN SILTY CLAY (CL) LENSE AT 10.5'
SPT	10.5-12'	100				LIGHT GRAY PLASTIC CLAY (CH) LENSE FROM 11.5' TO 12'
SPT	12-13.5'	100		SM		SM-SILTY SAND: LIGHT BROWN, ABOUT 75% FINE GRAINED SAND, ABOUT 15% SILT, ABOUT 10% CLAY, MODERATELY GRADED, OOLITIC SANDS, LOOSE, BEDDING NONAPPARENT, SLIGHTLY MOIST
SPT	13.5-15'	50				
SPT	15-16.5'	100				MEDIUM BROWN SAND LENSE (SP) FROM 14 TO 15'
SPT	16.5-18'	80				COLOR GRADES TO REDDISH BROWN WITH DEPTH. CLAY CONTENT ALSO INCREASES WITH DEPTH
SPT	18-19.5'	100				
SPT	19.5-21'	100				
SPT	21-22.5'	100		CL		SILTY CLAY: MEDIUM BROWN, NONPLASTIC, ABOUT 5-10% VERY FINE GRAINED SAND, BEDDING NONAPPARENT, TRACE TO SOME FE-OXIDE STAINING, MOIST
SPT	22.5-24'	100				MEDIUM REDDISH BROWN SILTY SAND (SM) LENSE FROM 23 TO 24'
SPT	24-25.5'	100				
SPT	25.5-27'	100	▼	CH		CH-CLAY: LIGHT GRAY TO OLIVE GRAY, HIGHLY PLASTIC, ABOUT 5-10% SILT, THINLY LAMINATED (VARVED), DENSE, SATURATED
SPT	27-28.5'	50				
SPT	28.5-30'	100				MEDIUM BROWN SILTY SAND (SM) LENSE FROM 28 TO 29.5'
SPT	30-31.5'	100				CLAY GRADES TO A PALE OLIVE COLOR WITH DEPTH
SPT	31.5-33'	100				

WELL COMPLETION DIAGRAM



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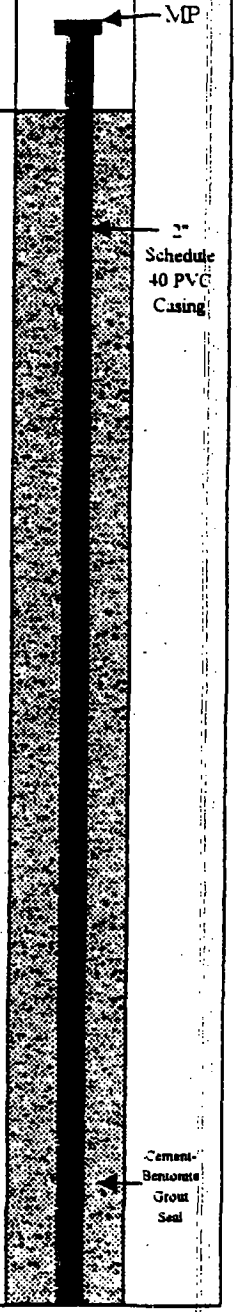
Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: L\RW South Area	Boring Number: GW-77
Date Drilled: 1/22/98 Date Completed 1/23/98	Northing: Easting:
Logged By: Dan Shrum	Ground Surface Elevation (ft):
Groundwater Elevation (ft):	Measuring Point (MP) Elevation (ft):
Date Measured:	MP is top of Protective Casing
Total Depth (ft): 40.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 29.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 29.0 to 0.0 feet Type PVC Sch. 40
Sand 40.0 to 27.0 feet Bentonite Seal 27.0 to 24.0 feet Cement Grout Seal 24.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Lithologic Log
0	0	25	75	NA	CC	4.5	CL	Sandy clay, light brown, fine sands, low plasticity, sl. moist
1								
2								Increasing sands and silts
3	0	30	70				ML	Sandy silt, reddish brown, loose, fine sands, sl. moist
4								
5	0	30	70	NA	CC	5.0	SM	Silty sand, reddish brown, loose, fine sands, sl. moist
6								
7								
8								
9								
10				NA	CC	5.0		As above
11	0	15	85				CL	Silty clay, greenish gray, fine sands, medium stiff, v. moist to wet, medium plasticity.
12								
13								
14								
15	0	40	60	NA	CC	4.5	ML/SM	Sandy silt/Silty sand, clay to 20%, greenish gray, moist, medium dense, slight iron oxide staining.
16								
17	0	10	90				CL	Silty clay, lt. gray, fine sands, stiff, low to med. plasticity, v. moist
18	0	70	30				ML/SM	Sandy silt/Silty sand, greenish gray, *fine sand, abundant silt,* slightly moist, no bedding - massive.
19								



CC Continuous Core Barrel

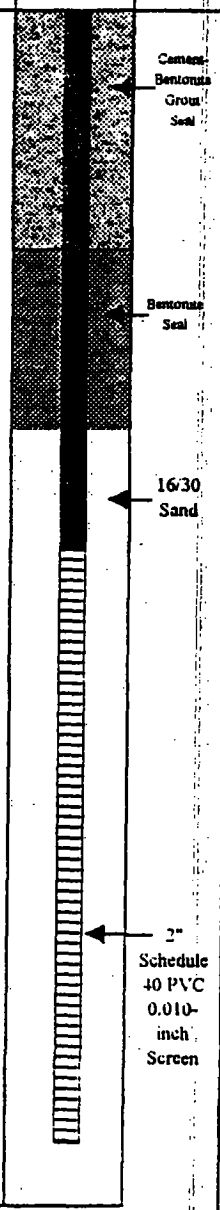
GW-77

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW South Area	Boring Number: GW-77
Date Drilled: 1/22/98 Date Completed 1/23/98	Northing: Easting:
Logged By: Dan Shrum	Ground Surface Elevation (ft):
Groundwater Elevation (ft):	Measuring Point (MP) Elevation (ft):
Date Measured:	MP is top of Protective Casing
Total Depth (ft): 40.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 29.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 29.0 to 0.0 feet Type PVC Sch. 40
Sand 40.0 to 27.0 feet Bentonite Seal 27.0 to 24.0 feet Cement Grout Seal 24.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Lithologic Log
20	0	65	35	NA	CC	5.0	ML/SM	As above, increasing silt, clay to 10 %.
21								
22	0	80	20				SM	Silty sand, greenish gray, fine to medium sands, medium dense, sl. moist
23	0	70	30					increasing silts and clays
24								
25				NA	CC	5.0		
26	0	85	15					Silty sand, lt. yellowish brown, fine to medium sands, some micaceous sands, loose to medium dense, no clay, sl. moist
27	0	50	50				SM/SC	Silty sand/Clayey sand, light yellowish brown, fine sands, medium dense, slightly moist, no bedding.
28								
29	0	10	90				CL	Silty clay, light brown, very thin interbedded silty sand lenses, very moist, medium plasticity
30	0	10	90	NA	CC	5.0		Silty clay, light gray mottled with light brown, stiff, wet
31								
32	0	75	25					Silty sand lenses, light gray, fine sands, wet.
33							CL	Silty sand lense
34							CL	
35				NA	CC	5.0		color changing to greenish gray
36								
37	0	70	30					Silty sand lense, wet
38							CL	
39								Silty sand lense, wet Silty clay, light olive gray, fine sands, stiff, moist
40							CL	



TD of boring - 40.0 feet bgs

CC Continuous Core Barrel

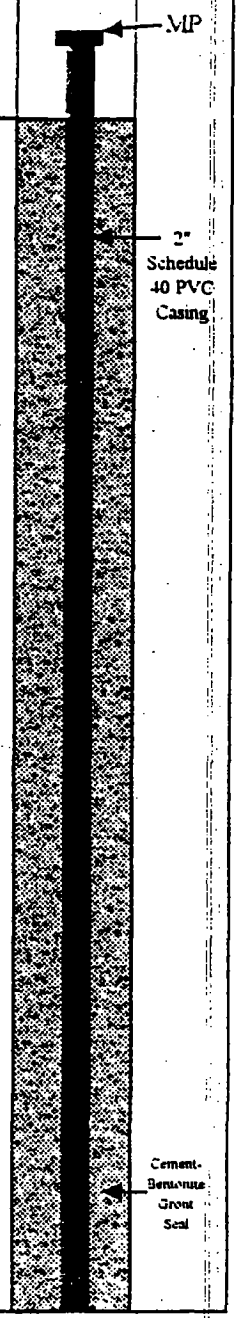
GW-77

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: L.RW South Area	Boring Number: GW-78
Date Drilled: 1/22/98 Date Completed 1/23/98	Northing: Easting:
Logged By: Dan Shrum	Ground Surface Elevation (ft):
Groundwater Elevation (ft):	Measuring Point (MP) Elevation (ft):
Date Measured:	MP is top of Protective Casing
Total Depth (ft): 40.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 29.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 29.0 to 0.0 feet Type PVC Sch. 40
Sand 40.0 to 26.9 feet Bentonite Seal 26.9 to 23.9 feet Cement Grout Seal 23.9 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Lithologic Log
0	0	25	75	NA	CC	4.0	CL	Sandy clay, light brown, fine sands, stiff, low plasticity, moist, compacted road material.
1								
2	0	40	60				ML	Sandy silt, brown, vertical rootlets w/ organic material, loose, fine sands, slightly moist
3								
4	0	30	70					
5	0	30	70	NA	CC	5.0		As above
6	0	20	80				CL	Silty clay, brown, abundant iron oxide staining, abundant silt to 30 %, medium stiff, low plasticity, slightly moist
7								
8	0	20	80					As above, light gray, vertical silty sand burrow like features, possibly worm burrows filled with silty sand
9								
10	0	10	90	NA	CC	5.0		Silty clay, light gray and light greenish gray (marl colored), fine sands, stiff, slightly moist
11								
12								
13								
14								
15				NA	CC	5.0		Silty sand lense
16	0	25	75				ML	Sandy silt, greenish gray, fine sand, medium dense, clay to 20 %, slightly moist
17								
18								
19	0	60	40					Silty sand/Sandy silt, greenish gray, fine sands, medium dense, slightly moist



CC Continuous Core Barrel

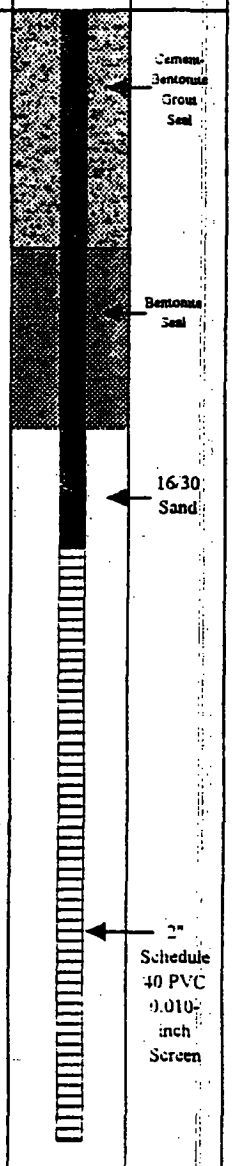
GW-78

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW South Area	Boring Number: GW-78
Date Drilled: 1/22/98 Date Completed 1/23/98	Northing: Easting:
Logged By: Dan Shrum	Ground Surface Elevation (ft):
Groundwater Elevation (ft):	Measuring Point (MP) Elevation (ft):
Date Measured:	MP is top of Protective Casing
Total Depth (ft): 40.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 29.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 29.0 to 0.0 feet Type PVC Sch. 40
Sand 40.0 to 26.9 feet Bentonite Seal 26.9 to 23.9 feet Cement Grout Seal 23.9 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Lithologic Log
20	0	60	40	NA	CC	5.0	ML/SM	Silty sand/Sandy silt, greenish gray, fine sands, medium dense, slightly moist
21								
22								
23	0	80	20				SM	Silty sand, reddish brown, fine sands, medium dense, slightly moist, no bedding, no clay
24								
25				NA	CC	5.0		
26								
27								
28								
29	0	70	30					Silty sand, dark yellowish brown, fine sands, some micaceous sands, medium dense, no clay, slightly moist
30	0	10	90	NA	CC	5.0	CL	Silty clay, brown, fine sand, stiff, low plasticity, very moist
31								
32	0	10	90					As above, color change to light gray, wet, low to medium plasticity
33								
34								
35				NA	CC	5.0		As above, more water in thin, interbedded silty sand lenses
36								
37	0	70	30					
38	0	70	30					Silty sand lense, wet
39	0	10	90				CL	Silty clay as above except slightly moist to moist stiff, medium plasticity
40								



TD of boring - 40.0 feet bgs

CC Continuous Core Barrel

GW-78

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New Mixed Waste Area	Boring Number: GW-79
Date Drilled: 7-20-98 Date Completed: 7-20-98	Northing: 860,591.98 Easting: 1,554,276.63
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,277.10
Groundwater Elevation (ft): 4,249.50	Measuring Point (MP) Elevation (ft): 4,279.85
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
									MP (4279.85)
0				NA	CC	3.0	ML	Silty, clayey, tan to lt gray	4277.10
1							CL	Clay, lt gray to tan, damp, plastic, silty	
2								Clay, damp, plastic, silty	2" Schedule 40 PVC Casing
3									
4				NA	CC	5.0	CL	Clay, brown, silty, dampl to layered and laminated, gray and white plastic, silty, some iron	
5									4272.10
6									
7									
8									
9				NA	CC	1.5	SM	Sand, clayey to silty, gray/tan, damp, iron staining, fine to medium grained sands	
10									4267.10
11							CL	Clay, 2-3" thick, silty, damp, lt gray	Cement-Bentonite Grout Seal
12							SM	Sand, clay to silty, lt gray/tan, damp	
13									
14				NA	CC	4.5		Sand, silty to very clayey, tan to lt gray, damp	
15									4262.10
16								Sandy clay to clayey sand, brown, damp, silty to very silty	Bentonite Seal
17								Sand, silty, fine grained, tan to very lt gray	
18									
19				NA	CC	5.0	CL	Clay, brown, damp, silty, some sand	
							SM	Sand, brown, damp, silty to clayey or very clayey	

CC Continuous Core Barrel

GW-79

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New Mixed Waste Area	Boring Number: GW-79
Date Drilled: 7-20-98 Date Completed: 7-20-98	Northing: 860,591.98 Easting: 1,554,276.63
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,277.10
Groundwater Elevation (ft): 4,249.50	Measuring Point (MP) Elevation (ft): 4,279.85
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	% Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM		4257.10
21							CL	Clay, silty to sandy, brown, iron staining	
22									
23									
24				NA	CC	5.0		Clay, silty to sandy, brown, damp	
25									4252.10
26									
27									
28									16/30 Sand
29				NA	CC	5.0		Clay, tan to gray to greenish gray, silty to very silty to sandy, iron staining, iron laminations	
30									4247.10
31									2" Schedule 40 PVC 0.010-inch Screen
32									
33									
34									

