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

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ADDENDUM 01

RADIOLOGIC CHARACTERIZATION OF THE MEXICAN HAT, UTAH,
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(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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PLATES

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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 Hatch, 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 Uplarp 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 Baples 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 UMTRA 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 (Th-232 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 plates 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

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

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

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

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 (Maritzky 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 BOLLATAPE 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 (Compllogger) 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 1.8 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 plates 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 sugar-stem casing, as described for the truck-mounted logging system. These data were also corrected for sugar-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 (Shewalter 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- μ Ci 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- μ Ci 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- μ Ci 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 $\mu\text{R/h}$ 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(²²⁶Ra)/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

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

where M is the fraction of the total weight accounted for by water (Maritzky 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:

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

where M_s 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

$$F_o = 1/(1-E) \quad (5)$$

where F_o 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

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

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

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

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'_o is the disequilibrium correction factor (average per area).

The disequilibrium correction factor (F'_o) 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

$$\sigma = k_{Ra} [(2N_u - N_d)^{1/2} / t] (F'_c) (F'_m) \quad (8)$$

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 3 pCi(cRa-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 Halcibita. 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 Balgaito 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 $\mu\text{R/h}$ 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 Renter-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 $\mu\text{R/h}$ 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		Depth (in.)	Bore- hole No.	MHD No.	Concentration		
Coordinates					Ra-226 (pCi/g)	Thorium (ppm)	Potassium (%)
North	East						
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	95 ± 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		139	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		Depth (in.)	Bore- hole No.	MRD No.	Concentration		
North	East				Rn-226 (pCi/g)	Thorium (ppm)	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		Depth (in.)	Bore- hole No.	MBD No.	Concentration		
Coordinates North East					Rs-226 (pCi/g)	Thorium (ppm)	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	259 ± 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 ± 0.2
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	1.3 ± 0.2
9400	9799	0	106	569	49 ± 3	9 ± 3	1.7 ± 0.4

Table B-1 (continued)

Grid		Depth (in.)	Bore- hole No.	MHD No.	Concentration			
Coordinates					Ra-226	Thorium	Potassium	
North	East				(pCi/g)	(ppm)	(%)	
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	13	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	10792	0	171	603	321 ± 16	316 ± 21	< 0.7 ± 0.0	
8922	11004	0	169	601	211 ± 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		Depth (in.)	Bore- hole No.	MHD No.	Concentration		
Coordinates					Ra-226	Thorium	Potassium
North	East				(pCi/g)	(ppm)	(%)
8800	11000	0		230	2 ± 1	10 ± 2	2.1 ± 0.5
8800	11200	0		329	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	2.1 ± 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		Depth (in.)	Bore-hole No.	MHD No.	Concentration		
North	East				Ra-226 (pCi/g)	Thorium (ppm)	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		Depth (in.)	Bore- hole No.	MHD No.	Concentration		
Coordinates					Ra-226 (pCi/g)	Thorium (ppm)	Potassium (%)
North	East						
7600	7800	0		206	2 ± 1	$< 2 \pm 0$	1.3 ± 0.3
7600	8000	0		205	2 ± 1	4 ± 1	1.1 ± 0.3
7600	8200	0		204	3 ± 1	12 ± 2	$< 0.6 \pm 0.0$
7600	8400	0		250	285 ± 16	857 ± 51	$< 0.7 \pm 0.0$
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	2.93	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	2.9	± 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	10.8	± 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	1.9	± 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	1.9	± 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	91.8	± 1.6	59.5	± 6.3	? 0.8	± 0.2
MBG-624	297.9	± 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 2 σ . 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 $\pm$ 1.0	MBG-601	2.3 $\pm$ 1.0
MHD-132	2.2 $\pm$ 1.0	MBG-602	2.3 $\pm$ 1.0
MHD-140	28.3 $\pm$ 1.6	MBG-603	27.2 $\pm$ 1.6
MHD-160	6.5 $\pm$ 1.0	MBG-604	6.6 $\pm$ 1.0
MHD-173	4.8 $\pm$ 1.0	MBG-605	4.6 $\pm$ 1.0
MHD-189	7.4 $\pm$ 1.0	MBG-606	7.6 $\pm$ 1.0
MHD-199	9.6 $\pm$ 1.0	MBG-607	10.3 $\pm$ 1.0
MHD-209	10.1 $\pm$ 1.0	MBG-608	11.0 $\pm$ 1.0
MHD-219	1.9 $\pm$ 1.0	MBG-609	1.7 $\pm$ 1.0
MHD-229	2.8 $\pm$ 1.0	MBG-610	2.5 $\pm$ 1.0
MHD-245	.9 $\pm$ 1.0	MBG-611	1.2 $\pm$ 1.0
MHD-235	2.2 $\pm$ 1.0	MBG-612	2.2 $\pm$ 1.0
MHD-257	8.0 $\pm$ 1.0	MBG-613	8.7 $\pm$ 1.0
MHD-264	2.2 $\pm$ 1.0	MBG-614	2.0 $\pm$ 1.0
MHD-275	2.0 $\pm$ 1.0	MBG-615	2.0 $\pm$ 1.0
MHD-508	16.0 $\pm$ 1.6	MBG-616	18.4 $\pm$ 1.8
MHD-518	75.7 $\pm$ 3.7	MBG-617	74.5 $\pm$ 3.1
MHD-528	39.3 $\pm$ 2.2	MBG-618	41.6 $\pm$ 2.4
MHD-283	4.9 $\pm$ 1.0	MBG-619	4.6 $\pm$ 1.0
MHD-309	39.0 $\pm$ 1.0	MBG-620	39.7 $\pm$ 2.2
MHD-538	54.4 $\pm$ 3.7	MBG-621	67.6 $\pm$ 4.3
MHD-548	1.0 $\pm$ 1.0	MBG-622	1.0 $\pm$ 1.0
MHD-558	30.6 $\pm$ 1.0	MBG-623	31.8 $\pm$ 1.6
MHD-568	299.9 $\pm$ 18.4	MBG-624	297.3 $\pm$ 14.6
MHD-578	1.1 $\pm$ 1.0	MBG-625	1.0 $\pm$ 1.0
MHD-588	40.7 $\pm$ 1.4	MBG-626	38.1 $\pm$ 2.5
MHD-613	167.0 $\pm$ 7.8	MBG-627	179.8 $\pm$ 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		Depth (in.)	eRa-226 (pCi/g)	Coordinates		Depth (in.)	eRa-226 (pCi/g)
North	East			North	East		
11600	11600	0	2.3 ± 0.8	10800	12000	0	10.8 ± 1.5
11600	11600	6	0.3 ± 0.6	10800	12000	6 *	0.6
11600	12000	6	0.9 ± 0.8	10800	12400	6	0.4 ± 0.7
11400	12450	0	95.8 ± 3.0	10800	12800	6	0.6 ± 0.7
11400	12450	6	131.5 ± 4.0	10775	11100	0	43.3 ± 1.9
11400	12450	12	65.8 ± 3.6	10775	11100	6	41.3 ± 2.7
11400	12450	15	28.1 ± 4.5	10775	11100	12	5.4 ± 1.9
11275	12325	0	39.3 ± 1.8	10775	11100	14	1.8 ± 2.1
11275	12325	6	2.4 ± 1.4	10775	12125	0	69.7 ± 3.0
11202	11600	6	1.7 ± 0.7	10775	12125	6	4.6 ± 2.2
11200	10800	6	0.6 ± 0.7	10725	10750	0	59.6 ± 2.3
11200	11200	6	0.4 ± 0.7	10725	10750	6	38.8 ± 2.9
11200	12000	6	2.3 ± 1.0	10725	10750	12	2.1 ± 1.7
11090	12225	0	6.1 ± 1.4	10700	10575	0	55.4 ± 2.5
11090	12225	6	1.1 ± 0.9	10700	10575	6	4.5 ± 1.9
11000	10400	0	3.7 ± 0.8	10700	10575	12	2.2 ± 1.2
11000	10400	6	0.7 ± 0.8	10700	10925	0	20.1 ± 1.5
10925	12125	0	37.1 ± 2.4	10700	10925	6	1.5 ± 0.9
10925	12125	6	4.2 ± 1.8	10650	12050	0	68.4 ± 3.1
10900	11650	0	3.8 ± 1.2	10650	12050	6	32.0 ± 3.1
10850	11475	0	31.4 ± 2.2	10600	8200	2	3.1 ± 0.9
10850	11475	6	4.0 ± 1.7	10600	9000	6	2.6 ± 0.8
10825	11825	0	22.8 ± 1.4	10600	9600	6	1.6 ± 0.9
10825	11825	6	31.0 ± 1.9	10600	10400	6	15.8 ± 3.5
10825	11825	12	39.8 ± 2.4	10600	10400	8	11.1 ± 3.3
10825	11825	18	11.1 ± 2.3	10600	11200	6	0.7 ± 1.3
10800	9400	6	0.5 ± 0.6	10550	10050	0	41.4 ± 2.1
10800	10000	6	0.9 ± 0.8	10550	10050	4	6.7 ± 1.8
10800	10800	6	0.3 ± 0.7	10525	9875	0	35.6 ± 2.2
10800	11300	0	41.3 ± 2.7	10525	9875	6	16.0 ± 2.1
10800	11300	6	2.9 ± 1.6	10525	9875	12 *	1.5
10800	11600	6	2.4 ± 1.3	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		Depth (in.)	eRa-226 (pCi/g)		Coordinates		Depth (in.)	eRa-226 (pCi/g)	
North	East				North	East			
10525	11950	10	10.8 ±	2.7	10000	9200	12	491.0 ±	7.2
10500	10200	0	240.2 ±	4.5	10000	9200	18	493.3 ±	9.7
10500	10200	6	278.1 ±	6.0	10000	9400	6	2.4 ±	0.8
10500	10200	12	2.2 ±	4.1	10000	9600	6	2.7 ±	1.3
10450	9700	0	12.8 ±	1.6	10000	9800	6	3.7 ±	1.4
10450	9700	4	1.1 ±	1.2	9967	12390	0	16.6 ±	1.7
10400	8000	6	0.7 ±	0.6	9967	12390	1	1.3 ±	1.3
10400	8200	6	45.4 ±	2.1	9950	12150	0	13.5 ±	2.0
10400	8200	12	24.1 ±	2.5	9950	12150	4	2.1 ±	1.2
10400	8200	18	15.9 ±	2.6	9866	11994	0	19.1 ±	1.7
10400	8200	24	4.1 ±	1.9	9866	11994	3	3.9 ±	1.5
10400	8400	6	0.9 ±	0.8	9800	8500	6	1.8 ±	0.9
10400	8800	6	0.7 ±	0.8	9800	8700	6	1.7 ±	0.9
10400	9400	6	0.9 ±	0.7	9800	11800	0	11.2 ±	1.9
10400	10400	6	1.5 ±	0.9	9800	11800	5	1.5 ±	1.1
10400	10800	6	2.3 ±	1.3	9800	12200	5	0.5 ±	1.0
10400	11600	6	3.6 ±	1.4	9800	12200	6	1.2 ±	1.0
10325	11925	0	44.2 ±	2.5	9600	8300	2	1.2 ±	0.9
10325	11925	6	59.0 ±	2.0	9600	8500	6	0.7 ±	0.7
10325	11925	10	9.4 ±	2.3	9600	8700	6	0.4 ±	0.8
10275	9650	0	143.6 ±	3.5	9600	12000	6	2.2 ±	1.2
10275	9650	4	19.1 ±	2.5	9580	12580	0	23.3 ±	1.8
10200	8000	6	0.8 ±	0.7	9580	12580	6	5.6 ±	1.4
10200	8400	6	1.8 ±	0.9	9580	12580	8	2.0 ±	1.3
10200	9000	6	1.0 ±	0.8	9450	12480	0	9.5 ±	1.3
10200	10000	6	0.9 ±	1.0	9450	12480	6	1.8 ±	0.9
10200	11600	6	2.3 ±	1.5	9400	8600	6	1.0 ±	0.9
10200	11800	0	124.8 ±	3.8	9400	12000	6	1.0 ±	1.0
10200	11800	6	224.1 ±	4.2	9400	12600	4	2.5 ±	0.8
10200	11800	12	194.4 ±	5.4	9350	12350	0	6.3 ±	1.3
10200	11800	15	115.8 ±	5.7	9350	12350	6	1.4 ±	0.8
10200	12200	6	1.9 ±	1.0	9300	12175	0	13.7 ±	1.4
10200	12600	4	0.3		9300	12175	6	2.3 ±	1.2
10125	9575	0	155.9 ±	3.8	9280	11980	0	20.4 ±	1.9
10125	9575	6	8.2 ±	2.4	9280	11980	5	5.7 ±	1.3
10125	9575	10	5.4 ±	1.9	9275	11800	0	4.0 ±	1.5
10059	12775	0	5.9 ±	1.1	9240	7400	6	0.6 ±	0.7
10059	12775	6	0.7 ±	0.7	9200	12000	6	0.2	
10010	12565	0	5.5 ±	1.2	9200	12400	6	3.0 ±	1.0
10010	12565	3	0.6 ±	0.8	9000	7600	6	0.8 ±	0.7
10000	7800	6	0.9 ±	0.7	9000	7800	6	0.7 ±	0.8
10000	8300	6	2.2 ±	0.7	9000	11600	6	1.2 ±	0.8
10000	8500	6	1.3 ±	0.8	9000	12200	6	0.3 ±	0.7
10000	8700	6	1.1 ±	0.9	8800	7200	6	1.3 ±	0.7
10000	8900	6	1.7 ±	0.9	8800	7600	6	2.0 ±	0.7
10000	9200	6	510.8 ±	8.2	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		Depth (in.)	eRa-226 (pCi/g)		Coordinates		Depth (in.)	eRa-226 (pCi/g)	
North	East				North	East			
8800	11000	6	1.8 ±	0.9	8200	10000	6	1.0 ±	0.8
8800	11400	6	2.4 ±	0.9	8200	10400	6	3.0 ±	0.8
8800	11800	6	1.7 ±	0.9	8000	7200	6	1.0 ±	0.7
8790	7400	6	1.4 ±	0.9	8000	7400	6	0.4 ±	0.6
8600	7200	6	1.1 ±	0.7	8000	7600	6	21.6 ±	2.1
8600	7400	6	1.0 ±	0.8	8000	7600	12	3.1 ±	1.7
8600	7600	6	1.8 ±	0.9	8000	7800	6	2.5 ±	0.9
8600	7800	6	0.7 ±	0.7	8000	8400	6	3.5 ±	2.2
8600	10400	6	2.3 ±	1.3	8000	8600	6	2.9 ±	1.3
8600	10800	6	2.9 ±	1.0	8000	9000	6	0.1 ±	0.7
8600	11200	6	0.7 ±	0.7	8000	9600	6	1.1 ±	0.8
8400	7200	6	1.0 ±	0.7	7800	7400	6	1.0 ±	0.8
8400	7200	6	1.0 ±	0.8	7800	7600	6	14.0 ±	2.1
8400	7400	6	1.8 ±	1.3	7800	7600	12	3.3 ±	1.6
8400	7600	6	1.2 ±	0.8	7800	7800	6	5.7 ±	1.8
8400	7800	6	1.8 ±	0.9	7800	7800	12	1.3 ±	1.5
8400	8800	6	8.3 ±	1.7	7800	8000	6	0.2 ±	0.7
8400	8800	8	1.9 ±	1.5	7800	8200	6	4.2 ±	1.7
8400	9600	6	2.1 ±	1.0	7800	8200	12	2.7 ±	1.2
8400	10000	6	4.2 ±	0.9	7800	8400	6	2.7 ±	1.3
8400	10400	6	1.9 ±	0.7	7800	8800	6	1.7 ±	0.8
8200	7200	6	2.0 ±	0.8	7800	9200	6	3.1 ±	0.8
8200	7400	6	1.5 ±	0.9	7600	7635	6	13.7 ±	1.1
8200	7600	6	0.1		7600	7635	12	5.0 ±	1.4
8200	7800	6	1.3 ±	0.9	7600	7635	18	2.8 ±	1.4
8200	8600	4	1.4 ±	0.8	7600	7800	6	0.7 ±	0.6
8200	8800	6	14.3 ±	1.6	7600	8000	6	0.9 ±	0.8
8200	8800	12	13.2 ±	1.6	7600	8200	6	0.5 ±	0.7
8200	8800	18	1.6 ±	1.2	7600	8400	6	16.4 ±	4.2
8200	9200	6	2.2 ±	1.0	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 (ft.)	cRa-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	1.3 ± 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	2.6 ± 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 (PES-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 $\pm$ 0.012
SERIAL NUMBER	231-03	FLUID FACTOR	1.220 $\pm$ 0.154
DETECTOR	NaI(Tl)	MOISTURE FACTOR	1.069 $\pm$ 0.007
DETECTOR SIZE	2 in. x 6 in.	K FACTOR	7.00 $\pm$ 0.18 g-cps/pCi(eRa-226)
PROBE DIAMETER	2.5 in.	BACKGROUND	21.04 $\pm$ 3.24 cps
BOLE DIAMETER	6.87 in.	ALPHA FACTOR	3.0 $\pm$ 0.3
		CALIBRATION DATE	4 September 1984

Hole No.	Grid Coordinates		Elevation (ft)	Log Depth (ft)
	North	East		
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 $\pm$ 0.095
SERIAL NUMBER	753	FLUID FACTOR	1.112 $\pm$ 0.078
DETECTOR	NaI(Tl)	MOISTURE FACTOR	1.069 $\pm$ 0.007
DETECTOR SIZE	2 in. x 2 in.	K FACTOR	77.14 $\pm$ 2.24 g-cps/pCi(eRa-226)
PROBE DIAMETER	2.5 in.	BACKGROUND	135.51 $\pm$ 94.20 cps
HOLE DIAMETER	6.87 in.	ALPHA FACTOR	3.0 $\pm$ 0.3
		CALIBRATION DATE	04 September 1984

Hole No.	Grid Coordinates		Elevation (ft)	Log Depth (ft)
	North	East		
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	441.7	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		Elevation (ft)	Log Depth (ft)
	North	East		
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	4313.0	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	8832	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		Elevation (ft)	Log Depth (ft)
	North	East		
*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)		PIC Exposure-Rate (μR/h)	
		Direct	Clean Surface	First Reading	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)		PIC Exposure-Rate (uR/h)	
		Direct	Clean Surface	First Reading	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)		PIC Exposure-Rate (uR/h)	
		Direct	Clean Surface	First Reading	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)		PIC Exposure Rate (uR/h)	
		Direct	Clean Surface	First Reading	Second Reading
X	3 ft/Center of Bldg.			37.2	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)		PIC Exposure-Rate (μR/h)	
		Direct	Clean Surface	First Reading	Second Reading
1	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	55	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)		PIC Exposure-Rate (uR/h)	
		Direct	Clean Surface	First Reading	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)		PIC Exposure-Rate (μ R/h)	
		Direct	Clean Surface	First Reading	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)		PIC Exposure-Rate (uR/h)	
		Direct	Clean Surface	First Reading	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	ED 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	30	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 ($\mu\text{R/h}$) 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	WHD 101	1.2	1.0 ± 1.0	6.0 ± 2.0	1.3 ± 0.4
			WHD 301		0.9 ± 1.0	9.9 ± 2.0	1.3 ± 0.3
BG-2b	11.7 / 11.4	1.3 ± 0.7 0.8 ± 0.7	WHD 213		1.4 ± 1.0	5.6 ± 1.4	1.8 ± 0.4
			WHD 625		1.0 ± 1.0	3.0 ± 1.4	1.0 ± 0.2
			WHD 578		1.1 ± 1.0	6.3 ± 1.0	1.8 ± 0.2
BG-3	10.7 / 10.9	1.1 ± 0.7 0.9 ± 0.7	WHD 103	1.2	1.0 ± 1.0	7.0 ± 2.0	1.3 ± 0.2
			WHD 151		0.7 ± 1.0	1.7 ± 0.0	1.4 ± 0.3
BG-4	12.7 / 12.4	1.0 ± 0.7 0.9 ± 0.7	WHD 114	3.0	2.0 ± 1.0	1.0 ± 1.0	1.3 ± 0.4
			WHD 579		1.3 ± 1.0	5.6 ± 1.4	1.6 ± 0.4

ADDENDUM D2

**FINAL RADIUM CONCENTRATIONS AND VOLUMES
OF TAILINGS AT MEXICAN HAT**

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
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

- BY ROGER A. NELSON

IRREGULAR BOUNDARY MODIFICATION

PROGRAM EXECUTION - Tue Jun 4 1985 15: 61 15.52.86

MEXICAN MAT (UPPER PILE) - HTU - MSD & 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

PAGE NO. 1

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	468		
2.5 - 5.0		773	462	428	387	361		
5.0 - 7.5		586	583	949	326	464		
7.5 - 10.0		435	585	743	757	411		
10.0 - 12.5		685	444	622	345	536		
12.5 - 15.0		655	872	584	676	738		
15.0 - 17.5		598	842	427	361	703		
17.5 - 20.0		981	1472	488	565	619		
20.0 - 22.5		816	872	928	785	828		
22.5 - 25.0		358	1808	662	941	578		
25.0 - 27.5					315	417		
27.5 - 30.0					215	316		
30.0 - 32.5					298	685		
32.5 - 35.0					777	38		
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	678	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	1883	734	
25.0 - 27.5				681	242	874	377	
27.5 - 30.0				788	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	188	212	1918	
2.5 - 5.0	478	1248	882	299	746	384	888	
5.0 - 7.5	455	1848	918	436	237	835	588	
7.5 - 10.0	141	1173	767	994	856	1848	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					1185	626	1824	
25.0 - 27.5					766	1871	498	
27.5 - 30.0					813	992		
30.0 - 32.5						785		
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	1884		316	238	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	178	485		961	1517	884	818	
10.0 - 12.5	218			684	1189	787	734	
12.5 - 15.0				342	636	652	793	
15.0 - 17.5				1185	672	1664	526	
17.5 - 20.0				39	961	924	552	
20.0 - 22.5				278	768	836	917	
22.5 - 25.0					1816	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	430	851		325	365	118		
2.5 - 5.0	236	231		386	249	239		
5.0 - 7.5	485	485		363	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	1030		
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	120		
2.5 - 5.0				206	107	137		
5.0 - 7.5				373	190	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	081			
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					138	214	295	
5.0 - 7.5					126	238	588	
7.5 - 10.0					17	138	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						138		
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		10.8	10.8		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	23.8	21.3	33.8	34.6		
I = 2	5.5	12.6	15.0	26.0	29.4	37.5	38.8	
I = 3	7.1	12.2	15.7	16.5	27.7	33.8	25.0	
I = 4	9.8	8.5		19.8	27.8	38.8	35.0	
I = 5	5.1	3.9		17.8	22.8	24.8		
I = 6				15.1	17.6	12.5		
I = 7				7.8	12.8	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	
I = 3	1.8	1.5	1.8	1.8	1.8	1.8	
I = 4	1.8	1.5		3.8	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)	763588	834528
TOTAL VOLUME (ft ³)	2.86167E+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 1.88769 FEET (BASED ON 13 VALUES)

AVERAGE FILE ACTIVITY PROFILE

DEPTH (FT)	ABOVE PHYSICAL INTERFACE		ABOVE 15 pCi/g INTERFACE		TOTAL FILE	
	VOLUME	ACTIVITY	VOLUME	ACTIVITY	VOLUME	ACTIVITY
0.0 - 2.5	98,119	438	98,119	438	98,119	438
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	86,783	665	98,119	592
10.0 - 12.5	73,896	719	77,768	718	98,119	576
12.5 - 15.0	63,731	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	47,283	756	98,119	373
22.5 - 25.0	33,944	869	48,128	837	98,119	372
25.0 - 27.5	27,849	728	31,943	694	98,119	244
27.5 - 30.0	20,791	577	25,858	584	98,119	184
30.0 - 32.5	15,911	583	19,118	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	878	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 - Tue Jun 4 1985 155 61 16.84.54

MEXICAN HAT (LOWER PILE) - HTL - MSD & SNL DATA

FILES: HTL001/DAT - ENTERED 5/22/85 (RANELSON)

FILE DATA FROM (8 by 12) GRID - GRID SPACING : (149 by 171 by 2.5) FEET

PAGE NO. 1

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	668	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					689	379	298	298	194			
15.0 - 17.5					784	323	314	314	268			
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	908	541	388	233	719	559
2.5 - 5.0					353	673	659	858	275	239	667	366
5.0 - 7.5					699	211	291	466	277	225	491	224
7.5 - 10.0					643	418	319	547	384	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	288	
25.0 - 27.5						22	403	379	381	541	232	
27.5 - 30.0							689	511	381	432		
30.0 - 32.5							784	639	175	764		
32.5 - 35.0							1235	598	222	254		
35.0 - 37.5							233	757	281	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	1688	1926	1255	883	983	299	571	
2.5 - 5.0		484	443	977	1405	1339	774	663	748	276	298	
5.0 - 7.5		528	326	922	489	1329	668	468	638	274	283	
7.5 - 10.0		232	1889	493	392	487	838	1312	1861	278	338	
10.0 - 12.5		123	1128	326	658	833	591	357	543	228	212	
12.5 - 15.0			980	982	767	538	416	589	387	228	245	
15.0 - 17.5			682	1849	381	263	388	746	498	367	119	
17.5 - 20.0			22	314	379	671	298	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	428	688		
27.5 - 30.0					196	888	379	416	719	769		
30.0 - 32.5					22	1262	878	742	667	572		
32.5 - 35.0						1836	1295	541	491	559		
35.0 - 37.5						457	771	432	688	366		
37.5 - 40.0							1414	764	769	224		
40.0 - 42.5							457	682	572	255		
42.5 - 45.0								849	785	229		
45.0 - 47.5								849	585			
47.5 - 50.0								649	542			
50.0 - 52.5								288	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	608	1537	2172	1292	988	614	567	782	283
2.5 - 5.0	413	484	326	561	1175	1895	1738	1285	1195	789	567	338
5.0 - 7.5	123	528	1888	393	1131	1588	1295	676	843	759	719	288
7.5 - 10.0		232	911	326	805	763	1598	451	355	669	667	234
10.0 - 12.5		123	928	1287	452	1418	1348	1189	796	582	491	9
12.5 - 15.0			621	1165	326	743	1818	1126	995	633	567	
15.0 - 17.5			254	1117	997	482	2848	1062	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	1180	932	717	678	719	544	
25.0 - 27.5					22	1176	932	792	716	667	438	
27.5 - 30.0						867	448	966	444	491	438	
30.0 - 32.5						535	1385	854	792	680	291	
32.5 - 35.0							547	1541	966	769		
35.0 - 37.5							332	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	1858	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	678	567	258
10.0 - 12.5			385	369	553	1831	1268	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	1588	668	732	
17.5 - 20.0					1244	1147	1117	348	275	747	298	
20.0 - 22.5					980	1778	953	633		555	428	
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		1824		
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	1402	902	757	348	692	484	325	312	
2.5 - 5.0			1645	1788	1093	874	633	458	598	637	298	
5.0 - 7.5			1231	1524	1926	1856	1149	756	698	752	298	
7.5 - 10.0			1136	779	2029	1413	1477	783	742	798	263	
10.0 - 12.5			1182	1222	1578	1434	1031	861	686	435		
12.5 - 15.0			568	1442	1420	1236	972	387	516	537		
15.0 - 17.5				1235	1304	386	1012		779	783		
17.5 - 20.0				1135	1058		1032		773	385		
20.0 - 22.5				13	1452		1114		1254	738		
22.5 - 25.0					1647		418		1214	687		
25.0 - 27.5					1547				489	1136		
27.5 - 30.0					1228					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	97	1229	253	927	544	351	923	521	364	434		
2.5 - 5.0		1497	547	1275	1110	740	989	569	502	329		
5.0 - 7.5		895	1190	1522	2143	1932	1269	831	438	545		
7.5 - 10.0			1388	828	1953	2492	1975	620	1527	2327		
10.0 - 12.5			1282	1657	1274	795	969		1252	1753		
12.5 - 15.0			1680	1560	1892	1810	824		1778	220		
15.0 - 17.5			948	1443	1086	1403	911		1189			
17.5 - 20.0				772	1564	1622	1112		333			
20.0 - 22.5					1758	1470	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 : B

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	1988	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	2894							
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	37.8	36.6	21.6	11.6	
I = 2					16.6	27.5	36.6	38.2	39.8	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	38.8	11.8
I = 5	2.6		11.0	13.5	22.8	27.6	35.8	41.1	19.6	34.8	26.6	11.5
I = 6				13.8	21.0	38.6	16.3	24.8	13.0	26.1	30.6	9.9
I = 7		1.8	6.1	16.6	18.4	26.5	23.6	23.8	8.8	20.8	14.8	
I = 8		3.9	7.8	6.6	15.8	18.8	9.1	9.8				

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	25.8	35.0	35.0	20.0	18.0	
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	18.0	32.4	25.0	10.7
I = 6				12.2	19.5	29.0	14.7	23.2	11.4	24.5	29.0	0.3
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	2.0	1.6	1.6	1.6	
I = 2				1.6	1.6	1.6	1.6	2.0	1.0	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	1.0
I = 5	1.6		1.6	2.0	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	2.0	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 (ft ³)	4.09116E+07	4.38211E+07
DEPTH (ft)	21.9959	23.5681
TOTAL ACTIVITY (Ci)	1366.20	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 (FT)	ABOVE PHYSICAL INTERFACE		ABOVE 15 pCi/g INTERFACE		TOTAL PILE	
	VOLUME	ACTIVITY	VOLUME	ACTIVITY	VOLUME	ACTIVITY
0.0 - 2.5	168,492	788	171,525	788	172,219	777
2.5 - 5.0	164,190	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	800	139,339	778	172,219	631
12.5 - 15.0	117,345	785	125,829	771	172,219	573
15.0 - 17.5	103,237	784	111,750	764	172,219	512
17.5 - 20.0	95,877	751	102,864	733	172,219	457
20.0 - 22.5	82,476	753	98,382	721	172,219	387
22.5 - 25.0	72,379	739	77,657	713	172,219	330
25.0 - 27.5	56,854	786	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	46,871	761	172,219	231
32.5 - 35.0	37,369	761	41,454	769	172,219	201
35.0 - 37.5	24,630	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	19,877	576	172,219	88
42.5 - 45.0	11,898	730	13,427	699	172,219	73
45.0 - 47.5	9,720	563	11,796	578	172,219	57
47.5 - 50.0	4,718	596	7,293	478	172,219	42
50.0 - 52.5	4,718	311	4,718	311	172,219	23

CONTENTS

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

Fault/ lineament number	Source	Examined by:			Comments
		Aerial recon.	Low-sun-angle Aerial recon.	Ground recon.	
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:			Comments
		Aerial recon.	Low-sun-angle Aerial recon.	Ground recon.	
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).

Table 03.2

PAUL V. SMITH
JENNIFER, HAUSKINS & BECKWITH

200-KM RADIUS OF MEXICAN NAT, UT, 37.13 N, 109.89 W

09 08 35 03:41:00

NGDC EARTHQUAKE DATA FILE

SOURCE	DATE			TIME			LOCATION		DEPTH KM	MAGNITUDES				INT MAX	GTSVNO	P-S CE	Q/W	DISTANCE KM
	YR	MO	DA	HR	MM	SEC	LAT	LONG		Mb	Ms	OTHER						
USN	1967	03	08	19	31	28.4	37.7 N	110.2 W	33									476 A 69
PDE	1981	09	10	07	55	09.30	37.511N	110.542W	7G									479 7 72
1***PDE	1967	03	08	19	31	28.3	37.726N	110.239W	33N									478 3 73
PDE	1971	03	01	02	11	20.4	36.501N	110.431W	5G									495 7 79
PDE	1971	03	14	18	14	12.2	36.472N	110.437W	5G									495 3 82
PDE	1973	02	09	17	38	37.4	36.43 N	110.425W	5G									495 6 82
1***USN	1973	02	09	17	39	37.4	36.4 N	110.4 W	5									495 A 93
ISS	1931	07	28	08	39	08.4	36.4 N	111.4 W										495 129
PDE	1979	04	30	02	07	10.30	37.883N	111.016W	7									478 F 21 131
USN	1894	02	03	03	30		37.1 N	111.4 W										478 135
USN	1894	02	04	15			37.1 N	111.4 W										478 135
USN	1935	10	06	03			37.6 N	111.3 W										478 136
USN	1963	09	30	09	17	40.3	39. N	111. W	15									478 138
PDE	1941	02	28	06	19	48.4	37.8 N	108.5 W										479 143
PDE	1983	03	03	12	43	38.10	38.298N	110.592W	7G				3.2					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	108.3 W	5									496 C 145
1***STO	1966	03	24	20	10	59.3G	36.8 N	108.3 W	5									496 EX 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 EX 146
PDE	1967	02	01	20	15	19.3	38.47 N	109.929W	5G	3.8								478 6 149
USN	1953	03	27	12	13		38.1 N	111.1 W										478 152
STO	1964	01	17	22	00	42.8G	36.71 N	108.25 W	33									496 EX 152
1***USN	1967	02	01	20	15	19.3	38.5 N	109.9 W	5	3.8								478 A 152
EQN	1912	08	18	21	12		36.5 N	111.5 W										495 160
1***USN	1912	08	18	21	12		36.5 N	111.5 W										495 160
USN	1950	01	17	00	53		35.7 N	109.6 W										495 161
USN	1896	10	14	14			38.4 N	110.8 W										478 163
2***USN	1970	02	03	05	59	35.6	37.9 N	108.3 W	33	4.								479 164
PDE	1970	02	03	05	59	35.6	37.918N	108.311W	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
EQN	1910	09	24	04	05		36. N	111.1 W										495 F 164
1***USN	1910	09	24	04	05		36. N	111.1 W										495 166
USN	1943	08	14	04	40		38.2 N	111.3 W										478 173
1***USN	1970	04	18	10	42	11.9	37.9 N	111.6 W	10	4.4								478 174
PDE	1970	04	18	10	42	11.9	37.258N	111.645W	10G	4.4								478 10 176
1***STO	1967	02	12	10	11	52.4G	37.67 N	108. W	5									479 9 177
PDE	1967	02	12	10	11	52.4	37.673N	108.002W	5G									479 5 177
PDE	1971	12	15	12	55	14.3	36.791W	111.324W	5G									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										478 180
USN	1926	10	04	20	30		37.3 N	111.9 W										473 180
USN	1926	10	23	07			37.3 N	111.9 W										473 180
USN	1926	11	12	03	40		37.3 N	111.9 W										473 180
USN	1926	11	16	14	15		37.3 N	111.9 W										478 190
USN	1948	01	24	02	57		35.9 N	111.2 W										495 181
PDE	1943	01	07	22	25	32.4	36.3 N	111.8 W					5.1	PES				495 D 185
2***USN	1967	01	16	09	22	45.9	37.7 N	107.9 W	33	4.1								479 A 186

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

SOURCE	DATE			TIME			LOCATION		DEPTH KM	MAGNITUDES				INT MAX	DTSYNO	P-E	CE	G/N	DISTANCE KM
	YR	MO	DA	HR	MM	SEC	LAT	LONG		MB	MS	OTHER	LOCAL						
USN	1895	12	17	03	20		38.3 N	111.4 W						III		478	G		187
1***STO	1967	01	16	09	22	45.96	37.67 N	107.86 W	33	4.1						479	B		183
PDE	1967	01	16	09	22	45.9	37.672N	107.86 W	33M	4.1						479		9	188
USN	1966	05	30	22	23	41.9	37.7 N	111.9 W	5							478	C		159
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								475	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	39.5 N	105.5 W	33							479	C		195
1***STO	1977	03	05	03	03	54.76	35.91 N	106.29 W	22	4.6			4.2 ML GS	VI		496	A		196
PDE	1977	03	05	03	00	54.7	35.915N	106.206W	22	4.6			4.2 ML GS	PDE VI		496 D		47	195
PDE	1976	01	05	06	23	32.9	35.844N	103.341W	250	5.			4.6 ML GS	VI		496 D		95	198
USN	1935	12	03	21	15		37.4 N	112.1 W								475			199
1***STO	1976	01	05	06	23	32.96	35.84 N	108.34 W	25	5.			4.6 ML GS	VI		496	A		199
1***STO	1976	05	20	19	43	21.96	35.47 N	109.04 W	5				2.5 PL GS	IV		495	C		199
PDE	1976	05	20	19	43	21.94	35.474N	109.039W	56							495 F		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/NORA BOULDER, COLORADO 80303

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Table D3.3 FIELD NOTES FOR GROUND RECONNAISSANCE

Andrew F. Hamer, III
2/24/86

Mesacon Hat, UT
Monument Valley, AZ

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

San Juan Drive - Mesacon Hat, Utah
(801) 683-2220 day
(801) 683-2261 night

MON. 1/27/86

Office - 8-10 am

Travel - Phoenix - Mesacon Hat 10 am - 5 pm
Arrive San Juan Drive - 5:00 pm

TUES. 1/28/86

Field work 8 am - 5 pm - Mesacon Hat

Wed. 1/28/86

Field work

8 am - 5 pm - Monument Valley

Thurs. 1/29/86 - Monument Valley

Field work 8 am - 5:30 pm

Fri. 1/30/86

Travel to Phoenix 8 am - 5 pm

Mexican flat, today etc -
1/2/86 - start work 8:00 am

in project to measure channel head etc.

Possible erosion beyond the pile
A. Ventilation?

in all side of land beds -
mostly measure exposure area

South side of upper tailing pile:
cut of D.H. 933' -
dike/Vern has been constructed along
downslope side (NW) of small drainage
channel which heads in a small
depression (loc. 1). Erosion

is composed of S.S. blocks ~ 6-8"
thick, averaging from 10" - 3' across.
Pebbles in situ, but the S.S. blocks
are withering to loose sand material.

Ht. of berm average from 3' - 5'.
Erosion appears to be from water from
a large drainage basin between the
low hills to the south of the upper pile.

Remnants deeply eroded gulches occur
at S. end of upper to lower piles. These
channel surface runoff directly into

the surface of both piles - some sediment
deposition has occurred where these
gulches open onto the pile surfaces.

hills to east & northwest of lower
tailing pile are actively eroding
landward toward the perimeter
road and the pile boundary. Rate
of erosion appears to be slow. Erosion
is not noticeably resistant, e.g.
bedrock.

bulky heads at LOC. 2 are approaching
material from elevated perimeter road
is being deposited in gully heads.
Slope of road is being slowly gulched.
No distinct gully erosion has yet occurred.
No branching of road seems likely
in immediate future. Possible breach of road
by gully heads could connect gully
to extend to pile boundary.
E. Erosion has occurred between
pile edge to road & an arrow E.
side of road at point gully head

↓ to p. 6.

PHOTOS

RILL MEX. 1.

1. - loc. P-1. headward erosion in gully ~ 200 yds east of lower pile. Dr. S.S. bedrock.
2. - View to west from east side of pile perimeter road. lower pile, east side. View of gully head at road bend. Note aggradation in depression from erosion of material used for ~~new~~ ^{old} bed. ~~the~~ erosion of slope of road bed, the steep 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 & further 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 extending from NE side of lower pile. Note extent of bedrock into S.S. bedrock at lower left of photo. Area in lower 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 987 & 986 in rock downstream from road.
- Area of net aggradation. Location P-8.
- 13-17. Canal view from W to N over tailings pile to upper drainage basin. From water tower hill to E of housing area. ~~to location P-9~~
- 18 - MONUMENT VALLEY - View to NE showing drainage thru old tailings pile. Location P-1.
- 19 - View upstream to May 1952. Flow channel bedrock at rock outcrop on right.
20. View to N toward pile along trend of wash flow. Wash to left. Flow to S in core block. Loc. P-2.

Location 3: Many narrow gully extending from edge of road to NE. of present "8" in (No. registered headcut across problem. Rock ledge is 15' high occurs on west side of road. Present sandstone.

Location 4: Disposition between edge of road and present permit road is a question with these several tailings. Very little erosion of side slopes of road in embankment. Possible landing of material occurred in this area. It is currently present to east of road. Breaching of road would probably result in gully development. Heavy areas of tailing slopes would be good practice 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 tailing pile. Present (?) erosion has lowered pile slope surface about 1' at gully heads. Bully heads are currently

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

Location 5: Main drainage channel going NE from NE side of lower tailing pile. Pile is placed out on top within this channel. A small basin occurs between pile slope base and perimeter road. This is an area of net deposition of tailing material ended from outer face of pile. Pile slope is extremely gullied. The 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 tailing pile & perimeter road. No incised channel is present in wash.

Edges of wash are cut into moderately resistant E.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 the line photo copy in (dated 3/7/86) Headcut is not resistant & finally converted into a sandstone bedrock.

Location 6: Baseline station 906 to 907, just downstream of road in wash from NE side of lower tailing pile. Baseline measurement of wash ground surface in relation to top of well casing cap. Measurements taken on upstream side of cap.

Location 7: Bully ended side S.S. bedrock across outer road at N side of lower tailing pile. Shift amount of erosion of loose surficial material appears to be occurring. Bully head does not reach upper perimeter road. Denotation is occurring at upper end of belly from material ended from upper perimeter road. No apparent headcut beyond to pit. Bully could deepen if a large amount of runoff water was channelled from tailing pile to the wash, across upper dirt road.

Bottom of wash is on S.S. bedrock. Flow appears to be slowly removing any sediment on which accumulates in wash. Therefore, net degradation in downstream channel below lower perimeter road.

Buckle coming baseline height measurement. Map location 8.

Channel across has lowered surface about 4" from edge of concrete pad pool poured around PVC pipe.

3 vertical S.S. stakes 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
 steps at each ledge of ^{unit}ment
 sandstone, ~12' high. Minor scars
 down to shallow rock surface between
 loc + bench 905+908. No ledge
 to leading pile. Very gentle possibility
 of headward scar to pile over
 a long time period. Probably not
 within 1000 years in present climate.
 Possible increased erosion rate if road
 is backed near depression + increased
 surface runoff scars.
 Minor gullies on present in dirt road
 embankment. Will erode to head
 road.

