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Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Sites At Rifle, Colorado

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Uranium Mill Tailings Remedial Action Project

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ADDENDUM D1

**RADIOLOGICAL CHARACTERIZATION OF THE RIFLE, COLORADO,
URANIUM MILL TAILINGS REMEDIAL ACTION SITES**

RADIOLOGIC CHARACTERIZATION OF THE RIFLE, COLORADO, URANIUM MILL TAILINGS REMEDIAL ACTION SITES

April 1985

**RADIOLOGIC CHARACTERIZATION OF THE RIFLE, COLORADO,
URANIUM MILL TAILINGS REMEDIAL ACTION SITES**

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April 1985

**Prepared for
U.S. Department of Energy
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Albuquerque Operations Office**

with

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Grand Junction Projects Office
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1.0 INTRODUCTION

This radiologic characterization of the two inactive uranium millsites at Rifle, Colorado, was conducted by Bendix Field Engineering Corporation (Bendix) for the U.S. Department of Energy (DOE), Grand Junction Projects Office, in accord with a Statement of Work prepared by the DOE Uranium Mill Tailings Remedial Action (UMTRA) Project Technical Assistance Contractor, Jacobs Engineering Group, Inc. (Jacobs). The purpose of this project is to define the extent of radioactive contamination at the Rifle sites that exceeds U.S. Environmental Protection Agency (EPA) standards for UMTRA sites. The data presented in this report are required for characterization of the areas adjacent to the tailings piles and for the subsequent design of cleanup activities.

An orientation visit to the study area was conducted on 31 July - 1 August 1984, in conjunction with Jacobs, to determine the approximate extent of contaminated area surrounding the piles. During that visit, survey control points were located and baselines were defined from which survey grids would later be established; drilling requirements were assessed; and radiologic and geochemical data were collected for use in planning the radiologic fieldwork. The information gained from this visit was used by Jacobs, with cooperation by Bendix, to determine the scope of work required for the radiologic characterization of the Rifle sites.

Fieldwork at Rifle was conducted from 1 October through 16 November 1984.

2.0 BACKGROUND

2.1 LOCATION

The inactive uranium millsites are located adjacent to the City of Rifle, Colorado, along U.S. Highway 6 and 24 (Figure 1). The Old Rifle millsite (RFO) is located on the eastern edge of the city in Sections 15 and 16, Township 6 South, Range 93 West, Sixth Principal Meridian, Garfield County, Colorado. The main line of the Denver and Rio Grande Western Railroad (DRGW/RR) runs approximately east-west through a narrow corridor between the southern edge of the site and the north bank of the Colorado River. Highways 6 and 24 share a single paved roadway 40 feet wide, running approximately east-west at the foot of the bluffs bordering the site on the north.

The New Rifle millsite (RFN) is located 2 miles west of RFO, in Section 17, Township 6 South, Range 93 West, Sixth Principal Meridian, Garfield County, Colorado. The main line of the DRGW/RR runs east-west along the northern edge of the site. Highways 6 and 24, again sharing a common roadbed, run parallel to and immediately adjacent to the northern boundary of the railroad. The site is bordered on the east by the Colorado River and on the south by Interstate Highway 70 (I-70).

Figure 1. Location Map for the Rifle Millsites showing Background-Measurement Sites

2.2 GEOLOGIC AND HYDROLOGIC SETTING

Unconsolidated Holocene alluvium of the Colorado River floodplain underlies both of the Rifle millsites. Unconfined groundwaters within the alluvium tend to flow parallel to the flow gradient of surface waters and ultimately discharge into the Colorado River. Water seepage through the tailings piles could conceivably contaminate these unconfined groundwaters. However, Ford, Bacon and Davis Utah, Inc. (1981a, 1981b) report that there is no record of registered wells occurring at a hydraulic gradient lower than the bases of the tailings piles within 2 miles of either site. This suggests that contaminants should tend to flow into the river and be diluted. Groundwaters in aquifers of older sedimentary strata are confined by the Tertiary Wasatch Formation, located to the north of RFO, and thus are protected from contamination from the millsites.

Further geologic and hydrologic descriptions of each site are presented in the two succeeding subsections.

2.2.1 Old Rifle Millsite

The tailings pile and millsite at RFO are situated on a flat, sand-and-gravel floodplain bordered by the Colorado River on the south and low bluffs of the Tertiary Wasatch Formation on the north. The portion of the bluffs immediately adjacent to the site on the north is transected by several small gullies, which converge into a large ravine opening onto the north-central portion of the site.

Surface water at the RFO site drains to the Colorado River via seepage and a small stream. The seepage originates from a low-lying area located between the southern edge of the tailings pile and the DRGW/RR tracks. The small stream flows through the millsite from north to south approximately 200 feet east of the eastern edge of the tailings pile. It collects surface runoff and seepage from the gullies that drain the bluff area to the north of the site.

2.2.2 New Rifle Millsite

The tailings pile and millsite at RFN are also situated on a flat, sand-and-gravel floodplain bordered by the Colorado River on the east and south. West of the site, a large, flat, low-lying area contains several marshes and oxbow lakes formed by former meanders of the Colorado River.

Surface water at the RFN site drains to the south and west via several small streams and the interconnected oxbow lakes and marshes, all of which ultimately drain into the Colorado River.

2.3 SITE HISTORY

2.3.1 Old Rifle Millsite

The mill at the Old Rifle site was operated from 1924 to 1932 by the United States Vanadium Corporation (USVC) for the recovery of vanadium from ore. It

was inactive from 1932 to 1942, when it was reopened to produce vanadium for the war effort. In 1946, the milling process was altered to recover uranium as well as vanadium. In 1947, USVC entered into a contract with the U.S. Atomic Energy Commission (AEC) to produce uranium concentrate. In 1956, Union Carbide and Carbon Corporation succeeded USVC at the Old Rifle millsite and continued the processing of uranium for the AEC. Union Carbide (now UMETCO Minerals Corporation, a division of Union Carbide) continued operations at RFO until 1958 when their new mill at RFN became operational.

During the period of its production of uranium for the AEC, the RFO mill generated approximately 700,000 tons of tailings. Some 400,000 tons of these tailings were subsequently moved to RFN and reprocessed. The 300,000 tons remaining at the RFO site cover an area of approximately 13 acres. The pile has been stabilized with about 6 inches of earth cover and vegetation.

2.3.2 New Rifle Millsite

The mill at the New Rifle site produced uranium for the AEC and vanadium for the commercial market from 1958 through 1970. From 1971 through 1972, both uranium and vanadium were produced for the commercial market. In early 1973, uranium-milling operations ceased. Production of vanadium concentrate continued in approximately 20 percent of the RFN mill until the mill was shut down in December 1984.

The pile at the RFN site contains an estimated 2.7 million tons of tailings. It covers an area of approximately 32 acres and ranges in height from 45 to 65 feet. Although not covered, the pile has been stabilized by windbreaks and vegetation.

2.4 PREVIOUS WORK

Prior to the start of fieldwork for this characterization project, a literature search was performed to identify published information pertinent to remedial action at the Rifle sites. The results of this search are included in the bibliography (Section 7.0); there is no guarantee that this list is complete.

Previous studies conducted at the Rifle sites include engineering assessments in 1977 and 1981 by Ford, Bacon and Davis Utah, Inc., an aerial radiologic survey in 1983 by EG&G, Inc., a geochemical investigation in 1983 by Markos and Bush, an economic evaluation in 1982 by Teel, and a study in 1982 of potential sites for relocation and/or reprocessing by the U.S. Geological Survey. Additional studies have been performed by Oak Ridge National Laboratory, Argonne National Laboratory, the Environmental Protection Agency, and other government agencies as well as private organizations.

2.5 SITE CONDITIONS

2.5.1 Old Rifle Millsite

Considerable cleanup and stabilization activities have been performed in the past at the Old Rifle site. All of the buildings, except the assay laboratory, were torn down and the material removed or buried. Some concrete foundations and retaining walls remain in place, while others are buried onsite. The tailings are contained in one pile, which was covered with approximately 6 inches of earth and stabilized with vegetation. See Plate 1 for location information.

The bluff top directly north of the tailings pile is largely vacant land belonging to the City of Rifle. A narrow lot extending along the south side of the bluff belongs to Canyon Cable Company and is the site of a microwave-receiving station. Several hot spots occur on the surface where small amounts of uranium ore are still present.

The bluff top located northeast of the old assay laboratory contains a moderate-sized hayfield and two water-storage ponds. This area is also owned by the City of Rifle. The rim of the bluff below the hayfield and ponds and the vacant land to the east of the hayfield are broadly contaminated, apparently by windblown tailings and/or uranium ore.

A trash dump located in one of the gullies transecting the north bluff (Plate 1) contains visible metal cuttings, metal drums, old electrical fixtures, and miscellaneous structural materials, as well as buried radioactive materials. In addition, several old tanks, foundations, pipes, and water pumps are still present on the Colorado River bank adjacent to the site.

2.5.2 New Rifle Millsite

At the New Rifle site, most of the buildings and structures remain standing (see Plate 2). Approximately 6 to 8 buildings are still used by UMETCO Minerals Corporation, the present site operator. Many of the old buildings and structures are in poor condition and show evidence of contamination. Five buildings were identified for radiologic surveying and possible remedial action. They are the main office/shop building, a new warehouse, the garage/change house, and the two buildings used for processing vanadium concentrate, the redcake building and the solvent extraction building.

The tailings pile at the RFN site lies approximately 0.25 mile south of the mill yard, and covers approximately 32 acres. The pile has steeply sloping sides and ranges in height from 45 to 65 feet. Although not earth-covered, it has an abundant growth of vegetation produced through seeding, fertilizing, and irrigation. A network of plastic irrigation pipes and large sprinklers covers the top of the pile and is used to irrigate the pile during the summer.

A series of raffinate and settling ponds lie between the mill-building area and the tailings pile (Plate 2). These still contain waters from the processing of vanadium. Two more settling ponds lie to the southeast of the tailings pile, near the Colorado River.

East of the main office/shop building, an area covering several acres was used for ore storage and still contains several small ore piles. Certain low-lying portions of this area exhibit ponding of surface waters during wet weather.

The area south of the ore-storage area and east of the tailings pile contains several trash dumps, both surface and subsurface. Materials disposed of in these dumps included old tires, scrap structural materials, pipes, discarded electrical supplies, broken machinery, and used laboratory and shop supplies.

The area west of the tailings pile covers approximately 80 acres. It was originally ranch land, and evidence of old corrals, fences, and buildings still exists. Presently there are no structures in this area except for a truck-weighing station and some gravel-processing equipment belonging to Corn Construction Company, which leases a portion of the land from UMETCO. The southern half of the area is dry and covered with weeds, grasses, and low shrubs. The low-lying, marshy, northern half contains a series of interconnected oxbow ponds which drain from the tailings pile on the east to the Colorado River approximately 1 mile to the southwest.

3.0 PROCEDURES

The radiologic characterization of the Rifle, Colorado, UMTRA sites was conducted in accord with an approved project technical and administrative plan (Bendix Field Engineering Corporation, 1984a). The measurement techniques, instrumentation, and procedures used for the Rifle radiologic characterization were based primarily on protocols developed by the DOE Division of Remedial Action Projects (DRAP) Technical Measurements Center (Marutzky and others, 1984), and those described in the Radiologic Field Measurements Procedures Manual (Bendix Field Engineering Corporation, 1983a, 1984f) and in the Site Characterization Data Entry/Reduction Procedures Manual (Showalter and others, 1984). Field implementation of these techniques and procedures at other UMTRA sites (Allen, Showalter, and Shay, 1983; Allen, Steele, and others, 1983; Marutzky and others, 1983; Allen and Strong, 1984; Shay and others, 1984; Shay and Rush, 1984; Goodknight and Walker, 1984; Ludlam, 1985; and Rush and Bonner, 1985) provided a broad base of experience for field personnel.

All project activities were performed in compliance with the provisions set forth in an approved Quality Assurance Program Plan (Bendix Field Engineering Corporation, 1984b). To ensure the health and safety of personnel assigned to the project, a comprehensive Health and Safety Plan was followed during fieldwork (Bendix Field Engineering Corporation, 1984c). This plan included monitoring of the following conditions: external radiologic exposure; potential for internal radiologic exposure (i.e., inhalation of airborne radioactive dust); personnel contamination; site access; and equipment contamination.