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

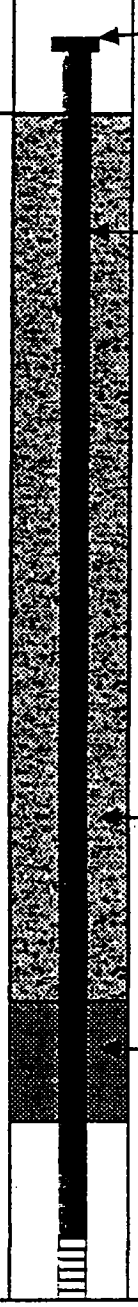
GW-79

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New Mixed Waste Area	Boring Number: GW-80
Date Drilled: 7-20-98 Date Completed: 7-20-98	Northing: 860,598.72 Easting: 1,554,100.07
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,273.58
Groundwater Elevation (ft): 4,249.68	Measuring Point (MP) Elevation (ft): 4,275.85
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
0				NA	CC	4.0	CL	Clay, engineered.	4273.58
1							CL	Clay, moist, gray to brown, iron, silty packages	
2									
3									
4				NA	CC	5.0	CL	Clay, white and gray layers and laminations, some iron, moist to very moist	
5									4268.58
6							SM	Sand, silty to very clayey, tannish gray, fine to medium, iron	
7									
8									
9				NA	CC	5.0		Sand, silty to very clayey, tannish gray to greenish tan, some rock fragments to 1cm, damp, fine to medium grained sands	
10									4263.58
11									
12									
13									
14				NA	CC	5.0		Sand, silty to very clayey, damp to very moist, tan to brown	
15									4258.58
16									
17							CL	Clay, brownish gray, moist, plastic, silty, iron staining	
18									
19				NA	CC	5.0			



CC Continuous Core Barrel

GW-80

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New Mixed Waste Area		Boring Number: GW-80
Date Drilled: 7-20-98	Date Completed: 7-20-98	Northing: 860,598.72 Easting: 1,554,100.07
Logged By: Jeff Low		Ground Surface Elevation (ft): 4,273.58
Groundwater Elevation (ft): 4,249.68		Measuring Point (MP) Elevation (ft): 4,275.85
Date Measured: 8/99		MP is top of Protective Casing
Total Depth (ft): 34.0		Drilling Contractor: RC Exploration
Diameter (in): 8.0		Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							CL	Clay, silty to very silty, tannish to brown to brownish gray, very moist, some sands	4253.58
21									
22									
23									
24				NA	CC	5.0		Clay, very lt tan to lt gray, silty to very sandy, iron, damp to very moist, some cementation of clays	
25									4248.58
26									
27									
28									16/30 Sand
29				NA	CC	5.0		Clay, sandy to very sandy, silty, lt green/gray to tan/gray, some rock fragments 2-3 cm, saturated	
30									4243.58
31									2" Schedule 40 PVC 0.010-inch Screen
32									
33							SM	Sand, fine to very fine grained, well sorted, whitish, about 1cm thick	
							CL	Clay	
34									

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

GW-80

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-81
Date Drilled: 7-14-98 Date Completed: 7-14-98	Northing: 862,999.31 Easting: 1,550,242.17
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,274.18
Groundwater Elevation (ft): 4,249.08	Measuring Point (MP) Elevation (ft): 4,276.70
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
0				NA	CC	3.0	CL	Silty clay, brown to tan, sl moist, low plasticity	MP (4276.70)
1									4274.18
2									2" Schedule 40 PVC Casing
3									
4				NA	CC	5.0	CL	Silty clay, white to gray/green, laminated to layered (varved), sl plasticity, some FeO staining, sl moist.	
5									4269.18
6									
7									
8									
9				NA	CC	1.5	SM	Silty sand with some clay, tan to lt gray, sl moist, some rock fragments, angular to sub-angular, fine to medium grained	
10									4264.18
11									Cement-Bentonite Grout Seal
12									
13									
14				NA	CC	4.5	CL	Sandy clay, sl moist, whitish to tan, grades to clayey sand	
15								grading to clayey sand.	4259.18
16								Silty clay, tan, sl moist, low to medium plasticity	Bentonite Seal
17								Sandy silt, lt olive, fine sands, low to no plasticity, sl moist.	
18									
19				NA	CC	5.0	SM	Silty sand, whit to tan, fine to medium grained sands.	

CC Continuous Core Barrel

GW-81

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-81
Date Drilled: 7-14-98 Date Completed: 7-14-98	Northing: 862,999.31 Easting: 1,550,242.17
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,274.18
Groundwater Elevation (ft): 4,249.08	Measuring Point (MP) Elevation (ft): 4,276.70
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	% Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Silty sand, whit to tan, fine to medium grained sands.	4254.18
21									
							CL	Clay, sl moist.	
22							SM	Silty sand, tan to brown, very moist	
							CL	Silty clay, tan to gray, low plasticity.	
23									
24				NA	CC	4.0	SM	Silty sand, tan to brown, very moist.	
25									4249.18
26									
27									
28									16/30 Sand
29				NA	CC	3.0			
							CL	Silty clay, tan, sl moist	4244.18
30							SM	Clayey sand, tan.	
31									2" Schedule 40 PVC 0.010-inch Screen
32									
33									
34									

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

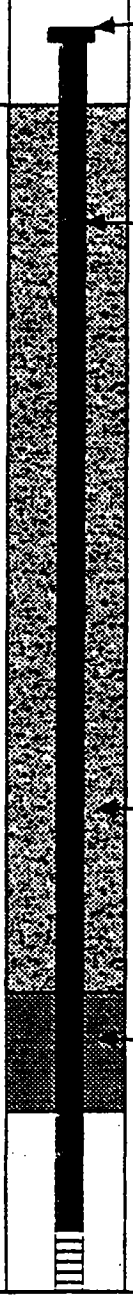
GW-81

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-82
Date Drilled: 7-13-98 Date Completed: 7-13-98	Northing: 862,992.28 Easting: 1,550,573.37
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,274.35
Groundwater Elevation (ft): 4,249.24	Measuring Point (MP) Elevation (ft): 4,276.72
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
0				NA	CC	3.0	CL	Silty clay, brown to tan, sl moist, low plasticity, some FeO staining	4274.35
4				NA	CC	5.0	CL	Silty clay, gray to white, varved, sl moist.	4269.35
8							SM	Silty sand, reddish brown to gray, some clayey layers, fine to large grained sands	
9				NA	CC	2.5		Sand, sub-rounded rock frags, clayey toward bottom.	4264.35
11							CL	Clay, very sandy, silty, tan to gray, plastic, damp	
14				NA	CC	4.0	SM	very sandy, clay or clayey sand, gray to tan Sand, gravelly at top, fine grained, silty at bottom, tan, damp.	4259.35
19				NA	CC	4.5		Sand, gray to tan, some lamination (FeO?)	



CC Continuous Core Barrel

GW-82

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-82
Date Drilled: 7-13-98 Date Completed: 7-13-98	Northing: 862,992.28 Easting: 1,550,573.37
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,274.35
Groundwater Elevation (ft): 4,249.24	Measuring Point (MP) Elevation (ft): 4,276.72
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							CL	Clay, very sandy, silty, damp, brown to lt brown, plastic	4254.35
21									
22									
23							SM	Sand, fine grained, brown, damp	
24				NA	CC	5.0		Sand, as above, fine to medium grained, moist.	
25									4249.35
26									
27								saturation (sand 6-inces thick) clayey sand with silt	
28								Saturated sand 1-inch thick	16/30 Sand
29				NA	CC	2.5	CL	Clay, gray to tan, damp, silty.	
30							SM	Sand, fine grained, silty, moist, tan to lt brown	4244.35
							CL	Clay, gray, silty, damp, plastic.	2" Schedule 40 PVC 0.010-inch Screen
31									
32									
33									
34									

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

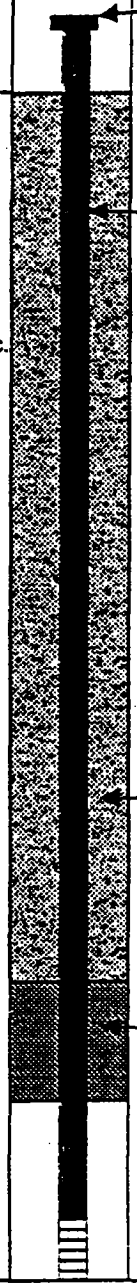
GW-82

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-83
Date Drilled: 7-13-98 Date Completed: 7-13-98	Northing: 862,985.98 Easting: 1,550,902.77
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,274.51
Groundwater Elevation (ft): 4,249.33	Measuring Point (MP) Elevation (ft): 4,276.82
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log
0				NA	CC	3.2	ML	Silt, some clay, tan to brown
1							CL	Clay, brown to brownish gray, silty, damp, Fe replacement
2								
3								
4				NA	CC	3.0	CL	Clay, varved gray and white to lt gray and white, silty, damp, plastic.
5								
6								
7							SM	Sand, silty to clayey, dry, lt reddish gray to brown, fine to coarse grained sand
8								
9				NA	CC	2.0		Sand, fine to medium grained, gravelly, yellow/gray to tan, fine gravel only toward bottom, dry
10								
11								
12								
13								
14				NA	CC	3.0	SM	Sand, fine to coarse at top, some silt and clay, fine grained toward bottom with silty and clay, gray to tan, damp, gravel 3-4 mm.
15								
16								
17								
18								
19				NA	CC	3.0		Sand, tan to gry, silty and clay at top with silty clay lenses



Elevation (feet)

CC Continuous Core Barrel

GW-83

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-83
Date Drilled: 7-13-98 Date Completed: 7-13-98	Northing: 862,985.98 Easting: 1,550,902.77
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,274.51
Groundwater Elevation (ft): 4,249.33	Measuring Point (MP) Elevation (ft): 4,276.82
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	% Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Sand, fine to medium toward bottom, most, reddish gray, some clayey layers.	4254.51
21									
22									
23									
24				NA	CC	4.0		Sand, as above.	
25									4249.51
26									
27									
28								saturated, gray to whit, fine grained	16/30 Sand
29				NA	CC	3.5	CL	Clay, very moist, tan, silty varves.	
30									4244.51
31							SM	Sand, clay and silty, very moist, tan Sand, silty and clayey, green	2" Schedule 40 PVC 0.010-inch Screen
32									
33									
34									

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

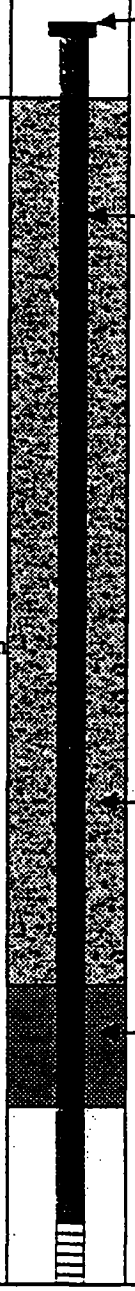
GW-83

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-84
Date Drilled: 7-13-98 Date Completed: 7-13-98	Northing: 862,979.53 Easting: 1,551,235.63
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,274.78
Groundwater Elevation (ft): 4,249.40	Measuring Point (MP) Elevation (ft): 4,277.14
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
0				NA	CC	3.0	ML	Silt, clayey and sandy, tannish gray to lt brown, dry, rootlets.	4274.78
1							CL	Clay, silty, damp, plastic, lt brown to gray, gray is layered with white.	
2									
3									
4				NA	CC	4.5	CL	Clay, as above.	
5									4269.78
6									
7							SM	Sand, fine to coarse, lt reddish brown to tan, dry, clasts towards bottom.	
8									
9				NA	CC	4.0		Sand, clayey, silty, gravelly (<3 cm), dry, fine grained toward bottom	
10									4264.78
11									
12							CL	Clay, sandy at top, silty toward bottom of sample, damp, tan to lt gray, plastic.	
13									
14				NA	CC	4.0		Clay, damp, plastic, silty, some sand.	
15							SM	Sand, dry, fine to coarse, tan to lt brown Clayey sand, some silt, damp, plastic.	4259.78
16									
17							CL	Clay, damp, brown to tan, silty, plastic	
18							SM	Sand, very clayey, silty	
19				NA	CC	4.0		Sand, tan to gry, silty and clay at top with silty clay lenses	



CC Continuous Core Barrel

GW-84

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area		Boring Number: GW-84
Date Drilled: 7-13-98	Date Completed: 7-13-98	Northing: 862,979.53 Easting: 1,551,235.63
Logged By: Jeff Low		Ground Surface Elevation (ft): 4,274.78
Groundwater Elevation (ft): 4,249.40		Measuring Point (MP) Elevation (ft): 4,277.14
Date Measured: 8/99		*MP is top of Protective Casing*
Total Depth (ft): 34.0		Drilling Contractor: RC Exploration
Diameter (in): 8.0		Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Sand, as above.	4254.78
21									
22									
23									
24				NA	CC	5.0		Sand, as above.	
25								saturated.	4249.78
26								Clayey sand	
27							CL	Clay, brown, silty	
28								Clay, white, silty, plastic, cemented at bottom	16/30 Sand
29				NA	CC	3.5		Clay, saturated, silty and sand, varved or layered, white and green gray	
30									4244.78
31									2" Schedule 40 PVC 0.010-inch Screen
32								Clay, blue green, varved or layered, sandy with depth, very moist.	
33									
34									

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

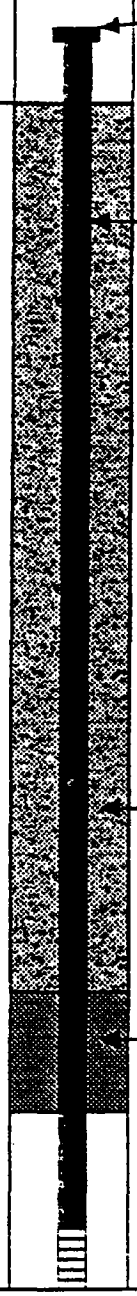
GW-84

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-85
Date Drilled: 7-10-98 Date Completed: 7-10-98	Northing: 862,973.14 Easting: 1,551,559.04
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,275.16
Groundwater Elevation (ft): 4,249.53	Measuring Point (MP) Elevation (ft): 4,277.79
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log
0				NA	CC	3.0	ML	Silty clay to clayey silt, tan, some lamination, dry, darker color with depth.
1							CL	Clay, silty, damp, plastic, tan to brown, grayer with depth.
2								Clay, gray to tan, silty, moist, Fe replacement.
3								
4				NA	CC	5.0	CL	Clay, varved or layered, white and greenish gray, moist, silty.
5								
6								
7								
8							SM	Sand, fine to coarse grained, reddish, dry
							CL	Silty clay or clayey silt, damp, more clay toward bottom, tan to reddish gray
9				NA	CC	3.0	SM	Sand, silty, damp, rounded rock fragments at 11.8'
10								
11								
12								
13								increasing clay, tan to reddish tan
14				NA	CC	4.5		Clayey sand or sandy clay, silty, damp, gray to reddish gray
15								
16								Sand, silty, tan to green, very silty toward bottom.
17								
18								
19				NA	CC	3.0		



CC Continuous Core Barrel

GW-85

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-85
Date Drilled: 7-10-98 Date Completed: 7-10-98	Northing: 862,973.14 Easting: 1,551,559.04
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,275.16
Groundwater Elevation (ft): 4,249.53	Measuring Point (MP) Elevation (ft): 4,277.79
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-incn
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Sand, fine grained, silty clay at top, silty at bottom, tan gray to tan.	4255.16
21									
22									
23									
24				NA	CC	5.0		Sand, fine grained, moist, tan to brown, interbedded tan clay, silty, very wet.	
25								saturated.	4250.16
							CL	Clay, silty, sandy, tan to gray	
26							SM	Sand, saturated	
							ML	Silty, sandy tan, very wet.	
27							CL	Clay, tan to brown, moist, sandy at top, silty at bottom	
28									16/30 Sand
29				NA	CC	5.0		Clay, very sand at top, very wet, grades to silt, gray. gray	
30									4245.16
31									2" Schedule 40 PVC 0.010-inch Screen
32								Clay, greenish gray, very moist, silty.	
33									
34									

TD of boring - 34.3 feet bgs

CC Continuous Core Barrel

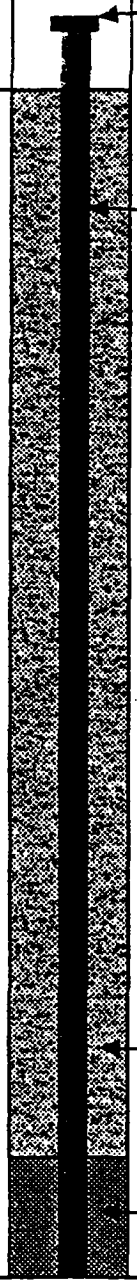
GW-85

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-86
Date Drilled: 7-9-98 Date Completed: 7-9-98	Northing: 862,965.78 Easting: 1,551,955.18
Logged By: Dan Shrum	Ground Surface Elevation (ft): 4,275.83
Groundwater Elevation (ft): 4,249.77	Measuring Point (MP) Elevation (ft): 4,278.23
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 39.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 38.4 to 23.4 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 23.4 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 21.4 feet Bentonite Seal 21.4 to 19.4 feet Cement Grout Seal 19.4 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
0				NA	CC	3.0	ML	Silty clay - clayey silt, tan to gray, stiff.	4275.83
1							CL	Clay, reddish, silty, damp	
								Clay, light gray, damp, plastic, Fe staining, some silt	
2								Clay, tan to brown, plastic, moist, silty, partings.	
3									
4				NA	CC	5.0	CL	Clay, varved, whitish or light tan and greenish gray, Fe replacement throughout.	4270.83
5									
6									
7									
8									
9				NA	CC	1.0	SM	Sand, oolitic, tan to light gray.	
							CL	Clay, very silty, tan to reddish brown, low plasticity.	4265.83
10							SM	Sand, clayey to very clayey, fine grained rock fragments, 1-2 mm in diameter, gray to lt gray.	
11									
12									
13									
14				NA	CC	4.0	CL	clay, very silty and sand at top, grading to silty clay @ 14.7', gray to light gray, damp.	4260.83
15									
15							SM	Sand, fine to medium grained, tannish, rock fragments, 1 cm, grads finer at bottome	
17									
18									
19				NA	CC	5.0	ML	Clayey, sandy silt, damp, tan to gray tan, interbbeded with silty clay.	