Possible solution for routing surface
 runoff from drainage basin above 1st
 bench of leading pile: see notes
 suggested by R.E.W. in site sketch.
 Best route seems to be Option 2. Divert
 drainage basin runoff to channel along
 west side of rd, then across highway
 to San Juan River. Flow would be
 through existing pond on SW side of rd.
 Existing channel channel along east
 side of rd would have to be

extended to reinforced to carry
 runoff along east side of pile to
 the main rock 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 near housing
 area.
 Existing rock berm along road at
 east side of the pile may be sufficient
 to channel runoff from hill 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
Piezocene 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		Completion date	Total depth (feet)
	Northing	Easting		
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		
<u>Borings (Cont.):</u>				
(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
<u>Test Pits:</u>				
(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

^aDBMS numbering system (See Table D4.1).

^bThese borings were cased and completed as monitoring wells.

^cTwo borings were advanced. One encountered hydrogen sulfide gas and was grouted to its full depth and another drilled nearby.

^dIndicates 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)
<u>Piezometers</u>		
HG2 ^d	01/23/82	20.0 ^b
HG3 ^d	01/23/82	60.0 ^b

^aThis boring is marked as A20 on original maps but appears as B20 in borehole logs.

^bAll or part of the boring was advanced using rock coring techniques.

^cOff-pile holes (not shown on location map).

^dBoring logs missing.

10/10/10

DOE BORING LOGS

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

Page 1 of 2

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: HT-1-1
APPROX. SITE COORDINATES (N. E.):
N 9110 E 4645
GROUND ELEVATION (ft. MSL): 4330 D 31
DRILLING METHOD: HSA CONTINUOUS
DRILLER: TEPT
DATE STARTED: 10-11-84
DATE COMPLETED: 10-11-84
FIELD REP.: CILWA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION

WILL BE TOWARD EAST

SUNNY DAY - POWDERY SURFACE

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVER	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 IN.	N VALUE	USCS	VISUAL CLASSIFICATION
5				S	1	11, 12	2	SM	SAND F6 WHITE D-D V. SILTY SAND: ST
3				S	2	11, 13	4	CLAY	TRANSITION INTO CLAY
5-6				S	3	12, 15			CLAY V. MOIST BLUE-BROWN, SANDY
7-7.5				S	4	234	7	SP	HA LAYERS - WHITE & LT BROWN
8.5-9				S	5	3, 2, 4	8		SAND F6 CLAY ESTY
10-11.5				S	6	3, 2, 2	4		ORAS. CLAY LAYERS
11.5-12				S	7	3, 2, 4	6		GREY - DARK GREY
13-15				S	8	3, 3, 4	7	CL	ORAS. CLAY OR V. SILTY LAYERS
15				S	9	3, 2, 4	6		CLAY LAYERS SANDY
17-18				T	10				
19				S	11	1, 2, 3	5		CLAY V. MOIST GREY
20.5				S	12	3, 4, 5	9	SP	BROWN LAYER
22				S	13	4, 4, 4	8		SAND S. SP SANDY CLAY
22.5				T	14	12, 20, 25			FL. SILTY CLAY LAYER - GREY
24									CLAY LAYERS MOIST GREY TO LIGHT BROWN

COMMENTS: + 6' @ 15' SUC BY EMP. PINE 6 (3-6)

ENTER PUSH BEH. SLUGGISH

SAMPLE TYPE

- 2 - 2" O.D. 1.5' L.D. drive sample
- 3 - 2" O.D. 1.5' L.D. drive sample
- 4 - 2" O.D. 2.5' L.D. drive sample
- 5 - 2" O.D. 2.5' L.D. drive sample
- 6 - 2" O.D. 2.5' L.D. drive sample
- 7 - 2" O.D. 2.5' L.D. drive sample
- 8 - 2" O.D. 2.5' L.D. drive sample
- 9 - 2" O.D. 2.5' L.D. drive sample
- 10 - 2" O.D. 2.5' L.D. drive sample
- 11 - 2" O.D. 2.5' L.D. drive sample
- 12 - 2" O.D. 2.5' L.D. drive sample
- 13 - 2" O.D. 2.5' L.D. drive sample
- 14 - 2" O.D. 2.5' L.D. drive sample
- 15 - 2" O.D. 2.5' L.D. drive sample
- 16 - 2" O.D. 2.5' L.D. drive sample
- 17 - 2" O.D. 2.5' L.D. drive sample
- 18 - 2" O.D. 2.5' L.D. drive sample
- 19 - 2" O.D. 2.5' L.D. drive sample
- 20 - 2" O.D. 2.5' L.D. drive sample
- 21 - 2" O.D. 2.5' L.D. drive sample
- 22 - 2" O.D. 2.5' L.D. drive sample
- 23 - 2" O.D. 2.5' L.D. drive sample
- 24 - 2" O.D. 2.5' L.D. drive sample
- 25 - 2" O.D. 2.5' L.D. drive sample
- 26 - 2" O.D. 2.5' L.D. drive sample
- 27 - 2" O.D. 2.5' L.D. drive sample
- 28 - 2" O.D. 2.5' L.D. drive sample
- 29 - 2" O.D. 2.5' L.D. drive sample
- 30 - 2" O.D. 2.5' L.D. drive sample
- 31 - 2" O.D. 2.5' L.D. drive sample
- 32 - 2" O.D. 2.5' L.D. drive sample
- 33 - 2" O.D. 2.5' L.D. drive sample
- 34 - 2" O.D. 2.5' L.D. drive sample
- 35 - 2" O.D. 2.5' L.D. drive sample
- 36 - 2" O.D. 2.5' L.D. drive sample
- 37 - 2" O.D. 2.5' L.D. drive sample
- 38 - 2" O.D. 2.5' L.D. drive sample
- 39 - 2" O.D. 2.5' L.D. drive sample
- 40 - 2" O.D. 2.5' L.D. drive sample
- 41 - 2" O.D. 2.5' L.D. drive sample
- 42 - 2" O.D. 2.5' L.D. drive sample
- 43 - 2" O.D. 2.5' L.D. drive sample
- 44 - 2" O.D. 2.5' L.D. drive sample
- 45 - 2" O.D. 2.5' L.D. drive sample
- 46 - 2" O.D. 2.5' L.D. drive sample
- 47 - 2" O.D. 2.5' L.D. drive sample
- 48 - 2" O.D. 2.5' L.D. drive sample
- 49 - 2" O.D. 2.5' L.D. drive sample
- 50 - 2" O.D. 2.5' L.D. drive sample
- 51 - 2" O.D. 2.5' L.D. drive sample
- 52 - 2" O.D. 2.5' L.D. drive sample
- 53 - 2" O.D. 2.5' L.D. drive sample
- 54 - 2" O.D. 2.5' L.D. drive sample
- 55 - 2" O.D. 2.5' L.D. drive sample
- 56 - 2" O.D. 2.5' L.D. drive sample
- 57 - 2" O.D. 2.5' L.D. drive sample
- 58 - 2" O.D. 2.5' L.D. drive sample
- 59 - 2" O.D. 2.5' L.D. drive sample
- 60 - 2" O.D. 2.5' L.D. drive sample
- 61 - 2" O.D. 2.5' L.D. drive sample
- 62 - 2" O.D. 2.5' L.D. drive sample
- 63 - 2" O.D. 2.5' L.D. drive sample
- 64 - 2" O.D. 2.5' L.D. drive sample
- 65 - 2" O.D. 2.5' L.D. drive sample
- 66 - 2" O.D. 2.5' L.D. drive sample
- 67 - 2" O.D. 2.5' L.D. drive sample
- 68 - 2" O.D. 2.5' L.D. drive sample
- 69 - 2" O.D. 2.5' L.D. drive sample
- 70 - 2" O.D. 2.5' L.D. drive sample
- 71 - 2" O.D. 2.5' L.D. drive sample
- 72 - 2" O.D. 2.5' L.D. drive sample
- 73 - 2" O.D. 2.5' L.D. drive sample
- 74 - 2" O.D. 2.5' L.D. drive sample
- 75 - 2" O.D. 2.5' L.D. drive sample
- 76 - 2" O.D. 2.5' L.D. drive sample
- 77 - 2" O.D. 2.5' L.D. drive sample
- 78 - 2" O.D. 2.5' L.D. drive sample
- 79 - 2" O.D. 2.5' L.D. drive sample
- 80 - 2" O.D. 2.5' L.D. drive sample
- 81 - 2" O.D. 2.5' L.D. drive sample
- 82 - 2" O.D. 2.5' L.D. drive sample
- 83 - 2" O.D. 2.5' L.D. drive sample
- 84 - 2" O.D. 2.5' L.D. drive sample
- 85 - 2" O.D. 2.5' L.D. drive sample
- 86 - 2" O.D. 2.5' L.D. drive sample
- 87 - 2" O.D. 2.5' L.D. drive sample
- 88 - 2" O.D. 2.5' L.D. drive sample
- 89 - 2" O.D. 2.5' L.D. drive sample
- 90 - 2" O.D. 2.5' L.D. drive sample
- 91 - 2" O.D. 2.5' L.D. drive sample
- 92 - 2" O.D. 2.5' L.D. drive sample
- 93 - 2" O.D. 2.5' L.D. drive sample
- 94 - 2" O.D. 2.5' L.D. drive sample
- 95 - 2" O.D. 2.5' L.D. drive sample
- 96 - 2" O.D. 2.5' L.D. drive sample
- 97 - 2" O.D. 2.5' L.D. drive sample
- 98 - 2" O.D. 2.5' L.D. drive sample
- 99 - 2" O.D. 2.5' L.D. drive sample
- 100 - 2" O.D. 2.5' L.D. drive sample

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

Page 2 of 2

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: HT-1-1
APPROX. SITE COORDINATES (N. E.):
N 9110 E 0625
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: HYDRAULIC
DRILLER: TECH
DATE STARTED: 10-11-84
DATE COMPLETED: _____
FIELD REP.: JLV

GROUNDWATER LEVELS

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

LOCATION DESCRIPTION _____

SITE CONDITION _____

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE REMARKS	TYPE	ID	BLOWS PER 6 in.	Z VALUE	USCS	VISUAL CLASSIFICATION
1.5				S	15	1.3.4	7	CL-AL	CLAY-SANDY SATY CLAY MIST (MISTY) CL
2.5				S	16	2.2.4	6	CL	SOME SANDY LAYERS
28				S	17	3.5.7	12	SL-SM	CLAY V MOIST SOFT
29.5				S	18	7.5.5	10	SL-SM	SAND F0 SLIGHTY GREY MOIST MD
31				S	19	3.4.4	8	CL	CLAY MIST SL SANDY MISTY
32.5				S	20				TRANSITION INTO BEDROCK 34' TO 35'
34				S	21				REASON ON SANDSTONE 34' TO 35'
34.5				S	22				TD=34'
				S	23				SAMPLES
				S	24				REASON ON 34' ON ROCK - BOUNDED
				S	25				SAMPLE N/E

COMMENTS:

SAMPLE TYPE

- 0 - Auger Cuttings
- 1 - 2" O.D. 1.38" I.D. Drive Sample
- 2 - 2" O.D. 2.43" I.D. Tube Sample
- 3 - 2" O.D. Hollowed Shelby Tube

BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: HT-1-3
APPROX. SITE COORDINATES (N.):
N 9310 E 7405
GROUND ELEVATION (ft. MSL): 4330
DRILLING METHOD: HSA - CONTINUOUS
DRILLER: TLATT
DATE STARTED: 10-11-90
DATE COMPLETED:
FIELD REP.: DLVA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION NORTH PART OF UNDER PILE
SITE CONDITION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	VALUE	USCS	VISUAL CLASSIFICATION
				T	1	EASY		CL	CLAY - MP/ GREY TO WHITE SOFT
3				S	2	27.3	5	SMSP	SAND F.G. SILTY-LOOSE, SLIGHTLY BROWN
4				S	3	32.3	5		4" LAYERS OF GREY & BROWN CL CLAY
5.5				S	4	33.3	6		WITH 1/2" LAYERS OF FINE SAND-SP
7				S	5	32.3	5		
8.5				S	6	31.3	6	ST	SAND. FG GREY SLIGHT
10				S	7	31.3	7	ALL	CLAY LAYERS
11.5				S	8	31.4	7		
13				S	9	31.2	5		
14.5				S	10	21.2, 3	5		
16				S	11	31.2	4		
17.5				T	11	EASY PUSH		SP	SAND @ 17.5
20.5				S	12	33.4	7		
22				S	13	61.5, 2	7		CLAYEY. SOFT NET TO 40 ST BROWN
23.5				S	14	31.4, 4	8		GROUND
25				S	15	33.2	6		CLAY LAYER @ 24'
26.5				S	16	33.9	11		
28								SS	26.5 SAND OVER SANDY CLAY
									SWITCHING @ 27' TO

COMMENTS: CAUTION 15'

SAMPLE TYPE
A - Splitter Cuttings
B - 2" O.D. 1.38" I.D. Open Sample
C - 2" O.D. 0.42" I.D. Tube Sample
T - 2" O.D. No-Valve Shelby Tube

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4 PAGE FIVE

A H₂O

SITE ID: N4701 LOCATION ID: HT6
APPROX. SITE COORDINATES (N. E.):
N 8710 E 7415
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: HSA
DRILLER: TEATTA ME SE
DATE STARTED: 10-11-82
DATE COMPLETED: 10-11-82
FIELD REP.: SILVA

DATE	TIME	DEPTH (ft.)
------	------	-------------

LOCATION DESCRIPTION	<u>SOUTH SIDE UPPER PILE</u>
SITE CONDITION	<u>WINDY SUNNY</u>

COMMENTS: _____

A - Layer settings
B - 3" O.D. 1.34" I.D. grip cement
C - 3" O.D. 2.43" I.D. test sample
T - 3" O.D. Staggered Shelby test

BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:

SITE ID: HAT-01 LOCATION ID: HT-7
APPROX. SITE COORDINATES (ft.):
N 7510 E 9215
GROUND ELEVATION (ft. MSL): 952.2
DRILLING METHOD: HDA - CONTINUOUS FEED SYSTEM
DRILLER: T. CRT
DATE STARTED: 10-11-94
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SOUTH SIDE URBAN MISC

SITE CONDITION

EXPOSED ROCK FOUNDATION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE ATTACHED	TYPE	ID	BLOWS PER 6 IN.	N VALUE	USCS	VISUAL CLASSIFICATION
0					1	1, 2, 1	3	SM	SAND F.G. SILTY SAND/CLAY - DRY
1.5					2	1, 1, 1	2		WHITE
4				U RINGS		1 7/16	17	SM	SAND F.G. SILTY WHITE DRY MD
5.5				S	3	1, 2, 1	3	CL	CLAY - SL SANDY - SLIMEY
7.0				S	4	2/10	1	ML	CLAY - BROWN - SILTY
8.5				S	6	1, 1, 1	2		WET - SL CLAY
9.5				U RING		2/10	1	SM	SANDY CLAY WITH LOTS OF FINE SILT
11				S	8	2, 1, 1	2	CL	CLAY - SLIMEY BROWN - FINE
12.5				S	9	1, 1, 1	2	ML	CLAY - BROWN - SLIMEY
14				S	10	1, 1, 1	30	SS	WET - SL CLAY
				S	11	1, 1, 1	30	SS	WET - SL CLAY
									SPUDS PILE OF MESSY STUFF
									LEFT AFTER FILLING IN HOLE
									CHANG 12.5'

COMMENTS:

SAMPLE TYPE

- A - Auger cuttings
- B - 1" O.D. 1.50' L.D. drive sample
- C - 1" O.D. 2.42' L.D. tube sample
- D - 1" O.D. 3.00' L.D. tube sample

BOREHOLE LOG (SOIL)

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LOCATION MAP:

SITE ID: NAT01 LOCATION ID: MT 9
APPROX. SITE COORDINATES (N.):
N 3910 E 7245
GROUND ELEVATION (ft. MSL): 4530
DRILLING METHOD: USA-CONTINUOUS
DRILLER: TLAT
DATE STARTED: 10-11-00
DATE COMPLETED:
FIELD REP.: SAVE

GROUNDWATER LEVELS

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

LOCATION DESCRIPTION UPPER PILE WESTSIDE

SITE CONDITION DRY, WINDY - DUSTY

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE AT RATING	TYPE	ID	BLOWS PER 6 IN.	2 VALUE	USCS	VISUAL CLASSIFICATION
0				S	1	1,1,1	62	SM	W/ MILL TRAILINGS
1.5				S	2	2,2,1	63	SM-AL	SAND FB SATY GRAY WHITE DRY LOOSE
3				S	3	17/12	17	CL-SL	SAND TRANSITION
4				S	4	3,4,6	10	CL	SAND SLIMY-CLAYEY ORANGE-BROWN @ 3.5 FB SOFT M PL
5.5				S	5	0,3,2	56	CL	1/2" LAYERED SAND ORANGE BROWN
7				S	6	2,2,3	45	SP	2-3" SLIMES MUST SOFT
8.5				S	7	1,1,1	42	SP	CLAY LAYER, 1"
10				S	8	1,1,1	42	CL-CH	AS ABOVE CLAY M PL SLIMY BROWN
11.5				S	9	1,1,2	43	SP	SAND LAYER - 1/2"
12.5				S	10	0,1,2	44	CL-CH	CLAY A.B. LAYERED BROWN-OR BR
13.5				S	11	1,2,2	44	CL	SL SAND LAYERS
15.5				S	12	1,1,7	48	S ₅ @	10' SANDSTONE RD R-DR. SL CLAYEY
17.5				S	13				18' SANDY FD. PEACOCK LEX CHIPS

TOP LAYER OF SANDSTONE IS WEATHERED
LAYERED-SANDY GRAVELLY
MAY HAVE BEEN PULVERIZED BY CA
PROMPT ACTION TO REMEDIAL

COMMENTS: LAST 3 SAMPLES DRIVEN 2' SINKING
IN SOFT SLIMES NOT SINKING OR 1 HIT 4 SAMPLES WOULD SINK

SAMPLE TYPE
A - 2" DIAM. SPT
B - 2" O.D. 1.50" I.D. 10" LONG
C - 2" O.D. 2.41" I.D. 10" LONG
T - 2" O.D. 2.41" I.D. 10" LONG

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ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

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LOCATION MAP:

SITE ID: HT 01 LOCATION ID: HT 17
APPROX. SITE COORDINATES (N. E.):
N. 9710 E. 10870
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: 454N SPT 454N BY
DRILLER: TLATT
DATE STARTED: 10-12-94
DATE COMPLETED: 10-12-94
FIELD REP.: SILVA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION

LOWE DIVE
NORTHWEST TOWARDS EAST
PARTLY CLOUDY WINDY PM - TO EAST
EXCEPT FOR 1-2

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERED	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 IN.	Σ VALUE	USCS	VISUAL CLASSIFICATION
0				S	001	1, 2, 2	4	SM	ART SAND FR SILTY LIME WHITE TO TROPICAL WHITE SANDY LAYERS CLAY CLAY GREENISH
4				T	2	HARD TACK			
5.5				S	3	2, 3, 4	7		
7				S	4	3, 3, 3	6		
8.5				S	5	3, 3, 2	6	SP-SM	SANDS - F6 60% 20% 20%
11				T	6				
12.5				S	7	4, 3, 4	7		
14				S	8	4, 3, 4	7		
15.5				S	9	4, 5, 4	9		
				S	10	4, 5, 4	9		
				S	11	4, 5, 5	10		
				S	12	4, 4, 5	9		
				S	13	4, 4, 4	8		
				S	14	4, 5, 4	9		CLAY SANDY TRANSITION
				S	15	4, 4, 5	9		
				S	16	4, 5, 4	9	CL	CLAY MOST SOFT DR ON 3L SANDY MPL
				S	17	4, 5, 4	11	CH	CLAY LAYER ON 10% SAND MAY BE RIPPY - GET-BROWN (60%)
20				S	18	4, 5, 4	9		

COMMENTS:

30-31%

NISAMPLE

456

SAMPLE TYPE

- 1 - Super Saturated
- 2 - 2" O.D. 130" L.D. 1000 Sample
- 3 - 2" O.D. 242" L.D. 1000 Sample

BOREHOLE LOG (SOIL)

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LOCATION MAP:

SITE ID: WAT01 LOCATION ID: MT-17
APPROX. SITE COORDINATES (N. E.):
N 0710 E 10890
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.	Z VALUE	USCS	VISUAL CLASSIFICATION
0	X	X	X		W-18	4.5, 6	11	SM	CLAYEY SILT
1.5	X	X	X					IN	
2.5	X	X	X			4.5, 4	9	CLCH	CLAY M-HPI MOST COMMON
3.5	X	X	X			5.6, 9	15		SILT CLAY / SILT CLAY
4.5	X	X	X			5.6, 7	13		
5.5	X	X	X			2.3, 4	7		
6.5									
7.5									
8.5									
9.5									
10.5									
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12.5									
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99.5									
100.5									

COMMENTS:

SAMPLE TYPE

- A - Auger cuttings
- B - 3" O.D. 1.25' L.D. drive sample
- C - 3" O.D. 2.43' L.D. tube sample
- T - 3" O.D. standard Shelby tube

BOREHOLE LOG (SOIL)

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LOCATION MAP:

SITE ID: HATO1 LOCATION ID: HT-20
APPROX. SITE COORDINATES (N.):
N 94° E 10870
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 ATTAINED	TYPE	ID	BLOWS PER 8 in.	N VALUE	USCS	VISUAL CLASSIFICATION
								SM	SAND FL M.D. 62% DRAWN TOGETHER 32 MOIST 90% 17
28.5	X	X	X	S	16	8, 9, 8	17		
	X	X	X	T	17	MED HARD			
32.5	X	X	X	S	18	3, 5, 6	11		5" CLAYEY LAYER M.D. 80% 32-32.5
34	X	X	X	S	19	8, 7, 8	15		UNSAT 35'
35.5	X	X	X	S	20	5, 7, 9	16	CL-SL	CLAY SLANDY MFL - MOIST DARK GREY BROWN
37	X	X	X	S	21	8, 8, 7	15		USAY MOIST
38.5	X	X	X	S	22	5, 6, 7	13		
40	X	X	X		23	29, 30 1/2		US HSS	WEATHERED SANDSTONE SM FL SAND RED TRACE CRIPS SILTSTONE GREY BLUE - COMPACT

COMMENTS:

SAMPLE TYPE

- S - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" C.D. threaded Shelby tube

BOREHOLE LOG (SOIL)

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LOCATION MAP:

SITE ID: HAT01 LOCATION ID: HT 23
APPROX. SITE COORDINATES (N. E.):
N 9500 E 10490
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: SEA
DRILLER: TCATT
DATE STARTED: 10-10-84
DATE COMPLETED: _____
FIELD REP.: SILVA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION NORTH OF ROAD LOWER DICE - TOWARDS WEST SIDE
SITE CONDITION GROUND SLIGHTLY FROZEN - ROAD TO SOUTH OF HOLE

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERED	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
0									TRAILINGS
1.5				S	1	2,3,3	6	SM CL	SAND MOIST
3				S	2	1,1,1	2		CLAY SANDY BROWN MOIST MPT
				T	3	6,6,4 181			CLAY SANDY LAYER IN MOIST CLAY
5.5									
7				S	4	2,3,4 1,2	4		
8.5				S	5	4,3,3 2,4	7		
10				S	6	2,3,4 4,3	6		
11.5				T	7	4,5,4 2,3	7		CLAY SAND LAYER
13				S	8	4,5,4 1,2	9		
				T	9	CLAY SAND			CLAY
15.5									
17				S	10	5,4,4	8		12" SAND LAYER @ 16-17'
18.5				T	11	2,3,4	7	CL	CLAY SL SANDY MPT MOIST STIFF BROWN W/CLAY
20				T	12	4,4,5	9		
				T	13	Medium			
22.5									
24				S	14	5,5,5 1/2	10	WSS	W _s SANDSTONE CLIPS SL CLAY SANDY
									TD=26'

COMMENTS: 24' ABOVE TO REFUSAL @ 25'

SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.31" I.D. drive sample
T - 2" O.D. 2.42" I.D. tube sample
W - 2" O.D. 1.625" I.D. Shelby Tube

BOREHOLE LOG (SOIL)

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LOCATION MAP:

SITE ID: HATOI LOCATION ID: HT 26
APPROX. SITE COORDINATES (11):
N 9310 E 10290
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: NSA
DRILLER: THATT LMB SF
DATE STARTED: 10-17-84
DATE COMPLETED: 10-18-84
FIELD REP.: SKVA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)
1	1	1

LOCATION DESCRIPTION LOWER PIE MIDDLE SOUTH

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERED	SAMPLE OF FAIR	TYPE	D	BLOWS PER 6 in.	N. VALUE	USCS	VISUAL CLASSIFICATION FILLINGS
5				S	1	1.1.1	2	SM	SAND & SILTY SAND, DRY LOOSE
5				S	2	2.2.3	5		
5				S	3	2.2.3	5	(CL)	TRACE CLAY LAYERS
4.5				S	4	3.3.4	7	ML	
6								CL	1/4 CLAY LAYER INTERV. 6.5-7.2
6.5				T	5			SM	SAND FL. WITH SLIMY GRAY LOOSE CLAY CLAYED
9				S	6	3.2.3	5		@ 12"
10.5				S	7	4.5.5	11		
12				S	8	3.4.6	10		CLAY SOFT MISTY - SANDY
12.5				S	9	4.5.3	6	CL	CLAY @ 10" SW/PL
15				S	10	3.4.3	7	CL	CLAY (SANDY LAYER) (THIN)
16.5				S	11	4.7.6	13		
18				S	12	7.6.9	15		
19.5				S	13	4.7.6	15		
21				S	14	4.7.6	15		
21.5				S	14	4.7.6	15		
21.5				LL	15	4.7.6	15		

COMMENTS:

SAMPLE TYPE

- A - Super cutting
B - 3" O.D. 1.38" I.D. thru center
C - 3" O.D. 2.43" I.D. tube sample
D - 3" O.D. 2.43" I.D. tube sample

BOREHOLE LOG (SOIL)

Page 1 of 2

LOCATION MAP:

SITE ID: HAT01 LOCATION ID: HT 32
APPROX. SITE COORDINATES (N. E.):
N 9510 E 10890
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: HSA
DRILLER: TEAT
DATE STARTED: 10-16-84
DATE COMPLETED: _____
FIELD REP.: SILVA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION NEAR MIDDLE OF COVERDILE

SITE CONDITION SD* SLIGHT BREEZE SUNNY

DEPTH 2-10	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE REMARKS	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION TAILINGS
0					1	1, 1, 1	2	SM CL	SAND FR. 4' MIN. DEPTH MOST CLAY SANDY MUST-BROWN
1.5				S	2	1, 2, 3	5	SM	SAND FR. 4' MIN. DEPTH MOST CLAY SANDY MUST-BROWN
3				T	3	EASY	4		CLAY LAYERS OF CLAY IN SAND 3-8.5
5.5				S	4	2, 2, 2	6		
7				S	5	2, 3, 3	7	CL	CLAY MUST GRAY TO BROWN MPL
8.5				S	6	2, 4, 3	9		CLAY SANDY LAYERS AS IN 13, 16
11.5				S	7	2, 4, 4	8	SM	SAND LAYERS IN CLAY
13				S	8	2, 3, 4	7	SM	CLAY AA
14.5					10	3, 4, 3	6	SM	LOAM SAND @ 16-17
16					11	1, 2, 1, 1	11	SM	CLAY AA
17.5					12	3, 5, 6	14		SAND 19' FC SLIGHTLY GRAY TO BROWN M
19					13	7, 7, 7	12		FIXED SAND AND CLAY LAYERS @ 19' - 23.5
20.5					14	7, 6, 6	12		(PERMANENTLY SAND)
22					15	7, 6, 6	12		FROM 8-22
23.5				T	16	MEDIUM		CL-CH	CLAY MPL MUST BE BROWN SL SANDY
26				S	17	3, 4, 5	9		SEE NEXT PAGE
27.5									

COMMENTS: Water Young 3-25

SAMPLE TYPE
A - Auger cuttings
S - 3" O.D. 1.38" I.D. drive sampler
U - 3" O.D. 2.45" I.D. tube sampler
T - 3" O.D. 1.38" I.D. Shelby tube

BOREHOLE LOG (SOIL)

Page 2 of 2

LOCATION MAP:

791

SITE ID: HAT01 LOCATION ID: HT 32
APPROX. SITE COORDINATES (N.):
N 95.0 E 108.0
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
27.5									CLAY - MONT MFL SL SANDY STIFF CUT & BRIDGES
29									VERY MOIST - HPL
30.5									
32									
33.5									
									THICK CLAY
37.5									
39									WET CLAY SL SANDY
40.5									42'
42									SANDSTONE WEATHERED V. SILTY SL CLAYEY RED BROWN MOIST
									ADDED TO REFUSAL LOGS COMPACT SANDSTONE OR POSS SILTSTONE

COMMENTS: _____

SAMPLE TYPE

- A - Auger settings
- B - 3" O.D. 1.25' L.D. drive sample
- U - 3" O.D. 2.42' L.D. tube sample
- T - 3" O.D. thin-walled Shelby tube

BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:

Lower Pile
TOWARDS S.W.

H 33

300'

SITE ID: HAT01 LOCATION ID: HT 33
APPROX. SITE COORDINATES (N. E.):
N 4510 E 11090
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: NSA - CONTINUOUS
DRILLER: PLATT
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 NO OLD BUILT

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION T.L. LINDS
1.5				S	1	1, 1, 2	3	SM	SAND, F6 SL. SILTY LOOSE WHITE TO BROWN
3				S	2	1, 1, 2	3		WELLY LAYER
4.5				S	3	1, 2, 2	4		
6				S	4	2, 2, 3	5		THICK LAYER
7.5				S	5	3, 3, 4	7		
9				S	6	4, 4, 6	10		
10.5				S	7	2, 2, 3	5		
12				S	8	8, 5, 5	10	CL	CLAYE II OR SANDY CLAYE II
13.5				S	9	3, 3, 5	8		
15				S	10	4, 4, 5	9	CH	CLAY OR FT SOFT GRAY HP
16.5				S	11	4, 5, 6	11		
18				S	12	4, 5, 7	12		
19.5				S	13	4, 5, 7	12		
21				S	14	MC D			
22.5				S	15	5, 5, 6	11		OR SANDY CLAYE II
24				S	16	6, 6, 9	13		
25.5				S	17	6, 7, 6	14		
27				S	18	8, 6, 6	12		

COMMENTS: 19 34 20/25 29 W. SANDSTONE CHIPS
24 BUCKET TO REFUSE @ 34 SANDSTONE
25 REFUSE ON 55 @ 34

SAMPLE TYPE
A - Auger Cuttings
B - 2" O.D. 1.38" I.D. drive sampler
C - 2" O.D. 2.42" I.D. tube sampler
T - 2" O.D. Washed Shelby Tube

BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:

SITE ID: HAT01 LOCATION ID: HT 35
APPROX. SITE COORDINATES (N.):
N 4310 E 11200
GROUND ELEVATION (ft. MSL): 5340
DRILLING METHOD: 1-BA
DRILLER: TRATT
DATE STARTED: 10-15-84
DATE COMPLETED: 10-15-84
FIELD REP.: JOE VA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION SW BRIDGEPONT OF LOWER RIVER
SITE CONDITION SW BRIDGEPONT OF LOWER RIVER

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERED	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION TAILINGS
1.5				S	1	11, 2	3	SP-SM	SAND, SILTY & MOIST AT GREY BROWN MOIST
3				S	2	5, 3, 4	7		
4.5				S	3	3, 4, 5	9		
7				T	4	EASY TBMED			
8.5				S	5	2, 2, 2	4		29' DEE SANDSTONE F6 SAND SILTY SAND & GRAVELLY S. CLAYS RED SLLOVE 11-
10				S	6	3, 4, 5	9		
11.5				S	7	5, 5, 6	11		
13				S	8	2, 3, 4	7		
14.5				S	9	3, 4, 5	8		
17				T	10				
18.5				S	11	3, 3, 4	7		
20				S	12	6, 6, 6	12		
21.5				S	13	5, 5, 5	10		
23				S	14	6, 6, 7	13		
24.5				S	15	5, 5, 6	11		
26				S	16	6, 8, 8	16		
27.5				S	17	6, 5, 5	10		
29				S	18	5, 6, 7	13	SM-GN	

COMMENTS: 11-23-84 12:25

ADDITIONAL TO REFERENCE 341

SAMPLE TYPE
A - Auger cuttings
B - 2" O.D. 120" L.D. drive sampler
C - 3" O.D. 240" L.D. tube sampler
D - 4" O.D. thin-walled Shelby tube

BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:

SITE ID: HAT01 LOCATION ID: 911
APPROX. SITE COORDINATES (N.):
N 9310 E 11090
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: 12" HSA 10" PVC CASING
DRILLER: SILVERTON BO ADAMS CME 75
DATE STARTED: 1-5-85
DATE COMPLETED: GROUND DOWN 1-6-85
FIELD REP.: SILVA B. SCHNEIDER

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)
1-5-85	OF DRILLING	DRY - UNKNOWN

LOCATION DESCRIPTION HAT ON PILE 10" CASING INSTALLATION
SITE CONDITION ON TRAILING - LOWE 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 FINEGRAINED SAND
								LL	LOOSE SURFACE & DRY
5									SL CLAYEY TRANSITION
7								CL	COLOR CHANGE TO BROWN - U CLAYEY
10									SLIMES MOIST
15								SM	FINE GRAINED SANDY GREY BROWN
								IS	GREY DRY
								SM	
								CL	VERY MOIST BROWN CLM - SLIMES - TRAILS
								SS	DARK BROWN BROWN SANDSTONE CHIPS & GRAVELLY FOUNDATION MATERIAL
									SANDSTONE - HALVED FORM.
									RETURN TO 12" HSA @ 21' BOUND AUGER TIGHT
									TD=21'
									SEE ROCK CORE LOG THIS HOLE

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

SAMPLE TYPE
A - Auger cuttings
B - 2" O.D. 130' L.D. drive sample
U - 3" O.D. 243' L.D. tube sample
T - 5" O.D. 300' L.D. Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

Page Lot ____

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: 911
APPROX. SITE COORDINATES (N.):
N 9510' E 10290'
GROUND ELEVATION (ft. MSL): 5140'
DRILLING METHOD: SEA WIRELINE
DRILLER: James Williams - SHB
DATE STARTED: 2/19/85
DATE COMPLETED: _____
FIELD REP.: R. Howard

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION ON-PNE - NE CORNER LOWER PNE
SITE CONDITION DRY TAG

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES										CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION								
						WIDE		CLOSE			HORIZ.		VERT.						
						1	2	3	4	5	H	60°	V						
39	NO	0	0	100						X					WS	5Y	siltstone, reddish brown with minor sh. gray mottling, highly calc., very hard to mod. hard		
40															WS				
41															WS				
42															WS				
43															WS				
44															WS				
45	NO	90%	0	100						X					WS	6Y	siltstone, reddish brown, highly calc., with angular to subround clasts of clay, sh. gray, very minor alteration noted at 48"		
46															WS				
47															WS				
48															WS				
49	NO	86%	0	100						X					R	WM	6Y		
50			0							X	X				R	WM	6Y		
51			0	0%						X		X			R	WM	6Y		
52			0	0						X	X				R	WM	6Y		
53			0	0						X	X				R	WM	6Y		

COMMENTS: 2 Water Hauls

BOREHOLE OPERATION
N - 8 1/2" HOLLOW STEM ANGER
S - 8 1/2" CONTINUOUS FLAME ANGER
DN - DRILL DOWN
UP - DRILL UP
WD - DRILL WIDE
WD - DRILL WIDE

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

Page 2 of 2

LOCATION MAP:

SITE ID: HAT-01 LOCATION ID: 911
APPROX. SITE COORDINATES (N.):
N _____ E _____

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

Page 4 of 4

LOCATION MAP:

SITE ID: HAT-01 LOCATION ID: 911
APPROX. SITE COORDINATES (N.):
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										CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION								
						WIDE ——— CLOSE					HORIZ. ——— VERT.								
						1	2	3	4	5	H	50°	V						
85			100		X			X						5m	sh	st.	Siltstone, to claystone, red to reddish brown, highly calc., micaceous, with sandy parting, lime-stone clast. Fracturing is essentially horiz. Some fractures are filled with talin. spar app. Core becoming more competent at 89.2 ft.		
86	NO	91	0	0	X			X						5m	sh	st.			
			40	0	X			X						5m	sh	st.			
			0	6	X				X					5m	sh	st.			
			40	6	X			X						5m	sh	st.			
			0	0	X				X					5m	sh	st.			
			60	0	X			X						5m	sh	st.			
			90	0	X			X						5m	sh	st.			
			0	6	X				X					5m	sh	st.			
			100	0	X		X							5m	sh	st.			
			100	0	X		X							5m	sh	st.			
			0	0	X				X					5m	sh	st.			

Siltstone, to clay-stone, red to reddish brown, highly calc., micaceous, with sandy parting, some stone clast. Fracturing is essentially horiz. Some fractures are filled with talin. sp. app. Core becoming more competent at 89.2 ft.

Core at above.

TAC TEST PITS:

ON PILE

TEST PIT LOG

Page 1 of 1

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: TP 1
APPROX. SITE COORDINATES (11)
N 9710 E 11090
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 10-17-84
BACKHOLE TYPE: CASE 500
CONTRACTOR: BLAKE 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		UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	INT	ID		
1.5			SM	Silty Sand, very fine, dry, light brown
7.0			CL w/ ML & SM	Silty Clay, medium to high plastic, interbedded with thin 0-3m. seams of silty sand & clayey silt, wet, brown.

COMMENTS: Stopped backfill @ 7.0 ft.
Collected 3-5 gal soil samples. 2-5 gal
soil samples sent to Earth Tech. Corp. Lab.
1-5 gal sent to Verrill Papers.

SAMPLE TYPE

- B - Undisturbed Block Sample
 D - Disturbed Bulk Sample

SITE ID: HAT 01 LOCATION ID: TP-2
APPROX. SITE COORDINATES (U)
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. DALL
REHAB. DATE: _____

GROUNDWATER LEVELS			
DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION Crown gradient $\approx 30^\circ$ of lower tailings pile.
SITE CONDITION Moderately sloping onto dike.

DEPTH (ft.)	SAMPLE		UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	INT. TYPE	ID		
0.5				<p>Clayey Silt with windblown sand (tailings not plastic to slight plastic, very fine sand, mont., rootlets, reddish brown to light brown (tailings)).</p> <p>Samples taken are of windblown contaminants mixed with natural topsoil materials.</p>

COMMENTS: Stopped bucket at 0.5 ft. Collected 3-5 gal soil samples. 3-5 gal samples sent to Chem. Assoc. and 1-5 gal sample sent to Ver-
hona.

SAMPLE TYPE

- 0 - Undisturbed Rock Sample
 1 - Disturbed Rock Sample

TEST PIT LOG

Page 1 of 1

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: TP3
APPROX. SITE COORDINATES (11)
N 9510 E 10690
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 10-23-84
BACKHOLE TYPE: CASE SPO
CONTRACTOR: BLADE ENTERPRISES
FIELD REP: P.S. DARR
REHAB. DATE: Not Applicable

GROUNDWATER LEVELS

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

LOCATION DESCRIPTION Lower fillings pit
SITE CONDITION

[illegible]

COMMENTS: Stopped backhoe at 5.5 ft.
Collected 4 - 5 gal soil samples 2 - 5 gal sample
to Chen & Assoc. & 2 - 5 gal samples to Vern Royce.

SAMPLE TYPE

- - Undisturbed Block Sample
● - Disturbed Bulk Sample

Page 1 of 1

APPROX. SITE COORDINATES (11)

GROUND ELEV. (FT. MSL)

GROUND ELEV. (FT. MSL)

DATE EXCAVATED: 11-23-84

BACKHOLE TYPE: CASE 520

CONTRACTOR: ~~BLAKE ENTERPRISES~~

FIELD REP: P.S. DARR

REHAB. DATE: Not applicable

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)
------	------	------------	---------------------

NOT

LOCATION DESCRIPTION Upper Tailings Pile
SITE CONDITION _____

[illegible]

D*- Small bag sample taken for miscellaneous testing.

COMMENTS: Collected 4-5 gal. Acid Aerosols.
2-5 gal Aerosols shipped to Chen & Assoc. and
2-5 gal aerosols shipped to Vern Rogers.
Stopped backhoe at 7.5 ft.