Land surveying and gridding of the Rifle sites were performed in accord with an approved Land Survey Plan (Bendix Field Engineering Corporation, 1984d).

All instruments used for radiologic characterization were calibrated at the DOE calibration facilities in Grand Junction, Colorado, before their use in the field. 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 radiologic-characterization work at Rifle was conducted in four major areas, designated as follows:

- RFO - The tailings pile, old mill yard, and adjacent bluffs at the Old Rifle site.
- RFN - The tailings pile, mill yard, ore-storage areas, and low-lying, marshy areas west of the tailings pile at the New Rifle site.
- Highway Scan - Both shoulders of Highway 6 and 24 from approximately 0.5 mile east of the Old Rifle site to approximately 0.5 mile west of the New Rifle site.
- Railroad Scan - Both sides of the DRGW/RR tracks adjacent to the Old and New Rifle sites.

3.2 PHYSICAL SURVEY

The physical survey was conducted by a Bendix survey team, using a Theodolite and Geodimeter, to establish baselines from horizontal control stations as shown on the Horizontal and Vertical Control map supplied by Jacobs.

A preliminary objective at the Rifle millsites was to establish and close a baseline traverse around each site prior to setting any gridpoints. At RFO, this was accomplished by first locating boundary points STA-A, G, and L, as shown on the Horizontal and Vertical Control map. Then by setting the instruments (Theodolite and Geodimeter) over first one point and then another, the desired angles and distances could be measured and the baseline turning points (BTPs) established. Each BTP was marked by setting a 2-ft-long piece of steel rebar at the point. The BTPs at RFN were established in a similar manner, using boundary points STA-2, 7, 8, and 9 as shown on the Horizontal and Vertical Control map. Once the BTPs were established, the instruments were set up over them and the actual distances from one point to another, as well as the included angles, were checked against the desired results. Once the baselines were established, several auxiliary lines were added at right angles to the baselines to aid in gridding. All other gridpoints were set by tape and line-of-sight.

Boreholes were located using steel tape extended from existing gridpoints. Several borehole locations at RFO were moved by the Bendix Site Manager to permit better vehicular access and/or to avoid concrete foundations, subsurface concrete slabs, or other obstructions. These holes were usually moved only a few feet by making measurements from existing gridpoints. Borehole locations at RFN were originally staked on the basis of a map provided by Jacobs. Many of these holes were subsequently moved by the Bendix Site Manager and the Jacobs Project Technical Monitor to more accessible locations

or to locations that would yield the best subsurface information. After drilling, all of the holes at both sites were surveyed in from existing control stations to the nearest 0.5 ft. Borehole locations at RFO and RFN are shown on Plates 1 and 2, respectively.

Elevations of all boreholes were established by means of differential leveling between control stations. All borehole elevations were determined to the nearest 0.1 ft.

3.3 SURFACE SAMPLING AND IN-SITU RADIOMETRIC MEASUREMENTS

The primary radiometric characterization of the Rifle, Colorado, sites was accomplished through surface and near-surface physical sampling and in-situ radiometric measurements. The surface and near-surface physical sampling included soil and stream-sediment sampling for laboratory radiometric and chemical analysis. The in-situ radiometric measurements included delta-gamma radium measurements and measurements of natural radioelement concentrations using portable gamma-ray spectrometers.

In this report, radioelement concentrations are reported as mass-normalized, dry-weight concentrations, assuming secular equilibrium between the radioelements of interest and their respective radioactive progeny. In other words, the reported concentration is that concentration of the radioelement, in equilibrium with its progeny, that would yield the same result under the same measurement conditions (geometry, moisture, etc.).

A total of 96 gridpoints were established at RFO and 135 gridpoints at RFN for soil sampling and surface radiometric measurements. Surface (0 to 6 in.) soil samples were collected for laboratory analysis at approximately 50 percent of the gridpoints in the gridded areas off-pile. At these points, in-situ delta-gamma radium measurements were made at a depth of 6 in. in the soil-sampling holes to determine whether further sampling was needed. If the 6-in. delta-gamma measurement indicated an 'apparent' radium-226 concentration greater than 5 picoCuries per gram [$\text{pCi}(\text{Ra-226})/\text{g}$],* a 6-to-12-in. soil sample was taken, followed by a 12-in. delta-gamma measurement. This procedure was followed until either an apparent Ra-226 concentration less than 5 pCi/g was indicated or a depth of 18 in. was attained.

This same sequence of alternating soil-sampling and delta-gamma measurements was used in those areas identified as anomalous on the basis of gamma-ray exposure-rate traverses.

*Delta-gamma measurements result in 'apparent' radium concentrations because calculations are based on area-average corrections for moisture, disequilibrium, and potassium and thorium concentrations, while actual conditions may vary with location. The 5-pCi/g criterion was selected to be on the safe side of the EPA standard of 5 pCi(Ra-226)/g above background in the first 15-cm soil layer, averaged over 100 m².

3.3.1 Soil Sampling and Analysis

Surface (0 to 6 in.) soil samples were collected at 77 borehole locations at RFO, at 146 borehole locations at RFN, at 89 gridpoints and hot spots at RFO, and at 129 gridpoints and hot spots at RFN. Plates 1 and 2 show the sampling locations at RFO and RFN, respectively.

The soil samples were collected 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 MCX were used for this project. Pertinent information, such as sample type, grid location, sample depth, project code, sampler's name, and soil conditions, were recorded on each sample ticket. A small, removable, white paper ticket carrying the sample number was removed from the main ticket and placed inside the plastic bag holding the sample. The top of the bag was then folded twice and stapled. 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 transported to the DOE Grand Junction Projects Office facility for analysis by the Bendix Analytical Chemistry Laboratory.

At 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 approximately 10 percent of the samples submitted for analysis. These values were used later for calculating moisture correction factors. The samples were stored for at least 21 days to allow the radon and radon daughters to reach equilibrium with the radium. 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, 1984e).

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, approximately 10 percent of the blended samples were split and analyzed for radium concentration as blind duplicates.

3.3.2 Stream-Sediment Sampling and Analysis

Stream-sediment samples were collected at 16 locations at RFO and at 17 locations at RFN (see Figures 2 and 3) to determine whether contamination is being carried offsite by surface-drainage channels. In dry stream channels, the upper 2 to 3 cm were scraped away to prevent inclusion of aeolian sediment. Samples were collected at quarterpoints across the stream channel, then sieved

Figure 2. Stream-Sediment Sampling Locations (*) at the Old Rifle Millsite

Figure 3. Stream-Sediment Sampling Locations (*) at the New Rifle Millsite

to remove particles larger than 2 mm in diameter. Wet samples from flowing streams were drained of excess water prior to bagging. After bagging, stream-sediment samples were tagged and processed in the same manner as regular soil samples.

In addition to spectral-gamma analysis (radium, potassium, and thorium), many of the stream-sediment samples were analyzed for Th-230 and total uranium, and 17 were also analyzed for heavy metals.

3.3.3 Delta-Gamma Radium Measurements and Associated Correction Factors

In-situ measurements of radium at gridpoints and hot spots were made using a Bendix delta-gamma system containing internal collimation and prefilters. The system was operated on counting plateau using a delta (difference) technique. The detector was placed on the surface to be assayed and an UP count was collected for 100 seconds; a high-density shield was then placed between the detector and the surface and a DOWN count of 100 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 mean of the count sets was determined arithmetically, and the standard deviation of the mean of each count set was calculated using the equation

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

where σ_{N_d} is the standard deviation, N_g is the unshielded gross (UP) count, and N_d is the delta count or difference between the unshielded (UP) count and the shielded (DOWN) count. 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

$$U_{N_d} = (\sigma_{N_d} / N_d) 100 \quad (2)$$

where U_{N_d} is the percent uncertainty of the difference count. If this criterion could not be met after three 100-second measurements, the data were flagged as being semiquantitative.

A correction for the moisture content in the soil was applied to the in-situ delta-gamma measurements to convert them to dry-weight radium concentrations. The correction was 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 (Marutzky and others, 1984).

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

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

where M_f is the soil-moisture content determined for each sampling depth interval at the site and M_p is the calibration-pad moisture content (approximately 11 percent).

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

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

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

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

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.

In the field, a calibration factor and three estimated corrections were applied to the raw delta-gamma readings to obtain radium concentrations in pCi(Ra-226)/g for guidance of the fieldwork. The calibration factor was determined from calibrations performed on the DOE Walker Field Airport pads in Grand Junction, Colorado, prior to fieldwork. These calibration data also provided stripping factors which, together with results of gamma-ray spectrometer measurements in the field, were used to determine corrections for average potassium and thorium concentrations. The radon/radium-disequilibrium correction factor and the moisture correction factors were estimated from soil-sampling data collected during the orientation visit to the site. The moisture correction factors were adjusted to account for the changes in weather that occurred during fieldwork at the two sites.

Analysis of 10 soil samples collected during the orientation visit indicated an average radon/radium disequilibrium of 37 percent and an average loss-on-drying moisture content of 10 percent, yielding correction multipliers of 1.41 and 0.99, respectively. These values were used initially to reduce data in the field. Subsequently, the moisture-correction multiplier was raised to 1.30, corresponding to an estimated 30 percent soil-moisture content, due to

a hard rain that occurred a few days after the start of fieldwork. Still later, when the weather was drier, the multiplier was lowered to 1.20, corresponding to an estimated 15 percent soil-moisture content.

A negative correction factor of 2.5 pCi(Ra-226)/g for area-average potassium-40 and thorium-232 concentrations was calculated from stripping factors determined during the prefieldwork calibration and from portable gamma-ray spectrometer measurements made at both RFO and RFN.

After returning to Grand Junction, the raw data collected during the field survey were converted to radium concentrations using the data-reduction procedures described in detail in Section 5.6, Revision 0, of the Site Characterization Data Entry/Reduction Procedures (Showalter and others, 1984). Moisture corrections were determined from LOD measurements of 74 soil samples. Corrections for disequilibrium between radium and its radon daughters were determined from 'as-is' (i.e., not crushed and dried) measurements of 37 samples. Area-average potassium and thorium corrections were calculated from results of gamma-ray-spectroscopy analysis of over 800 soil samples collected during the fieldwork at both sites.

3.3.4 Gamma-Ray Spectrometer Measurements and Associated Data Reduction

In-situ measurements of typical radioelement concentrations were made at a variety of locations at both RFO and RFN, using a geoMetrics GR-410 portable gamma-ray spectrometer. The data collected were used to calculate in-situ concentrations of potassium, radium, and thorium, using the data-reduction procedures described in Section 7.0, Revision 0, of the Site Characterization Data Entry/Reduction Procedures (Showalter and others, 1984). The potassium and thorium concentrations were used to verify the corrections applied to the delta-gamma measurements, while the radium concentrations were used to cross-check the in-situ delta-gamma measurements.

Calibration data were collected on the DOE Walker Field calibration pads. The data were processed through CALBRT, a computer program which performs a multiple linear regression on the data to calculate a nine-element calibration matrix which converts window count rates to radioelement concentrations.

The equations for calculating concentrations of potassium, radium, and thorium, uncorrected for disequilibrium and moisture, are

$$\begin{aligned} C'_K &= a_{11}^{-1} R_K + a_{12}^{-1} R_{Ra} + a_{13}^{-1} R_{Th} \\ C'_{Ra} &= a_{21}^{-1} R_K + a_{22}^{-1} R_{Ra} + a_{23}^{-1} R_{Th} \\ C'_{Th} &= a_{31}^{-1} R_K + a_{32}^{-1} R_{Ra} + a_{33}^{-1} R_{Th} \end{aligned} \quad (7)$$

or, in matrix form,

$$\begin{bmatrix} C'_K \\ C'_{Ra} \\ C'_{Th} \end{bmatrix} = [A]^{-1} \begin{bmatrix} R_K \\ R_{Ra} \\ R_{Th} \end{bmatrix} \quad (8)$$

The uncertainties (Stromswold and Kosanke, 1978) associated with these values are determined from the equation

$$\sigma_i = \sqrt{\sum_{j=1}^3 \left(a_{ij}^{-1} R_j \right)^2 \left[\left(\sigma_{a_{ij}^{-1}} / a_{ij}^{-1} \right)^2 + \left(\sigma_{R_j} / R_j \right)^2 \right]} \quad (9)$$

The uncorrected concentration values are then corrected for moisture and disequilibrium to yield mass-normalized, dry-weight concentrations using the equations

$$\begin{aligned} C_K &= C'_K F'_m \\ C_{Ra} &= C'_{Ra} F'_m F'_e \\ C_{Th} &= C'_{Th} F'_m \end{aligned} \quad (10)$$

where F'_m and F'_e are the moisture and disequilibrium correction factors determined for the delta-gamma data.