CC Continuous Core Barrel

GW-86

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-86
Date Drilled: 7-9-98 Date Completed: 7-9-98	Northing: 862,965.78 Easting: 1,551,955.18
Logged By: Dan Shrum	Ground Surface Elevation (ft): 4,275.83
Groundwater Elevation (ft): 4,249.77	Measuring Point (MP) Elevation (ft): 4,278.23
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 39.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 38.4 to 23.4 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 23.4 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 21.4 feet Bentonite Seal 21.4 to 19.4 feet Cement Grout Seal 19.4 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							ML		4255.83
21									
22							SM	Sand, fine grained, damp, tan.	
23									
24				NA	CC	5.0		Sand, fine grained, silty, damp, tan.	
25							CL	Clay, very silty, reddish tan, damp, sandy @ 25', grads to sand	4250.83
26							SM	Sand, gray/tan, silty, damp, fine grained	
27								Sand, tan to brown, fine grained to coarse grained.	
28							CL	Clay, tan reddish, silty to very silty	
29				NA	CC	5.0	ML	Clayey silty, brown, damp.	
30							CL	Clay, gray to light brown, varved, interbedded with silty sand, lt greenish gray, very moist	4245.83
31								increasing moisture.	
32									
33									
34				NA	CC	5.0		Clay, greenish or bluish gray, plastic, wet to very wet, sand lenses at 36', grades sandy to very sand with depth.	
35									4240.83
36									
37									
38									
39									

Bentonite Seal
16/30 Sand
2" Schedule 40 PVC 0.010-inch Screen

TD of boring - 39.0 feet bgs

CC Continuous Core Barrel

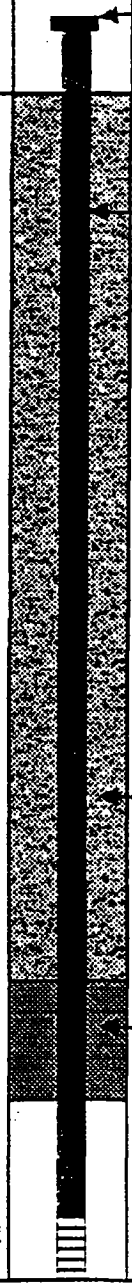
GW-86

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-88
Date Drilled: 7-5-98 Date Completed: 7-5-98	Northing: 862,958.18 Easting: 1,552,343.08
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,276.86
Groundwater Elevation (ft): 4,249.75	Measuring Point (MP) Elevation (ft): 4,279.45
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
0				NA	CC	4.0	ML	Silt, tan to lt gray, some clay.	4276.86
1							CL	Clay, damp, plastic, reddish gray to gray.	
2									
3								Clay, reddish brown, damp, somewhat layered with red/brown and lt gray layers.	
4				NA	CC	5.0	CL	Clay, reddish brown to laminated white and lt gray, damp, silty, plastic, some Fe lamination, laminae <1 mm	
5									4271.86
6									
7									
8									
9				NA	CC	3.0	SM	Sand, very clayey, damp, reddish tan to lt gray, fine to medium grained sand, some pebbles 3-4 mm, gravelly at 10.6, silty toward bottom of sample	
10									4266.86
11									
12									
13									
14				NA	CC	4.0	CL	Clay, very sandy, lt gray to tan, rock fragments 3-4 mm, damp.	
15								Clay, lt gray, silty, damp, plastic, with 2" same layer at 15.2 to 15.4 grades into a silty sand	4261.86
16							SM	Sand, tan, damp, silty, fine to medium, clayey towards bottom	
17									
18									
19				NA	CC	5.0		Sand, tan, damp, silty to very silty, alternating silt and clay and sand layers from 22.0'.	



CC Continuous Core Barrel

GW-88

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-88
Date Drilled: 7-5-98 Date Completed: 7-5-98	Northing: 862,958.18 Easting: 1,552,343.08
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,276.86
Groundwater Elevation (ft): 4,249.75	Measuring Point (MP) Elevation (ft): 4,279.45
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	% Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Sand, as above.	4256.86
21									
22								Clayey sand to sandy clay, reddish brown, damp, plastic.	
23									
24				NA	CC	5.0		Sand, silty to very silty, tan to gray.	
25							CL	Clay, sandy to silty, tan to lt brown, plastic, alternating sandy and silty layers, damp.	4251.86
26									
27									
28							ML	Silty, clayey to sandy, gray to reddish tan, damp	16/30 Sand
29				NA	CC	5.0	CL	Clay, very lt gray to lt greenish gray, saturated at 30.6 and 32.7', thin saturated zones, plastic, some silt laminae.	
30									4246.86
31									2" Schedule 40 PVC 0.010-inch Screen
32									
33									
34									

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

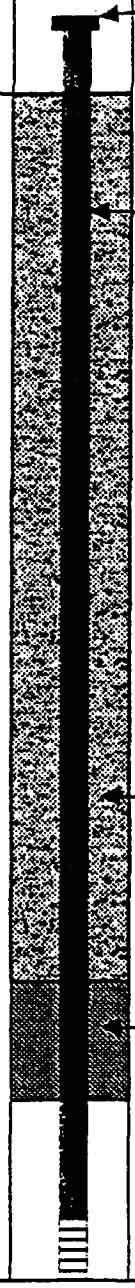
GW-88

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-89
Date Drilled: 7-15-98 Date Completed: 7-15-98	Northing: 862,564.41 Easting: 1,552,337.53
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,276.85
Groundwater Elevation (ft): 4,249.97	Measuring Point (MP) Elevation (ft): 4,279.28
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
0				NA	CC	1.0	ML	Silt to silty clay, tan to brown, damp, plastic, layered	4276.85
1							CL	Clay	
2									
3									
4				NA	CC	5.0	CL	Clay, brown to gray to alternating white and gray layers, moist to very moist, gray is lighter below, some Fe, dark organic material lower.	
5									4271.85
6									
7									
8									
9				NA	CC	3.7	SM	Sand, silty to clayey, some gravel, damp, reddish brown to gray, fine to medium grained sands.	
10									4266.85
11									
12									
13									
14				NA	CC	4.0		Sand, fine grained, damp.	
15							CL	Clay, silty, moist to very moist, gray to lt tan gray, saturated layers approximately 1 cm thick.	4261.85
16									
17								Clay, sandy to very sandy, tan.	
18									
19				NA	CC	5.0	SM	Sand, fine to medium grained sands, tan to grayish tan, damp, layered, silty to very silty	



CC Continuous Core Barrel

GW-89

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-89
Date Drilled: 7-15-98 Date Completed: 7-15-98	Northing: 862,564.41 Easting: 1,552,337.53
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,276.85
Groundwater Elevation (ft): 4,249.97	Measuring Point (MP) Elevation (ft): 4,279.28
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Sand, clayey with depth.	4256.85
21									
22								Clayey sand to sandy clay, tan to brown, damp	
								Sand, silty, tan to brown, damp	
23							CL	Clay, reddish brown, sandy to silty, damp, plastic.	
24				NA	CC	5.0		Clay, reddish brown, silty, damp.	
							SM	Sand, tan to gray, fine, silty, moist.	
25									4251.85
26							CL	Clay, silty to sandy, grayish tan to tan, some saturated layers.	
27									
28									16/30 Sand
29				NA	CC	5.0	CL	Clay, lt gray to white, laminated with silt and sand, moist to very moist	
30									4246.85
31									2" Schedule 40 PVC 0.010-inch Screen
32									
33									
34									

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

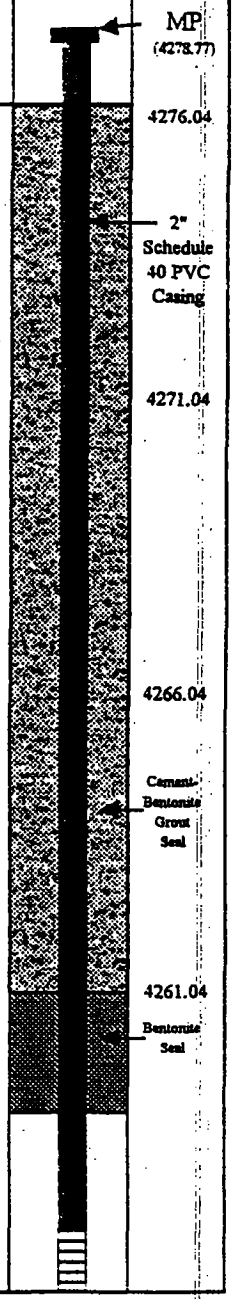
GW-89

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-90
Date Drilled: 7-16-98 Date Completed: 7-16-98	Northing: 862,173.19 Easting: 1,552,331.49
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,276.04
Groundwater Elevation (ft): 4,250.25	Measuring Point (MP) Elevation (ft): 4,278.77
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log
0				NA	CC	2.0	ML	Silty clay to clayey silt, damp, near surface brown to tan, grades to tannish gray silty clay, damp, plastic.
1							CL	Clay
2								
3								
4				NA	CC	5.0	CL	Clay, lt brown to lt gray and white (layered), silty, saturated layer at 6.5'and 7.7', laminated, silty partings.
5								
6								
7								
8								
9				NA	CC	1.7	SM	Sand, damp, fine to medium grained, lt brown
10							CL	Sand, fine to medium grained, some silt, lt brown, gravelly clay, sandy to very sandy, red/gray, silty, plastic, rootlets.
11							SM	
12								
13								
14				NA	CC	4.0	CL	Clay, similar to above, damp, red/gray
							SM	Sand, tan, fine to medium, clayey, silty
15							CL	Clay, tan to gray, silty/sandy with depth
16								
17							SM	Sand, clayey to very clayey, silty, damp, fine to medium sand, gray Sand, silty, no clay, gray/brown, fine, small gravels.
18							CL	Clay, sandy, silty, lt gray, damp, plastic
19				NA	CC	1.6		Clay, sandy to very sandy, with silt, tan to lt brown, damp, plastic.



CC Continuous Core Barrel

GW-90

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-90
Date Drilled: 7-16-98 Date Completed: 7-16-98	Northing: 862,173.19 Easting: 1,552,331.49
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,276.04
Groundwater Elevation (ft): 4,250.25	Measuring Point (MP) Elevation (ft): 4,278.77
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Sand, clayey with depth.	4256.04
21									
22									
23									
24				NA	CC	5.0		Sand, very lt gray to white, fine grained, silty.	
							ML	Clayey silt with sand, cleaner layer down	
25									4251.04
							CL	Clay, lt brown, silty, damp, less silt toward bottom, plastic.	
26									
27									
28								Clay, lt gray, some silt, plastic, damp to moist	16/30 Sand
29				NA	CC	5.0	CL	Clay, very lt gray, moist, silty, saturated at 30.7'.	
									4246.04
30									2" Schedule 40 PVC 0.010-inch Screen
31									
32								Clay, layered white and gray, moist to very moist, silty.	
33									
								Clay, very lt gray/green, tight, some silt.	
34									

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

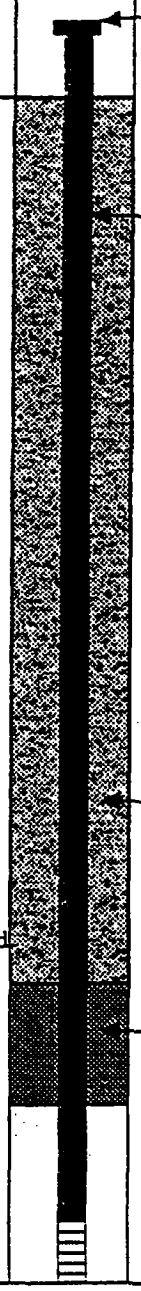
GW-90

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-91
Date Drilled: 7-16-98 Date Completed: 7-16-98	Northing: 861,778.51 Easting: 1,552,325.45
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,276.10
Groundwater Elevation (ft): 4,250.52	Measuring Point (MP) Elevation (ft): 4,278.68
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log
0				NA	CC	2.0	ML	Silt to silty clay, tan to lt brown, plastic.
1							CL	Clay
2								
3								
4				NA	CC	5.0	CL	Clay, gray brown to white and lt gray (layered), very moist to saturated in some areas, laminated lower part of sample.
5								
6								
7								
8								
9				NA	CC	1.8	SM	Sand, fine to medium grained, damp, brown to gray, silty. Very coarse sand, tan to lt brown.
10							CL	Sandy clay to clayey sand, tan and gray, clearer toward bottom
11							SM	
12								
13								
14				NA	CC	5.0	CL	Clay, some silty, damp, plastic, lt gray to tan, grades to a clayey sand
15							SM	Sand, some clay and silt, tan to gray, small rock fragments. Clay, tan to gray, silty/sandy with depth
16								
17								
18								
19				NA	CC	1.6		Sand, silty to clayey, damp, lt gray to tan, some dark gray to tan layers.



