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RADIOLOGIC CHARACTERIZATION OF THE MEXICAN HAT, UTAH, URANIUM MILL TAILINGS REMEDIAL ACTION SITE

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ADDENDUM D1

RADIOLOGIC CHARACTERIZATION OF THE MEXICAN HAT, UTAH, URANIUM MILL TAILINGS REMEDIAL ACTION SITE

(Note: The data on microfiche and the Plate 1 referenced in this document are available in the DOE UMTRA Project Office, Albuquerque, New Mexico.)

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Plate 1. Base Map for the Mexican Hat, Utah, Site

1.0 INTRODUCTION

This radiologic characterization of the inactive uranium millsite at Mexican Hat, Utah, was conducted by Bendix Field Engineering Corporation (Bendix) for the U.S. Department of Energy (DOE), Grand Junction Projects Office, in response to and in accord with a Statement of Work prepared by the DOE Uranium Mill Tailings Remedial Action Project (UMTRAP) Technical Assistance Contractor, Jacobs Engineering Group, Inc. (JEG). The objective of this project was to determine the horizontal and vertical extent of contamination that exceeds the U.S. Environmental Protection Agency (EPA) standards at the Mexican Hat site. The data presented in this report are required for characterization of the areas adjacent to the Mexican Hat tailings piles and for the subsequent design of cleanup activities. Some on-pile sampling was required to determine the depth of the 15-pCi/g Ra-226 interface in an area where wind and water erosion has taken place.

An orientation visit to the site was conducted on 4-8 June 1984, in conjunction with Jacobs Engineering Group, to determine the approximate extent of contamination that exceeds EPA standards surrounding the piles, to establish survey control points and baselines for later establishment of grid lines, to assess drilling requirements, and to gather background radiologic and geochemical data to be used to determine exposure rates, disequilibrium between radium and its radon daughters, moisture content in soils, and concentrations of radium, thorium, and potassium in soils. The information gained from this visit was used in determining the scope of work required for the radiologic site characterization.

Fieldwork at Mexican Hat was conducted on 10-24 September 1984. Radiometric measurements, soil samples, and building surveys were completed on 20 September and drilling was completed on 24 September 1984.

2.0 BACKGROUND

2.1 LOCATION

The inactive uranium millsite is located on the Navajo Nation (Indian Reservation) approximately 1.5 miles southwest of the town of Mexican Hat, Utah (see Figure 1). The mill housing area, now the community of Halchita, is located 0.5 mile southwest of the millsite. The millsite is within Section 13, Township 42 South, Range 18 East, Salt Lake Base and Meridian, San Juan County, Utah.

2.2 GEOLOGIC AND HYDROLOGIC SETTING

The Mexican Hat site is located within the southern Monument Upwarp region of the Colorado Plateau. This portion of the north-south elongated uplift contains several small plunging anticlines. The millsite is in the Mexican Hat syncline which is a sharp downfold between the Raplee Anticline to the east and the Cedar Mesa-Halgaito Anticlines to the west. The site is on the gently east-dipping (3 to 6 degrees) west limb of the syncline.

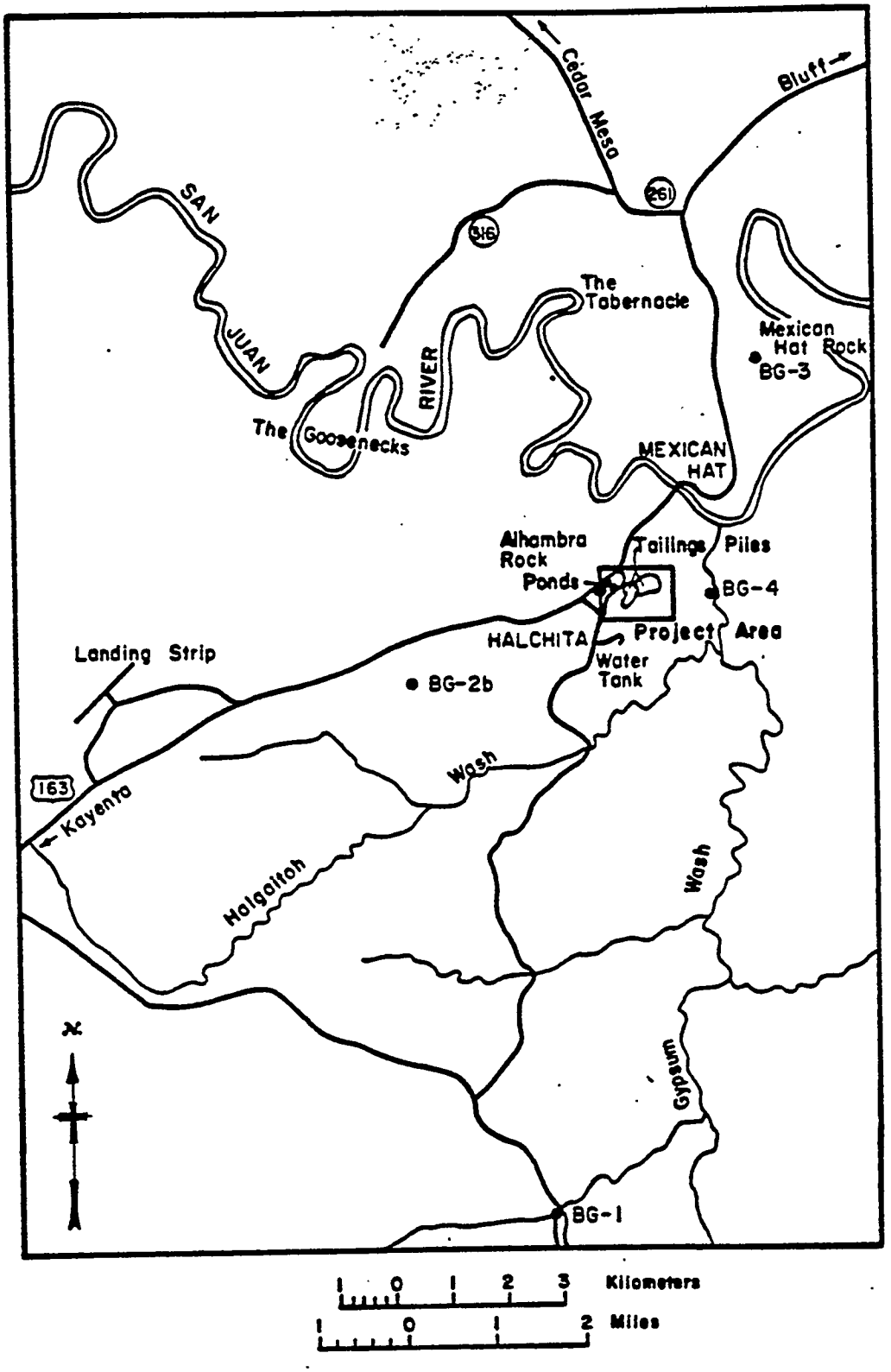

Figure 1. Location Map of the Mexican Hat Site Showing Background-Measurement Locations

Sedimentary rocks of the millsite area consist of fine-grained silty sandstones and shales of the Halgaito Tongue, a member of the Cutler Formation of Pennsylvanian age. These beds are a distinctive red to chocolate-brown in color and range in thickness from approximately 50 to 100 ft. The mill area and tailings piles are underlain by Halgaito redbeds. To the east of the tailings piles in the bottoms of the major arroyos draining the site are resistant limestone beds, probably part of the Rico Formation (or facies of the Cutler Formation), which underlie rocks of the Halgaito Tongue.

Unlike many other millsites, the Mexican Hat site does not contain a developed soil horizon or alluvial cover. Most of the site is located on bedrock or weathered bedrock. Accumulations of unconsolidated material greater than 2 ft thick are mainly restricted to man-made mixtures of bedrock, tailings, ore, and debris. Due to the color contrast between the Halgaito redbeds and contaminated materials (often white to gray), it is generally not difficult to identify contaminated materials.

Surface drainage at the millsite is to the east-northeast via tributary arroyos which drain into Gypsum Wash less than one mile from where it empties into the San Juan River. These arroyos are usually dry, with water flow restricted to infrequent periods of heavy rainfall.

Due to the fine-grained nature of the Halgaito sandstones and shales and to the arid climate at the millsite, no major near-surface groundwater aquifers exist. The major source of domestic water in the area is the San Juan River.

2.3 SITE HISTORY

The mill at Mexican Hat was built and operated by Texas-Zinc Minerals Corporation from 1957 to 1963. The mill was acquired by the Atlas Corporation in 1963 and was operated by them until operations ceased in 1965. A sulfuric acid plant continued to operate at the site until 1970. After the mill closure, control of the site reverted to the Navajo Nation. The site was used for a short period as a trade school (carpentry, welding, electrical, etc.) operated by the Utah Trades Commission. Presently the only continuously occupied portion of the site is the former mill office building which is now the Halchita Health Center.

Much of the ore processed at the mill came from the White Canyon district of Utah. This ore contained, along with uranium, a considerable amount of copper sulfides from which copper was also recovered. Brown and others (1974) described the process of recovery as a froth-flotation process followed by acid leaching. The leached flotation concentrates were filtered to recover a final copper product and the filtrate was combined with main-circuit leach slurry from the flotation tailings. A five-stage counter-current thickener circuit was used to separate leached solids and pregnant liquor, which was then clarified before solvent extraction. The loaded organic solvent was stripped with an ammonium nitrate solution, which was then neutralized with magnesium hydroxide to precipitate the final uranium product.

The tailings were distributed to two piles (referred to as the upper and lower piles) by a cyclone separator which built up the dams with coarse sand and

allowed the slimes to flow toward the center and southwestern portions of the piles.

The mill processed a total of 2.2 million tons of ore which assayed at an average of 0.28 percent U_3O_8 and produced 5700 tons of U_3O_8 concentrate for sale to the U.S. Atomic Energy Commission.

2.4 PREVIOUS WORK

Prior to the start of fieldwork for this characterization project, a thorough literature search was performed to identify published information pertaining to remedial action at the Mexican Hat site. The results of this search are presented in the bibliography at the end of this report (Section 7.0).

Previous studies at Mexican Hat include the following: an environmental survey of the uranium mill tailings piles at Mexican Hat by the U.S. Environmental Protection Agency conducted in May 1968; a cooperative site visit to assess site conditions by the U.S. Atomic Energy Commission, Environmental Protection Agency, and the State of Utah in May 1974; an engineering assessment of the site by Ford, Bacon and Davis Utah, Inc. under contract to the U.S. Energy Research and Development Administration in 1974; a radiologic impact assessment of the site by Oak Ridge National Laboratory for the U.S. Department of Energy in March 1980; and an aerial radiologic survey of the area surrounding the site by EG&G Energy Measurement Group for the U.S. Department of Energy Office of Operational Safety in September 1980.

2.5 SITE CONDITIONS

The remains of eight mill buildings exist at the site. Of the eight buildings only two are still in use. The former mill office building has been converted to a health center and is in good condition. A metal building once used as a chemistry lab and later as a sheet metal shop is now used for storage and remains locked. The long building once used for a trade school is abandoned but appears to contain a large amount of salvageable materials. An empty metal storage shed, in good condition, also appears to be salvageable. Other buildings including the scale house, ore-crushing building, and generator building are either contaminated or do not lend themselves to salvage.

Other remains of the milling operations include foundations of buildings that have been removed, tanks used for holding crushed ore, tanks used in the manufacture of sulfuric acid, and miscellaneous buried junk materials. A sewage pond, water line, and electrical transformer are also present and in use at the site.

The tailings piles, although crusted, are not covered or stabilized and access to the piles, as well as the entire site, is not restricted. Both wind and water erosion have occurred on the piles. The piles occupy a natural drainage area and although berms and dikes were built to reduce the amount of tailings being washed or blown off of the piles, arroyos downstream from the pile contain tailings for a considerable distance. The prevailing wind direction and drainage direction are both to the northeast. Therefore an area surrounding the northeast corner of the lower pile contains both visible windblown and

water-transported tailings contamination. Outward from the pile to the east and northeast, contamination is confined to a thin (generally less than 1-in. thick) blanket of windblown tailings over a broad area and to scattered sand bars (generally less than 1-ft thick) containing tailings, located along the bottoms of arroyos draining the pile area.

Due to the variable topography at the site (rolling hills, narrow ridges, and deep arroyos), much of the access to sampling, measurement, and drilling sites was accomplished by the use of three-wheeled, all-terrain cycles (ATCs). A portion of the drilling at the site was accomplished using a portable hand-held gas-powered auger.

3.0 PROCEDURES

The measurement techniques, instrumentation, and procedures used for the Mexican Hat radiologic characterization were based primarily on protocols developed by the DOE Division of Remedial Action Projects (DRAP) Technical Measurements Center (TMC) and on field-implementation experience gained during radiologic characterizations of other UMTRAP sites (Allen, Showalter, and others, 1983; Allen, Steele, and others, 1983; Allen and Strong, 1984; Marutzky and others, 1983; Shay and others, 1984; Shay and Rush, 1984; and Goodknight and Walker, 1984).

All activities at or in support of the project were performed in compliance with the provisions set forth in an approved Quality Assurance Program Plan (QAPP). To ensure the health and safety of personnel assigned to the project, a comprehensive health and safety plan was followed during the fieldwork phase of the project. This plan included monitoring of external radiologic exposure, potential for internal radiologic exposure (i.e., inhalation of airborne radioactive dust), personnel contamination, site access, and equipment contamination.

For purposes of this study, radiometric measurements made indirectly by measurement of radiation from sources other than the decay of the nuclide of interest are reported as 'equivalent' concentrations, denoted by an 'e' prefix, e.g., pCi(eRa-226)/g. Similarly, 'e' is used to report equivalent elemental concentrations (e.g., eK, eTh) calculated from the natural abundance of the nuclide (K-40 for eK) or a daughter in equilibrium with the parent (Tl-208 for eTh). Equivalent concentration is that concentration of nuclide/element of interest in equilibrium with its daughter products that yields the same measurement as the sample.

All instruments used for radiologic characterization were calibrated at the DOE calibration facilities in Grand Junction, Colorado, both before and after the fieldwork session. Instrument-response field checks were made before use each day, and the results were monitored for compliance with quality-control limits established on the statistical basis of previous response checks. The methods used for instrument-response field checks are described in Appendix A.

3.1 AREA DESIGNATIONS

The Mexican Hat site was divided into six areas (Areas A through F, Plate 1) as described in the Statement of Work, delineated on the basis of differing contamination patterns. These areas are the following: (A) windblown contamination north, northeast, and east of the tailings piles and arroyos containing both wind- and water-transported contamination; (B) windblown contamination south of the piles; (C) mill yard and ore-storage area; (D) ponds and contaminated arroyo in the northwest portion of the site; and (E) and (F) wind and water erosion adjacent to retaining dikes ringing the upper and lower tailings piles respectively. The type and amount of work required to characterize each area are discussed later in this report.

3.2 PHYSICAL SURVEY

The physical survey was conducted by a Bendix surveyor using a Theodolite and Geodimeter to establish baselines from horizontal control stations as shown on the Horizontal and Vertical Control map supplied by Jacobs Engineering Group. The millsite at Mexican Hat differed from previous sites in that the property boundary lines coincide with the baselines used to establish the grid network. A distance check was made between boundary points before baselines were established.

Once the baselines were established, several auxiliary lines were established with the instruments at right angles to the baselines to aid in gridding the different areas. All other gridpoints were set by steel tape and line of sight from established points. These gridpoints were located to the nearest 0.5 ft.

The borehole locations in Areas C and D were staked in the same manner as the gridpoints, using steel tape and existing points as line of sight. The boreholes located in Areas E and F were staked at approximate locations based on the work statement sample-design map provided by Jacobs Engineering Group. Many of the planned boreholes were moved to locations of easier access. After drilling, all holes in Areas E and F were surveyed from existing control stations. Elevations of all boreholes were established by differential leveling between control stations.

Many of these holes were moved and restaked by the Bendix Site Manager and the Technical Assistance Contractor to more accessible locations or to locations that would yield the best subsurface information (e.g., boreholes Hat-124, Hat-125, and Hat-158 in Area A).

3.3 SOIL SAMPLING AND DELTA-GAMMA RADIUM MEASUREMENTS AT GRIDPOINTS

A total of 145 gridpoints were established in Areas A through D for soil samples and delta-gamma measurements. Each grid point had a 0-to-6-in. soil sample taken for laboratory gamma-ray spectroscopic analysis. Delta-gamma measurements were made at a depth of 6 in. at specified gridpoints for field guidance in sampling. The purpose of the 0-to-6-in. soil sample was to determine the extent of surface contamination exceeding the EPA standard of 5 pCi/g Ra-226 above background. Subsequent subsurface delta-gamma measurements and soil samples were taken to define areas where the EPA standard of 15 pCi/g Ra-

226 was exceeded. The higher limit only applies to areas that will be excavated and then backfilled; the lower limit must be applied to areas that may be excavated but are not backfilled with at least 15 cm of soil. The procedure used for gridpoints in Areas A and B was (1) a 0-to-6-in. soil sample taken at each gridpoint, (2) a 6-in. delta-gamma measurement taken at one half of the gridpoints, and (3) a 6-to-12-in. soil sample where a 6-in. delta-gamma measurement indicates Ra-226 activity greater than 5 pCi/g, followed by a 12-in. delta-gamma measurement. This alternating procedure was continued until the delta measurement indicated less than 5 pCi/g or until an 18-to-24-in. soil sample was taken. In Areas C and D at every specified gridpoint this alternating soil sample/delta-gamma measurement protocol was also used.

3.3.1 Soil Sampling

Several steps were taken to ensure the integrity of the soil samples during the soil-sampling process. The samples were excavated using specially constructed shovels designed to produce samples of equal size. Care was taken to collect a uniform vertical cross section of the 6-in. layer sampled. Care was also taken to clean the sample-gathering equipment to prevent cross-contamination. Sample ticket books with the prefix MED were used for samples collected in the field during this project. Pertinent information such as sample type, grid location, sample depth, project code, sampler's name, and soil conditions were placed on each sample ticket. A paper record of the sample-ticket number was placed inside the plastic bag holding the sample and the top of the bag was then folded twice and stapled shut to retain moisture. Using a permanent ink marker, the sample number, location, and depth were written on the plastic bag. The plastic bag was then placed in a duck-cloth bag which was also labeled with the sample number and depth. The samples were then boxed and returned to Grand Junction for analysis by the Bendix Analytical Chemistry Laboratory.

Following transport to Grand Junction, the soil samples were weighed, dried, reweighed, crushed and ground to -28 mesh, blended, and sealed in sample cans. The difference in weight after drying, or loss on drying (LOD), in percent, was recorded for about 10 percent of the samples submitted for analysis. These values were used later to calculate moisture correction factors. The samples were stored for at least 21 days to allow the radon and radon daughters to reach equilibrium with any radium present. The samples were analyzed for radium, potassium, and thorium using high-resolution germanium gamma-ray spectroscopy systems. The systems were calibrated against the New Brunswick Laboratory (NBL) Series 100-A certified gamma-ray standards. All samples were positioned on a detector by means of an automatic sample changer to maintain consistent sample/detector geometry. The laboratory procedures used are described in detail in the Handbook of Analytical and Sample-Preparation Methods (Bendix Field Engineering Corporation, 1984c).

Amplifier gain and baseline were manually checked daily, using a Th-232 source. Two known control samples were analyzed each day; acceptance of the data set thus generated required that at least one control be within one standard deviation and that both controls be within two standard deviations of the statistically established individual ranges. In addition to analysis of known controls, 10 percent of the blended samples were split and analyzed for radium concentration as blind duplicates. The duplicates are identified with an MBG sample prefix.

3.3.2 Delta-Gamma Radium Measurements

In-situ measurements of equivalent radium at gridpoints were made using a Bendix delta-gamma system containing internal collimation and prefilters. The Bendix system was operated on counting plateau using a delta (difference) technique. The detector was placed on the surface to be assayed and an UP count was collected for 120 seconds; a high-density shield was then placed between the detector and the surface being assayed and a DOWN count of 120 seconds was collected. The UP/DOWN counter automatically registered the difference or delta count.

The statistical validity of the delta-gamma measurements was monitored in the field by taking two or more sets of measurements at each location. The procedures used in determining the statistical validity of the measurements and for data reduction are described in Section 6.3 of the Radiologic Field Measurements Procedures Manual (Bendix Field Engineering Corporation, 1984a). The mean of the count sets was determined arithmetically, and the standard deviation of each count set was calculated using the equation

$$\sigma_{N_d} = \sqrt{2N_u - N_d} \qquad (1)$$

where σ is the standard deviation and where N_u and N_d are the unshielded (UP) gross counts and the shielded (DOWN) difference or delta counts, respectively. A statistical check was made to determine if the second set of measurements was within 2σ of the first. If not, a third set of measurements was made. The data were summed and σ was calculated for the total measurement. A check was made to determine whether σ is less than 15 percent of the difference count using the equation

$$U_d = \frac{\sigma_{N_d}}{N_d} (100) \qquad (2)$$

where U_d is the percent uncertainty of the difference count. If this criterion could not be met after three 120-second measurements, the data were flagged as being semiquantitative.

A calibration factor and three major corrections were applied to the raw delta-gamma readings to obtain radium concentrations in picoCuries of equivalent radium per gram [pCi(eRa-226)/g]. Calibration of the instruments was performed at the Department of Energy (DOE) Walker Field calibration pads in Grand Junction, Colorado. The stripping factors necessary to calculate raw equivalent-radium concentrations from the delta-gamma readings were obtained from the calibration data.

A correction for contributions from radioelements other than Ra-226 was made to compensate for the fact that the raw data collected in the delta-gamma measurements are the result of all gamma radiation reaching the detector. The correction factor used in the field was derived from potassium and thorium concentrations determined from in-situ gamma-ray-spectrometer measurements and laboratory gamma-ray-spectroscopic analysis of soil samples obtained during the orientation visit to the site. The correction factor used in this report was obtained from gamma-ray-spectroscopic analysis of soil samples collected during the fieldwork phase of the project.

A correction factor was also applied for soil-moisture content since soil moisture reduces the total gamma-ray flux at the surface and because concentrations are conventionally based on dry sample weight. This correction factor was obtained through laboratory loss-on-drying (LOD) measurements performed on selected soil samples taken during the fieldwork phase of the project. Due to the small variability in soil conditions at the site, an average soil-moisture value, together with the moisture-content values for the calibration pads, was converted to a single correction factor to be applied to all of the delta-gamma measurements.

A disequilibrium factor was applied to the data to correct for the disequilibrium between radium and its gamma-emitting daughter products. This disequilibrium is due to loss of radon gas, radium's first daughter, from the soil. In-situ delta-gamma measurements include these gamma-ray-emitting radon daughters. When the correction for radon loss is applied, the apparent concentration of radium measured in situ increases. The disequilibrium factor was derived from laboratory analysis of selected soil samples. Equivalent-radium concentrations were measured at 2 to 12 hours after canning, and again after 6 days. Estimates of the radon disequilibrium ratio were made by calculating the radium concentration at disequilibrium and at equilibrium, using the standard equations for ingrowth and decay of the various isotopes involved (Marutzky and others, 1984; Scott and Dodd, 1960).

3.4 ARROYO DELTA-GAMMA MEASUREMENTS

To semiquantitatively characterize the extent of contamination in arroyos draining the site in Areas A and D, delta-gamma measurements were made at 200-ft intervals until three successive surface delta-gamma measurements indicated radium concentrations less than 5 pCi/g or until physical access became impossible.

Starting at surveyed gridpoints established during the physical survey, a ROLLATAPE bicycle wheel distance-measuring device was used to establish delta-gamma measurement locations at approximately 200-ft intervals along the bottoms of the arroyos.

At each location a surface delta-gamma measurement was made. Where surface measurements indicated Ra-226 concentrations greater than 5 pCi/g, an additional measurement was made at a depth of 6 in. This procedure was followed until (1) a measurement indicated Ra-226 concentrations were less than 5 pCi/g, (2) a measurement was made at a depth of 18 in. or (3) competent bedrock was reached.

The same statistical checks and corrections that were applied to delta-gamma measurements at grid points (cf. Section 3.3.2) were used for measurements taken in the arroyos. No soil samples were taken in the arroyos with the exception of surveyed grid points used as starting points for the arroyo delta-gamma survey.

3.5 BOREHOLE SAMPLING, DRILLING, AND LOGGING

3.5.1 Sampling

For each borehole location, a 0-to-6-in. surface soil sample was taken prior to drilling. The samples were collected in the same manner as those at grid points described in Section 3.3.1. No further subsurface sampling was required at borehole locations for this study.

3.5.2 Drilling

Borehole drilling was accomplished, using standard geotechnical techniques, with a CME 550 auger rig where access permitted. Hollow-stem augers (6-5/8 in. O.D. by 3-1/4 in. I.D.) were used to drill to total depth in each hole. Augers were left in place in the hole during radiometric logging operations to prevent hole collapse and to minimize smearing of any downhole contamination. A retrievable center bit was used for drilling to avoid contamination within the auger itself; the center bit was removed for radiometric logging. The driller furnished three auger heads so that two holes could be left open for geophysical logging while the third hole was being drilled.

The boreholes were drilled to either the total estimated depth as specified in the Statement of Work or until the driller reached a point of refusal (stopped downward penetration) due to conditions such as shallow bedrock, buried concrete, large rocks, or other material that would stop penetration.

Borehole locations which were inaccessible by a truck-mounted auger rig were drilled using a portable gas-powered 'Little Beaver' drill with a 4-in.-diameter auger. The boreholes were drilled and then immediately logged with the auger removed. Equipment transport to these holes was accomplished using three-wheeled ATCs.

Once geophysical logging operations were completed, hole abandonment was accomplished by filling the hole with auger cuttings or with other nearby natural material found on the ground surface. Holes that exceeded 8 ft or more in depth and that encountered groundwater were filled with a bentonite slurry having at least a 55-second viscosity.

A Bendix drilling supervisor monitored the drilling operations and maintained a record of footage drilled and materials used. The drilling supervisor also checked the augers and drill bits for contamination after removal from each borehole, using an Eberline PAC-6 Alpha Meter. Tools measuring greater than 200 counts per minute (cpm) were cleaned to remove the apparent source of contamination. The tools were then rechecked and recleaned if necessary, until measurements were less than 60 cpm.

3.5.3 Geophysical Logging

Boreholes accessible by two-wheel-drive truck and that were at least 5 feet in depth were logged using a Bendix computer-based geophysical-borehole-logging (Compulogger) system. The probe, which contains a 2-in.-diameter-by 6-in.-long sodium iodide detector, was raised from the bottom to the top of the borehole

at an approximate rate of 1.5 ft per minute; data were recorded at each 0.5-ft interval. Repeat logs were made of the entire borehole to confirm the measurements obtained during the main logging phase.

The gamma-ray detection system was operated in a linear (energy-proportional) mode. Uphole electronics provided system-gain stabilization by monitoring the 835-keV gamma-ray peak from a manganese-54 source contained in the probe. Pulse-height data were collected from single-channel-analyzer (SCA) windows corresponding to the principal energy peaks from the decays of potassium, radium, and thorium. Data from a fourth SCA window, the total-count window (1050 to 3000 keV), were collected to provide statistically improved radium concentrations.

After returning to Grand Junction, the data from the Bendix computer-based logging system were electronically transferred from a nine-track tape on the CDC-815 computer to a disk on the Zenith Z-100 portable computer and verified according to approved quality-assurance procedures. Data from the total count channel were corrected to reflect an average subsurface moisture content of 6.3 percent.

Data from the total-count channel were also corrected for gamma-ray attenuation caused by the auger casing and auger joints. The correction factor was determined in the calibration models at Grand Junction, using sections of casing identical to the casing used at the field site. This factor is an equation which corrects all counts to the observed count rate in the constant-thickness casing. At positions far from the auger joint, the function has a value of 1.0, but as the depth measured approaches the center of the joint, the value of the correction factor increases to a maximum value. Three coefficients determine the correction, one for the maximum value at the center, one for the distance from the center at which the correction reaches one-half of the maximum, and one which controls the speed at which the exponential curves approach the maximum and minimum values.

The depth of auger joints was determined by measuring the height of the auger above the ground surface for each borehole. Since the total auger length was known, the depth of the auger joints could be calculated. The auger joint correction was applied once the joint depth was known.

The data were then spatially deconvolved (George and Price, 1982) to produce logs of apparent-radium concentration versus depth. Corrections were applied for contributions from potassium and thorium. Contributions from potassium and thorium to the apparent radium analysis for the truck-mounted system are 1 pCi(eRa-226)/g for 1 percent potassium and 0.133 pCi(eRa-226)/g for 1 ppm thorium-232, respectively. The average concentrations of potassium and thorium, based on soil samples taken at the site, are 1.3 percent and 6.6 ppm, respectively.

In those areas not accessible by two-wheel drive truck or at shallow boreholes less than 5 feet in depth, logging was performed using a portable gross-count system. This system consists of an Eberline Model PRS-1 field survey meter (RASCAL) connected by 20 ft of cable to a waterproof Eberline Model SPA-3, 2-in.-by-2-in. sodium iodide detector. The system is operated on counting plateau in a gross-count mode, which counts all gamma rays whose energies exceed approximately 30 keV.

The probe was manually lowered to the bottom of the borehole in 6-in. increments, with 30-second measurements recorded manually at each step. The data measurements recorded while lowering the detector were identified as 'Phase 1'. The probe was then raised to the top of the borehole in 6-in. increments, with 30-second measurements again recorded at each step. Data recorded while the detector was being raised were identified as 'Phase 2'.

Most of the data were manually entered into the data base of a Zenith Z-100 portable computer and verified in the field according to approved quality-assurance procedures. Data taken during the last two days of fieldwork were entered and verified upon returning to Grand Junction. The data were then corrected for average moisture content and for gamma-ray attenuation caused by the auger-stem casing, as described for the truck-mounted logging system. These data were also corrected for auger-joint effects.

The borehole-logging systems were field-checked prior to logging each day, using a special monazite sand for the truck-mounted system and a radium check source for the portable system. The resulting data were recorded and compared with previous field-check data and with the two-standard-deviation limits for quality control. Repeat logging phases were run for each hole and the results of both the main and repeat phases were checked for agreement. Additional repeat logs were collected where disagreements in the data were observed. When possible, the apparent cause of the disagreement was noted.

The logging systems were calibrated, both before and after the fieldwork, using the DOE borehole-calibration models at Grand Junction, Colorado, and with the computer program LOGCAL (Showalter and others, 1984). Pre-fieldwork calibration was performed to process the data, while post-fieldwork calibration permitted detection of any equipment malfunctions. The resulting data were then archived in a permanent calibration data base.

3.6 BUILDING SURVEYS AND MEASUREMENTS

3.6.1 Exposure-Rate Measurements

Two indoor exposure-rate measurements were made at the same location in the approximate center of each building using a Reuter-Stokes Model RSS-111 Pressurized Ionization Chamber (PIC). This instrument, widely used for exposure rate measurements, produces a nearly flat response to gamma rays ranging in energy from 100 keV to 3 MeV and is also designed to respond linearly in gamma fields up to 100 mR/h.

A daily instrument check was made using a 1-μCi radium check source placed in the source-holding fixture at the top of the ion chamber. First, with the source removed, a background reading was obtained using a Bendix-modified readout to determine the average exposure rate over a time interval of 90 seconds. Following the background exposure-rate determination, the 1-μCi source was placed in the source holder and the same procedure was used to determine the average exposure rate. The background exposure rate was subtracted from the second exposure rate to determine net exposure rate from the source. The resulting value was recorded and checked for compliance with quality-control limits. To monitor PIC performance at higher exposure-rate levels, the procedure was repeated using a 10-μCi check source.

Two exposure-rate measurements were taken at the approximate center of each building at a height of 3 feet using a counting time of 180 seconds (3 minutes). The exposure-rate readings in μR/h were then entered into a field data book.

3.6.2 Alpha Measurements

An Eberline Air Proportional Alpha Detector was used to obtain gross-alpha measurements inside the site buildings. These measurements, recorded in counts per minute (cpm), were made to determine surface contamination levels. The overall objective of the measurements was to determine the extent of decontamination needed in the buildings.

A daily instrument-response check was made using a set of plutonium check sources. The detector was placed over the source and a reading was recorded. The detector was rotated 180 degrees and a second reading was recorded. The two readings were averaged and the result was checked to determine if the reading was within 2σ of the value (in cpm) stated on the reference check source. If the readings were not within 2σ, the procedure was repeated.

If the second test failed, the instrument was tagged 'DO NOT USE' and returned to Grand Junction for repair.

Two alpha measurements were made at each delineated location within the abandoned buildings. Four measurement locations were delineated for every 1000 square feet of floor space, with a minimum of four locations per building. The first reading was a direct surface reading. The location was then wiped or brushed clean and a second reading was taken. A marked decrease in count rate provided an indication that the contamination is removable. For the two buildings still in use, the Halchita Health Center and the locked storage building, both direct readings and smears were collected. The smears were taken at the same location as the direct reading. The smears were counted using a Ludlum Model 2000 Scaler with a Ludlum Model 43-17 detector for a period of 3 minutes. A sketch of each building showing the approximate alpha-measurement location was provided with the data.

3.7 BACKGROUND MEASUREMENTS

The four areas selected for background measurements near the site include an area approximately 3 miles northeast of the site near the Mexican Hat Rock, an area 5 miles to the south, an area 2 miles to the west-southwest, and an area 0.5 mile to the east. The background site to the east was located just west of Gypsum Wash, since there are no access roads across Gypsum Wash to allow establishment of a background site at least 3 miles east of the site. Three miles to the east of the site is the crest of the Raplee Anticline which is in a different geologic setting. All of the background sites were located in silty sandstones and shales of the Halgaito Tongue of the Cutler Formation, similar to the geologic setting at the millsite.

At each background site, PIC gamma exposure-rate measurements, delta-gamma measurements, and soil samples were taken. Soil samples taken during the

orientation visit were analyzed for Ra-226, Th, K, and moisture (LOD). One sample was analyzed for U-234, U-238, and Th-230. Soil samples taken at background sites during the fieldwork phase were analyzed for Ra-226, Th, and K.

4.0 RESULTS

Data obtained during the fieldwork phase of the project are presented in Appendices B through G. Discussion of the results of each task performed both during and after fieldwork is presented in subsequent sections of this report.

4.1 PHYSICAL-SURVEY RESULTS

Before establishing the baselines used in gridding the site, the Theodolite and Geodimeter were set up over two separate brass-capped control points, and the distance between the two points was measured. The measured distance was compared to the calculated distance and results indicated that the difference between the measured and the calculated distances was insignificant (less than 0.30 ft). Following this check, the baselines were established.

From the baselines, several auxiliary lines were established with the Theodolite and Geodimeter at right angles to the baselines. From these lines, gridpoints were set by tape and line of sight. A total of 145 gridpoints for sampling and measurements were established.

Boreholes in Areas C and D were located using a steel tape and existing points as line of sight prior to drilling. Several boreholes in Areas C and D were moved by the Bendix Site Manager to avoid powerlines, concrete foundations, surface bedrock, or other obstructions. These holes were usually moved only a few feet using a measuring tape and line of sight. Boreholes in Areas E and F were staked at approximate locations, based on the sample design map provided by Jacobs Engineering Group. Many of these holes were moved and restaked by the Bendix Site Manager and the Technical Assistance Contractor to more accessible locations or to locations that would yield the best subsurface information. After drilling, all holes in Areas E and F were surveyed from existing control stations to the nearest 0.5 ft.

Elevations of all boreholes were established by differential leveling between control stations. In the mill yard and ore-storage area, traverses were made from Station 5 to Station 7 to Station 6 and back to Station 5, and from Station 7 to Station 8. The differences in elevation survey closures noted at Stations 7, 6, and 5 were -0.04, -0.01, and 0.03 ft, respectively, and the difference in elevation noted at Station 8 was -0.03 ft. Around the upper tailings pile a traverse was made from Station 3 to Station 7 and back to Station 3. No difference in elevation closure was noted within this traverse. Around the lower tailings pile a traverse was made from Station 2 to Station 7 to Station 3 and back to Station 2. The differences in elevation closures noted at Stations 7, 3, and 2 were -0.17, +0.01, and +0.10 ft, respectively. The overall closure difference noted at Station 2 was -0.07 ft. All borehole elevations were determined to the nearest 0.1 ft.

The location of survey control stations, established gridpoints, and borehole locations are shown on Plate 1.

4.2 SOIL SAMPLING RESULTS

A total of 293 soil samples were collected and analyzed for radium, thorium, and potassium; results are presented in Appendix B, Table B-1. Duplicate analyses were performed on 27 samples for all three radionuclides; the results are presented in Appendix C, Table C-1. Duplicate samples are identified by the prefix MBG. Appendix C, Table C-2, presents the radium data for the original and duplicate analyses to permit comparison of the results.

The differing contamination patterns described in Section 3.1 of this report, with the exception of arroyo contamination where soil samples were not taken, are indicated in the results of soil-sample analyses. Figure 2 shows the distribution of radium concentrations for soil samples collected at 0-to-6-in. depths. Figure 3 shows the location of soil samples having greater than 5 pCi(eRa-226)/g radium concentrations in soil samples taken at 0-to-6-in. depths.

Windblown contamination (Area A) exceeding 5 pCi/g radium-226 in surface (0 to 6 in.) soil samples is present in a broad area to the northeast and east of the lower tailings pile. Soil samples taken at grid points N10152 and E9290, N10000 and E9200, N9960 and E9246, and N10600 and E10400 contain radium concentrations of 369, 535, 676, and 100 pCi/g, respectively. The first three samples are related to small piles of material containing uranium ore and the fourth was taken from the bottom of an arroyo containing water-transported tailings. All of the remaining soil samples in Area A containing greater than 5 pCi/g Ra-226 are related to windblown contamination. As shown by the delta-gamma data taken at a depth of 6 in., the windblown contamination is restricted to the upper 6 in. of material except for an area along the eastern edge of the lower pile. Only one surface soil sample in Area B has a concentration of radium-226 exceeding 5 pCi/g. This indicates that windblown contamination is insignificant south of the pile.

Contamination in soil samples taken from the mill and ore-storage areas (Area C) is highly variable. West of approximately E7600, the radium-226 concentrations in soil samples are at or near background concentrations (1 to 4 pCi/g). East of approximately E7600 to the upper tailings pile, the radium concentrations vary greatly ranging from 3 to 363 pCi/g, reflecting the scattered ore, tailings, and contaminated debris found in this area. Many of the soil samples taken in Area C correspond to borehole locations.

Soil samples taken in Area D have concentrations of Ra-226 at or near background levels, except those taken in the wash or arroyo which drains Area D to the north. The samples from the wash have Ra-226 concentrations ranging from 2 to 482 pCi/g, which represent spotty contamination by tailings and slimes being transported downstream during periods of heavy rainfall.

Equivalent-thorium concentrations in soil samples are highly variable, ranging from 0 to 1384 ppm. The highest concentrations of thorium are related to soil

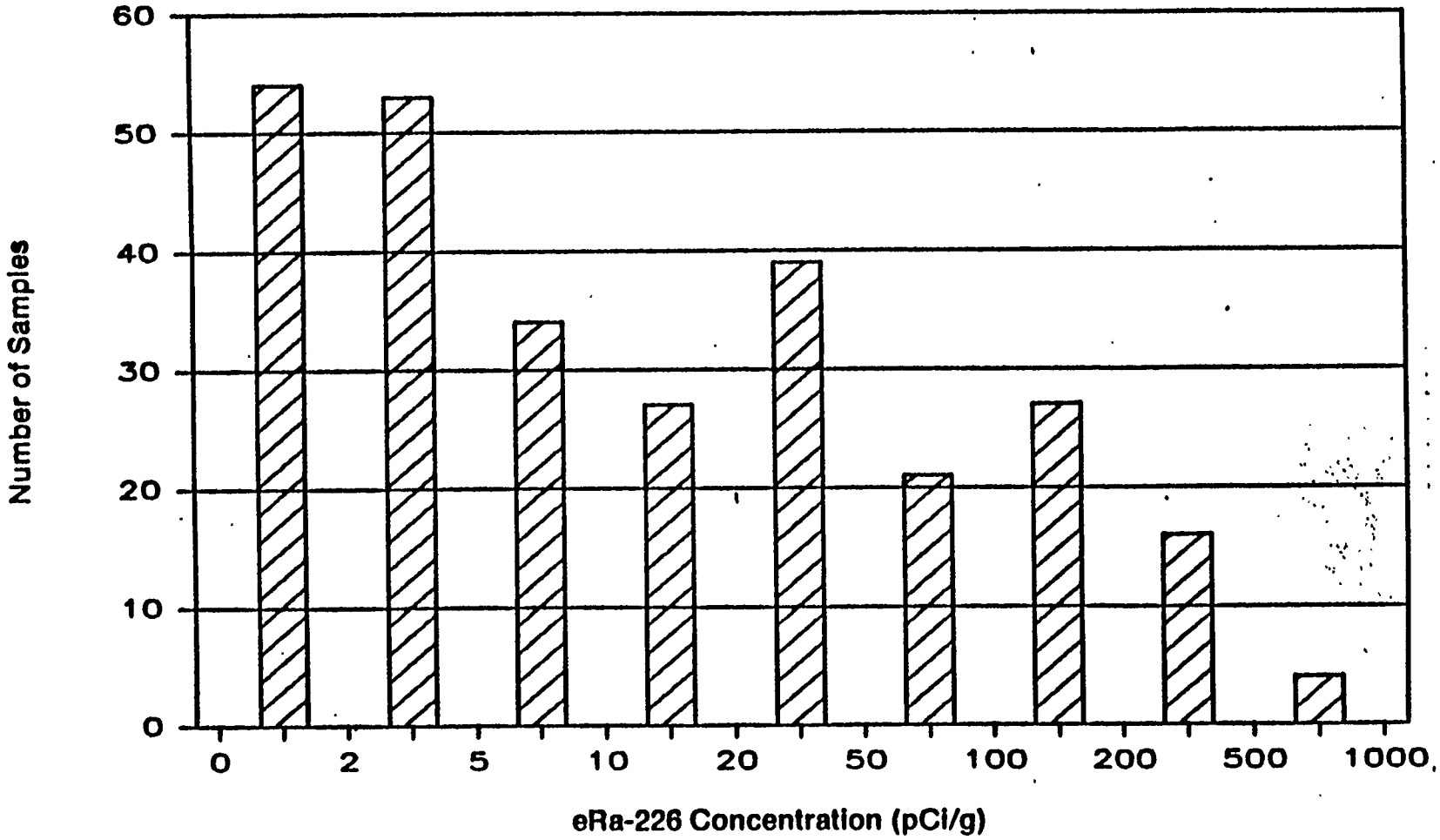

Figure 2. Histogram of Analytical Results for eRa-226 in Soils

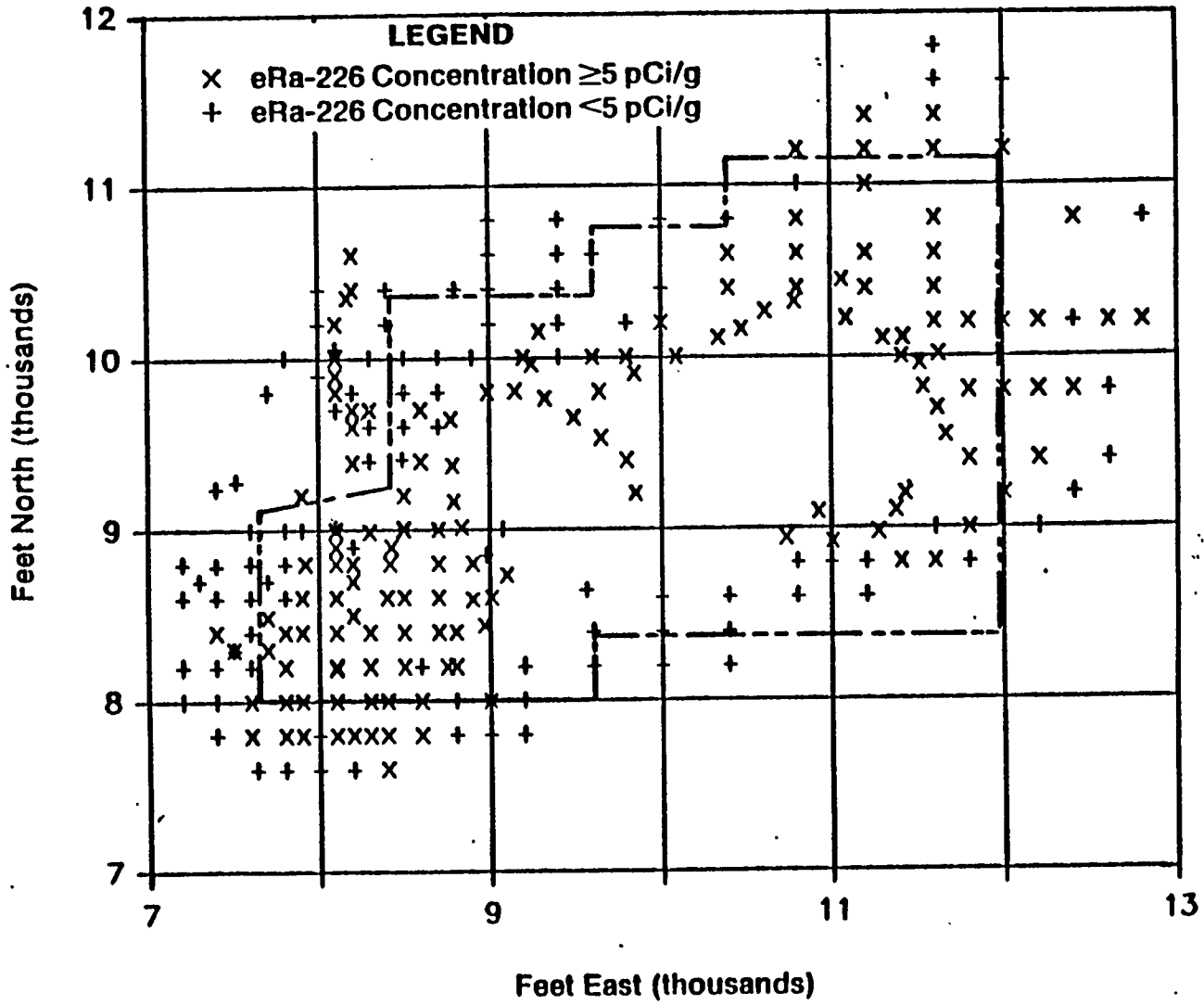

Figure 3. Locations of Soil Samples Having eRa-226 Concentrations Greater Than 5 pCi/g at Depths of 0 to 6 Inches

samples containing uranium ore and tailings. The locations of soil samples containing thorium in concentrations greater than 15 ppm are shown in Figure 4. A discussion on correction factors used to correct radiologic measurements for thorium contributions is presented in Section 4.3 of this report.

Potassium concentrations in soil samples are generally low but are also variable and range from below detection limit (<0.5 percent) to 3.2 percent. A discussion on correction factors used to correct radiologic measurements for potassium contributions is presented in the following section.

4.3 DELTA-GAMMA MEASUREMENTS

4.3.1 Soil-Moisture Correction Factors

Loss-on-drying (LOD) measurements were performed on ten percent (28) of the soil samples collected during the fieldwork phase of the study and on 16 samples collected during the site-orientation visit, to derive an average soil-moisture-content value for the site (Appendix B, Table B-2). Based on 25 soil samples taken at a depth of 0 to 6 in., the average moisture is 1.6 percent. Two samples taken at a depth of 6 to 12 in. and one sample taken at a depth of 12 to 18 in. had moisture contents of 1.13 percent, 2.65 percent, and 6.26 percent, respectively.

Soil-moisture corrections were applied to in-situ radium measurements to convert the measurements to dry-weight radium concentrations. The corrections were calculated, using the moisture content of the soil, from the equation

$$F_m = 1 + 1.11\ [M/(1-M)] \qquad (3)$$

where M is the fraction of the total weight accounted for by water (Marutzky and others, 1984).

Because calibration-pad moisture must also be taken into account, the ratio of the soil-moisture correction to the calibration-pad-moisture correction is applied to the data as follows:

$$F'_m = \frac{1 + 1.11\ [M_f/(1-M_f)]}{1 + 1.11\ [M_p/(1-M_p)]} \qquad (4)$$

where M_f is the soil-moisture content determined for each sampling depth interval in the study area and M_p is the calibration-pad moisture content (approximately 11 percent). Since the moisture content for the 6-to-12-in. depths was not significantly different from those of the 0-to-6-in. samples, the same correction factor ($F'_m = 0.89$) was applied for data in these depth ranges. For the seven soil samples taken below a depth of 12 in., a correction factor of $F'_m = 0.94$ was applied.

4.3.2 Disequilibrium Correction Factor

Radon escaping from the soil decreases the apparent concentration of radium measured in situ because the in-situ measurement technique actually measures gamma-ray-emitting radon daughters. The amount of this decrease is the fraction of radon that escapes from the soil.

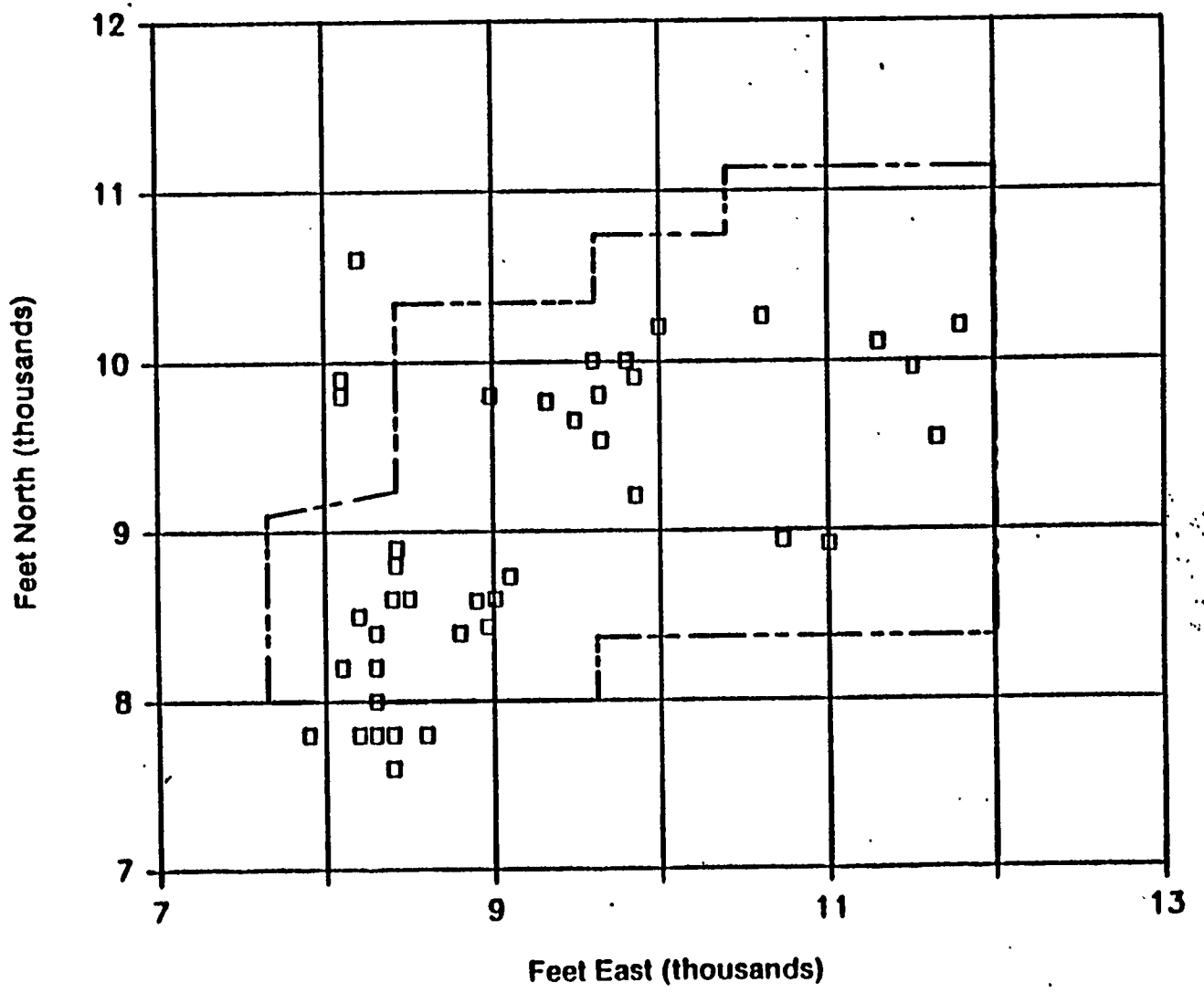

Figure 4. Locations of Soil Samples Having Thorium Concentrations Greater Than 15 ppm at Depths of 0 to 6 Inches

Results of laboratory measurements of disequilibrium between radium and its radon daughters for 2 samples taken during the site orientation visit were 17.8 ± 1.0 percent and 18.6 ± 1.0 percent. The average of the two values is 18.2 ± 1.0 percent. This value is lower than previous site disequilibrium values probably due to the low moisture content of the soils (1.6 percent for depths 0 to 6 in.).

The equation used for disequilibrium correction is

$$F_e = 1/(1-E) \tag{5}$$

where F_e is the disequilibrium correction and E is the fraction of radon escaping from the soil. The apparent-radium concentration calculated from in-situ data is multiplied by the disequilibrium factor to determine actual radium concentration. Because the calibration pads also emanate radon (approximately 10 percent), the final correction applied to the field data is the ratio between the field disequilibrium correction and the calibration-pad disequilibrium correction, or

$$F'_e = \frac{1/(1-E_f)}{1/(1-E_p)} = 1.10 \tag{6}$$

where E_p is the fraction of radon escaping from the pads (10 percent) and E_f is the fraction of radon escaping from the soil (18.2 percent).

4.3.3 Delta-Gamma Measurement Results

The raw data collected during the field survey were converted to equivalent-radium concentrations using correction factors for moisture, disequilibrium, and thorium and potassium concentrations, as well as the necessary calibration factors obtained from calibrations performed on the DOE Walker Field calibration pads.

The equation for data reduction is

$$C_{Ra} = [(k_{Ra})RF'_m - (S_K C_K) - (S_{Th} C_{Th})]\, F'_e \tag{7}$$

where C_{Ra} is radium concentration in pCi(eRa-226)/g, k_{Ra} is the delta-count calibration factor in pCi(eRa-226)/g per cps, R is average net count rate in cps, F'_m is the moisture correction factor (average per area), S_K is the stripping factor in pCi(eRa-226)/g per percent K, C_K is percent K (average per area), S_{Th} is the stripping factor in pCi(eRa-226)/g per ppm Th, C_{Th} is ppm Th (average per area), and F'_e is the disequilibrium correction factor (average per area).

The disequilibrium correction factor (F'_e) determined for this study is 1.10 (cf. Section 4.3.2). The moisture correction factor (F'_m) for this study area is 0.89 for measurements less than or equal to 12 in. in depth and 0.94 for measurements greater than 12 in. in depth. Mean thorium and potassium concentrations for the millsite were determined from laboratory analysis of a group of soil samples containing very high concentrations of thorium. The statistical mean for thorium is 38 ppm. To compensate for these high values, all thorium values greater than 15 ppm were, for the purpose of data reduction, placed in a separate file where the locations of the high thorium samples were

checked against locations of delta-gamma measurements. Delta measurements taken at the same location as soil samples containing high thorium were corrected individually for thorium. The remaining delta-gamma measurements were corrected for thorium using a mean concentration of 6.6 ppm. A mean potassium concentration (C_K) of 1.3 percent was used to reduce the delta-gamma data.

Uncertainties in radium-concentration values were calculated using the equation

$$\sigma = k_{Ra}[(2N_u - N_d)^{2/3}/t](F'_e)(F'_m) \qquad (8)$$

where σ is the uncertainty in radium concentration, N_u and N_d are the unshielded (UP) counts and delta or difference counts, respectively, t is the counting interval (time in seconds for the UP count), and the other parameters are as defined above. These uncertainties reflect counting errors only. Not included are the uncertainties in the equivalent-radium concentration introduced by the errors associated with each correction and calibration factor. At low radium concentrations, the counting uncertainty is, most likely, the largest source of error in the measurement. At high concentrations, however, the reported counting uncertainty is likely to be overshadowed by errors introduced by the correction- and calibration-factor uncertainties.

Equivalent-radium concentrations determined using the delta-gamma method and their associated two-standard-deviation counting uncertainties are reported in Appendix D, Table D-1. Figure 5 shows locations where the equivalent-radium content of the soil exceeds 5 pCi/g as determined by the delta-gamma method. Figure 6 illustrates the distribution of the delta-gamma measurements over the range of equivalent-radium concentrations determined for the site.

With the exception of delta-gamma measurements in arroyos, nearly all of the delta-gamma measurements were made at a depth of 6 in. as specified in the Statement of Work. The measurements were made at approximately half of the gridpoints in Areas A and B, and at all of the gridpoints (excluding borehole locations) in Areas C and D following the collection of a 0-to-6-in. soil sample. The alternating soil sample/delta-gamma measurement method described in Section 3.3 was used to determine the depth of contamination exceeding EPA standards.

The results of delta-gamma measurements taken in areas containing windblown contamination (Areas A and B) indicate that equivalent Ra-226 concentrations below a depth of 6 in. are at or near background concentrations. By comparing the 0-to-6-in. soil-sample data and the 6-in. delta-gamma measurement data, it appears that windblown contamination exceeding 5 pCi/g Ra-226 is confined to near-surface (0 to 6 in.) materials.

Delta-gamma measurements in arroyos of Area A indicate that extensive contamination consisting of a mixture of water- and wind-transported tailings is present in scattered sand bars along each of four arroyos surveyed. The extent of the contamination usually extends outside of available site maps. Therefore, in Appendix D, Table D-2, location values of 99999 are given for measurements taken outside the site map. However, in the remarks section of the data-entry sheets, the measurements are referenced to a known point (e.g., 400 ft downstream from N10600, E8200). The depths of contamination exceeding EPA standards generally correspond to depths needed to reach bedrock. The arroyo bottoms at the site are floored by bedrock and in many cases bedrock is reached

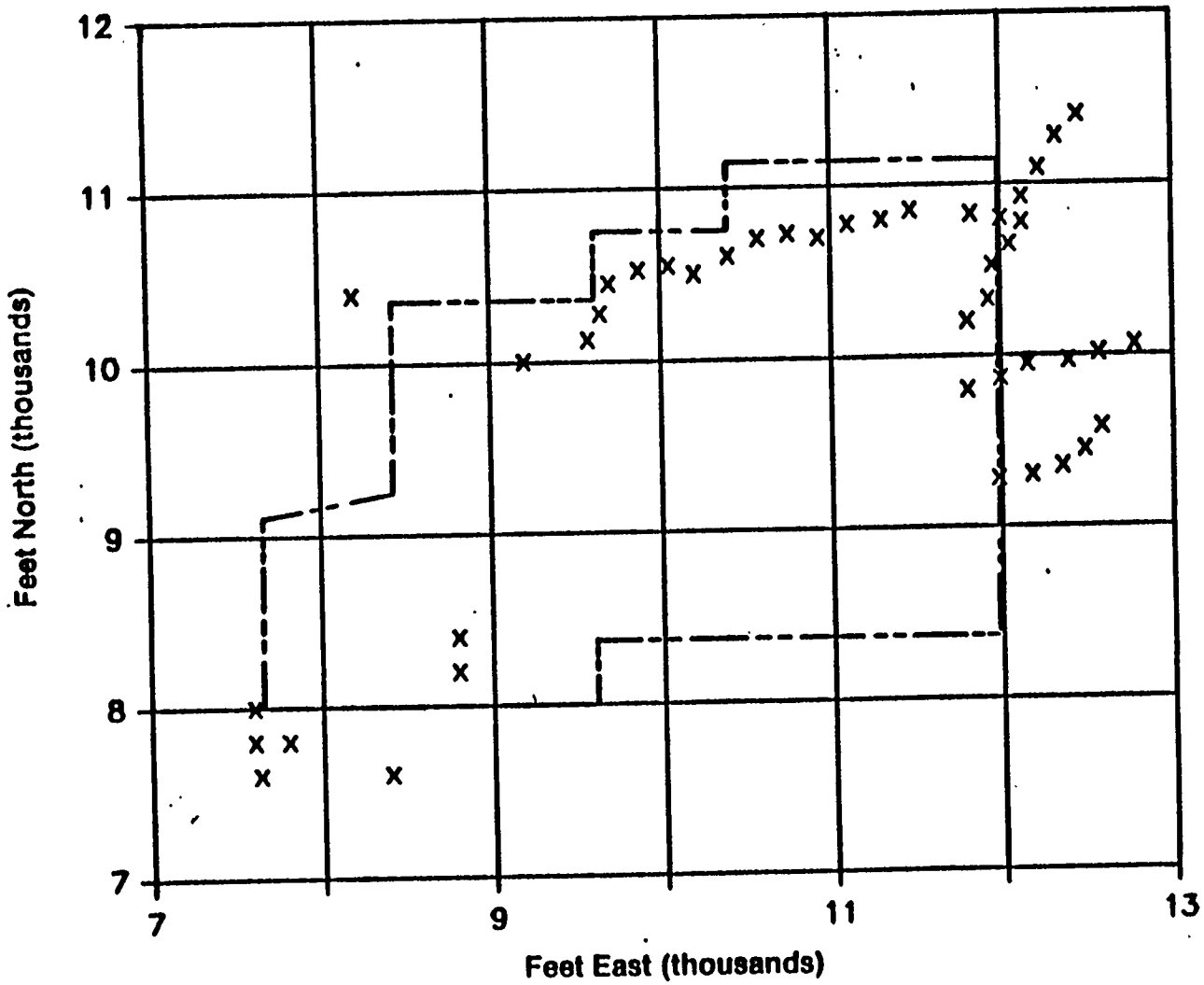

Figure 5. Locations of Delta-Gamma Measurements Greater Than 5 pCi(eRa-226)/g

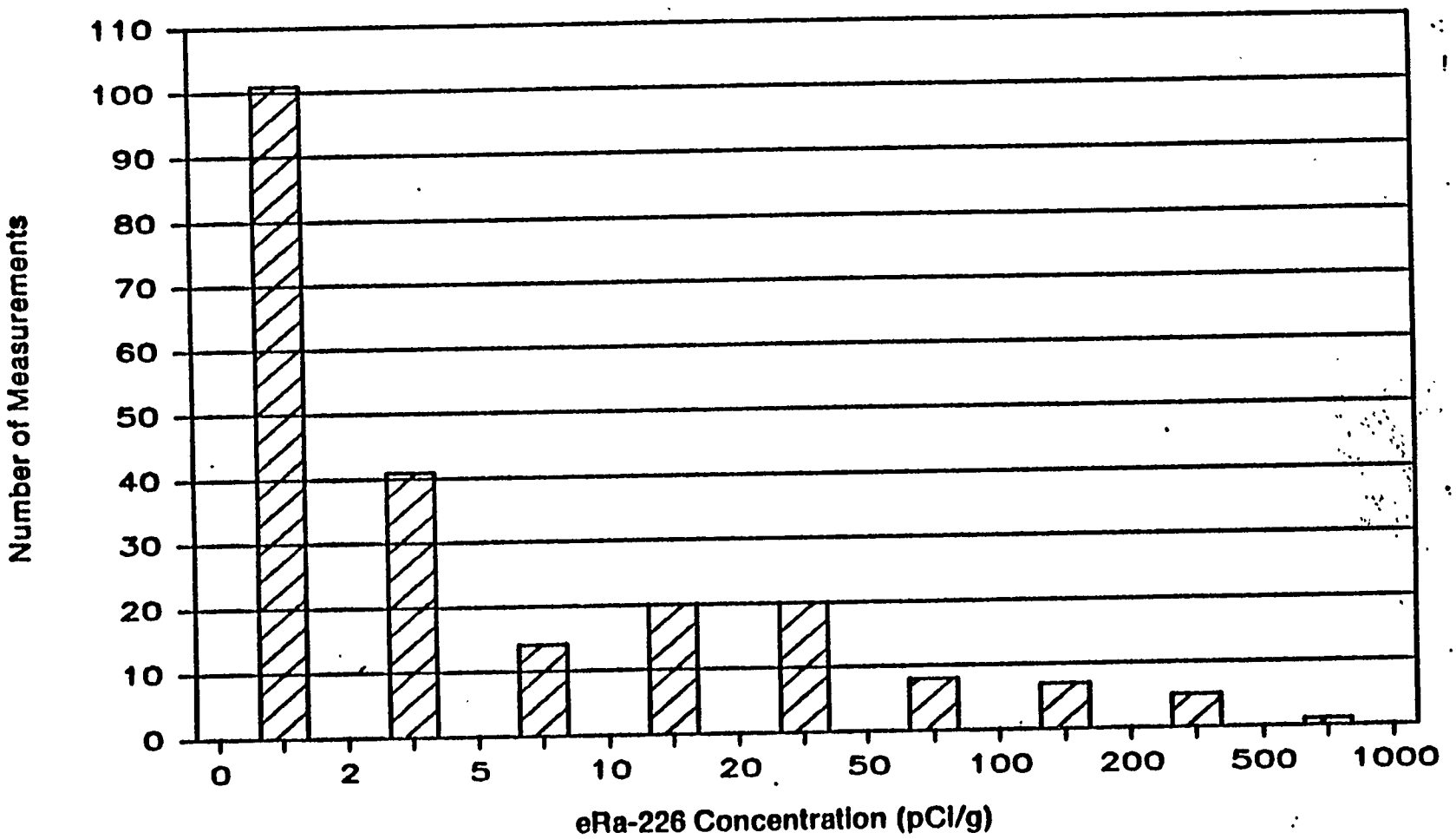

Figure 6. Histogram of Delta-Gamma Measurement Results for eRa-226

at a depth of 3 to 4 in. Once bedrock is reached, the equivalent-radium concentration falls below the EPA standard of 5 pCi/g above background. The arroyo in Area D contains the same type of concentration, but due to a greater thickness of material in the bottom of the arroyo south of U.S. Highway 163, the arroyo was characterized by drilling. North of the highway, surface delta-gamma measurements indicate the contamination extends only approximately 300 ft downstream from the highway.

The delta-gamma measurements from the mill yard and ore-storage area (Area C) indicate that with the exception of six gridpoints (N8200, E7600; N8000, E7600; N7800, E7600; N7600, E7635; N7800, E8200; and N7600, E8400) the eRa-226 concentrations at a depth of 6 in. are less than 5 pCi/g. Of the six measurement locations that contain concentrations greater than 5 pCi/g, four are located in a borrow-pit area between the gravel road on the west edge of the millsite and ore-storage area and the paved road to Halchita. The remaining two locations are located adjacent to small ore piles still present in the ore-storage area. Delta-gamma measurements at two of the above gridpoints (N7800, E8200 and N7600, E8400) yielded negative eRa-226 concentrations due to corrections for high thorium concentrations. Soil samples taken at a depth of 0 to 6 in. at these locations contain 138 and 857 ppm eTh, respectively. Other soil samples in Area C also contain high concentrations of thorium. These samples, however, corresponded to borehole locations and will be discussed in Section 4.4.2.

4.4 BOREHOLE DRILLING, SAMPLING, AND LOGGING RESULTS

4.4.1 Drilling and Sampling Results

A total of 117 boreholes were drilled, of which 47 were located in the mill yard and ore-storage area (Area C), 17 were located in the sewage pond and arroyo area in the northwest portion of the site (Area D), 23 were located along the periphery of the upper pile (Area E), 28 were located along the periphery of the lower pile (Area F), and 2 holes were added to test piles of contaminated material in Area A. The borehole numbers, coordinates, and elevations are included in Appendix E.

Boreholes in Area C were drilled by truck-mounted auger according to the locations specified in the Statement of Work, with the exception of 8 boreholes (HAT-013, 017, 022, 023, 026, 037, 048, and 051) that were moved to avoid utilities, existing structures, and other obstructions. Borehole HAT-057 was deleted since it was located directly on bedrock. Borehole depths were generally shallower than originally estimated depths due to the shallow depth to bedrock.

Boreholes in Area D were drilled with a truck-mounted auger according to the Statement of Work with the exception of boreholes HAT-071, 073, 078, 086, and 088 which were moved due to difficult access or shallow depth to bedrock. Borehole HAT-084 was abandoned due to both the lack of access and to shallow depth to bedrock. Borehole HAT-085 was drilled using a portable auger.

Boreholes in Areas E and F, which had approximate locations specified in the Statement of Work, were drilled with both truck-mounted auger in easily accessible locations and portable auger in difficult-access areas. Boreholes were located by the Technical Assistance Contractor and the Bendix site manager to

accommodate drilling and to provide the best subsurface information. Boreholes originally located along the southern periphery of both piles were moved inward to the edge of the tailings because the original approximate locations were 10 to 12 ft in elevation above the tailings piles, which would have required drilling approximately 10 ft of bedrock to reach the desired depth. These holes were drilled to determine the amount of leaching of contamination below the tailings/bedrock interface.

In Area A two small areas contained thick accumulations of contaminated materials (tailings, uranium ore, sulfur, and other debris) which could not be fully evaluated using the delta-gamma measurements. One borehole was placed in the approximate center of each pile of contaminated material.

A soil sample was taken from a depth of 0 to 6 in. at each borehole location prior to drilling. Appendix B, Table B-1 contains the results of analysis of the samples.

4.4.2 Geophysical Borehole-Logging Results

4.4.2.1 Borehole Logging with the Truck-Mounted System. The truck-mounted spectral gamma-ray logging system was used to log 32 boreholes of which 10 were in Area C, 9 were in Area D, 6 were in Area E, and 7 were in Area F. The radiometric logs are provided on microfiche in Appendix E; borehole-logging and equipment data are presented in Table E-1.

The logs of boreholes located in the ore-storage area (Area C) indicate that contamination exceeding the EPA standard of 5 pCi(eRa-226)/g above background is spotty and ranges from no contamination (HAT-021, 023, 029, and 045) to contamination at a depth of 5 ft (HAT-022). The deepest and most extensive contamination is found in boreholes surrounding the foundation of the old mill (HAT-022, 026, 031, and 035). The borehole drilled next to the truck scale also contains contamination from the surface to 4 ft in depth.

Logs of boreholes located in Area D also indicate that contamination exceeding EPA standards is spotty. In general the contamination is shallow (0 to 6 in. in HAT-073, 074, 080, 084, and 088) with the exception of boreholes HAT-071, 075, 081, 083, and 086, which have spotty contamination to a depth of 4 ft, 7.5 ft, 10.5 ft, 6.5 ft, and 2 ft, respectively. These holes are located in the arroyo containing water-transported tailings.

The logs of boreholes using the truck-mounted system located in Areas E and F are confined to boreholes located along the northern periphery of the upper and lower piles with the exception of boreholes HAT-120 and 121, located on the west edge of the upper pile and HAT-110 located on the south portion of the berm road between the upper and lower pile. Contamination, with the exception of boreholes HAT-102 and 103, is deep, often extending to the total depth of the hole.

4.4.2.2 Borehole Logging with the RASCAL Portable System. The RASCAL system was used to log boreholes that were generally not accessible by the truck-mounted logging system or that were shallow (<5 ft). The radiometric logs are provided on microfiche in Appendix E; borehole-logging and equipment data are presented in Table E-2.

Uncertainties in the final eRa-226 concentrations were calculated at the 95 percent confidence level (two standard deviations) and include terms for the following parameters:

- Statistics of the observed count rate.
- The deconvolution algorithm.
- Correction factors for casing, auger joints, and moisture, as well as background contributions of potassium and thorium concentrations.
- The k-factor (conversion factor for total gamma-ray count rate to radium concentration) for the system.

These calculated uncertainties may be used, together with calculated concentration values, to quantify radium concentrations as being definitely below specific limits with 95 percent confidence.

Radium concentrations at or near the surface, as indicated by borehole radiometric logs, do not agree with concentrations determined from gamma-ray spectroscopic analysis of 0-to-6-in.-deep soil samples, because the calibration procedure does not simulate the air/earth interface at the top of the borehole. The borehole-logging systems are calibrated in the middle of a zone of radioactive material assumed to appear infinitely thick and homogenous for gamma-ray generation and propagation. This same assumption is then made for the borehole when processing the log data, with appropriate deconvolution to correct for adjacent bed effects, but not near-surface and surface measurements for the air/earth interface effects.

A total of 82 boreholes were logged using the RASCAL system. Fourteen of these boreholes were drilled with a portable auger and were logged without casing. The remaining boreholes were logged through hollow-stem augers.

RASCAL borehole logs in Area C indicate that contamination, as with the truck-mounted logging, is spotty as was also indicated by the Compulogger system. Of 37 holes logged using the RASCAL system in this area, 27 of the boreholes did not contain contamination exceeding EPA standards below a depth of 6 in. Of the 10 that did contain greater than 5 pCi(eRa-226)/g below a depth of 6 in., only 4 had contamination below a depth of 1 ft.

RASCAL logs from boreholes in Area D indicated no contamination exceeding EPA standards below a depth of 6 in.

Logs of boreholes in Areas E and F indicate that contamination along the northern periphery of the upper and lower piles (HAT-101, 152, 154, 155, 156, and 158) is shallow, with depths to 6 in. or less. Contamination along the eastern periphery of the lower pile (windblown-tailings area) is more extensive, with depths to 12 ft. Boreholes on the southern periphery were drilled to bedrock on the edge of the tailings with a portable auger. In most cases the contamination exceeds 5 pCi(eRa-226)/g at the bottom of the hole. To fully test the amount of leaching below the tailings/Halgaito shale interface requires truck-mounted rotary drilling. Logs of boreholes along the west edge of the upper pile indicate that contamination is shallow, with depths generally less than 1 ft.

Logs of the two boreholes in Area A (HAT-124 and 125), which were drilled to test small piles of contamination, indicate that in HAT-124 approximately 7 ft of contaminated material exists from surface to bedrock; HAT-125 appears to contain a 5-ft-thick zone of contaminated material.

4.5 BUILDING SURVEY RESULTS

The eight buildings at the Mexican Hat site stand in relatively high gamma fields (often referred to as 'pile shine') due to their proximity to the tailings piles and the ore-storage area, and consequently only one indoor gamma exposure-rate measurement was made in the approximate center of each building at a height of one meter. Surface alpha measurements were made at approximately four locations per 1000 square feet of floor space. In abandoned buildings a surface reading was taken, the surface was brushed and wiped with a disposable wipe, and then a second reading was taken. This procedure gave a general indication of removable versus nonremovable contamination levels. In the two occupied buildings (the Halchita Health Clinic and the sheet metal shop, which is now used as a storage shed) direct measurements were taken, followed by smears on Rad-wipe filter paper which were then counted. Appendix F provides building diagrams showing measurement locations (Figures F-1 through F-8) and alpha contamination and exposure-rate measurement data (Tables F-1 through F-8).

The Halchita Health Clinic (building number 8) and the sheet metal shop storage building (building number 2) show little sign of alpha contamination. Alpha measurements in the former trade school building (building number 5) also indicate that little alpha contamination is present, ranging from 10 to a maximum of 130 cpm. Much of the alpha activity appears to be removable. Building 5 appears to contain a large amount of salvageable materials (e.g. structural steel). Another small metal building (building number 3) has higher alpha activity on the floor (135-220 cpm), but most of the alpha contamination appears to be removable and the building itself appears to be in good condition. The remaining buildings, the scale house building (number 7), ore-crushing building (number 1), generator building (number 4), and the small brick building (number 6), were either highly contaminated (number 7 and number 1) or had little salvage value (number 4 and number 6).

4.6 BACKGROUND CHARACTERIZATION RESULTS

Four locations were chosen for background measurements in the area of the Mexican Hat site (cf. Figure 1). Three of five background locations established during the site orientation visit were chosen as final background locations for the site. A fourth location was established during the fieldwork phase of the project. Background measurement areas were to be, according to the Statement of Work, at least 3 miles east or northeast of the site and at least 1 mile from the site in other directions. Background locations BG-1, 2b, 3, and 4 are located approximately 5 miles south, 2 miles west-southwest, 3 miles northeast, and 0.5 mile east of the Mexican Hat site, respectively. The background location BG-4 is located just west of Gypsum Wash; the lack of access to areas east of Gypsum Wash prevented the establishment of a background site 3 miles east as stated in the Statement of Work. All of the background

sites were located on weathered, red silty sandstones and shales of the Halgaito Tongue, a member of the Cutler Formation, similar to the geologic setting at the Mexican Hat site.

Gamma exposure-rate measurements, delta measurements, and soil samples were taken at each background location. Results of measurements and laboratory analyses of soil samples are presented in Appendix G, Table G-1.

The PIC exposure-rate measurements yield a mean background exposure rate of 11.6 ± 0.7 μR/h for the Mexican Hat area which is consistent with values reported by previous studies.

Delta-gamma measurements at each background location indicate that background eRa-226 concentrations range from 1.1 to 2.5 pCi/g with a mean of 1.6 ± 0.4 pCi/g.

Analyses of soil samples taken from the background locations had Ra-226 concentrations ranging from 0.7 to 2 pCi/g and a mean of 1.2 ± 0.4 pCi/g, Th concentrations ranging from 1 to 9.9 ppm and a mean of 5.4 ± 2.8 ppm, and K concentrations ranging from 1.3 to 1.8 percent and a mean of 1.4 ± 0.3 percent. For purposes of determining areas containing 5 pCi (eRa-226)/g above background, a background concentration of 1 pCi (eRa-226)/g can be used.

5.0 SUMMARY

Arroyo contamination consisting of windblown and water-transported tailings is the most widespread and problematic contamination at the Mexican Hat site. Spotty contamination is present in the bottom of arroyos from the north, northeast, and east edges of the tailings piles to their confluence with Gypsum Wash, approximately 2200 ft downstream from the lower pile. The contamination consists of elongated sand bars ranging in thickness from 6 in. to approximately 2 ft. This material contains eRa-226 concentrations greater than the EPA standard of 5 pCi/g above background.

Surface windblown contamination is widespread to the northeast and east of the tailings piles; contamination exceeds 5 pCi(eRa-226)/g approximately 1000 ft north and approximately 800 ft east of the lower pile. Results show that most of this contamination does not extend below a depth of 6 in. To the south and west no windblown contamination exceeding 5 pCi(eRa-226)/g was found.

Contamination in the ore-storage and mill areas is spotty and, due to the shallow depth to bedrock, is generally shallow as well. This contamination consists of a variety of materials including tailings, uranium ore, and other buried debris. The deepest contamination occurs in an area surrounding the large concrete foundation of the old mill.

The sewage pond and arroyo area in the northwest portion of the site do not appear to contain contamination exceeding 5 pCi(eRa-226)/g except in and along the banks of the small arroyo draining to the north. Results of drilling indicate that near the head of the arroyo (near the upper pile) water-transported tailings contamination exceeding EPA standards is present to as much as 10.5 ft in depth. Farther to the north near U.S. Highway 163, the contamina-

tion is shallow (less than 1 ft), except for dozed material on the east bank of the arroyo where contaminated material has been piled to a thickness of approximately 4 ft.

Several buildings at the Mexican Hat site are salvageable or contain large amounts of salvageable materials which are not contaminated. The Halchita Health Clinic was found to be free of contamination and in good condition. The sheet metal shop (former lab building), which is now used for storage of insulation and building supplies, was also found to be uncontaminated and in good condition. An empty metal shed was found to contain minor contamination but it appears that most of this contamination is in the form of removable radioactive dust, and the building is in good condition. The long building formerly used as a trade school also appears to contain minor removable contamination. Although missing large areas of metal siding and roofing, this building contains a large amount of salvageable materials. The remaining buildings are either contaminated or have little salvage value.

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Appendix A

INSTRUMENT-PERFORMANCE FIELD CHECKS

Instrument-response field checks were performed on each instrument before use each day. These checks were performed in an area near the motel in Mexican Hat at which the radiologic-characterization field crew was housed.

Readings were recorded in the appropriate data book and plotted on a graph that displayed a history of previous field-check results and specified quality-control limits, which were established as two standard deviations (2σ) from the mean of the previous readings. Readings which fell outside these limits were repeated to determine if they were the result of an instrumentation problem or of the statistical probability that approximately 5 percent could be expected to fall outside these specified limits. Values used for the mean and standard deviation were based on field-check data accumulated during the previous site characterizations.

For field-checking the Bendix delta-gamma units, a field-check source fixture held both the detector and a uranium-button source in a fixed geometry while a 100-second UP count was collected. The source was then removed to a point beyond its range of influence, and a 100-second DOWN count was collected. The resulting delta count was recorded in the appropriate data book, plotted on the graph, and checked for compliance with the 2-sigma quality-control limits.

A calibration jig was used for field-checking the portable spectrometers. A 240-second background count was followed by successive 240-second counts with a uranium-button source and a thorium-button source. The uranium source provided test counts in the K and gross-count channels as well as in the U channel, and the thorium source provided a test of the Th channel. Background counts in each channel were subtracted from the source counts, and net counts were recorded in the appropriate data book. Again, the counts were plotted and checked for compliance with quality-control limits.

For field-checking the Reuter-Stokes pressurized ionization chamber (PIC), a small source-holding fixture mounted permanently to the detector housing was used. A background reading was obtained using a built-in integrator to determine the average exposure-rate in μR/h over a 90-second interval. Following determination of background exposure rate, a radium button source was placed in the source-holding fixture and the average exposure rate over a 90-second interval was again determined. The background rate was subtracted from this second rate to determine the net exposure rate from the source. The rate was recorded in the appropriate data book and checked for compliance with quality-control limits. To monitor PIC performance at two different exposure levels, the procedure was repeated using 1-μCi and 10-μCi check sources.

Appendix B

ANALYTICAL DATA FOR SOIL SAMPLES

Table B-1 presents gamma-ray-spectroscopy data for the soil samples collected. The analytical uncertainties are reported at the two-standard-deviation (2σ) level. Radium, thorium, and potassium values represent equivalent concentrations. The MHD numbers in the table are sample numbers. The depth indicated refers to the top of a 6-inch sample interval. The borehole number is included for those samples taken from borehole locations. A less-than sign (<) indicates the value is below the detection limits of the analytical instrument being used.

Table B-1

Gamma-Ray-Spectroscopy Data for Soil Samples

Grid Coordinates		Depth	Borehole	MHD	Concentration		
North	East	(in.)	No.	No.	Ra-226 (pCi/g)	Thorium (ppm)	Potassium (%)
11800	11600	0		198	2 ± 1	5 ± 1	2.1 ± 0.5
11600	11600	0		197	3 ± 1	< 2 ± 0	0.9 ± 0.2
11600	12000	0		200	4 ± 1	4 ± 1	1.1 ± 0.3
11400	11200	0		192	8 ± 1	11 ± 2	1.4 ± 0.3
11400	11600	0		196	6 ± 1	< 2 ± 0	1.0 ± 0.2
11202	11600	0		195	6 ± 1	< 2 ± 0	0.8 ± 0.2
11200	10800	0		189	7 ± 1	9 ± 2	1.1 ± 0.3
11200	11200	0		193	6 ± 1	6 ± 2	1.5 ± 0.3
11200	12000	0		199	10 ± 1	< 2 ± 0	1.2 ± 0.3
11000	10400	0		188	5 ± 1	6 ± 2	0.9 ± 0.2
11000	10802	0		190	5 ± 1	6 ± 2	1.1 ± 0.2
11000	11200	0		194	8 ± 1	8 ± 2	2.1 ± 0.5
10800	9000	0		131	1 ± 1	9 ± 2	1.7 ± 0.4
10800	9400	0		132	2 ± 1	4 ± 1	1.4 ± 0.4
10800	10000	0		184	2 ± 1	4 ± 1	1.0 ± 0.2
10800	10400	0		187	3 ± 1	7 ± 2	1.3 ± 0.3
10800	10800	0		191	6 ± 1	7 ± 2	1.0 ± 0.2
10800	11600	0		144	35 ± 2	15 ± 4	1.1 ± 0.3
10800	12400	0		152	7 ± 1	4 ± 2	1.1 ± 0.3
10800	12800	0		153	4 ± 1	6 ± 2	1.5 ± 0.3
10600	8200	0		311	15 ± 1	19 ± 3	1.0 ± 0.2
10600	9000	0		130	2 ± 1	6 ± 1	1.0 ± 0.3
10600	9400	0		183	2 ± 1	7 ± 2	1.3 ± 0.3
10600	9600	0		133	2 ± 1	10 ± 2	1.8 ± 0.4
10600	10400	0		185	100 ± 5	< 3 ± 0	1.0 ± 0.3
10600	10400	6		186	64 ± 4	< 3 ± 0	0.8 ± 0.2
10600	10800	0		141	16 ± 1	< 2 ± 0	1.1 ± 0.3
10600	11200	0		142	31 ± 2	< 2 ± 0	0.9 ± 0.3
10600	11600	0		143	16 ± 1	< 2 ± 0	1.3 ± 0.3
10446	11063	0	158	591	139 ± 9	< 4 ± 0	< 0.6 ± 0.0

Table B-1 (continued)

Grid Coordinates North	Grid Coordinates East	Depth (in.)	Borehole No.	MHD No.	Concentration Ra-226 (pCi/g)	Concentration Thorium (ppm)	Concentration Potassium (%)
10400	8000	0		576	3 ± 1	5 ± 1	2.1 ± 0.2
10400	8200	0		307	24 ± 1	< 3 ± 0	0.9 ± 0.2
10400	8200	6		308	53 ± 3	< 3 ± 0	1.1 ± 0.3
10400	8200	12		309	39 ± 2	< 3 ± 0	0.9 ± 0.2
10400	8200	18		310	34 ± 2	< 3 ± 0	0.8 ± 0.2
10400	8400	0		306	2 ± 1	< 2 ± 0	1.0 ± 0.3
10400	8800	0		128	2 ± 1	9 ± 2	1.4 ± 0.4
10400	9000	0		129	3 ± 1	7 ± 1	1.3 ± 0.4
10400	9400	0		182	2 ± 1	6 ± 2	1.2 ± 0.3
10400	10000	0		138	3 ± 1	7 ± 2	1.1 ± 0.3
10400	10400	0		139	12 ± 1	9 ± 2	1.4 ± 0.3
10400	10800	0		140	28 ± 2	< 2 ± 0	1.1 ± 0.3
10400	11200	0		145	132 ± 6	< 4 ± 0	0.6 ± 0.2
10400	11600	0		147	37 ± 2	14 ± 4	1.4 ± 0.4
10350	8173	0	71	560	18 ± 1	9 ± 3	1.5 ± 0.3
10320	10788	0	157	590	81 ± 5	< 3 ± 0	< 0.6 ± 0.0
10263	10614	0	156	589	79 ± 5	22 ± 3	1.5 ± 0.2
10223	11088	0	159	592	226 ± 15	< 5 ± 0	< 0.6 ± 0.0
10200	8000	0		283	5 ± 1	< 1 ± 0	1.4 ± 0.3
10200	8100	0	72	562	8 ± 1	< 1 ± 0	0.8 ± 0.2
10200	8400	0		305	2 ± 1	9 ± 2	2.3 ± 0.5
10200	9000	0		126	3 ± 1	4 ± 1	1.3 ± 0.4
10200	9400	0		181	3 ± 1	5 ± 2	1.3 ± 0.3
10200	9800	0		136	4 ± 1	10 ± 2	1.7 ± 0.4
10200	10000	0		137	11 ± 1	18 ± 3	0.9 ± 0.4
10200	11600	0		149	38 ± 2	< 2 ± 0	1.2 ± 0.3
10200	11800	0		146	110 ± 6	< 3 ± 0	0.9 ± 0.3
10200	11800	6		148	166 ± 8	45 ± 9	0.9 ± 0.3
10200	11800	12		150	171 ± 8	< 4 ± 0	0.9 ± 0.3
10200	12000	0		154	12 ± 1	12 ± 3	1.8 ± 0.4
10200	12200	0		155	9 ± 1	< 2 ± 0	1.5 ± 0.4
10200	12400	0		156	4 ± 1	< 2 ± 0	1.2 ± 0.3
10200	12600	0		157	6 ± 1	< 2 ± 0	1.3 ± 0.3
10200	12800	0		158	8 ± 1	9 ± 2	0.6 ± 0.2
10159	10478	0	155	586	20 ± 1	8 ± 2	1.6 ± 0.2
10152	9290	0	125	605	369 ± 18	< 6 ± 0	0.8 ± 0.3
10109	10340	0	154	588	41 ± 1	13 ± 2	2.3 ± 0.2
10108	11416	0	161	594	22 ± 2	< 2 ± 0	1.3 ± 0.3
10107	11416	0	160	593	164 ± 8	< 5 ± 0	< 0.7 ± 0.0
10105	11302	0	177	613	167 ± 8	45 ± 9	< 0.3 ± 0.0
10050	8100	0	73	561	2 ± 1	5 ± 2	1.3 ± 0.3
10012	11622	0	179	597	168 ± 8	< 5 ± 0	< 0.7 ± 0.0
10000	7800	0		282	1 ± 1	3 ± 1	1.2 ± 0.3
10000	8100	0	73	559	19 ± 1	< 2 ± 0	1.2 ± 0.3
10000	8300	0		284	2 ± 1	7 ± 2	1.1 ± 0.3
10000	8500	0		281	3 ± 1	6 ± 1	1.2 ± 0.3
10000	8700	0		280	1 ± 1	4 ± 2	1.0 ± 0.3

Table B-1 (continued)

Grid Coordinates North	Grid Coordinates East	Depth (in.)	Borehole No.	MHD No.	Concentration Ra-226 (pCi/g)	Concentration Thorium (ppm)	Concentration Potassium (%)
10000	8900	0		127	3 ± 1	4 ± 1	1.1 ± 0.4
10000	9200	0		176	535 ± 21	< 5 ± 0	1.2 ± 0.2
10000	9200	6		177	437 ± 17	< 5 ± 0	1.0 ± 0.2
10000	9200	12		178	504 ± 18	< 5 ± 0	0.7 ± 0.1
10000	9200	18		179	458 ± 18	< 11 ± 0	0.9 ± 0.5
10000	9400	0		180	4 ± 1	8 ± 2	1.8 ± 0.4
10000	9600	0		134	11 ± 1	17 ± 3	1.5 ± 0.4
10000	9800	0		135	9 ± 1	22 ± 3	2.6 ± 0.5
9999	10095	0	153	585	7 ± 1	12 ± 2	3.2 ± 0.3
9998	11407	0	178	610	239 ± 12	< 5 ± 0	0.8 ± 0.3
9960	9246	0	124	604	676 ± 33	< 7 ± 0	< 0.4 ± 0.0
9957	11511	0	180	611	217 ± 10	52 ± 11	< 0.3 ± 0.0
9907	9847	0	152	587	15 ± 1	19 ± 2	2.3 ± 0.2
9900	8000	0	74	563	3 ± 1	4 ± 1	1.4 ± 0.4
9900	8100	0	75	558	31 ± 2	69 ± 7	1.3 ± 0.3
9818	11533	0	163	612	198 ± 9	< 5 ± 0	0.7 ± 0.3
9807	9149	0	102	550	50 ± 3	< 3 ± 0	1.4 ± 0.4
9801	9638	0	151	570	39 ± 3	17 ± 3	1.4 ± 0.5
9800	7700	0	76	609	1 ± 1	5 ± 1	1.0 ± 0.2
9800	8100	0	77	557	153 ± 7	51 ± 10	< 0.3 ± 0.0
9800	8198	0	78	564	3 ± 1	6 ± 2	1.8 ± 0.4
9800	8500	0		304	3 ± 1	8 ± 2	1.3 ± 0.3
9800	8700	0		303	1 ± 1	5 ± 1	1.4 ± 0.3
9800	8990	0	101	549	88 ± 5	324 ± 19	0.8 ± 0.2
9800	11800	0		201	34 ± 3	< 3 ± 0	0.8 ± 0.2
9800	12000	0		163	23 ± 1	12 ± 2	1.4 ± 0.2
9800	12200	0		161	22 ± 1	< 3 ± 0	1.0 ± 0.2
9800	12400	0		160	7 ± 1	10 ± 2	1.3 ± 0.3
9800	12600	0		159	3 ± 1	8 ± 2	1.3 ± 0.3
9762	9322	0	103	566	194 ± 11	47 ± 8	1.1 ± 0.4
9700	8100	0	79	565	3 ± 1	7 ± 1	1.1 ± 0.4
9700	8200	0	80	556	13 ± 1	10 ± 3	0.9 ± 0.2
9700	8300	0	81	555	37 ± 2	< 2 ± 0	1.1 ± 0.3
9700	8600	0	82	554	15 ± 1	11 ± 3	1.2 ± 0.3
9697	11614	0	164	595	21 ± 1	< 3 ± 0	1.9 ± 0.4
9652	9489	0	104	567	303 ± 17	85 ± 12	1.3 ± 0.5
9642	8775	0	123	572	12 ± 1	6 ± 2	1.5 ± 0.4
9600	8200	0	83	553	277 ± 13	< 5 ± 0	1.0 ± 0.4
9600	8300	0		577	3 ± 1	5 ± 1	1.5 ± 0.1
9600	8500	0		225	2 ± 1	5 ± 1	1.4 ± 0.1
9600	8700	0		302	3 ± 1	4 ± 2	1.4 ± 0.3
9538	11662	0	165	596	64 ± 5	38 ± 6	0.9 ± 0.3
9530	9648	0	105	568	300 ± 18	168 ± 17	0.6 ± 0.4
9410	8490	0	111	607	4 ± 1	6 ± 2	1.3 ± 0.3
9400	8300	0	87	551	3 ± 1	6 ± 2	1.0 ± 0.2
9400	8600	0		224	6 ± 1	6 ± 1	1.8 ± 0.2
9400	9799	0	106	569	49 ± 3	9 ± 3	1.7 ± 0.4

Table B-1 (continued)

Grid Coordinates North	Grid Coordinates East	Depth (in.)	Borehole No.	MHD No.	Concentration Ra-226 (pCi/g)	Concentration Thorium (ppm)	Concentration Potassium (%)
9400	11800	0		165	9 ± 1	10 ± 2	1.9 ± 0.2
9400	12200	0		167	7 ± 1	10 ± 2	2.7 ± 0.2
9400	12600	0		171	5 ± 1	8 ± 1	1.5 ± 0.2
9390	8200	0	86	552	482 ± 24	< 7 ± 0	< 0.4 ± 0.0
9373	8783	0	122	573	789 ± 29	< 13 ± 0	1.7 ± 0.6
9280	7520	0	88	548	1 ± 1	< 2 ± 0	0.7 ± 0.2
9240	7400	0		270	1 ± 1	5 ± 1	1.5 ± 0.4
9208	9849	0	107	571	199 ± 10	88 ± 11	1.4 ± 0.4
9200	7900	0	11	501	32 ± 2	< 3 ± 0	1.2 ± 0.3
9200	8500	0	14	504	29 ± 2	< 2 ± 0	0.6 ± 0.2
9200	12000	0		169	6 ± 1	7 ± 1	1.6 ± 0.2
9200	12400	0		170	5 ± 1	9 ± 1	2.2 ± 0.2
9199	11424	0	166	598	59 ± 4	15 ± 4	0.5 ± 0.2
9163	8790	0	121	574	9 ± 1	7 ± 2	2.9 ± 0.5
9104	11372	0	167	599	198 ± 11	< 5 ± 0	< 0.7 ± 0.0
9095	10924	0	170	602	241 ± 14	< 5 ± 0	< 0.7 ± 0.0
9014	8836	0	120	575	302 ± 17	< 9 ± 0	1.6 ± 0.5
9010	8100	0	12	502	5 ± 1	< 2 ± 0	1.0 ± 0.3
9008	8500	0	17	507	11 ± 1	< 2 ± 0	0.6 ± 0.2
9004	9074	0	119	580	5 ± 1	13 ± 2	1.8 ± 0.2
9000	7600	0		268	3 ± 1	5 ± 1	1.3 ± 0.4
9000	7800	0		221	4 ± 1	4 ± 1	0.9 ± 0.2
9000	7900	0	15	509	2 ± 1	4 ± 1	1.5 ± 0.4
9000	8100	0	16	508	16 ± 2	< 2 ± 0	0.9 ± 0.2
9000	8500	0	18	506	75 ± 5	< 3 ± 0	0.5 ± 0.2
9000	8700	0	19	505	87 ± 5	< 4 ± 0	< 0.6 ± 0.0
9000	11600	0		168	3 ± 1	9 ± 1	1.8 ± 0.2
9000	11800	0		266	11 ± 1	10 ± 2	1.1 ± 0.3
9000	12200	0		173	5 ± 1	8 ± 1	1.9 ± 0.2
8990	8300	0	13	503	15 ± 2	< 2 ± 0	0.5 ± 0.2
8978	11269	0	168	600	155 ± 8	< 5 ± 0	0.2 ± 0.1
8945	10732	0	171	603	321 ± 16	316 ± 21	< 0.7 ± 0.0
8922	11004	0	169	601	111 ± 5	223 ± 15	< 0.7 ± 0.0
8900	8100	0	20	510	11 ± 1	4 ± 1	1.0 ± 0.4
8900	8200	0	21	511	3 ± 1	6 ± 1	1.6 ± 0.4
8900	8425	0	22	512	30 ± 2	24 ± 4	1.7 ± 0.4
8852	8980	0	118	581	3 ± 1	10 ± 1	2.8 ± 0.3
8800	7200	0		222	1 ± 1	5 ± 1	1.1 ± 0.3
8800	7600	0		267	2 ± 1	7 ± 2	2.0 ± 0.4
8800	7800	0		220	2 ± 1	8 ± 2	1.6 ± 0.4
8800	7920	0	23	514	7 ± 1	6 ± 2	1.5 ± 0.4
8800	8100	0	24	513	11 ± 1	5 ± 1	1.5 ± 0.4
8800	8200	0	25	515	7 ± 1	8 ± 2	1.3 ± 0.4
8800	8420	0	26	516	126 ± 6	42 ± 7	2.0 ± 0.5
8800	8700	0	27	543	114 ± 8	< 4 ± 0	< 0.6 ± 0.0
8800	8900	0	28	542	10 ± 1	< 2 ± 0	1.7 ± 0.4
8800	10800	0		276	2 ± 1	8 ± 2	0.9 ± 0.2

Table B-1 (continued)

Grid Coordinates North	Grid Coordinates East	Depth (in.)	Borehole No.	MHD No.	Concentration Ra-226 (pCi/g)	Concentration Thorium (ppm)	Concentration Potassium (%)
8800	11000	0		230	2 ± 1	10 ± 2	2.1 ± 0.5
8800	11200	0		229	3 ± 1	7 ± 2	1.9 ± 0.4
8800	11400	0		226	7 ± 1	10 ± 1	1.3 ± 0.1
8800	11600	0		175	6 ± 1	7 ± 1	1.9 ± 0.2
8800	11800	0		265	5 ± 1	7 ± 2	0.9 ± 0.2
8790	7400	0		271	4 ± 1	8 ± 2	1.8 ± 0.4
8734	9097	0	117	582	7 ± 1	17 ± 2	2.3 ± 0.2
8700	7300	0	29	547	2 ± 1	< 2 ± 0	0.6 ± 0.2
8700	7700	0	30	608	1 ± 1	4 ± 1	0.8 ± 0.2
8700	8200	0	31	520	22 ± 2	6 ± 2	1.3 ± 0.4
8642	9559	0	110	606	3 ± 1	9 ± 2	1.1 ± 0.3
8600	7200	0		223	1 ± 1	4 ± 1	1.0 ± 0.1
8600	7400	0		272	1 ± 1	6 ± 1	1.5 ± 0.4
8600	7600	0		269	3 ± 1	6 ± 1	1.4 ± 0.4
8600	7800	0		219	2 ± 1	6 ± 2	1.3 ± 0.3
8600	7900	0	32	522	132 ± 10	< 7 ± 0	1.4 ± 0.4
8600	8100	0	33	521	127 ± 9	< 8 ± 0	1.3 ± 0.4
8600	8400	0	34	519	192 ± 15	32 ± 7	1.5 ± 0.5
8600	8500	0	35	518	76 ± 4	35 ± 6	1.6 ± 0.4
8600	8700	0	36	517	38 ± 2	8 ± 2	1.7 ± 0.4
8600	9008	0	116	583	20 ± 1	317 ± 16	1.9 ± 0.2
8600	10000	0		238	4 ± 1	5 ± 2	1.0 ± 0.2
8600	10400	0		239	5 ± 1	9 ± 2	< 0.5 ± 0.0
8600	10800	0		228	2 ± 1	14 ± 2	2.5 ± 0.5
8600	11200	0		227	4 ± 1	9 ± 2	1.9 ± 0.4
8590	8900	0	37	544	58 ± 4	194 ± 15	1.1 ± 0.3
8500	8200	0	39	523	103 ± 8	22 ± 3	1.7 ± 0.2
8490	7700	0	38	524	6 ± 1	7 ± 1	2.4 ± 0.2
8442	8964	0	115	584	50 ± 5	1384 ± 135	< 1.5 ± 0.0
8400	7400	0		273	43 ± 3	14 ± 3	1.2 ± 0.4
8400	7600	0		264	2 ± 1	5 ± 2	0.9 ± 0.2
8400	7800	0		218	37 ± 3	< 3 ± 0	< 0.6 ± 0.0
8400	7900	0	40	525	73 ± 5	< 3 ± 0	1.9 ± 0.2
8400	8100	0	41	526	120 ± 9	13 ± 3	1.7 ± 0.2
8400	8300	0	42	527	89 ± 6	109 ± 9	1.5 ± 0.2
8400	8500	0	43	528	40 ± 2	7 ± 2	1.6 ± 0.2
8400	8700	0	44	529	28 ± 1	10 ± 2	1.6 ± 0.2
8400	8800	0		210	112 ± 7	35 ± 7	1.3 ± 0.5
8400	8800	6		211	40 ± 3	10 ± 3	1.1 ± 0.4
8400	9600	0		241	3 ± 1	13 ± 2	1.3 ± 0.3
8400	10000	0		237	1 ± 1	6 ± 2	1.5 ± 0.4
8400	10400	0		234	2 ± 1	8 ± 2	1.6 ± 0.4
8300	7500	0	45	540	6 ± 1	< 2 ± 0	0.9 ± 0.2
8300	7500	0	45	541	2 ± 1	3 ± 1	1.3 ± 0.3
8300	7700	0	46	539	19 ± 1	< 2 ± 0	1.1 ± 0.3
8200	7200	0		278	1 ± 1	8 ± 2	1.3 ± 0.3
8200	7400	0		274	3 ± 1	8 ± 2	1.5 ± 0.4

Table B-1 (continued)

Grid Coordinates North	Grid Coordinates East	Depth (in.)	Borehole No.	MHD No.	Concentration Ra-226 (pCi/g)	Concentration Thorium (ppm)	Concentration Potassium (%)
8200	7600	0		263	2 ± 1	7 ± 2	1.1 ± 0.3
8200	7800	0		217	7 ± 1	< 2 ± 0	1.0 ± 0.2
8200	8100	0	47	533	363 ± 29	171 ± 16	1.2 ± 0.2
8200	8300	0	49	531	53 ± 3	37 ± 4	1.6 ± 0.2
8200	8500	0	50	530	127 ± 12	14 ± 3	0.9 ± 0.1
8200	8600	0		215	5 ± 1	6 ± 2	0.7 ± 0.2
8200	8750	0	51	545	70 ± 4	< 3 ± 0	0.7 ± 0.2
8200	8800	0		249	13 ± 1	< 2 ± 0	1.0 ± 0.3
8200	8800	6		212	13 ± 1	8 ± 1	1.4 ± 0.2
8200	8800	12		214	17 ± 1	6 ± 1	1.5 ± 0.2
8200	9200	0		243	1 ± 1	< 2 ± 0	0.8 ± 0.2
8200	9600	0		240	2 ± 1	< 2 ± 0	0.7 ± 0.2
8200	10000	0		236	1 ± 1	9 ± 2	1.5 ± 0.3
8200	10400	0		235	2 ± 1	11 ± 2	1.8 ± 0.4
8185	8100	0	48	532	47 ± 4	11 ± 2	1.8 ± 0.2
8000	7200	0		277	1 ± 1	5 ± 2	1.5 ± 0.3
8000	7400	0		275	2 ± 1	4 ± 1	1.1 ± 0.3
8000	7600	0		261	42 ± 3	< 2 ± 0	1.1 ± 0.3
8000	7600	6		262	49 ± 3	< 3 ± 0	1.2 ± 0.3
8000	7800	0		216	11 ± 1	11 ± 3	1.0 ± 0.3
8000	7900	0	52	534	75 ± 4	13 ± 3	1.6 ± 0.2
8000	8100	0	53	535	33 ± 2	< 3 ± 0	0.5 ± 0.1
8000	8300	0	54	536	47 ± 3	46 ± 6	1.4 ± 0.3
8000	8400	0		279	122 ± 6	< 4 ± 0	1.1 ± 0.3
8000	8600	0		202	17 ± 1	9 ± 2	1.2 ± 0.3
8000	8800	0		248	3 ± 1	8 ± 2	1.0 ± 0.3
8000	9000	0		247	6 ± 1	9 ± 2	1.2 ± 0.3
8000	9200	0		242	5 ± 1	7 ± 2	1.2 ± 0.3
7800	7400	0		258	1 ± 1	6 ± 2	1.1 ± 0.3
7800	7600	0		259	75 ± 4	< 3 ± 0	1.0 ± 0.3
7800	7600	6		260	27 ± 2	< 2 ± 0	1.2 ± 0.3
7800	7800	0		256	54 ± 3	< 3 ± 0	1.4 ± 0.3
7800	7800	6		257	8 ± 1	7 ± 2	1.6 ± 0.4
7800	7900	0	55	546	29 ± 2	31 ± 5	1.1 ± 0.3
7800	8000	0		255	3 ± 1	3 ± 1	1.0 ± 0.2
7800	8100	0	56	538	54 ± 4	< 3 ± 0	0.8 ± 0.2
7800	8200	0		252	106 ± 6	138 ± 11	< 0.7 ± 0.0
7800	8200	6		254	8 ± 1	< 2 ± 0	1.7 ± 0.4
7800	8300	0	57	537	252 ± 16	476 ± 33	< 0.7 ± 0.0
7800	8400	0		251	26 ± 2	16 ± 3	0.6 ± 0.2
7800	8600	0		253	71 ± 6	39 ± 6	1.7 ± 0.4
7800	8800	0		246	2 ± 1	< 2 ± 0	1.3 ± 0.3
7800	9000	0		245	1 ± 1	7 ± 2	0.8 ± 0.2
7800	9200	0		244	5 ± 1	7 ± 2	1.3 ± 0.3
7600	7635	0		207	3 ± 1	< 2 ± 0	1.2 ± 0.3
7600	7635	6		208	21 ± 2	< 6 ± 0	1.4 ± 0.4
7600	7635	12		209	10 ± 1	5 ± 1	1.5 ± 0.2

Table B-1 (continued)

Grid Coordinates North	Grid Coordinates East	Depth (in.)	Borehole No.	MHD No.	Concentration Ra-226 (pCi/g)	Concentration Thorium (ppm)	Concentration Potassium (%)
7600	7800	0		206	2 ± 1	< 2 ± 0	1.3 ± 0.3
7600	8000	0		205	2 ± 1	4 ± 1	1.1 ± 0.3
7600	8200	0		204	5 ± 1	12 ± 2	< 0.6 ± 0.0
7600	8400	0		250	285 ± 16	857 ± 51	< 0.7 ± 0.0
7600	8400	6		203	129 ± 10	399 ± 32	1.6 ± 0.4

Table B-2

Loss-On-Drying Results

Sample Number	LOD (%)	Sample Number	LOD (%)
MHD 101	1.21	MHD 191	0.62
MHD 102	0.57	MHD 199	0.63
MHD 103	1.21	MHD 212	1.13
MHD 104	1.71	MHD 227	1.38
MHD 105	2.52	MHD 238	0.84
MHD 106	5.08	MHD 249	1.23
MHD 107	4.21	MHD 260	2.65
MHD 108	3.66	MHD 268	1.24
MHD 109	4.15	MHD 277	0.68
MHD 110	3.47	MHD 304	1.61
MHD 111	2.33	MHD 504	2.46
MHD 112	3.06	MHD 512	5.04
MHD 113	6.96	MHD 524	2.08
MHD 114	3.06	MHD 535	1.48
MHD 115	2.34	MHD 538	1.33
MHD 117	2.48	MHD 552	3.27
MHD 126	2.01	MHD 560	1.24
MHD 129	0.52	MHD 574	2.43
MHD 143	1.12	MHD 583	5.09
MHD 155	0.80	MHD 589	0.89
MHD 178	6.26	MHD 599	0.68
MHD 183	0.95	MHD 608	1.91

APPENDIX C

DUPLICATE ANALYTICAL RESULTS

Table C-1 presents duplicate gamma-ray-spectroscopic analytical results for splits of approximately 10 percent of the soil samples collected. Radium, thorium, and potassium values represent equivalent concentrations. Table C-2 presents a comparison of the Ra-226 content in the soil sample (MHD) and the corresponding split (MBG). A less-than sign (<) indicates that the minimum detection limit based on Compton background was reached. A question mark (?) indicates that the analysis is semiquantitative due to a low count rate.

Table C-1

Duplicate Gamma-Ray-Spectroscopy Analytical Results

Sample Number	Ra-226 (pCi/g)	Error	Th (ppm)	Error	K (%)	Error
MBG-601	2.3	± 1.0	4.4	± 1.8	1.2	± 0.3
MBG-602	2.3	± 1.0	5.9	± 1.6	1.0	± 0.2
MBG-603	27.2	± 1.6	8.8	± 2.9	1.1	± 0.3
MBG-604	6.6	± 1.0	10.4	± 2.4	1.5	± 0.3
MBG-605	4.6	± 1.0	8.7	± 2.2	1.5	± 0.3
MBG-606	7.6	± 1.0	10.9	± 2.5	1.2	± 0.3
MBG-607	10.3	± 1.0	5.2	± 2.2	1.3	± 0.3
MBG-608	11.0	± 1.0	< 1.5	± 0.0	1.2	± 0.3
MBG-609	1.7	± 1.0	7.6	± 2.0	1.4	± 0.3
MBG-610	2.5	± 1.0	7.7	± 2.2	1.3	± 0.3
MBG-611	1.2	± 1.0	8.5	± 2.0	1.1	± 0.3
MBG-612	2.2	± 1.0	11.5	± 2.0	1.8	± 0.4
MBG-613	8.7	± 1.0	? 5.9	± 1.6	2.2	± 0.5
MBG-614	2.0	± 1.0	? 7.3	± 1.6	1.2	± 0.4
MBG-615	2.0	± 1.0	? 5.7	± 1.4	1.2	± 0.4
MBG-616	18.4	± 1.8	? 6.3	± 1.8	1.3	± 0.4
MBG-617	74.5	± 3.1	35.0	± 5.7	1.7	± 0.4
MBG-618	41.6	± 2.4	? 7.8	± 2.4	1.5	± 0.4
MBG-619	4.6	± 1.0	? 4.0	± 1.0	1.7	± 0.4
MBG-620	39.7	± 2.2	< 7.2	± 0.0	1.5	± 0.4
MBG-621	67.6	± 4.3	< 7.1	± 0.0	1.5	± 0.4
MBG-622	? 1.0	± 1.0	? 7.4	± 1.6	1.2	± 0.4
MBG-623	31.8	± 1.6	59.5	± 6.3	? 0.8	± 0.2
MBG-624	297.3	± 14.9	110.4	± 12.3	< 0.7	± 0.0
MBG-625	1.0	± 1.0	? 3.0	± 1.4	? 1.0	± 0.2
MBG-626	38.1	± 2.5	< 2.7	± 0.0	1.2	± 0.3
MBG-627	179.8	± 9.8	< 4.6	± 0.0	< 0.7	± 0.0

All errors reported in Table C-2 are expected analytical errors at 2σ. One sample showed a difference greater than expected. Re-analysis of this data set showed no significant change in either value. This difference is attributed to sample preparation.

Table C-2

Comparison of Radium Results Between Samples and Corresponding Splits

Sample Number	Ra-226 (pCi/g)	Duplicate Sample Number	Ra-226 (pCi/g)
MHD-126	2.5 ± 1.0	MBG-601	2.3 ± 1.0
MHD-132	2.2 ± 1.0	MBG-602	2.3 ± 1.0
MHD-140	28.3 ± 1.6	MBG-603	27.2 ± 1.6
MHD-160	6.5 ± 1.0	MBG-604	6.6 ± 1.0
MHD-173	4.8 ± 1.0	MBG-605	4.6 ± 1.0
MHD-189	7.4 ± 1.0	MBG-606	7.6 ± 1.0
MHD-199	9.6 ± 1.0	MBG-607	10.3 ± 1.0
MHD-209	10.1 ± 1.0	MBG-608	11.0 ± 1.0
MHD-219	1.9 ± 1.0	MBG-609	1.7 ± 1.0
MHD-229	2.8 ± 1.0	MBG-610	2.5 ± 1.0
MHD-245	.9 ± 1.0	MBG-611	1.2 ± 1.0
MHD-235	2.2 ± 1.0	MBG-612	2.2 ± 1.0
MHD-257	8.0 ± 1.0	MBG-613	8.7 ± 1.0
MHD-264	2.2 ± 1.0	MBG-614	2.0 ± 1.0
MHD-275	2.0 ± 1.0	MBG-615	2.0 ± 1.0
MHD-508	16.0 ± 1.6	MBG-616	18.4 ± 1.8
MHD-518	75.7 ± 3.7	MBG-617	74.5 ± 3.1
MHD-528	39.3 ± 2.2	MBG-618	41.6 ± 2.4
MHD-283	4.9 ± 1.0	MBG-619	4.6 ± 1.0
MHD-309	39.0 ± 1.0	MBG-620	39.7 ± 2.2
MHD-538	54.4 ± 3.7	MBG-621	67.6 ± 4.3
MHD-548	1.0 ± 1.0	MBG-622	1.0 ± 1.0
MHD-558	30.6 ± 1.0	MBG-623	31.8 ± 1.6
MHD-568	299.9 ± 18.4	MBG-624	297.3 ± 14.6
MHD-578	1.1 ± 1.0	MBG-625	1.0 ± 1.0
MHD-588	40.7 ± 1.4	MBG-626	38.1 ± 2.5
MHD-613	167.0 ± 7.8	MBG-627	179.8 ± 9.8

Appendix D

DELTA-GAMMA RADIUM MEASUREMENT DATA

Table D-1 presents results of the in-situ delta-gamma radium measurements. The two-standard-deviation (2σ) error reported in this table reflects only the uncertainty in the counting statistics; it does not include errors introduced through the use of a calibration factor and three correction factors. These data were generated using the computer program DELTCALC.BAS, Version 1.1. Radium values represent equivalent concentrations.

Table D-1

In-Situ Delta-Gamma Radium Measurement Results

Coordinates North	Coordinates East	Depth (in.)	eRa-226 (pCi/g)
11600	11600	0	2.3 ± 0.8
11600	11600	6	0.3 ± 0.6
11600	12000	6	0.9 ± 0.8
11400	12450	0	95.8 ± 3.0
11400	12450	6	131.5 ± 4.0
11400	12450	12	65.8 ± 3.6
11400	12450	15	28.1 ± 4.5
11275	12325	0	39.3 ± 1.8
11275	12325	6	2.4 ± 1.4
11202	11600	6	1.7 ± 0.7
11200	10800	6	0.6 ± 0.7
11200	11200	6	0.4 ± 0.7
11200	12000	6	2.3 ± 1.0
11090	12225	0	6.1 ± 1.4
11090	12225	6	1.1 ± 0.9
11000	10400	0	3.7 ± 0.8
11000	10400	6	0.7 ± 0.8
10925	12125	0	37.1 ± 2.4
10925	12125	6	4.2 ± 1.8
10900	11650	0	3.8 ± 1.2
10850	11475	0	31.4 ± 2.2
10850	11475	6	4.0 ± 1.7
10825	11825	0	22.8 ± 1.4
10825	11825	6	31.0 ± 1.9
10825	11825	12	39.8 ± 2.4
10825	11825	18	11.1 ± 2.3
10800	9400	6	0.5 ± 0.6
10800	10000	6	0.9 ± 0.8
10800	10800	6	0.3 ± 0.7
10800	11300	0	41.3 ± 2.7
10800	11300	6	2.9 ± 1.6
10800	11600	6	2.4 ± 1.3
10800	12000	0	10.8 ± 1.5
10800	12000	6	* 0.6
10800	12400	6	0.4 ± 0.7
10800	12800	6	0.6 ± 0.7
10775	11100	0	45.3 ± 1.9
10775	11100	6	41.3 ± 2.7
10775	11100	12	5.4 ± 1.9
10775	11100	14	1.8 ± 2.1
10775	12125	0	69.7 ± 3.0
10775	12125	6	4.6 ± 2.2
10725	10750	0	59.6 ± 2.3
10725	10750	6	38.8 ± 2.9
10725	10750	12	2.1 ± 1.7
10700	10575	0	55.4 ± 2.5
10700	10575	6	4.5 ± 1.9
10700	10575	12	2.2 ± 1.2
10700	10925	0	20.1 ± 1.5
10700	10925	6	1.5 ± 0.9
10650	12050	0	68.4 ± 3.1
10650	12050	6	32.0 ± 3.1
10600	8200	2	3.1 ± 0.9
10600	9000	6	2.6 ± 0.8
10600	9600	6	1.6 ± 0.9
10600	10400	6	15.8 ± 3.5
10600	10400	8	11.1 ± 3.3
10600	11200	6	0.7 ± 1.3
10550	10050	0	41.4 ± 2.1
10550	10050	4	6.7 ± 1.8
10525	9875	0	35.6 ± 2.2
10525	9875	6	16.0 ± 2.1
10525	9875	12	* 1.5
10525	11950	0	135.1 ± 3.9
10525	11950	6	78.4 ± 3.1

*There is at least 95 percent confidence that the true value is less than the measurement reported.

Table D-1 (continued)

Coordinates North	Coordinates East	Depth (in.)	eRa-226 (pCi/g)
10525	11950	10	10.8 ± 2.7
10500	10200	0	240.2 ± 4.5
10500	10200	6	278.1 ± 6.0
10500	10200	12	2.2 ± 4.1
10450	9700	0	12.8 ± 1.6
10450	9700	4	1.1 ± 1.2
10400	8000	6	0.7 ± 0.6
10400	8200	6	45.4 ± 2.1
10400	8200	12	24.1 ± 2.5
10400	8200	18	15.9 ± 2.6
10400	8200	24	4.1 ± 1.9
10400	8400	6	0.9 ± 0.8
10400	8800	6	0.7 ± 0.8
10400	9400	6	0.9 ± 0.7
10400	10400	6	1.5 ± 0.9
10400	10800	6	2.3 ± 1.3
10400	11600	6	3.6 ± 1.4
10325	11925	0	44.2 ± 2.5
10325	11925	6	59.0 ± 2.0
10325	11925	10	9.4 ± 2.3
10275	9650	0	143.6 ± 3.5
10275	9650	4	19.1 ± 2.5
10200	8000	6	0.8 ± 0.7
10200	8400	6	1.8 ± 0.9
10200	9000	6	1.0 ± 0.8
10200	10000	6	0.9 ± 1.0
10200	11600	6	2.3 ± 1.5
10200	11800	0	124.8 ± 3.8
10200	11800	6	224.1 ± 4.2
10200	11800	12	194.4 ± 5.4
10200	11800	15	115.8 ± 5.7
10200	12200	6	1.9 ± 1.0
10200	12600	4	* 0.3
10125	9575	0	155.9 ± 3.8
10125	9575	6	8.2 ± 2.4
10125	9575	10	5.4 ± 1.9
10059	12775	0	5.9 ± 1.1
10059	12775	6	0.7 ± 0.7
10010	12565	0	5.5 ± 1.2
10010	12565	3	0.6 ± 0.8
10000	7800	6	0.9 ± 0.7
10000	8300	6	2.2 ± 0.7
10000	8500	6	1.3 ± 0.8
10000	8700	6	1.1 ± 0.9
10000	8900	6	1.7 ± 0.9
10000	9200	6	510.8 ± 8.2
10000	9200	12	491.0 ± 7.2
10000	9200	18	493.3 ± 9.7
10000	9400	6	2.4 ± 0.8
10000	9600	6	2.7 ± 1.3
10000	9800	6	3.7 ± 1.4
9967	12390	0	16.6 ± 1.7
9967	12390	1	1.3 ± 1.3
9950	12150	0	13.5 ± 2.0
9950	12150	4	2.1 ± 1.2
9866	11994	0	19.1 ± 1.7
9866	11994	3	3.9 ± 1.5
9800	8500	6	1.8 ± 0.9
9800	8700	6	1.7 ± 0.9
9800	11800	0	11.2 ± 1.9
9800	11800	5	1.5 ± 1.1
9800	12200	5	0.5 ± 1.0
9800	12200	6	1.2 ± 1.0
9600	8300	2	1.2 ± 0.9
9600	8500	6	0.7 ± 0.7
9600	8700	6	0.4 ± 0.8
9600	12000	6	2.2 ± 1.2
9580	12580	0	23.3 ± 1.8
9580	12580	6	5.6 ± 1.4
9580	12580	8	2.0 ± 1.3
9450	12480	0	9.5 ± 1.3
9450	12480	6	1.8 ± 0.9
9400	8600	6	1.0 ± 0.9
9400	12000	6	1.0 ± 1.0
9400	12600	4	2.5 ± 0.8
9350	12350	0	6.3 ± 1.3
9350	12350	6	1.4 ± 0.8
9300	12175	0	13.7 ± 1.4
9300	12175	6	2.3 ± 1.2
9280	11980	0	20.4 ± 1.9
9280	11980	5	5.7 ± 1.3
9275	11800	0	4.0 ± 1.5
9240	7400	6	0.6 ± 0.7
9200	12000	6	* 0.2
9200	12400	6	3.0 ± 1.0
9000	7600	6	0.8 ± 0.7
9000	7800	6	0.7 ± 0.8
9000	11600	6	1.2 ± 0.8
9000	12200	6	0.3 ± 0.7
8800	7200	6	1.3 ± 0.7
8800	7600	6	2.0 ± 0.7
8800	7800	2	1.4 ± 0.7

*There is at least 95 percent confidence that the true value is less than the measurement reported.

Table D-1 (continued)

Coordinates North	Coordinates East	Depth (in.)	eRa-226 (pCi/g)
8800	11000	6	1.8 ± 0.9
8800	11400	6	2.4 ± 0.9
8800	11800	6	1.7 ± 0.9
8790	7400	6	1.4 ± 0.9
8600	7200	6	1.1 ± 0.7
8600	7400	6	1.0 ± 0.8
8600	7600	6	1.8 ± 0.9
8600	7800	6	0.7 ± 0.7
8600	10400	6	2.3 ± 1.3
8600	10800	6	2.9 ± 1.0
8600	11200	6	0.7 ± 0.7
8400	7200	6	1.0 ± 0.7
8400	7200	6	1.0 ± 0.8
8400	7400	6	1.8 ± 1.3
8400	7600	6	1.2 ± 0.8
8400	7800	6	1.8 ± 0.9
8400	8800	6	8.3 ± 1.7
8400	8800	8	1.9 ± 1.5
8400	9600	6	2.1 ± 1.0
8400	10000	6	4.2 ± 0.9
8400	10400	6	1.9 ± 0.7
8200	7200	6	2.0 ± 0.8
8200	7400	6	1.5 ± 0.9
8200	7600	6	* 0.1
8200	7800	6	1.3 ± 0.9
8200	8600	4	1.4 ± 0.8
8200	8800	6	14.3 ± 1.6
8200	8800	12	13.2 ± 1.6
8200	8800	18	1.6 ± 1.2
8200	9200	6	2.2 ± 1.0
8200	10000	6	1.0 ± 0.8
8200	10400	6	3.0 ± 0.8
8000	7200	6	1.0 ± 0.7
8000	7400	6	0.4 ± 0.6
8000	7600	6	21.6 ± 2.1
8000	7600	12	3.1 ± 1.7
8000	7800	6	2.5 ± 0.9
8000	8400	6	3.5 ± 2.2
8000	8600	6	2.9 ± 1.3
8000	9000	6	0.1 ± 0.7
8000	9600	6	1.1 ± 0.8
7800	7400	6	1.0 ± 0.8
7800	7600	6	14.0 ± 2.1
7800	7600	12	3.3 ± 1.6
7800	7800	6	5.7 ± 1.8
7800	7800	12	1.3 ± 1.5
7800	8000	6	0.2 ± 0.7
7800	8200	6	4.2 ± 1.7
7800	8200	12	2.7 ± 1.2
7800	8400	6	2.7 ± 1.3
7800	8800	6	1.7 ± 0.8
7800	9200	6	3.1 ± 0.8
7600	7635	6	13.7 ± 1.1
7600	7635	12	5.0 ± 1.4
7600	7635	18	2.8 ± 1.4
7600	7800	6	0.7 ± 0.6
7600	8000	6	0.9 ± 0.8
7600	8200	6	0.5 ± 0.7
7600	8400	6	16.4 ± 4.2
7600	8400	12	* 0.1

*There is at least 95 percent confidence that the true value is less than the measurement reported.

Table D-2

In-Situ Delta-Gamma Radium Measurement Results for Approximate Locations (N99999)

North	East	Depth (in.)	eRa-226(pCi/g)	Remarks
99999	1	0	2.2 ± 0.7	Background location BG-1
99999	2	0	1.6 ± 0.7	Background location BG-1
99999	3	0	1.0 ± 0.7	Background location BG-2b
99999	4	0	1.5 ± 0.7	Background location BG-2b
99999	5	0	1.3 ± 0.7	Background location BG-3
99999	6	0	1.1 ± 0.7	Background location BG-3
99999	7	0	1.1 ± 0.7	Background location BG-4
99999	8	0	1.2 ± 0.7	Background location BG-4
99999	9	0	11.7 ± 1.4	Arroyo- 200 ft downstream from N11400, E12450
99999	10	6	1.4 ± 0.9	Arroyo- 200 ft downstream from N11400, E12450
99999	11	0	13.2 ± 1.4	Arroyo- 400 ft downstream from N11400, E12450
99999	12	6	0.2 ± 0.9	Arroyo- 400 ft downstream from N11400, E12450
99999	13	0	14.7 ± 1.8	Arroyo- 600 ft downstream from N11400, E12450
99999	14	6	0.5 ± 0.9	Arroyo- 600 ft downstream from N11400, E12450
99999	15	0	8.6 ± 1.2	Arroyo- 800 ft downstream from N11400, E12450
99999	16	6	1.4 ± 0.9	Arroyo- 800 ft downstream from N11400, E12450
99999	17	0	0.6 ± 0.7	Arroyo-1000 ft downstream from N11400, E12450
99999	18	0	1.3 ± 0.7	Arroyo-1200 ft downstream from N11400, E12450
99999	19	0	10.0 ± 1.2	Arroyo-1400 ft downstream from N11400, E12450
99999	20	2	1.9 ± 0.9	Arroyo-1400 ft downstream from N11400, E12450
99999	21	0	2.9 ± 0.9	Arroyo-1600 ft downstream from N11400, E12450
99999	22	0	1.6 ± 0.8	Arroyo-1800 ft downstream from N11400, E12450
99999	23	0	51.7 ± 2.1	Arroyo- 200 ft downstream from N10600, E8200
99999	24	6	2.9 ± 1.6	Arroyo- 200 ft downstream from N10600, E8200
99999	25	0	2.9 ± 0.8	Arroyo- 400 ft downstream from N10600, E8200
99999	26	0	0.5 ± 0.6	Arroyo- 600 ft downstream from N10600, E8200
99999	27	0	0.8 ± 0.7	Arroyo- 800 ft downstream from N10600, E8200
99999	28	0	10.5 ± 1.3	Arroyo- 400 ft downstream from N10059, E12775
99999	29	6	4.8 ± 1.1	Arroyo- 400 ft downstream from N10059, E12775
99999	30	12	2.2 ± 1.0	Arroyo- 400 ft downstream from N10059, E12775
99999	31	0	4.4 ± 0.9	Arroyo- 600 ft downstream from N10059, E12775
99999	32	0	15.9 ± 1.3	Arroyo- 200 ft downstream from N9967, E12390
99999	33	5	2.1 ± 1.1	Arroyo- 200 ft downstream from N9967, E12390
99999	34	0	9.2 ± 1.0	Arroyo- 800 ft downstream from N9967, E12390
99999	35	6	3.3 ± 1.1	Arroyo- 800 ft downstream from N9967, E12390
99999	36	0	8.9 ± 1.4	Arroyo- 200 ft downstream from N9580, E12580
99999	37	6	1.1 ± 0.8	Arroyo- 200 ft downstream from N9580, E12580
99999	38	0	7.1 ± 1.2	Arroyo- 400 ft downstream from N9580, E12580
99999	39	6	0.5 ± 0.7	Arroyo- 400 ft downstream from N9580, E12580
99999	40	0	3.2 ± 1.0	Arroyo- 600 ft downstream from N9580, E12580
99999	41	0	2.9 ± 0.8	Arroyo- 800 ft downstream from N9580, E12580
99999	42	0	1.2 ± 0.8	Arroyo- 925 ft downstream from N9580, E12580
99999	43	0	39.2 ± 1.6	Arroyo- 43 ft north of U.S. Highway 163 (Area D)
99999	44	6	13.8 ± 1.6	Arroyo- 43 ft north of U.S. Highway 163 (Area D)
99999	45	8	15.8 ± 1.6	Arroyo- 43 ft north of U.S. Highway 163 (Area D)

Appendix E

BOREHOLE GEOPHYSICAL LOGS AND DATA

Two logging systems were used at the Mexican Hat, Utah, site, a spectral system (Compulogger) and a total-count system (PRS-1 RASCAL). Borehole data from each system are presented in Tables E-1 and E-2, respectively. Equipment characteristics and calibration information are included to document the parameters used in data reduction.

Uncertainties for the total-count system were calculated at a 95 percent confidence level (2σ). Water was encountered in only two boreholes. Logs for all other boreholes have an indicated fluid-level depth of 99.0 ft which is a default value. The auger height shown on each log indicates the distance measured from the top of the auger to the ground surface.

Radiometric logs for each of the boreholes are presented on microfiche in the pocket below. The percent sign (%) preceding data entries signifies an overflow in the data field which occurs after an apparent radium-226 concentration greater than 999.9 is reached.

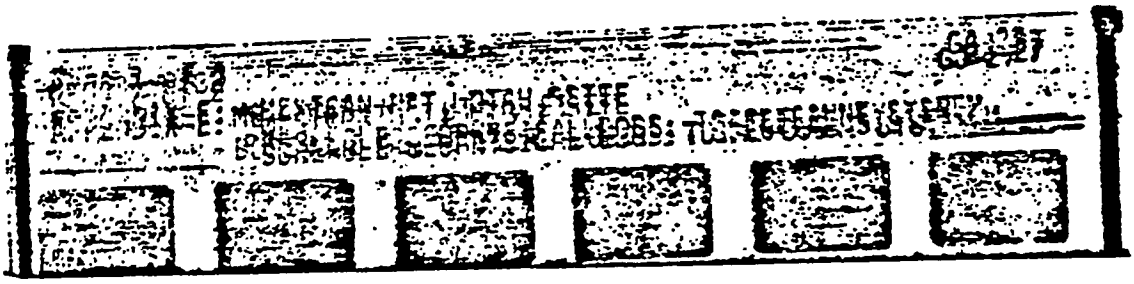

Table E-1

Borehole Data from Spectral System

EQUIPMENT DATA

INSTRUMENT	COMPULOGGER	CASING THICKNESS	0.1875 in.
GJO NUMBER	1815	CASING FACTOR	1.238 ± 0.012
SERIAL NUMBER	231-03	FLUID FACTOR	1.220 ± 0.154
DETECTOR	NaI(Tl)	MOISTURE FACTOR	1.069 ± 0.007
DETECTOR SIZE	2 in. x 6 in.	K FACTOR	7.00 ± 0.18 g-cps/pCi(eRa-226)
PROBE DIAMETER	2.5 in.	BACKGROUND	21.04 ± 3.24 cps
HOLE DIAMETER	6.87 in.	ALPHA FACTOR	3.0 ± 0.3
		CALIBRATION DATE	4 September 1984

Hole No.	Grid Coordinates North	East	Elevation (ft)	Log Depth (ft)
HAT-014	9200	8500	4335.1	7.5
HAT-021	8900	8200	4345.5	3.5
HAT-022	8900	8400	4339.7	6.0
HAT-023	8800	7900	4347.6	3.5
HAT-026	8800	8500	4340.4	4.0
HAT-029	8700	7300	4332.8	3.5
HAT-031	8700	8200	4342.1	3.5
HAT-035	8600	8500	4350.3	4.0
HAT-045	8300	7500	4340.1	5.5
HAT-047	8200	7900	4353.4	4.0
HAT-071	10350	8150	4313.8	4.0
HAT-073	10000	8100	4315.0	3.0
HAT-074	9900	8000	4316.8	8.0
HAT-075	9900	8100	4318.4	9.5
HAT-080	9700	8200	4321.0	7.5
HAT-081	9700	8300	4323.6	11.0
HAT-083	9600	8200	4322.4	8.0
HAT-086	9400	8200	4328.3	18.5
HAT-088	9300	7500	4330.8	4.5
HAT-102	9807	9148	4312.1	5.0
HAT-103	9762	9321	4305.1	4.0
HAT-105	9530	9647	4315.6	8.5
HAT-110	8642	9559	4336.0	27.5
HAT-120	9014	8836	4331.3	8.5
HAT-121	9163	8789	4331.2	14.0
HAT-151	9801	9637	4305.6	5.5
HAT-153	9999	10095	4292.2	8.0
HAT-157	10320	10788	4268.3	9.0
HAT-159	10223	11088	4267.7	7.0
HAT-161	10108	11630	4233.5	12.5
HAT-166	9199	11424	4300.7	9.0
HAT-169	8922	11004	4295.6	9.0

Table E-2

Borehole Data from Total-Count System

EQUIPMENT DATA

INSTRUMENT	PRS-1 RASCAL	CASING THICKNESS	0.1875 in.
GJO NUMBER	C-3572S	CASING FACTOR	1.555 ± 0.095
SERIAL NUMBER	753	FLUID FACTOR	1.112 ± 0.078
DETECTOR	NaI(Tl)	MOISTURE FACTOR	1.069 ± 0.007
DETECTOR SIZE	2 in. x 2 in.	K FACTOR	77.14 ± 2.24 g-cps/pCi(eRa-226)
PROBE DIAMETER	2.5 in.	BACKGROUND	135.51 ± 94.20 cps
HOLE DIAMETER	6.87 in.	ALPHA FACTOR	3.0 ± 0.3
		CALIBRATION DATE	04 September 1984

Hole No.	Grid Coordinates North	Grid Coordinates East	Elevation (ft)	Log Depth (ft)
HAT-011	9200	7900	4331.6	1.5
HAT-012	9200	8100	4343.6	1.3
HAT-013	9200	8300	4337.6	2.9
HAT-015	9000	7900	4342.1	3.8
HAT-016	9000	8100	4348.9	4.4
HAT-017	9000	8300	4342.1	2.8
HAT-018	9000	8500	4335.2	4.2
HAT-019	9000	8700	4330.3	2.5
HAT-020	8900	8100	4348.3	3.6
HAT-021	8900	8200	4345.5	4.4
HAT-024	8800	8100	4346.1	3.6
HAT-025	8800	8200	4343.4	1.0
HAT-027	8800	8700	4344.2	1.5
HAT-028	8800	8900	4338.7	1.0
HAT-030	8700	7700	4355.0	4.1
HAT-032	8600	7900	4350.6	2.7
HAT-033	8600	8100	4344.6	1.0
HAT-034	8600	8400	4342.6	3.7
HAT-036	8600	8700	4345.1	1.6
HAT-037	8590	8900	4.41.7	3.8
HAT-038	8500	7700	4351.5	2.2
HAT-039	8500	8200	4343.8	2.0
HAT-040	8400	7900	4350.8	1.3
HAT-041	8400	8100	4348.1	3.9
HAT-042	8400	8300	4347.4	2.8
HAT-043	8400	8500	4352.1	2.4
HAT-044	8400	8700	4359.3	0.7
HAT-046	8300	7700	4351.6	3.2
HAT-048	8185	8100	4351.6	2.8
HAT-049	8200	8300	4354.9	0.8
HAT-050	8200	8500	4357.4	0.3
HAT-051	8200	8750	4352.9	1.9
HAT-052	8000	7900	4353.2	3.5

Table E-2 (continued)

Hole No.	Grid Coordinates North	Grid Coordinates East	Elevation (ft)	Log Depth (ft)
HAT-053	8000	8100	4358.7	1.4
HAT-054	8000	8300	4357.6	3.5
HAT-055	7800	7900	4353.2	3.5
HAT-056	7800	8100	4360.1	2.0
HAT-072	10200	8100	4312.5	1.0
HAT-076	9800	7700	4328.4	4.3
HAT-078	9800	8200	4321.7	4.0
HAT-079	9700	8100	4318.6	1.4
HAT-082	9700	8600	4332.1	2.9
*HAT-085	9500	8200	4332.5	2.7
HAT-087	9400	8300	4336.8	0.8
HAT-101	9800	8990	4332.6	2.9
HAT-104	9652	9489	4315.0	4.0
HAT-106	9400	9769	4312.3	1.8
HAT-107	9208	9849	4300.0	14.5
*HAT-108	9023	9802	4315.0	2.7
*HAT-109	8825	9720	4296.8	2.0
*HAT-112	8299	9223	4329.5	2.8
*HAT-113	8388	9135	4332.2	7.5
*HAT-114	8241	8895	4329.1	3.5
HAT-115	8442	8964	4332.9	9.5
HAT-116	8600	9008	4336.4	1.9
HAT-117	8734	9097	4334.5	0.8
HAT-118	8852	8979	4338.4	0.8
HAT-119	9003	9074	4334.9	2.8
HAT-122	9373	8783	4330.1	2.0
HAT-123	9642	8775	4332.7	3.2
HAT-124	9960	9246	4313.7	7.1
HAT-125	10151	9290	4317.3	7.0
HAT-152	9907	9847	4295.7	4.7
HAT-154	10109	10340	4282.0	3.4
HAT-155	10159	10478	4287.3	0.9
HAT-156	10263	10614	4268.0	2.5
HAT-158	10446	11062	4257.3	4.5
HAT-160	10107	11416	4236.8	3.0
*HAT-163	9818	11533	4245.8	7.9
HAT-164	9697	11614	4272.7	2.7
HAT-165	9538	11662	4271.8	11.8
HAT-167	9103	11372	4304.3	3.3
HAT-168	8978	11269	4300.5	1.6
HAT-171	8944	10732	4293.5	4.5
*HAT-173	8903	10319	4284.5	1.3
*HAT-174	8898	10249	4280.2	5.3

*Boreholes logged without casing. Data were reduced for these boreholes using a hole diameter of 5.5 in., a casing thickness of 0 in., and a casing factor of 1.000 ± 0.000. All other equipment data were the same for all boreholes.

Table E-2 (continued)

Hole No.	Grid Coordinates North	Grid Coordinates East	Elevation (ft)	Log Depth (ft)
*HAT-175	8876	10100	4281.9	1.9
*HAT-176	8728	9768	4289.7	2.1
*HAT-177	10105	11302	4242.0	2.5
*HAT-178	9998	11407	4239.9	9.5
HAT-179	10011	11622	4230.7	2.7
*HAT-180	9957	11511	4237.2	4.6

*Boreholes logged without casing. Data were reduced for these boreholes using a hole diameter of 5.5 in., a casing thickness of 0 in., and a casing factor of 1.000 ± 0.000. All other equipment data were the same for all boreholes.

Appendix F

BUILDING-SURVEY DATA

Tables F-1 through F-8 present results of exposure-rate and alpha measurements made in buildings at the Mexican Hat site. Figures F-1 through F-8 identify the approximate locations of the measurements. Locations identified by the letter X indicate locations of PIC measurements. Locations identified by a black dot followed by a number indicate locations of alpha-survey measurements.

Table F-1

Survey Data for Building 1/Ore-Crushing Building

Measurement Location No.	Area Surveyed	Alpha Survey (cpm) Direct	Alpha Survey (cpm) Clean Surface	PIC Exposure-Rate (μR/h) First Reading	PIC Exposure-Rate (μR/h) Second Reading
X	3 ft/Center of Bldg.			64.0	63.1
1	Floor	370	345		
2	Floor	1000	1030		
3	Floor	625	600		
4	Floor	395	320		
5	Floor	1400	1300		
6	Floor	1100	1400		
7	Footer	1100	1100		
8	Pit	800	800		

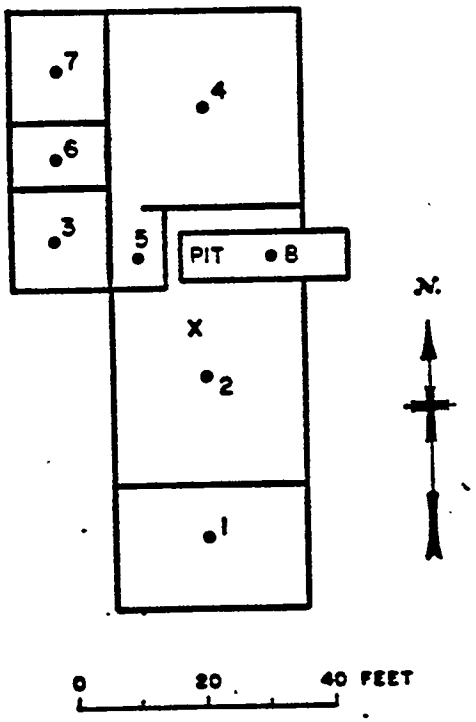

Figure F-1. Measurement Locations in Building 1/Ore-Crushing Building

Table F-2

Survey Data for Building 2/Sheet Metal Shop

Measurement Location No.	Area Surveyed	Alpha Survey (cpm) Direct	Alpha Survey (cpm) Clean Surface	PIC Exposure-Rate (μR/h) First Reading	PIC Exposure-Rate (μR/h) Second Reading
X	3 ft/Center of Bldg.			20.7	20.7
1	Wall	20	0		
2	Floor	20	2		
3	Light Fixture	25	5		
4	Wall	40	0		
5	Floor	20	4		
6	Brick Wall	75	0		
7	Wall		2		
8	Floor		8		
9	Fuse Box		8		
10	Wall		0		

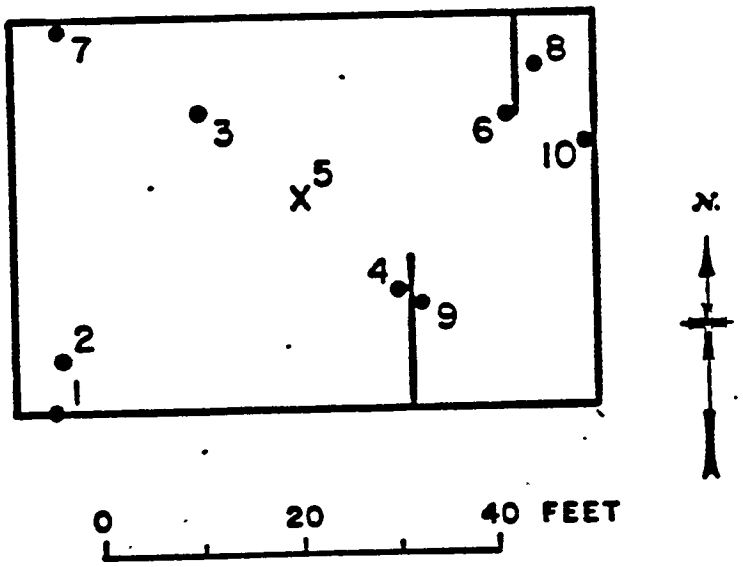

Figure F-2. Measurement Locations in Building 2/Sheet Metal Shop

Table F-3

Survey Data for Building 3/Empty Metal Building

Measurement Location No.	Area Surveyed	Alpha Survey (cpm) Direct	Alpha Survey (cpm) Clean Surface	PIC Exposure-Rate (μR/h) First Reading	PIC Exposure-Rate (μR/h) Second Reading
X	3 ft/Center of Bldg.			33.1	32.1
1	Floor	135	65		
2	Floor	220	40		
3	Floor	140	70		
4	Floor	180	90		

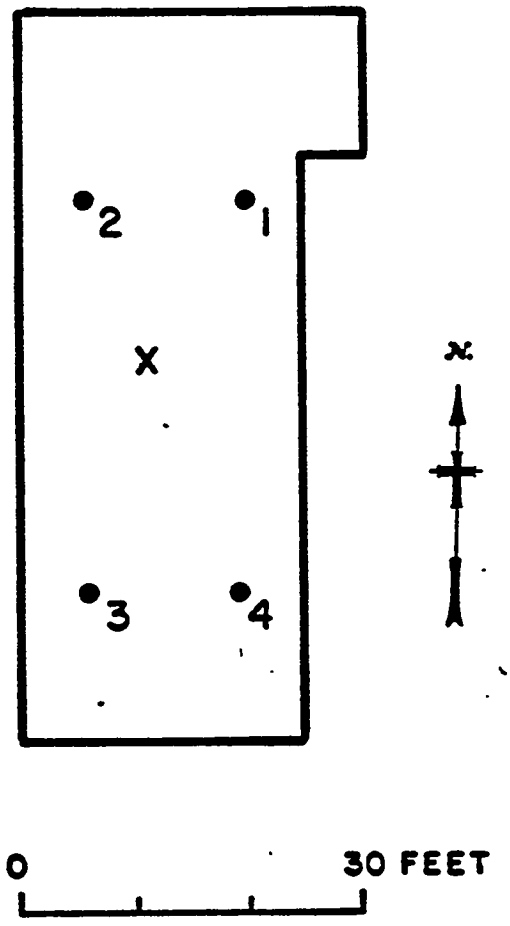

Figure F-3. Measurement Locations in Building 3/Empty Metal Building

Table F-4

Survey Data for Building 4/Generator Building

Measurement Location No.	Area Surveyed	Alpha Survey (cpm) Direct	Alpha Survey (cpm) Clean Surface	PIC Exposure-Rate (μR/h) First Reading	PIC Exposure-Rate (μR/h) Second Reading
X	3 ft/Center of Bldg.			17.2	16.0
1	Floor	100	95		
2	Floor	100	95		
3	Floor	50	110		
4	Floor	160	140		
5	Generator Support	120	140		
6	Generator Support	110	80		
7	Floor	75	75		
8	Floor	100	120		

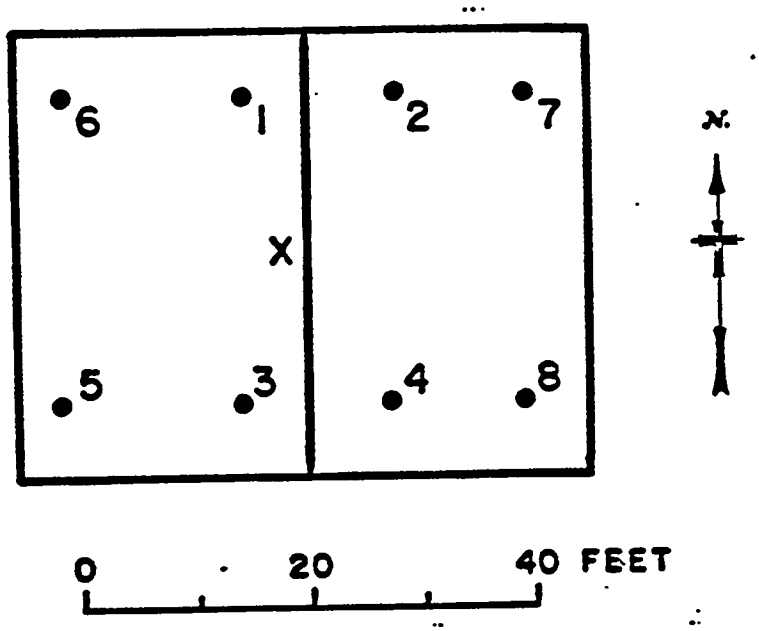

Figure F-4. Measurement Locations in Building 4/Generator Building

Table F-5

Survey Data for Building 5/Trade School Building

Measurement Location No.	Area Surveyed	Alpha Survey (cpm) Direct	Alpha Survey (cpm) Clean Surface	PIC Exposure-Rate (μR/h) First Reading	PIC Exposure-Rate (μR/h) Second Reading
X	3 ft/Center of Bldg.			18.0	17.4
1	Floor	80	60		
2	Floor	55	80		
3	Floor	130	100		
4	Floor	55	60		
5	Floor	55	55		
6	Floor	70	30		
7	Floor	60	50		
8	Floor	80	60		
9	Floor	30	80		
10	Wall	40	30		
11	Floor	55	35		
12	Wall	40	35		
13	Floor	10	10		
14	Floor	35	30		
15	Wall (Brick)	20	20		
16	Floor	40	30		
17	Floor	30	25		
18	Wall	50	20		
19	Floor	20	5		
20	Floor	50	40		
21	Floor	35	50		
22	Floor	50	25		
23	Heater Duct	90	55		
24	Floor	35	35		
25	Floor	90	70		
26	Floor	80	60		
27	Floor	90	60		
28	Floor	60	30		
29	Floor	80	40		
30	Wall	30	15		

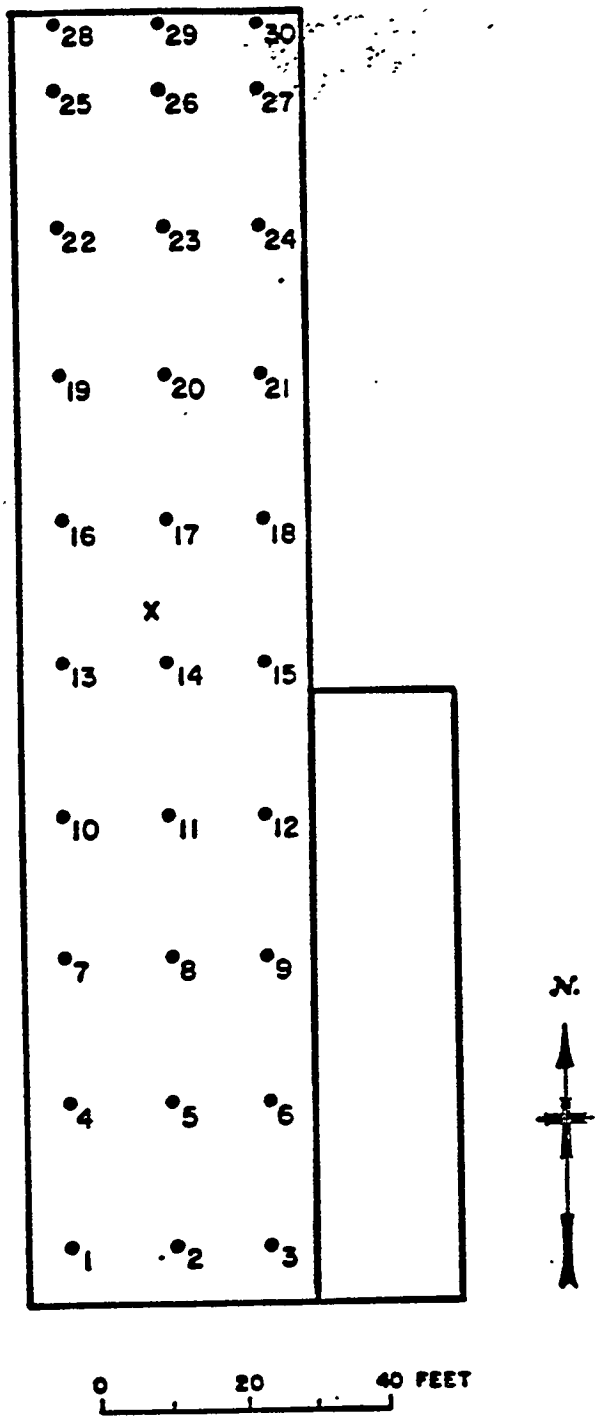

Figure F-5. Measurement Locations in Building 5/Trade School Building

Table F-6

Survey Data for Building 6/Brick Building

Measurement Location No.	Area Surveyed	Alpha Survey (cpm) Direct	Alpha Survey (cpm) Clean Surface	PIC Exposure-Rate (μR/h) First Reading	PIC Exposure-Rate (μR/h) Second Reading
X	3 ft/Center of Bldg.			18.0	18.6
1	Floor	80	50		
2	Floor	35	80		
3	Wall	40	20		
4	Floor	50	20		

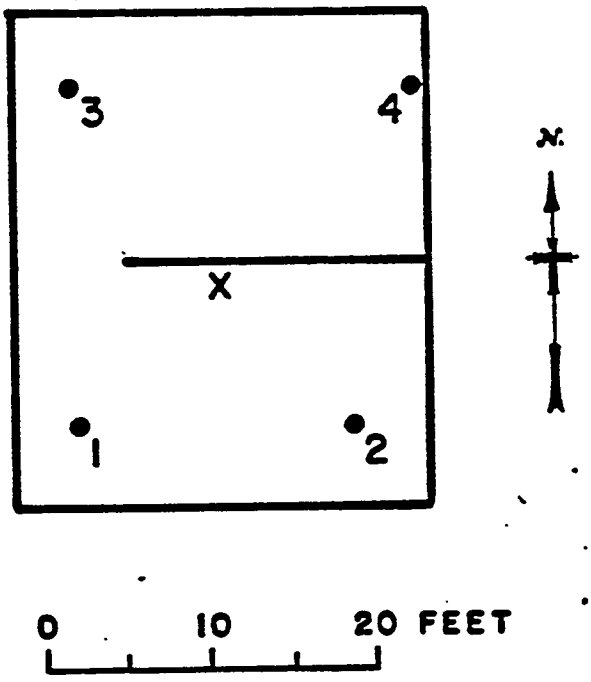

Figure F-6. Measurement Locations in Building 6/Brick Building

Table F-7

Survey Data for Building 7/Scale House

Measurement Location No.	Area Surveyed	Alpha Survey (cpm) Direct	Alpha Survey (cpm) Clean Surface	PIC Exposure-Rate (μR/h) First Reading	PIC Exposure-Rate (μR/h) Second Reading
X	3 ft/Center of Bldg.			67.7	67.9
1	Floor	330	280		
2	Floor	260	255		
3	Floor	235	400		
4	Floor	250	310		

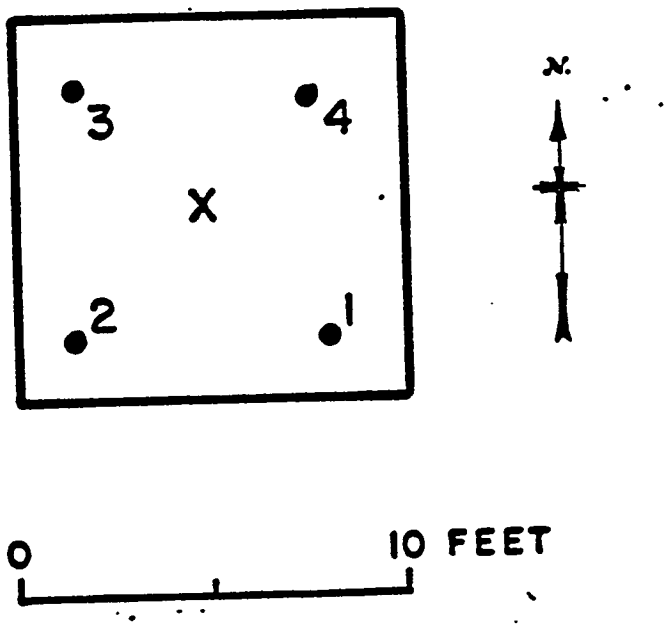

Figure F-7. Measurement Locations in Building 7/Scale House

Table F-8

Survey Data for Building 8/Health Clinic

Measurement Location No.	Area Surveyed	Alpha Survey (cpm) Direct	Alpha Survey (cpm) Clean Surface	PIC Exposure-Rate (μR/h) First Reading	PIC Exposure-Rate (μR/h) Second Reading
X	3 ft/Center of Bldg.			13.7	13.5
1	Waiting Room	40	0		
2	Dark Room	40	1		
3	Screening Room	40	1		
4	Exam Room	30	0		
5	Lab Room	30	0		
6	Pharmacy Room	10	0		
7	CHN Room	20	1		
8	ABE Room #1	20	0		
9	ABE Room #2	10	0		
10	RD Room	30	0		
11	Adult Ed. Room	20	0		
12	Sewing Room	15	0		
13	Womens Restroom	40	0		
14	Mens Restroom	30	0		
15	ABE Room #3	30	0		
16	ER Room	20	0		
17	Storage Room	25	0		
18	Furnace Room	50	0		

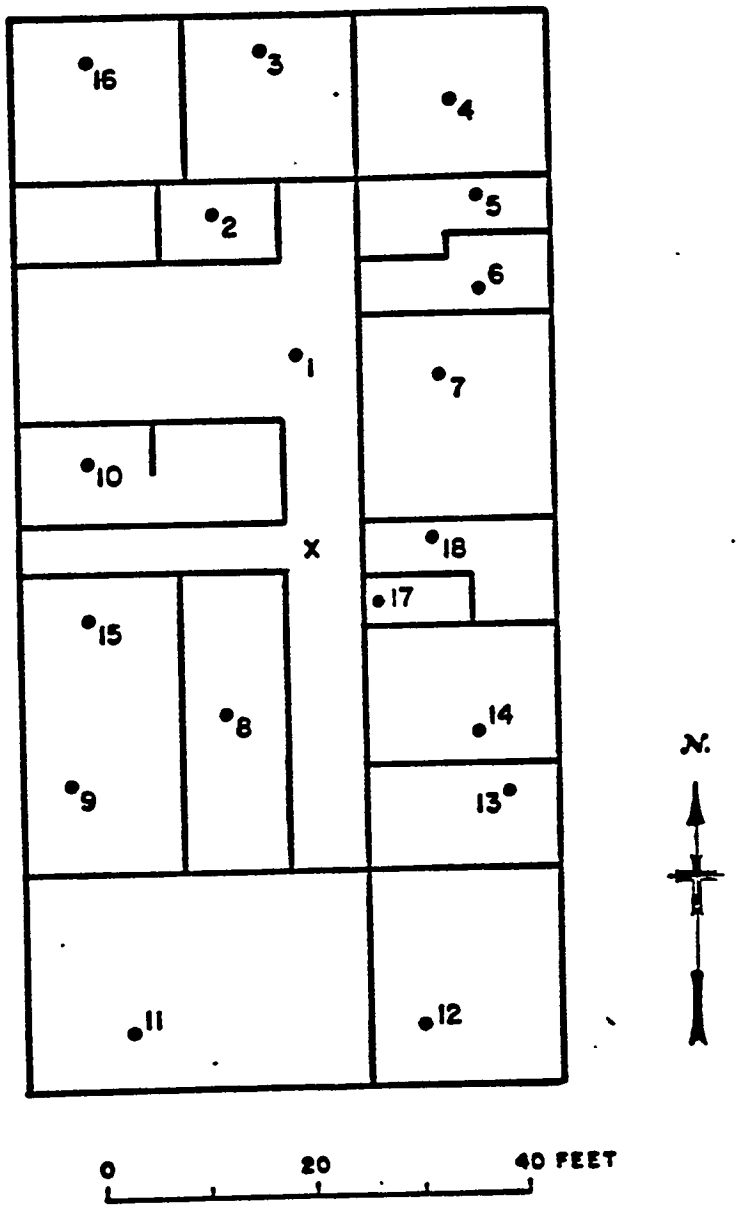

Figure F-8. Measurement Locations in Building 8/Health Clinic

Appendix G

BACKGROUND MEASUREMENT DATA

Table G-1 presents analytical and measurement data obtained at four background locations indicated in Figure 1. Radium, thorium, and potassium values represent equivalent concentrations. All measurements were surface measurements. Soil samples were collected at a depth of 0 to 6 in.