3.4 EXPOSURE-RATE SURVEYS

Gamma-ray exposure-rate measurements were made at the surface and at waist level (approximately 3 ft above the surface) at gridpoints within the gridded areas of both sites. In addition, gamma-ray exposure-rate traverses were conducted at waist level along horizontal (east-west) and vertical (north-south) gridlines within the gridded areas at both sites. At RFO, gamma-ray exposure-rate traverses were also performed along the bluffs and along the principal washes. At RFN, a traverse was conducted along the inside of the south perimeter fence.

Exposure-rate scans were also performed along both shoulders of Highway 6 and 24 and along both edges of the DRGW/RR roadbed. The traverse for the highway scan began approximately 0.5 mi east of the gridded area at RFO, continued past the RFO tailings pile, moved along the southern edge of the City of Rifle, then along the northern edge of RFN, and ended approximately 0.5 mi west of the gridded area at RFN. The railroad scan was conducted only on those portions of the roadbed that lie adjacent to the gridded areas at the sites.

All gamma-ray exposure-rate gridpoint measurements and traverses were performed using Eberline PRM-7 $\mu R/h$ meters. In the gridded areas, surface and waist-level exposure-rate readings were recorded at all gridpoints and at anomalous points encountered along traverse lines. A point was considered

anomalous if the exposure rate was more than 10 $\mu\text{R/h}$ (uncorrected) above the ambient rate (average for the 200-ft traverse segment). Anomalous areas were spatially defined, and the maximum exposure-rate point flagged for subsequent soil-sampling and delta-gamma measurements.

For the highway and railroad exposure-rate scans, maximum and minimum readings were recorded for each 200-ft segment. Again, points were considered anomalous if the exposure rate was more than 10 $\mu\text{R/h}$ above the ambient rate for that segment. Anomalies were spatially defined and flagged for subsequent soil-sampling and delta-gamma measurements.

The PRM-7 $\mu\text{R/h}$ meters were bench-calibrated in the Bendix Electronics Laboratory in Grand Junction prior to fieldwork, and were field-checked daily (see Appendix A). Measurements obtained using the $\mu\text{R/h}$ meters were cross-correlated against measurements obtained using a Reuter-Stokes pressurized ionization chamber (PIC) at 31 locations at the two Rifle sites. These cross-correlation data were then used to determine factors for reducing the raw exposure-rate data to true exposure rates. The locations were selected to provide a range of exposure rates from 15 $\mu\text{R/h}$ (background) to 500 $\mu\text{R/h}$ (hot spot) for typical geometries at both sites. The data were processed using a linear regression (Showalter and others, 1984) to provide a correction equation of the form

$$E_T = AE_M + B \quad (11)$$

where E_T is the true exposure rate in $\mu\text{R/h}$ as measured by the PIC, E_M is the exposure rate in $\mu\text{R/h}$ measured using the PRM-7 $\mu\text{R/h}$ meter, and A and B are the coefficients determined by the regression analysis.

Exposure-rate data were processed using the computer program EXPOCALC.BAS; the procedures are detailed in Section 6.0, Revision 0, of the Site Characterization Data Entry/Reduction Procedures (Showalter and others, 1984).

3.5 BOREHOLE SAMPLING, DRILLING, AND LOGGING

Off-pile boreholes at the two Rifle sites were drilled and radiometrically logged; on-pile boreholes were not radiometrically logged. Surface soil samples were collected at all borehole locations prior to drilling, using the techniques described in Section 3.3.1. Subsurface split-barrel samples were collected from all on-pile boreholes and from several off-pile boreholes. Additional samples from on-pile boreholes were collected jointly by Bendix personnel and a geotechnical representative of Sergeant, Hauskins, and Beckwith, a Jacobs subcontractor. These last samples, which included Shelby-tube samples, were submitted to outside laboratories for analysis.

Backhoe test pits were also dug on-pile at both sites, and bulk tailings samples were collected by Jacobs personnel.

3.5.1 Subsurface Sampling

Split-barrel samples were collected from 24 boreholes at RFO and from 27 boreholes at RFN. The procedure involved hammering the sampling tube into the

undisturbed soil just ahead of the auger bit, after the desired sampling depth had been attained through drilling. The split-barrel sampling tube was 24 in. long and had an inside diameter of 2.5 in. After the 24-in. depth increment had been penetrated, the sampler was returned to the surface and opened. A Bendix geologist examined the sample and recorded a lithologic log. The sample was then bagged and tagged using the same procedures as those described for soil samples (Section 3.1.1). The split-barrel sampler was cleaned and checked for contamination before reuse. Procedures for split-barrel sampling are detailed in Section 5.2, Revision 1, of the Radiologic Field Measurements Procedures Manual (Bendix Field Engineering Corporation, 1984f).

The Shelby-tube sampler was equipped with a thin-wall sampling tube, 30 in. long and 3 in. in diameter. Samples were collected by hydraulically pushing the sampling tube into the undisturbed soil just ahead of the auger bit, after the desired sampling depth had been reached through drilling. Upon retrieval, the tubes were sealed with paraffin, capped, labeled, and turned over to the geotechnical representative of Sergeant, Hauskins, and Beckwith.

3.5.2 Drilling

Borehole drilling was accomplished by a subcontractor, F. M. Fox, with a CME-55 auger rig using standard geotechnical techniques where access permitted. Hollow-stem augers, 6-5/8-in. outside diameter (O.D.) by 3-1/4-in. inside diameter (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 to prevent contamination within the auger itself. The driller furnished seven auger heads/bits so that drilling could proceed in the next sequential hole without having to wait for completion of radiometric logging.

The boreholes were drilled to the approximate depth specified in the Statement of Work. The center bit was removed and the bottom of the hole monitored using the RASCAL portable total-count logging system. If the apparent radium concentration at the bottom of the hole exceeded 15 pCi/g, drilling was continued for another 5 ft (the length of an auger section). This process continued until the apparent radium concentration at the bottom of the hole was less than 15 pCi/g, or until the driller reached a point of refusal (i.e., no further downward penetration was possible) due to such conditions as shallow bedrock, buried concrete, large rocks, or other material.

Boreholes that were inaccessible by the truck-mounted auger rig were drilled by Bendix personnel, using a portable gas-powered 'Little Beaver' drill equipped with a 4-in.-diameter, solid-stem auger. Little Beaver holes were drilled to a depth of 7.5 ft (the maximum depth capability) or to point of refusal, whichever came first. These holes were logged using the RASCAL system immediately after removal of the auger in order to accomplish logging before the hole collapsed and minimize the potential for cross-contamination.

Once geophysical operations were completed, hole abandonment for all boreholes was accomplished by filling the hole with auger cuttings and, where necessary, with surrounding natural surface materials in accord with regulations of the State of Colorado Mined Land Reclamation Act.

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 their removal from each borehole, using an Eberline PAC-6 alpha counter. Tools exhibiting an alpha activity greater than approximately 500 disintegrations per minute per 100 square centimeters (dpm/100 cm²) were cleaned, then rechecked, and re-cleaned if necessary until they measured less than 170 dpm/100 cm².

3.5.3 Radiometric Logging

Boreholes accessible by two-wheel-drive truck were logged using a Bendix, computer-based, geophysical-logging (Compulogger) system, in accord with procedures detailed in Section 4.1, Revision 1, of the Radiologic Field Measurements Procedures Manual (Bendix Field Engineering Corporation, 1984f). 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. This run was considered the main logging phase, designated as phase 1 or 3, depending on the number of logs run in the particular hole. Repeat logs were made of the entire borehole to confirm the measurements obtained during the main logging phase; these were designated phase 2 or 4.

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 truck-mounted logging system were entered into the data base on the Zenith Z-100 portable computer and verified according to approved quality-assurance procedures. Data from the total-count channel were processed according to procedures described in Section 8.0, Revision 0, of the Site Characterization Data Entry/Reduction Procedures (Showalter and others, 1984). Data derived from laboratory analysis of split-barrel soil samples were used to correct the logs for formation moisture. Average subsurface moisture content was 9.7 percent for RFO and 15.7 percent for RFN.

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 the DOE Grand Junction Projects Office facility, using sections of casing identical to the casing used at the field sites. The depths of auger joints were determined by measuring the height of the auger above the ground surface for each borehole; since the total auger length was known, the depths of the auger joints could be calculated.

The data were then spatially deconvolved (George and Price, 1982) to produce logs of radium concentration versus depth. No corrections were applied for individual borehole concentrations of potassium and thorium because of the large uncertainties associated with the data from these windows; instead,

average values for the sites, as determined from laboratory spectral-gamma analysis of soil samples, were used to correct the radium data from the total-count channel for all logs. Corrections for background radium were not made.

In areas not accessible by two-wheel drive truck, logging was performed using a portable gross-count system, in accord with the procedures detailed in Section 4.3, Revision 0, of the Radiologic Field Measurements Procedures Manual (Bendix Field Engineering Corporation, 1983a). This system consists of an Eberline Model PRS-1 portable ratemeter/scaler (RASCAL) connected by 20 ft of cable to a waterproof Eberline Model SPA-3, 2-in.-by-2-in. sodium-iodide detector. The system is operated on counting plateau in a gross-count mode, which counts all gamma rays whose energies exceed approximately 30 keV.

The detector was manually lowered to the bottom of the borehole in 0.5-ft increments, with 30-second measurements recorded manually at each step. The data measurements recorded while lowering the detector were identified as phase 1 or 3. The detector was then raised to the top of the borehole in 0.5-ft increments with 30-second measurements again recorded at each step. Data recorded while the detector was being raised were identified as phase 2 or 4.

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. These data were subsequently processed using the procedures detailed in Section 8.0, Revision 0, of the Site Characterization Data Entry/Reduction Procedures (Showalter and others, 1984). Corrections for area-average potassium and thorium concentrations were applied to the final logs, but no corrections were made for background radium nor for individual borehole concentrations of potassium and thorium. Corrections were also made for average moisture content and for gamma-ray attenuation caused by the auger-stem casing and the auger joints (when appropriate), as described for the truck-mounted logging system. These data were also corrected for borehole fluid.

The borehole-logging systems were field-checked prior to logging each day using the procedures described in Appendix A.

Prior to the start of fieldwork, the logging systems were calibrated using the DOE borehole-calibration models at Grand Junction, Colorado, in conjunction with the computer program LOGCAL.BAS (Showalter and others, 1984). The resulting data were archived in a permanent calibration data base, as well as used in the project files for data reduction.

3.6 BUILDING SURVEYS

3.6.1 Exposure-Rate Survey

Exposure-rate measurements were obtained inside one building at RFO (see Plate 1) and inside five buildings at RFN (see Plate 2), using Eberline PRM-7 $\mu\text{R/h}$ meters. Surface and/or waist-level exposure rates were recorded for the center and near the corners of each room. Locations which yielded readings greater than 10 $\mu\text{R/h}$ above the ambient rate for that room were designated for subsequent alpha measurements. In addition, PIC/PRM-7 cross-correlation measurements were made inside the warehouse, the main office/shop building, and the garage/change house at RFN.

The exposure-rate data from the building surveys were processed as described in Section 3.4.

3.6.2 Alpha Survey

An Eberline Model PAC-6 air-proportional alpha detector and a Ludlum Model 12/43-5 scintillation-type alpha detector were used to obtain gross-alpha measurements inside the same buildings surveyed for gamma-ray exposure rates. These measurements, recorded in counts per minute (cpm), were made to determine surface-contaminant levels, with a view to defining the extent of decontamination that would be required in the buildings.

Direct-alpha scans were made on surfaces where contamination was likely to accumulate, such as bench tops, window sills, permanent fixtures, and floors, and on those surfaces identified as anomalous during the exposure-rate surveys. Locations where the direct-scan count rates exceeded 50 cpm using the Eberline PAC-6, or 10 cpm using the Ludlum 12/43-5, were noted, and wipe samples were collected from a number of these locations in each building with a view to determining the typical extent of removable contamination. The smears were counted for gross-alpha activity within 4 hours of collection, and again approximately 40 hours later, to determine if the removable contamination originated from radium-226 or from radon daughters.