CC Continuous Core Barrel

GW-91

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-91
Date Drilled: 7-16-98 Date Completed: 7-16-98	Northing: 861,778.51 Easting: 1,552,325.45
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,276.10
Groundwater Elevation (ft): 4,250.52	Measuring Point (MP) Elevation (ft): 4,278.68
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Sand	4256.10
21							CL	Clay, reddish brown, silty, fine sand @ 22.5 to 22.7, tight.	
22									
23									
24				NA	CC	5.0	SM	Sand, clayey to silty, damp to moist, reddish gray to tan gray.	
25							CL	Clay, reddish brown to gray, damp, silty to very silty.	4251.10
26									
27									
28									16/30 Sand
29				NA	CC	5.0	CL	Clay, white to tannish gray, silty, greenish gray at depth	
30								saturated.	4246.10
31									2" Schedule 40 PVC 0.010-inch Screen
32									
33									
34									

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

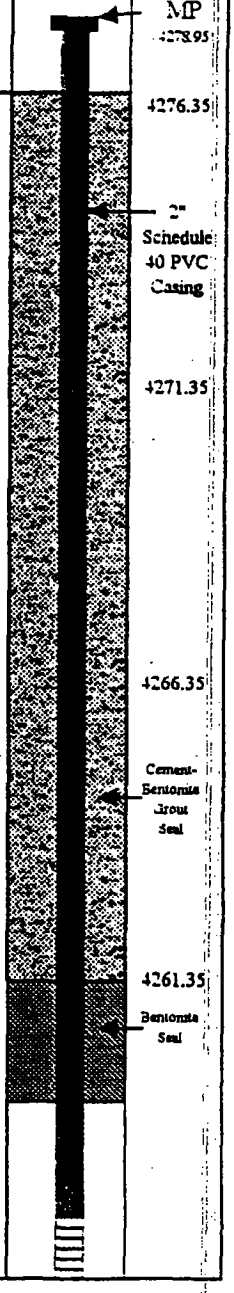
GW-91

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-92
Date Drilled: 7-16-98 Date Completed: 7-16-98	Northing: 861,379.65 Easting: 1,552,318.54
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,276.35
Groundwater Elevation (ft): 4,250.73	Measuring Point (MP) Elevation (ft): 4,278.95
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
									MP 4278.95
0				NA	CC	2.0	ML	Silt to silty clay tan to tannish gray, rock fragments 1-2 cm	4276.35
1							CL	Clay	
2									
3									
4				NA	CC	5.0	CL	Clay, lt gray brown to alternating whitish and gray layers, some lamination, moist to very moist, some silt, some iron.	
5									4271.35
6									
7									
8									
9				NA	CC	3.3	CL	Clay, as above	
							SM	Sand, clayey to very clayey, reddish to eyllow gray, interbedded	
10								clay laminations, silty iron	4266.35
11									
12									
13									
14				NA	CC	3.8	SM	Sand, silty to very clayey, tan to gray tan, fine to very coarse grained sand, damp	
15									4261.35
16									
17									
18									
19				NA	CC	1.6		Sand, silty to very silty, tan to green, some clay, very clayey towards bottom of sample.	



CC Continuous Core Barrel

GW-92

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-92
Date Drilled: 7-16-98 Date Completed: 7-16-98	Northing: 861,379.65 Easting: 1,552,318.54
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,276.35
Groundwater Elevation (ft): 4,250.73	Measuring Point (MP) Elevation (ft): 4,278.95
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Sand, as above.	4256.35
21									
22									
23								very clayey sand	
24				NA	CC	5.0		Sand, silty, damp, reddish gray, fine to medium sands.	
25							CL	Clay, silty to very silty, reddish gray to brown, variable, damp, plastic.	4251.35
26									
27									
28									16/30 Sand
29				NA	CC	5.0	CL	Clay, white and layered whitish and gray, silty	
30								Saturated zone, 3-4' thick	4246.35
31								Some FeO staining.	2" Schedule 40 PVC 0.010-inch Screen
32									
33									
34									

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

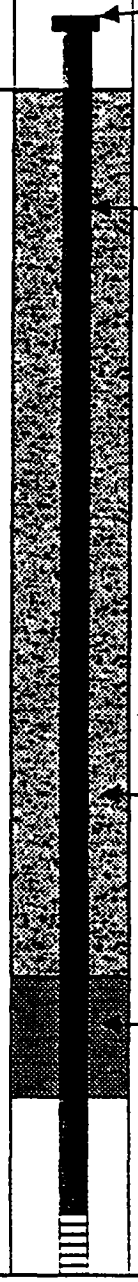
GW-92

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-93
Date Drilled: 7-6-98 Date Completed: 7-6-98	Northing: 861,389.47 Easting: 1,551,930.99
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4,275.02
Groundwater Elevation (ft): 4,250.90	Measuring Point (MP) Elevation (ft): 4,277.85
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log
0				NA	CC		CL	Silty clay, white to lt green, some pebbles, no apparent bedding.
1								
2							SM	Silty sand, lt green, some bedding, with clay lenses.
3							CL	Silty clay, as above.
4				NA	CC			Silty clay, white, plastic, sl bedding (varved), wet, occasional stringers of sand.
5								
6								
7								
8							SM	Silty sand, fine grained, tan, no inclusions or nodules, occasional stringers of clay, moist.
9				NA	CC			
10								
11								
12								increasing in sand content
13								
14				NA	CC		SM	occasional sand stringers
15								Sand, fine to medium grained.
16								
17								
18								
19				NA	CC			



CC Continuous Core Barrel

GW-93

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-93
Date Drilled: 7-6-98 Date Completed: 7-6-98	Northing: 861,389.47 Easting: 1,551,930.99
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4,275.02
Groundwater Elevation (ft): 4,250.90	Measuring Point (MP) Elevation (ft): 4,277.85
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	Grain Size: % Sand	Grain Size: % Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20		60					ML	Sandy silt, lt brown, non plastic, green streaks, moist, no apparent bedding.	4255.02
21									
22									
23									
24		70		NA	CC			increase in sand with less silt.	
25									4250.02
26									
27		80							
28									16/30 Sand
29				NA	CC		SM	Sand, white to lt green, friable, 80 percent sand, oolitic, no apparent bedding, increasing moisture	
30									4245.02
31									2" Schedule 40 PVC 0.010-inch Screen
32							CL	Clay, very wet, white to lt tan, occasional stringers, highly plastic, laminae to varved, no fractures, no vertical stains obs.	
33									
34									

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

GW-93

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-94
Date Drilled: 7-7-98 Date Completed: 7-7-98	Northing: 861,405.32 Easting: 1,551,131.92
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,273.94
Groundwater Elevation (ft): 4,250.92	Measuring Point (MP) Elevation (ft): 4,276.25
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
									MP 4276.25
0				NA	CC	3.5	CL	Clay, white to lt tan gray, some silt	4273.94
1								Clay, lt brown, silty.	
2								Clay, white to gray, moist.	2" Schedule 40 PVC Casing
3								Clay, gray to tan or lt brown, crumbly at top, moist.	
4				NA	CC	5.0	CL	Clay, brown or lt tan, some organic material replaced with iron, high plasticity.	
5								Clay, lt gray, plastic, moist, varved, iron replacement, organic materials varves, gray to white partings on white layers.	4268.94
6								New varves, 1 mm thick.	
7								less iron replacement, rootlets.	
8									
9				NA	CC	3.3	CL	Clay, as above	
							SM	Sandy, fine to medium grain, clean with silt, iron staining.	4263.94
10							CL	Clay, sandy to very sandy, sandy lenses, some angular rock fragments 3-4 mm thick.	
11									Cement-Bentonite Grout Seal
12									
13									
14				NA	CC	3.4	SM	Sand, clean with some silt, damp, lt brown to tan, damp	
15								Clayey sand, white to lt tan, damp, darker toward top, more clay with depth.	4258.94
16									Bentonite Seal
17									
18									
19				NA	CC	3.4		Silty sand, fine to medium, some clayey layers, moist at bottom. towards bottom of sample.	

CC Continuous Core Barrel

GW-94

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-94
Date Drilled: 7-7-98 Date Completed: 7-7-98	Northing: 861,405.32 Easting: 1,551,131.92
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,273.94
Groundwater Elevation (ft): 4,250.92	Measuring Point (MP) Elevation (ft): 4,276.25
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	% Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Silty sand as above	4253.94
21									
22								very clayey sand	
23									
24				NA	CC	4.0		Silty sand, fine grained, lt gray to tan, moist, no apparent bedding.	
25								Silty sand, as above except some cementation.	4248.94
26								Silty sand, as above, some clay.	
27							CL	Clayey sand to sandy clay, tannish to lt gray, moist.	
28									16/30 Sand
29				NA	CC	5.0		Sandy clay, silty, wet, lt brown, tan, grades to more silt.	
30								Clay, plastic, whitish tan, damp	4243.94
31									2" Schedule 40 PVC 0.010-inch Screen
32								Clay, blue to lt green, damp.	
33									
34									

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

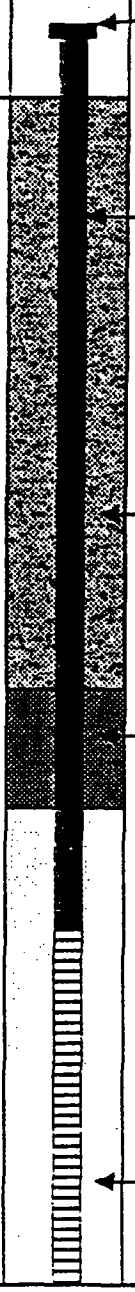
GW-94

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-95
Date Drilled: 7-7-98 Date Completed: 7-7-98	Northing: 861,419.95 Easting: 1,550,303.22
Logged By: Jeff Low	Ground Surface Elevation (ft): 4271.57
Groundwater Elevation (ft): 4,249.89	Measuring Point (MP) Elevation (ft): 4274.65
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 29.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 29.0 to 14.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 14.0 to 0.0 feet Type PVC Sch. 40
Sand 29.0 to 12.0 feet Bentonite Seal 12.0 to 10.0 feet Cement Grout Seal 10.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log
0				NA	CC	2.6	CL	Clay, dry, silty, lt brown to tan, dampens with depth.
1								
2								
3								Clay, whitish to lt gray, moist, plastic, silty, iron replacement of carbonaceous material, no apparent bedding
4				NA	CC	5.0	CL	Clay, tannish gray, silty, no apparent bedding, iron replacement of plant matter, some caliche, sandy partings.
5								
6								Clay, whitish to grayish varves, silty, moist, plastic, semi-vertical fracture with Fe deposition.
7								
8								
9				NA	CC	5.0	CL	Clay, varved, whitish to lt gray and grayish greenish silty, greenish inclusions, iron replacement of vegetation.
10								
11								
12							SM	Sand, clayey and silty, dryish, firm, tannish, some bedding, sandy clay.
13								
14				NA	CC	0.0		No recovery
15								
16								
17								
18								
19				NA	CC	0.0		No recovery



CC Continuous Core Barrel

GW-95

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area		Boring Number: GW-95
Date Drilled: 7-7-98 Date Completed: 7-7-98		Northing: 861,419.95 Easting: 1,550,303.22
Logged By: Jeff Low		Ground Surface Elevation (ft): 4271.57
Groundwater Elevation (ft): 4,249.89		Measuring Point (MP) Elevation (ft): 4274.65
Date Measured: 8/99		MP is top of Protective Casing
Total Depth (ft): 29.0		Drilling Contractor: RC Exploration
Diameter (in): 8.0		Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 29.0 to 14.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 14.0 to 0.0 feet Type PVC Sch. 40
Sand 29.0 to 12.0 feet Bentonite Seal 12.0 to 10.0 feet Cement Grout Seal 10.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Sand, as above.	4251.57
21									
22								Sand, very moist, silty, some clay, tannish gray, moist lenses.	2" Schedule 40 PVC 0.010-inch Screen
23									
24				NA	CC	5.0		Sand, very moist, clean, fine grained, grayish tan, saturated, grades to clayey sand or sandy clay.	
25								Sand, gray to dark gray, fine grained, silty to clayey in part.	4246.57
26									16/30 Sand
27									
28							CL	Clay, greenish or bluish with lt gray varves, damp.	
29									

TD of boring - 29.0 feet bgs

CC Continuous Core Barrel

GW-95

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICAT.	Project: Boring No.: GW-96 7/8/98 EOH 29 — LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0									Clay - tan to gray silty roots, darker & brown w/ depth, siltier w/ depth	
1							38/48	1	clay - some silt plastic, gray moist	
2									- dry to lt br. inclusion	
									clay - lt br grayish moist silty plastic	
3								2	clay - gray moist silty	
4										
5							60/60	3	iron replacement of vegetable matter	
6										
7										
8								4	gypsum filled cracks	
9									sand - iron staining of sand (10%) below upper contact 1", Fine gr. tannish	
10									clay - gray moist, iron staining.	
11								5	No recovery	
12								6	Top of sand pack 12'	
13										
14									No recovery	
									Top of screen 14'	
15										
16							18/60		Sand - tan fine to med rounded at top - moist toward bottom	
17									clay toward 19'. Angular rock fragments 1in - 0.5ch.	
18								7		
19										
20										

Bentonite

BORING LOG

Project:
Boring No.: SB-96

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICAT.	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0					NA	SS			Sand · cont – 0.5" thick clay & silt	
1							100%		(saturated) Sand wet fine 21.0" to ...	
2								8	Interbedded sand + clay, wet at top. clay layers are tan to gray. Sands are iron stained	
3								9	clay – silty whitish to v lt gy. moist to wet	
4									sand – fn + med tannish gray. wet some silt	
5									clayey sand – gray, dark streaks	
6							20/60		silty sand – gray, tannish. no recovery – clay?	
7										15' screen 25 → 14' 17' sand 29 – 11'
8										
9									TD 25.0	
0										
1										
2										
3										
4										
5										
6										
7										
8										
9										
0										

BORING LOG

corrected 7/23/98

Project:
Boring No.: GW-97 7/8/98 J6 Low EOH 31

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICAT.	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0									clay - dry tan to lt gray, to brown [illegible] @ 2' gray [illegible] - moist, plastic silt [illegible] at [illegible] top	
2							3.5'/4'		[illegible]	
4							100%		Clay lt br to grayish green from 5' to 9' gray/green clay is [illegible] w/ whitish to lt tan [illegible] gray/green layers. iron stain throughout sample replacement of [illegible] material very moist layer 1.5" @ 7'7" silty throughout sample subangular rock fragment @ 9'	
10							18"/60"		Bentonite [illegible]	
12									Sand - silty, fn grained. rock fragments (3-4 cm) [illegible] tannish, yellowish [illegible]	
14							30/60		clay - greenish gray to [illegible] gray, plastic moist, sandy at 18'	
16									Top of SCREEN	
16									sand - fn to med, silty, tan to Br. moist rock fragments 3-4 cm	
19									Top 2' of sample not recovered	
20										

Slowly ~ 1 hour Aquaguard in 2.5 gal.