Table G-1

Background Location Analytical and Measurement Data

Area	PIC Exposure-Rate (μR/h) Reading 1/Reading 2	Delta-Gamma Results pCi(Ra-226)/g Inst. C-1114 C-1130	Soil Sample Laboratory Results				
			Sample No.	Moisture (%)	Radium (pCi/g)	Thorium (ppm)	Potassium (%)
BG-1	11.5 / 11.4	2.0 ± 0.7 1.4 ± 0.7	MHD 101 MHD 301	1.2	1.0 ± 1.0 0.9 ± 1.0	6.0 ± 2.0 9.9 ± 2.0	1.3 ± 0.4 1.3 ± 0.3
BG-2b	11.7 / 11.4	1.3 ± 0.7 0.8 ± 0.7	MHD 213 MBG 625 MHD 578		1.4 ± 1.0 1.0 ± 1.0 1.1 ± 1.0	5.6 ± 1.4 3.0 ± 1.4 6.3 ± 1.0	1.8 ± 0.4 1.0 ± 0.2 1.8 ± 0.2
BG-3	10.7 / 10.9	1.1 ± 0.7 0.9 ± 0.7	MHD 103 MHD 151	1.2	1.0 ± 1.0 0.7 ± 1.0	7.0 ± 2.0 1.7 ± 0.0	1.3 ± 0.2 1.4 ± 0.3
BG-4	12.7 / 12.4	1.0 ± 0.7 0.9 ± 0.7	MHD 114 MHD 579	3.0	2.0 ± 1.0 1.3 ± 1.0	1.0 ± 1.0 5.6 ± 1.4	1.3 ± 0.4 1.6 ± 0.4

ADDENDUM D2

FINAL RADIUM CONCENTRATIONS AND VOLUMES

OF TAILINGS AT MEXICAN HAT

TABLE OF CONTENTS

Section		Page
D2.1	Final radium concentrations and volumes at the upper pile at Mexican Hat	D2-1
D2.2	Final radium concentrations and volumes at the lower pile at Mexican Hat	D2-10

D2.1 FINAL RADIUM CONCENTRATIONS AND VOLUMES AT THE UPPER PILE AT MEXICAN HAT

Pages D2-2 through D2-5 of this addendum present the concentrations of each grid cell by row, column, and layer. Each page contains two rows and all columns and layers for those rows. The layer by layer concentrations are printed down the page, while the columns are organized across the page. Pages D2-6 and D2-7 give the depths to the 15 pCi/g and physical interfaces, respectively. In these tables, the values are organized according to row and column. Page D2-8 presents the volume summary and the layer by layer averages with depth into the pile.

TAILINGS PILE ACTIVITY ANALYSES
IRREGULAR BOUNDARY MODIFICATION PROGRAM EXECUTION - TueJun 4198515. 61 15.52.86
MEXICAN HAT (UPPER PILE) - HTU - MSRD & SNL DATA
FILES: HTU001/DAT - ENTERED 5/21/85 (RANELSON)
FILE DATA FROM (8 by 8) GRID - GRID SPACING : (160 by 179 by 2.5) FEET

DATA FOR ROW : 1

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8
0.0 - 2.5		582	594	647	419	460		
2.5 - 5.0		773	462	428	387	361		
5.0 - 7.5		506	503	949	326	464		
7.5 - 10.0		435	505	743	757	411		
10.0 - 12.5		685	444	622	365	536		
12.5 - 15.0		655	872	584	676	730		
15.0 - 17.5		598	842	427	361	703		
17.5 - 20.0		981	1472	480	565	619		
20.0 - 22.5		816	872	928	705	828		
22.5 - 25.0		350	1008	662	941	578		
25.0 - 27.5					315	417		
27.5 - 30.0					215	316		
30.0 - 32.5					290	605		
32.5 - 35.0					777	30		
35.0 - 37.5						776		
37.5 - 40.0								
40.0 - 42.5								
42.5 - 45.0								
45.0 - 47.5								

DATA FOR ROW : 2

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8
0.0 - 2.5		417	911	489	516	127	242	432
2.5 - 5.0		489	544	670	785	357	496	353
5.0 - 7.5		3	655	855	737	484	473	377
7.5 - 10.0			522	287	689	232	636	913
10.0 - 12.5			612	926	531	665	782	581
12.5 - 15.0			266	811	584	564	1752	1268
15.0 - 17.5				38	575	784	957	677
17.5 - 20.0					849	643	717	442
20.0 - 22.5					467	792	581	1867
22.5 - 25.0					783	586	1083	734
25.0 - 27.5					681	242	874	377
27.5 - 30.0					700	739	742	436
30.0 - 32.5						941	546	396
32.5 - 35.0							1715	839
35.0 - 37.5							1157	1225
37.5 - 40.0							612	776
40.0 - 42.5								
42.5 - 45.0								
45.0 - 47.5								

DATA FOR ROW : 3

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8
0.0 - 2.5		633	1434	327	312	180	212	1018
2.5 - 5.0		478	1248	882	299	746	384	808
5.0 - 7.5		455	1040	918	436	237	835	580
7.5 - 10.0		141	1173	767	994	856	1048	824
10.0 - 12.5			689	1831	485	574	884	989
12.5 - 15.0			14	314	674	552	568	626
15.0 - 17.5				152	515	757	883	771
17.5 - 20.0					597	911	946	642
20.0 - 22.5						342	989	991
22.5 - 25.0						1105	626	1024
25.0 - 27.5						766	1071	490
27.5 - 30.0						813	992	
30.0 - 32.5							705	
32.5 - 35.0							1597	
35.0 - 37.5							645	
37.5 - 40.0								
40.0 - 42.5								
42.5 - 45.0								
45.0 - 47.5								

DATA FOR ROW : 4

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8
0.0 - 2.5		282	1084		316	230	182	158
2.5 - 5.0		1488	1397		213	394	327	284
5.0 - 7.5		736	214		274	218	317	326
7.5 - 10.0		170	485		961	1517	804	810
10.0 - 12.5		210			684	1189	787	734
12.5 - 15.0					342	636	652	793
15.0 - 17.5					1105	672	1664	526
17.5 - 20.0					39	961	924	552
20.0 - 22.5					278	768	836	917
22.5 - 25.0						1016	825	924
25.0 - 27.5						885	1224	1145
27.5 - 30.0						278	743	458
30.0 - 32.5							382	474
32.5 - 35.0								398
35.0 - 37.5								83
37.5 - 40.0								
40.0 - 42.5								
42.5 - 45.0								
45.0 - 47.5								

DATA FOR ROW : 5

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8
0.0 - 2.5		438	851		325	385	118	
2.5 - 5.0		236	231		386	249	239	
5.0 - 7.5		485	485		365	214	526	
7.5 - 10.0					373	1664	552	
10.0 - 12.5					373	514	926	
12.5 - 15.0					974	682	924	
15.0 - 17.5					215	895	1529	
17.5 - 20.0					10	1136	914	
20.0 - 22.5						391	1830	
22.5 - 25.0						11	1294	
25.0 - 27.5							276	
27.5 - 30.0								
30.0 - 32.5								
32.5 - 35.0								
35.0 - 37.5								
37.5 - 40.0								
40.0 - 42.5								
42.5 - 45.0								
45.0 - 47.5								

DATA FOR ROW : 6

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8
0.0 - 2.5					719	171	128	
2.5 - 5.0					206	187	137	
5.0 - 7.5					373	198	945	
7.5 - 10.0					263	533	1153	
10.0 - 12.5					130	596	1365	
12.5 - 15.0					582	771	597	
15.0 - 17.5					113	881		
17.5 - 20.0						412		
20.0 - 22.5								
22.5 - 25.0								
25.0 - 27.5								
27.5 - 30.0								
30.0 - 32.5								
32.5 - 35.0								
35.0 - 37.5								
37.5 - 40.0								
40.0 - 42.5								
42.5 - 45.0								
45.0 - 47.5								

DATA FOR ROW : 7

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8
0.0 - 2.5					295	64	127	
2.5 - 5.0					130	214	295	
5.0 - 7.5					126	230	588	
7.5 - 10.0					17	130	642	
10.0 - 12.5						1229	1297	
12.5 - 15.0						342	585	
15.0 - 17.5								
17.5 - 20.0								
20.0 - 22.5								
22.5 - 25.0								
25.0 - 27.5								
27.5 - 30.0								
30.0 - 32.5								
32.5 - 35.0								
35.0 - 37.5								
37.5 - 40.0								
40.0 - 42.5								
42.5 - 45.0								
45.0 - 47.5								

DATA FOR ROW : 8

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8
0.0 - 2.5						263		
2.5 - 5.0						130		
5.0 - 7.5						678		
7.5 - 10.0						17		
10.0 - 12.5								
12.5 - 15.0								
15.0 - 17.5								
17.5 - 20.0								
20.0 - 22.5								
22.5 - 25.0								
25.0 - 27.5								
27.5 - 30.0								
30.0 - 32.5								
32.5 - 35.0								
35.0 - 37.5								
37.5 - 40.0								
40.0 - 42.5								
42.5 - 45.0								
45.0 - 47.5								

DEPTHS TO 15 pCi/g INTERFACE TABLE

	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8
I = 1			23.4	24.8	23.1	35.8	35.5	
I = 2		7.5	14.4	15.5	27.8	31.2	39.3	39.8
I = 3		8.9	13.7	17.5	18.3	29.5	35.6	26.8
I = 4		18.8	18.8		22.8	28.8	31.8	36.8
I = 5		6.9	6.8		19.8	24.8	25.8	
I = 6					16.9	19.5	14.8	
I = 7					8.8	13.8	14.2	
I = 8						9.1		

DEPTHS TO PHYSICAL INTERFACE TABLE

	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8
I = 1			21.6	23.0	21.3	33.0	34.6	
I = 2		5.5	12.6	15.0	26.0	29.4	37.5	38.0
I = 3		7.1	12.2	15.7	16.5	27.7	33.8	25.0
I = 4		9.0	8.5		19.0	27.0	38.0	35.0
I = 5		5.1	3.9		17.0	22.0	24.0	
I = 6					15.1	17.6	12.5	
I = 7					7.0	12.0	12.4	
I = 8						7.3		

DEPTHS FROM PHYSICAL TO 15 pCi/g INTERFACE TABLE

	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8
I = 1			1.8	1.8	1.8	2.8	8.9	
I = 2		2.8	1.8	8.5	1.8	1.8	1.8	1.8
I = 3		1.8	1.5	1.8	1.8	1.8	1.8	1.8
I = 4		1.8	1.5		3.8	1.8	1.8	1.8
I = 5		1.8	2.1		2.8	2.8	1.8	
I = 6					1.8	1.9	1.5	
I = 7					1.8	1.8	1.8	
I = 8						1.8		

	ABOVE PHYSICAL INTERFACE	ABOVE 15 pCi/g INTERFACE
TOTAL VOLUME (cy)	763580	834528
TOTAL VOLUME (ft3)	2.06167E+07	2.25322E+07
DEPTH (ft)	19.4556	21.2633
TOTAL ACTIVITY (Ci)	561.687	597.283
AVERAGE ACTIVITY (pCi/g)	641.322	623.984

AVERAGE DEPTH FROM PHYSICAL INTERFACE TO 15 pCi/g INTERFACE IS 1.80769 FEET (BASED ON 13 VALUES)

AVERAGE PILE ACTIVITY PROFILE

DEPTH (FT)	ABOVE PHYSICAL INTERFACE VOLUME	ABOVE PHYSICAL INTERFACE ACTIVITY	ABOVE 15 pCi/g INTERFACE VOLUME	ABOVE 15 pCi/g INTERFACE ACTIVITY	TOTAL PILE VOLUME	TOTAL PILE ACTIVITY
0.0 - 2.5	98,119	430	98,119	430	98,119	430
2.5 - 5.0	96,952	479	98,119	476	98,119	476
5.0 - 7.5	89,633	583	95,899	487	98,119	485
7.5 - 10.0	79,556	712	86,785	665	98,119	592
10.0 - 12.5	75,896	719	77,768	718	98,119	576
12.5 - 15.0	63,751	728	71,678	687	98,119	523
15.0 - 17.5	54,952	775	68,989	718	98,119	453
17.5 - 20.0	46,779	782	53,151	715	98,119	487
20.0 - 22.5	42,324	778	47,203	756	98,119	373
22.5 - 25.0	33,944	869	40,120	837	98,119	372
25.0 - 27.5	27,849	720	31,945	694	98,119	244
27.5 - 30.0	20,791	577	25,858	584	98,119	184
30.0 - 32.5	15,911	583	19,110	512	98,119	127
32.5 - 35.0	12,892	869	15,911	893	98,119	157
35.0 - 37.5	5,384	1191	8,396	870	98,119	118
37.5 - 40.0	538	776	4,365	784	98,119	52
40.0 - 42.5	0	0	0	0	98,119	15
42.5 - 45.0	0	0	0	0	98,119	15

D2.2 FINAL RADIUM CONCENTRATIONS AND VOLUMES AT THE LOWER PILE AT MEXICAN HAT

Pages D2-10 through D2-17 of this addendum present the concentrations of each grid cell by row, column, and layer. Each page contains one row and all columns and layers for that row. The layer by layer concentrations are printed down the page, while the columns are organized across the page. Pages D2-18 and D2-19 give the depths to the 15 pCi/g and physical interfaces, respectively. In these tables, the values are organized according to row and column. Page D2-20 presents the volume summary and the layer by layer averages with depth into the pile.

TAILINGS PILE ACTIVITY ANALYSES - BY ROGER A. NELSON
IRREGULAR BOUNDARY MODIFICATION PROGRAM EXECUTION - TueJun 41985155 61 16.04.54
MEXICAN HAT (LOWER PILE) - HTL - MSRD & SNL DATA
FILES: HTL001/DAT - ENTERED 5/22/85 (RANELSON) PAGE NO. 1
FILE DATA FROM (8 by 12) GRID - GRID SPACING : (149 by 171 by 2.5) FEET

DATA FOR ROW : 1

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12
0.0 - 2.5						263	868	280	278	314	254	
2.5 - 5.0						671	482	227	252	932	213	
5.0 - 7.5						269	263	218	261	269	298	
7.5 - 10.0						379	671	278	278	379	244	
10.0 - 12.5						483	269	388	388	278	42	
12.5 - 15.0						609	379	298	298	194		
15.0 - 17.5						784	323	314	314	260		
17.5 - 20.0						1235	416	932	932	223		
20.0 - 22.5						163	583	269	269	23		
22.5 - 25.0							745	379	379			
25.0 - 27.5							9	242	266			
27.5 - 30.0								223	284			
30.0 - 32.5								221	247			
32.5 - 35.0								254	233			
35.0 - 37.5								9	18			
37.5 - 40.0												
40.0 - 42.5												
42.5 - 45.0												
45.0 - 47.5												
47.5 - 50.0												
50.0 - 52.5												
52.5 - 55.0												
55.0 - 57.5												
57.5 - 60.0												
60.0 - 62.5												

DATA FOR ROW : 2

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12
0.0 - 2.5					493	947	900	541	388	233	719	559
2.5 - 5.0					353	673	659	850	275	239	667	366
5.0 - 7.5					699	211	291	666	277	225	491	224
7.5 - 10.0					643	410	319	547	304	247	680	255
10.0 - 12.5					314	381	388	355	347	291	769	229
12.5 - 15.0					196	379	290	388	388	273	572	
15.0 - 17.5					22	583	314	298	298	253	254	
17.5 - 20.0						745	932	314	314	384	359	
20.0 - 22.5						787	269	932	932	347	355	
22.5 - 25.0						822	379	269	269	742	280	
25.0 - 27.5						22	403	379	381	541	232	
27.5 - 30.0							609	511	381	432		
30.0 - 32.5							784	639	175	764		
32.5 - 35.0							1235	590	222	254		
35.0 - 37.5							233	757	201	254		
37.5 - 40.0								157	4	254		
40.0 - 42.5										213		
42.5 - 45.0										298		
45.0 - 47.5										244		
47.5 - 50.0										42		
50.0 - 52.5												
52.5 - 55.0												
55.0 - 57.5												
57.5 - 60.0												
60.0 - 62.5												

DATA FOR ROW : 3

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12
0.0 - 2.5			611	763	762	1680	1926	1255	883	903	299	571
2.5 - 5.0			484	443	977	1485	1339	774	663	748	276	290
5.0 - 7.5			528	326	922	489	1329	868	460	630	274	283
7.5 - 10.0			232	1088	493	392	487	830	1312	1061	270	330
10.0 - 12.5			123	1128	326	658	833	591	357	543	228	212
12.5 - 15.0				900	982	767	530	416	589	387	228	245
15.0 - 17.5				682	1849	381	263	388	746	490	567	119
17.5 - 20.0				22	314	379	671	290	627	513	719	
20.0 - 22.5					196	699	269	314	647	253	667	
22.5 - 25.0					22	643	379	932	765	384	491	
25.0 - 27.5						314	762	269	448	420	680	
27.5 - 30.0						196	880	379	416	719	769	
30.0 - 32.5						22	1262	870	742	667	572	
32.5 - 35.0							1836	1295	541	491	559	
35.0 - 37.5							457	771	432	680	366	
37.5 - 40.0								1414	764	769	224	
40.0 - 42.5								457	602	572	255	
42.5 - 45.0									849	785	229	
45.0 - 47.5									849	505		
47.5 - 50.0									649	542		
50.0 - 52.5									280	341		
52.5 - 55.0									399	425		
55.0 - 57.5									232			
57.5 - 60.0												
60.0 - 62.5												

DATA FOR ROW : 4

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12
0.0 - 2.5	468	611	393	680	1537	2172	1292	980	614	567	782	203
2.5 - 5.0	413	484	326	561	1175	1895	1730	1285	1195	789	567	330
5.0 - 7.5	123	528	1008	393	1131	1588	1295	676	843	759	719	280
7.5 - 10.0		232	911	326	805	763	1598	451	355	669	667	234
10.0 - 12.5		123	920	1207	452	1418	1340	1189	796	582	491	9
12.5 - 15.0			621	1165	326	745	1818	1126	995	633	567	
15.0 - 17.5			254	1117	997	482	2048	1862	917	423	571	
17.5 - 20.0				816	1472	678	912	1142	693	782	298	
20.0 - 22.5				284	868	847	851	855	492	567	622	
22.5 - 25.0					639	1100	932	717	670	719	544	
25.0 - 27.5					22	1176	932	792	716	667	430	
27.5 - 30.0						867	448	966	444	491	430	
30.0 - 32.5						535	1385	854	792	680	291	
32.5 - 35.0							547	1541	966	769		
35.0 - 37.5							532	1366	854	572		
37.5 - 40.0								1448	1384	1219		
40.0 - 42.5								1371	892	414		
42.5 - 45.0								468	1399	328		
45.0 - 47.5									943	348		
47.5 - 50.0									486	428		
50.0 - 52.5												
52.5 - 55.0												
55.0 - 57.5												
57.5 - 60.0												
60.0 - 62.5												

DATA FOR ROW : 5

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12
0.0 - 2.5	461	1416	553	1261	1850	1294	812	792	617	768	332	
2.5 - 5.0	123	1164	997	1517	2220	1631	619	966	782	618	275	
5.0 - 7.5		1366	1166	589	1898	1825	1174	854	567	538	259	
7.5 - 10.0		1263	867	471	2048	1142	1831	851	670	567	258	
10.0 - 12.5		385	369	553	1831	1260	785	596	716	571	8	
12.5 - 15.0			199	1365	917	1341	1712	1125	444	290		
15.0 - 17.5				1456	827	1149	1142	1508	660	732		
17.5 - 20.0				1244	1147	1117	348	275	747	290		
20.0 - 22.5				980	1778	953	633		555	420		
22.5 - 25.0				13	1424	1224	971		913	454		
25.0 - 27.5					1351	1383	1867		1449	266		
27.5 - 30.0					531	1493	863		1024			
30.0 - 32.5						1285	1389		1141			
32.5 - 35.0						1848	1481		782			
35.0 - 37.5							1270					
37.5 - 40.0							1167					
40.0 - 42.5							98					
42.5 - 45.0												
45.0 - 47.5												
47.5 - 50.0												
50.0 - 52.5												
52.5 - 55.0												
55.0 - 57.5												
57.5 - 60.0												
60.0 - 62.5												

DATA FOR ROW : 6

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12
0.0 - 2.5				949	1482	982	757	348	692	484	325	312
2.5 - 5.0				1645	1780	1893	874	633	458	598	637	298
5.0 - 7.5				1231	1524	1926	1856	1149	758	650	752	298
7.5 - 10.0				1136	779	2029	1413	1477	783	742	798	263
10.0 - 12.5				1182	1222	1578	1434	1831	861	686	455	
12.5 - 15.0				560	1442	1428	1236	972	387	516	537	
15.0 - 17.5					1235	1384	386	1812		779	783	
17.5 - 20.0					1135	1858		1832		773	385	
20.0 - 22.5					13	1452		1114		1254	730	
22.5 - 25.0						1647		418		1214	687	
25.0 - 27.5						1547				488	1136	
27.5 - 30.0						1220					926	
30.0 - 32.5						531					363	
32.5 - 35.0												
35.0 - 37.5												
37.5 - 40.0												
40.0 - 42.5												
42.5 - 45.0												
45.0 - 47.5												
47.5 - 50.0												
50.0 - 52.5												
52.5 - 55.0												
55.0 - 57.5												
57.5 - 60.0												
60.0 - 62.5												

DATA FOR ROW : 7

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12
0.0 - 2.5		57	1229	253	927	544	351	523	521	364	434	
2.5 - 5.0			1497	547	1275	1110	740	989	569	582	329	
5.0 - 7.5			895	1190	1522	2143	1932	1269	831	438	545	
7.5 - 10.0				1388	828	1953	2492	1575	620	1527	2327	
10.0 - 12.5				1202	1657	1274	795	969		1252	1753	
12.5 - 15.0				1600	1560	1092	1010	824		1778	228	
15.0 - 17.5				948	1443	1086	1403	911		1139		
17.5 - 20.0					772	1564	1622	1112		533		
20.0 - 22.5						1758	1478	1429				
22.5 - 25.0						1435	28	19				
25.0 - 27.5						430						
27.5 - 30.0												
30.0 - 32.5												
32.5 - 35.0												
35.0 - 37.5												
37.5 - 40.0												
40.0 - 42.5												
42.5 - 45.0												
45.0 - 47.5												
47.5 - 50.0												
50.0 - 52.5												
52.5 - 55.0												
55.0 - 57.5												
57.5 - 60.0												
60.0 - 62.5												

DATA FOR ROW : 8

DEPTH	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12
0.0 - 2.5		1497	1338	1584	1980	393	744	1118				
2.5 - 5.0		476	1682	1948	1349	322	1592	1582				
5.0 - 7.5			795	1281	1923	384	2072	1952				
7.5 - 10.0					2125	745	28	37				
10.0 - 12.5					1814	2094						
12.5 - 15.0					847	1768						
15.0 - 17.5						634						
17.5 - 20.0						847						
20.0 - 22.5												
22.5 - 25.0												
25.0 - 27.5												
27.5 - 30.0												
30.0 - 32.5												
32.5 - 35.0												
35.0 - 37.5												
37.5 - 40.0												
40.0 - 42.5												
42.5 - 45.0												
45.0 - 47.5												
47.5 - 50.0												
50.0 - 52.5												
52.5 - 55.0												
55.0 - 57.5												
57.5 - 60.0												
60.0 - 62.5												

DEPTHS TO 15 pCi/g INTERFACE TABLE

	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12
I = 1						21.6	26.6	37.0	36.6	21.6	11.6	
I = 2					16.6	27.5	36.6	38.2	39.0	48.8	26.6	11.6
I = 3			11.6	19.8	23.2	31.2	36.3	41.7	56.1	54.1	42.6	16.6
I = 4	6.1	12.0	15.0	21.6	25.6	30.8	35.6	44.2	47.9	48.6	30.8	11.0
I = 5	2.6		11.0	13.5	22.8	27.6	35.0	41.1	19.6	34.0	26.6	11.5
I = 6				13.8	21.0	30.6	16.3	24.8	13.8	26.1	30.6	9.9
I = 7		1.8	6.1	16.6	18.4	26.5	23.6	23.0	8.8	20.0	14.8	
I = 8		3.9	7.0	6.6	15.0	18.0	9.1	9.0				

DEPTHS TO PHYSICAL INTERFACE TABLE

	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12
I = 1						20.0	25.0	35.0	35.0	20.0	10.0	
I = 2					15.0	25.9	35.0	36.6	37.0	47.0	25.0	10.0
I = 3			10.0	10.2	22.0	29.6	34.7	40.1	54.5	52.5	41.0	15.0
I = 4	4.5	11.6	13.5	20.0	24.0	29.2	34.0	42.6	46.3	47.0	29.2	10.0
I = 5	1.0		9.4	11.5	21.2	26.0	33.4	39.5	10.0	32.4	25.0	10.7
I = 6				12.2	19.5	29.0	14.7	23.2	11.4	24.5	29.0	8.3
I = 7		0.2	4.5	15.0	16.0	25.0	22.0	22.2	7.2	10.4	13.2	
I = 8		2.4	5.4	5.0	13.0	15.1	7.5	7.0				

DEPTHS FROM PHYSICAL TO 15 pCi/g INTERFACE TABLE

	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12
I = 1						1.6	1.6	2.8	1.6	1.6	1.6	
I = 2					1.6	1.6	1.6	1.6	2.8	1.8	1.6	1.6
I = 3			1.6	1.6	1.2	1.6	1.6	1.6	1.6	1.6	1.6	1.6
I = 4	1.6	0.4	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.0
I = 5	1.6		1.6	2.0	1.6	1.6	1.6	1.6	1.6	1.6	1.6	0.8
I = 6				1.6	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6
I = 7		1.6	1.6	1.6	1.6	1.5	1.6	0.8	1.6	1.6	1.6	
I = 8		1.6	1.6	1.6	2.0	2.9	1.6	2.0				

	ABOVE PHYSICAL INTERFACE	ABOVE 15 pCi/g INTERFACE
TOTAL VOLUME (cy)	1.51524E+06	1.623E+06
TOTAL VOLUME (ft3)	4.09116E+07	4.38211E+07
DEPTH (ft)	21.9959	23.5601
TOTAL ACTIVITY (Ci)	1366.28	1428.96
AVERAGE ACTIVITY (pCi/g)	786.129	763.384

AVERAGE DEPTH FROM PHYSICAL INTERFACE TO 15 pCi/g INTERFACE IS 1.56429 FEET (BASED ON 14 VALUES)

AVERAGE PILE ACTIVITY PROFILE

DEPTH	ABOVE PHYSICAL INTERFACE		ABOVE 15 pCi/g INTERFACE		TOTAL PILE	
(FT)	VOLUME	ACTIVITY	VOLUME	ACTIVITY	VOLUME	ACTIVITY
0.0 - 2.5	168,492	788	171,525	780	172,219	777
2.5 - 5.0	164,198	860	166,537	857	172,219	833
5.0 - 7.5	155,337	835	161,853	838	172,219	801
7.5 - 10.0	146,457	837	152,584	816	172,219	729
10.0 - 12.5	129,660	808	139,339	770	172,219	631
12.5 - 15.0	117,345	785	125,829	771	172,219	573
15.0 - 17.5	103,237	784	111,798	764	172,219	512
17.5 - 20.0	95,877	751	102,864	733	172,219	457
20.0 - 22.5	82,476	753	90,382	721	172,219	387
22.5 - 25.0	72,379	739	77,657	713	172,219	330
25.0 - 27.5	56,854	706	66,326	654	172,219	270
27.5 - 30.0	50,486	631	54,321	643	172,219	220
30.0 - 32.5	42,371	799	46,071	761	172,219	231
32.5 - 35.0	37,369	761	41,454	769	172,219	201
35.0 - 37.5	24,638	691	32,516	583	172,219	132
37.5 - 40.0	20,761	946	23,275	872	172,219	132
40.0 - 42.5	15,181	650	19,077	576	172,219	80
42.5 - 45.0	11,898	730	13,427	699	172,219	73
45.0 - 47.5	9,720	563	11,796	570	172,219	57
47.5 - 50.0	4,718	596	7,293	470	172,219	42
50.0 - 52.5	4,718	311	4,718	311	172,219	23

ADDENDUM D3

GEOLOGIC DATA

CONTENTS

Table		Page
D3.1	Faults in the Mexican Hat site region, source, method of study, and comments	D3-1
D3.2	NGDC earthquake data file, 200-km radius of Mexican Hat, Utah. .	D3-3
D3.3	Field notes for ground reconnaissance.	D3-5

Table D3.1 Faults in the Mexican Hat site region, source, method of study, and comments

Fault/ lineament number	Source	Examined by: Aerial recon.	Low-sun-angle Aerial recon.	Ground recon.	Comments
1	Witkind and others, 1957	X	X		Shorter than mapped. No late Quaternary offset.
2	this study	X	X		Not faulted - lineament from exposure by erosion of resistant stratigraphy.
3	Hackman and Wyant, 1973	X	X		No Late Quaternary offset.
4	Cooley and others, 1969	X			No Late Quaternary offset.
5	Haynes and Hackman, 1978	X			No Late Quaternary offset.
6	Haynes and Hackman, 1978	X			No Late Quaternary offset.
7	Hackman and Wyant, 1973	X	X		No Late Quaternary offset.
8	Hackman and Wyant, 1973 and this study	X	X		No Late Quaternary offset.
9	Cooley and others, 1969	X	X	X	No Late Quaternary offset.
10	Hackman and Wyant, 1973	X	X	X	No Late Quaternary offset.
11	Cooley and others, 1969 Hackman and Wyant, 1973	X	X		No Late Quaternary offset.
12	Hackman and Wyant, 1973	X	X		No Late Quaternary offset.
13	Hackman and Wyant, 1973 Haynes and Hackman, 1978 this study	X	X	X	No Late Quaternary offset.
14	this study	X	X		No Late Quaternary offset.
15	Hackman and Wyant, 1973 Haynes and Hackman, 1978 Cooley and others, 1969	X	X		No Late Quaternary offset.
16a	Haynes and others, 1972	X	X	X	No Late Quaternary offset.
16b	Haynes and others, 1972	X	X		No Late Quaternary offset.
17	Haynes and others, 1972	X	X	X	No Late Quaternary offset.
18	Haynes and others, 1972	X	X		No Late Quaternary offset.
19	Cooley and others, 1969 Hackman and Wyant, 1973	X	X		No Late Quaternary offset.

Table D3.1 Faults in the Mexican Hat site region, source, method of study, and comments (Concluded)

Fault/ lineament number	Source	Examined by: Aerial recon.	Low-sun-angle Aerial recon.	Ground recon.	Comments
20	Cooley and others, 1969 Hackman and Wyant, 1973	X	X		No Late Quaternary offset.
21	Cooley and others, 1969 Hackman and Wyant, 1973	X	X		No Late Quaternary offset.
22	this study	X	X	X	Not a fault - dike emplacement.
23	Haynes and others, 1972 and this study	X	X	X	Excavated scarps in resistant Rico Fm.
24	this study	X	X	X	Excavated scarps in resistant Rico Fm.
25	this study	X	X		Possible Quaternary displacement but probably erosion-exposed fault line. Not critical as length is only about 12 km (7.5 mi).

PAUL , SMITH
SERGENT, HAUSKINS & BECKWITH

200-KM RADIUS OF ME. AN HAT, UT, 37.13 N, 109.85W

08 08 -- 03:41:00

NGDC EARTHQUAKE DATA FILE

SOURCE	DATE YR	MO	DA	TIME HR	MN	SEC	LOCATION LAT		LONG		DEPTH KM	MAGNITUDES Mb	Ms	OTHER	LOCAL		INT MAX	DTSVNO	F-E	CE	Q/N	DISTANCE KM
USN	1967	05	08	19	31	28.4	37.7	N	110.2	W	33								478		A	69
PDE	1981	09	10	07	55	09.3U	37.511	N	110.542	W	7G				3.1	ML SLC			479		7	72
1***PDE	1967	05	08	19	31	28.5*	37.726	N	110.239	W	33N								478		5	73
PDE	1971	05	01	02	11	20.4	36.601	N	110.431	W	5G				2.	ML NOS			495		7	79
PDE	1971	03	14	18	14	12.2*	36.472	N	110.437	W	5G				2.2	ML NOS			495		5	82
PDE	1973	02	09	17	38	37. *	36.43	N	110.425	W	5G				3.2	ML ERL			495		6	92
1***USN	1973	02	09	17	33	37.	36.4	N	110.4	W	5								495		A	93
ISS	1931	07	28	08	39	06.	36.4	N	111.	W									495			129
PDE	1979	04	30	02	07	10.3U	37.883	N	111.016	W	7				3.9	ML GS	IV		478	F	21	131
USN	1894	02	05	03	30		37.1	N	111.4	W							IV		478		G	135
USN	1894	02	06	15			37.1	N	111.4	W							III		478		G	135
USN	1935	10	06	03			37.6	N	111.3	W							IV		478		G	136
USN	1963	09	30	09	17	40.3	38.	N	111.	W	15								478		C	138
PDE	1941	02	28	06	19	48.	37.8	N	108.5	W									479			143
PDE	1983	05	03	12	43	38.1U	38.258	N	110.592	W	7G			3.2	3.	ML SLC			478		24	143
PDE	1966	03	24	20	10	59.3	36.8	N	108.3	W	5								496		6	145
2***USN	1966	03	24	20	10	59.3	36.8	N	105.3	W	5								496		C	145
1***STO	1966	03	24	20	10	59.3G	36.8	N	108.3	W	5								496		CX	145
PDE	1966	09	09	17	43	58.4	36.7	N	108.3	W	33								496		5	146
1***STO	1966	09	09	17	43	58.4G	36.7	N	108.3	W	33								496		CX	146
PDE	1967	02	01	20	15	19.3*	38.47	N	109.929	W	5G	3.8							478		6	149
USN	1955	03	27	12	13		38.1	N	111.1	W							IV		478		H	152
STO	1964	01	17	22	00	42.8G	36.71	N	108.25	W	33								496		CX	152
1***USN	1967	02	01	20	15	19.3	38.5	N	109.9	W	5	3.8					IV		478		A	152
EQH	1912	09	18	21	12	Z	36.5	N	111.5	W							VII	F	495	D		160
1***USN	1912	08	18	21	12		36.5	N	111.5	W							VIII		495		H	160
USN	1950	01	17	00	53		35.7	N	109.6	W							VI		495		G	161
USN	1896	10	14	14			38.4	N	110.8	W							II		478		G	163
2***USN	1970	02	03	05	59	35.6	37.9	N	108.3	W	33	4.					V		479		A	164
PDE	1970	02	03	05	59	35.6*	37.918	N	108.311	W	33N	4.							479		5	164
1***STO	1970	02	03	05	59	35.6G	37.92	N	108.31	W	33	4.							479		C	164
EQH	1910	09	24	04	05	Z	36.	N	111.1	W							VI		495	F		165
1***USN	1910	09	24	04	05		36.	N	111.1	W							VIII		495		G	166
USN	1943	08	14	04	40		38.2	N	111.3	W									478		G	173
1***USN	1970	04	18	10	42	11.9	37.9	N	111.6	W	10	4.4					V		478		A	174
PDE	1970	04	18	10	42	11.9	37.858	N	111.645	W	10G	4.4							478		10	176
1***STO	1967	02	12	10	11	52.4G	37.67	N	108.	W	5								479		5	177
PDE	1967	02	12	10	11	52.4	37.673	N	108.002	W	5G								479		5	177
PDE	1971	12	15	12	59	14.5*	36.791	N	111.324	W	5G				3.	ML ERL			495		8	177
2***USN	1967	02	12	10	11	52.4	37.7	N	108.	W	5								479		A	178
USN	1926	10	01	15	15		37.3	N	111.9	W							III		478		G	180
USN	1926	10	04	20	30		37.3	N	111.9	W							III		473		G	180
USN	1926	10	23	07			37.3	N	111.9	W							III		473		G	180
USN	1926	11	12	03	40		37.3	N	111.9	W							III		478		G	180
USN	1926	11	16	14	15		37.3	N	111.9	W							III		478		G	180
USN	1948	01	24	02	57		35.9	N	111.2	W									495		I	181
PDE	1945	01	07	22	25	32.	36.5	N	111.8	W				5.1 PAS			VI		495	D		185
2***USN	1967	01	16	09	22	45.9	37.7	N	107.9	W	33	4.1					V		479		A	186

N*** BEFORE A RECORD MEANS IT IS A POSSIBLE DUPLICATE
NATIONAL GEOPHYSICAL DATA CENTER/NOAA BOULDER, COLORADO 80303

Table D3.2 (Concluded)

NGDC EARTHQUAKE DATA FILE

SOURCE	DATE YR	MO	DA	TIME HR	MN	SEC	LOCATION LAT		LONG		DEPTH KM	MAGNITUDES Mb	Ms	OTHER	LOCAL			INT MAX	DTSVNO	F-E	CE	C/N	DISTANCE KM
USN	1885	12	17	03	20		38.3	N	111.4	W								III		478	G		187
1***STO	1967	01	16	09	22	45.9G	37.67	N	107.86	W	33	4.1								479	B		188
PDE	1967	01	16	09	22	45.9	37.672	N	107.86	W	33N	4.1								479		9	188
USN	1966	05	30	22	20	41.9	37.7	N	111.9	W	5									478	C		189
PDE	1967	09	04	23	27	44.7	36.2	N	111.7	W	33									495		6	192
1***USN	1967	09	04	23	27	44.7	36.2	N	111.7	W	33									495	A		192
USN	1881	08	04	18	30		38.3	N	111.5	W										478	G		193
STO	1941	08	29	11	34	G	37.3	N	107.7	W								V		479	G		194
STO	1962	06	23	17	11	04. G	38.5	N	109.5	W	33									479	C		195
1***STO	1977	03	05	03	00	54.7G	35.91	N	108.29	W	22	4.6			4.2	ML	GS	VI		496	A		196
PDE	1977	03	05	03	00	54.7	35.915	N	108.286	W	22	4.6			4.2	ML	GS	VI	PDE	496	D	47	196
PDE	1976	01	05	06	23	32.9	35.844	N	108.341	W	25G	5.			4.6	ML	GS	VI		496	D	95	198
USN	1935	12	03	21	15		37.4	N	112.1	W										478			199
1***STO	1976	01	05	06	23	32.9G	35.84	N	108.34	W	25	5.			4.6	ML	GS	VI		496	A		199
1***STO	1976	05	20	19	43	21.9G	35.47	N	109.04	W	5				2.5	ML	GS	IV		495	C		199
PDE	1976	05	20	19	43	21.9*	35.474	N	109.039	W	5G									495	P	12	199

N*** BEFORE A RECORD MEANS IT IS A POSSIBLE DUPLICATE

TOTAL NUMBER OF EVENTS RETRIEVED IS 64
TOTAL NUMBER OF SUSPECTED DUPLICATES IS 19

NATIONAL GEOPHYSICAL DATA CENTER/NOAA BOULDER, COLORADO 80303

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Table D3.3 FIELD NOTES FOR GROUND RECONNAISSANCE

Andrew F. Homuth, III
2/24/86

Mexican Hat, UT
Monument Valley, AZ

Geomorphic Lagoon inspection
1/6 - 1/10/86

San Juan Inn - Mexican Hat, Utah
(801) 683-2220 day
(801) 683-2261 night

MON. 1/7/86
Office - 8-10 am
Travel - Phx → Mexican Hat 10am-5pm
Arrive San Juan Inn - 5:00 pm.
TUES. 1/7/86
Field work 8am - 5 pm - Mex. Hat.
Wed. 1/8/86
Field work - Mon. Valley
8am - 5 pm
Thurs. - 1/9/86 - Mon. Valley
Field work 8am - 5:30 pm
Fri. 1/10/86
Travel to Phoenix 8am - 5 pm

Mexican Hat tailings site -
1/2/76 - start work 8:00 am

Inspect & measure channel head cuts.
Possible erosion hazard to pile
Appropriation?
2 additional local beds -
boats to measure cupshire area

Left side of upper tailings pile:
east of O.H. 933. -
dike/berm has been constructed along
downslope side (NW) of small drainage
channel which leads in a small
depression (loc. 1). Berm
is composed of S.S. blocks ~ 6-8"
thick, ranging from 10" - 3' across.
Berm is intact, but the S.S. blocks
are inadequate to keep road material
out of bar ditch. Height of berm ranges from 3' - 5'.
Drainage upon the paved road from
a large drainage basin between the
two hills to the south of the upper pile

Numerous deeply incised gullies occur
at S. end of upper & lower piles. These
channel surface runoff directly onto

5276 2'

3

the surface of both piles. Some sediment
deposition has occurred where these
gullies open onto the pile surfaces.

gullies to east & northeast of lower
tailings pile are actively eroding
headward toward the perimeter
road and the pile boundary. Rate
of erosion appears to be slow. Erosion
is into moderately resistant S.S.
bedrock.

Gully heads at loc. 2 are aggrading
material from elevated perimeter road
is being deposited in gully heads.
Slope of road is being slowly gullied.
No distinct gully erosion has yet occurred
No breaching of road seems likely
in near future. Possible breach of road
by gully heads could cause gully
to extend to pile boundary.
Recommend berm across between
pile edge & road. On arroyo E.
side of road at present gully heads

↓ to p. 6.

PHOTOS

Roll MEX. 1

1 - loc. P-1 Headward erosion in gully ~ 200 yds east of lower pile. On S.S. bedrock.

2 - View to west from east side of pile perimeter road. Lower pile, east side. View of gully head at road bed. Net aggradation is occurring from erosion of material used for road bed. Minor erosion of slope of road bed. No deep gullies. Location P-2.

3-5 - loc. P-3. View of NE side of lower pile. Area of slope erosion & deposition in depression between pile & road. Breaching of road could cause gully head cutting.

6 - loc. P-4 - View of NE side of lower pile. Erosion of pile slope. Possible breach of road & future gully headward erosion.

7. View to W. along N side of lower pile. Shows location of tailings in former drainage channel. - P-4

PHOTOS

8 - loc. P-5 - View to south showing drainage channel exiting from NE side of lower pile. Note extent of headcut into S.S. bedrock at lower left of photo. Area is now one of net aggradation.

9-10 - loc. P-6 - View upstream of main drainage channel from NE side of lower pile.

11 - View up channel to NE side of lower pile. loc. P-7.

12 - View upstream in channel. Note gully in road embankment. Boreholes 907 & 906 in wash downstream from road. Area of net aggradation. location P-8

13-17. Panorama view from W to N over tailings pile to upper drainage basin. From water tower hill to E of housing area. ~~location P-9~~

18 - MONUMENT VALLEY -
View to NE showing drainage thru old tailings pile - location P-1

19 - View upstream at Map LOC. 2. Flow channel bench at rock outcrop on left.

20. View to N toward pile along trend of wash flow. Wash to left flows to S in Cove Wash. LOC. P-2

Location 3: Very minor gully extending from edge of road to NE. Incised "3". No expected headcut erosion problem. Rock ledge ~ 15' high occurs on west side of road. Resistant sandstone.

Location 4: Depression between edge of pile & perimeter road. Not connected with incised tailings. Very little erosion of side slopes of road embankment. Possible breaching of road is occurring. No incised pile is currently present to east of road. Breaching of road would probably result in gully development. Narrow area of tailings slope incised by gully portion here. Area to NE of road (downslope) appears to have been bulldozed to depth of 2' below original surface! See photo 3-5.

At Loc. 4: Headward erosion is occurring in shallowly incised gullies on outer slope of tailings pile. Recent (?) erosion has lowered pile slope surface about 1' at gully heads. Gully heads are currently

1/3 up slope from base of pile embankment. Gullies are deepening between pile & area of deposition in basin next to road. (See photos 3-6).

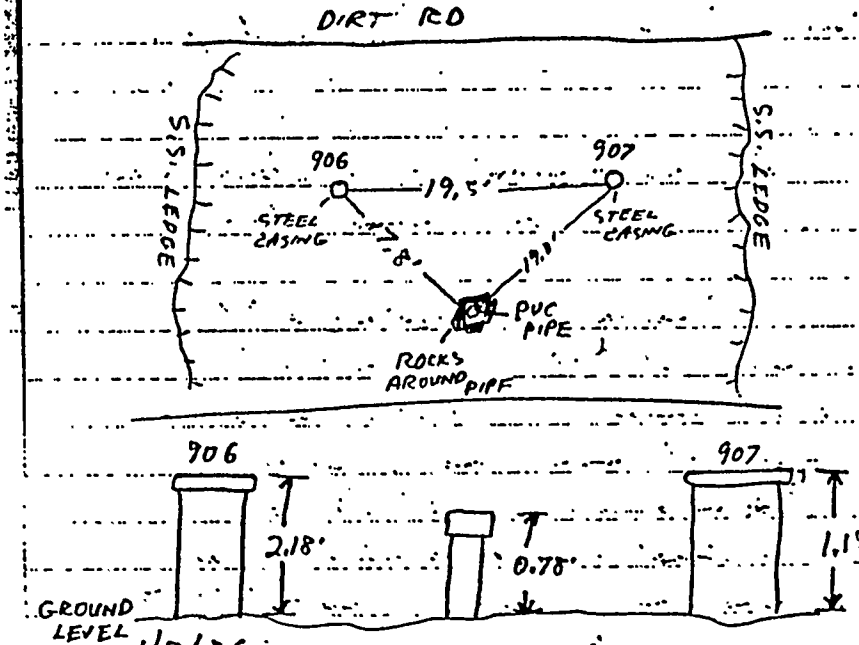
Location 5: Main drainage channel going NE from NE side of lower tailings pile. Pile is placed ~~on~~ on top within this channel. A small basin occurs between pile slope base and perimeter road. This is an area of net deposition of f.g. tailings material eroded from outer face of pile. Pile slope is extensively gullied. & Eolian dunes composed of tailings are present in this area. Perimeter road is being breached by a gully ~ 1' deep & 1' wide forming on the NE road embankment.

* Major gully appears to have had net aggradation since construction of tailings pile & perimeter road. No incised channel is present in area. Edges of wash are cut into moderately resistant S.S. bedrock. Breaching of perimeter road embankment would probably result in gully extension to edge of pile slope. →

Headcut in lower wash does not appear to have extended upstream past point shown on blue-line photo copy. (dated ?) Headcut is into resistant, ferruginously cemented sandstone bedrock.

Location 6: Borehole sites 906 & 907, just downstream of road, in wash from NE side of lower tailings pile.

Baseline measurement of wash ground surface in relation to top of well casing caps. Measurements taken on upstream side of casing



Location 7: Gully eroded into S.S. bedrock across outer road at N side of lower tailings pile. Slight amount of erosion of loose surficial material appears to be occurring. Gully head does not reach upper perimeter road. Deposition is occurring at upper end of gully from material eroded from upper perimeter road. No apparent headcut beyond to pile. Gully could deepen if a large amount of runoff water was channeled from tailings pile to this wash, across upper dirt road.

Bottom of wash is on S.S. bedrock. Flows appear to be slowly removing any sediment deposits which accumulate in wash. Therefore, net degradation in downstream channel below lower perimeter road.

Borehole casing baseline height measurement Map location 8.

Channel was last lowered surface about 4" from edge of concrete pad pad poured around PVC pipe. 3 vertical S.S. slabs were set into edge of concrete pad. Height (1/7/86) from PVC cap top to wash surface = 2.13'

Map Loc. 9 ... Headward gully erosion stops at rock ledge of resistant sandstone, ~ 12' high. Minor scour down to shallow rock surface between bor + borehole 905+906. No hazard to tailings pile. Very remote possibility of headward erosion to pile over a long time period. Probably not within 1000 years in present climate. Possible increased scour rate if road is breached near depression + increased surface runoff occurs. Minor gullies are present in dirt road embankment. Will enlarge to breach road.

Possible solutions for routing surface runoff from drainage basin above (to south) of tailings piles: See routes suggested by R.E.W. in site study. Best route seems to be Option 2. Divert drainage basin runoff to channel along west side of site, then across highway to San Juan River. Flow would be through existing pond on SW side of site. Existing bermed channel along east side of site would have to be =

extended + reinforced to carry runoff along east side of pile to the main wash leading to the San Juan River. Flow in this east side channel would be less than in the SW side channel. SW side channel would collect all runoff from upper basin area bordering area.

Existing rock berm along road at east side of the pile may be sufficient to channel runoff from hills to east.

ADDENDUM D4

LITHOLOGIC LOGS

This addendum contains borehole logs and test pit logs. When referring to the DOE boring and test pit ID numbers, please note that the numbers used in the text refer to the numbering system as used in the DOE computerized Database Management System (DBMS). The numbering system used on the field boring logs and tailings test pit logs does not match that used in the text. Therefore, when referring to the following DOE boring logs and test pit logs in conjunction with the text of this document it may be necessary to convert the field and laboratory numbers via Table D4.1.

Table D4.1

	Field or lab number	DBMS ID number
Piezocone data:	HAT01-01 through 40	HAT01-200 through 240
Boring and lab data:	HAT01-01	HAT01-126
	HAT01-03	HAT01-127
	HAT01-06	HAT01-128
	HAT01-07	HAT01-129
	HAT01-09	HAT01-130
	HAT01-11	HAT01-131
	HAT01-15	HAT01-132
	HAT01-17	HAT01-133
	HAT01-19	HAT01-134
	HAT01-20	HAT01-135
	HAT01-23	HAT01-136
	HAT01-26	HAT01-137
	HAT01-32	HAT01-138
	HAT01-33	HAT01-139
	HAT01-35	HAT01-181
	HAT01-41-47	HAT01-182-188
	HAT01-50-56	HAT01-189-195
Test pits:	HAT01-TP1-TP5	HAT01-001-005

Table D4.2 Summary of geotechnical subsurface explorations at Mexican Hat, Utah (DOE)

Boring or test pit number[a]	Coordinates: Northing	Coordinates: Easting	Completion date	Total depth (feet)
Borings:				
(On the pile)				
HAT01-126	9111.3	9644.9	10/11/84	34.0
HAT01-127	9310.0	9445.0	10/11/84	27.0
HAT01-128	8710.0	9441.5	10/11/84	20.0
HAT01-129	8516.0	9241.0	10/11/84	12.5
HAT01-130	8910.5	9239.0	10/11/84	18.0
HAT01-131	9510.0	9245.0	10/12/84	17.0
HAT01-132	9710.6	10490.0	10/12/84	27.0
HAT01-133	9710.0	10890.0	10/12/84	45.0
HAT01-134	9708.5	11232.0	10/12/84	46.5
HAT01-135	9909.5	10891.6	10/16/84	41.0
HAT01-136	9508.7	10485.0	10/16/84	25.0
HAT01-137	9310.0	10890.0	10/13/84	22.5
HAT01-138	9510.9	10890.0	10/16/84	42.0
HAT01-139	9511.1	11090.8	10/16/84	34.0
HAT01-181	9310.3	11291.7	10/15/84	34.0
HAT01-911[b]	(9310)	(11090)	01/06/85	98.0
HAT01-912[b]	(9520)	(11160)	03/28/85	84.0
(Off the pile)				
HAT01-182	8370.6	9343.2	10/10/84	5.0
HAT01-183	8304.5	10066.6	10/10/84	3.3
HAT01-184	8727.1	10830.5	10/10/84	12.0
HAT01-185	9670.4	11617.7	10/10/84	14.0
HAT01-186	10482.4	11221.2	10/10/84	3.0
HAT01-187	10199.4	10345.6	10/10/84	3.0
HAT01-188	9885.5	9540.9	10/10/84	6.0
HAT01-189	(10850)	(10930)	10/23/84	5.0
HAT01-190	10781.3	11109.9	10/23/84	5.0
HAT01-191	(11050)	(12270)	10/23/84	2.5
HAT01-192	11683.1	12321.9	10/23/84	2.5
HAT01-193	10935.2	12126.8	10/23/84	1.5
HAT01-194	10152.6	11711.0	10/23/84	2.0
HAT01-195	10019.3	9538.7	10/23/84	3.0
HAT01-905	10006.3	9544.2	12/11/84	9.0[d]
HAT01-906[b]	10137.5	11703.1	12/12/84	11.8[d]
HAT01-907[b]	10154.1	11692.4	12/19/84	125.0[d]
HAT01-908[b]	(10000)	(9580)	01/11/85	196.9[d]
HAT01-909[b]	(7780)	(7510)	01/19/85	215.0[d]
HAT01-910[b,c]	(8400)	(10400)	01/22/85	236.0[d]

Table D4.2 Summary of geotechnical subsurface explorations at Mexican Hat, Utah (DOE) (Concluded)

Boring or test pit number	Coordinates		Completion date	Total depth (feet)
	Northing	Easting		
Borings (Cont.):				
(Off the pile) (Cont.)				
HAT01-930[b]	10550.337	7732.998	10/10/85	116
HAT01-931	12083.029	9971.036	10/12/85	177
HAT01-932	13167.679	12636.319	10/14/85	193
HAT01-933	7782.264	8444.656	10/15/85	175
HAT01-934[b]	9221.312	11989.935	10/18/85	200
HAT01-935[b]	10023.747	12468.284	10/20/85	187
HAT01-936	11391.741	10912.259	10/21/86	142
Test Pits:				
(Tailings)				
HAT01-001	(9710)	(11090)	10/17/84	7.0
HAT01-002	(10600)	(11200)	10/23/84	0.5
HAT01-003	(9510)	(10690)	10/23/84	5.5
HAT01-004	(9110)	(9445)	10/23/84	7.5
HAT01-005	(9310)	(9445)	10/23/84	4.5

[a]DBMS numbering system (See Table D4.1).
[b]These borings were cased and completed as monitoring wells.
[c]Two borings were advanced. One encountered hydrogen sulfide gas and was grouted to its full depth and another drilled nearby.
[d]Indicates that all or part of the boring was advanced using rock coring techniques.

() Coordinates enclosed in parentheses are field estimates and were not surveyed.

Table D4.3 Summary of borings at Mexican Hat (MSRD/CSU)

Boring number	Date completed	Total depth (feet)
A1	01/08/82	5.0
A2	01/08/82	3.0
A3	01/08/82	2.5
A4	01/08/82	4.5
A5	01/08/82	3.9
A6	01/08/82	7.3
A7	01/08/82	10.9
A8	01/08/82	13.7
A9	--	9.0
A10	01/08/82	7.5
A11	--	5.0
A13	--	5.5
A25	01/09/82	8.9
A27	01/09/82	5.0
A29	01/09/82	10.3
A36	01/09/82	22.5
A37	01/09/82	14.5
A38	01/09/82	14.8
B12	01/09/82	15.3
B14	01/08/82	26.5
B15	--	20.0
B16	01/08/82	36.0
B17	--	23.9
B18	01/08/82	22.6
B19	01/08/82	25.2
B20[a]	01/08/82	2.0
B21	01/08/82	13.5
B22	01/09/82	17.5
B23	01/08/82	19.5
B24	01/09/82	28.2
B26	01/09/82	34.3
B28	01/09/82	13.8
B30	01/09/82	31.5
B31	01/09/82	27.5
B32	01/09/82	37.9
B33	01/09/82	21.4
B34	01/09/82	23.4
B35	01/09/82	31.0
B86	01/20/82	39.9
B88	--	35.9
B93	01/20/82	35.5

Table D4.3 Summary of borings at Mexican Hat (MSRD/CSU) (Continued)

Boring number	Date completed	Total depth (feet)
C39	01/10/82	1.9
C40	01/10/82	4.8
C41	01/10/82	10.7
C42	01/10/82	12.0
C43	01/10/82	14.9
C44	01/10/82	23.2
C45	01/10/82	22.7
C46	01/10/82	9.7
C47	01/10/82	27.5
C48	01/10/82	35.4
C49	01/11/82	35.0
C54	01/11/82	34.8
C56	01/11/82	30.0
C58	01/11/82	24.4
C60	01/11/82	29.7
C62	01/11/82	34.4
C65	01/12/82	29.9
C67	01/12/82	22.5
C69	01/12/82	7.5
C71	01/12/82	3.4
C73	01/12/82	0.9
C75	01/12/82	6.1
C77	01/12/82	17.4
C79	01/12/82	19.8
C81	01/18/82	26.4
C83	01/18/82	24.9
C87	01/18/82	16.3
C89	01/19/82	14.5
C90	01/19/82	6.0
C94	01/20/82	21.0[b]
C95	01/20/82	26.0[b]
C96	01/20/82	19.0[b]
C97	01/20/82	7.5
D50	01/10/82	54.8
D51	--	42.4
D52	01/11/82	41.3
D53	01/11/82	18.4
D55	01/11/82	33.1
D57	01/12/82	26.1
D59	01/12/82	29.3
D61	01/12/82	13.6
D63	01/12/82	24.1
D64	01/12/82	46.9

Table D4.3 Summary of borings at Mexican Hat (MSRD/CSU) (Continued)

Boring number	Date completed	Total depth (feet)
D66	01/12/82	47.3
D68	01/12/82	3.9
D70	01/12/82	14.2
D72	01/12/82	1.3
D74	01/12/82	1.8
D76	01/12/82	7.9
D78	01/12/82	19.1
D80	01/12/82	18.4
D82	01/12/82	22.7
D84	01/19/82	50.0
D85	01/19/82	8.9
D91	01/19/82	9.9
D92	01/19/82	12.0
D98	01/22/82	25.0
D99	01/22/82	11.8
D100	01/22/82	46.2
D101	01/22/82	48.9
D102	01/22/82	39.7
D103	01/22/82	37.9
D104	01/22/82	35.9
D105	01/22/82	54.8
CSU 200	01/23/82	1.5
CSU 201	01/23/82	4.0
CSU 202	01/23/82	19.7
CSU 203	01/23/82	34.5
CSU 204	01/23/82	39.6
CSU 205	01/23/82	25.5[b]
CSU 206	01/23/82	16.0
CSU 207	01/23/82	24.8
CSU 208	01/22/82	47.0[b]
CSU 209	01/22/82	12.0
CSU 210	01/22/82	5.0
CSU 211	01/23/82	30.9
CSU 212	01/23/82	37.9
CSU 214	01/23/82	29.8
106[c]	--	0.9
107[c]	01/23/82	1.1
108[c]	01/23/82	1.4
109[c]	01/23/82	4.9

Table D4.3 Summary of borings at Mexican Hat (MSRD/CSU) (Concluded)

Boring number	Date completed	Total depth (feet)
Piezometers		
HG2[d]	01/23/82	20.0[b]
HG3[d]	01/23/82	60.0[b]

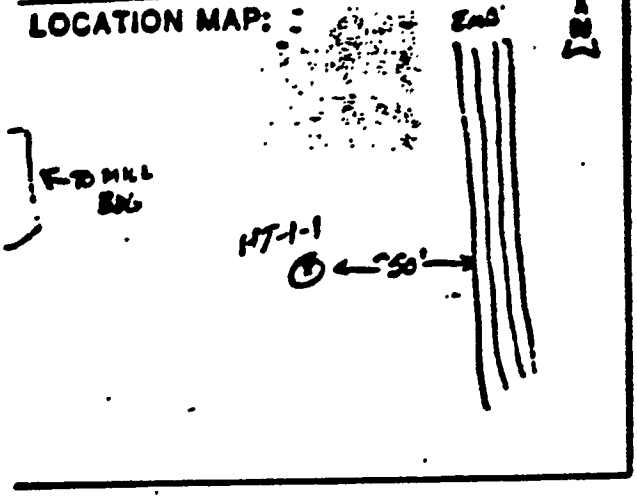
[a]This boring is marked as A20 on original maps but appears as B20 in borehole logs.
[b]All or part of the boring was advanced using rock coring techniques.
[c]Off-pile holes (not shown on location map).
[d]Boring logs missing.

DOE BORING LOGS

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

LOCATION MAP:



SITE ID: HAT 01 LOCATION ID: HT-1-1
APPROX. SITE COORDINATES (ft.):
N 9110 E 9645
GROUND ELEVATION (ft. MSL): 4330 T.M.
DRILLING METHOD: HSA CONTINUOUS
DRILLER: TCATT
DATE STARTED: 10-11-84
DATE COMPLETED: 10-11-84
FIELD REP.: GILMA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION: WEST SIDE TRENCH 1 FAR
SITE CONDITION: SUNNY DRY - POWDERY SURFACE

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
				S	1	1,1,1	2	SM	SAND F-G WHITE D-D V. SILTY SLIGHTLY TRANSITION INTO CLAY
5				S	2	1,2,3	4	CL	CLAY V MOIST OLIVE-BROWN TO DARK SOFT HA LAYERED = WHITE & LT BROWN
				T	3	C2015		SP/CL	SAND F-G SL CLAY GREY
5-6				S	4	2 3 4	7		OCAS. CLAY LAYERS
7 7.5				S	5	3,2,4	6		GREY - DARK GREY
8.5 9				S	6	3,2,2	4		OCAS CLAY OR V. SILTY LAYERS
10 10.5				S	7	3,2,4	6		
11.5 12				S	8	3,3,4	7	CL	CLAY LAYERS SPOTTY
13 13.5				S	9	3 2 4	6		
15				T	10				
17.5				S	11	1,2,3	5		CLAY VARIEGATED GREY BROWN LAYERS
19				S	12	3,4,5	9	SP	SAND F-G SILTY SOME SP GRAVELLY
20.5				S	13	4,4,4	8		OCAS CLAY LAYER - GREY
22 22.5				T	14	C2000		CH	CLAY HPL MOIST GREY TO LIGHT BROWN
25									See Next pg.

COMMENTS: + 6" @ 1st SILTY ENDOPHYTE 6 (3-6).
EXTRA PUSH DEPTH BY SLOUGH.

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

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: HT-1-P
APPROX. SITE COORDINATES (ft.):
N 9110 E 9865
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: USA CONFINED
DRILLER: TCATT
DATE STARTED: 10-11-84
DATE COMPLETED:
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION
SITE CONDITION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
				S	15	1,3,4	7	CL-ML	CLAY-SILTY SAND TO SILTY CLAY MOIST LOOSE TO SOFT CL-ML
3.5				S	16	2,2,4	6	CL	SOME SANDY LAYERS CLAY V MOIST SOFT
28									
29.5				S	17	3,5,7	12	SM SM	SAND FG SLSILTY GREY MOIST MD
31				S	18	7,5,5	10		
32.5				S	19	3,4,4	8	CL	CLAY MOD SL SANDY MPI GREY SOFT
									TRANSITION INTO BEDROCK SS/CH.PS
34	34.5			S	20				REDBROWN SANDSTONE @ 34' = TD
									TD = 34'
									SAMPLE REFUSAL @ 34 ON ROCK - BOULDER SAMPLE #1/2

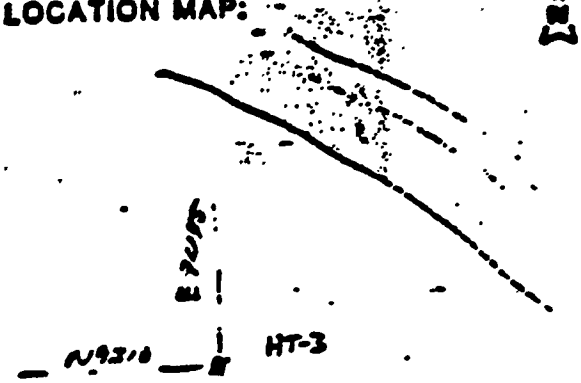
COMMENTS:

SAMPLE TYPE
A - Auger cuttings
S - 3" O.D. 1.38" I.D. Split barrel sampler
U - 3" O.D. 2.42" I.D. Tube sampler
T - 3" O.D. Thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

LOCATION MAP:



SITE ID: HAT 01 LOCATION ID: HT-1-3
APPROX. SITE COORDINATES (ft.):
N 9210 E 9445
GROUND ELEVATION (ft. MSL): 4330
DRILLING METHOD: HSA - CONTINUE
DRILLER: TCATT
DATE STARTED: 10-11-90
DATE COMPLETED:
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION NORTH PART OF VANCE PIT
SITE CONDITION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
						EASY		CL	CLAY - MPI GREY TO WHITE SOFT
				T	1				BROWN
5				S	2	27,3	5	SM-SP	SAND F.G. SILTY - LOOSE, SLMOIST GREY
4									¼" LAYERS OF GREY & BROWN CL CLAY
				S	3	3 2 3	5		WITH 1/16" LAYERS OF FINE SAND - SP
5.5				S	4	3.3.3	6		
7				S	5	3,2,3	5		
8.5				S	6	3,3,3	6	SP	SAND. FG GREY SLMOIST
10				S	7	3,3,4	7	NLL	CLAY LAYERS
11.5				S	8	3.3.2	5		
13				S	9	2,2,3	5		
14.5				S	10	3.2,2	4		
16				T	11	EASY PUSH		SP	SAND @ 18.5
18.5				S	12	3,3,4	7		
20.5				S	13	6,5,2	7		CLAYEY - SOFT WET TO MOIST BROWN
22				S	14	3,4,4	8		GRAVEL CLAY LAYERS @ 24'
23.5				S	15	3.3,2	6		
25				S	16	3,3,9	11		26.5 SAND OVER SANDY CLAY
25.5								SS	SANDSTONE @ 27 = TD

COMMENTS: CAVED @ 15'

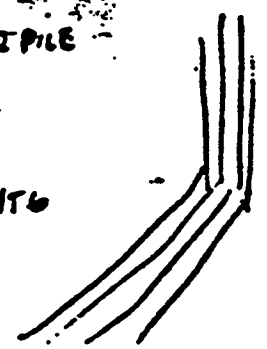
SAMPLE TYPE
A - Auger cuttings
B - 3" O.D. 1.38" I.D. Drive sample
C - 3" O.D. 2.42" I.D. Tube sample
T - 3" O.D. Thin-walled Shelby tube

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

BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:



SITE ID: HAT01 LOCATION ID: HT6
APPROX. SITE COORDINATES (ft.):
N 8710 E 9465
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: HSA
DRILLER: TEXAS ENGINEERING
DATE STARTED: 10-11-88
DATE COMPLETED: 10-11-88
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
/	/	/

LOCATION DESCRIPTION: SOUTH SIDE UPPER PILE
SITE CONDITION: WINDY SUNNY

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
	X	X	■	S	1	1,1,1	2	SM	SAND F.G. ORANGE & WHITE
1.5	X	■	■	S	2	1,2,1	3		OCCS SL SILTY LAYERS
3	X	X	■	U	3	6/12	6		BROWN YELLOW WHITE CLAY CLAY YELLOW
4								SP-SM	10% ROUNDED SAND OCCS CLAYEY LAMS
6	X	X	■	S	4	1/12" 2 2	4		
7.5	X	■	■	S	6	2 2 3	5		
9	X	X	■	S	7	1 2 2	4		
10.5	X	X	■	S	8	1,1,2	3		SL CLAYEY LAYERS @ 11
12	X	X	■	S	9	2,2,3	5		YELLOW BROWN SAND F.G. CLAY SCALES
13.5	X	X	■	S	10	3,3,3	6		CLAY SOFT MOIST @ 14 LAYERED
	X	X	■	S	11	2,1/12"	1	CH	COLORS GREY-BROWN OCCS THIN SAND LENS
		N R		U	12	4/12" NR	80		MOIST-SOFT
16.5	X	■	■	S	13	1,1,1	2		
18	X	X	■	S	14	1,1,1	2		
19.5	X	X	■	S	15	? 1,1,50/3	50/3	SS	PIECES AND SANDSTONE RED-BROWN SAND F.G. GRAVELLY TR GREEN SHALE & SILTSTONE IN - JOINTED & FRACTURED SS ROCK
20									TD=20'

COMMENTS:

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

JEG-AL-ENG-28. (9/84)

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

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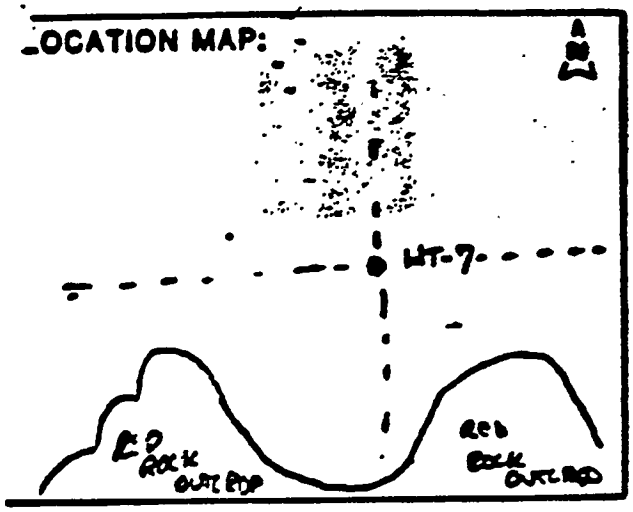
LOCATION MAP:



SITE ID: HAT01 LOCATION ID: HT-7
APPROX. SITE COORDINATES (ft.):
N 8510 E 9215
GROUND ELEVATION (ft. MSL): 9553.2
DRILLING METHOD: HSA - COULD NOT DRIVE SPLIT SPOON
DRILLER: T CATT
DATE STARTED: 10-11-94
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION: SOUTH SIDE UNDER PIC
SITE CONDITION: CLOSE DRY POWER HYDRANT

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
0				S	1	1,2,1	3	SM	SAND F. & SILTY BROWN TO TAN - DRY
1.5				S	2	1,1,1	2		WHITE
				U	RINGS	17/12"	17	SM	SAND F. & SILTY WHITE DRY MD
4				S	4	1,2,1	3	CL	CLAY - SL SANDY - SLIMEY
5.5				S	5	2/12"	1	ML	DARK BROWN - SILTY
7.0				S	6	1,1,1	2		SEE "ICE CREAM SHERBERT"
8.5	B			U	RING	2/12"	1	SM-CL	SANDY CLAY WITH LENSES OF SILTY CLAY
9.7				S	7				GREY SLIMEY BROWN GRAVEL "FEATHER"
11				S	8	2,1,1	2	CL	SLIMEY CLAY SOFT WET BROWN - ½" GRAVEL
12.5				S	9	1,1,1	2	ML	CRYSTALLINE ROCK BROWN - OLIVE BROWN SLIMEY CLAY WET SOFT "FEATHER"
14				S	10	11,13,19	30		WEATHERED SANDSTONE 13.8
				S	11		30	SS	SANDSTONE COBROWN SANDSTONE
									→ TD = 14'
									SMOOTH PILE OF MESSY STUFF LEFT AFTER FILLING IN HOLE CAVED @ 12.5'

COMMENTS:

SAMPLE TYPE
A - Auger cuttings
B - 3" 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

JEG-AL-ENG-28 (3/84)

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

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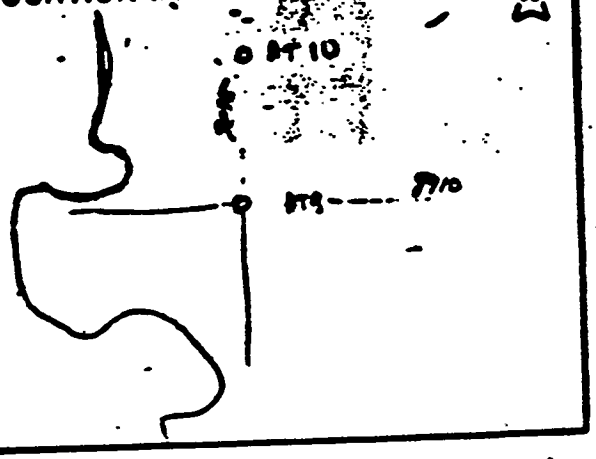
LOCATION MAP:



SITE ID: HAT01 LOCATION ID: HT9
APPROX. SITE COORDINATES (ft.):
N 8910 E 9245
GROUND ELEVATION (ft. MSL): 4530
DRILLING METHOD: USA-CONTINUOUS
DRILLER: TCATT
DATE STARTED: 10-11-84
DATE COMPLETED: "
FIELD REP.: SMM

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION UPPER PILE WESTSIDE
SITE CONDITION DRY WINDY - DUSTY

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERED	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
									MILL TAILINGS
0	X	X	X	S	1	1,1,1	#2	SM	SAND FG SILTY GREY WHITE DRY LOOSE
1.5	X		X						
3	X		X	S	2	2,2,1	#3	SM-ML CL-SC	SAND TRANSITION SANDSLIMEY-CLAYEY ORANGE-BROWN @ 3.5 FG SOFT M PL
4	X		X	U	3	17/12	17		
5.3	X		X	S	4	3,4,6	10		FG LAYERED SAND ORANGE BROWN 2"-3" ZONES CLAY SLIMES MOIST SOFT
7	X		X	D	5	0,3,2	5		
8.5	X		X	S	6	2,2,3	#5	SP	0.2ft SAND LAYER
10	X		X	S	7	1,1,1	#2	CL-CH	AS ABOVE CLAY M PL SLIMEY BROWN
11.5	X		X	S	8	1,1,1	#2	SP	SAND LAYER 6"
12.5	X		X	S	9	1,1,2	#3	CL-CH	CLAY A.B. LAYERED BROWN-DK BR
13.5	X		X	S	10	0,1,2	#3		SL SANDY LAYERS
	X		X	S	11	1,2,2	#4		
15.5	X		X	S	12	1,1,7	#8	SS	15' SANDSTONE RED R-BR, SLCLAYEY
17.5									18' SANDY FG. PEA GRAVELLY CHIPS

TOP LAYER OF SANDSTONE IS WEATHERED LAYERED - SANDY GRAVELLY MAY HAVE BEEN PUSHED BY CA— DID NOT HOLD TO REFUSAL

COMMENTS: LAST 3 SAMPLES DRIVEN 2' W/ 350 SINKER. IN SOFT SLIMES BIT OF SAMPLER OR 1 HIT & SAMPLER WOULD SINK

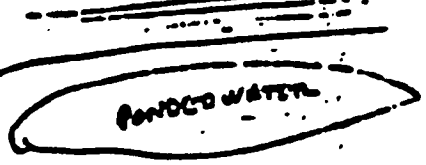
SAMPLE TYPE
A - Auger cuttings
B - 2" O.D. 1.38" I.D. drive sample
C - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

0-5 SPT

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

LOCATION MAP:



SITE ID: HATOI LOCATION ID: HT-11
APPROX. SITE COORDINATES (ft.):
N 9510 E 9245
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: 14SA
DRILLER: JCET
DATE STARTED: 10-12-84
DATE COMPLETED: "
FIELD REP.: SIVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION: NEAR UPPERMOST NE SOURCE AREA
SITE CONDITION:

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERED	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
				S	1	1,6,8	14	SM-ML	MILL TAILINGS LAYERS SILTS BROWN & WHITE DRY - TRACE YELLOW - SOFT
1.5				S	2	7,7,7	14	..	SAND & SILTS W/ LAYERS OF GRAVEL LT GREY TRACE CLAY & LN VFS MOIST
3				S	3	3,3,5,6	11		
4.5				T	4	HARD			SANDS & SILT LAYERS
				S	5				
				T	6			CL CL	CLAY MPI SOFT MOIST - BROWN TO GREY
12.5				S	7	2,2,2	4		LAYER
				S	8	3,2,2	4	SC	SAND - SL CLAYEY & MOIST GREY SOFT
16.5				T	9	3,2,2	4	CL	CLAY - V. MOIST PPL SOFT
					10	2,27 50/6			
17					11	16.5-17		SS	SAND STONE PIECES @ 16.5 MOIST AND CHIPS W/S CLAY LAYER @ 17 - IMPP
									TD = 17'

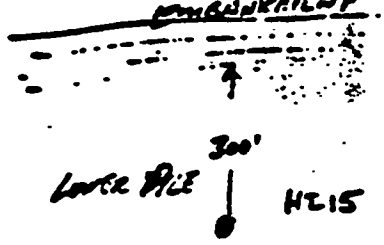
COMMENTS:

SAMPLE TYPE
A = Auger cuttings
S = 3" O.D. 1.38" I.D. split spoon sample
T = 3" O.D. 2.42" I.D. tube sample
U = 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

LOCATION MAP:



SITE ID: HAT01 LOCATION ID: HT-15
APPROX. SITE COORDINATES (ft.):
N 9710 E 1049.0
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: USA CONTINUOUS
DRILLER: TCATT
DATE STARTED: 10-12-84
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
/	/	/

LOCATION DESCRIPTION LOWER PILE NORTH SIDE
SITE CONDITION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
0				S	1	1,2,2	4	SC	SANDY CLAY MOIST FG. MPL BROWN TO GREY LAYERED SANDY LAYERS
1.5				T	2	MEDIUM PUSH			
4				S	3	1,2,3	5	CL	CLAY SL SANDY SOFT LT GREY ORG SANDY LAYERS
5.5				S	4	4,4,4	8		
7				S	5	3,3,3	6		
8.5				S	6	3,4,5	9	SP	SANDED SL SILTY GREY MOIST
10				S	7	4,3,4	7	CL	CLAY LAYER 10511.0
11.5				T	8	MEDIUM HARD PUSH		SP	SAND FG SILTY GREY MOIST ORG CLAYEY
14				S	9	3,4,5	9	SC SM	LAYERED SANDS SILTY & CLAYEY SANDS
15.5				S	10	4,4,4	8		
17				S	11	4,6,5	11		
18.5				S	12	4,4,4	8		
20				S	13	5,5,6	11		
21.5				S	14	3,4,5	9	CL	22.5 CLAY FAT MOIST DARK BROWN SL SANDY
23				S	15	3,4,4	8		
24.5				S	16	3,4,5	9		
26.5					17				FORMATION @ 27' RED BROWN
27				U	RING 17	37/12	D	SM	SAND FG V SILTY TRACE CLAY - SLIGHTLY MOIST
30									

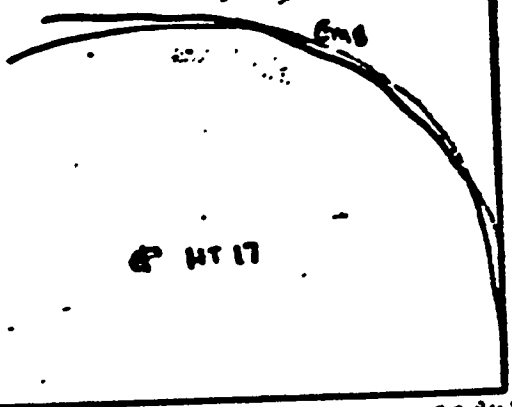
COMMENTS: 16 - SAMPLE FROM TOP OF RING SAMPLER

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 (SOIL)

LOCATION MAP:



SITE ID: HAT 01 LOCATION ID: HT-17
APPROX. SITE COORDINATES (ft.):
N 9717 E 10870
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: 4SA w SFT ASME: EY
DRILLER: TCATT
DATE STARTED: 10-12-84
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION: LOWER DUNE NORTH CENTRAL TRIANGLE FLAT
SITE CONDITION: PARTLY CLOUDY WINDY PM - TO EAST EXCEPT FOR DUNES

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
0				S	001	1,2,2	4	SM	DRY SAND FG SILTY LOSE WHITE TO BROWN ST SOME OLIVE BLACK
				T	2	HARD TORCH			INTERMIST SANDY LAYERS OF SILTY CLAY GREENISH
4				S	3	2,3,4	7		
5.5				S	4	3,3,3	6		
7				S	5	3,3,3	6	SP-SM	SANDS - FG GREY SL SILTY
8.5				T	6				
11				S	7	4,3,4	7		
12.5				S	8	4,3,4	7		
14				C	9	4,5,4	9		
15.5				S	10	3,5,4	9		
				S	11	4,5,5	10		
				S	12	4,4,5	9		
				S	13	4,4,4	8		225 CLAY SANDY TRANSITION
				S	14	4,5,4	9		
				S	15	4,4,5	9	CL	CLAY MOIST SOFT DK BN SL SANDY W/PL
				S	16	4,5,4	9		CLAY LAYERS OF FG SP SAND DARK
4.5.5				S	17	4,6,5	11	CH	MOIST & HI PL - GREY-BROWN & GREY
20½						4,5,4	9		
30						NO SAMPLE			

COMMENTS:
30-31½ 456
51½-34 454

SAMPLE TYPE
A - Auger cuttings
S - 3" 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 (SOIL)

LOCATION MAP:

SITE ID: HAT01 LOCATION ID: HT-17

APPROX. SITE COORDINATES (ft.):

N 9710 E 10490

GROUND ELEVATION (ft. MSL):

DRILLING METHOD:

DRILLER:

DATE STARTED: 12-12-94

DATE COMPLETED:

FIELD REP.:

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
0	X				18	4,5,6	11	SM IN CLAY	SAND LAYERS IN CLAY
1.5									
2.5	X	X			19	4,5,4	9	CL/H	CLAY M-HPI MOIST BROWN
3					20				
35.5				S		5,6,9	15		SM LAYERS IN CLAY-P
37				S	21	5,6,7	13		
38.5				S	22	2,3,4	7		BOULDER AT BOTTOM OF SPOON OR DRIVE @ 38.5-40'
40									CABLE HOLE GOOD @ 40'
									NO RECOVERY ENCOUNTERED (UNTIL 45')
									TRIED TO RETRIEVE 30' ROD (Remained) SAMPLER
									BY PLUGGING THE AUGER
									FROM BELOW. RAN TAPE IN BOREHOLE AND
45									TAGGED BOTTOM @ 45'. SOUNDED ON CAVED AUGER

COMMENTS:

SAMPLE TYPE
A = Auger cuttings
S = 2" O.D. 1.38" I.D. split spoon
U = 3" O.D. 2.43" I.D. thin tube
T = 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

SITE ID: HAT01 LOCATION ID: HT-1-19 B

LOCATION MAP:

APPROX. SITE COORDINATES (ft.): N 9710 E 11290
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: 8¼ CONTINUOUS
DRILLER: TCATT
DATE STARTED: 10-12-84
DATE COMPLETED: 10-13-84
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION: LOWER DIKE NE CORNER
SITE CONDITION: DAMP SUNNY PM - LOT INTERIOR CLEAR

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION TAILINGS
				S	1	1,2,3	5	SP-SM	SAND FG SL SILTY SL MOIST BROWN .62FT
1.5				S	2	1,1,2	3		CLAY LAYER @ 1.5,3
3				S	3	3,4,4	8	SP	SAND AS SL SILTY SLMOIST LOOSE LAYERED
4.5				S	4	2,3,4	7		
6				S	5	4,4,4	8		
7.5				S	6	3,4,4	8		
						PUSH: MEDIUM HARD			
				T	7				
11.5									
13				S	8	4,5,3	8		
				S	9	2,3,5	8		
									TRACE CLAY LAYER @ 16.5'
16				S	10	3,4,3	7		
18				S	11	3,3,3	6		
				T	12	PUSH MEDIUM HARD			
20.5									
22				S	13	4,5,6	11		
23.5				S	14	5,6,7	13		
26				S	15	7,8,8	16		SL CLAY LAYER
26.5				S	16	5,7,7	14		

COMMENTS: NOTE HT-1-19 PIEZOMETER IS LOCATED AT N9910 E11090.

SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.38" I.D. split barrel
B - 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 (SOIL)

LOCATION MAP:

SITE ID: HATCH LOCATION ID: HT-19B
APPROX. SITE COORDINATES (ft.):
N 9910 E 11290
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: HSA
DRILLER: TCATT
DATE STARTED: 10-12-84
DATE COMPLETED: 10-13-84
FIELD REP.: SLUSA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION
SITE CONDITION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERED	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
									FG SANDS SL MOIST GREY M DENSE
25				S	17	7,8,7	15		
28				S	18	7,5,6	11		
29.5				S	19	9,9,7	16		
31				S	20	6,7,7	14		
32.5									
									10-13-84
				T	21	MEDIUM HARD			
37.5									
39				S	22	7,8,10	18		
						10,12,11	22		
40.5									
42				S	23	9,9,11	20		
43.5				S	24	10,11,14	25		
45				S	25	10,9,9	18		
46.5				S	26	11,11,14	25		TD=46.5'

COMMENTS: COOLANT SAMPLE @ 45' - NOT GROUNDWATER (30' LOST IN LAST HOLE)

SAMPLE TYPE
A - Auger cuttings
B - 2" O.D. 1.38" I.D. Split barrel sample
U - 3" O.D. 2.42" I.D. Thin wall sample
T - 3" O.D. Thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

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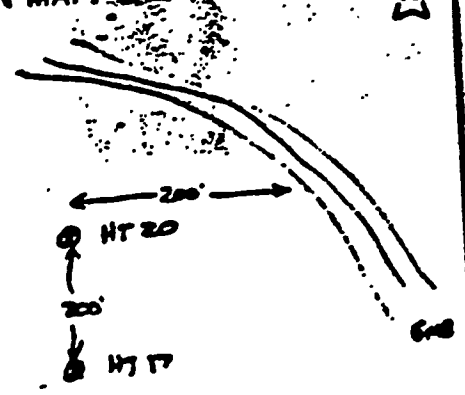
BOREHOLE LOG (SOIL)

LOCATION MAP:



SITE ID: HATOI LOCATION ID: HT 20
APPROX. SITE COORDINATES (ft.):
N 9910 E 10890
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: NSA
DRILLER: TCATT
DATE STARTED: 10-16-84
DATE COMPLETED: "
FIELD REP.: SILVIA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
/	/	/

LOCATION DESCRIPTION: NORTH CENTER PORTION OF LOWER PYLE
SITE CONDITION: COLD GROUND FROZEN

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
									TAILINGS
0				S	1	1,1,1	2	SM	SAND FG SLSNTY SLMOIST GRAY LOOSE
1.5				S	2	1,1,2	3		OCAS CLAY LAMES
3				T	3	EASY PUSH			
6.5				S	4	1,2,2	4		
7				S	5	,2,2,2	4		
8.5				S	6	3,3,3	6		
10				S	7	2,4,5	9		
11.5				S	8	4,3,4	7		
13				S	9	4 4 4	8		
14.5				S	10	3.2.2	4		16' CLAY MOIST BROWN SOFT CLAYEY.
16						DRILL TO 20'			
20				T	11	EASY			
22.5				S	12	3,5,5	10		
24				S	13	5,8R	16		
25.5						6.6.7	13		OCAS SAND LAYERS
27				S	14	5,7,8	15		SAND @ 26.-29'
28.5				S	15	8,9,8	16		CLAY AA
30.5				T	16		17		MED-HARD
32.6									
33.5									
34									

COMMENTS: PB 356

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

JEG-AL-ENG-28. (3/84)

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

LOCATION MAP:

SITE ID: HAT01 LOCATION ID: HT-20
APPROX. SITE COORDINATES (ft.):
N 998 E 10890
GROUND ELEVATION (ft. MSL):
DRILLING METHOD:
DRILLER:
DATE STARTED:
DATE COMPLETED:
FIELD REP.:

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION
SITE CONDITION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
								SM	SAND FG M.D. GREY-BROWN TO GREY SL MOIST TO MOIST
28.5				S	16	8,9,8	17		
30				T	17	MED HARD			
32.5				S					SL SANDY 5" CLAYEY LAYER MOIST BELOW 33-32.5
34				S	R	5,5,6	11		WET @ 35'
35.5				S	19	8 7 8	15		
37				S	20	5.7.9	16	CL-SC	CLAY SLSANDY MPL - MOIST DARK GREY BROWN
38.5				S	21	8,8,7	15		VERY MOIST
40				S	22	5,6,7	13		
					23	29,50/1½"		WR SS	WEATHERED SANDSTONE TRACE CHIPS
								SM	FG SAND RED
								HARD SS	SILTSTONE GREY BLUE - COMPETENT

COMMENTS:

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

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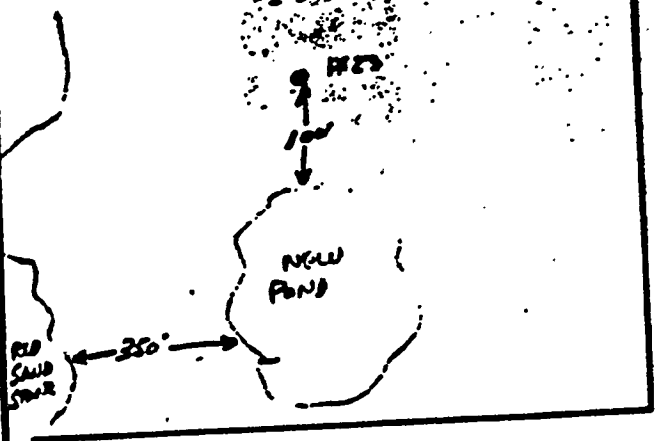
BOREHOLE LOG (SOIL)

SITE ID: HAT01 LOCATION ID: HT 23

LOCATION MAP:



APPROX. SITE COORDINATES (ft.):
N 9500 E 10490
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: HSA
DRILLER: TCATT
DATE STARTED: 10-16-84
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
/	/	/

LOCATION DESCRIPTION: NORTH OF NEW POND LOWER DIKE - TOWARDS WEST SIDE
SITE CONDITION: GROUND SLIGHTLY FROZEN - POND TO SOUTH OF HOLE

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
									TAILINGS
0				S	1	2.3.3	6	SM	SAND MOIST
1.5								CL	6" CLAY SANDY BROWN MOIST MED PI
				S	2	1,1,1	2		CLAY SANDY LAYERS IN MOIST CLAY
3									
				T	3	CASH PUSH			GREY TO BROWN
5.5						2 3 4 1,17	4		
7				S	4	4 3 3 234	7		
8.5				S	5				
10				S	6	2 3 4 433	6		CLAY SAND LAYERS
11.5				S	7	4 5 4 234	7		
13				S	8	454	9		
				T	9	CASH PUSH			CLAY
15.5									12" SAND LAYER @ 16-17'
17				S	10	5 4 4	8		CLAY SL SANDY NPI MOIST MED STIFF BROWN
18.5				S	11	2 3 4	7	CH	
20				S	12	4.4.5	9		
				T	13	REFUSAL			
22.5				S	14	5.5 50/6"	10	WSS	WC SANDSTONE CHIPS SL CLAYEY SANDY
24									TD=25'

COMMENTS: 24' AUGER TO REFUSAL @ 25

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

JEG-AL-ENG-28 (9/84)

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

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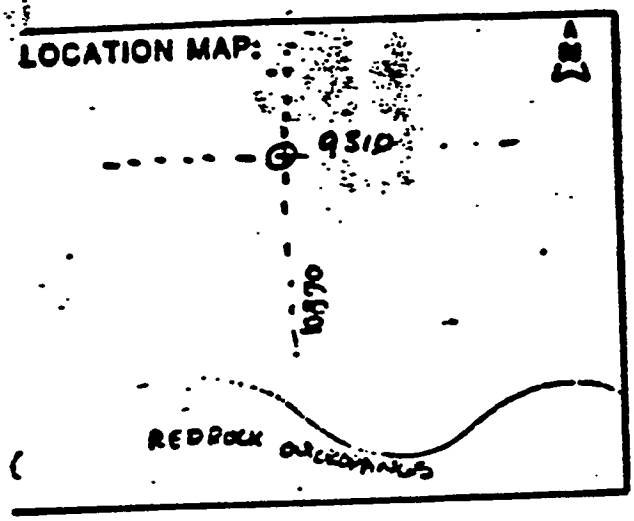
LOCATION MAP:



SITE ID: HATOI LOCATION ID: HT 26
APPROX. SITE COORDINATES (ft.):
N 9310 E 10790
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: HSA
DRILLER: SCATTCME 55
DATE STARTED: 10-13-84
DATE COMPLETED: 10-13-84
FIELD REP.: SMA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
/	/	/

LOCATION DESCRIPTION: LOWER DIKE MIDDLE SOUTH
SITE CONDITION:

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N-VALUE	USCS	VISUAL CLASSIFICATION
									TAILINGS
				S	1	1,1,1	2	SM	SAND F-G SILTY, SLIGHT, BRN, LOOSE
5				S	2	2,2,3	5		
3				S	3	2 2 3	5	(CL)	TRACE CLAY LAYERS
4.5				S	4	3,3,4	7	MOD CL	1" CLAYEY LAYER INSERTED 6.5-7.?
6	6.5			T	5			SM	SAND FG SILTY SLMOIST BRN LOOSE
9				S	6	3,2,3	5		DENSE CLAY LAYERS @ 12" &
10.5				S	7	4,5,5	11		
12				S	8	3,4,6	10	CL	CLAY 12.5' CLAY SOFT MOIST & SANDY
13.5				S	9	4,5,3	8	CL	CLAY @ 16' SOFT MOIST
15				S	10	3,4,3	7	CH	CLAY W/ SANDY LAYER (THIN)
16.5				S	11	4,7,6	13		
18				S	12	7,6,9	15		
19.5				S	13	4,7,8	15	SC-SM	SANDSTONE CHIPS & BRN SANDSTONE
21				S	14	2,1,5			SAND W/ SILTY PIECES CLAYEY REDBROWN
21.5				U	15	44/12"	44		
23.5									

COMMENTS:

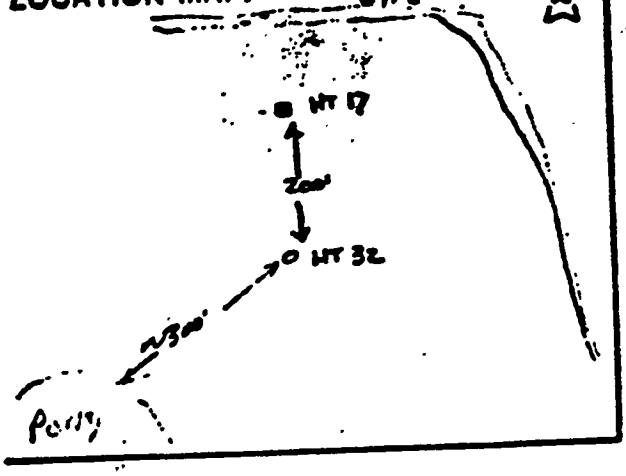
SAMPLE TYPE
A = Auger cuttings
S = 3" O.D. 1.38" I.D. Split barrel sampler
U = 3" O.D. 2.42" I.D. Thin wall sampler
T = 3" O.D. Thin-walled Shelby tube

JEG-AL-ENG-28 (3/84)

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

LOCATION MAP:



SITE ID: HAT01 LOCATION ID: HT32
APPROX. SITE COORDINATES (ft.):
N 9510 E 10890
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: HSA
DRILLER: TCATT
DATE STARTED: 10-16-84
DATE COMPLETED:
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION: MOST MIDDLE OF LOWER PILE
SITE CONDITION: 50° SLIGHT BREEZE SUNNY

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
0									TAILINGS
				S	1	1,1,1	2	SM CL	SAND FG LT BN-BN DRY TO SLMOIST CLAYEY SANDY MNST-BROWN
1.5									
				S	2	1,2,3	5	SM-	SAND FG LT BN-GREY & WHITE SLMOIST OCAS SAND
3									
				T	3	EASY			OCAS LAYERS OF CLAY IN SAND 3-8.5
5									
5.5				S	4	2,2,2			
7				S	5	2,3,3		CL	CLAY MOIST GREY TO BROWN MPL
8.5							7		OCAS SANDY LAYERS ASSOC @ 13,16
				S	6	2,4,3	9		
10				S	7	9,5,4			
11.5									
13				S	8	3,4,4	8	LAYER SM	SAND LAYERS IN CLAY
				S	9	3,3,4	7		CLAY AA
14.5							7	LAYER SM	LAYER SAND @ 16-17
15				S	10	3,4,3			
16				S	11	1,2,4	6		CLAY AA
17.5							11	SM	SAND M-F SLSILTY GREY TO BROWN M
19				S	12	3,5,6	14		MIXED SAND AND CLAY LAYERS @ 19'-23.5
20				S	13	7,7,7	12		(PREDOMINANTLY SAND) FROM 8-22
20.5							12		
22				S	14	7,6,6			
23.5				S	15	7,6,6		CL-CH	24' CLAY MPL MOIST BROWN SLSANDY
				T	16	PREDOMINANTLY			
26				S	17	3,4,5	9		SEE NEXT PAGE
27.5									

COMMENTS: Malcom Young 3-25

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 (SOIL)

HT 32

LOCATION MAP:

P91

SITE ID: HAT01 LOCATION ID:
APPROX. SITE COORDINATES (ft.):
N 9510 E 10890
GROUND ELEVATION (ft. MSL):
DRILLING METHOD:
DRILLER:
DATE STARTED: 10-16-84
DATE COMPLETED:
FIELD REP.:

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION
SITE CONDITION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
									CLAY - MOIST MPL SLSANDY STIFF GREY BROWN
								CLCH	
27.5				S	18	3,4,5	9		
29					19	5,6,8	14		VERY MOIST - MPL
30.5				S	20	5,5,6	11		
32					21	6,7,7	14		
33.5					22	6,6,7	13		
				T	23	HARD			DARK GREY
37.5				S	24	3,3,4	7		
39					25	6,5,4	9		WET CLAY SLSANDY
40.5				S	26	5,7,9	16		42'
42					27			SS	SANDSTONE WEATHERED V. SILTY SL CLAYEY RED BROWN MOIST
									AUGER TO REFUSAL @ 45' COMPETENT SANDSTONE OR POSS SILTSTONE

COMMENTS:

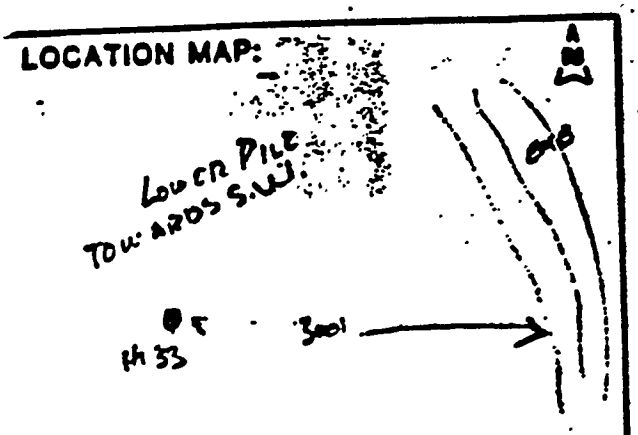
SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

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

BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:



SITE ID: HATO1 LOCATION ID: HT 33
APPROX. SITE COORDINATES (ft.):
N 9510 E 11090
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: HSA - CONTINOUS
DRILLER: TEMTT
DATE STARTED: 10-15-84
DATE COMPLETED:
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION TOWARDS MIDDLE OF LOWER PILE
SITE CONDITION 40 COLD & WET

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	NO	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
0				S	1	1,1,2	3	SM	SAND, FG SL. SILTY LOOSE SLMOIST WHITE TO GREY TN. LINES
.5									
3				S	2	1,1,2	3		YELLOW CLAYEY
4.5				S	3	1,2,2	4		TRACE CLAY
6				S	4	2,2,3	5		
7.5				S	5	3,3,4	7		
9				S	6	4,4,6	10		
10.5				S	7	2,2,3	5	CL	CLAYEY OCAS SANDY LAYERS
12				S	8	3,5,5	10		
13.5				S	9	3,3,5	8	CH	CLAY WET SOFT SANDY HPI
15				S	10	4,4,5	9		
16.5				S	11	4,5,6	11		
18				S	12	4,5,7	12		
19.5				S	13	4,5,7	12		
22				T	14	MCD			OCAS SANDY LAYERS
23.5				S	15	3,5,6	11		
25				S	16	6,6,7	13		
26				S	17	6,7,6	14		→ CLAY, REDDISH
28				C	18	5,6,6	12		
29				S		19 34 50/2.5"	29 W/S		SANDSTONE CHIPS

COMMENTS: AUGER TO REFUSAL @ 34' SANDSTONE
REFUSAL ON SS @ 34'

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

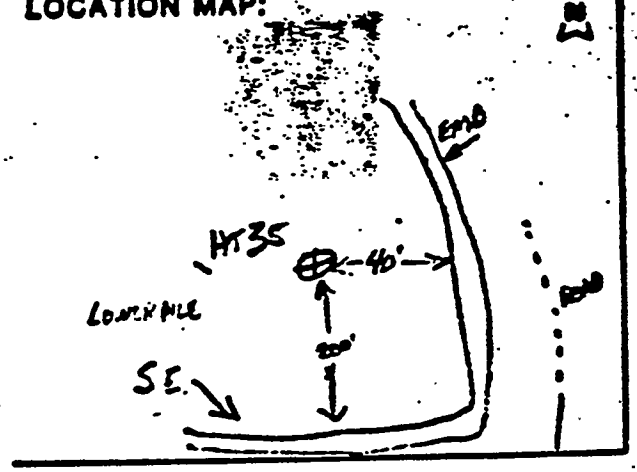
JEG-AL-ENG-28. (3/84) 20 AUGER FROM 29-34'=

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

Page __ of __

LOCATION MAP:



SITE ID: HAT01 LOCATION ID: HT 35
APPROX. SITE COORDINATES (ft.):
N 1510 E 1100
GROUND ELEVATION (ft. MSL): N/A
DRILLING METHOD: HSA
DRILLER: TCAT
DATE STARTED: 10-15-94
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION SW END POINT OF LOWER PILE
SITE CONDITION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
				S	1	1,1,2.	3	SP-SM	TAILINGS SAND F. GRAINED SILTY SL MOIST LT GREY BROWN
1.5				S	2	3,3,4.	7		MOIST
3				S	3	3,4,5.	9		
4.5				T	4	EASY TORQUE			
7				S	5	2,2,2	4		
8.5				S	6	3,4,5	9		
10				S	7	5,5,6	11		
11.5				S	8	3,3,4	7		
13				S	9	3,4,4	8		
14.5				T	10				
17				S	11	3,3,4	7		
18.5				S	12	6,6,6	12		
20				S	13	5,5,5	10		
21.5				S	14	6,6,7	13		
23				S	15	5,5,6	11		
24.5				S	16	6,8,8	16		29' DEC SANDSTONE F & SANDSILTY
26				S	17	4,5,5	10		W/SAND & GRAVELLY SEAMS RED SILLAGE II.
27.5				S	18	5,6,7	13	SM-GM	

11-23-30 / 2" Sp

COMMENTS:
AUGER TD @ 34'

SAMPLE TYPE
A - Auger cuttings
S - 3" 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

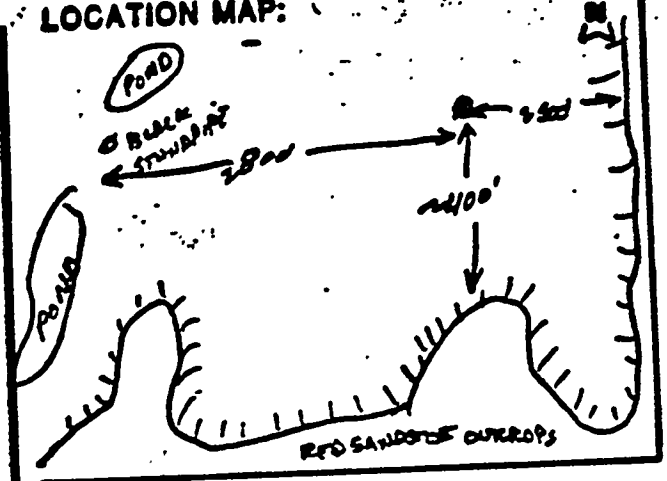
JEG-AL-ENG-28 (3/84)

3:57

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

BOREHOLE LOG (SOIL)

LOCATION MAP:



SITE ID: HAT01 LOCATION ID: 911-
APPROX. SITE COORDINATES (ft.):
N 9310 E 11090
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: 12" HSA 10" PVC CASING
DRILLER: S. CARTER ED ADAMS; CME '75
DATE STARTED: 1-5-95
DATE COMPLETED: GROUTED ON 1-6-95
FIELD REP.: SILVA B. SCHOENFELDER

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
1-5-95	OF DRILLING	DRY - UNMEASURED

LOCATION DESCRIPTION HAT ON PILE 10" CASING INSTALLATION
SITE CONDITION ON TAILING - LOWER PILE TOWARD EAST-SOUTH

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 IN.	N VALUE	USCS	VISUAL CLASSIFICATION
						NOT SAMPLED		SM	TAILINGS GREY FINGRAINED SAND LOOSE SURFACE & DRY
								CL	SL CLAYEY TRANSITION
5									
									COLOR CHANGE TO BROWN - V CLAYEY SLIMES MOIST
7								CL	
10									FINE GRAINED SANDY GREY-BROWN
								SM	
15								15	GREY DRY
								SM-CL	
									VERY MOIST BROWN CLAY-SLIMES-TAILINGS
								CL	
								SS	DARK REDDISH BROWN SANDSTONE CHIPS & GRAVELLY FOUNDATION MATL. SANDSTONE - HALGAITO FORM.
									REFUSAL TO 12" HSA @ 21' ROUND AUGER TIGHT
									TD = 21'
									SEE ROCK CORE LOG THIS HOLE

TAILS

COMMENTS: INSTALLED 10" SCH 40 PVC CASING TO 21'

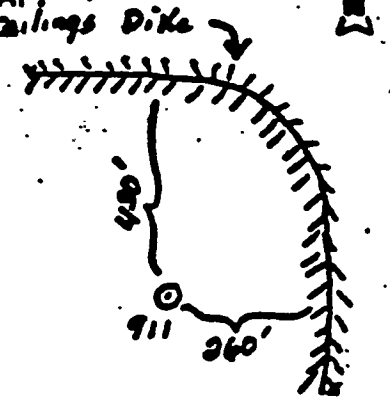
SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

Page 1 of _

LOCATION MAP:



SITE ID: HAT 01 LOCATION ID: 911
APPROX. SITE COORDINATES (ft.):
N 9510' E 10280'
GROUND ELEVATION (ft. MSL): Est 4090'
DRILLING METHOD: ~~CME~~ NQ WIRELINE
DRILLER: ~~Boart~~/Williams - SHB
DATE STARTED: 2/19/85
DATE COMPLETED:
FIELD REP.: B. Holland

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION On-Pile - NE corner lower pile
SITE CONDITION Dry/Dusty

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	% ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES: SPACING (WIDE — CLOSE: 1 2 3 4 5)	DISCONTINUITIES: ORIENTATION (HORIZ. — VERT.: H, 30°, V)	DISCONTINUITIES: CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
39	NQ	[illegible]	0	100		X	—	Smo	WS	St	Siltstone, reddish brown, with minor lt. gray mottling, highly calc., very hard to mod hard
40									WS		
41									WS		
42									WS		
43									WS		
44									WS		
45	NQ	90%	46%			X	—		WS	St	Siltstone, reddish brown, highly calc, with angular to subround lime cl. clast, lt gray. very minor alteration noted at 48'
46									WS		
47									WS		
48									WM		
49	NQ	64%	0			X		R	WM	St	Siltstone as ab only softer and becoming clayey. Lost circulation @ 51' Soft to Hard
50			0			X	X	R	WM	St	
51			0	0%		X	Y	R	WM	St	
52			0	0		X	X	R	WM	St	
53			0	0		X	X	R	WM	St	

Run 1 39-44.5'
Run 2 44.5-49.5'
Run 3 49.5-53.5'

COMMENTS: 2 Water Hauls

BORING OPERATION
6 - 6 1/2 HOLLOW STEM AUGER
6 - 6 1/2 CONTINUOUS FLIGHT AUGER
RB - REAR BIT
RC - RC ROCK CORING
WR - WR WIRELINE ROCK CORING

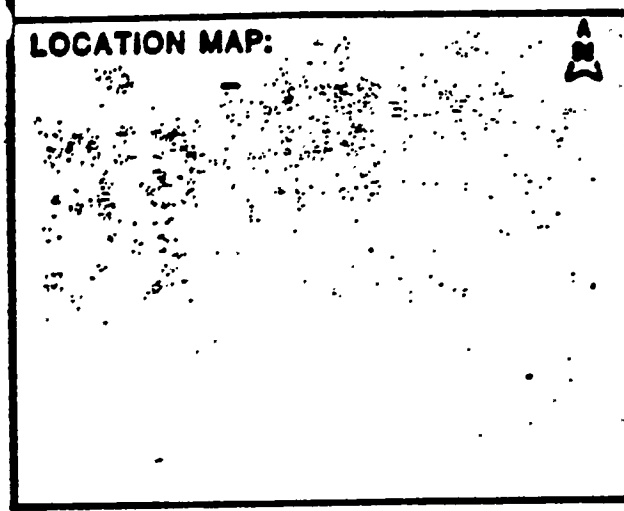
JEG-AL-ENG-2A (3/84)

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

Page 2 of ___

LOCATION MAP:



SITE ID: MAT-01 LOCATION ID: 911
APPROX. SITE COORDINATES (ft.):
N ___ E ___
GROUND ELEVATION (ft. MSL): ___
DRILLING METHOD: NQ Wire Line
DRILLER: Adams/Williams - SHB
DATE STARTED: 2/19/85
DATE COMPLETED: ___
FIELD REP.: Roger Holland

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION On Tailing Pile - N E corner of lower pile
SITE CONDITION Dry and Dusty

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	% ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES: SPACING (WIDE — CLOSE) 1 2 3 4 5	DISCONTINUITIES: ORIENTATION (HORIZ. — VERT.) H 30° 60° V	DISCONTINUITIES: CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
54	NQ	96	0	0	X	5	H	R	wm	ss	
55			0	0	X	5	H	smo	wm	ss	siltstone, reddish brown, highly calc. very hard, argillaceous,
56			40	75	X	4	H	smo	ws	ss	
57			40	75	X	4	H	smo	ws	ss	
58			65	50	X	4	H	smo	ws	ss	
59			85	50	X	4	H	smc	ws	ss	
60			70	50	X	4	H	smc	wm	ss	
61	NQ	92	55	50	X	4	H		wm	ss/sltst	2/20/85 cold & cloudy 60.0-61.1 silty clay stone, reddish brown highly calc. @ 61.1 siltstone, M. fractured grading to M. reddish brown, highly calc. with angular to sub rounded limestone clast & hard.
62			56	50	X	4	H	smo	ws	st	
63			70	50	X	4	H	smo	ws	st	
64			60	50	X	4	H	smo	ws	st	
65	NQ	94	0	50	X	3 5	H	smo	ws	st	
66			80	50	X	5	H	smo	ws	st	
67			0		X	5	H	sm	ws	st	
68			45		X	5	H	sm	ws	st	

COMMENTS: ___

BORING OPERATION
B - 8 1/2 HOLLOW STEM AUGER
C - 4 1/2 CONTINUOUS FLIGHT AUGER
CB - CLAW BIT
NX - NX ROCK CORING
NQ - NQ WIRELINE ROCK CORING

JEG-AL-ENG-2A (8/84)

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

LOCATION MAP:

SITE ID: HAR-01 LOCATION ID: 911
APPROX. SITE COORDINATES (ft.):
N ___ E ___
GROUND ELEVATION (ft. MSL): ___
DRILLING METHOD: NQ wire line
DRILLER: Adams / Williams - S&B
DATE STARTED: 2/19/85
DATE COMPLETED: ___
FIELD REP.: R. Holland

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION ___
SITE CONDITION ___

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES: SPACING (WIDE — CLOSE: 1 2 3 4 5)	DISCONTINUITIES: ORIENTATION (HORIZ. — VERT.: H 30° V)	CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
68	NQ		100		X	X	—	sm	F	st	Decrease in limestone frags. becoming OB at 67.0'
69	NQ		80		X	X	—	sm	F	st	
70			80		X	X	—	sm	F	st	
71			50		X	X	—	sm	sw	st	Note: core lost from 73.9 - 74.5
72			40		X	X	—	sm	wm	st	at 72.5 siltstone, reddish brown with red sandy siltstone clast. clast water wear ready.
73			0		X	X	—	R	wm	st	
74			LOST CORE								
	NQ	100%	40		X	X	—	sm	ws	st	Note: 74.5-79.5 7 min/ft.
75			56		X	X	—	sm	F	st	
76			100		X	X	—	sm	F	st	
77			100		X	X	—	sm	F	st	siltstone, reddish brown, to red, varying amts. of clay fraction slightly calc. @ 81.6 approaching limestone.
78			70		X	X	—	sm	wm	st	
79			86		X	X	—	sm	F	st	
80			60		X	X	—	sm	ws	st-ls	
81			0		X	X	—	sm		st-ls	Satin spar gyp. stringers at 80.5 to 81.3
82			60		X	X	—	sm		st-ls	

Run 7
Run 8

COMMENTS: ___

BORING OPERATION
B - 6 1/2 HOLLOW STEM AUGER
C - 4 1/2 CONTINUOUS FLIGHT AUGER
BR - REAR DIT
BR - BR ROCK CORING
BR - BR WIRELINE ROCK CORING

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

LOCATION MAP:

SITE ID: HAT-01 LOCATION ID: G11
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)	BORING OPERATION	% CORE RECOVERY	%ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES: SPACING (WIDE — CLOSE: 1 2 3 4 5)	DISCONTINUITIES: ORIENTATION (HORIZ. — VERT.: H 30° 60° V)	CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
84			10		X			sm	sl/f	sl/f	Siltstone, to clay-stone, red to reddish brown, highly calc., micaceous, with sandy inclusions, lime-stone clast. Fracturing is essentially horiz. Some fractures are filled with calc-spar typ. Core becoming more competent @ 89.2 ft.
85			0		X			sm	sl/f	sl/f	
86	NQ	89		0	X			sm	sl/f	sl/f	
87			40	0	X			sm	sl/f	sl/f	
88			0	6	X			sm	sl/f		
89			40	6	X			sm	sl/f		
90			0	0	X			sm	sl/f		
91			60	0	X			sm	f		
92			90	0	X			sm	f		
93			0	6	X			sm	f		
94			100	0	X			sm	f		
95			100	0	X			sm	f		
				0	X			sm	f	sl	
	NR	100	40	6	X			sm	f	sl	Core as above. Core has fract. than above. Hard @ 99.6 core becomes clayey, soft and no fracturing.
96			25	0	X			sm	f	sl	
97			70	0	X			sm	f	sl	
			100	0	X			sm	f	sl	

COMMENTS: _____

BORING OPERATION
- HS - 8 1/2 HOLLOW STEM AUGER
- CFA - 4 1/2 CONTINUOUS FLIGHT AUGER
- RB - ROAD BIT
- RR - RR ROCK BORING
- WL - WIRELINE ROCK BORING

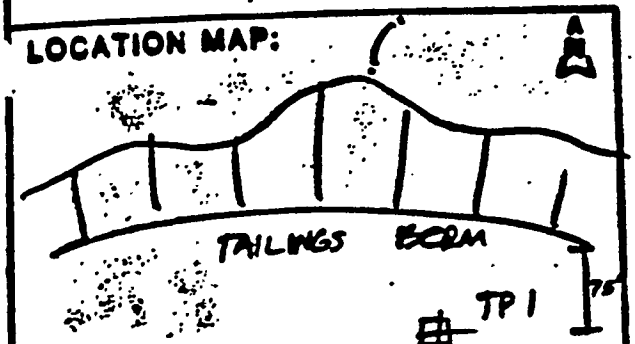
TAC TEST PITS:

ON PILE

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

TEST PIT LOG

LOCATION MAP:



SITE ID: HAT 01 LOCATION ID: TP 1
APPROX. SITE COORDINATES (ft)
N 9710 E 11090
GROUND ELEV. (FT. MSL)
DATE EXCAVATED: 10-17-84
BACKHOE TYPE: CASE 580
CONTRACTOR: BLACE ENTERPRISES
FIELD REP: P.S. DARR
REHAB. DATE: 10-17-84

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)
		None	

LOCATION DESCRIPTION: Lower tailings pile.
SITE CONDITION:

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
1.5		D	001	SM	Silty Sand, very fine, dry, light brown
7.0				CL w/ ML & SM	Silty Clay, medium to high plastic, interbedded with thin 0-3 in. seams of silty sand & clayey silt, wet, brown.

COMMENTS: Stopped backhoe @ 7.0 ft. Collected 3-1 gal soil samples, 2-5 gal soil samples sent to Earth Tech Corp Lab 1-5 gal sent to Vern Rogers.

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample

JEG-AL-ENG-7 (8/84)

JACOBS ENGINEERING GROUP INC.
CIVIL/NCBS SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

TEST PIT LOG

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: TP-2
APPROX. SITE COORDINATES (ft)
N 10600 11600 E 10200 10200 (?)
GROUND ELEV. (FT. MSL)
DATE EXCAVATED: 10-23-84
BACKHOLE TYPE: CASE 580
CONTRACTOR: BLAKE ENTERPRISES
FIELD REP: P.S. DAHL
REHAB. DATE:

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)
		None	

LOCATION DESCRIPTION Down gradient ≈ 300ft of lower tailings pile.
SITE CONDITION Moderately sloping into drainage.

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
0.5				ML	Clayey Silt with windblown sand (tailings) non plastic to slight plastic, very fine sand, moist, rootlets, reddish brown to light brown (tailings).

Samples taken are of windblown contaminants mixed with natural topsoil materials.

COMMENTS: Stopped auger at 0.5 ft. Collected 3-5gal soil samples. 2-5gal samples sent to Gen Of Assoc. and 1-5gal sample sent to Ken Rogers.

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

TEST PIT LOG

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: TP3
APPROX. SITE COORDINATES (ft)
N 9510 E 10690
GROUND ELEV. (FT. MSL)
DATE EXCAVATED: 10-23-84
BACKHOE TYPE: CASE 580
CONTRACTOR: BLAKE ENTERPRISES
FIELD REP: P.S. DARR
REHAB. DATE: Not Applicable

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)
		None	

LOCATION DESCRIPTION Lower Tailings pile
SITE CONDITION

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
		D	001	CL	Silty Clay, low plastic, wet, light brown,
3.0					
4.0		D	002	SP-CL	Sand with thin lenses of silty clay, fine, moist, white.
5.5				CL-SP	Silty Clay with thin lenses of sand low plastic, wet, light brown.

COMMENTS: Stopped backhoe at 5.5 ft. Collected 4-6 gal soil samples, 2-5 gal samples to Chem & Assoc & 2-5 gal samples to Hem Projects.

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample

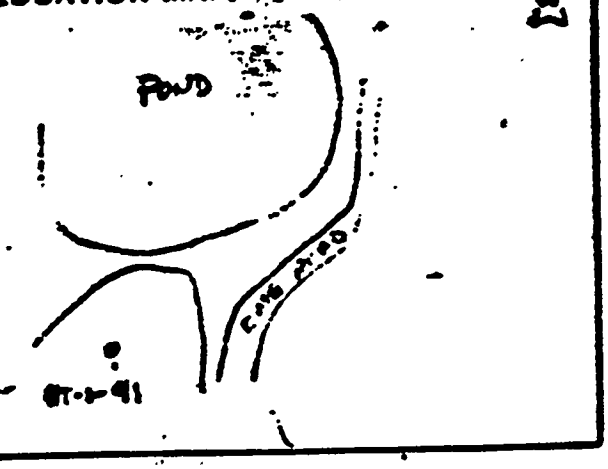
TAC BORING LOGS:

OFF PILE

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

LOCATION MAP:



SITE ID: HATO1 LOCATION ID: HT-1-41
APPROX. SITE COORDINATES (ft.):
N 8300 E 9150
GROUND ELEVATION (ft. MSL): ___
DRILLING METHOD: H.A.
DRILLER: TCATT
DATE STARTED: 10-12-84
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
/	/	/
/	/	/
/	/	/

LOCATION DESCRIPTION SOUTH OF WEST TAILS AREA
SITE CONDITION ROCKY - RED

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
[illegible]				A	000	AUGER		SS	SANDSTONE FINE SAND - ANGULAR GRAINS RED BROWN - DRY
[illegible]	X	X		A	001				
	X	X		A	2			SM	3-4 SOFT SEAM SM FG. SILTY TR GRAVELLY
4.5	X	X		A	3	ROCKS FROM AUGER PLUG			POSSIBLE LIMESTONE
[illegible]					445				
									TD: 5'

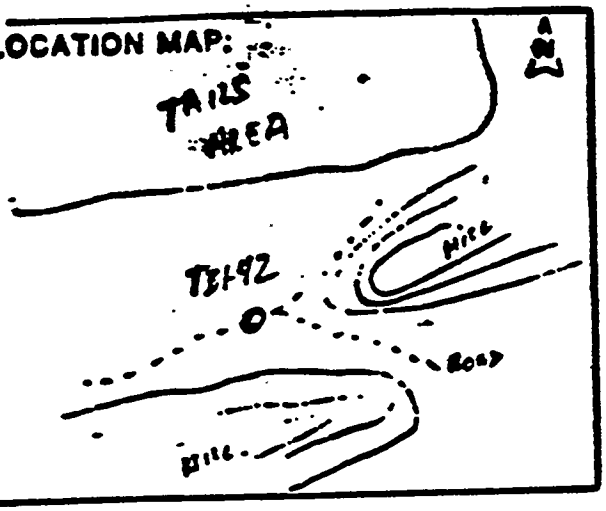
COMMENTS: CHANGED # BLOWS PER 6 INCH TO 5'-FELL & BROKE

SAMPLE TYPE
A - Auger cuttings
B - 3" O.D. 1.38" I.D. drive sample
C - 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 (SOIL)

LOCATION MAP:



SITE ID: HATBF LOCATION ID: HT-1-92
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: HSA
DRILLER: TCATT
DATE STARTED: 10-10-84
DATE COMPLETED: 10-10-84
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
/	/	/

LOCATION DESCRIPTION: RIDING ROAD SOUTH OF TAILS AREA ON RIDGE
SITE CONDITION: DRY

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERED	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
0	X	X		A	1			SP	SAND FG PICCESOT SANDSTONE RED BROWN DRY
1	X	X		A	2			SS	SANDSTONE - VERY HARD
2	X	X		A	3				LIMESTONE - WHITE DENSE
33	TD			A	4	ROCKS FROM AUGER CAKE			

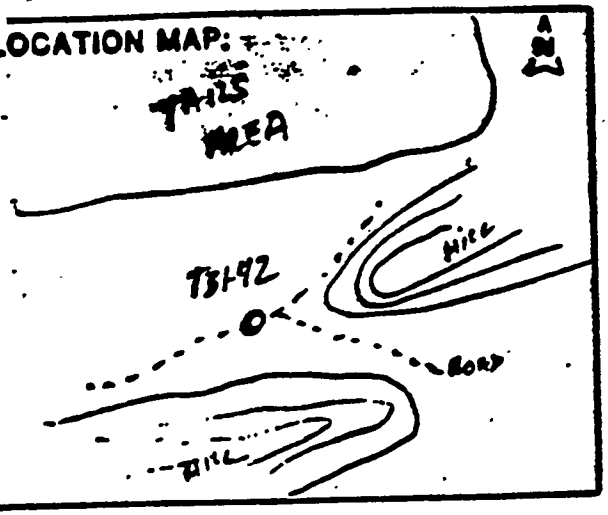
COMMENTS: _____

SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.38" I.D. split barrel
U - 3" O.D. 2.42" I.D. tube sampler
T - 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

LOCATION MAP:



SITE ID: HAT BF LOCATION ID: HT-BF2
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: HSA
DRILLER: TCATT
DATE STARTED: 10-10-84
DATE COMPLETED: 10-10-84
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
/	/	/

LOCATION DESCRIPTION: ALONG ROAD SOUTH OF TAILS AREA ON RED ROCK
SITE CONDITION: DRY

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
0	X	X		A	1			SP	SAND FG PIECES OF SANDSTONE RED BROWN DRY
1	X	X		A	2			SS	SANDSTONE - VERY HARD
2	X	X		A	3				LIMESTONE - WHITE BONE
3.33	TD			A	4	ROCKS FROM AUGER CAKE			

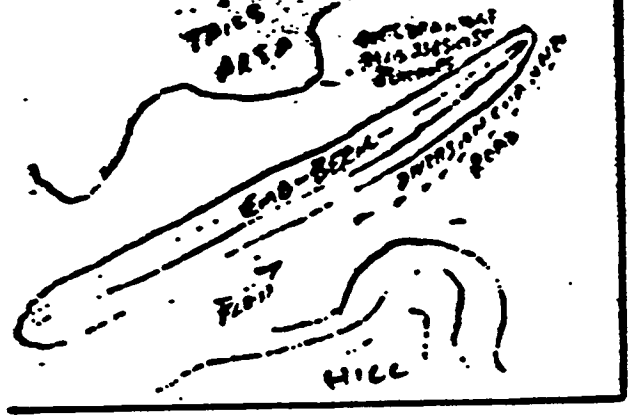
COMMENTS:

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 (SOIL)

LOCATION MAP:



SITE ID: HAT 01 LOCATION ID: HT-43
APPROX. SITE COORDINATES (ft.):
N 8730 E 10800
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: HSA 6" & CONV 9"
DRILLER: TEXT
DATE STARTED: 10-10-84
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)
/	/	/
/	/	/
/	/	/

LOCATION DESCRIPTION SOUTH OF SITE ON HILL
SITE CONDITION HOLE LOCATED IN SOUTH DIRECTION CHANNEL MADE BY CAT

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERED	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
0	X	X	X	A	001	AIR		SP	RED SAND F.G. GRAVELLY SANDSTONE PIECES
1	X	X	X	A	002	AUGER		SS	ROCK IS VERY FRIABLE SANDSTONE & SILTSTONE
2	X	X	X	A	003	AUGER			LAYERED SANDSTONE V DENSE
3	X	X	X						NO SAMPLES ARE POSSIBLE DUE TO AUGER CUTTINGS
4	X	X	X	A	004	"			
5	X	X	X	A	005	"			12' TD
6									
7									
8									
9									
10									
11									
12									

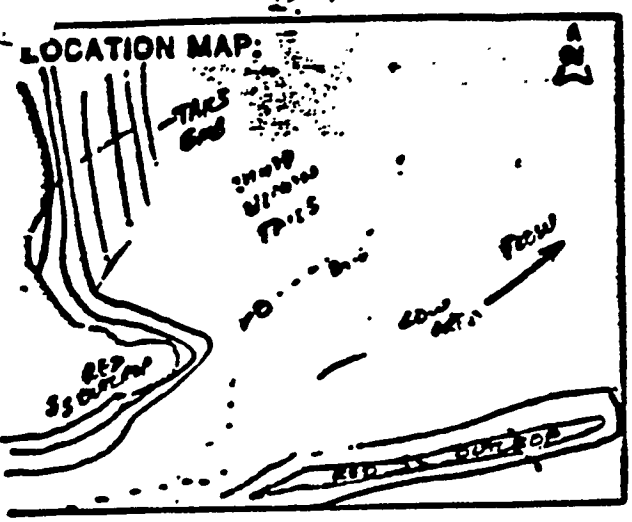
COMMENTS: DRILLED 6" TO 3' DS
TRIED TO USE 9" TO 12' DRY & SAFE

SAMPLE TYPE
A - Auger cuttings
B - 3" O.D. 1.38" I.D. Grab sample
S - 3" O.D. 2.42" I.D. Split spoon sample
T - 3" O.D. Thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

LOCATION MAP:



SITE ID: HAT01 LOCATION ID: UT-44
APPROX. SITE COORDINATES (ft.):
N 9700 E 11620
GROUND ELEVATION (ft. MSL): 9200
DRILLING METHOD: 6" HSA
DRILLER: T-CATT
DATE STARTED: 10-10-84
DATE COMPLETED: 10-10-84
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION EAST SIDE
SITE CONDITION DUCAT PUSH

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERED	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
0	X	X		A	001	AUGER		SS	SANDSTONE RED GRAY FINE GRAINED VERY HARD
									SAMPLE INTERVAL 1.5, 3-3.5 STILL HARD
	X	X		A		"			BOREHOLE DRILLED 6-10'
4.5	X	X		A	002	"			
	X	X		A	003				
6.5					DO				
7.5	X	X		A	004	"			SS
9.5									
12	X	X		A	005				REFUSAL TO AUGER @ 11'
14									

COMMENTS: SAMPLES ARE FOUND BELOW O/B AUGER CUTTINGS

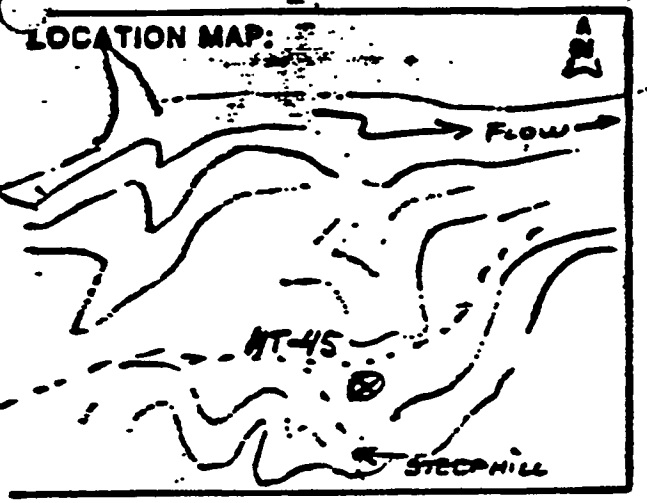
SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.38" I.D. split spoon
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:



SITE ID: HATO1 LOCATION ID: HT 95-
APPROX. SITE COORDINATES (ft.):
N 10250 / NSD E 11290
GROUND ELEVATION (ft. MSL): 42-9
DRILLING METHOD: HSA 6"
DRILLER: TLATT
DATE STARTED: 10-10-89
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
/	/	/
/	/	/
/	/	/

LOCATION DESCRIPTION NORTH OF TAILS @ ROAD FORK
SITE CONDITION WHITE BLOWSAND & ROCKY RED ON PLATEAU ABOVE DRAIN TO NORTH

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERED	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION (TOP 3" TAILS BLOWSAND - WHITE)
1	X	X	X	A	#1			SP-SM	SAND F-G SILTY RED BROWN DRY LOOSE
2	X	X	X	A	#2			5/3	SANDSTONE, BOULDER, LT RED BROWN DRY HARD TR SOCHIPS
3	X	X	X	A	#3				
						TD=3' REFUSAL			

COMMENTS: AUGER SAMPLES = GROUND ROCK - SMETHERED

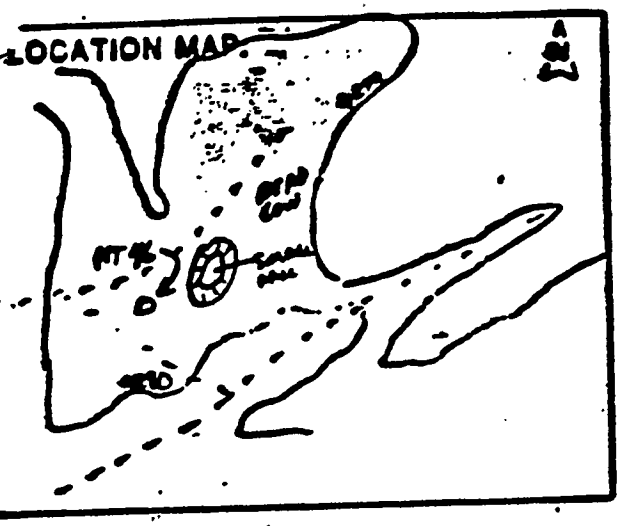
SAMPLE TYPE
A - Auger cuttings
B - 3" O.D. 1.38" I.D. Drive sampler
C - 3" O.D. 2.42" I.D. Tube sampler
T - 3" O.D. Thin-walled Shelby tube

JEG-AL-ENG-28 (8/84)

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

LOCATION MAP



SITE ID: HATOI LOCATION ID: HT46
APPROX. SITE COORDINATES (ft.):
N 10 100 E 10500
GROUND ELEVATION (ft. MSL): 9280
DRILLING METHOD:
DRILLER: TCATT
DATE STARTED: 10-10-84
DATE COMPLETED:
FIELD REP.: SKEM

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
/	/	/

LOCATION DESCRIPTION NORTH OF PILE ABOVE ON RIDGE NOT NORTH
SITE CONDITION SANDSTONE GENERALLY SURFACE

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
	X	X	X	B	001			SS	SANDSTONE HARD DRY RED BROWN
	X	X	X	A	002	TD=3'	..		TD=3'
3									

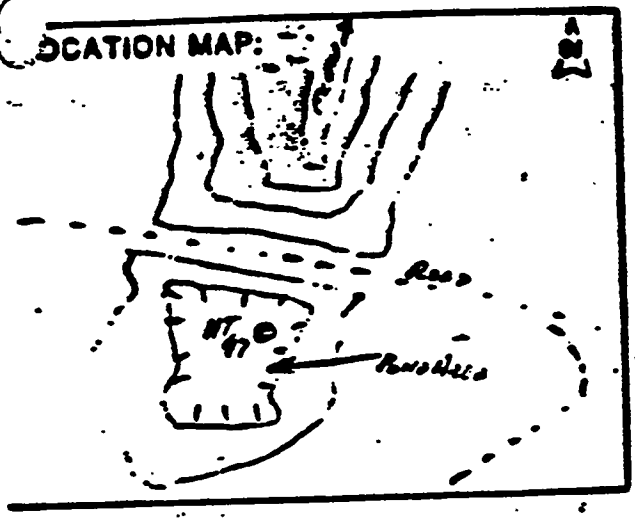
COMMENTS:

SAMPLE TYPE
A - Auger cuttings
B - 3" O.D. 1.38" I.D. Grab sample
C - 3" O.D. 2.42" I.D. Core sample
T - 3" O.D. Thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

LOCATION MAP:



SITE ID: HAT01 LOCATION ID: HT-47
APPROX. SITE COORDINATES (ft.):
N 9900 E 9550
GROUND ELEVATION (ft. MSL): 4296
DRILLING METHOD: HSA
DRILLER: TCATT
DATE STARTED: 10-18-84
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
/	/	/

LOCATION DESCRIPTION: NORTH OF DRY INUNDATION S. OF ROAD
SITE CONDITION:

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
0	X	X		S	001	2,7,13	20	SM-SC	SAND V SILTY TRACE CLAYEY F.G MOIST RED BROWN
1.5								SM-SC	F.D 'PIECES' SANDSTONE ANGULAR
				S	002	50/0"		SS	SANDSTONE BEDROCK @ 1.5' VERY HARD
4									TRACE GRAVEL
6	X	X		A					TD=6'

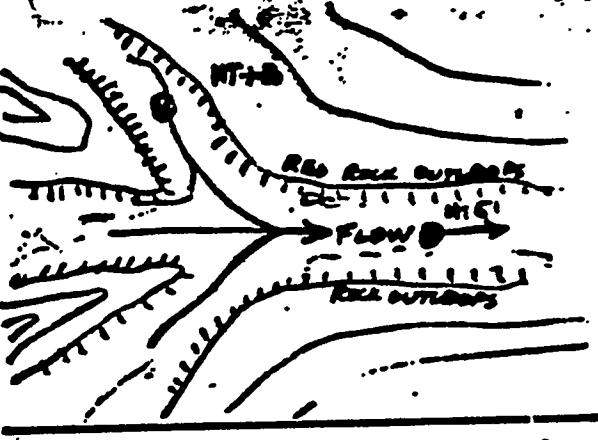
COMMENTS:

SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.38" I.D. Split Spoon
M - 3" O.D. 2.42" I.D. Split Spoon
T - 3" O.D. Thin-walled Shelby Tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

LOCATION MAP:



SITE ID: HAT01 LOCATION ID: HT-1-50
APPROX. SITE COORDINATES (ft.):
N 10850 E 10980
GROUND ELEVATION (ft. MSL): 4230'
DRILLING METHOD: HSA 9"
DRILLER: TCATT-SHB
DATE STARTED: 10-23-84
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)
/	/	/
/	/	/

LOCATION DESCRIPTION WEST DRAW ABOVE CONFLUENCE NORTH OF UPACK DILE
SITE CONDITION DRY - IN DRAINAGE ON ALLUVIUM
NOTE LOW ROCK OUTCROPPING IN NORTH DRAINAGE FLOW - ALLUVIUM CLEANED OFF

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERED	SAMPLE STRAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
								SM	SAND FG. V.SILTY, MEDIUM DENSE, DRY TO SLIGHTLY RED BROWN TRACE GRAVEL
									- DRY
								SS	SANDSTONE W/S FG. VERY HARD DRY
									DEASE DRILLING WITH 4" CONV AUGER IN HIGHLY SANDSTONE
									HOLE ABOCNED TO 5 - DUE TO TIGHTH

COMMENTS: TEST HOLES SD-56 WERE PROBE HOLES TO CHECK DEPTH TO ROCK AND AMOUNT OF EFFORT REQUIRED TO DRILL ROCK

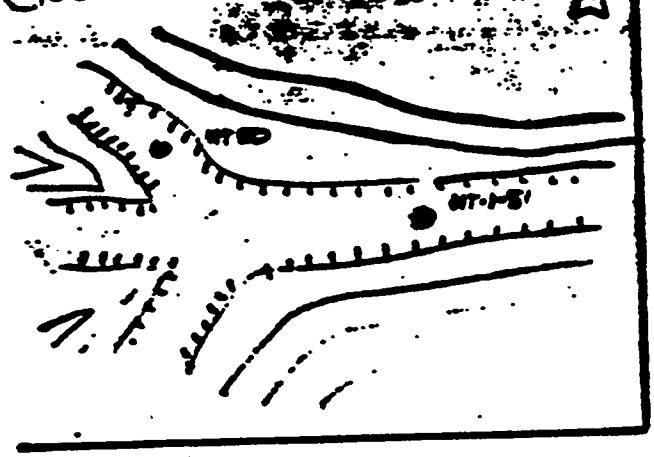
SAMPLE TYPE
A - Auger cuttings
B - 2" O.D. 1.38" I.D. drive sample
C - 3" O.D. 2.42" I.D. drive sample
T - 3" O.D. thin-walled Shelby tube

JEG-AL-ENG-28 (8/84)

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

LOCATION MAP:



SITE ID: HAT01 LOCATION ID: HT-1-51
APPROX. SITE COORDINATES (ft.):
N 10107 E 11090
GROUND ELEVATION (ft, MSL): 4220
DRILLING METHOD: 6¼ HSA / ROTARY-WATER
DRILLER: TCATT
DATE STARTED: 10-23-87
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION BELOW
SITE CONDITION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
								SM	RESIDUAL SOIL SAND SILTY MEDIUM SL MOIST - RED BROWN ND.
2								S	SANDSTONE WS WEATHERED RED BROWN
									NOTE: SWITCH TO ROTARY @ 3' ROTARY WITH WATER 3'-5' END HOLE @ 5' IN SANDSTONE
									TD=5' SET 5' PIPE 2'S.U. SEALED SAND 3-1 CEMENT GROUT
									HT-1-51 TD=5' 5' PIPE S/W 2' STICKUP 4' BLANK 1' BOTTOM SLOTTED ½ BAG CEMENT GROUT FOR ROTARY HOLES - SOIL

COMMENTS:

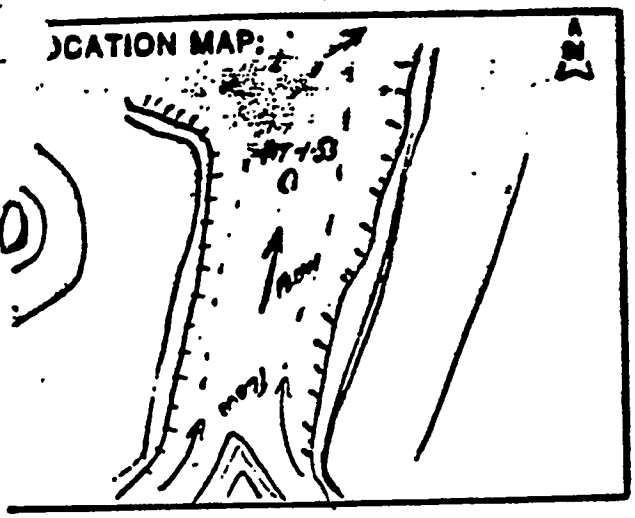
SAMPLE TYPE
A - Auger cuttings
B - 2" O.D. 1.38" I.D. drive sample
C - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JEG-AL-ENG-28. (9/84)

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

LOCATION MAP:



SITE ID: HAT01 LOCATION ID: HT-1-53
APPROX. SITE COORDINATES (ft.):
N 91050 E 12270
GROUND ELEVATION (ft. MSL): ~4185
DRILLING METHOD: 6" HSA
DRILLER: TEAM
DATE STARTED: 10-23-84
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION: IN DRAINAGE NORTH OF SITE
SITE CONDITION: DRY COLD

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
								SM	SAND FG VERY SILTY TRACE GRAVEL SL MOIST
2.5					1			WSS	WEATHERED SANDSTONE
0								SS	SANDSTONE RED-BROWN HARD

TD = 2.5' WELL NOT SET

1' STICKUP
1' SCREEN
2" ID

COMMENTS:

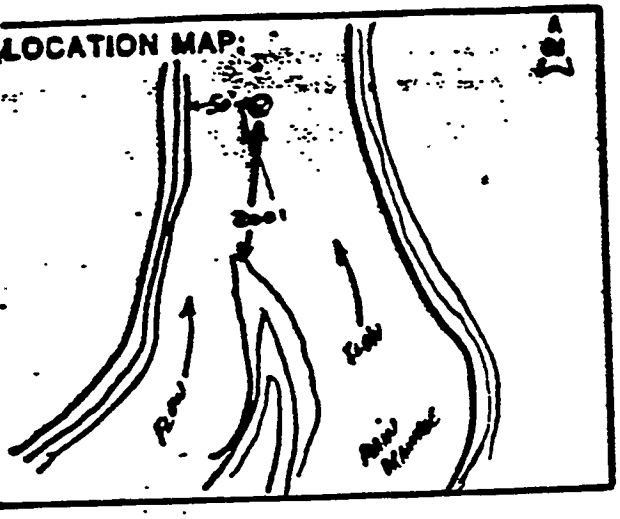
SAMPLE TYPE
A - Auger cuttings
S - 3" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

HT-154 HT-53A

LOCATION MAP:



SITE ID: HA701 LOCATION ID: HT-53A
APPROX. SITE COORDINATES (ft.): UNISTM 83
N 11500 E 12350
GROUND ELEVATION (ft. MSL): ~4180
DRILLING METHOD: 6" HSA
DRILLER:
DATE STARTED: 10-23-84
DATE COMPLETED:
FIELD REP.:

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION: DRAINAGE NORTH OF TAILINGS AREA
SITE CONDITION: ALLUVIUM OVER ROCK

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
								SM	SAND & SILTY TRACE GRAVEL.
								SS	SANDSTONE HARD · RED BROWN
									WELLSET
									WELLSET @ 2.5'
									Bentonite @ 1'
									1' SCREEN
									16" S.U.
									TD = 2.5
									TL. 3.7

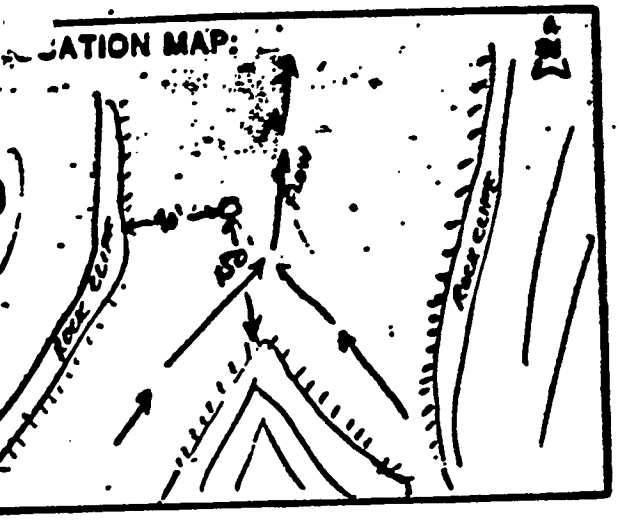
COMMENTS: ENCOUNTERED ROCK @ BGS 2.5

SAMPLE TYPE
A - Auger cuttings
B - 3" 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 (SOIL)

LOCATION MAP:



SITE ID: HATO1 LOCATION ID: MT-1-54
APPROX. SITE COORDINATES (ft.):
N 10900 E 12150
GROUND ELEVATION (ft. MSL): 9195
DRILLING METHOD: 6" HSA
DRILLER: TCATT
DATE STARTED: 10-22-84
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION: BELOW CONFLUENCE OF DRAINAGES NORTH OF TAILINGS
SITE CONDITION:

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
								SM	SAND F.G. V SILTY, SL MOIST RED BROWN, MEDIUM DENSE
1.5								SS	TD=1.5
0								SS	SANDSTONE HARD RED BROWN
									WELL SET.
									1-0 SCREENED VOLCLAY BENTONITE @ 0 CEMENT GROUT .010 @ SURFACE .75" STICKUP. ROCK PROTECTORS

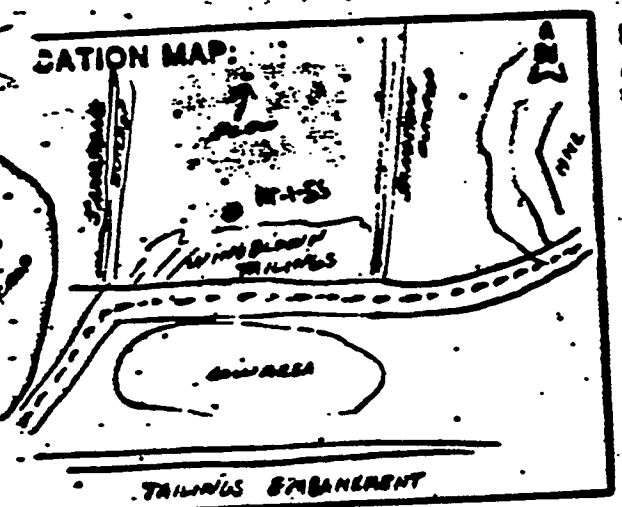
COMMENTS:

SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
M - 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 (SOIL)

LOCATION MAP:



SITE ID: HATO1 LOCATION ID: HT-1-55
APPROX. SITE COORDINATES (ft.):
N 10150 E 11700
GROUND ELEVATION (ft. MSL): 9225'
DRILLING METHOD: 6" HSA
DRILLER: TOTT
DATE STARTED: 10-23-84
DATE COMPLETED:
FIELD REP.: SILVA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION: NORTH OF LOWER PILE IN DRAINAGE
SITE CONDITION:

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
5								SM	WINDBLOWN TAILINGS WHITE-TAN
								SM	SAND V. SILTY RED-BROWN TO GRAVEL
10								SC	SANDSTONE HARD DRAKE DRILLING
									3":TLP
									2" HOLE
									1' STICK UP 1' SAND PACK
									YELLOW PEG @ 6"
									NO LOCK CAP
									ROCK PROTECTOR

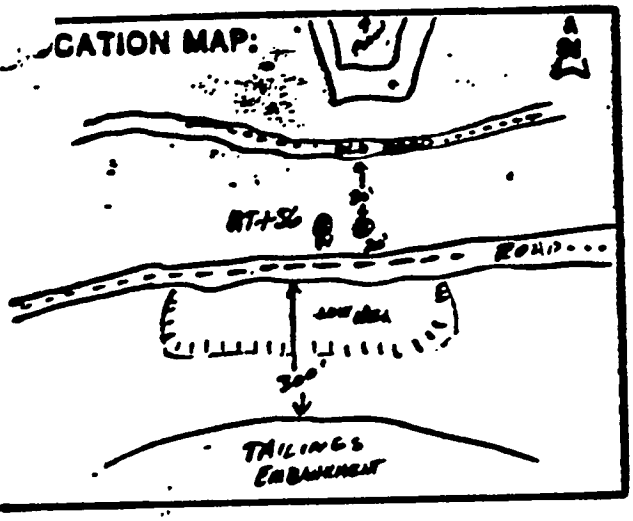
COMMENTS:

SAMPLE TYPE
A = Auger cuttings
S = 3" O.D. 1.38" I.D. drive sample
M = 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 (SOIL)

LOCATION MAP:



SITE ID: HAT01 LOCATION ID: HT-1-SC
APPROX. SITE COORDINATES (ft.):
N 10,040 E 950
GROUND ELEVATION (ft. MSL): 4294.8
DRILLING METHOD: 6" HSA
DRILLER: TCATT
DATE STARTED: 10-23-84
DATE COMPLETED: 10-23-84
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION: DRAINAGE NORTH OF UPPER PILE WESTERN SIDE OF SITE
SITE CONDITION: BETWEEN ROADS IN LOW AREA

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
1								SM	SAND W SILTY RED BROWN
								SP-SM	SAND W SILT RED BROWN BROWN GRAY
5				T	1	AUGER		SS	SANDSTONE RED BROWN DENSE
						TD=3'			

1' SCREENED
3' BLANK
3' STICK UP
BENTONITE PELLETS @ 1.5'
TL=6'
STEEL LOCK CAPS

COMMENTS: PROBE HOLE TO ✓ DEPTH TO PACK

SAMPLE TYPE
A - Auger cuttings
B - 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

MONITOR WELL BORING LOGS

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 905

JOB NO. NAT01 DATE 12/11/84

SURFACE ELEVATION 4294.13

TOP OF FILTER PACK 3.00

WELL CASING TYPE 2.0-in.SCHED.40 PVC

COMPLETION HALGAITO SHALE MEM.

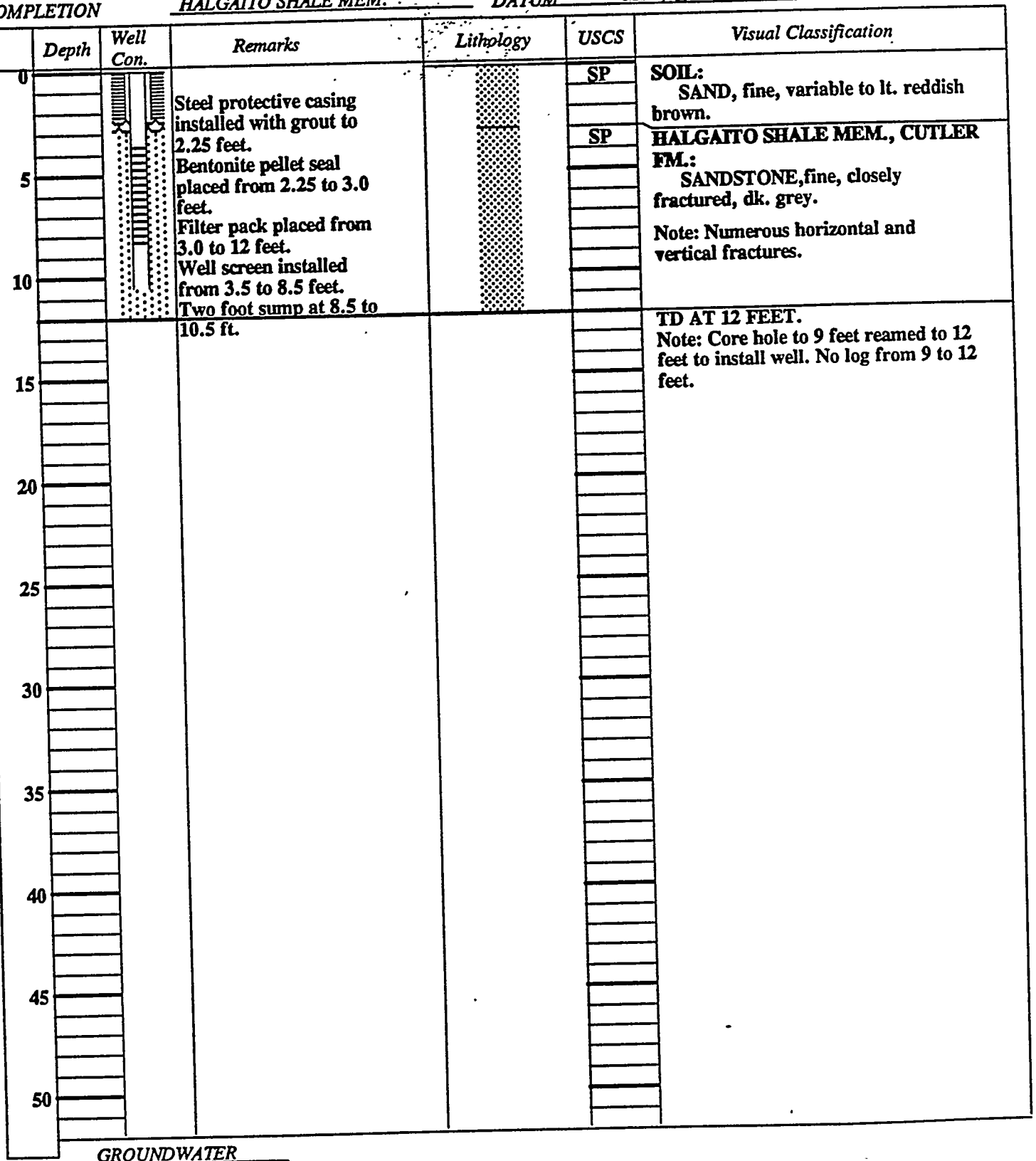
TOTAL DEPTH 12.0 feet

RIG TYPE MOBILE B-80

BORING TYPE HSA WITH ROTARY/CORE

LOCATION N 10006.30 E 9544.20

DATUM MSL, @ GROUND SURFACE



GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 906

JOB NO. NAT01 **DATE** 12/12/84

SURFACE ELEVATION 4220.83
TOP OF FILTER PACK 3.00
WELL CASING TYPE 2.0-IN.SCHED.40 PVC
COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 11.8 feet
RIG TYPE MOBILE B-80
BORING TYPE HSA WITH ROTARY/CORE
LOCATION N 10137.50 E 11703.10
DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Grout seal to 2 feet		SP	SOIL: SAND, fine to very fine, variable to dk. reddish brown.
5		Bentonite pellet seal from 2 to 3 feet. Filter pack placed from 3 to 11.75 feet. Well screen placed from 3.1 to 8.1 feet.		SP	HALGAITO SHALE MEM., CUTLER FM.: SANDSTONE, very fine, reddish brown.
10		Two foot sump from 8.1 to 10.1 feet.			TD AT 11.75 FEET.
15					
20					
25					
30					
35					
40					
45					
50					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 907

JOB NO. NAT01 DATE 12/17/84

SURFACE ELEVATION 4220.51

TOP OF FILTER PACK 107-110

WELL CASING TYPE 3/4-IN.PVC W/PACKER

COMPLETION HALGAITO SHALE MEM.

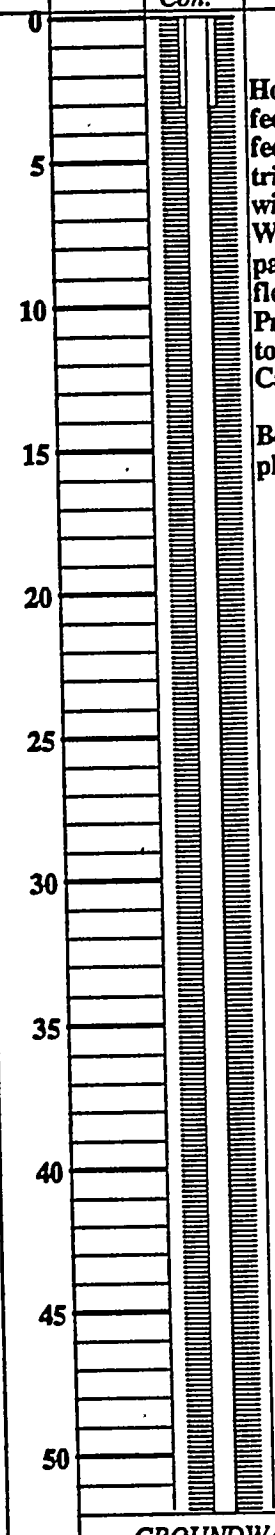
TOTAL DEPTH 125.0 feet

RIG TYPE MOBILE B-80

BORING TYPE HSA WITH NQ CORE

LOCATION N 10154.10 E 11692.40

DATUM MSL, @ GROUND SURFACE



Hole cored drilled to 125 feet, then reamed to 37 feet with 4 3/4-in tricone, then reamed with 3-in to 122 feet. Well designed for packer test of artesian flow from 110 feet. Protective casing placed to 3 feet. Casing is 3/4-in pvc.

Bentonite/ grout seal placed to 107 feet.

USCS	Visual Classification
SP	**SOIL:** SAND, fine to very fine sand, reddish brown to tan.
SP	**HALGAITO SHALE FM., CUTLER FM.:** SANDSTONE, very fine, closely fractured, moderately hard, dk. reddish brown.
ML	SILTSTONE, with seams of claystone, soft, dk. reddish brown.
SP	SANDSTONE, very fine, with lt. grey nodules, reddish brown.
CL / SC	MUDSTONE, with seams of silty sandstone, dark reddish brown.
SP	SANDSTONE, very fine, with scattered small greyish nodules in upper part, mod. soft, dark reddish brown.

Note: Thin limestone seam at 43.3 to 44.3 feet.
Note: Moderately hard from 44 feet.

Note: Increasing siltstone seams from 48 to 55 feet; with nodules of grey SS and limestone.