SAMPLE TYPE

B = Unregistered Blank Sample

D - Disturbed Soil Sample

TEST PIT LOG

Page 4 of 4

LOCATION MAP:

A

SITE ID: HAT 01 LOCATION ID: TP 5

APPROX. SITE COORDINATES (11)

N 9310 E 9445

GROUND ELEV. (FT. MSL)

DATE EXCAVATED: 10-23-84

BACKHOLE TYPE: CASE 5B2

CONTRACTOR: ALKE ENTERPRISES

FIELD REP: P.S. DARR

REHAB. DATE: Not Applicable

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)
------	------	------------	---------------------

DATE	TIME	LOCATION	REMARKS
			None

LOCATION DESCRIPTION Upper Tailings Pile

SITE CONDITION

COMMENTS: Stopped backhoe at 4.5 ft.
Collected 2-15 gal soil samples. 1-15 gal to
Chen & Assoc & 1-5 gal to Vena. Removed

SAMPLE TYPE

*** - Undisturbed Blank Sample**

D - Disturbed Bulk Sample

TAC BORING LOGS:

OFF PILE

BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:

SITE ID: 48201 LOCATION ID: HT-1-41
APPROX. SITE COORDINATES (N.):
N 8300 E 9150
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: H/A
DRILLER: TCRT
DATE STARTED: 8-10-80
DATE COMPLETED: _____
FIELD REP.: SILVA

GROUNDWATER LEVELS

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

LOCATION DESCRIPTION SOUTH OF WEST TANKS AREA
SITE CONDITION ROCKY - R/C

DEPTH	SAMPLE INTERVAL	REMARKS BY CLIENT	SAMPLE INTERVALS	TYPE	ID	BLOWS PER 6 in.	Z VALUE	UBCS	VISUAL CLASSIFICATION
0.00				A	800	AUGER		SS	SANDSTONE FINE SAND - ANHYDROUS & RED BROWN - DRY
0.01				A	001			SM	3-4% FINE SAND SM F.G. & SILTY TR. GRAY CLY
0.02				A	2				
0.03				A	3	ROCKS FROM AUGER TUBE			
0.04				A	415				PORECE Limestone
0.05									
0.06									
0.07									
0.08									
0.09									
0.10									
0.11									
0.12									
0.13									
0.14									
0.15									
0.16									
0.17									
0.18									
0.19									
0.20									
0.21									
0.22									
0.23									
0.24									
0.25									
0.26									
0.27									
0.28									
0.29									
0.30									
0.31									
0.32									
0.33									
0.34									
0.35									
0.36									
0.37									
0.38									
0.39									
0.40									
0.41									
0.42									
0.43									
0.44									
0.45									
0.46									
0.47									
0.48									
0.49									
0.50									
0.51									
0.52									
0.53									
0.54									
0.55									
0.56									
0.57									
0.58									
0.59									
0.60									
0.61									
0.62									
0.63									
0.64									
0.65									
0.66									
0.67									
0.68									
0.69									
0.70									
0.71									
0.72									
0.73									
0.74									
0.75									
0.76									
0.77									
0.78									
0.79									
0.80									
0.81									
0.82									
0.83									
0.84									
0.85									
0.86									
0.87									
0.88									
0.89									
0.90									
0.91									
0.92									
0.93									
0.94									
0.95									
0.96									
0.97									
0.98									
0.99									
1.00									

COMMENTS: BASED ON AUGER TEST TO 5'-IN. & DEEPER

SAMPLE TYPE
A - Auger cuttings
B - 2" O.D. 1.50' L.D. drive sampler
C - 2" O.D. 2.42' L.D. push sampler
T - 2" O.D. non-vibrated Shelby tube

Page 1 of 1

**WIS
MEM**

7342

Estadística

SITE ID: HATDF LOCATION ID: NT-142
APPROX. SITE COORDINATES (IL):
N E
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: HSA
DRILLER: JCAT
DATE STARTED: 10-10-84
DATE COMPLETED: 10-10-84
FIELD REP.: SILVA

DATE _____

TIME

DEPTH (ft.)

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

Focus Area on
MAGNET
LIFE

SAMPLE TYPE

A - Anger settings
B - 3" O.D. 1.34" I.D. drive sample
C - 3" O.D. 2.42" I.D. tube sample
D - 5" O.D. 3.61" I.D. sample

BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: HT-43
APPROX. SITE COORDINATES (N. E.):
N 8730 E 10825
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: 15A 4" & 10A 4"
DRILLER: TECH
DATE STARTED: 10-10-84
DATE COMPLETED: 11
FIELD REP.: SLV

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SOUTH OF SITE ON HILL

SITE CONDITION

HOLE LOCATED IN SOUTH DIRECTION CHANGE MADE BY CP

DEPTH	WATER SAMPLE	WATER RECOVERY	WATER SAMPLE	TYPE	ID	BLOWS PER 6 IN.	Z VALUE	USCS	VISUAL CLASSIFICATION
	X	X	X	A	001	AUGER		SP	RED SANDY CL. GRAVELLY SANDSTONE PIECE
	X	X	X	A	002	AUGER		Ss	RED & BROWN SANDSTONE
	X	X	X	A	003	AUGER			LARGED SANDSTONE DENSE
	X	X	X	A	004	"			NO SAMPLES ARE PRESENT NO AUGER CUTTINGS
	X	X	X	A	005	"			
									12' TR

COMMENTS:

DRIED 6" TO 3' IS
TRED TO USE 4" TO 12' USE 1 TRED

SAMPLE TYPE

- A - Auger Cuttings
- B - 2" O.D. 1.35' L.D. Drive Sample
- C - 3" O.D. 2.45' L.D. Drive Sample
- T - 5" O.D. Hand-Driven Shelby Tube

BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: VT-94
APPROX. SITE COORDINATES (N.):
N 4700 E 11620
GROUND ELEVATION (ft. MSL): 4200
DRILLING METHOD: 6" ASD
DRILLER: T. CATT
DATE STARTED: 10-10-84
DATE COMPLETED: 10-10-84
FIELD REP.: SWW

GROUNDWATER LEVELS

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION EAST SIDE
SITE CONDITION CRACK PUS. 1

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE REMARKS	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
0	X	X		A	001	AWCL		S _s	SANDSTONE REEDED WITH L.A. 10% V _h -H _h ED
1.5	X	X		A	002	"			Softer layers @ 15, 3-5.5 STILL H _h ED
4.5	X	X		A	003	"			ENTER DRILLING @ 10'
7.5	X	X		B	004	"			
9.5	X	X		A	005				
12	X	X		A	006				
14	X	X		A	007				
16	X	X		A	008				
18	X	X		A	009				
20	X	X		A	010				
22	X	X		A	011				
24	X	X		A	012				
26	X	X		A	013				
28	X	X		A	014				
30	X	X		A	015				
32	X	X		A	016				
34	X	X		A	017				
36	X	X		A	018				
38	X	X		A	019				
40	X	X		A	020				
42	X	X		A	021				
44	X	X		A	022				
46	X	X		A	023				
48	X	X		A	024				
50	X	X		A	025				
52	X	X		A	026				
54	X	X		A	027				
56	X	X		A	028				
58	X	X		A	029				
60	X	X		A	030				
62	X	X		A	031				
64	X	X		A	032				
66	X	X		A	033				
68	X	X		A	034				
70	X	X		A	035				
72	X	X		A	036				
74	X	X		A	037				
76	X	X		A	038				
78	X	X		A	039				
80	X	X		A	040				
82	X	X		A	041				
84	X	X		A	042				
86	X	X		A	043				
88	X	X		A	044				
90	X	X		A	045				
92	X	X		A	046				
94	X	X		A	047				
96	X	X		A	048				
98	X	X		A	049				
100	X	X		A	050				

COMMENTS: SAMPLES ARE READY BY AUGUST 20TH/21ST

SAMPLE TYPE

- A = Supply fittings
 B = 2" O.D. 1.38" I.D. drive cap
 C = 3" O.D. 2.43" I.D. tube cap
 D = 3" O.D. 2.43" I.D. tube cap

BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:

SITE ID: HAT01 LOCATION ID: HT 95-
APPROX. SITE COORDINATES (N.):
N 10250 / 14450 E 11250
GROUND ELEVATION (N. MSL): 421.9
DRILLING METHOD: HSI 6"
DRILLER: TLATT
DATE STARTED: 10-10-69
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)
/	/	/

LOCATION DESCRIPTION NORTHEAST 1/4 ROAD FORK

SITE CONDITION. WHITE BLOWSAND & ROCKY RED ON PLATEAU ABOVE DRAIN TO MZTL.

[illegible]

COMMENTS: AVER. SAMPLES = GRIND ROLX - 3 WITH MEAS

SAMPLE TYPE

- S - 8" type 4000
- U - 2" O.D. 1.58" I.D. drive shaft
- W - 2" O.D. 1.42" I.D. hub shaft
- V - 1" O.D. 0.875" I.D. shaft

Page 1 of 1

LOCATION MAP

SITE ID: HATOL LOCATION ID: HT46
APPROX. SITE COORDINATES (N.):
N 10 100 E 10300
GROUND ELEVATION (ft. MSL): 9280
DRILLING METHOD:
DRILLER: TEATT
DATE STARTED: 10-10-89
DATE COMPLETED:
FIELD REP.: SKM

DATE	TIME	DEPTH (ft.)
/	/	/

LOCATION DESCRIPTION NORTH OF FIVE ABOVE BRADLEY AND NORTH
SITE CONDITION SANDSTONE GENTLY SURFACE

[illegible]

COMMENTS:

SAMPLE TYPE
 A - Auger Settings
 B - 3" O.D. 1.31' L.D. Street Sample
 C - 5" O.D. 1.42' L.D. Street Sample
 D - 5" O.D. 1.42' L.D. Street Sample

Page 1 of 1

A

APPROX. SITE COORDINATES (11.):

N 7700 E 7550

GROUND ELEVATION (ft. MSL): 4276

DRILLING METHOD: USA

DRILLER: TEATT

DATE STARTED: 10-10-84

DATE COMPLETED: _____

FIELD REP.: SILVER

DATE	TIME	DEPTH (ft.)
------	------	-------------

DATE _____

TIME

DEPTH (ft.)

NORTH OF THE INDOCHINA S. OF ROKZ

SITE CONDITION

[illegible]

SAMPLE TYPE

A - Upper tailings
B - 2" O.D. 1.34" L.D. Drive sample
C - 3" O.D. 2.67" L.D. Drive sample
D - 3" O.D. 2.67" L.D. Drive sample

Page 1 of 1

SITE ID: HATON LOCATION ID: HT-1-50
APPROX. SITE COORDINATES (N.):
N 10950 E 10930
GROUND ELEVATION (ft. MSL): 9230'
DRILLING METHOD: NBA 9"
DRILLER: TEATT-SHS
DATE STARTED: 10-73-54
DATE COMPLETED: "
FIELD REP.: SILVA

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

LOCATION DESCRIPTION WEST BRAN 4000 CONDUIT NORTH OF SPACERILE
SITE CONDITION DRY - IN DRAINAGE ON ALLUVIUM

NOTE LOW ROCK OUTCROPPING IN NORTH; BEARING OF FLOOD-ALLUVIUM ELEVATED OFF

[illegible]

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

SAMPLE TYPE

- 2 - 3" O.D. 1.38" I.D. drive shaft
 3 - 3" O.D. 2.47" I.D. tube sample
 4 - 3" O.D. thermowell body tube

BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:

SITE ID: HAT-1 LOCATION ID: HT-1-51
APPROX. SITE COORDINATES (N.):
N 10800 E 11090
GROUND ELEVATION (ft. MSL): 4220
DRILLING METHOD: 6" HSA/ROTARY-WIRE
DRILLER: T. GATT
DATE STARTED: 10-23-87
DATE COMPLETED: "
FIELD REP.: ELVA

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
2								SM	RESIDUAL SOIL SAND FAULTY MUDST
								S	SL MOUT - RDG BASIN M.P.
									SANDSTONE WS WAYHARD REDBROWN
									NOTE: SWITCH TO ROTARY @ 3'
									ROTARY WITH WATER 3'-5'
									END LOG @ 5' IN SANDSTONE
									TD=3'
									SET 6" PIPE 2' IN.
									SEM @ 1
									AND 3-1
									COMING OUT
									HT-1-51
									TD=3' 5' PIPE/W 2' STAKED
									4' BLANK 1' BOTTOM ELATED
									1/2 BAG CEMENT MOUT
									FOR FILLING AT MEAS - SOIL

COMMENTS:

SAMPLE TYPE

A - Auger Cuttings
B - 2" O.D. 135" L.D. drive sample
U - 3" O.D. 947" L.D. tube sample
T - 2" O.D. thin-walled Shelby tube

BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP

SITE ID: HATE1 LOCATION ID: HT-163
APPROX. SITE COORDINATES (N.):
N 11050 E 12270
GROUND ELEVATION (N. MSL): ~4125
DRILLING METHOD: 6" HSA
DRILLER: TEAT
DATE STARTED: 10-27-84
DATE COMPLETED: "
FIELD REP: SWA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION IN DRAINAGE NORTH OF SITE

SITE CONDITION	REV	DATE
----------------	-----	------

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE REMARKS	TYPE	D	BLOWS PER 6 IN.	N VALUE	UBCS	VISUAL CLASSIFICATION
25					1			SM	SAND FG VERY SILTY TRALE GRAVEL S. MONT
								MISS	WEATHERED SANDSTONE
								ES	SANDSTONE R.P. BLOWN MUD
									TD=2.5' <u>WELL NOT SET</u>
									1' PICKUP 1' S. MONT 2' TO

COMMENTS: _____

SAMPLE TYPE

SAMPLE TYPE
 A - Apple cuttings
 B - 3" O.D. 1.38" LD. wire sample
 C - 3" O.D. 2.42" LD. flow sample
 D - 3" O.D. thru-walled shaker tube

BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:

SITE ID: H4701 LOCATION ID

NY-54

HT-53

APPROX. SITE COORDINATES (ft.):

N. 11500 E. 72350

GROUND ELEVATION (ft. MSL): _____

DRILLING METHOD: 6" HSA

DRILLER: _____

DATE STARTED: 10-23-64

DATE COMPLETED: _____

DATE COMPLETED: _____
FIELD REP.: _____

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SEAWALLS WITHIN OF TANKING AREA

SITE CONDITION

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	D	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
								SM	SANDY SILTY CLAY GRAPE
								S _s	SANDSTONE HARD RED BROWN <u>WFL SET</u> WFL SET @ 24" Antonioli @ 1' 1' section 16" S.H. TD = 25 TL. 3.7

COMMENTS: ENCOUNTERED ROCK @ 810/7.5

SAMPLE TYPE

A = 2" O.D. 1.38' LD. drive shaft
B = 3" O.D. 2.43' LD. top shaft
C = 3" O.D. 2.43' LD. bottom shaft

Page 1 of 1

SITE ID: WAT-1 LOCATION ID: NY-54
APPROX. SITE COORDINATES (N.):
N 10900 E 12150
GROUND ELEVATION (ft. MSL): 9195
DRILLING METHOD: 6" HSA
DRILLER: TCAT
DATE STARTED: 10-23-84
DATE COMPLETED: "
FIELD REP.: SILVA

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

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

[illegible]

COMMENTS: _____

SAMPLE TYPE

- A - Upper Settings
B - 2" O.D. 1.34" I.D. drive shaft
C - 5" O.D. 2.47" I.D. tube sample
T - 5" O.D. the-welded flange tube

SITE ID: HAT01 LOCATION ID: HT-1-56
APPROX. SITE COORDINATES (N.):
N 10150 E 1700
GROUND ELEVATION (ft. MBL): 4235'
DRILLING METHOD: 6" N/A
DRILLER: T097
DATE STARTED: 10-23-77
DATE COMPLETED:
FIELD REP: SDM

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION
SITE CONDITION _____

NORTH OF LOWER DYLE IN DRAINAGE

[illegible]

COMMENTS:

SAMPLE TYPE

2 - 4" x 4" x 1/2" L.D. 1/2" x 1/2" x 1/2" L.D. 1/2" x 1/2" x 1/2" L.D.
 3 - 2" O.D. 1.5" I.D. 1/2" x 1/2" x 1/2" L.D. 1/2" x 1/2" x 1/2" L.D.
 4 - 3" O.D. 2.4" I.D. 1/2" x 1/2" x 1/2" L.D. 1/2" x 1/2" x 1/2" L.D.
 5 - 4" O.D. 3.0" I.D. 1/2" x 1/2" x 1/2" L.D. 1/2" x 1/2" x 1/2" L.D.

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BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:

SITE ID: HAT01 LOCATION ID: UT-152
 APPROX. SITE COORDINATES (N. E.):
 N 10,040 E 950
 GROUND ELEVATION (ft. MSL): 4294.5
 DRILLING METHOD: 6" HSA
 DRILLER: TGAT
 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 AREAS

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 IN.	Σ VALUE	USCS	VISUAL CLASSIFICATION
5				A		AUGUR		SM	SAND USILT 200 BROWN
						TD=3'		SPH	SPH BLUNT BLOW SAND
								SS	SANDSTONE RED BROWN DENSE
									1' SCREENED 5' BLANK 3' STEEL CAP FL26'
									STEEL CAPS

COMMENTS:

PROBE HERE TO 1' DEPTH TO PILE

SAMPLE TYPE

- A - Auger Settings
- B - 3" O.D. 1.35' L.D. split sample
- C - 3" O.D. 2.42' L.D. split sample
- T - 6" O.D. thin-walled Shelby tube

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: 905
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: Heavy Stem Auger
DRILLER: SHB
DATE STARTED: 12/10/84
DATE COMPLETED: 12/11/84
FIELD REP.: S. David Beckett

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION noted to begin - the first 1.5' of digging comp.

[illegible]

COMMENTS: Switched to canine @ 3.5 ft b's

SAMPLE TYPE

- SAMPLE TYPE**
 A - Auger cuttings
 B - 3" O.D. 1.58" I.D. drive sampler
 M - 3" O.D. 2.42" I.D. tube sampler
 T - 5" O.D. thin-walled Shelby tube

BOREHOLE LOG (ROCK)

Page 2 of 2

LOCATION MAP:

see p. 1

SITE ID: HAT-01 LOCATION ID: 905

APPROX. SITE COORDINATES (N.):

N _____ E _____

GROUND ELEVATION (ft. MSL): _____

DRILLING METHOD: 4" x 5" core barrel (3.98)

DRILLER: SHB (6' barrel w/ 6.4)

DATE STARTED: 12/10/84

DATE COMPLETED: 12/11/84

FIELD REP.: J. David Bets, II

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____

SITE CONDITION _____

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	SPRICK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES									CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION							
						WIDE		CLOSE			HORIZ.		VERT.					
						1	2	3	4	5	H	SD°	V					
	H	NA	NA	NA	NA											SEE SOIL BORING LOGS ON PG 1		
																SANDS FINE		
																COLOR & FEEL		
																RESEMBLING TAN		
BS				H-2					X	H	V				1	W/ 64		
	NY								X		X							
									X		V	V						
									X		V							
									V	V								
									X	V								
	NY	100%	C						X		V	V	V					
	GB																	

COMMENTS: NOTE HOLE CAVED @ 2' AFTER DRILLING TO 2' 5"
after drilling core to 9', hole caved to 8.5'

BORING OPERATION
W - 6 1/2" HOLLOW STEM ANCHOR
B - 6 1/2" CONTINUOUS FLIGHT ANCHOR
CN - CEAR BIT
BS - BIT ROD CORING
BO - 60 MINUTE ROCK CORING

Page 1 of 2

LOCATION MAP:

Tailings Pile

Berm

Wash

907 - JAIL

MT. 1-55 (tailings?)

906 shallow

SITE ID: HAT-01 LOCATION ID: 906
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: H/A
DRILLER: SNB- Jim Carter
DATE STARTED: 12/12/84
DATE COMPLETED: 12/12/84
FIELD REP.: S. Davis Letz

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION In wash E. of berm 3 d. of fire.
SITE CONDITION much wood & low to 100 ft. in fire - due to

[illegible]

COMMENTS: Switched to tri-cone roller bit
@ 3.35' b/s

SAMPLE TYPE
 A - Sugar cylinder
 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

BOREHOLE LOG (ROCK)

Page 2 of 2

LOCATION MAP:

See p. 1

SITE ID: NAT-01 LOCATION ID: 926

APPROX. SITE COORDINATES (ft.):

N _____ **M** _____

GROUND ELEVATION (ft. MSL): _____

DRILLING METHOD: ~~Hand~~ TD - 1005 10' 41" =

DRILLER: CHB - Jim Carter

DATE STARTED: 12/12/84

DATE COMPLETED: 12/12/81

FIELD REP.: M. Gay 6-6-61

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)
------	------	-------------

LOCATION DESCRIPTION see p. 1

SITE CONDITION

[illegible]

no cores taken since
907 will be logged
continuously. It is
located in the
same wash.
Approved by E. Maso.
on 12/1/84 as
suggested by RTR.
(further info. re. sand
up - no coring so.)
← end of hole
(@ 11.75' b/g

COMMENTS:

SONIC OPERATION
M - 8 1/2 INCHES STEAM ANGLE
C - 4 1/2 CONTINUOUS FLAME ANGLE
SO - 8425 BT
RM - 81 BOLD CORING
MO - 80 BOLD BOLD CORING

BOREHOLE LOG (SOIL)

Page 1 of 10

LOCATION MAP:

SITE ID: AAT-01 LOCATION ID: 907
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: HA
DRILLER: SAB - Jim Carter
DATE STARTED: 12/11/84
DATE COMPLETED: _____
FIELD REP.: J. David Bell

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION In wash E. of LCR 4 to 1 mi. S.

SITE CONDITION *partly wooded, open area at about 2000'*

[illegible]

COMMENTS: _____

SAMPLE TYPE

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

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BOREHOLE LOG (ROCK)

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LOCATION MAP:

See pg. 1

SITE ID: HAT-01 LOCATION ID: 907
APPROX. SITE COORDINATES (N.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLER: SHA - Jim Carter
DATE STARTED: 12/11/84
DATE COMPLETED: _____
FIELD REP.: J. David Reice

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION See pg. 1

SITE CONDITION _____

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES									WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION							CONDITION
						WIDE		CLOSE			HORIZ.		VERT.					
						1	2	3	4	5	H	60°	V					
112	100	25	0						X	X	X				WH	SS	Sandstone, dk. colored, dark reddish in top 0.2' very fractured & friable. Several horizontal fractures throughout, 1' apart. Fractures from 5" to 7.5" long. Fractures III-IV.	
	100	100	0						X					X				
	41	100	0					X						X				
	100	100	0						X		X				WH	SS		
	100	2	90						X		X				WH	SS		
	57	90							X	X	X							
	6	90								X	X							
	75	90							X		X							
	100	90							X	X	X							
	100	90							X	X	X				WH	SS		
	100	90							X	X	X				WH	SS		
									X	X	X							
									X		X							
									X		X							
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COMMENTS:

BORING OPERATION
H - 6 1/2" HOLLOW STEM BORE
C - 6 1/2" CONTINUOUS FLIGHT ANCHOR
GO - GEAR BIT
NR - NO ROCK CORING
ND - NO DRILLING ROCK BORING

BOREHOLE LOG (ROCK)

Page 3 of 10

LOCATION MAP:

See pg. 1

SITE ID: HAT 01 LOCATION ID: 907
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLER: Jim Carter (SHB)
DATE STARTED: 12/11/84
DATE COMPLETED: _____
FIELD REP.: 3-David Berger

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

See pg. 1

SITE CONDITION

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	% ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES								CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION						
						WIDE ——— CLOSE					HORIZ. ——— VERT.						
						1	2	3	4	5	H	60°	V				
21	NR	100	80	90				X	Y		X			SS	locking core shot like a core from a mudstone. It is gray ss at well.		
22									X	X	Y						
23									X	X	X						
24									X	X	X						
25	NR	100	80	90					X	X	X			SS	Dark red mudstone w/ some reddish ss. ss mudstone is sandy.		
26			100	90					X		Y	Y					
27			50						X		X	Y					
28			80					X	X		Y	X					
29			40						Y		X			SS	Sandstone, v. fine grained, dark reddish bn w/ some ss nodules of ss. ss mudstone. This is the same as more uniform dark reddish bn ss w/ depth.		
30			100						X		X						
31			50						X		Y						
32			100					X	Y		Y				Hardness is II to III & becoming harder w/ depth.		
33			70					X	Y		X						
34			100					Y			Y						
4	NR	100	0	0					X		Y			SS			

COMMENTS: switched to new #10 core barrel on 34.5'. This gives a core 1.80" in dia.

BORING OPERATION
N - 8 1/2" HOLLOW STEM REGR
C - 4 1/2" CONTINUOUS FLIGHT ANGR
SS - SS REGR
NS - NS REGR
MS - MS REGR
MO - MO REGR

JACOBS ENGINEERING GROUP INC.

ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

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LOCATION MAP:

See pg. 1

SITE ID: HAT 01 LOCATION ID: 907

APPROX. SITE COORDINATES (N.):

N E GROUND ELEVATION (ft. MSL): DRILLING METHOD: DRILLER: SKB - 3m CorterDATE STARTED: 12/11/84DATE COMPLETED: FIELD REP.: J. David Betz, 11

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION See pg. 1SITE CONDITION

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES									WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION							CONDITION
						WIDE		CLOSE			HORIZ.		VERT.					
						1	2	3	4	5	H	SD°	V					
NR	100	70	20					X		X				11.5	Ss	Sandstone, v. fine grained & clay when wet; color gray to reddish; hardness II-III; reddish ls. (dune)		
		100						X		X								
		70							X	X	X							
		0							X	X	X							
		100						X		X	X							
		100							X	X	X							
		40							X	X	X							
		70							X	X	X							
		100							X	X	X							
NR	100	80	20					X	X	X	X			11.5	Ss	Sandstone, dk reddish to H. reddish ls., v. fine, hard (III)		
NR	100	80	20					X	Y	X	X							
		80						X	Y	X	X							
		80						X	Y	X	X							
		100						X	Y	X	X			11.5	Ss			
		80						X	Y	X	X			11.5	Ss	Sandstone, dk reddish to H. reddish ls., v. fine, hard (III)		
NR	100	100	20					X	Y	X	X			11.5	Ss	Sandstone, dk reddish to H. reddish ls., v. fine, hard (III)		

COMMENTS:

BORING OPERATION
 N - 1/2 INCH DIAMETER STEEL ANGLE
 S - 1/2 INCH CONTINUOUS FLIGHT ANGLE
 GR - GEAR BOX
 DR - DRILL CORING
 RD - REINFORCED ROCK CORING

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

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LOCATION MAP:

See p. 1

SITE ID: 4AT - 01 LOCATION ID: 907
APPROX. SITE COORDINATES (N. E.):
N E
GROUND ELEVATION (ft. MSL):
DRILLING METHOD:
DRILLER: SHB - Jim Carter
DATE STARTED: 12/11/84
DATE COMPLETED:
FIELD REP.: S. David Betts, Jr.

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION See p. 1
SITE CONDITION

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	% ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES										WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION								CONDITION
						WIDE		CLOSE			HORIZ.		VERT.						
						1	2	3	4	5	H	60°	V						
51	NG	100	100	20			X				X					Wm-2g	Sandstone, v. dark reddish br. to reddish tan		
52			100					X	X			X					hard (m); moderately weathered, no form		
53			70					X	X	X	X	X							
54			0	20					X	X	X	X	Y						
55	NG	100	0	60					X	X	X	X	Y			Wm-2g	SS		
56	HQ	100	10					X	X	X	X					Wm-2g	15		
57		100	0	20				X		X	X		X				FORECAST		
58			100	60					X	X	X	X							
59			50	50						X	Y	Y							
60			50	60						X	Y	Y					NE & SLOWLY DIPPING FEATURES		
61			100	50			X				X	X				SE	10% SILT, 90% SAND, 10% CLAY		
62			100	50			X				X								
63			100	50			X				X								
64			100	50		X	X				X					LS	TRANSITION INTO SILT CLAYSTONE VERY HARD DRILLED		
	V	V	100	50		X	X				X						TRANSITION INTO 65		

COMMENTS:

BORING OPERATION
H - 6 IN. HOLLOW STEM ANGER
C - 6 IN. CONTINUOUS FLIGHT ANGER
NG - NEAR GIL
W - 6 IN. ROCK CORING
HQ - HQ WIRELINE ROCK CORING

BOREHOLE LOG (ROCK)

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LOCATION MAP:

SITE ID: WET 21 LOCATION ID: 755
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLER: _____
DATE STARTED: 12-1-84
DATE COMPLETED: _____
FIELD REP.: SILVA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION APL - SNOW & STORMY
SITE CONDITION 12-1-84 NOON STORM, CLOUDY

DEPTH (ft.)	BORING OPERATION	% CORE RECOVERY	ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES						WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS		
						SPACING		ORIENTATION				CONDITION				
						WIDE		CLOSE		HORIZ.						
						1	2	3	4	5	6	H	60°	V		
	NR	100	12	50			X					X				
			10	50			X					X				
			15	60			X					X				
			15	90			X					X				
							X					X				
70	ND	100	10						X			X				
			0				X	X	X			X				
	7	100							X			X				
	9								X			X				
			0						X			X				
75	NQ	100	12	40			X					X				
		100	10				X									
		100	10				X									
		100	10				X									
		100	10				X									
		100	10				X									

COMMENTS:

BOREHOLE OPERATION
N - 0.5 IN. HOLLOW STEM ANGLE
S - 0.5 IN. CONTINUOUS FLIGHT ANGLE
D - DEAR BIT
R - IN ROCK CORING
C - IN CORE CORING

BOREHOLE LOG (ROCK)

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LOCATION MAP:

SITE ID: 24401 LOCATION ID: 907
APPROX. SITE COORDINATES (N.):
N E
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: NO WIRELINE LOG
DRILLER: BSH
DATE STARTED: 12-11-84
DATE COMPLETED:
FIELD REP.: SILVA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION COLD - SNOWY

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	% ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES									CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION								
						WIDE		CLOSE			HORIZ.		VERT.						
						1	2	3	4	5	H	50°	V						
NQ		100	100	60		1	2	3	4	5	X					W ₆	SE LS	SLATES - LIMESTONE REDISH BROWN - DARK RED VERY HARD II	
						X					X							VERTICAL, 2-3" DIA. PORE SPHERULE	
						X					X						W ₆	SE	SLATES LIMESTONE
						X					X								
	↓	↓	↓	↓		X					X								GRAY-BLUE MARG
115		100	100	90		X					X						ANY	SE	115-120' OFF IN HPCAL : 115-120' SLATES - RED BROWN - GREEN PORELESS BL. VERTICAL D. II
						X					X								
						X					X								
						X	X	X	X		X								BLUE GRAY SAND
				↓		X					X								120-125' OFF IN HPCAL : 120-125' VERTICAL FR. THE 90.5-94' SECTION
				70					X		X						W ₄	SE	
			↓	60					X		X								SMALL RED BROWN SP. ALONG OF SECTION
			100	70					X		X								
			0	70					X		X						W	SE	GREEN - MUDSTONE @ 90' GRAY V. SP. OVER
	↓	↓	0	70					X		X								SMALL GREEN NODULES

COMMENTS:

- FORMS DEFINITION
 M - 5 1/2 MILLION PERM ANGLE
 C - 4 1/2 CONTINUOUS PERM ANGLE
 MO - 1000 FT
 ME - 10000 PERM
 EQ - 10000 PERM ANGLE

BOREHOLE LOG (ROCK)

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LOCATION MAP:

See Pg 1

SITE ID: HAT01 LOCATION ID: 907
APPROX. SITE COORDINATES (N.):
N E
GROUND ELEVATION (ft. MSL):
DRILLING METHOD:
DRILLER: BS42-SLR
DATE STARTED: 12
DATE COMPLETED:
FIELD REP.: SLV6

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION TOOK 4 DOSE - 12-15-84 COLT: SAIDW11

DEPTH (FT)	BORMO OPERATION	% CORE RECOVERY	SPOCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES										CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION								
						WIDE ——— CLOSE					HORIZ. ——— VERT.								
						1	2	3	4	5	H	50°	V						
NR	100	50	50						X		Y				Sm	WH	Ce	CLAYSTONE-MUDSTONE BENTONITIC SPP	
		50	30				X				Y							SANDSTONE - BENTONITIC Small Gr. No. 100	
		80	20				X			Y	Y			Sm	WM	Ss	QUARTZITIC MUDSTONE AND SANDSTONE - BENTONITIC		
		100	50				X				Y							FRAGILE BLUE GRAY WH. LIME STONE 9-100'	
		120	30				Y				Y							HEAVY BENTONITIC - SPP	
		140	70		Y						X			Sm	WM	Ss	SANDSTONE BENTONITIC SPP		
		160	80		Y						Y							SHALE - BLUE GRAY No bentonite staining Heavy calcareous	
		180	60		X						Y								
		200	20		Y						Y							Vertical Fractures 100-105'	
V	V	100	20		Y						Y								
NR	100	100	80		X						Y							110-120' NO BENTONITE	
					Y						Y								
					Y														
					Y														
V	V	V	V		Y									Nls	Ls		LIMESTONE TAVEL HARD BLUE-GREY	109.5-NO MUDST.	

COMMENTS:

- SOCIAL OPINION**
- M -** I'VE BELIEVED SINCE ANGER
C - I'VE BELIEVED SINCE ANGER
ED - BELIEVE IN?
MR - WE DON'T KNOW
GO - WE THINK YOU DO KNOW

BOREHOLE LOG (ROCK)

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LOCATION MAP:

Sec A1

SITE ID: HAT 01 LOCATION ID: 907
APPROX. SITE COORDINATES (N. E.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLER: BP-5 S.W.
DATE STARTED: 12-11-84
DATE COMPLETED: 12-19-84
FIELD REP.: SILVA

ARTESIAN CONDITION ENCOUNTERED @ 122'

GROUNDWATER LEVELS:

DATE	TIME	DEPTH (ft.)
12-15-84	3:00 PM	50' ± 5'
12-15-84	4 PM	10' ± 6'
12-15-84	10 PM	10' ± 6'
12-16-84	10:15 AM	26' ± 1.5'

LOCATION DESCRIPTION

SITE CONDITION

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	% ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES									CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION							
						WIDE		CLOSE			HORIZ.		VERT.					
						1	2	3	4	5	H	50°	V					
ND	100	100	80			X					X			Sd	HW	Ss	SANDSTONE HIGHLY WEATHERED & FRACTURED @ 110.5'	
	100	50							X		X						BECOMING SL. CLAYEY III CONGLOMERATE IN-111.5'	
	90	100							X		X			Hd	Hw	Ls		
	100	100							X		X						BLUE-GRAY LIMESTONE	
	100	100	V						X		X			Hd	HW	Ss	SMALL FISSURE CRACKS H2 BEDDED VERY HARD II GRADUAL COLOR CHANGE TO LT RED BROWN / BLUE STREAK	
	100	100	80															
	100	100															PREDOMINANTLY SANDSTONE w/ LIMESTONE SPEC. UNIFORM	
	90	100	90															
	90	100																
	90	100	V															
	90	100	100															
	100	100	10														121' LIMESTONE MODULES	
	0	0	10	VOID													122' VOID - WATER BEARING	
	100	100	10									VERY HARD	Ws	Ls			123' GRAY LIMESTONE VERY HARD III	
V	100	100	10														124' TD=125'	

COMMENTS: TD = 125', LOST CIRCULATION @ 122'
AFTER PULLING CORE BASEL. HOLE BECAME ARTESIAN @ 50 PM
RAN CLEAR @ 10 PM. AFTER PULLING CORE STEEL AN 12-19-84
ARTESIAN @ 26 PM @ 10:15 AM

BORING OPERATION
H - 1/2" HOLLOW STEEL UNDER
C - 1/2" CONTINUOUS FLIGHT UNDER
SS - CLEAR BIT
BS - NO ROCK CORING
ND - NO DRILLING ROSS CORING

BOREHOLE LOG (ROCK)

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LOCATION MAP:

LOG OF 4 1/2" ROTARY REAMING
HOLE START AT 7'-22" ON 12-16-84
FINISH 22'-27" ON 12-17-84 7:10

SITE ID: MT01 LOCATION ID: 907
APPROX. SITE COORDINATES (N. E.):
N E
GROUND ELEVATION (H. MSL):
DRILLING METHOD:
DRILLER:
DATE STARTED: 12-11-84 TODAY 12-17-84
DATE COMPLETED:
FIELD REP.: SILVA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)
12-16-84	2:30 PM	24 ft.
12-17-84	5:30 PM	56 ft.
12-18-84	NOON	+1.5' @ 2:59 PM

ARTESIAN CONDITIONS FROM 12-15-84 2:30 PM

LOCATION DESCRIPTION IN ARROYO

SITE CONDITION BELOW FILL IN ARROYO COLD & SNOWY

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES										WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION								CONDITION
						WIDE		CLOSE			HORIZ.		VERT.						
						1	2	3	4	5	H	50°	V						
7'	NW	NA	NA	100%													EXPOSED 3" ROCK CORE HOLE TO 125'		
10'	4 3/4"	TRICONE		110													LOG FOR 4 1/2" ROTARY HOLE REAMING 12'		
22'																	START REAMING 3000 PSI CUTTINGS NOT CIRCULATING DRIPPING INTO HOLE RATE 1700 GPM		
37'	NW																REAMING TO 37' WITH 4 1/2"		
	2 1/4"	TRICONE		110													BACK IN WITH 2 1/4" TRICONE ONLY TO 82'		
	NW																BEFORE (AFTER) PLUG WAS REMOVED		
83'																	83'		
93'				120%													93' - 95'		
97'																	97' - 99' - 100' - 101' - 102' - 103' - 104' - 105' - 106' - 107' - 108' - 109' - 110' - 111' - 112' - 113' - 114' - 115' - 116' - 117' - 118' - 119' - 120'		
107'																	107' - 108' - 109' - 110' - 111' - 112' - 113' - 114' - 115' - 116' - 117' - 118' - 119' - 120'		
112'																	112' - 113' - 114' - 115' - 116' - 117' - 118' - 119' - 120'		
119'																	119' - 120'		

COMMENTS: HOLE REAMED TO 37' IN 4 1/2" TRICONE
THEN CLEANED WITH 2 1/4" TRICONE TO 119'
THEN WASHED TO 120' WITH WATER

BORING OPERATION
A - 6 1/2" HOLLOW STEM AUGER
B - 6 1/2" CONTINUOUS FLIGHT AUGER
C - BEAD BIT
D - DI ROCK BORING
E - NO WIRELINE ROCK BORING

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

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LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: 908
APPROX. SITE COORDINATES (N. 1.1.):
N 10000 E 9580
GROUND ELEVATION (ft. MSL): 4290
DRILLING METHOD: NO WIRELINE
DRILLER: ET LATER
DATE STARTED: 1-8-85
DATE COMPLETED:
FIELD REP.: SILVA / MCBENRY

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION: NORTH OF TAILINGS AREA NEXT TO 905
SITE CONDITION: IN ARROYO N.W. SIDE OF SITE

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	% ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES										CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION								
						WIDE		CLOSE			HORIZ.		VERT.						
						1	2	3	4	5	H	50°	V						
0	NA	NA	NA	DRY	-											STANDPIPE SUBMERGED ON 1-2" BS (GRAVITY FEED) (COUNTED) 1"			
1	NA	NA	NA	DRY	-											OPEN HOLE THROUGH USING 3/8" DEARBIT			
2	NA	NA	NA	DRY	-											SANDY-CAMEY RED-DISKY BED BEDD ALLUVIUM IN			
3	NA	NA	NA	DRY	-														
4	NA	NA	NA	DRY	-														
5	NA	NA	NA	DRY	-														
6	NA	NA	NA	DRY	-														
7	NA	NA	NA	DRY	-														
8	NA	NA	NA	DRY	-														
9	NA	NA	NA	DRY	-														
10	NA	NA	NA	DRY	-														
11	NA	NA	NA	DRY	-														
12	NA	NA	NA	DRY	-														
13	NA	NA	NA	DRY	-														
14	NA	NA	NA	DRY	-														
15	NA	NA	NA	DRY	-														
16	NA	NA	NA	DRY	-														
17	NA	NA	NA	DRY	-														
18	NA	NA	NA	DRY	-														
19	NA	NA	NA	DRY	-														
20	NA	NA	NA	DRY	-														
21	NA	NA	NA	DRY	-														
22	NA	NA	NA	DRY	-														
23	NA	NA	NA	DRY	-														
24	NA	NA	NA	DRY	-														
25	NA	NA	NA	DRY	-														
26	NA	NA	NA	DRY	-														
27	NA	NA	NA	DRY	-														
28	NA	NA	NA	DRY	-														
29	NA	NA	NA	DRY	-														
30	NA	NA	NA	DRY	-														
31	NA	NA	NA	DRY	-														
32	NA	NA	NA	DRY	-														
33	NA	NA	NA	DRY	-														
34	NA	NA	NA	DRY	-														
35	NA	NA	NA	DRY	-														
36	NA	NA	NA	DRY	-														
37	NA	NA	NA	DRY	-														
38	NA	NA	NA	DRY	-														
39	NA	NA	NA	DRY	-														
40	NA	NA	NA	DRY	-														
41	NA	NA	NA	DRY	-														
42	NA	NA	NA	DRY	-														
43	NA	NA	NA	DRY	-														
44	NA	NA	NA	DRY	-														
45	NA	NA	NA	DRY	-														
46	NA	NA	NA	DRY	-														
47	NA	NA	NA	DRY	-														
48	NA	NA	NA	DRY	-														
49	NA	NA	NA	DRY	-														
50	NA	NA	NA	DRY	-														

COMMENTS: _____

BOREHOLE DEVIATION
D - 0 1/2 HOLLOW STEM ANGLE
C - 0 1/2 CONTINUOUS FLIGHT ANGLE
SS - DEAR BIT
RE - RE BACK CORING
NO - NO WHOLE ROCK CORING

BOREHOLE LOG (ROCK)

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LOCATION MAP:

SEE PAGE DNE

SITE ID: HATD1 LOCATION ID: 908
APPROX. SITE COORDINATES (N. E.):
N E
GROUND ELEVATION (ft. MSL):
DRILLING METHOD:
DRILLER: CARTER ADAMS LANE 95
DATE STARTED: 1-8-85
DATE COMPLETED:
FIELD REP.: SILVA / MCENERY

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									CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION							
						WIDE — CLOSE					HORIZ. — VERT.							
						1	2	3	4	5	H	30°	V					
100	NR	100	100	100		x							SL	RS	SL	SLANDY SOFT LAYER GRAVELLY		
		100	D			x									CL			
		100	D			x												
		100	95			x							WS	SL		SILTSTONE		
		100	50			x							WS	SL		GREY- RED BROWN INTERBED SILTSTONE WITH LIMESTONE ENCLAVES		
		100	100						x							VERTICAL FRACTURES		
		100	70						x									
	Y	100	80						x							PREDOMINANTLY CLASS II SILTSTONE		
	NR	100	60	60		x										RED BROWN		
		50				x							SL	RS	SL	24" CLAY WITH STAGNANT US		
		0													EL	CLAY & MUD CLAY		
		50												WS	LS	LIMESTONE LAYER		
		0													SL	SILTSTONE		
		0													SL	ARTIFICIAL		
	Y	30													SL	PURE SPACES		
																VERTICAL FRACTURE WEATHERING BLACK-B		

COMMENTS:

BORING OPERATION
B - 0 1/2 INCH STEEL ANGLE
C - 0 1/2 INCH CONTINUOUS FLIGHT ANGLE
NR - NO CORE
SL - SLT ROCK BORING
WS - WS ROCK BORING
NO - NO WHOLE ROCK BORING

BOREHOLE LOG (SOIL)

Page 3 of 3

LOCATION MAP: SEE PAGE 2

SITE ID: HAT 01 LOCATION ID: 933

SITE COORDINATES (ft.):

N _____ E _____

GROUND ELEVATION (ft. MSL): _____

DRILLING METHOD: DOWN HOLE HAMMER 3/4"

DRILLING CONTR.: BEEMAN DRILLING CO.