PAGE ___ OF ___

BORING LOG

Project:
Boring No.: 97

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT.	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
20									thin < 1mm clay interbeds in layers of sand	
1							1'/1.1'		2-3" clay lense @ 21' in clayey sand.	
22										
3									sand - saturated @ 23' is clay (2") underlying it	
4									sand - brown fine to fine gr.	
5							2.5'/5.0'		7" saturated sand zone & 1 clayey sand below @ 24'	
6									silty sand below clayey sand at 25'	
7									clayey sand @ 24'8" to 25'	
8										
9										
30							100%		Clay - blue-green - moist variegated darker green & lt. gray green layers	
1								TD	sandy parting @ 31' w 1-2mm thick.	
2										
3									Note: well shaughi 1' So that screen is 1' above TD	
4										
5										
6										
7										
8										
9										
40										

14' sand 30' - 12'

BORING LOG

Project:
Boring No.: GW-99 2/8/99 1/5 ... EOH 29

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICAT.	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0									clay - lt gray to tan silty 0.8	
1									- clay tan to br 1' - 2' silty.	
							38/		- clay - lt gray moist friable at bottom of sample 3' to 4'	
2							/49		Top 3' root zone	
3					#1					
4									clay - varved whitish to lt gray + greenish gray Fe repl veg. mat. damp silty partings along lt colored layered Some Fe replacement of veg mat.	
6					#2		13'			
9									sand - fn gn br to lt br. silty damp	
10					#3		11' / 13'		sample not recovered	
11									SAND fn, br. silty dry	
									CLAY - lt green greenish gray, silty to v. silty	
12					#4				- sandy (coarse) lenses very silty @ 13'5' Fe repl. veg mat. rock frags. 4-5cms	
14									~~clay - sandy~~ or clayey sand damp greenish gray rock fragment	
15							6/11' 16'		Top of screen @ 14.1	
17									No Recovery	
19									sand. gnt	
20										

Bentonite Grout

Bentonite Chips

BORING LOG

PAGE OF

BORING LOG

Project:
Boring No.: GW-99

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICAT.	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
20									Sand cont. clayey to v. clayey & 19' → 20' rock frag clsts damp.	
1							3/10'			
2								▽	Bottom 2' of sample not recovered.	
3										
4									Sand - fg gr. silty w/ interbedded silty/sandy clay layers	
5							100%			
6										
7									sandy br clay some silt. damp	
8									clay - greenish gray silty Fe staining TD 29.1 damp.	
9										29.1
0										
1										
2										
3										
4										
5										
6										
7										
8										
9										
0										

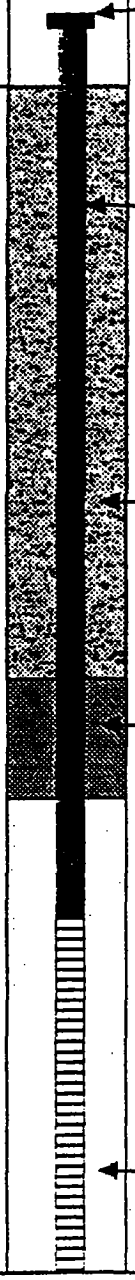
Sand pack

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-99
Date Drilled: 7-17-98 Date Completed: 7-17-98	Northing: 861,825.67 Easting: 1,549,885.08
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4270.89
Groundwater Elevation (ft): 4,249.55	Measuring Point (MP) Elevation (ft): 4273.67
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 29.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 29.0 to 14.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 14.0 to 0.0 feet Type PVC Sch. 40
Sand 29.0 to 12.0 feet Bentonite Seal 12.0 to 10.0 feet Cement Grout Seal 10.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
0				NA	CC		CL	Clay, white to tan, increasing sand with depth, dry, root casts.	4270.89
1									
2									
3							SM	Sand, tan, fine grained, loose, dry, increasing clay downward.	
4				NA	CC		CL	Clay, tan to white, increasing moisture with depth, increasing in plasticity, salt crystals, scattered remnants of carbonate intrusions, few nodules of iron.	4265.89
5									
6									
7									
8									
9				NA	CC		CL		
10								Clay, white with occasional salt crystals, very plastic, moist.	4260.89
11									
12							SM	Sand, tan to reddish, loose grains, fine to medium, streaks of red.	
13									
14				NA	CC				4255.89
15									
16									
17								Sand, as above, increasing clay, white to tan, grain size decreasing with depth.	
18									16.30 Sand
19				NA	CC				



CC Continuous Core Barrel

GW-99

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-99
Date Drilled: 7-17-98 Date Completed: 7-17-98	Northing: 861,825.67 Easting: 1,549,885.08
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4270.89
Groundwater Elevation (ft): 4,249.55	Measuring Point (MP) Elevation (ft): 4273.67
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 29.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 29.0 to 14.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 14.0 to 0.0 feet Type PVC Sch. 40
Sand 29.0 to 12.0 feet Bentonite Seal 12.0 to 10.0 feet Cement Grout Seal 10.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Sand, white with occasional clay stringers, very wet.	4250.89
21								Sand, red to reddish tan, varved with thin layers of clay (white), occasional reddish veins, wet.	
22									2" Schedule 40 PVC 0.010-inch Screen
23								Sand, fine grained, gray to lt black, black specs, loose, very wet, salty.	
24				NA	CC			Sand, as above.	
25									4245.89
26							CL	Clay, green with bands of dark gray to green, very plastic, moist, crystals.	16/30 Sand
27									
28									
29									

TD of boring - 29.0 feet bgs

CC Continuous Core Barrel

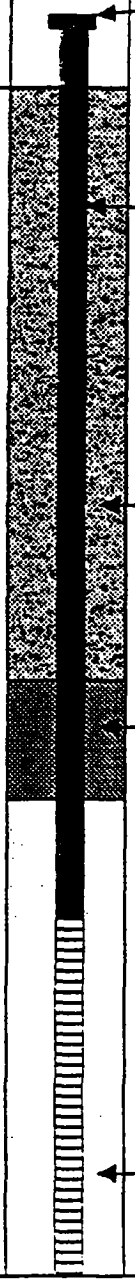
GW-99

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-100
Date Drilled: 7-17-98 Date Completed: 7-17-98	Northing: 862,218.82 Easting: 1,549,893.66
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4271.27
Groundwater Elevation (ft): 4,249.02	Measuring Point (MP) Elevation (ft): 4274.21
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 29.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 29.0 to 14.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 14.0 to 0.0 feet Type PVC Sch. 40
Sand 29.0 to 12.0 feet Bentonite Seal 12.0 to 10.0 feet Cement Grout Seal 10.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
0				NA	CC		CL	Clay, white to tan, top has root material, bottom is more plastic.	4271.27
4				NA	CC		CL	Clay, white to lt tan, plastic, moist, sl vein filling with iron, mottled in parts, dry, lenses, varved in parts.	4266.27
9				NA	CC		CL		4261.27
12							SM	Sand, tan, fine grained, loose, dry.	
13							CL	clay with gravel interbedded	
14				NA	CC		SM	Sand, tan, fine grained, loose, dry.	4256.27
18							CL	Clay, green to tan, increasing sand with depth, occasional layers of dry sand	16-30 Sand
19				NA	CC		SM	Sand, green, fine grained, varved, occasional clay stringers	



CC Continuous Core Barrel

GW-100

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-100
Date Drilled: 7-17-98 Date Completed: 7-17-98	Northing: 862,218.82 Easting: 1,549,393.66
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4271.27
Groundwater Elevation (ft): 4,249.02	Measuring Point (MP) Elevation (ft): 4274.21
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 29.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 29.0 to 14.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 14.0 to 0.0 feet Type PVC Sch. 40
Sand 29.0 to 12.0 feet Bentonite Seal 12.0 to 10.0 feet Cement Grout Seal 10.0 to 0.0 feet

Depth (feet)	% Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Sand, as above.	4251.27
21									
22									2" Schedule 40 PVC 0.010-inch Screen
23									
24				NA	CC			Sand, tan, with clay stringers, loose, increasing moisture.	4246.27
25									
26								Clay, green with bands of dark gray to green, very plastic, moist, crystals.	16/30 Sand
27									
28							CL	Clay, green, plastic, mottled, clean break with sand above.	
29									

TD of boring - 29.0 feet bgs

CC Continuous Core Barrel

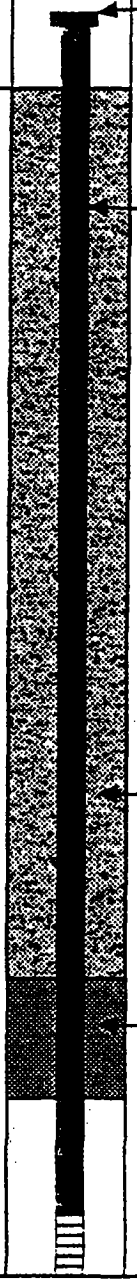
GW-100

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-101
Date Drilled: 7-14-98 Date Completed: 7-14-98	Northing: 862,612.18 Easting: 1,554,901.93
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,272.32
Groundwater Elevation (ft): 4,249.07	Measuring Point (MP) Elevation (ft): 4,275.01
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
0				NA	CC	3.0	ML	Silt, lt gray to white, clayey, rootlets.	4272.32
1							CL	clay, tannish brown to brownish gray, silty, damp.	
2									
3									
4				NA	CC	4.8	CL	Clay, variegated white and gray, silty, iron, damp, laminated.	
5									4267.32
6									
7									
8									
9				NA	CC	1.7	SM	Sand, fine, gray to tan.	
								Sand, fine to medium grained, some silt, lt brown, gravelly	4262.32
10							CL	clay, sandy to clayey sand, lt gray, tight.	
11									
12							SM	Sand, clayey to very clayey, gravel to 2-3 cm, tan	
13									
14				NA	CC	4.0	CL	Sandy clay to clayey sand, tan, grades to silty sand	
							SM	Sand, tan, fine to medium, clayey, silty	4257.32
15								Sand, fine grained, silty, dry, tan.	
16									
17									
18									
19				NA	CC	3.6		Sand, silty and clayey, lt gray to tan, grades to silty sand, fine.	



CC Continuous Core Barrel

GW-101

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-101
Date Drilled: 7-14-98 Date Completed: 7-14-98	Northing: 862,612.18 Easting: 1,554,901.93
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,272.32
Groundwater Elevation (ft): 4,249.07	Measuring Point (MP) Elevation (ft): 4,275.01
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Gram Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Sand, clayey with depth.	4252.32
21							CL	Clay, tan, silty, moist	
22									
23									
24				NA	CC	3.3	SM	Sand, dark gray to tan, fine to medium gravel, clayey at 26.1' silty throughout, moist	
25									4247.32
26									
27									
28									16/30 Sand
29				NA	CC	5.0	CL	Clay, lt greenish gray tan to greenish gray, silty, alternating with clayey sand layers, sands are saturated.	
30									4242.32
31									2" Schedule 40 PVC 0.010-inch Screen
32									
33									
34									

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

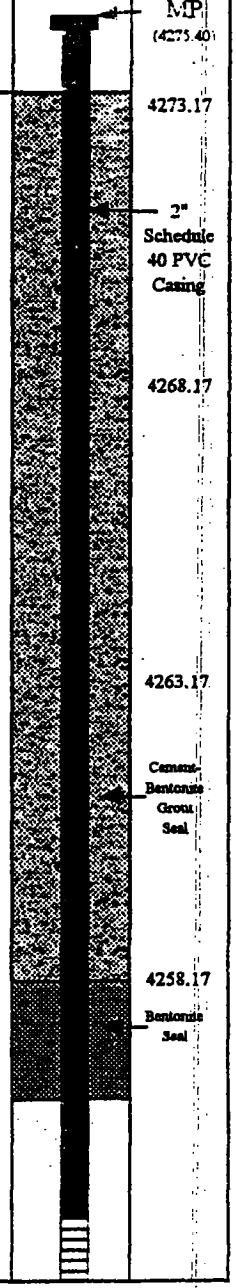
GW-101

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-102
Date Drilled: 7-14-98 Date Completed: 7-14-98	Northing: 863,006.22 Easting: 1,549,910.78
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,273.17
Groundwater Elevation (ft): 4,248.93	Measuring Point (MP) Elevation (ft): 4,275.40
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
0				NA	CC	1.0	ML	Silt, brown, clayey, dry, rootlets, tight.	4273.17
1							CL		
2									
3									
4				NA	CC	4.6	CL	Clay, layered, brownish gray to whitish and gray, silty, some laminae, damp, plastic.	4268.17
5									
6									
7									
8									
9				NA	CC	2.5	GM	Gravel with sand	
							SM	Sand, fine to medium, tan, dry, alternating sand and clay layers	4263.17
10							CL	Clay, very sandy, lt gray, damp, plastic.	
11							SM	Sand, fine to medium, tight, silty, greenish gray to tan	
12									
13									
14				NA	CC	4.3	CL	Sandy clay to clayey sand, tan to lt gray, damp, pea sized	
							SM	gravel, grades to silty sand, tan, fine to medium grained,	4258.17
15								Sand, fine grained, silty, dry, tan.	
16									
17									
18									
19				NA	CC	3.5		Sand, fine to medium grained, dark lenses, tan to lt gray	



CC Continuous Core Barrel

GW-102

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: New LARW Area	Boring Number: GW-102
Date Drilled: 7-14-98 Date Completed: 7-14-98	Northing: 863,006.22 Easting: 1,549,910.78
Logged By: Jeff Low	Ground Surface Elevation (ft): 4,273.17
Groundwater Elevation (ft): 4,248.93	Measuring Point (MP) Elevation (ft): 4,275.40
Date Measured: 8/99	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 17.0 feet Bentonite Seal 17.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Sand, clayey with depth.	4253.17
21							CL	Clay, laminated to layered, tan to lt brown, damp, silty	
22							SM	Sand, fine grained, damp tan to lt brown	
23									
24				NA	CC	3.6	SM	Sand, fine to medium grained, damp, greenish brown with dark gray layers, silty, very moist	
25								thin silty clay (1-2cm) separates sands	4248.17
26								Sand, lt reddish brown with dark gray layers, silty, very moist.	
27									
28									16/30 Sand
29				NA	CC	5.0		Sand, fine grained, tan, very moist, grades from silty to clayey, clayey sand layers, sands are saturated.	
30									4243.17
31									2" Schedule 40 PVC 0.010-inch Screen
32									
33									
34							CL	Clay, silty. lt gray to tan, very moist	

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

GW-102

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW South Area	Boring Number: GW-103
Date Drilled: 8-3-99 Date Completed: 8-3-99	Northing: 859,219.02 Easting: 1,552,546.69
Logged By: Dan Shrum	Ground Surface Elevation (ft): 4,275.29
Groundwater Elevation (ft): 4,253.59	Measuring Point (MP) Elevation (ft): 4,278.30
Date Measured: 8/4/99	MP is top of Protective Casing
Total Depth (ft): 39.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 29.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 29.0 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 26.4 feet Bentonite Seal 26.4 to 21.8 feet Cement Grout Seal 21.8 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
0	0	15	85	NA	CC	3.5	CL	Silty clay, brown, fine sand, sub-angular, firm, sl moist, low plasticity, silt to 35%.	4,275.29
4	0	15	85	NA	CC	5.0	CL	Silty clay, brown, fine sand, sub-angular, firm, sl moist, low plasticity, silt to 35%.	4270.29
6	0	15	85					increasing rootlets, FeO staining in rootlets.	
8								color change to light olive gray	
9	0	15	85	NA	CC	5.0	CL	Silty clay, light olive gray mottled with lt brown, fine sub-rounded sands, moist.	4265.29
13	0	80	20				SM	Silty sand, lt olive green with interbedded reddish brown lenses, medium dense, fine sub-rounded sands, sl moist.	
14	0	80	20	NA	CC	4.0			4260.29
16	0	10	90				CL	Silty clay, lt gray, fine sands, stiff, low to medium plasticity, v moist	
16	0	80	20				SM	Silty sand, color grading to more brown, fine sub-angular sands, medium dense, sl moist.	
18	0	70	30						
19	0	80	20	NA	CC	5.0		Silty sand, brown, fine sub-angular sands, medium dense, slightly moist.	