Daily instrument-response checks of both detectors were made using the procedures described in Appendix A. Alpha count-rate data were converted to dpm/100 cm² for 4 π geometry by dividing the cpm data by the detector's calibration factor and the effective area of the detector.

3.7 BACKGROUND MEASUREMENTS

Four sites—north, south, east, and west of the City of Rifle (see Figure 1)—were selected for background measurements on the basis of geology similar to that encountered at the two Rifle millsites. All four background sites are located on Quaternary alluvium in stream or river valleys near the contact between the alluvium and the Wasatch Formation of Tertiary age.

Background site 1 is located approximately 3 mi east of RFO, near the Mamm Creek exit on Interstate 70. Background site 2 is located approximately 3 mi west and 2 mi south of RFN, near the Colorado River slightly southwest of the Lacy Siding on the DRGW/RR. Background site 3 is located about 2 mi north of RFO, on the west bank of Government Creek on the Hubbard Mesa road. Background site 4 is located approximately 1 mi south and 0.75 mi east of RFN at the mouth of Helmer Gulch.

At each background-measurement location, PIC and PRM-7 gamma-ray exposure-rate surveys, delta-gamma measurements, and portable gamma-ray spectrometer measurements were performed, in addition to collecting soil samples.

4.0 RESULTS

Data and results for the Rifle site characterization project are presented in Appendices B through J; these results are discussed in subsequent sections of this report.

4.1 PHYSICAL SURVEY RESULTS

Boreholes that were staked as gridpoints and drilled at the locations specified in the initial survey plan were not resurveyed. Those boreholes that were staked by the Bendix Site Manager and the Jacobs Technical Monitor after the initial survey had been performed, together with those boreholes that were moved from their original locations prior to actual drilling, were resurveyed from new or existing control points. At RFO, these resurveyed boreholes were surveyed in from STA-A. At RFN, they were surveyed in from SP232-468, SP256-480, Tail-1, Tail-2, and Tail-3, all of which had been established during the initial survey.

Elevations of the boreholes were established by means of differential leveling between control stations. At RFO, one elevation traverse was made from STA-A to STA-G, and two traverses were made from STA-L and back to itself. The differences in elevation noted in these three traverses were +0.05, +0.04, and -0.03 ft, respectively. At RFN, an elevation traverse was made from STA-1 to STA-9, then to STA-8, and back to STA-1. The differences in elevation noted in the traverse were +0.02, +0.02, and -0.04 ft, respectively. Other traverses were made from STA-2 to STA-8, from STA-2 and back to itself, from STA-1 to STA-9, and from STA-1 to STA-2, yielding differences in elevation of -0.04, -0.02, +0.22, and +0.03 ft, respectively. It should be noted that the path of the traverse from STA-1 to STA-9 went across the tailings pile, which may explain the difference of +0.22 ft.

In the course of establishing elevations at RFN, it was noted that the information stamped on the brass cap at STA-1 differed from the information on the Horizontal and Vertical Control map supplied by Jacobs. All cross-checks performed during the survey substantiate the belief that the map is correct, and that the brass cap is erroneously stamped with data pertaining to a flight panel located approximately 43.5 ft to the northeast.

The coordinates of hot spots identified on the basis of the radiologic survey were obtained by tape and line-of-sight from adjacent gridpoints, after the radiologic measurements had been completed.

Locations of control stations, established gridpoints, borehole locations, and surveyed hot spots are shown on Plates 1 and 2 for RFO and RFN, respectively.

4.2 SOIL SAMPLING RESULTS

Over 800 soil samples were collected and analyzed for radium, thorium, and potassium; the results are presented in Appendix B, Tables B-1 and B-2 for RFO and RFN, respectively, and in Table B-3 for the hot spots along Highway 6 and 24. Average K-40 concentrations are 1.9 percent at RFO and 1.8 percent at RFN. Average Th-232 concentrations are 12.6 ppm at RFO and 10.5 ppm at RFN.

At RFO, Ra-226 concentrations range from background (1.2 pCi/g) to 17,904 pCi/g. This maximum value was recorded for a hot spot located at the eastern edge of the millsite, where concentrations in ten samples collected in the area exceed 2000 pCi(Ra-226)/g. At RFN, Ra-226 concentrations range from background (1.2 pCi/g) to 1239 pCi/g, the latter encountered at a hot spot in the swampy area to the west of the tailings pile. The highest Ra-226 concentration in soil samples collected along Highway 6 and 24 is 60 pCi/g.

Figures 4 and 5 show locations at RFO and RFN, respectively, where radium concentrations in soil samples exceed the EPA standards, i.e., greater than 5 pCi(Ra-226)/g above background in the top 6 in., and greater than 15 pCi/g above background in any subsequent 6-in. layer, averaged over 100 m². Separate symbols are used to indicate different concentration ranges for the various depth intervals sampled.

Duplicate analyses were performed on splits of 69 samples from both RFO and RFN; these samples are identified by the prefix MBB. Table B-4 (Appendix B) presents the radium data for the original and duplicate samples to permit comparison of the results. Three pairs—MCX-035 and MBB-903, MCX-223 and MBB-920, and MCX-480 and MBB-940—did not agree within the expected range. Reanalysis of all three pairs yielded no significant change from the original results, suggesting that the differences can be attributed to sample preparation.

Results of loss-on-drying (LOD) measurements for 30 samples from RFO and 44 samples from RFN are presented in Table B-5. At RFO, the average moisture content is 9.7 percent, resulting in a moisture-correction factor (F'_m) of 0.98. At RFN, the average moisture content is 15.2 percent, yielding a moisture-correction factor (F'_m) of 1.06.

Also presented in Table B-5 are results of radon/radium-disequilibrium measurements for 19 samples from RFO and 38 samples from RFN. The average disequilibrium of 12 soil samples collected at RFO is 34.7 percent, resulting in a disequilibrium-correction factor (F'_d) of 1.38. The average disequilibrium of 25 soil samples collected at RFN is 40.4 percent, yielding a disequilibrium-correction factor (F'_d) of 1.51. [The disequilibrium data for soil samples containing less than 5 pCi(Ra-226)/g were not used in the determination of the correction factors.]

Results of analyses for total uranium and thorium-230, together with corresponding Ra-226 concentrations, are presented in Tables B-6 and B-7 for 60 samples from RFO and 69 samples from RFN, respectively. A considerable number of samples from both sites contain Th-230 concentrations that exceed 15 pCi/g. Although the Ra-226 content in several of these samples is less than the EPA standard, the Th-230 concentration greatly exceeds the standard. This latter condition indicates that remedial action is required to prevent Ra-226 in-growth which could ultimately result in radium concentrations that exceed the EPA standard. Samples MCX-24 and 40 from RFO and samples MCX-355, 361, and 833 from RFN are primary examples. Locations where Th-230 concentrations exceed the EPA standard for Ra-226 at RFO and RFN are identified in Figures 6 and 7, respectively. Separate symbols are used to indicate different concentration ranges for the various depth intervals sampled.

Figure 4. Locations of Soil Samples Having Ra-226 Concentrations Exceeding EPA Standards at RFO

Figure 5. Locations of Soil Samples Having Ra-226 Concentrations Exceeding EPA Standards at RFN

Figure 6. Locations of Soil Samples Having High Th-230 Concentrations at RFO

Figure 7. Locations of Soil Samples Having High Th-230 Concentrations at RFN

Tables B-8 and B-9 present the results of heavy-metal analyses of 31 samples from RFO and 36 samples from RFN, respectively. Anomalous concentrations of heavy metals were found in samples from both sites. At RFO, the highest concentrations of several of the heavy metals occur in three areas: (1) the area between the tailings pile and the railroad bed, (2) the fill area between the railroad bed and the Colorado River, and (3) the area where the mill had been located (old mill yard). At RFN, anomalous concentrations are most pronounced in samples from the ore-storage areas and the low-lying, swampy area west of the tailings pile.

4.3 STREAM-SEDIMENT SAMPLING RESULTS

Results of gamma-ray-spectroscopy analyses of 16 stream-sediment samples from RFO and 17 stream-sediment samples from RFN are presented in Appendix C, Tables C-1 and C-2, respectively. Results of analyses for total uranium and thorium-230 in 1 sample from RFO and 16 samples from RFN are presented in Tables C-3 and C-4, respectively; the corresponding Ra-226 concentrations are also included in these tables.

Ra-226 concentrations at RFO range from 3 pCi/g in the dry stream channel near the hospital (located approximately 1.25 mi north of the site), to 247 pCi/g in the small stream flowing across the site at a point 5 ft above its junction with the Colorado River. Sample MCX-254, the only stream-sediment sample from RFO analyzed for Th-230, contains high levels of both Th-230 and Ra-226, as well as anomalous concentrations of arsenic and vanadium (see Table B-8).

At RFN, samples MCX-703, 706, 714, 716, and 717 contain high levels of both Th-230 and Ra-226. One of these samples, MCX-706, was collected from the stream in the low-lying, swampy area west of the tailings pile, suggesting that contamination is moving offsite via this pathway. This sample also contains anomalous heavy-metal concentrations, notably 840 ppm arsenic (Table B-9).

4.4 DELTA-GAMMA RADIUM MEASUREMENT RESULTS

Radium concentrations determined using the delta-gamma method, together with their associated two-standard-deviation counting uncertainties, are reported in Appendix D, Tables D-1 and D-2, for RFO and RFN, respectively. Figures 8 and 9 show the locations where delta-gamma radium values exceed the EPA standards at RFO and RFN, respectively. Separate symbols are used to indicate different concentration ranges for the various depth intervals measured.

At RFO, the data indicate surface contamination in the bluff area northeast of the tailings pile, probably due to windblown tailings, uranium ore, and/or unscrubbed stack discharge from early milling operations. Subsurface contamination is evident in the area between the railroad bed and the tailings pile, in the old mill yard, and in the old ore-stockpile area on the bluff to the north of the pile.

Figure 8. Locations of Delta-Gamma Radium Measurements Exceeding EPA Standards at RFO

Figure 9. Locations of Delta-Gamma Radium Measurements Exceeding EPA Standards at RFN

At RFN, the delta-gamma data indicate subsurface contamination in the ore-storage areas north of the pile and east of the mill yard, in the area along the western edge of the tailings pile, and in the low-lying, swampy area west of the pile.

Table D-3 lists delta-gamma radium concentrations for the hot spots along Highway 6 and 24 that were identified during the exposure-rate highway scan. Ra-226 concentrations range from background (1.2 pCi/g) to 35 pCi/g, the latter occurring at a point located a few hundred feet east of RFN (coordinates 25691N, 50310E).

4.5 EXPOSURE-RATE SURVEY RESULTS

4.5.1 Exposure-Rate Calibration: PIC/PRM-7 Cross-Correlation

Data used in the calibration of the PRM-7 $\mu\text{R/h}$ meters, accomplished by means of correlation with PIC measurements, are tabulated in Appendix E, Table E-1. The regression coefficients determined for the PRM-7 $\mu\text{R/h}$ meters used at the two Rifle sites are listed below:

- Instrument Number C-8837: $A = 0.44$, $B = 3.5$
- Instrument Number C-8838: $A = 0.45$, $B = 2.4$

4.5.2 Millsite Gridpoint and Scan Measurements

Results of surface and waist-level exposure-rate measurements at gridpoints and hot spots in the gridded areas at RFO and RFN are presented in Appendix E, Tables E-2 and E-3, respectively. Figures 10 and 11 show locations where waist-level exposure rates exceed 5 $\mu\text{R/h}$ above background (15 $\mu\text{R/h}$) at RFO and RFN, respectively.

At RFO, high exposure rates were found around the edges of the tailings pile, along the railroad tracks, along the southern edge of the old mill yard, and on the bluff in the ore-storage area.

At RFN, high exposure rates were recorded along the western side of the tailings pile, in the low-lying areas south and west of the pile, along the fence which marks the northern perimeter of the site, and in the ore-storage areas east of the mill yard.