DATE STARTED: 10-14-85

DATE COMPLETED: 10-15-85

FIELD REP.: E. DONNELSON / SHIR GEOLOGIST

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)
10-15-85	7:40AM	125 - 145'
NO WATER OBSERVED FROM 0-145' ON 10-14-85		
WATER FORMED IN HOLE OVERNIGHT. SEEP IS * DRILLER WAS ABLE TO BLOW DRY HOLE		

LOCATION DESCRIPTION SEE PAGE 1

SITE CONDITION SEE PAGE 1

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	DRILL RATE BLOWS PER 2-1/2" MIN / 5 FT	FOOT- CANDLES VARIABLE	FOOT- CANDLES USGS GEOL	VISUAL CLASSIFICATION
120					5/4"	22.5	H A T 0 1 S H A L E	Phy SLT	NOTES: TRACE GRAY GRN SILTSTONE 122-125' NOTE: TRACE GRAY GRN SILTSTONE 136-138' NOTE: SOME INTERBEDDED ORANGE MUD- STONE 142-144' NOTE: SOME INTERBEDDED ORANGE MUDSTONE w/ TRACES GRAY SILTSTONE 156-159'.
						17			
130						20.5			
						14			
140						11			
14-16-85						21			
10-15-85						16			
						11			
150						29			
160						14			
170						25	H A T 0 1 S H A L E	LS Pht	169 - 175' LIMESTONE: Shaly at top light gray grading to light gray brown.
175									T.D. 175', 9:45AM, 10-15-85

COMMENTS: SO SLIGHT THAT WE ARE UNABLE TO DETERMINE
FROM LITH & GEOPHYSICAL LOGS THE LOCATION OF THE
AQUIFER. THUS, UNABLE TO SELECT SCREEN LOCATION.
ABANDONED AND GROUTED HOLE. WELL SUGGESTS THAT THE

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 - 5" O.D. thin-walled Shelby tube

JEG-AL-ENG-29 (4/85) AQUIFER COULD BE AT 130'. AMOUNT OF WATER PRESENT IS
TOO SMALL TO DEVELOP.

BOREHOLE LOG (ROCK)

Page 2 of 2

LOCATION MAP:

See page one

SITE ID: MA-01 LOCATION ID: 908
APPROX. SITE COORDINATES (ft.):
N: _____ E: _____
GROUND ELEVATION (ft. MSL): 4290
DRILLING METHOD: NO WIRELINE
DRILLER: CARTER/ADAMS
DATE STARTED: 11/8/85
DATE COMPLETED: _____
FIELD REP.: ALC/ency

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	% ROCK QUALITY DESIGNATION (RQD)	% BRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES									WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION							CONDITION
						WIDE		CLOSE			HORIZ.		VERT.					
						1	2	3	4	5	H	60°	V					
0	NO	100	0	60		Y					X			Smc	US	St	dirty red siltstone, weathered in horizontal fractures, class III hardens, grades to no fractures or apparent laminations, darker red (10R, 3/4 Munsell)	
30			30			Y											St	med. red siltstone, soft, increased clay content, close spaced hor. fractures
50			50			Y											St	red siltstone, some lenses of light gray sh. of darker gray, med. fr. fractures
100			100	15		Y								SmD			St	dark red siltstone, med. spaced hor. fractures
100			100			Y					X						St/sh	gray, med. clayey sh., med. integrity
0			0			Y											St	dirty red siltstone, no fractures, hardens class III, sparse small lenses of gray shale 1/2 S.
75			75				Y				X						St	
50			50														St	
40			40														St	
50			50														St	
100			100			Y											St	
100			100			Y											St	
100			100														St	
100			100														St	

COMMENTS:

BIRMINGHAM OPERATION
M - 1/2" HOLLOW STEM ANGLES
C - 1/2" CONTINUOUS FLIGHT ANGLES
BA - 60MM BIT
WS - 60MM CORES
WD - 60MM WIRELINE ROCK CORING

BOREHOLE LOG (ROCK)

Page 4 of 4

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: 908
APPROX. SITE COORDINATES (ft.):
N: _____ E: _____
GROUND ELEVATION (ft. MSL): ~4290
DRILLING METHOD: NO WIRELINE
DRILLER: CARTER/ADAMS
DATE STARTED: 1/8/85
DATE COMPLETED: _____
FIELD REP.: MCENERY

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								WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION						CONDITION
						WIDE		CLOSE			HORIZ.		VERT.				
						1	2	3	4	5	H	50°					
	NG	100	100	15		X					X			Sm	W5	St	dusky red siltstone, refractives, hardmass Class III, very small sparse lenses of grey shale/L.S.
			↓			↓					↓					↓	
			30				X				X					St	weak red (10R, 4/4 Munsell) siltstone, little to no fractures
			0				X				X						
			75			X					X						
			100														
			100													↓	
																St	Some w/ increased interbeds w/ soft dark grey shale. Minor L.S. nodules.
																St	same as above, no fractures, weak red siltstone w/ small light-grey shale/L.S. lenticular inclusions
																↓	
																↓	
																↓	

COMMENTS:

BOWING OPERATIONS
 1 - 1 1/2" BOWING TIE RODS
 2 - 1 1/2" BOWING TIE RODS
 3 - 1 1/2" BOWING TIE RODS
 4 - 1 1/2" BOWING TIE RODS
 5 - 1 1/2" BOWING TIE RODS
 6 - 1 1/2" BOWING TIE RODS
 7 - 1 1/2" BOWING TIE RODS
 8 - 1 1/2" BOWING TIE RODS
 9 - 1 1/2" BOWING TIE RODS
 10 - 1 1/2" BOWING TIE RODS

BOREHOLE LOG (ROCK)

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LOCATION MAP:

A

SITE ID: HAT 01 LOCATION ID: 908
APPROX. SITE COORDINATES (N.):
N E
GROUND ELEVATION (ft. MSL): ~ 4200
DRILLING METHOD: NOWIRELINE
DRILLER:
DATE STARTED: 1/8/85 TODAY'S DATE 1/9/85
DATE COMPLETED:
FIELD REP.: M. G. GARY

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION
SITE CONDITION

[illegible]**COMMENTS:**

DONOR SPIRITUAL
M - 6 1/2 HOUR STEW ANDER
E - 4 1/2 HOUR CONTINUOUS FLIGHT ANDER
GR - GARDEN
MR - 81 BUCK CORNER
NR - ONE WINDY, ROCK CORNER

BOREHOLE LOG (ROCK)

Page 6 of 10

LOCATION MAP:

see pg. one

SITE ID: HAT 01 LOCATION ID: 908
APPROX. SITE COORDINATES (N. E.):
N E
GROUND ELEVATION (ft. MSL): ~4290
DRILLING METHOD: WIRELINE
DRILLER: CARTER/ADAMS
DATE STARTED: 1/8/85 TODAY: 1/9/85
DATE COMPLETED:
FIELD REP.: MCENERY

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									WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION							CONDITION
						WIDE		CLOSE			HORIZ.		VERT.					
						1	2	3	4	5	H	60°	V					
NR	100	100	60		X					X				Smc	Ms	St	Continuation of light reddish brown siltstone, fracture begins at 67, becomes heavy 68-71' both vert & horiz. Wx in fracs. Hardness Class III.	
			30		X					X								
			0							X	X		X					
			0							X	X		X					
			0							X	X		X					
			100		X						Y							
			100															
NR	100	100	60		X						Y						Thin bed of grey L.S. at 73'8"-73'12"	
			80			X						X					Continuation of light reddish brown siltstone some characteristics as the 7th core run.	
			100		X						X							
			100		X						X							
			100		X						X							

COMMENTS:

BORING OPERATION
N - 1/2 HOLLOW STEM BORING
S - 1/2 CONTINUOUS FLIGHT BORING
NR - BEAR PIT
RT - IN ROCK BORING
RG - IN WALL/ROCK BORING

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

Page 7 of 8

LOCATION MAP:

SITE ID: KATOY LOCATION ID: 908
APPROX. SITE COORDINATES (N.):
N E
GROUND ELEVATION (ft. MSL): 4290
DRILLING METHOD: AIR WIRELINE
DRILLER: CARTER/ADAMS
DATE STARTED: 1/8/85 TODAY: 1/9/85
DATE COMPLETED:
FIELD REP.: MCENERY

See pg one

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION

DEPTH (FT)	BORING OPERATION	S. CORE RECOVERY	ROCK QUALITY DESIGNATION (RQD)	S. DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES									CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION							
						WIDE		CLOSE			HORIZ.		VERT.					
						1	2	3	4	5	H	50°	V					
1	NO 100	100	100	100	100	X								Sm	WS	St	continuation of light reddish brown siltstone, small amount of fracturing, hardness class III, very thin bed of gray ^{15"} at 79'10"-79'11" and again at 87'3"-87'6"	
						X					X							
						X					X							
						X					X							
						X					X							
						X					X							

COMMENTS: color of St when dry is light reddish brown, when wet is dusky red
color of shale is olive when wet, grey when dry

BORING OPERATION
H - 8 1/2" HOLLOW STEM AUGER
C - 6 1/2" CONTINUOUS FLIGHT AUGER
SB - SCAR BAR
DR - DR BORE CORING
RD - RD WILLIAMS ROCK BORING

BOREHOLE LOG (ROCK)

Page 2 of 2

LOCATION MAP:

see pg. one

SITE ID: HA201 LOCATION ID: 908
APPROX. SITE COORDINATES (N. E.):
N: _____ E: _____
GROUND ELEVATION (ft. MSL): 4290
DRILLING METHOD: NO WIRELINE
DRILLER: CARTER/ADAMS
DATE STARTED: 11/15 DDAY 11/15
DATE COMPLETED: _____
FIELD REP.: MCENERY

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____

SITE CONDITION _____

DEPTH (FT)	DURING OPERATION	% CORE RECOVERY	ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES									CORROSION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION							
						WIDE — CLOSE					HORIZ. — VERT.							
						1	2	3	4	5	H	50°	V					
NO	95	100	60			X					X				Smc	WS	St	continuation of
			100			X					X							light reddish brown
			60				X				X							siltstone, small
			60				X				X							amount of
											X							fracturing,
NO	45	100	75			X					X				Smc	WS	St	hardness class
			80															III, slightly
			100															weathered in
			50								X							fractures, very
			80								X							homogeneous unit,
			50															from 93' to 103' 10"
			100															some inclusions of
																		clastic the size
																		of rock salt, from
																		97' - 100' clastic
																		interbedded, rock in
																		poor (crumbly) at
																		interface between
																		clastic & st.

COMMENTS: color of st when dry: H. red. brown, when wet: dusky red
color of clastic when dry: gray, when wet: blue
L.S.

BOREHOLE OPERATION
M - 6 IN HOLLOW STEM AUGER
C - 6 IN CONTINUOUS FLIGHT AUGER
QS - BEAD BIT
BS - 80 GPM BOREHOLE
BD - 80 GPM BOREHOLE

BOREHOLE LOG (ROCK)

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LOCATION MAP:

12

See pg one

SITE ID: HAT 01 LOCATION ID: 908
APPROX. SITE COORDINATES (N. E.):
N: _____ E: _____
GROUND ELEVATION (ft. MSL): ~4290
DRILLING METHOD: NO WIRELINE
DRILLER: CARTER ADAMS
DATE STARTED: 1/2/85 TODAY 1/9/85
DATE COMPLETED: _____
FIELD REP.: MCENERY

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						CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS				
						SPACING		ORIENTATION											
						WIDE ——— CLOSE		HORIZ. ——— VERT.											
						1	2	3	4	5	6	H	50°	V					
100	NG	100	70	Y								Y			ST	light reddish brown siltstone with trace of clay shale/ls. lens interbedded			
75																			
100							X						X	X		vertical fracturing at 108'			
100								X				X			CL	moist clayey red clay from 109-112, broken into cobbles, light red brown with nodules of clay			
50								X							CL	light red brown with nodules of clay			
															ST	size of rock salt			
																vert. fractures at 113'			

COMMENTS:

BOREHOLE OPERATIONS
N - 8 1/2" HOLLOW STEM BOREHOLE
C - 8 1/2" CONTINUOUS FLIGHT AUGER
CB - CORE BIT
RL - 8 1/2" ROCK CORING
RD - 8 1/2" HOLLOW ROCK CORING

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

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LOCATION MAP:

SITE ID: NAT 01 LOCATION ID: 908
APPROX. SITE COORDINATES (ft.):
N 10000 E 9580
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLER: J.C. S.H.B. BOAT-1-10-15
DATE STARTED: 1/8/05
DATE COMPLETED: _____
FIELD REP.: SILVA

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								CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION						
						WIDE		CLOSE			HORIZ.		VERT.				
						1	2	3	4	5	H	90°	V				
100	NR	100	100	80		Y								SW	SE	SWITCH TO 10' ISCT AND WDBI - SILTSTONE FINE SANDS H2 BEDDING	
							X								SE	VHARD II DISYRED	
							X								SE		
						Y							SW	R6	LG	SOFT PURPLE CLAYSTONE	
											A			SW	10	SILTSTONE	
											X					LIMESTONE BLUE	
											X					LIMESTONE BLUE	
								X	Y	X						RED BLUE MIX	
							Y										
											Y				LG	BLUE LG LAYON	
											X				SE	FRATILE INCLINING	
											X				LG	CRYSTAL LAYON	
											Y				SE	LIMESTONE	
											Y				SE		
								X			Y					LG LAYON 158, 143	
							A	Y								VERY HARD	
								Y									
								X									

COMMENTS:

BORING OPERATION
W - 0' TO 10' HOLLOW STEM BORE
C - 0' TO 10' CONTINUOUS FLIGHT BORE
NR - NO CORE
SE - SE ROCK CORING
NO - NO WIRELINE ROCK CORING

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

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LOCATION MAP:

SITE ID: HATO1 LOCATION ID: 908
APPROX. SITE COORDINATES (N. E.):
N 10,100 E 4580
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: UD
DRILLER: DC SUB
DATE STARTED: 1-8-85 1-10-85
DATE COMPLETED: _____
FIELD REP.: ELKA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____

SITE CONDITION _____

DEPTH (ft)	BORING OPERATION	CORE RECOVERY	SPECK QUALITY DESIGNATION (KOD)	S DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES						CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS		
						SPACING					ORIENTATION						
						WIDE		CLOSE			HORIZ.					VERT.	
						1	2	3	4	5	H					80°	V
0																	
10																	
20																	
30																	
40																	
50																	
60																	
70																	
80																	
90																	
100																	
110																	
120																	
130																	
140																	
150																	
160																	
170																	
180																	
190																	
200																	

COMMENTS:

BORING OPERATION
H - 8 1/2" HOLLOW STEM AUGER
C - 6 1/2" CONTINUOUS FLIGHT AUGER
DR - DRILL BIT
RE - RE-DRILLING
RD - RE-DRILLING ROCK CORING

BOREHOLE LOG (ROCK)

Page 2 of 2

LOCATION MAP:

SITE ID: HAT01 LOCATION ID: _____
APPROX. SITE COORDINATES (N. E.):
N 10,000 E 9500
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: ND
DRILLER: SMG
DATE STARTED: 1-6-85
DATE COMPLETED: _____
FIELD REP.: SLVA

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION

[illegible]**COMMENTS:**

EDMUND SPINALETH
W - 6 1/2 INCHES STAIN ANGLE
E - 4 1/2 INCHES STAIN FLIGHT ANGLE
SP - 6 INCH ST
SE - 8 INCH CORNER
SD - 8 INCH CORNER

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

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LOCATION MAP:

See Pa 1

SITE ID: HA001 LOCATION ID: 908
APPROX. SITE COORDINATES (ft.):
N 10000 E 9580
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: NR
DRILLER: J.L. SH2
DATE STARTED: 1-7-85 1-10-85
DATE COMPLETED: _____
FIELD REP.: SILVA

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									WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION							COMBINATION
						WIDE		CLOSE			HORIZ.		VERT.					
						1	2	3	4	5	H	50°	V					
100	100	100	80			1					X				5m0	SW	Ls	SILTSTONE
																	Se	MASSIVE
																		SMALL BEDDING
																		ENCASED
																	</	

COMMENTS: _____

BORING OPERATION
M - 5 1/2" HOLLOW STEM BORING
E - 4 1/2" CONTINUOUS FLIGHT BORING
BB - BEAR BIT
BR - BY ROCK BORING
BO - BY OIL BORING; ROCK BORING

BOREHOLE LOG (ROCK)

Page 14 of 14

LOCATION MAP:

See page one

SITE ID: HAT01 LOCATION ID: 908
APPROX. SITE COORDINATES (N. E.):
N E
GROUND ELEVATION (ft. MSL): 4290
DRILLING METHOD: N/S WIRELINE
DRILLER: CARTER/ADAMS
DATE STARTED: 1/10/95 TODAY 1/10/95
DATE COMPLETED:
FIELD REP.: MCENERY

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										WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION							
						WIDE — CLOSE					HORIZ. — VERT.							
						1	2	3	4	5	H	80°	V					
NQ	180	80	100			X					X				W	St	dark, red calcareous, mass, sh., w/ sandy stringers of ls. in bedded.	
		50				X					X				W	LS	184' 0" - 182' 7" dark grey, ls. massive, tight, cemented, hard, non-bedded.	
		0								X	X		X		W	SS	182' 7" - 182' 8" more grey ss.	
		0								X	X		X		W	SS	Friable, some small ls. inclusions, (has greenish yellow deposits in fractures) chert nodules like battery acid, porous texture, Green ls. med. sand, fine gr. ls., water encountered	
NQ	100	0	100							X	X		X		NM	Silt		
		0								X	X				W	LS		
		90							X		X					LS	grey ls., cherty, spaced fracture, pitted surface (pressure) filling	
		90						X			X						has green deposits in fracture surface + pits + pores, strong chemical odor, hard, non-bedded	
		90				X					X						close to from 185' 6" - 185' 6"	
		0						X			X							
		100				X												
		100					X											
		50					X				X							
		100				X					X							
		100				X					X							

COMMENTS:

BORING OPERATION
W - 8 1/2" HOLLOW STEM BORING
C - 6 1/2" CONTINUOUS FLOW BORING
M - 6 1/2" M
N - 6 1/2" ROCK BORING
D - 6 1/2" DRILLING ROCK BORING

BOREHOLE LOG (ROCK)

Page 3 of 4

LOCATION MAP:

See pg 1

SITE ID: 14701 LOCATION ID: 909
APPROX. SITE COORDINATES (N.):
N E
GROUND ELEVATION (ft. MSL):
DRILLING METHOD:
DRILLER: Bra B-20
DATE STARTED: 1-8-85 TIME: 1-9-85
DATE COMPLETED:
FIELD REP:

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION

[illegible]**COMMENTS:**

- BOWEN OPERATIONS
 1 - 117 FOLLOW UP AND
 2 - 117 CONTINUOUS FLAME AND
 3 - 117 117
 4 - 117 117
 5 - 117 117
 6 - 117 117

BOREHOLE LOG (ROCK)

Page 3 of 3

LOCATION MAP:

《王 后》！

SITE ID: HATO1 LOCATION ID: 905-909

APPROX. SITE COORDINATES (N.L.):

2 _____

GROUND ELEVATION (ft. MSL): _____

DRILLING METHOD: _____

DRILLER: _____

DATE STARTED: 1-8-85 1-9-85

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	PACER TEST INTERVAL	DISCONTINUITIES									WEATHERING CONDITION	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION						
						WIDE		CLOSE			HORIZ.		VERT.				
						1	2	3	4	5	H	60°	V				
NO	100	100	RECORDED	X													PRESUMABLY SILTSTONE WITH LIMESTONE BLK LAYERS VERY HARD
35.5			0														NZ FRACTURES TO 70.5'
36.5																	
40.5			0														SILTSTONE DRY & BD
			50														
			60														
			80														
			90														
45.5			70														NZ FRACTURES VECTICAL FRACTURES PLUGGED OFF @ 48.5' PILOT CASE

COMMENTS:

000000 0000000000
 00 - 0 1/2 000000 0000 000000
 00 - 0 1/2 0000000000 000000 000000
 0000 - 000000 0000
 0000 + 0000 000000 000000
 0000 - 0000 00000000 000000 000000

Page 4 of 4

SITE ID: HMT 01 LOCATION ID: 709
APPROX. SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: NO HUR/1A5
DRILLER: JEVERNAGER/Williams
DATE STARTED: 4/8/85 TODAY 1/10/85
DATE COMPLETED: _____
FIELD REP.: MUENYER

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							CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION						
						WIDE		CLOSE			HORIZ.						VERT.
						1	2	3	4	5	H	60°					V
46	NQ	100	100	100		X					R			SLID	F	St	PULLED CORE BECAME BUT AFTER RUN DOWN TO DIE NOT RECOVER ALL THE CORE GASTONE PHITOL. SOLID 6' PIECE OF CORE FROM 44.5-50.5
50.5	NQ	100	95	95		X					R			F	St		Light reddish brown ss very hard class II, no small oliv. ls. lenses, closely spaced & hor. fract from 55'-56' 10", in fractured zone pe pits are present on core surface
			80											US			
			50											F			
			50											F			

COMMENTS: pale. St when when is dusky red, when dry is light reddish brown.

SIGNAL DEFINITION

M - 8 1/2 MEGALOG WITH ANALOG
C - 6 1/2 CONTINUOUS FREQUENCY ANALOG
W - 9000 Hz
H - 45 HZ NOISE SIGNAL
L - 100 WATT, 1000 PPM CORRECTION

BOREHOLE LOG (ROCK)

Page 2 of 1

LOCATION MAP:

see pg. one

SITE ID: HAT 01 LOCATION ID: 909
APPROX. SITE COORDINATES (N.):
N: _____ E: _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: NO WIRELINE
DRILLER: JEVERNAGER WILLIAMS
DATE STARTED: 10/05 TODAY 1/10/05
DATE COMPLETED: _____
FIELD REP.: MCENERY

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					CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS				
						SPACING		ORIENTATION										
						WIDE		CLOSE		HORIZ.								
						1	2	3	4	5	H	60°	V					
100	NO	100	90			X					X			darker red siltstone (color when wet) w/ very thin beds of ls. (dine) bwn 60.5-61' and 63.4'-63.6' and 64.6' and 64.8'. Fracturing occurs primarily from 66'-68' in conjunction with surface pits (pore) on both the fractured surfaces and the core surface. Both 1st & 2nd Fracs. Class II harden consistent + uniform with previous lithology				
100																		
100																		
100																		
100																		
50																		
50								X			X							
50								X			X							
50							X				X							
100						X												
100						X								Class II harden consistent + uniform with previous lithology				
100						X												
100						X												
100						X												
100						X												

COMMENTS:

BORING OPERATION
M - 5 1/2" HOLLOW STEM ANCHOR
S - 4 1/2" CONTINUOUS FLIGHT ANCHOR
GS - GRAB BIT
CS - CORE CORING
SS - SOFT SOIL CORING

BOREHOLE LOG (ROCK)

Page 6 of 6

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: 909

APPROX. SITE COORDINATES (ft.):

NAME _____

GROUND ELEVATION (ft. MSL): _____

DRILLING METHOD: NO WIRELINE

DRILLER: TEVERNAGER/WILLIAMS

DATE STARTED: 1/8/85 TODAY 1/10/85

DATE COMPLETED: _____

FIELD REP.: M. LENERY

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								CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION							
						WIDE		CLOSE			HORIZ.		VERT.					
						1	2	3	4	5	H	60°	V					
100	INQ	100	0	40						X	X				Rough	W	Cg	dusty red (wet) siltstone, silty/gray
											X						Cg	ls., clayey congl. matrix
											X						St	poorly cemented
											X						Cg	dusty red siltstone, thin
											X						Cg	bands of ls., surface
											X						Cg	extremely pitted grading
											X						Cg	into ls./siltstone conglom- erate at 78' 6" extremely fractured into sharp small angular fragments

COMMENTS:

DISPATCH INFORMATION

E - 6 1/2 HOUR DISPATCH SCHEDULE

S - 4 1/2 HOUR CONTINUOUS FLIGHT AVAILABLE

AM - FLIGHTS ONLY

NO - NO ADCS CORRECTION

NO - NO WEATHERING ADCS CORRECTION

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

Page 1 of 1

LOCATION MAP:

SITE ID: WATD1 LOCATION ID: 910
APPROX. SITE COORDINATES (N. E.):
N 8,400 E 10,400
GROUND ELEVATION (H. MSL): 4300
DRILLING METHOD: NO WIPELINE
DRILLER: SH+B CARTER/ADAMS
DATE STARTED: 1/17/85
DATE COMPLETED: _____
FIELD REP.: TRIVINO/MCENERY

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION

SEE page 1 of 1 (S&I)
BOREHOLE 104 (S&I)

DISCONTINUITIES

DEPTH (FT)	SOUNDING OPERATION	% CORE RECOVERY	ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES										WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION								CONDITION
						WIDE		CLOSE			HORIZ.		VERT.						
						1	2	3	4	5	H	80°	V						

See page 1 of 1
Soil borehole log form

dark red siltstone, infilling
fractures of very fine grained
white sand, hardness class
III, mineralization
occurring in fractures

red gray ls. 12' 9" - 12' 14"

dark red siltstone, 11' 10" - 11' 14"
Same as above

COMMENTS:

DRILLING OPERATION
S - 5 1/2" HOLLOW STEM DRILL
C - 4 1/2" CONTINUOUS FLIGHT AUGER
SS - SEAM CUT
SC - SE ROCK CORING
SD - SE DRILLER ROCK CORING

BOREHOLE LOG (ROCK)

Page 2 of 1

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: 910
APPROX. SITE COORDINATES (N.):
N 8,400 E 10,400
GROUND ELEVATION (H. MSL): 4,300
DRILLING METHOD: AIR WIRE LINE
DRILLER: SAB / CRATER / ADAMS
DATE STARTED: 1-17-85
DATE COMPLETED: _____
FIELD REP.: TREVINO / W. E. E. RY

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION

Approx 30' SW of SP-84-104
Flat ground for 2 1/2 miles

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	SPRUCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES									CONDUCTION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION							
						WIDE		CLOSE			HORIZ.		VERT.					
						1	2	3	4	5	N	60°	V					
HQ	100	100	100			X					X				Sap	Wls	St	darker red siltstone, hardness class III, in filling of fractures with white very fine grained sand, fracturing more at 20'-21' filled fine grained with sandy clay
						X					X							
						X					X							
						X						X						
						X					X							
			80			X					X				Sno			
			100			X						X			Sno			
			160			X					X				Sh			
			30					X			X				Sno			
			40					X			X							
			100			X					X					Wls	St	trace inclusions of grey ls rock with sized decrease of in filling of fractures w/ white sand.
						X					X							
						X					X							
						X					X							
						X					X							

COMMENTS:

DRILLING OPERATION
 0 - 0 1/2 INCH DIAMETER
 0 - 0 1/2 INCH CONTAINING FLUID AMOUNT
 00 - 000000
 00 - 000000
 00 - 000000

BOREHOLE LOG (ROCK)

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LOCATION MAP:

SITE ID: HAT01 LOCATION ID: 910
APPROX. SITE COORDINATES (N.):
N 8,400 E 10,400
GROUND ELEVATION (ft. MSL): 4300
DRILLING METHOD: NOWIPELINE
DRILLER: H. B. CARTER/ADAMS
DATE STARTED: 9/17/85
DATE COMPLETED: _____
FIELD REP.: MCENERY/TREVINO

See pg. one

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION

Approx 30' SW of SP-84-10F
Flat ground Top 2% slope.

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	SPECK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES										WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION								CONDITION
						WIDE — CLOSE					HORIZ. — VERT.								
						1	2	3	4	5	H	SD	V						
NR	100	90	100	100	10							X		SD	US	SE	dusky red siltstone		
		100										X					massive, face at		
		200										X					33'-33'4", hardness		
		100				X						X					class III		
		30						X				X							
NR	100	80	100				X					X		SD	US	SE	35'2"-35'5" crushed		
		75												SD			fragments of siltstone		
		75												RH			in a matrix clay matrix		
		80												SD			siltstone - dusky red		
		85					X										35'4"-35'7" moist clay		
		100				X											fractures:		
		100				X											siltstone w/ intermittent		
		100				X											fractures filled with		
		50					X										clay, dusky red		
		50					X					X							

COMMENTS:

BOREHOLE OPERATION
 01 - 5 1/2" HOLLOW STEM BOREHOLE
 02 - 5 1/2" CONTINUOUS FLIGHT BOREHOLE
 03 - REAR BIT
 04 - 40 ROCK CORING
 05 - 40 DRILLING FLUID CORING

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SITE ID: HAT 01 LOCATION ID: 910
APPROX. SITE COORDINATES (N.):
N 8,400 E 10,400
GROUND ELEVATION (ft. MSL): 4300
DRILLING METHOD: NO WIRE LINE
DRILLER: SHTB & CARTER/ADAMS
DATE STARTED: 1/17/85
DATE COMPLETED:
FIELD REP.: ALFREDY FLORENO

DATE	TIME	DEPTH (ft.)
------	------	-------------

LOCATION DESCRIPTION Hydrox 30' SW. of 5-84-104
BITE CONDITION flat ground top 2% slope.

DEPTH (FT)	BIRMINGHAM OPERATION	% CORE RECOVERY	ROCK QUALITY OR % RECOVERY	% GRADING FLUID RECOVERY	PRESSURE TEST INTERVAL	DISCONTINUITIES										WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION								CORRUPTION
						WIDE		CLOSE			HORIZ.		VERT.						
						1	2	3	4	5	H	60°	V						
NR		100	100	100		X					X				Snd	W5	St	clayey red siltstone w/ls. beds interbeds a very thin band Some clay filling the fractures the 4 1/2" harder class 2 , small d. & very fine gr. ca. cemented	
			90				X												
			75				X												
			90				X												
			50			X													
			100																
			100																
			75																
			100																
			100			X					X				↓	↓	↓		
			0	100				X					X						
			0					X					X						
			100			X	X				X								
			100			X	X												
			100			X	X								↓	↓	↓	Dark Red surface w/ls. more bedded in very thin bands. Some clay filling. Red	

COMMENTS:

- [illegible]

Page 5 of 5

SITE ID: HAT 01 LOCATION ID: 910
APPROX. SITE COORDINATES (N. E.):
N 1,400 E 10,400
GROUND ELEVATION (ft. MSL): 4300
DRILLING METHOD: NO WIRELINE
DRILLER: S.H. & CARTER / ADAMS
DATE STARTED: 1/17/95
DATE COMPLETED: 1/17/95
FIELD REP.: MAJENRY GLEVING

DATE	TIME	DEPTH (ft.)

SITE CONDITION

SECTION Across 30' SW of 9P-84-104
Flat ground for 2% slope

[illegible]**COMMENTS:**

自2008年1月1日起, 在境内销售货物的单位和个人, 凡符合规定条件的, 均应按照《办法》的规定, 向主管税务机关办理备案手续, 并持备案资料向主管税务机关申报抵扣进项税额。

01 - 0 5/2 0001000 2720 00000
 02 - 0 5/2 0001000 2720 00000
 03 - 00000 00000
 04 - 00 00000 00000
 05 - 00 00000 00000
 06 - 00 00000 00000

TAC TEST PITS:

ON FILE

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

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LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: 910
APPROX. SITE COORDINATES (N. 1.):
N 8,100 E 10,400
GROUND ELEVATION (ft. MSL): 4700
DRILLING METHOD: NR 10" TAPER
DRILLER: SUB - CARTER / ADAMS
DATE STARTED: 11/17/85 11/18/85
DATE COMPLETED:
FIELD REP.: HOWARD

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION 230' SW 0 = SP-84-104
SITE CONDITION FLAT TO 2% SLOPE

DEPTH (FT)	BORING OPERATION	CORE RECOVERY	ROCK QUALITY DESIGNATION (RQD)	DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES										WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION							
						WIDE		CLOSE			HORIZ.		VERT.					
						1	2	3	4	5	H	80°	V					
AB	100	100	90	X					X				SPD	10s	56	DARK RED SILTSTONE, fine grained, well cemented. 68% LS nodules throughout the zone.		
		100		X														
		100		X														
		100		X														
		0						X					RAIN			DARK RED SILTSTONE, highly fractured, some calc. nodules.		
		0							X									
		0							X									
		50					X						SPD	6s		DARK RED SILTSTONE / LS, crumbly, well cemented. Fine grained.		
		50					X						SPD	6s				
		100		X											St	Light brown sandstone - fine grained, well cemented, possibly trace of oil - note.		
		100		X														
		50					X						SPD	6s		Microfossiliferous siltstone, brown siltstone, fractured siltstone with calc. nodules (1).		
		100		X											St			
		100		X											LS	Reddish brown - 5' thick. Interbedded w/ gray to blue ls.		
		100		X														

COMMENTS: Change @ 94' - mostly even bedded
on and pits and had calc. nodules

BOREHOLE OPERATION
H - 8 1/2" HOLLOW STEEL BORE
S - 4 1/2" DOWNHOLE FLUID BORE
SD - SEAL BIT
SH - SH ROCK BORING
SB - 80" WALLING ROCK BORING

Page 2 of 2

A

SITE ID: HAT 01 LOCATION ID: 910
APPROX. SITE COORDINATES (N. I.):
N 12,400 E 12,400
GROUND ELEVATION (ft. MSL): 1300
DRILLING METHOD: NO WIRELINE
DRILLER: SAB - CACITE / ADAMS
DATE STARTED: 1/1/85 (GMA 1/16/85)
DATE COMPLETED:
FIELD REP.: HOLMES

DATE	TIME	DEPTH (ft.)
------	------	-------------

LOCATION DESCRIPTION R 30' SW OF SP. BY 10Y
SITE CONDITION _____

[illegible]**COMMENTS:**[illegible]

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

Page 2 of 1

LOCATION MAP:

SITE ID: H401 LOCATION ID: 910
APPROX. SITE COORDINATES (N.3):
N 8,400 E 12,400
GROUND ELEVATION (ft. MSL): 4300
DRILLING METHOD: NR 10, REINFORCED
DRILLER: SHB - E40-10 / ADAMS
DATE STARTED: 1/12/95 (TIME: 11:00 AM)
DATE COMPLETED: _____
FIELD REP.: ALAN MIST

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION ~ 30' SW OF SP-84-104
SITE CONDITION FLAT TO 2% SLOPE

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	SPOCK QUALITY DESIGNATION (MOD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES							WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION					CONDITION
						WIDE — CLOSE		HORIZ. — VERT.								
						1	2	3	4	5	H	60°				
NR	120	100	75	X						X			SPG	WS	St	Light brown Siltstone FINE GRAINED, VERTICALLY COLUMNED
		101		X											St	
		100		X											St	
		100		X											St	
		75						X					Lower		St	DARK RED GASTROPOD SHELLS PROTRUDING FROM CONGLOMERATE SOME DISPERSED LINE FRAGMENTS
		0							X						St	
		50					X								St	DARK RED SILEXSTONE CONGLOMERATE Thin bands of ls in face, fine grained well cemented
		100		X									SPG		St	
		100		X											Cg	
		100		X											Cg	
				X											Cg	
						X							ROUGH		St	DARK RED SILEXSTONE LESS LOCAL GASTROPOD SHELLS FRAGMENTS, SPOG (LOW OVERLAP)
						X									St	
							X								St	DARK RED SILEXSTONE LESS LOCAL GASTROPOD SHELLS FRAGMENTS, SPOG (LOW OVERLAP)
							X						SPG		St	

COMMENTS:

BORING OPERATION
W - 6 1/2" HOLLOW STEM BORER
C - 6 1/2" CONTINUOUS FLAME BORER
DR - DRILL BIT
SS - 60 DEGREE CONE
SD - 60 DEGREE SLOPE BORER

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

Page 1 of 1

LOCATION MAP:

SEE PAGE 1

SITE ID: HAT 01 LOCATION ID: 910
APPROX. SITE COORDINATES (N. E.):
N 8,400 E 10,400
GROUND ELEVATION (H. MSL): 4,300
DRILLING METHOD: HQ WIRELINE
DRILLER: SAR - CARTEL / ADAMS
DATE STARTED: 1/12/95 (TO DM 1/16/95)
DATE COMPLETED: _____
FIELD REP.: ALBERT

GROUNDWATER LEVELS

DATE	TIME	DEPTH (H.)

LOCATION DESCRIPTION _____

SITE CONDITION _____

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACER TEST INTERVAL	DISCONTINUITIES										WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION								CONDITION
						WIDE ——— CLOSE					HORIZ. ——— VERT.								
						1	2	3	4	5	H	80°	V						
142	NR	100	100	45		X					X			570	W	St	SEL. RED SANDSTONE		
		100	100			X										G	DIMYRED. ALYDUS GREL-1		
		100	100			X										G	HYDRA L.		
		100	100			X										G	FINE GRAINED, WELL SORTED		
		100	100			X										G	?		
			100			X										St	DURY RED SANDSTONE		
			100			X											Very fine grained		
			100			X											finely cemented		
			100			X											Trace of lamination		
			100			X											very fine fractures		
			100			X											Trace		
			100			X	X												
			75					X											
			50						X										
			0							X									
			0							X									
			0							X									

COMMENTS: _____

BORING OPERATION
 @ - @ 1/2" HOLLOW STEM BIT
 @ - @ 1/2" CONTINUOUS FLIGHT BIT
 @ - @ 1/2" BIT
 @ - @ 1/2" BIT
 @ - @ 1/2" BIT
 @ - @ 1/2" BIT

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

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LOCATION MAP:

SITE ID: HAK 01 LOCATION ID: 910
APPROX. SITE COORDINATES (N. 1.):
N 8,400 E 10,400
GROUND ELEVATION (N. MSL): 3400
DRILLING METHOD: NR 100 REMANE
DRILLER: SHB - CARTER / ADAMS
DATE STARTED: 1/12/85 (TODAY 1/18/85)
DATE COMPLETED: 1/2/85
FIELD REP.: JOHNSON

GROUNDWATER LEVELS

DATE	TIME	DEPTH (N.)

LOCATION DESCRIPTION ~30' SWR SP-84-104

SITE CONDITION FLAT TO 2% SLOPE

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	SAMPLING QUALITY DESIGNATION (MOD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES										WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION								CONDITION
						WIDE ——— CLOSE					HORIZ. ——— VERT.								
						1	2	3	4	5	H	50°	V						
NR 100	0	95						X			X							SEE PAGE 9 STATION 2100 LITHOLOGY DRIFT AND SLT/CLAY CONTAINS A FEW FAT GRAINS, TIGHTLY COMPACTED 142 TO 144' ± BENTON PRESENT	
	0							X											
	100					X													
	100					X													
	100					X													
	100					X													
	100					X													
	100					X													
	0	0							X										
	0	0							X										
NR 100	0	0							X		X							DRIFT RED SLT/CLAY VERY WEAKLY INTERFRACTURED, NATURAL MUD FILL IN FRACS, ONE FAC WITH 1/2" ± AND 1/4" ± IS 2" FILL, NO MUD AND, FURTHER DOWN	
NR 100	0	50							X										
	0	50																	
	0	50																	
	0	50																	
	0	50																	

COMMENTS: LOG CORRECTION AT 442E

DRIFT OFF BIT @ NR 100 ENTERED 1/18/85

REMARKS: WATER LEVEL 8.0' TO 8.5' - 21' 2" H

DRIFT OFF BIT @ 100' - 21' 2" H

DRILLING OPERATION
 0 - 0 1/2" HOLLOW STEM AUGER
 1 - 0 1/2" CONTINUOUS FLIGHT AUGER
 2 - 0 1/2" BIT
 3 - 0 1/2" ROCK CORING
 4 - 0 1/2" WIRELINE ROCK CORING

BOREHOLE LOG (ROCK)

Page 1 of 1

LOCATION MAP:

SEE PAGE 1

SITE ID: HATD1 LOCATION ID: 910
APPROX. SITE COORDINATES (N. E.):
N 8400 E 10,400
GROUND ELEVATION (ft. MSL): 9350
DRILLING METHOD: NR 10-DRILL
DRILLER: SHB - CARTER / EDAMS
DATE STARTED: 1/17/85 CDDH 1/18/85
DATE COMPLETED:
FIELD REP.: D. HANNAH

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION N 30 SW of SA-84-104
SITE CONDITION FLAT TO 2% GRADE

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	SPUR QUANTITY DESIGNATION (ft.)	DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES									WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS	
						SPACING					ORIENTATION							COMBINATION
						WIDE		CLOSE			HORIZ.		VERT.					
						1	2	3	4	5	H	50°	V					
NA	NA	0	60					X	X					NA	St	}		
		50	50					X										
		50						X						50				
		75						X								Reddish brown Siltstone, very slightly cemented, smooth and, moderately to highly fractured, traces of blue limonite, few water blebs.		
		75						X										
		75	100					X								Reddish brown Siltstone, 1/4 day thrusts are present, traces of blue limonite limonite, few water blebs, without very little silicification.		
		75	100		X			X										
		100	90	X												Reddish brown and grey siltstone, highly fractured, fine to medium grained siliceous sandstone etc.		
		100		X														
		100		X														
		100		X														
		100		X														
		100		X														
		100		X														
		100		X														
		60	60		X				X							Reddish brown and grey siltstone, highly fractured, fine to medium grained siliceous sandstone etc.		
		0	60					X										
		0	11					X										

COMMENTS: Bottom of hole is at 110 ft. depth.
Continued to 110 ft. depth.