CC Continuous Core Barrel

GW-103

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW South Area	Boring Number: GW-103
Date Drilled: 8-3-99 Date Completed: 8-3-99	Northing: 859,219.02 Easting: 1,552,546.69
Logged By: Dan Shrum	Ground Surface Elevation (ft): 4,275.29
Groundwater Elevation (ft): 4,253.59	Measuring Point (MP) Elevation (ft): 4,278.30
Date Measured: 8/4/99	MP is top of Protective Casing
Total Depth (ft): 39.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 29.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 29.0 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 26.4 feet Bentonite Seal 26.4 to 21.8 feet Cement Grout Seal 21.8 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM		4255.29
21	0	70	30					As above, increasing silt, clay to 10%.	Cement-Bentonite Grout Seal
22									
23	0	10	90				CL	Silty clay, brown, fine sands, stiff, low to med. plasticity, v moist	
	0	80	20				SM	Silty sand, brown, fine sub-angular sands, medium dense, slightly moist.	Bentonite Seal
24	0	30	70	NA	CC	5.0	ML	Sandy silt, brown, fine sand to 30%, firm, slightly moist, low to no plasticity.	
25									4250.29
26									
27									
28	0	20	80				CL	Silty clay, lt tan to lt olive, fine sands, firm, moist, low to medium plasticity.	16/30 Sand
29	0	20	80	NA	CC	5.0		Silty clay, lt tan to lt olive, fine sands, firm, wet, low to medium plasticity, varved layering with interbedded silty sands.	
30	0	20	80					Silty clay, greenish gray to lt gray, interbedded with silty sand lenses, fine sands, wet, low to med plasticity.	4245.29
31									
32									
33									
34	0	20	80	NA	CC	5.0		Silty clay, greenish gray to lt gray, fine sands interbedded with thin silty sand lenses, firm, wet, low to medium plasticity.	
35									4240.29
36									2" Schedule 40 PVC 0.010-inch Screen
37									
38								color change to lt olive green, wet.	
39									

TD of boring - 39.0 feet bgs

CC Continuous Core Barrel

GW-103

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW South Area	Boring Number: GW-104
Date Drilled: 8-3-99 Date Completed: 8-3-99	Northing: 859,211.21 Easting: 1,553,039.26
Logged By: Dan Shrum	Ground Surface Elevation (ft): 4,275.42
Groundwater Elevation (ft): 4,253.65	Measuring Point (MP) Elevation (ft): 4,278.75
Date Measured: 8/4/99	MP is top of Protective Casing
Total Depth (ft): 39.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 29.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 29.0 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 26.5 feet Bentonite Seal 26.5 to 18.0 feet Cement Grout Seal 18.0 to 0.0 feet

Depth (feet)	Gran Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
									MP 4278.75
0	10	30	60	NA	CC	2.5	ML	Sandy silt, brown, fine sands, firm, slightly moist, low plasticity.	4275.42
1									
2									2" Schedule 40 PVC Casing
3									
4	0	15	85	NA	CC	5.0	CL	Silty clay, brown, fine sand, sub-angular, firm, sl moist, low plasticity, silt to 35%.	
5									4270.42
6									
7	0	15	85					rootlets begin, FeO staining in rootlets	
8								silty clay, lt olive gray, abundant rootlets with FeO staining, fine sands, moist, medium plasticity.	
9	0	15	85	NA	CC	5.0	CL	Silty clay, light olive gray mottled with lt. brown, fine sub-rounded sands, moist.	
10									4265.42
11									
12									
13	0	80	20				SM	Silty sand, brown, fine sands, silt to 20 %, sub-angular sands, medium dense, sl moist.	
14	0	80	20	NA	CC	5.0			
	0	10	90				CL	Silty clay, lt gray, fine sands, stiff, low to medium plasticity, v moist.	4260.42
15	0	75	25				SM	Silty sand with clay, brown, fine sand, medium dense, sl moist.	
16									Cement-Bentonite Grout Seal
17									
18	0	85	15					Silty sand, dark brown, fine sands, sub-angular, dense.	Bentonite Seal
19	0	85	15	NA	CC	5.0		Silty sand, brown, fine sub-angular sands, medium dense, slightly moist.	

CC Continuous Core Barrel

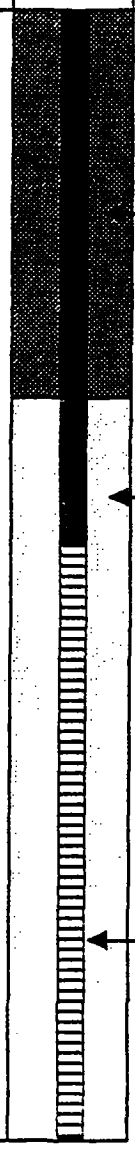
GW-104

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW South Area	Boring Number: GW-104
Date Drilled: 8-3-99 Date Completed: 8-3-99	Northing: 859,211.21 Easting: 1,553,039.26
Logged By: Dan Shrum	Ground Surface Elevation (ft): 4,275.42
Groundwater Elevation (ft): 4,253.65	Measuring Point (MP) Elevation (ft): 4,278.75
Date Measured: 8/4/99	MP is top of Protective Casing
Total Depth (ft): 39.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 29.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 29.0 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 26.5 feet Bentonite Seal 26.5 to 18.0 feet Cement Grout Seal 18.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM		4255.42
21	0	70	30						
22	0	75	25					As above, increasing silt, clay to 10 %.	
23									
24	0	85	15	NA	CC	5.0		Silty sand, brown, fine sub-angular sands, medium dense, slightly moist.	
25	0	25	75				ML	Sandy silt with clay, brown, fine sands, firm, sl moist.	4250.42
26									
27	0	15	85					Clayey silt w/ sand, brown, fine sands, increasing clay, firm, sl moist.	
28									
29	0	15	85	NA	CC	5.0		Clayey silt w/ sand, brown, fine sands, increasing clay, firm, sl moist.	
30									4245.42
31								increasing moisture.	
32	0	15	85				CL	Silty clay, lt tan, fine interbedded silty sand lenses, low plasticity, silt to 30%, wet.	
33									
34	0	10	90	NA	CC	5.0		Silty clay, greenish gray, fine sands interbedded with thin silty sand lenses, firm, wet, low to medium plasticity.	
35									4240.42
36									
37									
38									
39									



TD of boring - 39.0 feet bgs

CC Continuous Core Barrel

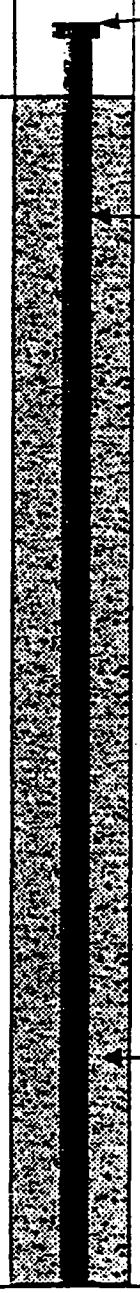
GW-104

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW South Area	Boring Number: GW-105
Date Drilled: 8-2-99 Date Completed: 8-2-99	Northing: 859,203.08 Easting: 1,553,529.71
Logged By: Dan Shrum	Ground Surface Elevation (ft): 4,276.23
Groundwater Elevation (ft): 4,257.22	Measuring Point (MP) Elevation (ft): 4,279.07
Date Measured: 8/3/99	MP is top of Protective Casing
Total Depth (ft): 39.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 29.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 29.0 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 26.5 feet Bentonite Seal 26.5 to 21.5 feet Cement Grout Seal 21.5 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
0	0	15	85	NA	CC	3.5	CL	Silty clay, brown, fine sand, sub-angular, firm, sl moist, low plasticity.	4276.23
1									
2									
3	0	15	85					Silty clay, lt tan, fine sands, low plasticity, moist, marled color with lt tan to green	
4	0	15	85	NA	CC	5.0	CL	Silty clay, brown, fine sand, sub-angular, firm, sl moist, low plasticity, silt to 35%.	4271.23
5									
6	0	15	85					rootlets begin, FeO staining in rootlets.	
7								Silty clay, lt olive gray, abundant rootlets with FeO staining, fine sands, moist, medium plasticity.	
8									
9	0	15	85	NA	CC	5.0	CL	Silty clay, light olive gray mottled with lt brown, fine sub-rounded sands, moist.	
10									4266.23
11									
12									
13	0	85	15				SM	Silty sand, dk yellowish brown, fine sands, sub-angular, medium dense, sl moist, FeO staining.	
14	0	80	20	NA	CC	5.0			
15	0	15	85				CL	Silty clay, brown, fine sands, stiff, low to med. plasticity, v moist.	4261.23
	0	80	20				SM	Silty sand, lt tan, fine sands, some clay to 10%, sub-angular sands,	
16								medium dense, sl moist.	
17									
	0	90	10					Silty sand, lt tan, fine sub-angular sand, medium dense, sl moist.	
18									
	0	15	85				CL	Silty clay, brown, variegated color, low plasticity, firm, sl moist.	
19	0	15	85	NA	CC	5.0		Silty clay, olive, low plasticity, stiff, sl moist	



CC Continuous Core Barrel

GW-105

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW South Area	Boring Number: GW-105
Date Drilled: 8-2-99 Date Completed: 8-2-99	Northing: 859,203.08 Easting: 1,553,529.71
Logged By: Dan Shrum	Ground Surface Elevation (ft): 4,276.23
Groundwater Elevation (ft): 4,257.22	Measuring Point (MP) Elevation (ft): 4,279.07
Date Measured: 8/3/99	MP is top of Protective Casing
Total Depth (ft): 39.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.0 to 29.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 29.0 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 26.5 feet Bentonite Seal 26.5 to 21.5 feet Cement Grout Seal 21.5 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20									4256.23
21	0	75	25				SM	Silty sand, brown, fine sub-angular sands, abundant silt and some clay, medium dense, slightly moist.	Cement-Bentonite Grout Seal
22									
23	0	85	15					Silty sand, reddish brown, fine sub-angular sands, medium dense, sl moist.	Bentonite Seal
24	0	65	35	NA	CC	5.0		Silty sand, brown, abundant silts, dense, slightly moist moist.	
25									4251.23
26	0	85	15					Silty sand, brown, fine sub-angular sands, medium dense, sl moist.	
27	0	65	35					Silty sand, brown, fine sub-angular sands, abundant silts, sl moist, dense	
28									16/30 Sand
	0	30	70				CL	Silty clay, lt tan, fine sands, low plasticity, firm, moist.	
29	0	20	80	NA	CC	5.0		Silty clay, lt tan, fine sands, low plasticity, firm, moist; varved silty sand lenses, silty sand lenses are very thin and wet.	
30									4246.23
31									
	0	15	85						
32									
33									
34	0	10	90	NA	CC	5.0		Silty clay, light gray, fine sands interbedded with thin silty sand lenses, firm, wet, low to medium plasticity.	
35									4241.23
36									2" Schedule 40 PVC 0.010-inch Screen
37									
38									
39									

TD of boring - 39.0 feet bgs

CC Continuous Core Barrel

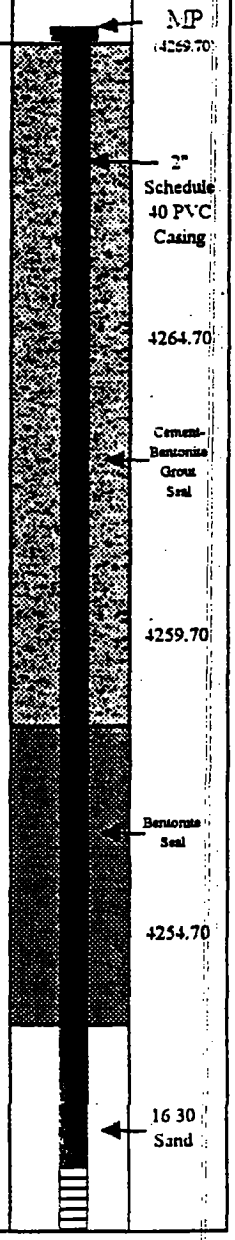
GW-105

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW South Area	Boring Number: PZ-1
Date Drilled: 8-4-99 Date Completed: 8-4-99	Northing: 859,229.02 Easting: 1,549,564.18
Logged By: Dan Shrum	Ground Surface Elevation (ft): 4269.70
Groundwater Elevation (ft): 4,255.49	Measuring Point (MP) Elevation (ft): 4269.70
Date Measured: 8/5/99	MP is top of Protective Casing
Total Depth (ft): 30.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 29.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 30.0 to 16.5 feet Bentonite Seal 16.5 to 11.5 feet Cement Grout Seal 11.5 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log
0	0	20	80	NA	CC	4.0	CL	Silty clay, lt brown, fine sand, sub-angular, firm, sl moist, low plasticity.
4	0	15	85	NA	CC	5.0	CL	Silty clay, lt brown, fine sand, sub-angular, firm, sl moist, low plasticity.
9	0	15	85	NA	CC	5.0	CL	Silty clay, light olive gray mottled with lt. brown, fine sub-rounded sands, moist.
13	0	85	15	NA	CC	5.0	SM	Silty sand, lt brown, fine sands, sub-angular, medium dense, sl moist, FeO staining.
19				NA	CC	5.0		Silty sand, as above except increasing sand, color change to lt gray.



Elevation (feet)

CC Continuous Core Barrel

PZ-1

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW South Area	Boring Number: PZ-1
Date Drilled: 8-4-99 Date Completed: 8-4-99	Northing: 859,229.02 Easting: 1,549,564.18
Logged By: Dan Shrum	Ground Surface Elevation (ft): 4269.70
Groundwater Elevation (ft): 4,255.49	Measuring Point (MP) Elevation (ft): 4269.70
Date Measured: 8/5/99	MP is top of Protective Casing
Total Depth (ft): 30.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 29.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 30.0 to 16.5 feet Bentonite Seal 16.5 to 11.5 feet Cement Grout Seal 11.5 to 0.0 feet

Depth (feet)	% Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							SM	Silty sand, brown, fine sub-angular sands, abundant silt and some clay, medium dense, slightly moist.	4249.70
21									
22									2" Schedule 40 PVC 0.010-inch Screen
23	0	25	75				ML	Sandy silt, lt gray, rootlets, firm, wet, little to no plasticity.	
24				NA	CC	5.0			4244.70
25									
26	0	15	85				CL	Silty clay, greenish gray, fine sands, low to medium plasticity, wet.	16/30 Sand
27									
28									
29									
30									4239.70

TD of boring - 30.0 feet bgs

CC Continuous Core Barrel

PZ-1

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: Broken Arrow Pond	Boring Number: PZ-2
Date Drilled: 8-4-99 Date Completed: 8-4-99	Northing: 865,345.68 Easting: 1,553,611.78
Logged By: Dan Shrum	Ground Surface Elevation (ft): 4282.00
Groundwater Elevation (ft): 4,246.47	Measuring Point (MP) Elevation (ft): 4282.00
Date Measured: 8/5/99	MP is top of Protective Casing
Total Depth (ft): 37.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 36.5 to 26.5 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 26.5 to 0.0 feet Type PVC Sch. 40
Sand 37.0 to 23.0 feet Bentonite Seal 23.0 to 19.0 feet Cement Grout Seal 19.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
0	0	20	80	NA	CC	3.5	CL	Silty clay, brown, fine sand, sub-angular, firm, sl. moist, low plasticity.	MP 4282.00
4	0	20	80	NA	CC	5.0	CL	Silty clay, brown, fine sand, sub-angular, firm, sl moist, low plasticity, silt to 35%; numerous rootlets.	
7								color change to light olive gray, fine sand, very moist.	4277.00
9	0	15	85	NA	CC	5.0	CL	Silty clay, light olive gray mottled with lt brown, fine sub-rounded sands, moist.	
12	0	80	20				SM	Silty sand, dk yellowish brown, fine sands, sub-angular, medium dense, sl moist, FeO staining.	4272.00
14				NA	CC	5.0			
17	0	25	75				ML	Sandy silt, lt olive, fine sands, low to no plasticity, sl moist.	4267.00
19				NA	CC	5.0			

2" Schedule 40 PVC Casing
Cement-Bentonite Grout Seal
Bentonite Seal

CC Continuous Core Barrel

PZ-2

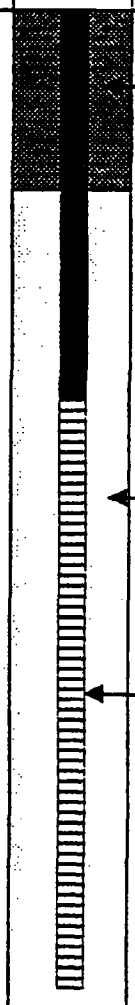
Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: Broken Arrow Pond	Boring Number: PZ-2
Date Drilled: 8-4-99 Date Completed: 8-4-99	Northing: 865,345.68 Easting: 1,553,611.78
Logged By: Dan Shrum	Ground Surface Elevation (ft): 4282.00
Groundwater Elevation (ft): 4,246.47	Measuring Point (MP) Elevation (ft): 4282.00
Date Measured: 8/5/99	MP is top of Protective Casing
Total Depth (ft): 37.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 36.5 to 26.5 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 26.5 to 0.0 feet Type PVC Sch. 40
Sand 37.0 to 23.0 feet Bentonite Seal 23.0 to 19.0 feet Cement Grout Seal 19.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20	0	80	20				SM	Silty sand, brown, fine sub-angular sands, dense, sl moist.	4262.00
21									
22	0	90	10					Color change to lt tan, fine sands, dense, sl moist.	
23									
24				NA	CC	5.0			
25	0	25	75				ML	Sandy silt, lt olive, fine sands, low to no plasticity, sl moist.	4257.00
26									
27									
28	0	15	85				CL	Silty clay, lt olive, fine sands, low plasticity, wet.	
29				NA	CC	5.0			
30									4252.00
31									
32									
33									
34	0	10	90	NA	CC	3.0		Silty clay, light gray, fine sands interbedded with thin silty sand lenses, firm, wet, low to medium plasticity.	
35									4247.00
36									
37	0	90	10				SM	Silty sand, extremely dense and compacted, sl moist, rig refusal.	