4.5.3 Highway 6 and 24 Scan

Maximum waist-level exposure rates for each 200-ft scanned segment of Highway 6 and 24 (north and south sides), and for hot spots identified on the basis of this highway scan, are listed in Table E-4. As expected, exposure rates are highest in those areas closest to the tailings piles at both sites. Slightly elevated readings were recorded near the Rifle Creek Bridge at approximately 54800E and at the rail spur which crosses the highway at approximately 56200E.

Figure 10. Locations of Anomalous Waist-Level Exposure Rates at RFO

Figure 11. Locations of Anomalous Waist-Level Exposure Rates at RFN

4.5.4 Railroad Scans

Waist-level exposure rates for each 200-ft scanned segment of the roadbed along both sides of the DRGW/RR tracks, and for hot spots identified on the basis of these railroad scans, are included in the data presented in Tables E-2 and E-3. At RFO, elevated readings were recorded for both sides of the tracks from approximately 62000E to the western edge of the tailings pile at approximately 59000E. At RFN, several hot spots were identified in the area between the southern edge of the tracks and the fence along the northern perimeter of the site. One additional hot spot was detected just north of the tracks near the main entrance to the mill yard.

Soil samples were collected at the major hot spots along the tracks at both sites. Boreholes were then drilled and logged at the same locations, using portable equipment. Results of these activities are included with the soil-sampling results (Appendix B) and the radiometric logs (Appendix I) for each site.

4.6 GAMMA-RAY-SPECTROMETER MEASUREMENT RESULTS

Portable gamma-ray spectrometers were used to measure in-situ radium-226, thorium-232, and potassium-40 at both sites; results for RFO and RFN are presented in Appendix F, Tables F-1 and F-2, respectively. Seventeen measurements at RFO yielded an average K-40 concentration of 1.6 percent and an average Th-232 concentration of 11.8 ppm. At RFN, 23 measurements were averaged to yield a K-40 concentration of 1.6 percent and a Th-232 concentration of 9.6 ppm.

4.7 BUILDING SURVEY RESULTS

Results of the building surveys at both sites are presented in Appendix G. For each building, exposure-rate and alpha survey results are presented in a table (e.g., Table G-1), which lists measurement locations by number. These locations are then identified on an associated figure (e.g., Figure G-1), which is a sketch of the floor plan of the building. For multilevel buildings, separate sketches are provided for each floor [e.g., Figures G-1(a) and G-1(b)]. Building locations at RFO and RFN are shown on Plates 1 and 2, respectively.

In the old assay laboratory at RFO [Table G-1 and Figures G-1(a) and G-1(b)], elevated exposure rates were recorded throughout the building and alpha contamination was detected on the surface at several locations. Of the latter, the most notable is a discolored area on the floor in Room J [Figure G-1(b)] which exhibited the highest direct-scan alpha reading and the most removable contamination. A floor-sweeping sample was collected from Room B [Figure G-1(a)] and processed with the rest of the soil samples from RFO; analytical results are included in Appendix B, Table B-1.

At RFN, elevated exposure rates and surface alpha contamination were found in all of the buildings (Tables G-2 through G-6 and Figures G-2 through G-6). Of these, two buildings contain the greatest amounts of overall contamination, the redcake building [Table G-5 and Figures G-5(a) through G-5(d)] and the solvent extraction building [Table G-6 and Figures G-6(a) through G-6(e)].

Unfortunately, these two buildings were also the most difficult to characterize radiologically due to their construction.

Also included in Appendix G are the tabulated results of alpha measurements made on various items contained in the trash dump at RFO (Table G-7). The dump is located in a gully north of Highway 6 and 24 at approximately 26950N, 60350E (see Plate 1). Although the direct-scan results indicate that several items are highly contaminated, wipe-sample results reveal that very little contamination is removable.

4.8 BOREHOLE DRILLING, SAMPLING, AND LOGGING RESULTS

Lithologic logs of 24-in. split-barrel samples from 24 boreholes at RFO and 27 boreholes at RFN are presented on microfiche in Appendix H. The laboratory analytical results for these samples are included with results for surface (0 to 6 in.) soil samples collected from the same boreholes prior to drilling (see Appendix B, Tables B-1 and B-2, for RFO and RFN, respectively).

Radiometric logging data, including borehole locations (also see Plates 1 and 2), surface elevations, subsurface sampling depths, and radiometric logging depths, are presented in Appendix I, Tables I-1 and I-2, for RFO and RFN, respectively. The radiometric logs are presented on microfiche in Appendix I; for each site, the suite of RASCAL logs is followed by the suite of Compulogger logs.

Corrections were applied to the radium data for contributions from area-average concentrations of potassium and thorium. For the truck-mounted (Compulogger) system, these corrections are 1.2 pCi(Ra-226)/g for each 1 percent potassium and 0.14 pCi(Ra-226)/g for each 1 ppm thorium. For the RASCAL system, the corrections are 0.56 pCi(Ra-226)/g for each 1 percent potassium and 0.14 pCi(Ra-226)/g for each 1 ppm thorium. No corrections for background radium were made; however, the average background concentration for both Rifle sites is 1.2 pCi(Ra-226)/g, as determined from laboratory analysis of soil samples.

4.9 BACKGROUND CHARACTERIZATION RESULTS

Results of radiometric measurements and laboratory analyses of soil samples for the four background sites in the Rifle area (see Figure 1) are tabulated in Appendix J. Soil-sampling results (Table J-1) indicate average background concentrations of 1.2 ± 1.0 pCi/g Ra-226, 10.6 ± 2.6 ppm Th-232, and 1.8 ± 0.4 percent K-40. An average Ra-226 concentration of 2.5 ± 1.1 pCi/g was derived from in-situ delta-gamma measurements made at all four background sites (Table J-2). Measurements obtained using the portable gamma-ray spectrometers (Table J-3) indicate average background concentrations of 2.2 pCi/g Ra-226, 12.1 ppm Th-232, and 2.0 percent K-40. Exposure-rate measurements were also made at the four background sites using PRM-7 μ R/h meters and a pressurized ionization chamber (PIC). The PIC results (Table J-4) yield a mean exposure rate of 15.1 μ R/h, which is consistent with background exposure-rate values reported for the Rifle area in previous studies. For purposes of determining areas exceeding the EPA standards at both Rifle sites, a background concentration of 1.2 pCi(Ra-226)/g was used.

5.0 SUMMARY

5.1 CONTAMINATION AT THE OLD RIFLE MILLSITE

At the Old Rifle millsite, subsurface contamination [>16 pCi(Ra-226)/g] is present at depths ranging from 12 to 60 in. along virtually the entire southern boundary of the site, in the area between the DRGW/RR tracks and the fence that extends along the southern site perimeter. Along the southern (river) side of the railroad tracks, subsurface contamination occurs from 60200E to 61400E at depths ranging from 12 to 18 in.

Contamination in the old mill yard is widespread; Ra-226 concentrations exceeding 16 pCi(Ra-226)/g occur at depths ranging from 18 to 52 in., and extend below 144 in. in borehole RFO-224. A large portion of the area is underlain with buried concrete slabs and foundations, making drilling and excavation difficult.

Contaminated materials and trash have been discarded or buried at several locations within and around the RFO site. The most significant of these with respect to contaminant levels are described below:

- On the hillside directly west of the tailings pile (25717N, 59217E), remains of old carpet, pieces of laboratory glassware, and other trash are visible at several hot spots.
- In the gully north of Highway 6 and 24 (trash dump at 26950N, 60350E), old barrels, electrical apparatus, structural materials, and metal cuttings are present on the surface. Boreholes drilled in this area indicate Ra-226 concentrations that exceed 16 pCi/g at depths ranging from 6 to 30 in. Surface alpha-scan measurements made on certain of the materials yielded readings up to 9860 dpm/100 cm²; wipe-sample measurements, however, indicate that little of this contamination is removable.
- At grid coordinates 26421N, 60207E, a contaminated piece of carpet produced a surface delta-gamma reading of more than 1900 pCi(Ra-226)/g.

In the old ore-storage area on the bluff north of the site near the microwave-receiving station, subsurface contamination [>16 pCi(Ra-226)/g] occurs at depths ranging from 6 to >18 in. at several hot spots. Most hot spots in this area, however, appear to be surficial. On the bluffs northeast of the site, contamination is widespread but spotty, with subsurface contamination occurring at depths ranging from 6 to 18 in. Surface contamination [>6 pCi(Ra-226)/g], probably due to windblown tailings, extends northeast beyond the corner of the gridded area at 27000N, 61600E.

Anomalous concentrations of Ra-226, Th-230, and heavy metals were found in a stream-sediment sample (MCX-254), collected at 25660N, 60318E. These data indicate that contamination is being carried offsite by surface waters which discharge into the Colorado River.

In the old assay laboratory, which is presently being used for storage, several contaminated locations were detected by the surface alpha scan, with measurements as high as approximately 14,500 dpm/100 cm². Subsequent wipe-

sample measurements indicate that some 30 percent or more of the contamination in the building is removable, and is not the result of radon-daughter plate-out.

5.2 CONTAMINATION AT THE NEW RIFLE MILLSITE

Contamination is widespread at RFN, covering most of the area between Interstate 70 on the south to Highway 6 and 24 on the north, between approximately 45600E and 49000E. In fact, no large blocks (greater than 500 ft by 500 ft) within the gridded area are free of contamination. The block which appears to have the least contamination is that surrounding the gridpoint at 24600N, 46000E. In the western portion of the site, the most prevalent contamination occurs in the low-lying drainages and near the western edge of the tailings pile, where thin layers of buried tailings extend into the adjacent swampy areas. High concentrations of Ra-226, Th-230, and heavy metals occur in some of the stream-sediment samples collected in this area of the site.

In the mill yard and ore-storage areas, contamination is generally widespread. Ra-226 concentrations exceeding 16 pCi/g extend to depths of 12 to 18 in. at the outer extremes of the areas and to depths of 3 to 6 ft near the boundary of the tailings pile.

In the narrow strip of railroad right-of-way land between the tracks and the fence along the northern perimeter of the site, contamination occurs from 46900E to 48600E, with Ra-226 concentrations exceeding 16 pCi/g at depths ranging from 12 to 18 in.

Most of the buildings also appear to be contaminated. Results for the buildings surveyed as part of this study indicate surface alpha contamination ranging as high as approximately 3000 dpm/100 cm². cursory examination of those buildings not formally surveyed revealed visible signs of uranium ore and yellow cake.

5.3 CONTAMINATION ALONG HIGHWAY 6 AND 24

Results of the highway scans, which covered approximately 4.25 lineal mi, revealed some 15 hot spots where surface delta-gamma readings exceed 6 pCi(Ra-226)/g. Subsurface readings at these locations indicate that no Ra-226 concentrations exceeding the EPA standards occur at depths of 18 in. or more.

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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 the parking lot of the motel at which the field crew was housed. The parking lot was considered to be a low-background area.

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 at the time of calibration.

For field-checking the Bendix delta-gamma units, a specially designed 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 2σ quality-control limits.

A calibration jig was used for field-checking the portable gamma-ray spectrometers. A 240-second count with a uranium button source was followed by a 240-second background count and a 240-second count with 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 $\mu\text{R/h}$ for a 90-second interval. Following determination of background exposure rate, a button source was placed in the source-holding fixture and the average exposure rate for a 90-second interval was 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.

The Eberline PRM-7 microroentgen-per-hour ($\mu\text{R/h}$) meters were field-checked using a special lead-lined shield box equipped with inserts to hold the instrument in a fixed geometry relative to the check source. Specially fabricated, uranium-ore check sources provided near-full-scale readings on the most

frequently used ranges (25 and 50 $\mu\text{R/h}$). Background readings were subtracted from source readings for each scale, and the net readings plotted on a graph and compared with the 2σ quality-control limits.

The Eberline PRS-1/SPA-3 (RASCAL) portable gross-count logging system was field-checked using a commercial uranium button source and a Bendix-fabricated test fixture. A 300-second background count was accumulated with the source removed to a point beyond its range of influence. Next, a 120-second count was obtained with the check source in place. The net count rate in counts per second (cps) was calculated, graphed, and compared with the 2σ quality-control limits.

The truck-mounted, spectral-gamma/total-count (Compulogger) logging system was field-checked in a low-background area onsite instead of at the motel, because of the logistics involved in overnight parking and the need to run the truck's engine while operating the system. A 300-second background count was accumulated, followed by a 300-second count using a Bendix-fabricated, monazite-sand source. The net window count rates were calculated, graphed, and compared with the 2σ quality-control limits.