BORING OPERATION
0 - 0 IN HOLLOW STEEL ROD
1 - 1 IN CONTINUOUS FLIGHT ANCHOR
2 - 2 IN BIT
3 - 3 IN CASE CEMENT
4 - 4 IN HOLLOW STEEL ROD

Page 12 of 1

SITE ID: HAT 01 LOCATION ID: 910
APPROX. SITE COORDINATES (N.):
N 8400 E 14,000
GROUND ELEVATION (ft. MSL): 4300
DRILLING METHOD: NO WIRELINE
DRILLER: SNE - CARTER 117145
DATE STARTED: 11/1/85 (TERRA 11/1/85)
DATE COMPLETED:
FIELD REP.: O. H. HANSEN

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION N 30' SW of SP-84-104
SITE CONDITION Flat 2-20 slope

[illegible]**COMMENTS:**[illegible]

BOREHOLE LOG (ROCK)

Page 13 of 1

LOCATION MAP:

SITE ID: HAT-01 LOCATION ID: 910
APPROX. SITE COORDINATES (N.):
N 8400 E 13400
GROUND ELEVATION (ft. MSL): 4300
DRILLING METHOD: AIR DRILLING
DRILLER: SAB - GEORGE J. JAMES
DATE STARTED: 11/15/65 (GEOLOGICAL)
DATE COMPLETED:
FIELD REP.: O. H. JAMES

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION

~30' SW of SP-01-104

[illegible]**COMMENTS:**

- ১ - ১২২ নং পল্লীতে ১২২ নং পল্লীতে
 ২ - ১২২ নং পল্লীতে ১২২ নং পল্লীতে
 ৩ - ১২২ নং পল্লীতে ১২২ নং পল্লীতে
 ৪ - ১২২ নং পল্লীতে ১২২ নং পল্লীতে
 ৫ - ১২২ নং পল্লীতে ১২২ নং পল্লীতে
 ৬ - ১২২ নং পল্লীতে ১২২ নং পল্লীতে
 ৭ - ১২২ নং পল্লীতে ১২২ নং পল্লীতে
 ৮ - ১২২ নং পল্লীতে ১২২ নং পল্লীতে
 ৯ - ১২২ নং পল্লীতে ১২২ নং পল্লীতে
 ১০ - ১২২ নং পল্লীতে ১২২ নং পল্লীতে

BOREHOLE LOG (ROCK)

Page 4 of 4

LOCATION MAP:

SITE ID: HA-01 LOCATION ID: 9R
APPROX. SITE COORDINATES (N.):
N BYOD E 10,400
GROUND ELEVATION (ft. MSL): 4500
DRILLING METHOD: NR WIRELINE
DRILLER: SAR-CORP / ADAMS
DATE STARTED: 1/17/85 (ADAMS 1/21/85)
DATE COMPLETED:
FIELD REP.: O. Hume

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION ~ 30' SW of ST-24-104
SITE CONDITION Flat in 2nd cove

[illegible]**COMMENTS:**

- SPECIAL OPERATIONS
 0 - 0 175 MILITARY STRIKE GROUP
 1 - 0 175 COMBATANT SUPPORT GROUP
 00 - 000000
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BOREHOLE LOG (ROCK)

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LOCATION MAP:

SITE ID: 4401 LOCATION ID: 910
APPROX. SITE COORDINATES (N.):
N 8400 E 10400
GROUND ELEVATION (ft. MSL): 24500
DRILLING METHOD: NR12 Bellue
DRILLER: SNA - C. Perez 1224m3
DATE STARTED: 11/1/95 TIME: 12:25
DATE COMPLETED:
FIELD REP.: H. H. H. H.

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION ~30' (N) of SP-84-104
SITE CONDITION Flt to 20% scale

[illegible]

COMMENTS: *Leafy and red 100% to 205' W*

BOMBYL OFFICINAE
 10 - 0 1/2 LBS. MICHIGAN STATE AGRICULTURAL
 12 - 0 1/2 LBS. CONTINENTAL PLANT SUPPLY
 100 - 0 1/2 LBS. IN T
 100 - 0 1/2 LBS. CONTINENTAL
 100 - 0 1/2 LBS. CONTINENTAL

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

Page 1 of 1

LOCATION MAP:

SITE ID: HAID1 LOCATION ID: 910
APPROX. SITE COORDINATES (N.):
N 2400 E 10,500
GROUND ELEVATION (N. MSL): 4300
DRILLING METHOD: DRIPPER
DRILLER: SAE - CARTER / ADAMS
DATE STARTED: 11/2/85 TIME: 11:00 AM
DATE COMPLETED: 11/2/85
FIELD REP.: ADAMS

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION: N30° S 10° E SP-24-104
SITE CONDITION: Flat to 20% slope

DEPTH (FT)	BORING OPERATION	% CORE RECOVERY	ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	DISCONTINUITIES										WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
						SPACING					ORIENTATION							
						WIDE — CLOSE					HORIZ. — VERT.							
						1	2	3	4	5	H	90°	V					
NR	100	100	80			X					X			SPD	02	St	drusy red siltstone very fine grained, interbedded w/ red grey drusy siltstone well cemented	
	11	11	11	50		X					X							

COMMENTS: HAID1 SP-24-104 DRILLER SAE - CARTER / ADAMS
22' 11" - 24' 11" - 26' 11" - 28' 11" - 30' 11" - 32' 11" - 34' 11" - 36' 11" - 38' 11" - 40' 11" - 42' 11" - 44' 11" - 46' 11" - 48' 11" - 50' 11" - 52' 11" - 54' 11" - 56' 11" - 58' 11" - 60' 11" - 62' 11" - 64' 11" - 66' 11" - 68' 11" - 70' 11" - 72' 11" - 74' 11" - 76' 11" - 78' 11" - 80' 11" - 82' 11" - 84' 11" - 86' 11" - 88' 11" - 90' 11" - 92' 11" - 94' 11" - 96' 11" - 98' 11" - 100' 11"
1/24/85 - DRILLER SAE - CARTER / ADAMS 22' 11" - 24' 11" - 26' 11" - 28' 11" - 30' 11" - 32' 11" - 34' 11" - 36' 11" - 38' 11" - 40' 11" - 42' 11" - 44' 11" - 46' 11" - 48' 11" - 50' 11" - 52' 11" - 54' 11" - 56' 11" - 58' 11" - 60' 11" - 62' 11" - 64' 11" - 66' 11" - 68' 11" - 70' 11" - 72' 11" - 74' 11" - 76' 11" - 78' 11" - 80' 11" - 82' 11" - 84' 11" - 86' 11" - 88' 11" - 90' 11" - 92' 11" - 94' 11" - 96' 11" - 98' 11" - 100' 11"

DRILLING OPERATION
① - 0 1/2 IN. HOLLOW STEEL ANCHOR
② - 0 1/2 IN. CENTRALIZER PLUGGING ANCHOR
③ - 0 1/2 IN. BIT
④ - 0 1/2 IN. ROCK BRIDGE
⑤ - 0 1/2 IN. DRILLING FLUID GUNNING

9.19.2.5

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

Page 1 of 2

LOCATION MAP: SITE ID: HAT 01 LOCATION ID: HOLE 930

SITE COORDINATES (N. E.):

N _____ E _____

GROUND ELEVATION (ft. MSL): _____

DRILLING METHOD: ROTARY AIR 7 1/8" TRICONEDRILLING CONTR.: BOB BEAMAN DRILLING CODATE STARTED: 10-9-85DATE COMPLETED: 10-10-85FIELD REP.: K. DONNELSON / SHLB GEOLOGIST**GROUNDWATER LEVELS:**

DATE	TIME	DEPTH (ft.)
10-12-85	9:30AM	52.34 (GROUND SURF)
(HOLE NOT YET DEVELOPED)		
10-9-85	CONFINED AQUIFER	96-98'

LOCATION DESCRIPTION: ABOUT 1.6 MILES SOUTH OF SAN JUAN RIVER & 300' W. OF HWY-1
SITE CONDITION: GENTLE, SHALLOW WEATHERED SILTSTONE, SPARSE LOW VEGETATION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE OBTAINED	TYPE	ID	DRILL RATE BLOWS PER 4 IN. MIN/5 FT	R VALUE	GEOL LOG	VISUAL CLASSIFICATION
0				R				Phg SLT	0 - 10' <u>HALCITO SHALE, SANDY SILTSTONE</u> ; thinbedded, calcareous, moist, medium red brn. NOTE: 0 - 5' WEATHERED NOTE: DRY 5' - 10'
10				T	7 1/8"				
				A				Phg SS	10 - 80' <u>HALCITO SHALE, SILTY SANDSTONE</u> ; thinbedded, slightly calcareous, dry, medium red brn. NOTE: STRONGLY CALCAREOUS 20' - 70' NOTE: SOME INTERBEDDED RED ORANGE MUDDSTONE 28' - 31'
15				R		15			
17				V		17			
20				A					
				R		5			
30						5			
						26			
40						8			
						16			
50						22	52.1'	10-12-85	NOTE: HARD DRILLING 46' - 78' NOTE: SOME THIN INTERBEDDED GRAY LIMESTONE & RED ORANGE MUDDSTONE 46' - 80' NOTE: VERY LITTLE MUDDSTONE BELOW 78'
						26 MIN/5 FT			

COMMENTS: INSTALLED 4" SCHED 40 PVC WITH SLOTTED SECTION FROM 100 - 100' & SAND PACK FROM 94 - 116'.

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

BOREHOLE LOG (SOIL)

Page 2 of 2

LOCATION MAP: SEE PAGE 1

SITE ID: LOCATION ID: HOLE 930

SITE COORDINATES (N. 1.):

N

GROUND ELEVATION (H. MSL):

DRILLING METHOD: ROTARY AIR 7 1/2" TRILONE

DRILLING CONTR.: BOB BEEBMAN DRILLING CO.

DATE STARTED: 10-9-85

DATE COMPLETED: 10-10-85

FIELD REP.: K. DONNELSON/SH&B GEOLOGIST

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION ABOUT 1.6 MILES SOUTH OF SAN JUAN RIVER 200' W. OF HWY 163
SITE CONDITION GENTLE, SHALLOW WEATHERED SILTSTONE, SPARSE LOW VEGETATION.

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	DRILL RATE BLOWS PER S.H. MIN/FT	R VALUE	Geol USGS	VISUAL CLASSIFICATION
					7 1/2"				
						22			
						27			
						23			
						9			
						40		Phg SLT	80 - 84' HALCANTO SHALE, SANDSILT- STONE: thin bedded, dry, consider- able interbedded gray limestone, medium red brown.
						44		Ph SS	84 - 96' HALCANTO SHALE, SILTY SANDSTONE: thin bedded, some interbedded gray & tan limestone, fine-grained, dry, medium red brn.
10-9-85						42			
10-10-85								TPH LS	96 - 103' MONKIE TRAIL FORMATION LIMESTONE: light-medium gray grading to light blue green & light purple
						36			NOTE: considerable interbedded fine-grained brn sandstone from 110 - 113'
						17			
						56 MIN/3FT		TPH SS	113 - 116' MONKIE TRAIL FORMATION SAND- STONE: thin bedded, silty, calcareous, some limestone, medium red brown.
									T.D. 116, 9:58 AM, 10-10-85

COMMENTS: ROTARY AIR 0-98', ROTARY WASH 98-116'
* JACOB'S CALLS THIS THE MONKIE TRAIL, BUT CHARLES HEATON
PROGRAM GEOLOGICAL ENGINEER FOR THE NAVAJO TRIBES DIV.
NATURAL RESOURCES SAYS THAT THE MONKIE TRAIL IS 2000'

SAMPLE TYPE
A - 3" core
B - 3" C.D. 1.35" I.D. drive sample
U - 3" C.D. 2.42" I.D. tube sample
T - 3" C.D. thin-walled Shelby core

JEO-AL-ENG-28 (4/88) DEEP. OTHERS CALL IT THE HALCANTO BUT HEATON CALLS IT
PART OF THE MONKIE FORMATION. MOST LIKELY IT IS
THE ALCO FORMATION

BOREHOLE LOG (BOR)

Page 1 of 4

LOCATION MAP

SITE NO: HAT. 01 LOCATION NO: HOLE 931

SITE COORDINATES (N. E.):

N E

GROUND ELEVATION (ft. MSL):

DRILLING METHOD: ROTARY

DRILLING CONTR.: B.B. BEAMAN DRILLING CO.

DATE STARTED: 10-10-85

DATE COMPLETED: 10-12-85

FIELD REP.: J. DONNELSON / SHLS GEOLOGIST

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)
	NONE	

LOCATION DESCRIPTION: ABOUT 1 MILE SOUTH OF SAN JUAN RIV. & W. OF OLD HWY 93.
SITE CONDITION: BORROW PIT FLOOR, SPARSE VEGETATION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	DRILL RATE FEET PER MIN / SFT	N VALUE	GEOLOGICAL CODE	VISUAL CLASSIFICATION
					8 3/4'	15		Phg LS	0 - 8' HALGAITO SHALE, SILTY LIMESTONE: fine grained, medium brown, thin bedded. NOTE: TOP 4' WEATHERED & MOIST NOTE: SOME ORANGE SILTSTONE INTERBEDS INCREASING W/DEPTH
10-10-85					7 1/6'	27		Phg SLT	8 - 16' HALGAITO SHALE, SILTSTONE: Sandy, calcareous, very thin bedded, medium red orange brn. NOTE: SOME INTERBEDDED LIGHT GRAY LIMESTONE 12 - 16
10-11-85						18		Phg MST	16 - 24' HALGAITO SHALE, MUDSTONE: friable, thin bedded, med orange, limonitic.
						4		Phg SLT	24 - 30' HALGAITO SHALE, SILTSTONE: VERY THIN BEDDED, med orange brn. CALcareous.
						1		Phg MST	30 - 38' HALGAITO SHALE, MUDSTONE: SOFT, CALcareous, MED - BK ORANGE BRN NOTE: BECOMES MORE SILTY & HARDER w/depth.
						26		Phg SLT	38 - 48' HALGAITO SHALE, SILTSTONE: Calcareous, thin bedded, medium orange brown. NOTE: TRACE LT. GRAY LIMESTONE
						6		Phg MST	48 - 73' HALGAITO SHALE, SILTSTONE: Silty, fine cuttings, med orange brn. Calcareous.
						13		Phg SLT	
						25		Phg MST	
						10		Phg SLT	
						38		Phg MST	
						29		Phg SLT	

COMMENTS: HOLE ABANDONED AT A DEPTH OF 177 FEET & GROUTED DUE TO ENCOUNTERING "BABY" SAND MEMBER OF THE MONAKER TRAIL FM AT 175'. HAD STRONG PETROLEUM ODOR & PRODUCED OIL FILM ON WATER WHEN SAMPLE WAS WASHED.

SAMPLE TYPE
A - Super cuttings
B - 2" O.D. 1.38" I.D. drive sample
U - 5" O.D. 2.42" I.D. tube sample
T - 2" O.D. threaded Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

Page 2 of 4

LOCATION MAP: SEE PAGE 1

SITE ID: HAT 01 LOCATION ID: 931

SITE COORDINATES (N.):

N _____ E _____

GROUND ELEVATION (ft. MSL): _____

DRILLING METHOD: ROTARY AIR

DRILLING CONTR.: SEEMAN DRILLING CO

DATE STARTED: 10-10-83

DATE COMPLETED: 10-12-83

FIELD REP.: K. DONNELSON / SH&B GEOLOGIST

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION ABOUT 1 MILE SOUTH OF SANTUAN RIVER & 100' E OF OLD ROAD
SITE CONDITION BORROW PIT FLOOR, SPARSE VEG - SPARSE VEGETATION.

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	DRILL RATE FEET PER MIN / SFT	W VALUE	GEOL CODE	VISUAL CLASSIFICATION
0					7 1/8"	26			
						25			
						30			NOTE: CHANGES TO BROWN w/ MORE SILTSTONE INTERBEDS BELOW TO
						63		Phg SLST	73-110' HALGATO SHALE, SILTSTONE: Thin bedded, fine cuttings, calcareous, light-medium brown.
						34			
						32			
						30			NOTE: some interbeds of light orange brown mudstone 95' - 100'
						16			
						23			
						39		Phg SLST	100' HALGATO
						28		Phg SLST	110-113 HALGATO SHALE, SILTSTONE & MUDSTONE: Thin bedded, coarse cuttings, calcareous, some orange mudstone, medium brown
						64		Phg LS	113-118 HALGATO SHALE, LIMESTONE:

COMMENTS: THIS HOLE IS LOCATED AT THE SOUTH END
OF THE MEXICAN OIL FIELD IN THE MEXICAN HAT SYN-
CLINE. THE OIL SAND IS LOCATED IN A STRATIGRAPHIC
OIL TRAP RATHER THAN A STRUCTURAL TRAP. THE

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. min-walled Shelby tube

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

Page 3 of 9

LOCATION MAP: SEE PAGE 1

SITE ID: HAT-01 LOCATION ID: 734

SITE COORDINATES (N.):

GROUND ELEVATION (ft. MSL):

DRILLING METHOD: ROTARY AIR

DRILLING CONTR.: SEEMAN DRILLING CO.

DATE STARTED: 10-10-85

DATE COMPLETED: 10-12-85

FIELD REP.: K. DONNELSON

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION: ABOUT 1 MILE SOUTH OF SAN JUAN RIVER 2 100'
SITE CONDITION: E. OF OLD HIGHWAY 143, BORROW PIT FLOOR, SPARSE VEGETATION

DEPTH	SAMPLE RECOVERY	SAMPLE RECOVERED	TYPE	ID	DRILL BLOWS PER MIN/5 FT	VALUE	GEDL 0000	VISUAL CLASSIFICATION
10-11-85				7 7/8"	22		SLST	medium red orange brown limestone w/ trace some light gray limestone, some siltstone, fine grained
10-12-85					35 MIN/4 FT		LS	118-124' SILTSTONE: COARSE CUTTINGS, calcareous, med red brown.
					67		LS	124-129' LIMESTONE: fine grained, light gray.
					58		SS	129-139' SANDY LIMESTONE: fine- grained, light-med red brown NOTE: SOME LT GRAY LIMESTONE INTERBEDS FROM 130-139'
					26			
					23			
					37		SLST	139-150' SILTY SANDSTONE: thin bed- ded, calcareous, fine-grained, med red brown. NOTE: Trace gray siltstone 145-147'. NOTE: Increased siltstone w/ depth.
					77		LS	150-154' SILTSTONE & LIMESTONE: fine grained interbedded, lt & med gray, gry green & gry brn.
					23		LS	154-169' SANDSTONE & LIMESTONE: fine grained, some gry brn limestone, medium brown. NOTE: Traces of gry gry limestone expanding w/ depth 160-169'
					37		SS	169-172' SILTY LIMESTONE:
					39			
					25			

COMMENTS: "BABY" SAND HAS A REPORTED THICKNESS OF 24'
& 22' AND IS LOCATED ABOUT 32' BELOW THE TOP OF THE
HONAKER FORMATION. THE MEXICAN HAT SYNCLINE IS ABOUT
16 MILES LONG BY 5 MILES WIDE WITH THE EAST FLANK DIP-

SAMPLE TYPE
A - Open cuttings
B - 2" O.D. 1.50" I.D. drive sample
U - 2" O.D. 2.42" I.D. tube sample
T - 2" O.D. 1.50" I.D. Shelby tube

JEG-AL-ENG-28 (4/85) PING ABOUT 24-40° & THE WEST FLANK DIPPING ABOUT

JACOBS ENGINEERING GROUP INC.

ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (SOIL)

Page 4 of 4

LOCATION MAP: SEE PAGE 1

SITE ID: NAT-01 LOCATION ID: 931

SITE COORDINATES (N. E.)

N. E.

GROUND ELEVATION (ft. MSL):

DRILLING METHOD: ROTARY AIR

DRILLING CONTR.: BEEMAN DRILLING CO

DATE STARTED: 10-10-85

DATE COMPLETED: 10-10-85

FIELD REP.: K. DONNELSON / SHLB GEOLOGIST

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION ABOUT 1 MILE SOUTH OF SAN JUAN RIVER & 100' E. OF
SITE CONDITION OLD ROAD, BORROW PIT, SPARSE PIT VEGETATION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE REMARKS	TYPE	Q	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
									thin bedded, calcareous, very fine-grained, may contain some sulfides, light-medium blue green gray.
									172-175' SHALY LIMESTONE: very thin bedded, fissile, may contain sulfides, dark gray.
									175-177' SANDSTONE: Considerable blue gray, weathered, calcareous shale, fine-grained, weakly calcareous, friable, light yellow gray to olive.
									NOTE: This sandstone has a petroliferous odor & maybe the "Baby" member of the Howaker Trail Formation.
									T.D. 177', 4:15 PM, 10-12-85

COMMENTS: Anomalous radioactivity at 147.5' on geophy-
Sica well log.

SAMPLE TYPE

- A - Auger cuttings
- S - 2" O.D. 1.33" I.D. drive sample
- U - 6" O.D. 2.42" I.D. tube sample
- T - 6" O.D. thin-walled Shelby tube

BOREHOLE LOG (SOIL)

Page 1 of 4

LOCATION MAP:

SITE ID: HAT 01 LOCATION ID: #932

SITE COORDINATES (N. E.):

N _____ E _____

GROUND ELEVATION (ft. MSL): _____

DRILLING METHOD: ROTARY AIR

DRILLING CONTR.: BEEMAN DRILLING CO

DATE STARTED: 10-13-85

DATE COMPLETED: _____

FIELD REP.: K. DONNELSON / SH&B GEOLOGIST

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION 100' EAST OF WATER PIPELINE 2 1/2 MILE SOUTH OF SAN JUAN
SITE CONDITION RIVER. AT BASE OF SMALL N-S HILL ON SLOPE, SPARSE VEG.

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	DRILL RATE BLOWS PER MIN/5 FT	FOR VALUES	GEOL USGS	VISUAL CLASSIFICATION
0				P	8 3/4"	22-25	H A L G A I T O S H A L E	Phg LS	0-6' SANDY LIMESTONE: fine grained, coarse cuttings, medium orange brown.
				A	5 1/2"	15		MDST Phg	6-11' MUDSTONE: some siltstone, calcareous, friable, fine cuttings, "brick" orange.
				A		20		Phg SST	11'-20' SANDY SILTSTONE: thin bedded, calcareous, fine-medium cuttings, medium red orange brown.
				A		32			
10								Phg SS	20-30' SILTY SANDSTONE: Calcareous coarse cuttings, fine grained medium red orange brown NOTE: SOME "BRICK" ORANGE MUDSTONE FROM 26-28'.
						30 MIN/ 15 FT			
						7.5			
						16			
						12			
50						14		Phg SST	50-187' SANDY SILTSTONE: calcareous coarse cuttings, fine grained, medium brown-red brown NOTE: some gray siltstone & limestone from 50-54
						21			

COMMENTS:

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. thermal-shielded Shelby tube

BOREHOLE LOG (SOIL)

Page 2 of 4

LOCATION MAP: SEE PAGE 1

SITE ID: HAT 01 LOCATION ID: #932
SITE COORDINATES (N.):
N: _____ E: _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: ROTARY
DRILLING CONTR.: BEEMAN DRILLING CO.
DATE STARTED: 10-13-85
DATE COMPLETED: _____
FIELD REP.: K. DONNELSON/SK & B GEOLOGIST

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION 100' EAST OF WATER PIPELINE 2 1/2 MILE SOUTH OF SANTO MARI IV.
SITE CONDITION AT BASE OF SMALL N-S RIDGE ON SLOPE, SPARSE VEGETATION.

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	DRILL RATE BLWS PER 8 IN. MIN/SFT	LOG VALUE	GEOLOGICAL UNIT	VISUAL CLASSIFICATION
				R	5 1/8"	12		Phg SLT	NOTE: Trace green gry siltstone from 78-76'
				O		11			
				T		29			
				A		16			
				R		10.5			
						14			
						12			
						12			
						3.5			
						14			
						10			NOTE: Trace of light grn gry siltstone 110-114 NOTE: Considerable "brick" orange mudstone w/ trace light gry limestone 116-118'
						7			

COMMENTS:

SAMPLE TYPE

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

Page 4 of 4

A

SITE ID: HAT 01 LOCATION ID: 932
SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: ROTARY AIR 5 1/8"
DRILLING CONTR.: BEE MAN DRILLING CO.
DATE STARTED: 10-13-85
DATE COMPLETED: 10-13-85
FIELD REP.: K. DONNELSON / SH&B GEOL

DATE	TIME	DEPTH (ft.)
10-13-83	6:28PM	192' (GROUND SURF)
10-13-85	7:00PM	153' "
10-14-85	7:35AM	151.0' "

LOCATION DESCRIPTION SEE PAGE 1
SITE CONDITION SEE PAGE 1

[illegible]

COMMENTS: HOLE DRILLED WITH 5/8" TRICONE DRIVER
3 TO 4 TIMES FASTER THAN 7/8" TRICONE & WATER
LEVEL PROBE WAS COVERED BY 2' OF BROWN STICKY OIL.
ATTEMPTED TO SAMPLE WITH BAILER BUT GOT MOSTLY

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

BOREHOLE LOG (SOIL)

Page 1 of 3

LOCATION MAP: SEE PAGE 2

A
M

SITE ID: HAT 01 LOCATION ID: 933

SITE COORDINATES (N. E.):

GROUND ELEVATION (ft. MSL):

DRILLING METHOD: DOWN HOLE HAMMER 5/4"

DRILLING CONTR.: BEEMAN DRILLING CO.

DATE STARTED: 10-12-85

DATE COMPLETED: 10-15-85

FIELD REP.: K. DONNELSON/SH & B GEOLOGIST

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION ABOUT 1/4 MILE NE OF MALCHITA & 500' EAST OF SCALE HOUSE
SITE CONDITION ON SLOPE BELOW 10 to 15' HILLS, SPARSE VEGETATION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	DRILL RATE BLOWS PER 4 in. MIN/5 FT	REMARKS	GEOL CODE	VISUAL CLASSIFICATION
0				D	5/4"				
				O		10		Phg SLT	0 - 15' SILTSTONE: Calcareous, coarse cuttings, medium brown - medium orange brown NOTE: Trace light gray siltstone 8-15'
				N		11			
10				H		14.5			
				O		3		Phg MDIT	15 - 32' MUDSTONE: Some interbedded siltstone, soft, medium orange- orange brown, calcareous, fine - medium cuttings.
20				H		5			
				A		7.5			
30				M		6			
				R		15		Phg SLT & MDIT	32 - 52' SILTSTONE & MUDSTONE: trace - some light gray limestone & siltstone, calcareous, thin bedded, fine - medium cuttings, medium red brown. NOTE: MUDSTONE DECREASING BELOW 38' - 50' NOTE: Trace - some chert 40-45' NOTE: Trace green silt 45-52'
40						18			
						7			
50						14		Phg SLT	52 - 65' SILTSTONE: Some chert trace gray limestone & siltstone, calcareous med cuttings, med orange brown
						14			

COMMENTS:

SAMPLE TYPE

A - Asper 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

BOREHOLE LOG (SOIL)

Page 2 of 3

LOCATION MAP: SEE PAGE 1

SITE ID: HAT 81 LOCATION ID: 933
SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: DOWN HOLE HAMMER
DRILLING CONTR.: BERMAN DRILLING CO.
DATE STARTED: 10-14-85
DATE COMPLETED: 10-15-85
FIELD REP.: K. DONNELSON / SH & B GEOLOGIST

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION SEE PAGE 1

SITE CONDITION SEE PAGE 1

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	DRILL RATE BLOWS PER 2' IN MIN/SET	FORM #	GEOL USGS	VISUAL CLASSIFICATION
0				D	5 1/2'	13			NOTE: limestone & gray siltstone absent 55-60'
				E		4		Phg MST	
				H		15		Phg SLST	NOTE: some orange mudstone & light green gray siltstone 62-65'
				E		15.5			65-71' MUDSTONE: clayey, soft, fine cuttings, calcareous, "brick" orange
				H		29		Phg SLST	71-80' SILTSTONE: some interbedded of orange mudstone, calcareous, medium cuttings, thin bedded, medium orange brown.
				A		12.5		Phg SLST	80-86' SILTSTONE: Cherty, calcareous med red orange brown
				M		11.5			86-96' SILTSTONE: calcareous, some interbedded orange mudstone med red brown.
				P		23.5		Phg SLST	NOTE: trace light gray limestone & gray siltstone 90-96'
						20.5			96-109' SILTSTONE: calcareous, cherty, med red orange brn, trace gray gr siltstone to 100'.
						14			NOTE: some orange mudstone 106-108'
						20			NOTE: TRACE - SOME LT GRAY LIMESTONE, 116-120'
						19.5			

COMMENTS:

SAMPLE TYPE

A - Upper cuttings
B - 2" O.D. 1.08" 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)

Page 2 of 3

LOCATION MAP: SEE PAGE 1

SITE ID: HAT 01 LOCATION ID: 934

SITE COORDINATES (N.):

N. _____ E. _____

GROUND ELEVATION (ft. MSL): _____

DRILLING METHOD: ROTARY

DRILLING CONTR.: BREMAN DRILLING CO.

DATE STARTED: 10-15-85

DATE COMPLETED: _____

FIELD REP.: K. DONNELSON / SHS GEOLOGIST

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION SEE PAGE 1

SITE CONDITION SEE PAGE 1

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	DRILL RATE BLOWS PER 4 IN. MIN/SFT	FORM & VALUES	GEOL USGS	VISUAL CLASSIFICATION
60				R	5/8"	13	H A G A I T O S H A L E	Phg SLST	NOTE: TRACE LIGHT GRAY GREEN SLTSTONE 62-64'
				O		15			NOTE: SOME MUDSTONE & LIGHT GRAY LIMESTONE INTERBEDS 66-68'
70				A		11			NOTE: SCATTERED INTERBEDS OF MUDSTONE w/ trace light gray siltstone & limestone 71-75'
				R		18			NOTE: SOME INTERBEDS OF MUDSTONE w/ trace light gray limestone 76-82'
80						14			
						21			NOTE: SOME MUDSTONE 89-91'
90						15.5			NOTE: TRACE LIGHT GRAY LIMESTONE 91-93'
						31			
100	10-8-85					14.5 min/s'			NOTE: TRACE GRAY LIMESTONE & SOME LIMONITIC SILTSTONE 100-102'
	10-16-85					8			NOTE: CONSIDERABLE ORANGE MUDSTONE INTERBEDS 106-109'
110						16.5			NOTE: SOME MUDSTONE 114-117'
						12.5			

COMMENTS:

SAMPLE TYPE

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

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

Page 2 of 2

LOCATION MAP:

see page 1

SITE ID: NAIOL LOCATION ID: 934
SITE COORDINATES (N.):
N E
GROUND ELEVATION (ft. MSL):
DRILLING METHOD:
DRILLING CONTR.:
DATE STARTED:
DATE COMPLETED:
FIELD REP.: Roger Holland

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION

DEPTH (ft.)	LOGGING OPERATION	% CORE RECOVERY	% ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKED TEST INTERVAL	SPACING	ORIENTATION	COMBUSTION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
175	Down Hole Hammer										156-175' NO Samples
180											
185											
190											
195											
200											
205											
210											
215											
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960											
965											
970											
975											
980											
985											
990											
995											
1000											

COMMENTS:

DRILLING RECORDING

H = 6 1/2" HOLLOW STEM AUGER
C = 4 1/2" CONTINUOUS FLIGHT AUGER
GB = GEAR BIT
AR = AIR ROCK BORING
AC = AIR WIRELINE ROCK BORING

Page 5 of 5

SITE COORDINATES (ft.):

N _____ **nn** _____

GROUND ELEVATION (ft. MSL):

DRILLING METHOD:

DRILLING CONTR.:

DATE STARTED: _____

DATE COMPLETED: _____

FIELD REP.: R. Holland

GROUNDWATER LEVELS

DATE _____

TIME

DEPTH (11.)

LOCATION DESCRIPTION

SITE CONDITION

[illegible]**ROCK TYPE & REMARKS**

TO 200'

Screen set @ 195-195'

COMMENTS:

1997年12月 第37卷第4期

 * * * * *
 * * * * *

E = A 723 604798400000 [3] 16=1 0 VBA

62 = 3E4B 3C7

全長 = 100 尺、幅員 = 10 尺、厚さ = 1 尺

全名 = MR WILLIAM JAMES COOPER

BOREHOLE LOG (ROCK)

Page 2 of 2

LOCATION MAP:

SITE ID: NATOL LOCATION ID: 935
SITE COORDINATES (N. L.):
N NK E NK
GROUND ELEVATION (ft. MSL): NK
DRILLING METHOD: Rotary
DRILLING CONTR.: Beaman Drilling
DATE STARTED: 10/12/85
DATE COMPLETED: 11/12/85
FIELD REP.: R. Holland

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION: East of Lower Tailings Pile
SITE CONDITION: Level with sparse native brush and yellow salt brush

DEPTH (ft.)	RODING OPERATION	% CORE RECOVERY	ROCK QUALITY DESIGNATION (RQD)	% CHILING FLUID RECOVERY	PACKER TEST INTERVAL	SPACING	ORIENTATION	CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
0										SS	sandstone, dark red to dark red brown, calc. to highly calc., vfg, fissile, very hard with siltstone, dark red to orange red, highly calc., very hard. minor if gray fragments of vfg sandstone + siltstone.
5										SS	
10										SS	
15										SS	
20											
25											
30											
35											
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50											
55											
60											
65											
70											
75											
80											
85											
90											
95											
100											

COMMENTS:

SPACING OPERATIONS

W - 4 1/2 HOLLOW STEM AUGER
C - 4 1/2 CONTINUOUS FLIGHT AUGER
SS - SEAR BIT
LS - 1/2 INCH CONING
AS - 3/8 WIRELINE PCC CONING

BOREHOLE LOG (ROCK)

Page 2 of 2

LOCATION MAP:

A
2SITE ID: NAT 01 LOCATION ID: 935

SITE COORDINATES (N.):

N _____ E _____

GROUND ELEVATION (ft. MSL): _____

DRILLING METHOD: _____

DRILLING CONTR.: _____

DATE STARTED: _____

DATE COMPLETED: _____

FIELD REP.: R. Halland

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____

SITE CONDITION _____

ROCK TYPE & REMARKS

DEPTH (ft.)	ROILING OPERATION	% CORE RECOVERY	% ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKED TEST INTERVAL	SPACING	ORIENTATION	CONDITION	WEATHERING	LITHOLOGY
30	Mannert Tool									SS and silt
35										
40										
45										
50										
55										
60										
65										
70										
75										
80										

COMMENTS:

SPACING ORIENTATION

W - 8 1/2" HOLLOW STEM AUGER
 C - 4 1/2" CONTINUOUS FLIGHT AUGER
 SB - SEAR BIT
 AS - 8" ROPE CORING
 AC - 8" WIRELINE REEL CORING

JACOBS ENGINEERING GROUP INC.

ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

Page 2 of 2

LOCATION MAP:

See Page 1

SITE ID: NAT 01 LOCATION ID: 955
 SITE COORDINATES (N.):
 N _____ E _____
 GROUND ELEVATION (ft. MSL): _____
 DRILLING METHOD: _____
 DRILLING CONTR.: _____
 DATE STARTED: _____
 DATE COMPLETED: _____
 FIELD REP.: R. Holland

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____

SITE CONDITION _____

ROCK TYPE & REMARKS

DEPTH (ft.)	DRILLING OPERATION	% CORE RECOVERY	% ROCK RECOVERY (% OF DRILLING FLUID RECOVERY)	% DRILLING FLUID RECOVERY (% OF PACKED TEST INTERVAL)	SPACING	ORIENTATION	CONDITION	WEATHERING	LITHOLOGY
55									55
56									56
57									57
58									58
59									59
60									60
61									61
62									62
63									63
64									64
65									65
66									66
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91									91
92									92
93									93
94									94
95									95
96									96
97									97
98									98
99									99
100									100

at 58' same as above with orange
clayey siltstone, soft, forms balls,
calcareous.

COMMENTS:

DRILLING OPERATIONS

W - 6 1/2" HOLLOW STEM AUGER
 C - 6 1/2" CONTINUOUS FLIGHT AUGER
 SS - SEAR BIT
 LS - NO ROCK LOGGING
 NS - NO WIRELINE LOGGING

Page 4 of 8

see page 1

SITE ID: NATO1 LOCATION ID: 935
SITE COORDINATES (N.):
N 1 E 1
GROUND ELEVATION (ft. MSL):
DRILLING METHOD:
DRILLING CONTR.:
DATE STARTED:
DATE COMPLETED:
FIELD REP.: R. Holland

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____
SITE CONDITION _____

[illegible]

COMMENTS:

馬尼拉(Philippines) 0901 50 51 52

M - 4 172 HOLLAND STREET APT 4
 C - 4 172 CONTINUOUS EIGHTH APT 4
 GS - 4172 817
 AS - 4172 817
 LS - 4172 817

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

Page 1 of 2

LOCATION MAP:

see page 1

SITE ID: AP01 LOCATION ID: 935
SITE COORDINATES (N. E.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLING CONTR.: _____
DATE STARTED: _____
DATE COMPLETED: _____
FIELD REP.: R. Holland

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____
SITE CONDITION _____

ROCK TYPE & REMARKS

DEPTH (ft.)	DRILLING OPERATION	% CORE RECOVERY	ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	SPACING	ORIENTATION	CONDITION	WEATHERING	LITHOLOGY
105	100									
110										
115										
120										

COMMENTS:

Logging Symbols

N = 1/2 HOLLOW STEW ANGEL
C = 1/2 CONTINUOUS FLIGHT ANGEL
CB = BEAR BIT
RA = NO ROCK CORNS
NS = NO DRILLING FLUID RECOVERY

BOREHOLE LOG (ROCK)

Page 4 of 8

LOCATION MAP:

see page 1

SITE ID: HAT 01 LOCATION ID: 935
SITE COORDINATES (N. E.):
N. _____ E. _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLING CONTR.: _____
DATE STARTED: _____
DATE COMPLETED: _____
FIELD REP.: Angus Holland

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION SITE CONDITION

DEPTH (ft.)	BOREHOLE OPERATION	% CORE RECOVERY	% ROCK QUALITY DESIGNATION (RQD)	% DRILLING FLUID RECOVERY	PACER TEST INTERVAL	SPACING	ORIENTATION	CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
130	Handwritten 700L									45 4 51	
135										45 4 51	
140										45 4 51	
145										45 4 51	
150										45 4 51	
155										45 4 51	
160										45 4 51	
165										45 4 51	
170										45 4 51	
175										45 4 51	
135										45 4 51	@ 135' same as above with maroon siltstone, highly calc,

COMMENTS:

BOREHOLE OPERATIONS

H - 6 1/2" HOLLOW STEM AUGER
C - 4 1/2" CONTINUOUS FLIGHT AUGER
CB - BEAR BIT
AS - AS ROCK CORING
AS - NO WIRELINE RECY CORING

AN

see page 1

SITE ID: HATOL LOCATION ID: 935
SITE COORDINATES (ft.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLING CONTR.: _____
DATE STARTED: _____
DATE COMPLETED: _____
FIELD REP.: B. Holland

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)
------	------	-------------

LOCATION DESCRIPTION
SITE CONDITION _____

[illegible]**COMMENTS:**

Page 4 of 13

W = W 1/2 WOLLON STEW AUGER
C = C 1/2 CONSUMOUS FINEST AUGER
CH = HEAR BIT
SH = SH SHOR FORTH
AC = AC WHELOWE DCLY CONING

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ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

BOREHOLE LOG (ROCK)

Page 2 of 2

LOCATION MAP:

see page 1

SITE ID: HAT01 LOCATION ID: 935
SITE COORDINATES (N. E.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLING CONTR.: _____
DATE STARTED: _____
DATE COMPLETED: _____
FIELD REP.: R. Holland

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____

SITE CONDITION _____

DEPTH (ft.)	DRILLING OPERATION	% CORE RECOVERY	% ROCK QUALITY SECTION (HQR)	% DRILLING FLUID RECOVERY	PACKER TEST INTERVAL	SPACING	ORIENTATION	CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
190	HAT01-7201										Dark red to dark red brown to chocolate brown siltstone to sandstone, v. fq, highly calc., friable, very hard.
185											Same as above with limestone, if gray, sandy(?) 50+% of cuttings TD 187 PD 186
190											
195											

COMMENTS:

LOGGING OPERATIONS

M - 1/2 HOLLOW STEM AUGER
C - 1/2 CONTINUOUS FLIGHT AUGER
SS - SEAR BIT
AS - AS ROSS CORING
NS - NO WIRELINE DEEP CORING

BOREHOLE LOG (ROCK)

Page 4 of 6

LOCATION MAP:

SITE ID: 40701 LOCATION ID: 936
SITE COORDINATES (ft.):
N 00 E 00
GROUND ELEVATION (ft. MSL): 00
DRILLING METHOD: Rotary - Chance Tool
DRILLING CONTR.: Beeman Drilling
DATE STARTED: 10/20/85
DATE COMPLETED:
FIELD REP.: Robert Holland

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION NE of the lower tailings pile and in the drainage heading under pile
SITE CONDITION level area, sandy with some weed cover

[illegible]

COMMENTS:

Бүтээгдэхүүн үйлчилгээний өрсөлдөгчид

H - 4 1/2 HOURS 2100-0100
 C - 4 1/2 HOURS 2100-0100
 DE - 6000 WIT
 SE - 40 HOURS 2100-0100
 H - 40 HOURS 2100-0100

Page 2 of 6

PL

see page 1

SITE ID: HATOL LOCATION ID: 936
SITE COORDINATES (N.):
N E
GROUND ELEVATION (ft. MSL):
DRILLING METHOD:
DRILLING CONTR.:
DATE STARTED:
DATE COMPLETED:
FIELD REP.: Reger, Holland

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION

SITE CONDITION

DEPTH (FT.)	ROCKET OPERATION	% CORE RECOVERY	% ROCK IMACTITY DESIGNATION (HDP)	% DRILLING FLUID RECOVERY	PACMER TEST INTERVAL	SPACING	ORIENTATION	CONDITION	WEATHERING	LITHOLOGY
	Hammered rock			Drilling with Air						618 / 740

ROCK TYPE & REMARKS

COMMENTS:

1. 2014年12月31日

W - 4 1/2 WDL40W STEW AUGIE
 E - 4 1/2 EOLTINGWUS FLEW-1 AUGI
 60 - SEAR 8:7
 62 - ME, RUCLE EUGINE
 64 - WD, WILKINS BLI - ZDORLE

BOREHOLE LOG (ROCK)

Page 3 of 6

LOCATION MAP:

see page 1

SITE ID: HRT01 LOCATION ID: 936
SITE COORDINATES (N. E.):
N KN E KN
GROUND ELEVATION (ft. MSL): KN
DRILLING METHOD: Rotary (Air Hammer)
DRILLING CONTR.: Bob Bergen Drilling
DATE STARTED: _____
DATE COMPLETED: _____
FIELD REP.: Robert E. Holland

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____

SITE CONDITION _____

DEPTH (FT.)	QUINCY OPERATION	% CORE RECOVERY	% ROCK RECOVERY (DESIGNATION INCH)	% DRILLING FLUID RECOVERY	PACKED TEST INTERVAL	SPACING	ORIENTATION	CONDITION	WEATHERING	LITHOLOGY
55										
60										
65										
70										

ROCK TYPE & REMARKS

COMMENTS:

BOREHOLE OPERATIONS

* - 6 1/2 IN. BOREHOLE STEM AUGER
C - 4 1/2 IN. CONTINUOUS FLIGHT AUGER
AS - 8 IN. BIT
AS - 8 IN. ROCK CORING
AC - NO WIRELINE CORE LOGGING

Page 4 of 4

SITE ID: HAT-1 LOCATION ID: 936
 SITE COORDINATES (11.):
 N _____ E _____
 GROUND ELEVATION (11. MSL): _____
 DRILLING METHOD: _____
 DRILLING CONTR.: _____
 DATE STARTED: _____
 DATE COMPLETED: _____
 FIELD REP.: R. Holland

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION
SITE CONDITION _____

[illegible]

COMMENTS:

是心非心也。即此心也。非心也。即此心也。

W = 4 1ST MIDDLEWATER STATION
C = 4 1ST MIDDLEWATER STATION FLIGHT AVIATION
CH = 4TH STATION
LH = 4TH STATION COMBINE
LH = 4TH MIDDLEWATER STATION COMBINE

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BOREHOLE LOG (ROCK)

Page 5 of 6

LOCATION MAP:

SITE ID: HAT01 LOCATION ID: 936

SITE COORDINATES (N. E.):

N _____ E _____

GROUND ELEVATION (ft. MSL): _____

DRILLING METHOD: _____

DRILLING CONTR.: _____

DATE STARTED: _____

DATE COMPLETED: _____

FIELD REP.: R. Holland

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____

SITE CONDITION _____

DEPTH (ft.)	BOHING OPERATION	% CORE RECOVERY	% ROCK QUALITY DESIGNATION (RQD)	% BUILDING FLUID RECOVERY	PACER TEST INTERVAL	SPACING	ORIENTATION	CONDITION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
100										SS	2100' as ab dec to < 50% of cuttings. sandstone, white, vdfq, highly calc.
105										SS	2105' sandstone as ab dec to < 30% of cuttings. siltstone/sandstone, chocolate brown, calc., fissile.
110										SS	siltstone/ss as ab
115										SS	note: cuttings damp began injecting water @ 115'
120										SS	2125' transition interval of siltstone to sandstone, red brown to dark red brown to chocolate brown, ss fraction vdfq, calc. to highly calc., fissile and silty if gray, calc.