TD of boring - 37.0 feet bgs



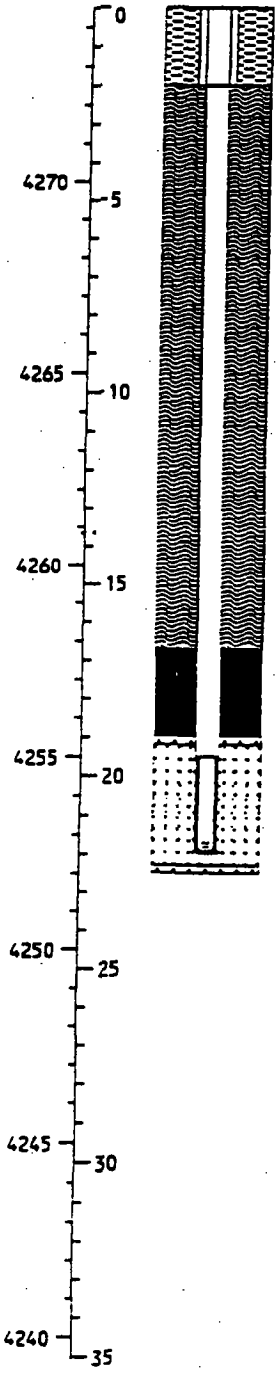
CC Continuous Core Barrel

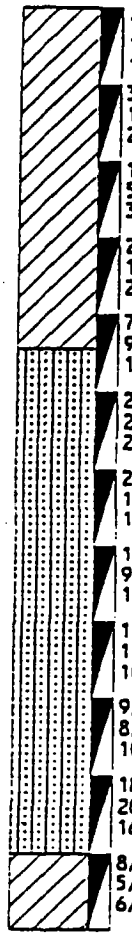
PZ-2

DRILL HOLE LOG
DRILL HOLE NO.: SL-1

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Approximately 161 feet south of GW-24
DRILLER: Overland Drilling Inc.
DRILL RIG: CME 750
DEPTH TO WATER: None HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-026
DATE: 7-16-93
TOC ELEV.:
GS ELEV.: 4274.5
LOGGED BY: DW
HOLE NO.: SL-1



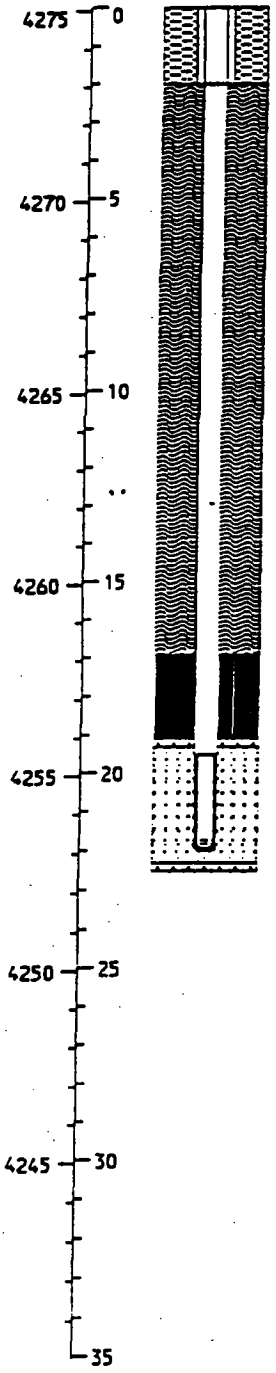


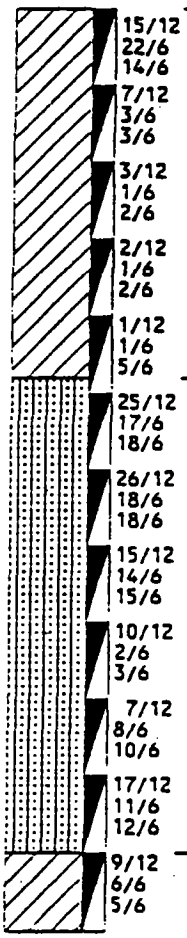
USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
CL	SILTY CLAY: Tan, slightly sandy, medium stiff to soft, damp to moist.	B-1	0-2	17/24
		B-2	2-4	24/24
		B-3	4-6	12/24
	...grades to gray with iron oxide staining.	B-4	6-8	24/24
		B-5	8-10	24/24
SM	SILTY SAND: Tan, fine to medium, occasional clayey lenses, dense, moist.	B-6	10-12	21/24
		B-7	12-14	23/24
		B-8	14-16	21/24
		B-9	16-18	24/24
		B-10	18-20	24/24
	...grades clayey.	B-11	20-22	24/24
CL	SILTY CLAY: Reddish tan, sandy, medium stiff, moist.	B-12	22-24	24/24

DRILL HOLE LOG
DRILL HOLE NO.: SL-2

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Approximately 361 feet south of GW-24
DRILLER: Overland Drilling Inc.
DRILL RIG: CME 750
DEPTH TO WATER: None HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-026
DATE: 7-19-93
TOC ELEV.:
GS ELEV.: 4275.1
LOGGED BY: DCH
HOLE NO.: SL-2



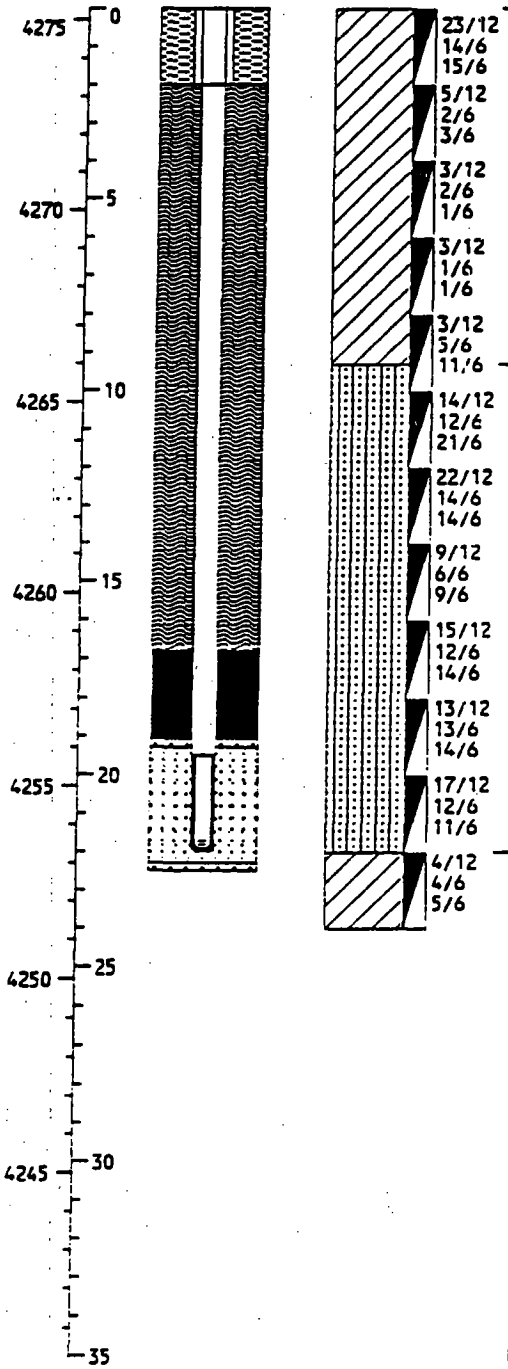


ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Tan, slightly sandy, medium stiff to soft, damp to moist.	B-1	0-2	24/24
					B-2	2-4	24/24
					B-3	4-6	24/24
				...grades to gray.	B-4	6-8	24/24
					B-5	8-10	24/24
			SM	SILTY SAND: Tan, fine to medium, occasional sandy clay lenses, dense, moist.	B-6	10-12	24/24
					B-7	12-14	23/24
					B-8	14-16	24/24
					B-9	16-18	24/24
					B-10	18-20	24/24
					B-11	20-22	24/24
				...grades clayey, reddish tan.			
			CL	SILTY CLAY: Reddish tan, sandy, medium stiff, moist.	B-12	22-24	14/24

DRILL HOLE LOG
DRILL HOLE NO.: SL-3

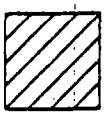
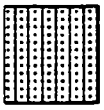
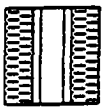
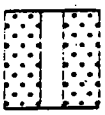
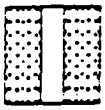
PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Approximately 318 feet north of GW-20
DRILLER: Overland Drilling Inc.
DRILL RIG: CME 750
DEPTH TO WATER: None HOLE DIAMETER: 7.75"

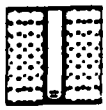
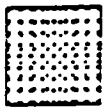
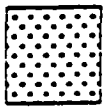
PROJECT NO.: 1416-026
DATE: 7-20-93
TOC ELEV.:
GS ELEV.: 4275.3
LOGGED BY: DCH
HOLE NO.: SL-3



ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Tan, slightly sandy, medium stiff to soft, damp to moist.	B-1	0-2	14/24
					B-2	2-4	24/24
					B-3	4-6	24/24
				...grades to gray.	B-4	6-8	24/24
					B-5	8-10	11/24
			SM	SILTY SAND: Tan, fine to medium, occasional sandy clay lenses, dense, moist.	B-6	10-12	24/24
					B-7	12-14	23/24
					B-8	14-16	24/24
					B-9	16-18	24/24
					B-10	18-20	24/24
					B-11	20-22	24/24
				...grades clayey, reddish tan.			
			CL	SILTY CLAY: Reddish tan, sandy, medium stiff, moist.	B-12	22-24	14/24

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty clay
	Silty sand
Soil Samplers	
	Standard penetration test (SPT)
Lysimeter Details	
	Protective casing set in concrete
	Bentonite chips, blank PVC pipe
	Bentonite pellets, blank PVC pipe
	Silica sand, blank PVC pipe
	Silica flour, blank PVC pipe

Symbol	Description
	Lysimeter set in silica flour
	Silica flour, no PVC pipe
	Silica sand, no PVC pipe

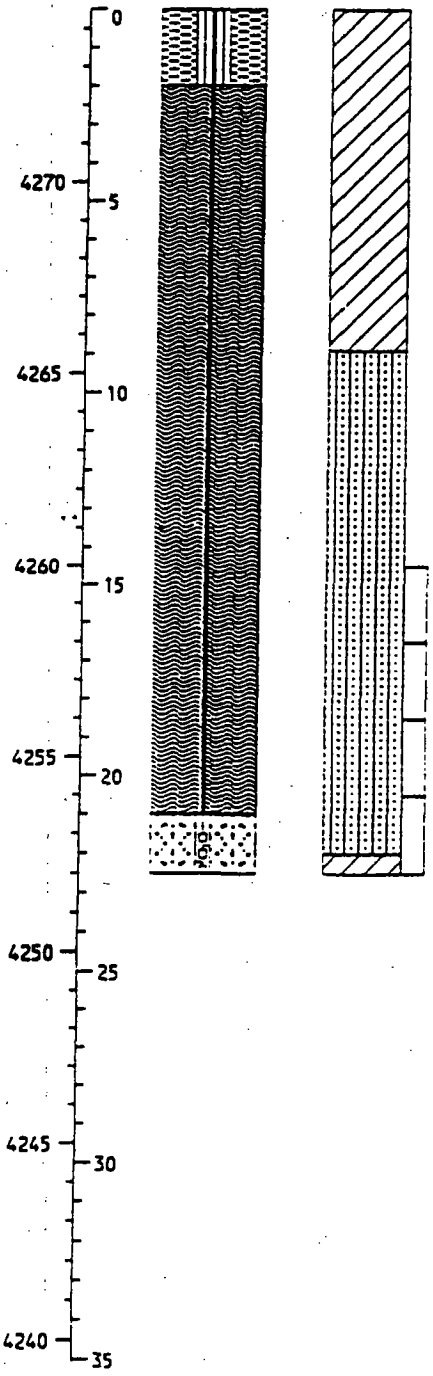
Notes:

1. Lysimeters SL-1, SL-2, and SL-3 were drilled and installed beginning on July 15, 1993 and proceeding through July 20, 1993. The holes were drilled utilizing a CME 750 all-terrain drill rig with 7.75-inch diameter (OD) continuous hollow stem auger.
2. No free water was encountered at the time of drilling.
3. Soil samples for soil identification were collected with the use of a standard split spoon sampler (SPT).
4. These logs are subject to the limitations, conclusions, and recommendations in this report.