The Eberline PAC-6 air-proportional alpha counters were field-checked using an Eberline calibration-source fixture. The detector was placed in the appropriate fixture for the X1 scale, and the reading recorded. The detector was then rotated 180 degrees in the fixture, and a second reading recorded. The two readings were averaged, plotted, and checked for compliance with the 2σ quality-control limits. The procedure was then repeated for the other scales, using the appropriate fixture for each scale.

The Ludlum Model 12/43-5 scintillation-type alpha counter was field-checked using an Eberline DNS-8 thorium standard as the source. A background reading was obtained first, using the X1 scale. The detector was then placed on the source, and a reading recorded using the X10 scale. The background reading was then subtracted from the source reading, and the net result checked for compliance with the 2σ quality-control limits.

Appendix B

ANALYTICAL DATA FOR SOIL SAMPLES

Tables B-1, B-2, and B-3 present gamma-ray-spectroscopy analytical data for the soil samples collected at RFO, at RFN, and along Highway 6 and 24, respectively. The prefix MCX was used to identify all soil samples, except those sample splits on which duplicate analyses were performed; these were assigned an MBB number. In all three tables, the radium, thorium, and potassium values represent mass-normalized, dry-weight concentrations, assuming secular equilibrium between radium or thorium and its radioactive progeny. The analytical uncertainties are reported at the two-standard-deviation (2σ) level. A less-than sign (<) indicates that the value is below the detection limit of the analytical system used. A question mark (?) indicates that the value is semiquantitative due to a low count rate.

Table B-4 presents the radium data for 69 sample splits on which duplicate analyses were performed. The original results (MCX- sample prefix) are included with the duplicate results (MBB- sample prefix) for comparison purposes. The analytical uncertainties are reported at the 2σ level, and include estimates of random and systematic errors.

Table B-5 presents results of loss-on-drying (LOD) moisture measurements and radon/radium-disequilibrium measurements for samples collected at both RFO and RFN.

Tables B-6 and B-7 list total uranium, thorium-230, and radium-226 concentrations for soil samples collected at RFO and RFN, respectively.

Tables B-8 and B-9 present results of heavy-metal analyses for soil, borehole, and stream-sediment samples collected at RFO and RFN, respectively.

Table B-1

Gamma-Ray-Spectroscopy Data for Soil Samples from RFO

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
27371	61374	0- 6	0	MCX-386	9 ± 1	16 ± 4	2.2 ± 0.5
27371	61374	6- 12	0	MCX-387	3 ± 1	16 ± 4	2.2 ± 0.5
27300	60300	0- 6	0	MCX-392	7 ± 1	17 ± 4	2.0 ± 0.5
27300	60300	6- 12	0	MCX-393	2 ± 1	12 ± 3	1.5 ± 0.4
27300	60500	0- 6	0	MCX-394	16 ± 1	15 ± 4	1.4 ± 0.4
27300	60500	6- 12	0	MCX-395	2 ± 1	< 2 ± 0	1.6 ± 0.4
27300	60700	0- 6	0	MCX-390	5 ± 1	? 13 ± 2	? 1.9 ± 0.2
27300	60700	6- 12	0	MCX-391	2 ± 1	17 ± 3	2.0 ± 0.5
27250	61315	0- 6	0	MCX-388	18 ± 1	17 ± 4	2.1 ± 0.5
27250	61315	0- 6	0	MBB-933	16 ± 1	15 ± 3	2.7 ± 0.5
27250	61315	6- 12	0	MCX-389	7 ± 1	11 ± 3	1.9 ± 0.4
27162	61383	0- 6	0	MCX-384	7 ± 1	18 ± 3	2.5 ± 0.5
27162	61383	6- 12	0	MCX-385	2 ± 1	15 ± 3	3.0 ± 0.5
27000	59200	0- 6	0	MCX- 77	2 ± 1	? 11 ± 2	2.2 ± 0.5
27000	59200	6- 12	0	MCX-136	2 ± 1	< 2 ± 0	2.3 ± 0.5
27000	59200	12- 18	0	MCX-137	2 ± 1	16 ± 3	1.9 ± 0.5
27000	59400	0- 6	0	MCX-905	2 ± 1	15 ± 3	2.0 ± 0.5
27000	59400	6- 12	0	MCX-906	2 ± 1	14 ± 3	2.1 ± 0.5
27000	59600	0- 6	0	MCX- 78	? 2 ± 1	? 12 ± 2	2.3 ± 0.5
27000	59600	6- 12	0	MCX-138	1 ± 1	15 ± 3	1.3 ± 0.3
27000	59600	12- 18	0	MCX-139	2 ± 1	12 ± 3	2.1 ± 0.5
27000	59800	0- 6	0	MCX-909	2 ± 1	16 ± 3	1.7 ± 0.4
27000	59800	6- 12	0	MCX-910	2 ± 1	19 ± 3	2.2 ± 0.5
27000	60000	0- 6	0	MCX- 79	2 ± 1	? 12 ± 2	2.3 ± 0.5
27000	60000	6- 12	0	MCX-140	1 ± 1	< 2 ± 0	1.8 ± 0.4
27000	60200	0- 6	0	MCX-911	3 ± 1	15 ± 3	2.0 ± 0.5
27000	60200	6- 12	0	MCX-912	2 ± 1	16 ± 3	1.5 ± 0.4
27000	60400	0- 6	0	MCX-147	10 ± 1	< 3 ± 0	1.8 ± 0.4
27000	60400	6- 12	0	MCX-148	1 ± 1	< 2 ± 0	1.6 ± 0.4
27000	60400	12- 18	0	MCX-149	1 ± 1	11 ± 3	1.5 ± 0.4
27000	60601	0- 6	0	MCX-913	8 ± 1	16 ± 4	2.4 ± 0.5
27000	60601	6- 12	0	MCX-914	4 ± 1	17 ± 3	2.1 ± 0.5
27000	61000	0- 6	0	MCX-382	6 ± 1	13 ± 3	2.1 ± 0.5
27000	61000	6- 12	0	MCX-383	3 ± 1	17 ± 3	2.0 ± 0.5
27000	61200	0- 6	0	MCX-380	6 ± 1	< 3 ± 0	1.5 ± 0.4
27000	61200	6- 12	0	MCX-381	4 ± 1	16 ± 3	1.9 ± 0.4
26990	61390	0- 6	0	MCX-377	11 ± 1	20 ± 3	? 2.5 ± 0.3
26990	61390	6- 12	0	MCX-378	2 ± 1	18 ± 3	2.1 ± 0.5
26990	61390	12- 18	0	MCX-379	2 ± 1	14 ± 3	1.5 ± 0.4
26934	60439	0- 6	259	MCX- 44	9 ± 1	13 ± 3	1.3 ± 0.3
26930	60271	0- 6	261	MCX- 43	32 ± 1	11 ± 2	2.8 ± 0.3
26927	60383	0- 6	258	MCX- 45	17 ± 1	< 2 ± 0	1.9 ± 0.5
26921	60286	0- 6	257	MCX- 42	44 ± 2	13 ± 3	3.1 ± 0.3
26809	60288	0- 6	260	MCX- 41	19 ± 1	15 ± 2	2.5 ± 0.2
26800	59200	0- 6	0	MCX-903	10 ± 1	13 ± 4	2.2 ± 0.5

Table B-1 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
26800	59200	0- 6	0	MBB-968	12 ± 1	14 ± 2	2.1 ± 0.2
26800	59200	6- 12	0	MCX-904	5 ± 1	14 ± 3	2.3 ± 0.5
26800	59400	0- 6	0	MCX- 80	8 ± 1	15 ± 2	2.4 ± 0.2
26800	59400	0- 6	0	MBB-905	9 ± 1	13 ± 2	1.8 ± 0.2
26800	59400	6- 12	0	MCX-143	2 ± 1	16 ± 3	1.9 ± 0.5
26800	59400	12- 18	0	MCX-144	2 ± 1	14 ± 3	2.0 ± 0.5
26800	59800	0- 6	0	MCX- 81	7 ± 1	10 ± 2	2.4 ± 0.2
26800	60000	0- 6	0	MCX-907	4 ± 1	10 ± 3	2.2 ± 0.5
26800	60000	6- 12	0	MCX-908	3 ± 1	12 ± 3	1.9 ± 0.4
26800	60200	0- 6	0	MCX-155	2 ± 1	16 ± 3	1.6 ± 0.4
26800	60200	6- 12	0	MCX-156	2 ± 1	17 ± 3	2.0 ± 0.5
26800	60400	0- 6	0	MCX-915	7 ± 1	17 ± 4	1.8 ± 0.4
26800	60400	6- 12	0	MBB-969	3 ± 1	17 ± 2	2.0 ± 0.2
26800	60400	6- 12	0	MCX-916	3 ± 1	17 ± 3	1.7 ± 0.4
26800	60600	0- 6	0	MCX-120	11 ± 3	17 ± 3	2.3 ± 0.5
26800	60600	6- 12	0	MCX-121	6 ± 1	< 3 ± 0	1.7 ± 0.4
26800	60600	12- 18	0	MCX-122	2 ± 1	14 ± 3	2.0 ± 0.5
26784	61400	0- 6	0	MCX-296	13 ± 1	14 ± 2	3.1 ± 0.3
26784	61400	6- 12	0	MCX-297	2 ± 1	20 ± 2	3.0 ± 0.3
26784	61400	12- 18	0	MCX-298	3 ± 1	19 ± 3	? 2.1 ± 0.3
26700	59500	0- 6	255	MCX- 36	124 ± 5	14 ± 4	2.8 ± 0.3
26700	59500	60- 84	255	MCX-859	2 ± 1	12 ± 3	2.0 ± 0.5
26617	59630	0- 6	0	MCX-126	1821 ± 107	< 14 ± 0	< 1.0 ± 0.0
26617	59630	6- 12	0	MCX-127	45 ± 2	< 3 ± 0	1.7 ± 0.4
26617	59630	12- 18	0	MCX-128	2 ± 1	13 ± 3	1.5 ± 0.4
26600	59250	0- 6	0	MCX- 82	3 ± 1	12 ± 2	1.9 ± 0.4
26600	59600	0- 6	252	MCX- 70	143 ± 8	< 4 ± 0	? 1.3 ± 0.3
26600	59600	6- 12	0	MCX-145	8 ± 1	14 ± 3	1.5 ± 0.4
26600	59600	60- 84	252	MCX-860	2 ± 1	11 ± 3	2.1 ± 0.5
26600	59800	0- 6	253	MCX- 71	50 ± 2	< 2 ± 0	1.9 ± 0.4
26600	59800	60- 84	253	MCX-861	3 ± 1	< 2 ± 0	1.3 ± 0.3
26600	60000	0- 6	254	MCX- 37	28 ± 1	13 ± 2	2.6 ± 0.2
26600	60000	60- 84	254	MCX-862	2 ± 1	16 ± 3	1.9 ± 0.5
26600	60200	0- 6	0	MCX-901	2 ± 1	8 ± 2	1.9 ± 0.4
26600	60200	6- 12	0	MCX-902	2 ± 1	10 ± 2	1.8 ± 0.4
26600	60300	0- 6	256	MCX- 38	3 ± 1	9 ± 1	2.7 ± 0.3
26600	60400	0- 6	0	MCX-176	8 ± 1	13 ± 3	1.9 ± 0.4
26600	60400	6- 12	0	MCX-177	2 ± 1	12 ± 3	2.1 ± 0.5
26600	60400	12- 18	0	MCX-178	3 ± 1	15 ± 2	2.2 ± 0.2
26600	60600	0- 6	0	MCX-917	14 ± 1	17 ± 4	1.9 ± 0.5
26600	60600	6- 12	0	MCX-918	12 ± 1	16 ± 3	1.9 ± 0.5
26600	60800	0- 6	0	MCX-150	10 ± 1	16 ± 4	2.0 ± 0.5
26600	60800	6- 12	0	MBB-910	7 ± 1	16 ± 2	2.3 ± 0.2
26600	60800	6- 12	0	MCX-118	7 ± 1	< 3 ± 0	1.8 ± 0.4
26600	60800	12- 18	0	MCX-119	6 ± 1	14 ± 3	1.7 ± 0.4
26600	61200	0- 6	0	MCX-167	1 ± 1	16 ± 3	1.8 ± 0.4
26600	61200	0- 6	0	MBB-914	1 ± 1	13 ± 2	2.0 ± 0.2