COMMENTS:

Logging Description

M = 6 1/2" HOLEW STEW AUGER
 E = 4 1/2" CONTINUOUS FEIGHT AUGER
 SS = SEAM BIT
 NS = 60 HOSE CORING
 AC = 40 WIRELINE PILE CORING

PROJECT Mexican Hat Tailings
JOB NO. ES1-63K DATE 1/20/82

LOG OF TEST BORING NO. 095

RIG TYPE CME 75 (206) CC

BORING TYPE 6 1/2" MSA

SURFACE ELEV.

DÁTUM.

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 20" 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 substrate
25										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 Tailings
 JOB NO. EA-63K DATE 1/20/82

LOG OF TEST BORING NO. C94

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				SM	moist	Silty Sand NP gry.
5			21"	X						
			20"	X						
10			23"	X						
			23"	X						
15			25"	X						tailings substrate
				X						
20				X						Sandstone
				X						
25				X						Auger stopped @ 10'
				X						Sample refused @ 15'
30				X						NK core stopped @ 21'

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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 OFFICE - ALBUQUERQUE - SANTA FE

PROJECT Mexican Hat
 JOB NO. ES-1-63K DATE 1/20/82

LOG OF TEST BORING NO. B93

RIG TYPE CMP-55 #203
 BORING TYPE LT-15A
 SURFACE ELEV. _____
 DATUM _____

DATE _____										RIG TYPE <u>CMP-55 T203</u>	
										BORING TYPE <u>6 1/2" dia</u>	
										SURFACE ELEV. _____	
										DATUM _____	
Depth in Feet	Continuous Penetration Resistance	Geological Log	Sample	Sample Type	Blows per foot 140 lb. 30" SPT	Dry Density Lbs. per cu. ft.	Molalure Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION	
0		24	X	u	1-3-3-4-5			SM	moist	soft	
		21"	X	u	3-5-7-9-5				mod firm	low I. clay cemented tan to grey	
5		21"	X	u	3-3-4-5-6						
		20"	X	u	4-4-5-7-3						
10		21"	X	u	4-4-6-6-9						
		17"	X	u	6-6-6-7-3						
15		20"	X	u	11-8-9-11-12						
		20"	X	u	9-9-9-13-6				firm		
20		18"	X	u	7-7-12-13-15						
		18"	X	u	9-13-17-23-29				hard		
25		16	X	u	10-11-11-13-14						
		23	X	u	10-11-10-11-11				mod firm		
30		20	X	u	4-4-6-7-6						
		23	X	u	5-6-7-12-16						
35		6	X	u	5-5-5				bedrock red	thinly subbed	
40										Auger stopped @ 5.0' sample interval @ 35' 5 1/2"	

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

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PROJECT Mexican Hat
JOB NO. ED/GJK DATE 1/17/82

LOG OF TEST BORING NO. D92

RIG TYPE Cm'E-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	X	1-2-3-5				Sp.	moist soil	Silty sand Loose w/ky cemented tan to grey
		21	X	4-4-4-6-7						
5										
		20	X	2-3-3-8-7					mod. firm	
		21	X	4-4-5-7-8						hard Substr.
10										
		19	X	10-11-10-06-50 1/2					dry - hard	bedrock red
15										
										Auger stopped @ 5.0' sampler refud @ 12 1/2"

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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PROJECT Mexican Hat
 JOB NO. EBI-63K DATE 11/19/82

LOG OF TEST BORING NO. D91

RIG TYPE CME-55 #203
 BORING TYPE 6 1/2" SCL
 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										
		21	1	4-6-7-12-16				SP	mod. soft	very sand loc. silty sl. cemented tan to gray
5		20	1	20-17-20-17-20						
		20	1	4-6-7-18-1					mod. firm	
10		18	1	8-8-18-5/5					dry hard	bedrock red. TAILINGS 5466 ASR
15										Aug. stopped @ 5.6 sampler refused @ 9' 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 Mexico
 JOB NO. EB-67K DATE 1/19/82

LOG OF TEST BORING NO. C90

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	RIG TYPE <u>CME-55 #203</u>		BORING TYPE <u>6" S.P.</u>		SURFACE ELEV. _____		DATUM _____	
									REMARKS	VISUAL CLASSIFICATION						
0		23	X	5-6-6-7-7					moist	soft	slty, smd loose w/ly cemented to 9 ft					
5		20	X	5-6-7-7-7							FALLING SUBBITO					
5		9	X	3-50/5%					dry	hard	bedrock red					
10											Auger stopped @ 5' 0" sample refusal @ 5' 1 1/2"					

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger cuttings. S - 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 1125-720 Apt
 JOB NO. EBI-63K DATE 1/19/82

LOG OF TEST BORING NO. C89

RIG TYPE C.E.-55 #203
 BORING TYPE CL-55
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Geophysical Log	Sample	Sample Type	Blows per foot (40 lb. 30" free fall drop hammer)	Dry Density (lbs. per cu. ft.)	Moisture Content (Per Cent of Dry Wt.)	Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
5		20	1		2-4-5-6-4			SH	mod	51.1% sand
		18	2		2-4-6-4-4					comp.
		21	3		2-3-3-4-4					wkly cemented
10		23	4		4-5-5-5-4				mod	fine
		26	5		5-5-4-5-6					
15		27	6		11-10-30-41-50/0				dry	hard bedrock
20										Auger stopped @ 5'6"
										sampler refusal @ 14'6"

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 Highway 101
 JOB NO. 881-43K DATE 1/19/82

LOG OF TEST BORING NO. B88

RIG TYPE CME-55 #203
 BORING TYPE 6 1/2" HSA
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Centimeter 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		21			1-1-5-5-6					
		20			5-5-5-5-8					
5		22			5-6-9-9-9					
		21			5-6-1-10-9					
10		20			7-9-8-12-15					
		21			9-6-9-11-8					
15		20			6-6-9-10-10					
		21			6-1-9-9-10					
20		20			9-10-11-10-13					
		22			11-11-12-13-18					
25		22			8-3-10-11-15					
		21			14-14-15-15-15					
30		20			11-11-15-15-18					
		22			11-13-14-15-17					
35		9			11-50/5"				dry HSPD	bedrock red
40										Auger stopped at 5.0' sample refused @ 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

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PROJECT Mexican Hat
 JOB NO. 881-63K DATE 1/20/82

LOG OF TEST BORING NO. B86

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
0			21"	X	2-3-3-4-6			Stn
			20"	X	4-3-11-4-9			
5			21"	X	4-4-6-6-6			
			21"	X	3-5-5-9-9			
10			20"	X	8-8-9-9-11			
			21"	X	7-8-1-12-13			
15			18"	X	8-10-10-15-16			
			20"	X	11-10-11-12-13			
20			20"	X	7-7-14-23-25			
			21"	X	12-17-16-23-20			
25			16"	X	11-11-11-13-13			
			21"	X	12-17-18-19-20			
30			20"	X	11-11-11-11-11			
			18"	X	11-11-11-11-11			
35			12"	X	12-12-12-12-12			
			16"	X	11-11-11-30-30-35			
40								

RIG TYPE CME-55 #203
 BORING TYPE 6 1/2" H.P.
 SURFACE ELEV. _____
 DATUM _____

REMARKS	VISUAL CLASSIFICATION
moist sand	silty sand
mod firm	low p.c. w/ly cemented white to tan
firm	
v. firm	
firm	
dry hard	red
	TAILINGS SUBSTRATE
	Recessed 5' foot @ 5' = 0.0001 - 0.0001 @ 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.

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 2000 ALBUQUERQUE BLVD. SUITE 200 SALT LAKE CITY

PROJECT MARINA HO
 JOB NO. EBI-63K DATE 1/19/82

100 OF TEST BORING NO. D65

RIG TYPE CME-50 # 203
 BORING TYPE C/S - F-5A
 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		16	1/0	3-3-3-4-4				SPH	moist soft	5/17, sand
2		21	1/0	3-3-3-3-3						low p.s. w/ky cemented fine to med
3		18	1/0	1-2-2-3-3-4-4						firm
4		10	1/0	18-20-22/0"					dry hard	Defunct
5										subgrade
10										
15										

Auger stopped @ 5.0' sample up to @ 8' 10"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger settings. 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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CONSULTING GEOTECHNICAL ENGINEERS
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PROJECT Mexican Hat Tailings
 JOB NO. 81-03K DATE 1/19/82

LOG OF TEST BORING NO. D84

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
0								SM
14'			X	T				
27'			X	T				
20'			X	T				
26'			X	T				
28'			X	T				
22'			X	T				
17'			X	T				
6'			X	T				
24'			X	T				
23'			X	T				
24'			X	T				
19'			X	T				
24'			X	T				
25'			X	T				
26'			X	T				
24'			X	T				
22'			X	T				
NE			X	T				
3'			X	T				

RIG TYPE CME 75 (20G) CC
 BORING TYPE 6 1/2" HSA
 SURFACE ELEV. _____
 DATUM _____

REMARKS	VISUAL CLASSIFICATION
moist	Silty Sand NP guy [Note: intermittent thin silt lenses below 2']
	tailings subbase Sandstone w/ interbedded shale
	Auger refused @ 45' Sampler refused @ 50'

GROUND WATER

DEPTH	HOOR	DATE
None		

SAMPLE TYPE

A - Auger borings. 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 roadJOB NO. 29-GRKDATE 1-10-82LOG OF TEST BORING NO. C83

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.	Unconfined Soil Classification	RIG TYPE <u>OMI-55 #203</u>		BORING TYPE <u>6 1/2" I.D.</u>		SURFACE ELEV. _____		DATUM _____	
									REMARKS		VISUAL CLASSIFICATION					
0		20	X	U	7-1-3-4-5			Sm	moist	soft	silty sand low p.T. w/ky remainder tan to grey					
		21	X	U	4-4-4-4-4											
5		22	X	U	2-3-5-5-6											
		20	X	U	5-7-6-5-5											
10		18	X	U	5-5-5-6-6											
		23	X	U	6-7-6-7-6					mod firm						
15		22	X	U	5-7-7-7-6											
		23	X	U	5-6-7-6-8											
20		26	X	U	7-7-7-8-9											
		23	X	U	16-18-29-30-52/5				dry	hard	bedrock red					TAILINGS subbit
25											Auger is stopped @ 25.0' sample of soil @ 24' 11"					
30																

GROUND WATER

DEPTH	NOON	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 - 4" O.D. 3.00" I.D. Shelby tube.

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PROJECT Mexican Hat Tailings
 JOB NO. EB-63K DATE 1/12/82

LOG OF TEST BORING NO. DB2

Depth in Feet	Continuous Penetration Resistance	Geophysical 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	RIG TYPE <u>CME 75 (200) CC</u> BORING TYPE <u>6 1/2" HSA</u> SURFACE ELEV. _____ DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
0										
		23'	X		2-3-3-2-4			SM		
		19'	X		3-3-3-3-4				moist	Silty Sand
5		19'	X		3-3-4-4-5					NP
		19'	X		5-5-6-4-7					guy.
10		19'	X		5-5-8-8-6					[Note: some slimes @ 13' - 20']
		20'	X		5-6-8-8-6					
15		18'	X		5-6-5-6-6					
		7'	X		4-5-6-6-6					
20		19'	X		5-6-6-6-26					(TAILINGS)
		2'	X		U (5/8" 2')					(Subbase)
25										Sandstone
										Auger stopped @ 5'
										Sampler, retracted @ 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.
 T - 3" O.D. thin-walled Shelby tube.

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PROJECT Movipal Hat
 JOB NO. 521-32 DATE 11/14/82

LOG OF TEST BORING NO. C81

Depth to 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	RIG TYPE <u>CME-55 #253</u> BORING TYPE <u>6" 1/2" HSA</u> SURFACE ELEV. _____ DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
0										
		20"	X	U	5-5-4-4-6			SM	moist	50-60
		20"	X	U	5-4-3-3-5					
5		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	8-7-7-7-1					
		21"	X	U	7-8-7-8-8					
20		24"	X	U	7-10-10-10-12				firm	
		28"	X	U	10-9-10-10-8					
25		12"	X	U	18-41-50/51				dm	hard
										block soil
30										Auger stopped @ 5'-0" samples refused @ 26'5"

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. ES-63K DATE 1/12/82

LOG OF TEST BORING NO. D80

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
0								SM
			25"	X	U 2-2-4-4-5			
			19"	X	U 3-3-4-8-7			
5			18"	X	U 2-3-4-3-4			
			19"	X	U 3-5-5-5-7			
10			20"	X	U 4-5-6-5-5			
			19"	X	U 6-6-7-7-7			
15			19"	X	U 6-7-5-7-6			
20			13'	X	U 14-(50/5")			

RIG TYPE: CM2 75(206)CC
 BORING TYPE: 6 1/2" HSA
 SURFACE ELEV.: _____
 DATUM: _____

REMARKS	VISUAL CLASSIFICATION
moist	Silty Clay NP gry
	(TAILINGS) (SUBBASE) Sandstone
	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 PIPE LAY
 JOB NO. 201-63K DATE 11/2/92

LOG OF TEST BORING NO. C79

RIG TYPE ONE-55 (203)
 BORING TYPE 6 1/2" HST
 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	U1-1-1-1-2				SM	moist sat	51% sand low pt. w/ clay cemented fine to grey
		26	X	U2-2-4-5-4						
5		18	X	U3-3-4-5-3						
		19	X	U4-4-6-6-6						
10		18	X	U5-5-7-1-5-2-2						
		20	X	U6-6-7-7-7-6						
15		23	X	U7-7-9-9-9-9						(TAILINGS) (SUBBASE)
			X	U5B-9-19-50 3 1/2"					dry HARD	bedrock rock
20										sample size @ 19' 9 1/2"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 11 - 3" O.D. 2.42" I.D. tube sample.

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PROJECT Mexican Hat
 JOB NO. EB-63K DATE 1/12/32

LOG OF TEST BORING NO. C77

DATE _____										RIG TYPE	CME-55 (203)	
										BORING TYPE	6 1/2" HSA	
										SURFACE ELEV.		
										DATUM		
Depth In Feet	Centimeter 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 sand	silt sand		
		23	X	U	2-3-3-3-4					Low pr		
		17	X	U	2-3-3-4-5					wkly cemental		
5										tan to brown		
		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							
15			X	U	14-12-17-17-50/3				dry hard	(TAILINGS) bedrock (SUBBASE) 11' C. 1002		
20										Range stopped @ 5.0' sample refusal @ 17 1/2'		

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.

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 PHOENIX - ALBUQUERQUE - SANTA FE - SALT LAKE CITY

2007

PROJECT

Mexican Hat Tailings

LOG OF TEST BORING NO. D72

JOB NO.

E81-538 DATE 11/2/82

RIG TYPE

Cone 757206 VC

BORING TYPE

6 1/2" HSA

SURFACE ELEV.

DATUM

REMARKS

VISUAL CLASSIFICATION

Depth In Feet

Continuous
Penetration
ResistanceGraphical
Log

Sample

Sample Type

Blows per foot
140 lb. 30" free-
fall drop hammerDry Density
Lbs. per cu. ft.Moisture Content
Per Cent of Dry Wt.Unified Soil
Classification

4-16-50/33 200

S. 1/4 Sand
NP
guy(TAILINGS)
(SUBBASE)
SandstoneSamples retrieved
1' 3"0
5
10
15
20

GROUND WATER

DEPTH HOUR DATE

None

SAMPLE TYPE

A - Auger cuttings, B - Block sample
S - 2" O.D. 1.58" I.D. tube sample,
U - 3" O.D. 2.62" I.D. tube sample,
C - 3" O.D. 2.62" I.D. tube sample,

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LOG OF TEST BORING NO. C71

CME-55 (203)

RIG TYPE C11E-D3
BORING TYPE C11E-H54

SURFACE ELEV......

DATUM

SERGEANT, HAUSKINS & BECKWITH
CONSULTING & TECHNICAL ENGINEERS
4000 WILSON BOULEVARD, SUITE 1000
ANN ARBOR, MI 48106-1500
734/769-0000

1251

Q115-55 (203)

RIG TYPE 115-30
BORING TYPE 144" E15H

SURFACE ELEV.

DATUM

REMARKS

VISUAL CLASSIFICATION

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

RIG TYPE	CM-55 (203)
BORING TYPE	1.4" ESH
SURFACE ELEV.	
DATUM	
REMARKS	VISUAL CLASSIFICATION

No.	Depth	Soil	Moist	S&T	Remarks	Sample Type	Ground Water
23	23"	6-1-1-2-3			moist soft		
23	23"	6-2-3-5-7			low PI		
26	26"	6-2-3-5-7-58			very cemented thin to gray		
5	5'				(TILLING) SPONGE (SUBURSE)		
10	10'				auger not good @ 5.0'		
15	15'				sample @ 7 1/2'		

GROUND WATER

SAMPLE TYPE

**A - Auger cutting-
B - Block sample**

SERGEANT, HAUSKUNS & BECKWITH

S - 2' 0.0. 1.38" I.D. tube sample
U - 3' 0.0. 2.42" I.D. tube sample.

CONSUMPTION OF GEOTECHNICAL ENGINEERING
PRODUCTS - ALBUQUERQUE - SANTA FE - NEW MEXICO

LOG OF TEST BORING NO. 768

Due to the

RIG TYPE CM2 151 2003C
BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATAFLUX

REMARKS

VISUAL CLASSIFICATION

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

RIG TYPE	CME 75 (200) CC
BORING TYPE	6 1/2" HSH
SURFACE ELEV.	
DATUM	
REMARKS	VISUAL CLASSIFICATION

Hand-drawn stratigraphic column with a grid. The grid has a vertical axis on the left with labels 0, 5, 10, 15, 20, 25, 30, 35, 40. The horizontal axis at the top is labeled 20". The column is divided into three main sections by diagonal lines. The top section is labeled "Silty Sand NP" and contains the handwritten text "14-1-2-1-2-3" and "14-15-16-17-18-19". The middle section is labeled "gray tailings subsea" and "Sandstone". The bottom section is labeled "Sample retrieved @ 3' 11\"".

1. Samples refused @ 3:11^{PM}

Silly Sand
NP
Gay tailings
substance
Sandstone

GROUND WATER

SAMPLE TYPE

DEPTH	HOUR	DATE
-------	------	------

SERGEANT, HAUSKINS & BECKWITH

A - Auger settings. B - Black sample.
 5 - 2" O.D., 1.94" I.D., tube sample.
 U - 3" O.D., 2.42" I.D., tube sample.
 T - 3" O.D., thin-walled Shelby tube.

COMPLIANCE & TECHNICAL ASSISTANCE
FEDERAL + ALABAMA + STATE

PROJECT Mexican Hot Tailings
 JOB NO. 29-68 DATE 11/2/82

LOG OF TEST BORING NO. D66

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										
5										
10										
15										
20										
25										
30										
35										
40										
45										
50										
25'			X	U-4-2-3-4-6				SM		
19"			X	U-3-4-5-5-5					moist	Silty Sand NP gr-y
20'			X	U-3-3-3-5-6						
18"			X	U-4-5-4-7-6						
19"			X	U-4-6-5-9-10						
19"			X	U-6-6-5-10-10						
15'			X	U-6-8-11-11-13						
19"			X	U-9-8-10-11-15						
18'			X	U-10-9-10-12-15						
19'			X	U-9-10-12-14-16						
19'			X	U-8-9-11-14-17						
20"			X	U-12-12-14-16-19						
19"			X	U-10-10-13-18-21						
22'			X	U-10-10-12-17-14						
19"			X	U-9-11-13-14-16						
18'			X	U-15-22-15-19-16						
19"			X	U-15-15-18-14-11						
19'			X	U-14-12-13-14-16						
17'			X	U-13-12-12-12-15-13-7						

Sampler refused @ 47'3"

(TAILINGS)
 (SUBBASE)
 Sandstone

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

- A - Auger cuttings. B - Block sample
 5 - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 2" O.D. thin-walled Shelby tube.

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS
 ENGINEER & ALPHABETICALLY BY EXPIRATION DATE

PROJECT 115X. (012) - 11
 JOB NO. 63K DATE 11/2/92

LOG OF TEST BORING NO. C67

RIG TYPE CME-55 (203)
 BORING TYPE 6 1/2" HSA
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Consolidation Penetration Resistance	Graphical Log	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		23	U	3-3-3-5-5			SP.	moist sand	silty, SAND low pt wkly cemented tan to grey
		19	U	2-2-3-4-3					
		21	U	3-5-4-2-3					
10		26	U	6-6-6-6-6					
		20	U	2-10-2-7-6					
		21	U	7-1-7-8-1					
15		20	U	6-7-7-11-11					
		19	U	8-6-7-5-10					(TAILINGS)
20		21	U	18-22-34-48-50 5/8"				dry hard	bedrock (SUBBASE) red
2									Auger stopped @ 8.0' sample refusal @ 22' 5 1/2"

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 - 4" O.D. thin-walled Shelby tube.

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PROJECT Mexican Hat Tailings

100 OF TEST BORING NO. D64

JOB NO. ES-03K DATE 11/2/81RIG TYPE CMS 75 (206) CCBORING TYPE 10 1/2" HSA

SURFACE ELEV. _____

DATUM _____

REMARKS

VISUAL CLASSIFICATION

Depth in Feet

Continuous
Penetration
ResistanceGraphical
Log

Sample

Sample Type

Blows per foot
140 lb. 30" free-
fall drop hammerDry Density
Lbs. per cu. ft.Moisture Content
Per Cent of Dry Wt.Unified Soil
Classification

moist

Silty Sand
NP
gray

D

5

10

15

20

25

30

35

40

45

50

55

60

65

70

75

80

85

90

95

100

105

110

115

120

125

130

135

140

145

150

155

160

165

170

175

180

185

190

195

200

205

210

215

220

225

230

235

240

245

250

255

260

265

270

275

280

285

290

295

300

305

310

315

320

325

330

335

340

345

350

355

360

365

370

375

380

385

390

395

400

405

GROUND WATER

SAMPLE TYPE

DEPTH

HOUR

DATE

A - Auger cuttings, B - Block sample
S - 2" O.D. 1.38" I.D. tube sample,
U - 3" O.D. 2.62" I.D. tube sample

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS
P.O. BOX 1000, ALBUQUERQUE, NM 87102

DEPTH	HOUR	DATE
NCNC		

A - Auger cuttings, B - Block sample
S - 2" O.D. 1.38" I.D. tube sample,
U - 3" O.D. 2.62" I.D. tube sample

SERGEANT, HAUSKINS & BECKWITH
CONSULTING GEOTECHNICAL ENGINEERS
P.O. BOX 1000, ALBUQUERQUE, NM 87102

25'	U 2-2-3-4-5	SM
19"	U 3-3-2-4-6	
20"	U 4-4-4-5-7	
19"	U 6-7-8-8-7	
18'	U 6-8-8-8-11	
19'	U 7-6-7-9-9	
20"	U 7-8-8-13-13	
19"	U 10-12-12-15-17	
20"	U 10-10-12-12-15	
19"	U 13-13-15-9-17	
20'	U 12-11-12-14-18	
19"	U 15-20-18-21-31	
19"	U 15-15-21-19-17	
19"	U 14-19-21-20-25	
13'	U 25-10-10-15-16	
19"	U 17-19-21-28-28	
17"	U 11-12-13-14-15	
18"	U 21-21-24-24-24	
17"	U 16-18-12-12-12	

(TAILINGS)
(SUBBASE)
Sandstone

Auger stopped @ 5'
Sample interval @ 46" in

PROJECT Marion HP
 JOB NO. EB-63K DATE 1/12/70

LOG OF TEST BORING NO. C65

RIG TYPE CME-55 (203)
 BORING TYPE 6" 15A
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Gravel Content	Sample Type	Blows per foot 140 lb. 30" SPT 60 lb. drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		23	U 7-8-0-6-4				SM	moist soft	SILTY SAND
		21	U 3-3-3-3-3						LOW PI
5		20	U 3-3-3-3-3						Whly cemented
		21	U 5-5-5-4-4						TAN TO GRAY
10		26	U 4-4-4-6-1						
		17	U 6-6-6-8-1						
15		21	U 6-6-6-8-13						
		23	U 8-10-13-20-14						
20		24	U 8-10-10-11-11						
		22	U 9-9-9-8-10						
25		23	U 8-10-11-12-3						(TAILINGS)
		23	U 38-2-45-49-50/5					bedrock red	(SUBBASE)
30									Auger stopped @ 5.0'
									sample refused @ 29'11"

GROUND WATER		
DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger cuttings. S - 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. EQ-63K DATE 11/1/82

LOG OF TEST BORING NO. C62

RIG TYPE CM3 75(200)CC
 BORING TYPE 6 1/2" HSD
 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		
5								SM		Slimes w/ PI red
10										Silty Sand NP grey
15										
20										
25										
30										
35										
23'			X		1-2-3-4-6					
19'			X		4-4-3-4-4					
20'			X		2-3-4-5-5					
18'			X		4-4-5-4-5-6					
17'			X		7-7-7-8-9					
18'			X		11-11-11-10-11					
19'			X		10-10-7-10-10					
20'			X		8-10-11-12-14					
19'			X		12-11-11-13-20					
20'			X		14-13-14-13-14					
19'			X		7-14-15-18-19					
17'			X		13-13-14-14-15					
19'			X		11-13-15-15-13					
18'			X		11-20-31-350/51					

(TAILINGS)
 (SUBSTRATE)
 Sandstone

Auger stopped @ 5'
 Sampler refused @
 34' 5"

DEPTH	HOUR	DATE
MCME		

GROUND WATER

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.

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERING
 400 NORTH WASHINGTON STREET, SUITE 100, SAN ANTONIO, TEXAS 78202

PROJECT Mexican Hat Tailings
 JOB NO. EQ1-63 DATE 11/1/91

LOG OF TEST BORING NO. CCO

RIG TYPE CNC 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										
5										
10										
15										
20										
25										
30										
35										
21'			X	U	6-6-6-4-4			CH		Slimes br. PE red
20'			X	U	4-4-3-3-3-3					
19'			X	U	2-2-2-5-7					
20'			X	U	8-8-8-8-11					
19'			X	U	2-9-10-9-11			SM		
18'			X	U	7-8-12-11-11					Silty Sand NP gray
17'			X	U	6-10-11-13-17					
19'			X	U	12-10-11-16-17					
20'			X	U	6-6-9-12-13					
21'			X	U	3-9-12-13-14					
19'			X	U	8-9-15-13-12					
19'			X	U	7-9-11-24-150/2"					(TRAILERS) (SUBBASE) Sandstone

Arjen stopped @ 5'
 Samples refused @
 29' 8"

DEPTH	NO. OF	DATE
11/1/91		

GROUND WATER

SAMPLE TYPE

A - Auger cuttings.
 B - Blast sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 2" O.D. 1.38" I.D. tube sample.

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS
 10000 W. 10th Avenue • Suite 101 • Denver, CO 80231

PROJECT MOBILE 45JOB NO. EBI-57K DATE 11/12/82LOG OF TEST BORING NO. D611

RIG TYPE <u>CMF-55 (#203)</u>									BORING TYPE <u>6 1/2" DIA</u>		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	✓	✓	1-2-3-5-4			SP	moist	soft	5' Fin sand loose slightly cemented turns to gray			
5		70	✓	✓	6-8-6-7-5									
		22	✓	✓	8-2-2-2-2									
		21	✓	✓	6-5-6-6-7									
10		70	✓	✓	7-7-8-11-25				dry	hard	(TAILINGS) (SUBBASE) bedrock red			
		(NR)			50 (1')						Auger stopped @ 510' sample recovered 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 - 2" O.D. 2.42" I.D. tube sample.
 T - 1" O.D. thin-walled Shelby tube.

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LOG OF TEST BORING NO. C-58

RIG TYPE CMZ 75 (206) CC

BORING TYPE 10 1/2" HSA

SURFACE ELEV

304.TUM

THESE

VISUAL CLASSIFICATION

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
0		22"	X	U3-4-2-2-4				SM
5		19"	X	U3-5-3-5-5				
10		17"	X	U4-6-6-7-10				
15		16"	X	U1-7-7-10-11				
20		12"	X	U12-12-15-10-8				
25		20"	X	U8-10-13-13-14				
30		19"	X	U9-12-11-12-14				
		18"	X	U10-12-12-13-11				
		6"	X	U1-6-8-11-14				
		18"	X	U33-24-11-150/11 1/2 7"				

moist

Silty Sand
NIP
gray.
[Note: red silty layer @ 5'-6']

tailings
subbase
sandstone

Auger stopped @ 5'
Sample refused @
24' 4 1/2"

GROUND WATER

SAMPLE TYPE

SERGEANT, HAUSKINS & BECKWITH

A = Answer **B = Block number**

DEPTH	HOUR	DATE
-------	------	------

MCN4

U - 3" O.D. 2.42" I.D. tube samples

COMPLUTENSE, EDICIONES
PROFESOR ALFONSO BOU + SUELO DE + SUELO DE + SUELO DE

PROJECT Mexican HAT
 JOB NO. EB-63K DATE 1/12/82

LOG OF TEST BORING NO. D59

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 100 lb, 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	UNITED STATES Classification	REMARKS	VISUAL CLASSIFICATION
0		18	X	6	3-3-5-4-2			Sm	moist soft	silty sand
		20	X	6	5-5-3-2-4					low PE
5		21	X	6	5-3-2-4-2					wkly cemented
		19	X	6	9-6-5-1-8					tan to gray
10		20	X	6	9-9-7-8-8					
		20	X	6	9-9-9-6-4					
15		18	X	6	8-8-11-12-12					
		21	X	6	9-9-7-11-10					
20		20	X	6	6-9-7-8-14					
		21	X	6	10-10-10-15-15					
25			X	11	10-10-11-14-16					
			X	16	8-9-43-50/4				hard	bedrock, red (TAUCHING) (SUBBASE)
30										Auger stopped @ 29'4" 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.
 T - 4" O.D. thin-walled Shelby tube.

SERGEANT, HAUSKINS & BECKWITH

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PROJECT Mexican Hat Tailings
 JOB NO. E81-103 DATE 1/11/81

LOG OF TEST BORING NO. C56

RIG TYPE QWZ 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										
5										
10										
15										
20										
25										
30										
35										
23'			X	U-3-4-3-3-4				SM		Silty Sand NP
19'			X	U-5-5-6-4-5						gray
19'			X	U-2-2-3-4-7						(Note: red silt lens @ 5'-7']
20'			X	U-6-6-6-6-7						
18'			X	U-6-6-6-6-4						
19'			X	U-6-6-6-6-11-14						
18'			X	U-8-8-8-9-13						
19'			X	U-8-7-11-14-18						
20'			X	U-6-8-3-14-16						
19'			X	U-9-9-3-15-17						
20'			X	U-10-9-11-11-14						
19'			X	U-9-10-11-13-15-16-17						

Silty Sand
NP
gray
(Note: red silt lens @ 5'-7']

tailings
subbase
Sandstone

Auger stopped @ 5'
 Sampler refused @ 29' 11 1/2"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

A - Auger cuttings, B - Block sample
 5 - 3" O.D. 1.38" I.D. tube sample
 U - 3" O.D. 2.62" I.D. tube sample

SERGEANT, HAUSKINS & BECKWITH
 CONSULTING GEOTECHNICAL ENGINEERS
 MOBILE - ALABAMA - BIRMINGHAM - DALLAS - SAN ANTONIO

PROJECT Mexican Hat Tailings
 JOB NO. ESI-632 DATE 1/11/82

LOG OF TEST BORING NO. C54

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.	Mohr's Constant Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM		
5			23'	X	4	12-4-0-5-6				Silty Sand
			21'	X	4	4-4-4-4-5				NP
			19'	X	4	2-3-4-5-7				red-grey
10			18'	X	4	10-13-13-13-12				[Note: silty layer @ 2'-8']
			18"	X	4	4-4-3-12-13				
15			19'	X	4	7-9-10-11-13				
			18"	X	4	6-6-8-10-12				
20			17'	X	4	6-8-13-16-8				
			17"	X	4	13-12-14-14-15				
25			19"	X	4	15-13-18-18-19				
			19"	X	4	9-9-12-15-15				
30			17"	X	4	10-11-13-13-14				
			18"	X	4	8-9-11-11-13				
35			16"	X	4	11-12-13-13-50(4")				tailings
										subgrade
										Sandstone
40										Auger stopped @ 5'
										Sampler retrieved @ 34'10"

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.

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PROJECT MEXICAN HPT.
 JOB NO. EB1-03K DATE 1/11/82

LOG OF TEST BORING NO. D53

RIG TYPE CME-55 #203
 BORING TYPE 6 1/2" HSA
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Geological 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	2-2-3-4-1	21				moist soft	silty sand w/ky cemented Low pet. tan to white
		21	X	5-2-6-4-2	22					
5		18	X	7-6-6-5-7						
		19	X	5-7-5-8-8						
10										
		21		7-6-5-8-7						
		20		7-6-7-7-8						
15										
		20		10-9-9-9-11						
			X	25-50/5					dry hard	bedrock red
20										Auger stopped @ 5.0' Sample refusal @ 10.5'

GROUND WATER

DEPTH	HOUR	DATE
-------	------	------

SAMPLE TYPE

A - Auger cuttings. B - Block sample
 C - 2" O.D. 1.38" I.D. tube sample.

SERGEANT, HAUSKINS & BECKWITH

PROJECT Mexican Hat Tailings
 JOB NO. ES-63K DATE 1/10/82 - 1/11/82

LOG OF TEST BORING NO. D50

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"	X	U 7-10-14-14-15				wet	
55			19"	X	U 12-14-12-31-250/5" 1				dry hard	tailings subbase sand stone
60										
65										
70										
										Sampler refused @ 54' 9"

GROUND WATER

DEPTH	HOUR	DATE
TK 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.

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PROJECT

Mexican Hwy

LOG OF TEST BORING NO. D51

JOB NO

E81-63K

DATE

1/11/82

RIG TYPE

RMH-55 #203

BORING TYPE

1 1/4" HSE

SURFACE ELEV.

DATA

REMARKS

VISUAL CLASSIFICATION

Depth in Feet

Continuous
Penetration
ResistanceGraphical
Log

Sample

Sample Type

Blows per foot
140 lb. 30" free-
fall drop hammerDry Density
lbs. per cu. ft.Moisture Content
Per Cent of Dry Wt.Unified Soil
Classification

SPH

moist soft

5' H₂ SAND
LOOSELY
w/ly cemented
thru to wh. fe

0

22

2

2 3-4-5-4-5

5

18

1

5-4-7-6-7

10

18

1

2 3-3-4-4-4

15

18

1

2 4-7-6-8-9

20

18

1

2 4-4-10-10-9

25

18

1

2 4-4-10-10-9

30

18

1

2 4-4-10-10-9

35

18

1

2 4-4-10-10-9

40

18

1

2 4-4-10-10-9

45

18

1

2 4-4-10-10-9

50

18

1

2 4-4-10-10-9

55

18

1

2 4-4-10-10-9

60

18

1

2 4-4-10-10-9

65

18

1

2 4-4-10-10-9

70

18

1

2 4-4-10-10-9

75

18

1

2 4-4-10-10-9

80

18

1

2 4-4-10-10-9

85

18

1

2 4-4-10-10-9

90

18

1

2 4-4-10-10-9

95

18

1

2 4-4-10-10-9

100

18

1

2 4-4-10-10-9

DEPTH	MDUR	DATE

GROUND WATER

SAMPLE TYPE

A - Auger cutting, B - Block sample

S - 2" O.D. 1.38" I.D. tube sample,

U - 3" O.D. 2.43" I.D. tube sample,

T - 3" O.D. thin-walled Shelby tube.

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PHOENIX - ALBUQUERQUE - SANTA FE - SALT LAKE CITY

dry firm

bedrock
subgradeAuger stopped @ 35.3'
penetration @ 42.5'

PROJECT Mexican Hat
 JOB NO. E91-63K DATE 1/11/82

LOG OF TEST BORING NO. C49

RIG TYPE CMF-55 #203
 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			21	X	U 5-6-6-5-5			SM	moist soft	Silty SAND Loose pit. w/ky cemented tan to white
			20	X	U 5-6-5-4-6					
5			18	X	U 3-2-2-2-3					
			19	X	U 5-6-7-5-11					
10			20	X	U 7-7-7-8-7					
			21	X	U 13-10-10-11-12					
15			19	X	U 12-11-12-11-10					
			20	X	U 12-10-11-13-15					
20			18	X	U 10-10-9-11					
			18	X	U 7-8-9-11-11					
25			13	X	U 10-11-9-10-11					
			20	X	U 13-11-14-15-19				firm	
30			24	X	U 9-10-11-12-9					bedrock
			16	X	U 10-10-11-12-13				hard	red
35									dry	
40										sample refused @ 34' 3" auger stopped @ 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 Mexican Hat Tailings
 JOB NO. E81-634 DATE 11/10/82

LOG OF TEST BORING NO. D50

RIG TYPE CME 75 (200) SC
 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		
1					U 6-5-6-4-6				Moist	
2					U 2-4-6-6-7					Silty Sand NP grt.
3					U 4-4-3-2-7					[Note: some slimes mixed w/ sand below 5']
4					U 4-3-4-7-12					
5					U 5-6-7-10-10					
6					U 8-9-2-14-14					
7					U 8-8-8-12-12					
8					U 8-8-8-13-20					
9					U 13-12-15-15-20					
10					U 9-11-13-16-19					
11					U 12-12-15-17-18					
12					U 9-11-7-17-17					
13					U 13-16-18-16-14					
14					U 9-15-14-14-17					
15					U 8-8-14-12-14					
16					U 10-14-22-21-24					
17					U 15-10-21-2-20					
18					U 10-11-16-23-27					
19					U 20-22-17-16-15					
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										

DEPTH	HOUR	DATE
50	9:29	11/11/81

GROUND WATER

SAMPLE TYPE

A - Auger samplings. B - Block sample
 5 - 3" O.D. 1.38" I.D. tube sample
 U - 3" O.D. 2.62" I.D. tube sample
 2 - 3" O.D. thin-walled Shelby tube.