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 907

JOB NO. NAT01 DATE 12/17/84

SURFACE ELEVATION 4220.51

TOP OF FILTER PACK 107-110

WELL CASING TYPE 3/4-IN.PVC W/PACKER

COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 125.0 feet

RIG TYPE MOBILE B-80

BORING TYPE HSA WITH NQ CORE

LOCATION N 10154.10 E 11692.40

DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					**HALGAITO SHALE MEM.**, Continued.
60					
					Note: Transition to calcareous silt and limestone from 63 to 64.5
65				LS	LIMESTONE, to limy siltstone, mod hard.
70					
75					
				ML	SILTSTONE, to limestone with some coarse sand, hard. reddish brown(10r-3/4).
80					
					Note: with bluish grey nodules.
85					
90					
				CL	MUDSTONE to claystone, mod.
95				SC	soft, dk. reddish brown.
				SP	SANDSTONE, fine, mod. hard, with small green nodules, fractures healed with calcite filling, reddish brown.
100					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH — LOG OF WELL BORING NO. 907

JOB NO. NAT01 DATE 12/17/84
SURFACE ELEVATION 4220.51
TOP OF FILTER PACK 107-110
WELL CASING TYPE 3/4-IN.PVC W/PACKER
COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 125.0 feet
RIG TYPE MOBILE B-80
BORING TYPE HSA WITH NQ CORE
LOCATION N 10154.10 E 11692.40
DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105		Neoprene packers set at 107 and 110 with 2.5 to 3 foot interval.			**HALGAITO SHALE MEM.**, Continued.
110					Note: Limestone nodule layer at 109.5 to 110; hard bluish grey. Note: Conglomerate layer at 111 to 111.5 feet.
				LS	LIMESTONE, horizontal dip, very hard, blue-grey gradually changing to lt. reddish brown.
115				SP	SANDSTONE, with limestone seams, lt. reddish brown.
120					Note: Limestone nodule layer at 121 to 122 feet. Note: Void at 123 feet; water bearing.
				LS	LIMESTONE, hard, grey.
125		Initially lost circulation at 122 feet; After pulling rods artesian flow measured at 26 gpm. Artesian water was carbonated. Steel tools turned blue (sulfates ?)			TD AT 125 FEET.
130					
135					
140					
145					
150					
155					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 908

JOB NO. NAT01 DATE 03/28/85

SURFACE ELEVATION 4294.60

TOP OF FILTER PACK UNK

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 197.0 feet

RIG TYPE CME-75

BORING TYPE HSA WITH NQ CORE

LOCATION N 10019.30 E 9538.70

DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		2.0-IN PVC well installed to 163 feet. Steel protective casing installed to 3 feet.		SM SC	TAILINGS: SILTY SAND.
					SOIL: CLAYEY SAND, reddish brown.
5				ML SM	HALGAITO SHALE MEM., CUTLER FM.: SILTSTONE, with silty sandstone, some grey nodules, hard, brownish red.
		Grout seal installed to 136 ft. (est.)			Note: Limestone seam at 10 to 10.3 feet.
10					
15					Note: Clayey, gravelly seam at 15 to 18 feet.
				ML	SILTSTONE, with limestone inclusions, grey to reddish brown.
20					
25					
30					
35					Note: Moist at 36 feet. Note: Lenses of lt. grey shale with darker grey breccia (turbidite).
40					Note: Occasional thin seams of grey shale.
45					
50					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 908

JOB NO. NAT01 DATE 03/28/85

SURFACE ELEVATION 4294.60

TOP OF FILTER PACK UNK

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 197.0 feet

RIG TYPE CME-75

BORING TYPE HSA WITH NO CORE

LOCATION N 10019.30 E 9538.70

DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					**HALGAITO SHALE MEM., Continued.**
					Continue, SILTSTONE. reddish brown.
60					
65					
70					
75					
80					**Note: Limestone seam at 79.8 to 79.9 feet.**
85					
90					**Note: Limestone seam at 87.2 to 87.5 feet.**
95					
100					**Note: Occasional thin interbedded shale and limestone seams.**

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH — LOG OF WELL BORING NO. 908

JOB NO. NAT01 DATE 03/28/85
SURFACE ELEVATION 4294.60
TOP OF FILTER PACK UNK
WELL CASING TYPE 2.0-IN.SCHED.40 PVC
COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 197.0 feet
RIG TYPE CME-75
BORING TYPE HSA WITH NQ CORE
LOCATION N 10019.30 E 9538.70
DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105					**HALGAITO SHALE MEM.**, Continued. (SILTSTONE, reddish brown.)
				CL	CLAYSTONE, greyish red.
110				ML	SILTSTONE, mod. hard, lt. with very small limestone inclusions, reddish brown.
115					
120					Note: Hard, greyish red
					Note: Soft, maroon, with claystone seams.
125					Note: Thin seams of limestone, and limy siltstone from 125.
130					
135		Bentonite pellet seal installed from 136 to 140 ft. (est.)			Note: Limestone seams at 138 and 143 feet; very hard.
140		Filter pack installed from 140 to 163 ft. (est.)			
145		Well screen placed from 146 to 161 feet.			
150					Note: Interbedded limestone seams from 153 feet.
155					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT *MEXICAN HAT SITE, UTAH* LOG OF WELL BORING NO. 908

JOB NO. *NAT01* DATE *03/28/85*
SURFACE ELEVATION *4294.60*
TOP OF FILTER PACK *UNK*
WELL CASING TYPE *2.0-IN.SCHED.40 PVC*
COMPLETION *HALGAITO SHALE MEM.*

TOTAL DEPTH *197.0 feet*
RIG TYPE *CME-75*
BORING TYPE *HSA WITH NQ CORE*
LOCATION *N 10019.30 E 9538.70*
DATUM *MSL, @ GROUND SURFACE*

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
160		Two ft. sump placed at 161 to 163 ft.			**HALGAITO SHALE MEM.**, Continued. (SILTSTONE, reddish brown to greyish red.
165		Initial hole was core drilled to 197 ft. then off-set hole was drilled to 163 for installation of well. Core hole decommissioned by grouting.			Note: Thin coarse grained sandstone with varved banding at 162 feet.
170					Note: Predominantly massive siltstone with interbedded thin limestone seams.
175					
180				LS	LIMESTONE, hard.
				SP	SANDSTONE, strong acid odor, yellow deposits in fractures.
				LS	LIMESTONE, grey, strong chemical odor, hard, grey.
185					
190					
195					TD AT 197 FEET.
200					
205					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

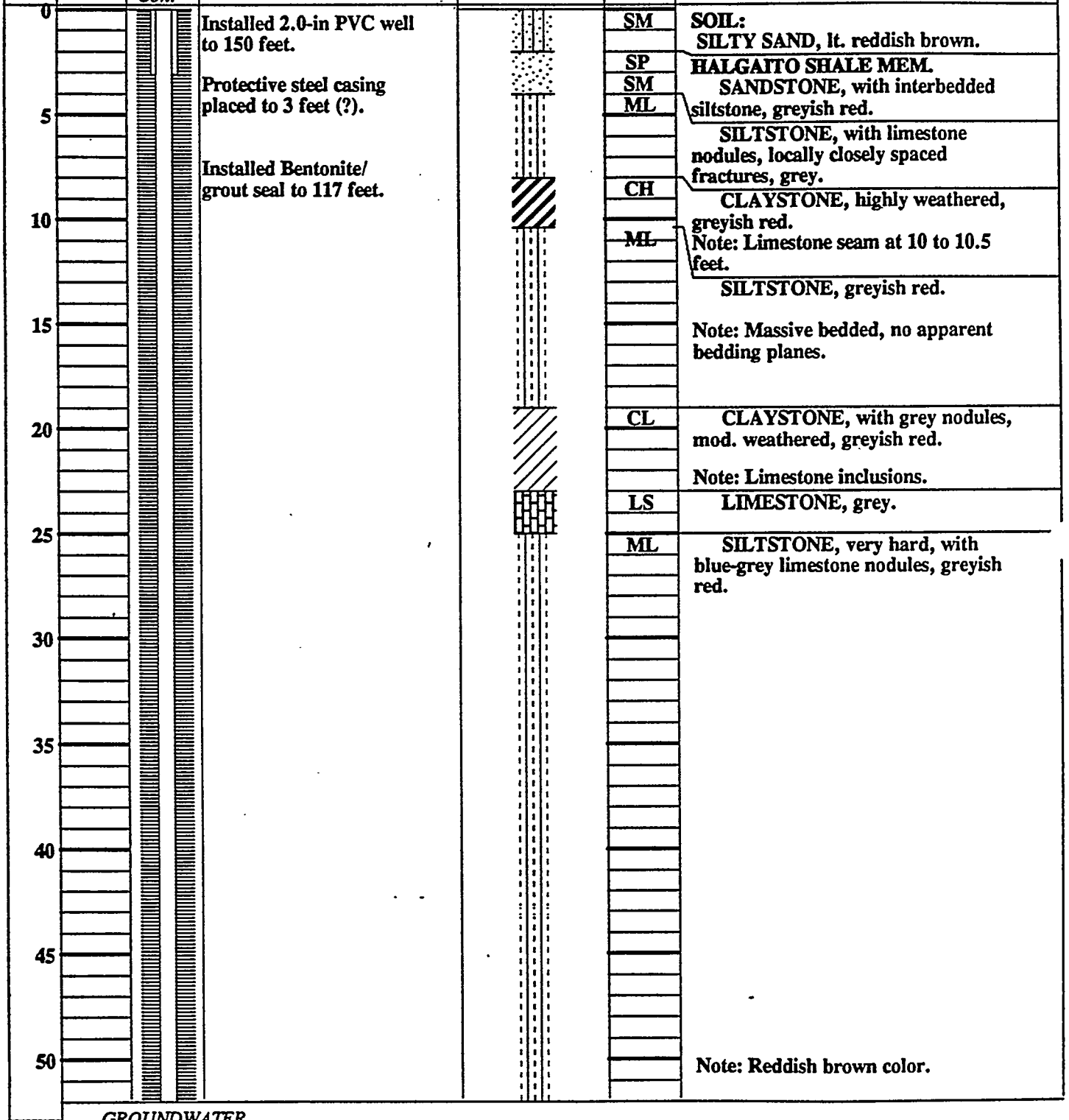
PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 909

JOB NO. NAT01 **DATE** 03/29/85

SURFACE ELEVATION 4349.77
TOP OF FILTER PACK 120.00
WELL CASING TYPE 2.0-IN.SCHED.40 PVC
COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 215.0 feet
RIG TYPE MOBILE B-80
BORING TYPE HSA WITH NQ CORE
LOCATION N 7925.50 E 7134.40
DATUM MSL, @ GROUND SURFACE



GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT *MEXICAN HAT SITE, UTAH* LOG OF WELL BORING NO. 909

JOB NO. *NAT01* DATE *03/29/85*
SURFACE ELEVATION *4349.77*
TOP OF FILTER PACK *120.00*
WELL CASING TYPE *2.0-IN.SCHED.40 PVC*
COMPLETION *HALGAITO SHALE MEM.*

TOTAL DEPTH *215.0 feet*
RIG TYPE *MOBILE B-80*
BORING TYPE *HSA WITH NO CORE*
LOCATION *N 7925.50 E 7134.40*
DATUM *MSL, @ GROUND SURFACE*

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					**HALGAITO SHALE MEM.**, Continued. (SILTSTONE, greyish red.)
60					
65					
70					
75					Note: Thin bands of limestone, and seams with clay clasts.
80					
85					
90					Note: Clayey, mudstone seams from 90 to 94 feet.
95					Note: With rock salt sized limestone nodules.
100					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT LOG OF WELL BORING NO. 909

JOB NO. NAT01 DATE 03/29/85 TOTAL DEPTH 215.0 feet

PROJECT MEXICAN HAT SITE, UTAH LOG OF WELL BORING NO. 909

JOB NO. NAT01 DATE 03/29/85 TOTAL DEPTH 215.0 feet

SURFACE ELEVATION 4349.77 RIG TYPE MOBILE B-80

TOP OF FILTER PACK 120.00 BORING TYPE HSA WITH NQ CORE

WELL CASING TYPE 2.0-IN.SCHED.40 PVC LOCATION N 7925.50 E 7134.40

COMPLETION HALGAITO SHALE MEM. DATUM MSL, @ GROUND SURFACE

	Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
210						**HALGAITO SHALE MEM., Continued.**
215						**TD AT 215 FEET.**
220						
225						
230						
235						
240						
245						
250						
255						
260						

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH — LOG OF WELL BORING NO. 910

JOB NO. NAT01 DATE 02/15/85
SURFACE ELEVATION 4353.22
TOP OF FILTER PACK 139.00
WELL CASING TYPE 2.0-IN.SCHED.40 PVC
COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 236.0 feet
RIG TYPE CME-75
BORING TYPE HSA WITH NO CORE
LOCATION N 8336.50 E 10067.70
DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Redrilled borehole for well 910A to 182 feet, next to hole 910. Placed steel protective casing to 3.8 feet.		SP	**SOIL:** SAND, fine, lt. reddish brown.
5		Installed bentonite/ grout seal to 137 feet.		ML	**HALGAITO SHALE MEM., CUTLER FM.:** SILTSTONE, mod. hard, mineralization in fractures, greyish red.
10					Note: Limestone seam from 12.6 to 12.8 ft.
15					Note: Fractures filled with fine white sand.
20					
25					Note: Scattered very small limestone inclusions.
30					
35					Note: shear zone at 35.1 to 35.4, with crushed angular frag. in clay gouge.
40					
45					Note: Some clay fracture fillings.
50					Note: Occasional thin lenses of very fine sandstone.

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT _____ LOG OF WELL BORING NO. 910

JOB NO. NAT01 DATE 02/15/85
SURFACE ELEVATION 4353.22
TOP OF FILTER PACK 139.00
WELL CASING TYPE 2.0-IN.SCHED.40 PVC
COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 236.0 feet
RIG TYPE CME-75
BORING TYPE HSA WITH NQ CORE
LOCATION N 8336.50 E 10067.70
DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					**HALGAITO SHALE MEM., Continued.** **Continued; SILTSTONE, GREYISH RED.** **Note: Thin interbedded limestone seams from 57 feet.**
60					**Note: limestone clasts in siltstone like conglomerate.**
65					
70					
75					
80					**Note; Grey limestone nodules in siltstone from 74 to 78 feet; well cemented.**
85					
90					**Note: limestone particles, like conglomerate, from 91 to 96.5 ft., well cemented, very few fractures.**
95					**Note; Color change from greyish red to brownish red.**
100					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 909

JOB NO. NAT01 DATE 03/29/85

SURFACE ELEVATION 4349.77

TOP OF FILTER PACK 120.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 215.0 feet

RIG TYPE MOBILE B-80

BORING TYPE HSA WITH NQ CORE

LOCATION N 7925.50 E 7134.40

DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					**HALGAITO SHALE MEM.**, Continued. (SILTSTONE, greyish red.)
60					
65					
70					
75					Note: Thin bands of limestone, and seams with clay clasts.
80					
85					
90					Note: Clayey, mudstone seams from 90 to 94 feet.
95					Note: With rock salt sized limestone nodules.
100					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE — LOG OF WELL BORING NO. 909

JOB NO. NAT01 DATE 03/29/85

SURFACE ELEVATION 4349.77

TOP OF FILTER PACK 120.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION HALGAITO SHALE MEM.

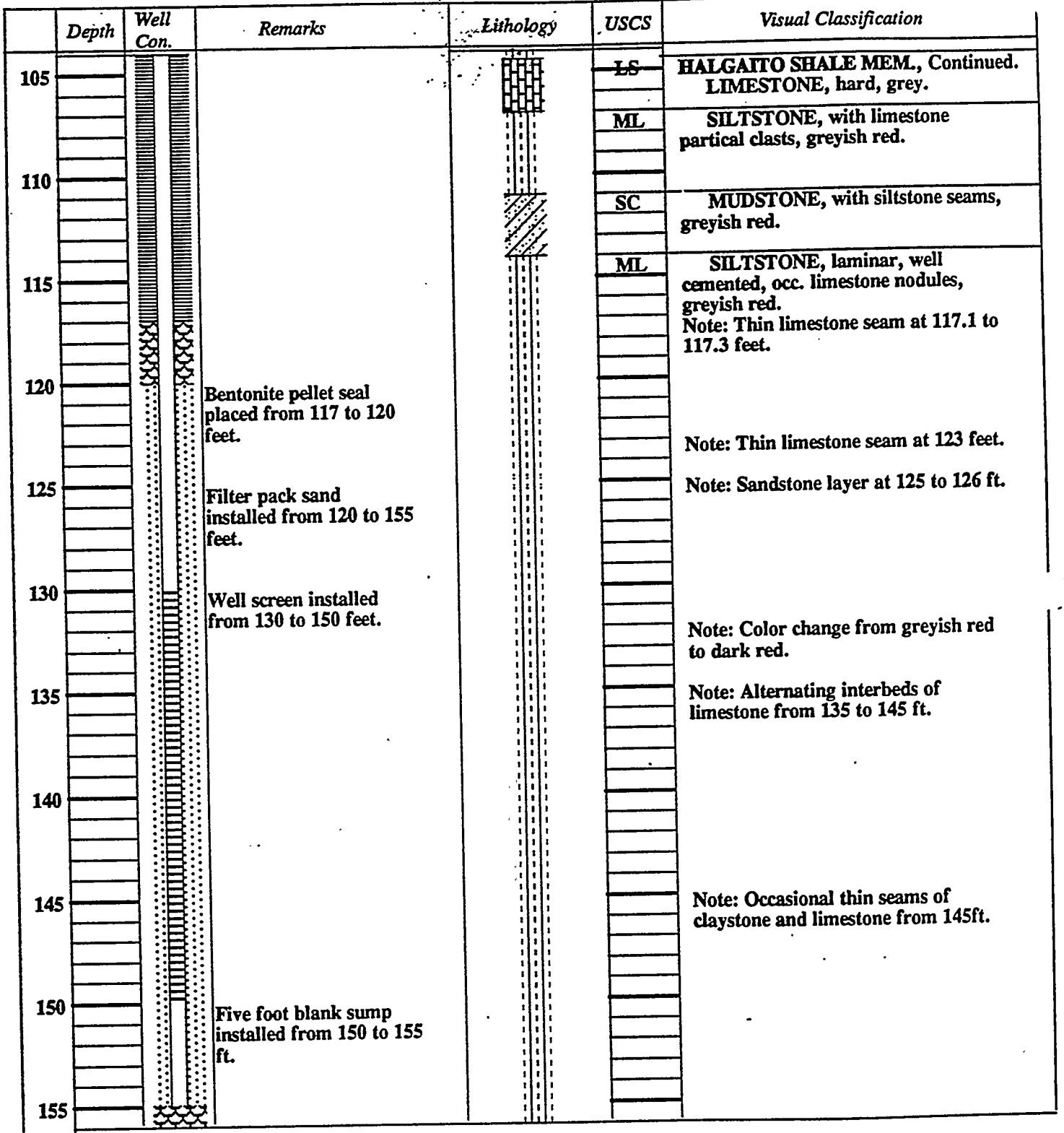
TOTAL DEPTH 215.0 feet

RIG TYPE MOBILE B-80

BORING TYPE HSA WITH NQ CORE

LOCATION N 7925.50 E 7134.40

DATUM MSL, @ GROUND SURFACE



USCS	Visual Classification
LS	**HALGAITO SHALE MEM.**, Continued. LIMESTONE, hard, grey.
ML	SILTSTONE, with limestone partical clasts, greyish red.
SC	MUDSTONE, with siltstone seams, greyish red.
ML	SILTSTONE, laminar, well cemented, occ. limestone nodules, greyish red. Note: Thin limestone seam at 117.1 to 117.3 feet.
	Note: Thin limestone seam at 123 feet.
	Note: Sandstone layer at 125 to 126 ft.
	Note: Color change from greyish red to dark red.
	Note: Alternating interbeds of limestone from 135 to 145 ft.
	Note: Occasional thin seams of claystone and limestone from 145ft.

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT *MEXICAN HAT SITE, UTAH* LOG OF WELL BORING NO. 909

JOB NO. *NAT01* DATE *03/29/85*
SURFACE ELEVATION *4349.77*
TOP OF FILTER PACK *120.00*
WELL CASING TYPE *2.0-IN.SCHED.40 PVC*
COMPLETION *HALGAITO SHALE MEM.*

TOTAL DEPTH *215.0 feet*
RIG TYPE *MOBILE B-80*
BORING TYPE *HSA WITH NQ CORE*
LOCATION *N 7925.50 E 7134.40*
DATUM *MSL, @ GROUND SURFACE*

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
		Bentonite pellet seal placed from 155 to 157 ft.			**HALGAITO SHALE MEM.** Continued.
				LS	**LIMESTONE**, mod. soft, masssive, grey.
160		Not confirmed if initial core hole was reamed or if off-set hole was drilled for installation of well to 156 feet.			
165					
170					Note: sulphur traces in limestone, strong acid odor.
175					Note: traces of petroleum imbedded in core at 177 to 179 ft.
180					
185					Note: Increasing siltstone interbeds from 184 ft. Note: More oil imbedded in core from 185 to 187 ft.
190					
195				ML	**SILTSTONE**, massive, with occasional beds of limestone, red.
200					
205					Note: Interbedded thin limestone seams and nodules.

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT *MEXICAN HAT SITE, UTAH* — LOG OF WELL BORING NO. 909

JOB NO. *NAT01* **DATE** *03/29/85*

SURFACE ELEVATION 4349.77
TOP OF FILTER PACK 120.00
WELL CASING TYPE 2.0-IN.SCHED.40 PVC
COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 215.0 feet
RIG TYPE MOBILE B-80
BORING TYPE HSA WITH NQ CORE
LOCATION N 7925.50 E 7134.40
DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
210					**HALGAITO SHALE MEM., Continued.**
215					**TD AT 215 FEET.**
220					
225					
230					
235					
240					
245					
250					
255					
260					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH — LOG OF WELL BORING NO. 910

JOB NO. NAT01 DATE 02/15/85
SURFACE ELEVATION 4353.22
TOP OF FILTER PACK 139.00
WELL CASING TYPE 2.0-IN.SCHED.40 PVC
COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 236.0 feet
RIG TYPE CME-75
BORING TYPE HSA WITH NQ CORE
LOCATION N 8336.50 E 10067.70
DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Redrilled borehole for well 910A to 182 feet, next to hole 910. Placed steel protective casing to 3.8 feet.		SP	**SOIL:** SAND, fine, lt. reddish brown.
5		Installed bentonite/ grout seal to 137 feet.		ML	**HALGAITO SHALE MEM., CUTLER FM.:** SILTSTONE, mod. hard, mineralization in fractures, greyish red.
10					Note: Limestone seam from 12.6 to 12.8 ft.
15					Note: Fractures filled with fine white sand.
20					
25					Note: Scattered very small limestone inclusions.
30					
35					Note: shear zone at 35.1 to 35.4, with crushed angular frag. in clay gouge.
40					
45					Note: Some clay fracture fillings.
50					Note: Occasional thin lenses of very fine sandstone.

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT EAST [illegible] LOG OF WELL BORING NO. [illegible]

JOB NO. NAT01 DATE 02/15/85
SURFACE ELEVATION 4353.22
TOP OF FILTER PACK 139.00
WELL CASING TYPE 2.0-IN.SCHED.40 PVC
COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 236.0 feet
RIG TYPE CME-75
BORING TYPE HSA WITH NQ CORE
LOCATION N 8336.50 E 10067.70
DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					**HALGAITO SHALE MEM.**, Continued. Continued; SILTSTONE, GREYISH RED. Note: Thin interbedded limestone seams from 57 feet.
60					Note: limestone clasts in siltstone like conglomerate.
65					
70					
75					
80					Note; Grey limestone nodules in siltstone from 74 to 78 feet; well cemented.
85					
90					Note: limestone particles, like conglomerate, from 91 to 96.5 ft., well cemented, very few fractures.
95					Note; Color change from greyish red to brownish red.
100					

GROUNDWATER

DEPTH	HOUR	DATE

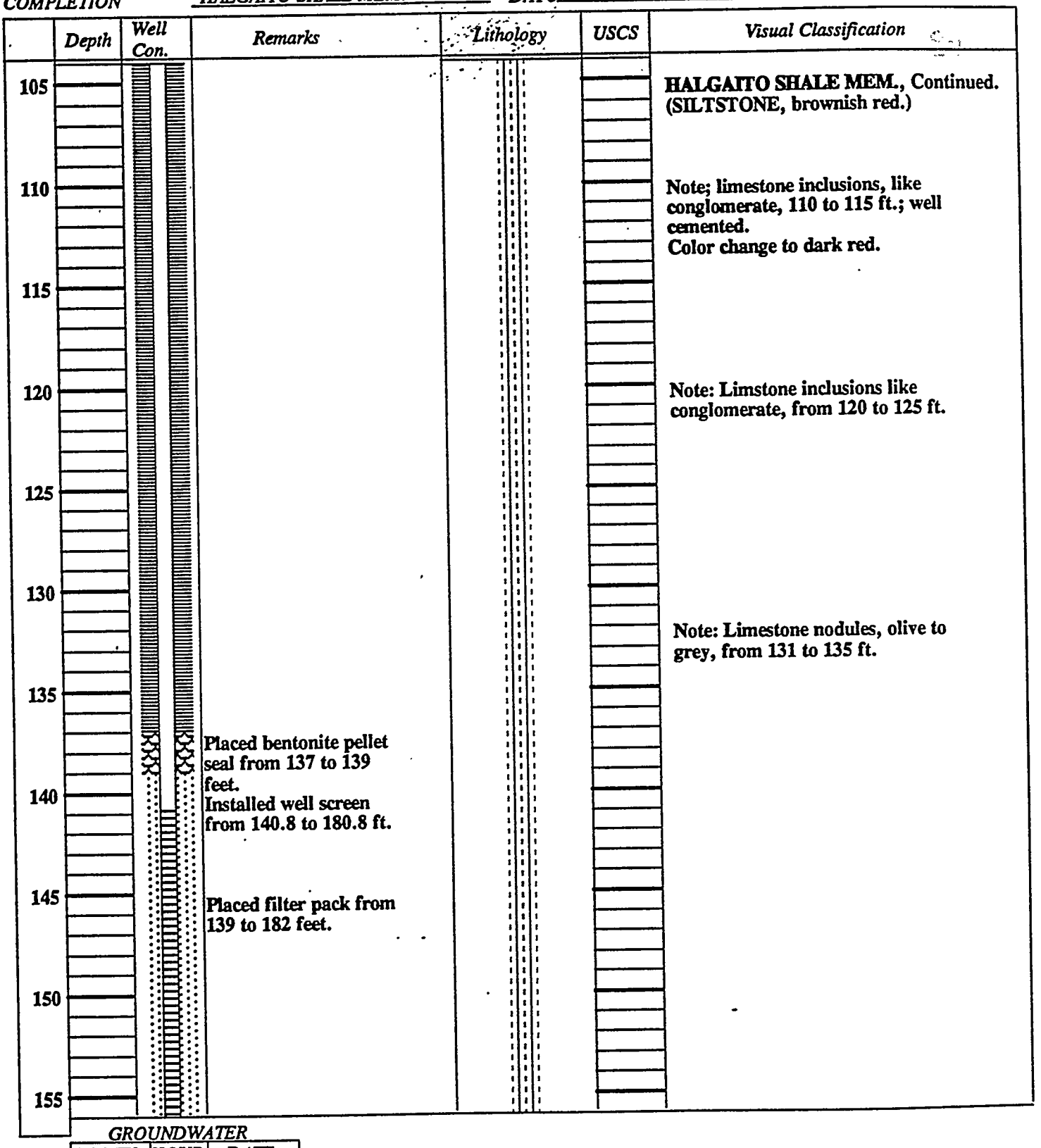
JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH — LOG OF WELL BORING NO. 910

JOB NO. NAT01 — DATE 02/15/85

SURFACE ELEVATION 4353.22
TOP OF FILTER PACK 139.00
WELL CASING TYPE 2.0-IN.SCHED.40 PVC
COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 236.0 feet
RIG TYPE CME-75
BORING TYPE HSA WITH NQ CORE
LOCATION N 8336.50 E 10067.70
DATUM MSL, @ GROUND SURFACE



GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH — LOG OF WELL BORING NO. 910

JOB NO. NAT01 DATE 02/15/85
SURFACE ELEVATION 4353.22
TOP OF FILTER PACK 139.00
WELL CASING TYPE 2.0-IN.SCHED.40 PVC
COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 236.0 feet
RIG TYPE CME-75
BORING TYPE HSA WITH NQ CORE
LOCATION N 8336.50 E 10067.70
DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
160					**HALGAITO SHALE MEM.**, Continued. (SILTSTONE, dark red to reddish brown.)
165					
170					
175					
180		Installed blank sump from 180.8 to 182.8 ft.			
185					
190					
195					
200					
205					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

JOB NO. NA101 DATE

SURFACE ELEVATION 4353.22
TOP OF FILTER PACK 139.00
WELL CASING TYPE 2.0-IN.SCHED.40 PVC
COMPLETION HALGAITO SHALE MEM.

RIG TYPE CME-75
BORING TYPE HSA WITH NQ CORE
LOCATION N 8336.50 E 10067.70
DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
210					**HALGAITO SHALE MEM.**, Continued. (SILTSTONE, brownish red.)
215					**Note: petroleum odor and oily fluid.**
220					
225					
230					**Note: Possible gas bearing zone fron 225 ft. Well bubbling with rotten egg odor. Possible sulfide gas hazard.**
235					**TD AT 236 FEET.**
240					
245					
250					
255					
260					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH — LOG OF WELL BORING NO. [illegible]

JOB NO. NAT01 DATE 01/06/85

SURFACE ELEVATION 4294.35
TOP OF FILTER PACK 93.00
WELL CASING TYPE 2.0-IN.SCHED.40 PVC
COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 105.0 feet
RIG TYPE CME-75
BORING TYPE NQ CORE & REAM
LOCATION N 9508.40 E 11114.00
DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Corehole through pile, NE corner. Steel protective casing placed to 3 feet (?).		SM	TAILINGS: UNDIFFERENTIATED
40				ML	HALGAITO SHALE MEM. CUTLER FM.: SILTSTONE, calcareous, very hard to mod. hard, reddish brown with lt. grey motteling. Note: with angular to subrounded limestone clasts from 45 to 48 ft. Note: Lost circulation at 51 ft.

GROUNDWATER

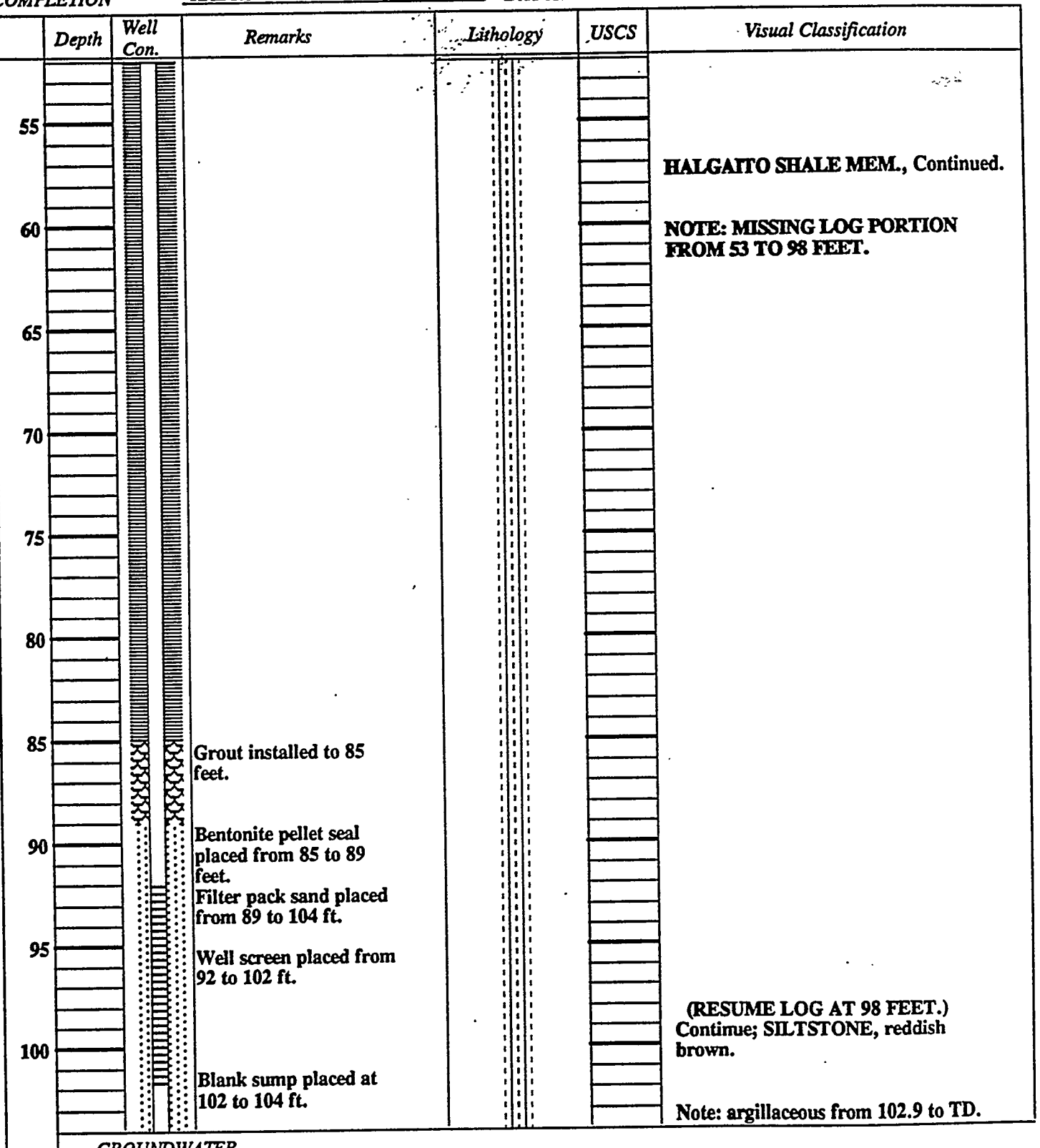
DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT _____ LOG OF WELL BORING NO. _____

JOB NO. NAT01 DATE 01/06/85
SURFACE ELEVATION 4294.35
TOP OF FILTER PACK 93.00
WELL CASING TYPE 2.0-IN.SCHED.40 PVC
COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 105.0 feet
RIG TYPE CME-75
BORING TYPE NQ CORE & REAM
LOCATION N 9508.40 E 11114.00
DATUM MSL, @ GROUND SURFACE



GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT [illegible] LOG OF WELL BORING NO. [illegible]

JOB NO. NAT01 DATE 01/06/85

SURFACE ELEVATION 4294.35

TOP OF FILTER PACK 93.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 105.0 feet

RIG TYPE CME-75

BORING TYPE NQ CORE & REAM

LOCATION N 9508.40 E 11114.00

DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105					TD AT 104.5 FEET.
110					
115					
120					
125					
130					
135					
140					
145					
150					
155					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

JOB NO. NAT01 DATE 03/28/85

SURFACE ELEVATION 4294.43

TOP OF FILTER PACK 55.50

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION HALGAITO SHALE MEM.

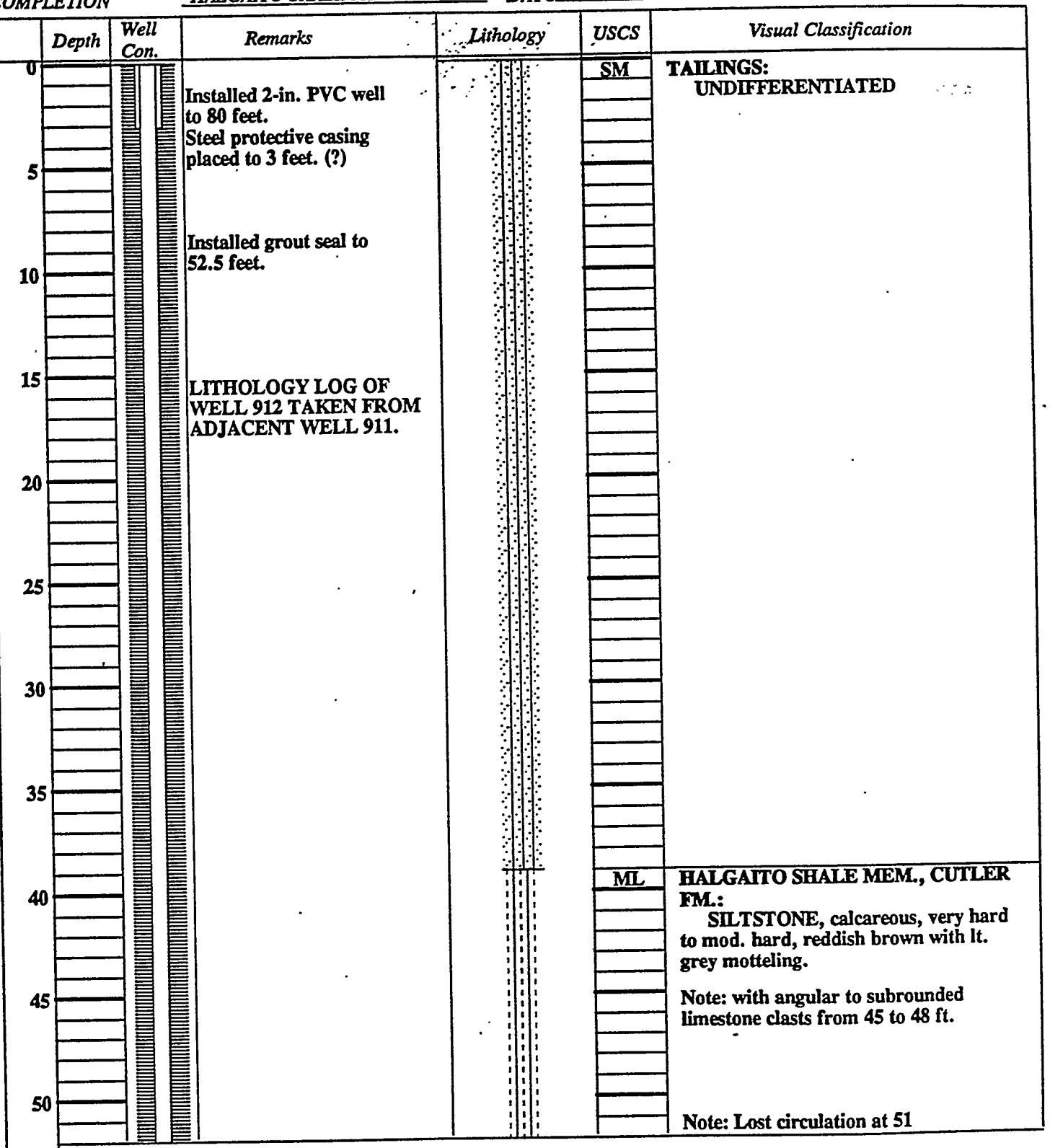
TOTAL DEPTH 84.0 feet

RIG TYPE CME-75

BORING TYPE ROTARY

LOCATION N 9527.00 E 11133.40

DATUM MSL, @ GROUND SURFACE



GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 912

JOB NO. NAT01 DATE 03/28/85

SURFACE ELEVATION 4294.43

TOP OF FILTER PACK 55.50

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 84.0 feet

RIG TYPE CME-75

BORING TYPE ROTARY

LOCATION N 9527.00 E 11133.40

DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
					ft.(REPORTED IN LOG OF WELL 911)
55		Installed bentonite pellet seal from 52.5 to 55.5 feet. Placed filter pack sand from 55.5 to 80 feet. Installed well screen from 58 to 78 feet.			
60					NOTE; MISSING LOG PORTION FROM 53 FEET TO TD BASED ON LOG OF ADJACENT WELL 911.
65					
70					
75					
80		Placed blank sump from 78 to 80 feet. Cave-in fill from 80 to 84 feet.			
85					TD AT 84 FEET.
90					
95					
100					Note: argillaceous from 102.9 to TD.

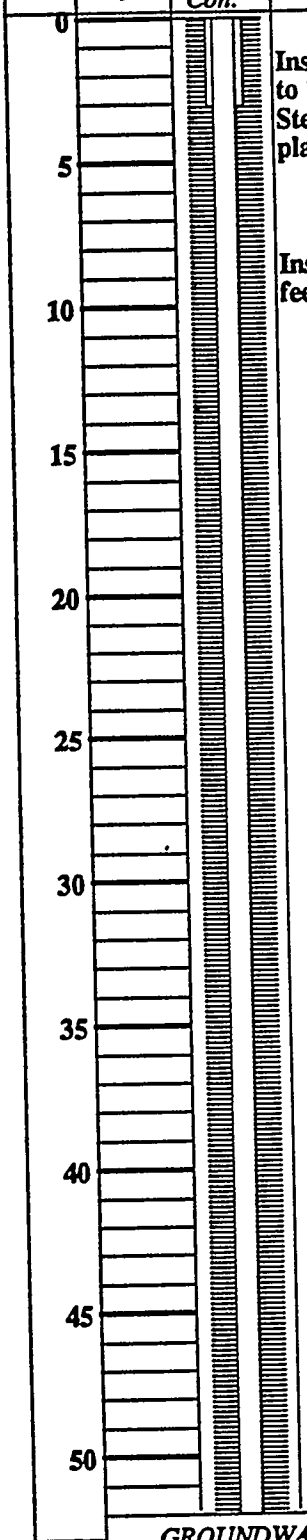
GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

JOB NO. NAT01 DATE 10/10/85
SURFACE ELEVATION 4311.65
TOP OF FILTER PACK 94.00
WELL CASING TYPE 4.0-IN.SCHED.40 PVC
COMPLETION HONAKER TRAIL FM.

TOTAL DEPTH 116.0 feet
RIG TYPE
BORING TYPE ROTARY-AIR
LOCATION N 10550.30 E 7733.00
DATUM MSL, @ GROUND SURFACE



Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 4-in. PVC well to 112 feet. Steel protective casing placed to 3 feet. (?)		ML	**HALGAITO SHALE FM.:** SANDY SILTSTONE, calcareous, thin bedded, highly to mod. weathered, moist, medium reddish brown.
10		Installed grout seal to 85 feet.		SM	SILTY SANDSTONE, slightly calcareous, thin bedded, medium reddish brown.
20					Note: Strongly calcareous (cementation) from 20 feet.
25					Note: some interbedded reddish orange mudstone from 28 to 31 feet.
45					Note: Some thin interbedded grey limestone from 46 to 80 feet; and some reddish orange mudstone from 46 to 58 feet.

GROUNDWATER

DEPTH	HOUR	DATE
52.3		10-12-85

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 930

JOB NO. NAT01 DATE 10/10/85

SURFACE ELEVATION 4311.65

TOP OF FILTER PACK 94.00

WELL CASING TYPE 4.0-IN.SCHED.40 PVC

COMPLETION HONAKER TRAIL FM.

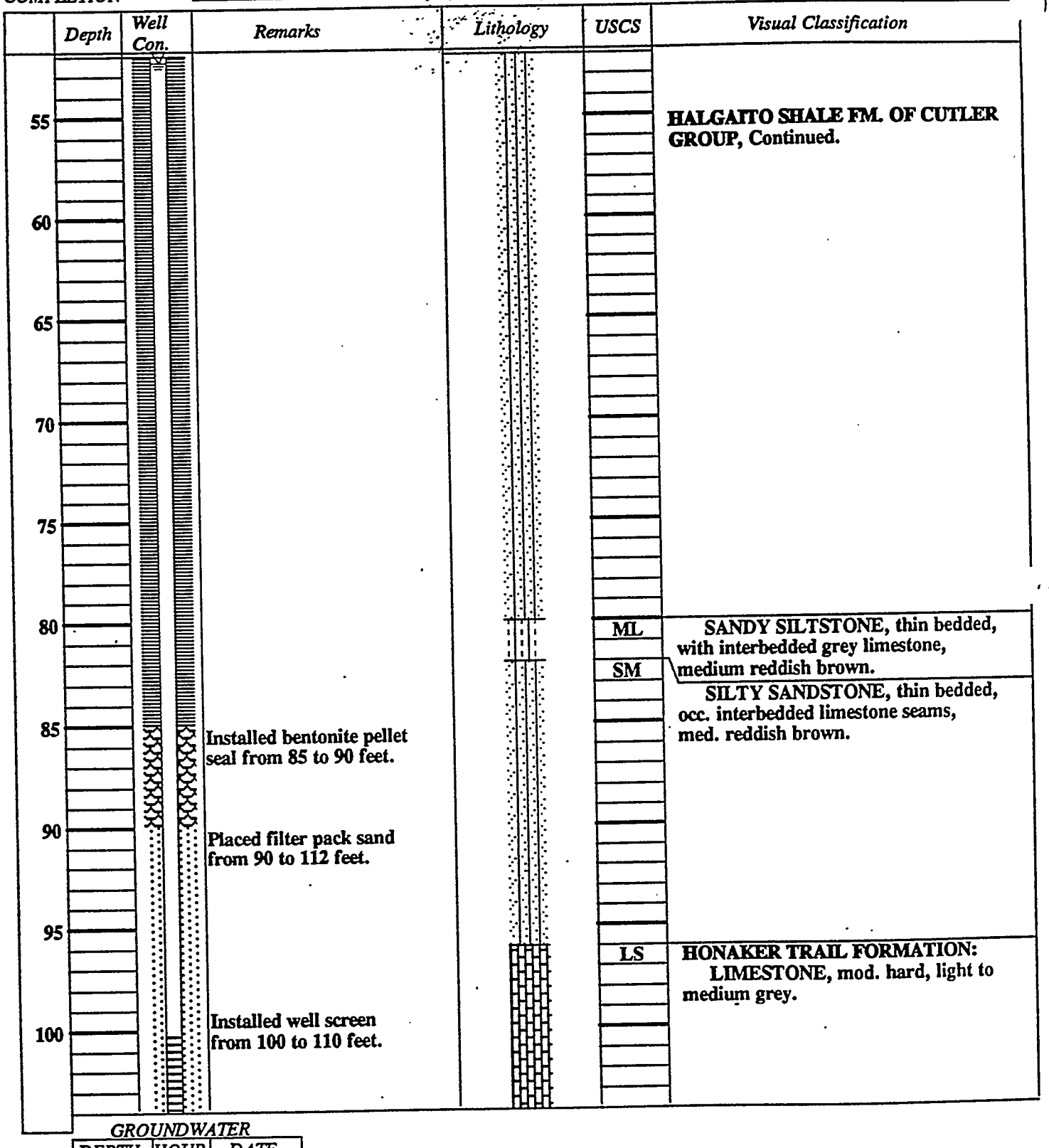
TOTAL DEPTH 116.0 feet

RIG TYPE

BORING TYPE ROTARY-AIR

LOCATION N 10550.30 E 7733.00

DATUM MSL, @ GROUND SURFACE



GROUNDWATER

DEPTH	HOUR	DATE
52.3		10-12-85

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 930

JOB NO. NAT01 DATE 10/10/85

SURFACE ELEVATION 4311.65

TOP OF FILTER PACK 94.00

WELL CASING TYPE 4.0-IN.SCHED.40 PVC

COMPLETION HONAKER TRAIL FM.

TOTAL DEPTH 116.0 feet

RIG TYPE

BORING TYPE ROTARY-AIR

LOCATION N 10550.30 E 7733.00

DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105					**HONAKER TRAIL FM.**, Continued.
110		Placed blank sump from 110 to 112 feet.			Note: Interbedded sandstone seams from 110 to 113 feet.
		Cave-in fill from 112 to 116 feet.		SM	SANDSTONE, silty, calcareous, thin bedded, with limstone seams and nodules, medium reddish brown.
115					TD AT 116 FEET.
120					
125					
130					
135					
140					
145					
150					
155					

GROUNDWATER

DEPTH	HOUR	DATE
52.3		10-12-85

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH — LOG OF TEST BORING NO. 951

JOB NO. NAT01 — DATE 10/12/85

LOCATION N12083.0 E9971.0
RIG TYPE BEEMAN ROTARY
BORING TYPE ROTARY -AIR 7 7/8-IN
SURFACE ELEV. 4316.27
DATUM MSL, @ GROUND SURFACE

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows/foot 140 lb. 30" free-fall drop hammer	Dry Density lbs. per cubic foot	Moisture Content Percent of Dry Weight	Unified Soil Classification
0								LS
5								
10								ML
15								
20								CL SC
25								ML
30								CL SC
35								
40								ML
45								
50								SM

REMARKS

Hole grouted to surface after encountering strong petroliferous odor at 177 feet with oily cuttings. No water encountered.

VISUAL CLASSIFICATION

HALGAITO SHALE MEM., CUTLER FM.:

LIMESTONE, silty, fine grained, thin bedded, brown. higly weathered to 4 feet, occasional orange siltstone interbedded.

SILTSTONE, sandy, calcareous, very thin beds, medium orange-brown. Occasional thin limestone beds from 13 to 16 feet.

MUDSTONE, friable, limonitic, med. orange.

SILTSTONE, very thin bedded, calcareous, med. orange.

MUDSTONE, calcareous, soft, med. to dark orange-brown. Becomes more silty and harder with depth.

SILTSTONE, calcareous, thin bedded, med. orange-brown. Occasional thin limestone seam from 46 to 48 ft.

SANDSTONE, silty, fine, calcareous, med. orange-brown.

GROUNDWATER

DEPTH	HOUR	DATE

SAMPLE TYPE

RX - Rock Coring - NX or HX
S - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.
T - 3" O.D. thin-walled Shelby tube.
G - Grab, cuttings sample

JEG TAC TEAM

JOB NO. NAT01 DATE 10/12/85

LOCATION N12083.0 E9971.0
RIG TYPE BEEMAN ROTARY
BORING TYPE ROTARY -AIR 7 7/8-IN
SURFACE ELEV. 4316.27
DATUM MSL, @ GROUND SURFACE

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows/foot* 140 lb. 30" free-fall drop hammer	Dry Density lbs. per cubic foot	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
55										**HALGAITO SHALE MEM., CUTLER FM.,** Continued.
60										
65										
70										
								ML		**SILTSTONE,** calcareous, thin bedded, light to med. brown.
75										
80										
85										
90										
95										**Note:** Occasional interbeds of lt. orange-brown mudstone from 100 ft.
100										

GROUNDWATER

DEPTH	HOUR	DATE

SAMPLE TYPE

RX - Rock Coring - NX or HX
S - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.
T - 3" O.D. thin-walled Shelby tube.
G - Grab, cuttings sample

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH — LOG OF TEST BORING NO.

JOB NO. NAT01 DATE 10/12/85

LOCATION N12083.0 E9971.0
RIG TYPE BEEMAN ROTARY
BORING TYPE ROTARY -AIR 7 7/8-IN
SURFACE ELEV. 4316.27
DATUM MSL, @ GROUND SURFACE

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows/foot 140 lb. 30" free-fall drop hammer	Dry Density Pcf per cubic foot	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
105										**HALGAITO SHALE MEM., CUTLER FM.,** Continued.
110										Note: Increasing to equal amounts of mudstone interbeds from 110 ft.
115								LS		LIMESTONE, some siltstone interbeds, fine grained, mostly orangeish brown with some lt. grey.
120								ML		SILTSTONE, calcareous, med. reddish brown.
125								LS		LIMESTONE, fine grained, light grey.
130										Note; Change to sandy limestone from 129 feet.
135										
140								SM		SILTY SANDSTONE, fine, calcareous, thin bedded, med. reddish brown.
145										Note: Anomolous radioactivity at 147.5 on geophysical well log.
150								ML		SILTSTONE, with limestone seams interbeds, lt. and med. greenish to brownish grey.
155								SM		SANDSTONE, with interbeds of limestone, med. brown.

GROUNDWATER

DEPTH	HOUR	DATE

SAMPLE TYPE

RX - Rock Coring - NX or HX
S - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.
T - 3" O.D. thin-walled Shelby tube.
G - Grab, cuttings sample

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF TEST BORING NO. 931

JOB NO. NAT01 DATE 10/12/85

LOCATION N12083.0 E9971.0

RIG TYPE BEEMAN ROTARY

BORING TYPE ROTARY -AIR 7 7/8-IN

SURFACE ELEV 4316.27

DATUM MSL, @ GROUND SURFACE

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows/foot 140 lb. 30" free-fall drop hammer	Dry Density lbs. per cubic foot	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
160										
165										
170								LS		LIMESTONE, silty, fine grained, calcareous, sulfur odor, lt. medium blue to greenish grey. Note: Becomes thin bedded, fissle, dark grey from 172 ft.
175								SP		SANDSTONE, fine grained, weakly calcareous, friable, lt. yellow grey to olive. Has petroliferous odor, Possible "baby member" of Honaker Trail Formation.
										TD AT 177 FEET. HOLE DECOMMISSIONED BY GROUTING FULL.

GROUNDWATER

DEPTH	HOUR	DATE

SAMPLE TYPE

RX - Rock Coring - NX or HX
S - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.
T - 3" O.D. thin-walled Shelby tube.
G - Grab, cuttings sample

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF TEST BORING NO. 932

JOB NO. NAT01 DATE 10/13/85

LOCATION N13167.7 E12636.3
RIG TYPE BEEMAN ROTARY
BORING TYPE ROTARY - AIR 5 1/8-IN
SURFACE ELEV. 4225.13
DATUM MSL, @ GROUND SURFACE

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows/foot 140 lb. 30" free-fall drop hammer	Dry Density lbs. per cubic foot	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								LS		**HALGAITO SHALE MEM., CUTLER FM.:** LIMESTONE, sandy, fine grained, med. orange- brown.
5								CL SC		MUDSTONE, calcareous, friable, with siltstone interbeds, "brick" orange.
10								ML	Hole decommissioned by grouting to surface.	SILTSTONE, sandy, fine grained, med. orange brown.
15									Encountered possible hydrogen sulfide gas followed by water with petroliferous odor.	
20								SM	Water level line coated with two feet of brown oil. Water quality shows salinity 2%; EC 3100 uMhos; pH 8.08.	SILTY SANDSTONE, calcareous, fine grained, med. orange- brown.
25										Note: Some interbedded orange mudstone from 26 to 28 ft.
30										
35										
40										
45										Note: Considerable mudstone interbeds from 48 to 50 ft.
50								ML		SILTSTONE, sandy, fine grained, calcareous, med. brown to reddish

GROUNDWATER

DEPTH	HOUR	DATE
151.0	07:35	10-14-85

SAMPLE TYPE

RX - Rock Coring - NX or HX
S - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.
T - 3" O.D. thin-walled Shelby tube.
G - Grab, cuttings sample

JEG TAC TEAM

PROJECT

JOB NO. NAT01 DATE 10/13/85

LOCATION N13167.7 E12636.3
RIG TYPE BEEMAN ROTARY
BORING TYPE ROTARY - AIR 5 1/8-IN
SURFACE ELEV. 4225.13
DATUM MSL, @ GROUND SURFACE

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows/foot 140 lb. 30" free-fall drop hammer	Dry Density lbs. per cubic foot	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
55										brown. Note: Some interbedded limestone seams to 54 feet. **HALGAITO SHALE MEM., CUTLER FM., Continued.**
60										
65										
70										Note: Color change to greenish grey from 72 to 76 feet.
75										
80										
85										
90										
95										Note: Color change to greyish green from 96 to 98 feet. Note: Some orange mudstone interbeds from 98 to 102 feet.
100										

GROUNDWATER

	DEPTH	HOUR	DATE
▽	151.0	07:35	10-14-85
▼			

SAMPLE TYPE

RX - Rock Coring - NX or HX
S - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.
T - 3" O.D. thin-walled Shelby tube.
G - Grab, cuttings sample

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF TEST BORING NO. 932

JOB NO. NAT01 DATE 10/13/85

LOCATION N13167.7 E12636.3
RIG TYPE BEEMAN ROTARY
BORING TYPE ROTARY - AIR 5 1/8-IN
SURFACE ELEV 4225.13
DATUM MSL, @ GROUND SURFACE

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows/foot 140 lb. 30" free-fall drop hammer	Dry Density lbs. per cubic foot	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
105										**HALGAITO SHALE MEM., CUTLER FM., Continued.**
110										**Note: Color change to lt. greenish grey from 110 to 114 ft.**
115										**Note: Considerable interbedded orange mudstone with trace limestone from 116 to 118 feet.**
120										
125										**Note: Some interbeds of lt. grey limestone from 132 to 138 ft.**
130										
135										
140										
145										**Note: Some interbeds of lt. to med. grey limestone from 146 to 187 ft.**
▽150										
155										

GROUNDWATER

	DEPTH	HOUR	DATE
▽	151.0	07:35	10-14-85
▼			

SAMPLE TYPE

RX - Rock Coring - NX or HX
S - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.
T - 3" O.D. thin-walled Shelby tube.
G - Grab, cuttings sample

JEG TAC TEAM

PROJECT *MEXICAN HAT SITE, UTAH*

LOG OF TEST BORING NO. 932

JOB NO. *NAT01* DATE *10/13/85*

LOCATION *N13167.7 E12636.3*
RIG TYPE *BEEMAN ROTARY*
BORING TYPE *ROTARY - AIR* *5 1/8-IN*
SURFACE ELEV *4225.13*
DATUM *MSL, @ GROUND SURFACE*

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows/foot 140 lb. 30" free-fall drop hammer	Dry Density lbs. per cubic foot	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
160									Top of Honaker Trail Formation may be at 162 or 187 feet. The geopysical logs do not show any break between 50 to 187 ft.	
165										
170										
175										
180										
185										
								LS		LIMESTONE, fine grained, lt. to medium grey.
190										TD AT 193 FEET.

GROUNDWATER

DEPTH	HOUR	DATE
151.0	07:35	10-14-85

SAMPLE TYPE

RX - Rock Coring - NX or HX
S - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.
T - 3" O.D. thin-walled Shelby tube.
G - Grab, cuttings sample

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF TEST BORING NO. 933

JOB NO. NAT01 **DATE** 10/15/85

LOCATION N7782.3 E8444.7
RIG TYPE BEEMAN ROTARY
BORING TYPE ROTARY - AIR 5 1/8-IN
SURFACE ELEV 4365.03
DATUM MSL, @ GROUND SURFACE

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows/foot 140 lb. 30" free-fall drop hammer	Dry Density lbs. per cubic foot	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								ML	Trace water found in borehole, unable to determine source from geophysical log. Hole decommissioned by grouting to surface.	**HALGAITO SHALE MEM., CUTLER FM.:** SILTSTONE, calcareous, medium brown to orangish brown. Note: Color variable includes seams with lt. grey.
5										
10										
15								CL SC		MUDSTONE, calcareous, with interbeds of siltstone, soft, orangish brown.
20										
25										
30										
35								ML		SILTSTONE, with mudstone interbeds, occasional thin limestone seams, med. reddish brown. Note: Mudstone decreasing from 38 feet. Note: Trace chert from 40 to 45 feet.
40										
45										Note: Color slightly greenish from 45 ft.
50										

GROUNDWATER

DEPTH	HOUR	DATE

SAMPLE TYPE
RX - Rock Coring - NX or HX
S - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.
T - 3" O.D. thin-walled Shelby tube.
G - Grab, cuttings sample

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF TEST BORING NO. 933

JOB NO. NAT01 DATE 10/15/85

LOCATION N7782.3 E8444.7
RIG TYPE BEEMAN ROTARY
BORING TYPE ROTARY - AIR 5 1/8-IN
SURFACE ELEV 4365.03
DATUM MSL, @ GROUND SURFACE

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows/foot 140 lb. 30" free-fall drop hammer	Dry Density lbs. per cubic foot	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
55										Note: No mudstone from 52 feet; occasional chert and limestone inclusions. to 55 feet. **HALGAITO SHALE MEM, CUTLER FM.,** Continued.
60										Note: Some orange mudstone seams from 62 to 65 feet.
65								CL SC		MUDSTONE, calcareous, soft, brick" orange.
70								ML		SILTSTONE, calcareous, thin bedded, med. orange- brown. Some interbeds of orange mudstone.
75										
80										Note: Considerable chert material from 80 to 86 ft.
85										
90										Note: Trace lt. grey limestone interbeds from 90 to 96 ft.
95										
100										

GROUNDWATER

DEPTH	HOUR	DATE

SAMPLE TYPE

RX - Rock Coring - NX or HX
S - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.
T - 3" O.D. thin-walled Shelby tube.
G - Grab, cuttings sample

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF TEST BORING NO. 933

JOB NO. NAT01 DATE 10/15/85

LOCATION N7782.3 E8444.7
RIG TYPE BEEMAN ROTARY
BORING TYPE ROTARY - AIR 5 1/8-IN
SURFACE ELEV. 4365.03
DATUM MSL, @ GROUND SURFACE

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows/foot 140 lb. 30" free-fall drop hammer	Dry Density lbs. per cubic foot	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
105										**HALGAITO SHALE MEM., CUTLER FM., Continued.**
110										
115										
120										
125										
130										
135										
140										
145										
150										
155										

GROUNDWATER

DEPTH	HOUR	DATE

SAMPLE TYPE

RX - Rock Coring - NX or HX
S - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.
T - 3" O.D. thin-walled Shelby tube.
G - Grab, cuttings sample

JEG TAC TEAM

PROJECT *MEXICAN HAT SITE, UTAH* — LOG OF TEST BORING NO. 933

JOB NO. *NAT01* **DATE** *10/15/85*

LOCATION *N7782.3 E8444.7*
RIG TYPE *BEEMAN ROTARY*
BORING TYPE *ROTARY - AIR* *5 1/8-IN*
SURFACE ELEV. *4365.03*
DATUM *MSL, @ GROUND SURFACE*

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows/foot 140 lb. 30" free-fall drop hammer	Dry Density lbs. per cubic foot	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
160										**HALGAITO SHALE MEM.**, Continued.
165										
170								LS		**HONAKER TRAIL FORMATION:** **LIMESTONE**, shaley at contact, lt. grey to greyish brown.
175										**TD AT 175 FEET.**

GROUNDWATER

DEPTH	HOUR	DATE

SAMPLE TYPE

RX - Rock Coring - NX or HX
S - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.
T - 3" O.D. thin-walled Shelby tube.
G - Grab, cuttings sample

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 934

JOB NO. NAT01 DATE 10/16/85

SURFACE ELEVATION 4289.27

TOP OF FILTER PACK 177.00

WELL CASING TYPE 4.0-IN.SCHED.40 PVC

COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 200.0 feet

RIG TYPE BEEMAN ROTARY

BORING TYPE ROTARY - AIR

LOCATION N 9221.30 E 11989.90

DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Reamed 5 1/8-in hole to 8-in hole. Installed 4-in PVC cased well to 197 feet.		ML	**HALGAITO SHALE MEM., CUTLER FM.:** SILTSTONE, cherty, calcareous, some interbedded mudstone, medium orange- brown. Note: Surface strewn with rock slabs of weathered limestone, and traces of gypsum.
5					
10		Placed steel protective casing to 8 feet.			
15		Installed bentonite-cement grout to 172 feet.			Note: Color change to med. brown.
20					Note: Becomes thin bedded, little or no chert present from 22 ft.
25					
30					Note: Considerable mudstone interbeds from 29 to 36 feet.
35					
40					Note: Occasional mudstone seams from 36 to 44 feet.
45					
50					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 934

JOB NO. NAT01 DATE 10/16/85

SURFACE ELEVATION 4289.27

TOP OF FILTER PACK 177.00

WELL CASING TYPE 4.0-IN.SCHED.40 PVC

COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 200.0 feet

RIG TYPE BEEMAN ROTARY

BORING TYPE ROTARY - AIR

LOCATION N 9221.30 E 11989.90

DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					**HALGAITO SHALE MEM.**, Continued. Note: Some mudstone interbeds from 55 to 57 feet.
60					
65					Note: Occasional thin limestone and mudstone interbeds from 66 to 82 ft.
70					
75					
80					
85					
90					
95					
100					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 934

JOB NO. NAT01 DATE 10/16/85

SURFACE ELEVATION 4289.27

TOP OF FILTER PACK 177.00

WELL CASING TYPE 4.0-IN.SCHED.40 PVC

COMPLETION HALGAITO SHALE MEM.

TOTAL DEPTH 200.0 feet

RIG TYPE BEEMAN ROTARY

BORING TYPE ROTARY - AIR

LOCATION N 9221.30 E 11989.90

DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105					**HALGAITO SHALE MEM., Continued.**
110					**Note: Occasional interbeds of thin grey limestone and orange mudstone seams from 100 to 117 feet.**
115					
120					**Note: cherty siltstone from 120 to TD; Occasional thin limestone and mudstone seams.**
125					
130					
135					
140					
145					
150					**Note: Wet below 150 feet.**
155					**Note: Stopped drilling 5 1/8-in**

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 934

JOB NO. NAT01 DATE 10/16/85

SURFACE ELEVATION 4289.27

TOP OF FILTER PACK 177.00

WELL CASING TYPE 4.0-IN.SCHED.40 PVC

COMPLETION HALGAITO SHALE MEM.

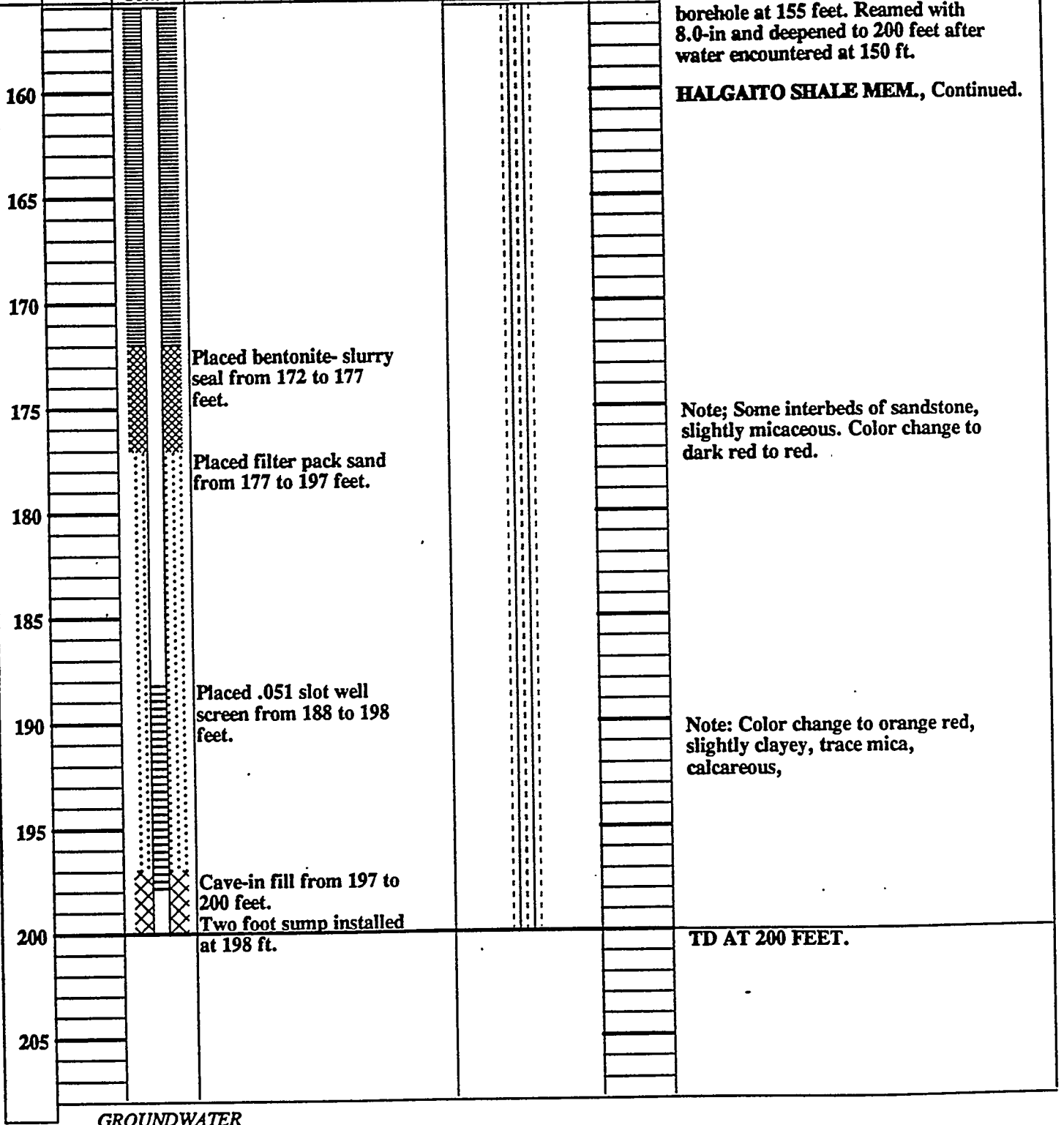
TOTAL DEPTH 200.0 feet

RIG TYPE BEEMAN ROTARY

BORING TYPE ROTARY - AIR

LOCATION N 9221.30 E 11989.90

DATUM MSL, @ GROUND SURFACE



GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF TEST BORING NO. 935

JOB NO. NAT01 DATE 10/19/85

LOCATION N10023.8 E12468.3
RIG TYPE BEEMAN ROTARY
BORING TYPE ROTARY - AIR 5 1/8-IN
SURFACE ELEV. 4230.62
DATUM MSL, @ GROUND SURFACE

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows/foot 140 lb. 30" free-fall drop hammer	Dry Density lbs. per cubic foot	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SP		**HALGAITO SHALE MEM., CUTLER FM.:** SANDSTONE, very fine grained, calcareous, fissle, hard, occasional siltstone seams, reddish brown.
								ML		SILTSTONE, highly calcareous, hard, dark red to lt. orange red.
5										
10										
15										
20										
25								ML SM		SANDSTONE AND SILTSTONE, alternating with variable sand content, reddish brown.
30										
35										
40										
45										
50										

GROUNDWATER

DEPTH	HOUR	DATE

SAMPLE TYPE

RX - Rock Coring - NX or HX
S - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.
T - 3" O.D. thin-walled Shelby tube.
G - Grab, cuttings sample

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF TEST BORING NO. 935

JOB NO. NAT01 DATE 10/19/85

LOCATION N10023.8 E12468.3

RIG TYPE BEEMAN ROTARY

BORING TYPE ROTARY - AIR 5 1/8-IN

SURFACE ELEV 4230.62

DATUM MSL, @ GROUND SURFACE

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows/foot 140 lb. 30" free-fall drop hammer	Dry Density lbs. per cubic foot	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
55										**HALGAITO SHALE MEM.**, Continued. Note: Some orange clayey siltstone interbeds with sandstone and siltstone layers.
60										
65										
70										
75										
80								SM		SANDSTONE, silty, very fine grained, calcareous, lt. grey.
85								ML SM		SANDSTONE AND SILTSTONE, interbedded, highly calcareous, hard, dark red to reddish brown.
90										
95										
100										

GROUNDWATER

DEPTH	HOUR	DATE

SAMPLE TYPE

RX - Rock Coring - NX or HX
S - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.
T - 3" O.D. thin-walled Shelby tube.
G - Grab, cuttings sample

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF TEST BORING NO. 935

JOB NO. NAT01 DATE 10/19/85

LOCATION N10023.8 E12468.3
RIG TYPE BEEMAN ROTARY
BORING TYPE ROTARY - AIR 5 1/8-IN
SURFACE ELEV 4230.62
DATUM MSL, @ GROUND SURFACE

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows/foot 140 lb. 30" free-fall drop hammer	Dry Density lbs. per cubic foot	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
105										**HALGAITO SHALE MEM.**, Continued.
110										
115										
120										
125										
130										
135										**Note; Continued alternating sandstone and siltstone with change of color of siltstone to maroon, highly calcareous.**
140										
145										
150										
155										

GROUNDWATER

DEPTH	HOUR	DATE

SAMPLE TYPE

RX - Rock Coring - NX or HX
S - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.
T - 3" O.D. thin-walled Shelby tube.
G - Grab, cuttings sample

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 190

JOB NO. NAT01 DATE 10/23/84

SURFACE ELEVATION 4220.00

TOP OF FILTER PACK 1.00

WELL CASING TYPE 4-IN PVC

COMPLETION DRAINAGE BOTTOM

TOTAL DEPTH 5.0 feet

RIG TYPE CME-55

BORING TYPE HSA / ROTARY

LOCATION N 10781.30 E 11109.90

DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Shallow well installed to 3.0 ft. in drainage to check for seep/ spring flow. Grout and bentonite seals installed to 1.0 foot. Filter pack sand placed from 1 to 3 feet. Slotted section placed at 2 to 3 feet.		SM SP	ALLUVIUM: SILTY SAND, fine, sl. moist, reddish brown.
5					HALGAITO SHALE MEM.: SANDSTONE, hard, reddish brown.
					TD AT 3.0
10					
15					
20					
25					
30					
35					
40					
45					
50					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 192

JOB NO. NAT01 DATE 10/23/84

SURFACE ELEVATION 4185.00

TOP OF FILTER PACK 1.00

WELL CASING TYPE 4-IN PVC

COMPLETION DRAINAGE BOTTOM

TOTAL DEPTH 2.5 feet

RIG TYPE CME-55

BORING TYPE HSA

LOCATION N 11683.10 E 12321.90

DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Shallow well installed to 2.5 ft. in drainage to check for seep/ spring flow. Grout and bentonite seals installed to 1.0 foot. Filter pack sand placed from 1 to 2.5 feet. Slotted section placed at 1.5 to 2.5 feet.		SM SP	**ALLUVIUM:** SILTY SAND, fine, tr. gravel, sl. moist, reddish brown. **HALGAITO SHALE MEM.:** SANDSTONE, hard, reddish brown. TD AT 2.5 FT.
5					
10					
15					
20					
25					
30					
35					
40					
45					
50					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 193

JOB NO. NAT01 DATE 10/23/84

SURFACE ELEVATION 4195.00

TOP OF FILTER PACK 0.50

WELL CASING TYPE 4-IN PVC

COMPLETION DRAINAGE BOTTOM

TOTAL DEPTH 1.5 feet

RIG TYPE CME-55

BORING TYPE HSA

LOCATION N 10935.20 E 12126.80

DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Shallow well installed to 1.5 ft. in drainage to check for seep/ spring flow. Grout and bentonite seals installed to 0.5 foot. Filter pack sand placed from .5 to 1.5 feet. Slotted section placed at 0.5 to 1.5 feet.		SM	**ALLUVIUM:** SILTY SAND, fine, tr. gravel, sl. moist, reddish brown.
				SP	**HALGAITO SHALE MEM.:** SANDSTONE, hard, reddish brown.
5					**TD AT 1.5 FT.**
10					
15					
20					
25					
30					
35					
40					
45					
50					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 194

JOB NO. NAT01 **DATE** 10/23/84

SURFACE ELEVATION 4225.00
TOP OF FILTER PACK 1.00
WELL CASING TYPE 4-IN PVC
COMPLETION DRAINAGE BOTTOM

TOTAL DEPTH 2.0 feet
RIG TYPE CME-55
BORING TYPE HSA
LOCATION N 10152.60 E 11711.00
DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Shallow well installed to 2.0 ft. in drainage to check for seep/ spring flow. Grout and bentonite seals installed to 0.5 foot. Filter pack sand placed from .5 to 2.0 feet. Slotted section placed at 1.0 to 2.0 feet.		SM SP	**ALLUVIUM:** SILTY SAND, fine, tr. gravel, sl. moist, reddish brown. **HALGAITO SHALE MEM.:** SANDSTONE, hard, reddish brown. TD AT 2.0 FT.
5					
10					
15					
20					
25					
30					
35					
40					
45					
50					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MEXICAN HAT SITE, UTAH

LOG OF WELL BORING NO. 195

JOB NO. NAT01 DATE 10/23/84

SURFACE ELEVATION 4294.80

TOP OF FILTER PACK 1.50

WELL CASING TYPE 4-IN PVC

COMPLETION DRAINAGE BOTTOM

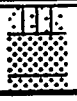
TOTAL DEPTH 3.0 feet

RIG TYPE CME-55

BORING TYPE HSA

LOCATION N 10019.30 E 9538.70

DATUM MSL, @ GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Shallow well installed to 3.0 ft. in drainage to check for seep/ spring flow. Grout and bentonite seals installed to 1.5 foot. Filter pack sand placed from 1.5 to 3.0 feet. Slotted section placed at 2.0 to 3.0 feet.		SM	ALLUVIUM: SILTY SAND, fine, tr. gravel, sl. moist, reddish brown.
				SP	
				SP	SAND,fine, lt. brn.
5					HALGAITO SHALE MEM.: SANDSTONE, hard, reddish brown.
					TD AT 3.0 FT.
10					
15					
20					
25					
30					
35					
40					
45					
50					

GROUNDWATER

DEPTH	HOUR	DATE

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 601

JOB NO. MON01 DATE 10/24/84

SURFACE ELEVATION 4881.51

TOP OF FILTER PACK 9.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION ALLUVIUM/SANDSTONE

TOTAL DEPTH 24.0 feet

RIG TYPE CME-75

BORING TYPE HS AUGER

LOCATION N 54980.40 E 88017.70

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 2-in PVC well to 24 feet Protective steel casing placed to 5 feet. Bentonite/ cement grout seal placed to 7 feet. Bentonite pellet seal installed from 7 to 9 feet. Filter pack placed from 9 to 24 feet. .010-in. slot well screen installed from 12 to 22 feet. Blank sump placed from 22 to 24 feet.		SP	**EOLIAN:** SAND, fine, tr. silt, lt. brown to reddish tan.
5				SP	**ALLUVIUM:** SAND, medium too fine, with fine gravel, dry, rounded, lt. brown. Note: Moist. Layer of reddish brown eolian sand at 8 ft. Note: Very moist at 11 ft.
10				SP	SAND, fine, with frag. sandstone, lt. brown.
15				SP	**SHINARUMP MEM., CHINLE FM.** SANDSTONE, yellowish brown to white.
20					
25					TD AT 24 FEET.
30					
35					
40					
45					
50					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	18.5	12:00	2-15-85
▼	13.8	15:10	4-7-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 603

JOB NO. MON01 DATE 10/24/84

SURFACE ELEVATION 4846.64

TOP OF FILTER PACK 10.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION ALLUVIUM

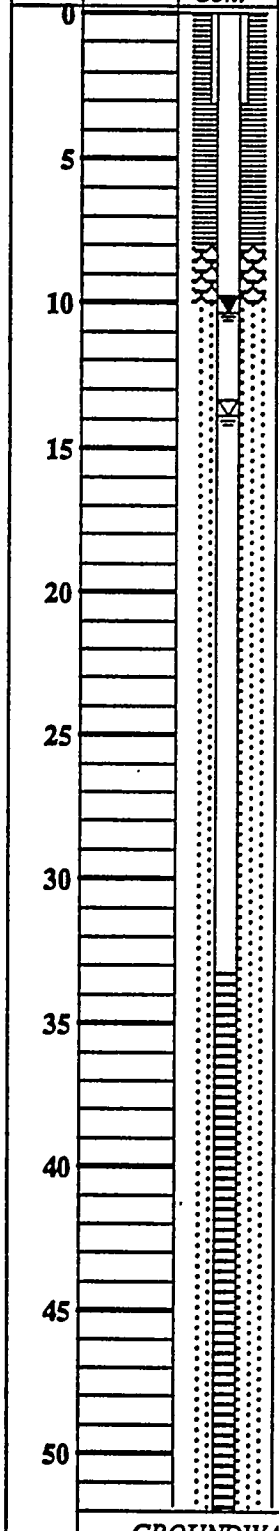
TOTAL DEPTH 55.0 feet

RIG TYPE CME-75

BORING TYPE HS AUGER

LOCATION N 57812.70 E 89036.90

DATUM MSL; GROUND SURFACE



Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 2-in PVC well to 55 feet		SM	EOLIAN: SILTY SAND, fine, lt. reddish
				SP	brown.
5		Protective steel casing placed to 3 feet.			SAND, medium to fine lt reddish brown.
		Bentonite/ cement grout seal placed to 8 feet.			
10		Bentonite pellet seal installed from 8 to 10 feet.		CL	ALLUVIUM:
				SP	CLAY, high plasticity, stiff, brown.
15		Filter pack of caved eolian sand from 10 to 55 feet.			EOLIAN: SAND, fine. Note: Wet at 10,5 feet. Note: Water table at 11.5 feet.
20					
25					Note: trace of fine gravel at 27 feet.
30					
35		.010-in. slot well screen installed from 33 to 53 feet.			
40					
45					
50					

GROUNDWATER

DEPTH	HOUR	DATE
13.9	12:00	2-15-85
10.3	11:46	4-6-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 603

JOB NO. MON01 DATE 10/24/84

SURFACE ELEVATION 4846.64

TOP OF FILTER PACK 10.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 55.0 feet

RIG TYPE CME-75

BORING TYPE HS AUGER

LOCATION N 57812.70 E 89036.90

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
		Blank sump placed from 53 to 55 feet.			
55					TD AT 55 FEET.
60					
65					
70					
75					
80					
85					
90					
95					
100					

GROUNDWATER

DEPTH	HOUR	DATE
13.9	12:00	2-15-85
10.3	11:46	4-6-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 604

JOB NO. MON01 DATE 10/25/84

SURFACE ELEVATION 4837.30

TOP OF FILTER PACK 7.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 30.0 feet

RIG TYPE CME-75

BORING TYPE HS AUGER

LOCATION N 58397.00 E 89424.60

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 2-in PVC well to 30 feet		SP	EOLIAN: SAND, fine, little silt, lt. dry, reddish brown.
5		Protective steel casing placed to 3 feet.			
		Bentonite/ cement grout seal placed to 5 feet.			
10		Bentonite pellet seal installed from 5 to 7 feet.			Note: water table encountered at 11.5 feet.
15		Filter pack of caved eolian sand from 7 to 30 feet.			
20		.010-in. slot well screen installed from 13 to 28 feet.			Note: change to lt. brown, no silt.
25					
30		Blank sump placed from 28 to 30 feet.		SP	ALLUVIUM: SANDY CLAY, medium plasticity, soft, wet, grey.
					TD AT 30 FEET.
35					
40					
45					
50					

GROUNDWATER

DEPTH	HOUR	DATE
12.2	12:00	2-15-85
8.1	10:44	4-6-86

JEG TAC TEAM

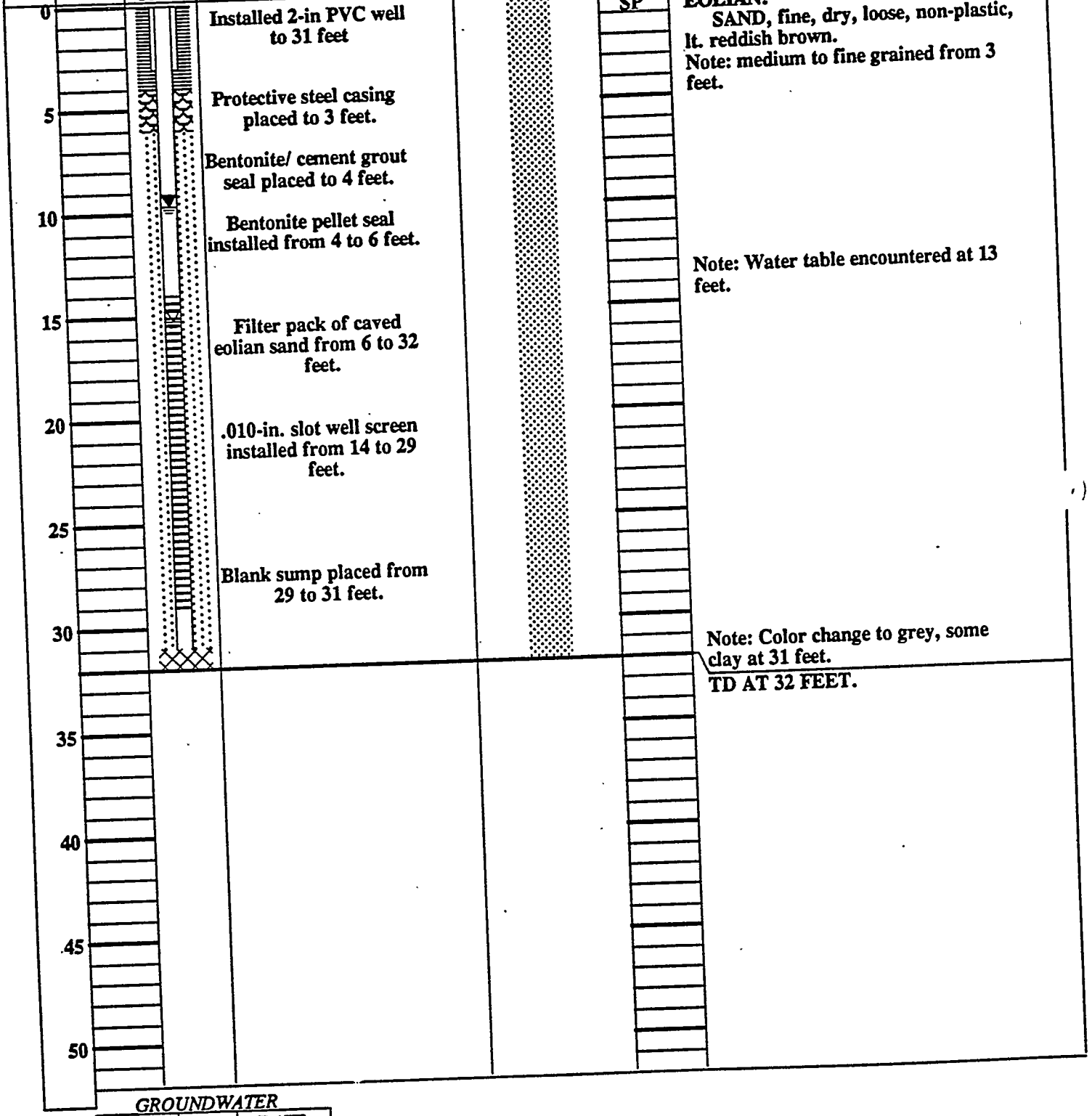
PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 605

JOB NO. MON01 **DATE** 10/25/84

SURFACE ELEVATION 4831.42
TOP OF FILTER PACK 6.00
WELL CASING TYPE 2.0-IN.SCHED.40 PVC
COMPLETION ALLUVIUM

TOTAL DEPTH 32.0 feet
RIG TYPE CME-75
BORING TYPE HS AUGER
LOCATION N 58707.60 E 90066.70
DATUM MSL; GROUND SURFACE



GROUNDWATER

	DEPTH	HOUR	DATE
▽	15.2	12:00	2-15-85
▼	9.7	12:55	4-5-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 606

JOB NO. MON01 DATE 10/26/84

SURFACE ELEVATION 4860.44

TOP OF FILTER PACK 31.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION ALLUVIUM

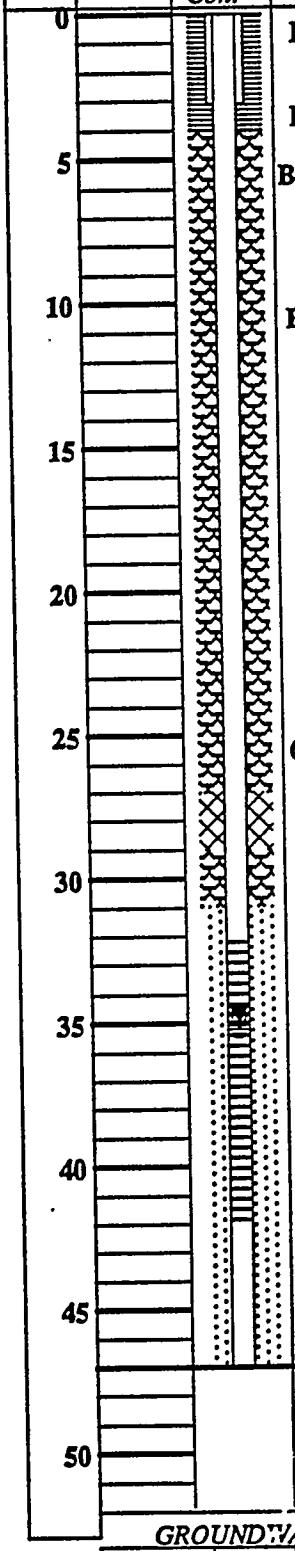
TOTAL DEPTH 47.0 feet

RIG TYPE CME-75

BORING TYPE HS AUGER

LOCATION N 59034.20 E 88634.00

DATUM MSL; GROUND SURFACE



Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 2-in PVC well to 47 feet		SM	EOLIAN: SILTY SAND, fine, slightly moist to dry, lt. reddish brown.
		Protective steel casing placed to 3 feet.		SP	SAND, fine, medium dense, lt. reddish brown.
5		Bentonite/ cement grout seal placed to 4 feet.			
10		Bentonite/ cuttings mix fill from 4 to 27.			
15					
20				SM	SILTY SAND, med. dense, lt. reddish brown.
25		Cave-in fill from 27 to 29 ft.			
30		Bentonite pellet seal installed from 29 to 31 feet.			Note: Moist at 30 feet.
35		Filter pack of caved eolian sand from 31 to 47 feet. .010-in. slot well screen installed from 32 to 42 feet.			Note: Water table encountered at 36 feet.
40					
45		Blank sump placed from 42 to 47 feet.		SP	SHINARUMP MEM., CHINLE FM.: SANDSTONE, soft, weathered.
50					TD AT 47 FEET.

GROUNDWATER

	DEPTH	HOUR	DATE
▽	35.2	12:00	3-7-85
▼	35.0	15:15	4-5-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 607

JOB NO. MON01 DATE 10/26/84

SURFACE ELEVATION 4869.41

TOP OF FILTER PACK 11.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 30.0 feet

RIG TYPE CME-75

BORING TYPE HS AUGER

LOCATION N 59657.20 E 87519.20

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 2-in PVC well to 27.5 feet Protective steel casing placed to 3 feet. Bentonite/ cement grout seal placed to 4 feet.		SM	**EOLIAN:** SILTY SAND, fine, moist, lt. reddish brown.
5					
10		Bentonite/ cuttings mix fill from 4 to 8. Bentonite pellet seal installed from 8 to 11 feet.		SP	**SHINARUMP MEM., CHINLE FM.:** SANDSTONE, lt. brown to yellow. Note: Color change to lt. yellow to grey.
15		Filter pack of crusher chips from 11 to 27.5 feet.			
20		.010-in. slot well screen installed from 15.5 to 25.5 feet.			Note; Color change to yellow brown.
25		Blank sump placed from 25.5 to 27.5 feet.			
30		Cave-in fill from 27.5 to 30 feet.			TD AT 30 FEET.
35					
40					
45					
50					

GROUNDWATER

DEPTH	HOUR	DATE
	DRY	2-15-85
	DRY	4-6-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 608

JOB NO. MON01 DATE 03/15/85

SURFACE ELEVATION 4901.08

TOP OF FILTER PACK 88.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 120.0 feet

RIG TYPE CME-75

BORING TYPE HS AUGER

LOCATION N 58685.70 E 87189.40

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 2-in PVC well to 120 feet		SP	SHINARUMP MEM.; CHINLE FM.: SANDSTONE, med. to coarse, yellowish grey.
5		Protective steel casing placed to 3 feet.			
		Bentonite/ cement grout seal placed to 86 feet.			
10				CL	SHALE, with fine sand, thnly laminated.
				SP	SANDSTONE, medium to coarse, mod. well cemented,noncalcareous, occasional clayey matrix, mostly cross bedded, yellowish grey (5YR,5/4).
15		SEE LOG 608C FOR RESULTS OF CORING.			
20					
25					
				GP	CONGLOMERATE, coarse sand to med. gravel, subrrounded, some clay matrix, sufficient porosity to lose circulation, medium yellowish brown (10YR,5/4).
30				CL ML	MOENKOPI FORMATION: SHALE, with coarse sand, to silty, poorly indurated, very thinnly laminated, greyish orange (10YR,7/4).
35					SILTSTONE, with very fine sand, occasional thin calcite stringers as fracture fillings, noncalcareous, thinly laminated, very hard, yellowish grey (5Y,7/2). Note: with inter bedded greyish orange from 34 feet. Some pyrite in the matrix.
40				ML	Note: color change to reddish brown (10R,4/6) from 39 feet.
45					SILTSTONE, dark reddish brown.
50					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	58.4	16:31	4-23-85
▼	57.6	15:00	4-7-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 608

JOB NO. MON01 DATE 03/15/85

SURFACE ELEVATION 4901.08

TOP OF FILTER PACK 88.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION ALLUVIUM

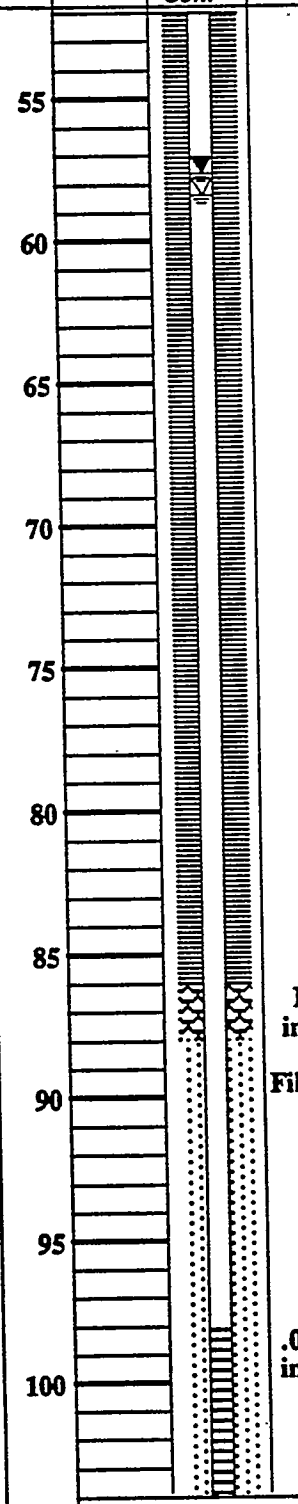
TOTAL DEPTH 120.0 feet

RIG TYPE CME-75

BORING TYPE HS AUGER

LOCATION N 58685.70 E 87189.40

DATUM MSL; GROUND SURFACE



Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
					MOENKOPI FM., Continued. Note: Becomes soft, more moist, from 54 feet.
				ML SM	SILTSTONE AND SANDSTONE, interbedded, yellowish grey.
					Note: Increase in sand, sandstone is lt. grey.
					Note: less siltstone interbeds from 72 ft.
				SW	SANDSTONE, coarse to fine, dark reddish brown.
					Note: Color change to very lt. grey, massive, from 78 ft. Note: Alternating color bands from very lt. grey to pale red from 80 ft.
		Bentonite pellet seal installed from 86 to 88 feet. Filter pack sand from 88 to 120 feet.			
				SP	**DeCHELLY SANDSTONE MEM., CUTLER FORMATION:** SANDSTONE, coarse to med., dune deposit, cross bedded, lt. brown to med. reddish brown (10R,4/6). Note: Lost circulation at 91 ft. due to porosity of this formation.
		.010-in. slot well screen installed from 98 to 118 feet.			

GROUNDWATER

	DEPTH	HOUR	DATE
▽	58.4	16:31	4-23-85
▼	57.6	15:00	4-7-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 608

JOB NO. MON01 DATE 03/15/85

SURFACE ELEVATION 4901.08

TOP OF FILTER PACK 88.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 120.0 feet

RIG TYPE CME-75

BORING TYPE HS AUGER

LOCATION N 58685.70 E 87189.40

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105					
110					
115					Note: color change to variable lt. brown and greyish orange.
		Blank sump placed from 118 to 120 feet.			
120		Core hole reamed with rotary/Revert mud to 120 ft.			TD AT 120 FEET.
125					
130					
135					
140					
145					
150					
155					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	58.4	16:31	4-23-85
▼	57.6	15:00	4-7-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 609

JOB NO. MON01 DATE 01/03/85

SURFACE ELEVATION 4878.30

TOP OF FILTER PACK 6.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION ALLUVIUM/SHINARUMP MEM.

TOTAL DEPTH 15.0 feet

RIG TYPE CME-75

BORING TYPE HS AUGER

LOCATION N 59052.10 E 87652.90

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 2-in PVC well to 14 feet		SP	EOLIAN: SAND, fine, slightly moist, med. dense, lt. reddish brown.
5		Protective steel casing placed to 3 feet.			
10		Bentonite/ cement grout seal placed to 4 feet. Bentonite pellet seal installed from 4 to 6 feet.		SW	SHINARUMP MEM. CHINLE FM.: SANDSTONE, coarse to fine, dry, yellowish olive green.
15		Filter pack sand from 6 to 14 feet. .010-in. slot well screen installed from 7 to 12 feet. Blank sump placed from 12 to 14 feet. Cave-in fill from 14 to 15 ft.			TD AT 15 FEET.
20					
25					
30					
35					
40					
45					
50					

GROUNDWATER

DEPTH	HOUR	DATE
▽	DRY	2-15-85
▼	DRY	4-6-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 610

JOB NO. MON01 DATE 12/03/84

SURFACE ELEVATION 4860.83

TOP OF FILTER PACK 63.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION SHINARUMP MEM.

TOTAL DEPTH 130.5 feet

RIG TYPE CME-75

BORING TYPE HS AUGER

LOCATION N 56338.80 E 88611.60

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 2-in PVC well to 85.5 feet		SP	EOLIAN: SAND, fine, dry, med. dense, lt. reddish brown (5YR,5/3,5/4).
5		Protective steel casing placed to 5 feet.			Note: Very Moist at 6 feet. Note: Water table encoountered at 8 feet.
10		Bentonite/ cement grout seal placed to 58 feet.			
15					
20		SEE LOG 610C FOR RESULTS OF CORING.			
25					
30				SP	SHINARUMP MEM., CHINLE FM.: SANDSTONE, med. grain. mod. hard, mod. weathered. thick bedding, brownish red.
35					
40					Note: Med. grey lens at 39 .5 to 40 feet.
45					
50					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	5.4	08:30	4-23-85
▼	5.4	11:59	4-6-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 610

JOB NO. MON01 DATE 12/03/84

SURFACE ELEVATION 4860.83

TOP OF FILTER PACK 63.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION SHINARUMP MEM.

TOTAL DEPTH 130.5 feet

RIG TYPE CME-75

BORING TYPE HS AUGER

LOCATION N 56338.80 E 88611.60

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					Note: Color change to dk. brown (10YR,8/4).
					SHINARUMP MEM., Continued.
		Bentonite pellet seal installed from 58 to 63 feet.			Note: Occasional clast of siltstone.
60					
		Filter pack sand from 63 to 85.5 feet.			
65					
		.010-in. slot well screen installed from 63 to 83 feet.			
70				CL	SHALE, yellowish brown to grey.
				SP CL	SANDSTONE, very fine grained, grey; With thin interbedded lenses of grey shale.
75				SP	SANDSTONE, very fine, greyish white.
80					
		Blank sump placed from 83 to 85 feet.			
85		Cave-in fill from 85 to 130.5 ft when reamed.		SW CL	CONGLOMERATE, with fine to coarse gravel, well cemented. SHALE, lt. grey.
90				CL	**MOENKOPI FORMATION:** SHALE, reddish brown.
		Hole cored to 130.5 feet, then reamed for well installation to 87 feet.(No record of seal for sandstone unit at 115 feet so that water levels / quality could show Moenkopi influence)			
95					
100					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	5.4	08:30	4-23-85
▼	5.4	11:59	4-6-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 610

JOB NO. MON01 DATE 12/03/84

SURFACE ELEVATION 4860.83

TOP OF FILTER PACK 63.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION SHINARUMP MEM.

TOTAL DEPTH 130.5 feet

RIG TYPE CME-75

BORING TYPE HS AUGER

LOCATION N 56338.80 E 88611.60

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105					
110					
115				SP	SANDSTONE, very fine, well cemented, reddish brown.
120					Note: Becomes moderately cemented at 120.5 feet. Note: thin shale bed, reddish brown at 122 feet.
125					
130					TD AT 130.5 FEET.
135					
140					
145					
150					
155					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	5.4	08:30	4-23-85
▼	5.4	11:59	4-6-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 611

JOB NO. MON01 DATE 03/05/85

SURFACE ELEVATION 4846.35

TOP OF FILTER PACK

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION DeCHELLY MEM.

TOTAL DEPTH 185.0 feet

RIG TYPE CME-75

BORING TYPE CORE/ ROTARY

LOCATION N 57811.00 E 89017.50

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 2-in PVC well to 185 feet		SP	EOLIAN:
5		Protective steel casing placed to 63 feet.			
10		SEE LOG 611C FOR RESULTS OF CORING			
15					
20					
25					
30					
35					
40					
45					
50					

GROUNDWATER

DEPTH	HOUR	DATE
10.7	12:45	6-7-89

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 611

JOB NO. MON01 DATE 03/05/85

SURFACE ELEVATION 4846.35

TOP OF FILTER PACK

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION DeCHELLY MEM.

TOTAL DEPTH 185.0 feet

RIG TYPE CME-75

BORING TYPE CORE/ ROTARY

LOCATION N 57811.00 E 89017.50

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					
60					
		Est.)Bentonite/ cement grout seal placed to 156 feet.		SP	SHINARUMP MEM., CHINLE FM. SANDSTONE, fine to med, with conglomeritic layers, soft, with hematite and limonite stain, lt. grey to yellow to orange.
65					
70					
75					
					Note: Less altered in fractures, less weathered, becomes mod. soft.
80					
85					Note: Uniform grain size fine to medium, no conglomeritic layers. Sericite mica on fracture planes. Becomes mod. hard from 85 feet.
90					
					Note: Occasional carbonaceous material, from 90 feet.
95					
100					
				SP SC	SANDSTONE, coarse to fine, with pyrite, some coal, soft, greenish grey.

GROUNDWATER

DEPTH	HOUR	DATE
10.7	12:45	6-7-89

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 611

JOB NO. MON01 DATE 03/05/85

SURFACE ELEVATION 4846.35

TOP OF FILTER PACK

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION DeCHELLY MEM.

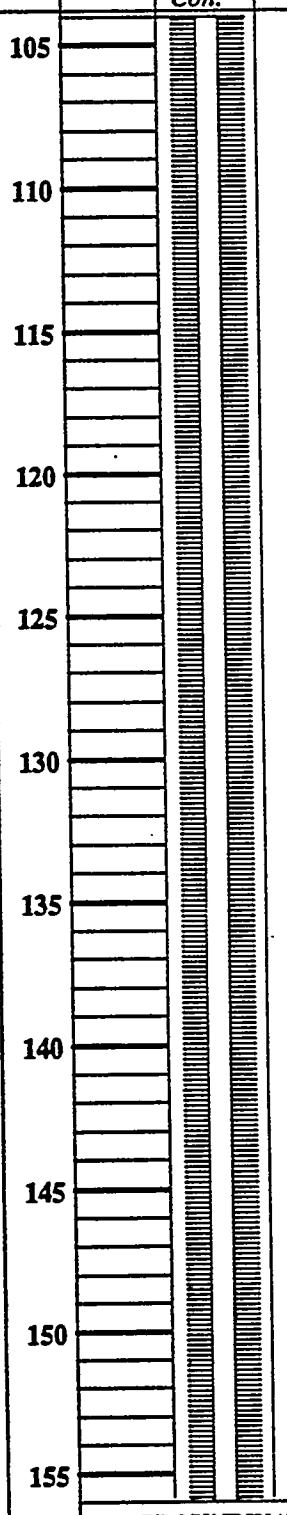
TOTAL DEPTH 185.0 feet

RIG TYPE CME-75

BORING TYPE CORE/ ROTARY

LOCATION N 57811.00 E 89017.50

DATUM MSL; GROUND SURFACE



Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
				SP	SANDSTONE, shaley (indicated by geophy. log). Note: core not recovered from this zone.
				ML	SANDSTONE, with conglomeritic zones, pyrite common, slightly calcareous, lt. green to grey. Note: Basal portion of Shinarump Member at 108 ft. as evidenced by pebbly chert conglomerate, rounded.
				CL	MOENKOPI FM.: SILTSTONE, greenish grey, very clayey, slightly calcareous, soft, greenish grey to 112, variable yellow grey to dark reddish brown.
					CLAYSTONE, silty, with interbeds of siltstone, cross laminated, calcareous, mod. soft to mod. hard, dark reddish brown. Note: artesian flow encountered as claystone aquitard penetrated.
				ML CL	SILTSTONE, clayey, with minor nonclayey lenses, reddish brown.
				SP	SANDSTONE, very fine, lt. grey, with interbeds of reddish brown claystone; calcareous, mod. soft to mod hard.
				ML	SILTSTONE, clayey, hard, mottled red-brown to lt. grey.
				SP	SANDSTONE, fine to med. clayey, calcareous, pinkish brown to greenish grey. Occasional variable seams of reddish brown to bleached.
					Note: Mottled at 143, hard.
					Note: Becoming coarser from 145 ft., calcareous.

GROUNDWATER

DEPTH	HOUR	DATE
10.7	12:45	6-7-89

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 611

JOB NO. MON01 DATE 03/05/85

SURFACE ELEVATION 4846.35

TOP OF FILTER PACK

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION DeCHELLY MEM.

TOTAL DEPTH 185.0 feet

RIG TYPE CME-75

BORING TYPE CORE/ ROTARY

LOCATION N 57811.00 E 89017.50

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
160		Est.)Bentonite pellet seal installed from 156 to 160 feet. Est.)Filter pack sand from 160 to 185 feet.		SP	DeCHELLY MEM.,CUTLER FM: SANDSTONE, fine, cross bedded, mod. soft, reddish brown.
165		Est.).010-in. slot well screen installed from 163 to 183 feet.			
170					
175					
180		Est.)Blank sump placed from 183 to 185 feet.			
185					TD AT 185 FEET.
190					
195					
200					
205					

GROUNDWATER

DEPTH	HOUR	DATE
10.7	12:45	6-7-89

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 612

JOB NO. MON01 DATE 02/21/85

SURFACE ELEVATION 5000.09

TOP OF FILTER PACK 43.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION DeCHELLY MEM.

TOTAL DEPTH 215.0 feet

RIG TYPE CME-75

BORING TYPE CORE/ ROTARY

LOCATION N 58437.20 E 85614.80

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 2-in PVC well to 215 feet		SP	**SHINARUMP MEM., CHINLE FM.:** SANDSTONE, little clay fraction, medium to coarse, friable, thinnly bedded, mod. spaced fractures, lt. yellowish brown, to yellowish grey(10YR-6/2;5Y-7/2). Note: Occasional lenses to 5-in. of dk. grey shale,
5		Protective steel casing placed to 5 feet.			
10		Bentonite/ cement grout seal placed to 41 feet.			Note: pinkish, with limonite stains on fractures, well cemented, calcareous, cross bedded; from 11 feet.
15				GP	CONGLOMERATE: coarse sand to 1-in. pebbles. subangular to subrounded, cemented, slightly calcareous, massive bedded, light grey (N7).
20		(SEE LOG 612C FOR ROCK CORE RESULTS) Cored to 208 ft., then reamed hole to 215 for well inst.		SP	Note: Possible fault/shear plane at 16.5 ft.
25					SANDSTONE, very fine, very well cemented, slightly calcareous, 2-6-in. beds. ripple laminations, alternating layers of yellowish grey to lt. grey.
30				ML	**MOENKOPI FORMATION:** SANDY SILTSTONE, with thin clayey lenses, clay binder, bioturbated layers, pale red to greyish red (10R-6/2; 10R-4/2).
35				SP	SANDSTONE, very fine, well cemented, very calcareous, thin stratum cross bedded, slump structures, light grey (N7).
40		Bentonite pellet seal installed from 40.7 to 43 feet.		ML	SANDY SILTSTONE, little clay, cross bedded, thin contorted bedding, bioturbation, pale red to greyish red.
45		No. 20 filter pack sand placed from 43 to 215 feet.		ML SM	Note: Medium to fine grained, limonite stained, from 41 ft.
50				ML	SILTSTONE TO SILTY SANDSTONE, laminated to very thin laminated, rippled and cross bedded, bioturbation, minor sandstone lenses, greyish red.

GROUNDWATER

DEPTH	HOUR	DATE
	12:00	2-19-85
60.9	14:37	4-7-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 612

JOB NO. MON01 DATE 02/21/85

SURFACE ELEVATION 5000.09

TOP OF FILTER PACK 43.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION DeCHELLY MEM.

TOTAL DEPTH 215.0 feet

RIG TYPE CME-75

BORING TYPE CORE/ ROTARY

LOCATION N 58437.20 E 85614.80

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55				ML SM	SANDY SILTSTONE, 50 % silt, 50% sand, cross bedded, very fine to fine sand, calcareous, greyish red.
					SILTSTONE, greyish red.
60					SILTY SANDSTONE, medium to fine, abundant black mineral grains, very limonite stained, well cemented, calcareous, intensly cross bedded, with clay clasts, greyish red. Note: becomes massive bedded at 63 ft, with bleached spots.
65					
70				SW	SANDSTONE, fine to coarse, arkosic with 50 % feldspar, very well cemented, very calcareous to noncalcareous, mostly massive with ripple and cross bedding, greyish orange-pink (5YR,7/2).
75					
80				SP	DeCHELLY SANDSTONE MEM.;CUTLER FORMATION: SANDSTONE, medium to fine, well cemented, slightly calcareous and ferric cement, cross bedded, isotropic porosity, pale red (10R,6/2).
85					
90					
95					
100					

GROUNDWATER

DEPTH	HOUR	DATE
	12:00	2-19-85
60.9	14:37	4-7-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 612

JOB NO. MON01 DATE 02/21/85

SURFACE ELEVATION 5000.09

TOP OF FILTER PACK 43.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION DeCHELLY MEM.

TOTAL DEPTH 215.0 feet

RIG TYPE CME-75

BORING TYPE CORE/ ROTARY

LOCATION N 58437.20 E 85614.80

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105					**DeCHELLY SANDSTONE MEM.;CUTLER FM., Continued.**
110					
115					
120					
125					
130					
135					
140					
145					
150					
155					

GROUNDWATER

	DEPTH	HOUR	DATE
▽		12:00	2-19-85
▼	60.9	14:37	4-7-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 612

JOB NO. MON01 DATE 02/21/85

SURFACE ELEVATION 5000.09

TOP OF FILTER PACK 43.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION DeCHELLY MEM.

TOTAL DEPTH 215.0 feet

RIG TYPE CME-75

BORING TYPE CORE/ ROTARY

LOCATION N 58437.20 E 85614.80

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
160					**DeCHELLY SANDSTONE MEM., continued.**
165					**Note: Color changes to dark red, fine grained, better cementation, from 166 ft.**
170					
175					
180					
185					
190					
195		**.010-in. slot well screen installed from 195 to 205 feet.**			
200					
205		**Blank sump placed from 205 to 215 feet.**			**DeCHELLY SANDSTONE MEM.,**

GROUNDWATER

DEPTH	HOUR	DATE
	12:00	2-19-85
60.9	14:37	4-7-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 612

JOB NO. MON01 DATE 02/21/85

SURFACE ELEVATION 5000.09

TOP OF FILTER PACK 43.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION DeCHELLY MEM.

TOTAL DEPTH 215.0 feet

RIG TYPE CME-75

BORING TYPE CORE/ ROTARY

LOCATION N 58437.20 E 85614.80

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
210					Continued.
215		Core hole reamed to 215 feet for well installation.			TD AT 215 FEET.
220					
225					
230					
235					
240					
245					
250					
255					
260					

GROUNDWATER

DEPTH	HOUR	DATE
	12:00	2-19-85
60.9	14:37	4-7-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 613

JOB NO. MON01 DATE 03/05/85

SURFACE ELEVATION 4860.81

TOP OF FILTER PACK 136.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION DeCHELLY MEM.

TOTAL DEPTH 160.0 feet

RIG TYPE CME-75

BORING TYPE CORE/ ROTARY

LOCATION N 56377.80 E 88643.70

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 2-in PVC well to 160 feet		SP	EOLIAN: SAND, fine. lt. reddish brown to tan.
5		Protective steel casing placed to 5 feet.			
10		Bentonite/ cement grout seal placed to 134 feet.			
15		Cored to 144.7 feet. then reamed to 160 feet for well inst.			
20		(See log 613C for results of coring).			
25		SEE LOG 613C FOR RESULTS OF CORING.			
30					
35				SP	SHINARUMP MEM., CHINLE FM.: SANDSTONE, medium to coarse grained. See log of nearby well 610 for description of materials to 78 feet. Not recorded for this hole.
40					
45					
50					

GROUNDWATER

DEPTH	HOUR	DATE
0.0	FLOWING	2-19-85
5.2	12:00	2-26-92

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 613

JOB NO. MON01 DATE 03/05/85

SURFACE ELEVATION 4860.81

TOP OF FILTER PACK 136.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION DeCHELLY MEM.

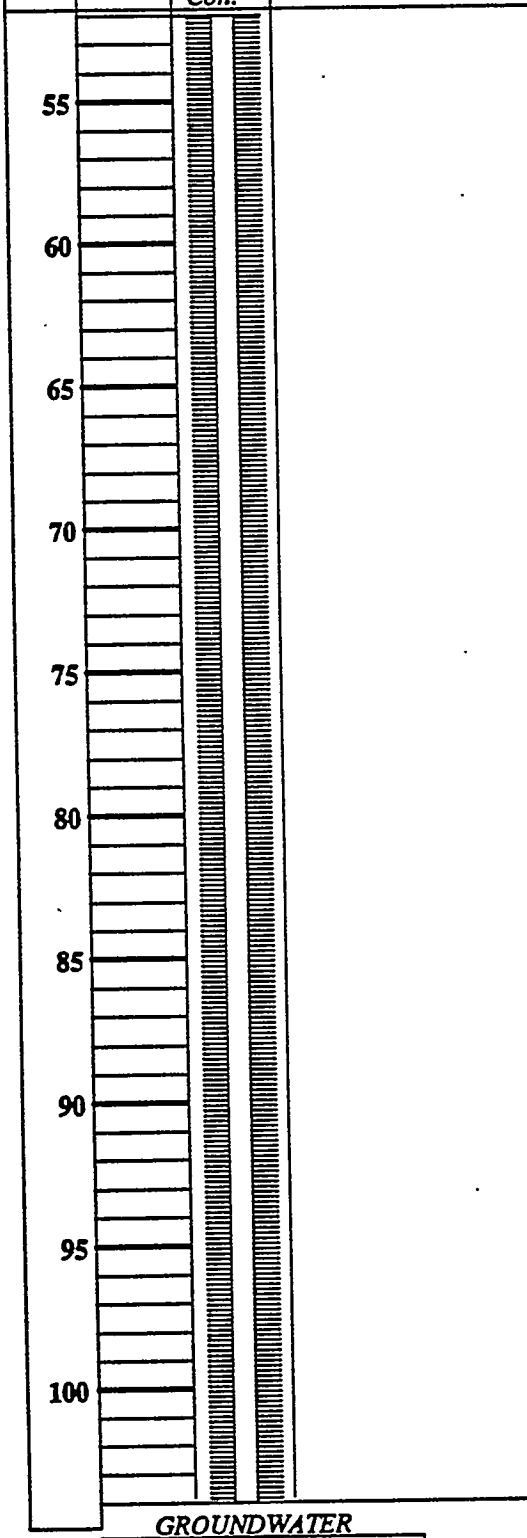
TOTAL DEPTH 160.0 feet

RIG TYPE CME-75

BORING TYPE CORE/ ROTARY

LOCATION N 56377.80 E 88643.70

DATUM MSL; GROUND SURFACE



USCS	Visual Classification
	SHINARUMP MEM.,Continued.
SP	Note: No log until coring commenced at 77.8 feet. SANDSTONE, fine to medium grained, cross bedded with hematite and limonite common, noncalcareous, lt. grey to yellowish brown.
	Note: Thin seam of black chert pebble cong. at base of Shinarump mem.
CL	**MOENKOPI FORMATION:** CLAYSTONE, with finely disseminated pyrite, reduction environment, mod. spaced fractures, slightly calcareous, greenish grey. Note: Color change to reddish brown, closely spaced fractures.
ML	Note: Color change to dark brown, becomes micaceous, closely spaced fractures, with minor seams of lt. orange micaceous sandstone.
CL	SILTSTONE AND CLAY STONE, interbedded, calcareous, lt. grey to dk. brown.
	CLAYSTONE, with minor interbeds of siltstone, dk. brown.

GROUNDWATER

	DEPTH	HOUR	DATE
▽	0.0	FLOWING	2-19-85
▼	5.2	12:00	2-26-92

JEG TAC TEAM

PROJECT MONUMENT SITE, AZ. LOG OF WELL BORING NO. 613

JOB NO. MON01, DATE 03/05/85
SURFACE ELEVATION 4860.81
TOP OF FILTER PACK 136.00
WELL CASING TYPE 2.0-IN.SCHED.40 PVC
COMPLETION DeCHELLY MEM.

TOTAL DEPTH 160.0 feet
RIG TYPE CME-75
BORING TYPE CORE/ ROTARY
LOCATION N 56377.80 E 88643.70
DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105					Note: One foot layer of sandstone at 100 feet. Note: Closely space fractures at 103 feet.
				SP CL	Note: Thin seam of sandstone at 103 feet and at 104.5 ft.. MOENKOPI,Continued.
110					CLAYSTONE/SANDSTONE, interbedded, mottled dark brown and lt grey respectively.
				SP	Note: Intensly fractured at 110 to 111 feet. Artesian flow from borehole, 1.6 gpm, during drilling.
115					
					SANDSTONE, fine to coarse, trace to little clay, calcareous, dk. brown to pinkish white.
120					Note: Color change to pale yellow at 120 ft.
					Note: Color change to dark brown with varying amounts of clay/shale seams from 122 feet.
125					Note: Color change to reddish brown, clean, friable, calcareous from 125 feet.
130				SP	DeCHELLY SANDSTONE MEM.,CUTLER FM. (Probable contact) SANDSTONE, fine to very fine, cross bedded, with limonite cementation, yellowish brown.
		Bentonite pellet seal installed from 134 to 136 feet.			Note: Color change to tan.
135					
		No. 20 filter pack sand placed from 136 to 160 feet.			
140					
145		.010-in. slot well screen installed from 138 to 158 feet.			TD AT 144.7 FEET. Artesian flow at 2.0 gpm at completion of drilling. Packer set at 130.3 feet had 5 gpm flowing through pipe.
150					
155					

GROUNDWATER

DEPTH	HOUR	DATE
0.0	FLOWING	2-19-85
5.2	12:00	2-26-92

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 613

JOB NO. MON01 DATE 03/05/85

SURFACE ELEVATION 4860.81

TOP OF FILTER PACK 136.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION DeCHELLY MEM.

TOTAL DEPTH 160.0 feet

RIG TYPE CME-75

BORING TYPE CORE/ ROTARY

LOCATION N 56377.80 E 88643.70

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
160		Blank sump placed from 158 to 160 feet.			
165					
170					
175					
180					
185					
190					
195					
200					
205					

GROUNDWATER

DEPTH	HOUR	DATE
0.0	FLOWING	2-19-85
5.2	12:00	2-26-92

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 614

JOB NO. MON01 DATE 03/04/85

SURFACE ELEVATION 4854.28

TOP OF FILTER PACK 43.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION MOENKOPI FM.

TOTAL DEPTH 84.5 feet

RIG TYPE CME-75

BORING TYPE CORE/ ROTARY

LOCATION N 60940.50 E 87832.60

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 2-in PVC well to 70 feet		SP SM	EOLIAN: SAND, fine, brown.
5		Protective steel casing placed to 5 feet.			
10		Bentonite/ cement grout seal placed to 40.9 feet.			
15					
20					
25					
30					
35					
40		Bentonite pellet seal installed from 40.9 to 43.1 feet.			
45		No. 20 filter pack sand placed from 43.1 to 70 feet.			
50		.010-in. slot well screen installed from 48 to 68 feet.		SP	SHINARUMP MEM., CHINLE FM: SANDSTONE, fine to medium grained, well cemented, noncalcareous, massive with occ.

GROUNDWATER

	DEPTH	HOUR	DATE
▽	48.3	12:00	3-7-85
▼	49.7	10:15	4-5-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 614

JOB NO. MON01 DATE 03/04/85

SURFACE ELEVATION 4854.28

TOP OF FILTER PACK 43.00

WELL CASING TYPE 2.0-IN.SCHED.40 PVC

COMPLETION MOENKOPI FM.

TOTAL DEPTH 84.5 feet

RIG TYPE CME-75

BORING TYPE CORE/ ROTARY

LOCATION N 60940.50 E 87832.60

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					traces of cross bedding, limonite stains, good porosity, lt. grey to dark greyish orange. Note: Cross bedding becoming more prominent. Note: large clast of grey claystone.
60					
65					
70		Blank sump placed from 68 to 70 feet. Cave-in fill from 70 to 84.5 feet.		SW GP	CONGLOMERATE, fine sand to pebbles, subangular to subrounded, well cemented, noncalcareous, cross bedded, porous, pale yellowish brown 910YR,6/2).
75				CL	MOENKOPI FORMATION: CLAYSTONE, with siltstone interbeds, altered, bleached, micaceous with diseminated pyrite, brownish yellow.
80				ML	SILTSTONE, with interbedded sandstone seams (15%), firmly cemented to friable, ripple laminations, occasional clay lenses, yellowish brown.
85					TD AT 84.5 FEET.
90					
95					
100					

GROUNDWATER

DEPTH	HOUR	DATE
48.3	12:00	3-7-85
49.7	10:15	4-5-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 650

JOB NO. MON01 DATE 09/30/85

SURFACE ELEVATION 4790.15

TOP OF FILTER PACK 73.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 104.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 64970.00 E 89923.80

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 4-in PVC well to 100 feet		SP SM	EOLIAN: SAND, silty, fine to medium, nonplastic, lt. reddish brown.
5		Steel surface casing placed to 20 feet.			
10		Bentonite/ cement grout seal placed to 68 feet.			
15					
20					
25					
30					
35					
40					
45					
50					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	19.3	12:00	10-19-85
▼	19.2	09:00	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 650

JOB NO. MON01 DATE 09/30/85

SURFACE ELEVATION 4790.15

TOP OF FILTER PACK 73.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 104.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 64970.00 E 89923.80

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					**EOLIAN DEPOSIT,** Continued.
60					
65					
70		Bentonite pellet seal installed from 68 to 73 feet.			
75		No.8-12 filter pack sand placed from 73 to 99.5 feet.			
80		.051-in. slot well screen installed from 78 to 98 feet.			
85					
90					
95					
100		Blank sump placed from 98 to 100 feet. Cave-in fill from 100 to 104 feet.		SP	**SHINARUMP MEM., CHINLE FM.:** SANDSTONE, soft, red.

GROUNDWATER

DEPTH	HOUR	DATE
19.3	12:00	10-19-85
19.2	09:00	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 650

JOB NO. MON01 DATE 09/30/85

SURFACE ELEVATION 4790.15

TOP OF FILTER PACK 73.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 104.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 64970.00 E 89923.80

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105					TD AT 104 FEET.
110					
115					
120					
125					
130					
135					
140					
145					
150					
155					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	19.3	12:00	10-19-85
▼	19.2	09:00	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 651

JOB NO. MON01 DATE 09/29/85

SURFACE ELEVATION 4781.46

TOP OF FILTER PACK 17.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

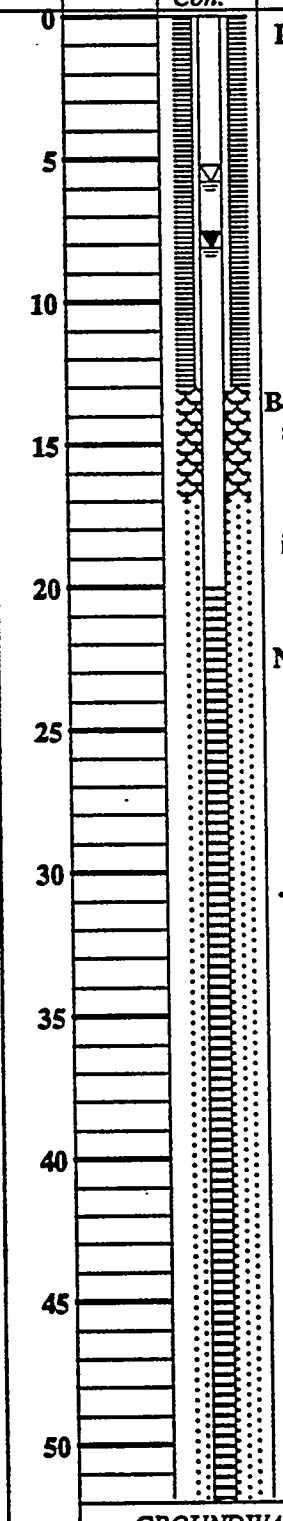
TOTAL DEPTH 82.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 63788.90 E 92734.30

DATUM MSL; GROUND SURFACE



Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 4-in PVC well to 82 feet		SP SM	**EOLIAN:** SAND, some silt, fine to medium, nonplastic, lt. reddish brown.
5		Steel surface casing placed to 13 feet.			
10					
15		Bentonite/ cement grout seal placed to 13 feet.			
20		Bentonite pellet seal installed from 13 to 17 feet.			
25		No.8-12 filter pack sand placed from 17 to 82 feet.			
30		.051-in. slot well screen installed from 20 to 80 feet.			
35					
40				CL	**ALLUVIUM:** SANDY CLAY, low plasticity, tan.
45				SP SM	**EOLIAN:** SAND, some silt, fine to medium, nonplastic, lt. reddish brown.
50					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	5.8	12:00	10-19-85
▼	8.1	13:00	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 651

JOB NO. MON01 DATE 09/29/85

SURFACE ELEVATION 4781.46

TOP OF FILTER PACK 17.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 82.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 63788.90 E 92734.30

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					
60					
65					
70				CL	ALLUVIUM: SANDY CLAY, low plasticity, tan to lt. brown.
75					
80		Blank sump placed from 80 to 82 feet.			
85					TD AT 82 FEET.
90					
95					
100					

GROUNDWATER

DEPTH	HOUR	DATE
5.8	12:00	10-19-85
8.1	13:00	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 652

JOB NO. MON01 DATE 09/29/85

SURFACE ELEVATION 4800.69

TOP OF FILTER PACK 29.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

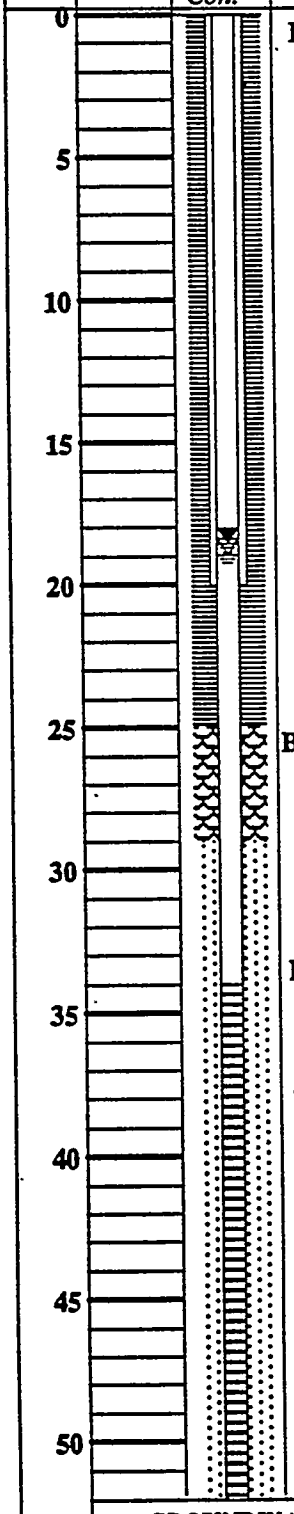
TOTAL DEPTH 58.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 62581.50 E 93759.30

DATUM MSL; GROUND SURFACE



Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 4-in PVC well to 56 feet		SP SM	EOLIAN: SAND, some silt, fine to medium, nonplastic, lt. reddish brown.
20		Steel surface casing placed to 20 feet.			
25		Bentonite/ cement grout seal placed to 25 feet.			
30		Bentonite pellet seal installed from 25 to 29 feet.			
		No.8-12 filter pack sand placed from 29 to 56 feet.			
35		.051-in. slot well screen installed from 34 to 54 feet.			

GROUNDWATER

DEPTH	HOUR	DATE
19.0	12:00	10-19-85
18.6	12:30	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 652

JOB NO. MON01 DATE 09/29/85

SURFACE ELEVATION 4800.69

TOP OF FILTER PACK 29.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 58.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 62581.50 E 93759.30

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55		Blank sump placed from 54 to 56 feet.			EOLIAN, Continued.
				SP	SHINARUMP MEM., CHINLE FM.: SANDSTONE, soft, lt. red.
		Cave-in from 56 to 58 feet when hole reamed.			TD AT 58 FEET.
60					
65					
70					
75					
80					
85					
90					
95					
100					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	19.0	12:00	10-19-85
▼	18.6	12:30	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 653

JOB NO. MON01 DATE 09/25/85

SURFACE ELEVATION 4832.14

TOP OF FILTER PACK 50.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 78.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 61249.30 E 89596.30

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 4-in PVC well to 78 feet		SP SM	EOLIAN: SAND, some silt, lt. reddish brown. Note: undifferentiated to total depth.
5					
10					
15					
20		Steel surface casing placed to 22 feet.			
25					
30					
35					
40					
45		Bentonite/ cement grout seal placed to 45 feet.			
50		Bentonite pellet seal installed from 45 to 50 feet.			

GROUNDWATER

DEPTH	HOUR	DATE
35.6		10-19-85

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 653

JOB NO. MON01 DATE 09/25/85

SURFACE ELEVATION 4832.14

TOP OF FILTER PACK 50.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 78.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 61249.30 E 89596.30

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55		No.8-12 filter pack sand placed from 50 to 78 feet.			**EOLIAN DEPOSITS**, continued.
60		.051-in. slot well screen installed from 56 to 76 feet.			
65					
70					
75		Blank sump placed from 76 to 78 feet.			
80					TD AT 78 FEET. Note: Caving badly to TD.
85					
90					
95					
100					

GROUNDWATER

DEPTH	HOUR	DATE
35.6		10-19-85

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 654

JOB NO. MON01 DATE 09/27/85

SURFACE ELEVATION 4824.41

TOP OF FILTER PACK 47.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

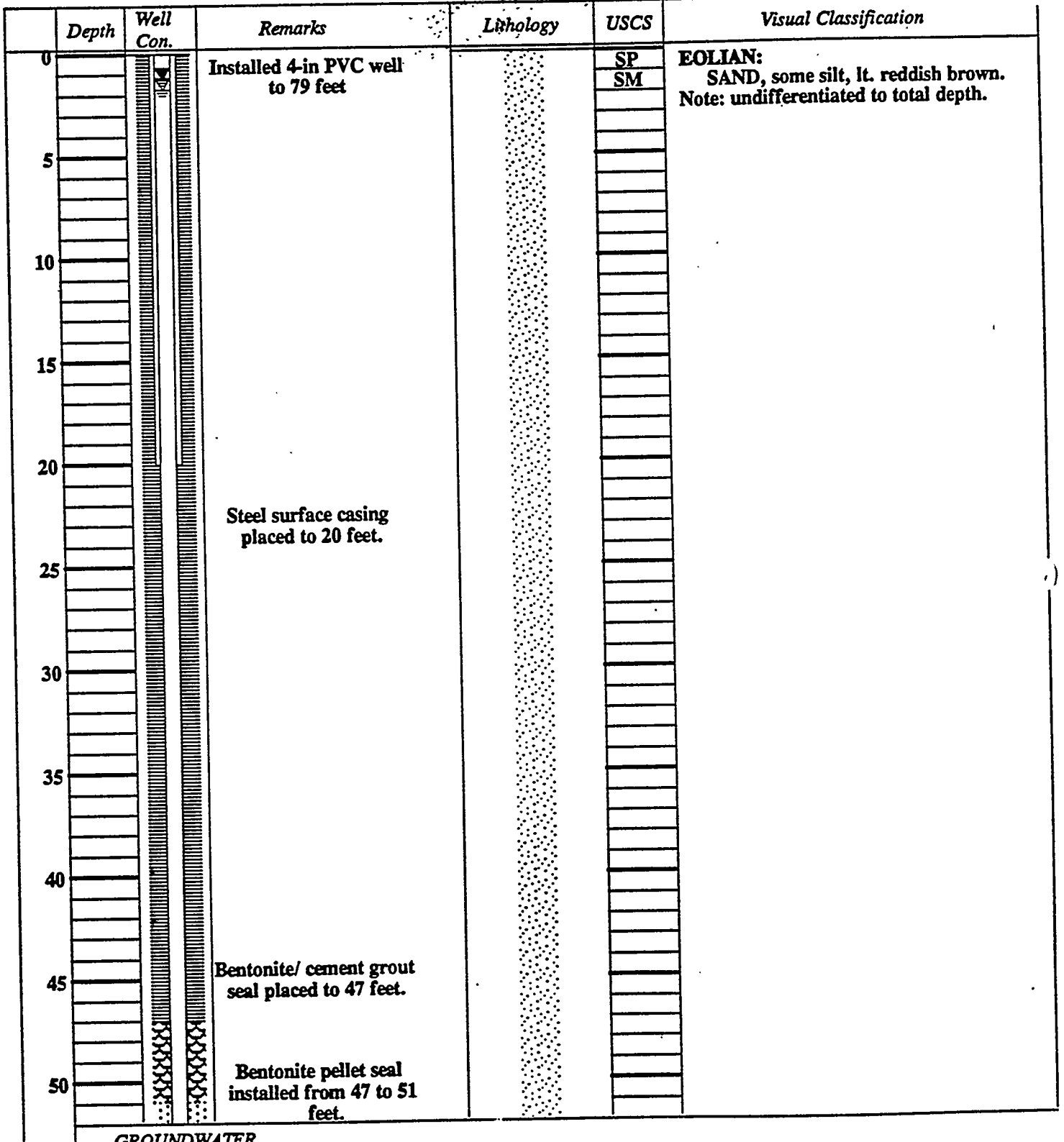
TOTAL DEPTH 79.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 59351.40 E 91063.40

DATUM MSL; GROUND SURFACE



GROUNDWATER

	DEPTH	HOUR	DATE
▽	1.7		10-19-85
▼	1.2	10:28	4-27-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 654

JOB NO. MON01 DATE 09/27/85

SURFACE ELEVATION 4824.41

TOP OF FILTER PACK 47.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 79.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 59351.40 E 91063.40

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55		No.8-12 filter pack sand placed from 51 to 79 feet.			**EOLIAN DEPOSITS**, continued.
60		.051-in. slot well screen installed from 57 to 77 feet.			
65					
70					
75		Blank sump placed from 77 to 79 feet.			
80					TD AT 79 FEET. Note: Caving badly to TD.
85					
90					
95					
100					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	1.7		10-19-85
▼	1.2	10:28	4-27-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 655

JOB NO. MON01 DATE 09/12/85

SURFACE ELEVATION 4857.73

TOP OF FILTER PACK 33.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

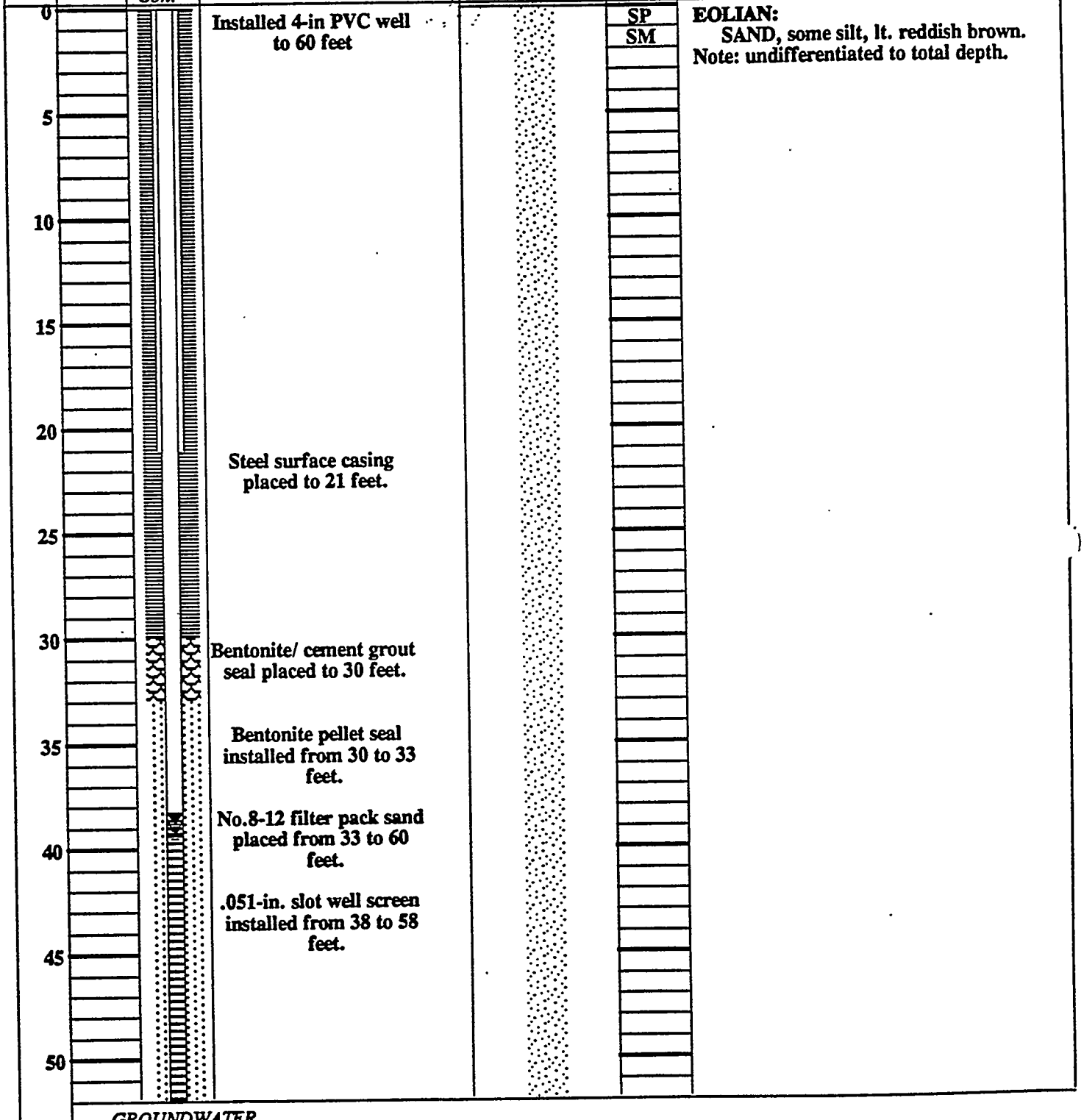
TOTAL DEPTH 60.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 59754.60 E 88624.10

DATUM MSL; GROUND SURFACE



GROUNDWATER

	DEPTH	HOUR	DATE
▽	39.2		10-19-85
▼	38.8	09:45	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 655

JOB NO. MON01 DATE 09/12/85

SURFACE ELEVATION 4857.73

TOP OF FILTER PACK 33.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 60.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 59754.60 E 88624.10

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55		Blank sump placed from 58 to 60 feet.			**EOLIAN DEPOSITS, continued.**
60					**TD AT 60 FEET.** **Note: Caving badly to TD.**
65					
70					
75					
80					
85					
90					
95					
100					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	39.2		10-19-85
▼	38.8	09:45	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 656

JOB NO. MON01 DATE 09/12/85

SURFACE ELEVATION 4852.07

TOP OF FILTER PACK 33.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

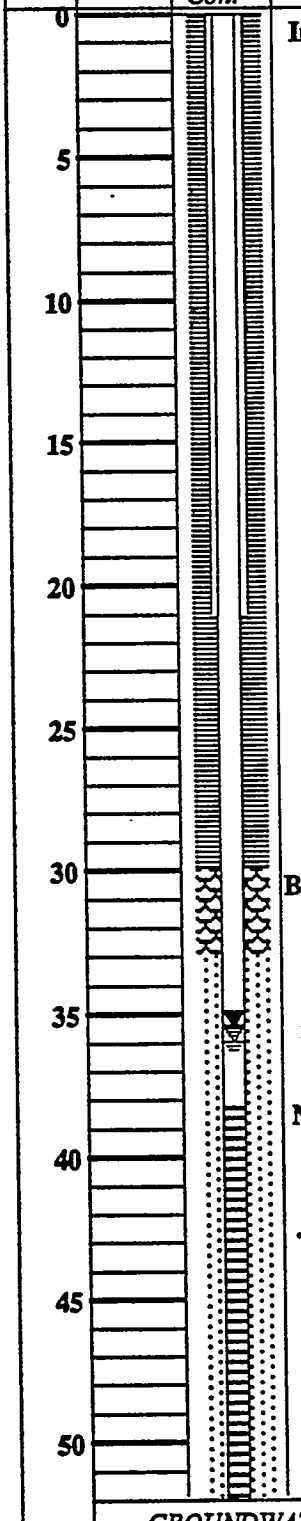
TOTAL DEPTH 60.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 59545.20 E 89175.10

DATUM MSL; GROUND SURFACE



Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 4-in PVC well to 60 feet		SP SM	EOLIAN: SAND, some silt, lt. reddish brown. Note: undifferentiated to total depth.
		Steel surface casing placed to 21 feet.			
		Bentonite/ cement grout seal placed to 30 feet.			
		Bentonite pellet seal installed from 30 to 33 feet.			
		No.8-12 filter pack sand placed from 33 to 60 feet.			
		.051-in. slot well screen installed from 38 to 58 feet.			

GROUNDWATER

DEPTH	HOUR	DATE
36.0		10-19-85
35.5	12:00	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 656

JOB NO. MON01 DATE 09/12/85

SURFACE ELEVATION 4852.07

TOP OF FILTER PACK 33.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 60.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 59545.20 E 89175.10

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55		Blank sump placed from 58 to 60 feet.			**EOLIAN DEPOSITS, continued.**
60					**TD AT 60 FEET.** **Note: Caving badly to TD.**
65					
70					
75					
80					
85					
90					
95					
100					

GROUNDWATER

DEPTH	HOUR	DATE
36.0		10-19-85
35.5	12:00	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 657

JOB NO. MON01 DATE 09/04/85

SURFACE ELEVATION 4881.18

TOP OF FILTER PACK 118.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

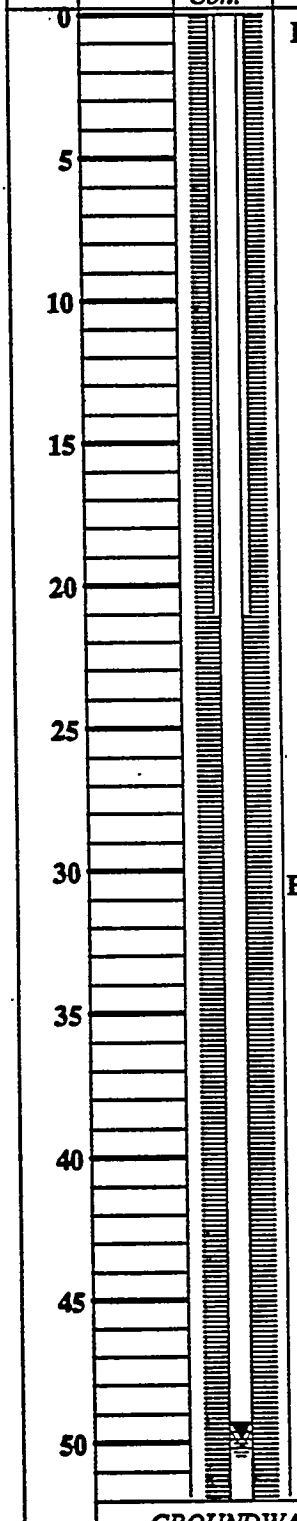
TOTAL DEPTH 140.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 59266.00 E 87596.50

DATUM MSL; GROUND SURFACE



Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 4-in PVC well to 138 feet		SP SM	**EOLIAN:** SAND, some silt, lt. reddish brown. Note: undifferentiated to total depth.
5				SW	**ALLUVIUM:** GRAVELLY SAND, medium to coarse sand, with fine gravel, lt. reddish brown.
10					**EOLIAN:** SAND, some silt, lt. reddish brown.
20		Steel surface casing placed to 21 feet.		SP SM	Note: Occasional pebbles indicating some lenses of reworked alluvial deposits from 20 to 35 feet
30		Bentonite/ cement grout seal placed to 113 feet.			
40				SW	**ALLUVIUM:** GRAVELLY SAND, with interbeds of eolian sand, tan.
50					

GROUNDWATER

DEPTH	HOUR	DATE
50.2		10-19-85
49.9	11:35	4-28-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 657

JOB NO. MON01 DATE 09/04/85

SURFACE ELEVATION 4881.18

TOP OF FILTER PACK 118.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 140.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 59266.00 E 87596.50

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					**EOLIAN DEPOSITS, continued.**
60					
65					
70					
75					
80					
85					
90					
95					
100				GP	**SANDY GRAVEL, coarse sand.**
					ALLUVIUM, continued.

GROUNDWATER

DEPTH	HOUR	DATE
50.2		10-19-85
49.9	11:35	4-28-86

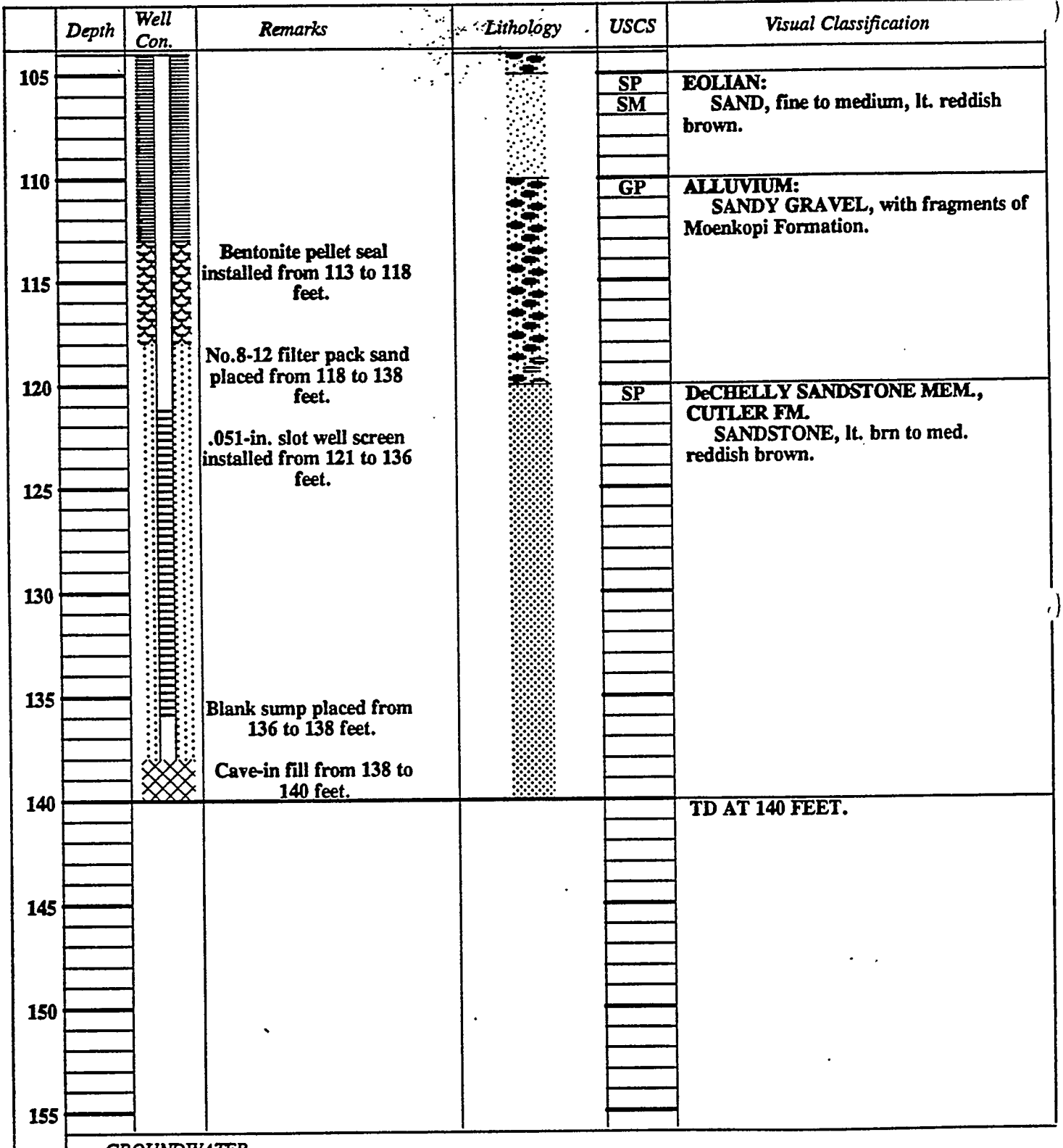
JEG TAC TEAM

PROJECT MONUMENT VALLEY DAP, MONTICELLO, UTAH
TAILINGS AREA

LOG OF WELL BORING NO. 657

JOB NO. MON01 DATE 09/04/85
SURFACE ELEVATION 4881.18
TOP OF FILTER PACK 118.00
WELL CASING TYPE 4.0-IN.SCHED.80 PVC
COMPLETION ALLUVIUM

TOTAL DEPTH 140.0 feet
RIG TYPE GARDNER-DENVER
BORING TYPE ROTARY MUD
LOCATION N 59266.00 E 87596.50
DATUM MSL; GROUND SURFACE



GROUNDWATER

DEPTH	HOUR	DATE
50.2		10-19-85
49.9	11:35	4-28-86

JEG TAC TEAM

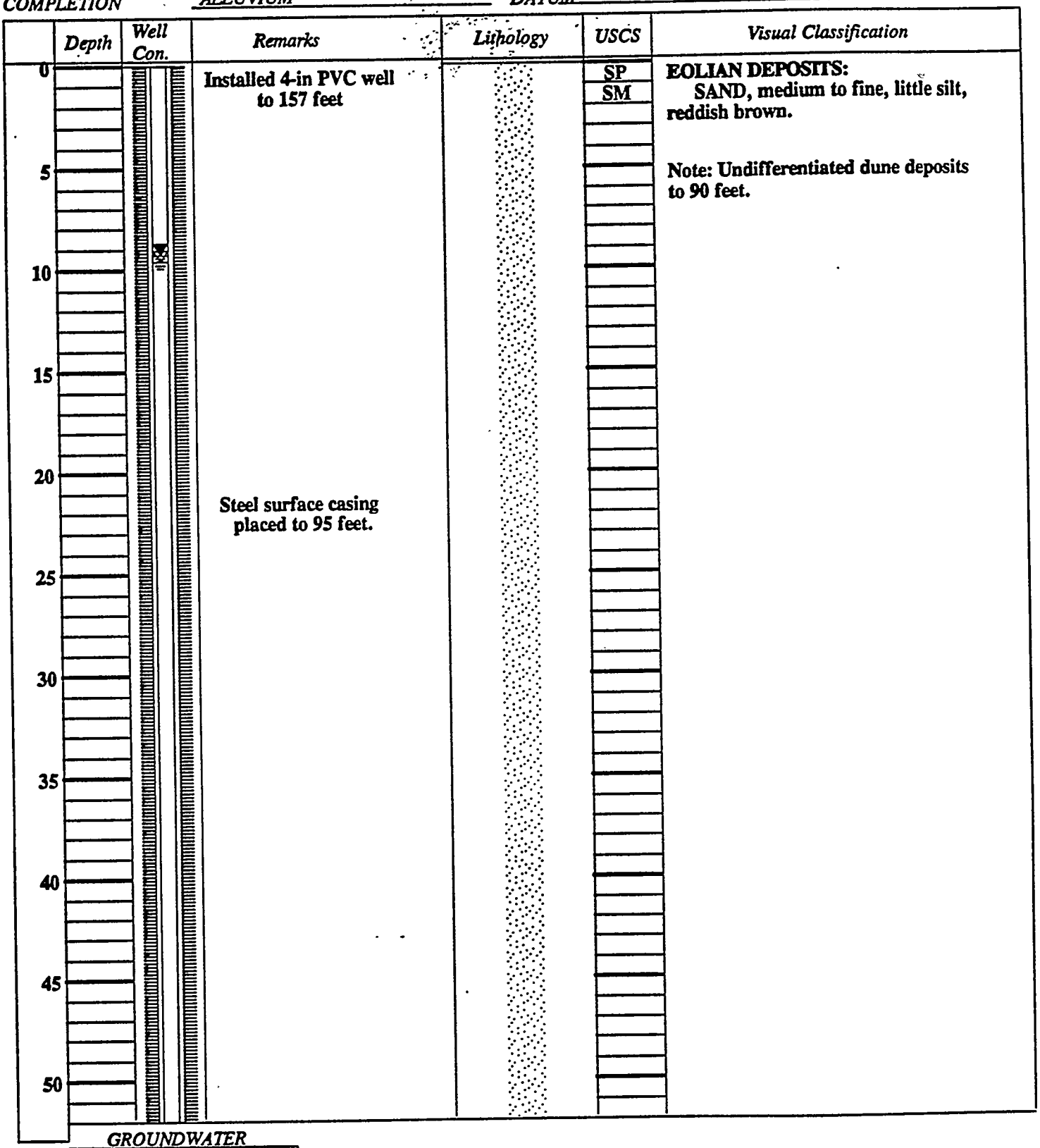
PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA
TAILINGS AREA

LOG OF WELL BORING NO. 658

JOB NO. MON01 DATE 09/26/85

SURFACE ELEVATION 4876.19
TOP OF FILTER PACK 114.00
WELL CASING TYPE 4.0-IN.SCHED.80 PVC
COMPLETION ALLUVIUM

TOTAL DEPTH 165.0 feet
RIG TYPE GARDNER-DENVER
BORING TYPE ROTARY MUD
LOCATION N 54763.40 E 88857.00
DATUM MSL; GROUND SURFACE



GROUNDWATER

	DEPTH	HOUR	DATE
▽	9.6		10-19-85
▼	9.3	11:00	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 658

JOB NO. MON01 DATE 09/26/85

SURFACE ELEVATION 4876.19

TOP OF FILTER PACK 114.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 165.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 54763.40 E 88857.00

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					**EOLIAN DEPOSITS, Continued.**
60					
65					
70					
75					
80					
85					
90				SP	**SHINARUMP MEM., CHINLE FM.:**
95		**Bentonite/ cement grout seal placed to 109 feet.**			
100					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	9.6		10-19-85
▼	9.3	11:00	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 658

JOB NO. MON01 DATE 09/26/85

SURFACE ELEVATION 4876.19

TOP OF FILTER PACK 114.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 165.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 54763.40 E 88857.00

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105					**SHINARUMP MEM., Continued.**
110		**Bentonite pellet seal installed from 109 to 114 feet.**			
115		**No.8-12 filter pack sand placed from 114 to 157 feet.**			
120					
125					
130					
135		**.051-in. slot well screen installed from 135 to 155 feet.**			
140					
145					
150					
155		**Blank sump placed from**			

GROUNDWATER

DEPTH	HOUR	DATE
9.6		10-19-85
9.3	11:00	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 658

JOB NO. MON01 DATE 09/26/85

SURFACE ELEVATION 4876.19

TOP OF FILTER PACK 114.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM

TOTAL DEPTH 165.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 54763.40 E 88857.00

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
160		155 to 157 feet. Cave-in fill from 157 to 165 feet.		ML	MOENKOPI FM. SILTSTONE, altered, bluish grey. Note: Color change to reddish brown.
165					TD AT 165 FEET.
170					
175					
180					
185					
190					
195					
200					
205					

GROUNDWATER

DEPTH	HOUR	DATE
9.6		10-19-85
9.3	11:00	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY MTL, ARIZ., UMTRA
TAILINGS AREA

LOG OF WELL BORING NO. 659

JOB NO. MON01 DATE 09/11/85

SURFACE ELEVATION 4860.84

TOP OF FILTER PACK 82.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM/EOLIAN

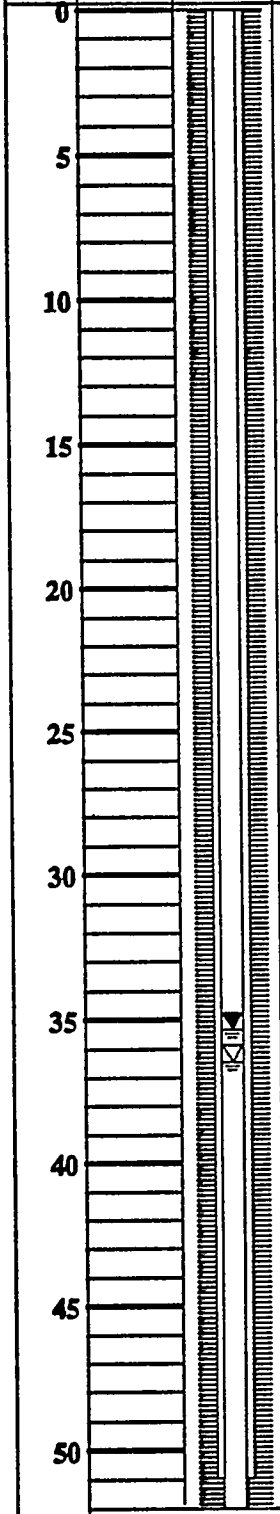
TOTAL DEPTH 110.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 59069.80 E 88670.30

DATUM MSL; GROUND SURFACE



Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 4-in PVC well to 109 feet		SP SM	**EOLIAN DEPOSITS:** SAND, medium to fine, little silt, reddish brown.
5					Note: Undifferentiated dune deposits to 90 feet.
10					
15					
20		Steel surface casing placed to 51 feet.			
25					
30					
35					
40					
45					
50				SW	**SHINARUMP MEM., CHINLE FM.:** SANDSTONE, medium to coarse, occasional conglomeritic stratum, white with limonite stains.

GROUNDWATER

	DEPTH	HOUR	DATE
▽	36.5		10-19-85
▼	35.3	15:35	4-27-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 659

JOB NO. MON01 DATE 09/11/85

SURFACE ELEVATION 4860.84

TOP OF FILTER PACK 82.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM/EOLIAN

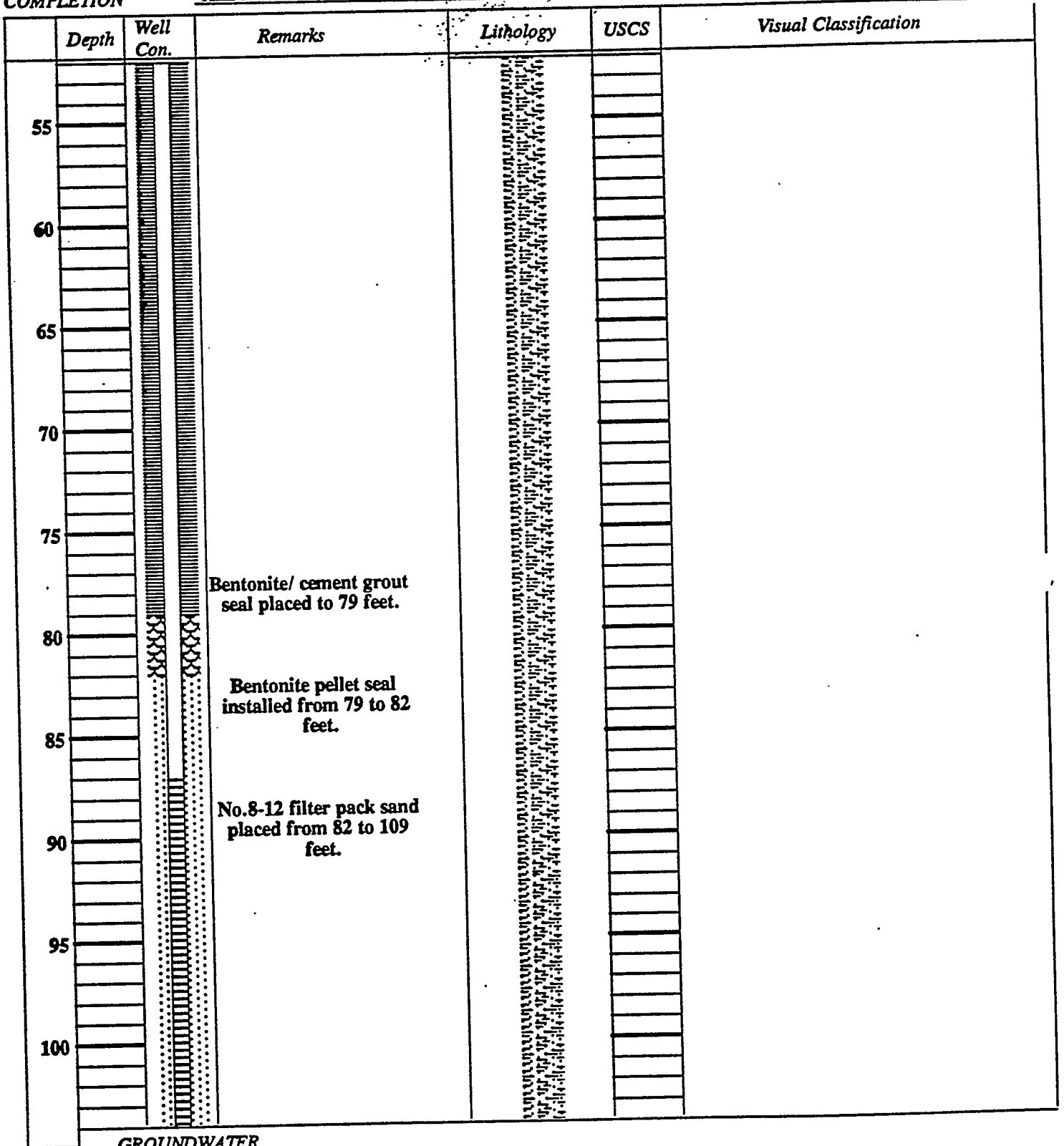
TOTAL DEPTH 110.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 59069.80 E 88670.30

DATUM MSL; GROUND SURFACE



GROUNDWATER

DEPTH	HOUR	DATE
36.5		10-19-85
35.3	15:35	4-27-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 659

JOB NO. MON01 DATE 09/11/85

SURFACE ELEVATION 4860.84

TOP OF FILTER PACK 82.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM/EOLIAN

TOTAL DEPTH 110.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 59069.80 E 88670.30

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105		.051-in. slot well screen installed from 87 to 107 feet.			**SHINARUMP MEM., Continued.**
110		Blank sump placed from 107 to 109 feet. Cave-in fill from 109 to 110 feet.			**TD AT 110 FEET.**
115					
120					
125					
130					
135					
140					
145					
150					
155					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	36.5		10-19-85
▼	35.3	15:35	4-27-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 660

JOB NO. MON01 **DATE** 09/24/85

SURFACE ELEVATION 4831.38
TOP OF FILTER PACK 124.00
WELL CASING TYPE 4.0-IN.SCHED.80 PVC
COMPLETION SHINARUMP MEM.