Table B-1 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
26600	61400	0- 6	0	MBB-926	22 ± 1	? 14 ± 3	2.6 ± 0.5
26600	61400	0- 6	0	MCX-299	22 ± 1	13 ± 2	3.0 ± 0.3
26600	61400	6- 12	0	MCX-300	2 ± 1	17 ± 2	3.0 ± 0.3
26600	61400	12- 18	0	MCX-376	3 ± 1	17 ± 3	2.0 ± 0.5
26600	61400	12- 18	0	MBB-931	2 ± 1	20 ± 3	2.7 ± 0.5
26600	61600	0- 6	0	MCX-162	2 ± 1	14 ± 3	2.1 ± 0.5
26600	61600	6- 12	0	MCX-163	2 ± 1	11 ± 3	1.7 ± 0.4
26500	59500	0- 6	250	MCX- 39	14 ± 1	13 ± 2	2.7 ± 0.2
26500	59500	60- 84	250	MBB-967	2 ± 1	19 ± 2	2.0 ± 0.2
26500	59500	60- 84	250	MCX-864	2 ± 1	20 ± 3	2.7 ± 0.3
26500	59700	0- 6	251	MCX- 40	125 ± 5	< 3 ± 0	2.5 ± 0.3
26500	59700	60- 84	251	MCX-863	4 ± 1	14 ± 3	1.8 ± 0.4
26445	59577	0- 6	0	MCX-129	151 ± 8	< 5 ± 0	? 1.2 ± 0.4
26445	59577	6- 12	0	MCX-130	48 ± 3	< 4 ± 0	1.6 ± 0.4
26445	59577	12- 18	0	MCX-131	53 ± 3	< 4 ± 0	1.6 ± 0.4
26440	60675	0- 6	0	MCX-183	100 ± 3	12 ± 3	2.6 ± 0.3
26440	60675	6- 12	0	MCX-184	5 ± 1	17 ± 2	2.7 ± 0.3
26440	60675	12- 18	0	MCX-185	5 ± 1	16 ± 2	2.6 ± 0.2
26421	60207	0- 6	0	MCX-132	1035 ± 45	< 10 ± 0	< 0.5 ± 0.0
26421	60207	6- 12	0	MCX-133	37 ± 3	< 3 ± 0	? 1.1 ± 0.3
26421	60207	6- 12	0	MBB-911	36 ± 3	< 3 ± 0	1.4 ± 0.2
26400	59400	0- 6	0	MCX- 83	5 ± 1	12 ± 2	2.4 ± 0.2
26400	59400	6- 12	0	MCX-141	3 ± 1	< 2 ± 0	2.0 ± 0.5
26400	59400	12- 18	0	MCX-142	2 ± 1	10 ± 3	1.7 ± 0.4
26400	60200	0- 6	0	MCX-157	3 ± 1	13 ± 3	1.9 ± 0.4
26400	60600	0- 6	0	MCX-179	60 ± 2	15 ± 3	2.8 ± 0.3
26400	60600	0- 6	0	MBB-916	62 ± 3	14 ± 3	1.8 ± 0.2
26400	60600	6- 12	0	MCX-180	9 ± 2	13 ± 3	2.1 ± 0.5
26400	60600	12- 18	0	MCX-181	4 ± 1	12 ± 2	2.8 ± 0.3
26400	60800	0- 6	0	MCX-186	73 ± 3	14 ± 3	2.5 ± 0.3
26400	60800	6- 12	0	MCX-187	6 ± 1	18 ± 2	2.8 ± 0.3
26400	60800	12- 18	0	MCX-188	2 ± 1	17 ± 2	2.9 ± 0.3
26400	61000	0- 6	0	MCX-168	45 ± 2	12 ± 5	2.3 ± 0.5
26400	61000	6- 12	0	MBB-915	3 ± 1	18 ± 2	2.3 ± 0.2
26400	61000	6- 12	0	MCX-169	3 ± 1	17 ± 3	2.3 ± 0.5
26400	61000	12- 18	0	MCX-170	2 ± 1	18 ± 3	2.0 ± 0.5
26400	61400	0- 6	0	MCX-164	39 ± 2	< 3 ± 0	2.2 ± 0.5
26400	61400	6- 12	0	MCX-165	5 ± 1	20 ± 4	2.4 ± 0.5
26400	61400	12- 18	0	MCX-166	3 ± 1	17 ± 3	2.2 ± 0.5
26225	61350	0- 6	0	MCX-192	87 ± 4	< 4 ± 0	? 1.3 ± 0.4
26225	61350	6- 12	0	MCX-193	2 ± 1	15 ± 3	2.3 ± 0.5
26225	61350	12- 18	0	MCX-194	2 ± 1	20 ± 3	1.8 ± 0.4
26209	61383	0- 6	0	MCX-195	73 ± 3	< 4 ± 0	1.5 ± 0.4
26209	61383	6- 12	0	MCX-196	3 ± 1	18 ± 3	2.1 ± 0.5
26209	61383	12- 18	0	MCX-197	2 ± 1	14 ± 3	2.5 ± 0.5
26200	60000	0- 6	0	MCX- 64	45 ± 2	< 2 ± 0	1.4 ± 0.3
26200	60033	0- 6	245	MCX-858	202 ± 9	< 6 ± 0	0.9 ± 0.4

Table B-1 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
26200	60100	0- 6	246	MCX- 30	78 ± 4	< 3 ± 0	1.4 ± 0.4
26200	60200	0- 6	247	MCX- 31	205 ± 10	< 4 ± 0	1.2 ± 0.4
26200	60300	0- 6	248	MCX- 32	53 ± 3	< 3 ± 0	1.0 ± 0.3
26200	60600	0- 6	0	MCX-182	1 ± 1	6 ± 1	2.3 ± 0.3
26200	61200	0- 6	0	MCX-171	1 ± 1	18 ± 3	2.0 ± 0.5
26200	61200	6- 12	0	MCX-172	2 ± 1	15 ± 3	2.2 ± 0.5
26200	61200	12- 18	0	MCX-173	2 ± 1	16 ± 3	2.0 ± 0.5
26200	61600	0- 6	0	MCX-152	2 ± 1	12 ± 2	1.9 ± 0.4
26200	61600	6- 12	0	MCX-153	2 ± 1	14 ± 3	1.5 ± 0.4
26200	61600	12- 18	0	MCX-154	2 ± 1	12 ± 3	1.6 ± 0.4
26190	60400	0- 6	0	MCX- 33	19 ± 1	< 2 ± 0	1.8 ± 0.4
26189	59721	0- 6	244	MCX- 50	12 ± 1	7 ± 3	2.0 ± 0.5
26189	61020	0- 6	0	MCX-189	102 ± 3	< 4 ± 0	2.6 ± 0.3
26189	61020	6- 12	0	MCX-190	63 ± 2	14 ± 3	2.5 ± 0.3
26189	61020	6- 12	0	MBB-917	65 ± 3	14 ± 3	1.9 ± 0.2
26189	61020	12- 18	0	MCX-191	12 ± 1	14 ± 3	1.8 ± 0.4
26173	60063	0- 6	0	MCX-221	842 ± 45	< 10 ± 0	< 0.5 ± 0.0
26173	60063	6- 12	0	MCX-222	1495 ± 94	< 17 ± 0	1.5 ± 0.7
26173	60063	12- 18	0	MCX-223	563 ± 43	< 8 ± 0	< 0.8 ± 0.0
26173	60063	12- 18	0	MBB-920	481 ± 41	< 10 ± 0	1.5 ± 0.6
26167	60361	0- 6	249	MCX-865	64 ± 3	< 3 ± 0	2.0 ± 0.2
26167	60361	60- 84	249	MCX-866	5 ± 1	15 ± 2	2.4 ± 0.3
26105	60398	0- 6	242	MCX- 68	23 ± 1	? 9 ± 2	2.0 ± 0.4
26105	60398	60- 63	242	MCX-857	21 ± 1	< 3 ± 0	1.8 ± 0.4
26101	60301	0- 6	241	MCX-854	290 ± 15	< 6 ± 0	< 0.3 ± 0.0
26101	60301	60- 84	241	MCX-855	13 ± 1	< 2 ± 0	1.7 ± 0.4
26100	60300	0- 6	0	MCX- 67	88 ± 7	< 4 ± 0	1.4 ± 0.4
26100	60100	0- 6	0	MCX- 65	5 ± 1	< 2 ± 0	1.5 ± 0.3
26100	60200	0- 6	240	MCX- 66	188 ± 10	< 5 ± 0	? 1.0 ± 0.3
26100	60200	180-189	240	MCX-856	2 ± 1	< 2 ± 0	1.1 ± 0.3
26100	60500	0- 6	243	MCX- 69	8 ± 1	14 ± 3	1.9 ± 0.4
26100	60500	60- 84	243	MCX-853	2 ± 1	12 ± 3	1.5 ± 0.4
26100	60500	60- 84	243	MBB-966	2 ± 1	14 ± 2	1.8 ± 0.2
26077	59994	0- 6	277	MCX-768	6 ± 2	8 ± 2	1.5 ± 0.3
26077	59994	222-234	277	MCX-769	37 ± 4	< 4 ± 0	1.5 ± 0.4
26077	59994	264-270	277	MCX-770	56 ± 5	< 5 ± 0	1.5 ± 0.4
26074	61208	0- 6	0	MCX-134	106 ± 5	< 5 ± 0	< 0.7 ± 0.0
26074	61208	6- 12	0	MCX-135	3 ± 1	10 ± 3	1.6 ± 0.4
26017	60655	0- 6	0	MBB-924	350 ± 17	< 11 ± 0	1.4 ± 0.5
26017	60655	0- 6	0	MCX-276	355 ± 18	< 7 ± 0	< 0.8 ± 0.0
26017	60655	6- 12	0	MCX-277	532 ± 22	< 9 ± 0	< 0.9 ± 0.0
26017	60655	12- 18	0	MCX-278	608 ± 32	< 9 ± 0	< 0.8 ± 0.0
26006	59423	0- 6	238	MCX- 76	172 ± 8	< 4 ± 0	1.1 ± 0.4
26006	59423	294-306	238	MCX-836	29 ± 3	? 9 ± 2	? 2.1 ± 0.3
26000	60000	0- 6	0	MCX-206	3 ± 1	17 ± 3	2.1 ± 0.5
26000	60000	6- 12	0	MCX-207	18 ± 1	? 11 ± 3	1.8 ± 0.4
26000	60000	12- 18	0	MCX-208	354 ± 12	< 7 ± 0	? 0.6 ± 0.3