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LOG OF TEST BORING NO. C48

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

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 1/10/82

LOG OF TEST BORING NO. C45

RIG TYPE CME-55 #203
 BORING TYPE 6 1/2" HSA
 SURFACE ELEV. _____
 DATUM _____

Depth In Feet	Continuous Penetration Resistance	Graphical Log	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									
		70	X	5-2-3-2-5			SM	moist - soft	silty sand Low ft. wkly cemented tan to yellow to white
		70	X	3-4-3-5-1					
5		70	X	3-4-2-5-1					
		21	X	4-5-1-7-3					
10		21	X	7-1-8-5-7					
		10	X	6-6-7-7-10					
15		19	X	9-9-10-7-8					
		20	X	5-6-5-6-7					
20		26	X	6-5-7-6-7				dry - hard	bedrock red
		(NL)	X	2-1 3/4"					
25									Auger stopped @ 5.6' sample refused @ 22' 7 3/4"

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.
 T - 3" O.D. thin-walled Shelby tube.

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PROJECT Mexican Hat Tailings
 JOB NO. E8-G2K DATE 1/10/82

LOG OF TEST BORING NO. C44

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
0			26"	U	3-2-4-6-8			SM
5			20"	U	3-3-3-4-3			
			19"	U	3-3-4-5-7			
10			18"	U	4-5-6-7-12			
			19"	U	4-5-7-10-11			
15			18"	U	6-6-6-9-11			
			20"	U	5-4-5-5-8			
20			19"	U	7-7-8-12-10			
			17"	U	7-5-4-11-33			
25			8"	U	4-9-5-12"			

RIG TYPE CM2 75(206)CC
 BORING TYPE 6 1/2" HSA
 SURFACE ELEV. _____
 DATUM _____

REMARKS	VISUAL CLASSIFICATION
	Silty Sand NP grey
	tailings subbase Sandstone
	Auger stopped at 25' Sampler retrieved @ 23'2"

GROUND WATER

DEPTH	WATER	DATE
NONE		

SAMPLE TYPE

A - Auger cuttings. S - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 1" O.D. thin-walled Shelby tube.

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PROJECT PROV. 1003 FISH
 JOB NO. 5-2-R DATE 1-2-71

LOG OF TEST BORING NO. 041

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" Max. fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		21"	X	U	3-3-2-2-2			SM	moist soft	Silty SAND low P.I. w/ly cemented tan to yellow to white
5		20	X	U	4-3-4-2-1					Note: slimes from 1' and deeper
		21	X	U	8-14-25--5					
		26	X	U	4-5-5-8-13				firm	
10		8	X	U	16-50(8")				hard	TAKINGS SUBFACE
15										Auger stopped @ 5.0' sampler refusal @ 10' 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 Mexican Hat Tailings LOG OF TEST BORING NO. CTO
JOB NO. 81-0316 DATE 1/10/82

LOG OF TEST BORING NO. C40[illegible]

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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CONSULTING GEOTECHNICAL ENGINEERING
P.O. BOX 11, 21101 CANTON, MASSACHUSETTS 01913-0011

PROJECT Mexican HatLOG OF TEST BORING NO. C39JOB NO. ED-63KDATE 10-82RIG TYPE CME-55 #203BORING TYPE 6" HSA

SURFACE ELEV. _____

DATUM _____

Depth in Feet	Continuous Penetration Resistance	Geological Log	Sample	Sample Type	Blows per foot 140 lb, 30" drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		14	X	U	5-13-29-50/5			SM	main soil	sim. sand low pt. w/ly cemented tan
5										bedrock bed
										TAILINGS substrate
										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.
 T - 3" O.D. thin-walled Shelby tube.

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PROJECT Mex. HAT
 JOB NO. EBI-63K DATE 1/19/82

LOG OF TEST BORING NO. A37

RIG TYPE WINE-SS # 303
 BORING TYPE 6" HPI
 SURFACE ELEV. _____
 DATUM _____

Depth to 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.	Mohr's Circle Per Cent of Dry Wt.	Unitary Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2 1/2						SM	first soil	stiff, silty Low pt. whly cemented tan to white to yellow
5		2 1/2								
		2 1/2								
		2 1/2								
10		2 1/2								FAIRLY SUBSOL
		2 1/2								bedrock red
15		2.0								
20										Auger not used sampled @ 4 1/2'

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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 P.O. BOX 1000 • SANTA FE • NEW MEXICO

PROJECT Mexican Hat Tailings
 JOB NO. ES-1-625 DATE 1/19/82

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	Geophysical 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"	X	W-1-9-1-44-87				SM		
		20"	X	7-8-9-9-12					moist	Silty Sand NP grey
5		19"	X	8-7-9-7-10						
		19"	X	7-6-7-9-10						
10		20"	X	4-4-6-7-10						
		19"	X	8-7-8-8-10						
15		20"	X	4-4-4-5-7-8						
		20"	X	4-5-5-7-7-8						
20		18"	X	4-4-1-4-4-5-50/37						tailings substrate 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 Mexican Hat La.
JOB NO. E81-G3K DATE 1/9/81

LOG OF TEST BORING NO. B34

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.	Mohr's Circle Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			20"	X	4-5-7-12-10-6			MR-1	moist	Silty Sand NP grey
5			19"	X	4-5-11-11-15-15					
			19"	X	4-5-8-9-15					
			18"	X	4-6-7-9-9-10					
10			19"	X	4-5-4-7-7-6					
			18"	X	4-4-7-6-4-8					
15			19"	X	4-7-5-5-6-6					
			18"	X	4-9-8-8-7-6					
20			MR	X	4-6-7-8-7-8				tailings subbase Sandstone	
			17"	X	4-7-5-5-5					
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. 2.47" I.D. tube sample.

7 - 1" O.D. thin-walled Shelby tube.

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PROJECT MEXICAN HAT
 JOB NO. EB-63K DATE 7/9/82

LOG OF TEST BORING NO. B35

RIG TYPE CME-55 #203
 BORING TYPE 1.5" TSP
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Test Results	Geological 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'	V	T				CL	mod. silty	mod. silty clay w/ky cemented low pt. tan to white to yellow
5		2 1/2'	V	T						
		2 1/2'	V	T						
10		2 1/2'	V	T						
		2 1/2'	V	T						
15		2 1/2'	V	T						
		2 1/2'	V	T						
20		2'	V	T						
		2'	V	T						
25		24'	V	U	21-22-26-27-39				hard mod. silty	bedrock red
		26'	V	U	17-18-27-28-3					bedrock red
		22'	V	U	7-5-6-7-8					bedrock red
30		1.0'	V	T					hard	
35										hard mod. silty complete @ 31'0"

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: Mexican Hat Tailings
 JOB NO. 391-676 DATE 1/4/82

LOG OF TEST BORING NO. B32

RIG TYPE CMS 75 (200) CC
 BORING TYPE 1 1/2" USA
 SURFACE ELEV. DATA

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										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
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19										
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29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										

GROUND WATER

DEPTH	INCH	DATE
NCNC		

SAMPLE TYPE

A - Auger cuttings, B - Black sample
 S - 2" O.D., 1-28" I.D., tube sample
 U - 3" O.D., 2-42" I.D., tube sample
 T - 3" O.D., thin-walled Shelby tube

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOLOGICAL ENGINEERS
 1400 N. 10th Street, Suite 100, Phoenix, Arizona 85004

Auger stopped @ 5'
 Sample refused @
 37'10"

tailings
 subgrade
 Sandstone

moist
 Silty Sand
 some clay
 NP
 grey

PROJECT Mexican Hat
 JOB NO. FB163R DATE 1/9/02

LOG OF TEST BORING NO. B33

RIG TYPE CME-55 #203
 BORING TYPE 6 1/2" HSD
 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.	Mol. Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		16	✓	2-1-2-3-4-5				CL	moist	50%
		20	✓	2-3-3-4-6-7						
5		20	✓	2-3-3-4-5-6-7						
		20	✓	4-3-4-5-6-7						
		20	✓	4-3-3-5-6-6						
10		20	✓	4-6-4-6-6-6						
		18	✓	4-4-5-6-6-7						
15		21	✓	4-5-5-6-7						
		22	✓	4-1-2-3-5-7					mod firm	
20		13	✓	4-18-33-50/5"					dry hard	bedrock red
25										Auger stopped @ 50' sample full @ 21'5"

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 701 2-1-58
 JOB NO. FBI-63K DATE 2-2-58

LOG OF TEST BORING NO. B30

RIG TYPE CN-55 (203)
 BORING TYPE 6" - 3"
 SURFACE ELEV.
 DATUM

Depth in Feet	Continuous Penetration Resistance	Geological Log	Sample	Sample Type	Blows per foot 2.40 lb. 30" lever 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	1-2-3-2-4				SM	moist	50%
		18	1	2-2-2-3-4						
5		19	1	4-4-4-5-6						
		20	1	6-6-8-8-9						
10		19	1	6-8-9-9-9						
		18	1	10-10-10-10-10						
15		20	1	9-8-8-5-6						
		24	1	4-4-4-4-5-6						
20		20	1	8-8-9-11-12						
		19	1	8-9-10-12-11						
25		19	1	5-8-6-7-11						
		20	1	4-10-13-13-11						
30		12	1	4-13-10-50-5					dry	hard
35										

5' - 7' sand
 w/ky cemented
 Low PT
 tan to yellow to white

Note: some thin silt line lenses
 encountered throughout depth

firm

(TAILINGS)
 (SUBBASE)

Auger stopped @ 5'-0"
 sampler @ 2' from @ 31'5"

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
JOB NO. EB-63K DATE 1-6-82

LOG OF TEST BORING NO. B31

JOB NO. _____ DATE _____								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 x 10 lb. 30" free-fall drop Sweeney	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 p.c. likely cemented tends white to yellow
1		2 1/2'	X	T						
2		2 1/2'	X	T						
3		2 1/2'	X	T						
4		2 1/2'	X	T						
5		2 1/2'	X	T						
6		2 1/2'	X	T						
7		2 1/2'	X	T						
8		2 1/2'	X	T						
9		2 1/2'	X	T						
10		2 1/2'	X	T						
11		2 1/2'	X	T						
12		2 1/2'	X	T						
13		2 1/2'	X	T						
14		2 1/2'	X	T						
15		2 1/2'	X	T						
16		2 1/2'	X	T						
17		2 1/2'	X	T						
18		2 1/2'	X	T						
19		2 1/2'	X	T						
20		2 1/2'	X	T						
21		2 1/2'	X	T						
22		2 1/2'	X	T						
23		2 1/2'	X	T						
24		2 1/2'	X	T						
25		2 1/2'	X	T						(TAILINGS) (SUBBASE)
26		28"	X	T					dry hard	bedrock red
27		(MC) 5 1/2'	X	T						
28										
29										
30										Auger stopped @ 5.0' sample taken @ 27'6"
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
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55										
56										
57										
58										
59										
60										
61										
62										

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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CONSULTING ELECTRICAL ENGINEERS
P.O. BOX 1000, ALBUQUERQUE, N.M. 87103 • 505/263-0171

PROJECT Mexican Hat Tailings
 JOB NO. ES-63K DATE 1/9/82

LOG OF TEST BORING NO. B-28

RIG TYPE CMZ SS (203)

BORING TYPE 6 1/2" HSA

SURFACE ELEV. _____

DATUM _____

Depth in Feet	Continuous Penetration Resistance	Geotechnical 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-1-2-2-4-5				SM	moist soft	Silty Sand weakly cemented. Lo PI tan to white to yellow
5		20"	X	U-6-8-7-8-8						
		18"	X	U-3-6-2-3-1						
10		20"	X	U-1-2-1-1-2						
		18"	X	U-2-2-1-2-1						(tailings) (subbase)
15		12"	X	U-4-3-50/3 1/2"						Bedrock red
										Auger stopped @ 5' Sampler refused @ 13' 9 1/2"

GROUND WATER

DEPTH	MOOR	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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 INDENIE - ALBUQUERQUE - SANTA FE

PROJECT Man 12JOB NO. 881-67KDATE 11-9-52LOG OF TEST BORING NO. A29RIG TYPE CME-55 (203)BORING TYPE 6" HEP

SURFACE ELEV. _____

DATUM _____

Depth to Feet	Continuous Penetration Resistance	Geophysical Log	Sample	Sample Type	Blows per foot 140 lb. 30" S&W fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Pct. Cent. of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
		24			1-1-1-2-3				mod. firm	city, spin Low p.T. w/ky cemented tan to white to yellow
		20			2-2-4-3-4					
5		15			5-8-7-8-7					(TAILINGS) (SUBBASE)
10		19			6-10-12-12-10				dry hard	bedrock red
15										Auger refusal @ 5' 6"
20										sample refusal @ 70' 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.
 T - 3" O.D. thin-walled Shelby tube.

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PROJECT Mexican Hat Tailings
 JOB NO. 331-13 & DATE 1/9/52

LOG OF TEST BORING NO. 3-26

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		
5		22"	X	U 3-3-2-3-4					moist	Silty Sand NP gray
10		19'	X	U 2-1-1-2-3						
15		18'	X	U 4-3-4-7-9						
20		20'	X	U 5-5-5-7-8						
25		19'	X	U 7-8-7-9-10						
30		19'	X	U 9-9-8-7-10						
35		19"	X	U 7-7-7-8-7						
40		20'	X	U 7-9-13-12-13						
45		20'	X	U 10-12-13-21-24						
50		19'	X	U 14-15-16-19-16						
55		19'	X	U 5-6-9-9-9						
60		19'	X	U 5-13-14-16-14						
65		7"	X	U 5-6-6-9-10						
70		19'	X	U 5-8-19-150/3"						

(Tailings)
 (30 Blows)
 Sandstone

Auger stopped @ 5'
 Sampler refused @
 34' 3"

DEPTH	NCUR	DATE
NONE		

GROUND WATER

SAMPLE TYPE

A - Auger cuttings. B - Block sample
 S - 3" O.D. 1.38" I.D. tube sampler.
 U - 3" O.D. 2.42" I.D. tube sampler.
 T - 3" O.D. thin-walled Shelby tubes.

SERGEANT, HAUSKINS & BECKWITH

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 PROVIDENCE, RHODE ISLAND • BOSTON, MASS. • NEW YORK, N.Y.

PROJECT Mexican Hat Tailings
 JOB NO. 81-43K DATE 1/19/81

LOG OF TEST BORING NO. B-24

RIG TYPE CME 75(200) CC
 BORING TYPE 6 1/2" USA
 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		
			20'	X	U 1-2-1-1-4				moist	Silt
			20'	X	U 3-2-2-2-3					Lo PI
5			18"	X	U 5-7-8-8-8					grey
			19"	X	U 5-5-10-7-5					[Note: some sand and clay lenses @ 10'-20']
10			18"	X	U 5-6-8-7-9					
			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 11-11-5-7-16					
			17"	X	U 8-6-1-9-10					(tailings) (subsoil) Sandstone
25			18"	X	U 6-6-5-6					
			5"	X	U 36-50 1/2"					
30										Auger stopped @ 5' Sampler retrieved @ 28' 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
 T - 3" O.D. thin-walled Shelby tube

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PROJECT Mexican Hat Tailings
 JOB NO. E91-63K DATE 1/9/82

LOG OF TEST BORING NO. A-25

RIG TYPE CME 55 (203)

BORING TYPE 6 1/2" HSA

SURFACE ELEV. _____

DATUM _____

Depth in Feet	Continuous Penetration Resistance	Geological Log	Sample	Sample Type	Blows per foot 60 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Mohr's Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		23'	X	1K 11-1-1-3-4				SM	moist soft	Silty Sand
5		16"	X	U 5-7-7-9-8						weakly cemented
		20"	X	U 11-13-9-9-11						Lo PI
10		12"	X	U 13-29-50/4						tan to white to yellow (tailings) (subbase)
										Bedrock red
										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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PROJECT Mexican Hat Tailings
 JOB NO. E81-63K DATE 1/9/81

LOG OF TEST BORING NO. B-22

									RIG TYPE <u>CME-75 (206) CC</u>			
									BORING TYPE <u>1 1/2" HSA</u>			
									SURFACE ELEV. _____			
									DATUM _____			
Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION		
0			25"	X	U 1-2-1-2-3			ML	moist	Silt Lo PI grey		
5			19"	X	U 1-2-2-3-4							
			18"	X	U 7-9-7-6-7			SM	moist	Silty Sand NP grey		
10			19"	X	U 3-4-4-6-9							
			18"	X	U 6-6-6-8-10							
15			19"	X	U 8-6-7-9-8							
			19"	X	U 5-8-4-5-5 50/24							
			NR		S 50/1 1/2"					(tails) (subcore) Weathered Sandstone		
20												
25										Auger stopped @ 5' Sampler refused @ 17' 6 1/2"		
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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Auger stopped @ 5'
 Sampler refused @
 17' 6 1/2"

(Tails)
 (Subsided)
 Weathered Sandstone

PROJECT Mexican Hat Tailings
 JOB NO. 581-63K DATE 1/8/52

LOG OF TEST BORING NO. B-23

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
		23"	X	U 1-1-1-4-5						Lo PI
		20"	X	U 3-4-4-3-2						Weakly cemented
5		18"	X	U 6-5-4-1-6						tan to yellow to white
		20"	X	U 4-3-3-3-2						
10		20"	X	U 3-2-1-1-1						
		18"	X	U 1-2-2-1-2						
15		20"	X	U 1-2-2-1-1						
		16"	X	U 5-4-2-1-5 - soft					dry hard	(tailings) (subbase)
20										Bedrock red
										Auger stopped @ 5'
										Sampler retrieved @ 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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PROJECT Mexican Hat Tailings
 JOB NO. BAI-134 DATE 1/18/82

LOG OF TEST BORING NO. 3-20

Depth in Feet	Continuous Penetration Resistance	Geophysical Log	Sample	Sample Type	Blows per foot 140 lb. 30" hammer full drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										Sandstone (Native)
5										Auger refused @ 2'
10										Sampler refused @ 5'
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 Mexican Hat Tailings
 JOB NO. ES-63K DATE 1/8/82

LOG OF TEST BORING NO. B-21

Depth In Feet	Continuous Penetration Resistance	Geophysical Log	Sample	Sample Type	Blows per foot 140 lb. 30" drop fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	Remarks	Visual Classification
0										
		22"	X	U 1-2-3-4-3				Sm	moist soft	Silty Sand
		21"	X	U 3-2--2-2						Lo PI
5		18"	X	U 6-14-3-3-2					mod. firm	weakly cemented
		18"	X	U 5-4-5-5-4						tan to yellow to white
10		20"	X	U 4-5-5-5-4						
			X	U 29-50/47"						(tailings) (subbase)
15									hard	Bedrock red
										Auger stopped @ 5'
										Sampler refused @ 13' 4 1/2'

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. 2.62" 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. B-18

RIG TYPE CME 75(200)CC
 BORING TYPE 6 1/2" HSA
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Geological Log	Sample	Sample Type	Blows per foot 140 W. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Molinite Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM		Silty Sand
			26"	X	4	5-5-6-11-17				NP
			21"	X	6	9-9-9-9-10				grey
5			19"	X	11	2-3-4-6-7				
			20"	X	4	5-6-6-6-9				
10			19"	X	4	5-6-6-7-7				
			19"	X	4	4-5-6-7-10				
15			19"	X	4	5-6-6-7-9				
			19"	X	11	7-7-7-9-10				
20			18"	X	4	4-9-22-50/4 1/2"				(failings) (subgrade)
			NR		S	50/1"				Weathered Sandstone
25										
30										Auger stopped @ 5'
35										Sampler retracted @ 22'7"

GROUND WATER		
DEPTH	TIME	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. E91-63K DATE 1/8/82

LOG OF TEST BORING NO. B-19

Depth in Feet	Continuous Penetration Resistance	Geopical 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.	Uniting Soil Classification	RIG TYPE <u>CME 55(203)</u> BORING TYPE <u>6 1/2" HSA</u> SURFACE ELEV. _____ DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
0		19"	X	U2-2-3-4-6				SMA		Silty Sand Lo PI weakly cemented brown to yellow
		20"	X	U4-2-2-4-5						
5		21"	X	U6-8-8-11-13						
		18"	X	U4-5-5-5-5						
10		21"	X	U3-5-6-6-9						
		20"	X	U7-8-9-10-8						
15		15"	X	U6-1-7-6-6						
		24"	X	U5-4-4-4-5					v. moist	
20		21"	X	U5-6-6-5-6					mod. firm	(tailings) (subbase)
		20"	X	U4-5-4-6-13						
25		NR		U50/1						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. 2.43" I.D. tube sample
 T - 7" O.D. Minnagified Shelby tube.

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PROJECT Mexican Hat Trailers
JOB NO. 1591-123 DATE 1/8/52

LOG OF TEST BORING NO. B-16

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		
25"			X	4 2-3-11-11-13					moist	Silty Sand NP grey
19"			X	4 13-12-15-15-14						
19"			X	4 4-6-8-10-11						
18"			X	4 3-4-5-6-8						
19"			X	4 6-5-6-8-9						
19"			X	4 1-8-9-11-11						
19"			X	4 6-7-9-9-11						
19"			X	4 7-7-9-11-11						
18"			X	4 6-9-9-10-11						
19"			X	4 10-11-15-19-25						
15"			X	4 14-9-10-14-17						
20"			X	4 11-11-11-15-13						
20"			X	4 7-7-7-9-10						
19"			X	4 7-22-22-22-50/5"					v. moist	(tailings) (subbase) Weathered Sandstone
10"			X	5 13-50/5"						
40										Auger stopped @ 5' Sampler refused @ 35' 11"

PROJECT Mexican Hat Tailings
 JOB NO. ES1-03K DATE 1/8/82

LOG OF TEST BORING NO. B-17

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	1-1-1-2-3					weakly cemented
		21"	X	U	5-4-2-3-2					Lo PI
5		21"	X	U	1-5-3-3-6					tan to brown to yellow
		18"	X	U	3-2-2-4-5					
10		18"	X	U	3-3-2-2-2					
		15"	X	U	1-1-1-2-4					
15		18"	X	U	4-4-2-2-1					
		21"	X	U	1-1-1-2-1					
20		26"	X	U	1-1-2-10-22					
		16"	X	U	21-20-50/51				dry hard	(tailings) (subbase)
25										Bedrock red
										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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PROJECT Mexican Hat Tailings
 JOB NO. ES1-02 DATE 1/8/82

LOG OF TEST BORING NO. B-14

RIG TYPE CME 75 (206) CC
 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 lb./cu. ft.	Mol. Moist. Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM		Silty Sand
			25"	X	U 3-4-4-5-6					NP
			20"	X	U 4-4-3-4-6				moist	grey
5			19"	X	U 3-2-3-4-8					[Note: occasional thin silty sand lenses below 3']
			19"	X	U 4-5-4-7-10					
10			19"	X	U 7-6-7-9-10					
			19"	X	U 6-5-7-9-10					
15			19"	X	U 10-7-8-9-10					
			18"	X	U 7-12-10-15-15					
20			18"	X	U 11-9-11-15-11					(tailings) (subbase)
			19"	X	U 8-8-7-7-6					Weathered Sandstone
26			16"	X	U 7-9-50/5"					
30										Auger stopped @ 5' Sampler retrieved @ 26' 5"

GROUND WATER

DEPTH	HOUR	DATE
110N7		

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 1/8/82

LOG OF TEST BORING NO. B-15

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free fall deep hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	RIG TYPE <u>CME 55 (203)</u> BORING TYPE <u>6 1/2" HSA</u> SURFACE ELEV. _____ DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
0		26'	X	U	3-3-4-4-5			SM	moist soft	Silty Sand Lo FI weakly cemented tan to white to red [Note: slimes below 14']
5		22"	X	U	5-7-9-7-7					
		21"	X	U	19-24-30-10-9					
10		18"	X	U	3-3-4-5-3					
		18"	X	U	3-2-1-1-1					
15		23"	X	U	2-1-1-1-1					
		27"	X	U	1-1-1-3-5					(tailings) (subbase)
20		21"	X	U	15-24-35-24-58/59				dry hard	bedrock red
										Auger stopped @ 17 1/2' Sampler refused @ 19' 11 3/4"

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. 2.43" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.

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PROJECT Mexican Hat Tailings
JOB NO. 221-6314 DATE 1/8/82

LOG OF TEST BORING NO. A-10

RIG TYPE CME 75/206) CC
BORING TYPE 6 1/2" HSA
SURFACE ELEV. _____
DATUM _____

[illegible]

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. A-7

JOB NO. E81-G3K DATE 1/8/82

BORING TYPE 6' 1/2" HSA

SURFACE ELEV.

-DATUM

Auger stopped @ 10'
Sampler raised @ 10'

SAMPLE TYPE

DEPTH	HOUR	DATE

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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[illegible]

PROJECT Mexican Hat Tailings
 JOB NO. EG1-632 DATE 1/21/82

LOG OF TEST BORING NO. A-8

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		
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
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93										
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95										
96										
97										
98										
99										
100										

moist
 Silty Sand
 trace clay
 NP
 gray
 [Note: some silt lenses
 @ 12']
 (tailings)
 (subbase)
 Sandstone
 some silt
 Argon stopped @ 5'
 Sampler retracted @
 13' 8"

DEPTH	HOURL	DATE
NONE		

GROUND WATER
 SAMPLE TYPE
 A - Auger workings, B - Blank sample
 S - 3" O.D., 1.38" I.D. tube sample
 U - 3" O.D., 2.42" I.D. tube sample
 T - 3" O.D., Intervalled Shelby tube.

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PROJECT Mexican Hat
JOB NO. E81-63K DATE 1/8/87

LOG OF TEST BORING NO. A-5

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blow count per foot 140 lb. 30" hammer fall drop hammer	Dry Density lbs. per cu. ft.	Moisture Content Pct. Cont. of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			U-4-2-2-4					ML	moist soft	Silt
5			U-18-2-2-50/4						hard	weakly cemented NP tan to red refusal on bedrock
										Auger stopped @ 2 1/2'
										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 Well Tailings
 JOB NO. ES1-63K DATE 1/8/81

LOG OF TEST BORING NO. A-6

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"	X	U	1-2-3-3-4			st. moist	Silty sand
			20"	X	U	3-4-4-6-8				LPTI
5			20"	X	U	3-3-4-6-50/4"				grey (tailings)
										= 1 (subbase)
10										Sandstone
15										Auger stopped @ 5'
20										Sampler refused @ 7 1/4'
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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LOG OF TEST BORING NO. A-3

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM

GROUND WATER		
DEPTH	MOOR	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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வினாக்கள்:

PROJECT

JOB NO.

DATE

LOG OF TEST BORING NO. #17

RIG TYPE

BORING TYPE

SURFACE ELEV.

DATUM

ft. in Foot	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 2.00 ft. 30" tube full drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
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45								
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47								
48								
49								
50								

REMARKS

VISUAL CLASSIFICATION

dry horn

bedrock
red

SUBBASE

rough refusal @ 11.0'
piezometric hole
NO piez. set

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

- A - Auger cuttings. B - Block sample
 1 - 2" O.D. 1.38" I.D. tube sample.
 3 - 3" O.D. 2.43" I.D. tube sample.
 7 - 3" O.D. thin-walled Shelby tube.

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS
 MOOREHEAD, ALABAMA 36586 • SHELBYVILLE, KY 40177

PIEZOMETER OR WELL COMPLETION RECORD

WELL OR PIEZOMETER NUMBER 3
 SITE LOCATION Mission Park
 GROUNDWATER LOCATION LINE
 COMMENTS:

DATE 1/23/82
 JOB NO. EB/631C

SERGENT, HAUSKINS & BECKWITH

CONSULTING OF CIVIL ENGINEERING
 PROJECTS & ALABAMA STATE & COUNTY

PROJECT

LOG OF TEST BORING NO. 74

JOB NO.

DATE

Dr	Continuous Penetration Resistance	Gravel Test	Sample	Sample Type	Blows per foot 140 lb. 30" hammer	Dry Density lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Soil Classification

RIG TYPE

ONE-EE #203

BORING TYPE

2" 15P

SURFACE ELEV.

DATUM

REMARKS

VISUAL CLASSIFICATION

dry hrs bedrock 10' SURFACE

PIEZOMETER OR WELL COMPLETION RECORD

DIAMETER & TYPE OF CASING 4" A.S.

HT. ABOVE GROUND

TYPE OF BACKFILL

SAND

BENTONITE SEAL

SLOT LENGTH

BLANK LENGTH

GROUND SURFACE

RECORD ALL DIMENSIONS!

TOTAL DEPTH

TOTAL CASING LENGTH

SAND OR GRAVEL PACK (circle one)

WELL OR PIEZOMETER NUMBER 2SITE LOCATION MR. ALAN HAYGROUNDWATER LOCATION NONEDATE 1/23/02JOB NO. EE-63K

MSRD BORING LOGS

Page 4 of 4

▲

SITE ID: HAT01 LOCATION ID: 936
SITE COORDINATES (N.):
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
DRILLING METHOD: _____
DRILLING CONTR.: _____
DATE STARTED: _____
DATE COMPLETED: _____
FIELD REP.: R. Holland

GROUNDWATER LEVELS

DATE	TIME	DEPTH (M.)

CATION DESCRIPTION

THE CONDITION

MUDLOG OPERATION		% CORE RECOVERY	% ROCK RECOVERY (% RECOVERY IN MUD)	% DRILLING FLUID RECOVERY	PERCENT TEST INTERVAL	SPACING	ORIENTATION	COMBUSTION	WEATHERING	LITHOLOGY	ROCK TYPE & REMARKS
Abandoned Well											<p>138' stop at 140' Drilling stopped.</p> <p>Sample from 140-142' smells of oil. Swab test on probe tool confirmed oil in hole.</p> <p>TD 142' PD 139'</p> <p>Hole abandoned and grouted to surface.</p>

REMARKS:

● 2014 年 12 月 1 日

1 - 0 113 000000 2130 00000
 2 - 0 113 000000 2130 00000
 3 - 0 113 000000 2130 00000
 4 - 0 113 000000 2130 00000
 5 - 0 113 000000 2130 00000

PROJECT MEXICAN HAT
 JOB NO. ED-63K DATE 1/20/82

LOG OF TEST BORING NO. 296

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	RIG TYPE <u>PM-55 #203</u> BORING TYPE <u>L.H. 11/2"</u> SURFACE ELEV. _____ BATHY _____	
									REMARKS	VISUAL CLASSIFICATION
0										
		2 1/2	X	T				SN	moist	EXT. SILTY SAND
		2 1/2	X	T						Loose
5										slightly cemented
		2 1/2	X	T						tan to grey
		2 1/2	X	T						
10										
		2 1/2	X	T						
		10	X	T					dry	HARD bedrock
										tailings substrate
15										sample refused @ 13' 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.
 A - Auger cuttings. B - Block sample

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

2000 W. 10th Street - Santa Fe - New Mexico 87505

SERGEANT, HAUSKINS & BECKWITH

PROJECT Mexican Hat TailingsLOG OF TEST BORING NO. C96PROJECT Mexican HatLOG OF TEST BORING NO. D98JOB NO. 3142K DATE 12/25/52

Depth in Feet	Confinees 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	RIG TYPE	BORING TYPE	SURFACE ELEV.	DATUM	REMARKS	VISUAL CLASSIFICATION
0									CME-55 (203)	6 1/2" TSA				
5		2 1/2		T									moist soft	silty sand low fine likely cemented tan to grey
10		2 1/2		T										
15		2 1/2		T										
20		2 1/2		T										
25		2 1/2		T										
30		2 1/2		T										
35		2 1/2		T										
40		2 1/2		T										
45		2 1/2		T										
50		2 1/2		T										
55		2 1/2		T										
60		2 1/2		T										
65		2 1/2		T										
70		2 1/2		T										
75		2 1/2		T										
80		2 1/2		T										
85		2 1/2		T										
90		2 1/2		T										
95		2 1/2		T										
100		2 1/2		T										
105		2 1/2		T										
110		2 1/2		T										
115		2 1/2		T										
120		2 1/2		T										
125		2 1/2		T										
130		2 1/2		T										
135		2 1/2		T										
140		2 1/2		T										
145		2 1/2		T										
150		2 1/2		T										
155		2 1/2		T										
160		2 1/2		T										
165		2 1/2		T										
170		2 1/2		T										
175		2 1/2		T										
180		2 1/2		T										
185		2 1/2		T										
190		2 1/2		T										
195		2 1/2		T										
200		2 1/2		T										
205		2 1/2		T										
210		2 1/2		T										
215		2 1/2		T										
220		2 1/2		T										
225		2 1/2		T										
230		2 1/2		T										
235		2 1/2		T										
240		2 1/2		T										
245		2 1/2		T										
250		2 1/2		T										
255		2 1/2		T										
260		2 1/2		T										
265		2 1/2		T										
270		2 1/2		T										
275		2 1/2		T										
280		2 1/2		T										
285		2 1/2		T										
290		2 1/2		T										
295		2 1/2		T										
300		2 1/2		T										
305		2 1/2		T										
310		2 1/2		T										
315		2 1/2		T										
320		2 1/2		T										
325		2 1/2		T										
330		2 1/2		T										
335		2 1/2		T										
340		2 1/2		T										
345		2 1/2		T										
350		2 1/2		T										
355		2 1/2		T										
360		2 1/2		T										
365		2 1/2		T										
370		2 1/2		T										
375		2 1/2		T										
380		2 1/2		T										
385		2 1/2		T										
390		2 1/2		T										
395		2 1/2		T										
400		2 1/2		T										
405		2 1/2		T										
410		2 1/2		T										
415		2 1/2		T										
420		2 1/2		T										
425		2 1/2		T										
430		2 1/2		T										
435		2 1/2		T										
440		2 1/2		T										
445		2 1/2		T										
450		2 1/2		T										
455		2 1/2		T										
460		2 1/2		T										
465		2 1/2		T										
470		2 1/2		T										
475		2 1/2		T										
480		2 1/2		T										
485		2 1/2		T										
490		2 1/2		T										
495		2 1/2		T										
500		2 1/2		T										
505		2 1/2		T										
510		2 1/2		T										
515		2 1/2		T										
520		2 1/2		T										
525		2 1/2		T										
530		2 1/2		T										
535		2 1/2		T										
540		2 1/2		T										
545		2 1/2		T										
550		2 1/2		T										
555		2 1/2		T										
560		2 1/2		T										
565		2 1/2		T										
570		2 1/2		T										
575		2 1/2		T										
580		2 1/2		T										
585		2 1/2		T										
590		2 1/2		T										
595		2 1/2		T										
600		2 1/2		T										
605		2 1/2		T										
610		2 1/2		T										
615		2 1/2		T										
620		2 1/2		T										
625		2 1/2		T										
630		2 1/2		T										
635		2 1/2		T										
640		2 1/2		T	</									

PROJECT MEXICAN HAT
 JOB NO. ED-63K DATE 1/20/82

LOG OF TEST BORING NO. C96

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					noise	50T	STLY, SAND Lamp = w/ky cemented tanks grey
5		2 1/2	X	T							
		2 1/2	X	T							
		2 1/2	X	T							
10		2 1/2	X	T							
		2 1/2	X	T							
		10	X	T					dry	HARD	badly c + H.M.S SUBSILE
15											sample refusal @ 13' 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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CONSULTING GEOTECHNICAL ENGINEERS
 BIRMINGHAM - ALBUQUERQUE - SANTA FE - SALT LAKE CITY

JOB NO. E81-63K DATE _____

LOG OF TEST BORING NO. C96

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										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.

SERGEANT. HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS
ENGINEER - ALBUQUERQUE • SANTA FE

PROJECT MR. V. M. HAT
JOB NO. EA-1631C DATE 1/20/02

LOG OF TEST BORING NO. C97

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.	Molature Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			2 1/2'	X				SP	mist	5' soil
5			2 1/2'	X						Silty sand Low P _w Wt. corrected to grey
			2 1/2'	X						(TAILINGS)
10										Sampler stopped @ 7 1/2' (BLANK)
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.

SERGENT, HAUSKINS & BECKWITH

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PHOENIX • ALBUQUERQUE • SANTA FE

LOG OF TEST BORING NO. D100

BORING TYPE 10 1/2" + SP

SURFACE ELEV.

PATLW

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.

SERGEANT. HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS
 TAMMUN & ALONSOVERQUE • SANTA FE

LOG OF TEST BORING NO. D101

RIG TYPE ONE-25 (203)

BORING TYPE 12 1/2" x 16 ft

SURFACE ELEV.

DATUM

REMARKS	VISUAL CLASSIFICATION.
ms - 50'	S. 76' 2" from low p=. widely scattered from 9' to 12'
	(TAILINGS) (SUB BASE)
dry	Average depth @ 50' Cannon Creek @ 48' 11"

GROUND WATER

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.

SERGEANT. HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS
ALBUQUERQUE • ALBUQUERQUE • SANTA FE

LOG OF TEST BORING NO. D102

RIG TYPE CDIE-55 (203)
BORING TYPE 1 1/2" HSP
SURFACE ELEV. _____
DATUM _____

REMARKS		VISUAL CLASSIFICATION
moist	50%	silty, some low p.w. w/ly cemented tan to gray
	mod firm	
	firm	
		(TAILINGS)
		(SUBBASE)
dry	HARD	bed rock red
		Auger stopped @ 5.0' sample original @ 39'8"

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.

SERGEANT. HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS
PHOENIX • ALBUQUERQUE • SANTA FE

PROJECT 1125-63K DATE 1-2-68

LOG OF TEST BORING NO. D103

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
0								
5		78	/	U-4-4-7-7				SH
		24	/	5-5-5-5-5				
		78	/	3-7-3-4-5				
		25	/	5-3-5-3-7				
10		18	/	5-4-5-5-7				
		24	/	4-5-4-5-7				
15		18	/	6-5-7-6-7				
		23	/	6-7-6-6-7				
20		18	/	6-5-6-5-6				
		24	/	6-5-7-5-11				
25		18	/	8-8-5-7-10				
		25	/	8-5-7-5-11				
30		18	/	7-5-7-7-3				
		24	/	9-6-7-6-20				
35		7 (UP)	/	13-7-6-7-10				
			/	50/5				
40								

RIG TYPE 1125-63 (203)
 BORING TYPE 6 3/4" TCA
 SURFACE ELEV. _____
 DATUM _____

REMARKS	VISUAL CLASSIFICATION
mod. firm	Silty sand low p.c. slightly cemented tan to grey
firm	
moist	(TAILINGS) (SUBBASE) bedrock rock
	Auger stopped @ 51' 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.

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT 15-111
 JOB NO. FB1-63K DATE 12-2

LOG OF TEST BORING NO. D104

RIG TYPE ONE-55 (203)
 BORING TYPE 6 1/2" RSH
 SURFACE ELEV. _____
 DATUM _____

RIG TYPE <u>PIPE-55 (203)</u>											
BORING TYPE <u>6 1/2" SPT</u>											
SURFACE ELEV. _____											
DATUM _____											
Depth to Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 640 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	A	1-2-3-3-4			SP	moist	soft	silty sand
			24	A	3-3-5-7						low silty
5			25	A	3-2-4-6-4						very cemented
			22	A	5-4-5-6-8						tan to gray
10			23	A	4-5-4-7-8						
			24	A	6-5-5-6-8						
15			18	A	6-7-8-9-12						
			24	A	9-7-8-11-13						
20			23	A	7-8-7-14-14						
			23	A	10-9-10-13-12						
25			14	A	7-7-8-12-15						
			22	A	10-15-14-15-16						
30			24	A	9-7-7-15-2						
			21	A	12-12-11-12-14						
35			9	A	20-50-5						
											(TAILINGS)
											(SLURRY)
											red
											penetration @ 5.0"
											sample from 35' 11"

(TAILINGS)
 (SUBBASE)

average plugging @ 5.0' "
 sample taken @ 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.

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS
 PHOENIX • ALBUQUERQUE • SANTA FE

PROJECT 1122 1240 1475
 JOB NO. 24-23K DATE 1-2-32

LOG OF TEST BORING NO 1105

RIG TYPE OME-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 30" free fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification
0		24	1	3-4-5-7-8	58			
		22	1	5-3-3-8-8				
5		21	1	8-8-7-6-8				
		22	1	5-5-6-6-10				
10		23	1	6-7-10-11-12				
		24	1	9-9-7-11-13				
15		18	1	10-8-8-12-10				
		18	1	13-14-13-14-14				
20		23	1	10-9-11-13-15				
		21	1	9-9-10-12-16				
25		21	1	14-9-15-12-18				
		20	1	15-13-13-13-15				
30		14	1	16-12-15-17-19				
		21	1	15-15-18-19-21				
35		20	1	17-14-16-14-20				
		21	1	14-15-14-14-23				
40		23	1	15-13-15-10-21				
		23	1	16-12-14-14-19				
45		21	1	17-16-17-18-21				
		23	1	14-17-13-13-22				
50								

REMARKS	VISUAL CLASSIFICATION
mod. firm	Silty sand
	10-12
	Wkly cemented
	to grey
firm	

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
 PHOENIX • ALBUQUERQUE • SANTA FE

PROJECT 1167 1000 000
 JOB NO. 1000000 DATE 11/22/54

LOG OF TEST BORING NO D10.5

RIG TYPE CMF-55 (203)
 BORING TYPE 6" 1154
 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	16-15	16-22-23				
			16	X	16-75	16-23-54 9/16"			dry	hard red (TAILING) (SUBGRADE)
55										Auger stopped @ 5.0' sample refusal @ 54' 9 1/2"
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.