TOTAL DEPTH 155.0 feet
RIG TYPE GARDNER-DENVER
BORING TYPE ROTARY MUD
LOCATION N 61303.40 E 89584.30
DATUM MSL, GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 4-in PVC well to 155 feet		SP	EOLIAN: UNDIFFERENTIATED, dune sand, medium to fine, lt. reddish brown.
5					
10					
15					
20		Steel surface casing placed to 96 feet.			
25					
30					
35					
40					
45					
50					

GROUNDWATER

DEPTH	HOUR	DATE
33.3		10-19-85
31.4	14:25	4-28-86

JEG TAC TEAM

TAILINGS AREA

JOB NO. MON01 DATE 09/24/85
SURFACE ELEVATION 4831.38
TOP OF FILTER PACK 124.00
WELL CASING TYPE 4.0-IN.SCHED.80 PVC
COMPLETION SHINARUMP MEM.

TOTAL DEPTH 155.0 feet
RIG TYPE GARDNER-DENVER
BORING TYPE ROTARY MUD
LOCATION N 61303.40 E 89584.30
DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					**EOLIAN DEPOSITS, Continued.**
60					
65					
70					
75					
80					
85					
90				SW	**SHINARUMP MEM., CHINLE FORMATION:** SANDSTONE, medium to coarse, tan to white. Occasional coaly fragments indicate channel fill deposit.
95					
100					

GROUNDWATER

DEPTH	HOUR	DATE
33.3		10-19-85
31.4	14:25	4-28-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SATELLITE, UMTRA
TAILINGS AREA

LOG OF WELL BORING NO. 660

JOB NO. MON01 DATE 09/24/85

SURFACE ELEVATION 4831.38

TOP OF FILTER PACK 124.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION SHINARUMP MEM.

TOTAL DEPTH 155.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 61303.40 E 89584.30

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105					**SHINARUMP MEM., Continued.**
110					
115		Bentonite/ cement grout seal placed to 119 feet.			
120		Bentonite pellet seal installed from 119 to 124 feet.			
125					
130		No.8-12 filter pack sand placed from 124 to 155 feet.			
135		.051-in. slot well screen installed from 133 to 153 feet.			
140					
145					
150		Blank sump placed from 153 to 155 feet.			
155					TD AT 155 FEET.

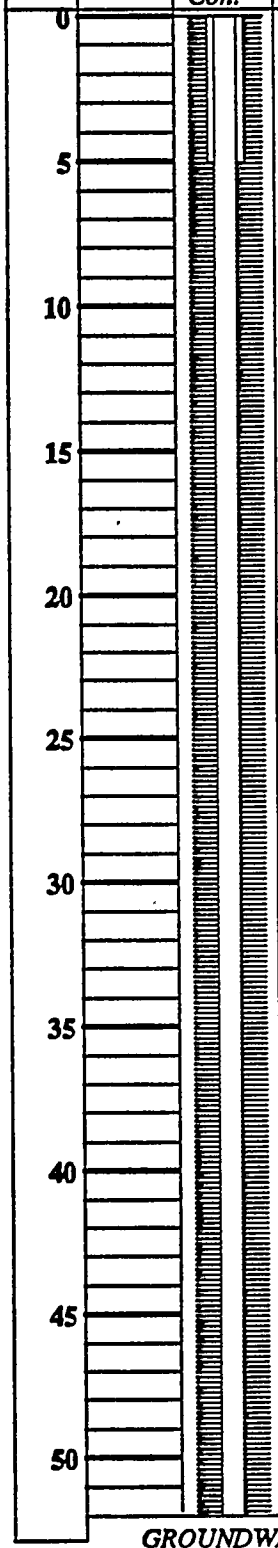
GROUNDWATER

	DEPTH	HOUR	DATE
▽	33.3		10-19-85
▼	31.4	14:25	4-28-86

JEG TAC TEAM

JOB NO. MON01 DATE 10/06/85
SURFACE ELEVATION 5057.34
TOP OF FILTER PACK 179.00
WELL CASING TYPE 4.0-IN.SCHED.80 PVC
COMPLETION DeCHELLY MEM.

TOTAL DEPTH 218.0 feet
RIG TYPE GARDNER-DENVER
BORING TYPE ROTARY MUD
LOCATION N 56366.10 E 85447.70
DATUM MSL; GROUND SURFACE



Depth	Remarks	USCS	Visual Classification
0	Installed 4-in PVC well to 212 feet	SP	SHINARUMP MEM., CHINLE FM.: SANDSTONE, fine to medium, well cemented, beige to pale tan.
5	Protective steel casing placed to 5 feet.		
10	Bentonite/ cement grout seal placed to 174 feet.		
15			Note: Becomes coarse grained with lt. limonite staining, medium yellowish brown.
20	Note: Original hole 661 was grouted full with casing in-place.		
25		SM	MOENKOPI FM.: MUDSTONE, friable, thin bedded, medium yellowish brown.
30			Note: Color change to medium to dark reddish brown.
35			
40		ML	SILTSTONE, very thin bedded, medium reddish brown to chocolate brown.
45			
50			

GROUNDWATER

	DEPTH	HOUR	DATE
▽	164.2		10-19-85
▼	162.8	14:00	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 661R

JOB NO. MON01 DATE 10/06/85

SURFACE ELEVATION 5057.34

TOP OF FILTER PACK 179.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION DeCHELLY MEM.

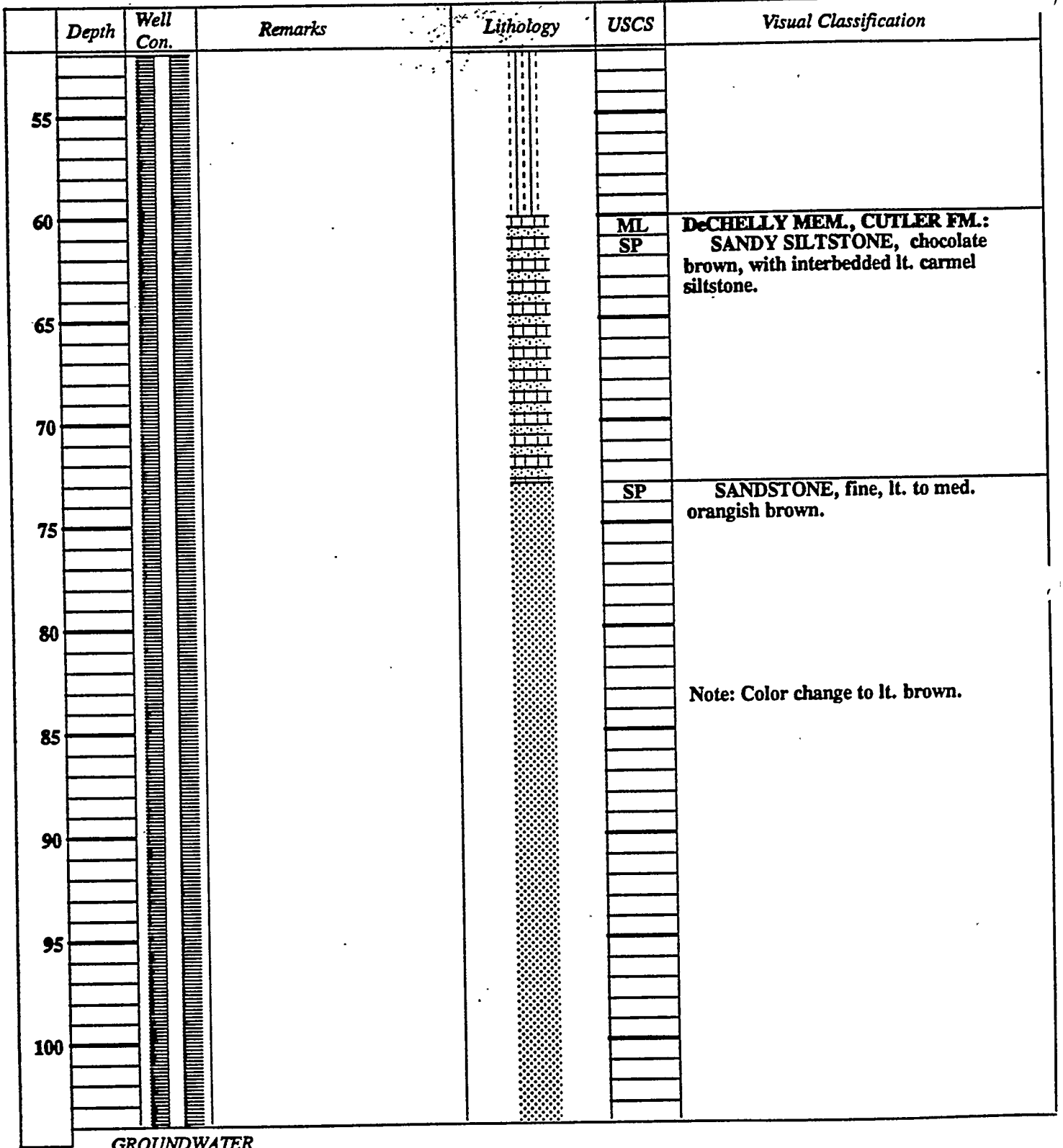
TOTAL DEPTH 218.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 56366.10 E 85447.70

DATUM MSL; GROUND SURFACE



GROUNDWATER

	DEPTH	HOUR	DATE
▽	164.2		10-19-85
▼	162.8	14:00	4-29-86

JEG TAC TEAM

JOB NO. MON01 DATE 10/06/85
SURFACE ELEVATION 5057.34
TOP OF FILTER PACK 179.00
WELL CASING TYPE 4.0-IN.SCHED.80 PVC
COMPLETION DeCHELLY MEM.

TOTAL DEPTH 218.0 feet
RIG TYPE GARDNER-DENVER
BORING TYPE ROTARY MUD
LOCATION N 56366.10 E 85447.70
DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105					**DeCHELLY SANDSTONE MEM., CUTLER FM.,** Continued.
110					
115					
120					**Note: Color change to lt. orange brown.**
125					
130					
135					
140					
145					
150					**Note: Becoming weakly to mod. cemented.**
155					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	164.2		10-19-85
▼	162.8	14:00	4-29-86

JEG TAC TEAM

PROJECT TAILINGS AREA — LOG OF WELL BORING NO. 85IR

JOB NO. MON01 DATE 10/06/85

SURFACE ELEVATION 5057.34

TOP OF FILTER PACK 179.00

WELL CASING TYPE 4.0-IN. SCHED. 80 PVC

COMPLETION DeCHELLY MEM.

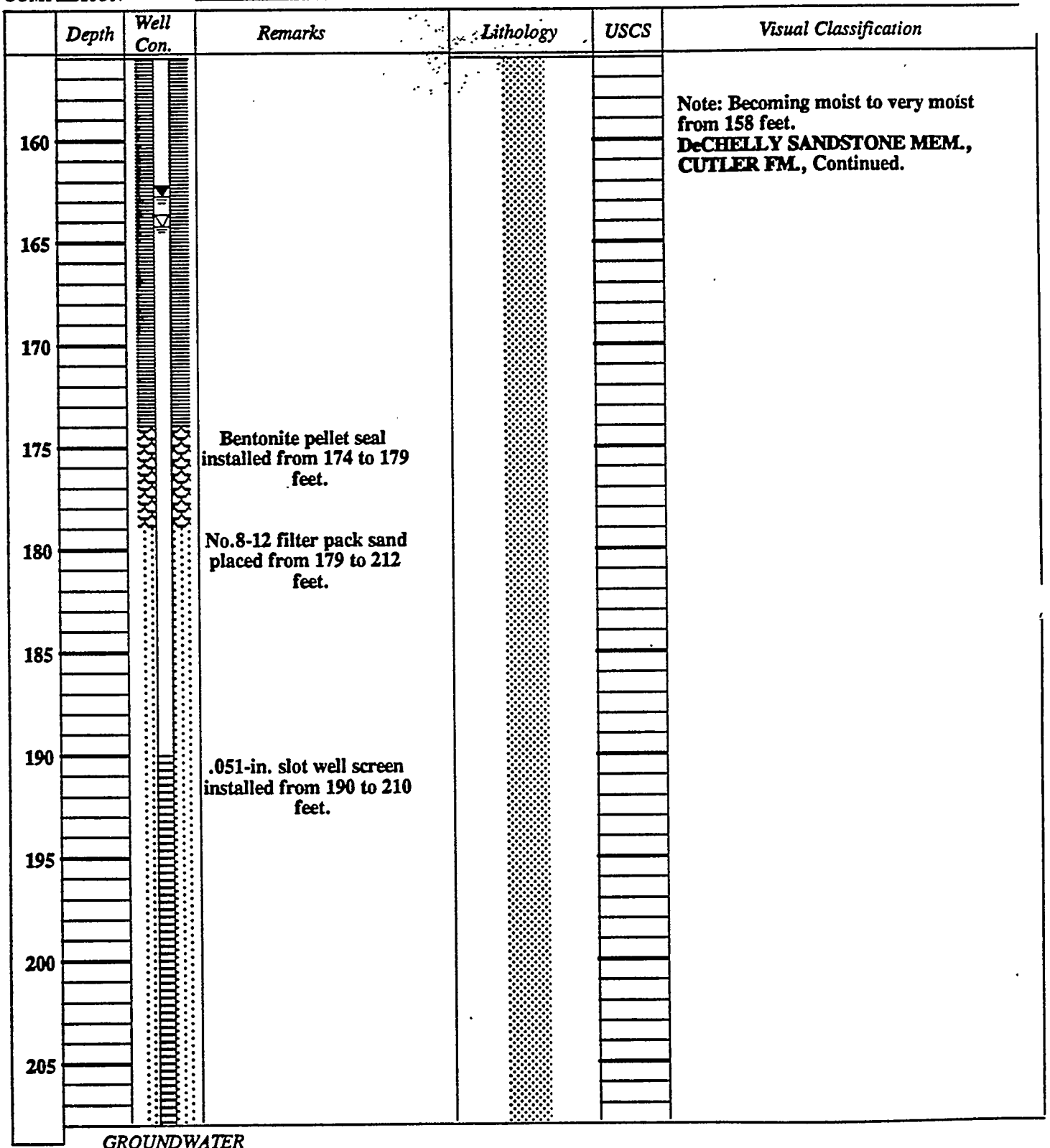
TOTAL DEPTH 218.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 56366.10 E 85447.70

DATUM MSL; GROUND SURFACE



GROUNDWATER

DEPTH	HOUR	DATE
164.2		10-19-85
162.8	14:00	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY DAT, MOAB, UTAH
TAILINGS AREA

LOG OF WELL BORING NO. 661R

JOB NO. MON01 DATE 10/06/85

SURFACE ELEVATION 5057.34
TOP OF FILTER PACK 179.00
WELL CASING TYPE 4.0-IN.SCHED.80 PVC
COMPLETION DeCHELLY MEM.

TOTAL DEPTH 218.0 feet
RIG TYPE GARDNER-DENVER
BORING TYPE ROTARY MUD
LOCATION N 56366.10 E 85447.70
DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
210		Blank sump placed from 210 to 212 feet.			DeCHELLY SANDSTONE MEM., CUTLER FM., Continued.
215					
					TD AT 218 FEET.
220					
225					
230					
235					
240					
245					
250					
255					
260					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	164.2		10-19-85
▼	162.8	14:00	4-29-86

JEG TAC TEAM

TAILINGS AREA

LOG OF WELL BORING NO. 602

JOB NO. MON01 DATE 10/05/85

SURFACE ELEVATION 4877.07

TOP OF FILTER PACK 35.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALJ.UVIUM/EOLIAN

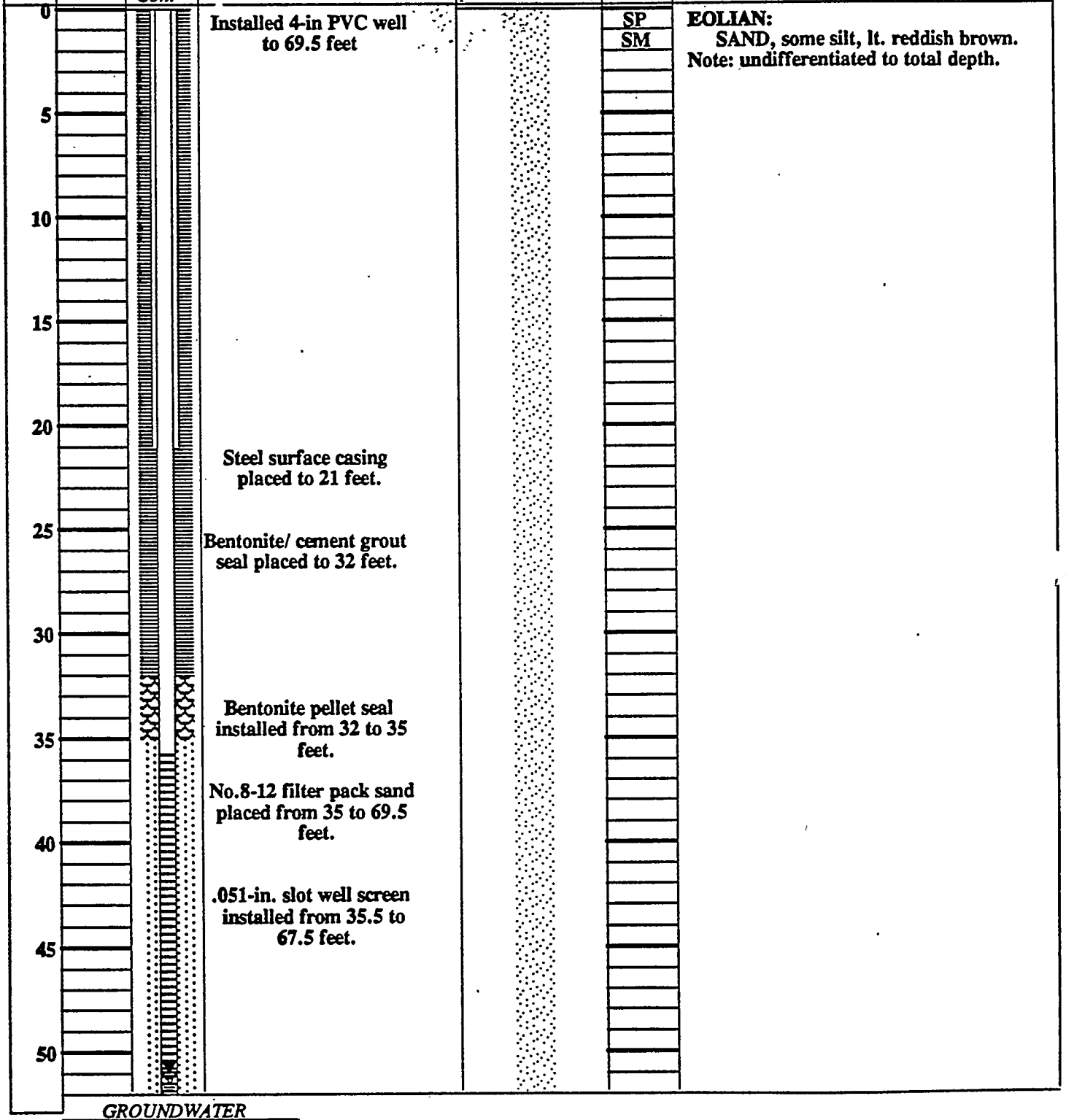
TOTAL DEPTH 70.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 59236.50 E 87577.50

DATUM MSL; GROUND SURFACE



GROUNDWATER

	DEPTH	HOUR	DATE
▽	51.5		10-19-85
▼	51.0	11:35	4-28-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 662

JOB NO. MON01 DATE 10/05/85

SURFACE ELEVATION 4877.07

TOP OF FILTER PACK 35.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM/EOLIAN

TOTAL DEPTH 70.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 59236.50 E 87577.50

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					**EOLIAN DEPOSITS, continued.**
60					
65		Blank sump placed from 67.5 to 69.5 feet.			
70		Cave-in fill from 69.5 to 70 ft.			**TD AT 70 FEET.** Note: Caving badly to TD.
75					
80					
85					
90					
95					
100					

GROUNDWATER

DEPTH	HOUR	DATE
51.5		10-19-85
51.0	11:35	4-28-86

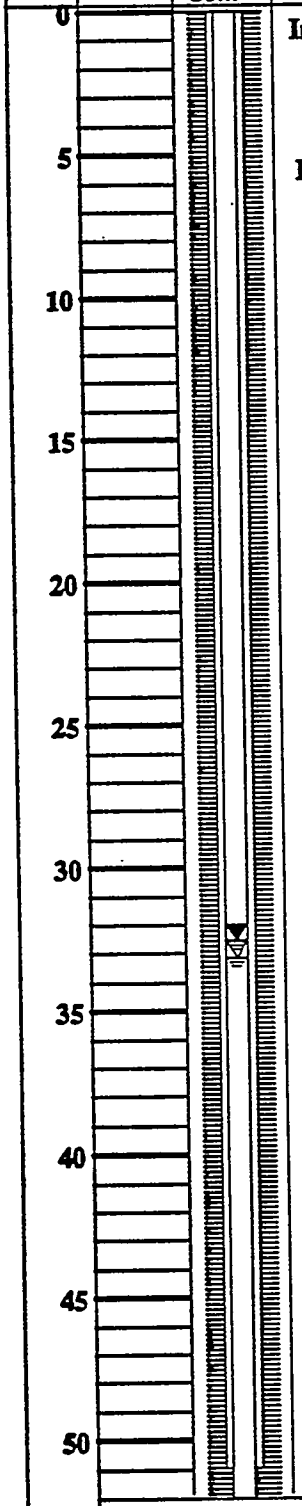
JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.: UMTRA TAILINGS AREA — LOG OF WELL BORING NO. 663

JOB NO. MON01 DATE 09/10/85

SURFACE ELEVATION 4861.56
TOP OF FILTER PACK 155.00
WELL CASING TYPE 4.0-IN.SCHED.80 PVC
COMPLETION DeCHELLY MEM.

TOTAL DEPTH 217.0 feet
RIG TYPE GARDNER-DENVER
BORING TYPE ROTARY MUD
LOCATION N 59069.60 E 88593.50
DATUM MSL; GROUND SURFACE



Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 4-in PVC well to 217 feet		SP	EOLIAN: UNDIFFERENTIATED, DUNE SAND, with minor alluvium in lower section consisting of minor fine gravel derived from Shinarump formation, and minor Moenkopi rock fragments.
5		Flowing well at 5 gpm initially.			
10		Steel surface casing placed to 51 feet.			
50				SM	SHINARUMP MEM., CHINLE FORMATION:

GROUNDWATER

DEPTH	HOUR	DATE
33.2		10-19-85
32.6	11:49	4-27-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 663

JOB NO. MON01 DATE 09/10/85

SURFACE ELEVATION 4861.56

TOP OF FILTER PACK 155.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION DeCHELLY MEM.

TOTAL DEPTH 217.0 feet

RIG TYPE GARDNER-DENVER

BORINC TYPE ROTARY MUD

LOCATION N 59069.60 E 88593.50

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55		Bentonite/ cement grout seal placed to 150 feet.			SANDSTONE, fine to coarse, occ. pebbles, whitish tan to reddish tan. Note: Water began flowing at 5 gpm at 52 feet during drilling, continuing until hole deepened to 55 feet. SHINARUMP MEM., Continued.
60					
65					
70					
75					
80					
85					
90					
95					
100					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	33.2		10-19-85
▼	32.6	11:49	4-27-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 663

JOB NO. MON01 DATE 09/10/85

SURFACE ELEVATION 4861.56

TOP OF FILTER PACK 155.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION DeCHELLY MEM.

TOTAL DEPTH 217.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 59069.60 E 88593.50

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105					**SHINARUMP MEM.**, Continued. Note: Conglomeritic from 107 to 110 feet. Occasional coaly fragment indicates channel fill deposit.
110					
115					
120				ML	**MOENKOPI FORMATION:** SILTSTONE, with minor thin interbeds of sandstone, upper few feet altered to bleached, grey; changing to reddish brown.
125					
130					
135					
140					
145					
150		Bentonite pellet seal installed from 150 to 155 feet.			
155		No.8-12 filter pack sand			

GROUNDWATER

	DEPTH	HOUR	DATE
▽	33.2		10-19-85
▼	32.6	11:49	4-27-86

JEG TAC TEAM

PROJECT TAILINGS AREA — LOG OF WELL/BORING NO. 663

JOB NO. MON01 — DATE 09/10/85 — TOTAL DEPTH 217.0 feet

SURFACE ELEVATION 4861.56 — RIG TYPE GARDNER-DENVER

TOP OF FILTER PACK 155.00 — BORING TYPE ROTARY MUD

WELL CASING TYPE 4.0-IN.SCHED.80 PVC — LOCATION N 59069.60 E 88593.50

COMPLETION DeCHELLY MEM. — DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
160		placed from 155 to 217 feet.			MOENKOPI FM.,Continued.
165					
170				SP	DeCHELLY SANDSTONE MEM., CUTLER FM.: SANDSTONE, medium to fine, reddish tan to orange.
175		.051-in. slot well screen installed from 175 to 215 feet.			
180					
185					
190					
195					
200					
205					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	33.2		10-19-85
▼	32.6	11:49	4-27-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 663

JOB NO. MON01 DATE 09/10/85

SURFACE ELEVATION 4861.56

TOP OF FILTER PACK 155.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION DeCHELLY MEM.

TOTAL DEPTH 217.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 59069.60 E 88593.50

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
210					**DeCHELLY SANDSTONE MEM., Continued.**
215		**Blank sump placed from 215 to 217 feet.**			
					TD AT 217 FEET.
220					
225					
230					
235					
240					
245					
250					
255					
260					

GROUNDWATER

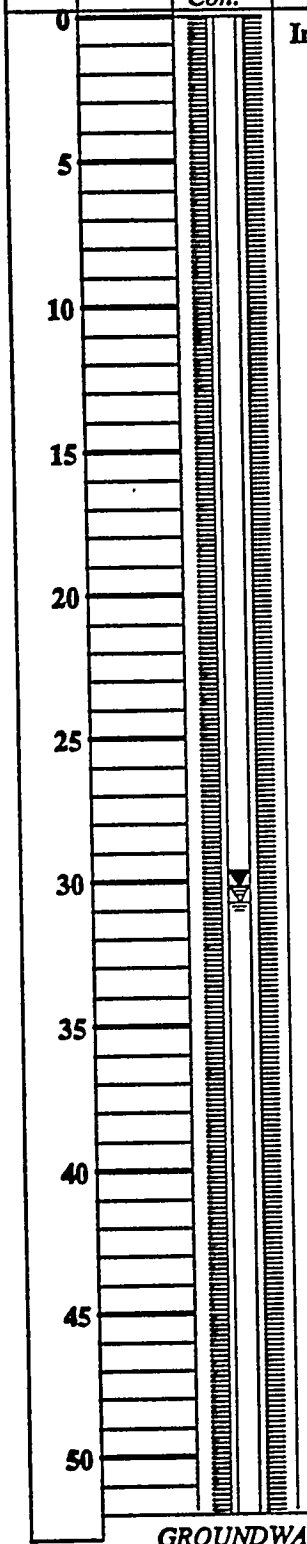
DEPTH	HOUR	DATE
33.2		10-19-85
32.6	11:49	4-27-86

JEG TAC TEAM

PROJECT MONUMENT SITE, AZ. LOG OF WELL BORING NO. 664

JOB NO. MON01, DATE 09/19/85
SURFACE ELEVATION 4832.84
TOP OF FILTER PACK 202.00
WELL CASING TYPE 4.0-IN.SCHED.80 PVC
COMPLETION DeCHELLY MEM.

TOTAL DEPTH 233.0 feet
RIG TYPE GARDNER-DENVER
BORING TYPE ROTARY MUD
LOCATION N 61255.90 E 89537.00
DATUM MSL; GROUND SURFACE



Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 4-in PVC well to 233 feet		SP	**EOLIAN DEPOSITS:** SAND, medium to fine, reddish brown.
		Steel surface casing placed to 90 feet.			

GROUNDWATER

DEPTH	HOUR	DATE
30.8		10-19-85
30.2	14:25	4-28-86

JEG TAC TEAM

PROJECT MONUMENT SITE, AZ.

LOG OF WELL BORING NO. 664

JOB NO. MON01, **DATE** 09/19/85

SURFACE ELEVATION 4832.84
TOP OF FILTER PACK 202.00
WELL CASING TYPE 4.0-IN.SCHED.80 PVC
COMPLETION DeCHELLY MEM.

TOTAL DEPTH 233.0 feet
RIG TYPE GARDNER-DENVER
BORING TYPE ROTARY MUD
LOCATION N 61255.90 E 89537.00
DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55					**EOLIAN DEPOSITS, Continued.**
60					
65					
70					
75					
80					
85				SW	**SHINARUMP MEM., CHINLE FM.:** SANDSTONE, medium to coarse, occasional conglomeritic seams, well cemented, limonite stained, tan to white.
90					
95					
100					

GROUNDWATER

DEPTH	HOUR	DATE
30.8		10-19-85
30.2	14:25	4-28-86

JEG TAC TEAM

PROJECT _____ LOG OF WELL BORING NO. _____

JOB NO. MON01, DATE 09/19/85
SURFACE ELEVATION 4832.84
TOP OF FILTER PACK 202.00
WELL CASING TYPE 4.0-IN.SCHED.80 PVC
COMPLETION DeCHELLY MEM.

TOTAL DEPTH 233.0 feet
RIG TYPE GARDNER-DENVER
BORING TYPE ROTARY MUD
LOCATION N 61255.90 E 89537.00
DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105					**SHINARUMP MEM.,Continued.**
110					
115					
120					
125					
130					
135					
140					
145				SW GP	**SANDSTONE, coarse to medium, with gravelly conglomeritic lenses, abundant coaly material,(channel fill deposit), tan to white.**
150					
155					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	30.8		10-19-85
▼	30.2	14:25	4-28-86

JEG TAC TEAM

PROJECT MONUMENT SITE, AZ.

LOG OF WELL BORING NO. 664

JOB NO. MON01, DATE 09/19/85

SURFACE ELEVATION 4832.84

TOP OF FILTER PACK 202.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION DeCHELLY MEM.

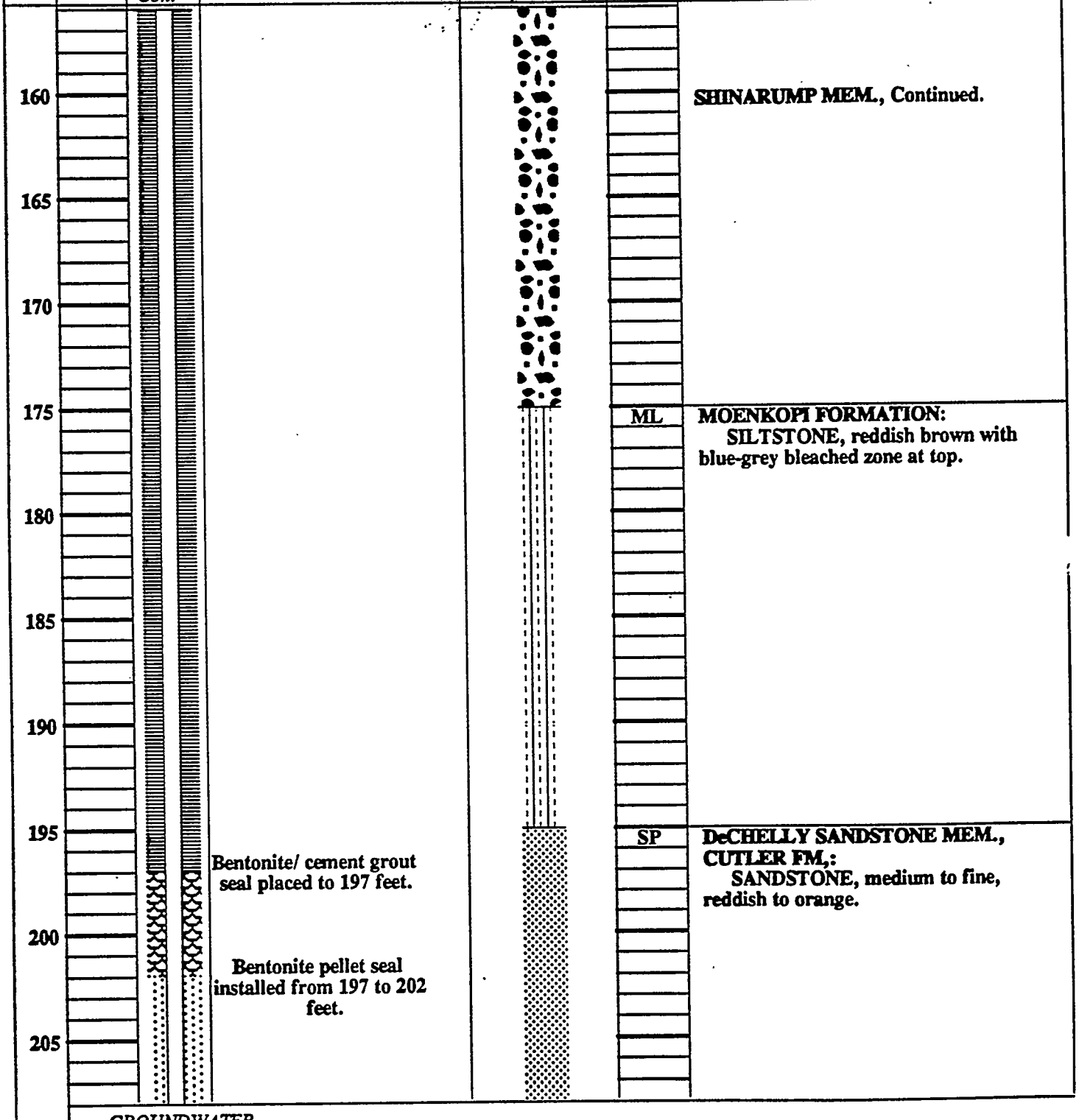
TOTAL DEPTH 233.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 61255.90 E 89537.00

DATUM MSL; GROUND SURFACE



GROUNDWATER

DEPTH	HOUR	DATE
30.8		10-19-85
30.2	14:25	4-28-86

JEG TAC TEAM

PROJECT [illegible] LOG OF WELL BORING NO. 664

JOB NO. MON01, DATE 09/19/85
SURFACE ELEVATION 4832.84
TOP OF FILTER PACK 202.00
WELL CASING TYPE 4.0-IN.SCHED.80 PVC
COMPLETION DeCHELLY MEM.

TOTAL DEPTH 233.0 feet
RIG TYPE GARDNER-DENVER
BORING TYPE ROTARY MUD
LOCATION N 61255.90 E 89537.00
DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
210		No.8-12 filter pack sand placed from 202 to 233 feet.			**DeCHELLY SANDSTONE MEM., Continued.**
215					
220		.051-in. slot well screen installed from 211 to 231 feet.			
225					
230		Blank sump placed from 231 to 233 feet.			
235					**TD AT 233 FEET.**
240					
245					
250					
255					
260					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	30.8		10-19-85
▼	30.2	14:25	4-28-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY SITE, ARIZ.; UMTRA TAILINGS AREA

LOG OF WELL BORING NO. 668

JOB NO. MON01 DATE 10/04/85

SURFACE ELEVATION 4864.27

TOP OF FILTER PACK 167.00

WELL CASING TYPE 4.0-:N.SCHED.80 PVC

COMPLETION DeCHELLY MEM.

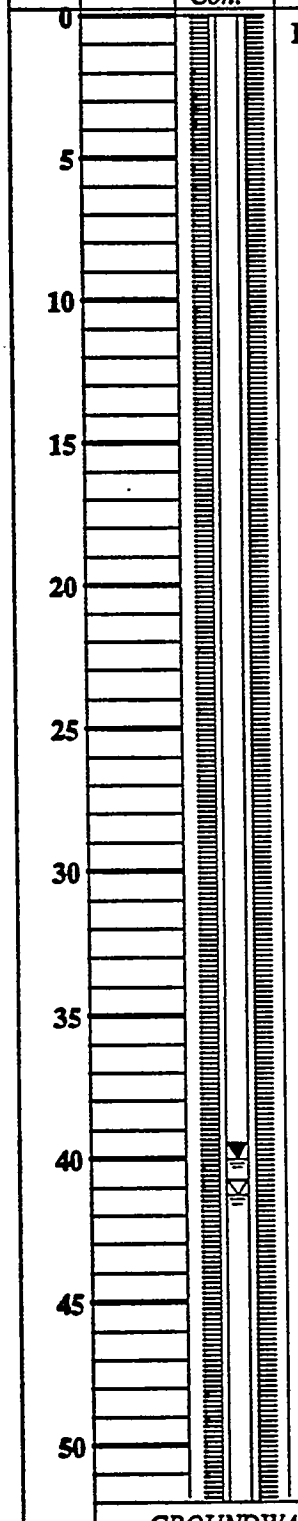
TOTAL DEPTH 218.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 60171.40 E 88287.00

DATUM MSL; GROUND SURFACE



Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
0		Installed 4-in PVC well to 215 feet		SP SM	**EOLIAN:** **SAND, some silt, lt. reddish brown.** **Note: undifferentiated to total depth.**
10		**Steel surface casing placed to 60 feet.**			

GROUNDWATER

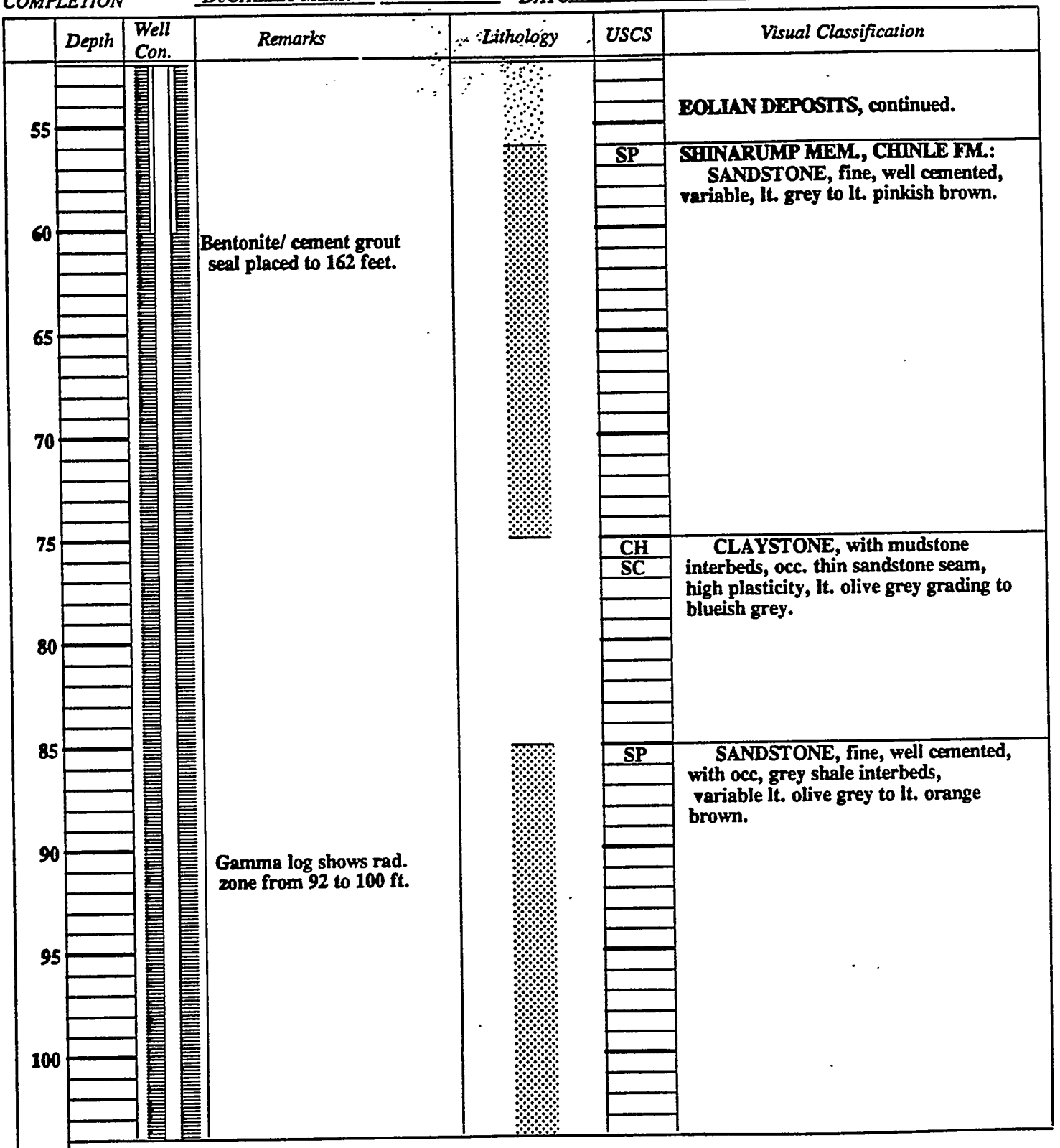
DEPTH	HOUR	DATE
41.3		10-19-85
40.0	09:30	4-29-86

JEG TAC TEAM

TAILINGS AREA

JOB NO. MON01 DATE 10/04/85
SURFACE ELEVATION 4864.27
TOP OF FILTER PACK 167.00
WELL CASING TYPE 4.0-IN.SCHED.80 PVC
COMPLETION DeCHELLY MEM.

TOTAL DEPTH 218.0 feet
RIG TYPE GARDNER-DENVER
BORING TYPE ROTARY MUD
LOCATION N 60171.40 E 88287.00
DATUM MSL; GROUND SURFACE



GROUNDWATER

	DEPTH	HOUR	DATE
▽	41.3		10-19-85
▼	40.0	09:30	4-29-86

JEG TAC TEAM

PROJECT TAILINGS AREA — LOG OF WELL BORING NO. [illegible]

JOB NO. MON01 DATE 10/04/85

SURFACE ELEVATION 4864.27

TOP OF FILTER PACK 167.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION DeCHELLY MEM.

TOTAL DEPTH 218.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 60171.40 E 88287.00

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
105				CL	**SHINARUMP MEM., CHINLE FM.,** Continued. SHALE, thin bedded, with lenses of sandstone, occasional coal fragment.
110					
				CL ML	**MOENKOPI FM.:** MUDSTONE AND SILTSTONE, interbedded, reddish brown to chocolate brown.
115					
120					
125					Note: Increasing sand from 126 feet.
130					
135					Note: Gas bubbles in mud tub from 136 feet.
140					
145					
150				SP CL	**DeCHELLY SANDSTONE MEM., CUTLER FM.** SANDSTONE, with interbedded shale, fine, medium orange brown.
155					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	41.3		10-19-85
▼	40.0	09:30	4-29-86

JEG TAC TEAM

PROJECT TAILINGS AREA — LOG OF WELL BORING NO. 608

JOB NO. MON01 DATE 10/04/85

SURFACE ELEVATION 4864.27

TOP OF FILTER PACK 167.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION DeCHELLY MEM.

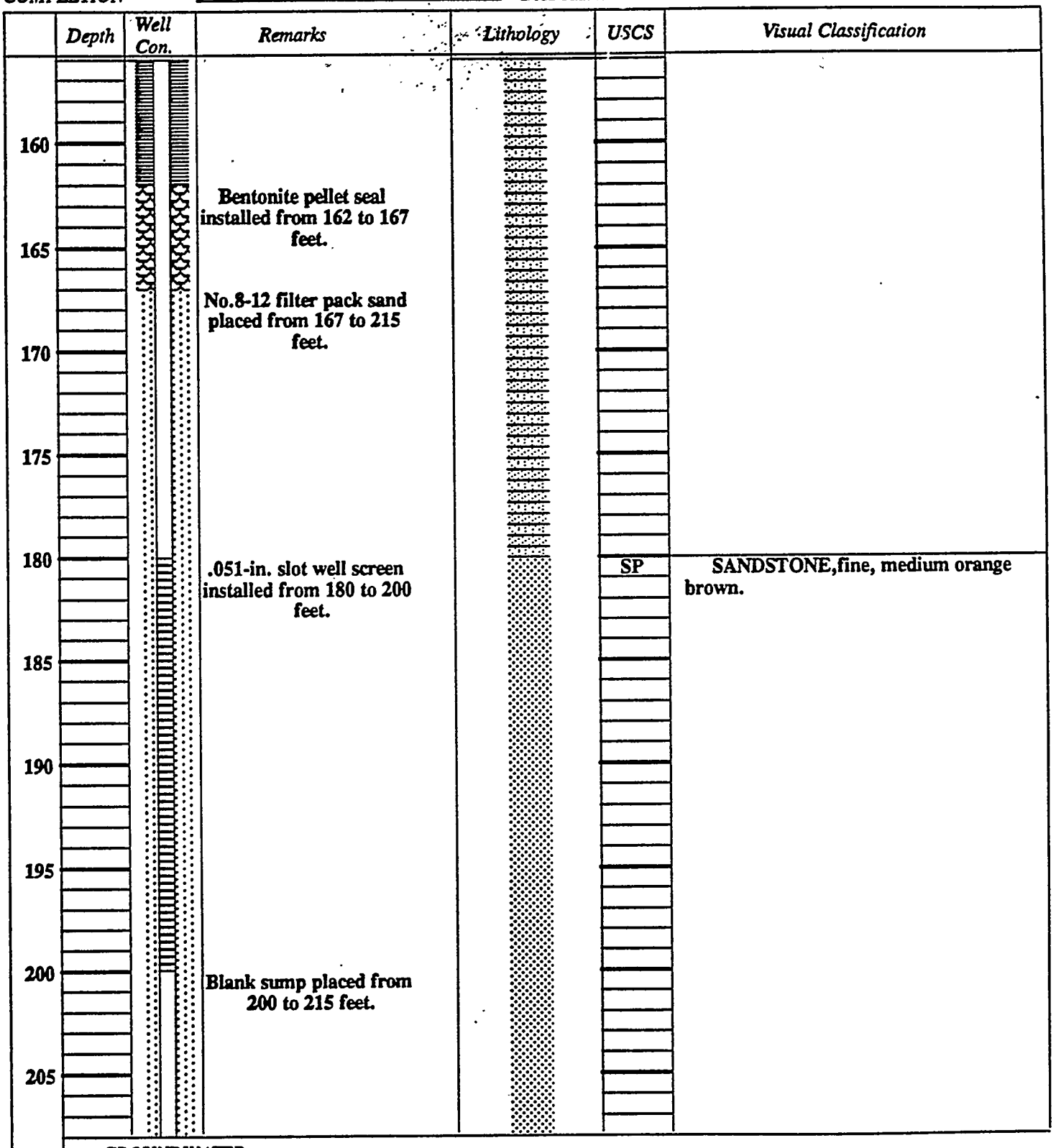
TOTAL DEPTH 218.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 60171.40 E 88287.00

DATUM MSL; GROUND SURFACE



GROUNDWATER

DEPTH	HOUR	DATE
41.3		10-19-85
40.0	09:30	4-29-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY DAP, MESA, UTAH
TAILINGS AREA

LOG OF WELL BORING NO. 668

JOB NO. MON01 DATE 10/04/85

SURFACE ELEVATION 4864.27
TOP OF FILTER PACK 167.00
WELL CASING TYPE 4.0-IN.SCHED.80 PVC
COMPLETION DeCHELLY MEM.

TOTAL DEPTH 218.0 feet
RIG TYPE GARDNER-DENVER
BORING TYPE ROTARY MUD
LOCATION N 60171.4 E 88287.00
DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
210					**DeCHELLY SANDSTONE MEM.,Continued.**
215		**Cave-in fill from 215 to 218 feet.**			
					TD AT 218 FEET.
220					
225					
230					
235					
240					
245					
250					
255					
260					

GROUNDWATER

DEPTH	HOUR	DATE
41.3		10-19-85
40.0	09:30	4-29-86

JEG TAC TEAM

PROJECT TAILINGS AREA — LOG OF WELL BORING NO. 689

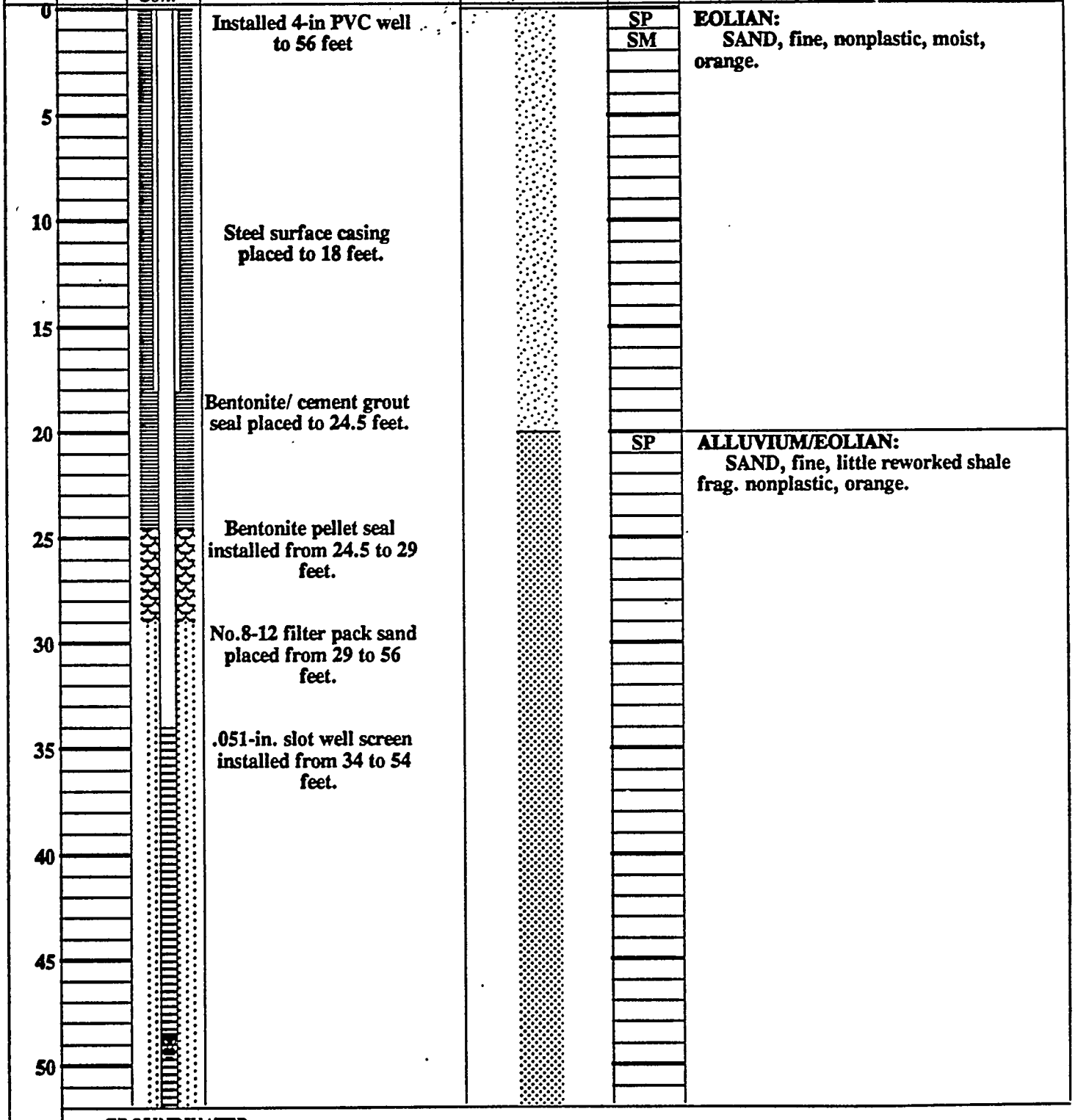
JOB NO. MON01 — DATE 10/05/85 — TOTAL DEPTH 56.0 feet

SURFACE ELEVATION 4863.19 — RIG TYPE GARDNER-DENVER

TOP OF FILTER PACK 29.00 — BORING TYPE ROTARY MUD

WELL CASING TYPE 4.0-IN.SCHED.80 PVC — LOCATION N 60146.30 E 88247.80

COMPLETION ALLUVIUM. — DATUM MSL; GROUND SURFACE



USCS	Visual Classification
SP SM	**EOLIAN:** SAND, fine, nonplastic, moist, orange.
SP	**ALLUVIUM/EOLIAN:** SAND, fine, little reworked shale frag. nonplastic, orange.

GROUNDWATER

DEPTH	HOUR	DATE
49.3		10-19-85
49.0	13:00	4-28-86

JEG TAC TEAM

PROJECT MONUMENT VALLEY URANIUM TAILINGS AREA

LOG OF WELL BORING NO. 009

JOB NO. MON01 DATE 10/05/85

SURFACE ELEVATION 4863.19

TOP OF FILTER PACK 29.00

WELL CASING TYPE 4.0-IN.SCHED.80 PVC

COMPLETION ALLUVIUM.

TOTAL DEPTH 56.0 feet

RIG TYPE GARDNER-DENVER

BORING TYPE ROTARY MUD

LOCATION N 60146.30 E 88247.80

DATUM MSL; GROUND SURFACE

Depth	Well Con.	Remarks	Lithology	USCS	Visual Classification
55		Blank sump placed from 54 to 56 feet.			TD AT 56 FEET.
60					
65					
70					
75					
80					
85					
90					
95					
100					

GROUNDWATER

	DEPTH	HOUR	DATE
▽	49.3		10-19-85
▼	49.0	13:00	4-28-86

JEG TAC TEAM

PROJECT MONUMENT SITE, AZ. UMTRA

JOB NO. MON01,

LOG OF CORE HOLE NO.

DATE COMPL.	03/15/85
RIG TYPE	2.0-IN.SCHED.40 PVC
METHOD	HS AUGER
CORE SIZE,IN.	6 5/8-IN
GRID COORD. N / E	N58685.7 E87189.4
SURFACE ELEV. FT.	4901.1

DEPTH IN FEET	SAMPLE	% CORE RECOVERY	ROCK QUALITY DESIGNATION	% MEDIA RECOVERY	FRACTURE NONE	FRACTURE ANGLE, DEG.	FRACTURE WIDE >20 IN	FRACTURE MOD. 5-20 IN	FRACTURE CLOSE <5IN.	GRAPHICAL LOG	LITHOLOGY SYMBOL	REMARKS	STRATIGRAPHIC DESCRIPTION
0											SP	Core hole reamed to 5 5/8-in. to install 2-in PVC well.	SHINARUMP MEM.; CHINLE FM.: SANDSTONE, med. to coarse, yellowish grey.
5												See log 608 for well installation	
10	NQ	100	70			30	X				CL		SHALE, with fine sand, thnly laminated.
											SP		SANDSTONE, medium to coarse, mod. well cemented,noncalcareous, occasional clayey matrix, mostly cross bedded, yellowish grey (5YR,5/4).
15	NQ	100	100			30		X					
20								X					
25	NQ	100	100			3	X						
											GP		CONGLOMERATE, coarse sand to med. gravel, subrrounded, some clay matrix, sufficient porosity to lose circulation, medium yellowish brown (10YR,5/4).
	NQ	0	0										
30						3		X					
	NQ	100	50								CL		MOENKOPI FORMATION:
											ML		SHALE, with coarse sand, to silty, poorly indurated, very thinnly laminated, greyish orange (10YR,7/4).
35	NQ	100	45			3	X						
						3			X				SILTSTONE, with very fine sand, occasional thin calcite stringers as fracture fillings, noncalcareous, thinly laminated, very hard, yellowish grey (5Y,7/2). Note: with inter bedded greyish orange from 34 feet. Some pyrite in the matrix.
40						3	X						
											ML		
45	NQ	100	76			3	X						Note: color change to reddish brown (10R,4/6) from 39 feet.
													SILTSTONE, dark reddish brown.
50						3	X						

GROUNDWATER

	DEPTH	HOUR	DATE
▽	58.4	16:31	15:00
▼	57.6	4-23-85	4-7-86

JEG TAC TEAM

PROJECT MONUMENT SITE, AZ. UMTRA

JOB NO. MON01,

LOG OF CORE HOLE NO.

DATE COMPL.	03/15/85
RIG TYPE	2.0-IN.SCHED.40 PVC
METHOD	HS AUGER
CORE SIZE,IN.	6 5/8-IN
GRID COORD. N / E	N58685.7 E87189.4
SURFACE ELEV. FT.	4901.1

DEPTH IN FEET	SAMPLE	% CORE RECOVERY	ROCK QUALITY DESIGNATION	% MEDIA RECOVERY	FRACTURE NONE	FRACTURE ANGLE, DEG.	FRACTURE WIDE,>20 IN	FRACTURE MOD.5-20 IN	FRACTURE CLOSE <5IN.	GRAPHICAL LOG	LITHOLOGY SYMBOL	REMARKS	STRATIGRAPHIC DESCRIPTION
55	NQ	100	52			3		X			ML SM		**MOENKOPI FM.**, Continued. Note: Becomes soft, more moist, from 54 feet.
													SILTSTONE AND SANDSTONE, interbedded, yellowish grey.
60						3		X					
65	NQ	100	95										Note: Increase in sand, sandstone is lt. grey.
70						3		X					Note: less siltstone interbeds from 72 ft.
75	NQ	100	95								SW		SANDSTONE, coarse to fine, dark reddish brown.
80						3		X					Note: Color change to very lt. grey, massive, from 78 ft. Note: Alternating color bands from very lt. grey to pale red from 80 ft.
85	NQ	100	97										
90						45		X			SP		**DeCHELLY SANDSTONE MEM., CUTLER FORMATION:** SANDSTONE, coarse to med., dune deposit, cross bedded, lt. brown to med. reddish brown (10R,4/6). Note: Lost circulation at 91 ft. due to porosity of this formation.
95	NQ	100	100										
100						45		X					

GROUNDWATER

DEPTH	HOUR	DATE
58.4	16:31	15:00
57.6	4-23-85	4-7-86

JEG TAC TEAM

JOB NO. MON01,

DATE COMPL.	03/15/85
RIG TYPE	2.0-IN.SCHED.40 PVC
METHOD	HS AUGER
CORE SIZE,IN.	6 5/8-IN
GRID COORD. N / E	N58685.7 E87189.4
SURFACE ELEV. FT.	4901.1

DEPTH IN FEET	SAMPLE	% CORE RECOVERY	ROCK QUALITY DESIGNATION	% MEDIA RECOVERY	FRACTURE: NONE	FRACTURE: ANGLE, DEG.	FRACTURE: WIDE,>20 IN	FRACTURE: MOD.5-20 IN	FRACTURE: CLOSE <5IN.	GRAPHICAL LOG	LITHOLOGY SYMBOL	REMARKS	STRATIGRAPHIC DESCRIPTION
105													
110						45	X						
115													Note: color change to variable lt. brown and greyish orange.
120													TD AT 120 FEET.

GROUNDWATER

	DEPTH	HOUR	DATE
▽	58.4	16:31	15:00
▼	57.6	4-23-85	4-7-86

JEG TAC TEAM

PROJECT MONUMENT SITE, AZ. UMTRA

JOB NO. MON01,

LOG OF CORE HOLE NO. 610C

DATE COMPL. 12/03/84

RIG TYPE 2.0-IN.SCHED.40 PVC

METHOD HS AUGER

CORE SIZE,IN. 6 5/8-IN

GRID COORD. N / E N56338.8 E88611.6

SURFACE ELEV. FT. 4860.8

DEPTH IN FEET	SAMPLE	% CORE RECOVERY	ROCK QUALITY DESIGNATION	% MEDIA RECOVERY	FRACTURE NONE	FRACTURE ANGLE, DEG.	FRACTURE WIDE, >20 IN	FRACTURE MOD.5-20 IN	FRACTURE CLOSE <5IN.	GRAPHICAL LOG	LITHOLOGY SYMBOL	REMARKS	STRATIGRAPHIC DESCRIPTION
0											SP	Core hole reamed to 4.5-in to install 2-in. PVC casing.	EOLIAN: SAND, fine, dry, med. dense, lt. reddish brown (5YR,5/3,5/4).
▽5												See log 610 for well construction log.	Note: Very Moist at 6 feet.
10													Note: Water table encoountered at 8 feet.
15													
20													
25													
30	NO	0	0										
	NO	0	0										
											SP		SHINARUMP MEM., CHINLE FM.: SANDSTONE, med. grain. mod. hard, mod. weathered. thick bedding, brownish red.
35	NO	98	86			20			X				
40	NO	100	95										Note: Med. grey lens at 39 .5 to 40 feet.
45													
50	NO	100	93			3			X				

GROUNDWATER

	DEPTH	HOUR	DATE
▽	5.4	08:30	11:59
▼	5.4	4-23-85	4-6-86

JEG TAC TEAM

PROJECT MONUMENT SITE, AZ. UMTRA

JOB NO. MON01.

LOG OF CORE HOLE NO.

DATE COMPL.	12/03/84
RIG TYPE	2.0-IN.SCHED.40 PVC
METHOD	HS AUGER
CORE SIZE,IN.	6 5/8-IN
GRID COORD. N / E	N56338.8 E88611.6
SURFACE ELEV. FT.	4860.8

DEPTH IN FEET	SAMPLE	% CORE RECOVERY	ROCK QUALITY DESIGNATION	% MEDIA RECOVERY	FRACTURE NONE	FRACTURE ANGLE, DEG.	FRACTURE WIDE, >20 IN	FRACTURE MOD.5-20 IN	FRACTURE CLOSE <5IN.	GRAPHICAL LOG	LITHOLOGY SYMBOL	REMARKS	STRATIGRAPHIC DESCRIPTION
55													Note: Color change to dk. brown (10YR,8/4).
													SHINARUMP MEM., Continued.
60	NO	100	95			20	X						Note: Occasional clast of siltstone.
65													
70	NO	100	50			20			X				
	NO	60	50						X		CL		SHALE, yellowish brown to grey.
	NO	100	0								SP		SANDSTONE, very fine grained, grey; With thin interbedded lenses of grey shale.
75	NO	100	95			15		X			CL		
	NO	100	40										
	NO	100	50										
	NO	100	100			7			X		SP		SANDSTONE, very fine, greyish white.
						90			X				
80	NO	100	95			3	X						
85													
											SW		CONGLOMERATE, with fine to coarse gravel, well cemented.
	NO	100	95								CL		SHALE, lt. grey.
90	NO	100	97								CL		**MOENKOPI FORMATION:** SHALE, reddish brown.
	NO	100	95										
95													
100													

GROUNDWATER

	DEPTH	HOUR	DATE
▽	5.4	08:30	11:59
▼	5.4	4-23-85	4-6-86

JEG TAC TEAM

PROJECT MONUMENT SITE, AZ. UMTRA

JOB NO. MON01,

LOG OF CORE HOLE NO. 611C

DATE COMPL. 03/05/85

RIG TYPE 2.0-IN.SCHED.40 PVC

METHOD CORE/ ROTARY

CORE SIZE,IN. 6 -IN

GRID COORD. N / E N57811.0 E89017.5

SURFACE ELEV. FT. 4846.4

DEPTH IN FEET	SAMPLE	% CORE RECOVERY	ROCK QUALITY DESIGNATION	% MEDIA RECOVERY	FRACTURE: NONE	FRACTURE: ANGLE, DEG.	FRACTURE: WIDE,>20 IN	FRACTURE: MOD,5-20 IN	FRACTURE: CLOSE <5IN.	GRAPHICAL LOG	LITHOLOGY SYMBOL	REMARKS	STRATIGRAPHIC DESCRIPTION
0											SP	Core hole reamed to 6-in to install 2-in PVC casing.	EOLIAN:
5												See log 611 for well construction log.	
▽10													
15													
20													
25													
30													
35													
40													
45													
50													

GROUNDWATER

	DEPTH	HOUR	DATE
▽	10.7	12:45	
▼		6-7-89	

JEG TAC TEAM

PROJECT MONUMENT SITE, AZ. UMTRA

JOB NO. MON01,

LOG OF CORE HOLE NO. 611C

DATE COMPL. 03/05/85

RIG TYPE 2.0-IN.SCHED.40 PVC

METHOD CORE/ ROTARY

CORE SIZE,IN. 6 -IN

GRID COORD. N / E N57811.0 E89017.5

SURFACE ELEV. FT. 4846.4

DEPTH IN FEET	SAMPLE	% CORE RECOVERY	ROCK QUALITY DESIGNATION	% MEDIA RECOVERY	FRACTURE NONE	FRACTURE ANGLE, DEG.	FRACTURE WIDE, >20 IN	FRACTURE MOD.5-20 IN	FRACTURE CLOSE <5IN.	GRAPHICAL LOG	LITHOLOGY SYMBOL	REMARKS	STRATIGRAPHIC DESCRIPTION
55													
60													
											SP		SHINARUMP MEM., CHINLE FM. SANDSTONE, fine to med, with conglomeritic layers, soft, with hematite and limonite stain, lt. grey to yellow to orange.
65	NO	100	71			3			X				
						3		X					
70						3			X				
						3		X					
75	NO	100	71			3			X				Note: Less altered in fractures, less weathered, becomes mod. soft.
						25			X				
80						20			X				
						10		X					
85	NO	100	79			20		X					Note: Uniform grain size fine to medium, no conglomeritic layers. Sericite mica on fracture planes. Becomes mod. hard from 85 feet.
						3		X					
90						3			X				Note: Occasional carbonaceous material, from 90 feet.
95	NO	83	66			3			X				
						X	X						
100											SP		SANDSTONE, coarse to fine, with pyrite, some coal, soft, greenish
						3			X		SC		

GROUNDWATER

	DEPTH	HOUR	DATE
▽	10.7	12:45	
▼		6-7-89	

JEG TAC TEAM

PROJECT MONUMENT SITE, AZ. UMTRA

JOB NO. MON01,

LOG OF CORE HOLE NO. 611C

DATE COMPL.	03/05/85
RIG TYPE	2.0-IN.SCHED.40 PVC
METHOD	CORE/ ROTARY
CORE SIZE,IN.	6 -IN
GRID COORD. N / E	N57811.0 E89017.5
SURFACE ELEV. FT.	4846.4

DEPTH IN FEET	SAMPLE	% CORE RECOVERY	ROCK QUALITY DESIGNATION	% MEDIA RECOVERY	FRACTURE NONE	FRACTURE ANGLE, DEG.	FRACTURE WIDE, >20 IN	FRACTURE MOD, 5-20 IN	FRACTURE CLOSE <5 IN.	GRAPHICAL LOG	LITHOLOGY SYMBOL	REMARKS	STRATIGRAPHIC DESCRIPTION
105	NQ	92	75			0		X			SP		grey. SANDSTONE, shaley (indicated by geophy. log). Note: core not recovered from this zone.
110	NQ	30	30			0			X		ML		SANDSTONE, with conglomeritic zones, pyrite common, slightly calcareous, lt. green to grey. Note: Basal portion of Shinarump Member at 108 ft. as evidenced by pebbly chert conglomerate, rounded.
115	NQ	50	41			3			X		CL		MOENKOPI FM.: SILTSTONE, greenish grey, very clayey, slightly calcareous, soft, greenish grey to 112, variable yellow grey to dark reddish brown.
120						3			X				CLAYSTONE, silty, with interbeds of siltstone, cross laminated, calcareous, mod. soft to mod. hard, dark reddish brown.
125	NQ	100	77								ML CL		Note: artesian flow encountered as claystone aquitard penetrated. SILTSTONE, clayey, with minor nonclayey lenses, reddish brown.
130											SP ML		SANDSTONE, very fine, lt. grey, with interbeds of reddish brown claystone; calcareous, mod. soft to mod hard.
						2	X						SILTSTONE, clayey, hard, mottled red-brown to lt. grey.
135	NQ	100	73								SP		SANDSTONE, fine to med. clayey, calcareous, pinkish brown to greenish grey. Occasional variable seams of reddish brown to bleached.
140	NQ	100	100			2	X						Note: Mottled at 143, hard.
145	NQ	100	91										Note: Becoming coarser from 145 ft., calcareous.
						30			X				
150									X				
155	NQ	100	100				X						

GROUNDWATER

	DEPTH	HOUR	DATE
▽	10.7	12:45	
▼		6-7-89	

JEG TAC TEAM

PROJECT MONUMENT SITE, AZ. UMTRA

JOB NO. MON01,

LOG OF CORE HOLE NO. 611C

DATE COMPL. 03/05/85

RIG TYPE 2.0-IN.SCHED.40 PVC

METHOD CORE/ ROTARY

CORE SIZE,IN. 6 -IN

GRID COORD. N / E N57811.0 E89017.5

SURFACE ELEV. FT. 4846.4

DEPTH IN FEET	SAMPLE	% CORE RECOVERY	ROCK QUALITY DESIGNATION	% MEDIA RECOVERY	FRACTURE NONE	FRACTURE ANGLE, DEG.	FRACTURE WIDE, ≥20 IN	FRACTURE MOD.,5-20 IN	FRACTURE CLOSE <5IN.	GRAPHICAL LOG	LITHOLOGY SYMBOL	REMARKS	STRATIGRAPHIC DESCRIPTION
											SP		DeCHELLY MEM.,CUTLER FM: SANDSTONE, fine, cross bedded, mod. soft, reddish brown.
160													
165	NO	100	100										
170							X						
175	NO	100	100										
180							X						
185							X						TD AT 185 FEET.

GROUNDWATER

DEPTH	HOUR	DATE
10.7	12:45	
	6-7-89	

JEG TAC TEAM

PROJECT MONUMENT [illegible]

JOB NO. MON01,

DATE COMPL.	03/05/85
RIG TYPE	2.0-IN.SCHED.40 PVC
METHOD	CORE/ ROTARY
CORE SIZE,IN.	6 -IN
GRID COORD. N / E	N56377.8 E88643.7
SURFACE ELEV. FT.	4860.8

DEPTH IN FEET	SAMPLE	% CORE RECOVERY	ROCK QUALITY DESIGNATION	% MEDIA RECOVERY	FRACTURE NONE	FRACTURE ANGLE, DEG.	FRACTURE WIDE,>20 IN	FRACTURE MOD.5-20 IN	FRACTURE CLOSE <5IN.	GRAPHICAL LOG	LITHOLOGY SYMBOL
105	NO	100	69			10		X			
											SP
110						10			X		CL
115	NO	99	84			10		X			SP
120						10	X				
125	NO	100	90			10		X			
130						20			X		
						65			X		
135	NO	40	0								
140											

REMARKS

STRATIGRAPHIC DESCRIPTION

CLAYSTONE, with minor interbeds of siltstone, dk. brown.
Note: One foot layer of sandstone at 100 feet.
Note: Closely space fractures at 103 feet.
Note: Thin seam of sandstone at 103 feet and at 104.5 ft..
MOENKOPI,Continued.

CLAYSTONE/SANDSTONE, interbedded, mottled dark brown and lt grey respectively.
Note: Intensly fractured at 110 to 111 feet.
Artesian flow from borehole, 1.6 gpm, during drilling.

SANDSTONE, fine to coarse, trace to little clay, calcareous, dk. brown to pinkish white.
Note: Color change to pale yellow at 120 ft.
Note: Color change to dark brown with varying amounts of clay/shale seams from 122 feet.
Note: Color change to reddish brown, clean, friable, calcareous from 125 feet.
DeCHELLY SANDSTONE MEM.,CUTLER FM.
(Probable contact)
SANDSTONE, fine to very fine, cross bedded, with limonite cementation, yellowish brown.
Note: Color change to tan.

TD AT 144.7 FEET.
Artesian flow at 2.0 gpm at completion of drilling.
Packer set at 130.3 feet had 5 gpm flowing through pipe.

GROUNDWATER

	DEPTH	HOUR	DATE
▽	0.0	FLOWING	12:00
▼	5.2	2-19-85	2-26-92

JEG TAC TEAM

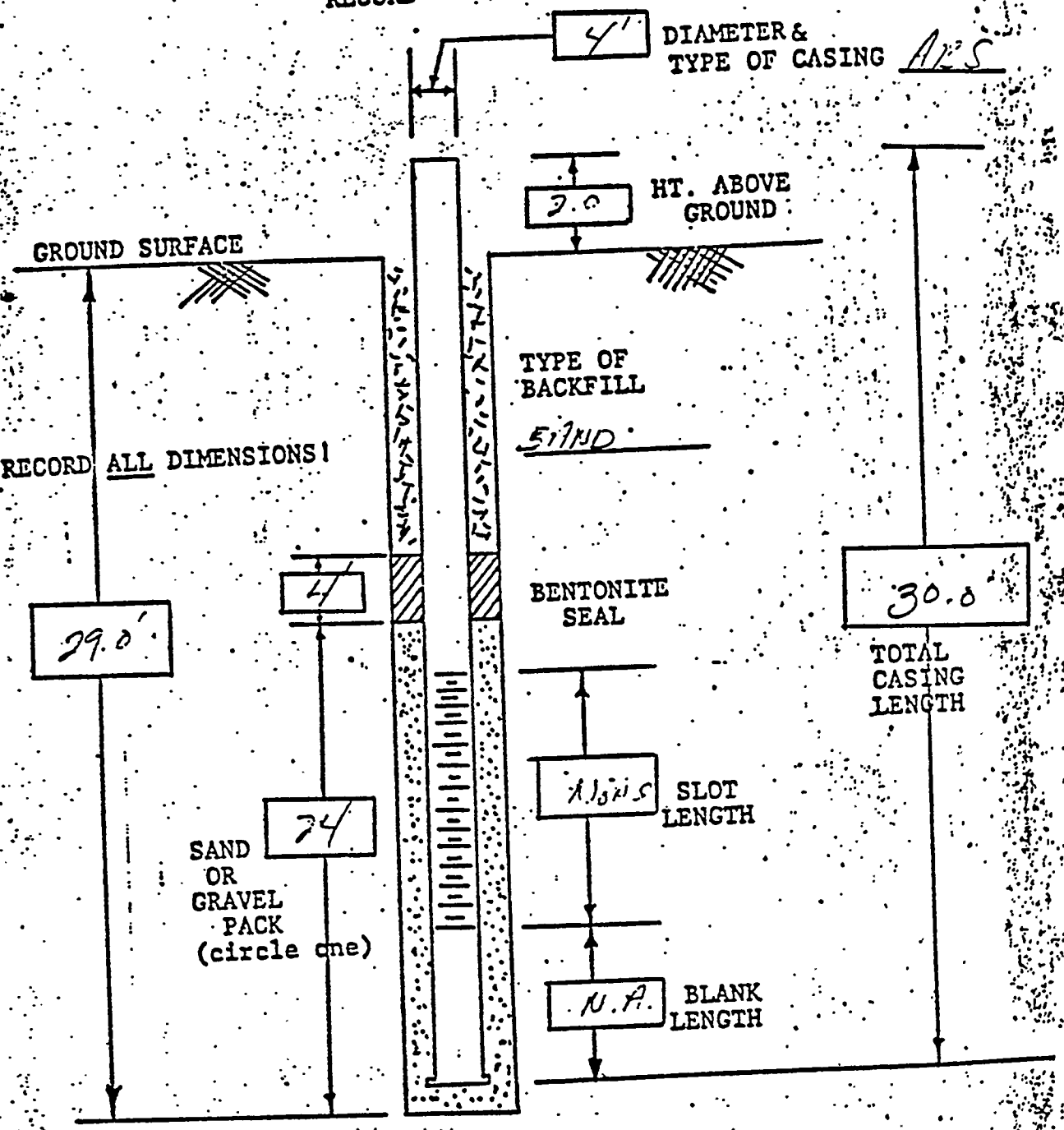
MSRD BORING LOGS

Mexican Hat Piezometer Data

Piezometer	Location	Hole Depth	Interface	Pipe Depth	Slot Length	Fill around Pipe
H2	Survey 55	28'6"	~24'	27'6"	—	Sand to 3', then bentonite
H3	Survey 12	60'	~54'	58'9"	10'	Sand to 3', then bentonite

The surface and subsurface materials around and under the pile were shale and hard sandstone which were difficult or impossible for the drilling equipment to penetrate. attempts to drill and to install piezometers off pile were unsuccessful and upon evaluation of the site conditions, deemed unnecessary.

PIEZOMETER OR WELL COMPLETION RECORD



WELL OR PIEZOMETER NUMBER HGC 2

SITE LOCATION MR. AN HWY

GROUNDWATER LOCATION NONE

COMMENTS:

DATE 4/23/92

JOB NO. EE-63K

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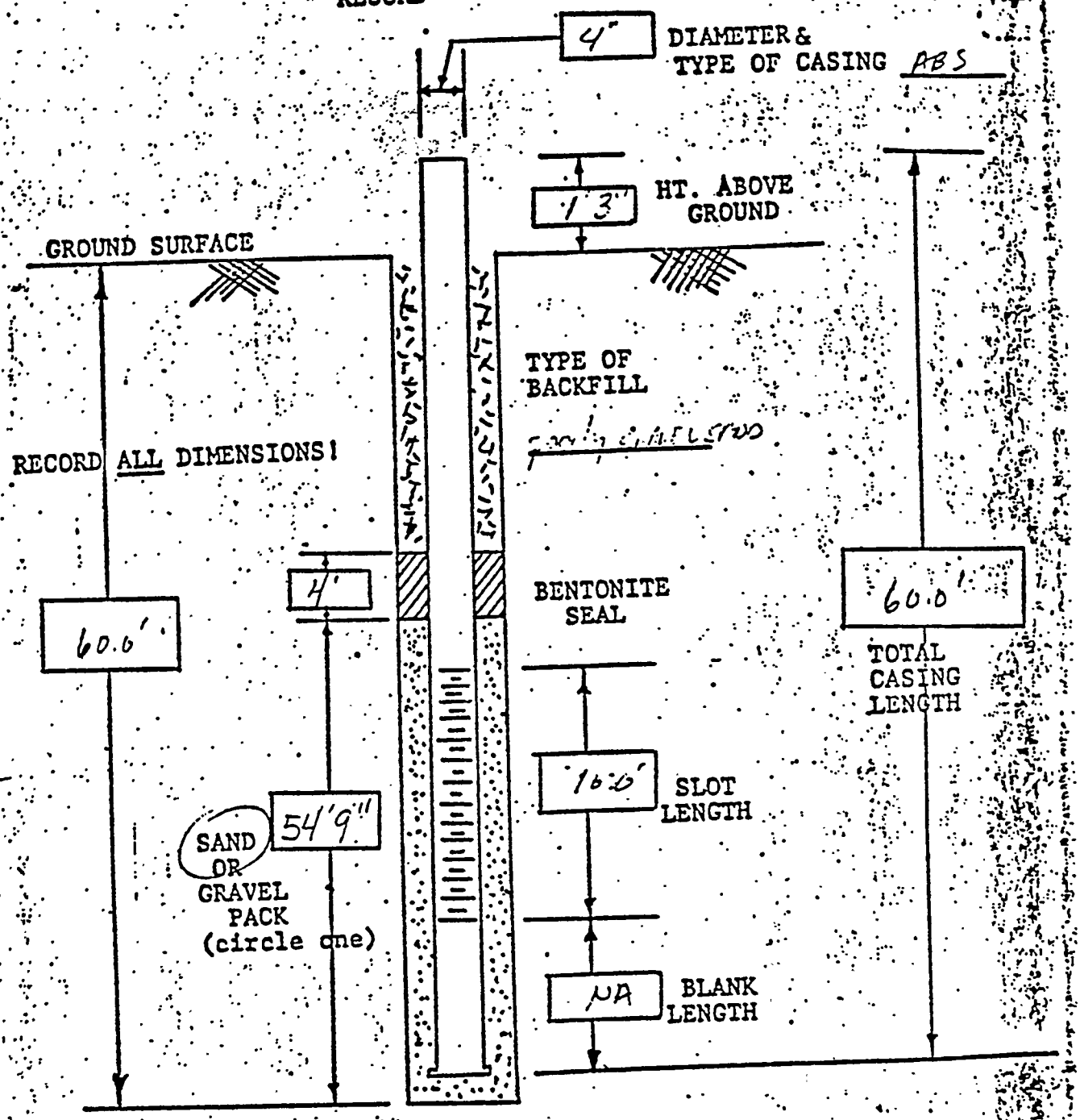
PIEZOMETER OR WELL COMPLETION RECORD



WELL OR PIEZOMETER NUMBER #6cc 3

SITE LOCATION Mexican Hat

GROUNDWATER LOCATION None

COMMENTS:

DATE 1/23/82

JOB NO. EB163C

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LOG OF TEST BORING NO. #4

PROJECT
JOB NO. DATE

RIG TYPE CME-55 #203
BORING TYPE 6" HSA
SURFACE ELEV.
DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									dry	brown silty SAND loose
5										Auger stopped @ 8 Pictometer rod refusal
10										

GROUND WATER

DEPTH	HOUR	DATE

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

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PROJECT

JOB NO. DATE

RIG TYPE Gmc 53 4x4 D.D.

BORING TYPE 6 1/4" C.F.

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
5									drlg. hrs.	bedrock Subbase rock
10										auger refusal @ 11.0' Piezometer hole - (No piez. set.)

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

S B

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/8/82

LOG OF TEST BORING NO. A-1

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		26"		U	6-9-8-9-14			ML	dry firm	Silt Weakly cemented NP
				U	12-44-50/1½"				hard	brown to red
5				S	50/1"					Auger stopped @ 5' Sampler refused @ 5'1"
10										
15										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 11/8/81

LOG OF TEST BORING NO. A-2

RIG TYPE CME 75 (206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								ML	dry	Silt (Native) some gravel some cobbles Lo PI red
		16"		U	3-15-46-54				dry	
5										Sandstone
10										Sampler refused @ 1'9"
15										Auger refused @ 3'
20										
25										
30										
35										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/8/82

LOG OF TEST BORING NO. A-3

RIG TYPE CME 55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			U		5-7-9-9-50/5"			ML	moist hard	Silt weakly cemented NP brown to red [Note: Sampler refused on sandstone]
5										
10										Auger stopped @ 2½' Sampler refused @ 2'5"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat Tailings

JOB NO. E31-123 DATE 11/8/82

LOG OF TEST BORING NO. A-4

RIG TYPE CME 75 (206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								ML	sl. moist	Sandy Silt (Native) trace clay LoPI red
			25"	U	9-7-12-21=19					
			10"		17-50/5"					
5										
										Sandstone
10										
15										Sampler refused @ 3'5" Auger refused @ 4'6"
20										
25										
30										
35										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/8/82

LOG OF TEST BORING NO. A-5

RIG TYPE CME 55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per. Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0					4-2-2-2-4			ML	moist soft hard	Silt weakly cemented NP tan to red refusal on bedrock
5					18-22-50/4"					Auger stopped @ 2½' Sampler refused @ 3'10"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/8/81

LOG OF TEST BORING NO. A-6

RIG TYPE CME-75 (206)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	sl. moist	Silty Sand
			22"	U	1-2-3-3-4					Lo PI
			20"	U	3-4-4-6-8					grey (Tailings)
5			20"	U	3-3-4-6-50/4"					(Subbase)
										Sandstone
10										Auger stopped @ 5'
										Sampler refused @ 7'4"
15										
20										
25										
30										

GROUND WATER

DEPTH	HOUR	DATE
None		

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/8/82

LOG OF TEST BORING NO. A-1

RIG TYPE CME 55 (203)

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			26"	U	5-7-8-7-5			SM	moist soft	Silty Sand Lo PI weakly cemented tan to red
			19"	U	5-3-3-2-4					
5			18"	U	3-2-1-1-1					
			18"	U	18-22-32-36-40					[Note: refusal on sandstone
10			4"	U	44-50/4"					Auger stopped @ 10' Sampler refused @ 10'
15										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Hexham Pit - Tailings

JOB NO. E81-63K DATE 1 R/82

LOG OF TEST BORING NO. 15

RIG TYPE CME 75 (2066) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist	Silty Sand trace clay NP grey [Note: some slime lenses @ 12'] (tailings) (subbase)
		23"	X	U	6-4-4-5-4					
		21"	X	U	1-3-4-6-6					
5										
		19"	X	U	3-4-4-5-6					
		19"	X	U	10-5-7-7-6					
10										
		20"	X	U	3-9-7-16-24					
		17"	X	U	17-37-50/2"					Sandstone some silt
15										Auger stopped @ 5' Sampler refusal @ 13'8"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/5/82

LOG OF TEST BORING NO. [illegible]

RIG TYPE CME 55 (203)

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2½'		T				SM	moist soft	Silty Sand some layered slimes Lo PI moderately cemented brown to tan to red [Note: cementation increases with depth]
		2½'		T						
5		2½'		T					hard	
		18"		T						
10										Auger stopped @ 5' Sampler refused @ 9'

GROUND WATER

DEPTH	HOUR	DATE
	-	

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. E81-631K DATE 1/8/82

LOG OF TEST BORING NO. A-10

RIG TYPE CME 75(2061)CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist	Silty Sand NP grey (tailings) (subbase)
		23"	X	U	2-3-3-4-T					
		19"	X	U	4-4-5-6-T					
5										Sandstone
		20"	X	U	10-9-T-29-[50/5"]					
10										Auger stopped @ 5' Sampler refused @ 7'5"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/8/82

LOG OF TEST BORING NO. A-11

RIG TYPE CME 55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									dry hard	Siltstone red
5										Auger refusal @ 5' no sampling

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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JOB NO. E81-103K DATE 1/9/81

LOG OF TEST BORING NO. B-12

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist	Silty Sand NP grey
			23"	U	1-1-4-3-4					
			19"	U	4-3-4-4-5					
5			20"	U	3-3-5-5-10					
			19"	U	8-9-9-11-13					
10			19"	U	3-3-4-5-10					
			19"	U	5-4-6-7-45					(Tailings)
15			4"	U	50/4"					(Sub-Base) Sandstone
20										Auger stopped @ 5' Sampler refused @ 15'4"

GROUND WATER

DEPTH	HOUR	DATE
None		

SAMPLE TYPE

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

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JOB NO. E81-631K DATE 1/8/82

LOG OF TEST BORING NO. A-13

RIG TYPE CME 55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			23"	U	1-1-3-2-1			SM	moist soft	Silty Sand Lo PI weakly cemented tan to red (Tailing Subbase
			26"	U	2-4-3-6-7					
5			6"	U	50/6"				hard	bedrock red
10										Auger stopped @ 5' Sampler refused @ 5'6"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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JOB NO. E81-62L DATE 11/8/82

LOG OF TEST BORING NO. B-14

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			25"	U	3-4-4-5-6			SM	moist	Silty Sand NP grey [Note: occasional thin slimey sand lenses below 3']
			20"	U	4-4-3-4-6					
5			19"	U	5-2-3-4-X					
			19"	U	4-5-4-7-10					
10			19"	U	7-6-7-9-10					
			19"	U	6-5-7-9-10					
15			19"	U	6-7-6-9-10					
			18"	U	7-12-X6-15-15					(tailings) (subbase) Weathered Sandstone
20			18"	U	11-9-11-15-11					
			19"	U	8-8-7-7-6					
25			16"	U	7-9-50/5"					Auger stopped @ 5' Sampler refused @ 26'5"
30										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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JOB NO. E81-63K DATE 1/8/82

LOG OF TEST BORING NO. B-15

RIG TYPE CME 55 (203)

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			26"	U	3-3-4-4-5			SM	moist soft	Silty Sand Lo PI weakly cemented tan to white to red [Note: slimes below 14']
			22"	U	5-7-9-7-7					
5			21"	U	19-24-30-10-9					
			18"	U	3-3-4-5-3					
10			18"	U	3-2-1-1-1					
			23"	U	2-1-1-1-1					
15			27"	U	1-1-1-3-5					(Tailings) (subbase)
			21"	U	15-24-35-24-50/5¾"				dry hard	bedrock red
20										Auger stopped @ 17½' Sampler refused @ 19' 11¾"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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JOB NO. 1-81-163K DATE 1/8/82

LOG OF TEST BORING NO. B-16

RIG TYPE CME 75 (200) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist	Silty Sand NP grey
		25"	X	U	2-3-11-11-13					
		19"	X	U	13-12-13-15-14					
5		19"	X	U	4-6-8-10-11					
		18"	X	U	3-4-5-6-8					
10		19"	X	U	6-5-6-8-9					
		19"	X	U	6-8-9-11-11					
15		19"	X	U	6-7-9-9-11					
		19"	X	U	7-7-9-11-14					
20		18"	X	U	6-8-9-10-11					
		19"	X	U	10-11-15-19-25					
25		15"	X	U	14-9-10-14-17					
		20"	X	U	11-11-11-15-13					
30		20"	X	U	7-7-7-9-10					(tailings) (sublocke)
		19"	X	U	7-22-22-22-50/5"				v. moist	Weathered Sandstone
35		10"	X	S	13-50/5"					Auger stopped @ 5' Sampler refused @ 35'11"
40										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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JOB NO. E81-63K DATE 1/8/82

LOG OF TEST BORING NO. B-17

RIG TYPE CME 55 (203)

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			23"	U	1-1-1-2-3			SM	moist soft	Silty Sand weakly cemented Lo PI tan to brown to yellow
			21"	U	5-4-2-3-2					
5			21"	U	1-5-3-3-6					
			18"	U	3-2-2-4-5					
10			18"	U	3-3-2-2-2					
			15"	U	1-1-1-2-4					
15			18"	U	4-4-2-2-1					
			21"	U	1-1-1-2-1					
20			26"	U	1-1-2-10-22					(Tailings) (subbase)
			16"	U	21-26-50/5"				dry hard	Bedrock red
25										Auger stopped @ 5' Sampler refused @ 23'11"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

T – 3" O.D. thin-walled Shelby tube.

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JOB NO. E81-63K DATE 11/8/82

LOG OF TEST BORING NO. B-18

RIG TYPE CME 75 (2066) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM		Silty Sand
		26"		U	5-5-6-11-17					NP
		21"		U	9-8-9-8-10					grey
5		19"		U	2-3-4-6-7					
		20"		U	5-6-6-6-9					
10		19"		U	5-6-8-7-7					
		19"		U	4-5-6-7-10					
15		19"		U	5-6-6-7-9					
		19"		U	7-7-7-9-10					
20		18"		U	4-9-22-50/4½"					(Tailings)
		NR		S	50/1"					(Sabkha)
										Weathered Sandstone
25										
										Auger stopped @ 5'
30										Sampler refusal @ 22'7"
35										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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JOB NO. E81-63-K DATE 1/8/82

LOG OF TEST BORING NO. B-19

RIG TYPE CME 55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows Per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		19"		U	7-2-3-4-6			SM		Silty Sand
		20"		U	6-2-2-4-5					Lo PI
5		21"		U	6-8-10-11-13					weakly cemented
		18"		U	4-5-5-5-5					brown to yellow
10		21"		U	3-5-6-6-9					
		20"		U	7-8-9-10-8					
15		18"		U	6-7-1-6-6				v. moist	
		24"		U	5-4-4-4-5					
20		21"		U	5-6-6-5-6				mod. firm	
		20"		U	4-5-4-6-13?					(tailing (subbase)
25		NR		U	50/2"					Bedrock red

Auger stopped @ 5'

Sampler refused @ 25'2"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

T – 3" O.D. thin-walled Shelby tube.

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JOB NO. 541-623K DATE 1/8/82

LOG OF TEST BORING NO. B-20

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			S-1	S	50/5"					Sandstone (Native)
5										Auger refused @ 2' Sampler refused @ 5"
10										
15										
20										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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JOB NO. E81-63K DATE 1/8/82

LOG OF TEST BORING NO. B-21

RIG TYPE CME 55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist soft	Silty Sand
			22"	U	1-2-3-4-3					Lo PI
			21"	U	3-2-[illegible]-2-2				mod.	weakly cemented
5									firm	tan to yellow to white
			18"	U	6-14-8-3-2					
			18"	U	5-4-5-5-4					
10			20"	U	4-5-5-5-4					(tailings)
				U	29-50/4½"					(subbase)
									hard	Bedrock red
15										

Auger stopped @ 5'

Sampler refusal @ 13'4½'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

T – 3" O.D. thin-walled Shelby tube.

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JOB NO. E81-63K DATE 1/9/81

LOG OF TEST BORING NO. B-22

RIG TYPE CME 75 (206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								ML	moist	Silt Lo PI grey
		25"	X	U	1-2-1-2-3					
		19"	X	U	1-2-2-3-4					
5			X							
		18"	X	U	7-9-7-6-7			SM	moist	Silty Sand NP grey
		19"	X	U	3-4-4-6-9					
10			X							
		18"	X	U	6-6-6-8-10					
		19"	X	U	8-6-7-9-8					
15			X							
		19"	X	U	5-8-45-50/2"					(tails)
		NR	S		50/1½"					(subbase) Weathered Sandstone
20										
										Auger stopped @ 5' Sampler refused @ 17'6½"
25										
30										
35										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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JOB NO. E81-63K DATE 1/8/82

LOG OF TEST BORING NO.

RIG TYPE CME 55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								Sm	moist soft	Silty Sand
			23"	U	1-1-1-4-5					Lo PI
			28	U	3-4-4-3-2					weakly cemented
5			18"	U	6-5-4-7-6					tan to yellow to white
			20"	U	4-3-3-3-2					
10			20"	U	3-2-1-1-1					
			18"	U	1-2-2-1-2					
15			20"	U	1-2-2-1-1					(tailings)
			16"	U	15-42-45-50/5"				dry hard	(subbase)
20										Bedrock red
										Auger stopped @ 5'
										Sampler refused @ 19'5

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

T – 3" O.D. thin-walled Shelby tube.

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JOB NO. E81-63K DATE 1/9/81

LOG OF TEST BORING NO. B-24

RIG TYPE CME 75 (206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								ML	moist	Silt Lo PI grey [Note: some sand and clay lenses @ 10'-20'] (Tailings) (subbase) Sandstone Auger stopped @ 5' Sampler refused @ 28'2"
		20"	X	U	1-2-1-1-4					
		20"	X	U	3-2-2-2-3					
5		18"	X	U	5-7-8-8-8					
		19"	X	U	5-5-6-7-5					
10		18"	X	U	5-6-8-7-9		5			
		19"	X	U	8-10-12-12-11					
15		20"	X	U	10-12-11-8-10					
		19"	X	U	7-7-8-11-15					
20		19"	X	U	11-11-15-17-16					
		17"	X	U	8-6-11-9-10					
25		18"	X	U	6-6-6-5-6					
		5"	X	U	36-50/2"					
30										

GROUND WATER

DEPTH	HOUR	DATE
NCNE		

SAMPLE TYPE

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

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JOB NO. E81-63K DATE 1/9/82

RIG TYPE CME 55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM.	moist soft	Silty Sand weakly cemented Lo PI tan to white to yellow (tailings) (subbase)
		23"	X	U	1-1-1-3-4					
		16"	X	U	5-7-7-9-8					
5		20"	X	U	11-13-9-9-14					
		12"	X	U	13-29-50/4"					Bedrock red
10										Auger stopped @ 5' Sampler refused @ 8'10"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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JOB NO. E81-63K DATE 1/9/82

LOG OF TEST BORING NO. B-26

RIG TYPE CME 75 (206) CC

BORING TYPE 6½" HSA

SURFACE ELEV. -

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist	Silty Sand NP grey
		22"	X	U	3-3-2-3-4					
		19"	X	U	2-1-1-2-3					
5										
		18"	X	U	4-5-6-7-9					
		20"	X	U	5-5-5-7-8					
10										
		19"	X	U	7-8-7-9-10					
		19"	X	U	9-9-8-7-10					
15										
		19"	X	U	7-7-7-8-7					
		20"	X	U	7-9-13-12-13					
20										
		20"	X	U	10-12-13-21-24					
		19"	X	U	14-15-16-19-16					
25										
		19"	X	U	5-6-9-9-9					
		19"	X	U	5-13-14-16-14					
30										(tailings) (subbase) Sandstone
		7"	X	U	5-6-6-9-10					
		19"	X	U	5-8-19-50/3"					
35										Auger stopped @ 5' Sampler refusal @ 34'3"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. ES1-635 DATE 1/9/82

LOG OF TEST BORING NO. A-2

RIG TYPE CME 55 (203)

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									dry hand	Bedrock red (from surface)
5										Auger stopped @ 5'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. ES1-63K DATE 1/9/82

LOG OF TEST BORING NO. B-28

RIG TYPE CME 55 (203)

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist soft	Silty Sand weakly cemented. Lo PI tan to white to yellow (tailings) (subbase)
		20"	X	U	1-2-2-4-5					
		20"	X	U	6-8-7-8-8					
5		18"	X	U	3-6-2-3-1					
		20"	X	U	1-2-1-1-2					
10		18"	X	U	2-2-1-2-1					
		12"	X	U	4-39-50/3½"					Bedrock red
15										Auger stopped @ 5' Sampler refusal @ 13'9½"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT Mesa Flat

JOB NO. EBI-63K DATE 1082

LOG OF TEST BORING NO. A29

RIG TYPE CME-55 (F203)

BORING TYPE 4¼" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		-24		U	1-1-1-2-3				loose moist	SILTY, SAND Low P.I. with cement and TAN to white to yellow
		20		U	2-2-3-3-4					
5		15		U	5-8-7-8-7				med. firm	(TAILINGS) (SUBBASE)
		19		U	6-10-12-12-10				dry hard	bedrock red
10				U	50/4"					Auger stopped @ 5.0' sampler refusal @ 10'4"
15										
20										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT [illegible]

JOB NO. EBL-63K DATE [illegible]

LOG OF TEST BORING NO. B30

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot #140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		23		U	1-2-3-2-4			SM	moist soft	SILTY SAND, wkly cemented, Low PI, TAN to yellow to white
		18		U	2-2-2-3-4					
5		19		U	4-4-4-3-4					
		20		U	10-6-8-8-9					
10		19		U	6-8-9-9-9					
		18		U	5-10-10-9-8					
15		20		U	9-8-8-5-6					Note: some thin slime lenses encountered throughout depth
		24		U	4-4-4-5-6					
20		20		U	8-8-9-11-12					
		19		U	8-9-10-12-11				firm	
25		19		U	5-8-6-9-14					
		20		U	5-10-13-13-11					
30		12		U	13-44-50/5				dry hard	bedrock (TAILINGS) (SUBBASE) rod
										Auger Refusal @ 30.9' Sampler 2" Refusal @ 31'5"
35										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT Mexican Hat

JOB NO. E81-63K DATE 1 6.82

LOG OF TEST BORING NO. B31

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2½'	X	T				SM	moist	SAND silty, fine. Low plastic. Locally cemented. Hues white to yellow
		2½	X	T						
5		2½'	X	T						
		2½'	X	T						
10		2½	X	T						
		2½	X	T						
15		2½	X	T						
		2½	X	T						
20		2½	X	T						
		2½	X	T						
25		29"	X	T						(TAILINGS) (SUBBASE) bedrock
		(DC)	X	50/½"					tiny hard	ref
30										Auger refusal @ 5.0' Completion @ 27'6"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. 81-67K DATE 1/9/87

LOG OF TEST BORING NO. B32

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		26"	X	U	1-4-5-6-6			SM	moist	Silty Sand some clay NP grey
		17"	X	U	4-4-5-5-6					
5		20"	X	U	3-3-3-5-6					
		17"	X	U	5-5-6-7-13					
10		19"	X	U	7-8-10-10-11					
		20"	X	U	7-8-8-13-13					
15		19"	X	U	13-11-13-14-16					
		19"	X	U	13-9-12-16-21					
20		19"	X	U	12-10-12-16-20					
		18"	X	U	12-13-23-24-26					
25		20"	X	U	9-13-13-17-18					
		19"	X	U	9-8-14-16-17					
30		19"	X	U	11-8-7-11-13					
		19"	X	U	9-9-10-12-16					tailings subbase Sandstone
35		20"	X	U	12-14-16-20-24					
		4"	X	U	[50/4"]					
40										Auger stopped @ 5' Sampler refused @ 37'10"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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PROJECT Mexican HAT

JOB NO. E81-63K DATE 1/9/82

LOG OF TEST BORING NO. B33

RIG TYPE CME-55 #203

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									moist soft	SILTY SAND
		16		U	1-2-3-4-3			SM		Low PI.
		20			3-3-4-6-4					wk's cemented
5										tan to yellow to white
		20			4-3-4-5-4-5					
		20"		U	3-3-5-6-6					
10										
		20		U	6-4-6-6-7					
		18		U	4-5-6-6-7					
15										
		21		U	4-5-5-6-7				mod firm	TAILINGS SUBBASE
				U	1-2-5-5-7					
		13		U	18-33-50/5"				dry hard	bedrock red
20										
										Auger stopped @ 5' sampler refusal @ 21'5"
25										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/9/81

LOG OF TEST BORING NO. B34

RIG TYPE CME 75(206)CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								NSM		Silty Sand
		20"	X	U	5-7-12-10-6				moist	NP
		9"	X	U	15-11-11-15-15					grey
5										
		19"	X	U	4-5-8-9-15					
		18"	X	U	6-7-6-9-10					
10										
		19"	X	U	5-4-7-7-6					
		18"	X	U	4-7-6-8-8					
15										
		9"	X	U	4-5-5-6-6					tailing
		18"	X	U	9-8-8-7-6					subbase
20										
		NR	X	U	6-7-8-7-8					Sandstone
		17"	X	U	7-8-5					
25										Auger stopped @ 5'
										Sampler refused 23'5"

GROUND WATER

DEPTH	HOUR	DATE
None		

SAMPLE TYPE

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

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PROJECT Mexican Hat

JOB NO. E81-63K DATE 7/9/82

LOG OF TEST BORING NO. B35

RIG TYPE CME-55 4x3

BORING TYPE 4½" CFA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2½'		T				Silt	moist	SILTY SAND wkly cemented Low PI tan to white to yellow
		2½'	X	T						
5		2½'		T						
		2½'		T						
10		2½'		T						
		2½		T						
15		2½		T						
		2½		T						
20		2'		T						
		24"		U	21-23-26-27-39				hard	
25		26"		U	17-13-7-7-8				mod firm	TAILINGS SUBBASE
		22"		U	7-5-6-7-8				hard	bedrock red
30		1.0		T					dry	Refusal @ 30.0' Groundwater @ 31'0"
35										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. 81-122K DATE 1/9/82

LOG OF TEST BORING NO. A36

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM		Silty Sand
		25"	X	U	1-9-11-44-117				moist	NP
		20"	X		7-8-9-9-12					grey
5		19"	X		8-7-9-7-10					
		19"	X		7-6-7-8-10					
10		20"	X		4-4-6-7-10					
		19"	X		8-7-8-8-10					
15		20"	X	U	4-4-5-7-8					
		20"	X	U	5-5-7-7-8					
20		18"	X	U	4-7-9-45-[50/3"]					tailings
										subbase
										Sandstone
25										sampler refusal @ 22'3"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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PROJECT Mex. HAT

JOB NO. EBI-63K DATE 1/9/82

LOG OF TEST BORING NO. A37

RIG TYPE CME-55 # 203

BORING TYPE 6¼" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2½						SM	moist soft	SILTY, SAND Low pl. wkly cemented tan to white to yellow
		2½		T						
5		2½								
		2½		T						
10		2½		T						HAZARDS Subbase bedrock red
		2.0		T						
15										Auger not used sampler refusal @ 14½'
20										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. E81-123K DATE 1/9/81

LOG OF TEST BORING NO. A38

RIG TYPE CME 75(206)CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM		Silty Sand
			20"	U	1-5-6-6-9				moist	NP
										grey
			21"	U	7-6-7-6-7					
5										tailings
			19"		11-7-9-8-9					subbase
			20"		5-5-4-5-50/2" T					Sandstone
10										Auger stopped @ 5'
										Sampler refused @ 14'9"
15										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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PROJECT Mexican Hat

JOB NO EB163K DATE 10-82

LOG OF TEST BORING NO. C39

RIG TYPE CME-55 #203

BORING TYPE 6¼" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		14	X	4	5-13-29-50/5"			SM	moist soft	silty, sand, loose, wkly cemented, tan
5										TAILINGS SAND base
										bedrock red
										sampler refusal @ 1'11"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat Tailings

JOB NO. F81-631K DATE 1/10/82

LOG OF TEST BORING NO. [illegible]

RIG TYPE CME 75 (206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			25"	A	5-2-3-3-2			SM	sl. moist	Silty Sand NP grey tailings
			20"	U	3-3-4-4-50/5"					
5										Sublease Sandstone
10										Auger stopped @ 5' Sampler refusal @ 4'9"
15										
20										

GROUND WATER

DEPTH	HOUR	DATE
None		

SAMPLE TYPE

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

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PROJECT Mavericks Hot

JOB NO. 89-3-K DATE 1-13-89

LOG OF TEST BORING NO. B-1

RIG TYPE CME-55 #203

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									moist soft	silty, SAND
		21"	X	U	3-3-2-2-2			SM		low PI.
										wkly cemented
		20	X	U	4-3-4-2-1					TAN to yellow to white
5										Note: slimes from 1' and deeper
		21	X	U	8-14-23-9-5					
									firm	TAILINGS
		26	X	U	4-5-5-8-13					
10										SUBBASE
		8	X	U	18-50/2"				hard	
										Auger stopped @ 5.0'
										sampler refusal @ 10'8"
15										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT Mexican Hat - Tailings

JOB NO. E81-63K DATE 1/10/81

LOG OF TEST BORING NO. [illegible]

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth, Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	sl. moist	Silty Sand
			25"	U	3-5-4-5-5					NP
			19"	U	4-4-6-6-6					grey.
5			19"	U	4-4-5-7-7					
			20"	U	5-5-5-7-8					
10			19"	U	5-7-10-50/5"					tailings
										subbase
										Sandstone
15										Sampler refused @ 11'11"

GROUND WATER

DEPTH	HOUR	DATE
None		

SAMPLE TYPE

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

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LOG OF TEST BORING NO.

PROJECT Mexican Hat
JOB NO. EB163K DATE 11/3/21

RIG TYPE CME-55 4x4
BORING TYPE 6 6" HSA
SURFACE ELEV.
DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist	silty, SAND
		16"		U	3-2-4-1					Low pl.
		20		U	2-1-1-1-1					Wk'y cemented
5		18		U	3-4-3-6-7					tan to yellows & white
		18		U	6-6-7-8-9					TAILINGS
10		13		U	5-8-9-11-17					SANDSTONE
		18		U	25-6"-50/4"				dry HARD	
15										Auger plugged @ 5.0'. Sampler refusal @ 14'10"

GROUND WATER

DEPTH	HOUR	DATE

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

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/10/82

LOG OF TEST BORING NO. C44

RIG TYPE CME 75(206)CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			26"	U	3-2-4-6-8			SM		Silty Sand NP gray
			20"	U	3-3-3-4-3					
5			19"	U	3-3-4-5-7					
			18"	U	4-5-6-7-12					
10			19"	U	4-5-7-10-11					
			18"	U	6-6-6-9-11					
15			20"	U	5-4-5-5-8					
			19"	U	7-7-8-12-10					
20			17"	U	7-5-6-11-33					tailings
			8"	U	40-50/2"					subbase Sandstone
25										Auger stopped @ 5' Sampler refused @ 23'2"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat

JOB NO. E81-63K DATE 1/10/82

LOG OF TEST BORING NO. C45

RIG TYPE CME-55 #203

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									moist soft	silty, SAND
		20	X	S	5-2-3-2-5			SM		Low p.T.
		20	X	S	3-4-3-5-7					wkly cemented
5										tan & yellow to white
		20	X	S	2-4-3-5-7					
		21		U	4-5-7-7-8					
10										
		21		S	4-4-8-8-7					
		18		U	6-6-7-7-10					
15										
		19	X	U	9-9-10-7-8					
										TARINGS
		20	X	S	5-6-5-6-7					Subbase
20										Bedrock
		26	X	U	6-5-7-6-11				dry -HPB	red
		(Ref)		U	50/3¼"					
										Auger stopped @ 5.0'
25										sample refusal @ 22'7¾

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/10/82

LOG OF TEST BORING NO. C46

RIG TYPE CME 75 (206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			24"	U	3-2-(3)-4			SM	moist	Silty Sand ND grey
			24"	U	5-6-7-10-7					
5			19"	U	4-3-5-5-7					
			18"	U	3-4-7-15-(50/3")					tailings subbase
10										Sandstone
										Auger stopped @ 5' Sampler refused @ 9'9"
15										

GROUND WATER

DEPTH	HOUR	DATE
DRY		

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

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PROJECT Mexican Hat

JOB NO. E81-63K DATE 1/16/81

LOG OF TEST BORING NO. C-7

RIG TYPE CME-55 #203

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		20	X	S	4-6-4-4-4			SM	MOIST SAND	SILTY SAND Loose dk gray cemented trace to yellowish white
		21	X	S	3-5-4-6-7					
5		20	X	S	3-2-1-3-2					
		22	X	U	4-5-4-6-7					
10		18	X	S	5-7-6-8-7					
		19	X	S	7-8-8-9-11					
15		20	X	S	9-11-13-16-9					
		19	X	S	10-9-9-9-11					
20		20	X	S	8-7-5-9-7					TAILINGS SUBBASE
		20	X	S	9-9-10-11-12					bedrock red
25		10	X	S	9-7-12-11-50/5¾"				dry HARD	
										Auger stopped @ 5.0' sampler refusal @ 27'5¾"
30										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

T – 3" O.D. thin-walled Shelby tube.

S B

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/10/82

LOG OF TEST BORING NO. C10

RIG TYPE CME 75 (206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			25"	U	4-3-3-4-5			SM		Silty Sand
			24"	U	4-3-5-7-12					NP
5			19"	U	5-4-4-6-9				moist	grey
			20"	U	5-4-5-6-9					
10			20"	U	5-5-8-7-10					
			20"	U	6-6-8-10-9					
15			19"	U	5-7-6-10-13					
			18"	U	8-7-10-12-17					
20			19"	U	11-11-12-15-15					
			20"	U	8-8-9-14-20					
25			25"	U	11-11-12-13-14					
			18"	U	9-10-12-19-22					
30			17"	U	12-10-10-12-13					
			18"	U	10-7-9-10-11					Tailings
35			NR	U	(0/5")					Subbase
										Sandstone
40										Auger stopped @ 5'
										Sampler refused @ 35'5"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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PROJECT Mexican Hat

JOB NO. E81-63K DATE 1/11/82

LOG OF TEST BORING NO. C49

RIG TYPE CME F-55 #203

BORING TYPE 10½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist soft	Si Hy SAND
		21		U	5-6-6-5-5					Low PIT.
										wkly cemented
		20		U	5-6-6-4-6					tan to white
5										
		18		U	3-2-2-3-3					
		19		U	5-6-7-5-16					
10										
		20		U	7-7-7-8-7					
		21		U	13-10-10-11-12					
15										
		19		U	12-11-12-11-10					
		20		U	12-14-11-13-15					
20										
		18		U	11-10-10-9-16					
		18		U	7-8-9-11-11					
25										
		13		U	10-11-9-10-11					
		20		U	13-17-14-15-19				v. firm	
30										TAILINGS
		24		U	9-10-11-12-9					subbase
										bedrock
		16		U	10-10-9-5/3"				dry HARD	red
35										sampler refusal @ 34'3"
										auger stopped @ 5.0'
40										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat Tailings — **LOG OF TEST BORING NO.** B-50

JOB NO. E81-63K DATE 1/10/82

RIG TYPE CME 75 (206) cc

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist	Silty Sand NP grey [Note: some slimes mixed w/sand below 5']
			21"	U	2-3-2-4-6					
			28"	U	2-4-6-6-7					
5			19"	U	4-4-3-2-7					
			19"	U	4-3-4-7-10					
10			20"	U	5-6-7-10-10					
			19"	U	8-9-12-14-14					
15			19"	U	8-8-8-12-12					
			20"	U	8-8-8-13-20					
20			19"	U	13-12-15-15-20					
			19"	U	9-11-13-16-19					
25			18"	U	12-12-15-17-18					
			19"	U	9-11-17-17-17					
30			19"	U	13-16-18-16-14					
			18"	U	9-15-14-14-17					
35			19"	U	8-8-14-12-14					
			19"	U	10-14-22-21-24					
40			20"	U	14-15-17-24-26					
			19"	U	15-16-21-21-20					
45			20"	U	16-17-16-25-27					
			20"	U	26-22-17-16-12					
50										

GROUND WATER

DEPTH	HOUR	DATE
50'	9:00 AM	1/11/81

SAMPLE TYPE

A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/10/82 - 1/11/82

LOG OF TEST BORING NO. B50

RIG TYPE CME 75 (206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
50			14"	U	7-10-14-14-15				wet	
			19"	U	12-14-12-31-50/5"					tailings subbase
55									dry hard	Sandstone
60										Sampler refused @ 54" 9"
65										
70										

GROUND WATER

DEPTH	HOUR	DATE
▼ 50'	9:00A	1/11/82

SAMPLE TYPE

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

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PROJECT Mexican Hat

JOB NO. 81-63K DATE 1/8/82

LOG OF TEST BORING NO. DS1

RIG TYPE CME-55 #203

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		22		D	3-4-3-4-5			SM	moist soft	silty, SAND
		18"	X	D	5-4-7-6-7					Low pl.
5		14"		D	2-3-4-4-4					with cemented
		18"		D	4-7-6-8-9					frag to white
10		18"		D	8-9-10-10-9					
		18		D	6-10-10-9-13					
15		18		D	8-9-9-9-10					
		23		D	7-9-11-10-19					
20		18"		D	8-13-14-17-21					
		18"		D	9-11-14-16-18					
25		14"	X	U	8-10-10-11-13					
		26"	X	U	12-11-10-12-14					
30		24"	X	U	11-12-13-14-15					
		21	X	U	4-6-7-8-9					
35		26"	X	U	3-5-7-9-11				firm	TAILINGS
		23	X	U	6-8-9-11-15					
40		22	X	U	25-35-43-42-50/5"				dry hard	bedrock
										real
										Auger stopped @ 35.0'
45										Sampling refusal @ 42'5"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

T – 3" O.D. thin-walled Shelby tube.

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/11/82

LOG OF TEST BORING NO. D52

RIG TYPE CME 75 (206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM		Silty Sand
			21"	U	2-3-4-4-5					NP
			19"	U	4-3-5-6-5					gray
5			20"	U	3-3-3-3-5					
			18"	U	4-5-8-9-10					
10			18"	U	8-9-9-10-12					
			19"	U	7-7-6-12-15					
15			19"	U	9-9-9-12-12					
			19"	U	6-6-8-11-13					
20			19"	U	11-10-12-16-15					
			19"	U	10-11-12-14-14					
25			19"	U	9-13-13-12-13					
			19"	U	10-14-18-20-19					
30			16"	U	8-13-24-19-19					
			19"	U	16-18-18-20-19					
35			19"	U	15-16-13-13-13					
			19"	U	16-15-15-16-19					
40			12"	U	20-32-50/3"					tailings
										Subbase
										Sandstone
45										Auger stopped @ 5'
										Sampler refused @ 41'3"

GROUND WATER

DEPTH	HOUR	DATE
None		

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat

JOB NO. E81-63K DATE 1/11/82

LOG OF TEST BORING NO. B53

RIG TYPE CME-55 #203

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									moist	silty, sand
		21			2-2-3-4-4			SM		wkly cemented
		22			5-2-4-4-3					Low pt.
5		18			7-6-6-5-4					tan + white
		19			5-3-5-5-8					
10		21			7-6-8-8-9					
		20			7-6-7-7-8					TAILINGS
15		20			6-9-9-9-11					SUBBASE
					25-50/5"				dry hard	bedrock red
20										Auger stopped @ 5.0' Sample refusal @ 18'5"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat Tailings

JOB NO. E81-503K DATE 1/11/82

LOG OF TEST BORING NO. [illegible]

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			23"	U	12-9-6-5-6			SM		Silty Sand NP red-grey [Note: slime layer @ 2'-8']
			21"	U	4-4-4-4-5					
5			19"	U	2-3-4-5-7					
			18"	U	10-13-13-13-12					
10			18"	U	8-9-13-12-13					
			19"	U	7-9-10-11-13					
15			18"	U	6-6-8-10-12					
			17"	U	6-8-13-16-18					
20			17"	U	13-12-14-14-15					
			19"	U	15-13-18-18-19					
25			19"	U	9-9-12-15-15					
			17"	U	10-11-13-13-14					
30			18"	U	8-9-11-11-18					
			18"	U	11-12-13-13-50/4"					tailings
35										subbase Sandstone
										Auger stopped @ 5' Sampler refused @ 34'10"
40										

GROUND WATER

DEPTH	HOUR	DATE
None		

SAMPLE TYPE

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

S B

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PROJECT Mexican Hat

JOB NO. EBI-63K DATE 1/11/82

LOG OF TEST BORING NO. B-3

RIG TYPE CME-55 #303

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
		24		U	2-3-3-3-3					
		20		U	3-4-4-6-8					
5		22		U	3-5-2-1-6					
		21		U	3-4-6-8-9					
10		21		U	6-5-6-8-11					
		22		U	5-4-6-7-8					
15		19		U	6-7-3-8-15					
		20		U	8-10-10-13-16					
20		20		U	10-16-11-16-19					
		18		U	9-10-11-10-9					
25		19		U	5-8-6-8-13					
		20		U	11-10-11-14-12					
30		20		U	9-8-9-11-13					
		6		U	28-50/6"					
35										

20+ moist

dry hard

SM, sand, low P.I., wk cemented, tan & white to yellow

TAILINGS SUBBASE

reddish

Auger stopped @ 5.0', sampler refusal @ 33'1½"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 11/11/81

LOG OF TEST BORING NO. 5B

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			23"	U	3-4-5-3-4			SM		Silty Sand NP grey [Note: red slime lens @ 5'-7'].
			19"	U	5-5-6-4-5					
5			19"	U	2-2-3-4-7					
			20"	U	6-6-7-6-7					
10			18"	U	6-6-6-8-9					
			19"	U	6-6-6-11-14					
15			18"	U	8-8-6-9-13					
			19"	U	8-7-11-14-13					
20			20"	U	6-8-13-14-16					
			19"	U	9-9-13-15-17					
25			20"	U	10-9-11-11-14					
			19"	U	9-10-11-13-50/5½"					tailings subbase Sandstone
30										Auger stopped @ 5' Sampler refused @ 29'11½"
35										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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PROJECT _____

JOB NO. 281-63K DATE 1/10/82

RIG TYPE CME-55 #203

BORING TYPE 6½" HSA

SURFACE ELEV. _____

DATUM _____

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
		26		U	2-3-6-3-4			SM		SILTY SAND
										loose
		22		U	3-4-5-4-2					wet, cemented
										tan to white to yellow
5										
		20		U	3-3-4-7-7					
		21		U	4-5-7-6-8					
10										
		23		U	6-5-7-9-12					
		22		U	6-5-6-8-7					
15										
		21		U	5-5-6-8-11					
		20		U	5-6-7-8-10					
20										
		21		U	6-8-7-14-19					
		20		U	11-5-10-9-16					TAILINGS
25		16		U	7-11-50/1½"				dry hard	SUBBASE bedrock red
										Auger stopped @ 5.0'
										sampler refusal @ 26'1½"
30										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/11/82

LOG OF TEST BORING NO. [illegible]

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

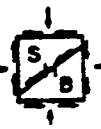
Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			22"	U	3-4-2-2-4			SM	moist	Silty Sand NP grey. [Note: red slime layer @ 5'-6']
			19"	U	3-5-3-5-5					
5			17"	U	4-6-6-7-10					
			18"	U	7-7-7-10-11					
10			12"	U	12-12-15-10-8					
			20"	U	8-10-13-13-14					
15			19"	U	9-12-11-12-14					
			18"	U	10-12-12-13-11					
20			6"	U	6-6-8-11-14					
			18"	U	33-24-11-50/4½"					tailings subbase
25										Sandstone
										Auger stopped @ 5' Sampler refused @ 24'4½"
30										

GROUND WATER

DEPTH	HOUR	DATE
NCNE		

SAMPLE TYPE

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



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PROJECT Mexican HAT

JOB NO. E81-63K DATE 1/12/82

LOG OF TEST BORING NO. D59

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		18			3-3-5-4-2			SM	moist Soft	silty SAND low PI with cemented TAN TO GRAY
		28			5-5-3-2-4					
5		21			5-3-2-4-2					
		19			4-6-5-7-8					
10		30			9-9-7-8-8					
		20			9-9-9-6-4					
15		16			8-8-11-12-12					
		21			9-9-7-11-10					
20		20			6-9-7-8-14					
		21			10-10-10-15-15					
25					10-10-11-14-16					
					8-9-43-50/4"				Dry KARO, bedrock, red	(TAILINGS) (SUBBASE)
30										Auger Stopped @ 5' SAMPLER REFUSED @ 29'4"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat Tailings

JOB NO. E91-63K DATE 1/11/91

LOG OF TEST BORING NO. C60

RIG TYPE CME 75 (206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								CH		Slimes
		21"	X	U	6-6-6-4-4				U. moist	hi PI
		20"	X	U	4-3-3-3-3					red
5										
		19"	X	U	2-2-2-5-7					
		20"	X		8-8-8-8-11					
10										
		19"	X		8-9-10-9-11					
								SM		Silty Sand
		18"	X		7-8-12-14-14					NP
15										
		19"	X		6-10-11-13-17					gry
		19"	X	U	12-10-11-16-17					
20										
		20"	X	U	6-6-9-12-13					
		21"	X	U	8-9-12-18-14					
25										
		19"	X	U	8-9-15-13-12					
		19"	X	U	7-9-11-24-[50/2"]					(TAILINGS)
										(SUBBASE)
30										Sandstone
35										Auger stopped @ 5'
										Sampler refusal @ 29'8"

GROUND WATER

DEPTH	HOUR	DATE
None		

SAMPLE TYPE

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

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PROJECT Marigold Lift

JOB NO. E81-63K DATE 1:12 pm

LOG OF TEST BORING NO. B61

RIG TYPE CME-55 (#203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		23		U	1-2-3-5-4			SP	moist / SOFT	Silty SAND Loose Slightly cemented TAN to grey
		20		U	6-5-6-7-5					
5		22		U	8-2-2-2-2					
		21		U	4-5-6-8-7					(TAILINGS) (SUBBASE)
10		20		U	7-7-8-11-25				dry / HARD	bedrock red
		(NR)		U	50(1")					Auger stopped @ 5.0' sampler refusal @ 12'7"
15										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat Tailings — LOG OF TEST BORING NO. EB2

JOB NO. EQ1-63K DATE 1/11/82

RIG TYPE CME 75 (206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								CH		Slimes
		23"	X	U	1-2-3-4-6					hi PI
		19"	X	U	4-4-3-4-4					red
5										
		20"	X	U	2-3-4-5-5			SM		
		18"	X	U	4-5-4-5-6					Silty Sand
10										NP
		17"	X	U	7-7-7-8-9					grey
		18"	X	U	11-11-11-10-N					
1/11 15										
1/12		19"	X	U	10-10-7-10-10					
		20"	X	U	8-10-11-12-14					
20										
		19"	X	U	12-11-11-13-20					
		20"	X	U	14-13-14-13-14					
25										
		19"	X	U	7-14-15-18-19					
		17"	X	U	13-13-14-14-15					
30										
		19"	X	U	11-13-13-15-13					
		18"	X	U	11-20-31-50/5"					(TAILINGS) (SUBBASE)
35										Sandstone
										Auger stopped @ 5'
										Sampler refusal @ 34'5"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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PROJECT Mexican Hat

JOB NO. EB1-63K DATE 1/12/82

LOG OF TEST BORING NO. D-63

RIG TYPE CME-55 4(203)

BORING TYPE 6 1/4" A-A

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SAC	moist soft	silty SAND
		23	1	U	7-3-2-1-1					low pf
			2							wkly cemented
		71	3	U	2-3-4 ~~5-8~~					tans to grey
5			4							
		20	5		4-4-5-8-10					
			6							
		21	7	U	5-4-6-6-6					
10			8							
		20	9	U	8-6-7-9-1					
			10							
		21	11	U	11-9-10-4-14					
15			12							
		18	13	U	11-10-11-12-13					
			14							(TAILINGS)
		20	15	U	9-11-14-13-15					(SUBBASE)
20			16							
		14	17	U	6-11-11-13-15					bedrock
			18						hard	red
			19		27-14-4½-50/1				dry	
25										Auger refusal @ 5.0'
										Sampler refusal @ 24'1"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 11/2/81

LOG OF TEST BORING NO. D64

RIG TYPE CME 75 (206) CC

BORING TYPE 10 1/2" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			25"	U	2-2-3-4-5			SM	moist	Silty Sand NP grey
			19"	U	3-3-2-4-6					
5			20"	U	4-4-4-6-7					
			19"	U	6-7-8-8-7					
10			18"	U	6-8-8-8-11					
			19"	U	7-6-7-9-9					
15			20"	U	7-8-8-13-13					
			19"	U	10-12-12-15-17					
20			20"	U	10-10-12-12-13					
			19"	U	13-13-15-19-17					
25			20"	U	12-11-12-14-18					
			19"	U	15-20-18-21-31					
30			19"	U	15-15-21-19-17					
			18"	U	14-19-21-20-25					
35			13"	U	28-16-16-15-16					
			19"	U	19-19-21-28-28					
40			17"	U	11-12-13-14-15					
			18"	U	21-21-24-26-24					(TAILINGS)
45			17"	U	16-18-42-(50-5")					(SUBBASE) Sandstone
										Auger stopped @ 45' Sampler refusal @ 46'11"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

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GEOTECHNICAL ENGINEERS

PROJECT Milltown Hill

JOB NO. EB1-63K DATE 1/12/82

LOG OF TEST BORING NO. C65

RIG TYPE CME-55 #(203)

BORING TYPE 6¼-16A

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									moist soft	SILTY SAND
		23		U	7-8-6-6-4			SM		LOW PI
		21		U	3-3-3-3-3					Wkly Cemented
5										TAN TO GRAY
		26		U	3-3-3-3-3					
		21		U	5-5-5-4-5					
10										
		26		U	4-4-4-6-7					
		17		U	6-7-5-7-5					
15										
		21		U	6-6-6-5/3					
		23		U	8-10-13-20-14					
20										
		24		U	8-10-10-11-11					
		22		U	9-9-9-8-10					
25										(TAILINGS)
		23		U	5-10-11-12-5					(SUBBASE)
		23		U	38-2"-40-49-50/5"					bedrock red
30										Auger refusal @ 5.0' sample refusal @ 29'11"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

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PROJECT: Mexican Hat Tailings

JOB NO. 681-62K DATE 1/12/82

LOG OF TEST BORING NO. D66

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM		Silty Sand
			25"	U	4-2-3-4-6					NP
			19"	U	3-4-5-5-5				moist	grey
5			20"	U	3-3-3-5-6					
			18"	U	4-5-4-7-6					
10			19"	U	4-6-5-9-10					
			19"	U	6-6-9-10-10					
15			15"	U	6-8-11-11-13					
			19"	U	9-8-10-11-15					
20			19"	U	9-10-12-14-16					
			18"	U	10-9-10-12-15					
25			19"	U	8-9-11-14-17					
			20"	U	12-12-14-16-19					
30			19"	U	10-10-13-18-21					
			20"	U	10-10-12-17-14					
25			19"	U	9-11-13-14-16					
			18"	U	15-22-15-19-16					
40			19"	U	15-15-18-14-11					
			19"	U	14-12-13-14-16					(TAILINGS)
45			17"	U	13-12-12-12-[50/3"]					(SUBBASE)
										Sandstone
										Sampler refusal @ 47'3"
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

S B

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PROJECT [illegible] -A-

JOB NO. EB1-63K DATE 1/12/19

LOG OF TEST BORING NO. C67

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		23	1	U	3-3-3-5-5			SM	moist	silty, SAND
			2							low pl
		19	3	U	2-2-3-4-3					wkly cemented
			4							tan to grey
5		21	5	U	3-5-4-2-2					
			6							
		26	7	U	6-6-6-6-6					
10			8							
		20	9	U	2-10-8-7-6					
		21	10	U	7-7-9-8-7					
15			11							
		20	12	U	6-7-9-11-11					
		19	13		8-6-7-5-10					(TAILINGS)
20										(SUBBASE)
		21	14	U	18-22-34-48-50/5½"				dry hard	bedrock red
										Auger stopped @ 5.0'
25										sample refusal @ 22'5½"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexico Hat Tailings

JOB NO. E81-63K DATE 1/12/82

LOG OF TEST BORING NO. D68

RIG TYPE CME 75(206)CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		26"		U	1-2-1-2-3			SM		Silty Sand
				U	15-16-50/5"					NP
										gray tailings subbase
5										Sandstone
10										Sampler refused @ 3'11"
15										
20										
25										
30										
35										
40										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT [illegible]

JOB NO. EBI-63K DATE 2 1972

LOG OF TEST BORING NO. C69

RIG TYPE CME-55 (203)

BORING TYPE 1¼" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		23"		U	1-1-1-2-3			SM	moist soft	silty, SAND low PI wkly cemented tan to gray
		23		U	3-2-3-5-7					
5		26		U	25-25-25-37-50				hard	SAND (TAILINGS) (SUBBASE)
										auger stopped @ 50' sample @ 7½'
10										
15										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT Mexican Hat Tailings

JOB NO. 81-63K DATE 11/12/82

LOG OF TEST BORING NO. D70

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			25"	U	1-1-2-3-4			SM		Silty Sand NP grey.
			19"	U	2-2-4-6-7					
5			20"	U	4-4-5-5-5					
			19"	U	5-5-5-5-5					
10			19"	U	7-7-5-6-7					(TAILINGS) (SUBBASE)
			19"	U	22-26-48-[50/2"]					Sandstone
15										Auger stopped @ 5' Sampler refused @ 14'2"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican

JOB NO. EB1-63K DATE 1/12/82

LOG OF TEST BORING NO. C71

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist soft	SILTY SAND loose with gravel tan to grey (TAILINGS)
		26	X	4	10-7-7-8-22					
		(NR)	X	U	25-50/5"				dry	
5									hard	bedrock red (SUBBASE)
										sample refusal @ 3'5"
10										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

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LOG OF TEST BORING NO. D72

PROJECT Mexican Hat Tailings
JOB NO. E81-63K DATE 1/12/82

RIG TYPE CME 75(206)CC
BORING TYPE 6½" HSA
SURFACE ELEV.
DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			X		4-16-50/3"			SM		Silty Sand NP grey (TAILINGS) (SUBBASE)
5										Sandstone
10										Sampler refusal @ 13'
15										
20										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.

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LOG OF TEST BORING NO. C13

PROJECT Mor. Hwy
JOB NO. E81-631K DATE 1/12/82

RIG TYPE CME-55 (203)
BORING TYPE 6¼" HSA
SURFACE ELEV.
DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			X		4 15-50/5			SM	moist soft	Silty, SAND low P.I. wk'ly cemented tan to red (TAILINGS) (SUBBASE)
5									hard	bedrock red
										sampler refusal @ .11"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE
A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
[illegible] 2" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/12/82

LOG OF TEST BORING NO. B74

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			18"	X	3-3-28-50/3"			SM		Silty Sand NP gray (TAILINGS) (SUBBASE) Sandstone
5									Sampler refused @ 1'9"	

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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PROJECT Mexican Hat

JOB NO. EB-631C DATE 1/12/82

LOG OF TEST BORING NO. C7

RIG TYPE CME-55 (203)

BORING TYPE 3 1/2" F.A.

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		24	X	U	3-4-5-3-3			SM	moist loose	SILTY SAND low PI wkly cemented tan to grey (TAILINGS)
			X	U	3-4-4-5-7					
5			X	U	14-24-50(1½")				dry hard	Bedrock red (SUBBASE)
										sampler refusal @ 6' 1½"
10										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/12/82

LOG OF TEST BORING NO. D76

RIG TYPE CME 75 (206) CT

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM		Silty Sand NP grey (TAILINGS)
			25"	S	3-3-3-3-5					
			19"	S	5-3-3-5-3					
5			19"	S	3-3-3-15-21					
			4"	U	50/5"					(SUBBASE) Sandstone
10										Sampler refusal @ 7'11"

GROUND WATER

DEPTH	HOUR	DATE
None		

SAMPLE TYPE

A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican HAT

JOB NO. EBL-63K DATE 11/12/92

LOG OF TEST BORING NO. [illegible]

RIG TYPE CME-55 (#203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist soft	silty SAND
		23	X	U	2-3-3-3-4					low pc
										wkly cemented
		17	X	U	2-3-3-4-5					tan to brn
5										
		21	X	U	4-4-5-5-6					
		17	X	U	4-5-4-5-5					
10										
		8	X	U	4-6-5-4-5					
			X	U	4-4-5-6-4					
										(TAILINGS)
15			X	U	14-12-17-17-50/5				dry hard	bedrock (SUBBASE)
										red
										Auger stopped @ 5.0'
20										sampler refusal @ 17.5'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 11/12/81

LOG OF TEST BORING NO. D78

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM		Silty Sand
			25"	U	1-2-2-1-3				moist	ND
			21"	U	8-8-4-4-6					gray
5			19"	U	4-4-4-4-4					
			19"	U	4-4-4-5-7					
10			18"	U	6-5-6-5-6					
			17"	U	6-7-7-8-8					
15			18"	U	9-8-6-5-6					(TAILINGS) (SUBBASE)
			17"	U	6-6-22-[50/1"]					Sandstone
20										Auger stopped @ 5' Sampler refused 19' 1"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Silver City RT — LOG OF TEST BORING NO.

JOB NO. 881-63K DATE 11/2/87

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist SOFT	SILTY, SAND low pl. with cemented fragments to gravel
		18"		U	4-1-1-2					
		26		U	2-2-4-6					
5		18		U	2-4-5-3					
		19		U	7-6-6-6					
10		18		U	7-1-5-7					
		20		U	6-7-7-6					
15		23		U	7-9-9-9					(TAILINGS) (SUBBASE)
				U	58-9-19-50/3½"				dry VERY HARD	bedrock reef
20										sampler rejected @ 19' 9½"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.
[illegible] – [illegible] Shelby tube.

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/12/82

LOG OF TEST BORING NO. B80

RIG TYPE CME 75 (206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			25"	U	2-2-4-4-5			SM	moist	Silty Clay NP gry
			19"	U	3-3-4-6-7					
5			18"	U	2-3-4-3-4					
			19"	U	3-5-5-5-9					
10			20"	U	4-5-6-5-5					
			19"	U	6-6-7-7-7					
15			19"	U	6-7-5-7-6					
			13"	C	14-(50/5")					(TAILINGS) (SUBBASE) Sandstone
20										Auger stopped @ 5' Sampler refused @ 18'5"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mohican Hat

JOB NO. EA1-63C DATE 11/9/82

LOG OF TEST BORING NO. 201

RIG TYPE CME-55 # 203

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									moist 50+	silty, sand
		20"	X	U	5-5-4-4		6	SM		Low pl
		20"	X	U	5-4-3-3-5					wthy cemented
5										tan to grey
		20"	X	U	2-3-6-6-5					
		20"	X	U	3-5-5-5-6					
10										
		18"	X	U	7-7-8-7-6					
		18	X	U	7-6-7-7-8					
15										
		23	X	U	8-7-7-7-7					
		21	X	U	7-8-7-5-8					
20										
		24	X	U	7-10-10-10-12				frm	
		28	X	U	10-9-10-10-8					TAILINGS
25		12	X	U	18-41-50/5"				dry hard	bedrock ref SUBBASE
										Auger stopped @ 5.6' sampler refusal @ 26'5"
30										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

Z – 3" O.D. thin-walled Shelby tube. N/A

S B

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/12/82

LOG OF TEST BORING NO. DB2

RIG TYPE CME 75 (206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM		Silty Sand
			23"		2-3-3-2-4				moist	NP
			19"		3-3-3-3-4					grey
5			19"		3-3-4-4-5					[Note: some slimes
			19"		5-5-6-4-7					@ 13'-20']
10			19"		[illegible]					
			20"		5-6-8-8-6					
15			18"		5-6-5-6-6					
			7"		4-5-6-6-6					
20			19"		5-6-6-19-26					(TAILINGS)
			2"		U/50/2"					(Subbase)
										Sandstone
25										Auger stopped @ 5'
										Sampler refused @ 22'8"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT mav. 4 **LOG OF TEST BORING NO.** CB5

JOB NO EB1-63K DATE 1.10.82

RIG TYPE OME-55 #203

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		20		U	1-1-3-4-5			SM	moist soft	silty, SAND Low plast. with cemented tan to grey
		21		U	4-4-4-4-4					
5		22		U	2-3-5-5-6					
		20		U	5-7-6-5-5					
10		18		U	5-5-5-6-6					
		23		U	6-7-6-7-6				mod firm	
15		22		U	5-7-7-7-6					
		23		U	5-6-7-6-8					
20		26		U	7-7-7-8-9					TAILINGS SUBBASE
		23		U	16-18-29-30-50/5				dry hard	bedrock red
25										Auger is refusal @ 25.0' sampler refusal @ 24'11"
30										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/19/82

LOG OF TEST BORING NO. B89

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist	Silty Sand NP gray [Note: intermittent thin slime lenses below 2']
				T	14"					
5				T	27"					
				T	20"					
				T	26"					
10				T	23"					
				T	22"					
15				T	17"					
				T	6"					
20				T	24"					
				T	23"					
25				T	24"					
				T	19"					
30				T	24"					
				T	25"					
35				T	26"					tailings subbase
				T	24"					Sandstone w/ interbedded Shale
40				N	22"					
				T	NR					
45				NX Core						Auger refusal @ 45' Sampler refused @ 50'
50				S	3" (50/3")					

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mobile Gas HP

JOB NO. E81-63K DATE 1/19/82

LOG OF TEST BORING NO. B85

RIG TYPE CME-55 #203

BORING TYPE 6¼" I.D. SA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		16	1	U	3-3-3-4-4			SM	moist soft	silty, SAND
			2							Low P.I.
		21	3	U	3-3-3-3-3					wkly cemented
			4							TAN to gray
5		18	5	U	1-2-2-3-16				firm	TAILINGS
			6							SLAG/ASH
		10	7	U	18-24-50/4"				dry hard	Bedrock red
10										Auger stopped @ 5.0'
										sampler refusal @ 8'10"
15										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

S B

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PROJECT Mexican Hat

JOB NO. E81-63K DATE 11/20/82

LOG OF TEST BORING NO. B86

RIG TYPE CME-55 #203

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									moist soft	silty, sandy
		21"	X	S	2-3-3-4-6			SM		Low P.I.
									mod firm	wkly cemented
		20"	X	S	4-3-4-4-7					white to tan
5										
		21"	X	S	4-4-6-6-6					
									firm	
		21"	X	S	3-5-5-8-9					
10										
		20	X	S	8-8-9-9-N					
		21"	X	S	7-8-11-12-13					
15										
		18"	X	S	8-10-10-15-16					
		20"	X	S	11-10-11-12-13					
20										
		29"	X	S	7-7-14-23-25				v. firm	
		21"	X	S	12-17-16-23-20					
25										
		16"	X	S	11-13-11-13-13					
		21"	X	S	12-17-18-19-20					
30										
		20	X	U	11-[illegible]-11-12				firm	
		10	X	U	5-6-8-7-7					
35										TAILINGS SUBBASE
		18	X	U	10-13-[illegible]-12-13					boring in red
									hard	
		16	X	U	9-11-17-30-50/5				dry	
40										Rough auger refusal @ 39'11"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT Mavis HA

JOB NO. E81-63K DATE 1/19/82

LOG OF TEST BORING NO. B-1

RIG TYPE CME-55 #203

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			1					SM	moist	SILTY, SAND
		20	X	S	3-4-3-4-5					low P.I.
			1							wk'g cemented
			X	S	4-4-5-5-4					TAN to white & grey
		21								
5										
		22	1	S	3-5-3-5-6					
		17	1	S	4-4-4-5-6					
10										
		23"	1	S	4-6-5-66					
		20	X	U	5-7-9-7-10				firm	
										TAN 12 IN 6.5
15										subbase
		10	X	S	16-33-50/3				dry HARD	bedrock
										red
20										
										Auger stopped @ 5½'
										sampler refusal @ 16'3"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mowry Pit

JOB NO. E81-63K DATE 1/19/82

LOG OF TEST BORING NO. B86

RIG TYPE CME-55 #203

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									moist	Silty, sandy
		21		U	1-1-5-5-6					low pl
									mod	with cemented
		20			5-5-5-5-8				firm	fine grey
5										
		22			5-6-9-9-9					
		21			5-6-7-10-9					
10									firm	
		20			7-9-8-12-15					
		21			9-6-9-11-8					
15										
		20		U	6-6-9-10-10					
		21		U	8-7-9-9-10					
20										
		20		U	9-10-11-10-13					
		23		U	11-11-12-13-18					
25										
		22		U	8-5-10-11-15					
		21		U	14-10-15-15-15					
30										TAILINGS subbase
		20		U	11-11-15-15-18					
		22		U	11-13-14-15-17					bedrock
35		9		U	14-50/5"				dry rapid	red
										Auger stopped @ 5.0'
										sampler refusal @ 35'11"
40										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Loop

JOB NO. E81-63K DATE 1/19/82

LOG OF TEST BORING NO. C89

RIG TYPE CME-55 #303

BORING TYPE 4¼" F.A.

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		20	X	U	3-4-5-6-4			SM	moist — SOFT	silty, SAND loose wkly cemented tan to grey
		16	X	U	3-4-6-4-4					
5		21	X	U	2-3-3-4-4					
		23	X	U	4-5-5-5-4				mod firm	
10		26	X	U	5-5-4-5-6					
		29	X		11-10-30-49-50/0				dry — HARD	bedrock red TAILINGS -SUBBASE
15										Auger stopped @ 5.0' sampler refusal @ 14'6"
20										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.

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LOG OF TEST BORING NO. C90

PROJECT Mesa AZ
JOB NO. EB1-63K DATE 1/19/82

RIG TYPE CM-55 #203
BORING TYPE 6½" HSA
SURFACE ELEV.
DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		23	1	S	5-6-6-7-7			SM	moist SOFT	SILTY, SAND Loose wk'y cemented 1 pc. to grav. TAILINGS SUBSTANCE
		20	3	U	5-6-7-7-7					
5		9	4	S	3-50/5½"				dry HARD	bedrock red
										Auger stopped @ 5'0" sampler refusal @ 5'11½"
10										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE
A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat

JOB NO. E81-63K DATE 11/19/82

LOG OF TEST BORING NO.

RIG TYPE CME-55 #203

BORING TYPE 6½" ISA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			1						moist	Silty sand (fill)
		21	2	S	4-6-7	12	16			Lean CL (decomposed) tan to grey.
			3							
		20	4	S	20-17	20	19	20		
5			5						mod firm	
		20	6	S	4-6	9	18	9		TAILINGS
			7							
		18	8	S	8-8	9	18	5/5	dry	hard bedrock red.
10			9							
										Auger stopped @ 5.5 sampler refusal @ 9'11"
15										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

T – 3" O.D. thin-walled Shelby tube.

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PROJECT Mexican Hat

JOB NO. E8163K DATE 1/19/82

LOG OF TEST BORING NO. D92

RIG TYPE CME-55 #203

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		22		U	1-2-3-5-7			SM	moist soft	SILTY ISAND LS chip I. wkly cemented tan to gray
		21		U	4-4-6-6-7					
5		20		U	2-3-7-8-9				mod. firm	
		21		U	4-4-5-7-8					~~FILLING~~ Subbase
10		19		U	10-11-14-06-50/½				dry - hard	bedrock red
15										Auger stopped @ 5.0' sampler refusal @ 12'½"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT Mexican Hat

JOB NO. E81-63K DATE 1/20/82

LOG OF TEST BORING NO. B93

RIG TYPE CME-55 #203

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									moist soft	SILTY SAND
		24		U	1-3-3-4-5			SM		Loose
		21"		U	3-5-7-9-8				mod firm	with cemented
5										hard to grey
		21"		U	3-3-4-5-6					
		20"		U	4-4-5-7-8					
10										
		21"		U	4-4-6-6-9					
		17"		U	6-6-6-7-8					
15										
		20"		U	11-8-8-11-12					
		20"		U	9-9-9-13-16				firm	
20										
		18"		U	7-9-12-13-15					
		18"		U	9-13-17-28-29				hard	
25										
		16		U	10-11-11-13-14					
		23		U	10-11-10-11-11				mod firm	
30										
		20		U	4-4-6-7-6					
		23		U	5-6-7-12-16					TAILING
35		5		U	50/5"				bedrock red	subbase
										Auger refusal @ 5.0'
40										sampler refusal @ 35'5½"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/20/82

LOG OF TEST BORING NO. C94

RIG TYPE CME 75(206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		24"		T				SM	moist	Silty Sand NP grey
		21"		T						
5		20"		T						
		23"		T						
10		23"		T						
		25"		T						tailings subbase
15				T						Sandstone
				NX Core						
20										
										Auger stopped @ 10' Sample refusal @ 15' NX core stopped @ 21'
25										
30										

GROUND WATER

DEPTH	HOUR	DATE
None		

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

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PROJECT Mexican Hat -

JOB NO. EEH-67K DATE 7/20/82

LOG OF TEST BORING NO. C-13

RIG TYPE CME-55 #203

BORING TYPE 6¼" RBA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist soft	silty, sand low pl. w/ ¼ cemented tan to grey
		2½	X	T						
		2½	X	T						
5		2½	X	T						
		2½	X	T						
10		2½	X	T						
		2½	X	T						
		2½	X	T						
15		2½	X	T						tailings subbase
		2½	X	T					dirt hard	bedrock red
20		DR			33/6"					Sampler refusal @ 20'3"
25										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/20/82

LOG OF TEST BORING NO. C95

RIG TYPE CME 75 (206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
5										
10										
15										
20										tailings subbase
25			NX Core							Sandstone
30										Auger stopped @ 20' NX coring @ 20'6" - 26' Hole sampled previously - re-augered for coring

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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PROJECT MEXICAN HAT

JOB NO. E81-63K DATE 1/20/82

LOG OF TEST BORING NO. C96

RIG TYPE CME-55 #203

BORING TYPE 4½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2½	X	T				SM	moist — loose	Silty, sand, loose, wkly cemented, tan to grey
		2½	X	T						
5		2½	X	T						
		2½	X	T						
10		2½	X	T					dry — HARD	bedrock — TAILINGS SUBSURFACE
		10	X	T						sampler refusal @ 13'6"
15										
20										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

T – 3" O.D. thin-walled Shelby tube.

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/22/82

LOG OF TEST BORING NO. C96

RIG TYPE CME 75(206) CC

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
5										
10										
15				NX Core						Sandstone
20										Auger stopped @ 14' NX core stopped @ 19'

GROUND WATER

DEPTH	HOUR	DATE
None		

SAMPLE TYPE

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

S B

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106

PROJECT Mexican Hat

JOB NO. E91-631C DATE 11/20/82

LOG OF TEST BORING NO. C97

RIG TYPE CME-55 (203)

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth in feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2 1/2'	X	T				SM	moist soft	silty, SAND Low PI wkly cemented tan to grey
		2 1/2'	X	T						
5		2 1/2'	X	T						(TAILINGS
										Samples stopped @ 7 1/2' (SUBBASE)
10										
15										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Morenci AF

JOB NO. 22-82K DATE 12-22-82

LOG OF TEST BORING NO. D4B

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2½		T				SM	moist soft	silty, SAND Low pl. wkly cemented tan to grey
		2½		T						
5		2½		T						
		2½		T						
10		2½		T						
		2½		T						
15		2½		T						
		2½		T						
20		2½		T						(TAILINGS) (SUBBASE)
		2½		T						sand rock road
									dry	
										No water encountered @ 25.0'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT _____ **LOG OF TEST BORING NO.** D99

JOB NO. K DATE 12

RIG TYPE CME-55 #203

BORING TYPE 6½" HSA

SURFACE ELEV. _____

DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									moist soft	SILTY, SAND low PI. brick fragments (TAILINGS)
		23"	1	S	2-3-5-5-8			-11		
		21"	2	S	4-4-5-5-5					
5										
		18"	3	S	2-3-2-2-3					
		20	4	S	2-3-3-4-7					
10										
		18	5	S	12-11-10-50/3"				dry hard	bedrock (SUBBASE) rock
15										Auger stopped @ 10' sampler refusal @ 11'9"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

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PROJECT [illegible]

JOB NO. [illegible] DATE 10-24-

LOG OF TEST BORING NO. D100

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		20"	X		1-2-2-3-4				mois- soft	silty sand low to [illegible] dk/g contained [illegible]
		24"	X		2-2-2-3-2					
5		25"		U	3-4-6-6-7				mod firm	
		22"		U	4-3-4-4-6					
10		21"		U	4-4-4-5-6					
		23"		U	5-4-4-6-7					
15		21"		U	5-4-4-4-7					
		21"			6-5-5-7-9					
20		21"	X	U	5-5-6-6-9					
		20"	X	U	6-6-7-7-11					
25		20"	X	U	7-6-7-9-11					
		20"		U	8-8-7-9-13					
30		21"		U	6-7-8-10-12					
		22"			8-10-10-12-13					
35		20"		U	8-9-9-12-15					
		21"	X	U	10-8-9-12-16				firm	
40		20"	X	U	12-5-7-10-10					(TAILINGS) (SUBBASE)
		21"		U	9-13-10-15-17					
45		12	X	T	14-50/2					Auger refusal @ 50' Drilling refusal @ 46'2"
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT _____ **LOG OF TEST BORING NO.** D101

JOB NO. [illegible]K DATE [illegible]

RIG TYPE CME-55 (203)

BORING TYPE 4½" HSA

SURFACE ELEV. _____

DATUM _____

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2½		1				SM	moist	SILTY SAND LOOSE WITH GRAVEL SAND TO GRAVEL
5		2½		T						
		2½		T						
		2½		—						
10		2½		—						
		2½		—						
15		2½		T						
		2½		T						
20		2½		T						
		2½		T						
25		2½		T						
		2½		T						
30		2½		T						
		2½		T						
35		2½		—						
		2½		—						
40		2½		T						
		2½		—						(TAILINGS) (SUB BASE)
45		2½		—						
		13								Auger stopped @ 50 Caving in ... level @ 48'11"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT [illegible] LF

JOB NO. EB1-631K DATE 2-22

LOG OF TEST BORING NO. D102

RIG TYPE CME-55 (203)

BORING TYPE 1 1/2" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	moist	silty, sm-
		23		U	1-4-4-6-7					Low pl
		23		U	3-3-4-5-6					wkly cemented
5										tan to grey
		24		U	3-3-3-3-4					
		26		U	4-4-4-4-6					
10										
		23		U	4-4-4-4-6					
		22		U	3-4-4-4-7				mod	
15										firm
		23		U	4-5-4-4-7					
		25		U	5-4-4-6-8					
20										
		24		U	5-5-5-7-10					
		22		U	6-6-7-8-10					firm
25										
		22		U	6-7-7-9-9					
		21		U	7-8-8-11-11					
30										
		23		U	8-7-8-11-11					
		24		U	7-8-9-11-13					
35										(TAILINGS)
		23		U	8-7-9-22-22					(SUBBASE)
										bedrock
										red
		20		U	17-17-16-35		20/2		hard dry	
40										Auger stopped @ 5.0'
										Sample refusal @ 39'8"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT [illegible]

JOB NO. EB1-63K DATE 1-2-82

LOG OF TEST BORING NO. B103

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
		78		U	1-4-4-7-7			SM	moist - dry	SILTY SAND
		24		U	5-4-5-4					large gr.
5		18		U	3-2-3-4-5				mod firm	wk'y cemented
		25		U	5-3-5-3-7					1/2" to 9" gravel
10		18		U	5-4-5-5-7					
		24		U	4-5-4-5-7					
15		10		U	6-6-7-6-7					
		23		U	6-7-6-6-7					
20		18		U	6-5 6-5-8					
		24		U	6-5-7-5-11					
25		18		U	8-8-7-14				firm	
		25		U	9-5-7-8-11					
30		18		U	9-5-7-11-13					
		24		U	9-6-9-12-20					(TAILINGS)
35		7 (NR)		U	13-9 16-9-10				moist	bedrock (SUBBASE)
				U	50/5"					
40										Auger stopped @ 5.0' sampler refusal @ 37'11"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT U.S. CPI

JOB NO. E81-63K DATE 2-22

LOG OF TEST BORING NO. D104

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		23	1	S	2-3-3-4			SM	moist soft	silty, SAND
		24	2	S	3-3-5-7					loose
5		25	3	S	3-2-4-6-4					wkly cemented
		22	4	S	5-4-5-6-8					tan to grey
10		23	5	S	4-5-4-7-8					
		24	6	S	6-5-5-6-8					
15		18	7	S	6-7-8-9-12					
		24	8	U	9-7-8-11-13					
20		23	9	U	7-8-7-14-14					
		23	10	U	10-9-10-13-14					
25		14	11	U	7-7-8-2-15					
		32	12	U	12-13-14-15-16					
30		24	13	U	9-7-12-2-3					
		21	14	S	7-12-17-19					
35		9	15	U	20-50/5				poorly graded red	(TAILINGS) (SUBBASE)

Auger stopped @ 5.0' & 35'11"
Sample lost from @ 35'11"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT [illegible] LOG OF TEST BORING NO. 103

JOB NO. 78-23K DATE 1-12-82

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		24	1	U	3-4-5-7-8			SM	moist mod firm	Silty sand loose to firm wkly cemented tan to grey
		22	2	U	5-3-3-8-8					
5		21	3	U	8-8-7-6-8					
		22	4	U	5-5-6-6-10				firm	
10		23	5	U	6-7-10-11-12					
		24	6	U	9-9-7-11-13					
15		18	7	U	10-9-8-12-14					
		18	8	U	13-14-13-14-14					
20		23	9	U	10-9-11-13-15					
		21	10	U	9-9-10-12-16					
25		21	11	U	7-9-12-13-18					
		20	12	U	15-13-13-13-15					
30		14	13	U	10-12-12-17-19					
		21	14	U	15-15-18-17-21					
35		20	15	U	10-14-16-18-20					
		21	16	U	12-12-14-15-23					
40		23	17	U	15-13-15-14-20					
		23	18	U	16-12-14-18-19					
45		21	19	U	11-10-11-18-21					
		23	20	U	10-17-12-18-22					
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT [illegible]

JOB NO. [illegible] DATE 1-23-74

LOG OF TEST BORING NO. D103

RIG TYPE CME-55 (203)

BORING TYPE 6¼" H.S.A.

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
50										
		21	X	U	16-15-16-22-23					(TAILINGS)
		16	X	U	16-15-16-23-5.0/3½"				dry	non-cohesive (SUBBASE)
55										Auger stopped @ 5.0' sampler refusal @ 54'9½"
60										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT [illegible]

JOB NO. 681-63K DATE [illegible]

LOG OF TEST BORING NO. 106

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

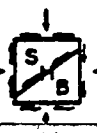
Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		7	X						dry hard	bedrock: red.
				4	17-50/3					
5										sampler refusal @ 11"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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



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PROJECT

JOB NO. E81-63K DATE

LOG OF TEST BORING NO. 107

RIG TYPE CME-55 (203)

BORING TYPE

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		17	X		4-14-34-47-50/4"				dry	bedrock (SUBBASE) red
5										sampler refusal @ 1'10"
10										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample
S – 2" O.D. 1.38" I.D. tube sample.
U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexicana Hat

JOB NO. E81-63k DATE 1/23/82

LOG OF TEST BORING NO. 108

RIG TYPE CME-55 (203)

BORING TYPE 6¼" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		13'			51-31	50/5"			dry hard	bedrock red
5										sample refusal @ 1'5"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT [illegible]

JOB NO. [illegible] DATE 11/23/22

LOG OF TEST BORING NO. 101

RIG TYPE CME-55 (203)

BORING TYPE 6¼" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									dry HARD	bedrock
		23	X	U	8-11-10-35-15					tied
		19	X	U	14-13-11-18-50/5"					
5										sampler refusal @ 4" 11"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT [illegible]

JOB NO. E81-63K DATE 1 [illegible]

LOG OF TEST BORING NO. 1

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									dry	bedrock subbase red
5										
10										auger refusal @ 11.0' piezometer hole (No piez. sand.)

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT

JOB NO. E81-63K DATE

LOG OF TEST BORING NO. 4

RIG TYPE OME-55 (203)

BORING TYPE 6" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									dry rig	bedrock (Sulbare) fractured
5										Auger stopped @ 8' piezometer not set.
10										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT [illegible]

JOB NO. [illegible] K DATE [illegible]

LOG OF TEST BORING NO. 200

RIG TYPE CME 55 (203)

BORING TYPE [illegible]

SURFACE ELEV.

DATUM

Depth in feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		1½'	X	T					dry hard	bedrock subbase red
5										Sample refusal @ 1'6"
10										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

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GEOTECHNICAL ENGINEERS

PROJECT Mexican Hat Tailings

JOB NO. E81-63.K DATE 1/24/82

LOG OF TEST BORING NO. 200

RIG TYPE CME 75 (20G)

BORING TYPE

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
5										Sandstone & Siltstone
10				NX Core						
15										
20										
25										Auger stopped @ 3' NX core stopped @ 23'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT N.D.V. CMD KMT

JOB NO. E81-63k DATE 11/23/82

LOG OF TEST BORING NO. 201

RIG TYPE CME-5- (203)

BORING TYPE 1 1/2" EST

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2½	X	T	50/0"				dry HARD	bedrock red
5										Sampler refusal @ 2½' auger refusal @ 4.0'
10										
15										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Navajo Rpt

JOB NO. E81-63K DATE 1 23 82

LOG OF TEST BORING NO. 202

RIG TYPE CME-55 #(203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2½	X	T				SM	moist soft	SILTY SAND low ρ = wkly cemented tan to grey
5		18	X	S	2-4-3					
10		18	X	S	3-3-3				v. moist	(Tailings) (subbase)
15		2.0	X	T					bedrock rec	hard dry
20		NR			50/6"					Auger lapped @ 19'6" sampler refusal @ 19'8"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT [illegible] FAT

JOB NO. EB-63K DATE 1/23/82

LOG OF TEST BORING NO. 203

RIG TYPE CME-55 #(203)

BORING TYPE 6" 1/2" + SP.

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		14	X	S	2-1-1			SM	moist soft	Silty, SAND low pl. w/ cemented tan to yellow
5		2.0'	X	T						
10		18"	X	S	2-3-3				V. moist	
15		18	X	S	3-3-2					
20		18"	X	S	4-5-6					
25		2.0'	X	T						
30		16"	X	S	14-17-48				wet very firm	bedrock rec (TAILINGS) (SUBBASE)
35					50/0"					Auger refusal @ 34'6" sampler refusal @ 34'6"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT [illegible]

JOB NO E8-63K DATE [illegible]

LOG OF TEST BORING NO. 204

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		14	1	S	1-2-2			SM	moist soft	silty, SAND Low PI. w/ clay content tan to grey
5		18	2	S	3-5-5				½ moist	
10		2½	3	T						
15		18"	4	S	4-4-4					
20		18"	5	S	5-7-8					
25		18	6	S	11-16-17					
30		2½"	7	T						
35		18"	8	S	5-6-8				moist	(TAILINGS) (SUBBASE) bedrock red
40		NR	9	S	50/1"					auger refusal @ 39'6" sampler refusal @ 39'7"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

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PROJECT Martin Life

JOB NO. E81-63K DATE 1-22-82

LOG OF TEST BORING NO. 205

RIG TYPE CME-55 (203)

BORING TYPE 6¼" HSA

SURFACE ELEV.