DRILL HOLE LOG
DRILL HOLE NO.: SRS-1

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Ten feet north of SL-1
DRILLER: Overland Drilling Inc.
DRILL RIG: CME 750
DEPTH TO WATER: None HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-026
DATE: 7-16-93
TOC ELEV.:
GS ELEV.: 4274.5
LOGGED BY: DW
HOLE NO.: SRS-1



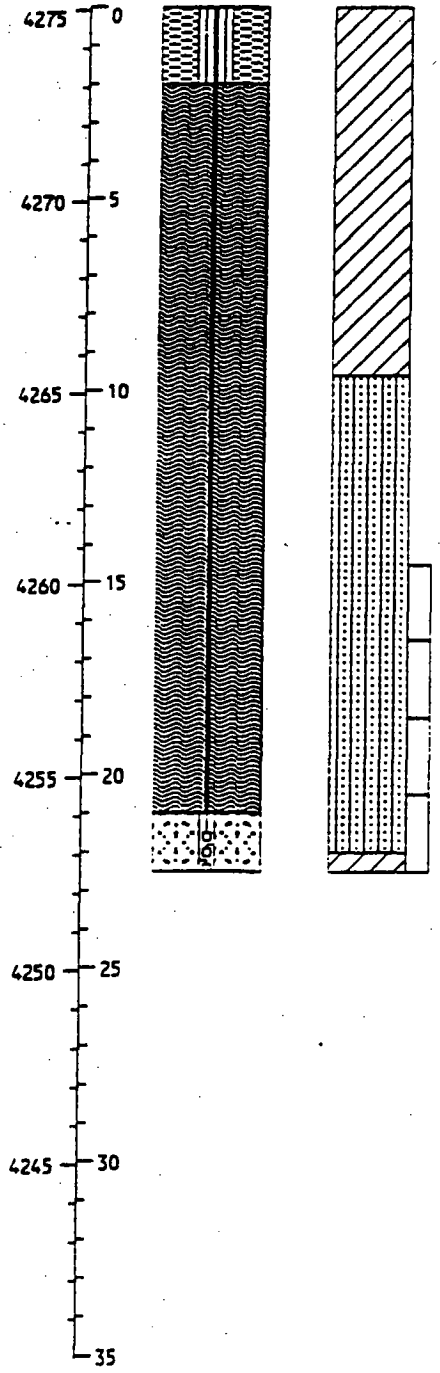
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Tan, slightly sandy, medium stiff to soft, damp to moist.			
				...grades to gray with iron oxide staining.			
			SM	SILTY SAND: Tan, fine to medium, occasional clayey lenses, dense, moist.			
					S-1	14.5-16.5	24/24
					S-2	16.5-18.5	24/24
					S-3	18.5-20.5	24/24
				...grades clayey.	S-4	20.5-22.5	24/24
			CL	SILTY CLAY: Reddish tan, sandy, medium stiff, moist.			

Gypsum blocks installed at 21.5', 22.0' and 22.5' below the ground surface. Subsurface profile obtained from drill hole SL-1.

DRILL HOLE LOG
DRILL HOLE NO.: SRS-2

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Ten feet north of SL-2
DRILLER: Overland Drilling Inc.
DRILL RIG: CME 750
DEPTH TO WATER: None HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-026
DATE: 7-19-93
TOC ELEV.:
GS ELEV.: 4275.1
LOGGED BY: DCH
HOLE NO.: SRS-2



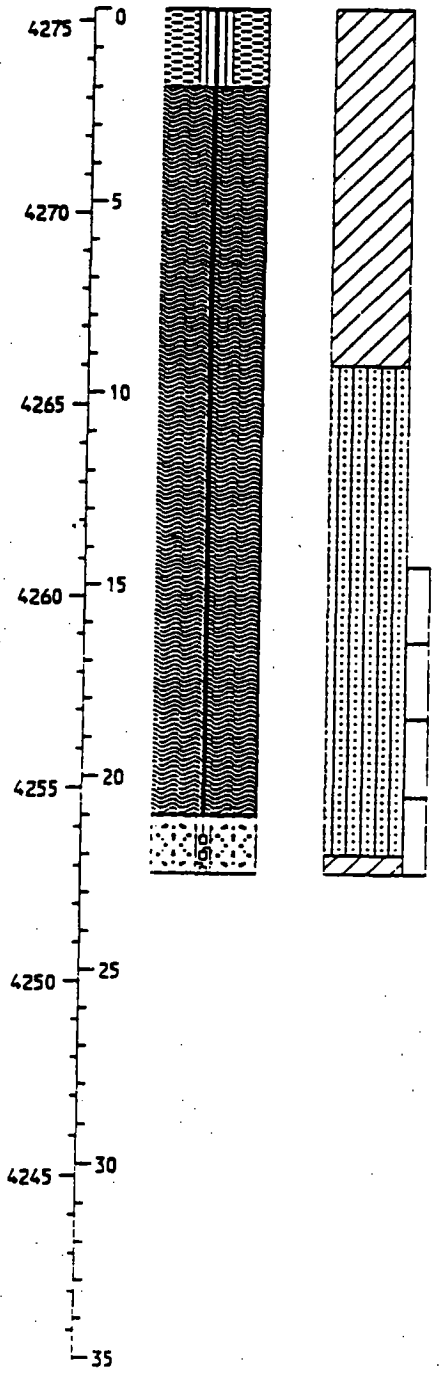
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Tan, slightly sandy, medium stiff to soft, damp to moist.			
				...grades to gray.			
			SM	SILTY SAND: Tan, fine to medium, occasional sandy clay lenses, dense, moist.			
					S-1	14.5-16.5	24/24
					S-2	16.5-18.5	24/24
					S-3	18.5-20.5	24/24
					S-4	20.5-22.5	24/24
				...grades clayey, reddish tan.			
			CL	SILTY CLAY: Reddish tan, sandy, medium stiff, moist.			

Gypsum blocks installed at 21.5', 22.0' and 22.5' below the ground surface. Subsurface profile obtained from drill hole SL-2.

DRILL HOLE LOG
DRILL HOLE NO.: SRS-3

PROJECT: Envirocare Landfill
CLIENT/OWNER: Envirocare of Utah
HOLE LOCATION: Ten feet north of SL-3
DRILLER: Overland Drilling Inc.
DRILL RIG: CME 750
DEPTH TO WATER: None
HOLE DIAMETER: 7.75"

PROJECT NO.: 1416-026
DATE: 7-20-93
TOC ELEV.:
GS ELEV.: 4275.3
LOGGED BY: DCH
HOLE NO.: SRS-3



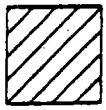
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Sample Number	Sample Depth (ft)	Recovery (in/in)
			CL	SILTY CLAY: Tan, slightly sandy, medium stiff to soft, damp to moist.			
				...grades to gray.			
			SM	SILTY SAND: Tan, fine to medium, occasional sandy clay lenses, dense, moist.			
					S-1	14.5-16.5	24/24
					S-2	16.5-18.5	24/24
					S-3	18.5-20.5	24/24
					S-4	20.5-22.5	24/24
				...grades clayey, reddish tan.			
			CL	SILTY CLAY: Reddish tan, sandy, medium stiff, moist.			

Gypsum blocks installed at 21.5', 22.0' and 22.5' below the ground surface. Subsurface profile obtained from drill hole SL-3.

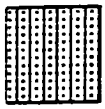
KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty clay

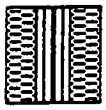


Silty sand

Soil Samplers

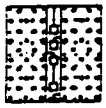
Undisturbed thin wall Shelby tube

Soil Resistivity Sensor Completion Details



Wire leads to gypsum blocks inside protective casing set in concrete

Wire leads to gypsum blocks set in bentonite



Gypsum blocks in unit 3 backfill sand

Notes:

1. Soil resistivity instrument drill holes SRS-1, SRS-2, and SRS-3 were drilled and installed beginning on July 15, 1993 and proceeding through July 20, 1993. The holes were drilled utilizing a CME 750 all-terrain drill rig with 7.75-inch diameter (OD) continuous hollow stem auger.

2. No free water was encountered at the time of drilling.

3. Soil samples for soil identification, backfill and testing were collected with the use of a thin wall shelby tub sampler.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW Ponds	Boring Number: P3-95 NEC
Date Drilled: 12/10/98 Date Completed 12/10/98	Northing: 862,309.14 Easting: 1,554,153.60
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4,280.51
Groundwater Elevation (ft):	Measuring Point (MP) Elevation (ft): 4,282.98
Date Measured:	MP is top of Protective Casing
Total Depth (ft): 39.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.2 to 24.2 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 24.2 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 20.6 feet Bentonite Seal 20.6 to 17.4 feet Cement Grout Seal 17.4 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
									MP (4282.98)
0				NA	CC		Fil	Road fill and Rubble	4280.51
1									
2									2" Schedule 40 PVC Casing
3									
4									
5				NA	CC				4275.51
6									
7									
8									
9				NA	CC		CL	Clay	
10									4270.51
11									
12									
13									
14				NA	CC	3.5		Clay	
15									4265.51
16									Cement-Bentonite Grout Seal
17							SM	Sand	
18									Bentonite Seal
19				NA	CC	3.0	SM	Sand, dry	

CC Continuous Core Barrel

P3-95 NEC

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW Ponds	Boring Number: P3-95 NEC
Date Drilled: 12/10/98 Date Completed 12/10/98	Northing: 862,309.14 Easting: 1,554,153.60
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4,280.51
Groundwater Elevation (ft):	Measuring Point (MP) Elevation (ft): 4,282.98
Date Measured:	MP is top of Protective Casing
Total Depth (ft): 39.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 39.2 to 24.2 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 24.2 to 0.0 feet Type PVC Sch. 40
Sand 39.0 to 20.6 feet Bentonite Seal 20.6 to 17.4 feet Cement Grout Seal 17.4 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20									4260.51
21									
22									
23									
24				NA	CC	5.0		Clay	4255.51
25									
26									
27									
28									16/30 Sand
29				NA	CC	5.0		Clay, damp	
30									4250.51
31									
32									
33									
34				NA	CC	5.0	CL	Clay with gravel, damp	
35									4245.51
36									2" Schedule 40 PVC 0.010-inch Screen
37									
38									
39									

TD of boring - 39.0 feet bgs

CC Continuous Core Barrel

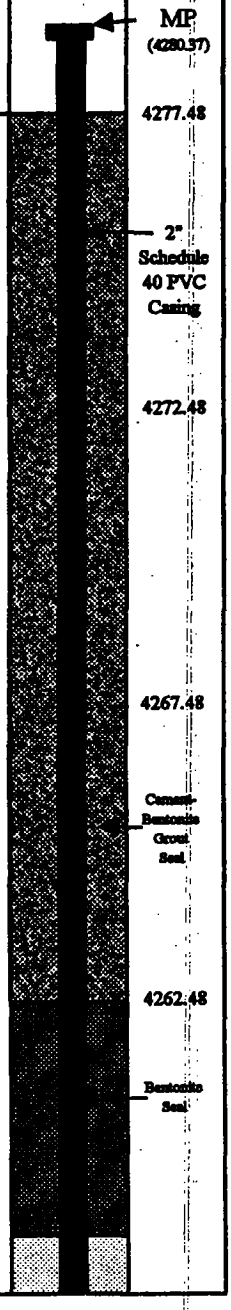
P3-95 NEC

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW Ponds	Boring Number: P3-95 SWC
Date Drilled: 12/9/98 Date Completed 12/9/98	Northing: 862,053.86 Easting: 1,553,913.00
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4,277.48
Groundwater Elevation (ft):	Measuring Point (MP) Elevation (ft): 4,280.37
Date Measured:	MP is top of Protective Casing
Total Depth (ft): 36.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 36.0 to 21.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 21.0 to 0.0 feet Type PVC Sch. 40
Sand 36.0 to 19.0 feet Bentonite Seal 19.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log
0				NA	CC		Fil	Road fill and Rubble
1								
2								
3								
4								
5				NA	CC			
6								
7								
8								
9				NA	CC	1.5	SM	Sand
10								
11								
12								
13				NA	CC	4.0	CL	Clay
14								
15								
16							SM	Sand
17								
18				NA	CC	4.0	SM	Sand
19								



CC Continuous Core Barrel

P3-95 SWC

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW Ponds	Boring Number: P3-95 SWC
Date Drilled: 12/9/98 Date Completed 12/9/98	Northing: 862,053.86 Easting: 1,553,913.00
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4,277.48
Groundwater Elevation (ft):	Measuring Point (MP) Elevation (ft): 4,280.37
Date Measured:	MP is top of Protective Casing
Total Depth (ft): 36.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger
Well Screen: Diameter 2-inch I.D.	Length 36.0 to 21.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D.	Length 21.0 to 0.0 feet Type PVC Sch. 40
Sand 36.0 to 19.0 feet	Bentonite Seal 19.0 to 15.0 feet Cement Grout Seal 15.0 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20							CL	Clay	4257.48
21									
22									
23									
24				NA	CC	4.5		Clay, damp	4252.48
25									
26									
27									
28									16/30 Sand
29				NA	CC	5.0	CL	Green Clay, damp	
30									4247.48
31									2" Schedule 40 PVC 0.010-inch Screen
32									
33									
34									
35				NA	CC	5.0	CL	Green Clay, Wet	4242.48
36									

TD of boring - 36.0 feet bgs

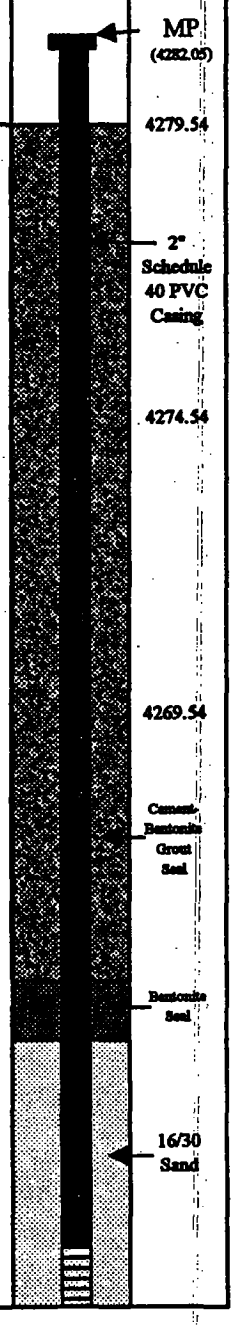
CC Continuous Core Barrel

P3-95 SWC

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW Ponds	Boring Number: P3-97 NEC
Date Drilled: 12/11/98 Date Completed 12/11/98	Northing: 862,629.13 Easting: 1,554,159.58
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4,279.54
Groundwater Elevation (ft):	Measuring Point (MP) Elevation (ft): 4,282.05
Date Measured:	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger
Well Screen: Diameter 2-inch I.D.	Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D.	Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 15.5 feet Bentonite Seal 15.5 to 14.5 feet	Cement Grout Seal 14.5 to 0.0 feet

Depth (feet)	Grain Size: % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log
0				NA	CC		Fil	Road fill and Rubble
5				NA	CC			
9				NA	CC	5.0	CL	Clay
12							SM	Sand
14				NA	CC	4.0	SM	Sand
17							CL	Clay
18				NA	CC	4.0	SM	Sand



CC Continuous Core Barrel

P3-97 NEC

Envirocare of Utah, Inc.
Groundwater Monitoring Well Boring Log

Project: LARW Ponds	Boring Number: P3-97 NEC
Date Drilled: 12/11/98 Date Completed 12/11/98	Northing: 862,629.13 Easting: 1,554,159.58
Logged By: Richard Poulson	Ground Surface Elevation (ft): 4,279.54
Groundwater Elevation (ft):	Measuring Point (MP) Elevation (ft): 4,282.05
Date Measured:	MP is top of Protective Casing
Total Depth (ft): 34.0	Drilling Contractor: RC Exploration
Diameter (in): 8.0	Drilling Method: Hollow Stem Auger

Well Screen: Diameter 2-inch I.D. Length 34.0 to 19.0 feet Slot Size 0.010-inch
Casing: Diameter 2-inch I.D. Length 19.0 to 0.0 feet Type PVC Sch. 40
Sand 34.0 to 15.5 feet Bentonite Seal 15.5 to 14.5 feet Cement Grout Seal 14.5 to 0.0 feet

Depth (feet)	Grain Size % Gravel	% Sand	% Gravel	Blows (6 in.)	Sample Type	Sample Recovery	Graphic Log	Stratigraphic Log	Elevation (feet)
20									4259.54
21									
22									
23				NA	CC	5.0	CL	Clay	
24									
25									4254.54
26									
27				NA	CC	5.0	CL	Clay	
28									16/30 Sand
29									
30									4249.54
31									2" Schedule 40 PVC 0.010-inch Screen
32									
33									
34									

TD of boring - 34.0 feet bgs

CC Continuous Core Barrel

P3-97 NEC