SERGEANT, HAUSKINS & BECKWITH
 CONSULTING GEOTECHNICAL ENGINEERS
 PHOENIX - ALBUQUERQUE - SANTA FE

LOG OF TEST BORING NO. 106

JOB NO. 58-63K DATE 5-2-64

RIG TYPE ONE-55 (203)
BORING TYPE 1 1/2" TCA
SURFACE ELEV. _____
DATUM _____

THESE

VISUAL CLASSIFICATION

dry hairs

bedrock
feel

sample effect @ 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.

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS
PHOENIX • ALBUQUERQUE • SANTA FE

LOG OF TEST BORING NO. 107

JOB NO. E81-63K DATE 23-4-75

BORING TYPE 4" dia. - 10'

SURFACE ELEV.

DATUM

GROUND WATER

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.

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS
PHOENIX • ALBUQUERQUE • SANTA FE

PROJECT Mexican Hat
JOB NO. EBI-63K DATE 1/23/82

LOG OF TEST BORING NO. 108

RIG TYPE CME-53 (203)
BORING TYPE 6 1/2" HSH
SURFACE ELEV. _____
DATUM _____

[illegible]

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger cuttings. B - Block sample
S - 3" 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.

SERGEANT. HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS
 TUPENIZ & ALBUQUERQUE • SANTA FE

JOB NO. E81-63K DATE 12-7

[illegible]

RIG TYPE CMR-55 (205)
BORING TYPE 1/2 REP
SURFACE ELEV. _____
DATUM _____

[illegible]

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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CONSULTING GEOTECHNICAL ENGINEERS
PHOENIX • ALBUQUERQUE • SANTA FE

PROJECT 110-100-100
 JOB NO. 110-100-100 DATE 11/1/55

LOG OF TEST BORING NO. 200

RIG TYPE 30" 55 (203)
 BORING TYPE 6" 55
 SURFACE ELEV. 61.55
 DATUM 61.55

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.	Mol. Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									dry hard	bedrock Subgrade
1 1/2			X	T						red
5										sample refused @ 1' 6"
10										
15										
20										
25										
30										
35										
40										
45										
50										
55										
60										
65										
70										
75										
80										
85										
90										
95										
100										
105										
110										
115										
120										
125										
130										
135										
140										
145										
150										
155										
160										
165										
170										
175										
180										
185										
190										
195										
200										

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. ^{CSU} 200

RIG TYPE CME 75 (20G)

SURFACE ELEV.

BATUN.

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT 101 V. C. P. D. KNT
JOB NO. ES1-63K DATE 11/27/82

LOG OF TEST BORING NO. 201

RIG TYPE CONE-5 (203)
BORING TYPE 1 1/2" 45°
SURFACE ELEV. _____
DATUM _____

[illegible]

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Asper settings. B - Block sample
5 - 2" O.D. 1.38" I.D. tube sample.
U - 3" O.D. 2.42" I.D. tube sample.

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ENGINEER • ALBUQUERQUE • SANTA FE

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	sort
5		10	X	S	2-4-3					5 1/2" S.P.N. Low p=
10		10	X	S	3-3-3				v. moist	wt. clay cemented tan to grey
15		2.0	X	T						(Tailings) (subbase)
20		NR							dry	bedrock fci
										Augered @ 19'6"
										Sampler refused @ 19'8"

PROJECT 110.7 PM 467
 JOB NO. ED-13K DATE 1/23/72

LOG OF TEST BORING NO. 203

Depth in Feet	Continuous Penetration Resistance	Geological 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
0		14	X	S	2-1-1			SM
5		2.0'	X	T				
10		18"	X	S	2-3-3			
15		18"	X	S	3-3-2			
20		18"	X	S	4-5-5			
25		2.0'	X	T				
30		16"	X	S	14-1-40			
35		50/0"						

RIG TYPE CME-55 #203
 BORING TYPE 1 1/2" x 5 ft
 SURFACE ELEV. _____
 DATUM _____

REMARKS	VISUAL CLASSIFICATION
moist soil	Silty sand low p.I. w/ly cemented tan to yellow
v. moist	
moist	bedrock rev
	(TAILINGS) (SUBBASE)
	Auger stopped @ 34' 6" sample refusal @ 34' 6"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger cuttings. B - Block sample
 S - 3" 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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CONSULTING GEOTECHNICAL ENGINEERS
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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	RIG TYPE <u>CME-55 (203)</u>		REMARKS	VISUAL CLASSIFICATION
									BORING TYPE	SURFACE ELEV.		
0		14	X	S	1-2-3			SM			moist soft	silty, sand low pt. w/ly cemented tan to gray
5		18			3-5-5						1. moist	
10		2 1/2	X	T								
15		18			4-4-5							
20		18	X	S	5-7-8							(TAILINGS) bedrock void
25		18	X	S	11-11-17							
30		2 1/2	X	T								
35		18	X	S	5-6-8						music	
40		NE			50/1"							max. depth @ 39' 6" sampled @ 39' 7"

PROJECT 1721-1A
 JOB NO. E21-63K DATE 1/22/50

LOG OF TEST BORING NO. 205

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
0		2 1/2		A				SM
		1 1/2		T				
5								
10								
15								
20								
25								
30								
35								
40								
45								
50								
55								
60								
65								
70								
75								
80								
85								
90								
95								
100								

RIG TYPE CME-55 (203)
 BORING TYPE 6 1/2" H5"
 SURFACE ELEV. _____
 DATUM _____

REMARKS	VISUAL CLASSIFICATION
moist sand	Silty sand low plastic widely cemented tan to gray
dry hard	(TAILINGS) bedrock (SUBSTRATE) rock
	Sample refusal @ 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 Mexican Hat Tailings
 JOB NO. ESL-63K DATE 1/23/82

LOG OF TEST BORING NO. 205

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.	Mol. Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
5										
10										
15										
20										
25										
30										

RIG TYPE CM2 75(200) CC
 BORING TYPE 6 1/2" HSA
 SURFACE ELEV. _____
 DATUM _____

Siltstone
 some interbedded
 shales and
 sandstones

Auger stopped @ 5 1/2'
 NX coring stopped
 @ 25 1/2'

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.
 T - 3" O.D. thin-walled Shelby tube.

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 PHOENIX - ALBUQUERQUE - SANTA FE

PROJECT

JOB NO. 281-628

DATE

22-81

LOG OF TEST BORING NO 206

RIG TYPE

ONE-55 (203)

BORING TYPE

1 1/2" IPS

SURFACE ELEV.

DATUM

REMARKS

VISUAL CLASSIFICATION

Depth In Feet

Continuous
Penetration
ResistanceGraphical
Log

Sample

Sample Type

Blows per foot
140 lb., 30" free-
fall drop hammerDry Density
Lbs. per cu. ft.Moisture Content
Per Cent of Dry Wt.Unified Soil
Classification

moist

soft

51 lb. sand
100 lb. fine
with cemented
fine to med. g. g.

17'

X 5 46-4

18'

X 5 43-3

(TAILINGS)

bedrock.

(subbase)

dry hard

Auger stopped @ 14' 6"
sample surface @ 16' 0"

20

GROUND WATER

DEPTH HOUR DATE

SAMPLE TYPE

A - Auger cuttings. B - Block sample

S - 3" O.D. 1.38" I.D. tube sample.

U - 3" O.D. 2.42" I.D. tube sample.

T - 4" O.D. 3.54" I.D. tube sample.

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CONSULTING GEOTECHNICAL ENGINEERS

INCORPORATED - 1948 - 1000 N. 10th St. - 10th Fl. - Denver, CO

PROJECT MAC (2) 107
 JOB NO. FB-63K DATE 1-22-91

LOG OF TEST BORING NO. 207

RIG TYPE CME-55 (203)
 BORING TYPE 6 1/2" HSD
 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 sand	silty sand low silt w/ky cemented @ tan to grey
5		2 1/2'	X	S						
10		14	X	S	1-2-					
15		16	X	S	3-3-4					
20		18	X	S						
25		H2	X	S	50/1				hard	bedrock red (TAILINGS) (SUBBASE)
										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

SERGEANT, HAUSKINS & BECKWITH

PROJECT 1705 AD Hwy
 JOB NO. EB-131C DATE 1/20/22

LOG OF TEST BORING NO. 208

RIG TYPE CME-55 (203)
 BORING TYPE 6 1/2" HSA
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Geological Log	Sample	Sample Type	Blows per foot 140 lb. 30" loose fall drop hammer	Dry Density Lbs. per cu. ft.	Mol. Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		2 1/2'		T				SP	moist sand	silty, sand low pt. w/ky cemented tan to grey
5		2 1/2'		T						
		2 1/2'		T						
		2 1/2'		T						
10		2 1/2'		T						
		2 1/2'		T						
15		2 1/2'		T						
		2 1/2'		T						
20		2 1/2'		T						
		2 1/2'		T						
25		2 1/2'		T						(tarmines) (subbase)
		2 1/2'		T					bedrock red	
		2 0'		T					dry hard	
30										Sampler refusal @ 29 1/2'

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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CONSULTING GEOTECHNICAL ENGINEERS
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PROJECT Mexican Hat Tailings
 JOB NO. E81-G3K DATE 1/22/82 - 1/23/82

LOG OF TEST BORING NO. CSU 208

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 deep 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										
35										
40										
45										
50										

MAX
Core

Siltstone
some interbedded
sands and mudstone

Auger stopped @ 27'
MAX 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.
 T - 3" O.D. thin-walled Shelby tube.

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PROJECT

JOB NO. EBI-63K

DATE

1.22.20LOG OF TEST BORING NO. 209

RIG TYPE

CR-55 # 203

BORING TYPE

6.12" H.S.H.

SURFACE ELEV.

DATUM

Depth in Feet	Confidence 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		2 1/2	X	T					50'	fine sand
5		18	X	S 2-2-3						low s.s. very compact fine to med
7.5		2.0	X	T						(TAILINGS) bedrock (SUBBASE) rock
10										fine grained @ 10.0' sampled @ 12.0'

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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LOG OF TEST BORING NO. 210

RIG TYPE CIME-55 (203)
BORING TYPE 6 1/2" HSA
SURFACE ELEV. _____
DATUM _____

GROUND WATER		
DEPTH	HOUR	DATE

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.

CONSULTING GEOTECHNICAL ENGINEERS
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PROJECT Highway 200
 JOB NO. E81-63K DATE 11-28-67

LOG OF TEST BORING NO. 211

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
0			18	X	57-2-2			SN
5			18	X	3-4-4			
10			18		44-4			
15			18		3-3-3			
20			18	X	5-5-4			
25			18		3-4-6			
30			18		5-5-5			

RIG TYPE CME-55 (203)
 BORING TYPE 1 1/2" HSH
 SURFACE ELEV. _____
 DATUM _____

REMARKS	VISUAL CLASSIFICATION
moist sat.	silty sand. 2 in. dia. cutting cemented fine to gray
mod firm	
hard	(TAILINGS) (SUBBASE) bedrock red
dry	Auger stopped @ 29'6" sample refused @ 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.
 T - 2" O.D. thin-walled Shelby tube.

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CONSULTING GEOTECHNICAL ENGINEERS
 PHOENIX - ALBUQUERQUE - SANTA FE - SALT LAKE CITY

PROJECT 14470
 JOB NO. ES-22K DATE 1/23/82

LOG OF TEST BORING NO. 212

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
3		13	X	4 1-4-3				CL
6		18	X	4 3-2-3				
10		18	X	4 5-4-5				
15		18	X	4 6-6-7				
20		17	X	4 6-5-6				
25		16	X	4 6-3-6				
30		17	X	4 6-6-7				
35		13		4 3-4-4				
40				50/5				

RIG TYPE CMS-E (203)
 BORING TYPE 1.42" dia
 SURFACE ELEV. _____
 DATUM _____

REMARKS	VISUAL CLASSIFICATION
17' 0" - 50'	silty, sand low p.s. w/ly cemented sand to gray
mid firm	
firm	
bedrock	(TAILINGS) (SUBBASE)
1' d	
hard	
frag. up @ 37' 6"	
sample up @ 37' 11"	

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger cuttings. S - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 4" O.D. thin-walled Shelby tube

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PROJECT

112-203

LOG OF TEST BORING NO. 214

JOB NO.

112-203

DATE

1-2-52

RIG TYPE

CONE-EST. (203)

BORING TYPE

1.4" COT

SURFACE ELEV.

DATUM

REMARKS

VISUAL CLASSIFICATION

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

0

16

15

3-2-2

2

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4

GROUND WATER

SAMPLE TYPE

DEPTH HOUR DATE

A - Auger cuttings. 8 - 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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TEST PIT LOGS OF COVER BORROW AREA

TEST PIT LOG

Page 1 of 1

LOCATION MAP:

SITE ID: Hol-01 LOCATION ID: 501
APPROX. SITE COORDINATES (11)
N E
GROUND ELEV. (FT. MSL)
DATE EXCAVATED: 8/5/14
BACKHOLE TYPE: Case 500
CONTRACTOR: Alamo Corp
FIELD REP: M. Kemp
REHAB. DATE:

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION on east side of access road 500 yds. N.W. of garbage dump
SITE CONDITION Surf break

DEPTH (ft.)	SAMPLE INT	TYPE	ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	X	A	001	SP	Silt/Sand, medium fine, little or no clays, N.P. to brown plasticity, 5/8 6/8 reddish yellow
3.0	X	B	002	SP-SM	
5.0	X	B	003	GP	Well-graded gravel & sand mixture, silt & clay, little or no clay, gravels up to 3" max. N.P. to brown plasticity, 5/8 6/8 reddish yellow
	X	B	004	SM	
	X	B	005	GP	
	X	B	006	GP	Silt/Sand, trace silt, trace gravel, little or no clays, N.P. to brown plasticity, 5/8 6/8 reddish yellow
10.0	X	B	007	GP	
					Stop digging backhoe extended

COMMENTS: hi large sample disturbed waste
min
Bi-Bag sample
Seals P.F.D. F to V.F.

SAMPLE TYPE

B - Undisturbed Bulk Sample
D - Disturbed Bulk Sample

TEST PIT LOG

Page 1 of 1

LOCATION MAP:

SITE ID: H-1-01 LOCATION ID: 502
APPROX. SITE COORDINATES (11)
N E
GROUND ELEV. (FT. MSL)
DATE EXCAVATED: 8/5/14
BACKHOLE TYPE: Case
CONTRACTOR: Blake, Ent.
FIELD REP: M. Dwyer
REHAB. DATE:

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION on point line, ~ 700 yds N-NE of garbage dump
SITE CONDITION Scrub brush

DEPTH (ft.)	SAMPLE INT TYPE	ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	☒	D 001	SP-SM	Sandy-sand, fine ^{fine} med ^{med} , little or no clay
	☒	B 002		Some nodules, N.P. to ^{5' MFT} to ^{5' MFT} 5' R/G reddish yellow
	☒	B 003		
7.0	☒	L 004	GP	TO 3' ^{CS + 0.5' TC}
	☒	B 005		well graded gravel / fine ^{fine} sand, some silt, little or no clay, N.P. to ^{5' MFT} to ^{5' MFT} 5' R/G reddish yellow
	☒			stop digging backhoe extended

COMMENTS: SANDS. PREP FI to V FI

SAMPLE TYPE

B - ~~disturbed~~ ^{Bag} ~~disturbed~~ ^{Bag} Sample
D - Disturbed Bulk Sample

Page 1 of 1

A

APPROX. SITE COORDINATES (ft)

GROUND ELEV. (FT. MSL)

DATE EXCAVATED: 85/5/15

BACKHOLE TYPE: case

CONTRACTOR: Alaska State

FIELD REP: McDermise

REHAB. DATE: _____

DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)
------	------	------------	---------------------

LOCATION DESCRIPTION 2.5 mi. N-NW of Garysburg, La.

SITE CONDITION Sealed

DEPTH (ft.)	SAMPLE		UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	INT	TYPE		
2	X	D 001	LT GP	Well graded gravel 1/2 Sand, ^{LS 3-4} sticky, predom sandy sand, some silt, little or no clay gravel to 2 1/2", 5YR 6/8 reddish yellow N.P. to 100 , SI Mst. gravels increasing to max of 4" also quant of gravels increasing
		B 002		
		D 003		
		B 004		
8	X	B 005	SP	gravel size decreasing to 1/2" ← stop digging backhoe extended

Sa, Fi to Cs, Grly, Tr Slt, NP,
 5YR 6/8 R-Yel

Sa, Fi to Cs, Grly, Tr Sit, NP, F/Ks:
 5YR 6/8 R-Yel

COMMENTS: SANDS PRD F1 to V F1
SAMPLE 001 NOT SHIPPED TO V. ROSEN
(111 471 061)

SAMPLE TYPE

3 - Undisturbed Block Sample

D - Disturbed Bulk Sample

TEST PIT LOG

Page 1 of 1

LOCATION MAP:

SITE ID: Hat-a-1 LOCATION ID: 504
APPROX. SITE COORDINATES (11)
N E
GROUND ELEV. (FT. MSL)
DATE EXCAVATED: 8/5/15
BACKHOLE TYPE: Case
CONTRACTOR: Blake Contract
FIELD REP: M. M. M. M.
REHAB. DATE:

GROUNDWATER LEVELS

DATE	TIME	DEPTH (11)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION 2 50yds East of gravel car pad
SITE CONDITION Surge drain

DEPTH (ft.)	SAMPLE INT	TYPE	ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
2	X	D	001	SP	gravel, sand, silt, moisture, green, band
2	X	B	002	ML	1 silt, none visible, little or no clay, N.P., 5% mst
2	X	B	003	ML	Low P. 5YR 6/8 reddish brown
10.6	X	B	004	ML	NP to LP, sandy-silt, some fine sand, trace clay, low plasticity, 2.5YR 6/8 light red
10.6	X	B	004	ML	Dry to SI Mst
10.6	X	B	004	ML	Stop digging backhoe operator

COMMENTS: SANDS PREP. FL TO V FL

SAMPLE TYPE
B - ~~Disturbed~~ Sample
D - Disturbed Bulk Sample

TEST PIT LOG

Page 1 of 1

LOCATION MAP:

*subsurface average
depth*

*505

sewerage
lagoon

SITE ID: Hell #1 LOCATION ID: 505
APPROX. SITE COORDINATES (11)
N _____ E _____
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 8/5/15
BACKHOLE TYPE: cast
CONTRACTOR: B. L. & S. Engineering
FIELD REP: M. Hargis
REHAB. DATE: _____

GROUNDWATER LEVELS

DATE	TIME	DEPTH (11)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION ~ 100 yds NE of sewage lagoon
SITE CONDITION Scrub brush

DEPTH (11.)	SAMPLE INT	TYPE	ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, +0.3" G to F, PLASTICITY, CONDITION, ETC.
2.0	X	D	001	<i>Gravel</i>	<i>Gravel, sand, silt, moisture, some gravel, sand, silt, some rootlets, 5/8 6/8 reddish yellow</i>
	X	B	002	<i>Gravel</i>	<i>Gravel, sand, silt, moisture, some gravel, sand, silt, some rootlets, 5/8 6/8 reddish yellow</i>
	X	B	003	<i>Gravel</i>	<i>Gravel, sand, silt, moisture, some gravel, sand, silt, some rootlets, 5/8 6/8 reddish yellow</i>
	X	B	004	<i>Gravel</i>	<i>Gravel, sand, silt, moisture, some gravel, sand, silt, some rootlets, 5/8 6/8 reddish yellow</i>
	X	D	005	<i>Gravel</i>	<i>Gravel, sand, silt, moisture, some gravel, sand, silt, some rootlets, 5/8 6/8 reddish yellow</i>
10.0	X	B	006	<i>Gravel</i>	<i>Gravel, sand, silt, moisture, some gravel, sand, silt, some rootlets, 5/8 6/8 reddish yellow</i>
					<i>Stop digging @ 10' large boulder from 10' down</i>

COMMENTS: SANDS FRED F. To V F.

SAMPLE TYPE

B - *Disturbed* Bulk Sample
D - Disturbed Bulk Sample

TEST PIT LOG

Page Lot 1

LOCATION MAP:

A

SITE ID: 21st-st LOCATION ID: 506
APPROX. SITE COORDINATES (11)
N E
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 8/5/15
BACKHOLE TYPE: CASE
CONTRACTOR: Blake P. Phipps
FIELD REP: M. Thayer
REHAB. DATE: _____

GROUNDWATER LEVELS

DATE	TIME	DEPTH (11)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION 100 yds south of garbage dump & 200 yds North of
SITE CONDITION Sanitary Trench; 5' deep

DEPTH (ft.)	SAMPLE INT	TYPE	ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
0	X	D	001	Loose GP	Gravel, Sandy, 5.11 mm, some pebbles, little or no clay, NP to 1/2" gravel to 4" 5/8 reddish brown. note: quantity and size of gravel increasing with depth
1	X	B	002		
2	X	B	003		
3	X	D	004	ML	Sandy-Silt, some very fine sand, some clay, low plasticity, 7/4 very pale brown stop digging backhoe extended
4	X	B	005		

COMMENTS: SANDS, RED F, 70 V F

SAMPLE TYPE

- B - disturbed Eng Sample
D - Disturbed Bulk Sample

Page 1 of 1

Sewage Lagoons

*507

Access
Reel

SITE ID: H-1-01 LOCATION ID: 507
APPROX. SITE COORDINATES (N)
N 2 E
GROUND ELEV. (FT. MSL)
DATE EXCAVATED: 85/5/15
BACKHOLE TYPE: Case
CONTRACTOR: Blake Enterprises
FIELD REP: M. Morgan
REHAB. DATE:

GROUNDWATER LEVELS

[illegible]

LOCATION DESCRIPTION 2.50 yds. N. of Hwy 163 east of runway light
SITE CONDITION Sagebrush

DEPTH (ft.)	SAMPLE		UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	INT TYPE	ID		
4.0	X	D 001	SP-SM	Sand Sand with some gravelly, trace clay Some nodules of NP. 5YR 6/8 reddish yellow GRAY. INCREASING W/ DEPTH
	X	B 002		
	X	B 003	GP-GMT	Well graded gravelly sand with siltstone, little fine clay, NP to low P. 5YR 6/8 reddish yellow
	X	D 005		
9.0	X	B 006	SP	No SK or CL, NP, Lt Gr W, dry
	X	D 007	GP-GMT	well graded gravel & sand mix. little or no fines, N.P., cobbles to 8", 10YR 7/6 yellow
	X	B 008		

COMMENTS: SANDS PRED F1 to V F1

SAMPLE TYPE

S - ~~Disturbed~~^{Disturbed} Sample
D - Disturbed Bulk Sample

TEST PIT LOG

Page Lot 1

LOCATION MAP:

SITE ID: Hol-01 LOCATION ID: 508
APPROX. SITE COORDINATES (N):
N: _____ E: _____
GROUND ELEV. (FT. MSL): _____
DATE EXCAVATED: 05/15/15
BACKHOLE TYPE: Case
CONTRACTOR: Blake Enterprises
FIELD REP: M. Hargis
REHAB. DATE: _____

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION 75 yards South of Sewage lagoon (on Eam)
SITE CONDITION Sagebrush

DEPTH (ft.)	SAMPLE INT	TYPE	ID	UNIFIED SOIL CLASS.	VISUAL CLASS: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	☒	B	001	GM	Gravel, sandy, silty, some, gravel, sand & silt well graded, little or no clays, NP. to low P. 5YR 6/8 reddish yellow, some red bits
	☒	B	002	GM	
	☒	B	003	GM	
6.0	☒	B	004	GP	gravel quantity and size increasing to GW
8.0	☒	B	005	SP	Silty Sand, silty fine grained, trace clay, NP to low P. 5YR 6/8 reddish yellow
	☒	B	006	SP-GP	
	☒				Stop digging backhoe extended

COMMENTS: SANDS PREP F. to V.F.

SAMPLE TYPE

- B - ~~Disturbed~~ ^{Bag} Sample
D - Disturbed Bulk Sample

TEST PIT LOG

Page 1 of 1

LOCATION MAP:

SITE ID: H-1-01 LOCATION ID: 509

APPROX. SITE COORDINATES (11)

N E

GROUND ELEV. (FT. MSL)

DATE EXCAVATED: 9/5/15

BACKHOLE TYPE: Case

CONTRACTOR: Blake Enterprises

FIELD REP: M. Henjes

REHAB. DATE: _____

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION 200 yds North of Hwy 163

SITE CONDITION Surge tank

DEPTH (ft.)	SAMPLE INT	TYPE	ID	UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	X	D	001	SM	Silty - Sandy, fine to med. sand, some silt, little to med. clay, N.P. to low P. 1/5 yk 6/8 reddish brown.
	X	B	002		
	X	B	003		
6.0	X	D	004		
9	X	B	005	G.P.G.S.	C Horizon, Ca layer, Took large sample
10	X	B	006		
					Stop digging backhoe fully extended

COMMENTS:

SAMPLE TYPE

B - Undisturbed Bulk Sample

D - Disturbed Bulk Sample

TEST PIT LOG

Page 1 of 1

LOCATION MAP:

SITE ID: Hwy-21 LOCATION ID: S10
APPROX. SITE COORDINATES (11)
N: _____ E: _____
GROUND ELEV. (FT. MSL) _____
DATE EXCAVATED: 4/5/15
BACKHOLE TYPE: Curb
CONTRACTOR: Blanca Construction
FIELD REP: M. Hanyla
REHAB. DATE: _____

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION 200 yds. North of Hwy 163 on West Side of access Rd
SITE CONDITION Surfcrete

DEPTH (ft.)	SAMPLE			UNIFIED SOIL CLASS.	VISUAL CLASS.: DENSITY, COLOR, STRENGTH, PLASTICITY, CONDITION, ETC.
	INT	TYPE	ID		
	☒	D	001	GS GP	well-sorted gravel, / sand, medium, some Tr to N: silt, gravel to 4", little or no clay, some nodules N.P. - to 100 5 YR 6/8 reddish yellow
	☒	B	002		
5.0	☒	B	003		
	☐				Refusal @ 5' Bedrock
	☐				
	☐				
	☐				
	☐				
	☐				
	☐				
	☐				
	☐				
	☐				

COMMENTS:

SAMPLE TYPE

B - ^{Dist.} Undisturbed Bulk Sample
D - Disturbed Bulk Sample

TEST PIT LOG

Page 1 of 1

1 LOCATION MAP:

HWY
163

† १५५०

41*

in our head

SITE ID: 103-01 LOCATION ID: 41

APPROX. SITE COORDINATES (11)

N E

GROUND ELEV. (FT. MSL)

DATE EXCAVATED: 85/5/16

BACKHOLE TYPE: NA

CONTRACTOR: NA

FIELD REP: Mr. Hendon

REHAB. DATE: _____

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION

SITE CONDITION

[illegible]**COMMENTS:****SAMPLE TYPE**

U = Undisturbed Block Sample

D = Disturbed Sub. Sample

TEST PIT LOG

Page 1 of 1

LOCATION MAP:

non
valley

*12

Hwy
163

harding
pile

max Hub
↓

SITE ID: H-1-01 LOCATION ID: 12

APPROX. SITE COORDINATES (11)

N

E

GROUND ELEV. (FT. MSL)

DATE EXCAVATED: 8/5/16

BACKHOLE TYPE: NA

CONTRACTOR: NA

FIELD REP: M. Luján

REHAB. DATE: _____

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft)	EST. FLOW (GAL/MIN)

LOCATION DESCRIPTION

SITE CONDITION

DEPTH
(ft.)

SAMPLE

INT TYPE

ID

UNIFIED

SOIL CLASS.

VISUAL CLASS.: DENSITY, COLOR, STRENGTH,
PLASTICITY, CONDITION, ETC.

0

001

surface sample from outcrop: limestone
some dolomite, pred micaceous
retained 2100 psi

COMMENTS:

SAMPLE TYPE

B - Undisturbed Block Sample

D - Disturbed Bulk Sample

ADDENDUM D5

PARTICLE SIZE DISTRIBUTION CURVES

FIGURE D5.1
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.2
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.3
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.4
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.5
PARTICLE SIZE DISTRIBUTION CURVE

LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	127	14.5-18.0	CL

FIGURE D5.6
PARTICLE SIZE DISTRIBUTION CURVE

LEGEND			
SAMPLE	HAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	127	16.0-16.5	CL-ML

FIGURE D5.7
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.8
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.9
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.10
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.11
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.12
PARTICLE SIZE DISTRIBUTION CURVE

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

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

FIGURE D5.18
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.19
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.20
PARTICLE SIZE DISTRIBUTION CURVE

LEGEND			
SAMPLE	NAT 01	DEPTH INTERVAL (FT.)	UNIFIED SOIL CLASSIFICATION
	133	8.5-11.0	

FIGURE D5.21
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.22
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.23
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.24
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.25
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.26
PARTICLE SIZE DISTRIBUTION CURVE

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

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

FIGURE D5.31
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.32
PARTICLE SIZE DISTRIBUTION CURVE

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

FIGURE D5.36
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.37
PARTICLE SIZE DISTRIBUTION CURVE

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

FIGURE D5.40
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.41
PARTICLE SIZE DISTRIBUTION CURVE

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

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

FIGURE D5.46
PARTICLE SIZE DISTRIBUTION CURVE

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

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

FIGURE D5.52
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.53
PARTICLE SIZE DISTRIBUTION CURVE

FIGURE D5.54
PARTICLE SIZE DISTRIBUTION CURVE

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

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	8.8	1.8	3140	130	2500	507	118	60	778	224	4	2	21.8
MH-200	3.5	8.7	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	6.8	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	17.8	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	5870	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	291	4	6	32.8
MH-208	36.8	8.4	0.7	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	282	2	2	29.8
MH-208	49.0	8.1	0.2	120	52	124	47	98	<20	671	103	3	<1	18.8

^aBoring numbers currently do not have DOE identification numbers; CSU boring numbers represent NA rock core samples.

^bAnalysis done by solute extraction; values are expressed in milligrams per gram of dry soil; SO₄ - sulfate; Fe - iron; Ca - calcium; Mg - magnesium; As - arsenic; Se - selenium.

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 006
AVERAGE SOIL WEIGHT: 100.0 (PSF)

- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL						UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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)

	- DEPTH -				AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PRESS.	RATIO	CLASS	BC	DEN	FA	ELAS.	SHEAR	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)

	- DEPTH -																
	LY FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

	- DEPTH -														
	LY FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
	LY	FROM	TO	THK.	POINT	SLEEVE	PORE	CLASS	BC	DEN	FA	ELAS.	SHEAR	OCR
							PRESS.						STREN	
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

GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 011

AVERAGE SOIL WEIGHT: 100.0 (PSF)

- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL						UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	OCR
						PRESS.	RATIO						STREN	
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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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)

	- DEPTH -														
	LY	FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

- DEPTH -			AUG.		AUG.	AUG.	AUG.	SOIL					UND.		
LY	FROM	TO	THK.	POINT	SLEEVE	PRESS.	RATIO	CLASS	BC	DEN	FA	ELAS.	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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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)

- DEPTH -			AUG.		AUG.	AUG.	AUG.	SOIL				UND.		OCR
LY	FROM	TO	THK.	POINT	SLEEVE	PRESS.	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	
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)

	- DEPTH -														
	LY FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
	LY FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	OCR
						PRESS.	RATIO						STREN	
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)

	- DEPTH -		AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	CLASS	BC	DEN	FA	ELAS.	SHEAR	OCR
1	0.0	1.0	1.0	15.2	0.1	-0.2	S-SL*	5	37	30	53	1827	
2	1.0	2.0	1.0	6.7	0.1	-0.1	SLIM	4			23	798	13.9
3	2.0	3.1	1.1	15.9	0.2	-0.1	S-SL*	5	38	30	56	1905	
4	3.2	6.5	3.3	10.1	0.2	-0.1	SLIM	6			35	1208	7.9
5	6.5	9.3	2.8	27.2	0.2	0.0	S-SL*	9	53	32	95	3265	
6	9.4	10.3	0.9	13.3	0.2	0.0	S-SL	4	29	29	47	1599	
7	10.3	11.3	1.0	31.7	0.2	0.0	S-SL*	10	51	32	111	3800	
% THK:		61	6.8	22.4	0.2	-0.0	S-SL	7	44	31	78	2691	
% THK:		38	4.3	9.3	0.2	-0.1	SLIM	5			32	1112	9.3

SITE ID: HAT01

GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 021

AVERAGE SOIL WEIGHT: 100.0 (PSF)

- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL	BC	DEN	FA	ELAS.	UND.	OCR	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS				SHEAR		
						PRESS.	RATIO					STREN		
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)

- DEPTH -			AUG.		AUG.	AUG.	AUG.	SOIL					UND.	OCR
LY	FROM	TO	THK.	POINT	SLEEVE	PRESS.	RATIO		BC	DEN	FA	ELAS.	SHEAR	
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)

	- DEPTH -														
	LY FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

- DEPTH -				AUG.	AUG.	AUG.	AUG.	SOIL				UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR
						PRESS.	RATIO						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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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)

	- DEPTH -														
	LY	FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

	-	DEPTH	-												
	LY	FROM	TO	THK.	AUG.	AUG.	AUG.	AUG.	SOIL	BC	DEN	FA	ELAS.	UND.	OCR
					POINT	SLEEVE	PORE	FRICT.	CLASS					SHEAR	
							PRESS.	RATIO						STREN	
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)

	- DEPTH -													
	LY FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

	- DEPTH -														
	LY	FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

	- DEPTH -														
	LY	FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

- DEPTH -			AUG.		AUG.	AUG.	AUG.	SOIL				UND.		OCR
LY	FROM	TO	THK.	POINT	SLEEVE	PRESS.	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	
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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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)

- DEPTH -			THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
LY	FROM	TO												
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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL	BC	DEN	FA	ELAS.	UND. SHEAR	OCR
	LY	FROM	TO	THK.	POINT	SLEEVE	PORE PRESS.	CLASS					STREN	
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)

- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL	BC	DEN	FA	ELAS.	UND.	OCR
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS				SHEAR	
						PRESS.	RATIO					STREN	
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)

- DEPTH -			AUG.		AUG.	AUG.	AUG.	SOIL	BC	DEN	FA ELAS.		UND.	OCR
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS					SHEAR	
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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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)

	- DEPTH -														
	LY FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

	-	DEPTH	-		AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PRESS.	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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	2230			
% 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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	OCR
						PRESS.	RATIO						STREN	
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: NAT01

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

LOCATION ID: 009

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

SITE ID: HAT01

LOCATION ID: 017

PIEZOCONE SOUNDING TEST

SITE ID: NAT01

LOCATION ID: 018

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 019

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 020

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 021

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 022

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 023

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 024

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 025

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 026

PIEZOCONE SOUNDING TEST

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

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 001
AVERAGE SOIL WEIGHT: 100.0 (PSF)

- DEPTH -			AUG.		AUG.	AUG.	AUG.	AUG.	SOIL	BC	DEN	FA	ELAS.	UND.	OCR
LY	FROM	TO	THK.	POINT	SLEEVE	PRESS.	FRICT.	RATIO	CLASS					SHEAR	
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)

	- DEPTH -		AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	CLASS	BC	DEN	FA	ELAS.	SHEAR	OCR
						PRESS.	RATIO					STREN	
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)

	-	DEPTH	-		AUG.	AUG.	AUG.	AUG.	SOIL	BC	DEN	FA	ELAS.	UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PRESS.	FRICT.	RATIO	CLASS					SHEAR	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

SITE ID: HAT01

LOCATION ID: 031

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 832

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 033

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)

	-	DEPTH	-		AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PRESS.	RATIO	CLASS	BC	DEN	FA	ELAS.	SHEAR	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)

	- DEPTH -				AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	OCR
						PRESS.	RATIO						STREN	
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)

	- DEPTH -				AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PRESS.	RATIO	CLASS	BC	DEN	FA	ELAS.	SHEAR	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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.		
	LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	OCR
							PRESS.	RATIO						STREN	
1	0.1	2.0	1.9	14.2	0.1	-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	-0.0	1.6	SLIM	4			25	842	9.0
% THK:		54	1.9	14.2	0.1	-0.1	-0.1	0.5	S-SL	4	35	29	50	1701	
% THK:		45	1.6	7.0	0.1	0.0	0.0	1.6	SLIM	4			25	842	9.0

SITE ID: HAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 011
AVERAGE SOIL WEIGHT: 100.0 (PSF)

	- DEPTH -														
LY	FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

	- DEPTH -		AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR
						PRESS.	RATIO						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)

	- DEPTH -				AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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

LOCATION ID: 014

GROUND WATER DEPTH: 50.0 (FT.)

AVERAGE SOIL WEIGHT: 100.0 (PSF)

	- DEPTH -														
	LY FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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

LOCATION ID: 015

GROUND WATER DEPTH: 50.0 (FT.)

AVERAGE SOIL WEIGHT: 100.0 (PSF)

- DEPTH -			AUG.		AUG.		AUG.		AUG.		SOIL		UND.		OCR
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	RATIO	CLASS	BC	DEN	FA	ELAS.	SHEAR	
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)

	- DEPTH -															
	LY	FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

- DEPTH -			THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
LY	FROM	TO												
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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	OCR
						PRESS.	RATIO						STREN	
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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.		
	LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	OCR
							PRESS.	RATIO						STREN	
	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)

	- DEPTH -													
	LY FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

- DEPTH -			AUG.		AUG.	AUG.	AUG.	SOIL CLASS	BC	DEN	FA	ELAS.	UND.	OCR
LY	FROM	TO	THK.	POINT	SLEEVE	PORE PRESS.	FRICT. RATIO						SHEAR STREN	
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

LOCATION ID: 022

GROUND WATER DEPTH: 50.0 (FT.)

AVERAGE SOIL WEIGHT: 100.0 (PSF)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	OCR
						PRESS.	RATIO						STREN	
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)

	- DEPTH -				AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
	LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	OCR
							PRESS.	RATIO						STREN	
1	0.1	2.2	2.1	11.3	0.2	0.0	0.0	1.6	SLIM	7			40	1359	24.8
2	2.3	24.7	22.4	4.5	0.2	0.5	0.5	4.3	SLIM	2			16	536	1.5
* THK:	100	24.5		5.1	0.2	0.5	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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL	BC	DEN	FA	ELAS.	UND. SHEAR	OCR
	LY	FROM	TO	THK.	POINT	SLEEVE	PORE PRESS.	CLASS					STREN	
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)

	- DEPTH -														
LY	FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	OCR
						PRESS.	RATIO						STREN	
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)

- DEPTH -			AUG.		AUG.		AUG.		AUG.		SOIL		UND.		OCR
LY	FROM	TO	THK.	POINT	SLEEVE	PRESS.	RATIO	CLASS	BC	DEN	FA	ELAS.	SHEAR STREN		
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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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	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)

- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR
						PRESS.	RATIO						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)

- DEPTH -			THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. FRICT. RATIO	SOIL CLASS	BC	DEN	FA	ELAS.	UND. SHEAR STREN	OCR
LY	FROM	TO												
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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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)

	- DEPTH -																	
	LY FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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	12.4
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)

- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL	BC	DEN	FA	ELAS.	UND.	OCR
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS				SHEAR	
						PRESS.	RATIO					STREN	
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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	OCR
						PRESS.	RATIO						STREN	
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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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)

	- DEPTH -													
	LY FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

- DEPTH -			AUG.		AUG.	AUG.	AUG.	SOIL	BC	DEN	FA	ELAS.	UND.	OCR
LY	FROM	TO	THK.	POINT	SLEEVE	PRESS.	RATIO						SHEAR	
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)

- DEPTH -			AUG.		AUG.	AUG.	AUG.	SOIL	BC	DEN	FA ELAS.		UND.	OCR
LY	FROM	TO	THK.	POINT	SLEEVE	PRESS.	FRICT.						SHEAR	
							RATIO	CLASS					STREN	
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

LOCATION ID: 009

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

SITE ID: HA101

LOCATION ID: 017

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 018

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 019

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 020

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 021

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 022

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 023

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 024

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 025

PIEZOCONE SOUNDING TEST

SITE ID: HAT01

LOCATION ID: 026

PIEZOCONE SOUNDING TEST

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

SITE ID: NAT01
GROUND WATER DEPTH: 50.0 (FT.)

LOCATION ID: 001
AVERAGE SOIL WEIGHT: 100.0 (PSF)

- DEPTH -			AUG.		AUG.	AUG.	AUG.	SOIL	BC	DEN	FA	ELAS.	UND.	OCR
LY	FROM	TO	THK.	POINT	SLEEVE	PRESS.	FRICT.						SHEAR	
							RATIO	CLASS					STREN	
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)

	- DEPTH -															
	LY FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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)

	-	DEPTH	-													
	LY	FROM	TO	THK.	AUG.	AUG.	PORE	AUG.	SOIL	BC	DEN	FA	ELAS.	UND.		
					POINT	SLEEVE	PRESS.	FRICT.	CLASS					SHEAR		OCR
								RATIO						STREN		
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)

	- DEPTH -														
	LY	FROM	TO	THK.	AUG. POINT	AUG. SLEEVE	AUG. PORE PRESS.	AUG. 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

PIEZOCONE SOUNDING TEST

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

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: 032

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: 004
AVERAGE SOIL WEIGHT: 100.0 (PSF)

	- DEPTH -			AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PORE	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	OCR
						PRESS.	RATIO						STREN	
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)

	- DEPTH -				AUG.	AUG.	AUG.	AUG.	SOIL					UND.	
LY	FROM	TO	THK.	POINT	SLEEVE	PRESS.	FRICT.	CLASS	BC	DEN	FA	ELAS.	SHEAR	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		

[Faint, illegible markings]

ADDENDUM B7

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 Radon (Rn-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 μ R/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.