DATUM

Depth in feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2½	1	T				SM	moist Jar	Silty, SAND Low PI wkly cemented tan & gray (TAILINGS)
		2½	2	T					dry brkn	bedrock (SUBBASE) red.
5										Sample refusal @ 5.0'
10										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

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PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/23/82

LOG OF TEST BORING NO. 205

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
5										Siltstone some interbedded shales and sandstones
10				NX Core						
15										
20										
25										Auger stopped @ 5½' NX coring stopped @ 25½'
30										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

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PROJECT Silver Cliff

JOB NO. E81-63K DATE 2-2-81

LOG OF TEST BORING NO 206

RIG TYPE CME-55 (203)

BORING TYPE 6¼" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2½"	X	T				SM	moist SOFT	SILTY, SAND low p= silty cemented tan to grey.
5		11"	X	S	46-4					
10		10"	X	S	4-3-3					(TAILINGS)
										(SUBBASE) bedrock red
15		1½"	X	T					dry HARD	
										Auger stopped @ 14'6" sample refusal @ 16.0'
20										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

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PROJECT MAC (PH) APT

JOB NO. E81-63K DATE 1/22/81

LOG OF TEST BORING NO. 207

RIG TYPE CME-55 (203)

BORING TYPE 6¼" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		16	X	S	3-3-2			SM	moist soft	silty, SAND Low P.I. wkly cemented. tan to grey
5		21½"	X	T						
10		14	X	S	1-2-					
15		16	X	S	3-3-4					
20		12	X	S						(TAILINGS)
										(SUBBASE)
		NR.		S	50/4				dry HARD	bedrock red
25										Auger stopped @ 24'6" sample refusal @ 24'7"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

ALBUQUERQUE • SANTA FE • SALT LAKE CITY

PROJECT [illegible] HSP

JOB NO. E81-63K DATE 1/20/92

LOG OF TEST BORING NO. 208

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2½'		T				SM	moist soft	silty, SAND Low pl. wkly cemented tan to grey
		2½'		T						
5		2½'		T						
		2½'		T						
10		2½'		T						
		2½'		T						
15		2½'		T						
		2½'		T						
20		2½'		T						
		2½		T						(TAILINGS) (subbase)
25		2½		T						bedrock red
		2.0'		T					dry hard	
30										Sampler refusal @ 29½'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT Mexican Hat Tailings

JOB NO. E81-63K DATE 1/22/82 - 1/23/82

LOG OF TEST BORING NO. CSU 208

RIG TYPE CME 75(206) c-c

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
5										
10										
15										
20										
25										
30				NX Core						Siltstone some interbedded sands and mudstone
35										
40										
45										
50										Auger stopped @ 27' NX core stopped @ 47'

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

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JOB NO. E81-63K DATE 1-22-82

RIG TYPE CME-55 #203
BORING TYPE 6 1/2" HSA
SURFACE ELEV.
DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2 1/2	X	T				SM	SAMPLE	SILTY SAND -DRY TO SLIGHTLY MOIST -LIGHT BROWN -FINE GRAINED -NON PLASTIC (TAILINGS)
5		18	X	S	2-2-3					
10		20"	X	T						BEDROCK (SUBBASE) -HARD AUGER STOPPED @ 10.0' SAMPLER REFUSAL @ 12.0'
20										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS
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PROJECT [illegible] FF

JOB NO. E91-63K DATE 11/20/92

LOG OF TEST BORING NO. [illegible]

RIG TYPE CME-55 (203)

BORING TYPE 6½" HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		IR	X	C	2-1-3			SM	moist soft	silty, SAND Low pl. wkly cemented tan to white & grey (TAILINGS) (SUBBASE)
				S	50/0"				dry hard	bedrock red
5										Auger stopped @ 5'0" Sample refusal @ 2'6"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

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PROJECT [illegible]

JOB NO. E81-63K DATE [illegible]

LOG OF TEST BORING NO. 211

RIG TYPE CME-55 4(203)

BORING TYPE 1a½" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		18	X	S	2-2-2			SM	moist soft	silty, sand, little gravel, cuttings, tan to gray
5		18	X	S	3-4-4					
10		18		S	4-4-4					
15		18		S	3-3-3					
20		18		S	5-5-4				mod firm	
25		18		S	3-4-6					(TAILINGS) (SUBBASE) bedrock red
30		16		S	3-5-5/5"				dry hard	Auger stopped @ 29'6" sampler refusal @ 30'11"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A – Auger cuttings. B – Block sample

S – 2" O.D. 1.38" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

U – 3" O.D. 2.42" I.D. tube sample.

T – 3" O.D. thin-walled Shelby tube.

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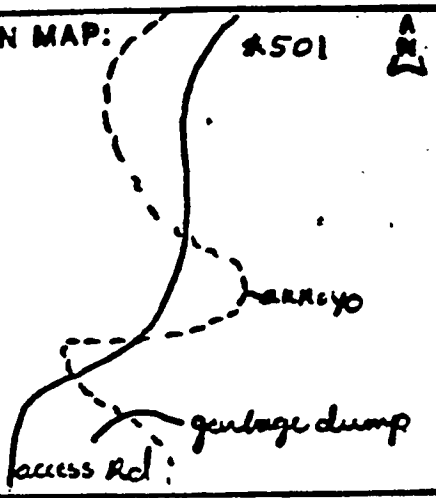
TEST PIT LOGS OF COVER BORROW AREA

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

TEST PIT LOG

Page 1 of 1

LOCATION MAP:



SITE ID: Hot-01 LOCATION ID: 501
APPROX. SITE COORDINATES (ft)
N _____ E _____
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 8/15/14
BACKHOE TYPE: Case 580
CONTRACTOR: Blaine Ent
FIELD REP: McKenzie
REHAB. DATE: _____

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION on east side of access road ~~≈~~ yds N-NE of garbage dump
SITE CONDITION Sage brush

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	X	L	001	~~SM~~ SP-SM	~~Silty~~ Sand, ~~trace~~ to ~~fine~~ fine, little or no clays, N.P. ~~to low plasticity~~, 5YR 5/8 reddish yellow
	X	B	002		
~~3.0~~	X	B	003	~~GW~~ GP	well graded gravel & Sand mixture, ~~some~~ silt, little or no clay, gravels up to ¾" max. N.P. ~~to low plas.~~ 5YR 6/8 reddish yellow
~~5.0~~	X	B	004	SM	Silty Sand, Trace silt, ~~trace~~ gravel, little or no clays, N.P. ~~to low~~ 5YR 6/8 reddish yellow Fi to V Fi
	X	B	005	GP	
	X	L	006	GW	
	X	B	007		
10.0					~~well graded~~ gravel & Sand ~~mix~~, ~~some~~ silt, little or no clay, gravels are increasing to max of 6", N.P. ~~to low~~, 5YR 6/4 light reddish brown
					stop digging backhoe extended

COMMENTS: L: large sample disturbed wpdo
smsm
B: Bag sample
Soils PED. Fi to V. Fi

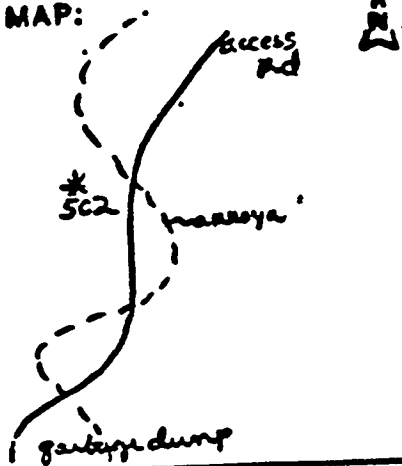
SAMPLE TYPE
~~B – Undisturbed Block Sample~~
D – Disturbed Bulk Sample

JEG-AL-ENG-7 (8/84)

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

TEST PIT LOG

LOCATION MAP:



SITE ID: H-T-01 LOCATION ID: SC2
APPROX. SITE COORDINATES (ft)
N _____ E _____
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 85/5/14
BACKHOLE TYPE: case
CONTRACTOR: Blake Ent
FIELD REP: McBryde
REHAB. DATE: _____

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION ~~on point bar~~ ≈ 400 yds N-NE of garbage dump
SITE CONDITION Sage brush

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	X	D	001	SP-SM	~~Silty~~-Sand, ~~fine to~~ F ~~silty~~, little non clay
	X	B	002		Some rootlets, N.P. ~~to loose~~, SP MST 7.5YR 6/8 reddish yellow
					TD 3" CS + 0 Fi TF
	X	B	003		
			OCYA		
7.0	X	L	CC4B	~~GW~~ GP	well graded gravel ~~to~~ sand ~~mix~~, ~~some~~ silt, little or no clay, N.P. ~~to loose~~, 5YR 6/8 reddish yellow
	X	B	005		
					stop digging backhoe extended

COMMENTS: SANDS PRED Fi to V Fi

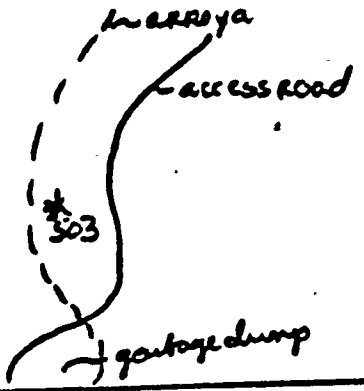
SAMPLE TYPE
B - ~~Undisturbed~~ Bag Sample
D - Disturbed Bulk Sample

JEG-AL-ENG-7 (8/84)

JE
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

TEST PIT LOG

LOCATION MAP:



SITE ID: Hat-21 LOCATION ID: 503
APPROX. SITE COORDINATES (ft)
N _____ E _____
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 85/5/15
BACKHOLE TYPE: case
CONTRACTOR: Black Estip
FIELD REP: McKenzie
REHAB. DATE: _____

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION 2 Sic cycle N-NW of garbage dump
SITE CONDITION Sagebrush

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
		D	001	* GM	~~Well graded~~ gravel ~~w/ Sand silty, predominately~~ Silty Sand, some silts, little or no clay
2		B	002	GP	gravels to 2½", 5YR 6/8 reddish yellow
		D	003		N.P. ~~Damp~~, SI Mst,
		B	004		gravels increasing to max of 4" also quantity of gravels increasing
8					~~gravels slightly decreasing to 2½".~~
		B	005	SP	stop digging backhoe extended

Sa, Fi to Cs, Gvly, Tr Slt, N.P., FINE
5YR 6/8, R-Yel

COMMENTS: SANDS RED Fi to V Fi
*SAMPLE 001 NOT SIEVED TO V. ROSES (All coarse)

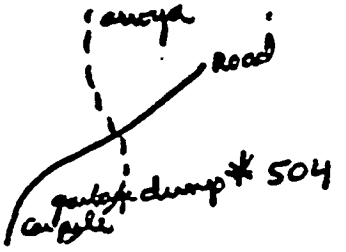
SAMPLE TYPE
B - ~~Undisturbed~~ Bag Sample
D - Disturbed Bulk Sample

JEG-AL-ENG-7 (8/84)

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

TEST PIT LOG

LOCATION MAP:



SITE ID: Hat-01 LOCATION ID: 504
APPROX. SITE COORDINATES (ft)
N _____ E _____
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 8/5/15
BACKHOLE TYPE: Case
CONTRACTOR: Blake Enterp
FIELD REP: McKinzie
REHAB. DATE: _____

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION ≈ 50yds East of wicked cow pole
SITE CONDITION Sagebrush

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	X	D	001	~~GM~~ SP	~~gravel~~, Sand, ~~silty~~ S1 moisture, med. F. sand
2	X	B	002		~~F~~ silt, none ~~non~~ plastic, little or no clay, N.P. to LP. 5YR6/8 reddish brown
		B	003	ML	~~Sandy~~ - silt, NP to LP, some fine sand, Trace clay ~~low plasticity~~ 2.5YR 6/8 light red Dry to S1 Mst
10.6	X	B	004		Stop digging backhoe extended

S1 Mst

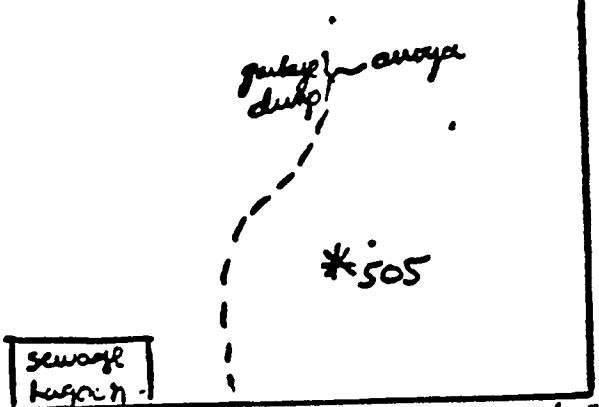
COMMENTS: SOILS PRED. FL to V FL

SAMPLE TYPE
B - ~~Bulk~~ Disturbed ~~Block~~ Grab Sample
D - Disturbed Bulk Sample

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

TEST PIT LOG

LOCATION MAP:



SITE ID: Hole #1 LOCATION ID: 505
APPROX. SITE COORDINATES (ft)
N E
GROUND ELEV. (FT. MSL)
DATE EXCAVATED: 8/15/15
BACKHOLE TYPE: case
CONTRACTOR: Black Enterprise
FIELD REP: M. Runyan
REHAB. DATE:

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION ≈ 100 yds NE of arroyo lagoon
SITE CONDITION Scrape bladed

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	X	D	001	~~GM~~ GP	~~+o 3" Cs to Fi~~ Gravel, Sand, Silt, ~~cmptime, some pebbles, grust, Sandstone~~, some rocklet, 5YR 6/8 reddish yellow, little or no clays N.P. ~~to low~~ ~~well graded gravel & sand cmptime, some well, little or no clay N.P. to low~~ ~~5YR 6/8 reddish yellow~~
	X	B	002		
20	X	B	003	~~GW~~	
	X	B	004		
	X	D	005		
100	X	B	006		Stop digging @ 10' large boulder from 10' down

COMMENTS: SANDS FRED Fi to V Fi

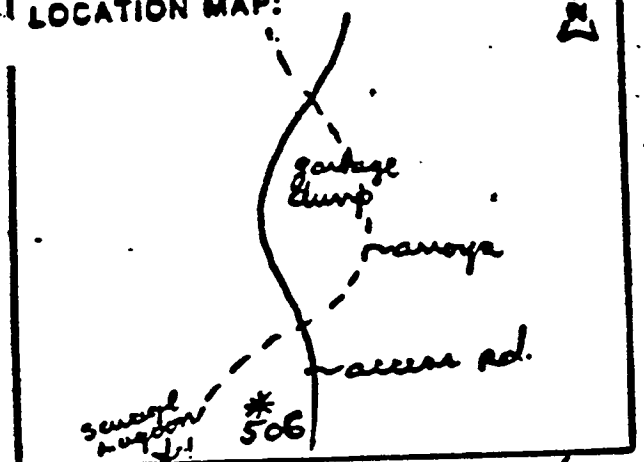
SAMPLE TYPE
B - ~~Undisturbed~~ Bag Sample
D - Disturbed Bulk Sample

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

TEST PIT LOG

Page 1 of 1

LOCATION MAP:



SITE ID: 7/21-21 LOCATION ID: 506
APPROX. SITE COORDINATES (ft)
N _____ E _____
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 85/5/15
BACKHOE TYPE: Case
CONTRACTOR: Blake Partigues
FIELD REP: M. Nagid
REHAB. DATE: _____

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION ≈1 acre S of garbage dump ≈200 yds N of
SITE CONDITION Sewage lagoon; Sagebrush

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	X	D	001	~~Sand~~ GP	Gravel; Sandy, Silt ~~sandy~~, some ~~gravel~~ fine to coarse sand, little or no clay, NP to ~~low~~ plasticity, ~~gravel~~ to 4" 5YR 6/8 reddish brown.
	X	B	002		
	X	B	003		note: quantity and size of gravels increasing silt decreasing ~~Sand~~
9	X	B	004		
9 1/2	X	B	005	ML	Sandy-Silt, ~~Silt~~ very fine sand, ~~some~~ clay, low Pl, dry to slightly moist 5YR 7/4 very pale brown
10					stop digging backhoe extended

COMMENTS: SANDS PRED F; TO V F

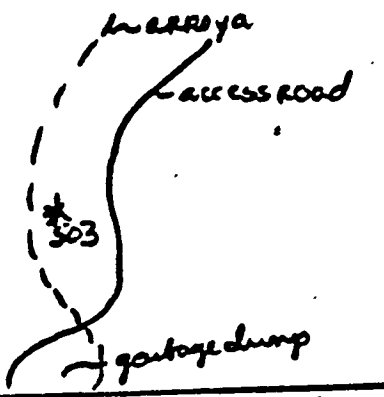
SAMPLE TYPE
B - ~~Undisturbed~~ Disturbed ~~Core~~ Bag Sample
D - Disturbed Bulk Sample

IEG-AL-ENG-7 (8/84)

JE
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

TEST PIT LOG

LOCATION MAP:



SITE ID: Hot-21 LOCATION ID: 503
APPROX. SITE COORDINATES (ft)
N _____ E _____
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 85/5/15
BACKHOLE TYPE: case
CONTRACTOR: Blake's Enterp
FIELD REP: McKenzie
REHAB. DATE: _____

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION: a bicycle N-NW of garbage dump
SITE CONDITION: sagebrush

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
		D	001 *	GM	~~Well graded gravel w/ Sand, silty, sandy~~ Cs ± Fi
		B	002	GP	~~Sand, some silts, little or no clay~~
2		D	003		gravels to 2½" 5YR 6/8 reddish yellow
		B	004		N.P. ~~Dry~~, SI Mst,
					gravels increasing to max of 4" also quantity of gravels increasing
8					~~gravels not increasing @ 2½"~~.
		B	005	SP	stop digging backhoe extended

Sa, Fi to Cs, Gvly, Tr Slt, N.P., FIM
5YR 6/8, R-Yel

COMMENTS: SANDS PRED Fi to V Fi
* SAMPLE 001 NOT SHIPPED TO V. ROSES
(111 contained)

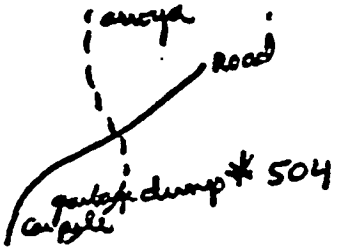
SAMPLE TYPE
B - ~~Undisturbed~~ Bag Sample
D - Disturbed Bulk Sample

JEG-AL-ENG-7 (8/84)

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

TEST PIT LOG

LOCATION MAP:



SITE ID: Hot-01 LOCATION ID: 504
APPROX. SITE COORDINATES (ft)
N _____ E _____
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 85/5/15
BACKHOLE TYPE: Case
CONTRACTOR: Blake Enting
FIELD REP: McKenzie
REHAB. DATE: _____

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION ≈ 50 yds East of unused car pile
SITE CONDITION Sagebrush

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	X	D	001	~~GM~~ SP	~~gravel~~, sand, ~~silty~~ moisture, med. F sand, ~~F sand~~, some rootlets, little or no clay, N.P. to L.P. 5YR6/8 reddish brown
2	X	B	002		Dry to SI Mst
				ML	
	X	B	003		~~Sandy~~ - silt, NP to LP, some fine sand, Trace clay low plasticity 2.5YR 6/8 light red
					Dry to SI Mst
10.6	X	B	004		Stop digging backhoe extended

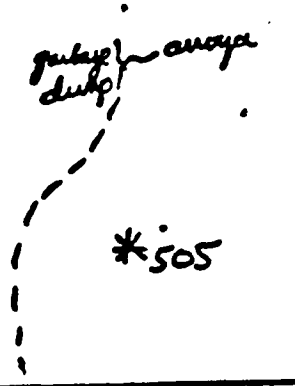
COMMENTS: SANDS PRED. FL TO V FL

SAMPLE TYPE
B - ~~Undisturbed~~ Disturbed ~~Block~~ Grab Sample
D - Disturbed Bulk Sample

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

TEST PIT LOG

LOCATION MAP:



SITE ID: Hot #1 LOCATION ID: 505
APPROX. SITE COORDINATES (ft)
N _____ E _____
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 85/5/15
BACKHOE TYPE: case
CONTRACTOR: Black Enterprise
FIELD REP: M. Runge
REHAB. DATE: _____

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION ≈ 100 yd NE of sewage lagoon
SITE CONDITION Scrape level

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, +o 3" Cs to Fi PLASTICITY, CONDITION, ETC.
	X	D	001	~~GM~~ GP	Gravel, Sand, Silt, ~~moisture, sand, gravel~~
	X	B	002	~~GP~~	~~Sand fract~~, some rootlet, 5YR 6/8 reddish yellow
~~20~~	X	B	003	~~GW~~	little or no clays N.P. ~~to low~~
	X	B	004		~~well graded gravel, sand moisture, some~~
	X	D	005		~~well, little or no clay P.I. to low~~ ~~5YR 6/8 reddish yellow~~
~~100~~	X	B	006		Stop digging @ 10' large boulder from 10' down

COMMENTS: SANDS FRED Fi to V Fi

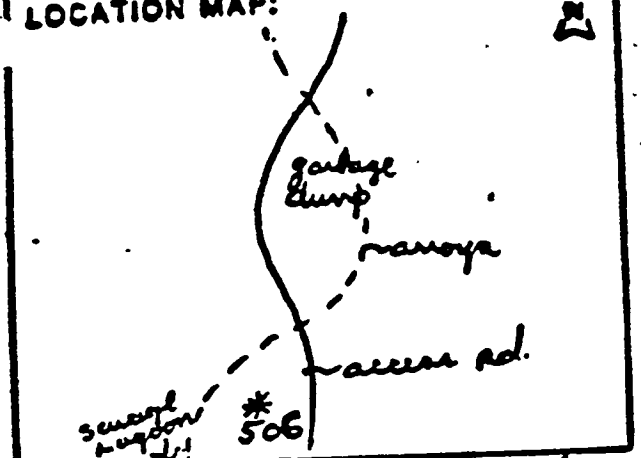
SAMPLE TYPE
B - ~~Undisturbed~~ Bag Sample
D - Disturbed Bulk Sample

IG-AL-ENG-7 (3/84)

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

TEST PIT LOG

LOCATION MAP:



SITE ID: 7/21-21 LOCATION ID: 506
APPROX. SITE COORDINATES (ft)
N _____ E _____
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 85/5/15
BACKHOLE TYPE: case
CONTRACTOR: Blake Contractors
FIELD REP: M. Nanjo
REHAB. DATE: _____

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION ≈100 yds South of garbage dump ≈200 yds North of
SITE CONDITION Sewage lagoon; Sagebrush

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	X	D	001	~~SW~~ GP	Gravel; Sandy, Silt ~~some~~, some fine to coarse sand, little or no clay, NP ~~to low~~ plasticity, gravels to 4" 5YR 6/8 reddish brown.
	X	B	002		
	X	B	003		note: quantity and size of gravels increasing silt decreasing ~~SW~~
	X	B	004		
9	X	B	005	ML	~~Sandy~~ Silt, ~~some~~ very fine sand, ~~some~~ clay, low Pl dry to slightly moist 10YR 7/4 very pale brown
10					stop digging backhoe extended

COMMENTS: SANDS PRED F; TO V F.

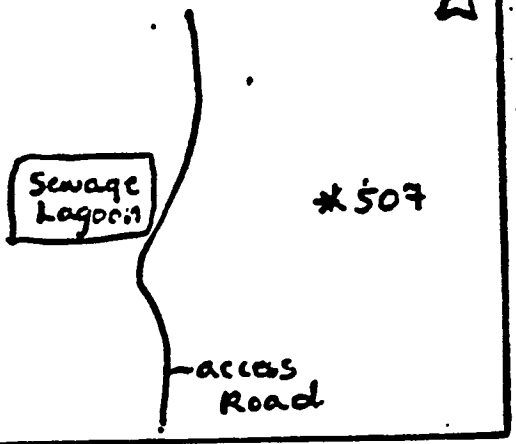
SAMPLE TYPE
B - ~~Undisturbed~~ Grab Sample
D - Disturbed Bulk Sample

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

TEST PIT LOG

Page 1 of 1

LOCATION MAP:



SITE ID: Hat-a1 LOCATION ID: 507
APPROX. SITE COORDINATES (ft)
N _____ E _____
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 85/5/15
BACKHOLE TYPE: Case
CONTRACTOR: Blake Enterprises
FIELD REP: M Chenyse
REHAB. DATE: _____

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION ≈ 5 cycle to North of Hwy 163 east of sewage lagoon
SITE CONDITION Sagebrush

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
		D	001	SP-SM	~~Sand~~ Sand, Fi to VFi, NP, Tr to 5% Silt, with some gravel, Tr to 5% Clay, trace clay
		B	002		Some rootlets, ~~Loose~~, Dry, 5YR 6/8 reddish yellow
		B	003		GRAV INCREASING W/ DEPTH
4.0		B	004	GP-GM	~~well graded~~ gravel, Fi to Co, Sand, Tr to Lt Silt, ~~moisture~~, ~~color~~, Tr to No clay, NP, ~~to Loose~~, Dry, 5YR 6/8 reddish yellow
		D	005		
		B	006	SP	Sa, Fi, No SH or Cl, NP, Lt Gr W, Dry
9.0		D	007	GP-GW	~~well graded~~ gravel, Fi to Co, Sand mix, ~~color~~ Tr to ~~no~~ Silt or Cl, NP, Cobbles to 8", 10YR 7/6 yellow
		B	008		

COMMENTS: SANDS FINE Fi to V Fi

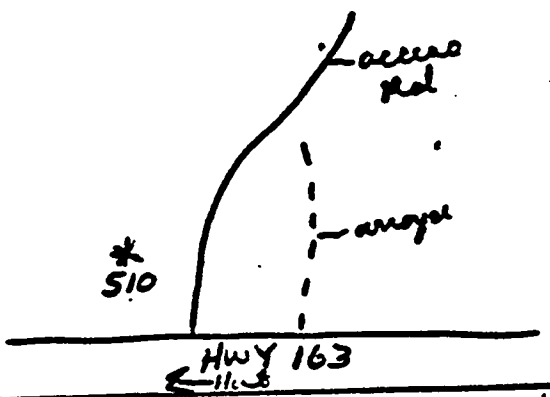
SAMPLE TYPE
B - ~~Disturbed~~ Bag Sample
D - Disturbed Bulk Sample

JE — ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

TEST PIT LOG

Page 1 of 1

LOCATION MAP:



SITE ID: Unit-A1 LOCATION ID: S10
APPROX. SITE COORDINATES (ft)
N _____ E _____
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 05/15/15
BACKHOLE TYPE: Case
CONTRACTOR: Blake Cottingame
FIELD REP: M'Benzie
REHAB. DATE: _____

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION ≈ 100 yds North of Hwy 163 on West Side of access rd
SITE CONDITION Sagebrush

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	X	D	001	~~GW~~ GP	~~well graded~~ gravel, ~~sandy mixture, some~~ silt, gravels to 4", ~~little or no clay~~, some rootlets, N.P. ~~& loose~~, 5 YR 6/8 reddish yellow
	X	B	002		
	X	B	003		
5.0					Refusal @ 5' Bedrock

Tr to N:

COMMENTS: _____

SAMPLE TYPE
B - ~~Undisturbed~~ Grab Sample
D - Disturbed Bulk Sample

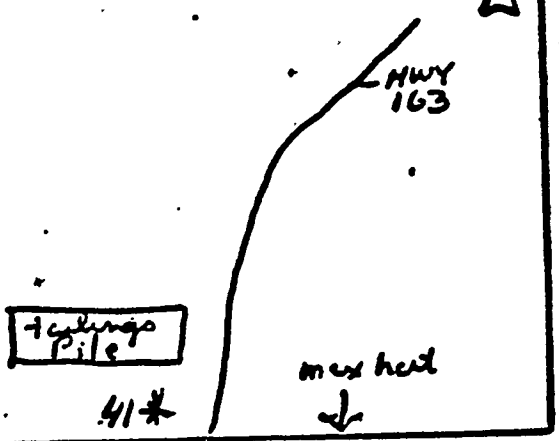
JEG-AL-ENG-7 (3/84)

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

TEST PIT LOG

Page 1 of 1

LOCATION MAP:



SITE ID: Hill-01 LOCATION ID: 41
APPROX. SITE COORDINATES (ft)
N _____ E _____
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 85/5/16
BACKHOLE TYPE: N/A
CONTRACTOR: NA
FIELD REP: McKenzie
REHAB. DATE: _____

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION _____
SITE CONDITION _____

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
		D	001		surface outcrop sample; siltstone, fine grained, ≈ 100 pcf or retained

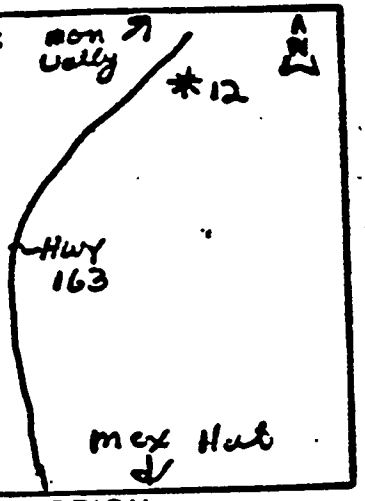
COMMENTS: _____

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample

JEG-AL-ENG-7 (8/84)

TEST PIT LOG

LOCATION MAP:



SITE ID: H.T-01 LOCATION ID: 12
APPROX. SITE COORDINATES (ft)
N _____ E _____
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 85/5/16
BACKHOLE TYPE: NA
CONTRACTOR: NA
FIELD REP: McDougal
REHAB. DATE: _____

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION _____
SITE CONDITION _____

DEPTH (ft.)	SAMPLE INT	SAMPLE TYPE	SAMPLE ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
		D	001		Surface sample from outcrop: limestone some dolomite, gred micaceous returned ≈100 pds

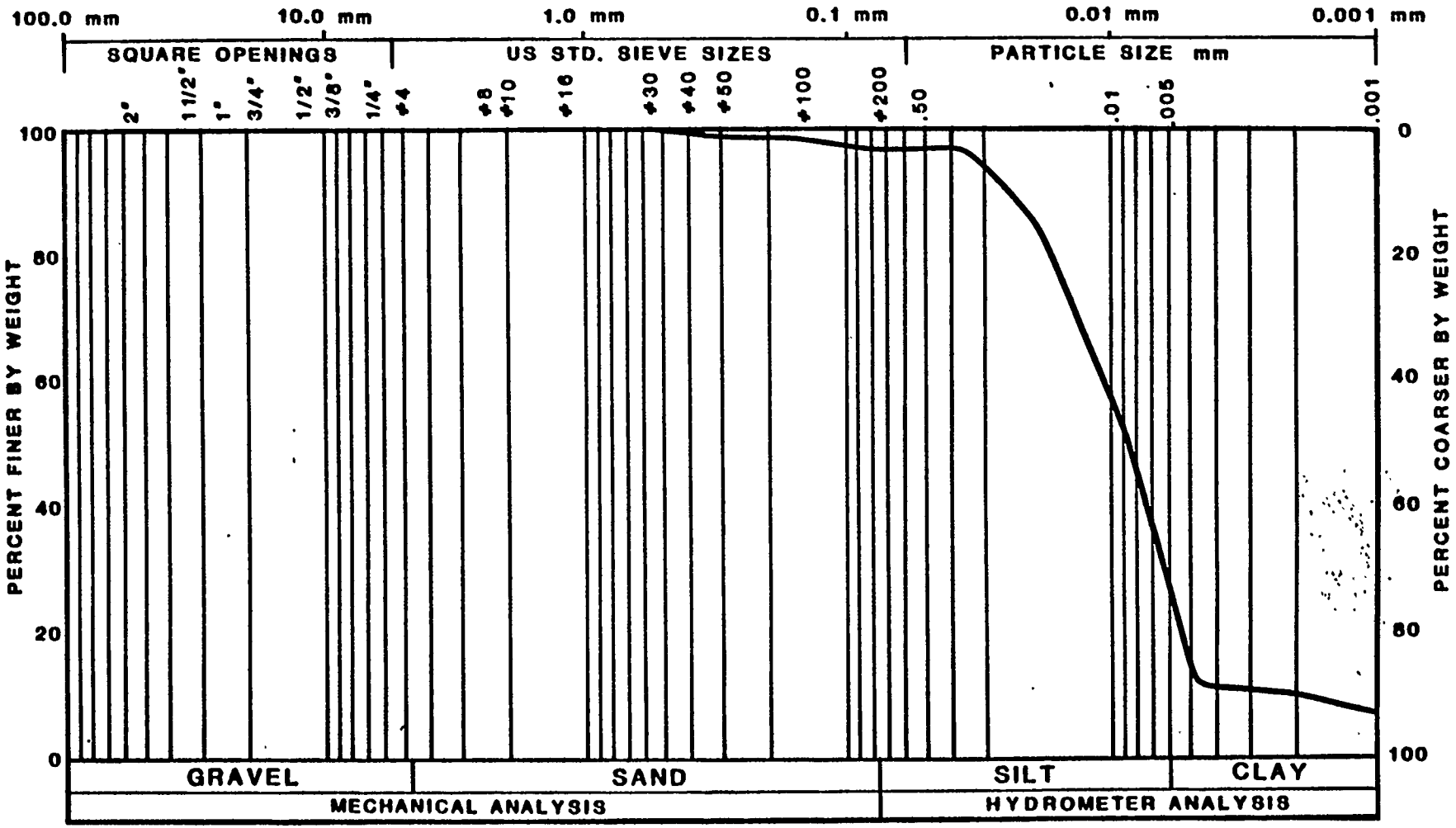
COMMENTS: _____

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample

JEG-AL-ENG-7 (8/84)

ADDENDUM D5

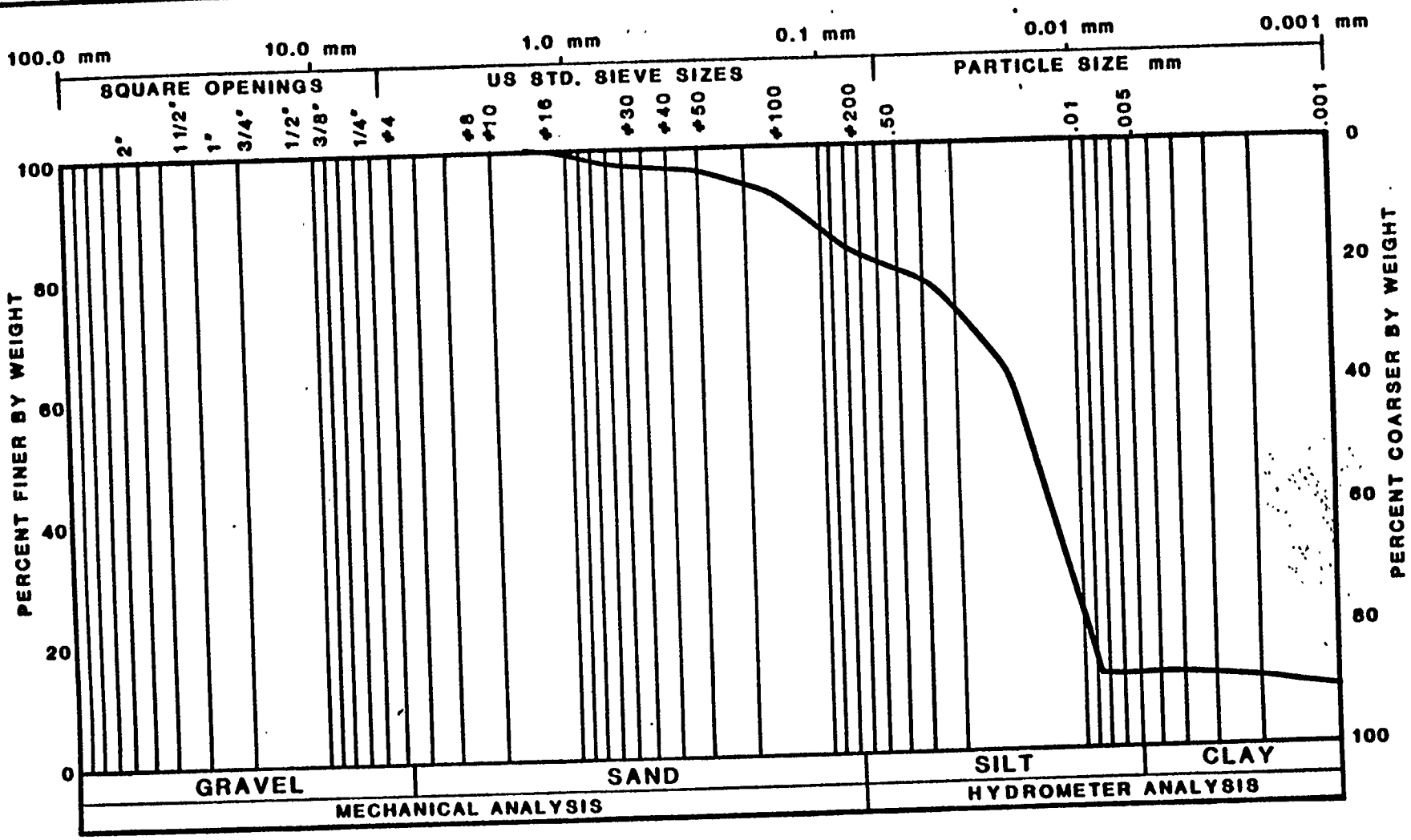
PARTICLE SIZE DISTRIBUTION CURVES



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	126	3.0-5.5	CL

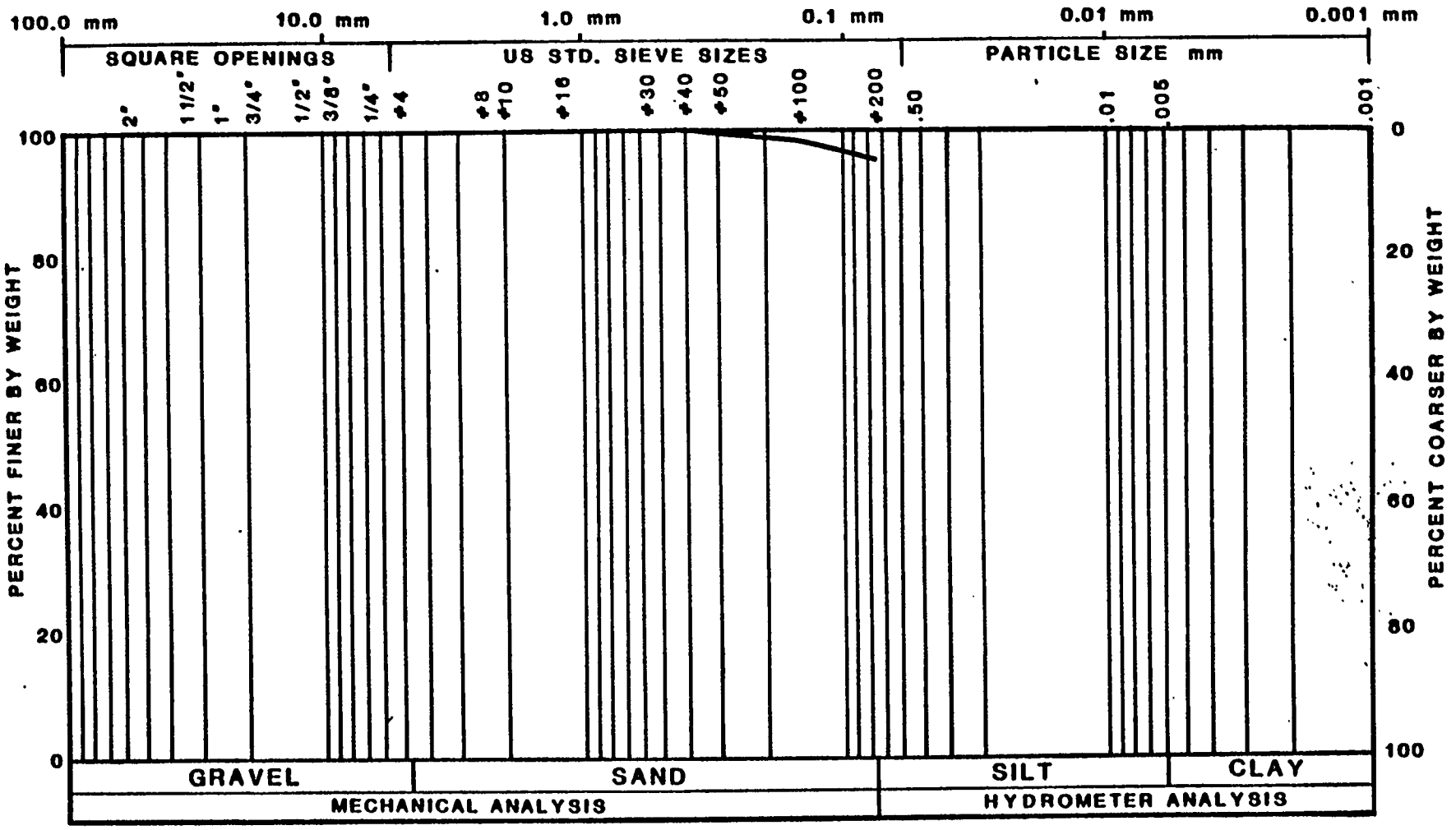
FIGURE D5.1

PARTICLE SIZE DISTRIBUTION CURVE



LEGEND		
SAMPLE HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
126	15.0–17.5	CL

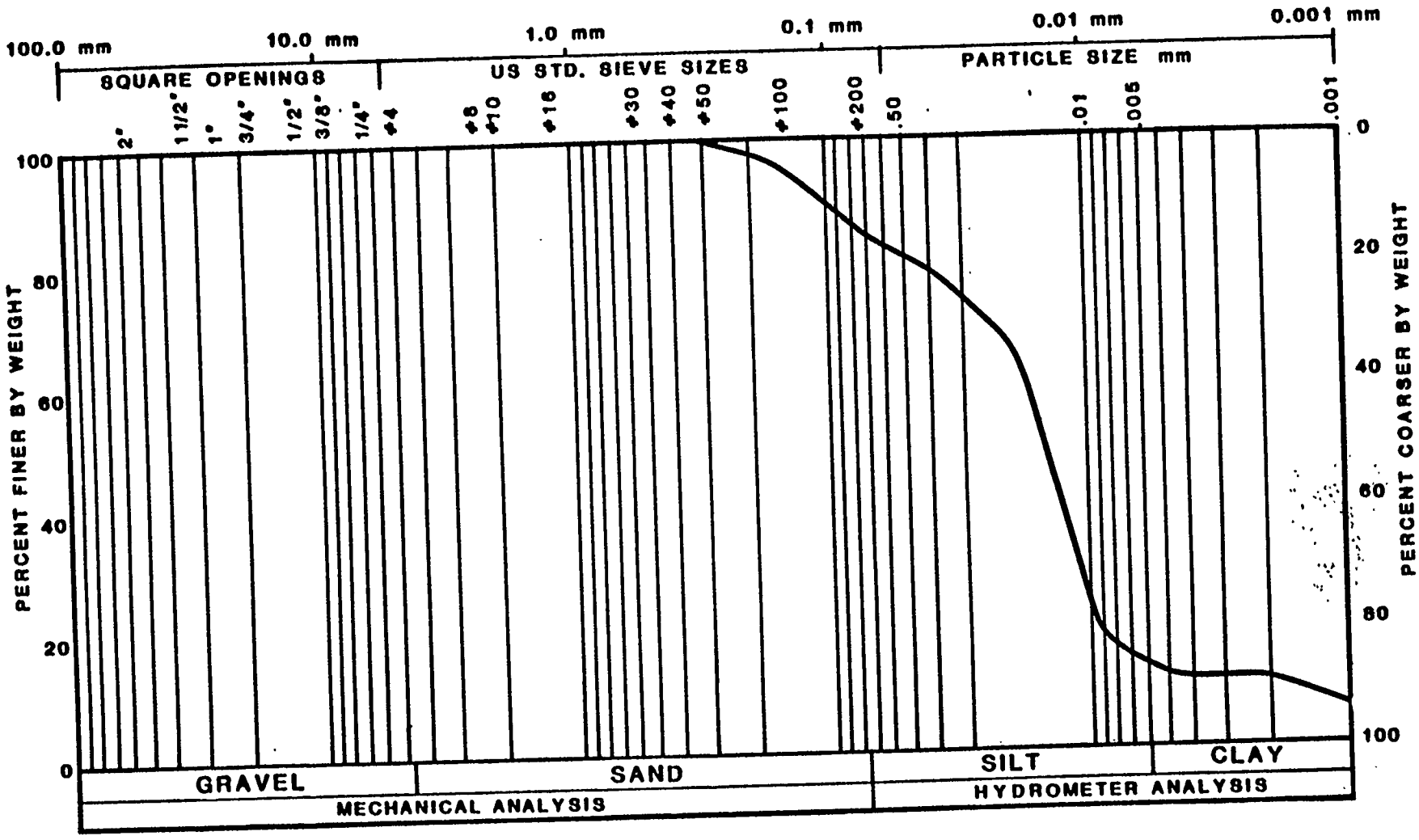
FIGURE D5.2
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	126	19.0-20.5	

FIGURE D5.3

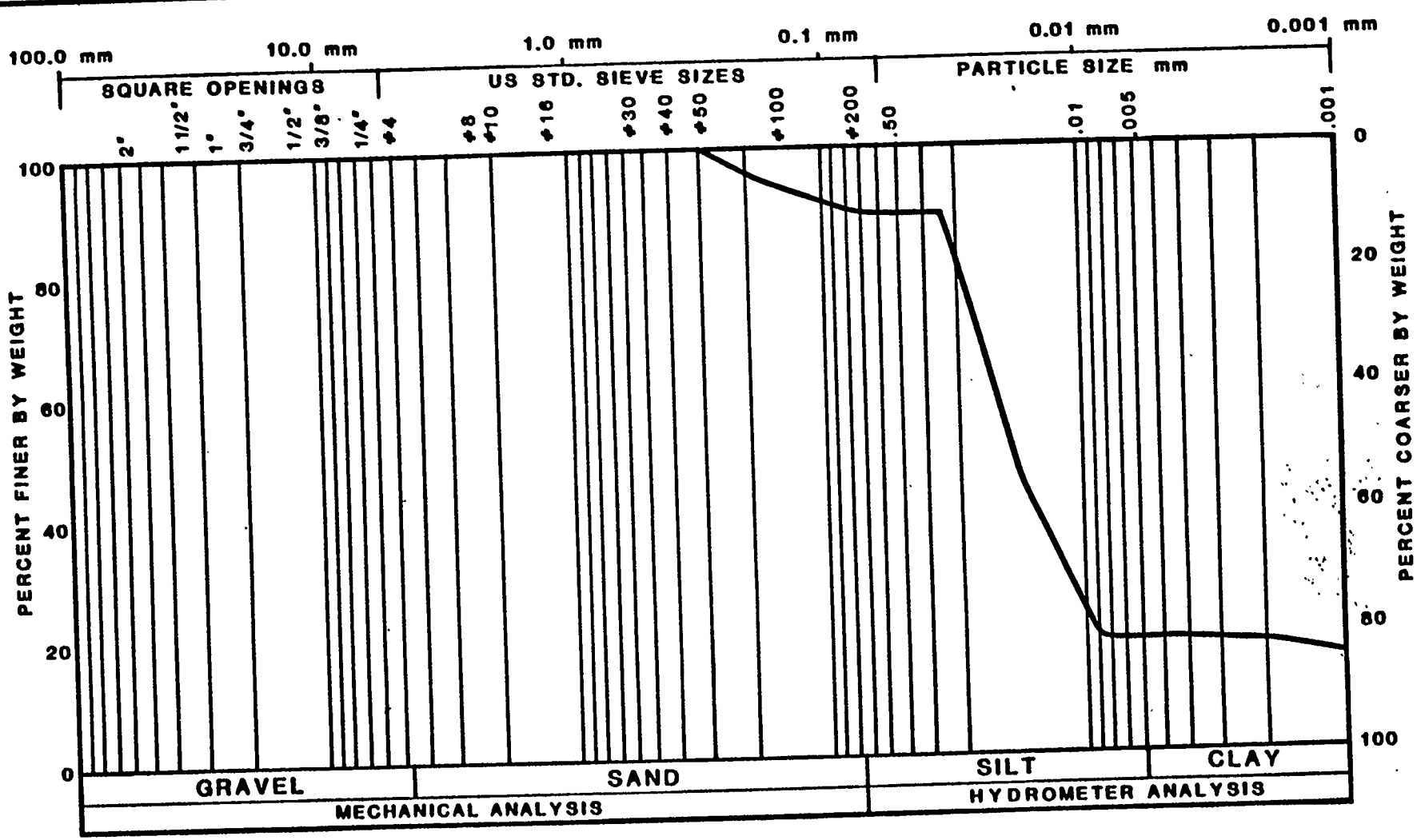
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND		
SAMPLE HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
126	22.5–25.0	ML

FIGURE D5.4

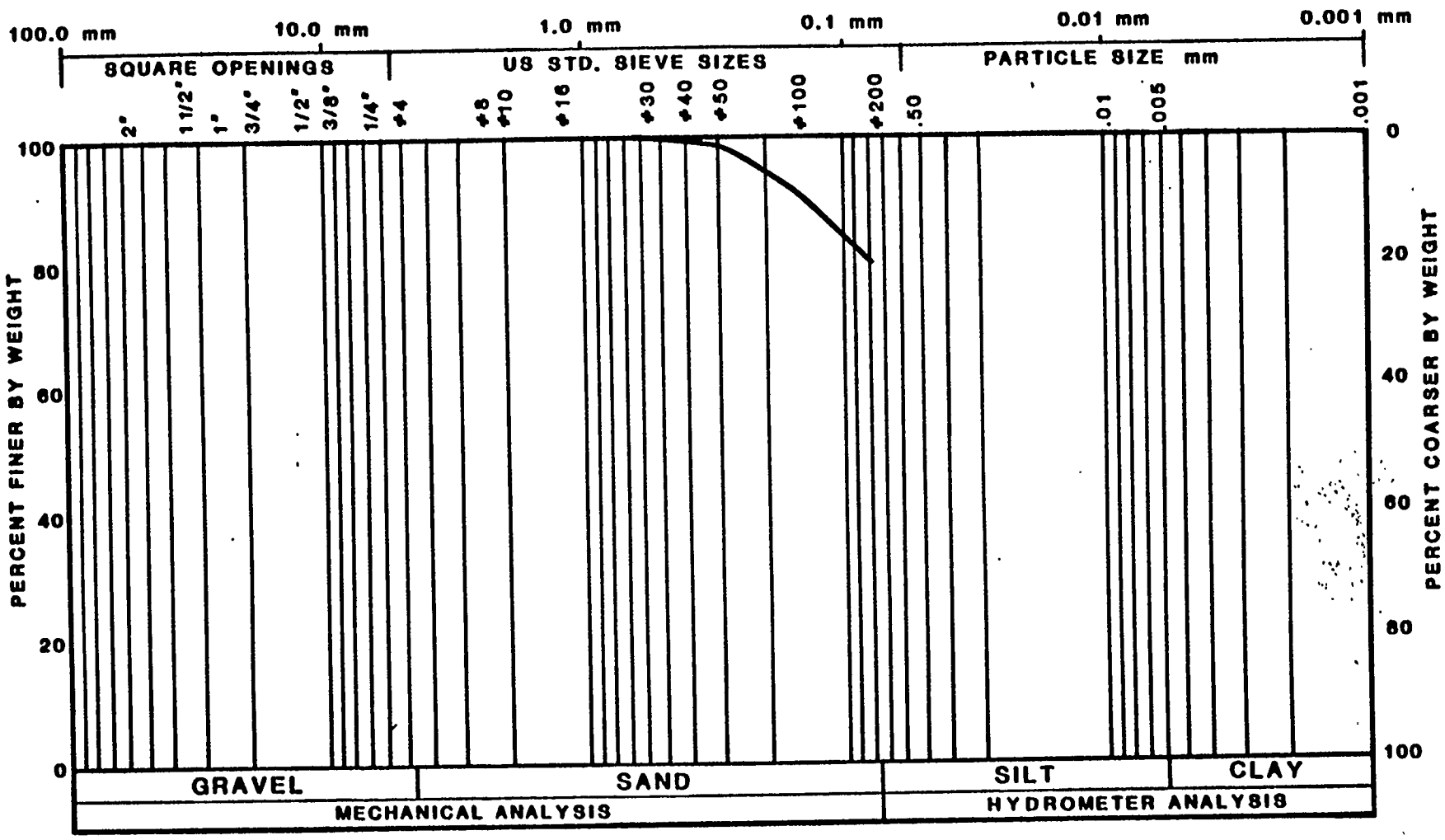
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	127	0.0-2.5	ML

FIGURE D5.5

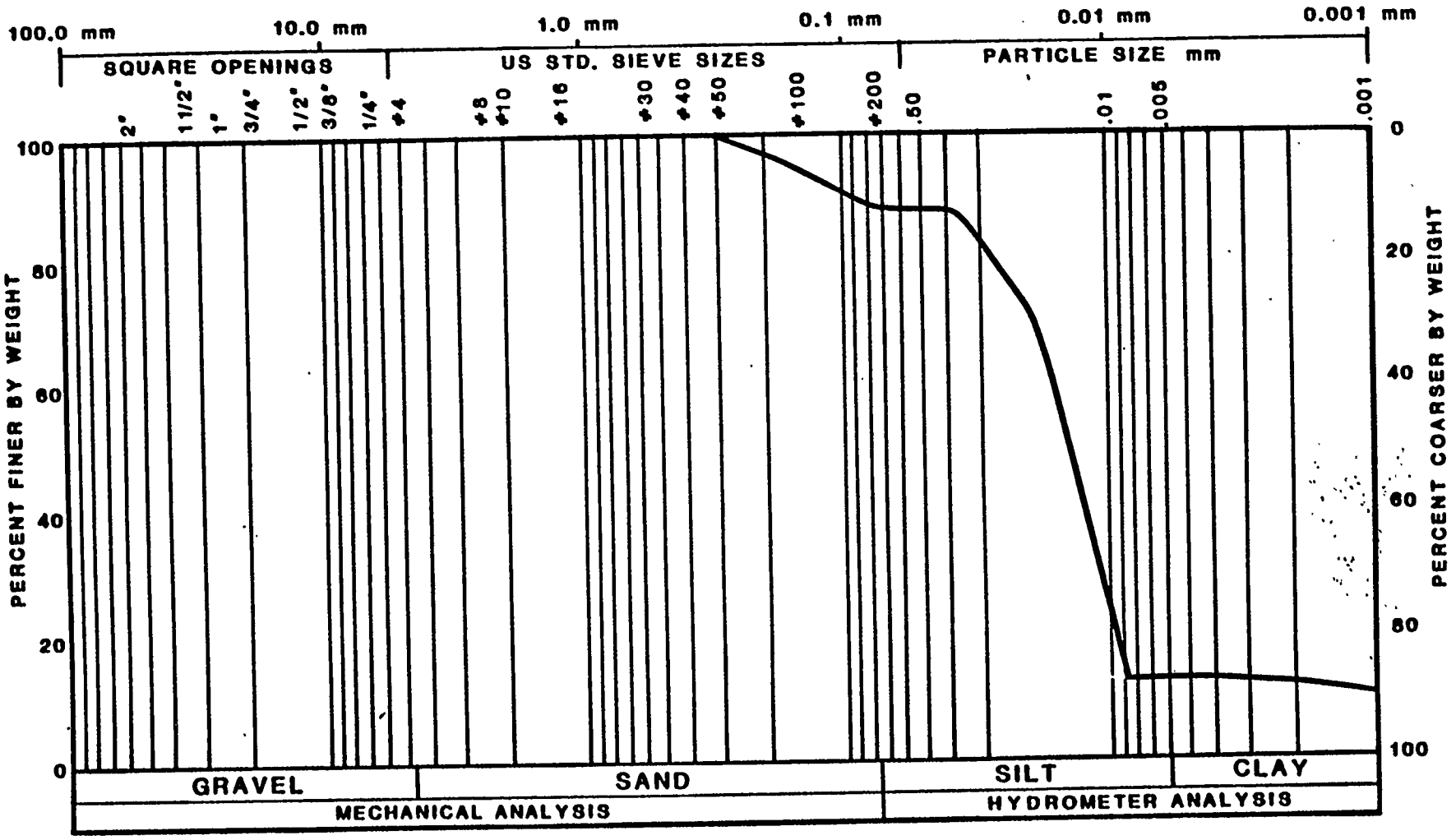
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	127	14.5–16.0	CL

FIGURE D5.6

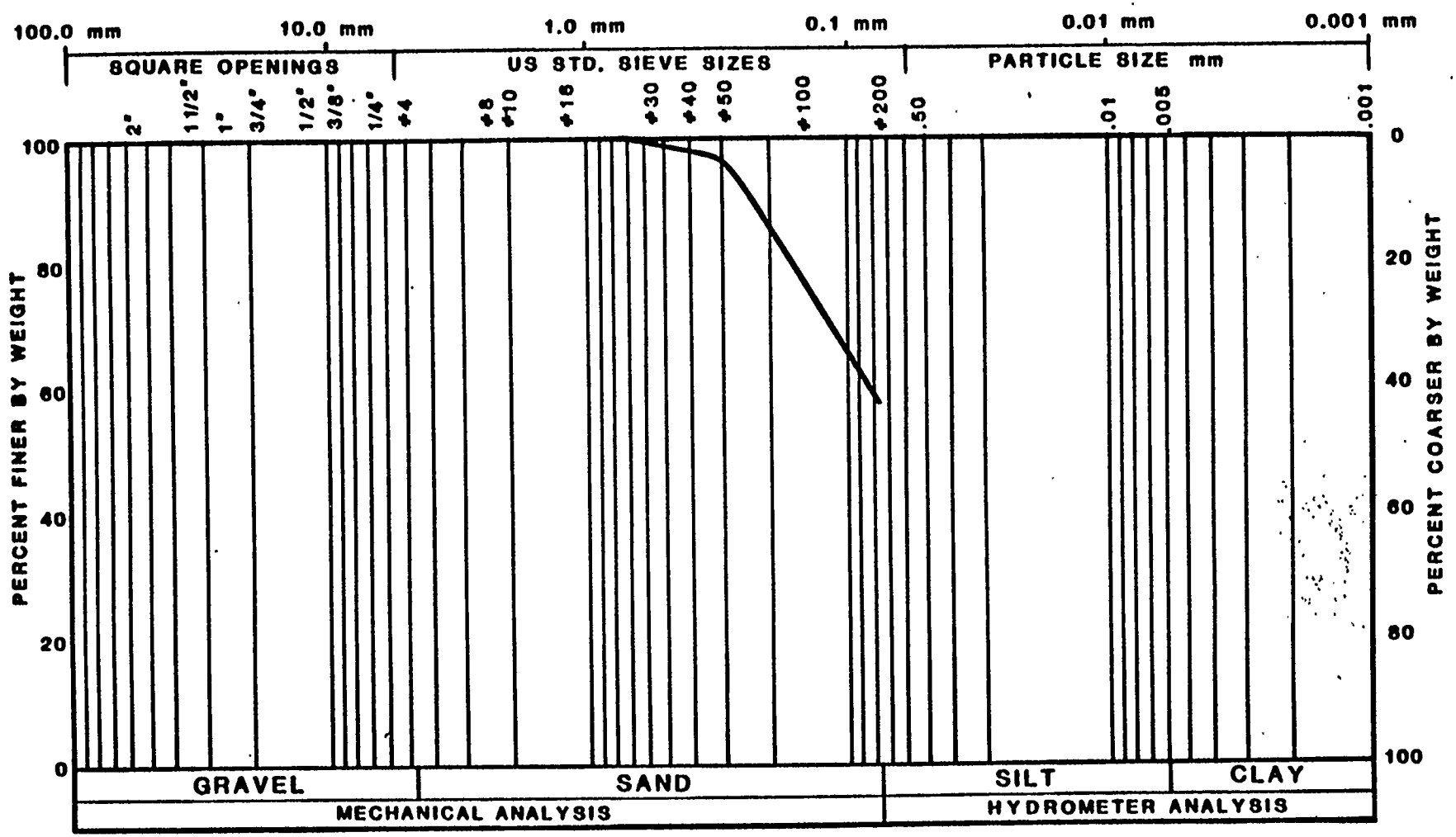
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	127	16.0-18.5	CL-ML

FIGURE D5.7

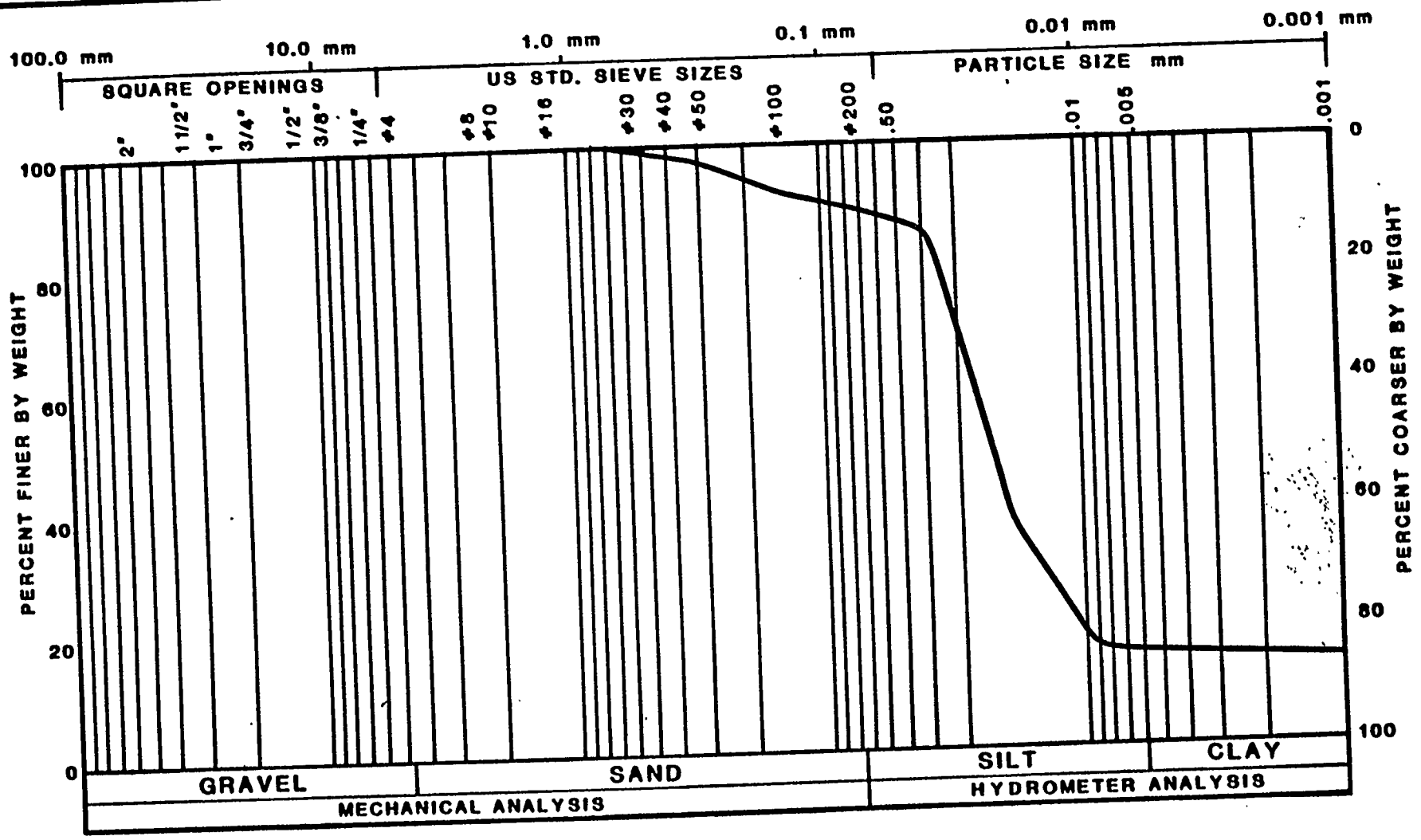
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND		
SAMPLE HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
127	19.0-20.5	ML

FIGURE D5.8

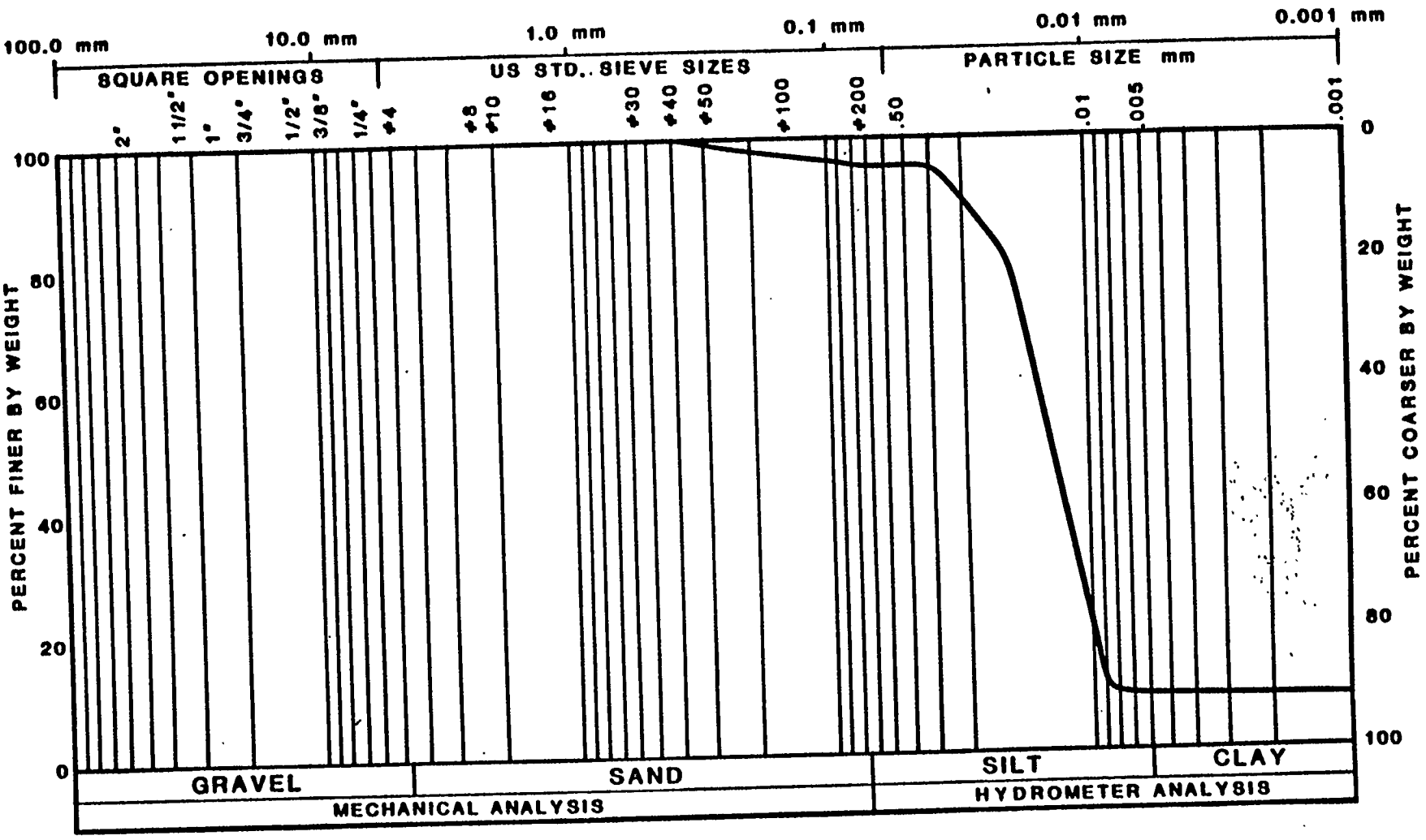
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	128	0.0–1.5	ML

FIGURE D5.9

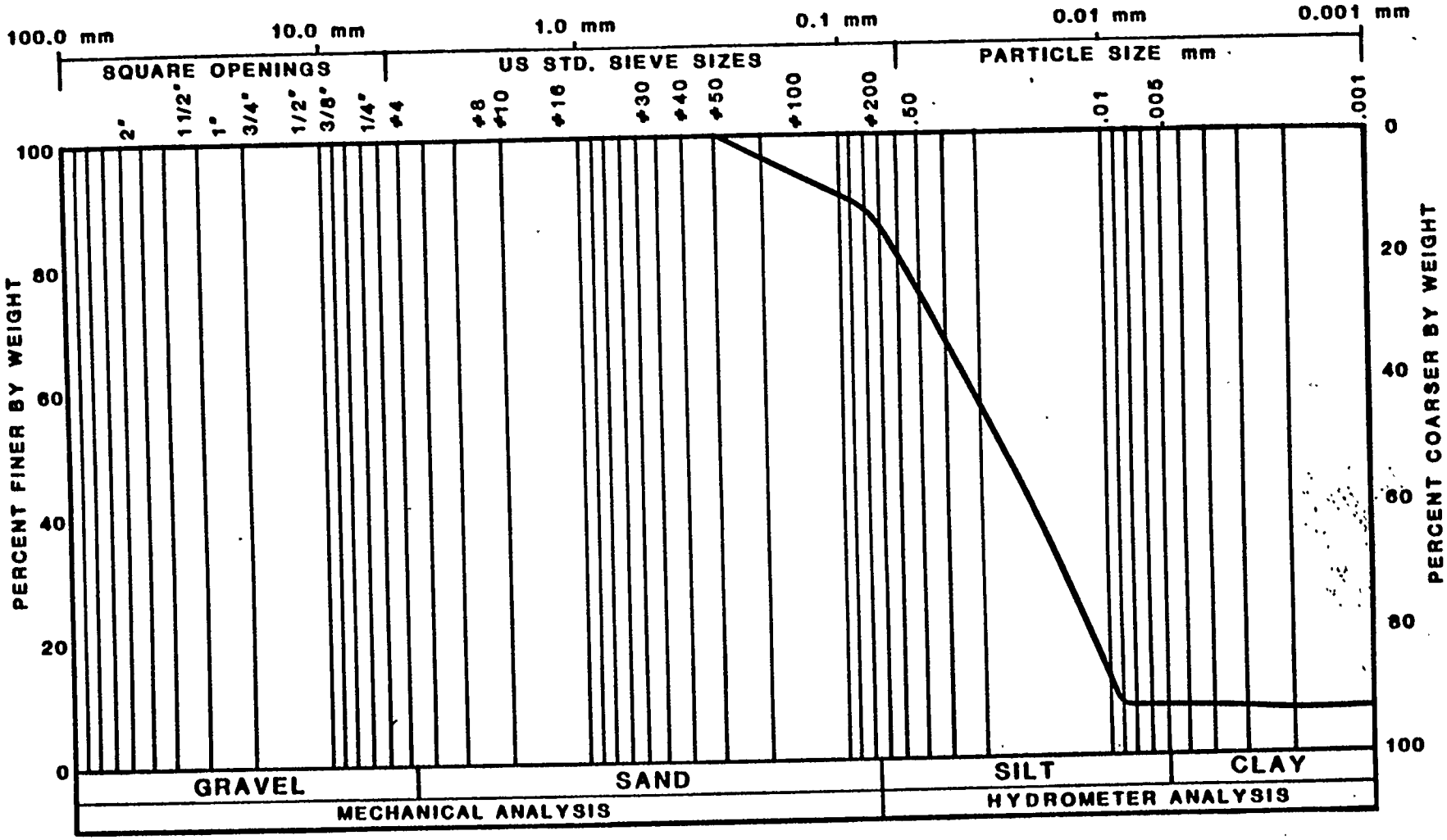
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	·128	16.5–18.0	ML

FIGURE D5.10
PARTICLE SIZE DISTRIBUTION CURVE

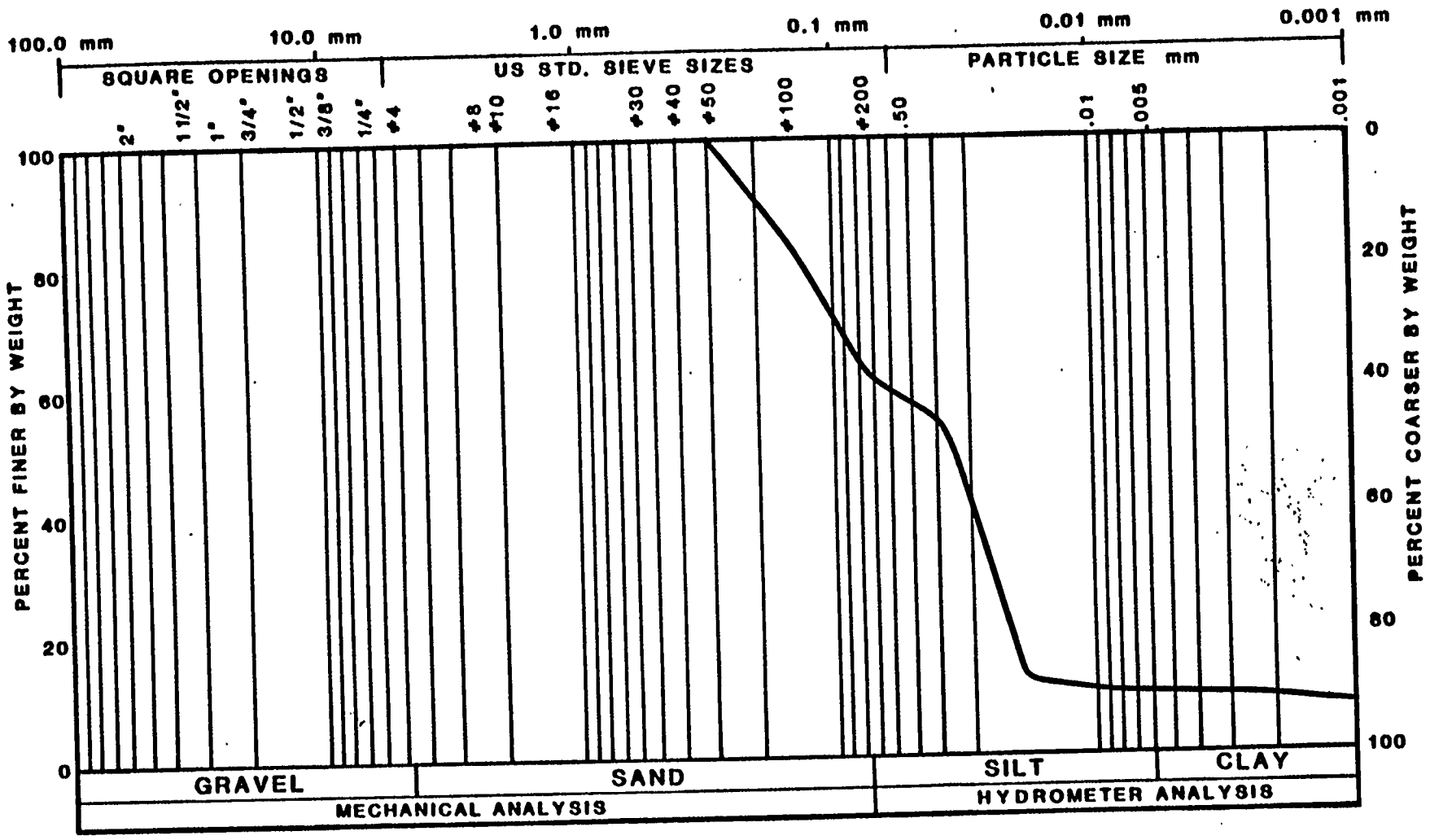
12



LEGEND		
SAMPLE HAT-01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
129	7.0-8.5	ML

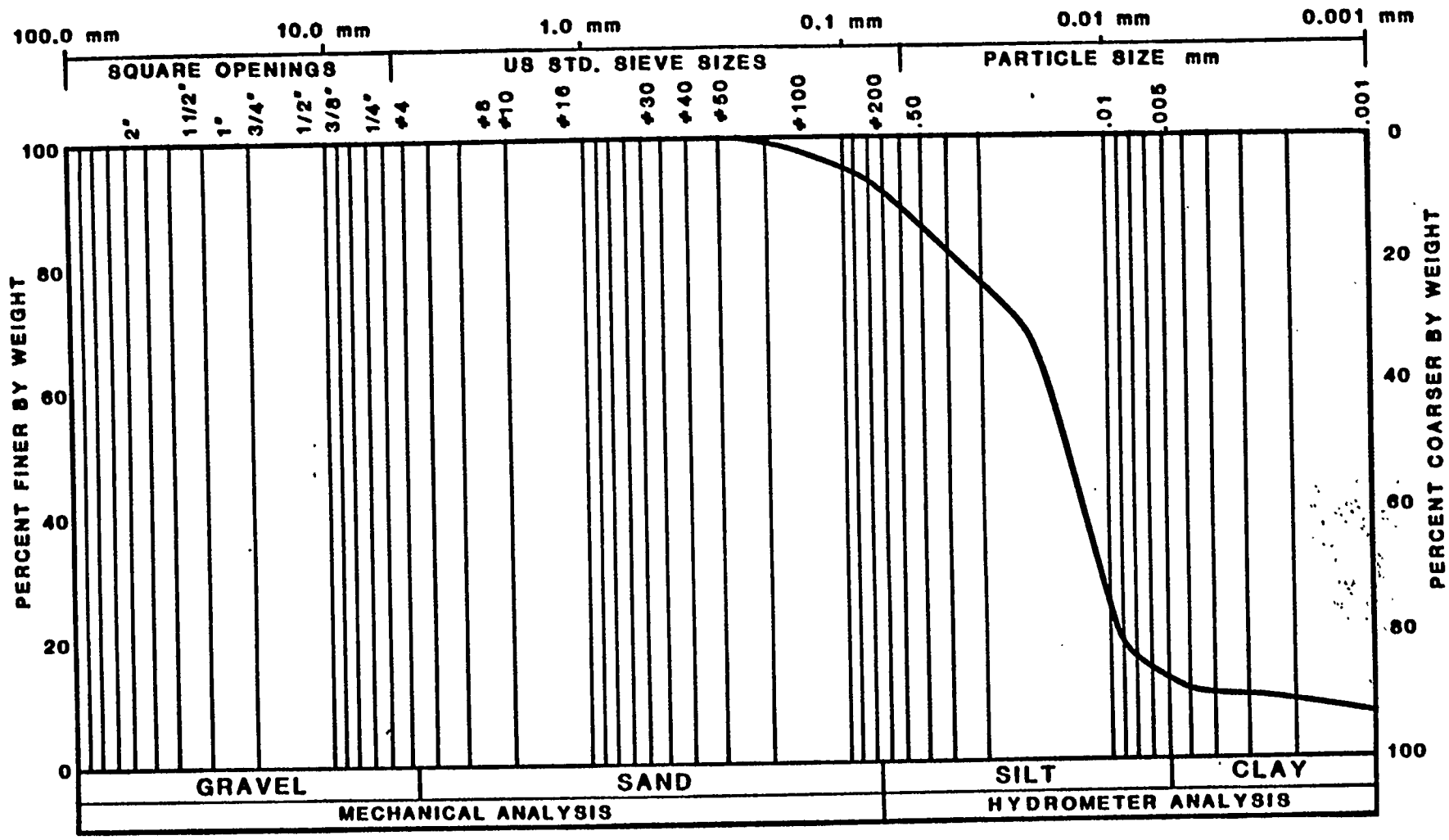
FIGURE D5.11

PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	130	4.0-5.5	ML

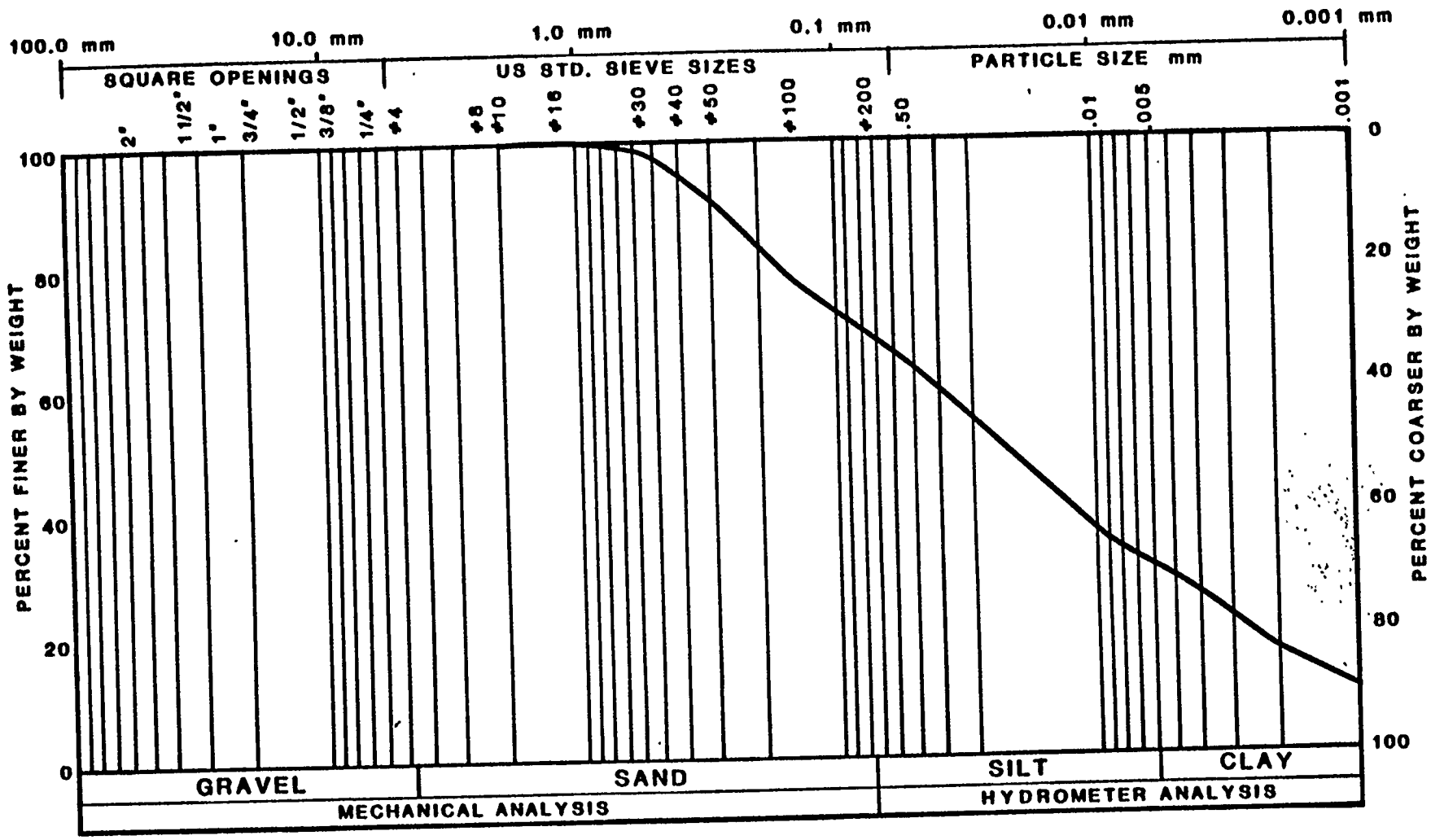
FIGURE D5.12
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	131	10.0-17.0	CL

FIGURE D5.13

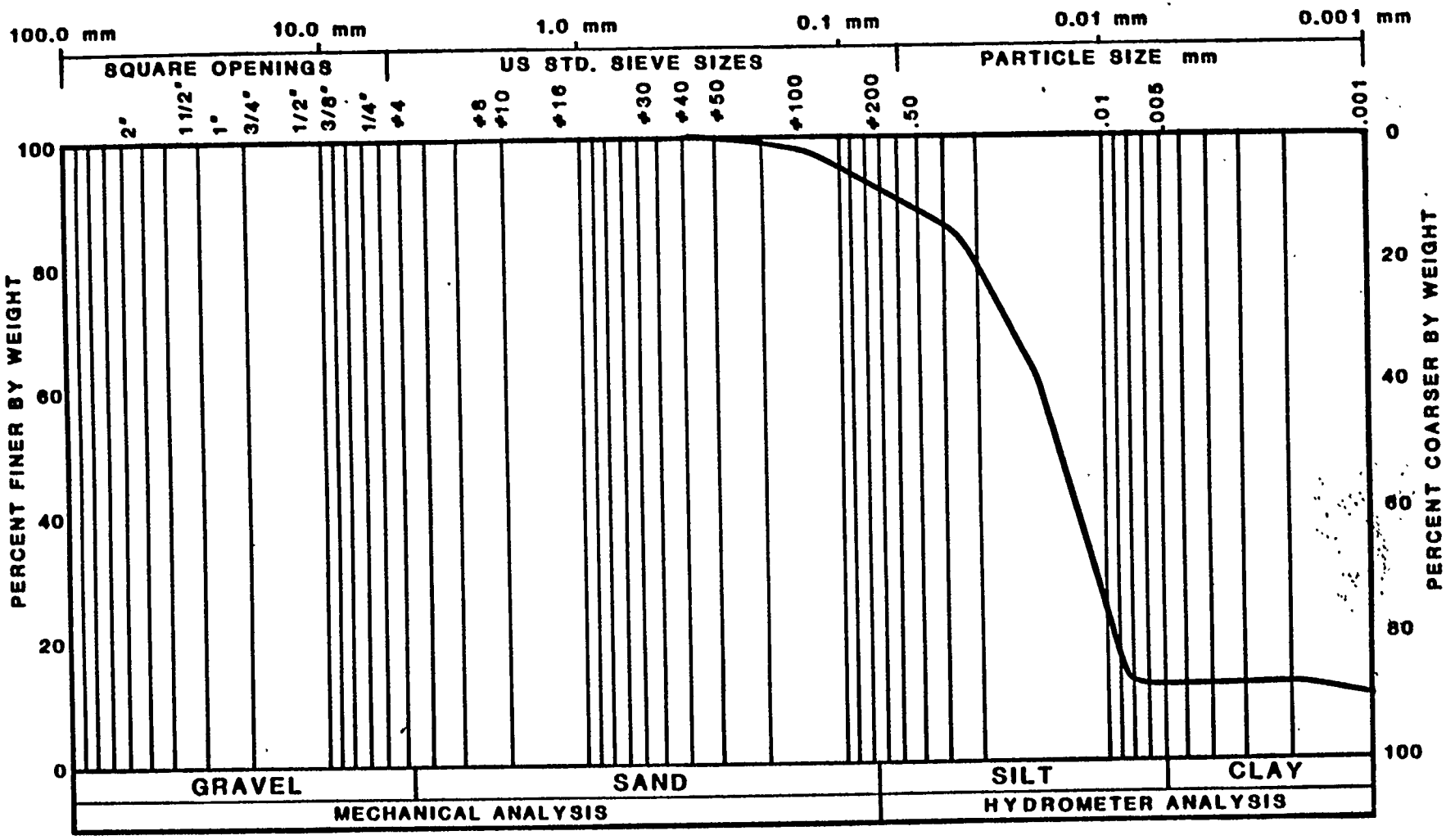
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	131	16.5–17.0	ML

FIGURE D5.14

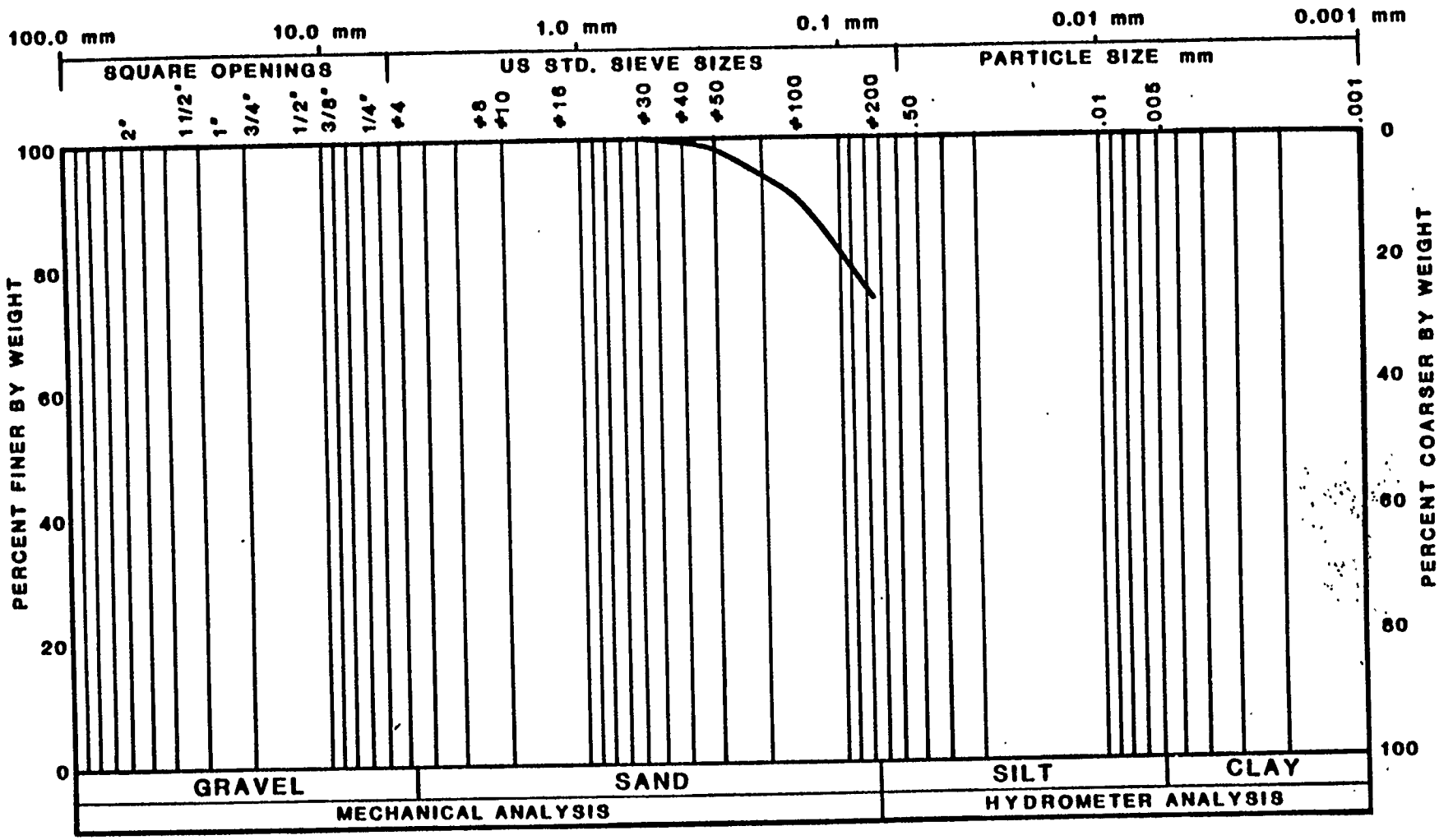
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND		
SAMPLE HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
132	1.5–4.0	CL

FIGURE D5.15

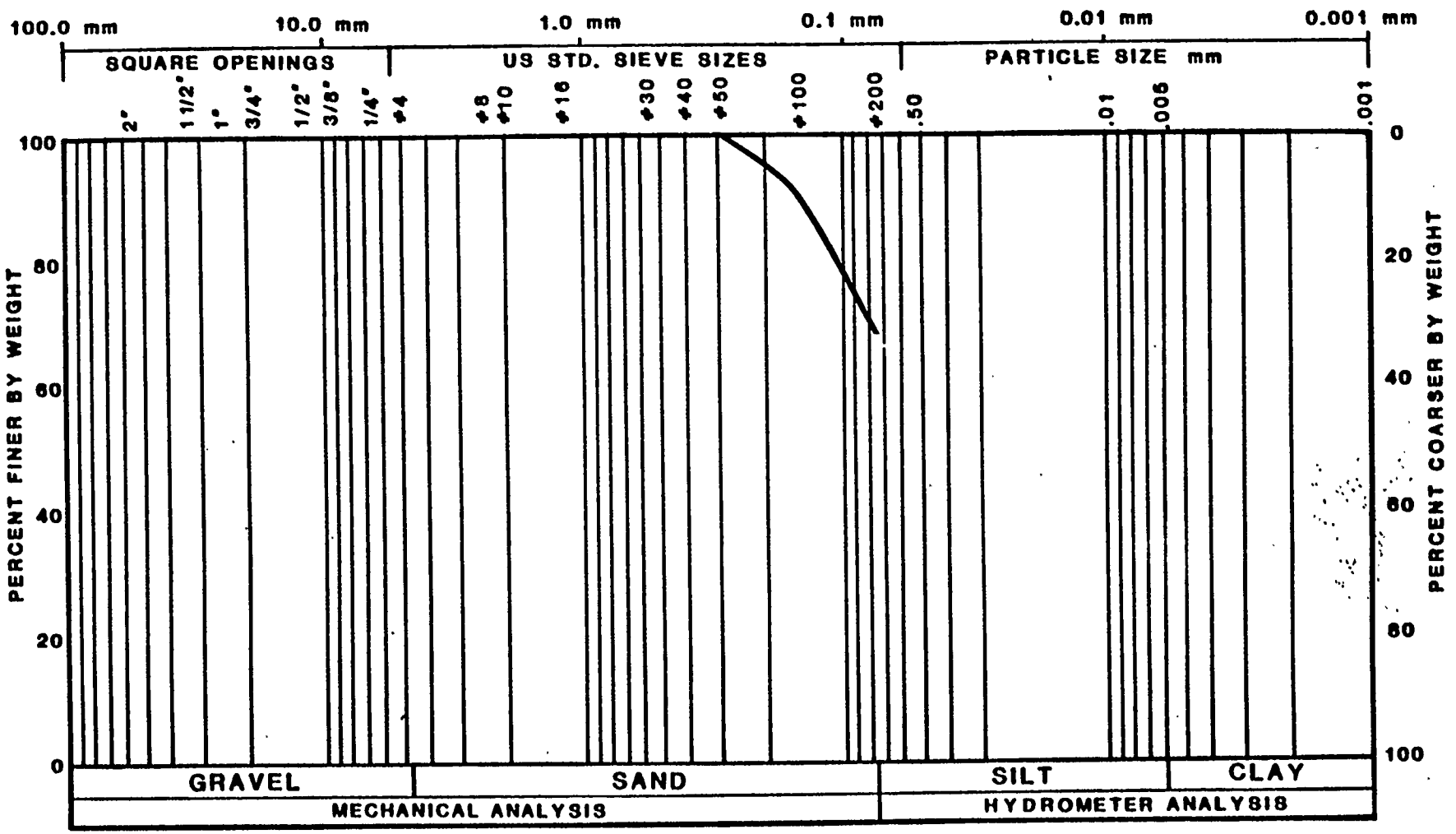
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	132	7.0-8.5	

FIGURE D5.16

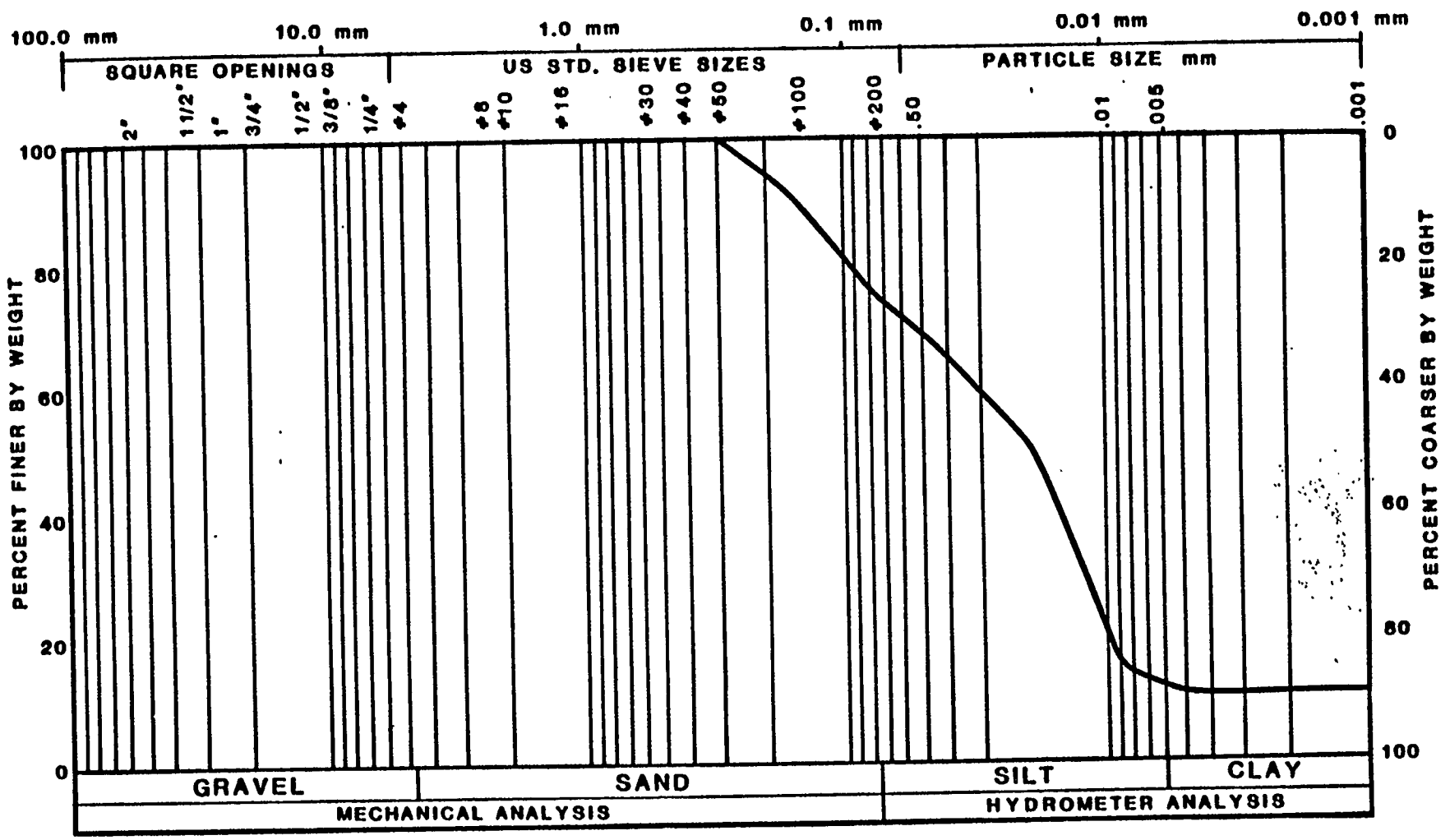
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND		
SAMPLE · HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
132	11.5–14.0	

FIGURE D5.17

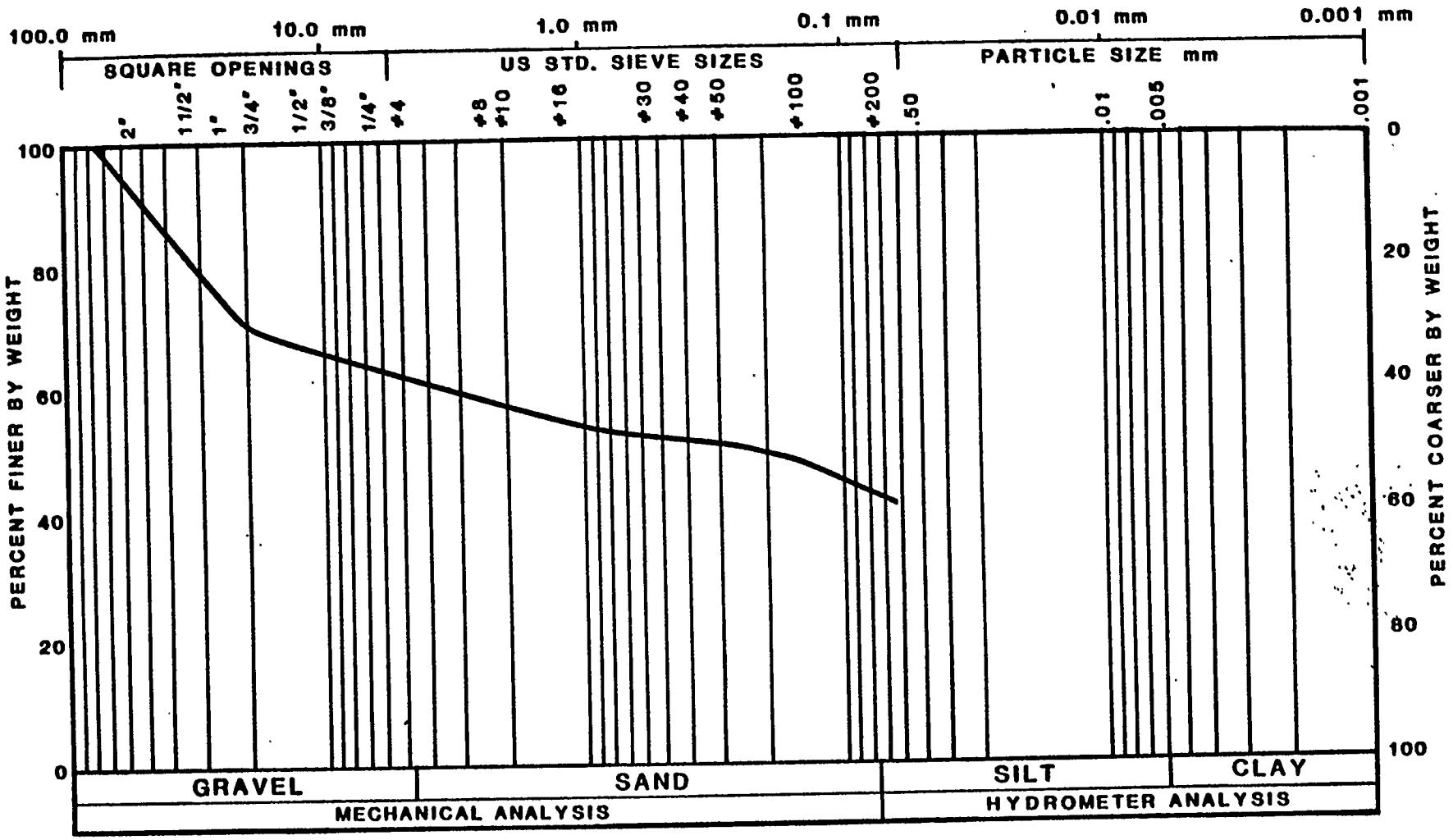
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	132	24.5-26.5	ML

FIGURE D5.18

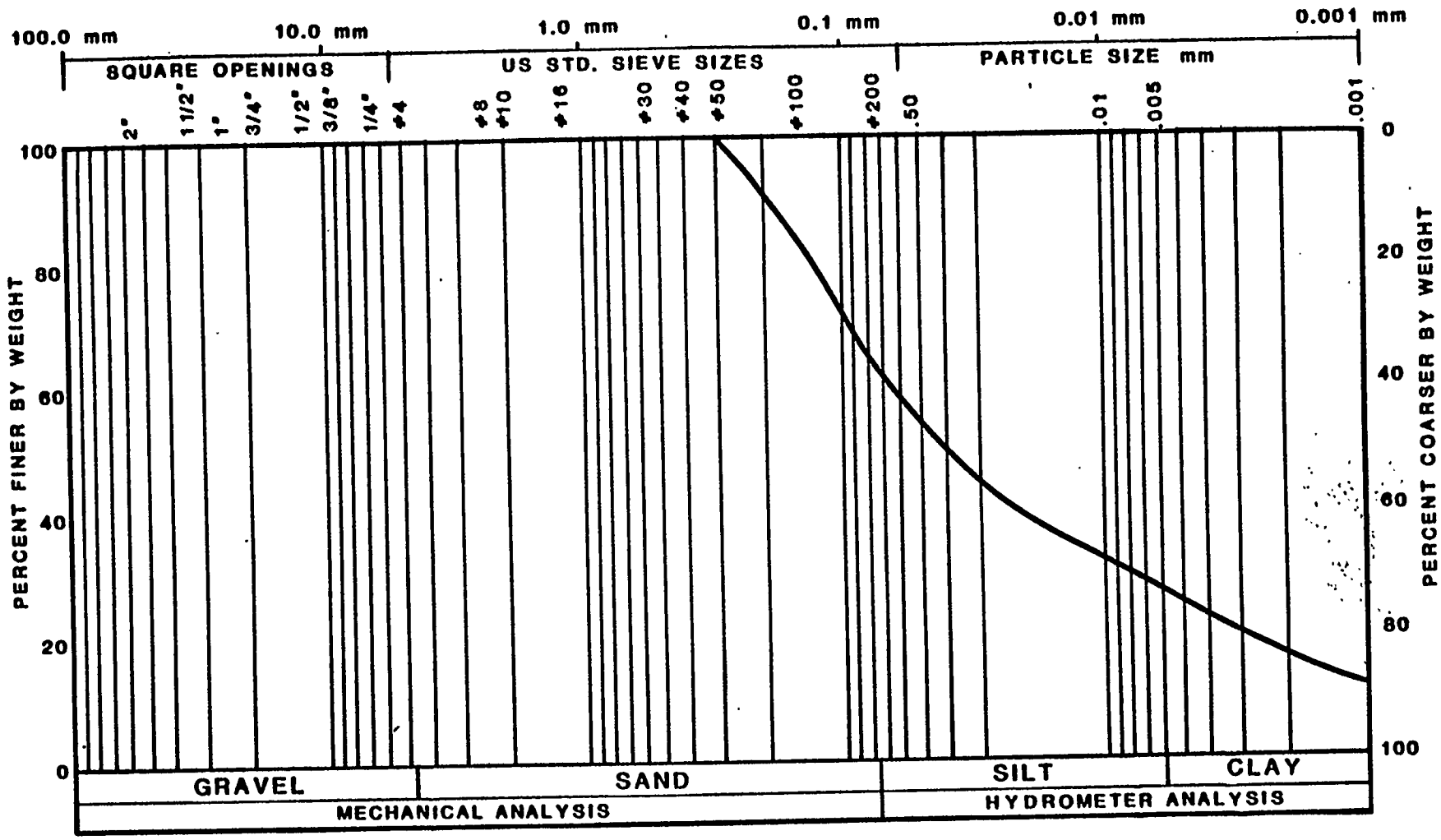
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	132	27.0-28.0	

FIGURE D5.19

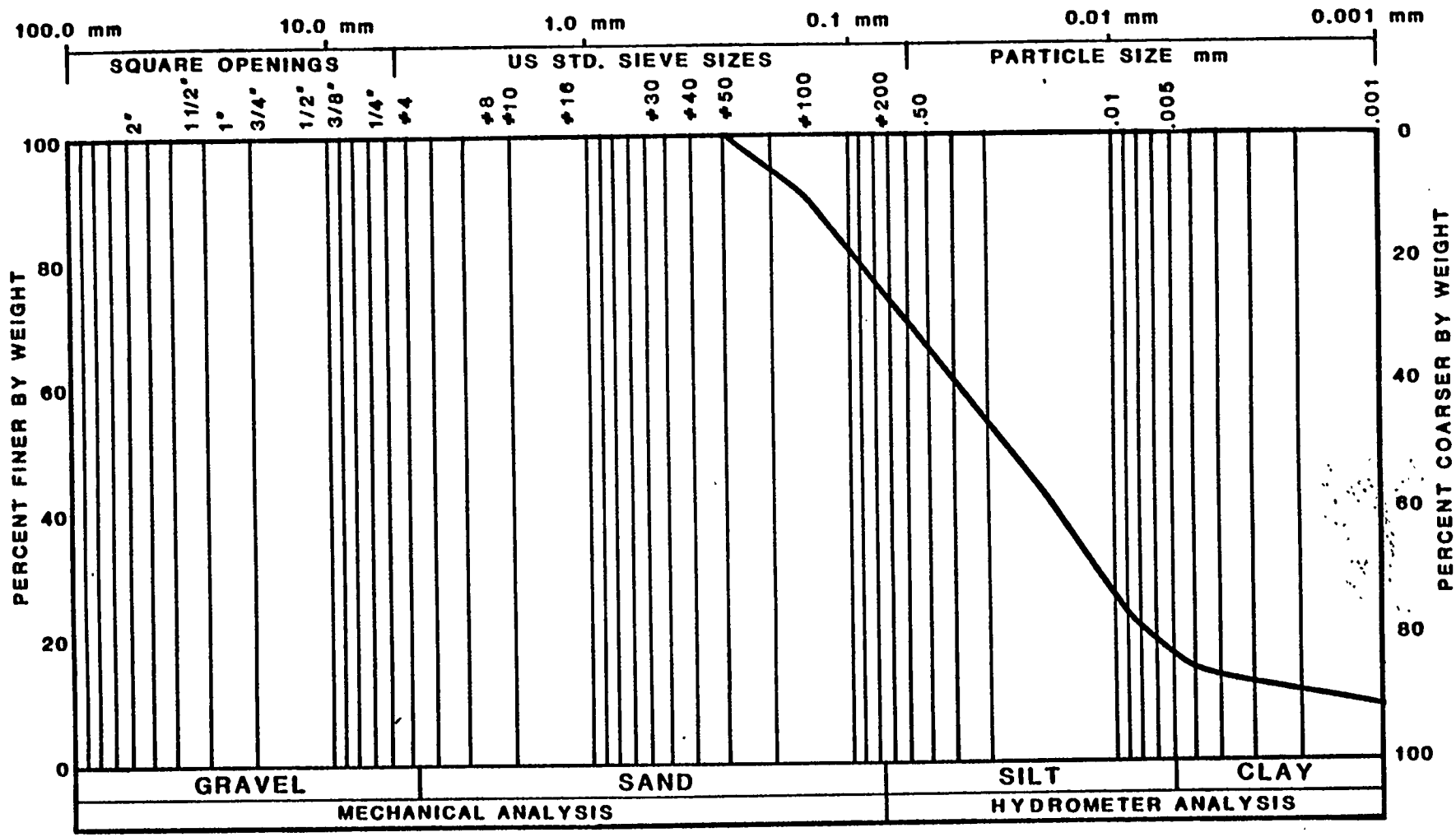
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	133	1.5–4.0	

FIGURE D5.20

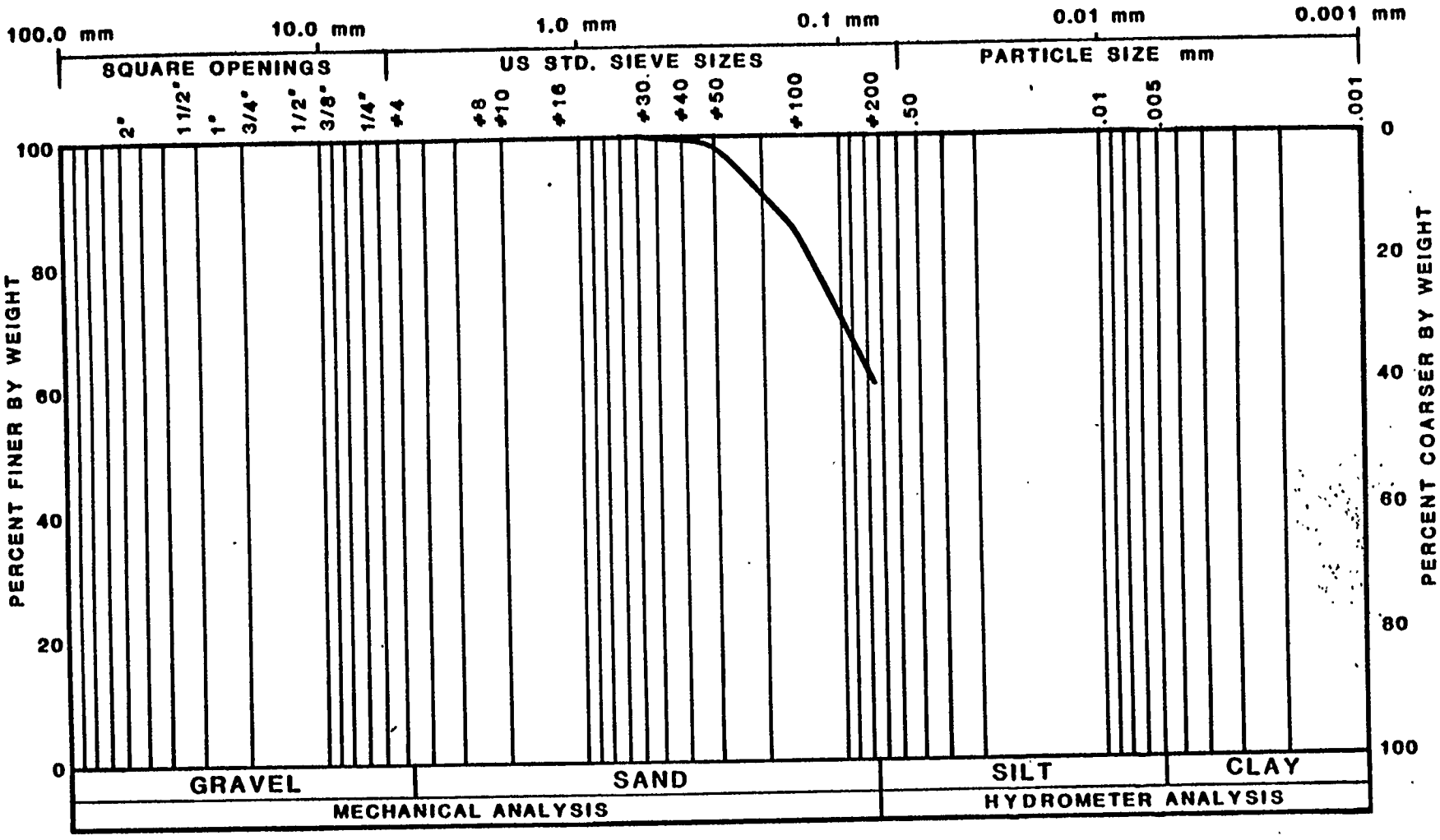
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	133	8.5-11.0	

FIGURE D5.21

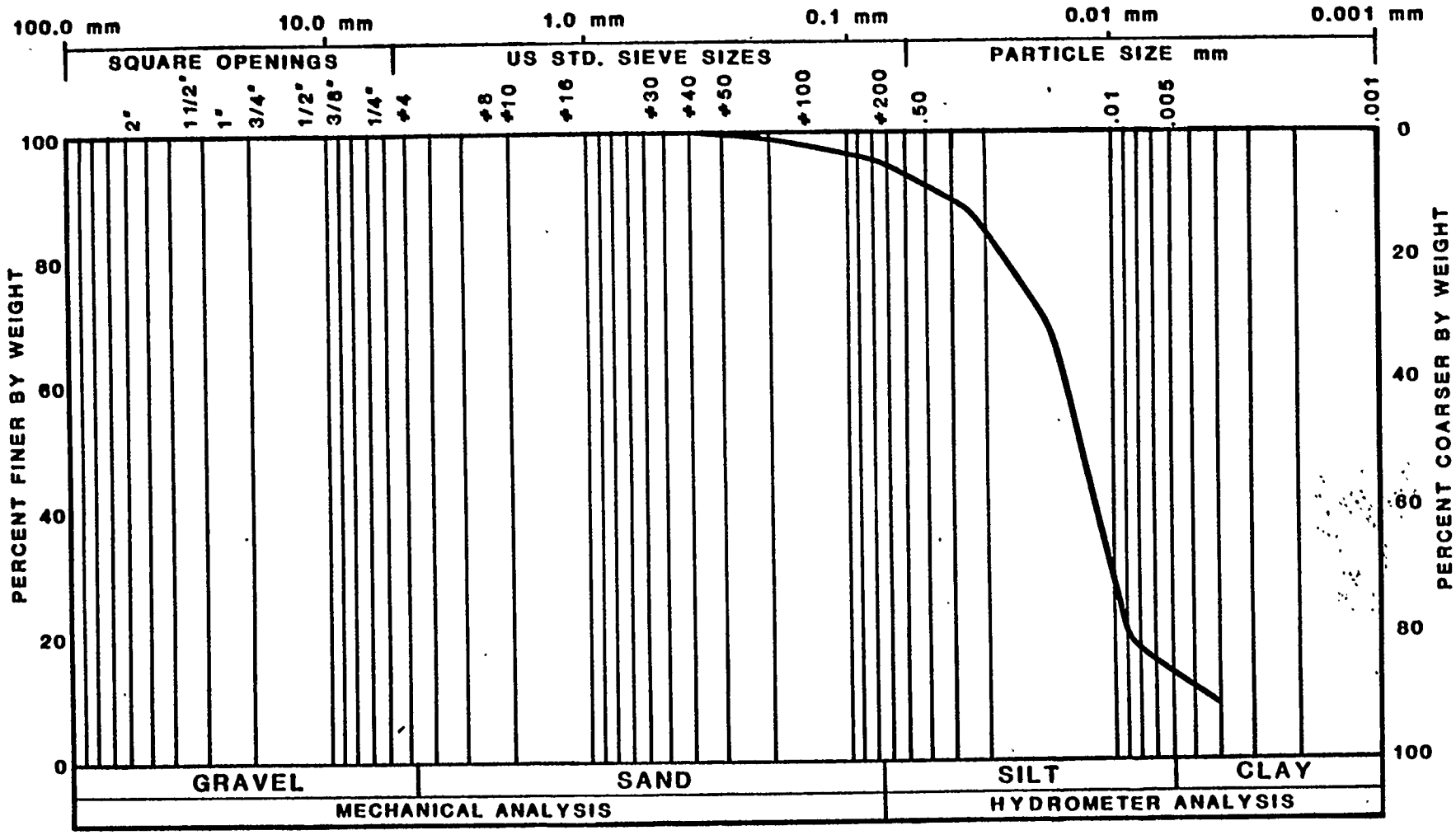
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	133	15.5-17.0	

FIGURE D5.22

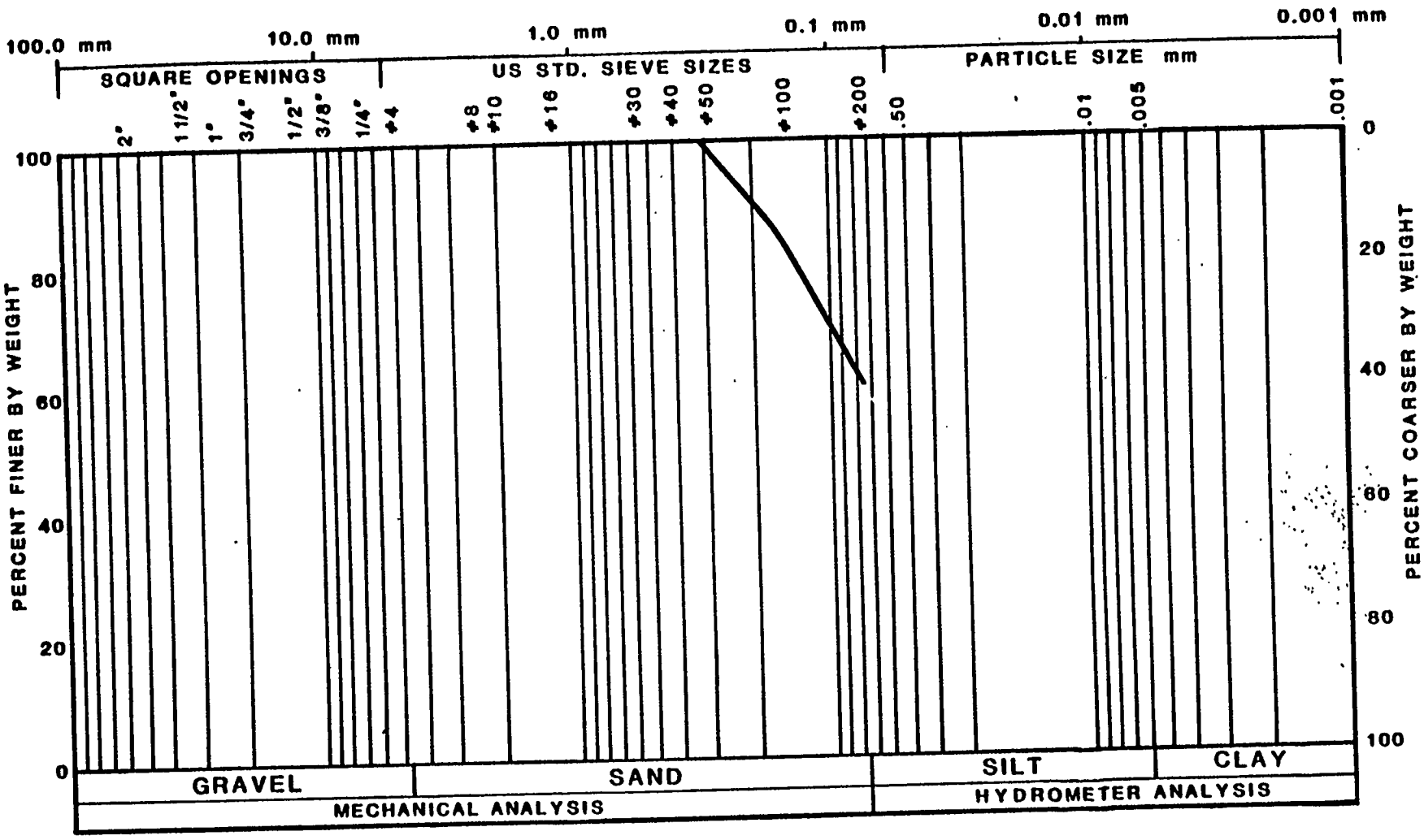
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	133	27.0-28.5	CL

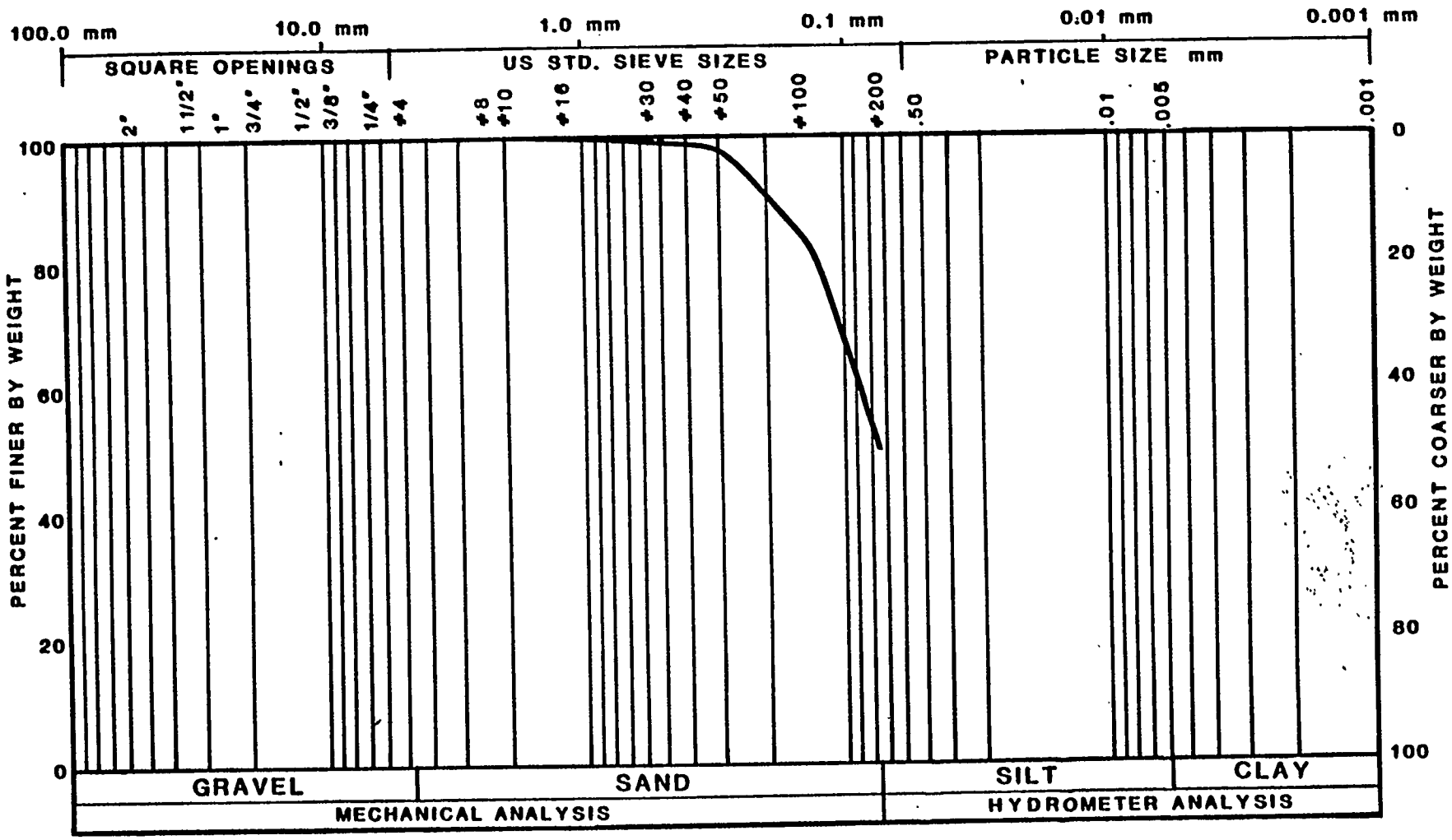
FIGURE D5.23

PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	134	1.5-3.0	

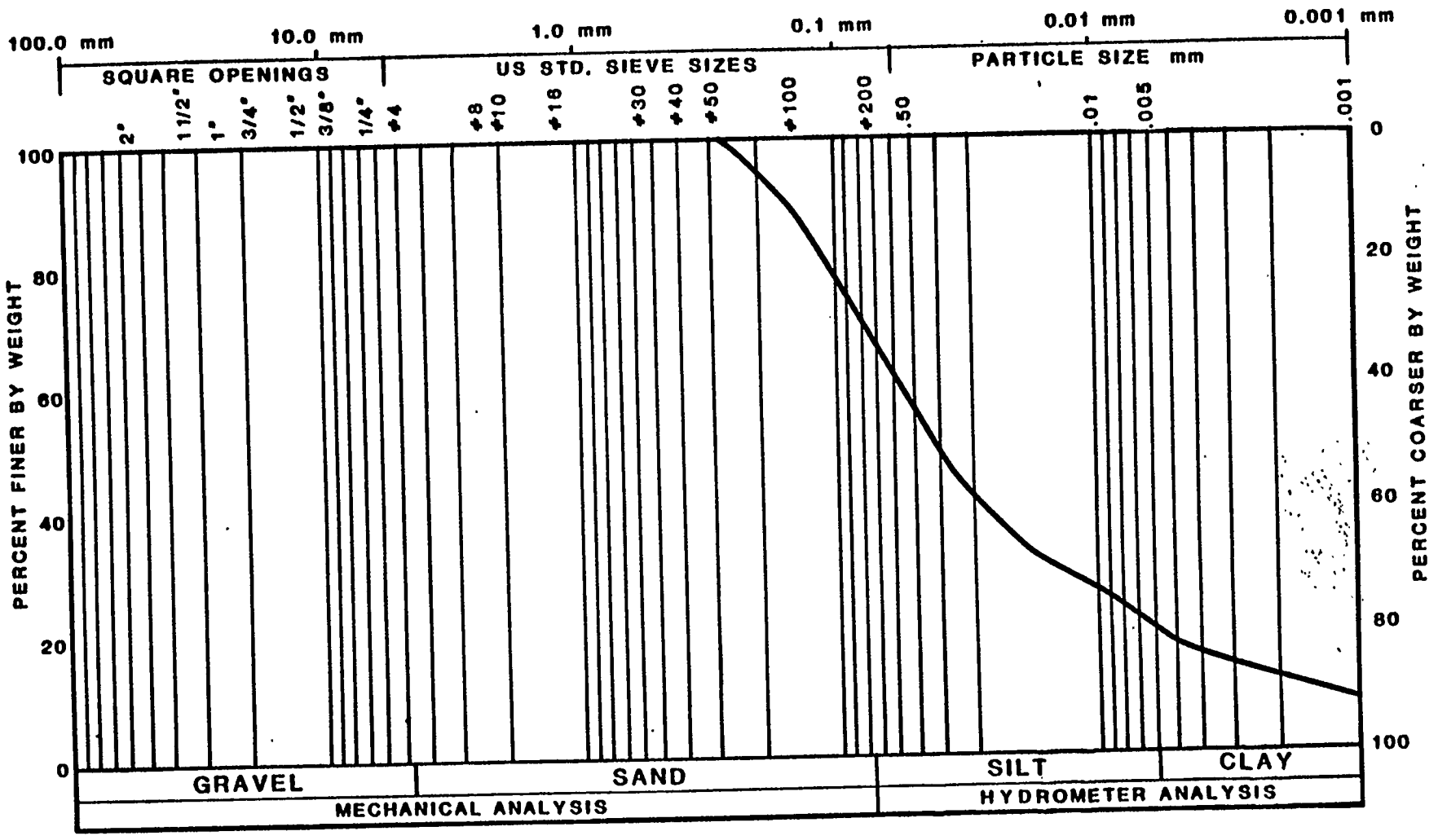
FIGURE D5.24
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT-1	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	134	4.5-6.0	

FIGURE D5.25

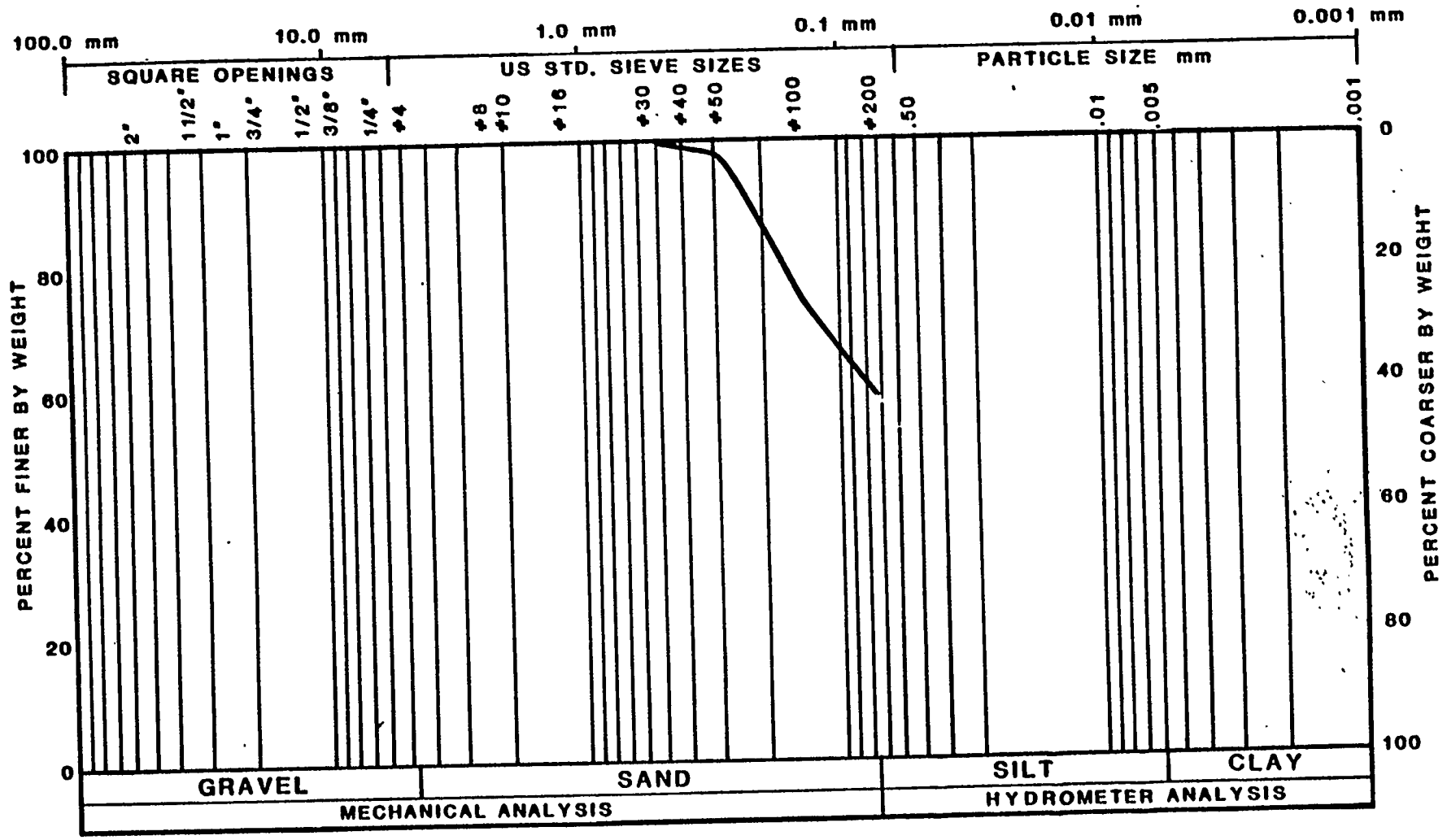
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	134	9.0–11.5	ML

FIGURE D5.26

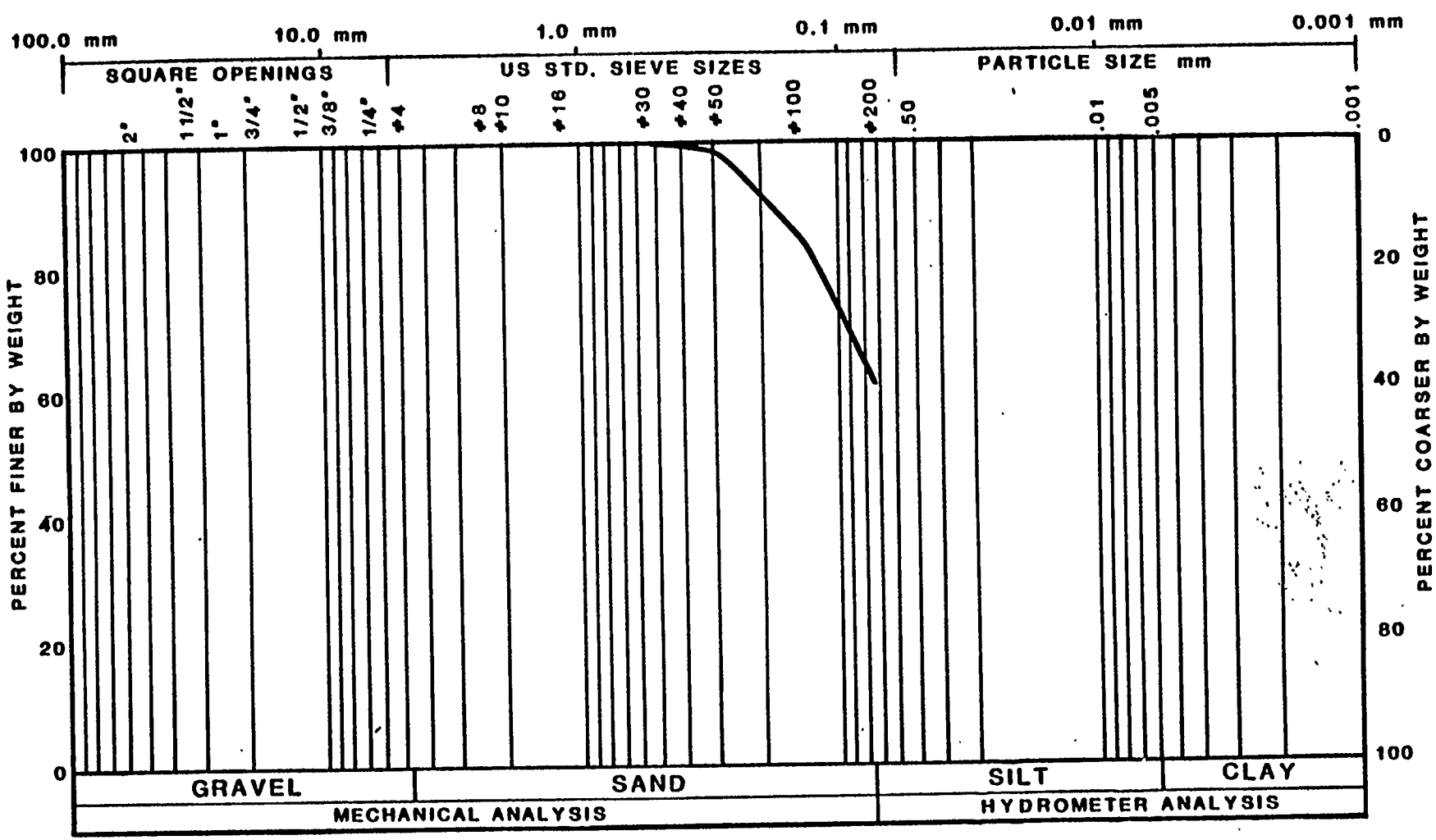
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	134	22.0-23.5	

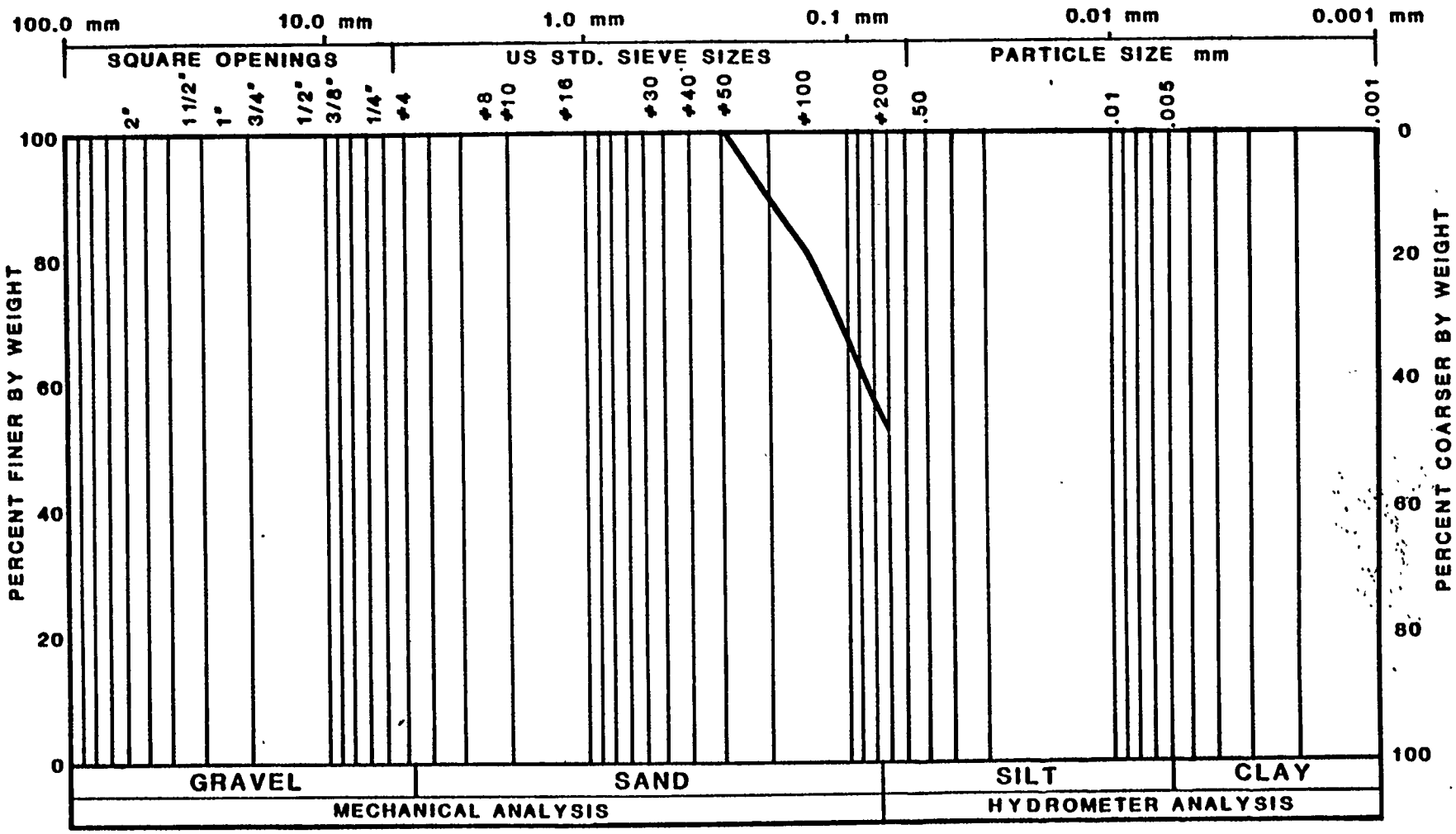
FIGURE D5.27

PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	134	35.0-37.5	

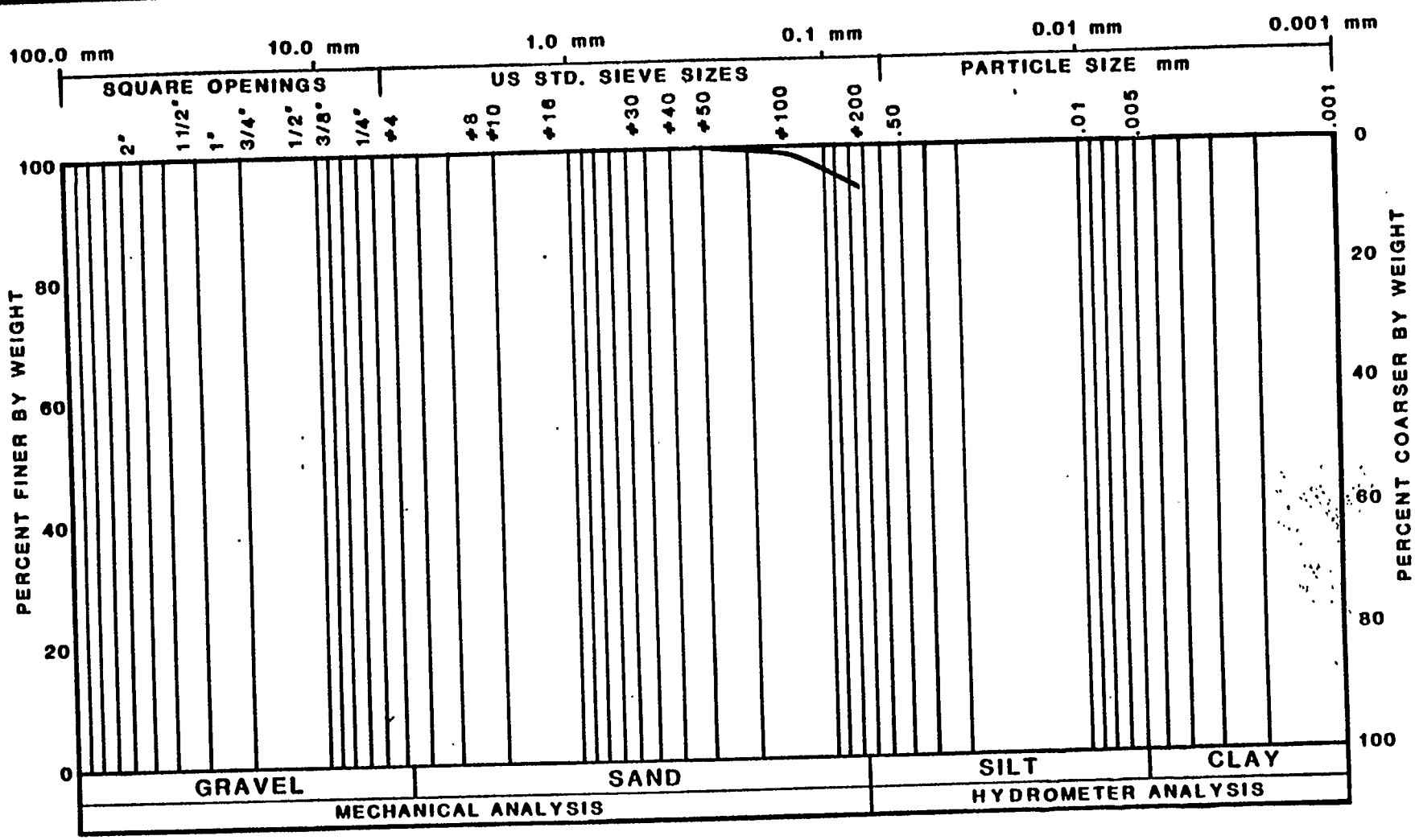
FIGURE D5.28
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	134	42.0–43.5	

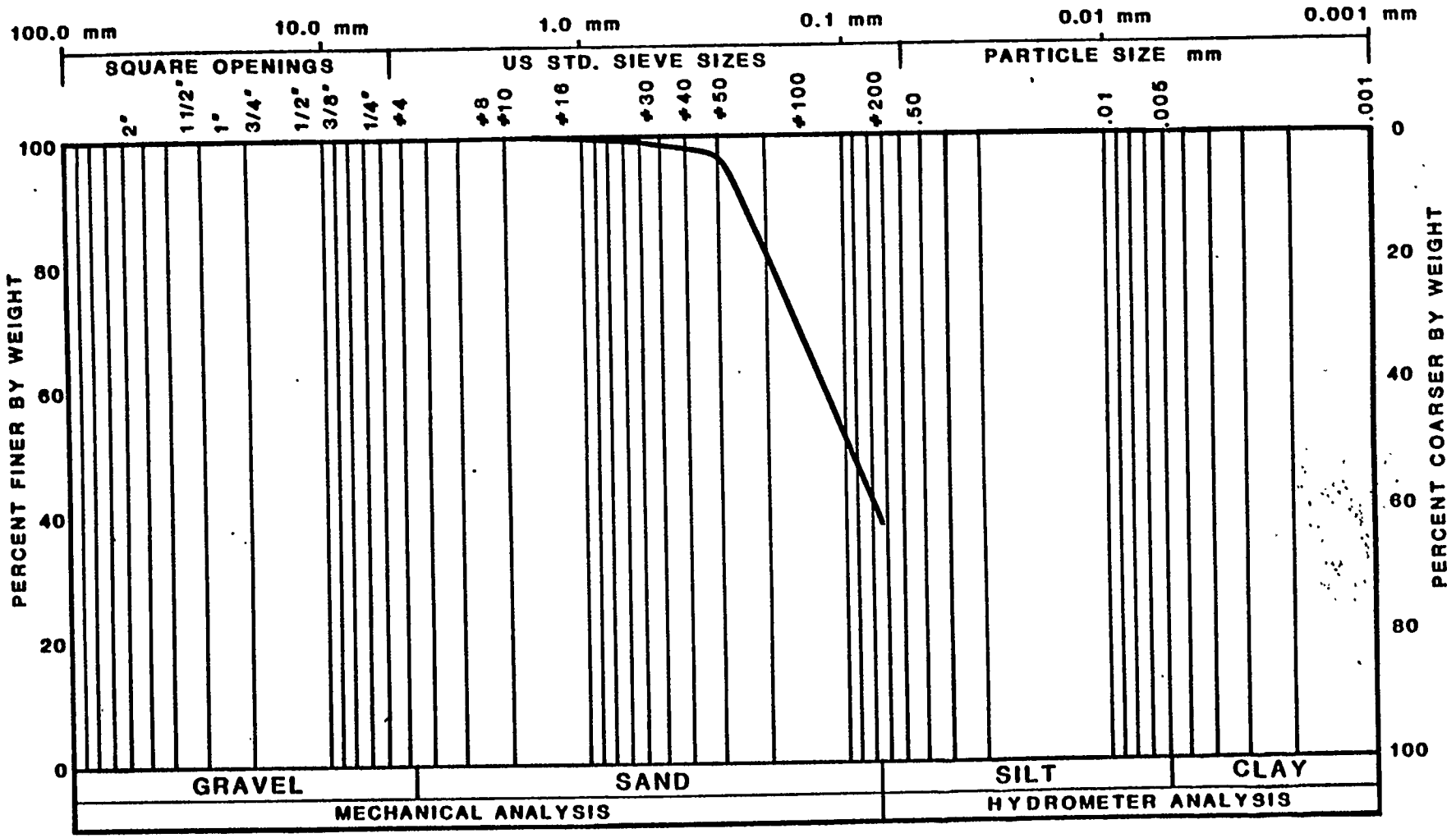
FIGURE D5.29

PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	135	3.0–5.5	ML

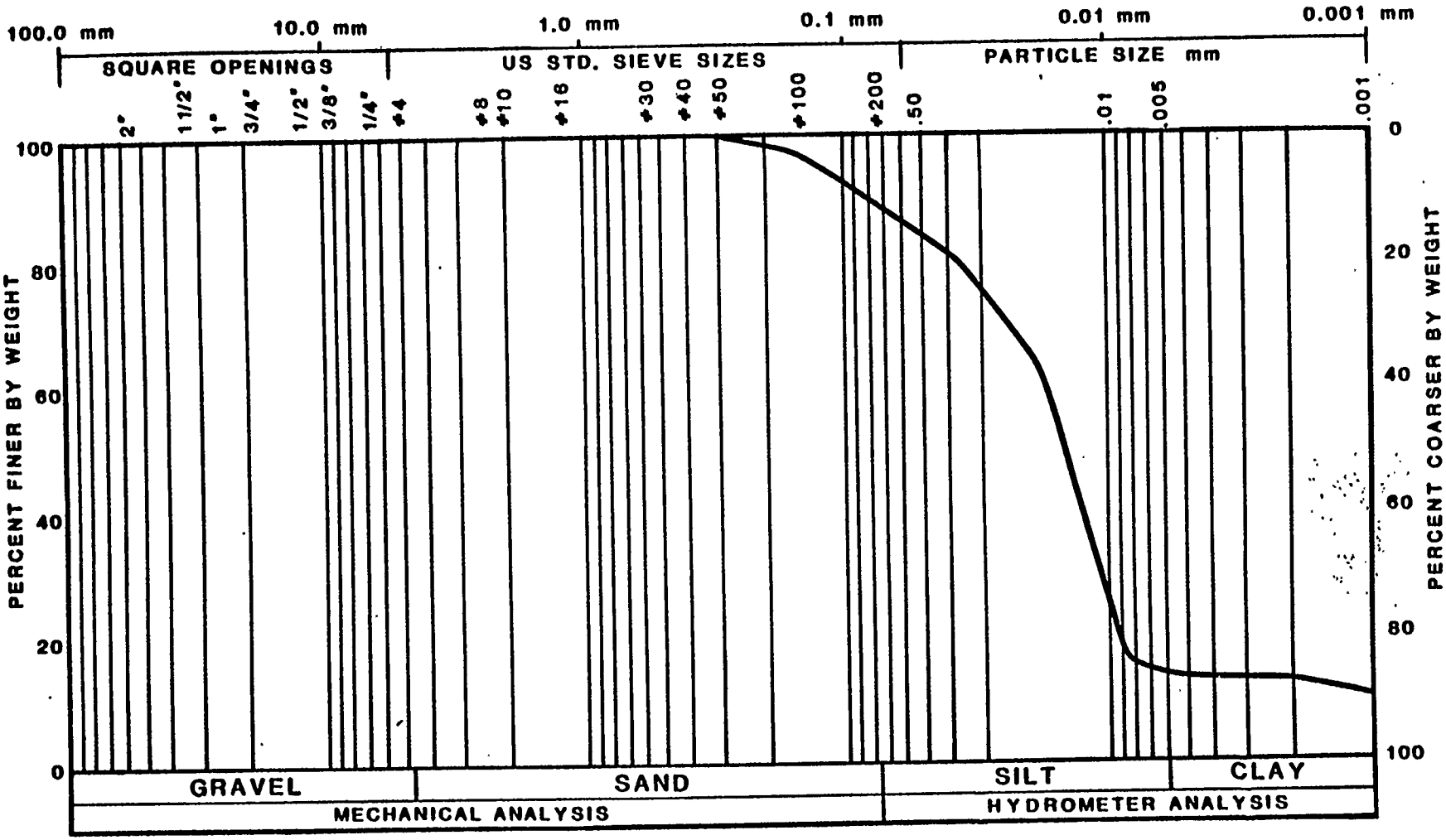
FIGURE D5.30
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	135	8.5-10.0	

FIGURE D5.31

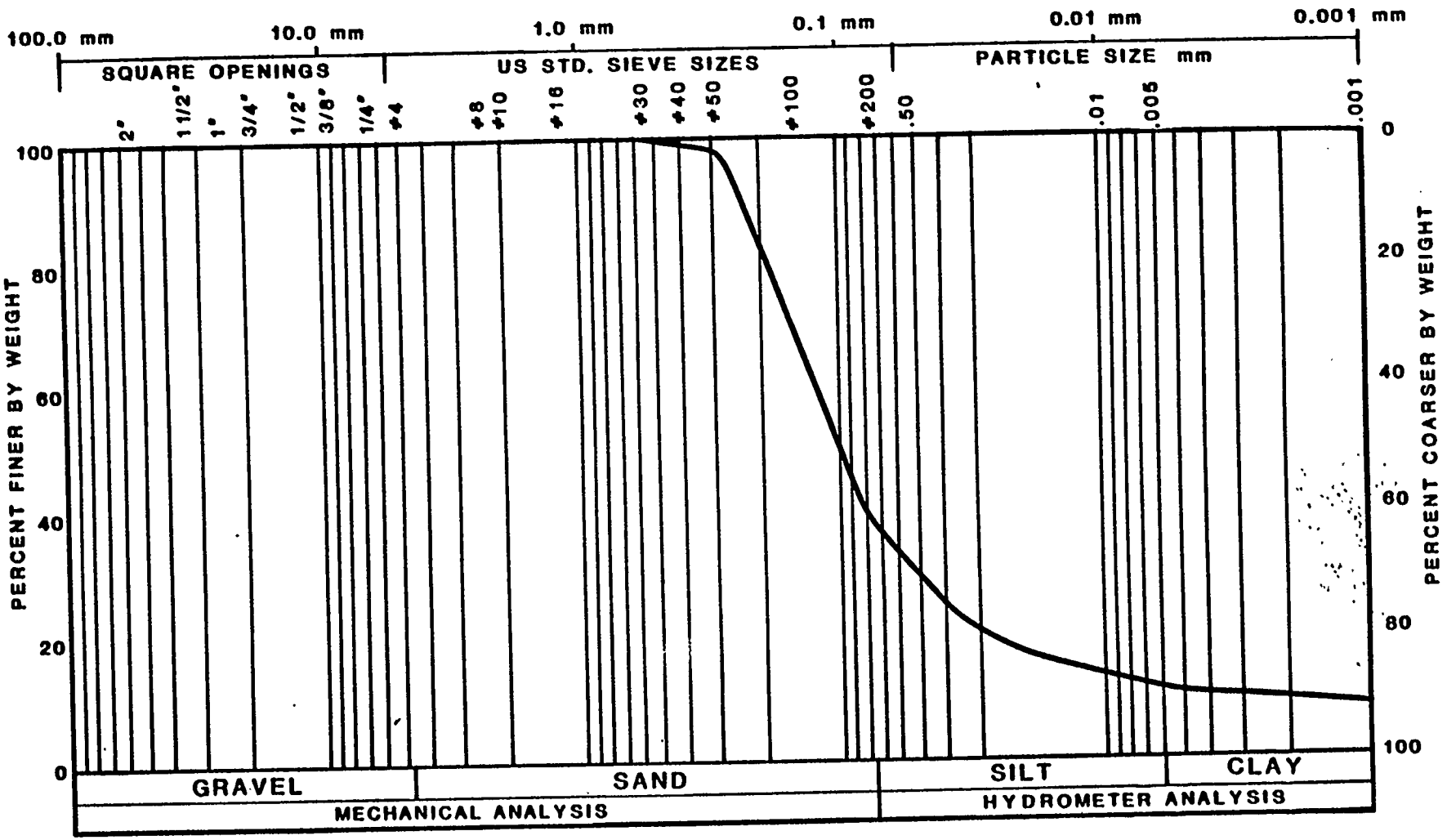
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	135	20.0–22.5	CL

FIGURE D5.32

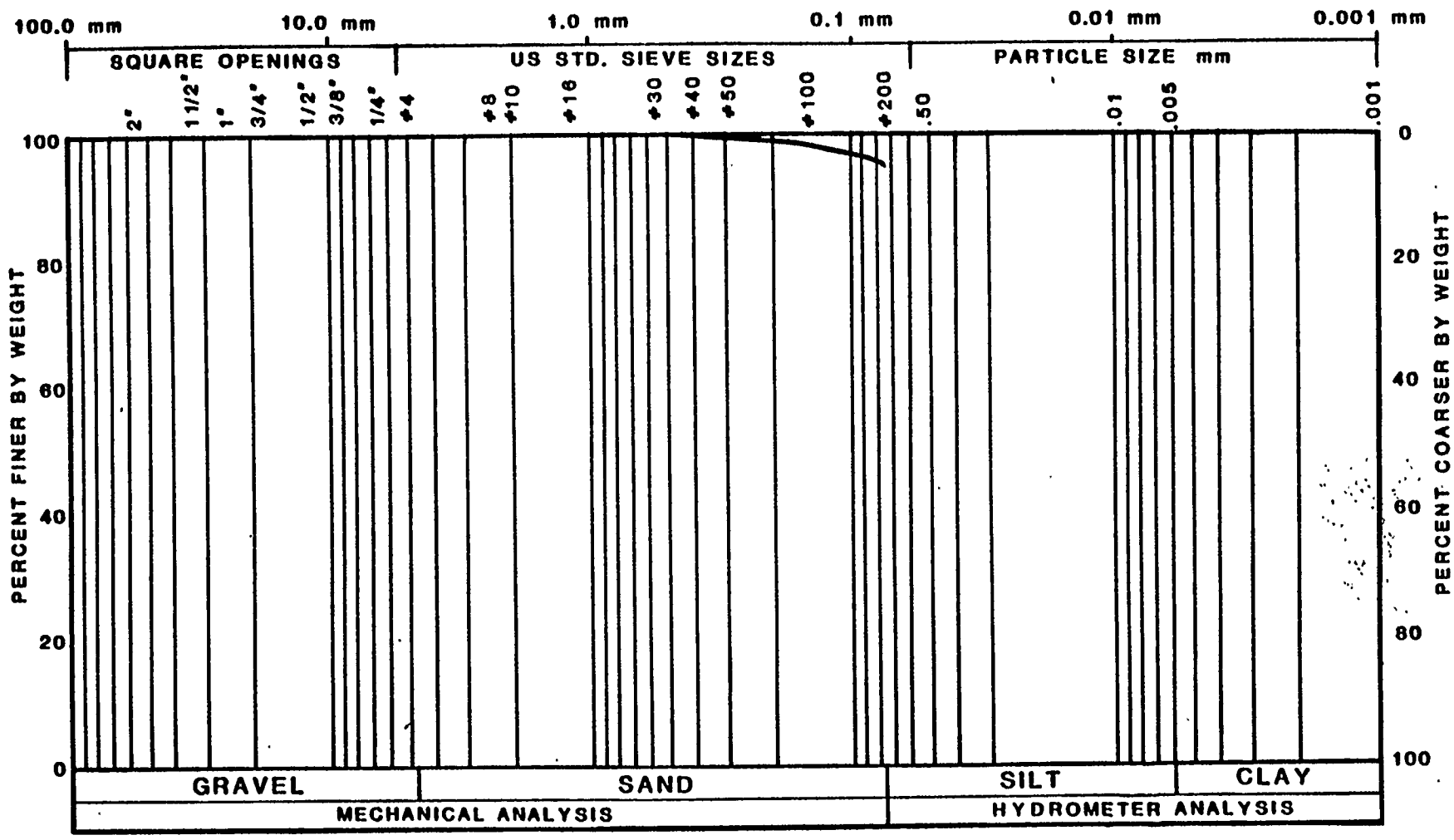
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	135	30.0-32.5	SM

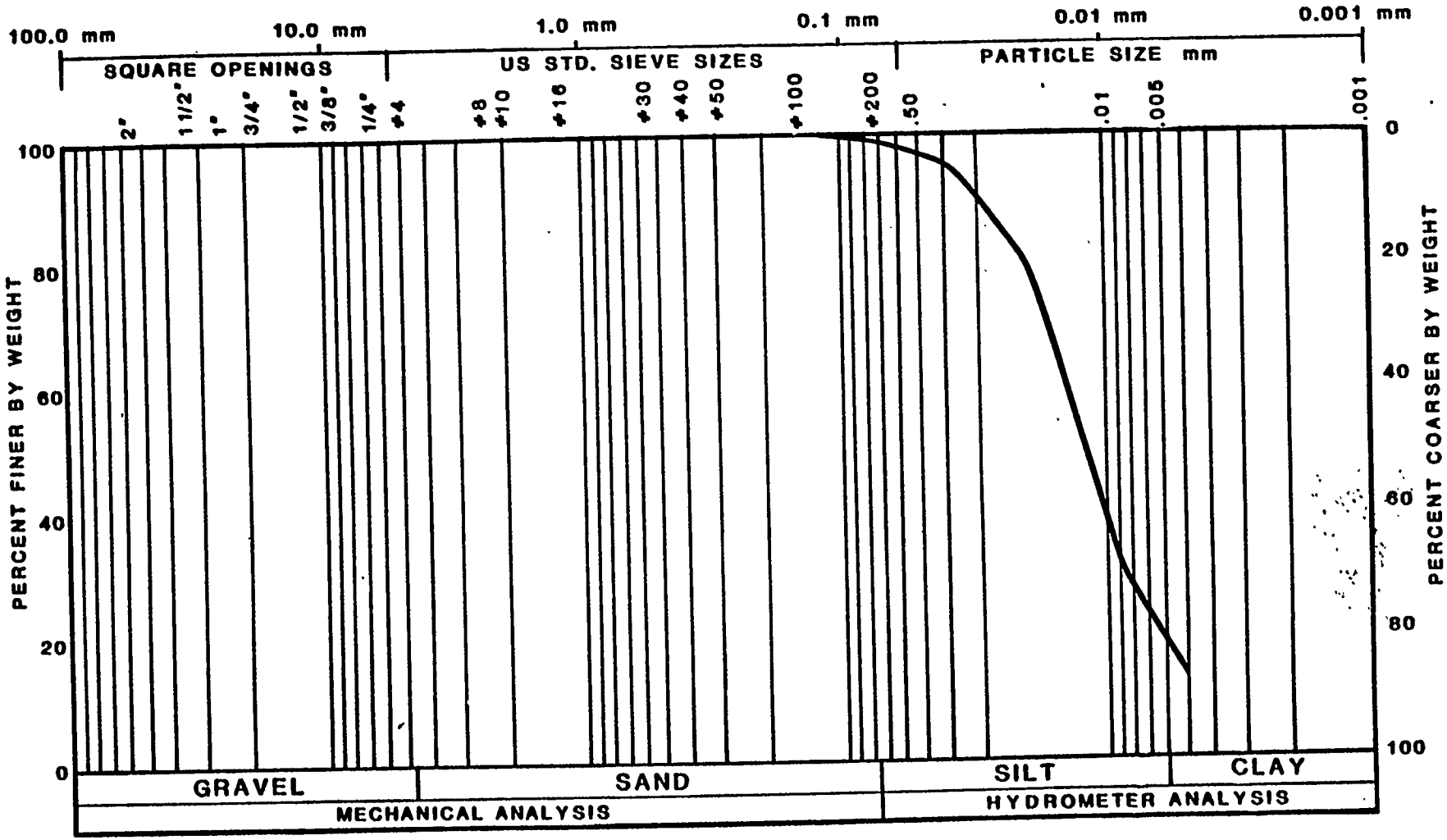
FIGURE D5.33

PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	135	38.5–40.0	

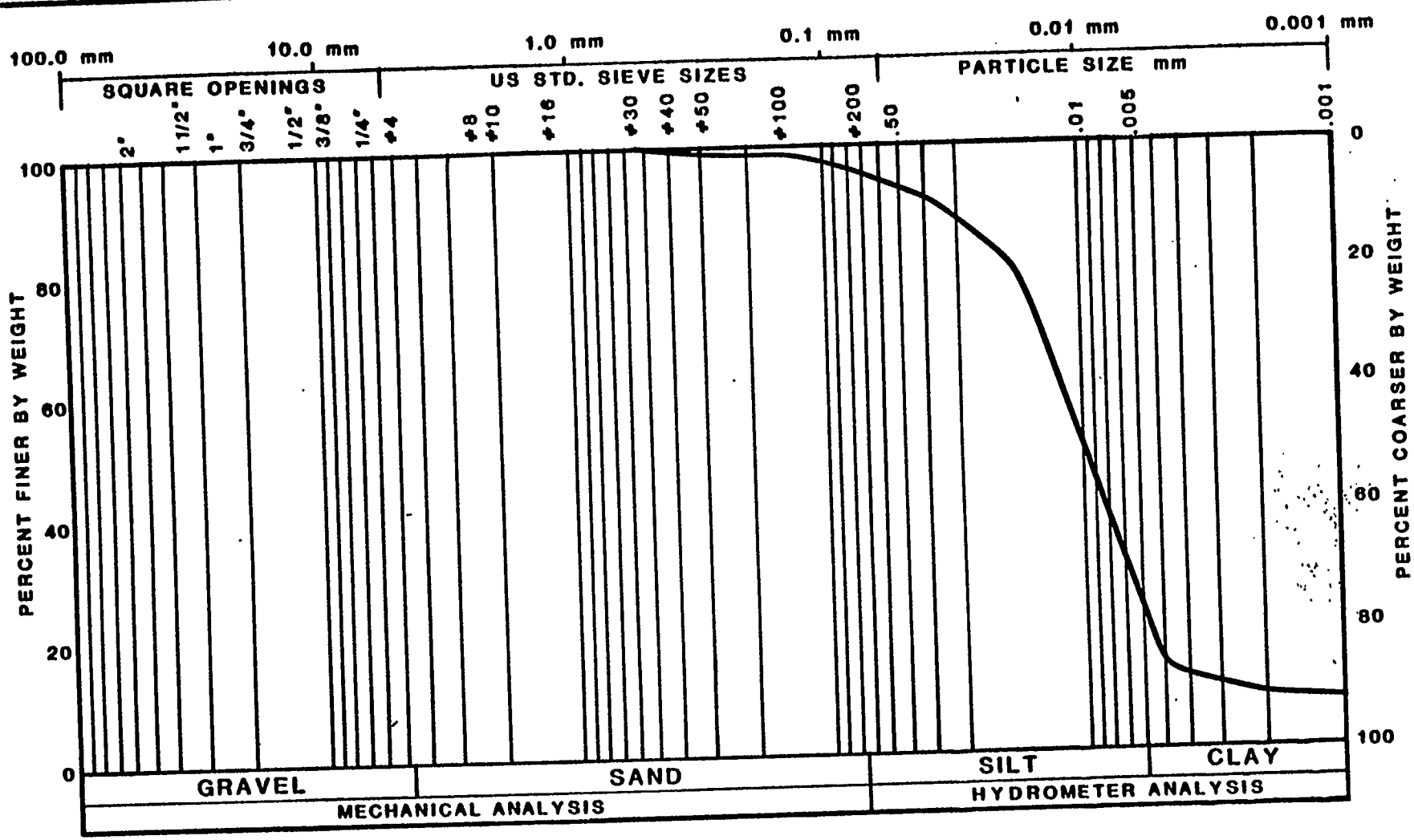
FIGURE D5.34
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	136	3.0-5.5	CL

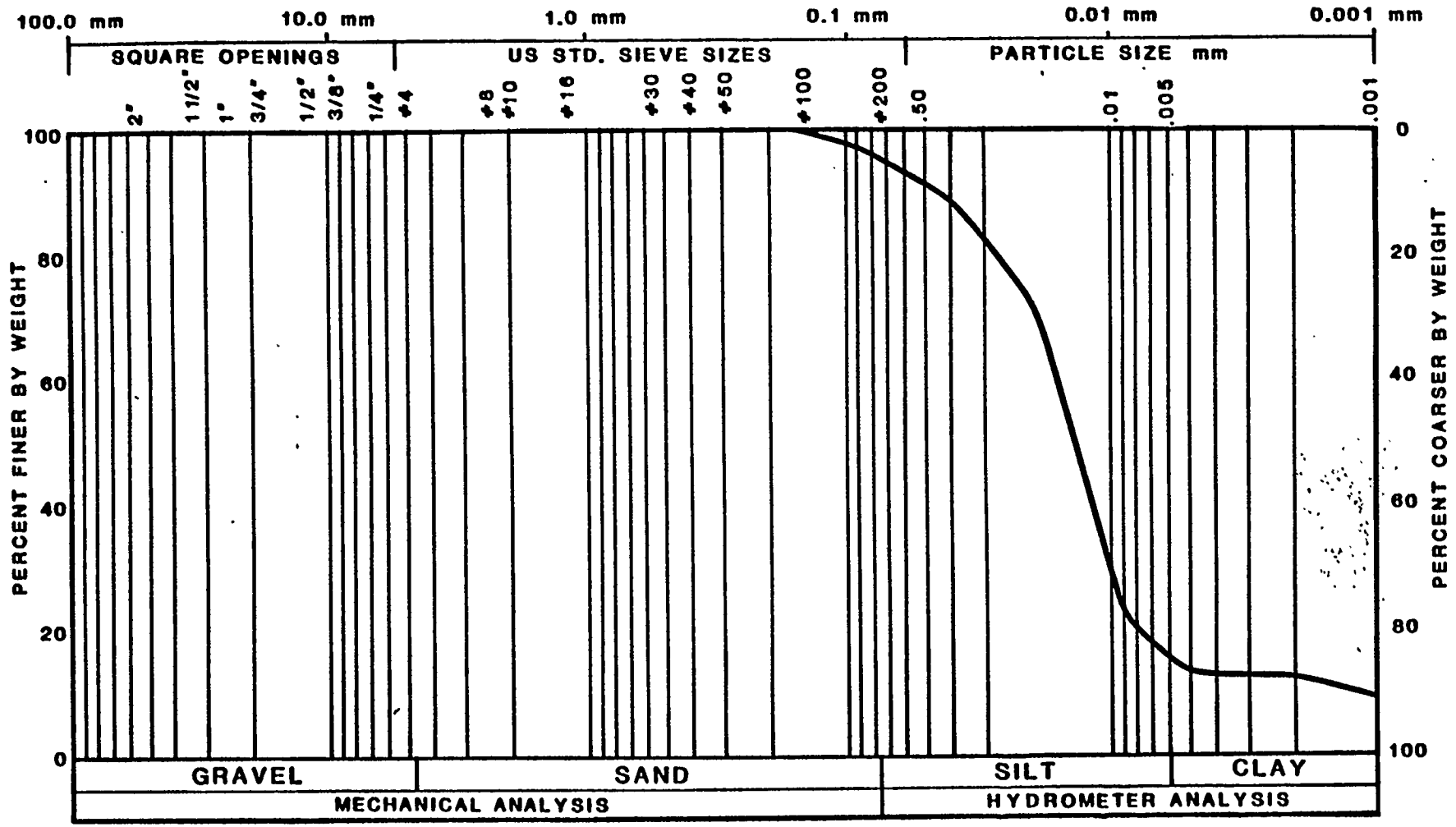
FIGURE D5.35

PARTICLE SIZE DISTRIBUTION CURVE



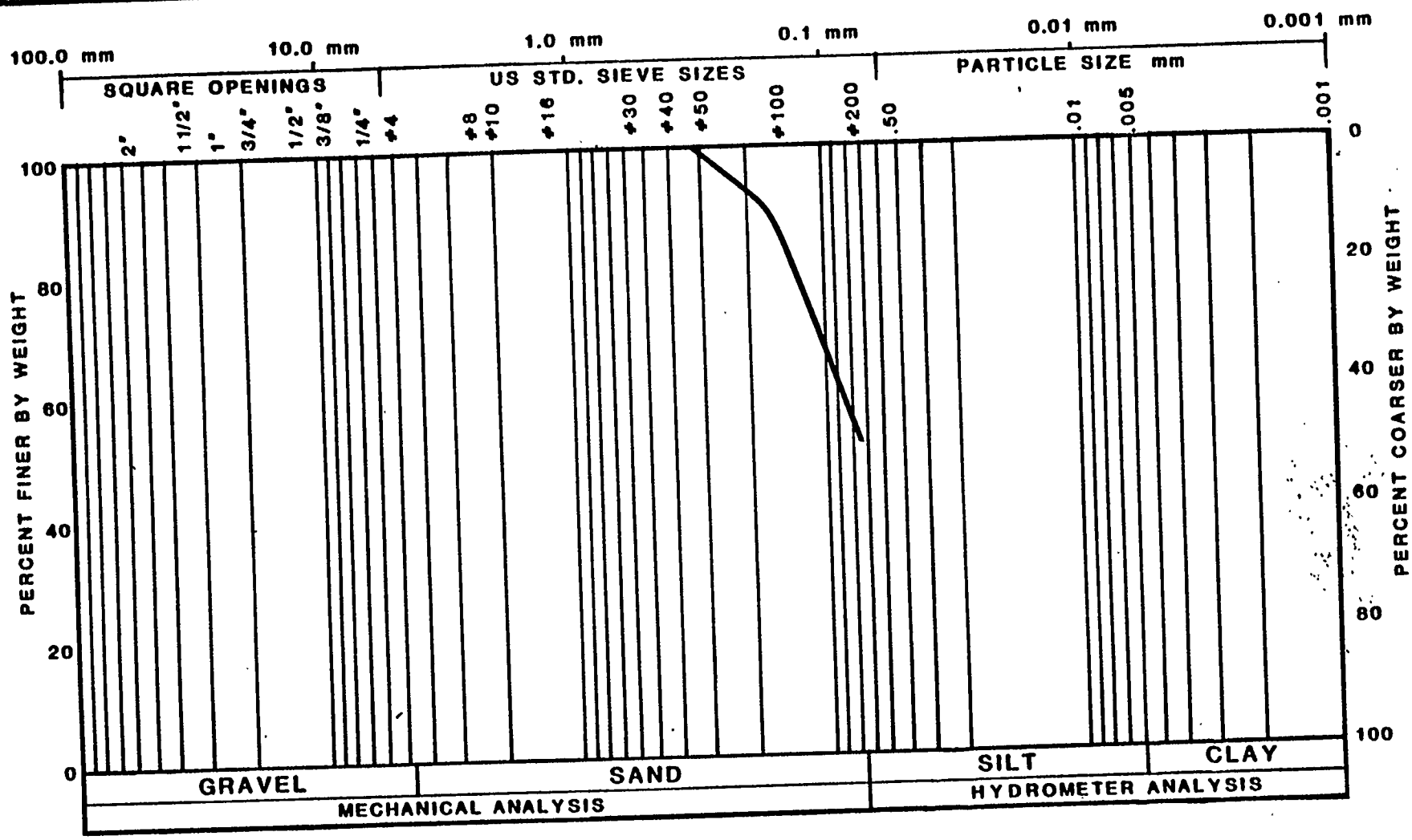
LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	136	13.0–15.5	CH

FIGURE D5.36
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	136	20.0–22.5	CL

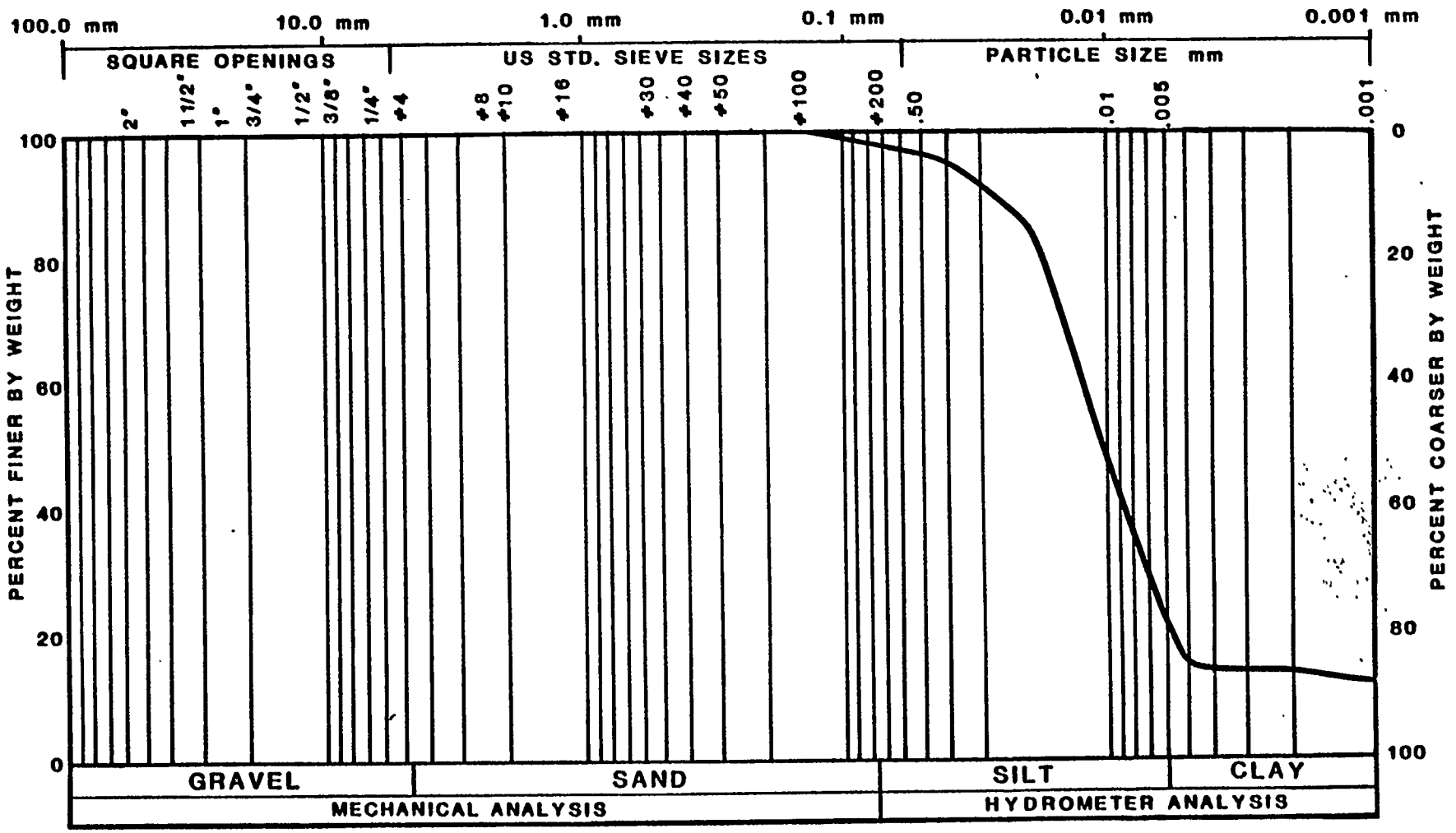
FIGURE D5.37
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND		
SAMPLE HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
137	1.5–3.0	

FIGURE D5.38

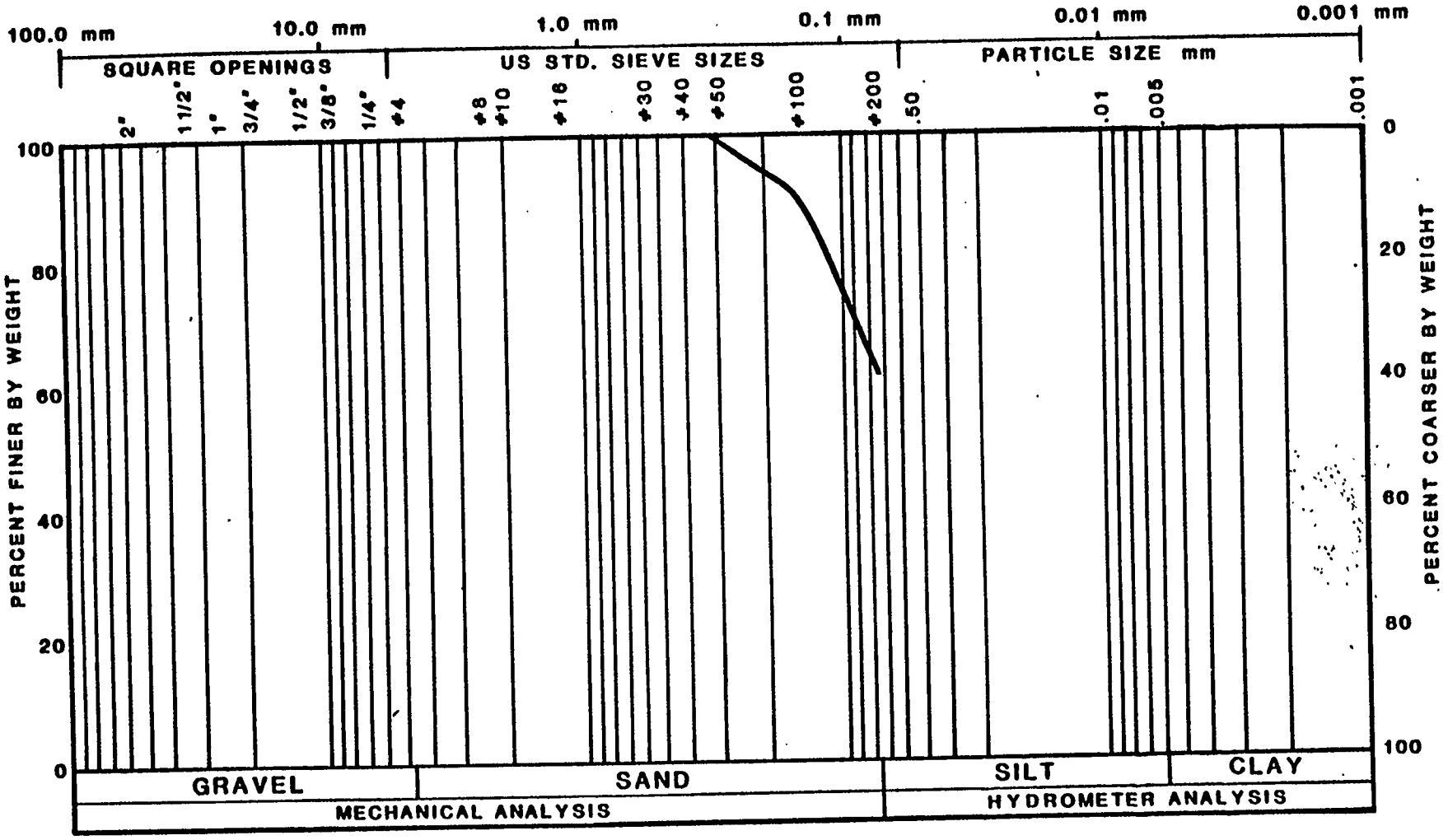
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	137	6.5-9.0	CL

FIGURE D5.39

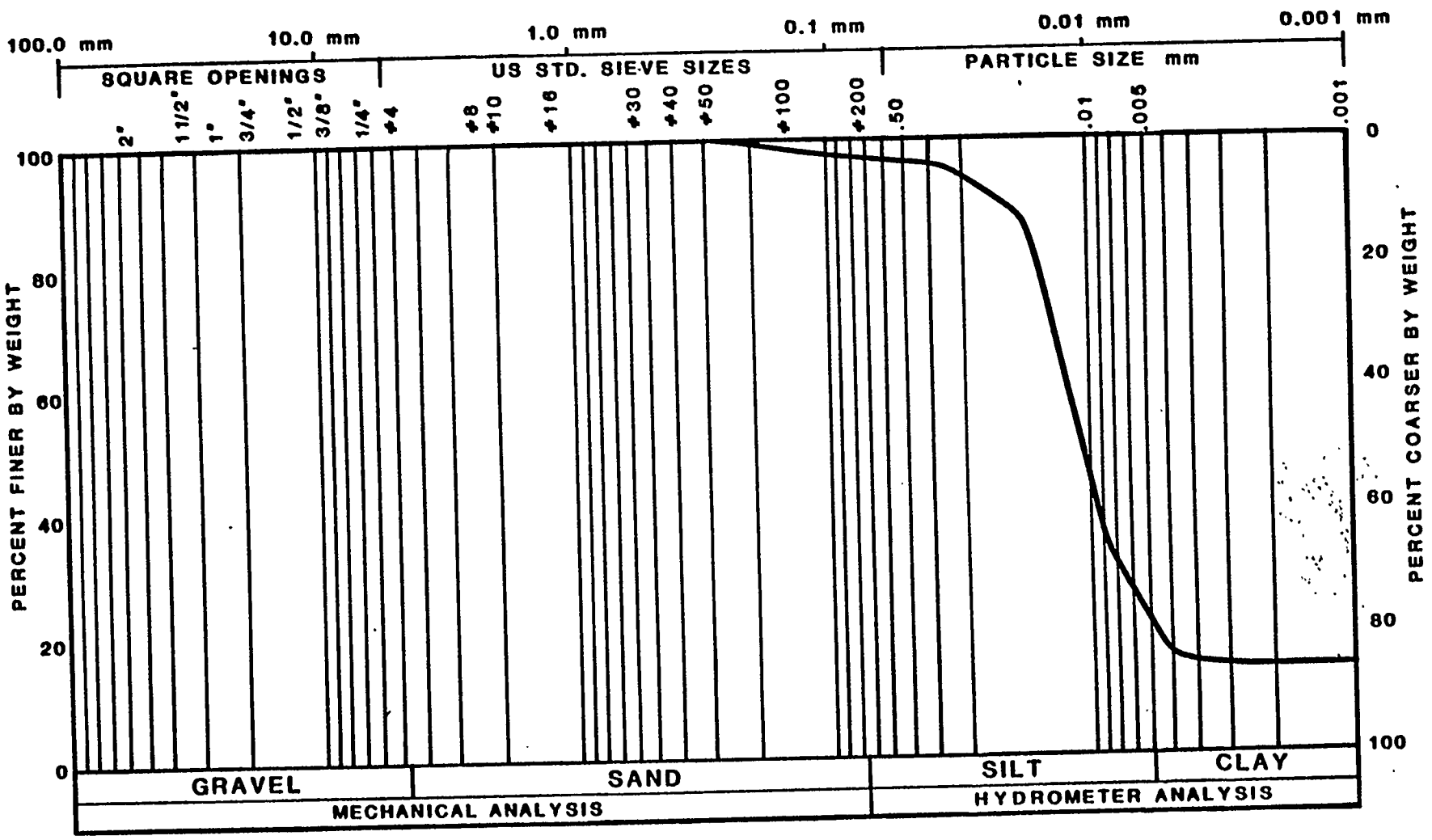
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND		
SAMPLE HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
137	10.5–12.0	

FIGURE D5.40

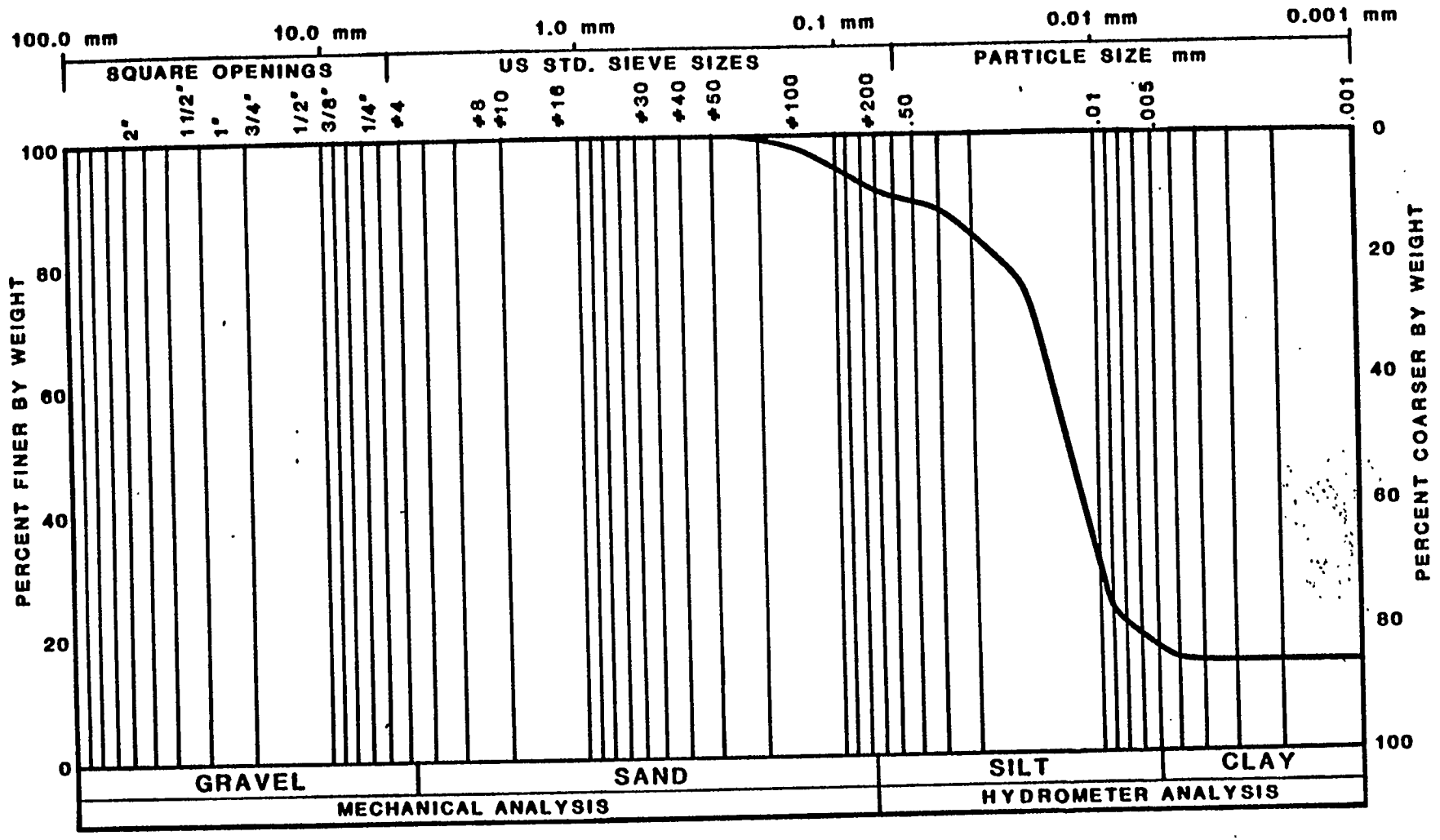
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND		
SAMPLE HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
137	16.5–18.0	CL

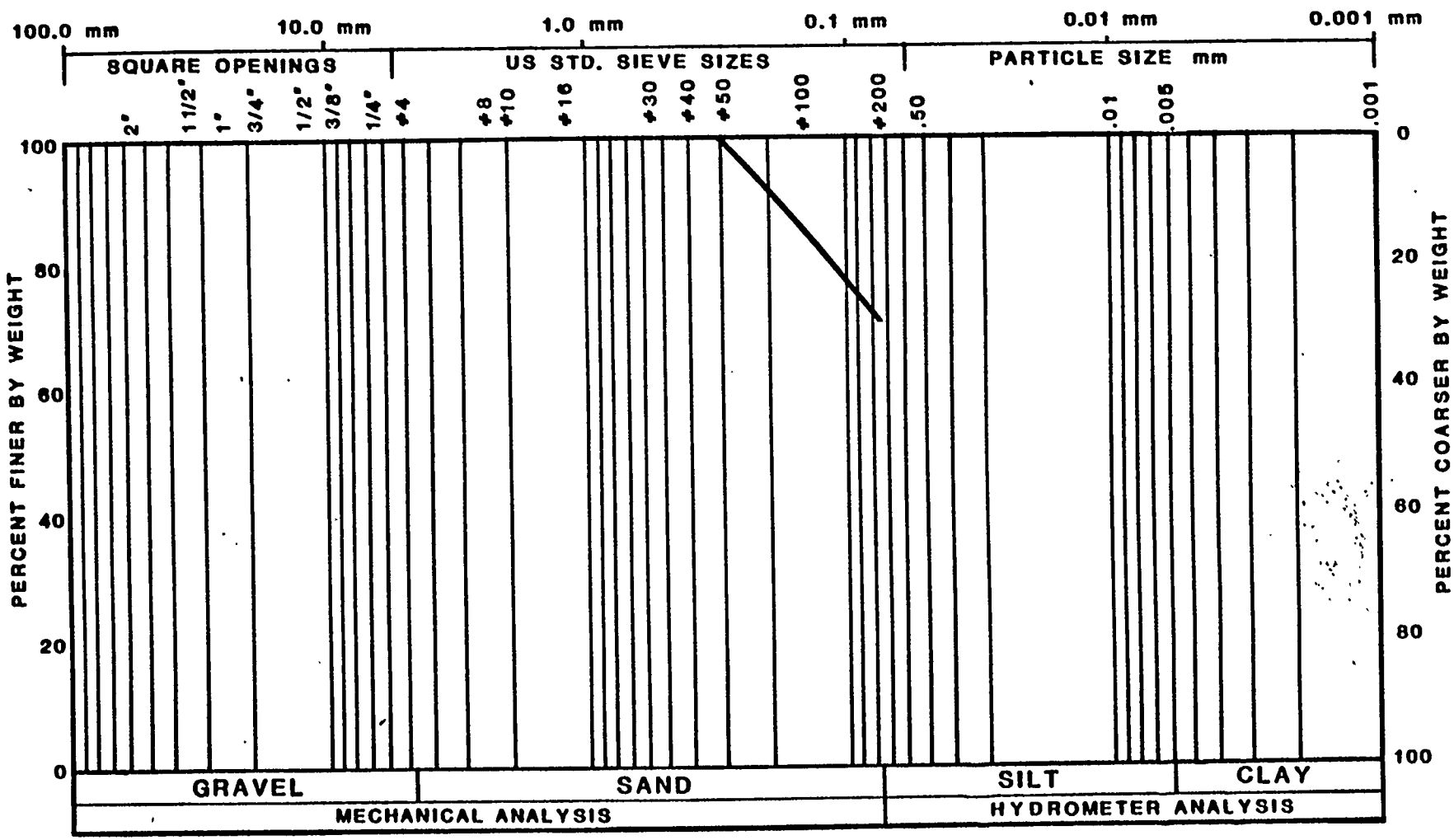
FIGURE D5.41

PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	138	10.0–11.5	CL

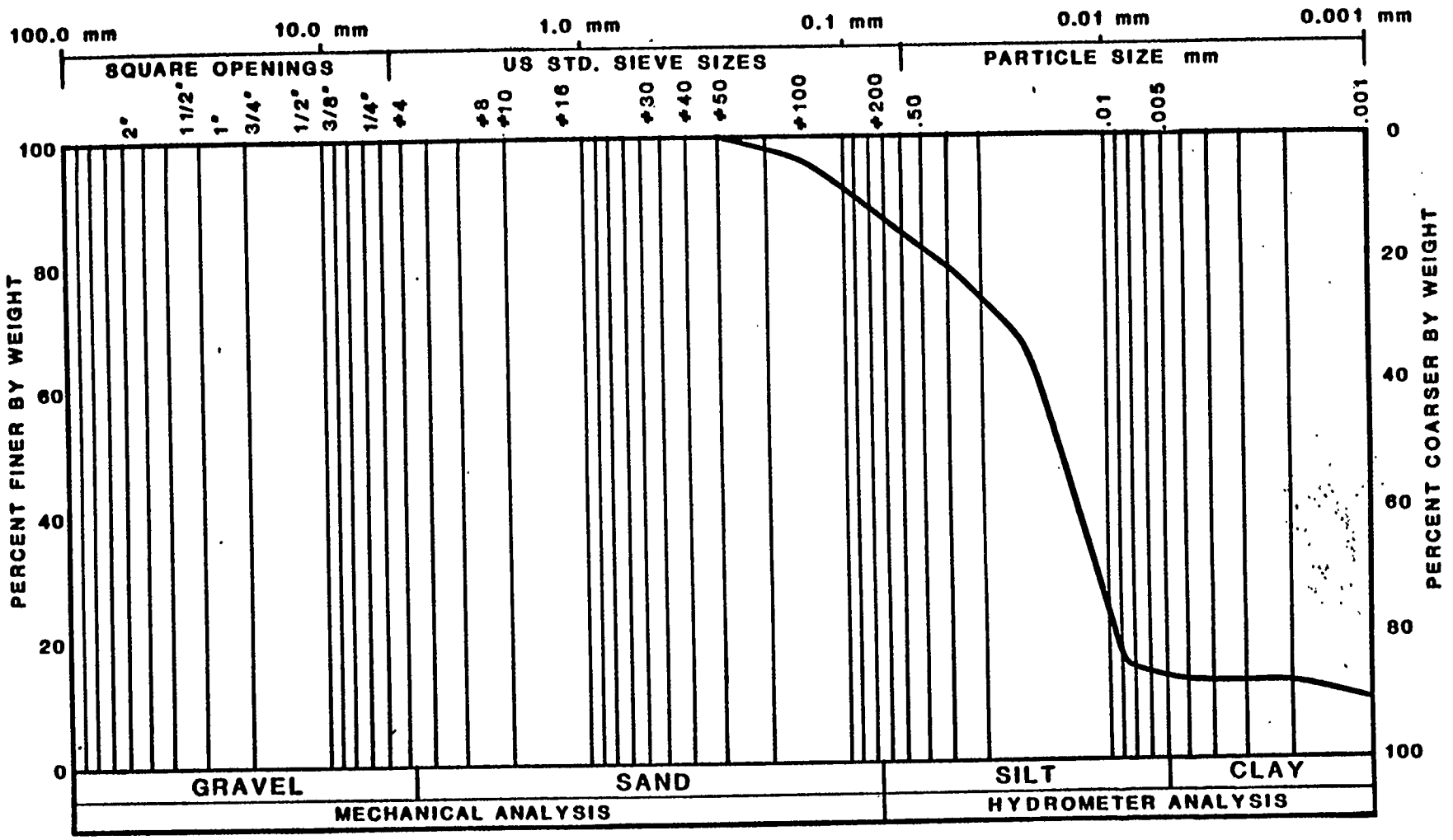
FIGURE D5.42
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	138	20-5-22.0	CL-ML

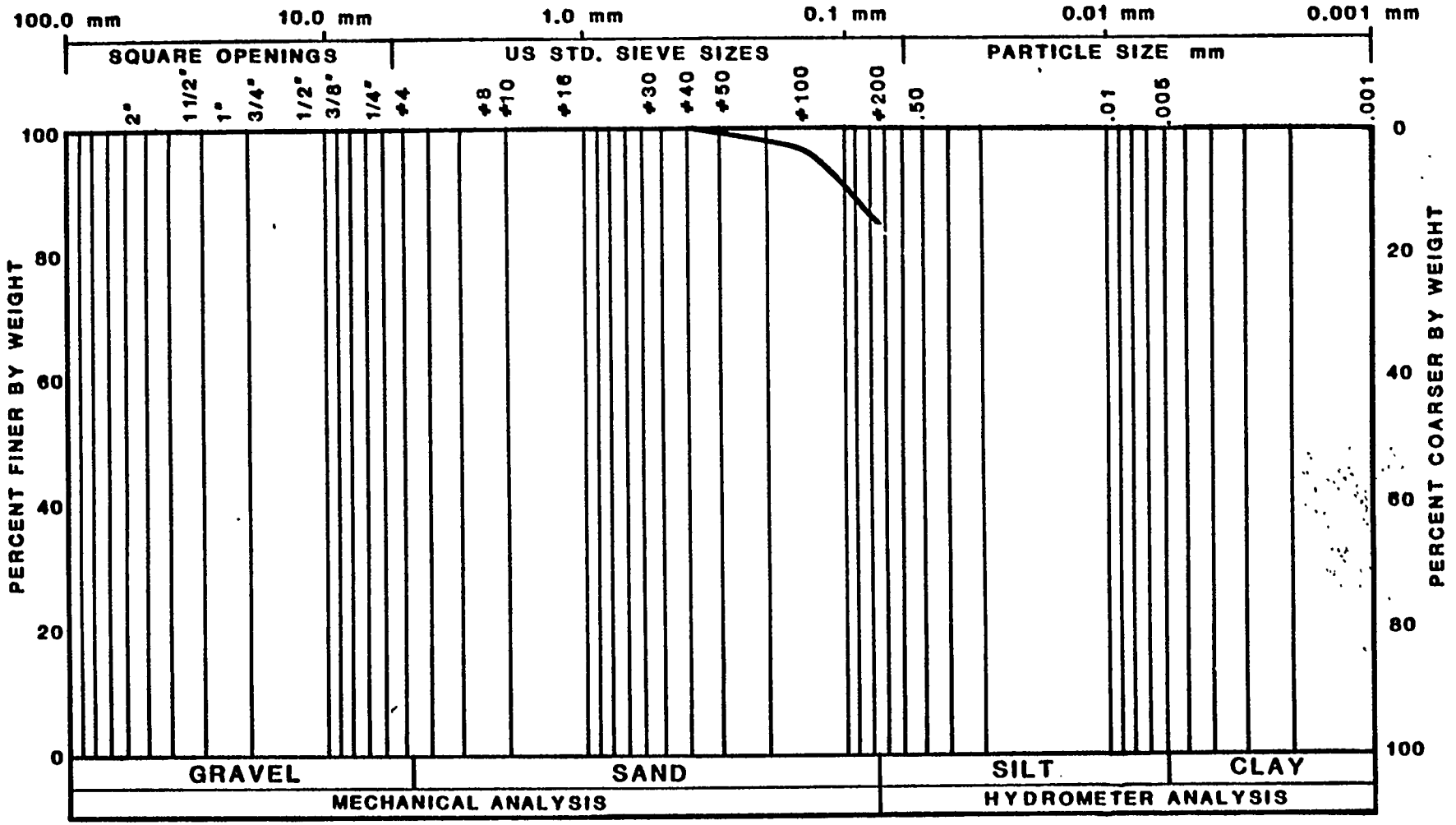
FIGURE D5.43

PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	138	35.0–37.5	CL

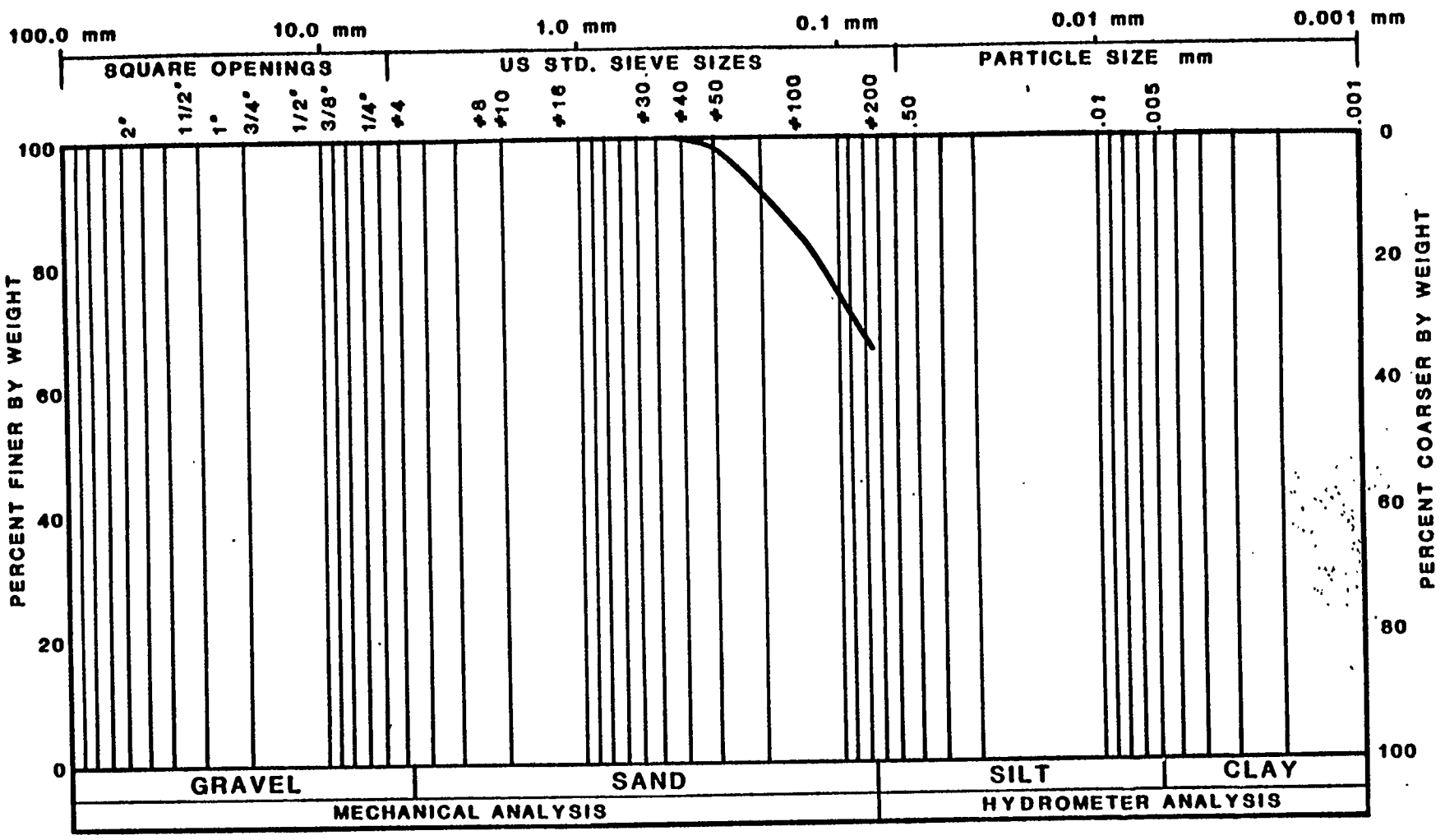
FIGURE D5.44
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	138	4.5-6.0	CL

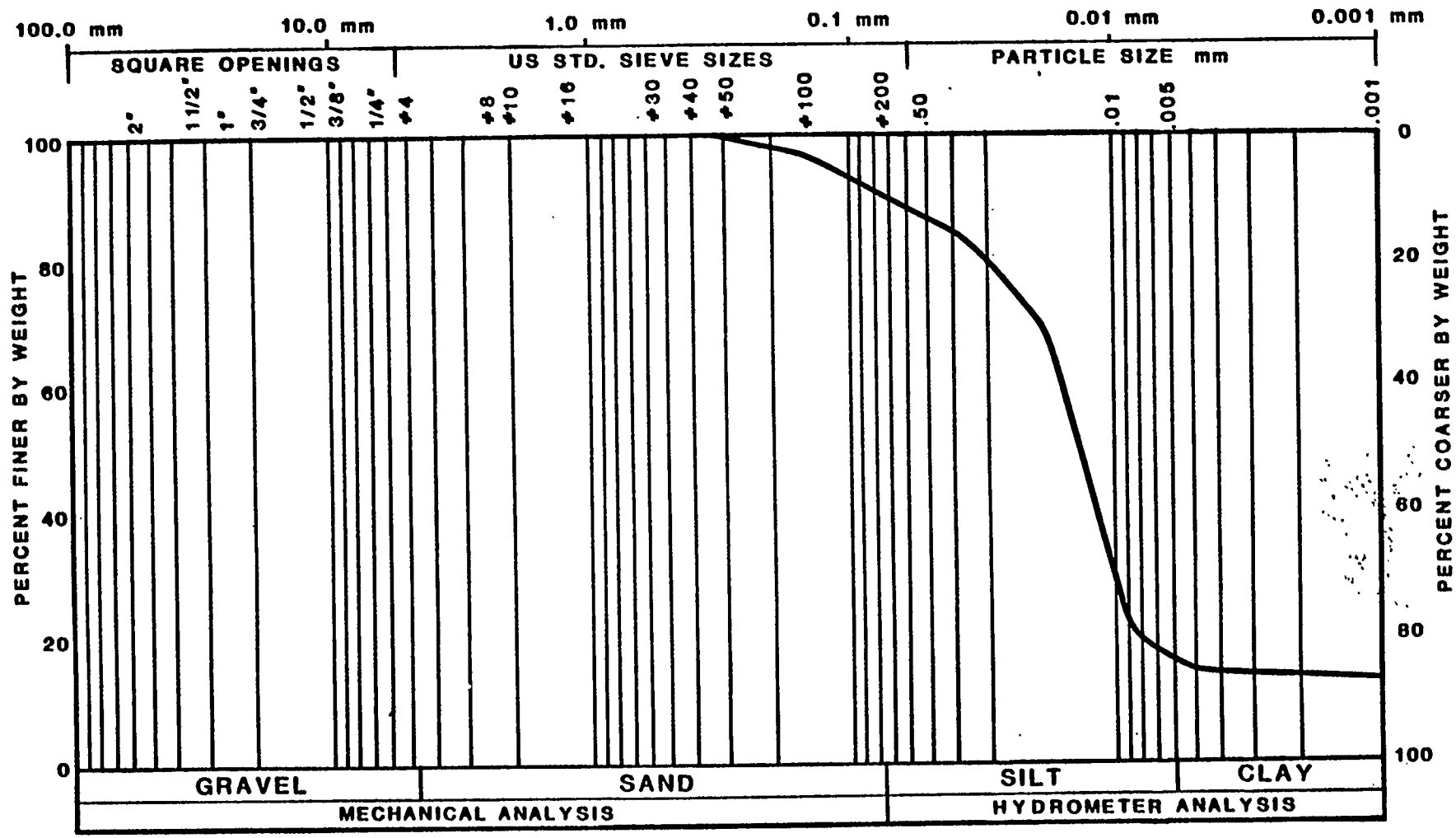
FIGURE D5.45

PARTICLE SIZE DISTRIBUTION CURVE



LEGEND		
SAMPLE HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
139	10.5–12.0	ML

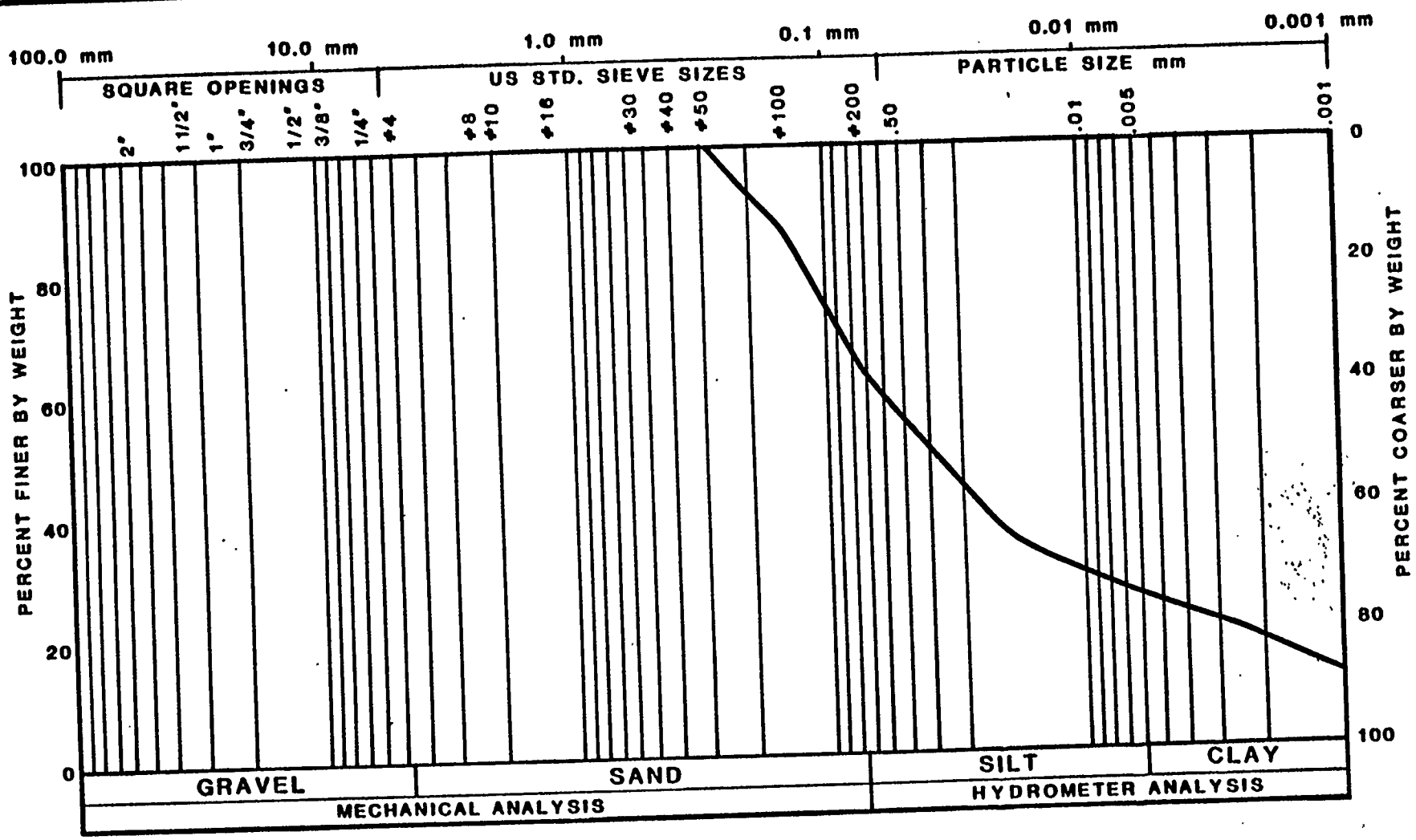
FIGURE D5.46
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	139	13.5–15.0	CL

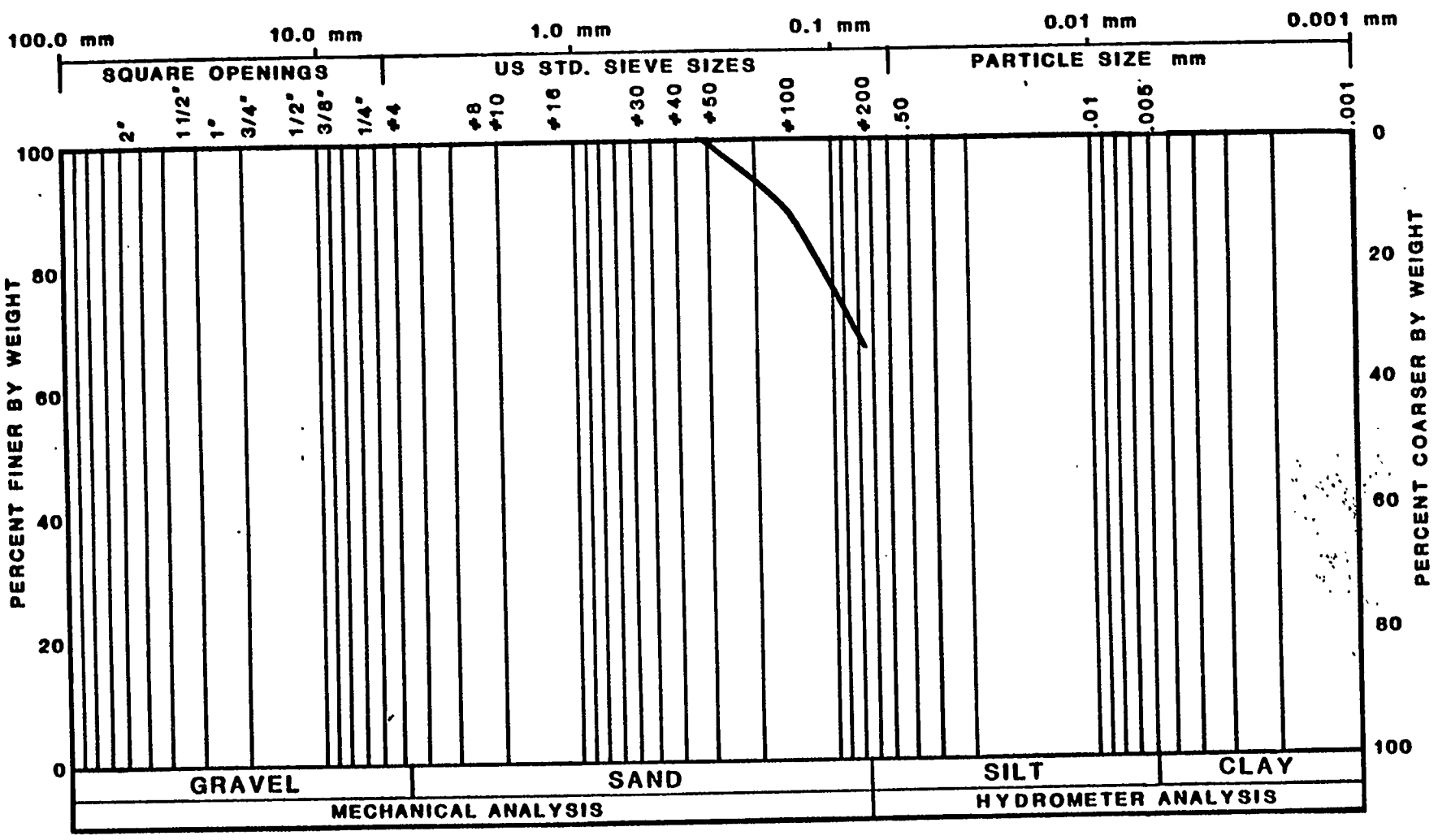
FIGURE D5.47

PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	139	19.5–22.0	ML

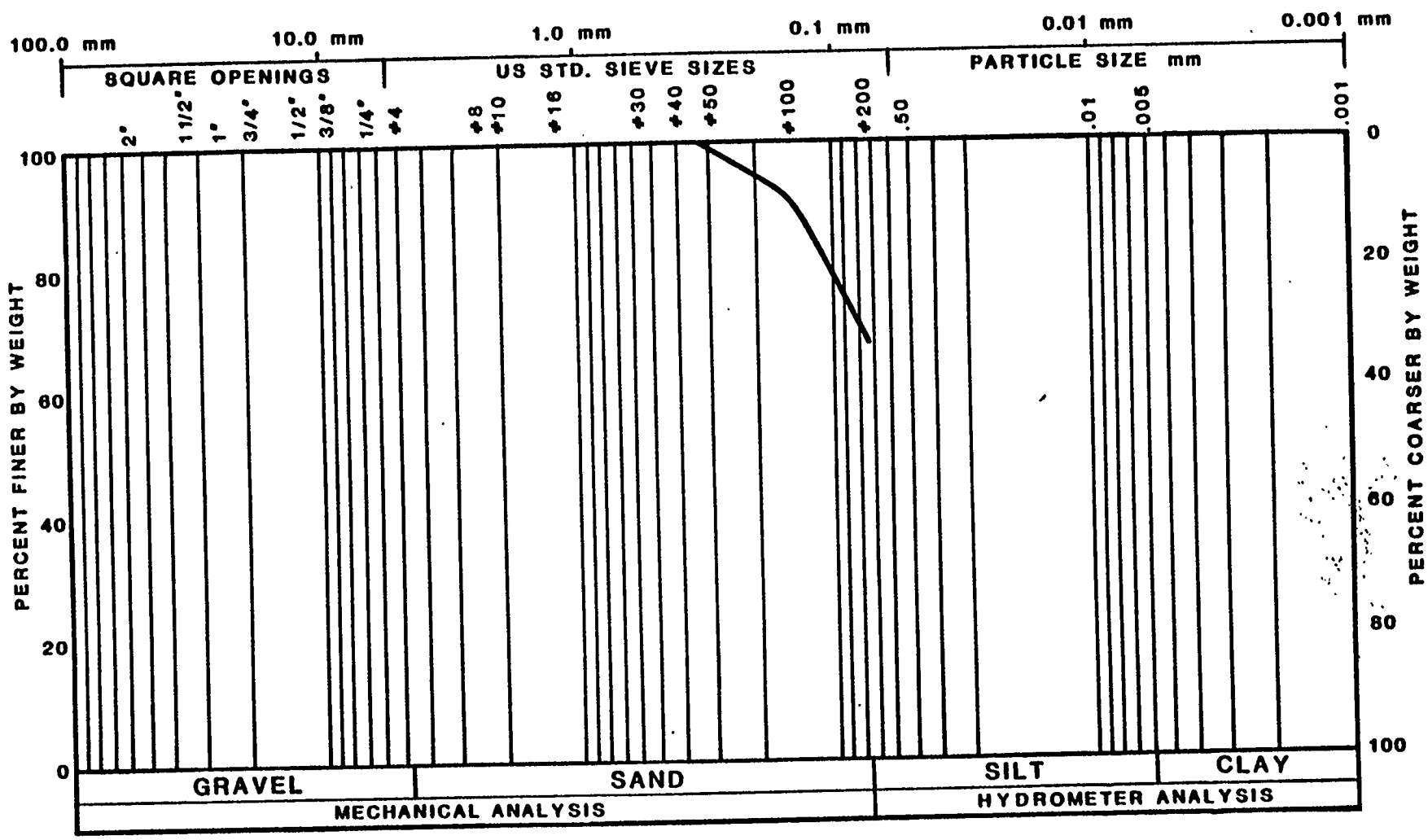
FIGURE D5.48
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND		
SAMPLE HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
139	0.0-1.5	

FIGURE D5.49

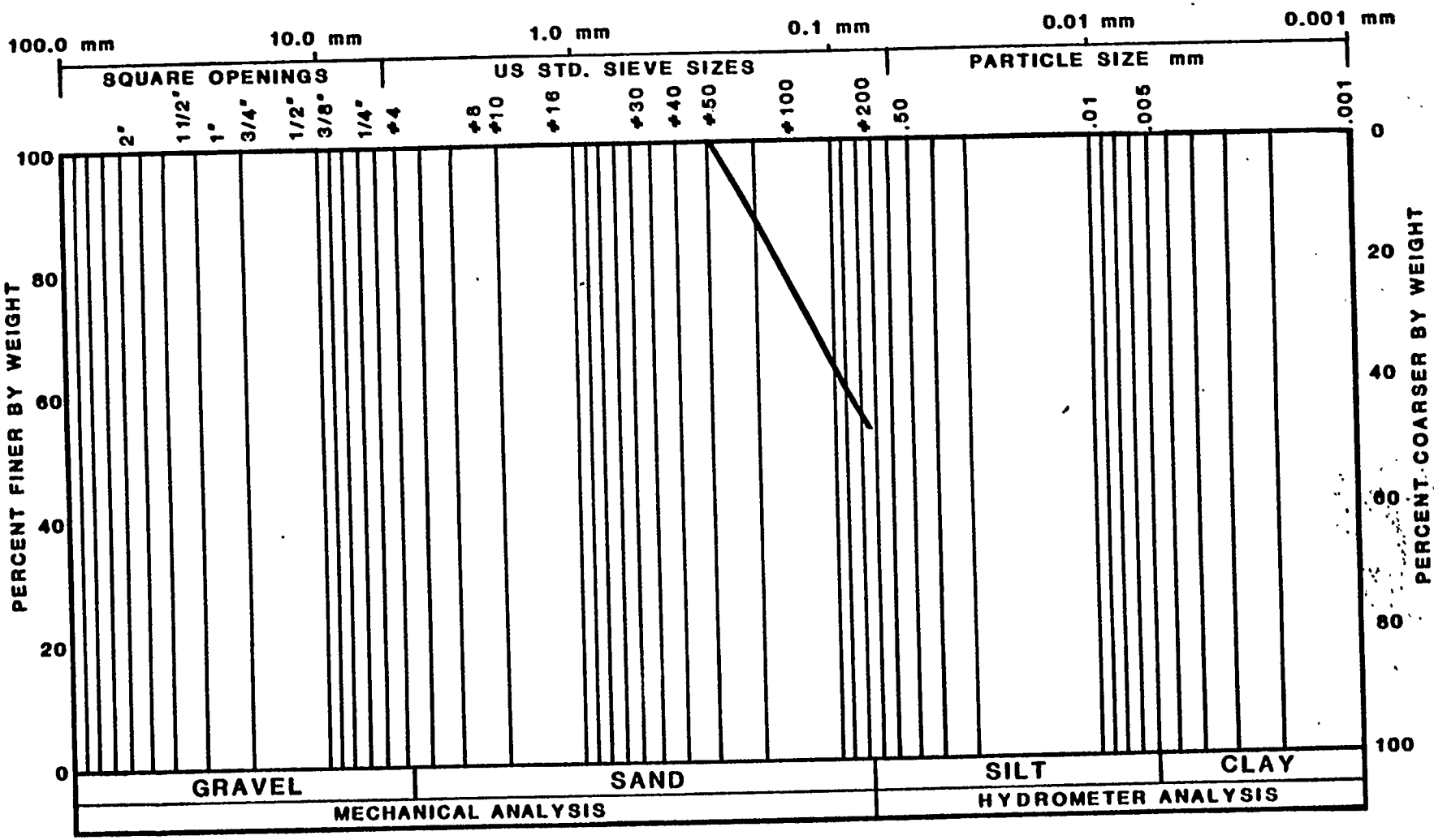
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	181	4.5–7.0	ML

FIGURE D5.50

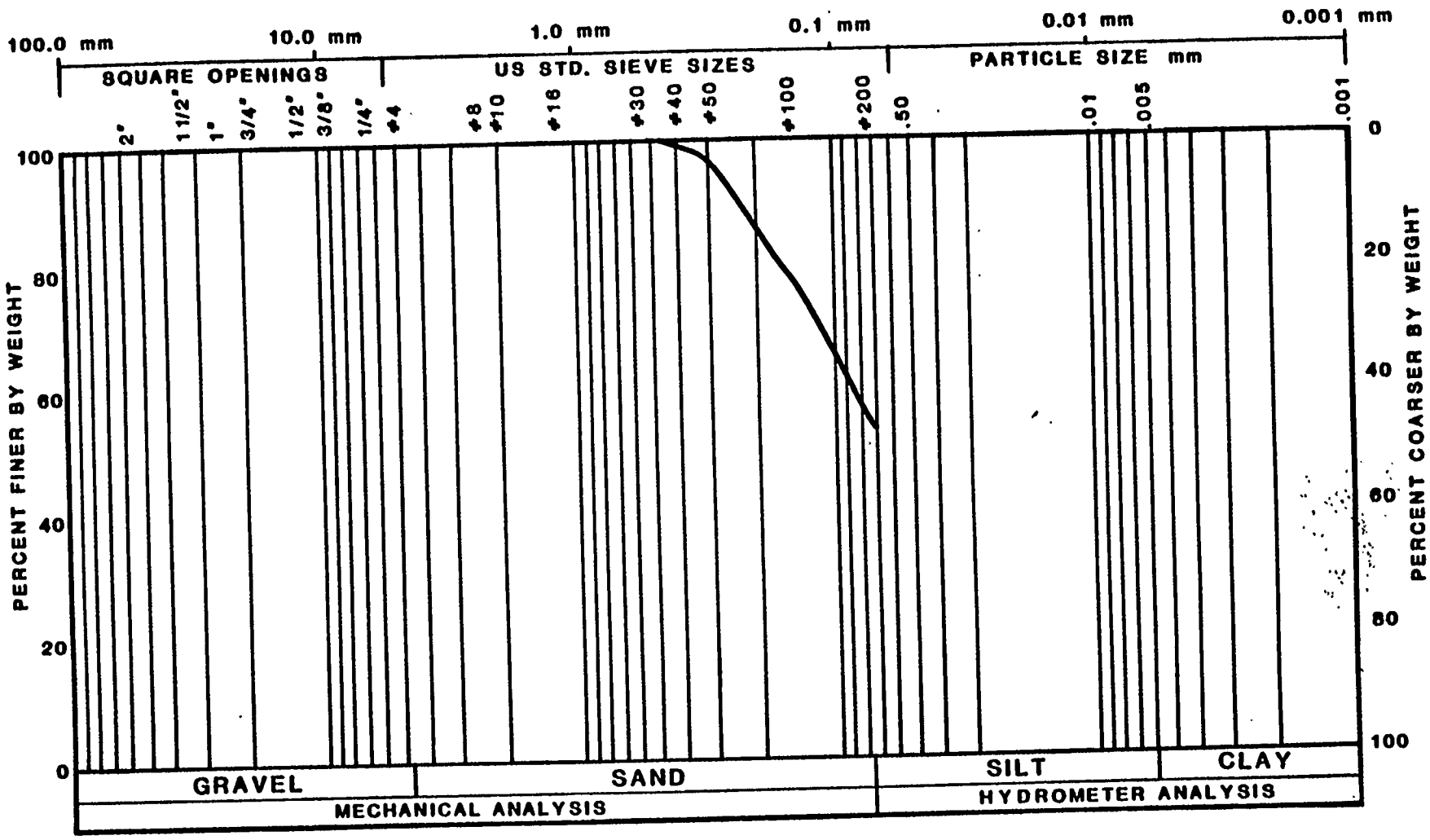
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	181	8.5–10.0	

FIGURE D5.51

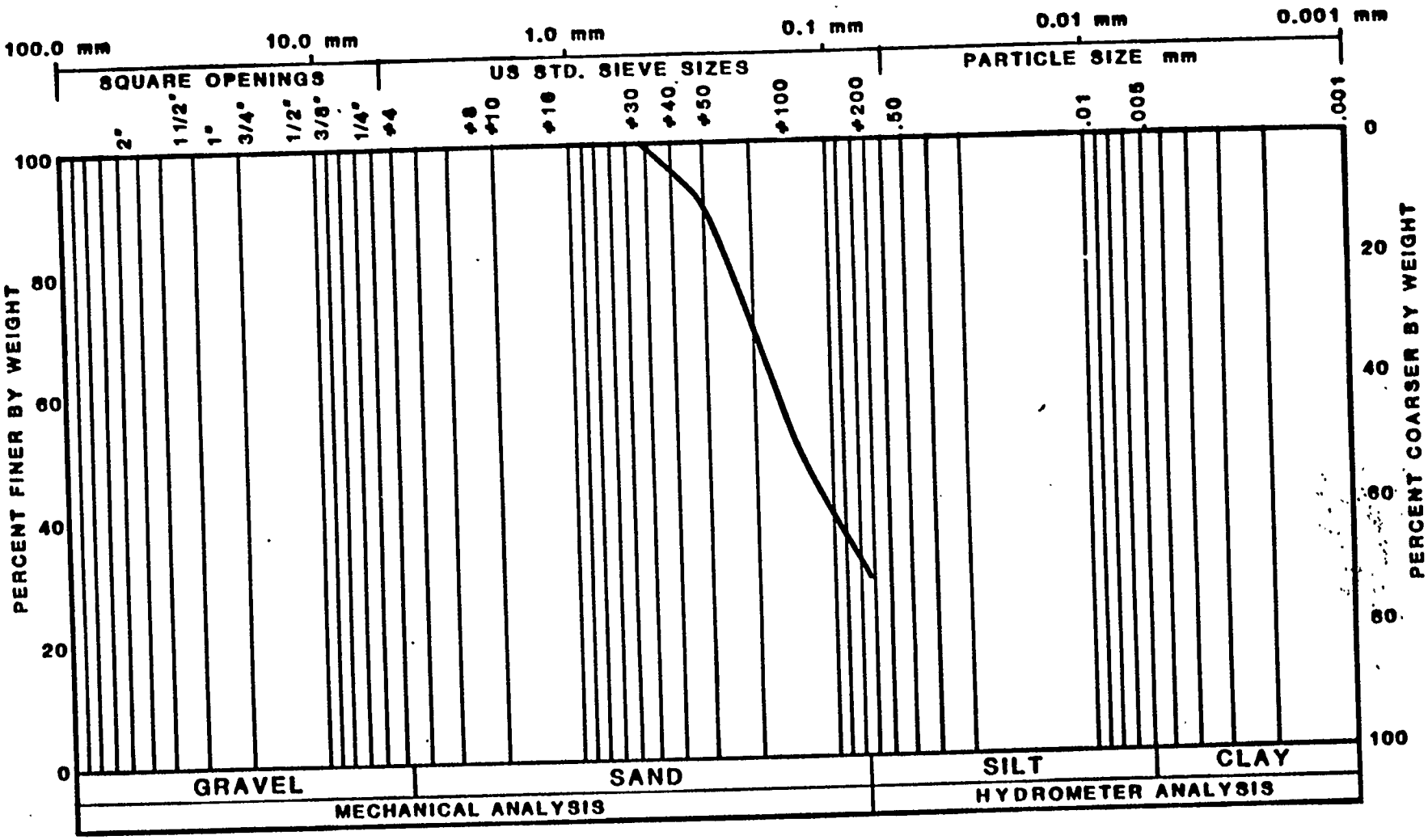
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	181	14.5–17.0	ML

FIGURE D5.52

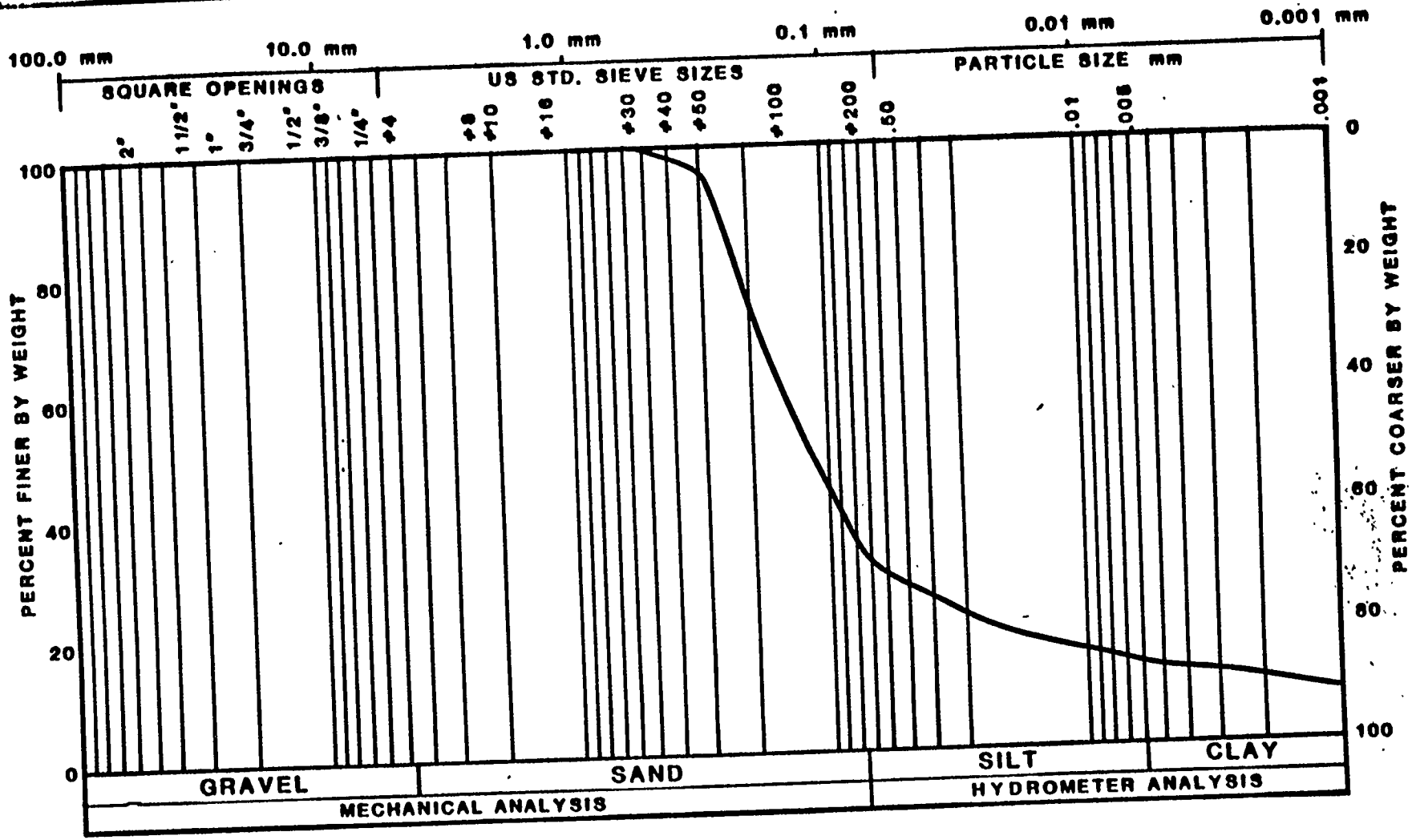
PARTICLE SIZE DISTRIBUTION CURVE



LEGEND		
SAMPLE HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
181	20.0-21.5	SM

FIGURE D5.53

PARTICLE SIZE DISTRIBUTION CURVE



LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	181	24.5-26.0	SM

FIGURE D5.54
PARTICLE SIZE DISTRIBUTION CURVE

ADDENDUM D6

PIEZOCONE SOUNDING LOGS

This addendum contains piezocone sounding logs. When referring to the DOE boring and test pit ID numbers, please note that the numbers used in the text refer to the numbering system as used in the DOE computerized Database Management System (DBMS). The numbering system used on the piezocone logs does not match that used in the text. Therefore, when referring to the following piezocone logs in conjunction with the text of this document it may be necessary to convert the field and laboratory numbers via Table D4.1 in Addendum D4.

Results of piezocone testing

The following pages contain the results obtained by processing the raw field data from the piezocone soundings with a piezocone data analysis and plotting computer program developed by the TAC.

The program allows the engineer to pick the various soil layer boundaries on a high resolution graphics screen plot of the data. The engineer is aided by a bar-coded, computer-calculated soil classification plotted alongside the data plots. The tailings classification scheme, as developed through lab test correlations is presented as Figure D6.1.

The resulting graphics containing the data plots, bar-code classification, and designated layer boundaries are presented on the following pages. Following the graphic output are printouts containing various averaged piezocone readings and empirically correlated soil parameters for each layer and for the entire profile.

Bar code

White = sand
Gray = sand-slime
Charcoal gray = slimes

Layer numbers in graphics output correspond to those listed in printed output that follow graphics.

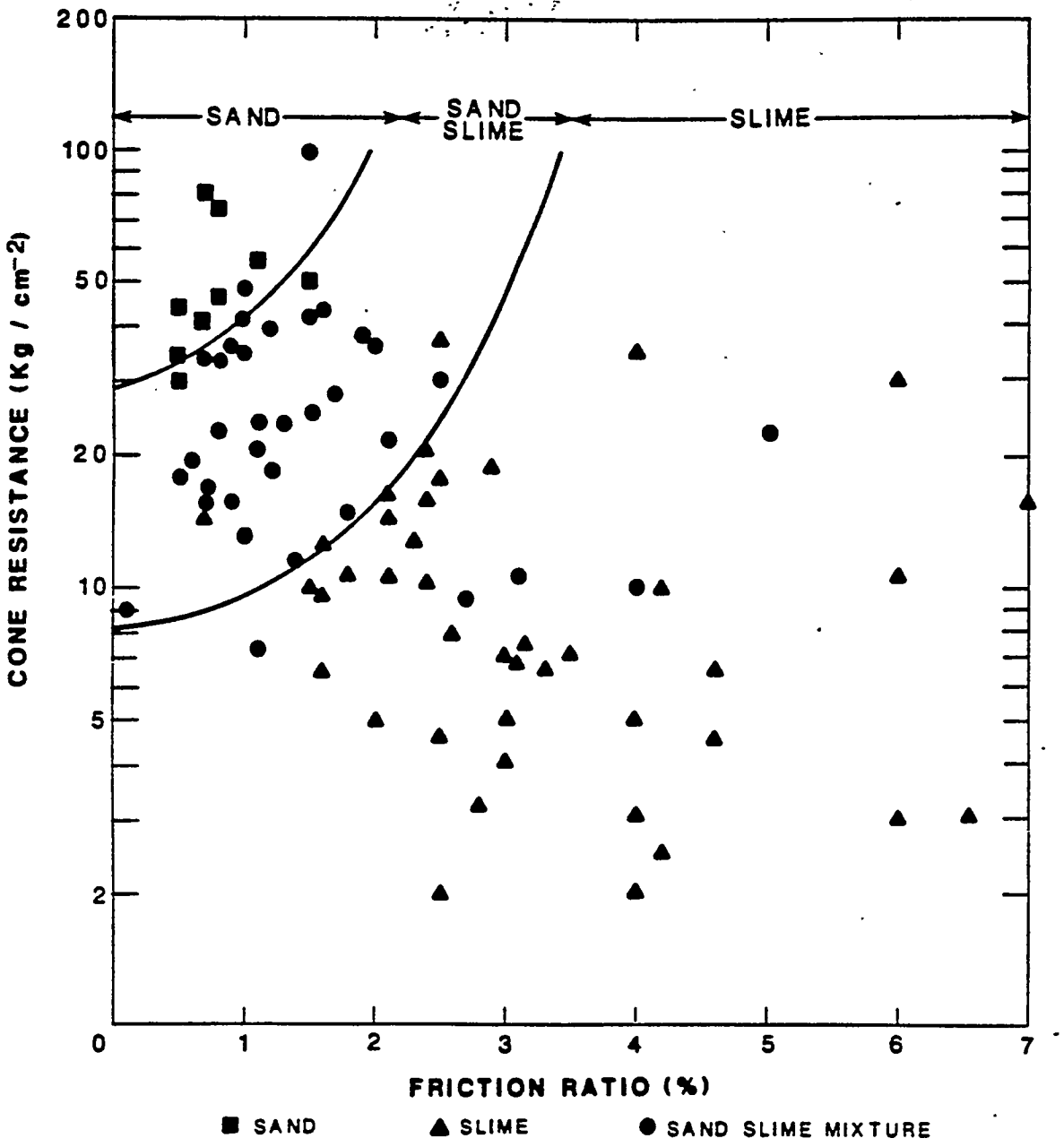


FIGURE D6.1
PIEZOCONE CLASSIFICATION CHART USED FOR TAILINGS

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 006
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	3.0	2.9	16.8	0.1	-0.0	0.5	S-SL*	5	40	30	59	2014	
2	3.0	5.1	2.1	6.5	0.2	-0.1	3.0	SLIM	4			23	778	6.5
3	5.1	9.1	4.0	21.0	0.2	-0.0	1.2	S-SL*	7	45	31	74	2520	
4	9.2	11.8	2.6	12.6	0.1	-0.0	1.1	S-SL*	4	27	29	44	1518	
5	11.8	19.2	7.3	7.1	0.2	0.5	3.1	SLIM	4			25	857	1.8
% THK:		50	9.5	17.4	0.1	0.0	1.0	S-SL	5	38	30	61	2091	
% THK:		49	9.4	7.0	0.2	0.4	3.1	SLIM	4			24	839	2.8

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 007
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.0	1.0	9.9	0.2	0.0	2.0	SLIM	6			34	1182	39.5
2	1.0	3.9	2.8	15.5	0.2	0.0	1.2	S-SL*	5	38	30	54	1864	
3	3.9	13.0	9.1	7.4	0.3	-0.0	4.2	SLIM	4			26	887	3.8
% THK:		21	2.8	15.5	0.2	0.0	1.2	S-SL	5	38	30	54	1863	
% THK:		78	10.1	7.6	0.3	0.0	4.0	SLIM	4			26	916	7.3

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 008
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.3	1.2	9.5	0.1	-0.0	1.4	SLIM	6			33	1144	32.2
2	1.3	3.9	2.6	22.4	0.2	-0.0	1.0	S-SL*	7	48	31	78	2690	
3	3.9	7.2	3.3	11.6	0.3	-0.0	2.8	SLIM	7			41	1393	7.8
4	7.3	16.3	9.1	5.1	0.2	-0.1	3.3	SLIM	3			18	608	2.0
% THK:		16	2.6	22.4	0.2	0.0	1.0	S-SL	7	48	31	78	2690	
% THK:		83	13.6	7.1	0.2	-0.1	3.0	SLIM	4			24	845	6.1

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 009
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	3.4	3.3	18.2	0.1	-0.0	0.7	S-SL*	6	42	30	64	2183	
												35	1194	8.8
2	3.4	4.8	1.4	9.9	0.3	0.0	2.8	SLIM	6					
3	4.9	6.0	1.2	33.2	0.2	0.1	0.7	S-SL*	11	60	33	116	3980	
												45	1553	7.8
4	6.1	6.5	0.4	12.9	0.3	0.1	2.1	SLIM	8					
% THK:		71	4.5	22.2	0.1	0.0	0.7	S-SL	7	46	31	77	2662	
												37	1273	8.6
% THK:		28	1.8	10.6	0.3	0.0	2.6	SLIM	6					

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 010
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	2.0	1.9	14.2	0.1	-0.1	0.5	S-SL*	4	35	29	50	1701	
2	2.0	3.6	1.6	7.0	0.1	-0.0	1.6	SLIM	4			25	842	9.0
% THK:		54	1.9	14.2	0.1	-0.1	0.5	S-SL	4	35	29	50	1701	
% THK:		45	1.6	7.0	0.1	0.0	1.6	SLIM	4			25	842	9.0

SITE ID: HAT01 LOCATION ID: 011
GROUND WATER DEPTH: 50.0 (FT.) AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	0.8	0.7	36.1	0.6	0.0	1.7	S-SL*	12	63	33	126	4326	
2	0.8	2.5	1.6	56.8	0.5	0.0	0.8	SAND*	11	78	36	199		
3	2.5	9.8	7.3	26.2	0.2	0.2	0.7	S-SL*	8	52	32	92	3147	
4	9.9	10.8	0.9	15.8	0.2	3.0	1.5	S-SL	5	32	29	55	1891	
5	10.8	12.2	1.4	21.5	0.3	1.5	1.5	S-SL*	7	39	30	75	2583	
6	12.3	16.3	4.0	7.0	0.0	1.4	0.7	SLIM*	4			24	839	1.9
% THK:		10	1.6	56.8	0.5	0.0	0.8	SAND	11	78	36	199		
% THK:		64	10.3	25.3	0.2	0.6	0.9	S-SL	7	49	32	88	3040	
% THK:		25	4.0	7.0	0.0	1.4	0.7	SLIM	4			24	839	1.9

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 012
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	0.8	0.7	17.4	0.2	-0.0	1.4	S-SL*	5	41	30	61	2086	
2	0.8	1.5	0.7	53.2	0.5	0.1	0.9	SAND*	10	76	35	186		
3	1.5	2.7	1.2	28.7	0.3	0.0	1.1	S-SL*	9	56	32	101	3448	
4	2.7	3.6	0.9	37.3	0.3	0.1	0.7	SAND*	7	64	34	131		
5	3.7	6.8	3.1	21.9	0.2	0.1	1.0	S-SL*	7	47	31	77	2631	
6	6.8	7.4	0.7	9.5	0.2	0.2	1.9	SLIM	6			33	1138	5.6
7	7.5	8.2	0.7	18.4	0.2	0.2	0.9	S-SL*	6	42	30	64	2207	
8	8.2	8.9	0.7	32.1	0.3	0.2	0.8	S-SL*	10	57	33	112	3852	
9	8.9	11.1	2.1	19.7	0.2	0.3	1.2	S-SL*	6	39	30	69	2360	
10	11.1	12.0	0.9	7.1	0.1	0.6	1.9	SLIM	4			25	855	2.6
% THK:		13	1.6	44.3	0.4	0.1	0.8	SAND	8	69	34	155		
% THK:		72	8.5	22.5	0.2	0.1	1.1	S-SL	7	46	31	78	2700	
% THK:		13	1.6	8.2	0.1	0.4	1.9	SLIM	4			28	978	3.9

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 013
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.0	1.0	13.2	0.1	-0.1	0.9	S-SL*	4	33	29	46	1579	
2	1.0	1.7	0.7	9.7	0.2	-0.1	1.8	SLIM	6			34	1167	19.3
3	1.8	5.5	3.8	16.6	0.2	-0.0	1.3	S-SL*	5	39	30	58	1989	
4	5.6	10.1	4.5	31.2	0.2	-0.1	0.8	S-SL*	10	56	32	109	3740	
% THK:		93	9.3	23.3	0.2	-0.1	1.0	S-SL	7	46	31	81	2792	
% THK:		6	0.7	9.7	0.2	-0.1	1.8	SLIM	6			34	1167	19.3

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 014
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.2	1.1	0.9	17.6	0.3	-0.2	1.7	S-SL	5	41	30	61	2107	
2	1.1	2.0	0.9	7.1	0.2	-0.2	2.4	SLIM	4			25	858	14.0
3	2.1	5.1	3.1	14.0	0.3	-0.2	1.9	SLIM	9			49	1682	12.5
4	5.1	8.0	2.9	17.3	0.3	-0.2	1.6	S-SL	5	40	30	61	2078	
5	8.0	9.7	1.6	45.5	0.3	-0.2	0.7	SAND*	9	67	34	159		
% THK:		17	1.6	45.5	0.3	-0.2	0.7	SAND	9	67	34	159		
% THK:		40	3.8	17.4	0.3	-0.2	1.6	S-SL	4	40	30	60	2084	
% THK:		42	4.0	12.4	0.3	-0.2	2.0	SLIM	7			43	1496	12.8

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 015
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.2	2.4	2.2	7.1	0.2	0.0	2.9	SLIM	4			25	846	16.2
2	2.4	3.1	0.7	25.2	0.4	0.1	1.6	S-SL*	8	52	32	88	3021	
3	3.1	5.7	2.6	8.9	0.2	0.1	2.3	SLIM	5			31	1071	7.6
4	5.8	7.2	1.4	27.5	0.3	0.2	1.3	S-SL*	9	54	32	96	3294	
5	7.2	9.1	1.9	14.1	0.3	0.2	2.1	SLIM	9			49	1697	6.6
6	9.1	10.6	1.4	28.8	0.2	0.3	0.8	S-SL*	9	50	32	101	3456	
7	10.6	11.7	1.1	16.8	0.3	0.3	1.9	SLIM	11			59	2015	5.0
8	11.8	16.5	4.8	27.3	0.4	0.3	1.3	S-SL*	9	41	30	95	3270	
9	16.6	18.4	1.9	49.0	0.5	0.3	1.0	SAND*	9	54	32	172		
10	18.5	19.9	1.4	28.0	0.4	0.3	1.5	S-SL*	9	36	29	98	3355	
11	19.9	22.0	2.1	42.6	0.5	0.4	1.1	S-SL*	14	46	31	149	5109	
12	22.0	22.7	0.7	17.5	0.3	0.3	1.9	S-SL	5	23	28	61	2101	
13	22.8	25.1	2.4	16.9	0.2	0.4	0.9	S-SL*	5	21	28	59	2024	
% THK:		7	1.9	49.0	0.5	0.3	1.0	SAND	9	54	32	172		
% THK:		60	14.9	27.4	0.3	0.3	1.2	S-SL	8	39	30	95	3289	
% THK:		31	7.8	10.8	0.2	0.1	2.4	SLIM	6			37	1293	9.4

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 016
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.0	4.4	4.4	8.2	0.2	0.1	2.3	SLIM	5			29	988	12.1
2	4.4	5.1	0.7	22.4	0.3	0.3	1.4	S-SL*	7	48	31	79	2694	
3	5.1	7.3	2.1	10.8	0.3	0.2	2.4	SLIM	7			38	1292	6.8
4	7.3	9.2	1.9	28.0	0.4	0.8	1.5	S-SL*	9	53	32	98	3365	
5	9.2	10.6	1.4	17.2	0.4	0.8	2.2	SLIM	11			60	2066	6.0
6	10.6	15.6	5.0	29.2	0.4	0.7	1.3	S-SL*	9	45	31	102	3506	
7	15.6	16.1	0.5	14.6	0.5	0.6	3.2	SLIM	9			51	1756	2.9
% THK:		47	7.6	28.3	0.4	0.7	1.4	S-SL	8	47	31	98	3395	
% THK:		52	8.4	10.7	0.3	0.3	2.4	SLIM	6			37	1289	9.2

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 017
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
												29	989	10.1
1	0.1	5.5	5.4	8.2	0.3	-0.0	3.1	SLIM	5					
2	5.6	7.0	1.4	26.2	0.3	0.1	1.3	S-SL*	8	53	32	92	3139	
3	7.0	9.3	2.4	13.1	0.4	0.1	2.7	SLIM	8			46	1575	6.2
4	9.4	11.5	2.1	40.7	0.4	0.1	0.9	SAND*	8	60	33	143		
5	11.5	12.5	0.9	36.5	0.6	0.1	1.6	S-SL*	12	53	32	128	4376	
6	12.5	13.0	0.5	13.8	0.5	0.1	3.3	SLIM	9			48	1660	3.7
7	13.0	17.3	4.3	31.8	0.4	0.1	1.1	S-SL*	10	44	31	111	3812	
8	17.3	19.4	2.1	17.5	0.4	0.1	2.5	SLIM	11			61	2094	2.8
9	19.4	20.1	0.7	35.6	0.5	0.2	1.4	S-SL*	11	42	30	124	4268	
10	20.1	21.8	1.6	12.8	0.5	0.2	4.0	SLIM	8			45	1536	1.9
11	21.8	23.2	1.4	24.4	0.5	0.2	2.0	SLIM	16			85	2923	2.7
12	23.3	30.4	7.1	8.4	0.2	2.5	2.9	SLIM	5			29	1006	1.0
13	30.4	31.3	0.9	28.6	0.4	1.8	1.3	S-SL*	9	29	29	100	3426	
14	31.4	31.8	0.5	15.0	0.1	1.6	1.0	S-SL*	4	16	26	52	1797	
% THK:		6	2.1	40.7	0.4	0.1	0.9	SAND	8	60	33	143		
% THK:		27	8.7	30.4	0.4	0.4	1.2	S-SL	9	43	31	106	3643	
% THK:		65	20.5	11.4	0.3	0.9	2.9	SLIM	7			39	1367	4.4

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 018
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.0	3.6	3.6	13.4	0.1	-0.0	1.0	S-SL*	4	34	29	47	1609	
2	3.7	4.8	1.1	13.1	0.3	0.0	2.0	SLIM	8			46	1572	10.5
3	4.9	8.4	3.5	21.5	0.2	0.1	1.1	S-SL*	7	47	31	75	2584	
4	8.4	11.7	3.3	32.4	0.3	0.1	0.9	S-SL*	10	53	32	113	3890	
5	11.8	13.4	1.6	13.7	0.3	0.1	2.2	SLIM	9			48	1644	3.7
6	13.4	15.6	2.1	25.5	0.3	0.2	1.2	S-SL*	8	39	30	89	3056	
7	15.6	16.8	1.1	40.8	0.3	0.2	0.6	SAND*	8	50	32	143		
8	16.8	18.4	1.6	40.6	0.5	0.2	1.1	S-SL*	13	48	31	142	4867	
% THK:		6	1.1	40.8	0.3	0.2	0.6	SAND	8	50	32	143		
% THK:		78	14.1	24.7	0.2	0.1	1.0	S-SL	7	44	31	86	2970	
% THK:		15	2.7	13.5	0.3	0.1	2.1	SLIM	8			47	1614	6.5

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 019
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.0	0.8	0.7	13.4	0.1	-0.1	0.8	S-SL*	4	34	29	47	1613	
% THK:		100	0.7	13.4	0.1	-0.1	0.8	S-SL	4	34	29	46	1613	

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 020
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.0	1.0	1.0	15.2	0.1	-0.2	0.8	S-SL*	5	37	30	53	1827	
2	1.0	2.0	1.0	6.7	0.1	-0.1	1.8	SLIM	4			23	798	13.9
3	2.0	3.1	1.1	15.9	0.2	-0.1	1.4	S-SL*	5	38	30	56	1905	
4	3.2	6.5	3.3	10.1	0.2	-0.1	2.4	SLIM	6			35	1208	7.9
5	6.5	9.3	2.8	27.2	0.2	0.0	0.7	S-SL*	9	53	32	95	3265	
6	9.4	10.3	0.9	13.3	0.2	0.0	1.4	S-SL	4	29	29	47	1599	
7	10.3	11.3	1.0	31.7	0.2	0.0	0.6	S-SL*	10	51	32	111	3800	
% THK:		61	6.8	22.4	0.2	-0.0	0.9	S-SL	7	44	31	78	2691	
% THK:		38	4.3	9.3	0.2	-0.1	2.3	SLIM	5			32	1112	9.3

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 021
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.0	1.2	1.2	7.2	0.1	-0.2	2.0	SLIM	4			25	869	27.7
2	1.3	2.5	1.2	14.8	0.3	-0.1	1.7	S-SL	4	36	29	52	1777	
3	2.5	4.9	2.4	8.2	0.2	0.0	2.6	SLIM	5			29	978	8.2
4	4.9	8.2	3.3	26.4	0.3	0.1	1.1	S-SL*	8	53	32	92	3163	
5	8.2	9.2	0.9	51.8	0.4	0.2	0.8	SAND*	10	72	35	181		
6	9.2	9.9	0.7	15.4	0.3	0.2	2.1	SLIM	10			54	1847	5.8
7	9.9	10.6	0.7	26.5	0.3	0.2	1.2	S-SL*	8	47	31	93	3183	
8	10.6	12.3	1.6	38.8	0.4	0.2	1.0	S-SL*	12	56	32	136	4657	
9	12.3	13.0	0.7	19.0	0.6	0.2	3.0	SLIM	12			67	2283	4.7
10	13.0	16.6	3.5	28.9	0.4	0.3	1.6	S-SL*	9	42	30	101	3465	
11	16.6	18.2	1.6	40.6	0.5	0.4	1.1	S-SL*	13	48	31	142	4872	
12	18.3	19.2	0.9	19.6	0.5	0.3	2.5	SLIM	13			69	2352	2.9
% THK:		4	0.9	51.8	0.4	0.2	0.8	SAND	10	72	35	181		
% THK:		63	11.9	29.5	0.4	0.2	1.3	S-SL	9	47	31	103	3543	
% THK:		31	5.9	11.9	0.3	0.1	2.5	SLIM	7			41	1423	10.7

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 022
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	2.5	2.4	16.5	0.1	0.0	0.8	S-SL*	5	39	30	58	1986	
2	2.5	5.4	2.9	4.5	0.1	0.1	1.7	SLIM	2			16	538	5.0
3	5.4	7.5	2.1	20.0	0.2	0.3	1.0	S-SL*	6	45	31	70	2405	
4	7.5	8.4	0.9	8.9	0.2	0.5	1.8	SLIM	5			31	1064	4.8
5	8.5	11.8	3.3	26.9	0.2	0.5	0.6	S-SL*	8	47	31	94	3233	
6	11.8	13.2	1.4	43.6	0.2	0.6	0.6	SAND*	8	58	33	153		
7	13.3	15.1	1.9	27.9	0.2	0.5	0.7	S-SL*	9	42	30	98	3352	
8	15.2	16.1	0.9	45.0	0.2	0.5	0.5	SAND*	9	54	32	158		
9	16.1	17.2	1.1	30.2	0.3	0.6	1.0	S-SL*	10	41	30	106	3626	
10	17.3	18.7	1.4	44.7	0.4	0.7	0.8	SAND*	8	51	32	156		
% THK:		20	3.7	44.4	0.3	0.6	0.7	SAND	8	54	32	155		
% THK:		59	10.8	23.8	0.2	0.4	0.8	S-SL	7	43	31	83	2855	
% THK:		20	3.8	5.5	0.1	0.2	1.7	SLIM	2			19	662	5.0

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 023
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
												22	769	7.0
1	0.0	7.2	7.2	6.4	0.2	0.3	3.1	SLIM	4					
												58	1987	
2	7.2	8.2	1.0	16.6	0.3	0.5	1.6	S-SL	5	39	30			
												23	792	2.6
3	8.2	14.1	5.8	6.6	0.2	0.7	2.5	SLIM	4					
												97	3330	
4	14.1	16.0	1.9	27.7	0.3	1.0	1.2	S-SL*	9	41	30			
												16	537	0.9
5	16.0	23.6	7.6	4.5	0.2	2.1	3.5	SLIM	2					
												83	2866	
% THK:		12	2.9	23.9	0.3	0.8	1.3	S-SL	7	40	30			
												20	689	3.5
% THK:		87	20.6	5.8	0.2	1.1	3.1	SLIM	3					

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 024
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	UND. SHEAR ELAS.	UND. SHEAR STREN	OCR
1	0.1	2.2	2.1	11.3	0.2	0.0	1.6	SLIM	7			40	1359	24.8
2	2.3	24.7	22.4	4.5	0.2	0.5	4.3	SLIM	2			16	536	1.5
% THK:		100	24.5	5.1	0.2	0.5	4.1	SLIM	2			18	606	3.5

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 025
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.3	1.2	18.7	0.2	-0.2	1.1	S-SL*	6	43	30	65	2245	
2	1.3	3.0	1.6	7.7	0.2	-0.1	2.1	SLIM	5			27	922	11.8
3	3.0	4.1	1.1	20.4	0.3	-0.1	1.6	S-SL*	6	45	31	72	2454	
4	4.2	5.3	1.2	13.9	0.4	-0.1	2.8	SLIM	9			49	1666	10.1
5	5.4	6.8	1.4	9.5	0.1	-0.1	1.4	SLIM	6			33	1137	6.3
6	6.8	10.6	3.8	8.9	0.3	-0.0	3.0	SLIM	5			31	1069	4.3
7	10.6	12.0	1.4	13.8	0.2	0.0	1.6	SLIM	9			48	1652	4.3
8	12.1	15.1	3.1	10.2	0.2	0.1	2.3	SLIM	6			36	1223	2.7
% THK:		15	2.3	19.5	0.2	-0.2	1.3	S-SL	5	43	31	68	2344	
% THK:		84	12.5	10.2	0.2	-0.0	2.4	SLIM	6			35	1218	5.6

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 026
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	5.1	5.0	14.2	0.1	-0.0	0.9	S-SL*	4	35	29	50	1703	
2	5.1	6.1	0.9	8.2	0.2	0.0	2.3	SLIM	5			29	989	6.1
3	6.1	9.0	2.9	22.9	0.3	0.2	1.1	S-SL*	7	48	31	80	2753	
4	9.0	9.7	0.7	13.2	0.2	0.2	1.6	SLIM	8			46	1588	5.3
% THK:		83	7.9	17.4	0.2	0.1	1.0	S-SL	5	39	30	61	2088	
% THK:		16	1.6	10.4	0.2	0.1	2.0	SLIM	6			36	1251	5.8

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 027
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.8	1.7	12.8	0.2	-0.1	1.3	S-SL	4	33	29	45	1533	
2	1.8	6.5	4.7	7.1	0.2	0.0	2.8	SLIM	4			25	856	6.8
3	6.6	9.4	2.9	21.5	0.4	-0.0	1.8	S-SL	7	46	31	75	2579	
4	9.4	13.2	3.8	22.3	0.3	-0.0	1.3	S-SL*	7	40	30	78	2680	
5	13.2	13.9	0.7	8.4	0.0	-0.0	0.5	SLIM*	5			29	1007	2.3
6	14.0	16.1	2.1	30.8	0.4	0.0	1.2	S-SL*	10	43	31	108	3700	
7	16.1	16.8	0.7	14.0	0.5	0.2	3.6	SLIM	9			49	1680	2.7
8	16.8	17.3	0.5	26.3	0.5	0.3	1.8	S-SL	8	37	29	92	3162	
% THK:		64	11.0	22.4	0.3	-0.0	1.4	S-SL	7	40	31	78	2692	
% THK:		35	6.1	8.0	0.2	0.0	2.6	SLIM	4			28	967	5.8

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 028
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	3.0	2.9	13.4	0.1	-0.2	0.6	S-SL*	4	34	29	47	1609	
2	3.0	3.7	0.7	8.8	0.1	-0.2	1.0	SLIM*	5			31	1052	9.4
3	3.7	5.6	1.9	17.6	0.1	-0.2	0.5	S-SL*	5	41	30	62	2115	
4	5.6	10.6	5.0	4.9	0.0	-0.1	0.2	SLIM*	3			17	593	3.0
% THK:		45	4.8	15.1	0.1	-0.2	0.6	S-SL	4	36	30	52	1809	
% THK:		54	5.7	5.4	0.0	-0.1	0.3	SLIM	3			18	649	3.8

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 029
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	7.0	6.9	11.2	0.3	-0.1	2.6	SLIM	7			39	1342	10.7
2	7.1	10.1	3.1	3.2	0.3	0.3	8.2	SLIM	2			11	383	2.0
% THK:		100	10.0	8.7	0.3	0.0	4.3	SLIM	5			30	1044	8.0

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 030
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.0	1.0	11.1	0.2	-0.1	1.4	SLIM	7			39	1329	41.3
2	1.1	6.5	5.4	6.1	0.1	-0.0	2.1	SLIM	4			21	734	6.5
3	6.6	8.5	1.9	18.6	0.3	-0.0	1.7	S-SL	6	42	30	65	2229	
4	8.5	12.8	4.3	6.9	0.2	0.2	2.9	SLIM	4			24	828	2.8
% THK:		15	1.9	18.6	0.3	0.0	1.7	S-SL	6	42	30	65	2229	
% THK:		84	10.7	6.9	0.1	0.1	2.4	SLIM	4			23	827	8.3

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 031
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
												23	775	15.2
1	0.1	2.5	2.4	6.5	0.2	0.0	3.1	SLIM	4					
2	2.5	4.1	1.6	18.9	0.3	-0.0	1.7	S-SL	6	43	30	66	2269	
3	4.2	7.2	3.1	5.8	0.2	0.0	3.9	SLIM	3			20	701	4.6
4	7.3	8.5	1.2	18.8	0.4	0.1	2.0	SLIM	12			66	2252	8.5
5	8.5	11.5	3.1	8.6	0.2	0.1	2.9	SLIM	5			30	1033	3.6
6	11.6	12.8	1.2	15.1	0.3	0.2	1.9	SLIM	10			53	1811	4.2
7	12.8	13.9	1.1	6.7	0.3	0.2	3.8	SLIM	4			23	799	2.0
8	14.0	14.7	0.7	16.3	0.4	0.4	2.7	SLIM	10			57	1953	3.6
9	14.7	15.8	1.1	12.2	0.4	0.4	3.6	SLIM	8			43	1469	2.7
10	15.9	17.5	1.6	32.7	0.7	0.4	2.3	S-SL	10	43	30	115	3926	
11	17.5	19.9	2.4	16.0	0.5	0.4	2.8	SLIM	10			56	1924	2.5
12	19.9	21.6	1.6	9.2	0.2	0.5	1.8	SLIM	6			32	1107	1.5
13	21.6	25.4	3.8	11.3	0.4	0.8	3.6	SLIM	7			39	1354	1.5
14	25.4	26.8	1.4	12.1	0.3	1.4	2.8	SLIM	8			42	1451	1.3
15	26.9	27.8	0.9	15.5	0.3	1.7	1.8	S-SL	5	18	27	54	1856	
16	27.8	28.7	0.9	9.1	0.3	2.0	2.9	SLIM	6			32	1094	1.0
17	28.8	30.4	1.6	16.5	0.4	1.4	2.6	SLIM	10			58	1978	1.4
18	30.4	32.1	1.6	10.7	0.1	0.8	1.3	SLIM	7			37	1282	1.0
% THK:		13	4.1	23.5	0.5	0.5	2.0	S-SL	7	37	30	82	2824	
% THK:		86	27.2	10.9	0.3	0.5	2.9	SLIM	6			38	1313	3.9

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 032
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.2	2.1	1.9	8.6	0.3	0.0	3.4	SLIM	5			30	1031	20.4
2	2.1	3.5	1.4	16.0	0.3	0.0	2.0	SLIM	10			56	1918	16.5
3	3.6	6.9	3.3	10.2	0.4	-0.0	3.5	SLIM	6			36	1224	7.5
4	6.9	12.1	5.2	23.1	0.4	0.0	1.8	S-SL	7	44	31	81	2771	
5	12.2	14.5	2.4	22.1	0.6	0.0	2.7	SLIM	14			77	2647	4.9
6	14.6	16.4	1.9	14.4	0.3	0.2	2.2	SLIM	9			50	1725	3.0
7	16.5	23.1	6.7	36.6	0.7	0.2	2.0	S-SL*	12	43	30	128	4394	
8	23.2	25.0	1.9	60.3	0.9	0.2	1.5	SAND*	12	54	32	211		
9	25.1	30.3	5.2	22.1	0.6	0.2	2.6	SLIM	14			77	2654	2.0
10	30.3	40.3	10.0	11.9	0.3	0.8	2.1	SLIM	7			42	1427	0.9
% THK:		4	1.9	60.3	0.9	0.2	1.5	SAND	12	54	32	211		
% THK:		29	11.9	30.7	0.6	0.1	1.9	S-SL	9	43	31	107	3684	
% THK:		65	26.1	14.8	0.4	0.4	2.5	SLIM	9			51	1777	4.7

SITE ID: HAT01 LOCATION ID: 033

GROUND WATER DEPTH: 50.0 (FT.) AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.1	1.0	10.5	0.2	-0.0	1.9	SLIM	7			37	1262	38.9
2	1.1	2.0	0.9	13.3	0.2	-0.1	1.3	S-SL	4	34	29	47	1601	
3	2.1	4.2	2.1	19.1	0.3	-0.1	1.5	S-SL*	6	43	31	67	2296	
4	4.2	6.1	1.9	10.4	0.3	-0.1	2.4	SLIM	6			36	1245	7.7
5	6.1	11.1	5.0	25.9	0.3	-0.1	1.3	S-SL*	8	49	31	91	3105	
6	11.2	12.1	1.0	48.7	0.5	-0.1	1.1	SAND*	9	63	33	171		
7	12.1	12.6	0.5	41.2	0.7	-0.1	1.8	S-SL*	13	56	32	144	4944	
8	12.6	15.0	2.4	19.0	0.5	-0.1	2.6	SLIM	12			67	2283	4.2
9	15.0	17.6	2.6	37.8	0.5	-0.0	1.4	S-SL*	12	48	31	132	4536	
10	17.6	19.3	1.6	56.9	0.6	-0.1	1.1	SAND*	11	58	33	199		
11	19.3	21.4	2.1	44.9	0.7	-0.0	1.6	S-SL*	14	48	31	157	5385	
12	21.5	25.3	3.8	20.6	0.5	-0.0	2.6	SLIM	13			72	2469	2.3
13	25.3	26.2	0.9	46.0	0.7	0.1	1.5	S-SL*	15	44	31	161	5519	
14	26.2	27.9	1.6	22.6	0.5	0.0	2.2	S-SL	7	25	28	79	2714	
% THK:		9	2.6	53.7	0.6	-0.1	1.1	SAND	10	59	33	188		
% THK:		57	15.7	30.1	0.4	-0.0	1.5	S-SL	9	44	31	105	3609	
% THK:		33	9.1	16.9	0.4	-0.0	2.5	SLIM	10			59	2031	8.0

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 034
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	0.6	0.5	11.2	0.3	-0.0	2.6	SLIM	7			39	1343	63.1
2	0.6	5.8	5.2	19.9	0.3	-0.0	1.4	S-SL*	6	44	31	69	2383	
3	5.9	7.1	1.2	16.4	0.4	-0.1	2.5	SLIM	10			57	1969	9.1
4	7.1	9.4	2.4	26.3	0.3	-0.1	1.2	S-SL*	8	51	32	92	3161	
5	9.5	10.7	1.2	36.5	0.3	-0.1	0.9	S-SL*	12	57	33	128	4385	
6	10.8	12.9	2.1	34.4	0.4	-0.1	1.0	S-SL*	11	52	32	121	4133	
7	12.9	15.3	2.3	42.9	0.4	-0.1	1.0	SAND*	8	55	32	150		
8	15.3	15.5	0.2	40.1	0.3	-0.1	0.8	SAND*	8	51	32	141		
9	15.5	22.9	7.3	52.8	0.5	-0.1	1.0	SAND*	10	55	32	185		
10	22.9	24.1	1.2	22.3	0.7	-0.1	3.3	SLIM	14			78	2679	2.4
11	24.1	25.6	1.4	60.0	0.7	-0.0	1.2	SAND*	11	53	32	210		
% THK:		44	11.2	51.4	0.5	-0.1	1.0	SAND	9	54	32	180		
% THK:		43	10.9	25.9	0.3	-0.1	1.2	S-SL	8	48	32	90	3111	
% THK:		11	2.9	17.9	0.5	-0.1	2.8	SLIM	11			62	2154	15.6

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 035
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	5.6	5.5	16.5	0.3	-0.1	1.7	S-SL	5	39	30	58	1985	
2	5.6	9.9	4.3	27.0	0.4	-0.1	1.5	S-SL*	8	52	32	94	3237	
3	9.9	17.3	7.4	38.6	0.4	-0.1	1.1	S-SL*	12	52	32	135	4628	
4	17.4	23.7	6.4	55.4	0.6	-0.1	1.1	SAND*	11	55	32	194		
5	23.8	25.6	1.8	23.2	0.6	-0.1	2.4	S-SL	7	27	29	81	2778	
6	25.6	26.6	1.0	39.1	0.4	-0.0	1.1	S-SL*	13	39	30	137	4693	
7	26.7	27.4	0.7	18.9	0.5	-0.1	2.6	SLIM	12			66	2263	1.8
8	27.4	28.5	1.1	16.4	0.3	-0.0	2.1	SLIM	10			57	1971	1.6
% THK:		22	6.4	55.4	0.6	-0.1	1.1	SAND	11	55	32	194		
% THK:		70	20.0	28.7	0.4	-0.1	1.5	S-SL	8	45	31	100	3438	
% THK:		6	1.8	17.4	0.4	-0.0	2.3	SLIM	10			60	2084	1.7

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 036
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	2.3	2.1	12.3	0.1	-0.1	0.8	S-SL*	4	32	29	43	1477	
2	2.3	3.0	0.7	22.6	0.2	-0.1	0.7	S-SL*	7	48	31	79	2709	
3	3.0	3.7	0.7	10.1	0.2	-0.1	2.1	SLIM	6			35	1211	10.3
4	3.7	4.7	0.9	17.2	0.1	-0.1	0.8	S-SL*	5	40	30	60	2064	
5	4.7	5.4	0.7	7.4	0.1	-0.1	1.9	SLIM	4			26	887	6.1
6	5.4	6.8	1.4	30.7	0.3	-0.1	1.0	S-SL*	10	58	33	107	3685	
7	6.9	7.4	0.6	14.8	0.3	-0.2	2.3	SLIM	9			52	1773	7.8
8	7.4	8.6	1.2	21.7	0.2	-0.1	0.8	S-SL*	7	46	31	76	2598	
9	8.7	12.2	3.5	35.3	0.4	-0.1	1.1	S-SL*	11	55	32	124	4241	
10	12.2	13.1	0.9	41.7	0.3	-0.1	0.7	SAND*	8	56	32	146		
11	13.2	14.6	1.4	37.2	0.4	-0.2	1.0	S-SL*	12	51	32	130	4459	
12	14.6	18.1	3.5	14.2	0.5	0.1	3.5	SLIM	9			50	1705	2.7
% THK:		5	0.9	41.7	0.3	-0.1	0.7	SAND	8	56	32	146		
% THK:		63	11.2	26.9	0.3	-0.1	0.9	S-SL	8	47	31	94	3233	
% THK:		31	5.5	12.9	0.4	0.0	3.0	SLIM	7			45	1545	4.7

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 037
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
												35	1183	24.1
1	0.1	2.0	1.9	9.9	0.2	-0.0	1.9	SLIM	6					
												86	2940	
2	2.0	5.1	3.1	24.5	0.2	-0.1	1.0	S-SL*	8	51	32			
												60	2073	8.6
3	5.1	9.2	4.0	17.3	0.4	-0.1	2.4	SLIM	11					
												86	2946	
4	9.2	10.4	1.1	24.5	0.3	-0.1	1.2	S-SL*	8	45	31			
												44	1519	4.2
5	10.4	11.6	1.2	12.7	0.3	-0.0	2.6	SLIM	8					
												63	2177	
6	11.6	13.0	1.4	18.1	0.4	-0.0	2.0	S-SL	6	33	29			
												46	1565	2.6
7	13.0	19.6	6.6	13.0	0.4	0.1	2.7	SLIM	8					
												80	2750	
% THK:		29	5.6	22.9	0.3	-0.1	1.3	S-SL	7	45	31			
% THK:		70	13.7	13.8	0.4	0.0	2.5	SLIM	8			48	1656	7.5

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 038
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.0	1.0	11.9	0.2	-0.0	1.7	SLIM	7			42	1430	43.6
2	1.1	3.0	1.9	17.7	0.2	-0.0	1.2	S-SL*	5	41	30	62	2120	
3	3.1	5.6	2.6	13.8	0.4	-0.1	2.5	SLIM	9			48	1659	10.8
4	5.7	7.6	1.9	19.2	0.3	-0.1	1.5	S-SL*	6	43	31	67	2302	
5	7.6	9.9	2.3	6.2	0.2	-0.0	3.2	SLIM	4			22	744	3.2
% THK:		39	3.8	18.5	0.2	-0.1	1.4	S-SL	5	42	31	64	2211	
% THK:		60	5.9	10.5	0.3	-0.0	2.6	SLIM	6			36	1263	13.4

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 039
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.2	2.8	2.6	16.4	0.2	-0.0	1.3	S-SL*	5	39	30	57	1967	
2	2.8	4.2	1.4	9.2	0.3	-0.1	3.1	SLIM	6			32	1103	9.3
3	4.3	5.0	0.7	22.7	0.4	-0.1	1.6	S-SL*	7	48	31	79	2725	
4	5.0	5.9	0.9	8.5	0.2	-0.1	2.9	SLIM	5			30	1015	6.3
5	5.9	6.4	0.4	26.1	0.4	-0.0	1.4	S-SL*	8	53	32	92	3138	
6	6.4	8.0	1.6	9.9	0.3	-0.1	2.6	SLIM	6			35	1183	5.7
7	8.1	16.4	8.3	3.7	0.1	0.0	3.5	SLIM	2			13	442	1.5
% THK:		23	3.7	18.6	0.3	-0.0	1.4	S-SL	5	42	31	64	2236	
% THK:		76	12.2	5.5	0.2	-0.0	3.3	SLIM	3			19	657	3.3

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

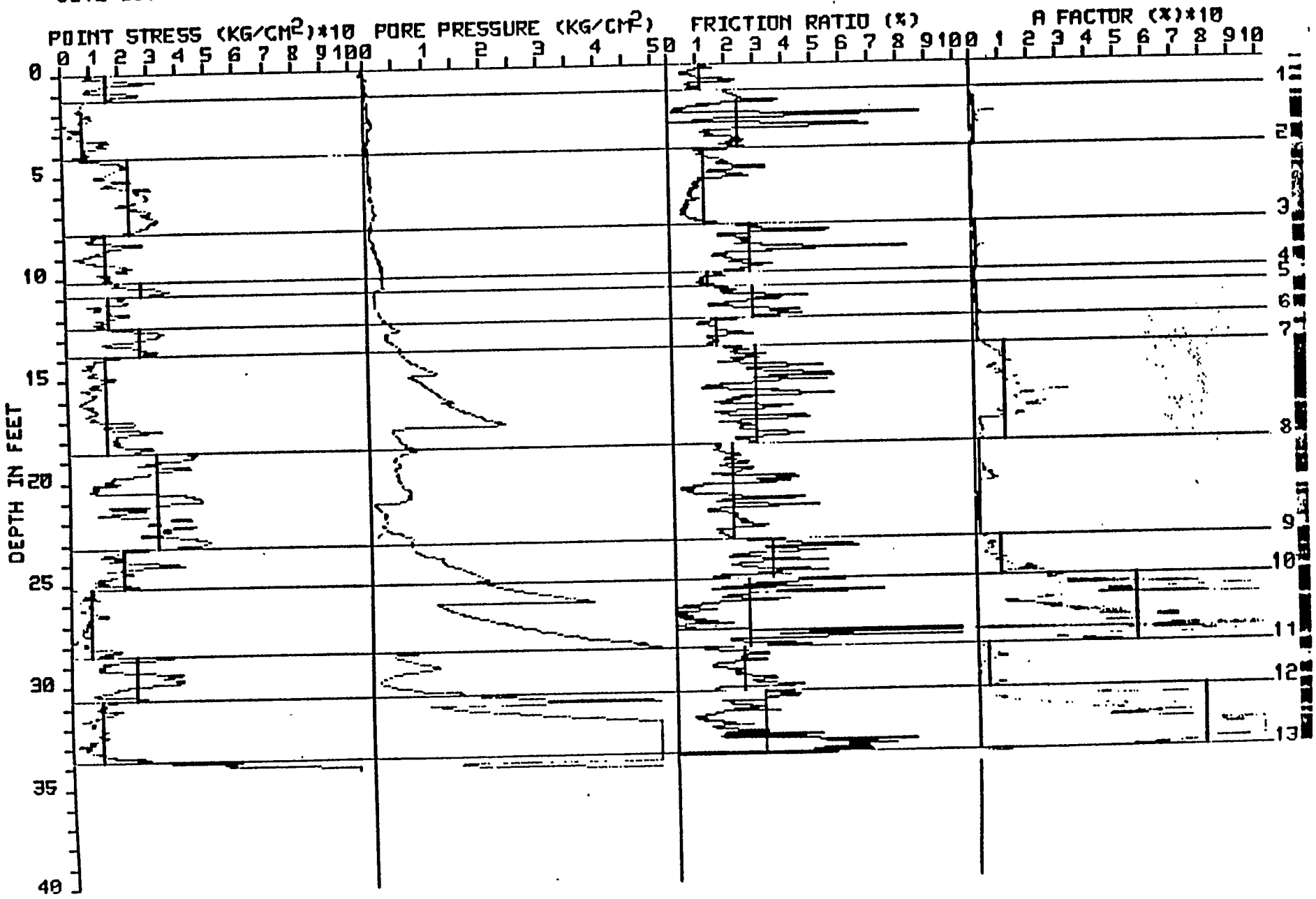
LOCATION ID: 040
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.3	1.2	15.0	0.1	-0.1	0.6	S-SL*	4	37	29	52	1797	
2	1.3	2.5	1.1	14.1	0.2	-0.2	1.4	S-SL	4	35	29	49	1689	
3	2.5	3.4	0.9	45.4	0.4	-0.2	0.9	SAND*	9	71	35	159		
4	3.5	4.2	0.7	15.1	0.3	-0.2	2.2	SLIM	10			53	1816	12.7
5	4.2	5.1	0.9	27.2	0.4	-0.2	1.5	S-SL*	9	54	32	95	3264	
6	5.1	8.2	3.1	9.1	0.2	-0.1	2.6	SLIM	6			32	1093	5.7
7	8.3	9.9	1.6	18.8	0.5	-0.1	2.6	SLIM	12			66	2252	7.1
8	9.9	11.3	1.4	10.1	0.2	-0.1	1.6	SLIM	6			35	1217	3.7
9	11.3	13.3	1.9	12.6	0.3	-0.1	2.4	SLIM	8			44	1507	3.6
10	13.3	13.7	0.4	27.2	0.3	-0.0	1.1	S-SL*	9	42	30	95	3261	
11	13.7	14.7	0.9	10.5	0.2	-0.0	1.7	SLIM	6			37	1260	2.6
% THK:		6	0.9	45.4	0.4	-0.2	0.9	SAND	9	71	35	159		
% THK:		25	3.6	19.1	0.2	-0.1	1.1	S-SL	5	41	30	66	2293	
% THK:		68	9.6	12.1	0.3	-0.1	2.3	SLIM	7			42	1454	5.4

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

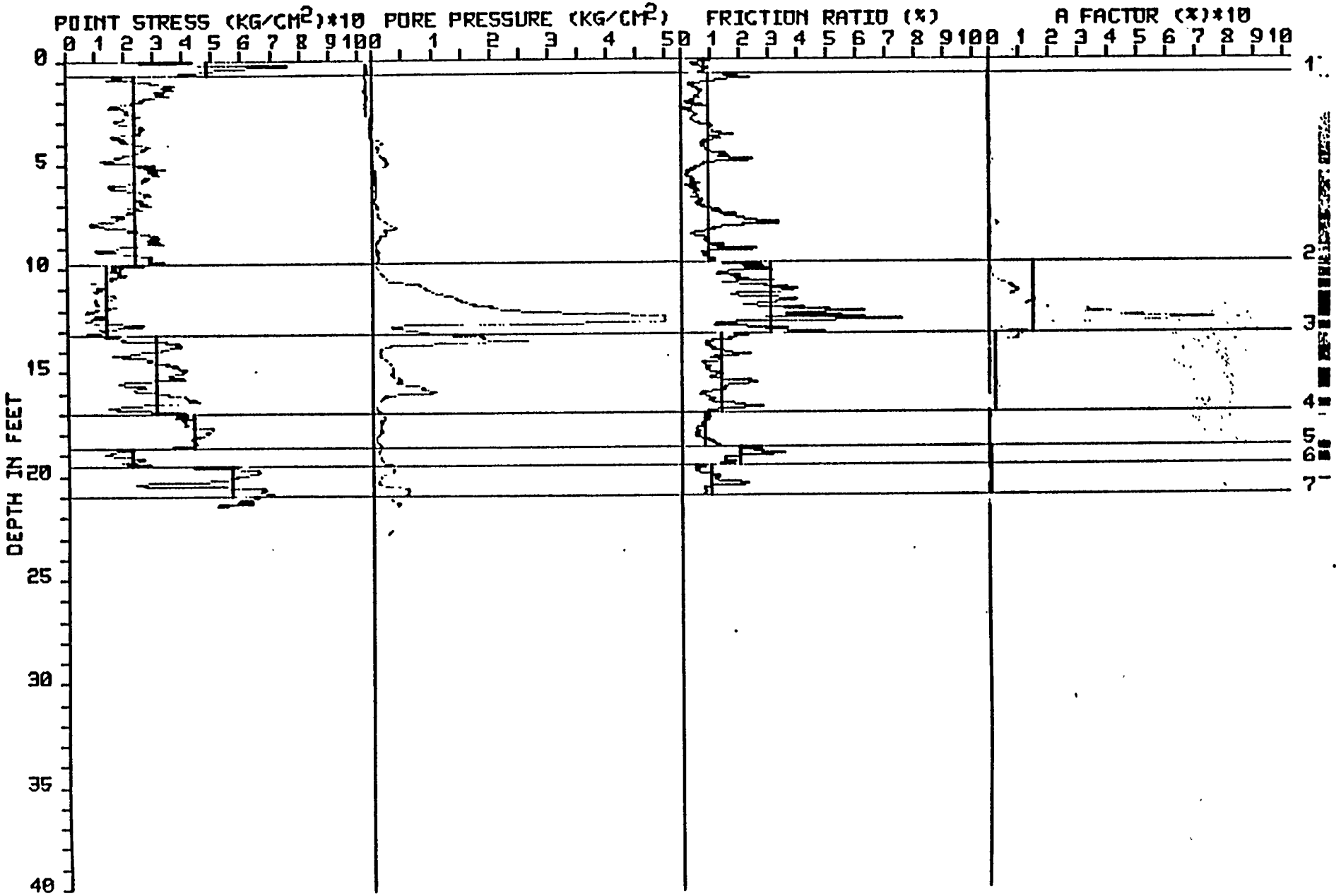
LOCATION ID: 001



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

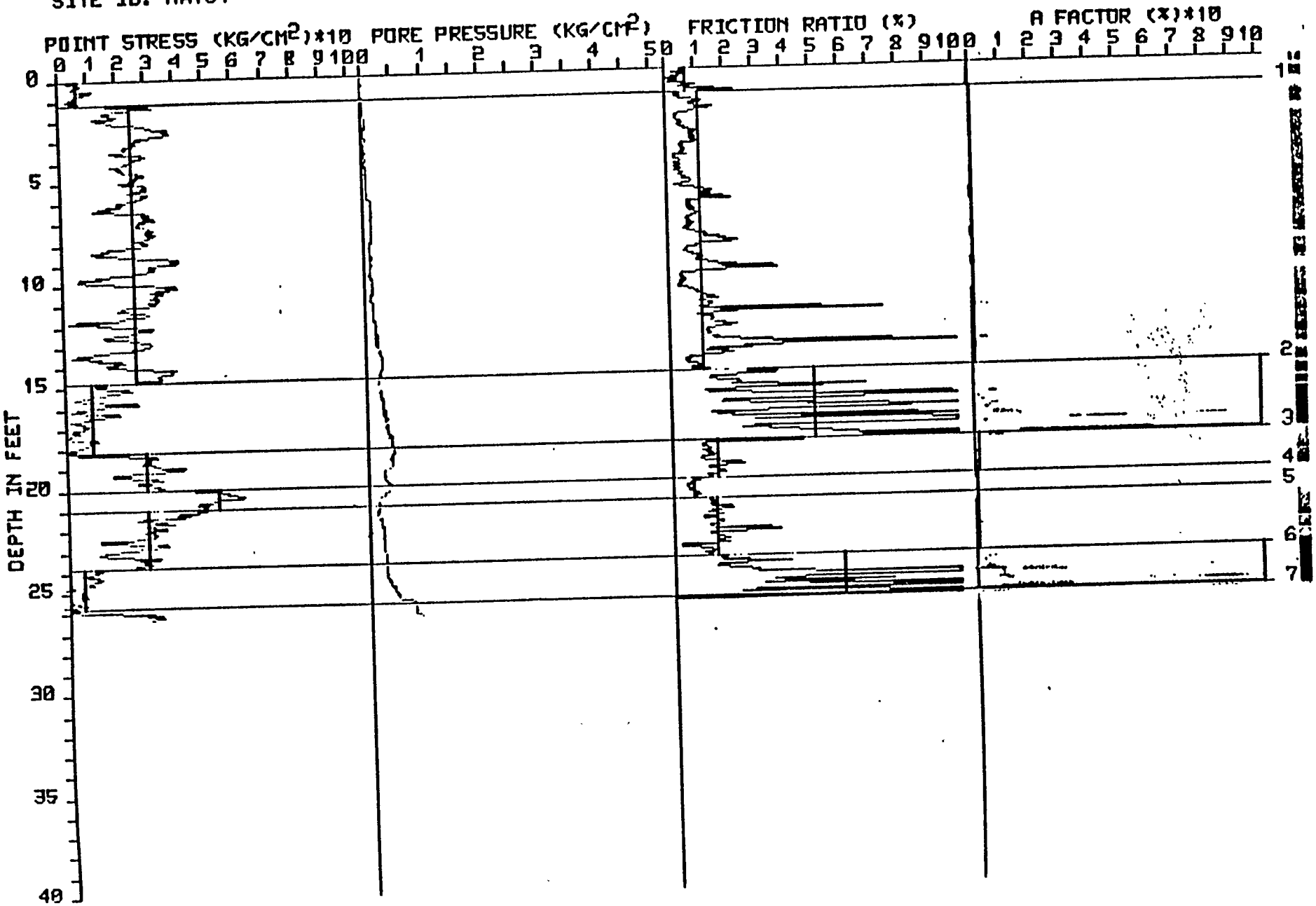
LOCATION ID: 002



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

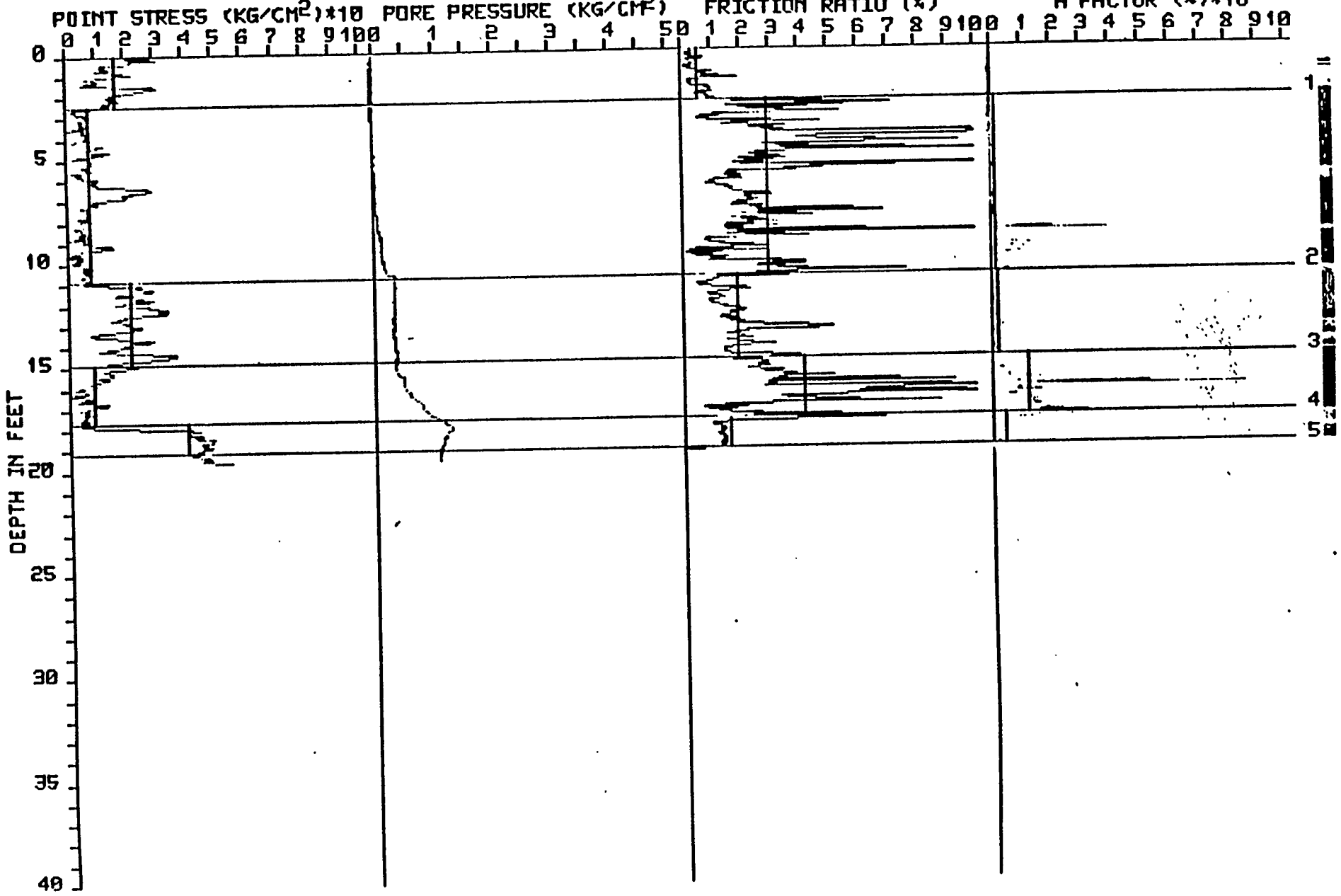
LOCATION ID: 003



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

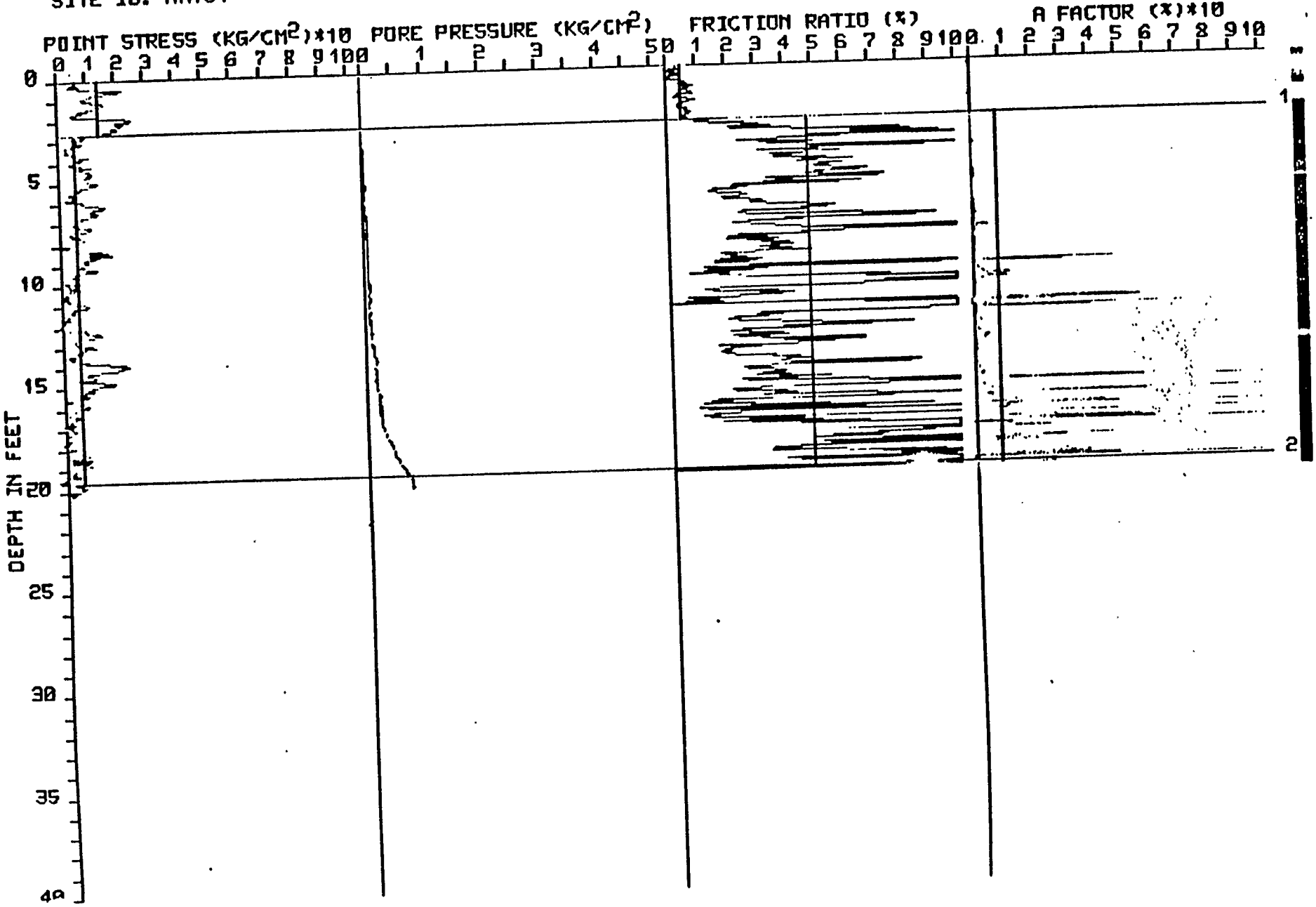
LOCATION ID: 004



PIEZOCONE SOUNDING TEST

LOCATION ID: 005

SITE ID: HAT01



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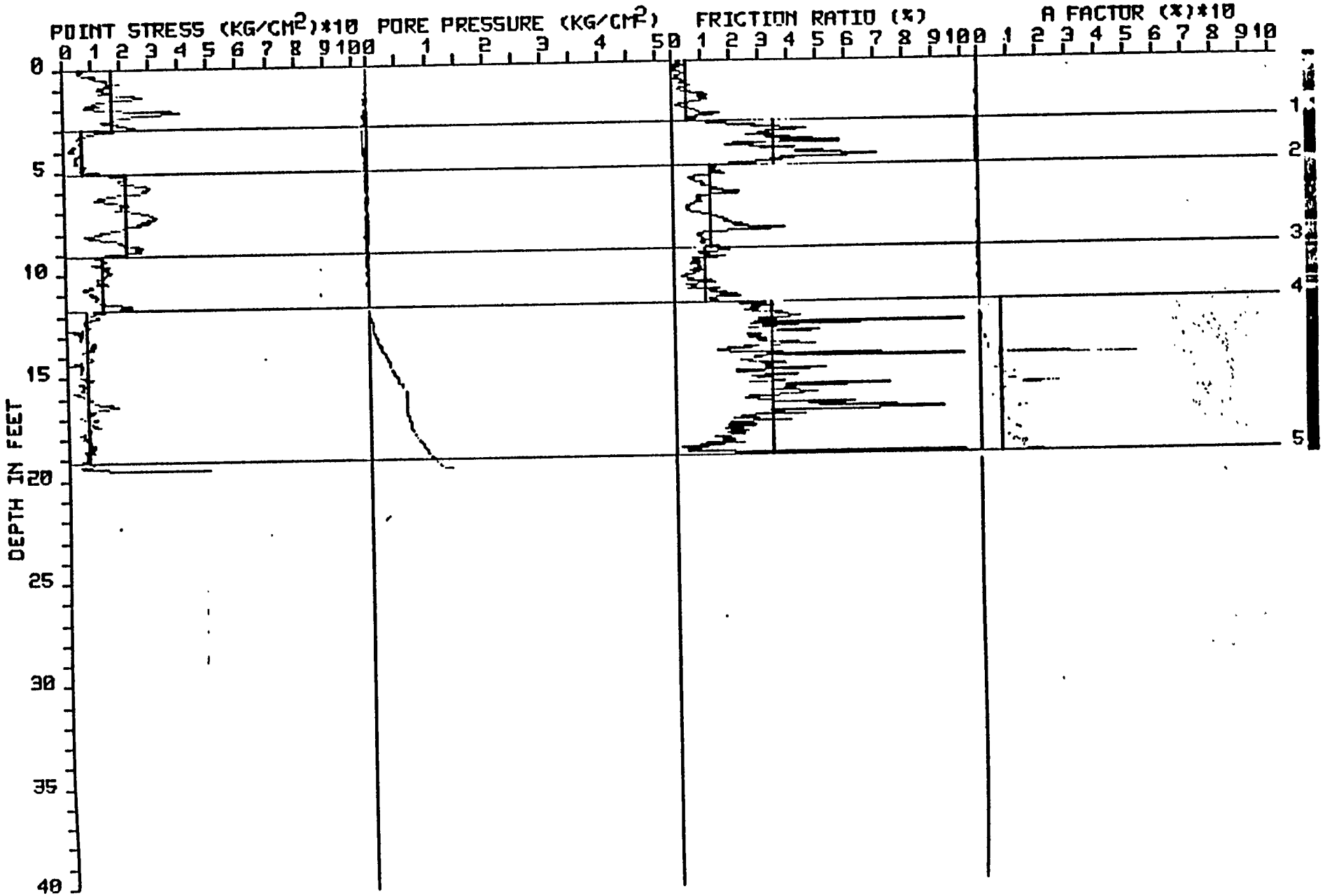
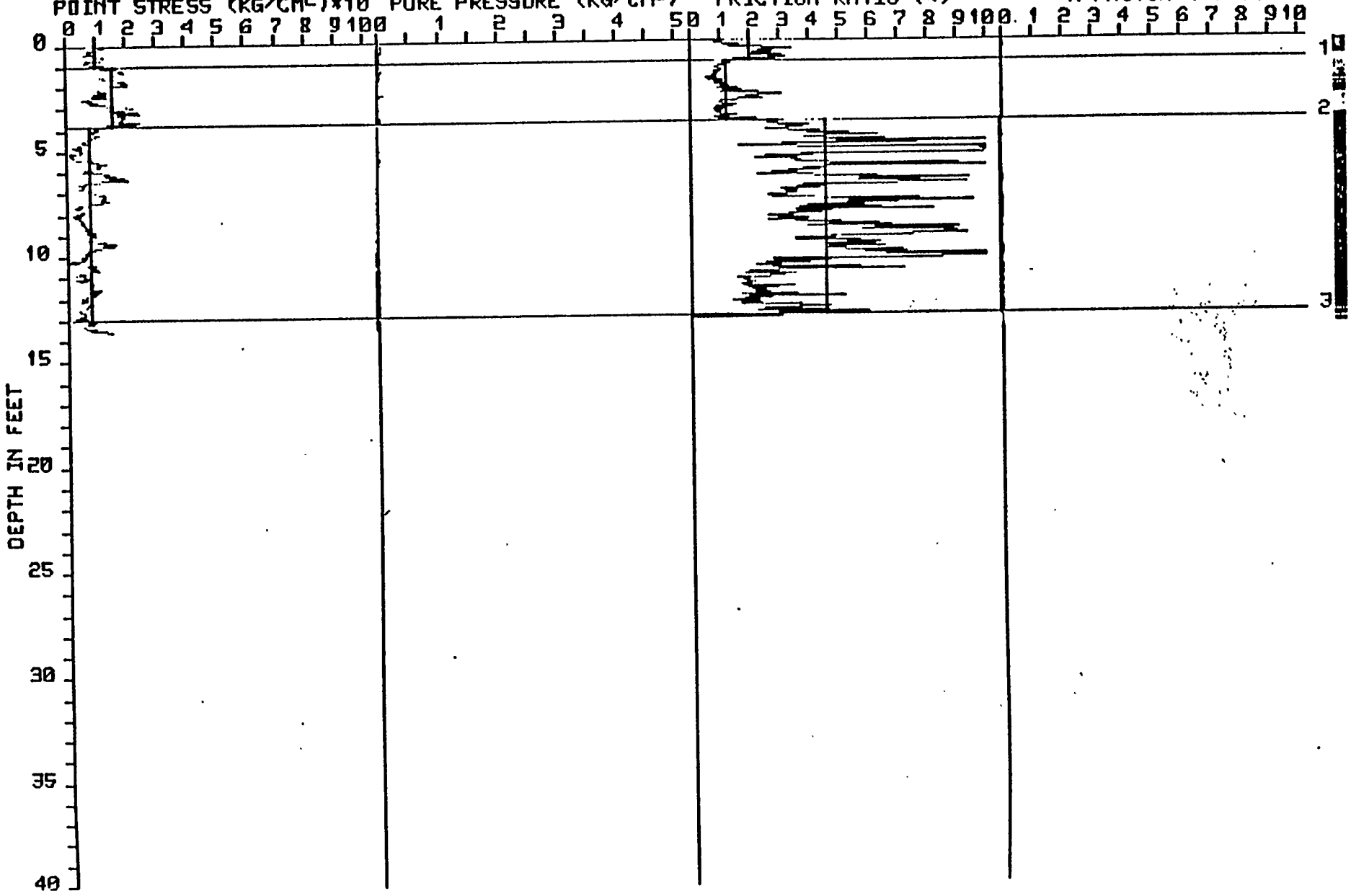
LOCATION ID: 006



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

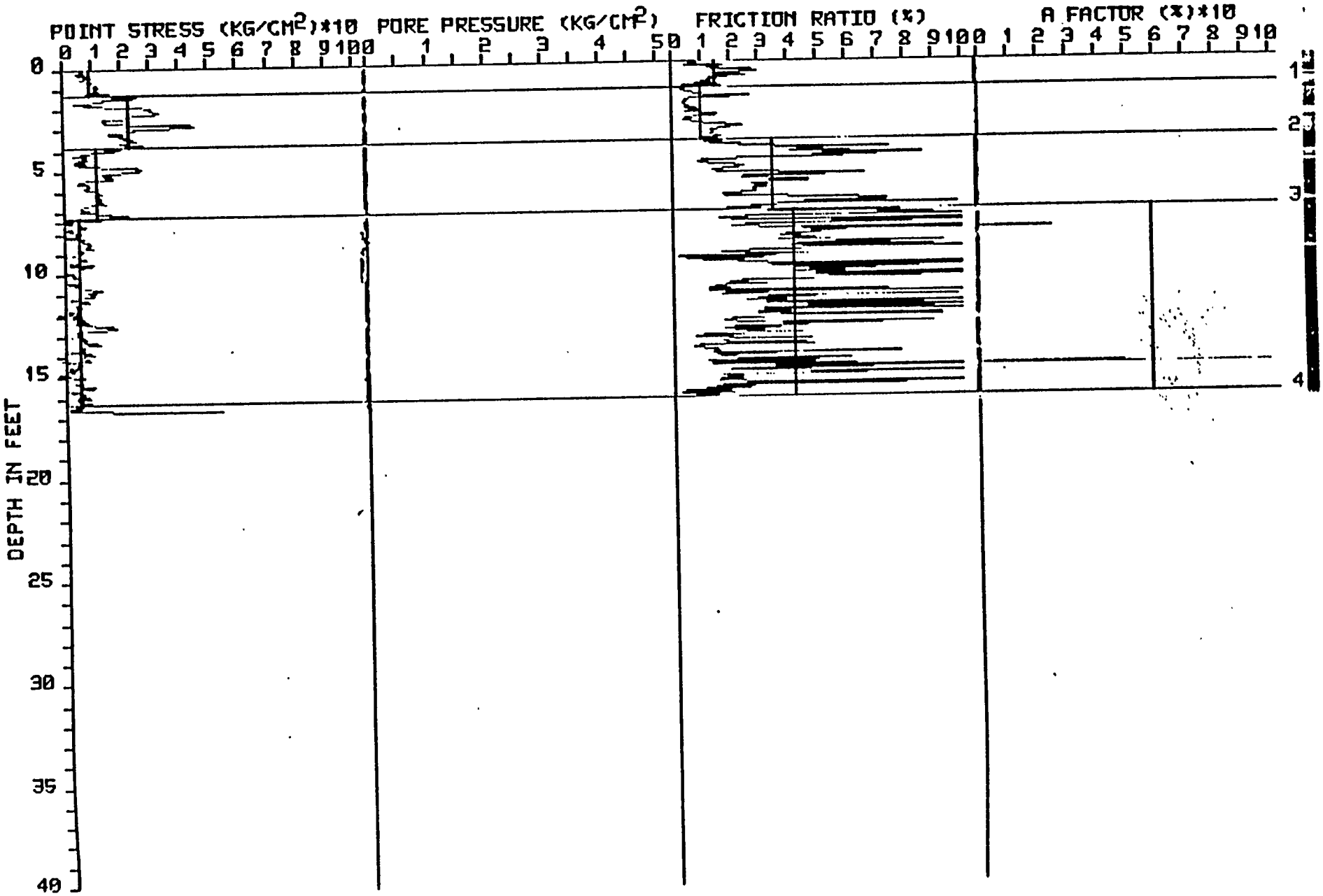
LOCATION ID: 007



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

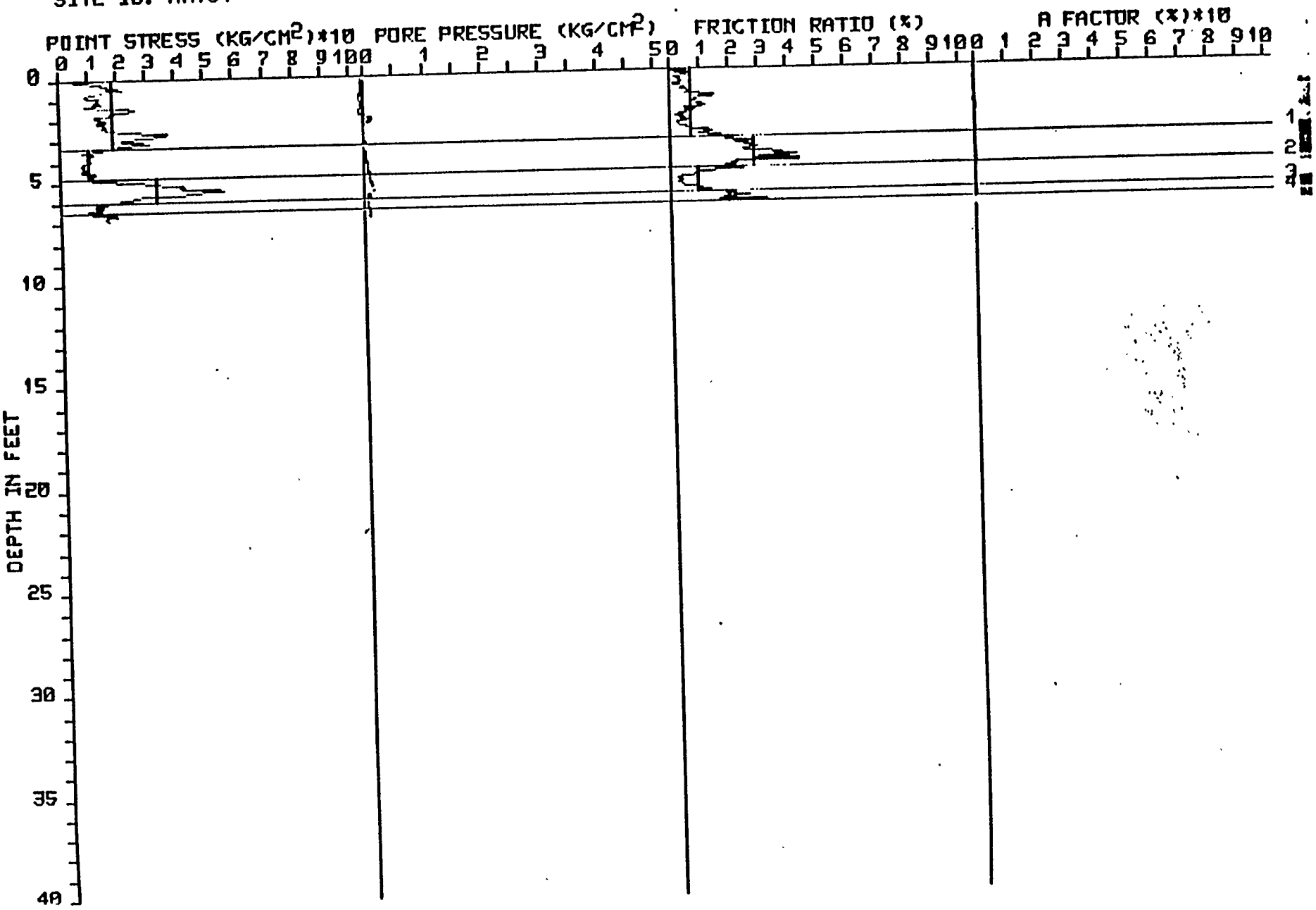
LOCATION ID: 008



PIEZOCONE SOUNDING TEST

LOCATION ID: 009

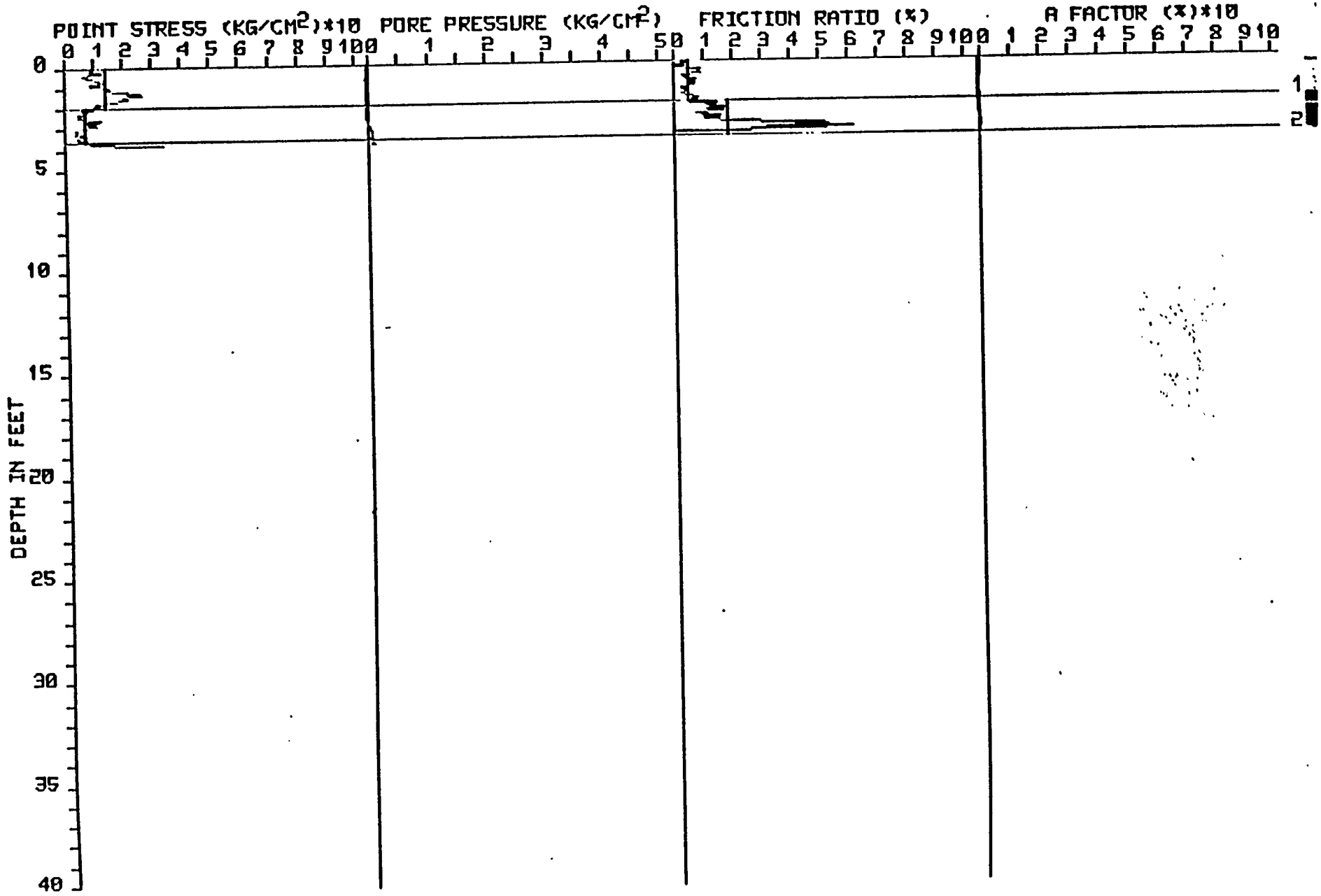
SITE ID: HAT01



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

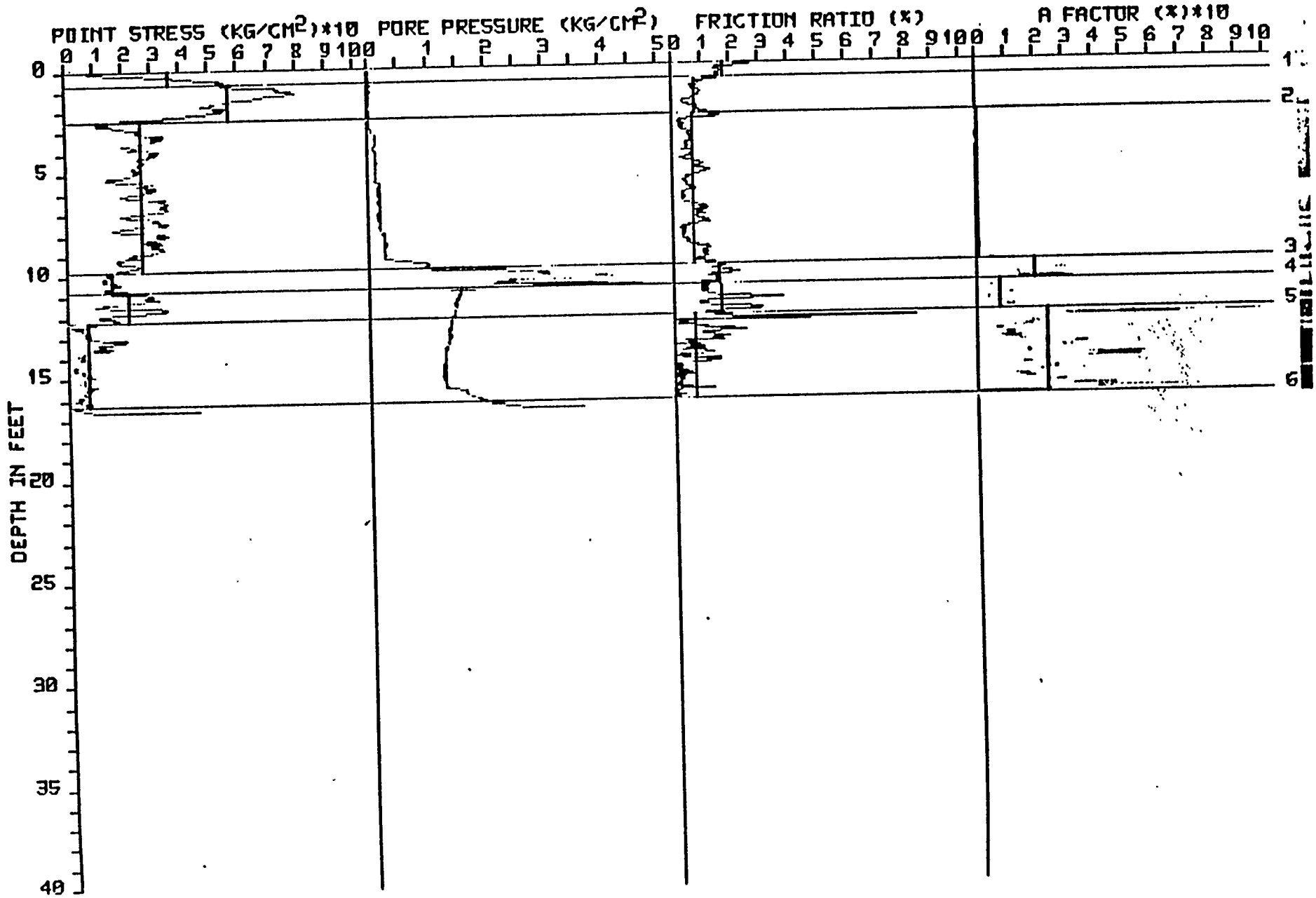
LOCATION ID: 010



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

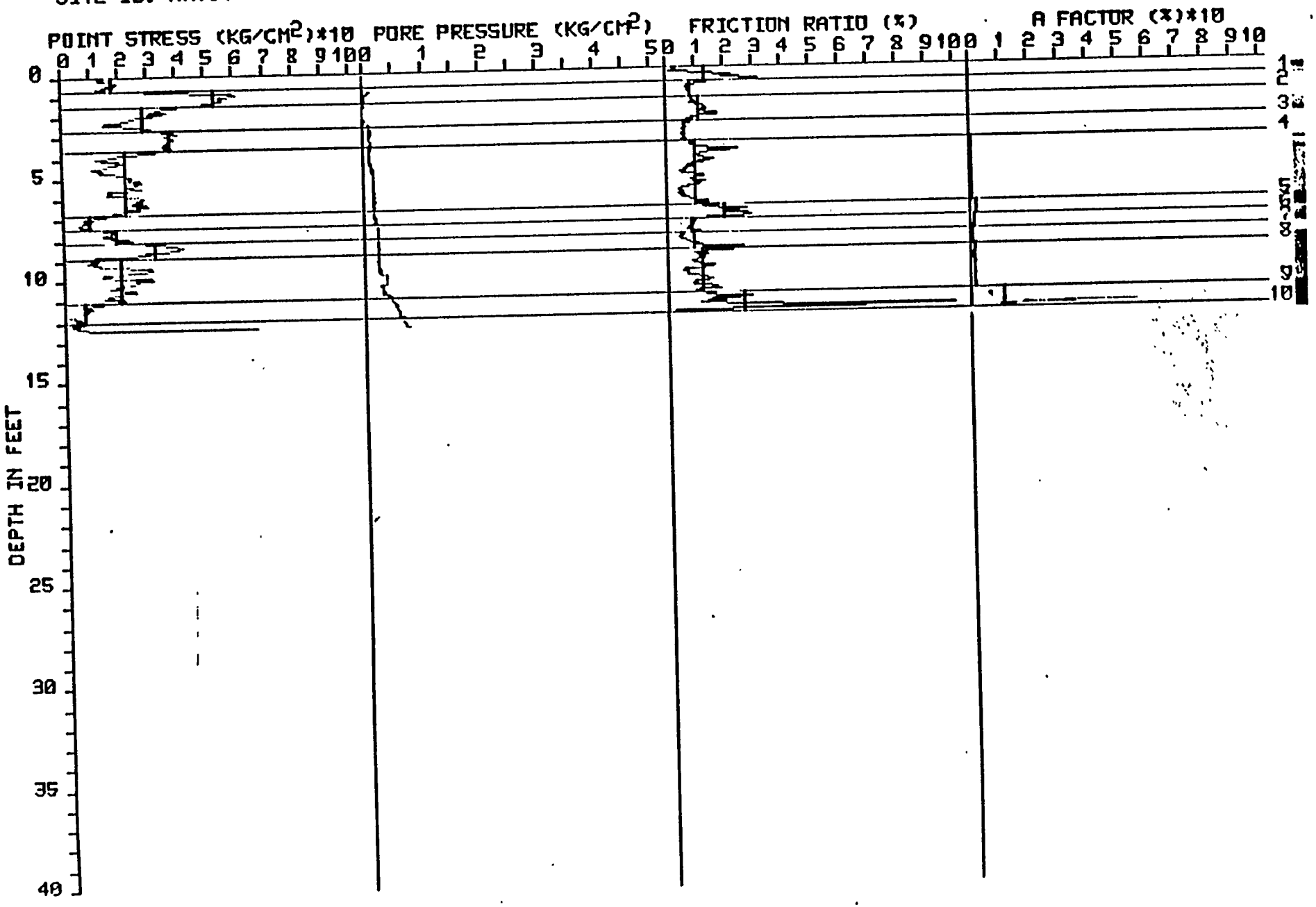
LOCATION ID: 011



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

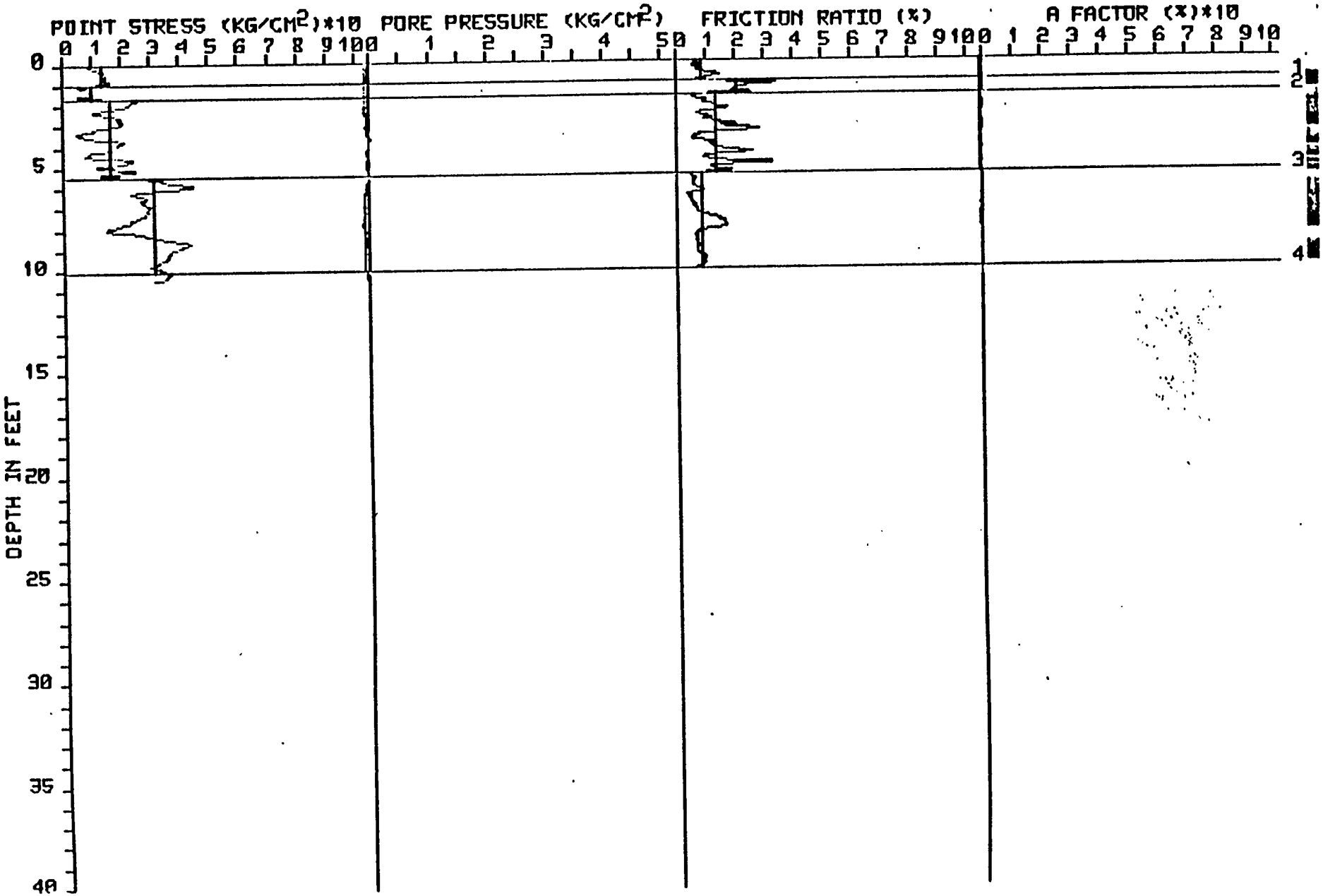
LOCATION ID: 012



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

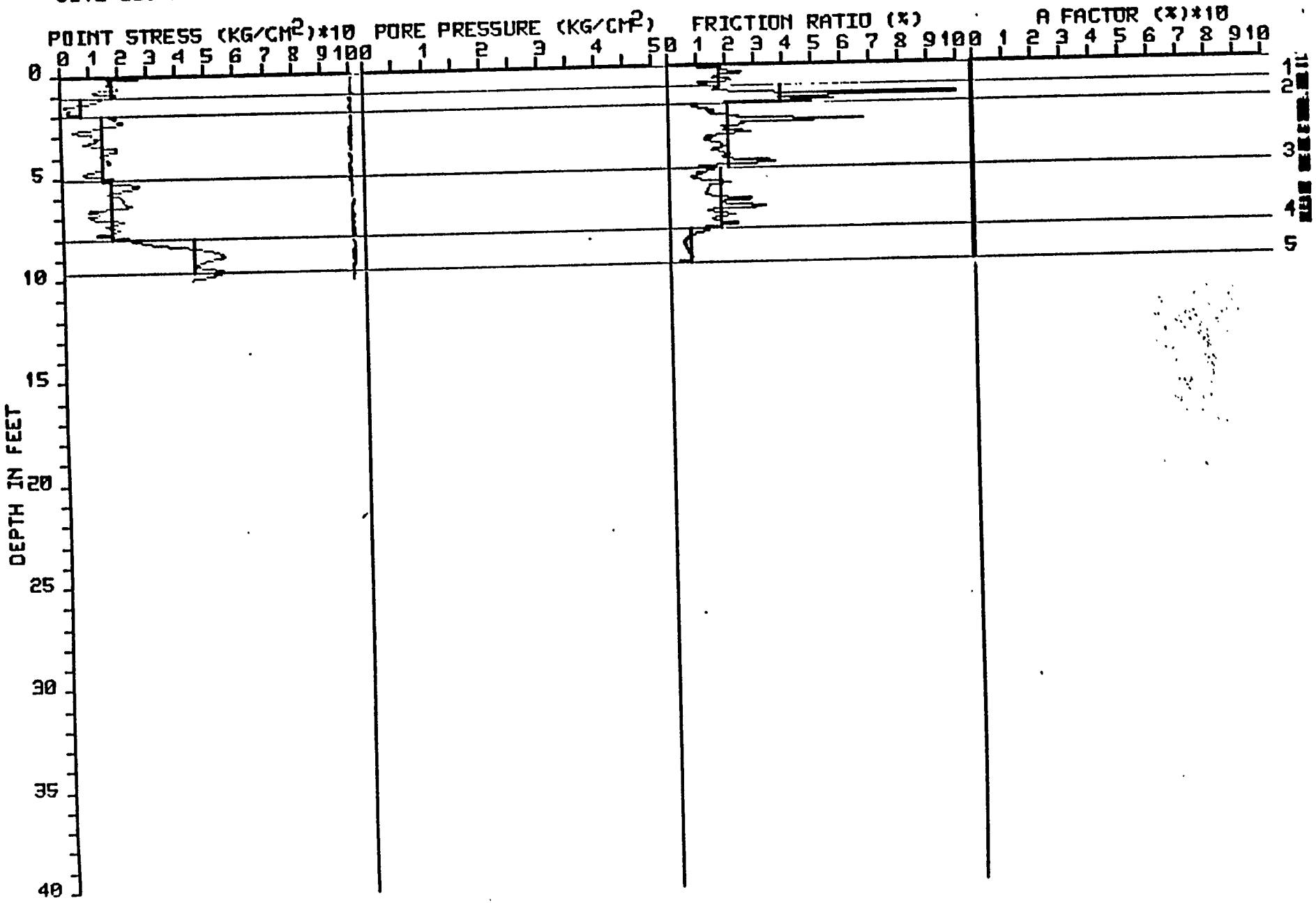
LOCATION ID: 013



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

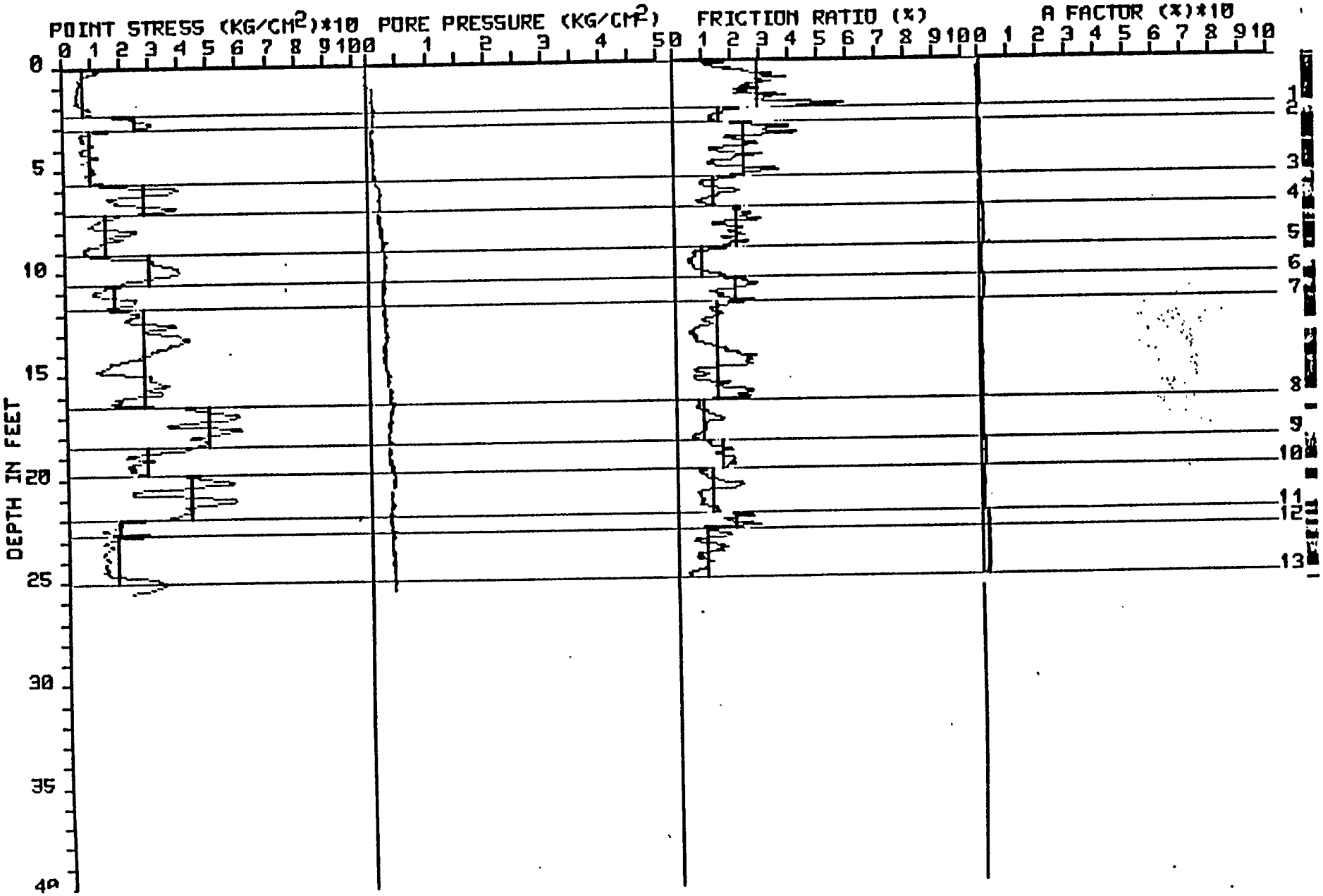
LOCATION ID: 014



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

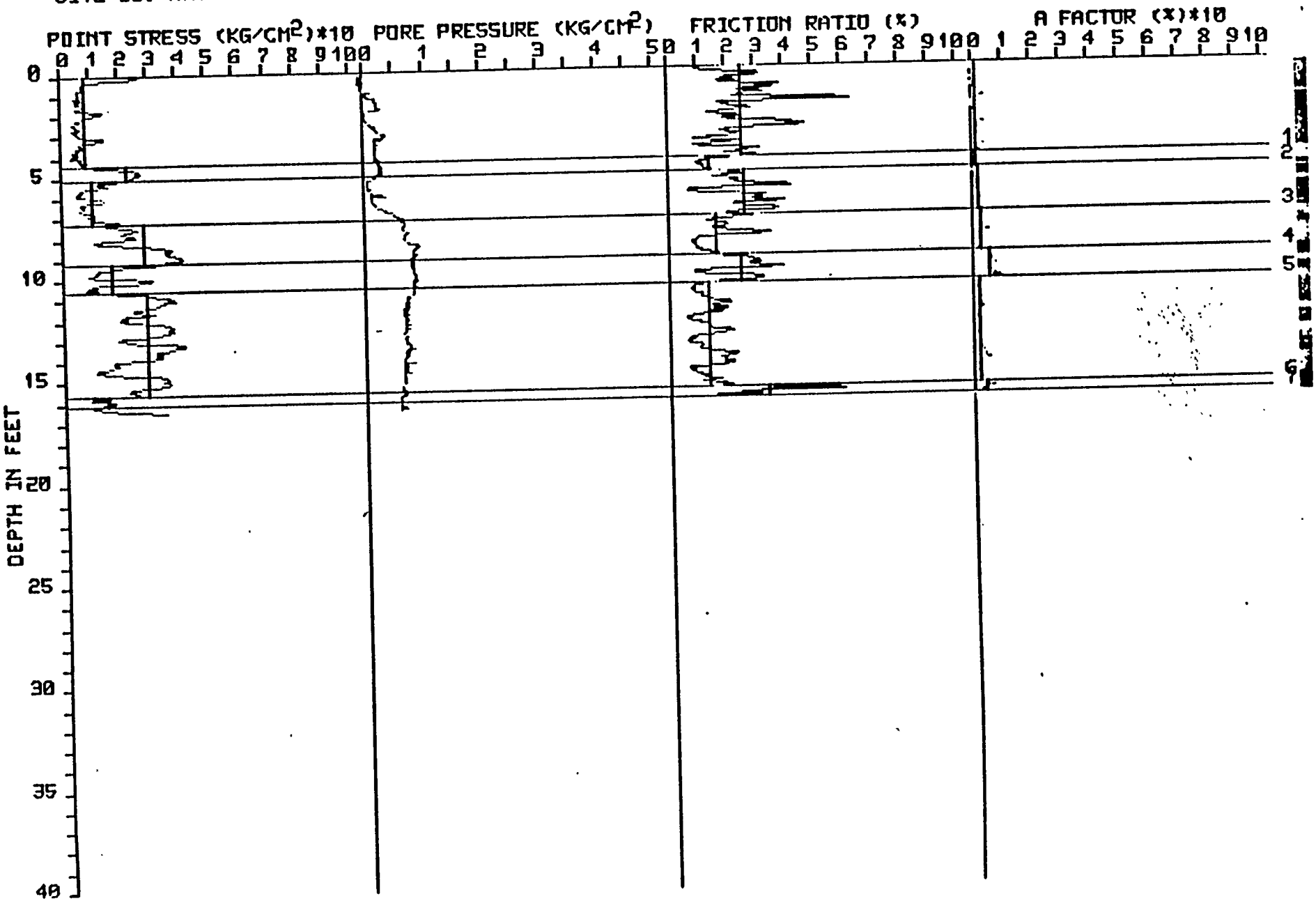
LOCATION ID: 015



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

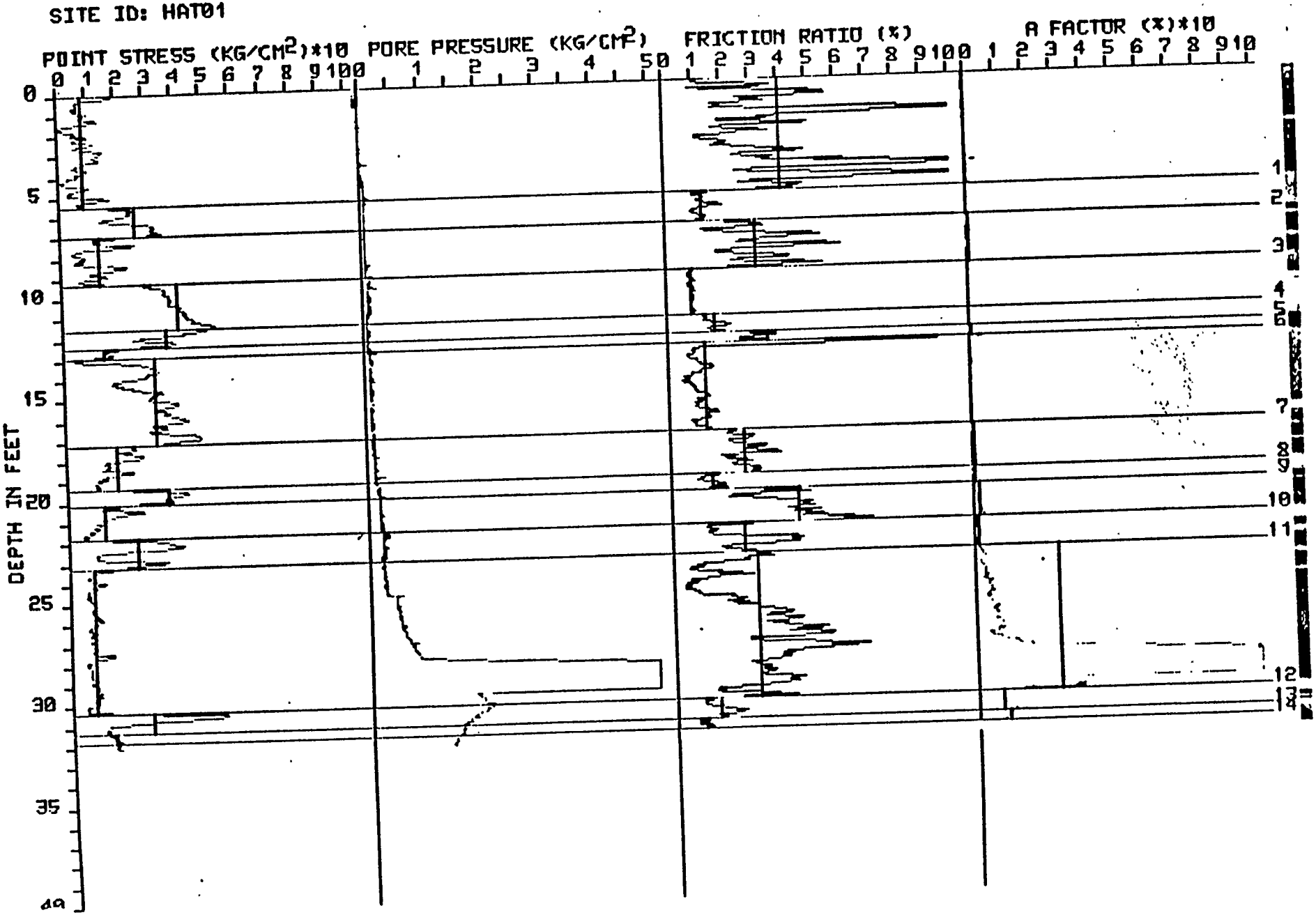
LOCATION ID: 016



PIEZOCONE SOUNDING TEST

LOCATION ID: 017

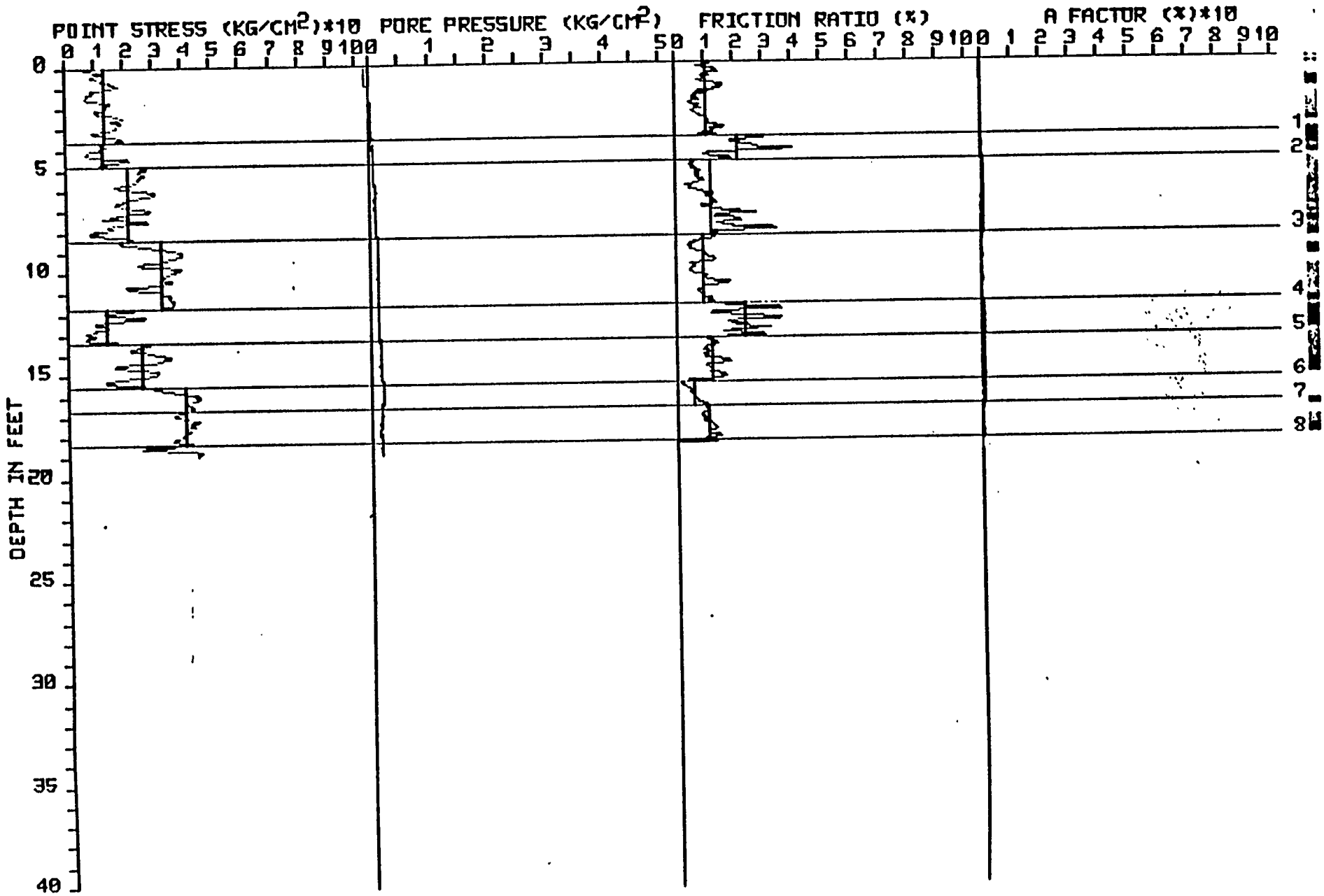
SITE ID: HAT01



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

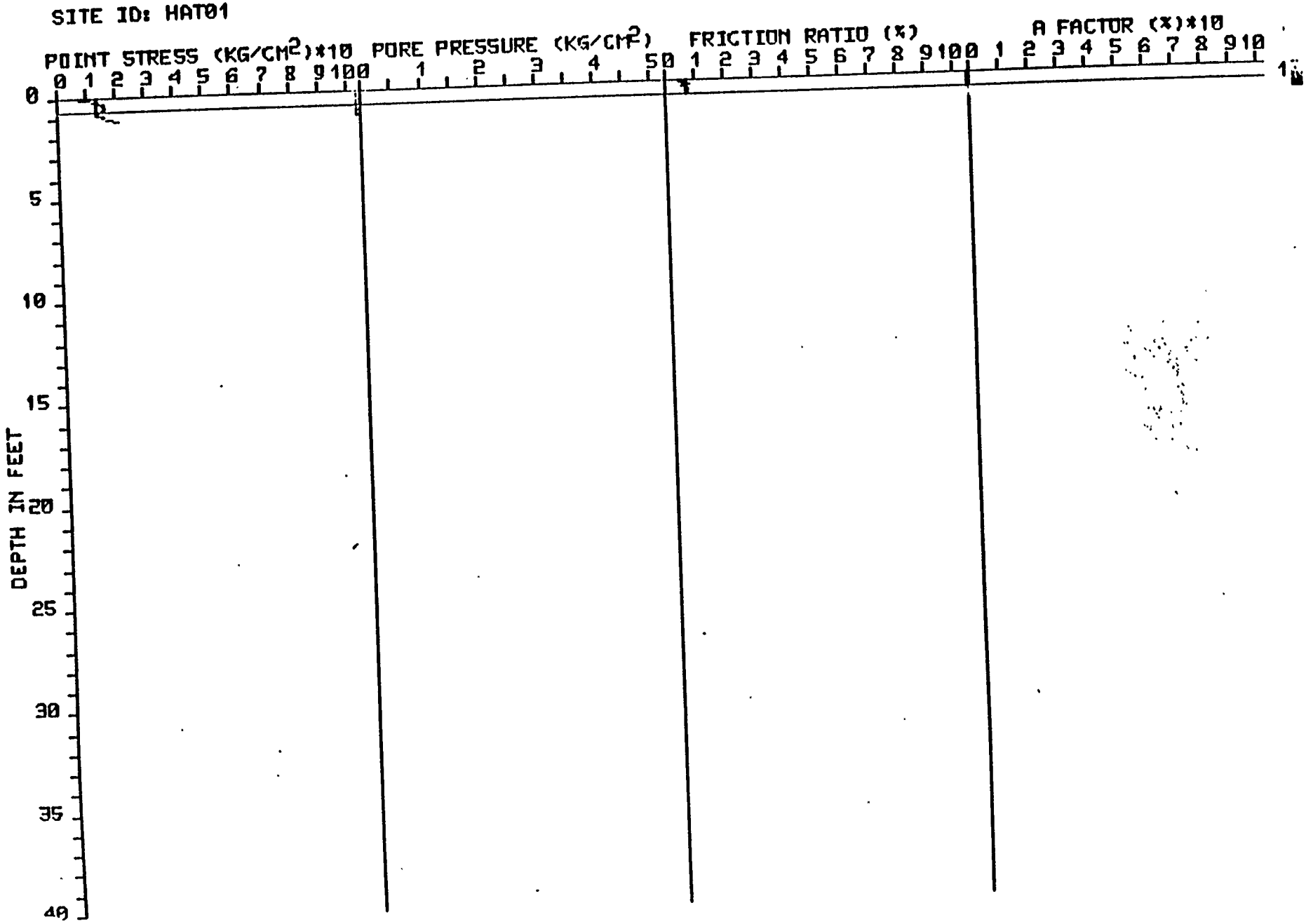
LOCATION ID: 018



PIEZOCONE SOUNDING TEST

LOCATION ID: 019

SITE ID: HAT01



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

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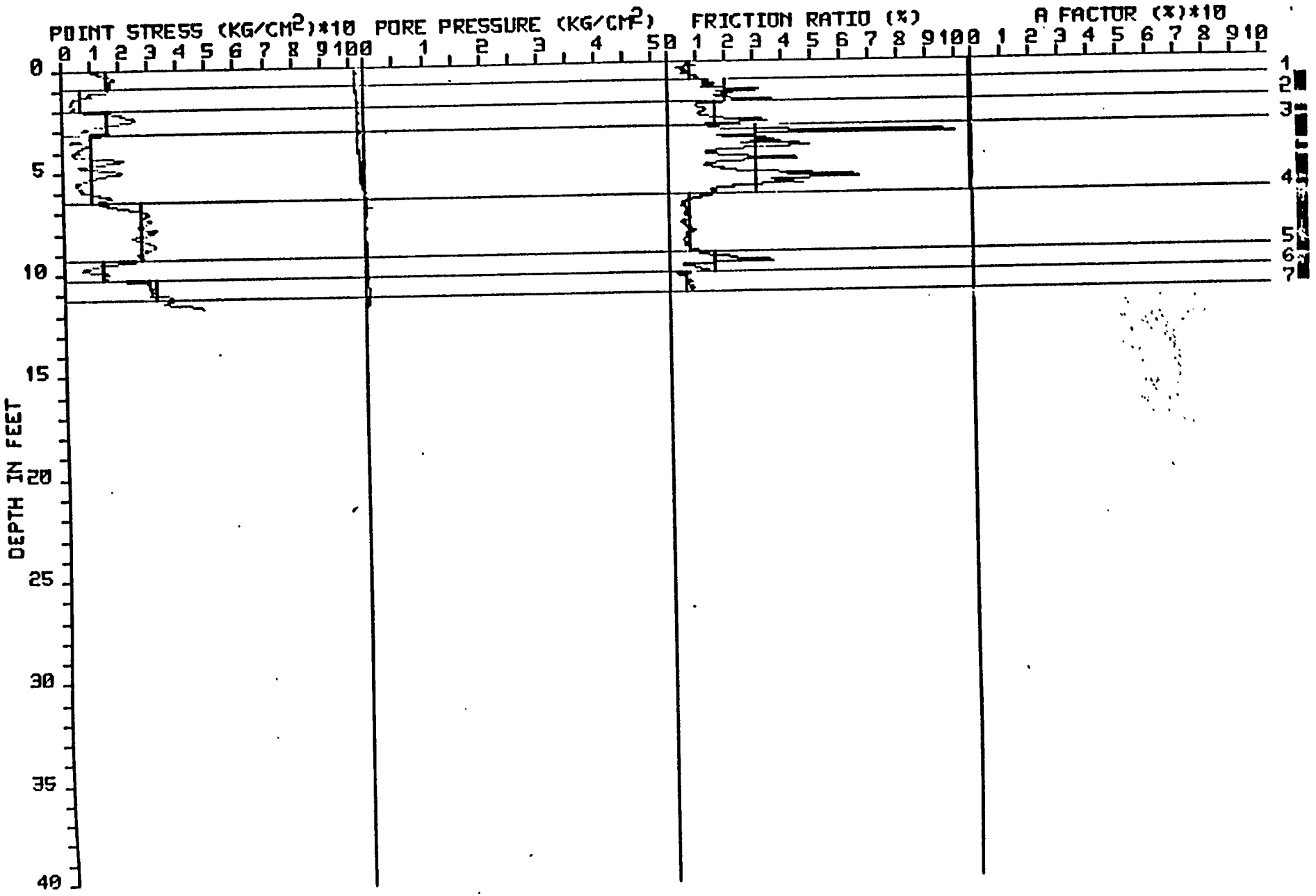
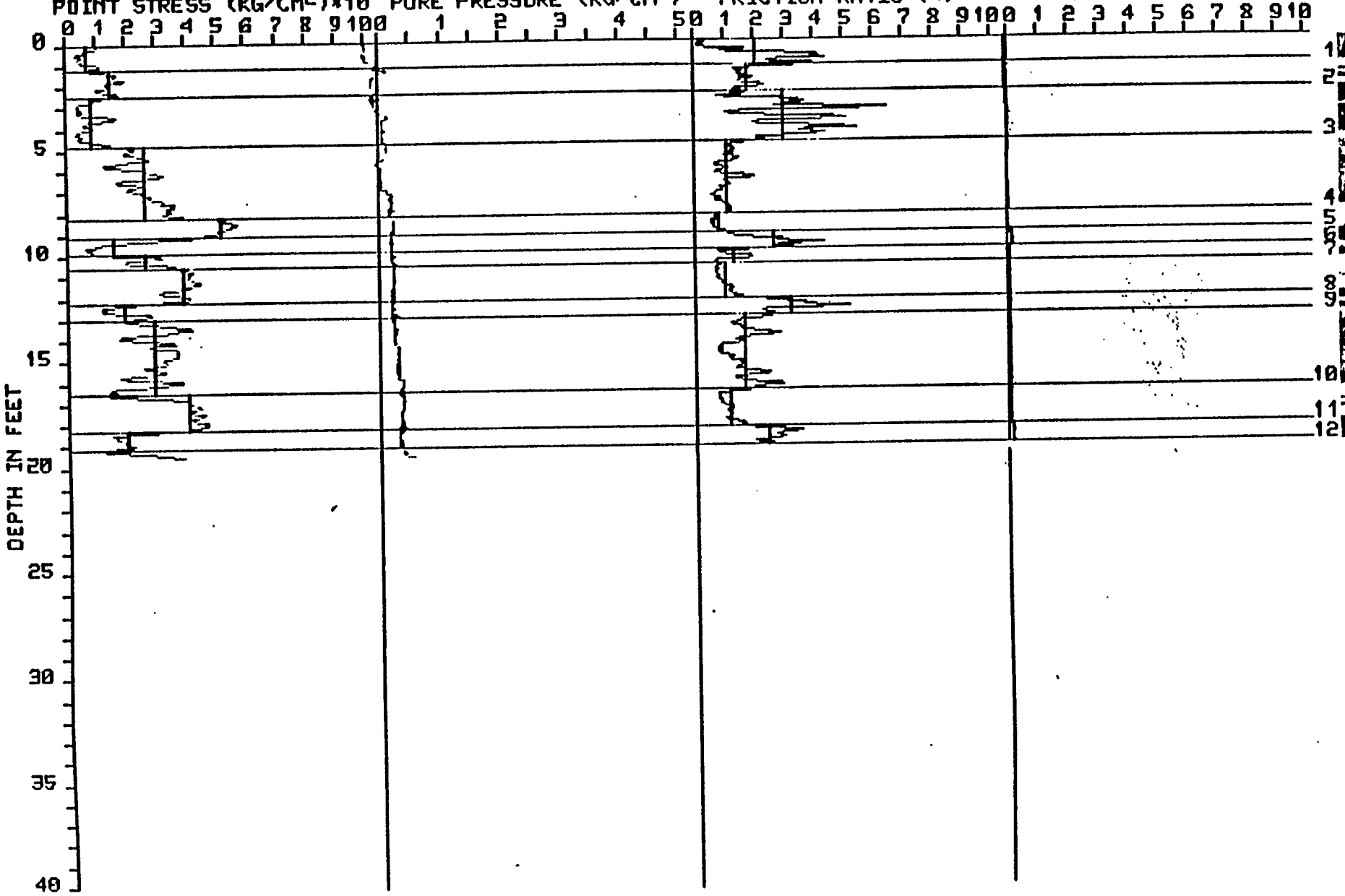


PIEZOCONE SOUNDING TEST

SITE ID: HAT01

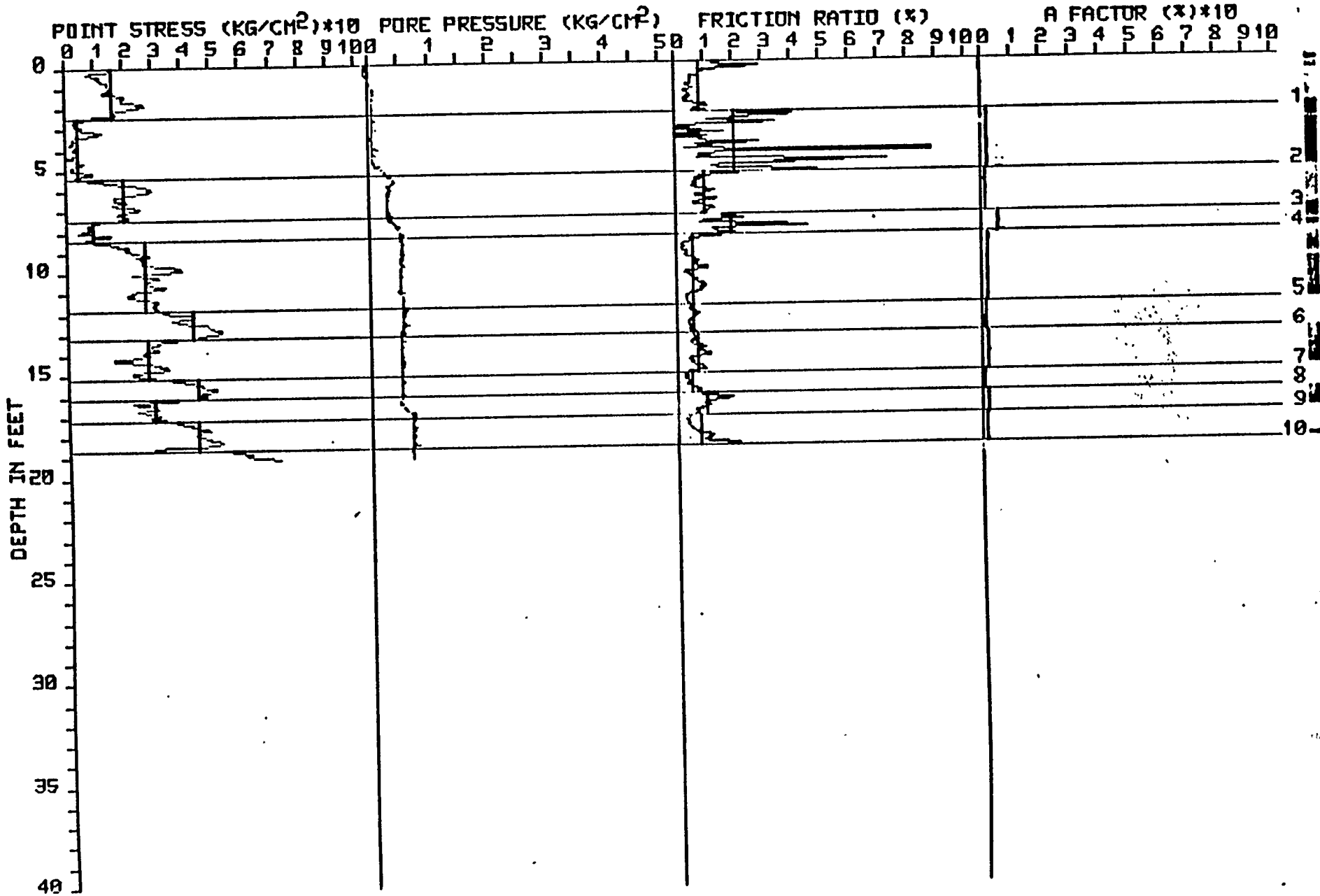
LOCATION ID: 021



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 022



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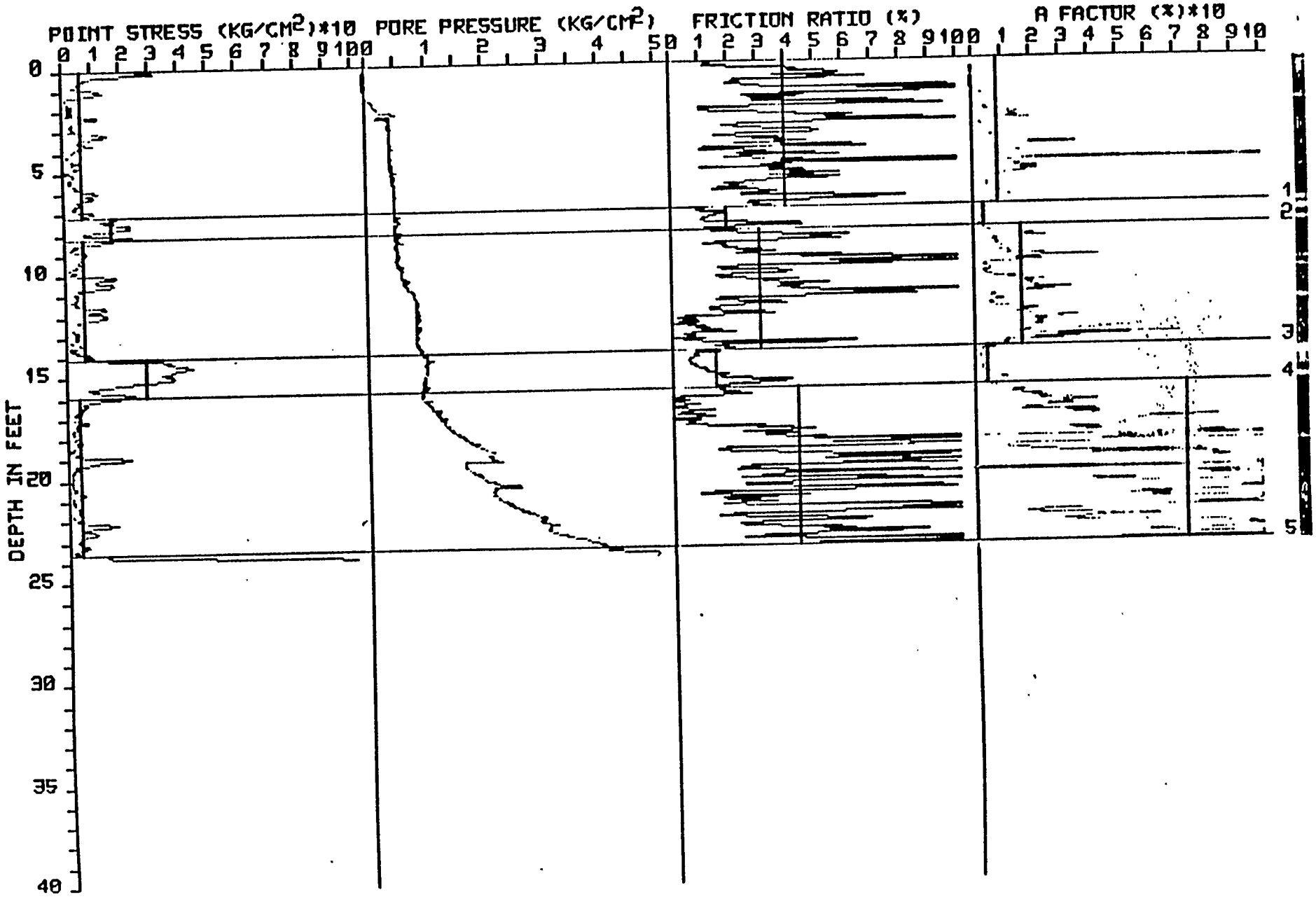
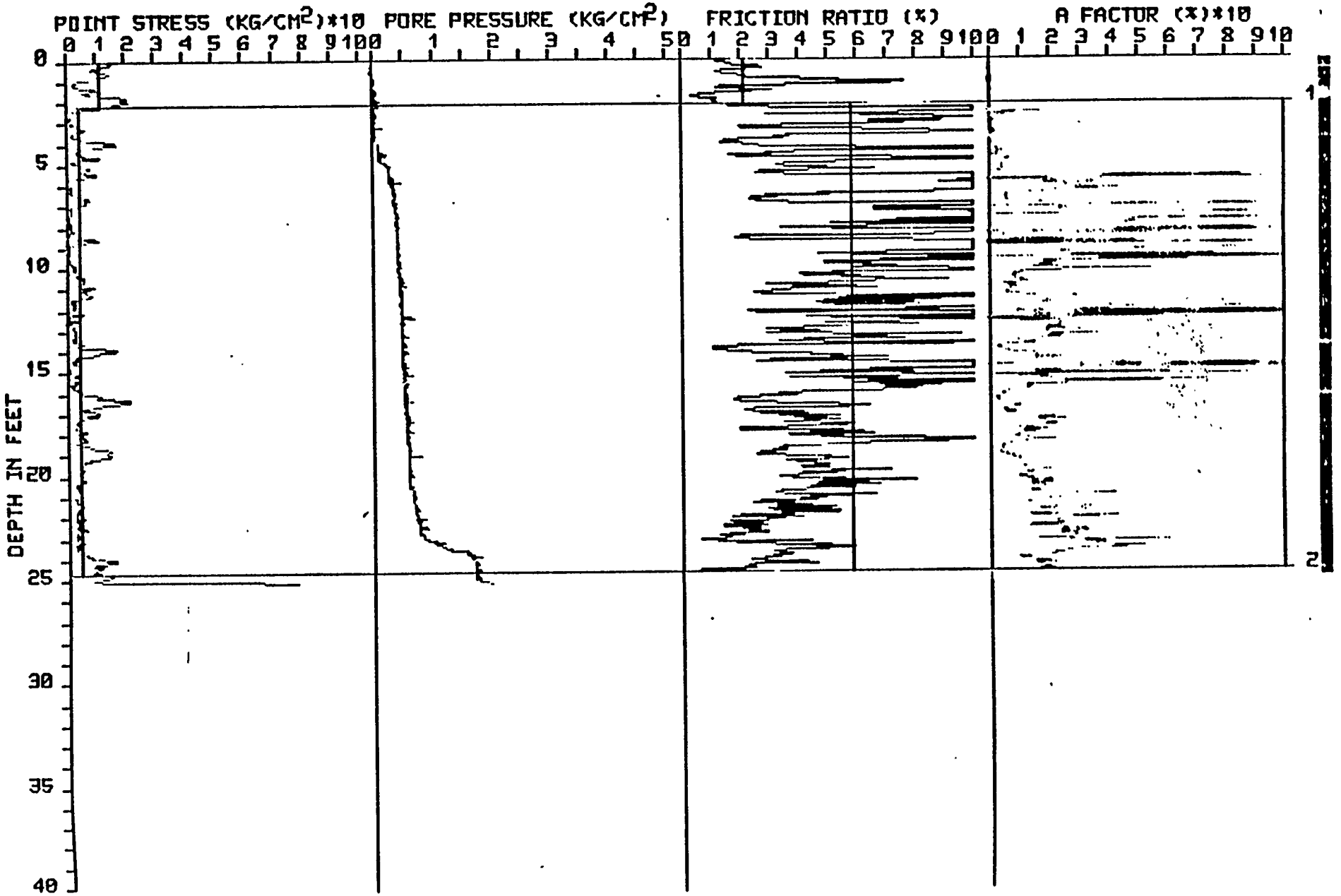


PIEZOCONE SOUNDING TEST

SITE ID: HAT01

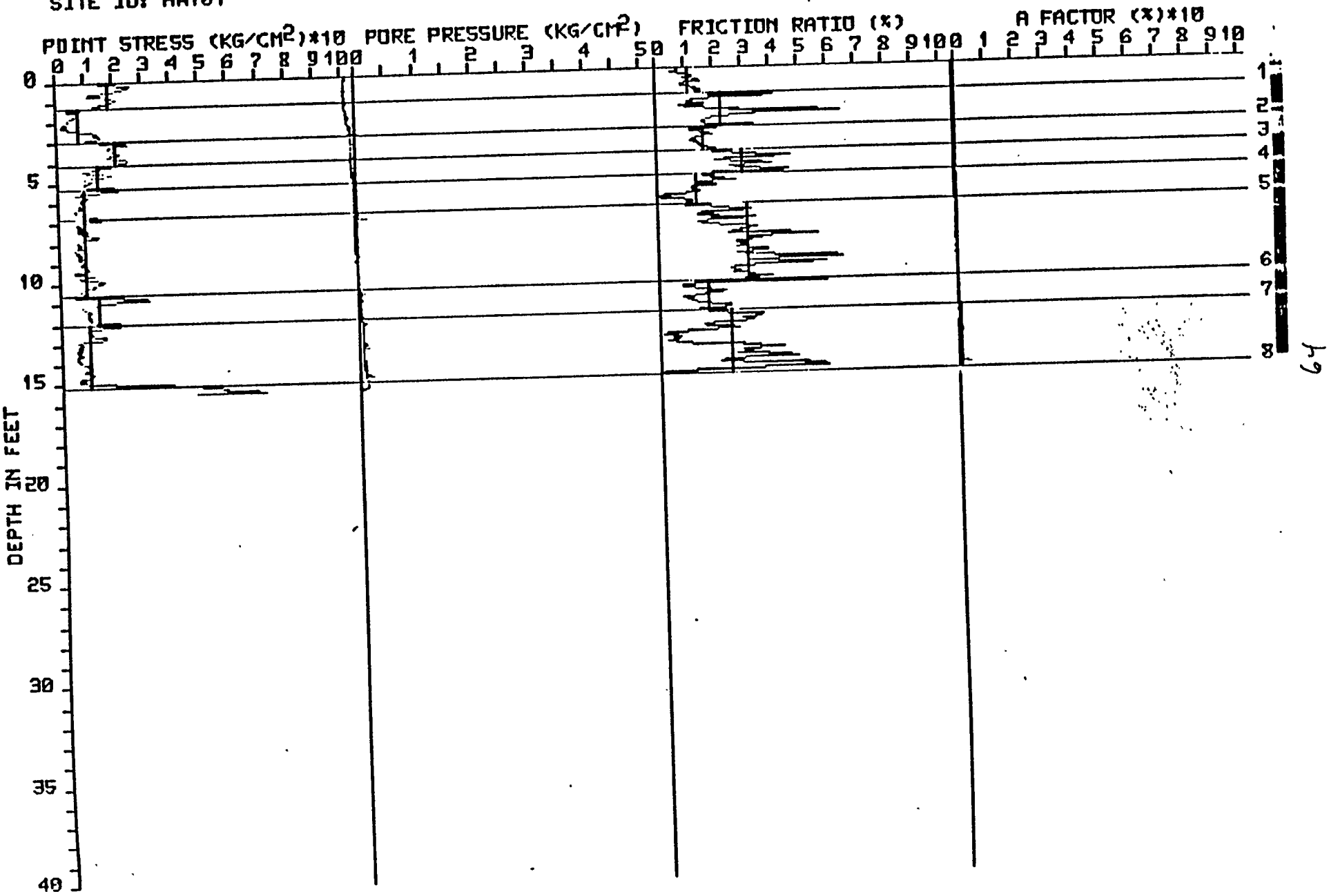
LOCATION ID: 024



PIEZOCONE SOUNDING TEST

LOCATION ID: 025

SITE ID: HAT01



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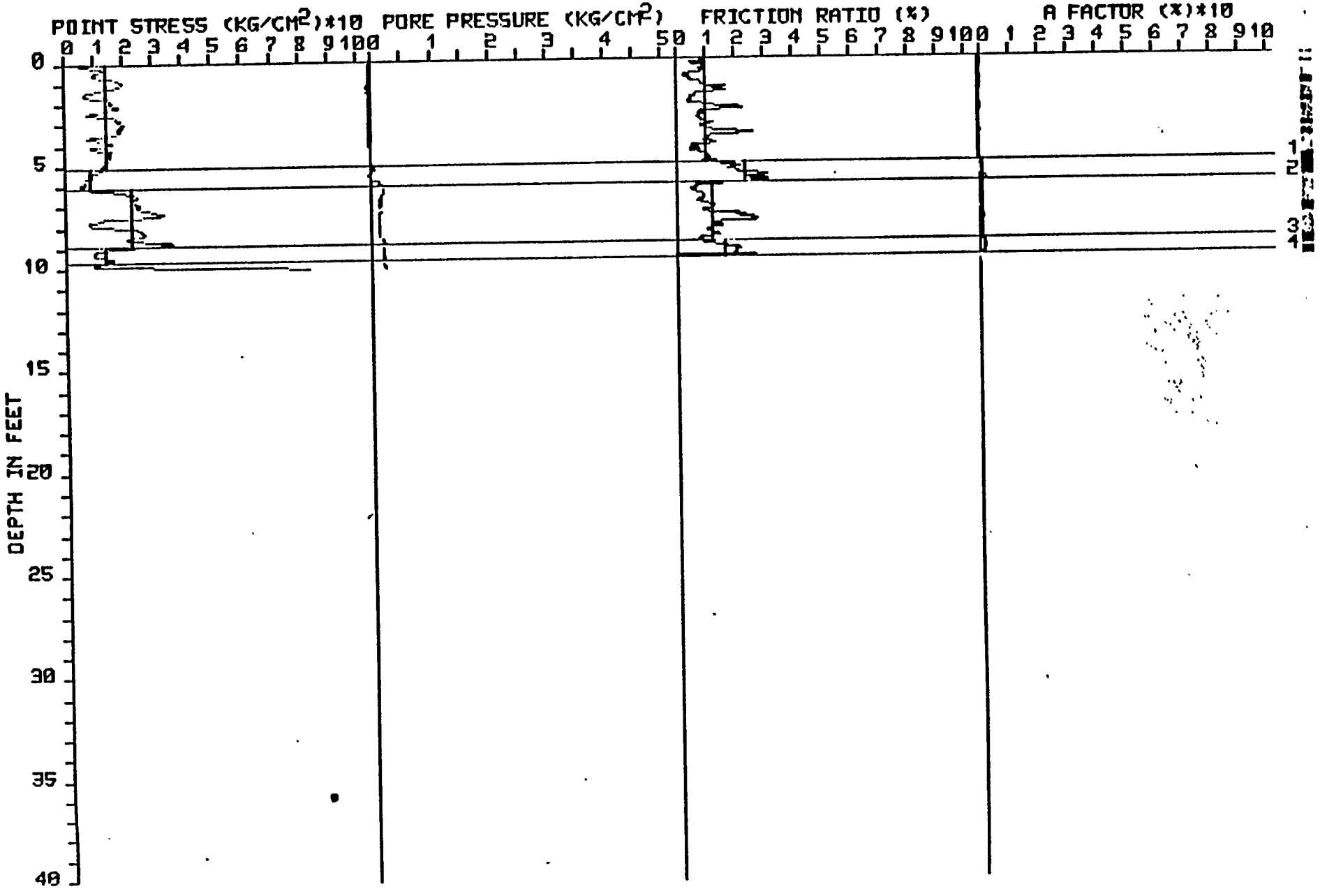
LOCATION ID: 026



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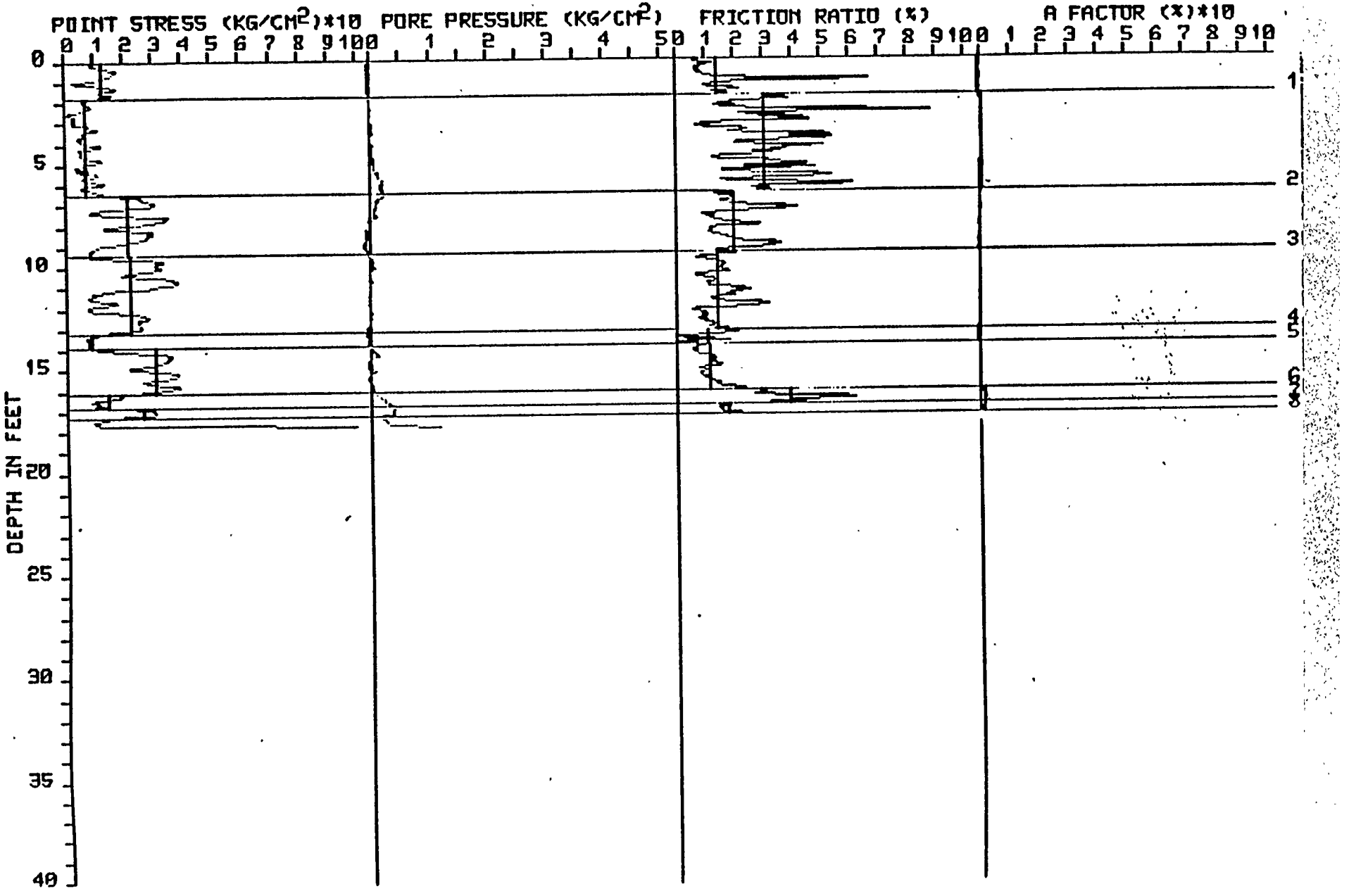
SITE ID: HAT01

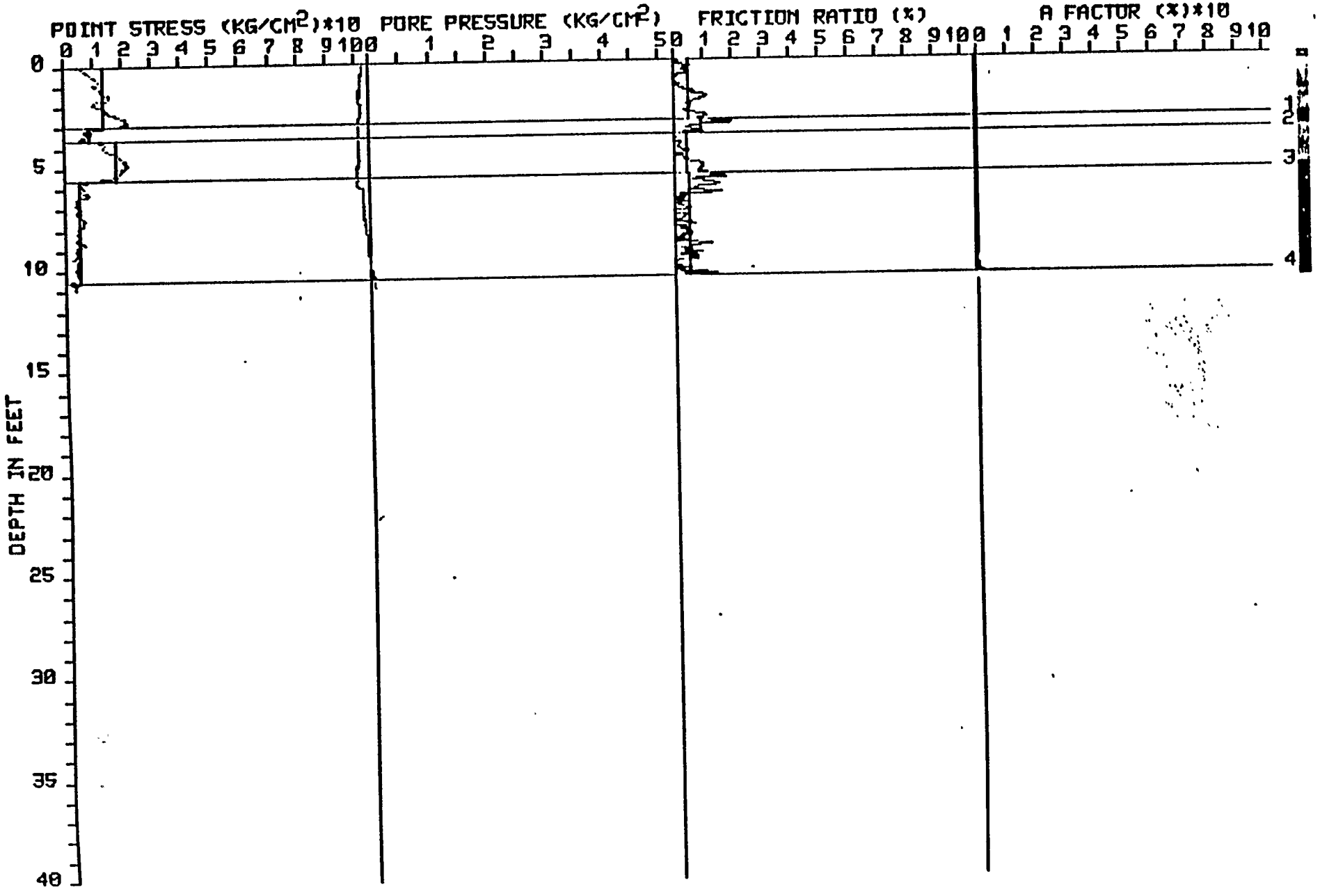
LOCATION ID: 027



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

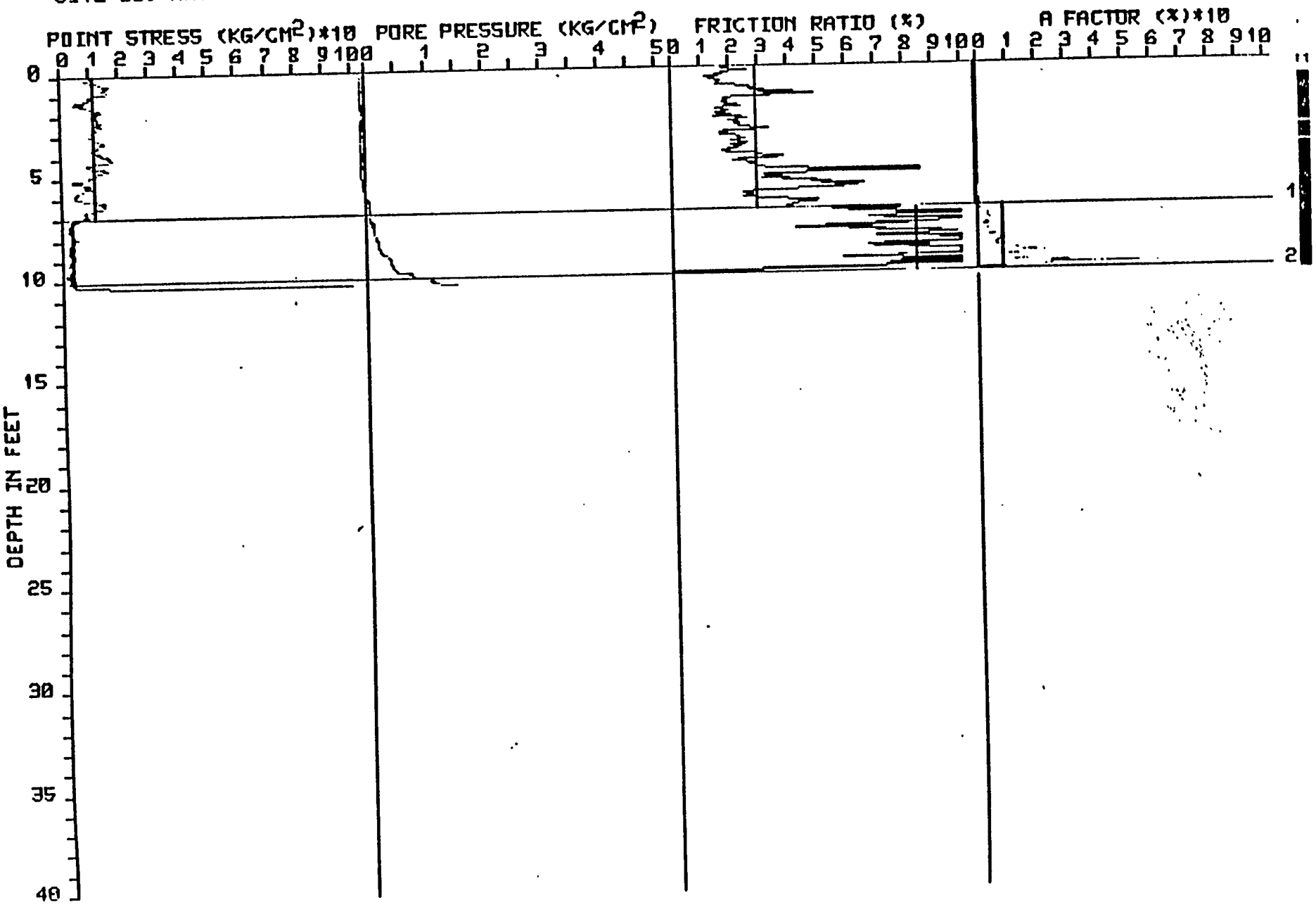
LOCATION ID: 028



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 029



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 030

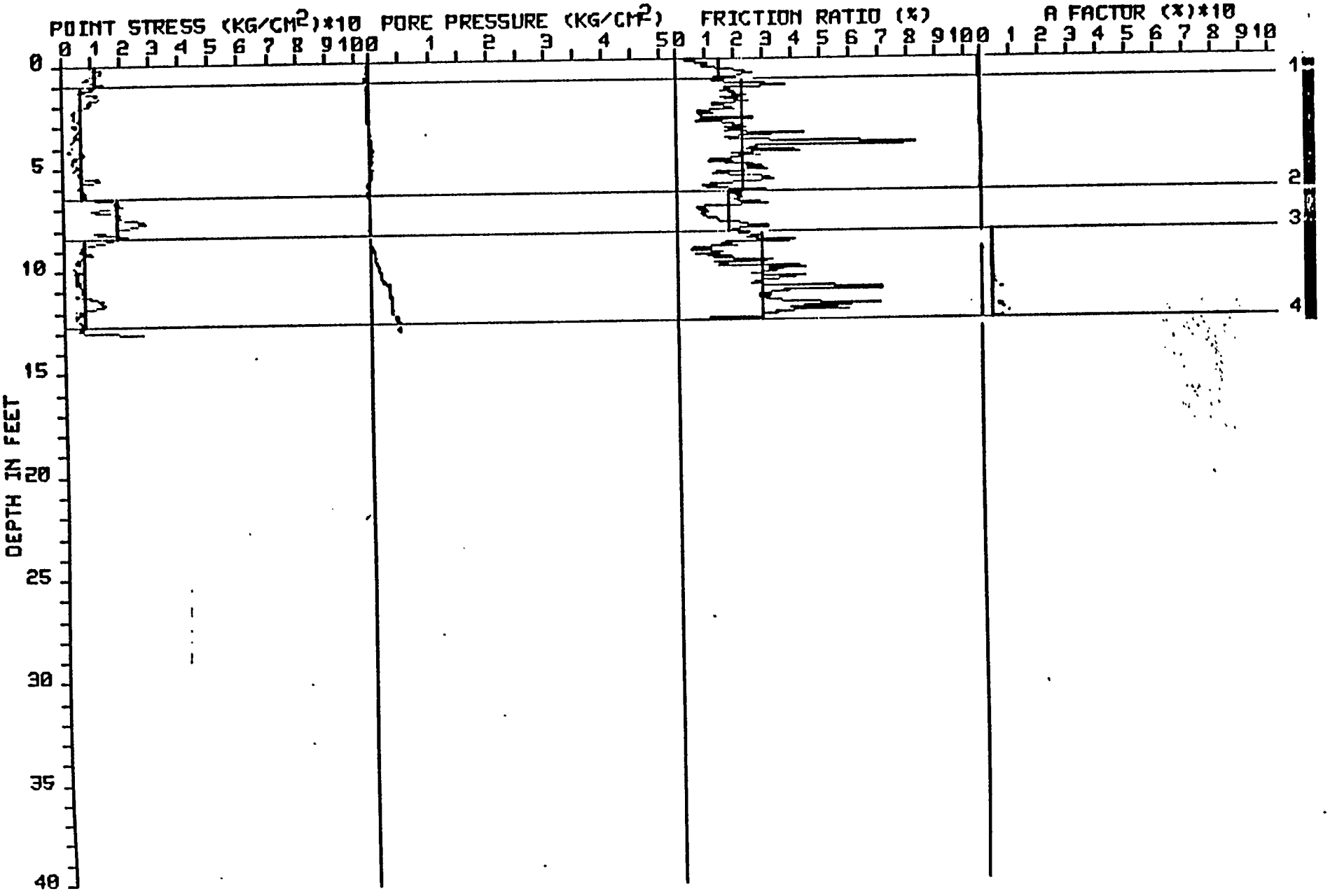


Table D6.1 Geochemical analyses of Colorado State University borings

Boring Number[a]	Sample depth (feet)	pH	Electrical conductivity (mhos/centimeter)	Constituent[b]										$CaCO_3$ equivalent (percent)
				SO_4	Fe	Ca	Mg	Na	Cl	Al	Mn	As	Se	
MH-200	2.5	8.1	1.8	3650	158	2660	782	323	130	812	252	4	3	10.4
MH-200	3.0	8.0	1.8	3140	130	2500	507	118	60	778	224	4	2	21.8
MH-200	3.5	8.1	2.0	4240	128	4260	473	161	60	675	183	4	4	19.3
MH-200	4.0	8.0	1.9	3870	110	3380	378	69	<20	781	159	4	4	21.8
MH-200	4.8	8.2	0.2	200	118	222	29	30	272	288	390	3	5	36.0
MH-200	6.0	8.6	0.1	111	84	131	21	16	<20	363	296	2	4	17.5
MH-200	10.0	8.6	0.2	270	115	217	53	41	<20	336	191	3	4	36.0
MH-200	15.0	8.6	0.1	67	106	114	30	49	<20	348	138	3	4	49.8
MH-200	19.0	8.5	0.1	134	82	155	35	29	<20	248	224	2	3	18.7
MH-205	5.5	8.5	0.2	173	112	167	65	35	<20	278	222	3	5	41.0
MH-205	6.0	8.3	0.8	160	215	1460	186	50	<20	325	610	2	3	29.6
MH-205	7.0	8.5	0.2	190	144	149	55	81	<20	306	228	3	2	36.4
MH-205	10.0	7.9	1.7	3050	96	2110	541	268	<20	931	194	2	<1	18.0
MH-205	12.5	8.1	0.2	300	78	105	60	29	30	609	89	1	1	11.5
MH-205	17.0	8.4	0.1	150	67	131	44	35	20	276	237	1	<1	12.8
MH-205	22.0	8.3	0.2	170	38	53	23	300	30	671	45	1	3	6.1
MH-205	25.5	8.6	0.1	155	87	130	37	36	20	277	193	13	<1	16.4
MH-208	27.0	6.4	2.0	5070	430	5470	177	96	<20	549	72	13	<1	0.84
MH-208	27.5	8.0	0.2	348	304	340	47	22	<20	253	271	4	6	34.4
MH-208	30.2	8.5	0.1	90	130	131	26	24	<20	263	231	4	6	32.0
MH-208	36.0	8.4	0.1	89	93	116	32	31	<20	260	208	2	3	31.4
MH-208	38.0	8.1	0.2	370	74	289	91	72	<20	845	128	2	<1	9.8
MH-208	43.0	8.6	0.1	67	119	111	32	35	<20	342	202	2	2	29.8
MH-208	49.0	8.1	0.2	120	52	124	47	98	<20	671	103	3	<1	18.0

[a]Boring numbers currently do not have DOE identification numbers; CSU boring numbers represent NX rock core samples.
[b]Analysis done by solute extraction; values are expressed in milligrams per gram of dry soil; SO_4 - sulfate; Fe - iron; Ca - calcium; Mg - magnesium; As - arsenic; Se - selenium.

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 001
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.3	1.2	16.4	0.2	0.0	1.0	S-SL*	5	39	30	57	1965	
2	1.3	4.1	2.8	7.3	0.1	0.1	1.4	SLIM	4			25	870	9.6
3	4.2	8.0	3.8	22.6	0.3	0.1	1.1	S-SL*	7	48	31	79	2709	
4	8.0	10.1	2.1	14.2	0.4	0.2	2.6	SLIM	9			50	1709	5.8
5	10.1	11.1	1.0	24.5	0.3	0.2	1.4	S-SL*	8	44	31	86	2937	
6	11.1	12.5	1.4	14.3	0.4	0.2	2.7	SLIM	9			50	1718	4.2
7	12.5	13.7	1.2	25.7	0.4	0.4	1.5	S-SL*	8	41	30	90	3086	
8	13.8	18.5	4.8	13.2	0.4	1.1	2.8	SLIM	8			46	1585	2.6
9	18.6	23.3	4.7	30.6	0.6	0.5	1.9	S-SL*	10	37	29	107	3671	
10	23.3	25.2	1.9	18.0	0.6	1.4	3.2	SLIM	12			63	2164	2.0
11	25.3	28.3	3.1	6.2	0.1	2.7	2.1	SLIM	4			22	742	0.8
12	28.3	30.7	2.3	21.8	0.5	1.0	2.2	SLIM	14			76	2615	1.8
13	30.7	33.8	3.1	11.8	0.4	6.6	3.3	SLIM	7			41	1414	1.0
% THK:		35	11.9	25.6	0.4	0.3	1.5	S-SL	8	41	30	89	3071	
% THK:		64	21.5	12.7	0.3	1.9	2.5	SLIM	7			44	1527	3.3

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 002
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	0.8	0.7	48.0	0.3	-0.1	0.7	SAND*	9	72	35	168		
2	0.8	9.8	9.1	23.7	0.2	0.0	0.8	S-SL*	7	49	31	83	2845	
3	9.9	13.2	3.3	13.4	0.4	1.6	2.7	SLIM	8			47	1611	4.1
4	13.2	17.0	3.8	30.4	0.4	0.5	1.2	S-SL*	10	43	30	106	3647	
5	17.1	18.6	1.6	43.1	0.3	0.1	0.8	SAND*	8	50	31	151		
6	18.7	19.6	0.9	22.2	0.4	0.2	1.9	S-SL	7	30	29	78	2662	
7	19.6	21.0	1.4	56.3	0.5	0.3	1.0	SAND*	11	55	32	197		
% THK:		17	3.7	49.0	0.4	0.1	0.9	SAND	9	56	32	171		
% THK:		66	13.8	25.4	0.3	0.2	1.0	S-SL	7	46	31	89	3053	
% THK:		15	3.3	13.4	0.4	1.6	2.7	SLIM	8			46	1611	4.1

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

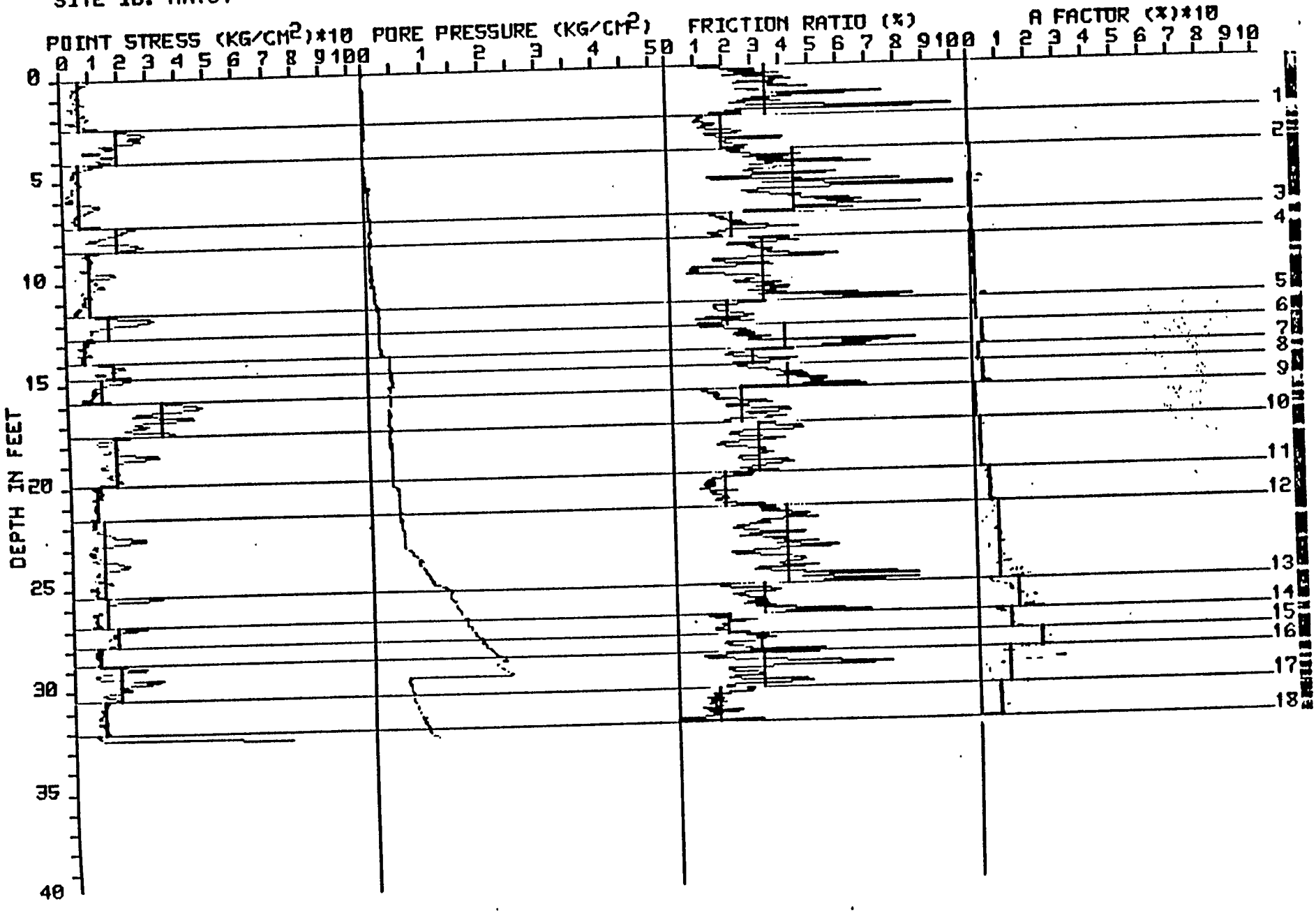
LOCATION ID: 003
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.2	1.1	6.7	0.0	-0.0	0.6	SLIM*	4			23	800	25.6
2	1.2	14.8	13.5	24.9	0.2	0.1	1.0	S-SL*	8	48	31	87	2985	
3	14.8	18.1	3.3	8.8	0.3	0.3	3.4	SLIM	5			31	1057	1.9
4	18.2	20.1	1.9	27.5	0.4	0.4	1.4	S-SL*	9	36	29	96	3302	
5	20.1	21.0	0.9	52.8	0.4	0.2	0.7	SAND*	10	53	32	185		
6	21.1	23.9	2.8	27.4	0.4	0.2	1.5	S-SL*	9	33	29	96	3287	
7	23.9	25.8	1.9	4.8	0.2	0.4	4.0	SLIM	3			17	574	0.7
% THK:		3	0.9	52.8	0.4	0.2	0.7	SAND	10	52	32	185		
% THK:		71	18.2	25.6	0.3	0.1	1.1	S-SL	8	44	31	89	3064	
% THK:		24	6.3	7.2	0.2	0.3	3.1	SLIM	4			25	866	5.7

PIEZOCONE SOUNDING TEST

LOCATION ID: 031

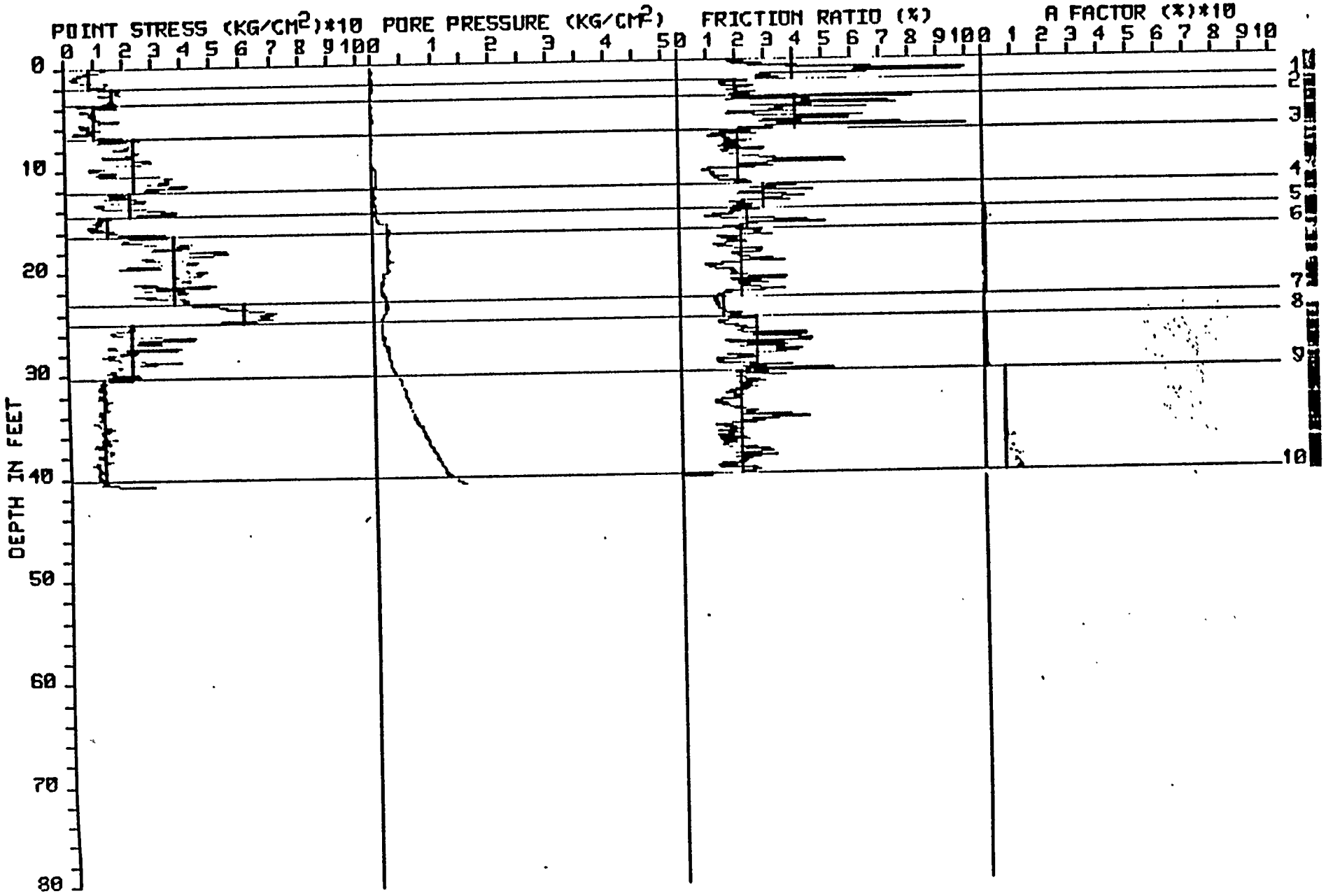
SITE ID: HAT01



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

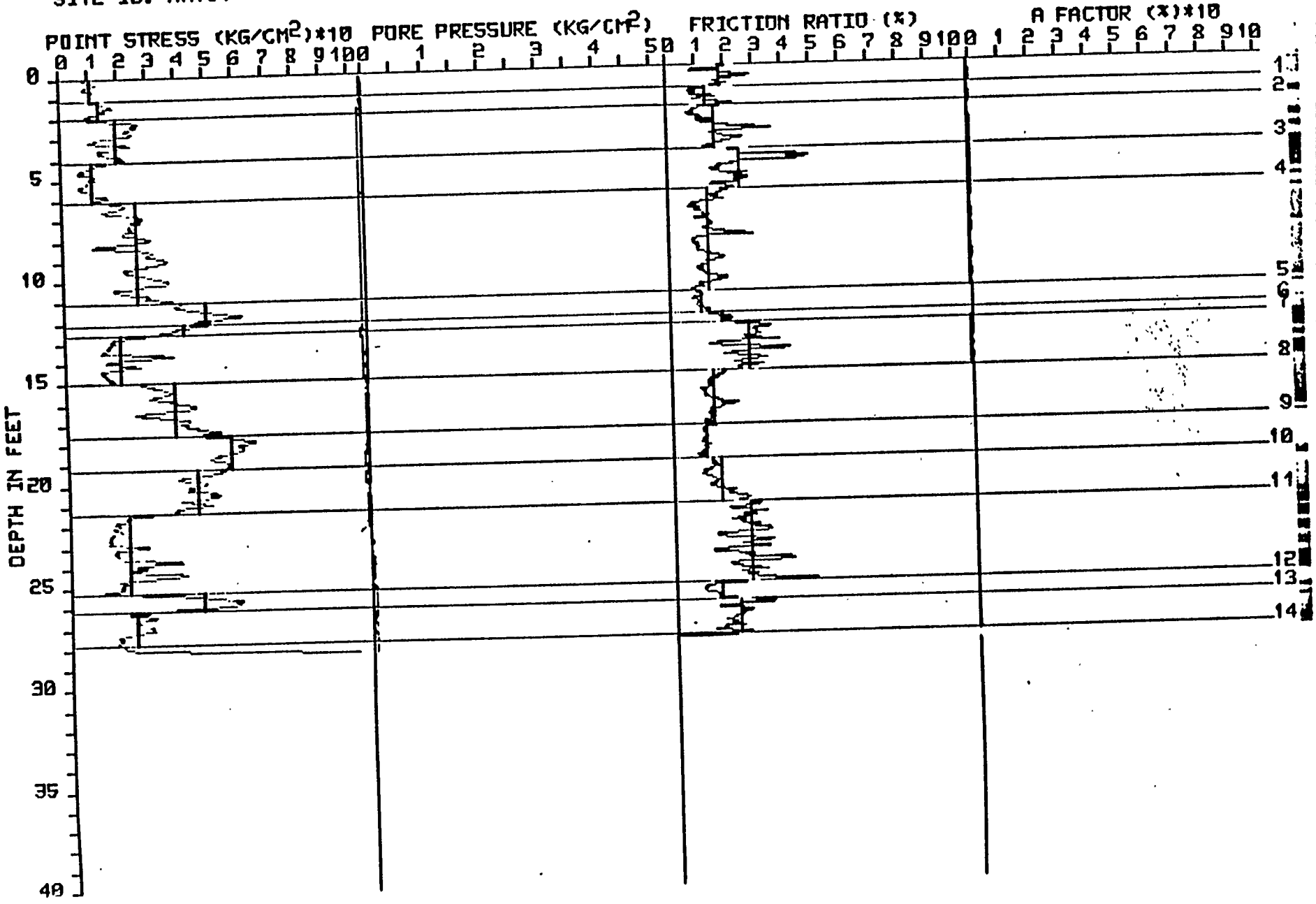
LOCATION ID: 032



PIEZOCONE SOUNDING TEST

LOCATION ID: 033

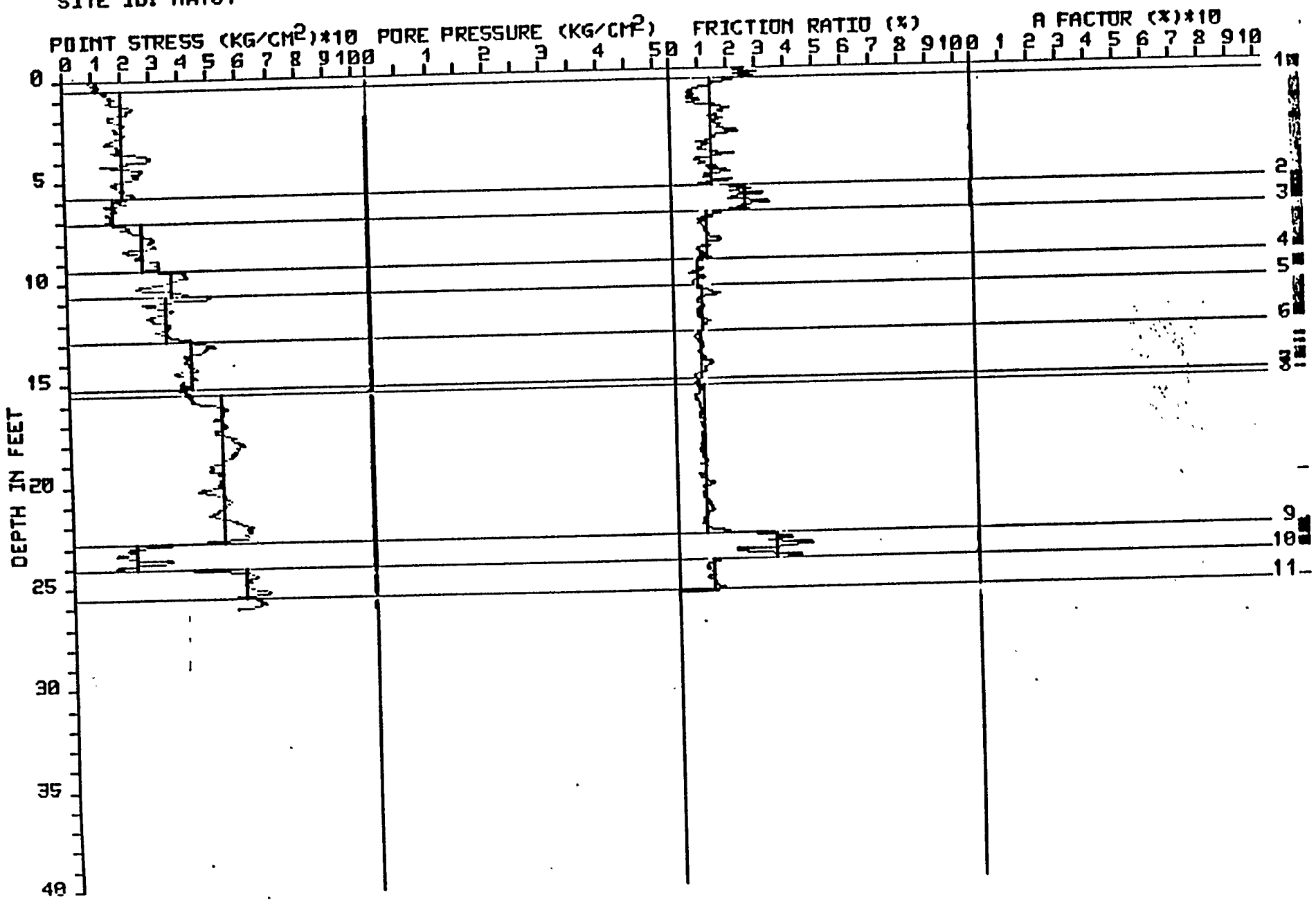
SITE ID: HAT01



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

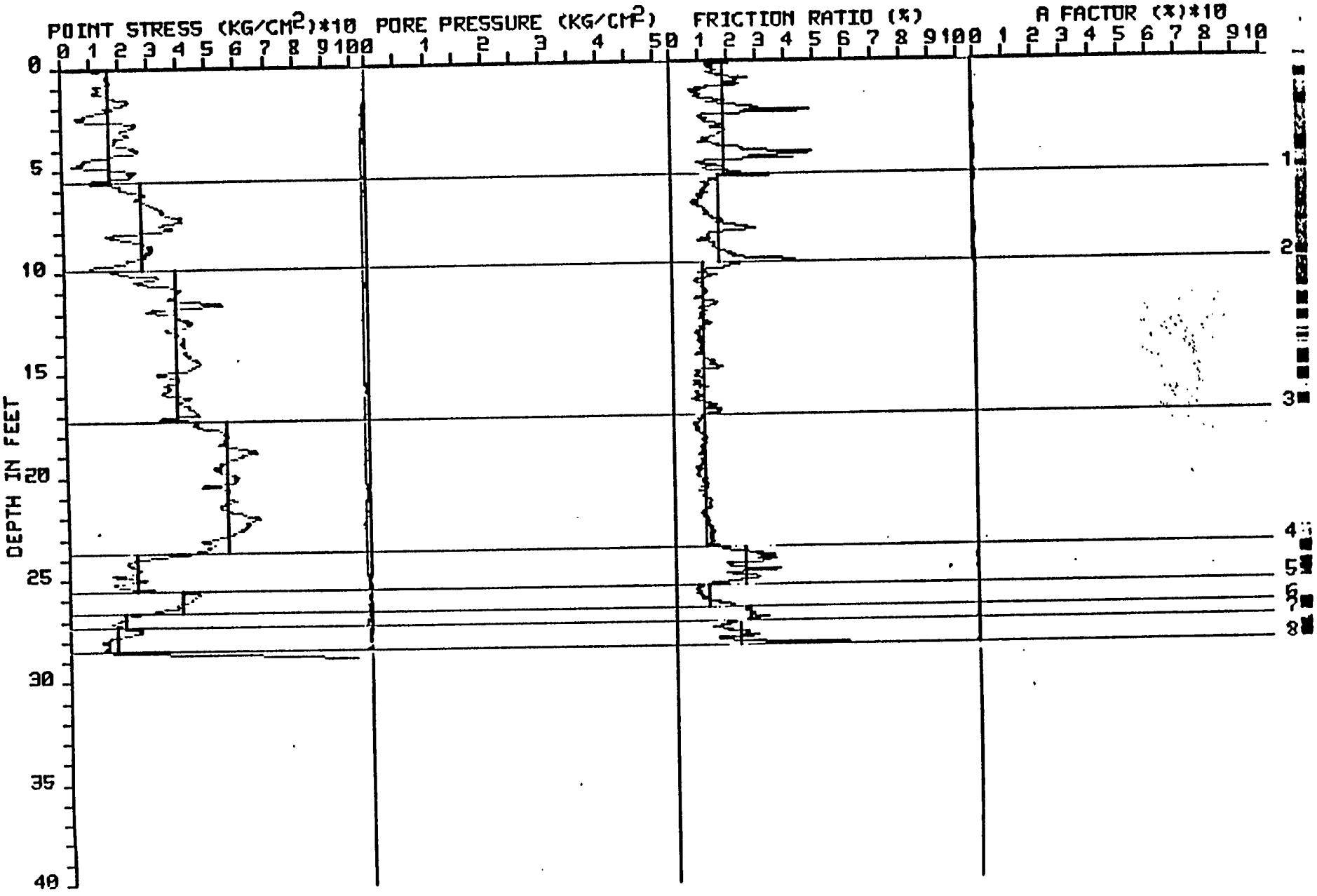
LOCATION ID: 034



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

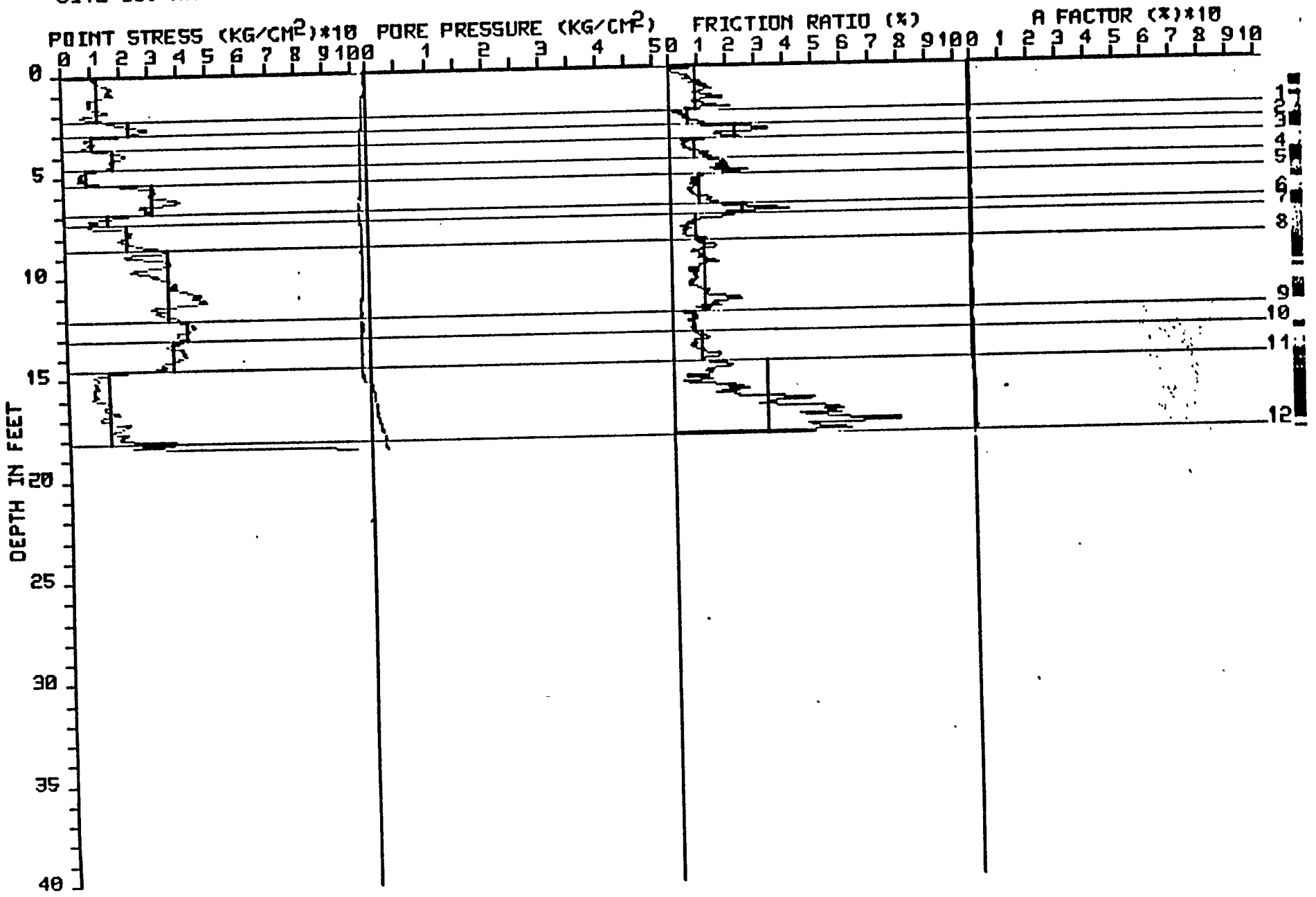
LOCATION ID: 035



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

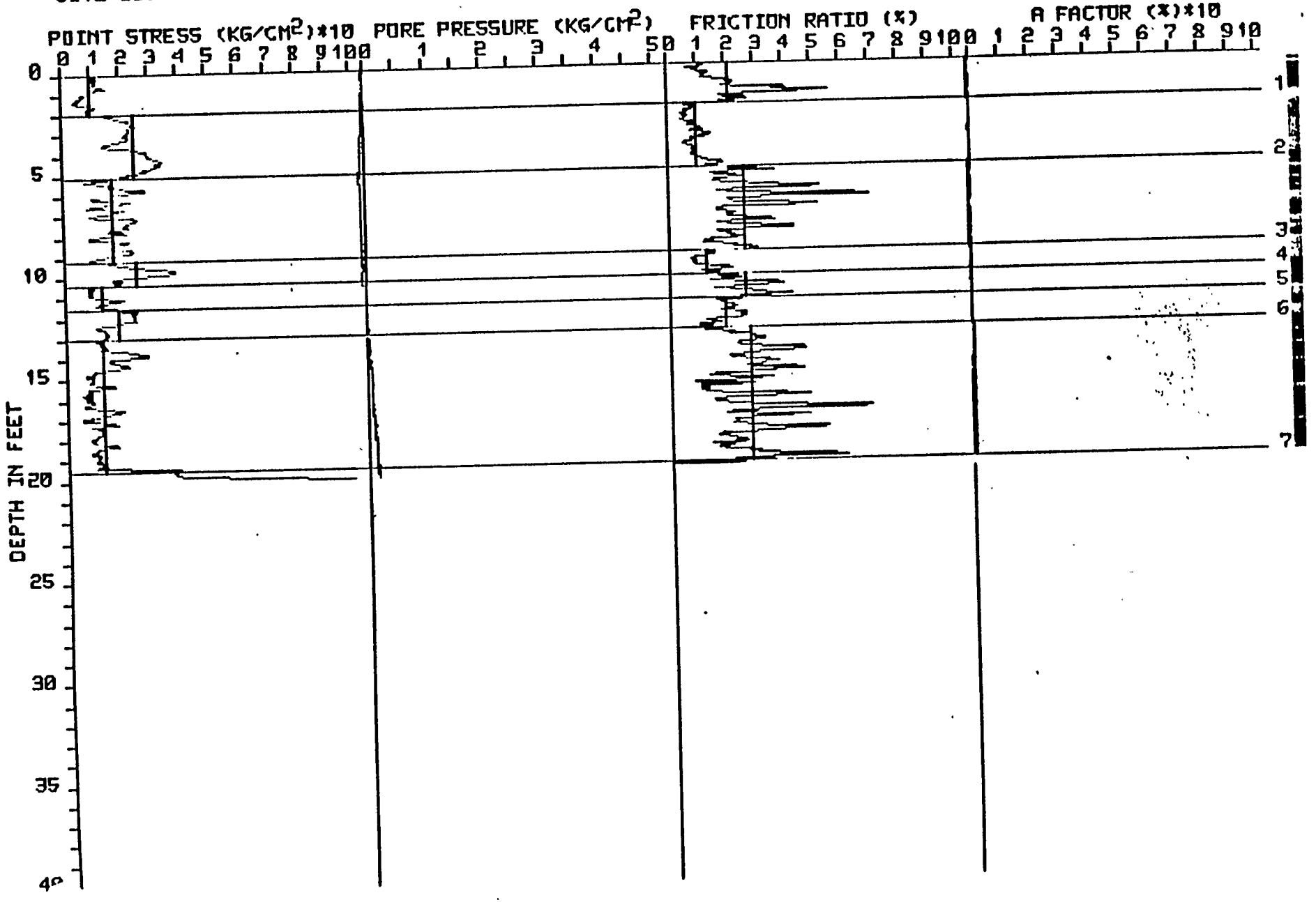
LOCATION ID: 036



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

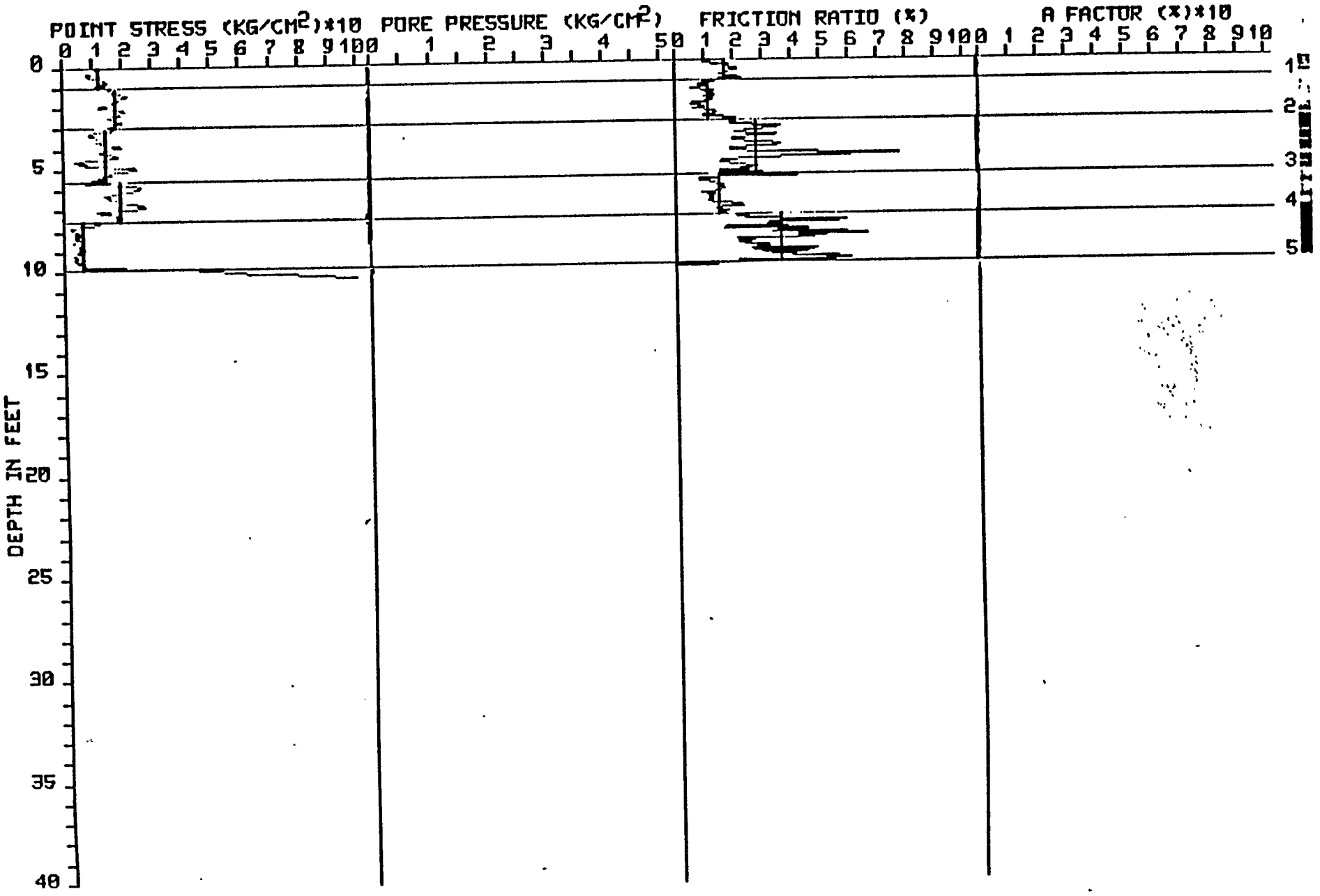
LOCATION ID: 037



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

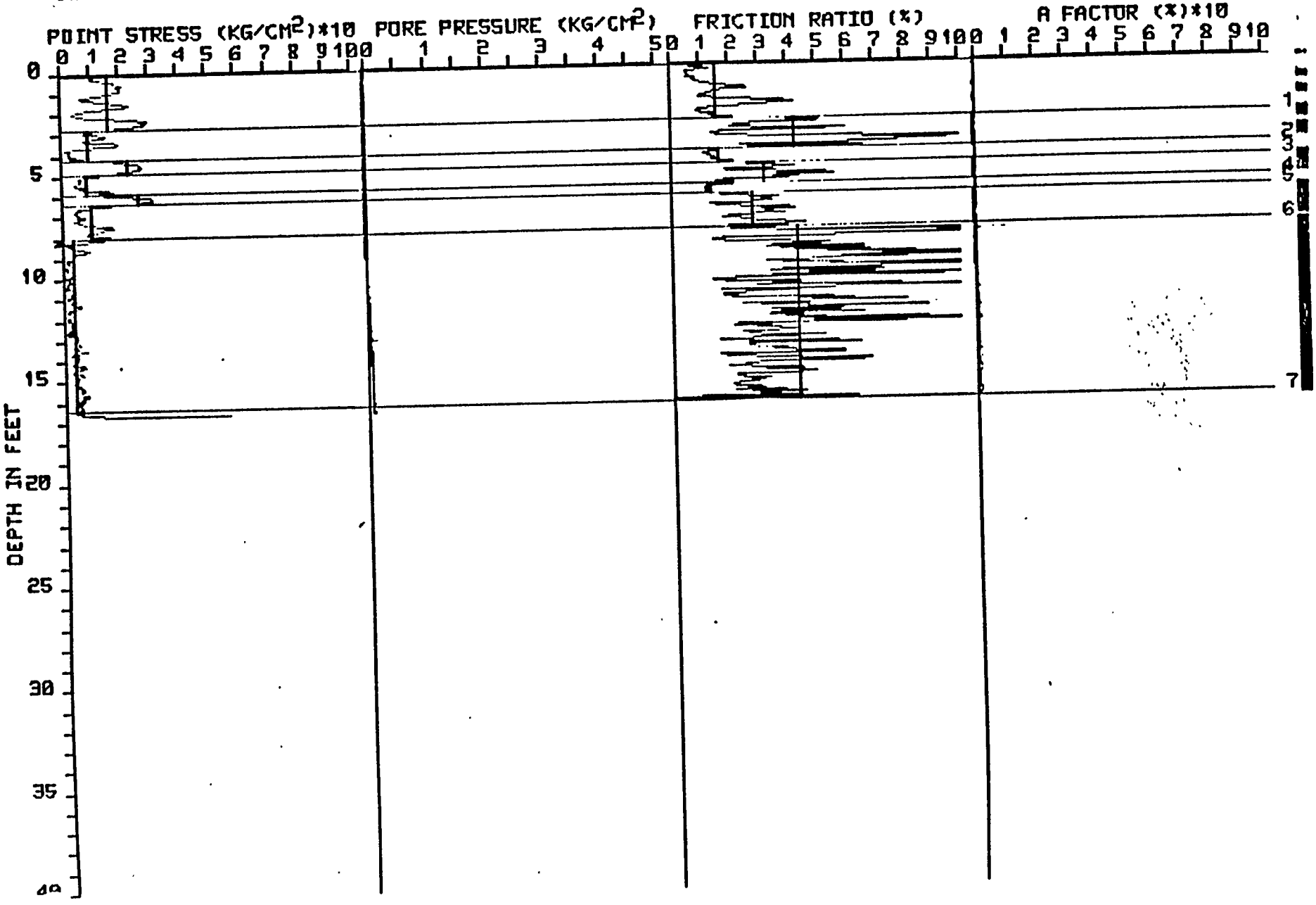
LOCATION ID: 038



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

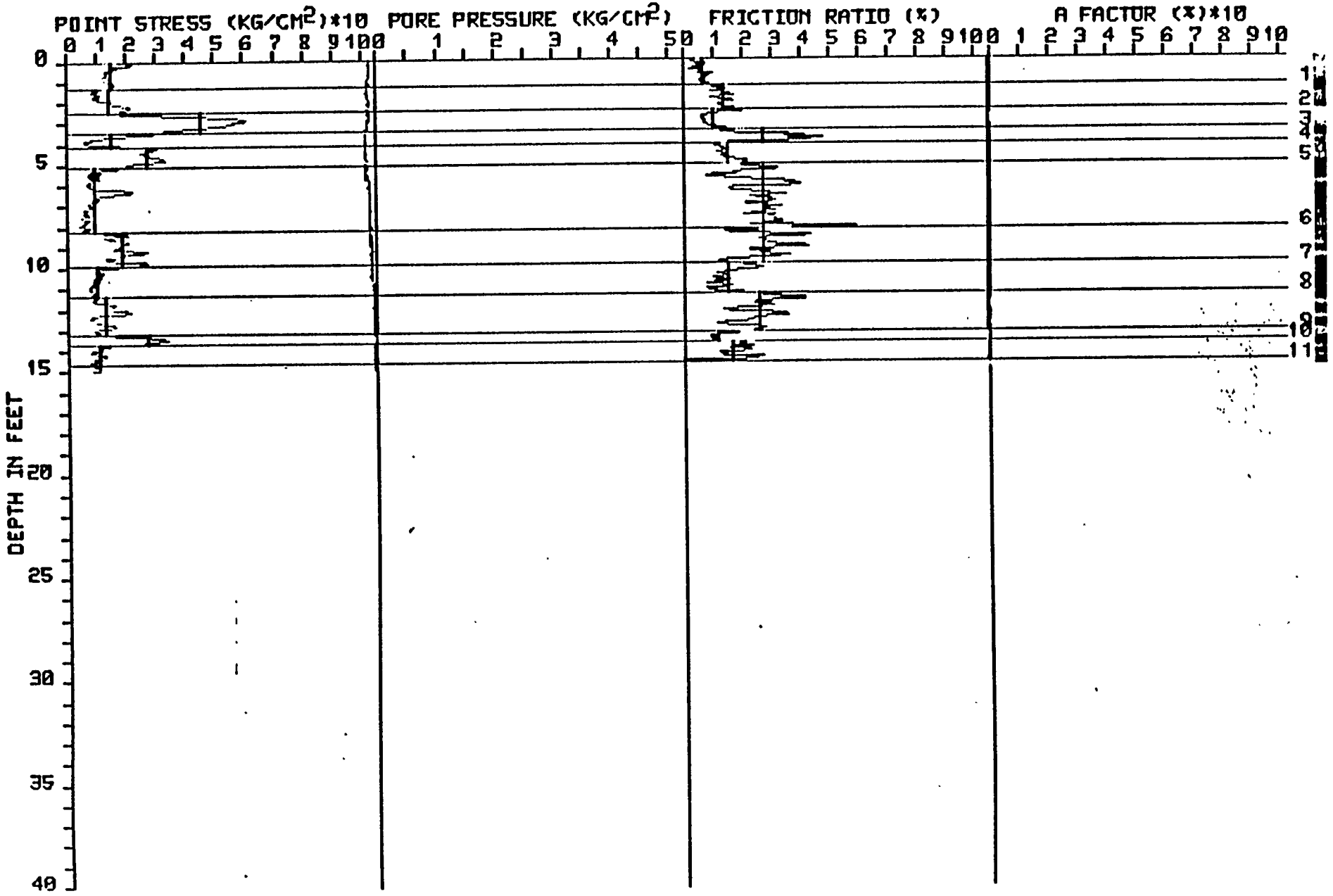
LOCATION ID: 039



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 040



SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 006
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	3.0	2.9	16.8	0.1	-0.0	0.5	S-SL*	5	40	30	59	2014	
2	3.0	5.1	2.1	6.5	0.2	-0.1	3.0	SLIM	4			23	778	6.5
3	5.1	9.1	4.0	21.0	0.2	-0.0	1.2	S-SL*	7	45	31	74	2520	
4	9.2	11.8	2.6	12.6	0.1	-0.0	1.1	S-SL*	4	27	29	44	1518	
5	11.8	19.2	7.3	7.1	0.2	0.5	3.1	SLIM	4			25	857	1.8
% THK:		50	9.5	17.4	0.1	0.0	1.0	S-SL	5	38	30	61	2091	
% THK:		49	9.4	7.0	0.2	0.4	3.1	SLIM	4			24	839	2.8

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 007
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.0	1.0	9.9	0.2	0.0	2.0	SLIM	6			34	1182	39.5
2	1.0	3.9	2.8	15.5	0.2	0.0	1.2	S-SL*	5	38	30	54	1864	
3	3.9	13.0	9.1	7.4	0.3	-0.0	4.2	SLIM	4			26	887	3.8
% THK:		21	2.8	15.5	0.2	0.0	1.2	S-SL	5	38	30	54	1863	
% THK:		78	10.1	7.6	0.3	0.0	4.0	SLIM	4			26	916	7.3

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 008
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.3	1.2	9.5	0.1	-0.0	1.4	SLIM	6			33	1144	32.2
2	1.3	3.9	2.6	22.4	0.2	-0.0	1.0	S-SL*	7	48	31	78	2690	
3	3.9	7.2	3.3	11.6	0.3	-0.0	2.8	SLIM	7			41	1393	7.8
4	7.3	16.3	9.1	5.1	0.2	-0.1	3.3	SLIM	3			18	608	2.0
% THK:		16	2.6	22.4	0.2	0.0	1.0	S-SL	7	48	31	78	2690	
% THK:		83	13.6	7.1	0.2	-0.1	3.0	SLIM	4			24	845	6.1

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 009
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	3.4	3.3	18.2	0.1	-0.0	0.7	S-SL*	6	42	30	64	2183	
2	3.4	4.8	1.4	9.9	0.3	0.0	2.8	SLIM	6			35	1194	8.8
3	4.9	6.0	1.2	33.2	0.2	0.1	0.7	S-SL*	11	60	33	116	3980	
4	6.1	6.5	0.4	12.9	0.3	0.1	2.1	SLIM	8			45	1553	7.8
% THK:		71	4.5	22.2	0.1	0.0	0.7	S-SL	7	46	31	77	2662	
% THK:		28	1.8	10.6	0.3	0.0	2.6	SLIM	6			37	1273	8.6

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 010
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	2.0	1.9	14.2	0.1	-0.1	0.5	S-SL*	4	35	29	50	1701	
2	2.0	3.6	1.6	7.0	0.1	-0.0	1.6	SLIM	4			25	842	9.0
% THK:		54	1.9	14.2	0.1	-0.1	0.5	S-SL	4	35	29	50	1701	
% THK:		45	1.6	7.0	0.1	0.0	1.6	SLIM	4			25	842	9.0

SITE ID: HAT01 LOCATION ID: 011
GROUND WATER DEPTH: 50.0 (FT.) AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	0.8	0.7	36.1	0.6	0.0	1.7	S-SL*	12	63	33	126	4326	
2	0.8	2.5	1.6	56.8	0.5	0.0	0.8	SAND*	11	78	36	199		
3	2.5	9.8	7.3	26.2	0.2	0.2	0.7	S-SL*	8	52	32	92	3147	
4	9.9	10.8	0.9	15.8	0.2	3.0	1.5	S-SL	5	32	29	55	1891	
5	10.8	12.2	1.4	21.5	0.3	1.5	1.5	S-SL*	7	39	30	75	2583	
6	12.3	16.3	4.0	7.0	0.0	1.4	0.7	SLIM*	4			24	839	1.9
% THK:		10	1.6	56.8	0.5	0.0	0.8	SAND	11	78	36	199		
% THK:		64	10.3	25.3	0.2	0.6	0.9	S-SL	7	49	32	88	3040	
% THK:		25	4.0	7.0	0.0	1.4	0.7	SLIM	4			24	839	1.9

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 012
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	0.8	0.7	17.4	0.2	-0.0	1.4	S-SL*	5	41	30	61	2086	
2	0.8	1.5	0.7	53.2	0.5	0.1	0.9	SAND*	10	76	35	186		
3	1.5	2.7	1.2	28.7	0.3	0.0	1.1	S-SL*	9	56	32	101	3448	
4	2.7	3.6	0.9	37.3	0.3	0.1	0.7	SAND*	7	64	34	131		
5	3.7	6.8	3.1	21.9	0.2	0.1	1.0	S-SL*	7	47	31	77	2631	
6	6.8	7.4	0.7	9.5	0.2	0.2	1.9	SLIM	6			33	1138	5.6
7	7.5	8.2	0.7	18.4	0.2	0.2	0.9	S-SL*	6	42	30	64	2207	
8	8.2	8.9	0.7	32.1	0.3	0.2	0.8	S-SL*	10	57	33	112	3852	
9	8.9	11.1	2.1	19.7	0.2	0.3	1.2	S-SL*	6	39	30	69	2360	
10	11.1	12.0	0.9	7.1	0.1	0.6	1.9	SLIM	4			25	855	2.6
% THK:			13	1.6	44.3	0.4	0.1	0.8	SAND	8	69	34	155	
% THK:			72	8.5	22.5	0.2	0.1	1.1	S-SL	7	46	31	78	2700
% THK:			13	1.6	8.2	0.1	0.4	1.9	SLIM	4			28	978	3.9

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 013
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.0	1.0	13.2	0.1	-0.1	0.9	S-SL*	4	33	29	46	1579	
2	1.0	1.7	0.7	9.7	0.2	-0.1	1.8	SLIM	6			34	1167	19.3
3	1.8	5.5	3.8	16.6	0.2	-0.0	1.3	S-SL*	5	39	30	58	1989	
4	5.6	10.1	4.5	31.2	0.2	-0.1	0.8	S-SL*	10	56	32	109	3740	
% THK:		93	9.3	23.3	0.2	-0.1	1.0	S-SL	7	46	31	81	2792	
% THK:		6	0.7	9.7	0.2	-0.1	1.8	SLIM	6			34	1167	19.3

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 014
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.2	1.1	0.9	17.6	0.3	-0.2	1.7	S-SL	5	41	30	61	2107	
2	1.1	2.0	0.9	7.1	0.2	-0.2	2.4	SLIM	4			25	858	14.0
3	2.1	5.1	3.1	14.0	0.3	-0.2	1.9	SLIM	9			49	1682	12.5
4	5.1	8.0	2.9	17.3	0.3	-0.2	1.6	S-SL	5	40	30	61	2078	
5	8.0	9.7	1.6	45.5	0.3	-0.2	0.7	SAND*	9	67	34	159		
% THK:		17	1.6	45.5	0.3	-0.2	0.7	SAND	9	67	34	159		
% THK:		40	3.8	17.4	0.3	-0.2	1.6	S-SL	4	40	30	60	2084	
% THK:		42	4.0	12.4	0.3	-0.2	2.0	SLIM	7			43	1496	12.8

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 015
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.2	2.4	2.2	7.1	0.2	0.0	2.9	SLIM	4			25	846	16.2
2	2.4	3.1	0.7	25.2	0.4	0.1	1.6	S-SL*	8	52	32	88	3021	
3	3.1	5.7	2.6	8.9	0.2	0.1	2.3	SLIM	5			31	1071	7.6
4	5.8	7.2	1.4	27.5	0.3	0.2	1.3	S-SL*	9	54	32	96	3294	
5	7.2	9.1	1.9	14.1	0.3	0.2	2.1	SLIM	9			49	1697	6.6
6	9.1	10.6	1.4	28.8	0.2	0.3	0.8	S-SL*	9	50	32	101	3456	
7	10.6	11.7	1.1	16.8	0.3	0.3	1.9	SLIM	11			59	2015	5.0
8	11.8	16.5	4.8	27.3	0.4	0.3	1.3	S-SL*	9	41	30	95	3270	
9	16.6	18.4	1.9	49.0	0.5	0.3	1.0	SAND*	9	54	32	172		
10	18.5	19.9	1.4	28.0	0.4	0.3	1.5	S-SL*	9	36	29	98	3355	
11	19.9	22.0	2.1	42.6	0.5	0.4	1.1	S-SL*	14	46	31	149	5109	
12	22.0	22.7	0.7	17.5	0.3	0.3	1.9	S-SL	5	23	28	61	2101	
13	22.8	25.1	2.4	16.9	0.2	0.4	0.9	S-SL*	5	21	28	59	2024	
% THK:		7	1.9	49.0	0.5	0.3	1.0	SAND	9	54	32	172		
% THK:		60	14.9	27.4	0.3	0.3	1.2	S-SL	8	39	30	95	3289	
% THK:		31	7.8	10.8	0.2	0.1	2.4	SLIM	6			37	1293	9.4

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 016
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.0	4.4	4.4	8.2	0.2	0.1	2.3	SLIM	5			29	988	12.1
2	4.4	5.1	0.7	22.4	0.3	0.3	1.4	S-SL*	7	48	31	79	2694	
3	5.1	7.3	2.1	10.8	0.3	0.2	2.4	SLIM	7			38	1292	6.8
4	7.3	9.2	1.9	28.0	0.4	0.8	1.5	S-SL*	9	53	32	98	3365	
5	9.2	10.6	1.4	17.2	0.4	0.8	2.2	SLIM	11			60	2066	6.0
6	10.6	15.6	5.0	29.2	0.4	0.7	1.3	S-SL*	9	45	31	102	3506	
7	15.6	16.1	0.5	14.6	0.5	0.6	3.2	SLIM	9			51	1756	2.9
% THK:		47	7.6	28.3	0.4	0.7	1.4	S-SL	8	47	31	98	3395	
% THK:		52	8.4	10.7	0.3	0.3	2.4	SLIM	6			37	1289	9.2

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 017
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	DEPTH FROM	DEPTH TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	5.5	5.4	8.2	0.3	-0.0	3.1	SLIM	5			29	989	10.1
2	5.6	7.0	1.4	26.2	0.3	0.1	1.3	S-SL*	8	53	32	92	3139	
3	7.0	9.3	2.4	13.1	0.4	0.1	2.7	SLIM	8			46	1575	6.2
4	9.4	11.5	2.1	40.7	0.4	0.1	0.9	SAND*	8	60	33	143		
5	11.5	12.5	0.9	36.5	0.6	0.1	1.6	S-SL*	12	53	32	128	4376	
6	12.5	13.0	0.5	13.8	0.5	0.1	3.3	SLIM	9			48	1660	3.7
7	13.0	17.3	4.3	31.8	0.4	0.1	1.1	S-SL*	10	44	31	111	3812	
8	17.3	19.4	2.1	17.5	0.4	0.1	2.5	SLIM	11			61	2094	2.8
9	19.4	20.1	0.7	35.6	0.5	0.2	1.4	S-SL*	11	42	30	124	4268	
10	20.1	21.8	1.6	12.8	0.5	0.2	4.0	SLIM	8			45	1536	1.9
11	21.8	23.2	1.4	24.4	0.5	0.2	2.0	SLIM	16			85	2923	2.7
12	23.3	30.4	7.1	8.4	0.2	2.5	2.9	SLIM	5			29	1006	1.0
13	30.4	31.3	0.9	28.6	0.4	1.8	1.3	S-SL*	9	29	29	100	3426	
14	31.4	31.8	0.5	15.0	0.1	1.6	1.0	S-SL*	4	16	26	52	1797	
% THK:		6	2.1	40.7	0.4	0.1	0.9	SAND	8	60	33	143		
% THK:		27	8.7	30.4	0.4	0.4	1.2	S-SL	9	43	31	106	3643	
% THK:		65	20.5	11.4	0.3	0.9	2.9	SLIM	7			39	1367	4.4

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 018
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.0	3.6	3.6	13.4	0.1	-0.0	1.0	S-SL*	4	34	29	47	1609	
2	3.7	4.8	1.1	13.1	0.3	0.0	2.0	SLIM	8			46	1572	10.5
3	4.9	8.4	3.5	21.5	0.2	0.1	1.1	S-SL*	7	47	31	75	2584	
4	8.4	11.7	3.3	32.4	0.3	0.1	0.9	S-SL*	10	53	32	113	3890	
5	11.8	13.4	1.6	13.7	0.3	0.1	2.2	SLIM	9			48	1644	3.7
6	13.4	15.6	2.1	25.5	0.3	0.2	1.2	S-SL*	8	39	30	89	3056	
7	15.6	16.8	1.1	40.8	0.3	0.2	0.6	SAND*	8	50	32	143		
8	16.8	18.4	1.6	40.6	0.5	0.2	1.1	S-SL*	13	48	31	142	4867	
% THK:		6	1.1	40.8	0.3	0.2	0.6	SAND	8	50	32	143		
% THK:		78	14.1	24.7	0.2	0.1	1.0	S-SL	7	44	31	86	2970	
% THK:		15	2.7	13.5	0.3	0.1	2.1	SLIM	8			47	1614	6.5

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 019
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.0	0.8	0.7	13.4	0.1	-0.1	0.8	S-SL*	4	34	29	47	1613	
% THK:		100	0.7	13.4	0.1	-0.1	0.8	S-SL	4	34	29	46	1613	

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 020
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.0	1.0	1.0	15.2	0.1	-0.2	0.8	S-SL*	5	37	30	53	1827	
2	1.0	2.0	1.0	6.7	0.1	-0.1	1.8	SLIM	4			23	798	13.9
3	2.0	3.1	1.1	15.9	0.2	-0.1	1.4	S-SL*	5	38	30	56	1905	
4	3.2	6.5	3.3	10.1	0.2	-0.1	2.4	SLIM	6			35	1208	7.9
5	6.5	9.3	2.8	27.2	0.2	0.0	0.7	S-SL*	9	53	32	95	3265	
6	9.4	10.3	0.9	13.3	0.2	0.0	1.4	S-SL	4	29	29	47	1599	
7	10.3	11.3	1.0	31.7	0.2	0.0	0.6	S-SL*	10	51	32	111	3800	
% THK:		61	6.8	22.4	0.2	-0.0	0.9	S-SL	7	44	31	78	2691	
% THK:		38	4.3	9.3	0.2	-0.1	2.3	SLIM	5			32	1112	9.3

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 021
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.0	1.2	1.2	7.2	0.1	-0.2	2.0	SLIM	4			25	869	27.7
2	1.3	2.5	1.2	14.8	0.3	-0.1	1.7	S-SL	4	36	29	52	1777	
3	2.5	4.9	2.4	8.2	0.2	0.0	2.6	SLIM	5			29	978	8.2
4	4.9	8.2	3.3	26.4	0.3	0.1	1.1	S-SL*	8	53	32	92	3163	
5	8.2	9.2	0.9	51.8	0.4	0.2	0.8	SAND*	10	72	35	181		
6	9.2	9.9	0.7	15.4	0.3	0.2	2.1	SLIM	10			54	1847	5.8
7	9.9	10.6	0.7	26.5	0.3	0.2	1.2	S-SL*	8	47	31	93	3183	
8	10.6	12.3	1.6	38.8	0.4	0.2	1.0	S-SL*	12	56	32	136	4657	
9	12.3	13.0	0.7	19.0	0.6	0.2	3.0	SLIM	12			67	2283	4.7
10	13.0	16.6	3.5	28.9	0.4	0.3	1.6	S-SL*	9	42	30	101	3465	
11	16.6	18.2	1.6	40.6	0.5	0.4	1.1	S-SL*	13	48	31	142	4872	
12	18.3	19.2	0.9	19.6	0.5	0.3	2.5	SLIM	13			69	2352	2.9
% THK:		4	0.9	51.8	0.4	0.2	0.8	SAND	10	72	35	181		
% THK:		63	11.9	29.5	0.4	0.2	1.3	S-SL	9	47	31	103	3543	
% THK:		31	5.9	11.9	0.3	0.1	2.5	SLIM	7			41	1423	10.7

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 022
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	2.5	2.4	16.5	0.1	0.0	0.8	S-SL*	5	39	30	58	1986	
2	2.5	5.4	2.9	4.5	0.1	0.1	1.7	SLIM	2			16	538	5.0
3	5.4	7.5	2.1	20.0	0.2	0.3	1.0	S-SL*	6	45	31	70	2405	
4	7.5	8.4	0.9	8.9	0.2	0.5	1.8	SLIM	5			31	1064	4.8
5	8.5	11.8	3.3	26.9	0.2	0.5	0.6	S-SL*	8	47	31	94	3233	
6	11.8	13.2	1.4	43.6	0.2	0.6	0.6	SAND*	8	58	33	153		
7	13.3	15.1	1.9	27.9	0.2	0.5	0.7	S-SL*	9	42	30	98	3352	
8	15.2	16.1	0.9	45.0	0.2	0.5	0.5	SAND*	9	54	32	158		
9	16.1	17.2	1.1	30.2	0.3	0.6	1.0	S-SL*	10	41	30	106	3626	
10	17.3	18.7	1.4	44.7	0.4	0.7	0.8	SAND*	8	51	32	156		
% THK:		20	3.7	44.4	0.3	0.6	0.7	SAND	8	54	32	155		
% THK:		59	10.8	23.8	0.2	0.4	0.8	S-SL	7	43	31	83	2855	
% THK:		20	3.8	5.5	0.1	0.2	1.7	SLIM	2			19	662	5.0

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 023
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.0	7.2	7.2	6.4	0.2	0.3	3.1	SLIM	4			22	769	7.0
2	7.2	8.2	1.0	16.6	0.3	0.5	1.6	S-SL	5	39	30	58	1987	
3	8.2	14.1	5.8	6.6	0.2	0.7	2.5	SLIM	4			23	792	2.6
4	14.1	16.0	1.9	27.7	0.3	1.0	1.2	S-SL*	9	41	30	97	3330	
5	16.0	23.6	7.6	4.5	0.2	2.1	3.5	SLIM	2			16	537	0.9
% THK:			12	2.9	23.9	0.3	0.8	1.3	S-SL	7	40	30	83	2866	
% THK:			87	20.6	5.8	0.2	1.1	3.1	SLIM	3			20	689	3.5

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 024
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	2.2	2.1	11.3	0.2	0.0	1.6	SLIM	7			40	1359	24.8
2	2.3	24.7	22.4	4.5	0.2	0.5	4.3	SLIM	2			16	536	1.5
% THK:		100	24.5	5.1	0.2	0.5	4.1	SLIM	2			18	606	3.5

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 025
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.3	1.2	18.7	0.2	-0.2	1.1	S-SL*	6	43	30	65	2245	
2	1.3	3.0	1.6	7.7	0.2	-0.1	2.1	SLIM	5			27	922	11.8
3	3.0	4.1	1.1	20.4	0.3	-0.1	1.6	S-SL*	6	45	31	72	2454	
4	4.2	5.3	1.2	13.9	0.4	-0.1	2.8	SLIM	9			49	1666	10.1
5	5.4	6.8	1.4	9.5	0.1	-0.1	1.4	SLIM	6			33	1137	6.3
6	6.8	10.6	3.8	8.9	0.3	-0.0	3.0	SLIM	5			31	1069	4.3
7	10.6	12.0	1.4	13.8	0.2	0.0	1.6	SLIM	9			48	1652	4.3
8	12.1	15.1	3.1	10.2	0.2	0.1	2.3	SLIM	6			36	1223	2.7
% THK:		15	2.3	19.5	0.2	-0.2	1.3	S-SL	5	43	31	68	2344	
% THK:		84	12.5	10.2	0.2	-0.0	2.4	SLIM	6			35	1218	5.6

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 026
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	5.1	5.0	14.2	0.1	-0.0	0.9	S-SL*	4	35	29	50	1703	
2	5.1	6.1	0.9	8.2	0.2	0.0	2.3	SLIM	5			29	989	6.1
3	6.1	9.0	2.9	22.9	0.3	0.2	1.1	S-SL*	7	48	31	80	2753	
4	9.0	9.7	0.7	13.2	0.2	0.2	1.6	SLIM	8			46	1588	5.3
% THK:		83	7.9	17.4	0.2	0.1	1.0	S-SL	5	39	30	61	2088	
% THK:		16	1.6	10.4	0.2	0.1	2.0	SLIM	6			36	1251	5.8

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 027
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.8	1.7	12.8	0.2	-0.1	1.3	S-SL	4	33	29	45	1533	
2	1.8	6.5	4.7	7.1	0.2	0.0	2.8	SLIM	4			25	856	6.8
3	6.6	9.4	2.9	21.5	0.4	-0.0	1.8	S-SL	7	46	31	75	2579	
4	9.4	13.2	3.8	22.3	0.3	-0.0	1.3	S-SL*	7	40	30	78	2680	
5	13.2	13.9	0.7	8.4	0.0	-0.0	0.5	SLIM*	5			29	1007	2.3
6	14.0	16.1	2.1	30.8	0.4	0.0	1.2	S-SL*	10	43	31	108	3700	
7	16.1	16.8	0.7	14.0	0.5	0.2	3.6	SLIM	9			49	1680	2.7
8	16.8	17.3	0.5	26.3	0.5	0.3	1.8	S-SL	8	37	29	92	3162	
% THK:		64	11.0	22.4	0.3	-0.0	1.4	S-SL	7	40	31	78	2692	
% THK:		35	6.1	8.0	0.2	0.0	2.6	SLIM	4			28	967	5.8

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 028
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	3.0	2.9	13.4	0.1	-0.2	0.6	S-SL*	4	34	29	47	1609	
2	3.0	3.7	0.7	8.8	0.1	-0.2	1.0	SLIM*	5			31	1052	9.4
3	3.7	5.6	1.9	17.6	0.1	-0.2	0.5	S-SL*	5	41	30	62	2115	
4	5.6	10.6	5.0	4.9	0.0	-0.1	0.2	SLIM*	3			17	593	3.0
% THK:		45	4.8	15.1	0.1	-0.2	0.6	S-SL	4	36	30	52	1809	
% THK:		54	5.7	5.4	0.0	-0.1	0.3	SLIM	3			18	649	3.8

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 029
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	7.0	6.9	11.2	0.3	-0.1	2.6	SLIM	7			39	1342	10.7
2	7.1	10.1	3.1	3.2	0.3	0.3	8.2	SLIM	2			11	383	2.0
% THK:		100	10.0	8.7	0.3	0.0	4.3	SLIM	5			30	1044	8.0

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 030
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.0	1.0	11.1	0.2	-0.1	1.4	SLIM	7			39	1329	41.3
2	1.1	6.5	5.4	6.1	0.1	-0.0	2.1	SLIM	4			21	734	6.5
3	6.6	8.5	1.9	18.6	0.3	-0.0	1.7	S-SL	6	42	30	65	2229	
4	8.5	12.8	4.3	6.9	0.2	0.2	2.9	SLIM	4			24	828	2.8
% THK:		15	1.9	18.6	0.3	0.0	1.7	S-SL	6	42	30	65	2229	
% THK:		84	10.7	6.9	0.1	0.1	2.4	SLIM	4			23	827	8.3

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 031
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	2.5	2.4	6.5	0.2	0.0	3.1	SLIM	4			23	775	15.2
2	2.5	4.1	1.6	18.9	0.3	-0.0	1.7	S-SL	6	43	30	66	2269	
3	4.2	7.2	3.1	5.8	0.2	0.0	3.9	SLIM	3			20	701	4.6
4	7.3	8.5	1.2	18.8	0.4	0.1	2.0	SLIM	12			66	2252	8.5
5	8.5	11.5	3.1	8.6	0.2	0.1	2.9	SLIM	5			30	1033	3.6
6	11.6	12.8	1.2	15.1	0.3	0.2	1.9	SLIM	10			53	1811	4.2
7	12.8	13.9	1.1	6.7	0.3	0.2	3.8	SLIM	4			23	799	2.0
8	14.0	14.7	0.7	16.3	0.4	0.4	2.7	SLIM	10			57	1953	3.6
9	14.7	15.8	1.1	12.2	0.4	0.4	3.6	SLIM	8			43	1469	2.7
10	15.9	17.5	1.6	32.7	0.7	0.4	2.3	S-SL	10	43	30	115	3926	
11	17.5	19.9	2.4	16.0	0.5	0.4	2.8	SLIM	10			56	1924	2.5
12	19.9	21.6	1.6	9.2	0.2	0.5	1.8	SLIM	6			32	1107	1.5
13	21.6	25.4	3.8	11.3	0.4	0.8	3.6	SLIM	7			39	1354	1.5
14	25.4	26.8	1.4	12.1	0.3	1.4	2.8	SLIM	8			42	1451	1.3
15	26.9	27.8	0.9	15.5	0.3	1.7	1.8	S-SL	5	18	27	54	1856	
16	27.8	28.7	0.9	9.1	0.3	2.0	2.9	SLIM	6			32	1094	1.0
17	28.8	30.4	1.6	16.5	0.4	1.4	2.6	SLIM	10			58	1978	1.4
18	30.4	32.1	1.6	10.7	0.1	0.8	1.3	SLIM	7			37	1282	1.0
% THK:		13	4.1	23.5	0.5	0.5	2.0	S-SL	7	37	30	82	2824	
% THK:		86	27.2	10.9	0.3	0.5	2.9	SLIM	6			38	1313	3.9

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 032
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.2	2.1	1.9	8.6	0.3	0.0	3.4	SLIM	5			30	1031	20.4
2	2.1	3.5	1.4	16.0	0.3	0.0	2.0	SLIM	10			56	1918	16.5
3	3.6	6.9	3.3	10.2	0.4	-0.0	3.5	SLIM	6			36	1224	7.5
4	6.9	12.1	5.2	23.1	0.4	0.0	1.8	S-SL	7	44	31	81	2771	
5	12.2	14.5	2.4	22.1	0.6	0.0	2.7	SLIM	14			77	2647	4.9
6	14.6	16.4	1.9	14.4	0.3	0.2	2.2	SLIM	9			50	1725	3.0
7	16.5	23.1	6.7	36.6	0.7	0.2	2.0	S-SL*	12	43	30	128	4394	
8	23.2	25.0	1.9	60.3	0.9	0.2	1.5	SAND*	12	54	32	211		
9	25.1	30.3	5.2	22.1	0.6	0.2	2.6	SLIM	14			77	2654	2.0
10	30.3	40.3	10.0	11.9	0.3	0.8	2.1	SLIM	7			42	1427	0.9
% THK:		4	1.9	60.3	0.9	0.2	1.5	SAND	12	54	32	211		
% THK:		29	11.9	30.7	0.6	0.1	1.9	S-SL	9	43	31	107	3684	
% THK:		65	26.1	14.8	0.4	0.4	2.5	SLIM	9			51	1777	4.7

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 033
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.1	1.0	10.5	0.2	-0.0	1.9	SLIM	7			37	1262	38.9
2	1.1	2.0	0.9	13.3	0.2	-0.1	1.3	S-SL	4	34	29	47	1601	
3	2.1	4.2	2.1	19.1	0.3	-0.1	1.5	S-SL*	6	43	31	67	2296	
4	4.2	6.1	1.9	10.4	0.3	-0.1	2.4	SLIM	6			36	1245	7.7
5	6.1	11.1	5.0	25.9	0.3	-0.1	1.3	S-SL*	8	49	31	91	3105	
6	11.2	12.1	1.0	48.7	0.5	-0.1	1.1	SAND*	9	63	33	171		
7	12.1	12.6	0.5	41.2	0.7	-0.1	1.8	S-SL*	13	56	32	144	4944	
8	12.6	15.0	2.4	19.0	0.5	-0.1	2.6	SLIM	12			67	2283	4.2
9	15.0	17.6	2.6	37.8	0.5	-0.0	1.4	S-SL*	12	48	31	132	4536	
10	17.6	19.3	1.6	56.9	0.6	-0.1	1.1	SAND*	11	58	33	199		
11	19.3	21.4	2.1	44.9	0.7	-0.0	1.6	S-SL*	14	48	31	157	5385	
12	21.5	25.3	3.8	20.6	0.5	-0.0	2.6	SLIM	13			72	2469	2.3
13	25.3	26.2	0.9	46.0	0.7	0.1	1.5	S-SL*	15	44	31	161	5519	
14	26.2	27.9	1.6	22.6	0.5	0.0	2.2	S-SL	7	25	28	79	2714	
% THK:		9	2.6	53.7	0.6	-0.1	1.1	SAND	10	59	33	188		
% THK:		57	15.7	30.1	0.4	-0.0	1.5	S-SL	9	44	31	105	3609	
% THK:		33	9.1	16.9	0.4	-0.0	2.5	SLIM	10			59	2031	8.0

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 034
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	0.6	0.5	11.2	0.3	-0.0	2.6	SLIM	7			39	1343	63.1
2	0.6	5.8	5.2	19.9	0.3	-0.0	1.4	S-SL*	6	44	31	69	2383	
3	5.9	7.1	1.2	16.4	0.4	-0.1	2.5	SLIM	10			57	1969	9.1
4	7.1	9.4	2.4	26.3	0.3	-0.1	1.2	S-SL*	8	51	32	92	3161	
5	9.5	10.7	1.2	36.5	0.3	-0.1	0.9	S-SL*	12	57	33	128	4385	
6	10.8	12.9	2.1	34.4	0.4	-0.1	1.0	S-SL*	11	52	32	121	4133	
7	12.9	15.3	2.3	42.9	0.4	-0.1	1.0	SAND*	8	55	32	150		
8	15.3	15.5	0.2	40.1	0.3	-0.1	0.8	SAND*	8	51	32	141		
9	15.5	22.9	7.3	52.8	0.5	-0.1	1.0	SAND*	10	55	32	185		
10	22.9	24.1	1.2	22.3	0.7	-0.1	3.3	SLIM	14			78	2679	2.4
11	24.1	25.6	1.4	60.0	0.7	-0.0	1.2	SAND*	11	53	32	210		
% THK:		44	11.2	51.4	0.5	-0.1	1.0	SAND	9	54	32	180		
% THK:		43	10.9	25.9	0.3	-0.1	1.2	S-SL	8	48	32	90	3111	
% THK:		11	2.9	17.9	0.5	-0.1	2.8	SLIM	11			62	2154	15.6

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 035
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	5.6	5.5	16.5	0.3	-0.1	1.7	S-SL	5	39	30	58	1985	
2	5.6	9.9	4.3	27.0	0.4	-0.1	1.5	S-SL*	8	52	32	94	3237	
3	9.9	17.3	7.4	38.6	0.4	-0.1	1.1	S-SL*	12	52	32	135	4628	
4	17.4	23.7	6.4	55.4	0.6	-0.1	1.1	SAND*	11	55	32	194		
5	23.8	25.6	1.8	23.2	0.6	-0.1	2.4	S-SL	7	27	29	81	2778	
6	25.6	26.6	1.0	39.1	0.4	-0.0	1.1	S-SL*	13	39	30	137	4693	
7	26.7	27.4	0.7	18.9	0.5	-0.1	2.6	SLIM	12			66	2263	1.8
8	27.4	28.5	1.1	16.4	0.3	-0.0	2.1	SLIM	10			57	1971	1.6
% THK:		22	6.4	55.4	0.6	-0.1	1.1	SAND	11	55	32	194		
% THK:		70	20.0	28.7	0.4	-0.1	1.5	S-SL	8	45	31	100	3438	
% THK:		6	1.8	17.4	0.4	-0.0	2.3	SLIM	10			60	2084	1.7

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 036
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	2.3	2.1	12.3	0.1	-0.1	0.8	S-SL*	4	32	29	43	1477	
2	2.3	3.0	0.7	22.6	0.2	-0.1	0.7	S-SL*	7	48	31	79	2709	
3	3.0	3.7	0.7	10.1	0.2	-0.1	2.1	SLIM	6			35	1211	10.3
4	3.7	4.7	0.9	17.2	0.1	-0.1	0.8	S-SL*	5	40	30	60	2064	
5	4.7	5.4	0.7	7.4	0.1	-0.1	1.9	SLIM	4			26	887	6.1
6	5.4	6.8	1.4	30.7	0.3	-0.1	1.0	S-SL*	10	58	33	107	3685	
7	6.9	7.4	0.6	14.8	0.3	-0.2	2.3	SLIM	9			52	1773	7.8
8	7.4	8.6	1.2	21.7	0.2	-0.1	0.8	S-SL*	7	46	31	76	2598	
9	8.7	12.2	3.5	35.3	0.4	-0.1	1.1	S-SL*	11	55	32	124	4241	
10	12.2	13.1	0.9	41.7	0.3	-0.1	0.7	SAND*	8	56	32	146		
11	13.2	14.6	1.4	37.2	0.4	-0.2	1.0	S-SL*	12	51	32	130	4459	
12	14.6	18.1	3.5	14.2	0.5	0.1	3.5	SLIM	9			50	1705	2.7
% THK:		5	0.9	41.7	0.3	-0.1	0.7	SAND	8	56	32	146		
% THK:		63	11.2	26.9	0.3	-0.1	0.9	S-SL	8	47	31	94	3233	
% THK:		31	5.5	12.9	0.4	0.0	3.0	SLIM	7			45	1545	4.7

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 037
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	2.0	1.9	9.9	0.2	-0.0	1.9	SLIM	6			35	1183	24.1
2	2.0	5.1	3.1	24.5	0.2	-0.1	1.0	S-SL*	8	51	32	86	2940	
3	5.1	9.2	4.0	17.3	0.4	-0.1	2.4	SLIM	11			60	2073	8.6
4	9.2	10.4	1.1	24.5	0.3	-0.1	1.2	S-SL*	8	45	31	86	2946	
5	10.4	11.6	1.2	12.7	0.3	-0.0	2.6	SLIM	8			44	1519	4.2
6	11.6	13.0	1.4	18.1	0.4	-0.0	2.0	S-SL	6	33	29	63	2177	
7	13.0	19.6	6.6	13.0	0.4	0.1	2.7	SLIM	8			46	1565	2.6
% THK:		29	5.6	22.9	0.3	-0.1	1.3	S-SL	7	45	31	80	2750	
% THK:		70	13.7	13.8	0.4	0.0	2.5	SLIM	8			48	1656	7.5

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 038
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.0	1.0	11.9	0.2	-0.0	1.7	SLIM	7			42	1430	43.6
2	1.1	3.0	1.9	17.7	0.2	-0.0	1.2	S-SL*	5	41	30	62	2120	
3	3.1	5.6	2.6	13.8	0.4	-0.1	2.5	SLIM	9			48	1659	10.8
4	5.7	7.6	1.9	19.2	0.3	-0.1	1.5	S-SL*	6	43	31	67	2302	
5	7.6	9.9	2.3	6.2	0.2	-0.0	3.2	SLIM	4			22	744	3.2
% THK:		39	3.8	18.5	0.2	-0.1	1.4	S-SL	5	42	31	64	2211	
% THK:		60	5.9	10.5	0.3	-0.0	2.6	SLIM	6			36	1263	13.4

SITE ID: HAT01 LOCATION ID: 039
GROUND WATER DEPTH: 50.0 (FT.) AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.2	2.8	2.6	16.4	0.2	-0.0	1.3	S-SL*	5	39	30	57	1967	
2	2.8	4.2	1.4	9.2	0.3	-0.1	3.1	SLIM	6			32	1103	9.3
3	4.3	5.0	0.7	22.7	0.4	-0.1	1.6	S-SL*	7	48	31	79	2725	
4	5.0	5.9	0.9	8.5	0.2	-0.1	2.9	SLIM	5			30	1015	6.3
5	5.9	6.4	0.4	26.1	0.4	-0.0	1.4	S-SL*	8	53	32	92	3138	
6	6.4	8.0	1.6	9.9	0.3	-0.1	2.6	SLIM	6			35	1183	5.7
7	8.1	16.4	8.3	3.7	0.1	0.0	3.5	SLIM	2			13	442	1.5
% THK:		23	3.7	18.6	0.3	-0.0	1.4	S-SL	5	42	31	64	2236	
% THK:		76	12.2	5.5	0.2	-0.0	3.3	SLIM	3			19	657	3.3

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

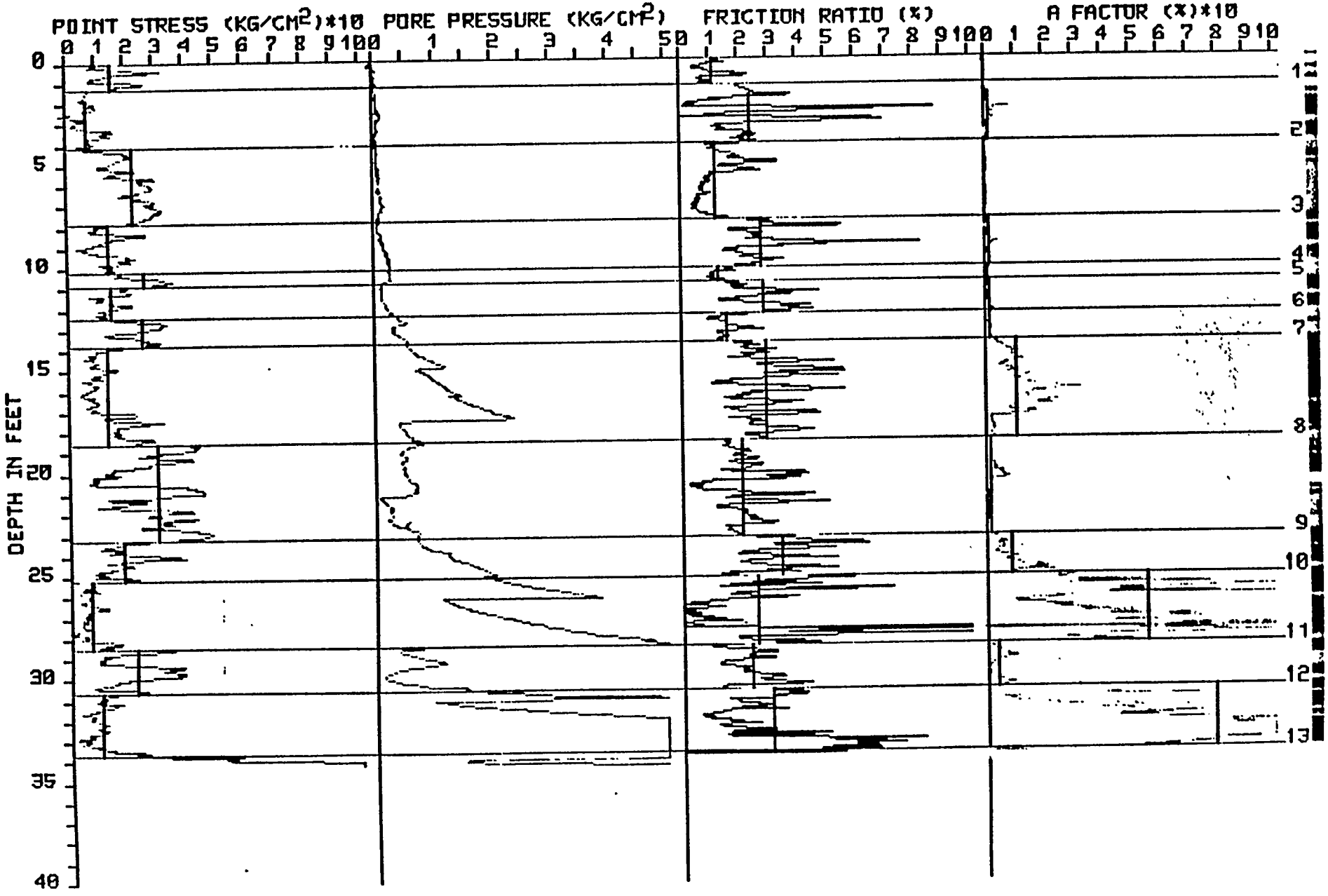
LOCATION ID: 040
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.3	1.2	15.0	0.1	-0.1	0.6	S-SL*	4	37	29	52	1797	
2	1.3	2.5	1.1	14.1	0.2	-0.2	1.4	S-SL	4	35	29	49	1689	
3	2.5	3.4	0.9	45.4	0.4	-0.2	0.9	SAND*	9	71	35	159		
4	3.5	4.2	0.7	15.1	0.3	-0.2	2.2	SLIM	10			53	1816	12.7
5	4.2	5.1	0.9	27.2	0.4	-0.2	1.5	S-SL*	9	54	32	95	3264	
6	5.1	8.2	3.1	9.1	0.2	-0.1	2.6	SLIM	6			32	1093	5.7
7	8.3	9.9	1.6	18.8	0.5	-0.1	2.6	SLIM	12			66	2252	7.1
8	9.9	11.3	1.4	10.1	0.2	-0.1	1.6	SLIM	6			35	1217	3.7
9	11.3	13.3	1.9	12.6	0.3	-0.1	2.4	SLIM	8			44	1507	3.6
10	13.3	13.7	0.4	27.2	0.3	-0.0	1.1	S-SL*	9	42	30	95	3261	
11	13.7	14.7	0.9	10.5	0.2	-0.0	1.7	SLIM	6			37	1260	2.6
% THK:		6	0.9	45.4	0.4	-0.2	0.9	SAND	9	71	35	159		
% THK:		25	3.6	19.1	0.2	-0.1	1.1	S-SL	5	41	30	66	2293	
% THK:		68	9.6	12.1	0.3	-0.1	2.3	SLIM	7			42	1454	5.4

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

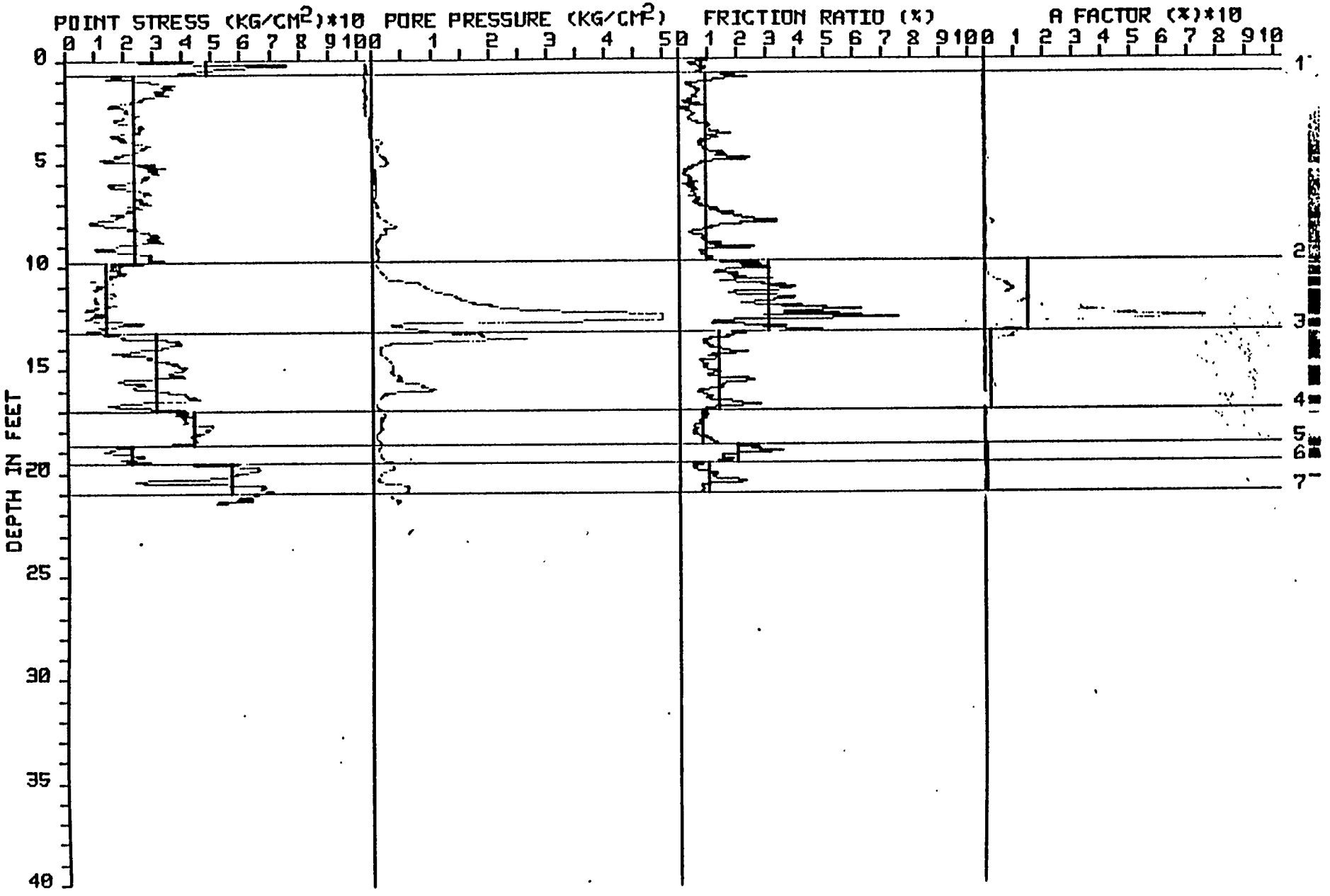
LOCATION ID: 001



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

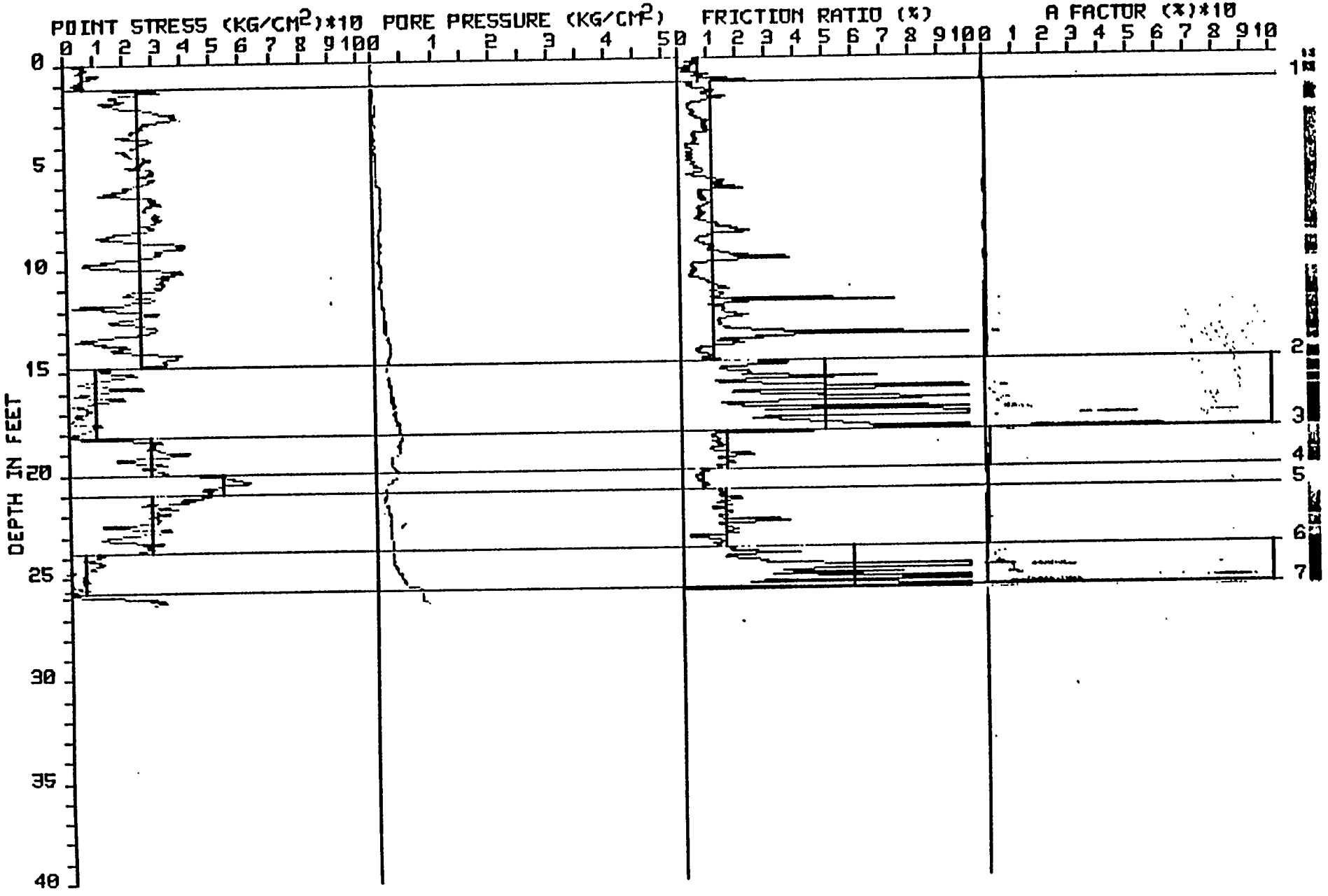
LOCATION ID: 002



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

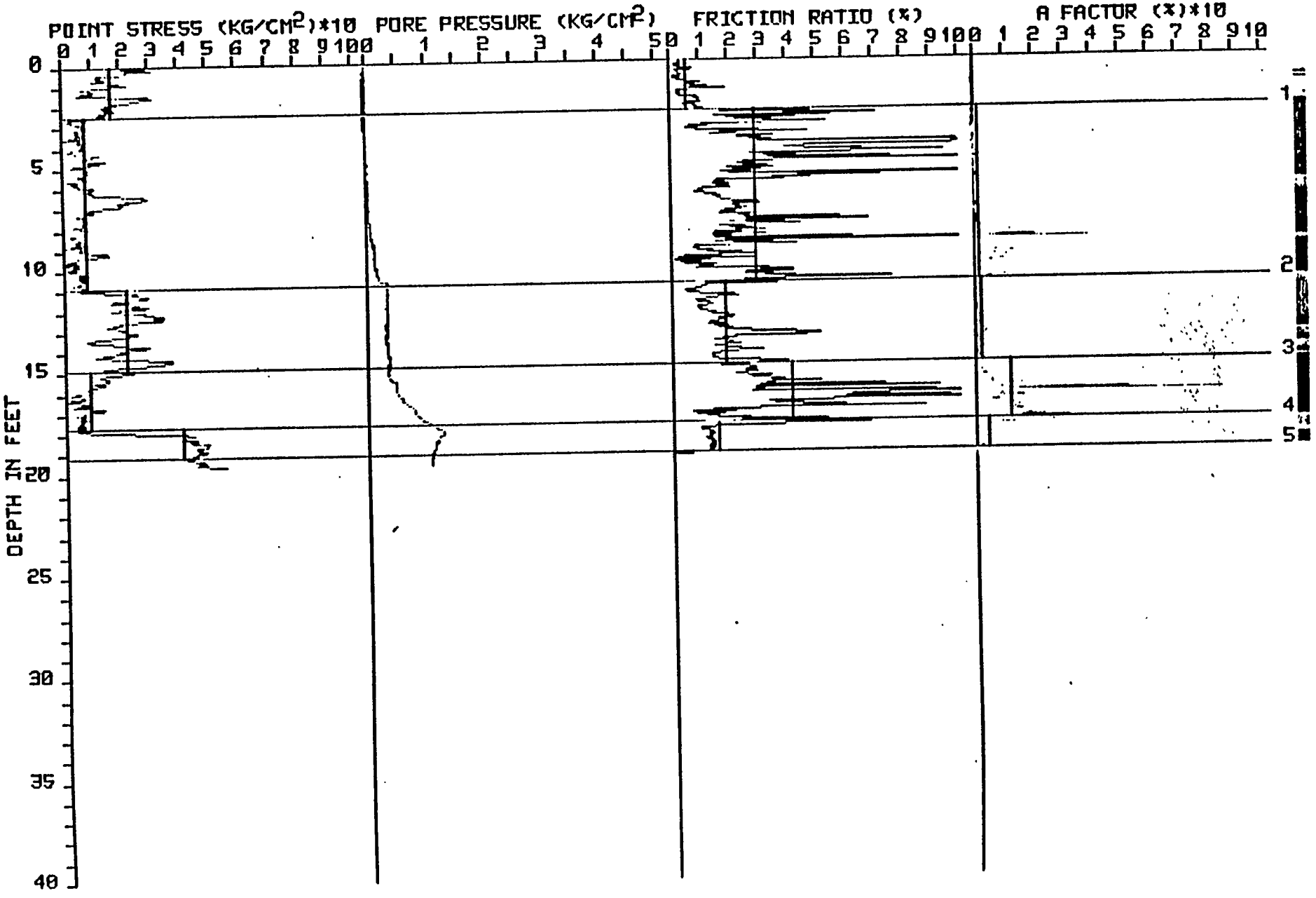
LOCATION ID: 003



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

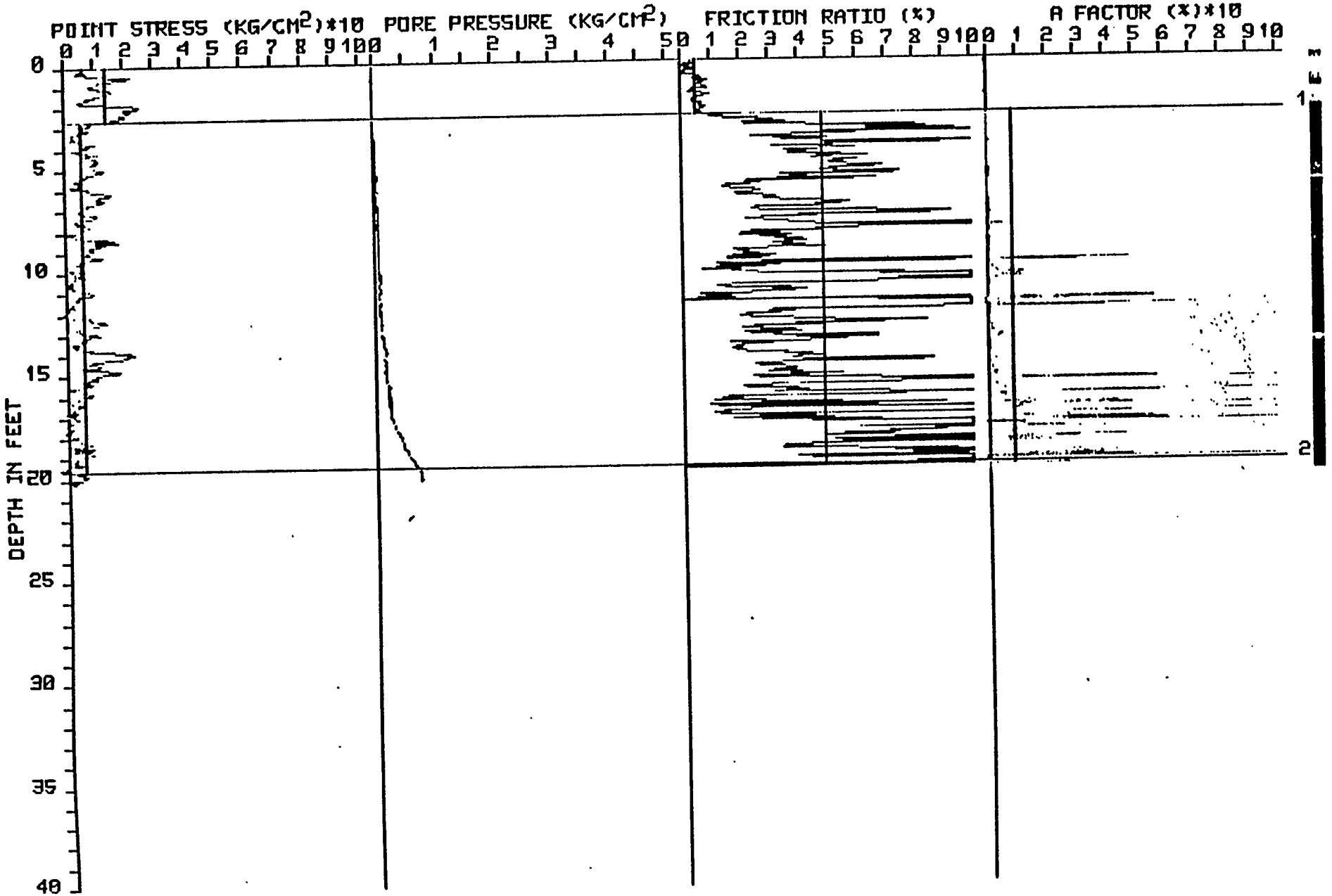
LOCATION ID: 004



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

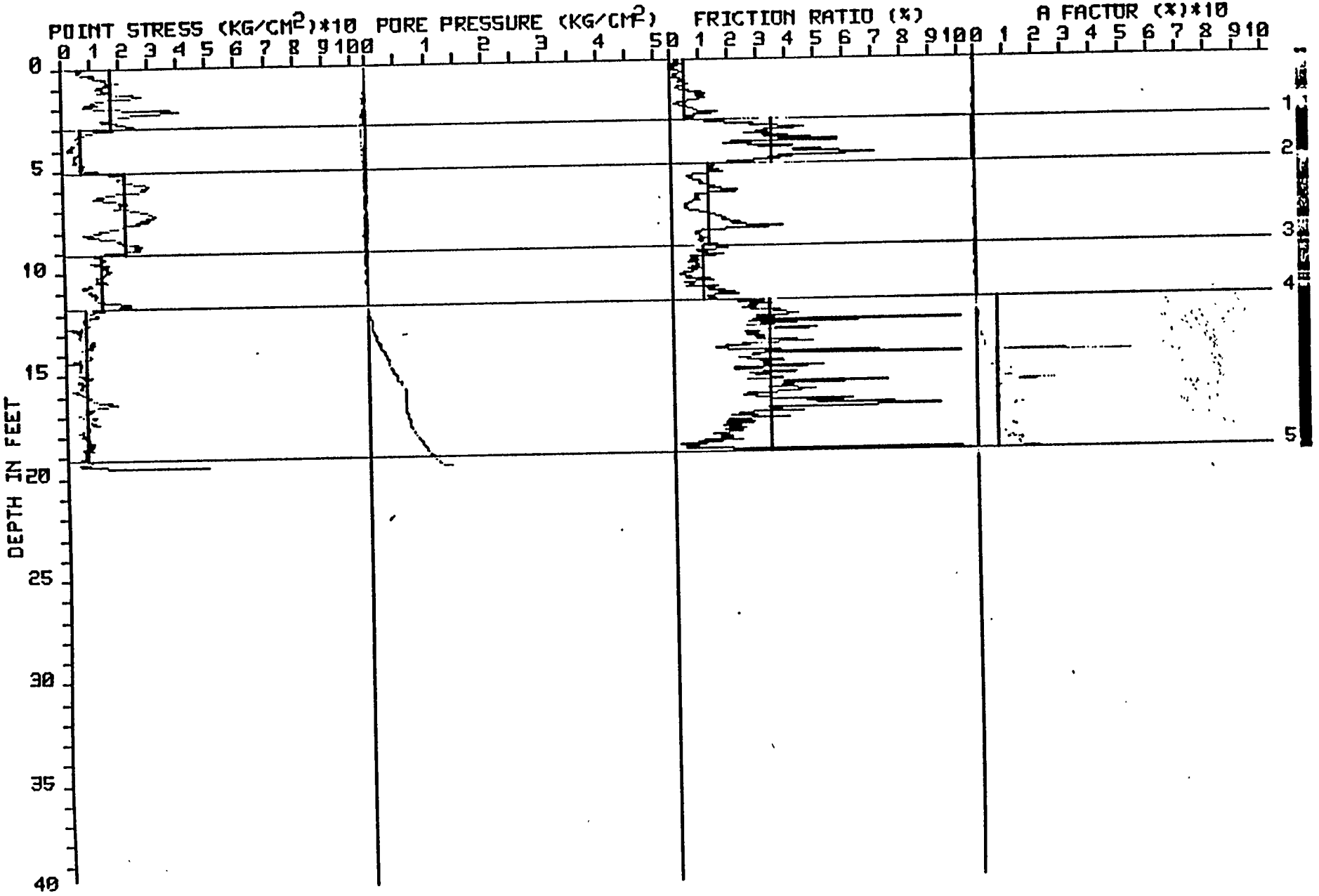
LOCATION ID: 005



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

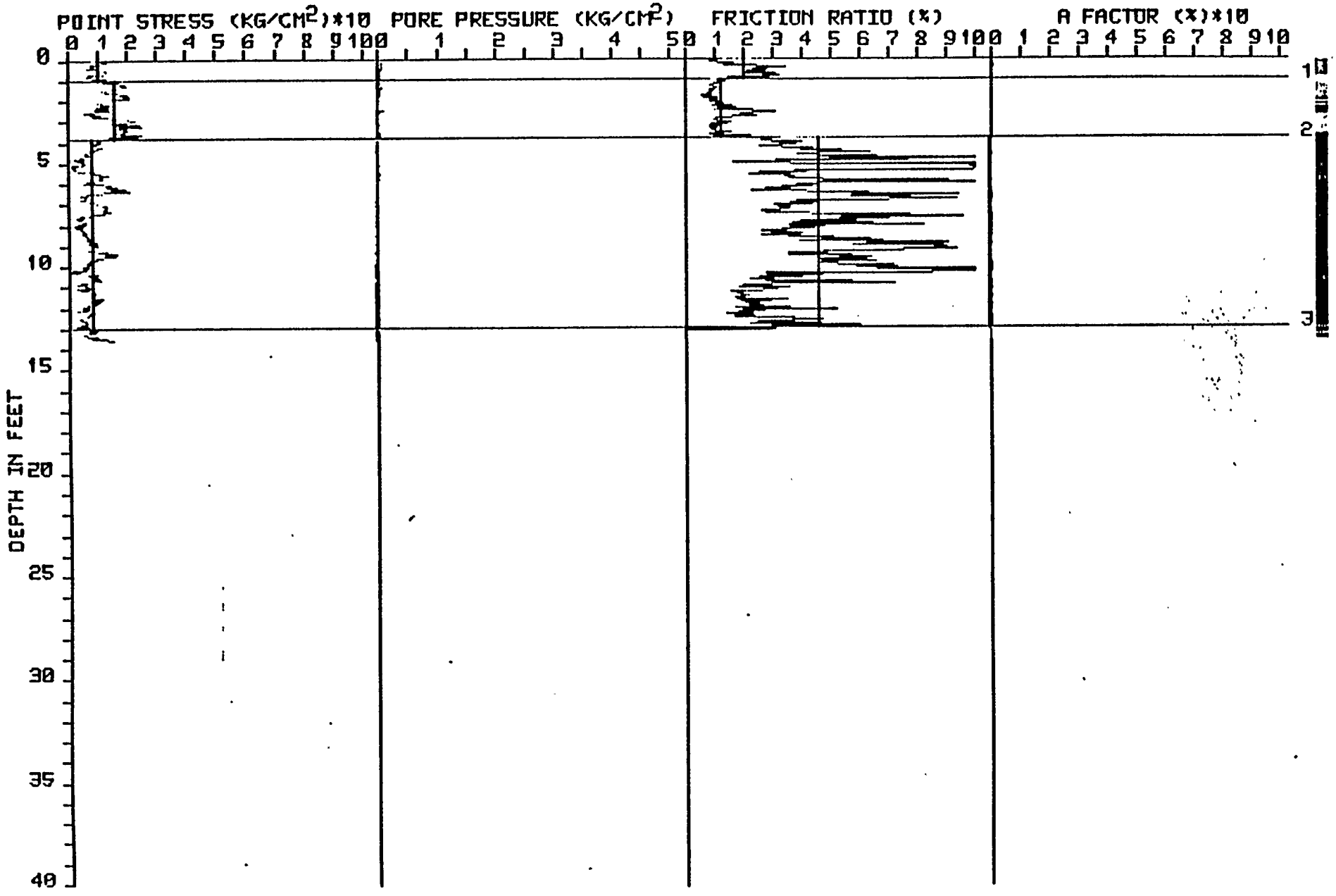
LOCATION ID: 006



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

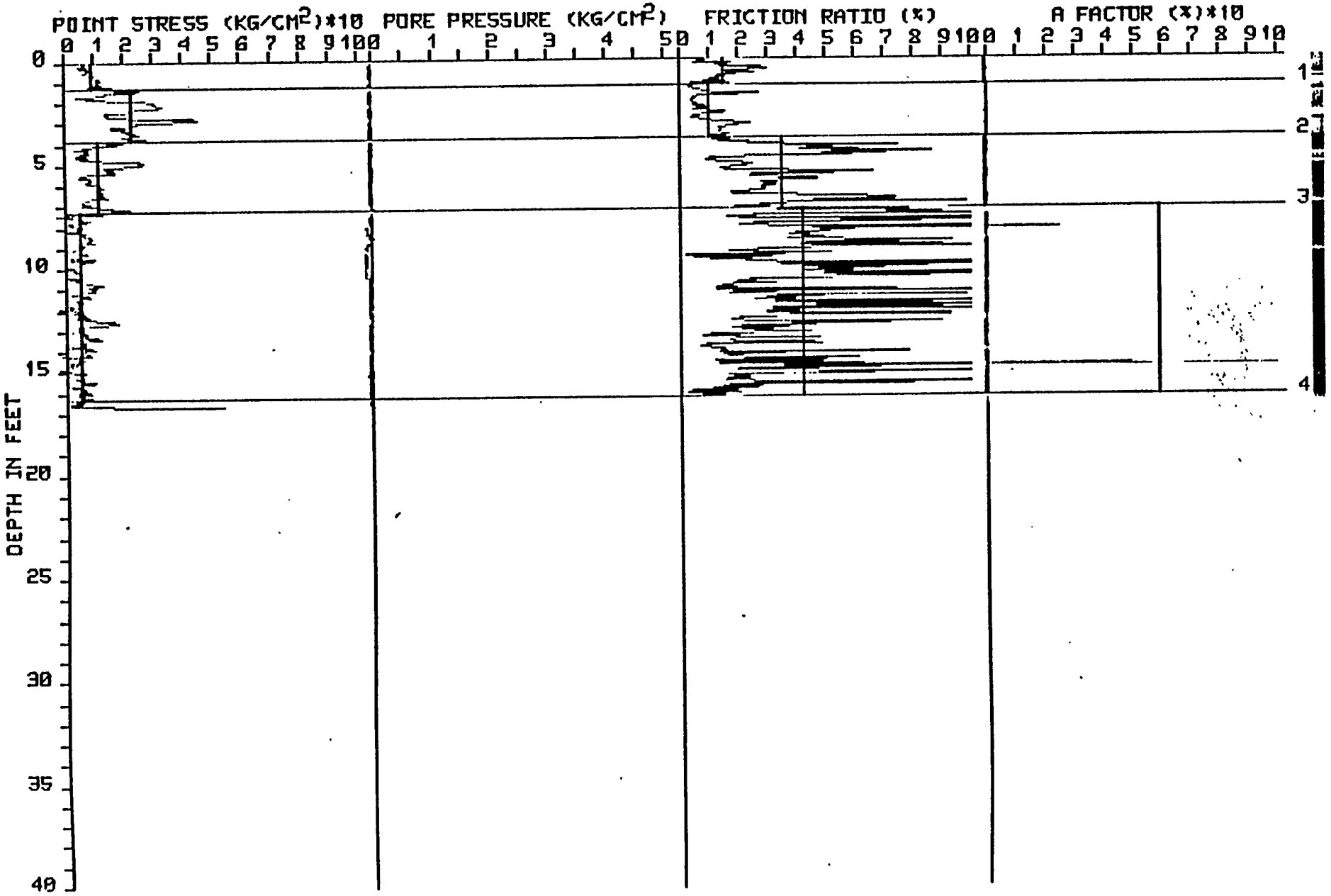
LOCATION ID: 007



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 008



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

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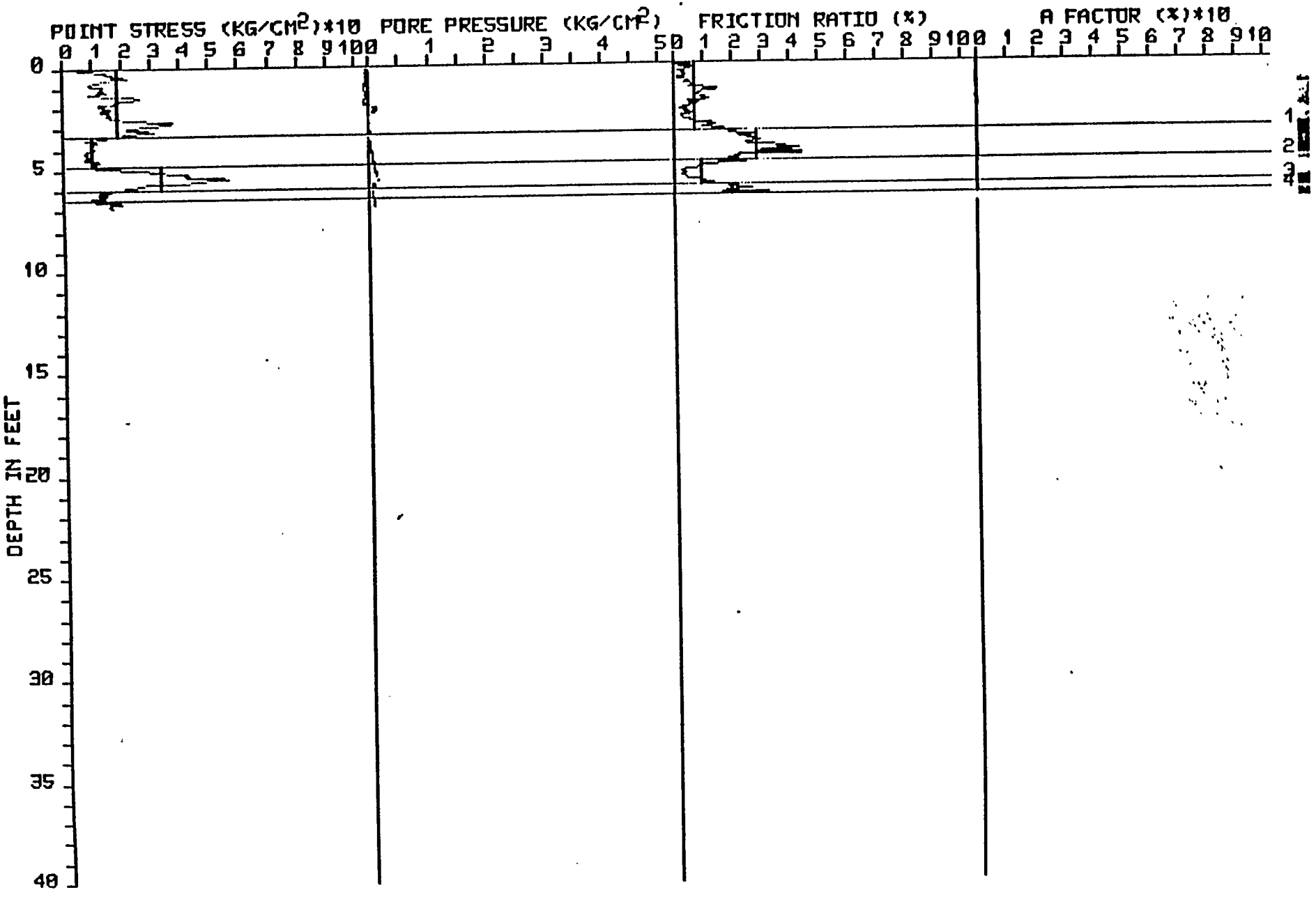

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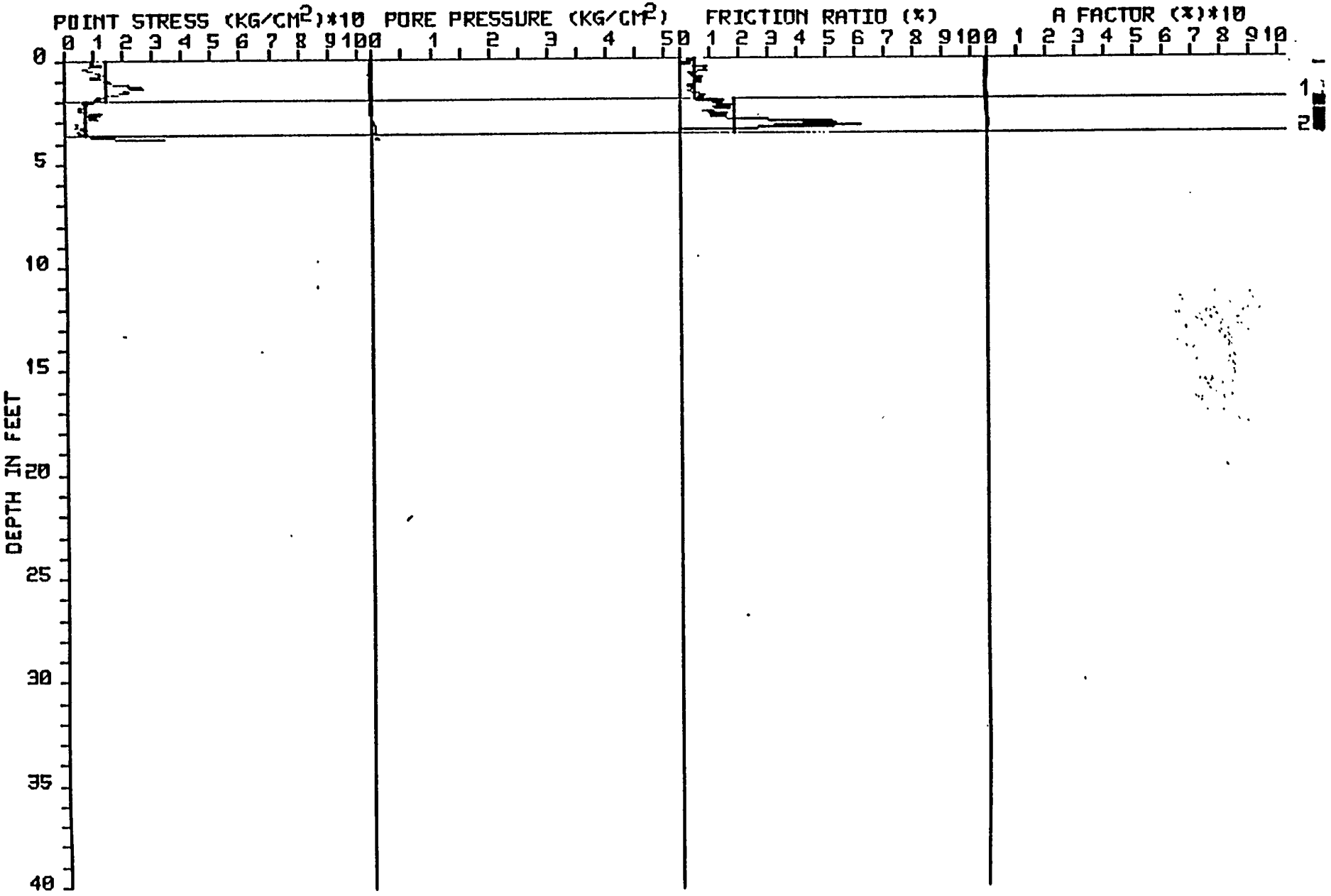

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

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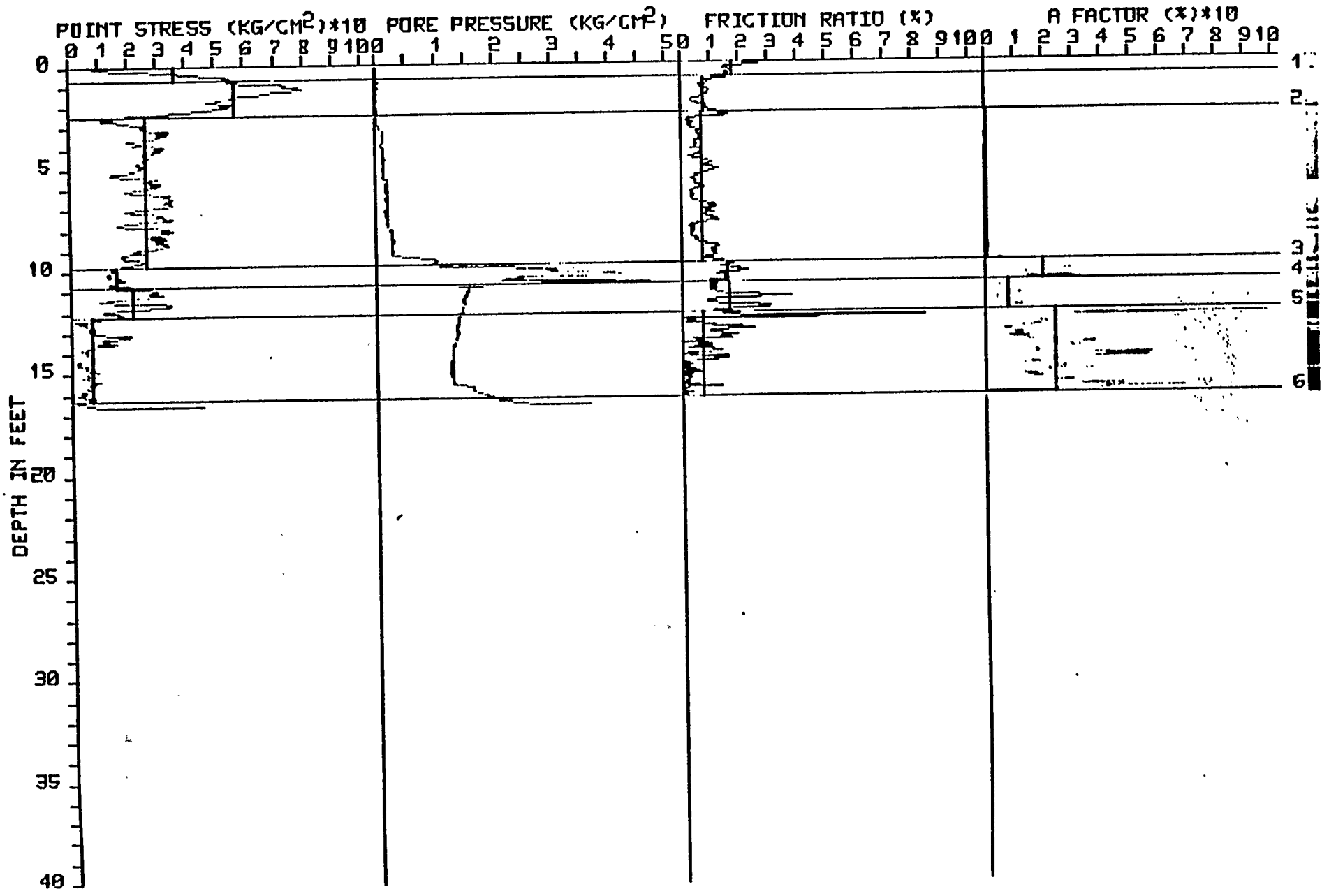

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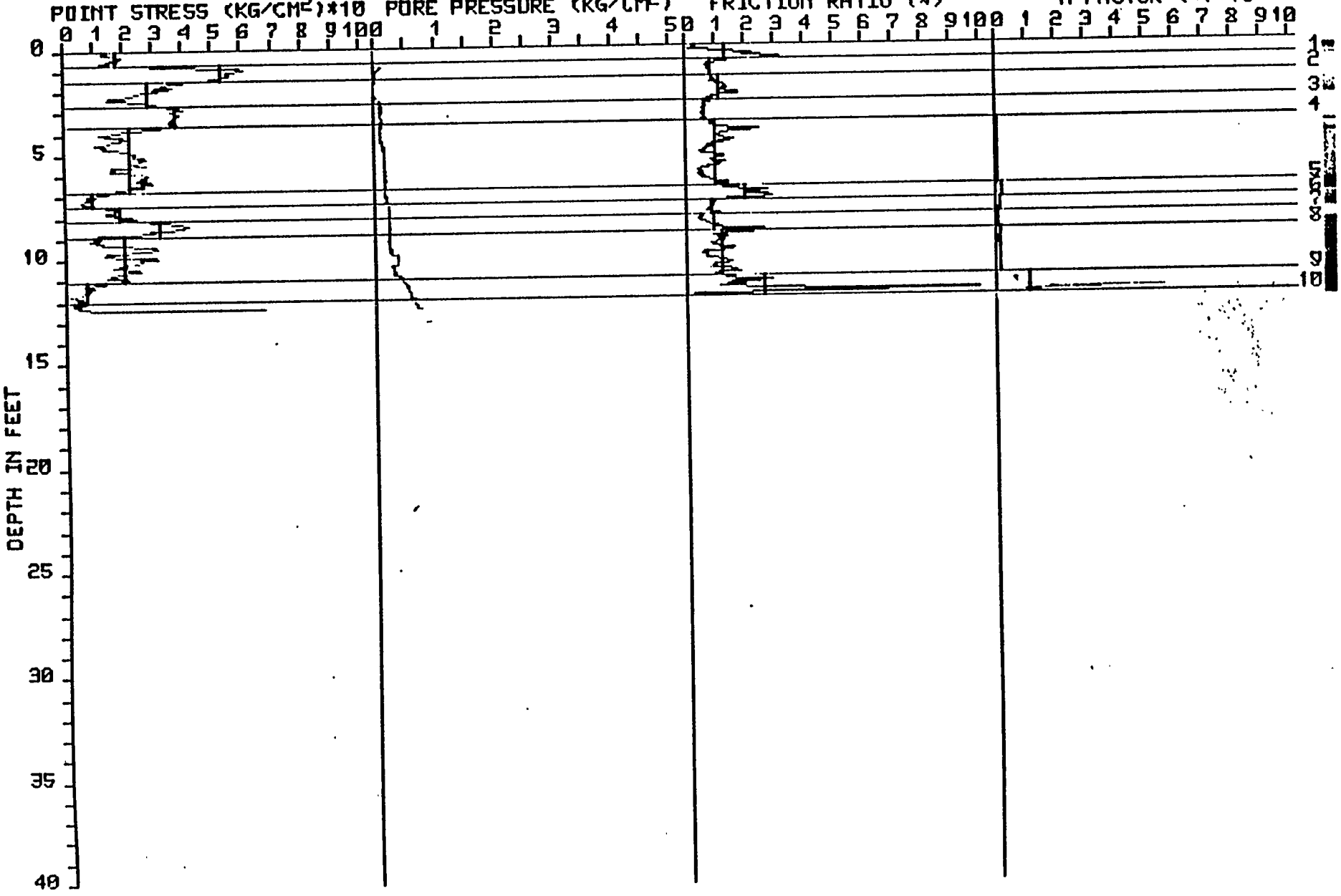

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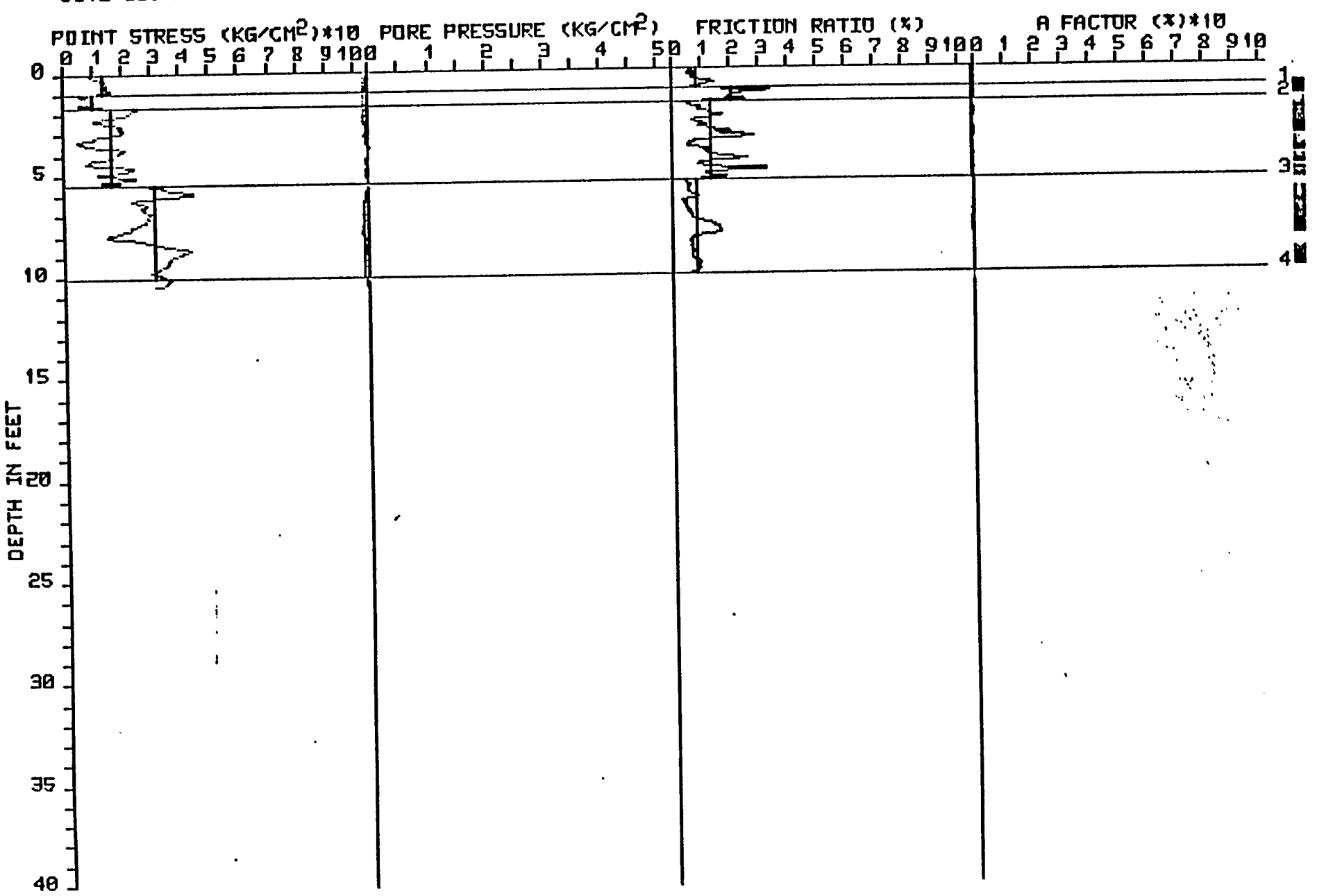

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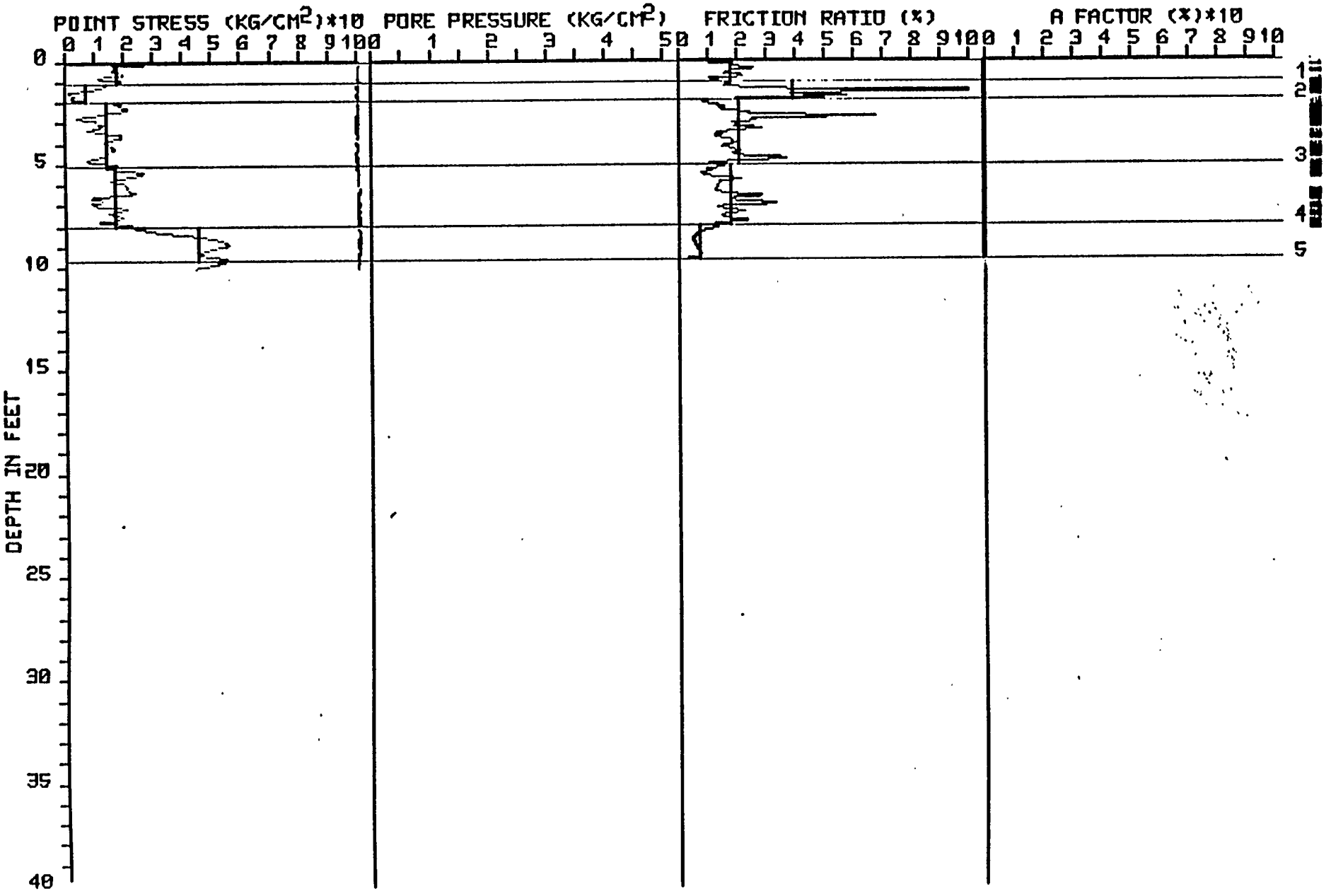

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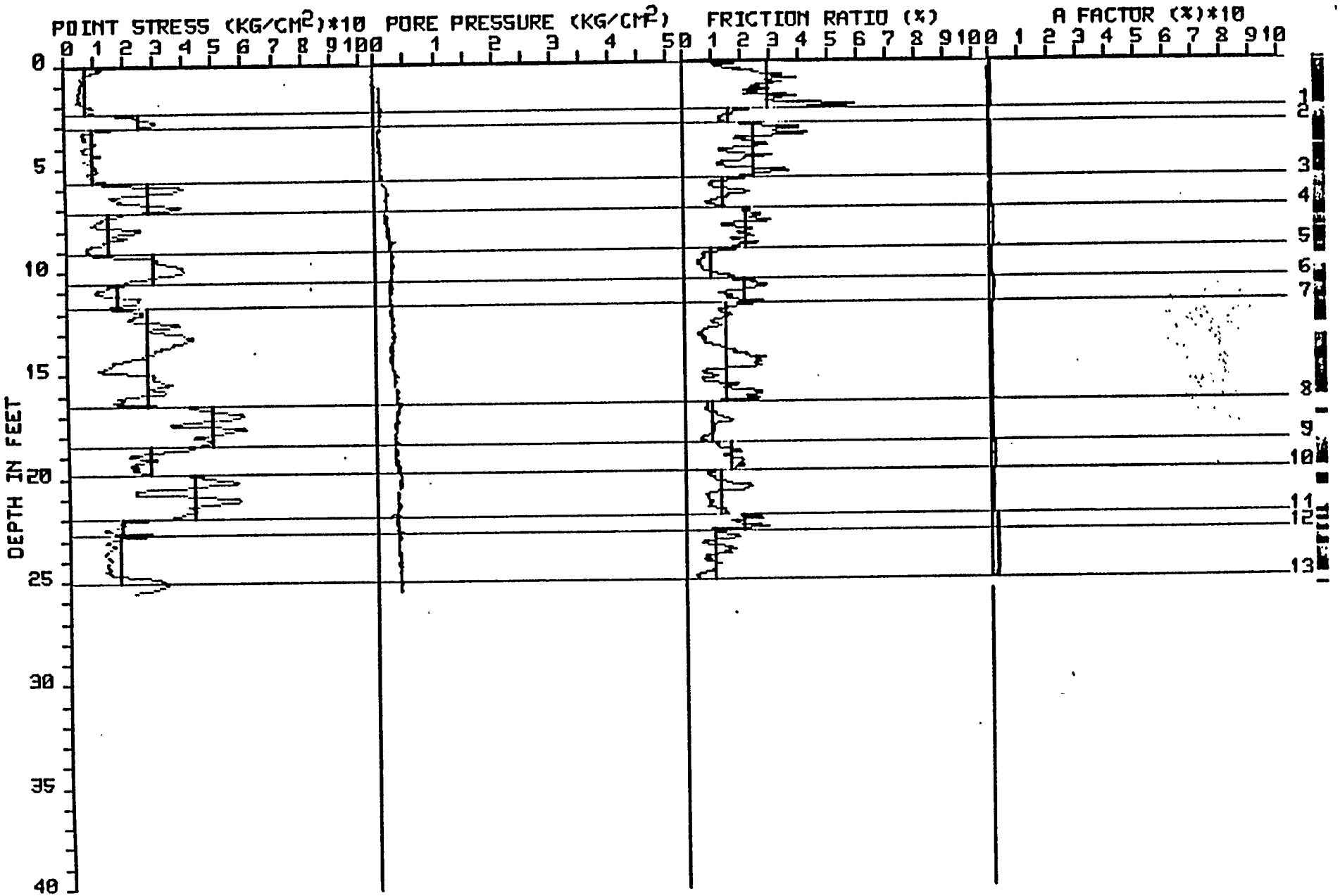

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SITE ID: HAT01

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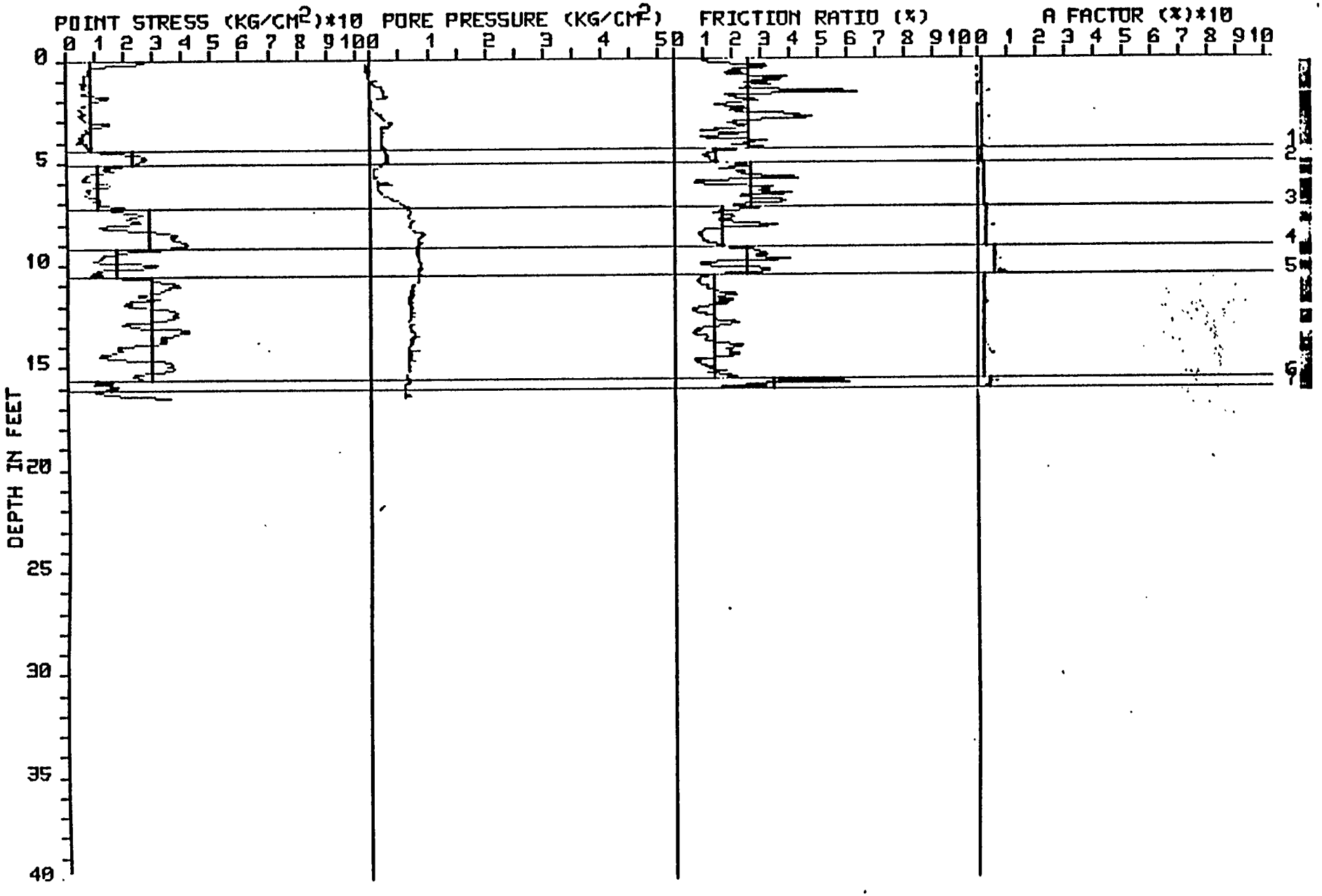

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

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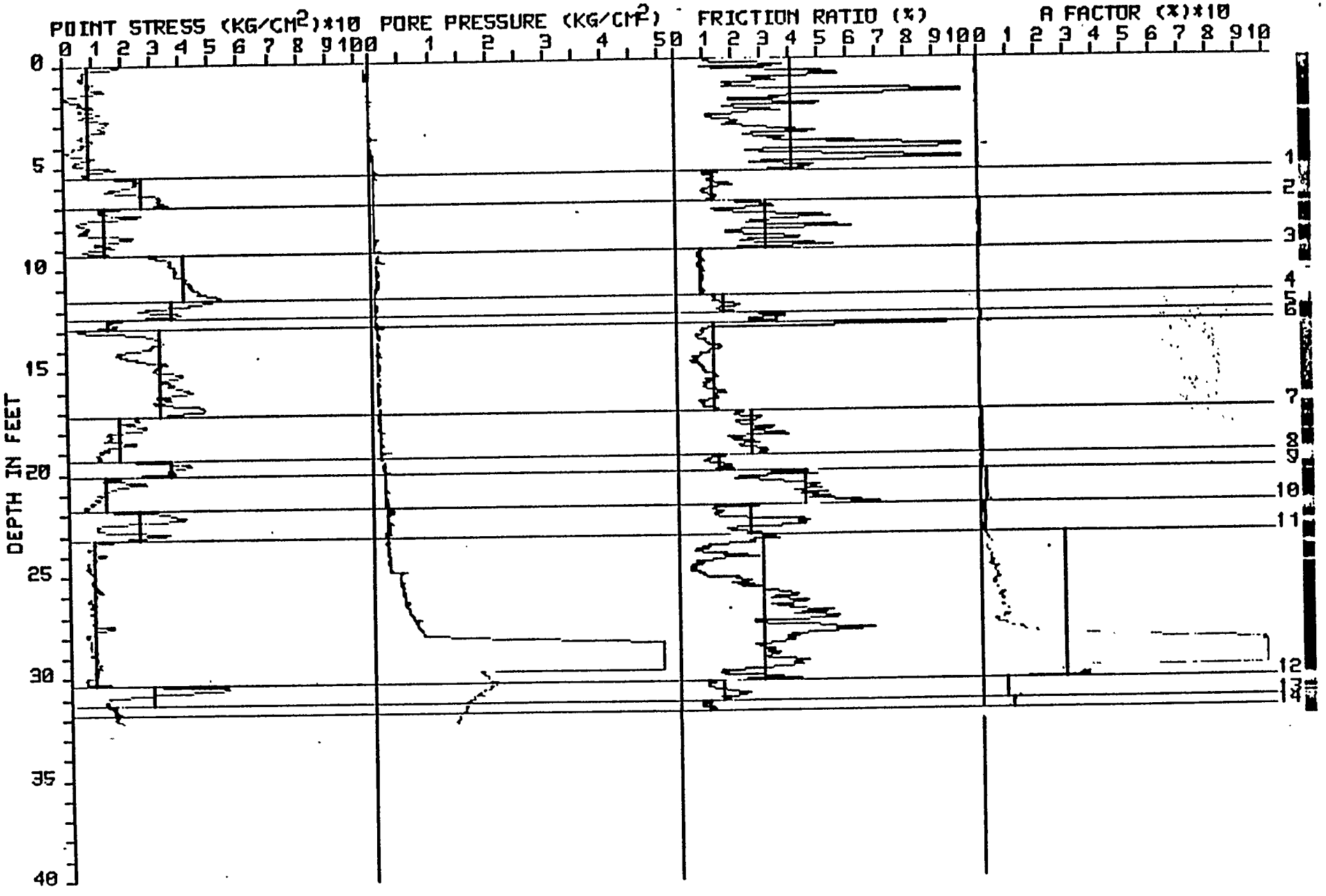
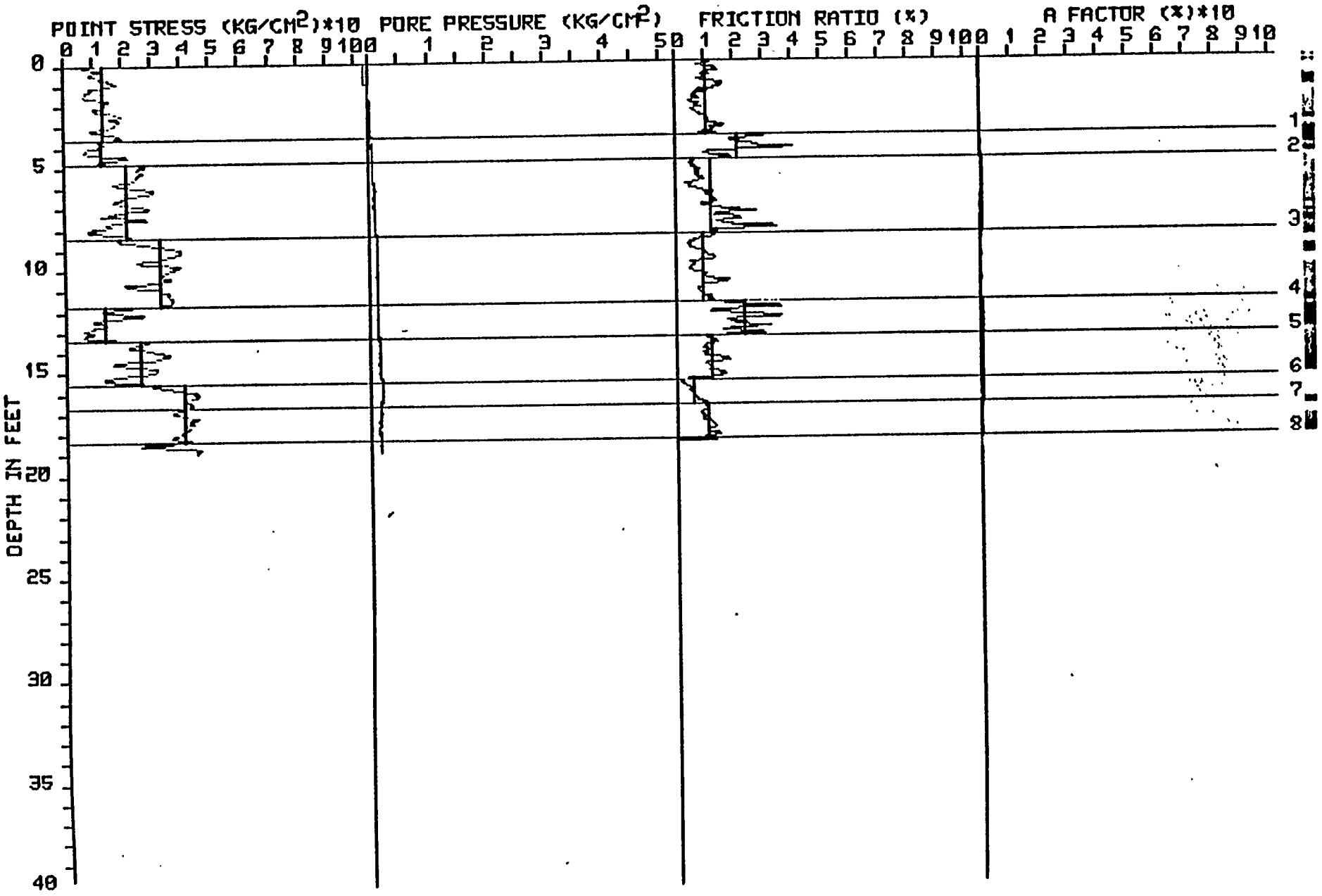


PIEZOCONE SOUNDING TEST

SITE ID: HAT01

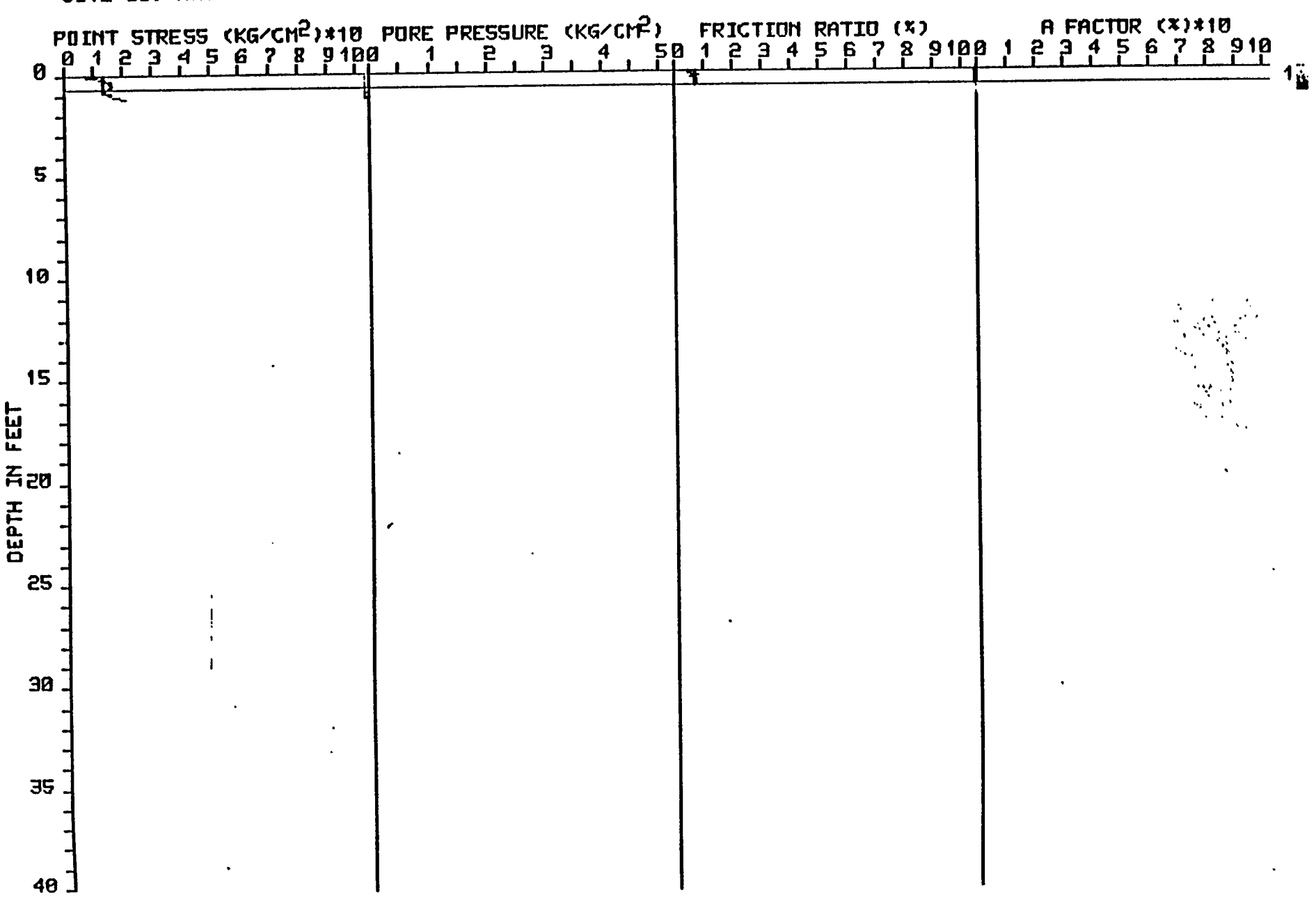
LOCATION ID: 018



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 019



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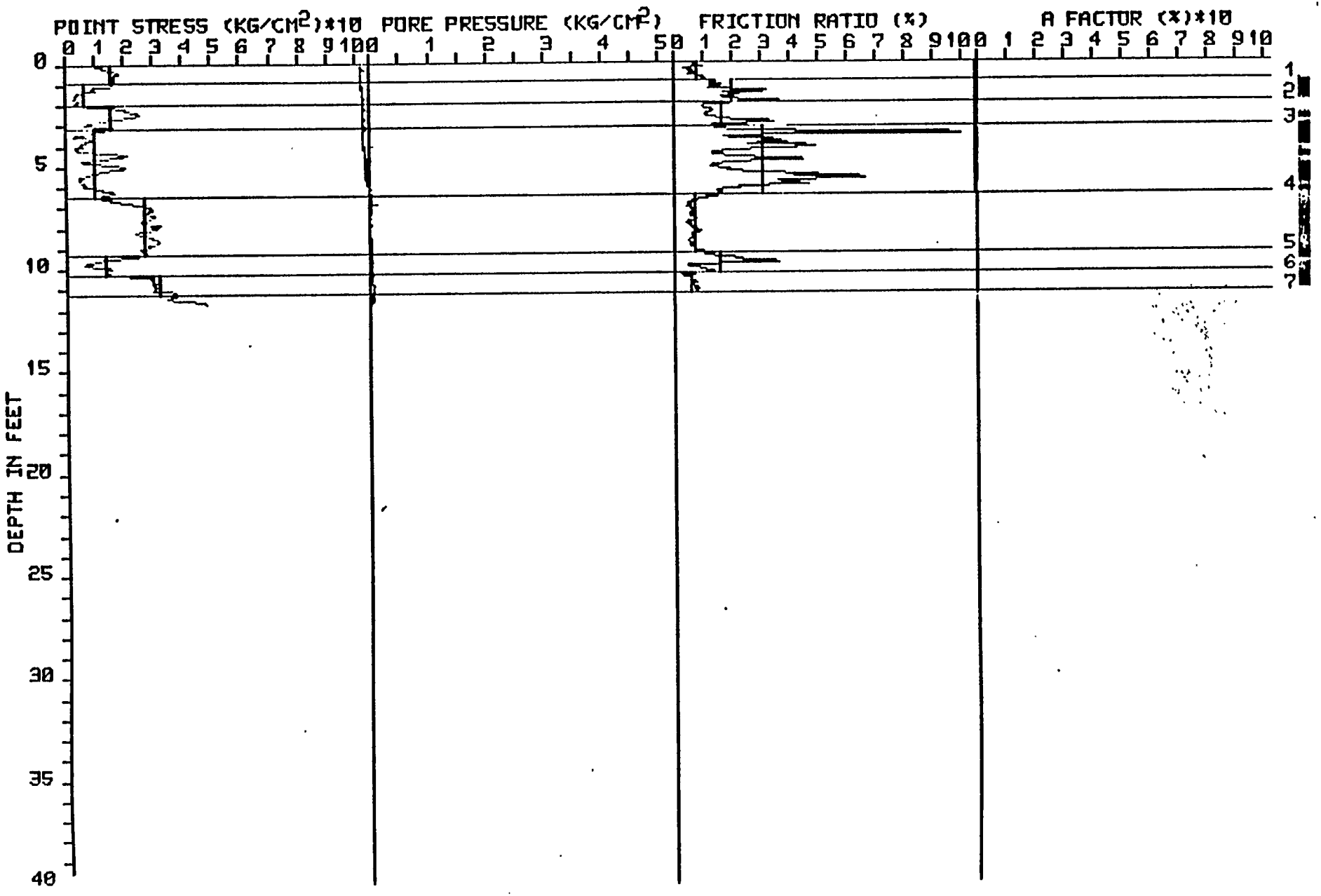
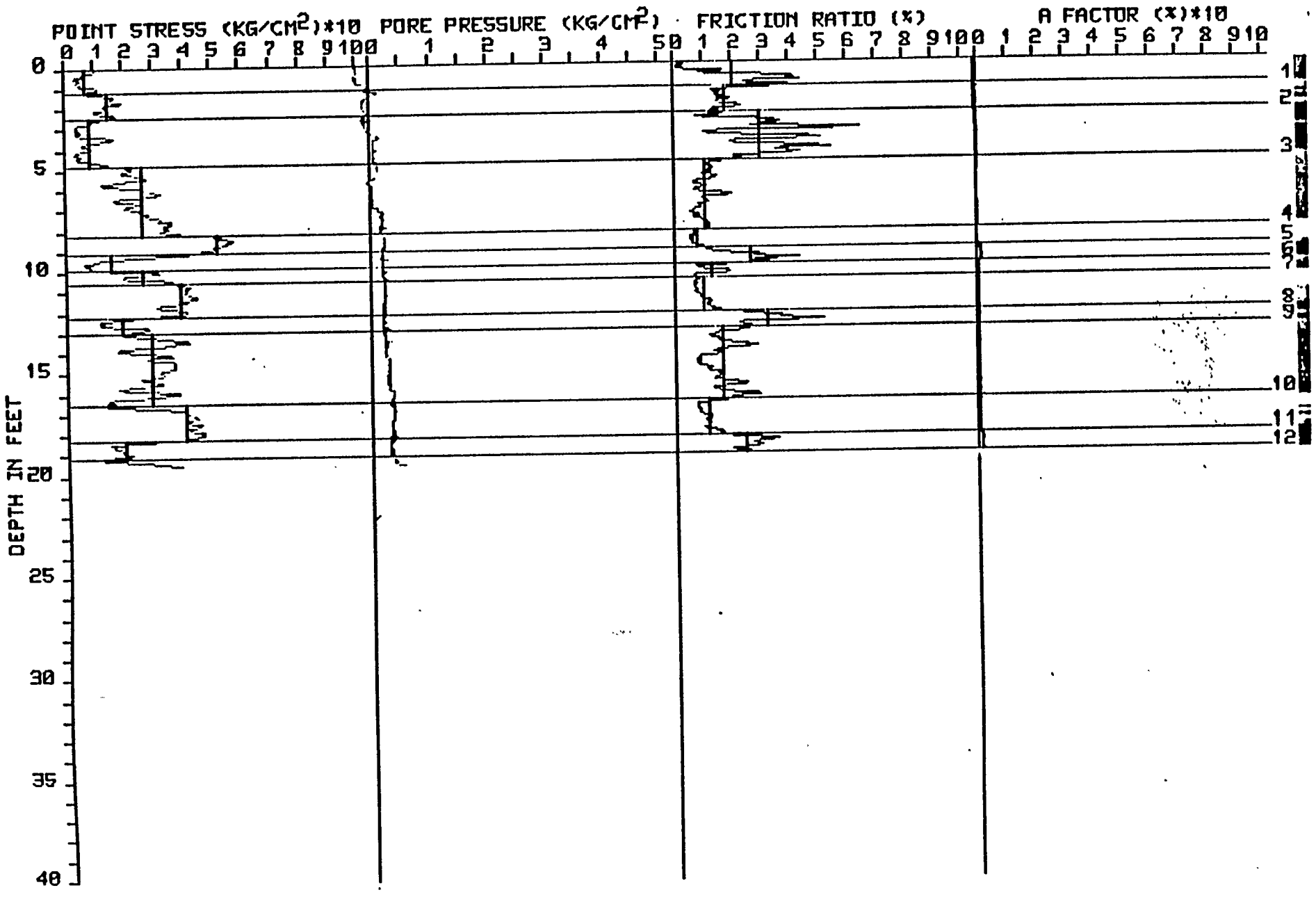


PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 021



PIEZOCONE SOUNDING TEST

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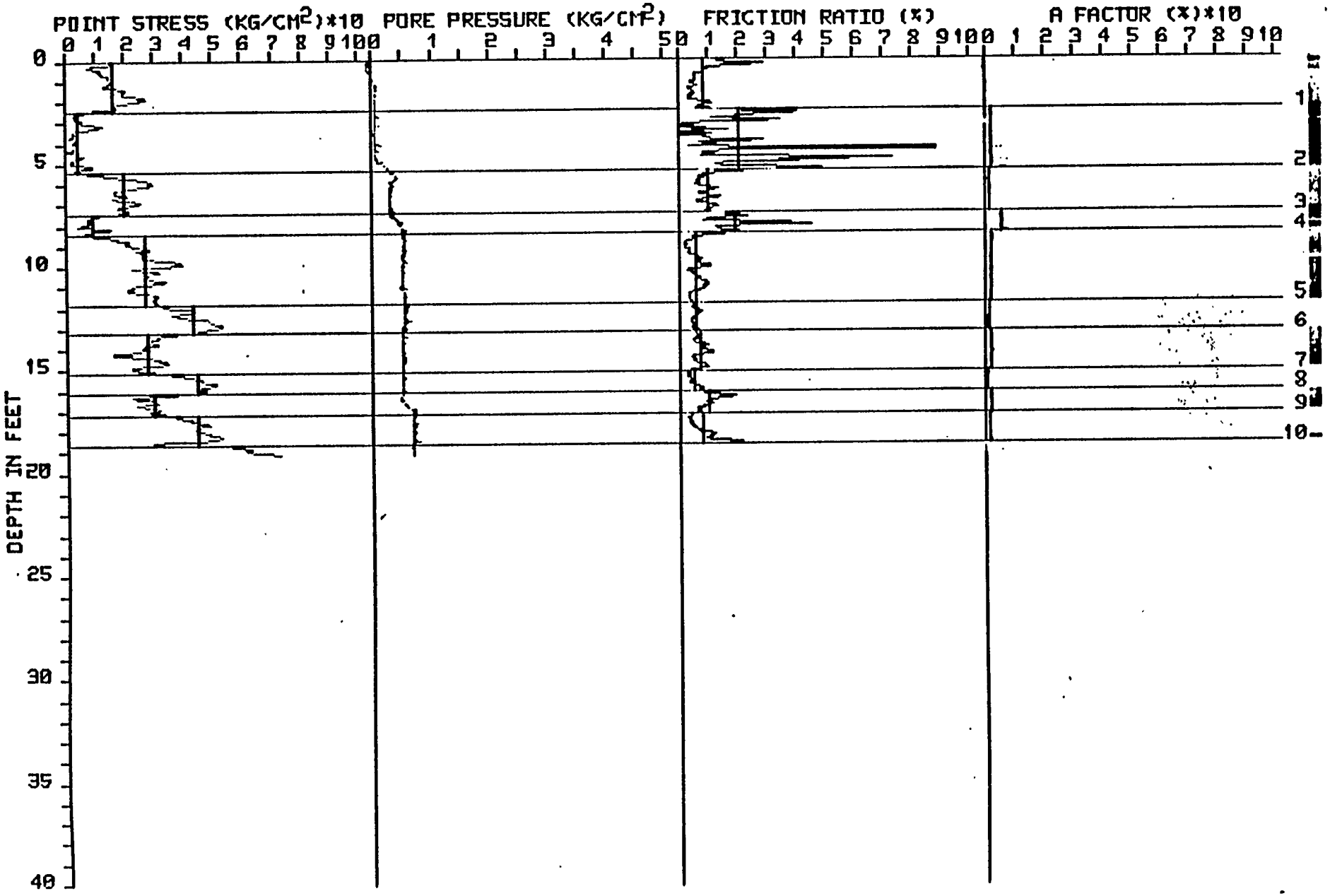

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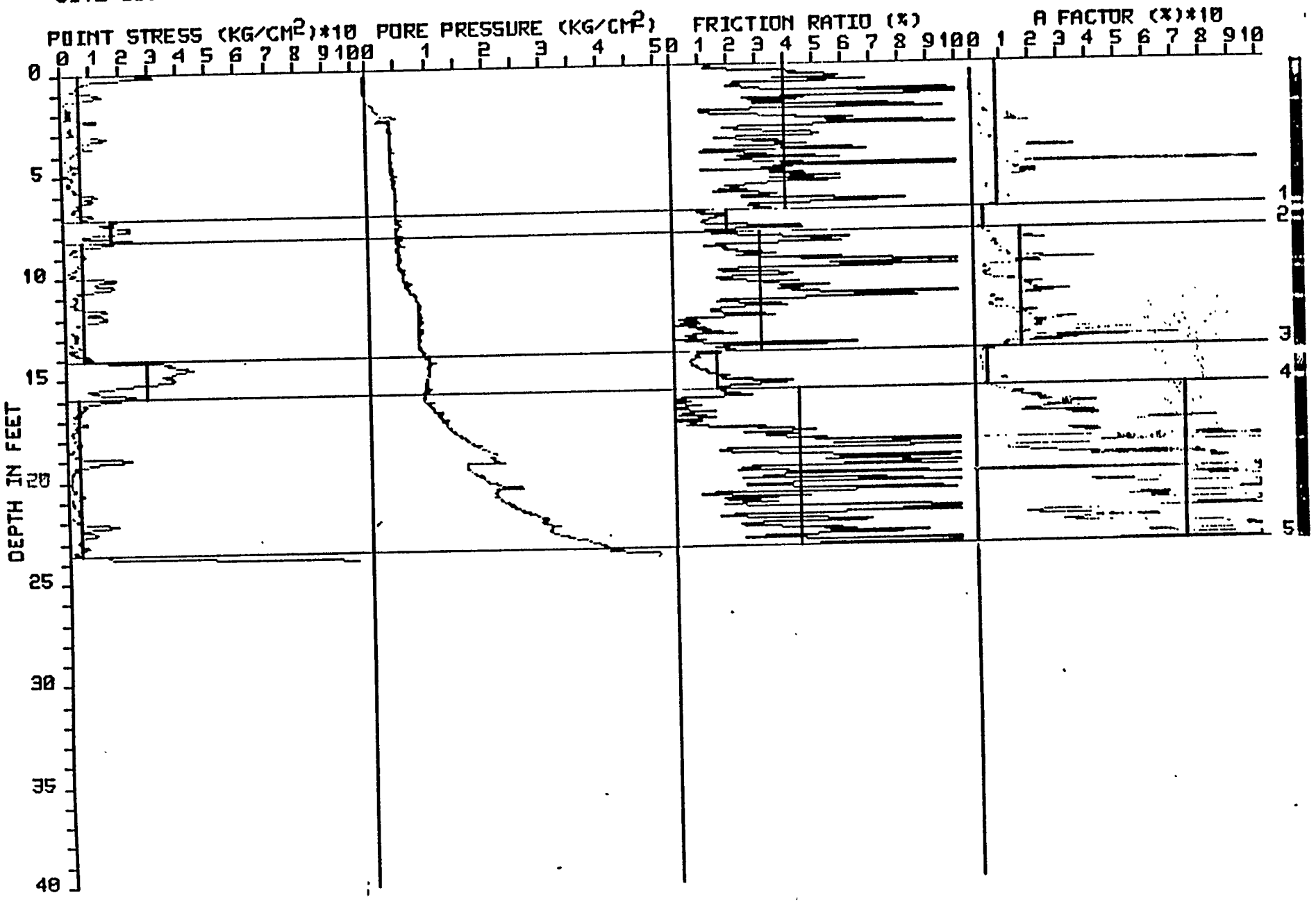

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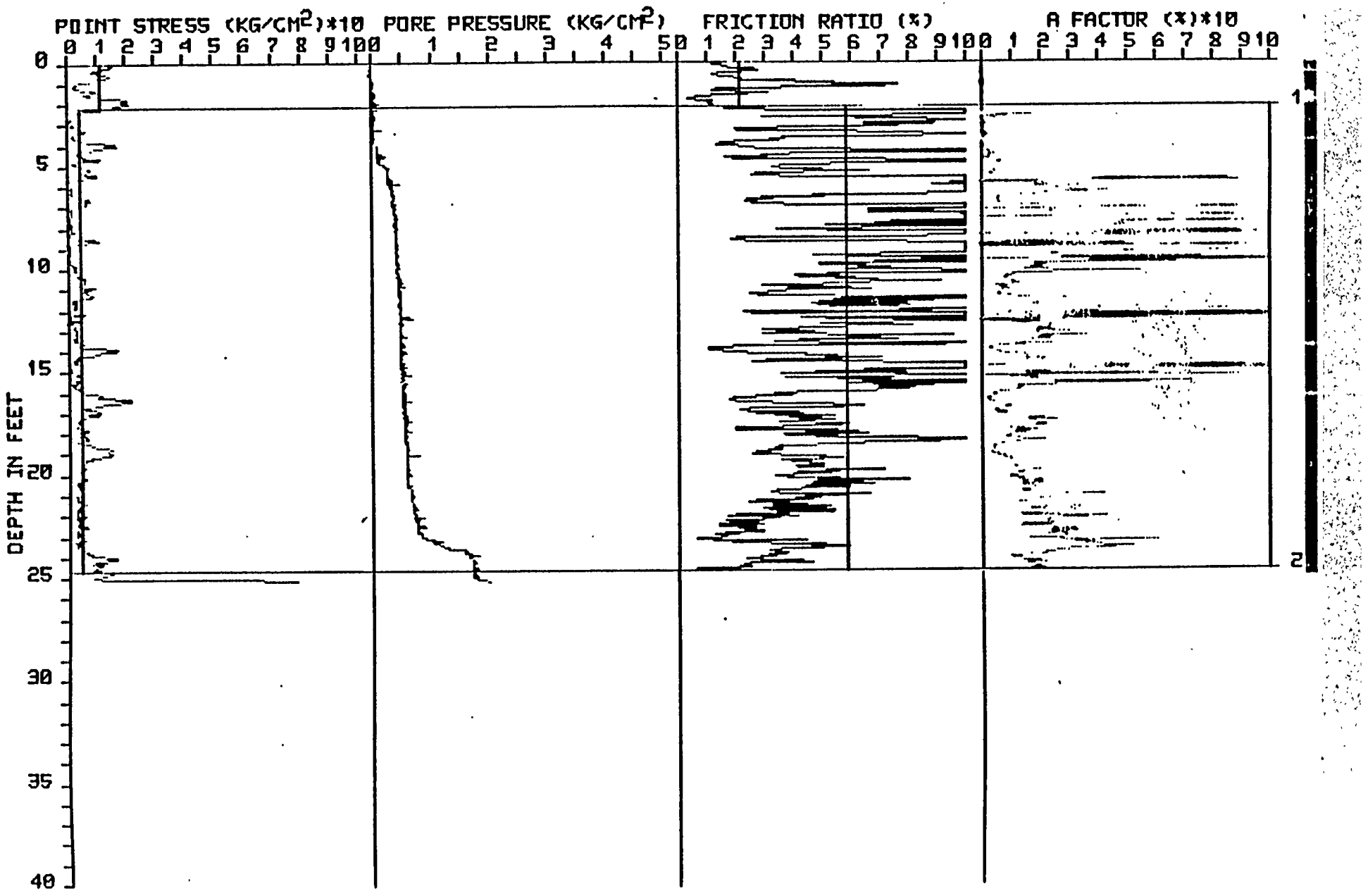

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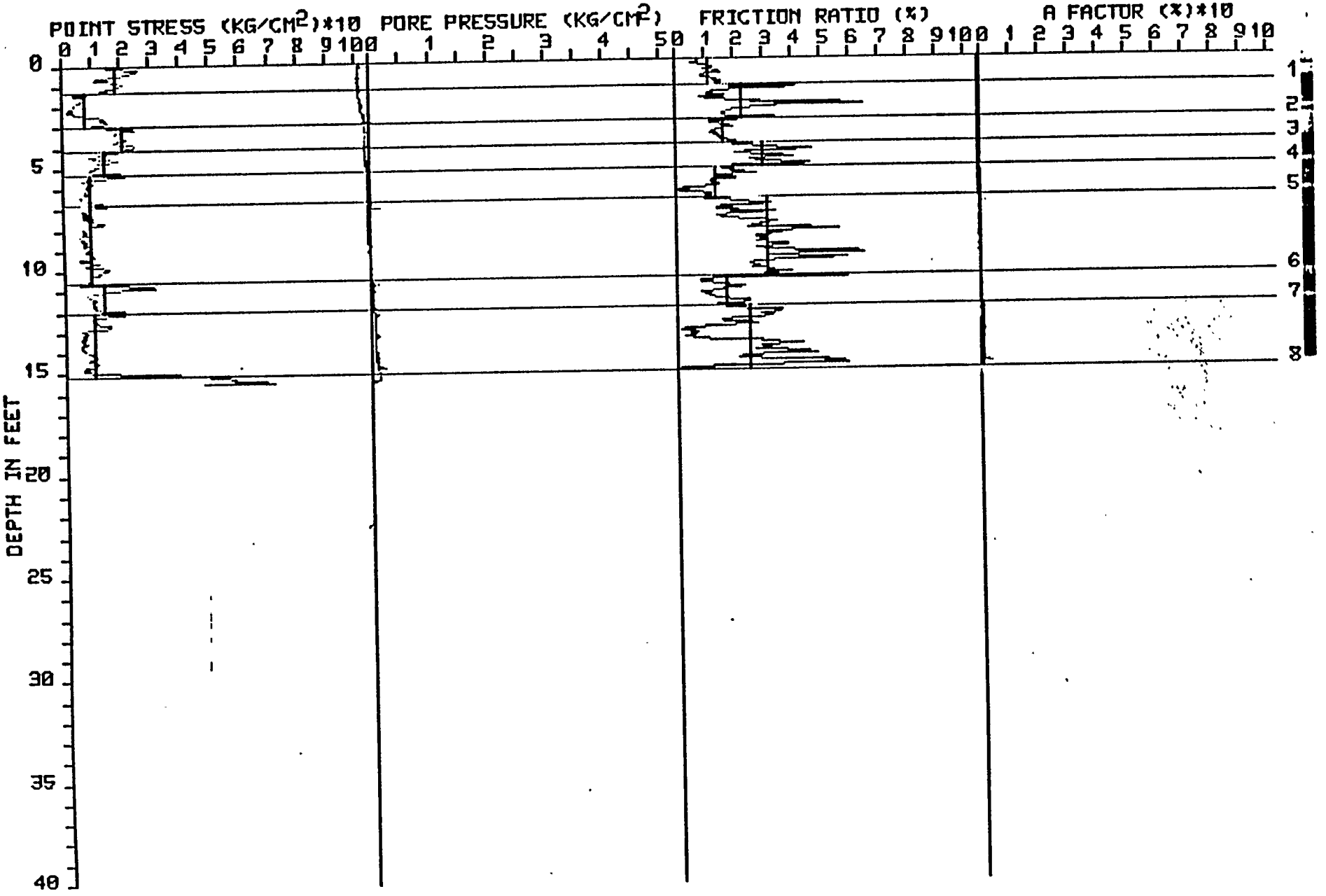

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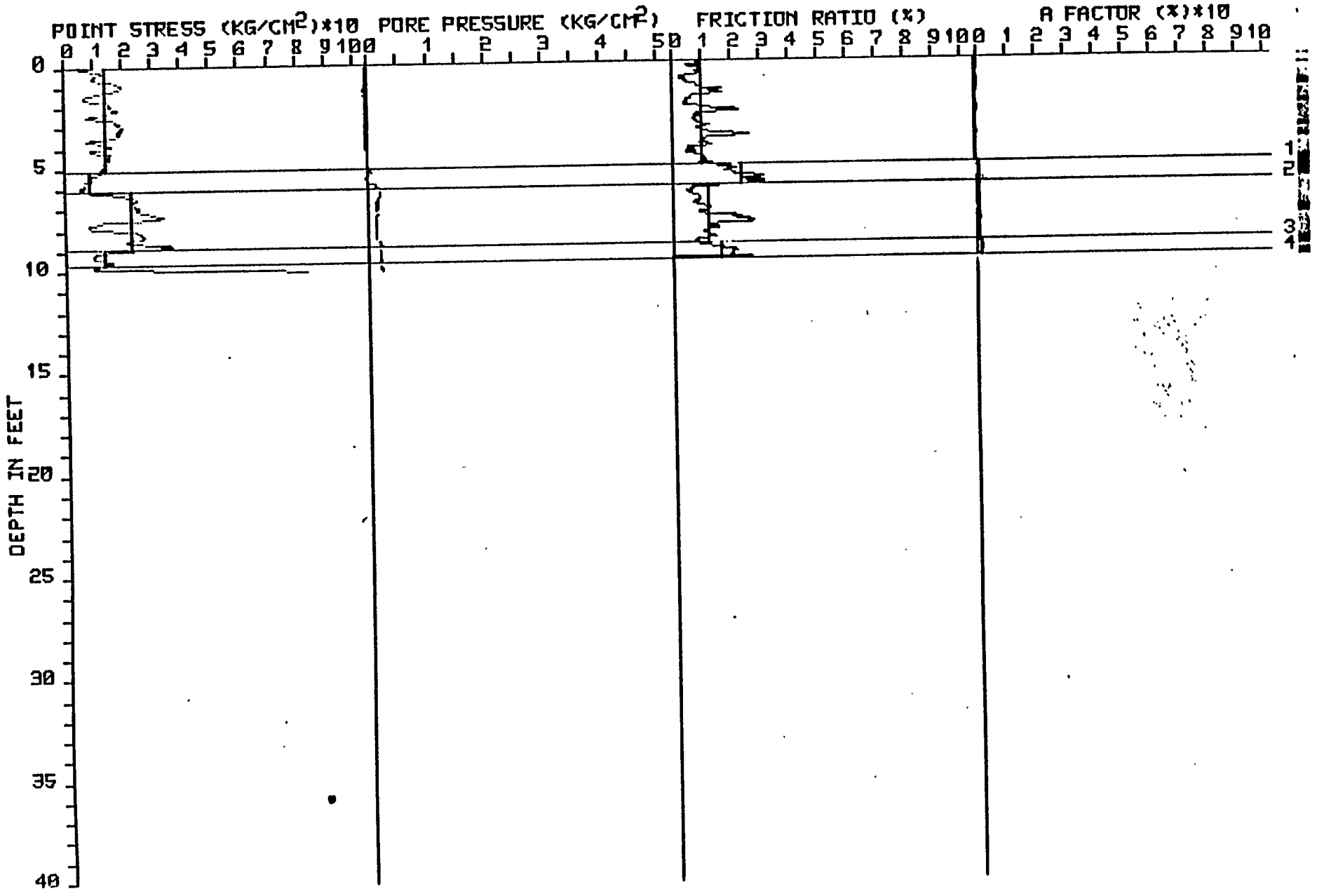

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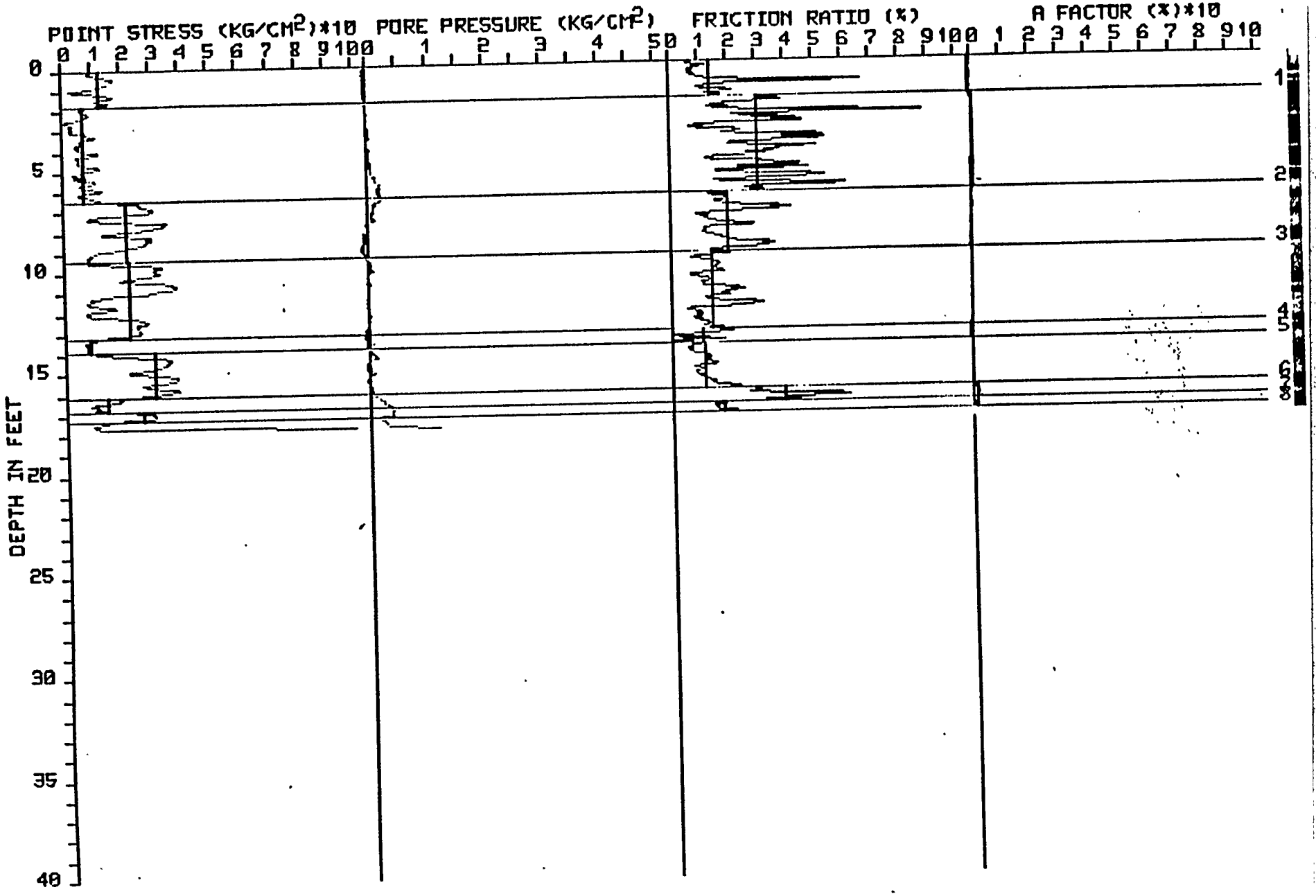

PIEZOCONE SOUNDING TEST

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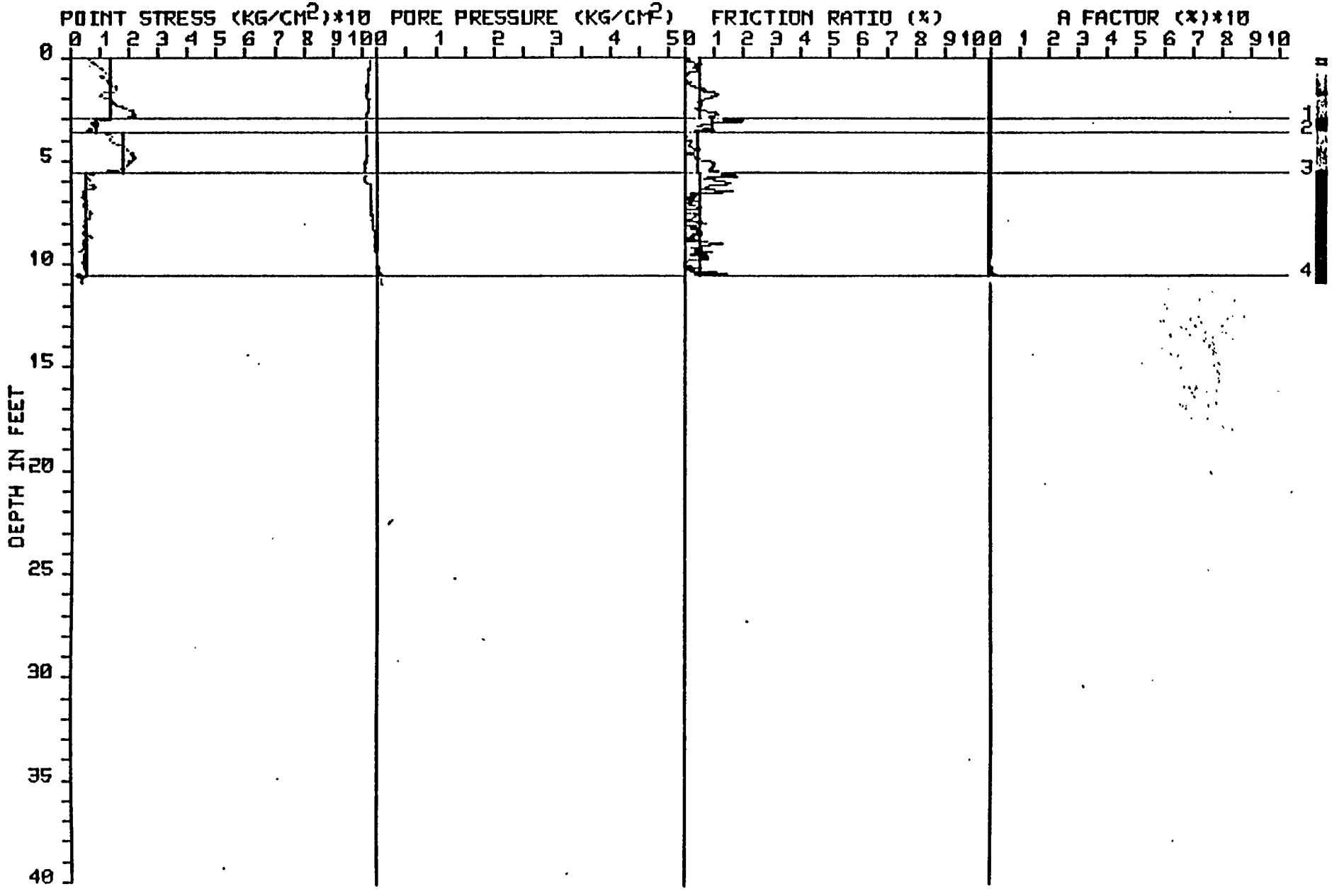
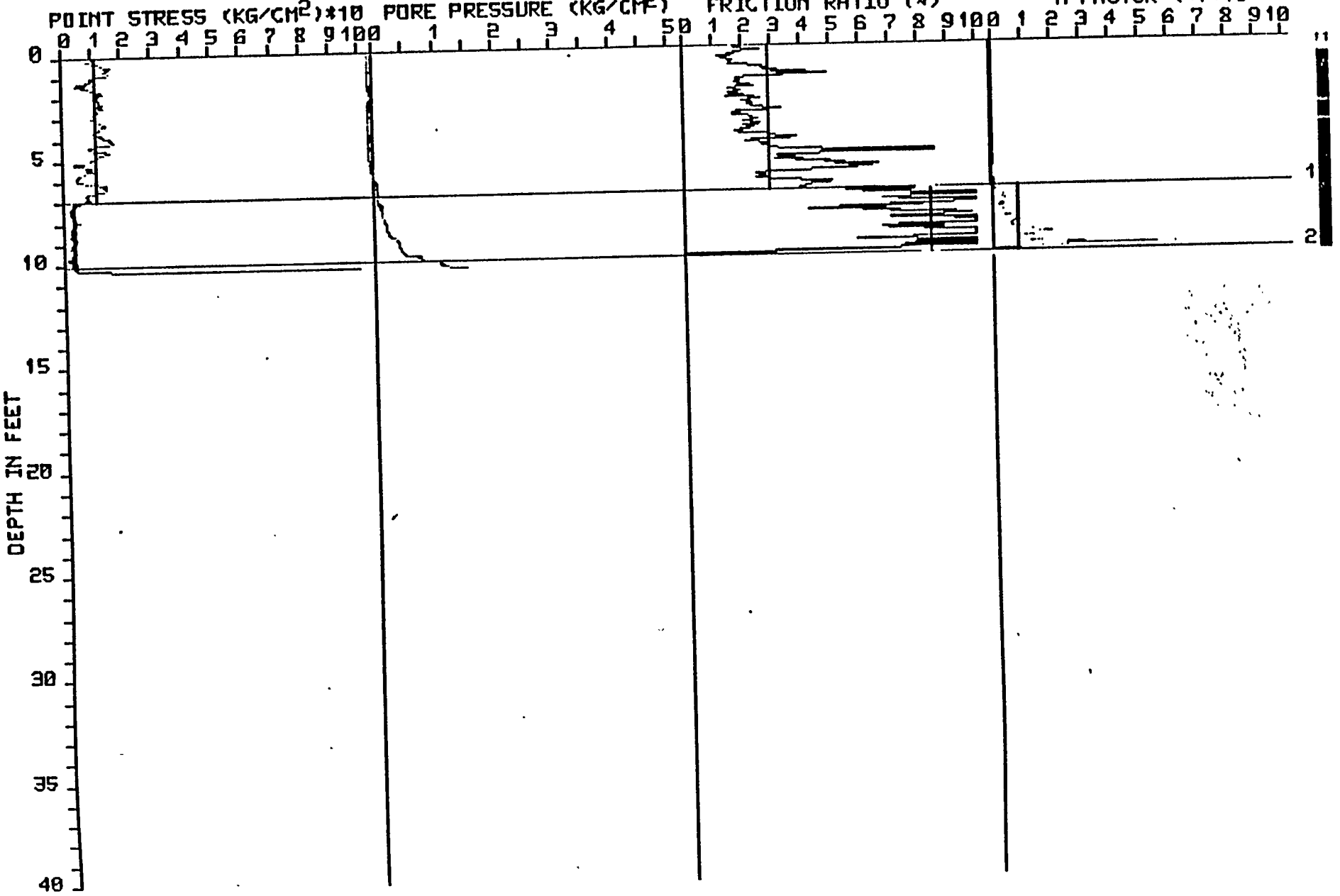


PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 029



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LOCATION ID: 030

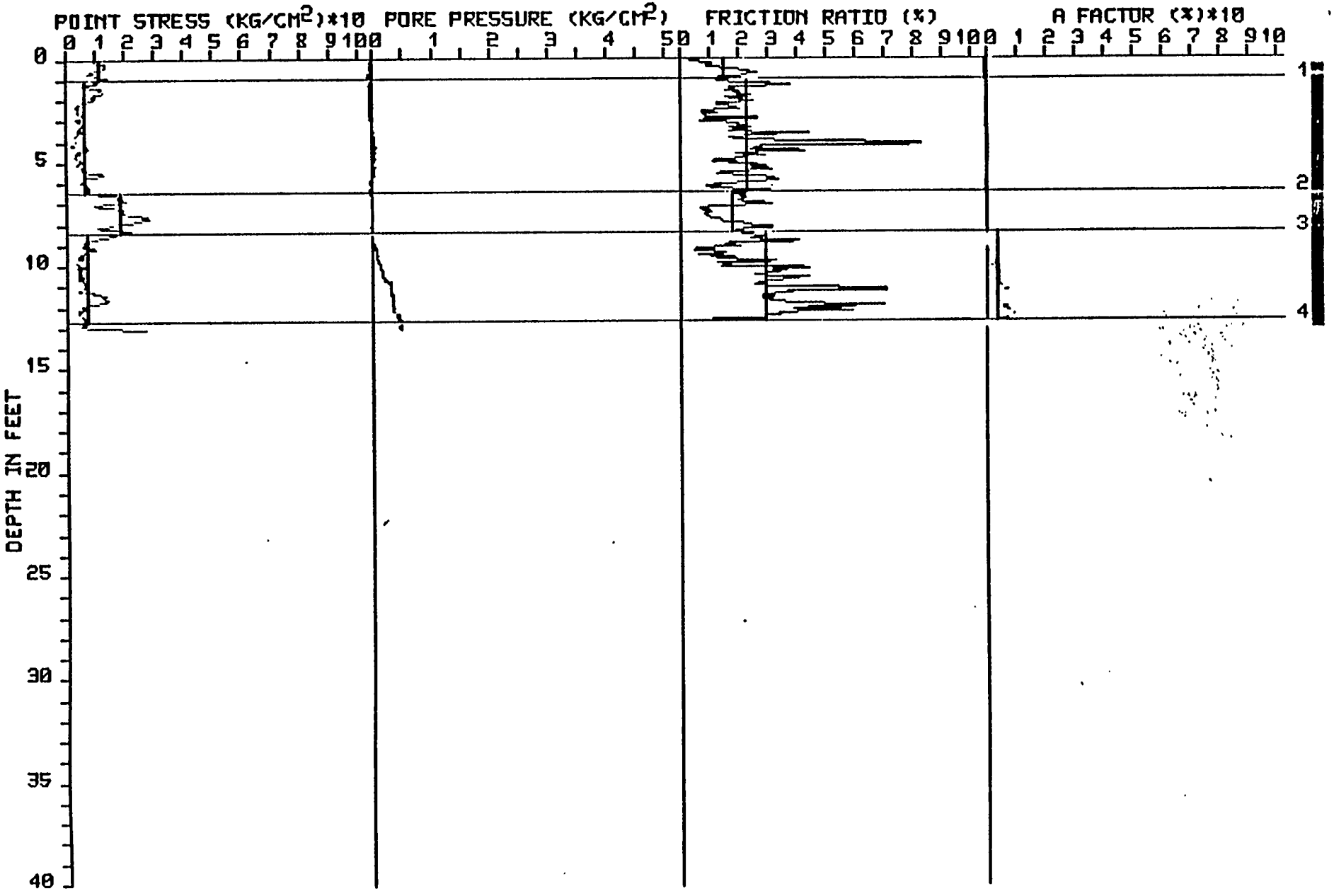


Table D6.1 Geochemical analyses of Colorado State University borings

Boring Number[a]	Sample depth (feet)	pH	Electrical conductivity (mhos/centimeter)	Constituent[b]										$CaCO_3$ equivalent (percent)
				SO_4	Fe	Ca	Mg	Na	Cl	Al	Mn	As	Se	
MH-200	2.5	8.1	1.8	3650	158	2660	782	323	130	812	252	4	3	10.4
MH-200	3.0	8.0	1.8	3140	130	2500	507	118	60	778	224	4	2	21.8
MH-200	3.5	8.1	2.0	4240	128	4260	473	161	60	675	183	4	4	19.3
MH-200	4.0	8.0	1.9	3870	110	3380	378	69	<20	781	159	4	4	21.8
MH-200	4.8	8.2	0.2	200	118	222	29	30	272	288	390	3	5	36.0
MH-200	6.0	8.6	0.1	111	84	131	21	16	<20	363	296	2	4	17.5
MH-200	10.0	8.6	0.2	270	115	217	53	41	<20	336	191	3	4	36.0
MH-200	15.0	8.6	0.1	67	106	114	30	49	<20	348	138	3	4	49.8
MH-200	19.0	8.5	0.1	134	82	155	35	29	<20	248	224	2	3	18.7
MH-205	5.5	8.5	0.2	173	112	167	65	35	<20	278	222	3	5	41.0
MH-205	6.0	8.3	0.8	160	215	1460	186	50	<20	325	610	2	3	29.6
MH-205	7.0	8.5	0.2	190	144	149	55	81	<20	306	228	3	2	36.4
MH-205	10.0	7.9	1.7	3050	96	2110	541	268	<20	931	194	2	<1	18.0
MH-205	12.5	8.1	0.2	300	78	105	60	29	30	609	89	1	1	11.5
MH-205	17.0	8.4	0.1	150	67	131	44	35	20	276	237	1	<1	12.8
MH-205	22.0	8.3	0.2	170	38	53	23	300	30	671	45	1	3	6.1
MH-205	25.5	8.6	0.1	155	87	130	37	36	20	277	193	13	<1	18.4
MH-208	27.0	6.4	2.0	5070	430	5470	177	96	<20	549	72	13	<1	0.84
MH-208	27.5	8.0	0.2	348	304	340	47	22	<20	253	271	4	6	34.4
MH-208	30.2	8.5	0.1	90	130	131	26	24	<20	263	231	4	6	32.0
MH-208	36.0	8.4	0.1	89	93	116	32	31	<20	260	208	2	3	31.4
MH-208	38.0	8.1	0.2	370	74	289	91	72	<20	845	128	2	<1	9.8
MH-208	43.0	8.6	0.1	67	119	111	32	35	<20	342	202	2	2	29.8
MH-208	49.0	8.1	0.2	120	52	124	47	98	<20	671	103	3	<1	18.0

[a]Boring numbers currently do not have DOE identification numbers; CSU boring numbers represent NX rock core samples.
[b]Analysis done by solute extraction; values are expressed in milligrams per gram of dry soil; SO_4 - sulfate; Fe - iron; Ca - calcium; Mg - magnesium; As - arsenic; Se - selenium.

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 001
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.3	1.2	16.4	0.2	0.0	1.0	S-SL*	5	39	30	57	1965	
2	1.3	4.1	2.8	7.3	0.1	0.1	1.4	SLIM	4			25	870	9.6
3	4.2	8.0	3.8	22.6	0.3	0.1	1.1	S-SL*	7	48	31	79	2709	
4	8.0	10.1	2.1	14.2	0.4	0.2	2.6	SLIM	9			50	1709	5.8
5	10.1	11.1	1.0	24.5	0.3	0.2	1.4	S-SL*	8	44	31	86	2937	
6	11.1	12.5	1.4	14.3	0.4	0.2	2.7	SLIM	9			50	1718	4.2
7	12.5	13.7	1.2	25.7	0.4	0.4	1.5	S-SL*	8	41	30	90	3086	
8	13.8	18.5	4.8	13.2	0.4	1.1	2.8	SLIM	8			46	1585	2.6
9	18.6	23.3	4.7	30.6	0.6	0.5	1.9	S-SL*	10	37	29	107	3671	
10	23.3	25.2	1.9	18.0	0.6	1.4	3.2	SLIM	12			63	2164	2.0
11	25.3	28.3	3.1	6.2	0.1	2.7	2.1	SLIM	4			22	742	0.8
12	28.3	30.7	2.3	21.8	0.5	1.0	2.2	SLIM	14			76	2615	1.8
13	30.7	33.8	3.1	11.8	0.4	6.6	3.3	SLIM	7			41	1414	1.0
% THK:		35	11.9	25.6	0.4	0.3	1.5	S-SL	8	41	30	89	3071	
% THK:		64	21.5	12.7	0.3	1.9	2.5	SLIM	7			44	1527	3.3

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 002
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	0.8	0.7	48.0	0.3	-0.1	0.7	SAND*	9	72	35	168		
2	0.8	9.8	9.1	23.7	0.2	0.0	0.8	S-SL*	7	49	31	83	2845	
3	9.9	13.2	3.3	13.4	0.4	1.6	2.7	SLIM	8			47	1611	4.1
4	13.2	17.0	3.8	30.4	0.4	0.5	1.2	S-SL*	10	43	30	106	3647	
5	17.1	18.6	1.6	43.1	0.3	0.1	0.8	SAND*	8	50	31	151		
6	18.7	19.6	0.9	22.2	0.4	0.2	1.9	S-SL	7	30	29	78	2662	
7	19.6	21.0	1.4	56.3	0.5	0.3	1.0	SAND*	11	55	32	197		
% THK:		17	3.7	49.0	0.4	0.1	0.9	SAND	9	56	32	171		
% THK:		66	13.8	25.4	0.3	0.2	1.0	S-SL	7	46	31	89	3053	
% THK:		15	3.3	13.4	0.4	1.6	2.7	SLIM	8			46	1611	4.1

SITE ID: HAT01 LOCATION ID: 003
GROUND WATER DEPTH: 50.0 (FT.) AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	1.2	1.1	6.7	0.0	-0.0	0.6	SLIM*	4			23	800	25.6
2	1.2	14.8	13.5	24.9	0.2	0.1	1.0	S-SL*	8	48	31	87	2985	
3	14.8	18.1	3.3	8.8	0.3	0.3	3.4	SLIM	5			31	1057	1.9
4	18.2	20.1	1.9	27.5	0.4	0.4	1.4	S-SL*	9	36	29	96	3302	
5	20.1	21.0	0.9	52.8	0.4	0.2	0.7	SAND*	10	53	32	185		
6	21.1	23.9	2.8	27.4	0.4	0.2	1.5	S-SL*	9	33	29	96	3287	
7	23.9	25.8	1.9	4.8	0.2	0.4	4.0	SLIM	3			17	574	0.7
% THK:		3	0.9	52.8	0.4	0.2	0.7	SAND	10	52	32	185		
% THK:		71	18.2	25.6	0.3	0.1	1.1	S-SL	8	44	31	89	3064	
% THK:		24	6.3	7.2	0.2	0.3	3.1	SLIM	4			25	866	5.7

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 004
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	2.5	2.4	17.3	0.1	-0.0	0.6	S-SL*	5	41	30	61	2076	
2	2.5	10.8	8.3	7.6	0.2	0.0	2.5	SLIM	5			27	917	4.9
3	10.9	14.9	4.0	21.7	0.4	0.3	1.7	S-SL	7	37	29	76	2598	
4	14.9	17.7	2.8	8.4	0.3	0.6	3.5	SLIM	5			29	1007	1.9
5	17.8	19.2	1.4	40.7	0.6	1.2	1.4	S-SL*	13	47	31	142	4882	
% THK:		41	7.8	23.8	0.3	0.4	1.3	S-SL	7	40	30	83	2847	
% THK:		58	11.1	7.8	0.2	0.2	2.8	SLIM	5			27	939	4.1

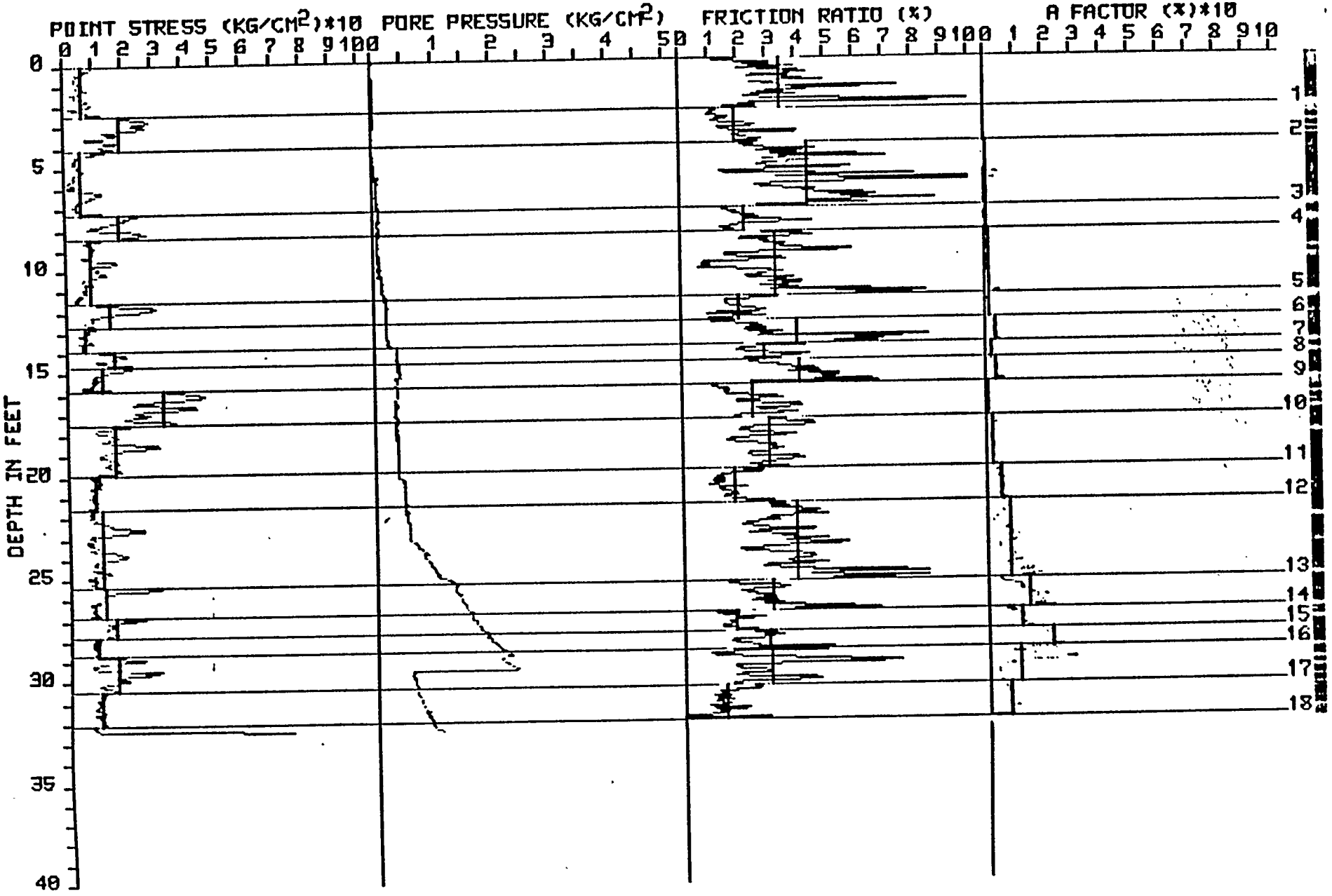
SITE ID: HAT01 LOCATION ID: 005
GROUND WATER DEPTH: 50.0 (FT.) AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	2.7	2.6	13.8	0.1	-0.0	0.6	S-SL*	4	35	29	48	1661	
2	2.8	19.7	16.9	6.0	0.2	0.1	3.9	SLIM	3			21	718	2.5
% THK:		13	2.6	13.8	0.1	0.0	0.6	S-SL	4	35	29	48	1660	
% THK:		86	16.9	6.0	0.2	0.1	3.9	SLIM	3			21	718	2.5

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 031



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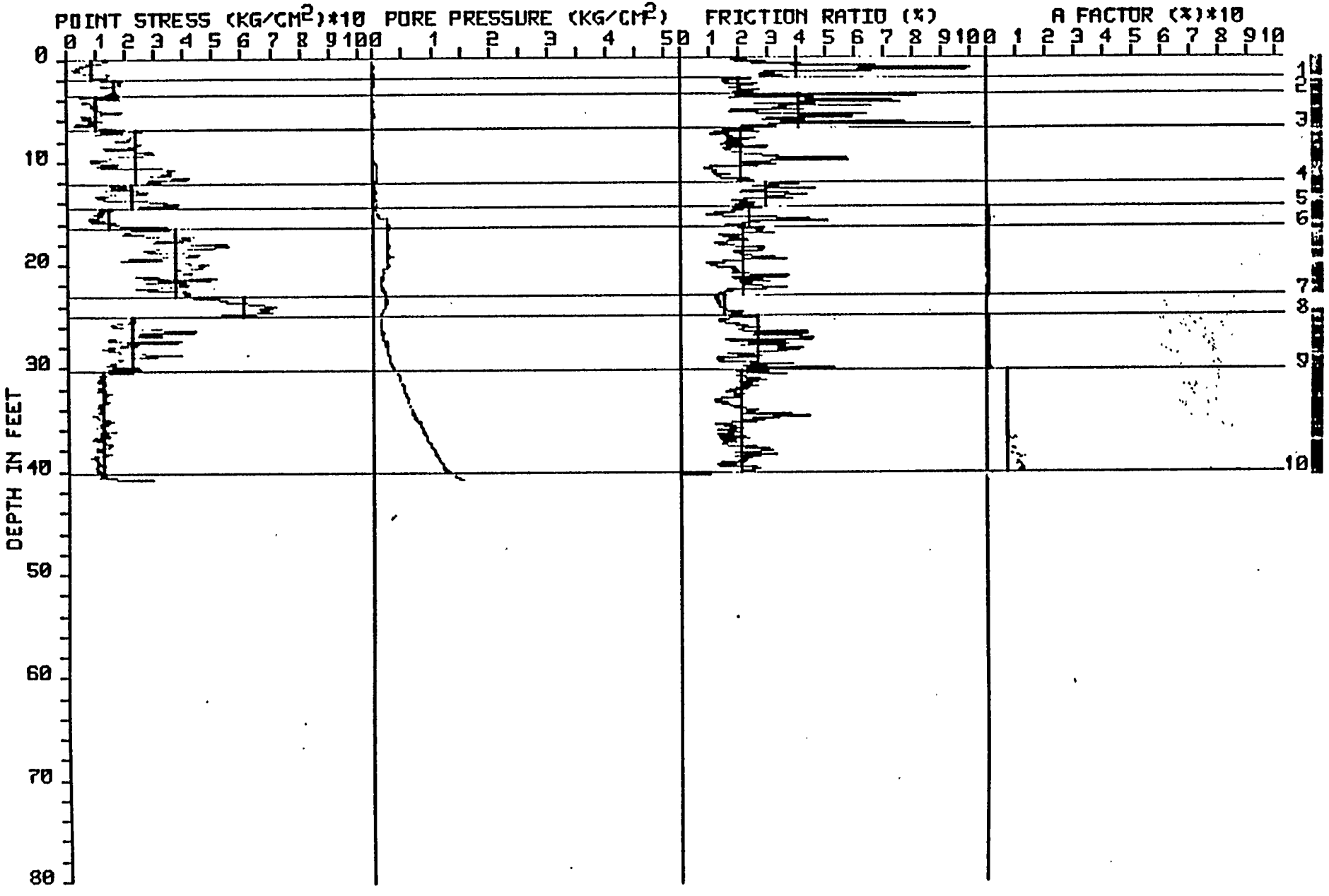
SITE ID: HAT01

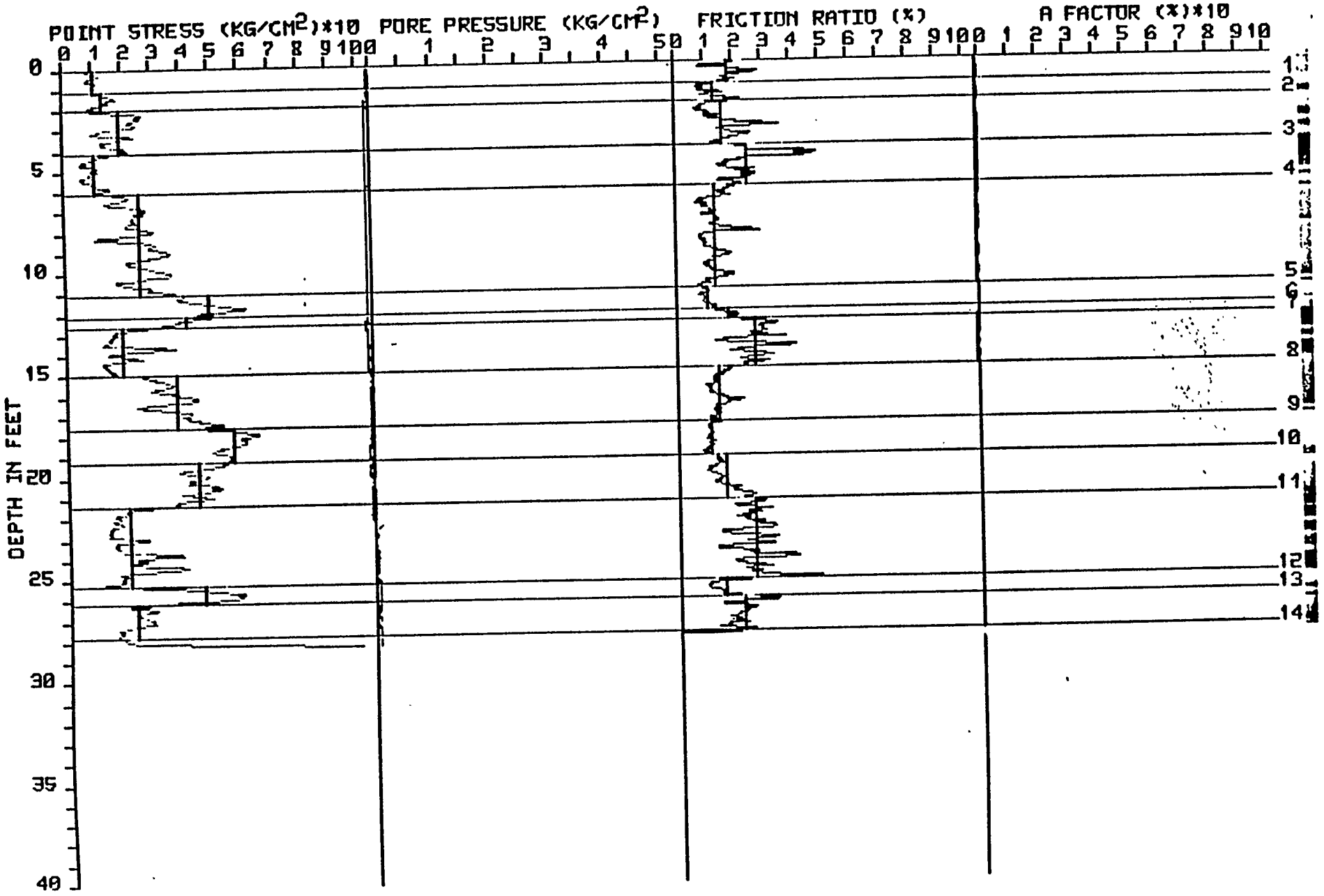
LOCATION ID: 032



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

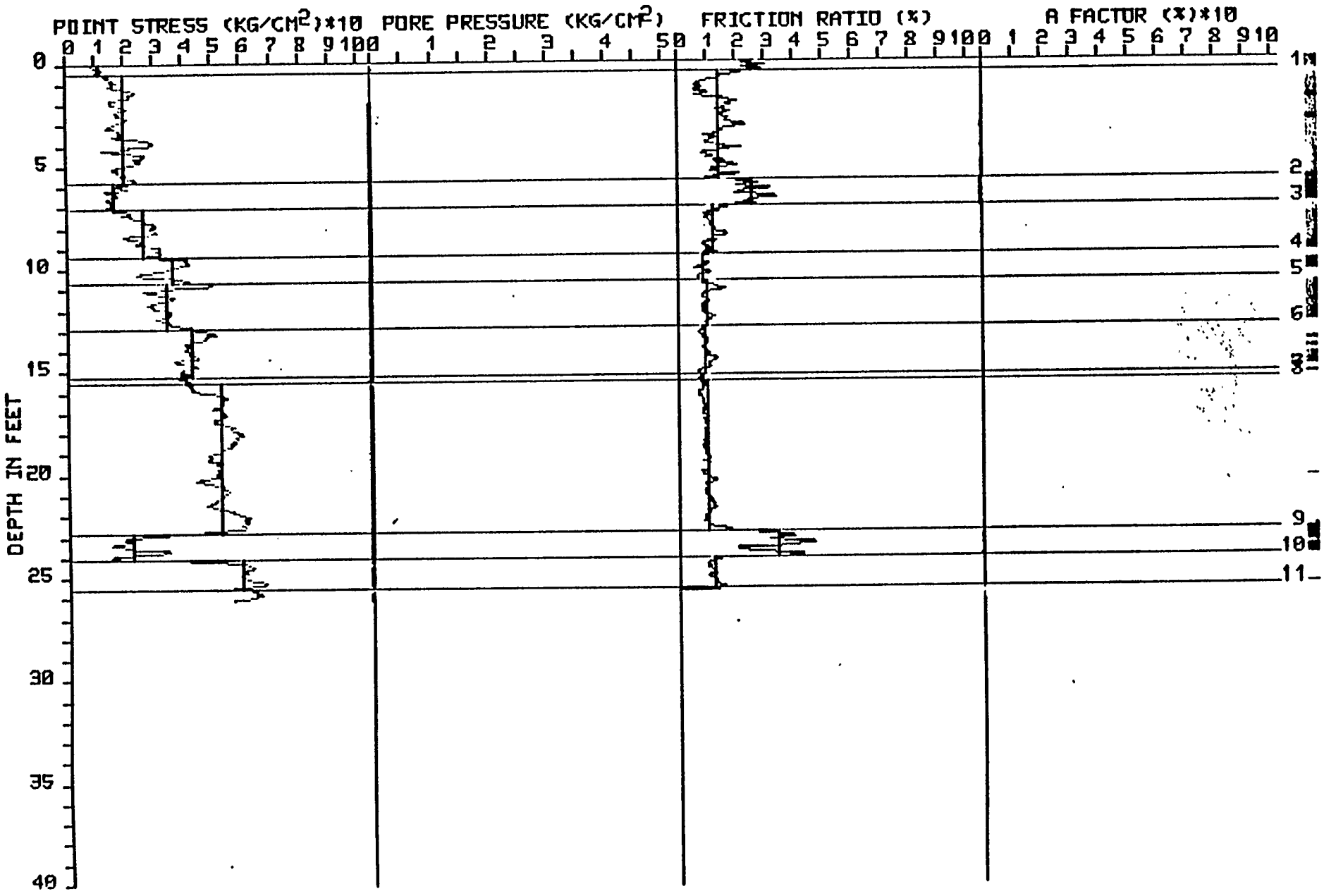
LOCATION ID: 033



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 034



PIEZOCONE SOUNDING TEST

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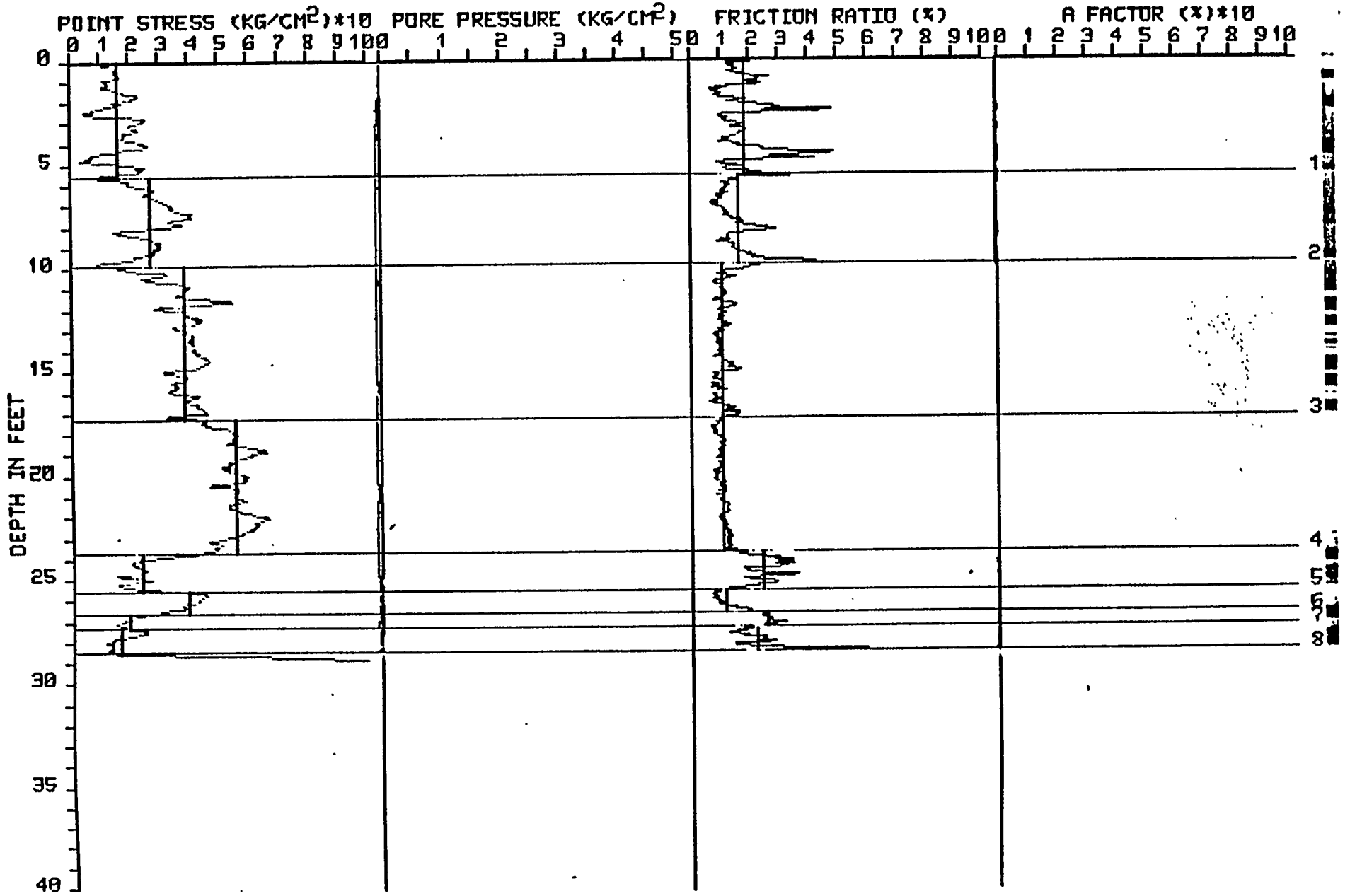
LOCATION ID: 035

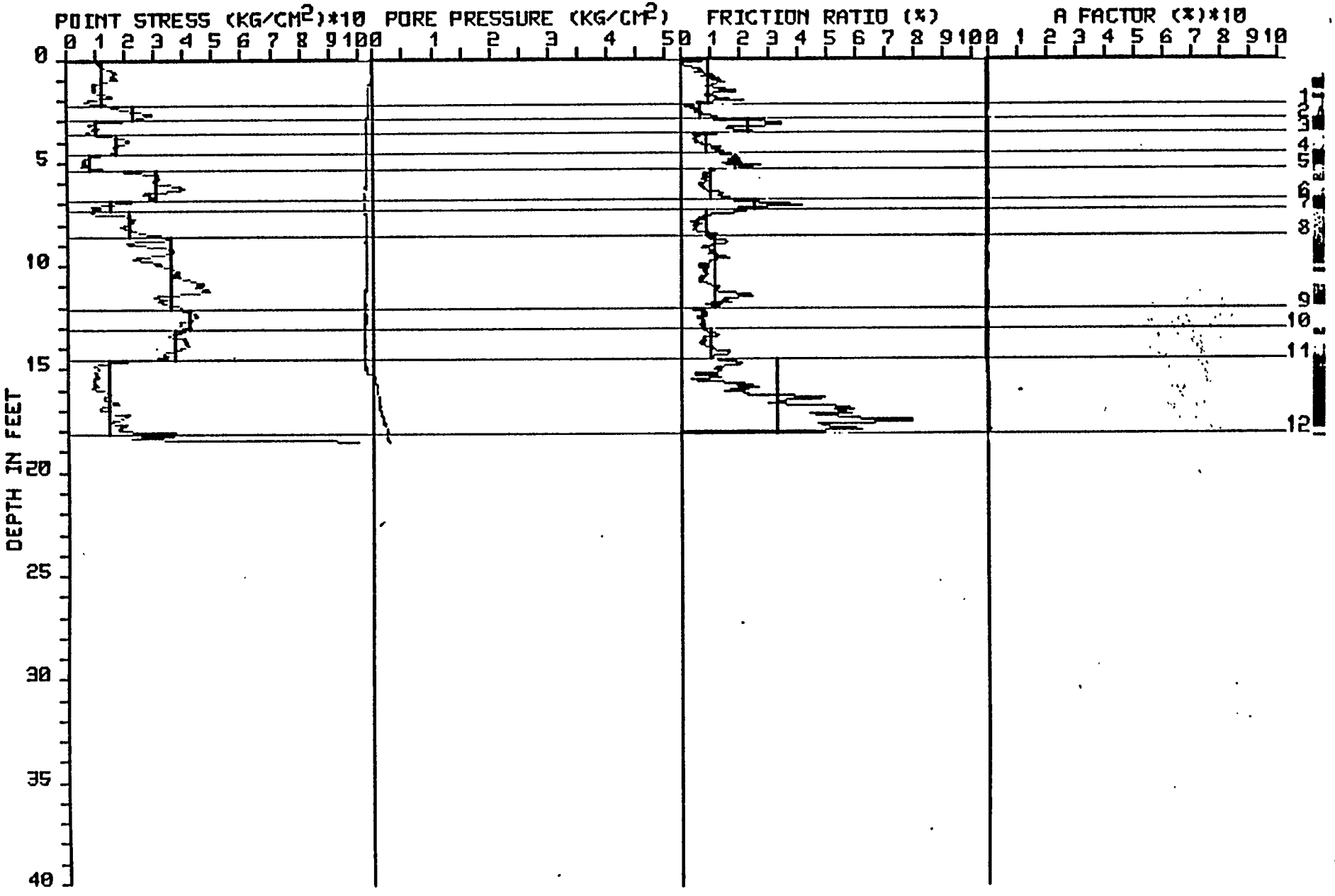


159

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 036



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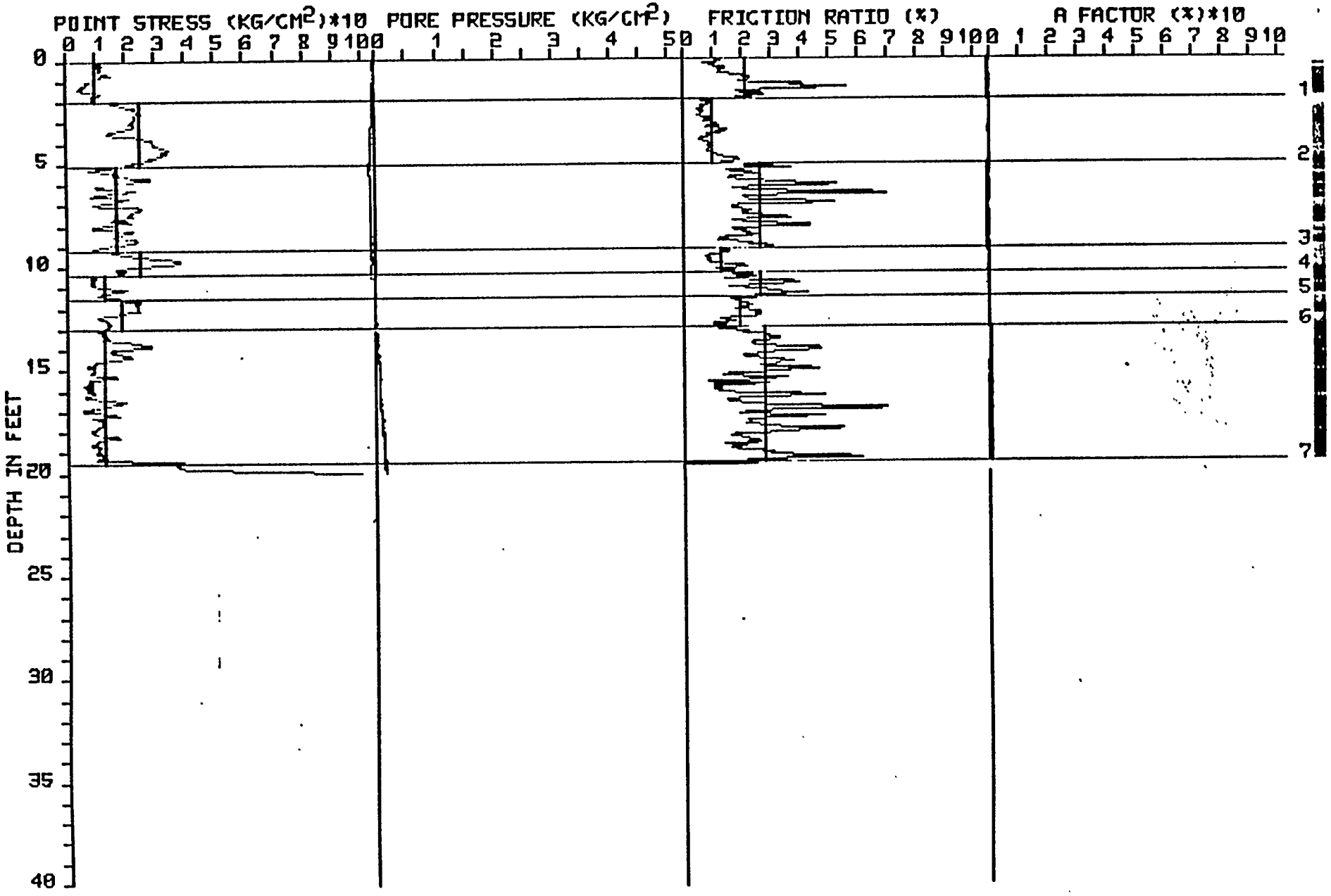
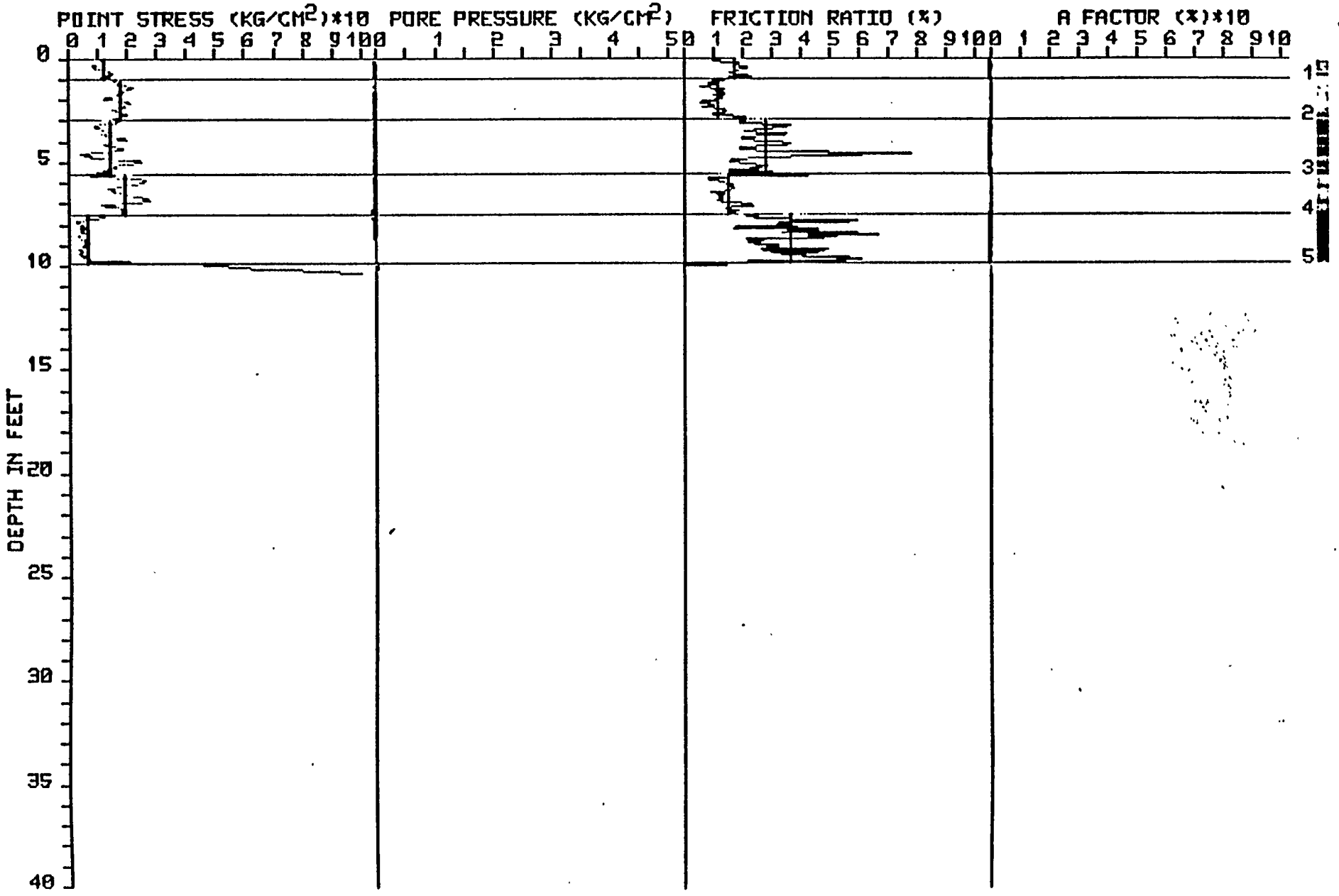
LOCATION ID: 037



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 038



PIEZOCONE SOUNDING TEST

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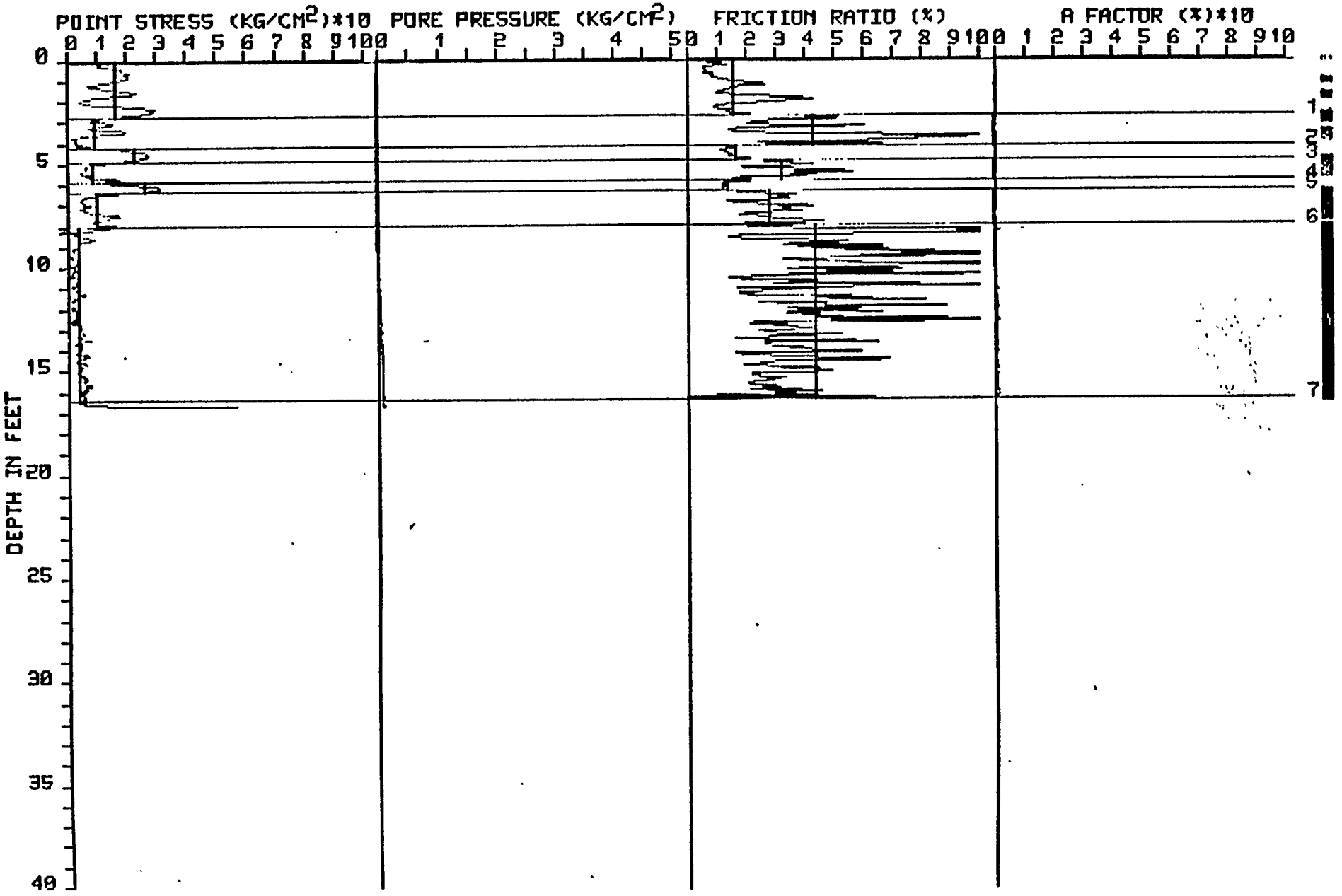
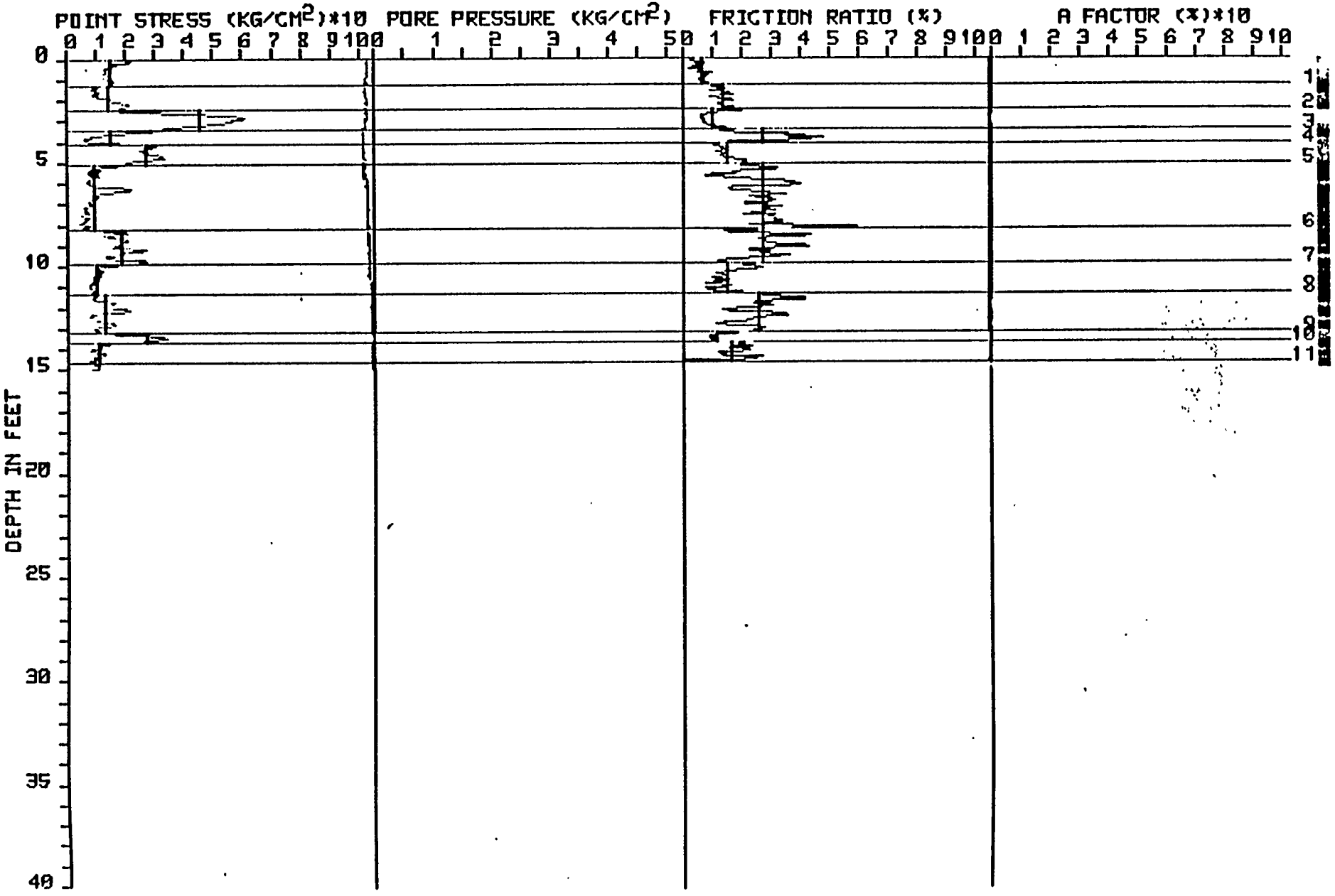
LOCATION ID: 039



PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 040



SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 004
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	2.5	2.4	17.3	0.1	-0.0	0.6	S-SL*	5	41	30	61	2076	
2	2.5	10.8	8.3	7.6	0.2	0.0	2.5	SLIM	5			27	917	4.9
3	10.9	14.9	4.0	21.7	0.4	0.3	1.7	S-SL	7	37	29	76	2598	
4	14.9	17.7	2.8	8.4	0.3	0.6	3.5	SLIM	5			29	1007	1.9
5	17.8	19.2	1.4	40.7	0.6	1.2	1.4	S-SL*	13	47	31	142	4882	
% THK:		41	7.8	23.8	0.3	0.4	1.3	S-SL	7	40	30	83	2847	
% THK:		58	11.1	7.8	0.2	0.2	2.8	SLIM	5			27	939	4.1

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 005
AVERAGE SOIL WEIGHT: 100.0 (PSF)

LY	- DEPTH - FROM	TO	THK.	AVG. POINT	AVG. SLEEVE	AVG. PORE PRESS.	AVG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
1	0.1	2.7	2.6	13.8	0.1	-0.0	0.6	S-SL*	4	35	29	48	1661	
2	2.8	19.7	16.9	6.0	0.2	0.1	3.9	SLIM	3			21	718	2.5
% THK:		13	2.6	13.8	0.1	0.0	0.6	S-SL	4	35	29	48	1660	
% THK:		86	16.9	6.0	0.2	0.1	3.9	SLIM	3			21	718	2.5

ADDENDUM D7

ADDITIONAL RADIOLOGICAL DATA

Radon monitoring was performed at the Mexican Hat site from 08/27/85 until 09/22/86 in four separate quarterly periods: 08/27/85 to 11/21/85; 11/21/85 to 02/28/86; 02/28/86 to 06/06/86; and 06/06/86 to 09/22/86. Nineteen monitoring locations were established from the edge of the Mexican Hat site to 2500 meters away. Each monitoring location housed two to five film radon detectors. Multiple detectors were placed at each location to determine an average Rn-220 concentration and to avoid loss of data from a single damaged detector. The monitoring locations are illustrated in Figure D7.1. The mean radon concentration at each location for each quarterly period is given in Table D7.1.

Table D7.1 Background Ra-222 concentrations, Mexican Hat site, Utah

Location number	Concentration for the period (in pCi/l)			
	08/27/85 to 11/21/85	11/21/85 to 02/28/86	02/28/86 to 06/06/86	06/06/86 to 09/22/86
1	5.9	12	6.6	-
2	6.3	9.4	-	-
3	12	15	9.5	-
4	3.1	4.7	2.9	-
5	0.57	0.73	0.56	-
6	4.0	6.7	4.7	-
7	0.57	0.91	0.51	1.3
8	0.97	2.1	-	1.5
9	0.44	0.74	0.36	0.61
10	0.67	1.2	0.64	0.86
11	0.60	0.77	0.57	1.3
12	0.39	0.65	0.31	-
13	-[a]	0.47	0.27	0.48
14	-	0.64	0.40	-
15	0.84	1.3	0.76	1.2
16	0.45	0.98	-	-
17	1.1	2.0	0.97	-
19	0.20	0.37	0.30	0.36
20	0.62	0.94	0.48	0.51
Mean of nine background locations	0.50	0.78	0.42	0.74
Mean of four on site locations	6.8	10.3	6.3	-

[a]Indicates either damaged or stolen detector.

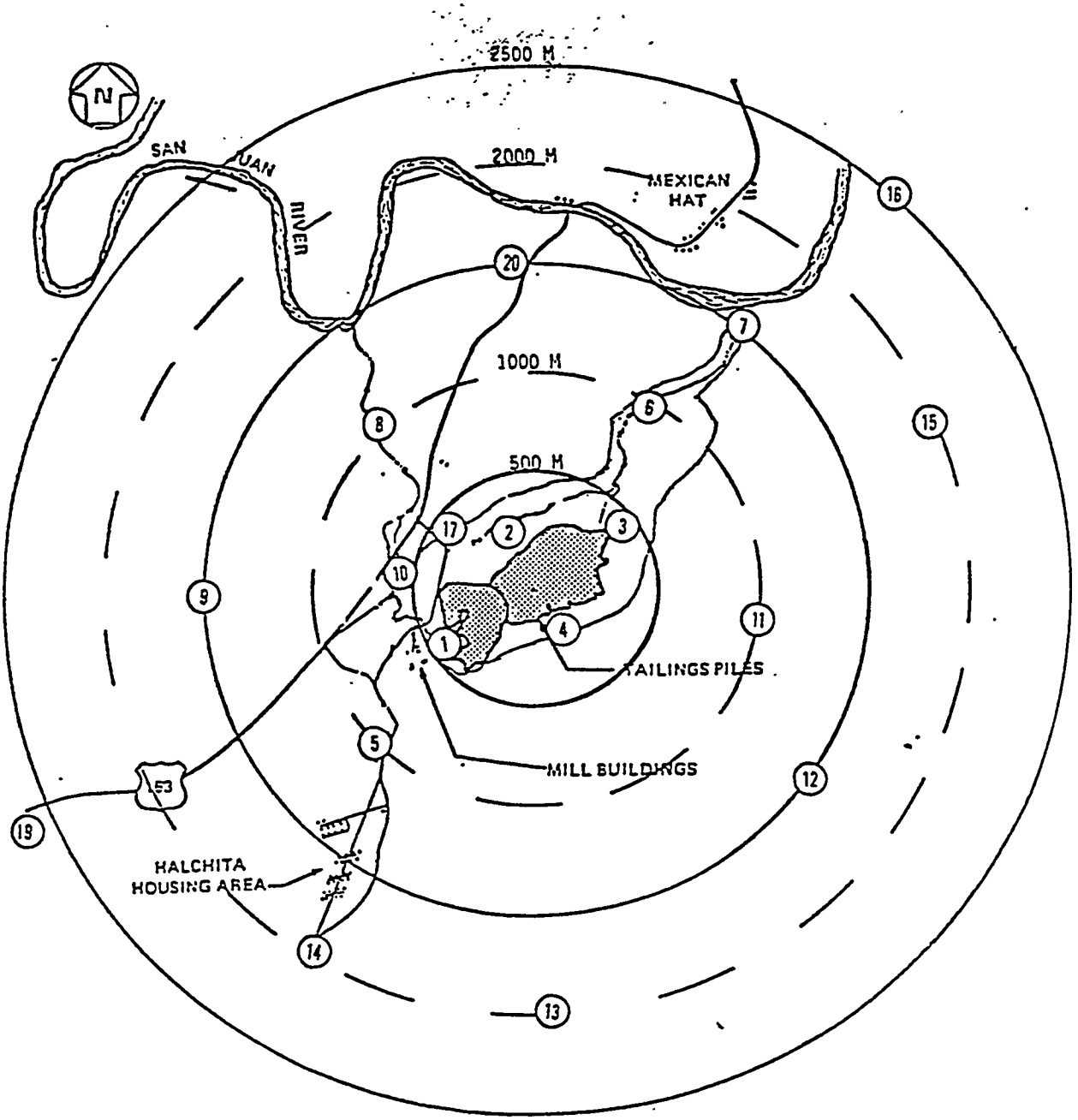


FIGURE D7.1
RADON MONITORING LOCATIONS
MEXICAN HAT, UTAH

Locations 1, 2, 3, and 4 are on the Mexican Hat uranium mill tailings site and may be used to determine the on-site radon concentration. The average radon concentration for the four sites ranged from 6.3 to 10.3 pCi/l for the four quarterly periods. Locations 5, 6, 8, 10, 11, and 17 are not on the site and are too close to the site to be considered background locations. Monitoring locations 7, 9, 12, 13, 14, 15, 16, 19, and 20 are 1500 meters or more from the site and may be considered background locations. The average background radon concentration over the nine background locations was 0.50 pCi/l for the period 08/27/85 to 11/21/85; 0.78 pCi/l for 11/21/85 to 02/28/86; 0.42 pCi/l for 02/28/86 to 06/06/86; and 0.74 pCi/l for 06/06/86 to 09/22/86. The background radon concentration in air shows a small seasonal variation with a range of 0.42 to 0.78 pCi/l.

Background gamma measurements were performed at four locations in the vicinity of the Mexican Hat site using a pressurized ionization chamber. Two measurements were performed at each location, giving an average gamma exposure rate of 11.6 μR/hr for the eight measurements. The locations of the background measurements were from 0.5 to five miles from the tailings site and are beyond the influence of the site. Gamma exposure rate is independent of the frequency and time of measurement for background measurements.

The arroyos extending beyond the 5 pCi/g windblown contamination limit are illustrated in Plate 1, Radiological Contamination Distribution Map. The contamination material was characterized using delta measurements and the data are summarized in Table D1.2 of Addendum D1. These data indicate that contamination may exist up to 2500 feet along the length of the four arroyos outside of the 5 pCi/g windblown boundary. Assuming a 100-foot width and a six-inch depth of contaminated material in the arroyos gives a volume estimate of 5500 cy. The average Ra-226 concentration is 10.4 pCi/g. This small volume of contaminated material will have a negligible impact on the final pile design.

Further characterization by the RAC will be necessary in the arroyos to determine the exact volume of contaminated materials since the contamination is largely associated with sandbars and probably does not cover the entire length and width of the arroyos. Zero- to six-inch soil samples may adequately characterize the materials in the arroyos north and east of the site. The arroyo at the northeast corner of the site will be characterized further downstream than is indicated on Plate 1 to a length of 1600 feet from the windblown border. This characterization will be performed by the RAC during remedial action.