Table B-1 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates North	East				Ra-226 (pCi/g)	Th-232 (ppm)	K-40 (%)
26000	60200	0- 24	233	MCX-837	832 ± 35	< 10 ± 0	< 0.9 ± 0.0
26000	60200	0- 6	233	MCX- 25	1703 ± 76	< 14 ± 0	< 0.6 ± 0.0
26000	60200	0- 24	233	MBB-965	837 ± 34	< 10 ± 0	< 0.5 ± 0.0
26000	60200	24- 48	233	MCX-838	266 ± 11	< 7 ± 0	1.7 ± 0.5
26000	60200	48- 66	233	MCX-839	86 ± 4	< 4 ± 0	1.6 ± 0.4
26000	60400	0- 6	235	MCX- 27	7 ± 1	10 ± 3	1.8 ± 0.4
26000	60600	0- 6	236	MCX- 28	3 ± 1	9 ± 2	1.8 ± 0.4
26000	60600	0- 24	236	MCX-843	152 ± 8	< 5 ± 0	< 0.7 ± 0.0
26000	60600	24- 48	236	MCX-844	58 ± 3	< 4 ± 0	1.7 ± 0.4
26000	60600	48- 66	236	MCX-845	22 ± 1	< 3 ± 0	1.6 ± 0.4
26000	60800	0- 6	237	MCX- 29	2 ± 1	4 ± 2	1.1 ± 0.3
26000	60800	60- 84	237	MCX-852	6 ± 1	15 ± 3	1.7 ± 0.4
26000	61400	0- 6	0	MCX-123	3 ± 1	9 ± 2	1.8 ± 0.4
26000	61400	6- 12	0	MCX-124	2 ± 1	11 ± 3	1.7 ± 0.4
26000	61400	12- 18	0	MCX-125	2 ± 1	11 ± 3	1.6 ± 0.4
26000	61800	0- 6	0	MCX-151	1 ± 1	10 ± 2	1.6 ± 0.4
26000	61800	0- 6	0	MBB-912	1 ± 1	10 ± 2	2.1 ± 0.2
25999	60577	0- 6	0	MCX-198	466 ± 26	< 11 ± 0	1.4 ± 0.6
25999	60577	6- 12	0	MCX-199	652 ± 33	< 12 ± 0	1.3 ± 0.6
25999	60577	12- 18	0	MCX-200	15 ± 1	? 10 ± 3	2.5 ± 0.5
25998	60298	0- 24	234	MCX-840	209 ± 14	< 6 ± 0	< 0.7 ± 0.0
25998	60298	0- 6	234	MCX- 26	10 ± 1	10 ± 3	1.7 ± 0.4
25998	60298	24- 48	234	MCX-841	85 ± 5	< 4 ± 0	< 0.7 ± 0.0
25998	60298	66- 90	234	MCX-842	48 ± 3	< 4 ± 0	1.5 ± 0.4
25997	60975	0- 6	0	MCX-174	15 ± 1	9 ± 3	2.0 ± 0.5
25997	60975	6- 12	0	MCX-175	9 ± 1	8 ± 3	1.7 ± 0.4
25997	60975	12- 18	0	MCX-201	5 ± 1	12 ± 3	2.2 ± 0.5
25997	60975	12- 18	0	MBB-918	5 ± 1	11 ± 2	1.9 ± 0.2
25983	60207	0- 6	0	MCX-224	3875 ± 163	< 22 ± 0	< 1.5 ± 0.0
25983	60207	6- 12	0	MCX-225	1848 ± 34	< 15 ± 0	< 0.7 ± 0.0
25983	60207	12- 18	0	MCX-226	123 ± 7	< 5 ± 0	1.6 ± 0.4
25914	60271	0- 6	0	MCX-218	647 ± 33	< 8 ± 0	< 0.4 ± 0.0
25914	60271	6- 12	0	MCX-219	420 ± 30	< 10 ± 0	1.4 ± 0.5
25914	60271	12- 18	0	MCX-220	367 ± 19	< 7 ± 0	< 0.3 ± 0.0
25900	60200	0- 6	227	MCX- 58	4 ± 1	9 ± 2	1.4 ± 0.3
25900	60300	0- 6	228	MCX- 59	8 ± 1	12 ± 3	1.6 ± 0.4
25900	60300	0- 6	228	MBB-904	9 ± 1	12 ± 2	1.9 ± 0.2
25900	60500	0- 6	230	MCX- 61	118 ± 7	< 4 ± 0	? 1.3 ± 0.3
25900	60700	0- 6	231	MCX- 62	2 ± 1	11 ± 3	1.2 ± 0.3
25900	60700	60- 84	231	MCX-846	7 ± 1	< 2 ± 0	2.0 ± 0.5
25900	60900	0- 6	232	MCX- 63	2 ± 1	10 ± 3	1.6 ± 0.4
25900	60900	60- 84	232	MCX-851	3 ± 1	< 2 ± 0	1.8 ± 0.4
25898	60141	0- 6	226	MCX- 57	5 ± 1	12 ± 2	1.3 ± 0.3
25897	60405	0- 6	229	MCX- 60	98 ± 5	< 3 ± 0	1.5 ± 0.4
25830	61208	0- 6	0	MCX-289	236 ± 20	< 6 ± 0	< 0.6 ± 0.0
25830	61208	6- 12	0	MCX-290	141 ± 9	< 5 ± 0	? 1.0 ± 0.3
25830	61208	12- 18	0	MCX-291	108 ± 5	< 5 ± 0	< 0.7 ± 0.0

Table B-1 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
25815	60351	0- 6	0	MCX-215	619 ± 41	< 8 ± 0	< 0.8 ± 0.0
25815	60351	6- 12	0	MCX-216	310 ± 21	< 10 ± 0	1.5 ± 0.5
25815	60351	12- 18	0	MCX-217	101 ± 7	< 6 ± 0	0.9 ± 0.3
25814	61093	0- 6	0	MCX-203	5990 ± 309	< 26 ± 0	< 0.8 ± 0.0
25814	61093	6- 12	0	MCX-204	470 ± 25	< 14 ± 0	1.7 ± 0.7
25814	61093	12- 18	0	MCX-205	765 ± 44	< 16 ± 0	2.4 ± 0.8
25801	60789	0- 6	224	MCX-848	3 ± 1	12 ± 3	1.9 ± 0.4
25801	60789	60- 84	224	MCX-849	32 ± 3	< 3 ± 0	? 1.1 ± 0.3
25800	59100	0- 6	0	MCX-242	2 ± 1	8 ± 2	2.3 ± 0.3
25800	59200	0- 6	0	MCX-241	57 ± 4	8 ± 2	2.0 ± 0.3
25800	59200	6- 12	0	MCX-351	10 ± 1	< 2 ± 0	1.2 ± 0.3
25800	59200	12- 18	0	MCX-352	11 ± 1	< 2 ± 0	1.9 ± 0.5
25800	60000	0- 6	0	MCX-209	58 ± 3	< 8 ± 0	1.9 ± 0.5
25800	60000	6- 12	0	MCX-210	207 ± 12	< 9 ± 0	1.9 ± 0.5
25800	60000	12- 18	0	MCX-211	399 ± 21	< 11 ± 0	0.9 ± 0.5
25800	60200	0- 6	220	MCX- 56	2 ± 1	10 ± 2	1.4 ± 0.3
25800	60300	0- 6	221	MCX- 55	12 ± 1	< 2 ± 0	1.4 ± 0.3
25800	60400	0- 6	222	MCX- 54	8 ± 1	14 ± 3	1.5 ± 0.4
25800	60600	0- 6	223	MCX- 53	2 ± 1	12 ± 3	1.9 ± 0.4
25800	60600	60- 84	223	MCX-847	4 ± 1	< 2 ± 0	1.5 ± 0.4
25800	60800	0- 6	0	MCX- 52	193 ± 7	< 10 ± 0	1.5 ± 0.5
25800	61000	0- 6	225	MCX- 51	268 ± 10	< 11 ± 0	1.5 ± 0.5
25800	61400	0- 6	0	MCX-202	3 ± 1	? 12 ± 3	2.5 ± 0.5
25798	60840	0- 6	290	MCX-850	396 ± 17	< 7 ± 0	< 0.4 ± 0.0
25796	60341	0- 6	0	MBB-919	543 ± 30	< 12 ± 0	0.4 ± 0.5
25796	60341	0- 6	0	MCX-212	595 ± 42	< 11 ± 0	1.0 ± 0.5
25796	60341	6- 12	0	MCX-213	398 ± 23	< 11 ± 0	0.4 ± 0.5
25796	60341	12- 18	0	MCX-214	258 ± 15	< 6 ± 0	< 0.7 ± 0.0
25796	60724	0- 6	0	MCX-286	56 ± 3	< 4 ± 0	? 1.1 ± 0.3
25796	60724	6- 12	0	MBB-925	7018 ± 254	< 29 ± 0	< 0.9 ± 0.0
25796	60724	6- 12	0	MCX-287	7185 ± 292	< 28 ± 0	< 1.7 ± 0.0
25796	60724	12- 13	0	MCX-288	4233 ± 182	< 21 ± 0	< 1.4 ± 0.0
25793	61011	0- 6	0	MCX-292	17904 ± 741	< 169 ± 0	< 7.5 ± 0.0
25786	60825	0- 6	0	MCX-227	469 ± 23	< 8 ± 0	< 0.8 ± 0.0
25786	60825	6- 10	0	MCX-228	3959 ± 183	< 21 ± 0	< 1.3 ± 0.0
25781	60813	0- 6	0	MCX-280	1110 ± 47	< 12 ± 0	< 1.0 ± 0.0
25781	60813	6- 12	0	MCX-281	2101 ± 98	< 15 ± 0	< 1.1 ± 0.0
25779	60803	0- 6	0	MCX-283	493 ± 20	< 9 ± 0	< 0.9 ± 0.0
25779	60803	6- 12	0	MCX-284	1201 ± 52	< 12 ± 0	< 1.0 ± 0.0
25779	60803	12- 15	0	MCX-285	4250 ± 61	< 24 ± 0	< 1.1 ± 0.0
25777	60436	0- 6	0	MCX-279	155 ± 8	< 5 ± 0	< 0.7 ± 0.0
25777	60436	6- 12	0	MCX-294	885 ± 48	< 7 ± 0	< 1.0 ± 0.0
25777	60436	12- 18	0	MCX-295	839 ± 44	< 7 ± 0	< 1.0 ± 0.0
25711	60700	0- 6	218	MCX- 46	290 ± 15	< 6 ± 0	< 0.3 ± 0.0
25706	59819	0- 6	278	MCX-771	4 ± 1	8 ± 2	1.5 ± 0.4
25706	59819	174-204	278	MCX-772	9 ± 2	9 ± 2	1.8 ± 0.4
25700	59000	0- 6	0	MCX-236	1 ± 1	9 ± 2	2.2 ± 0.3

Table B-1 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
25700	59100	0- 6	0	MCX-238	3 ± 1	10 ± 2	2.3 ± 0.2
25700	59100	6- 12	0	MCX-249	3 ± 1	15 ± 3	1.7 ± 0.4
25700	59100	12- 18	0	MCX-250	3 ± 1	16 ± 3	2.0 ± 0.5
25700	59200	0- 6	0	MCX-243	196 ± 14	< 4 ± 0	2.0 ± 0.3
25700	60000	0- 6	0	MCX-240	108 ± 5	< 4 ± 0	2.0 ± 0.3
25700	60100	0- 6	213	MCX- 24	5 ± 1	9 ± 2	2.4 ± 0.2
25700	60200	0- 6	214	MCX- 22	5 ± 1	13 ± 3	1.6 ± 0.4
25700	60300	0- 6	215	MCX- 21	8 ± 1	7 ± 3	1.5 ± 0.4
25700	60400	0- 6	216	MCX- 20	3 ± 1	11 ± 3	1.6 ± 0.4
25700	60400	0- 6	216	MBB-901	3 ± 1	10 ± 2	1.9 ± 0.2
25700	60500	0- 6	0	MCX- 19	2 ± 1	11 ± 2	1.6 ± 0.4
25660	60540	0- 6	280	MCX-876	236 ± 14	< 5 ± 0	1.1 ± 0.4
25660	60580	0- 6	281	MCX-877	513 ± 24	< 8 ± 0	< 0.4 ± 0.0
25629	60308	0- 6	211	MCX- 72	251 ± 17	< 9 ± 0	1.0 ± 0.4
25614	59173	0- 6	276	MCX-763	12 ± 3	< 3 ± 0	1.6 ± 0.4
25614	59173	204-222	276	MCX-764	10 ± 2	11 ± 3	1.8 ± 0.4
25614	59173	222-240	276	MCX-765	13 ± 3	11 ± 3	1.6 ± 0.4
25614	59173	240-276	276	MCX-766	4 ± 2	< 3 ± 0	1.9 ± 0.4
25614	59173	276-294	276	MCX-767	2 ± 1	? 11 ± 3	2.0 ± 0.5
25600	58800	0- 6	0	MCX-235	1 ± 1	8 ± 1	1.7 ± 0.2
25600	59000	0- 6	0	MCX-237	2 ± 1	13 ± 2	2.5 ± 0.2
25600	59100	0- 6	0	MCX-244	17 ± 3	14 ± 4	1.9 ± 0.5
25600	59100	6- 12	0	MCX-326	29 ± 2	< 3 ± 0	? 0.9 ± 0.3
25600	59100	12- 18	0	MCX-327	4 ± 1	? 9 ± 2	? 1.5 ± 0.2
25600	59200	0- 6	0	MCX-234	10 ± 1	11 ± 2	2.3 ± 0.2
25600	59200	6- 12	0	MCX-325	20 ± 1	13 ± 4	1.5 ± 0.4
25600	59900	0- 6	0	MCX-239	3 ± 1	7 ± 1	2.2 ± 0.2
25600	60000	0- 6	209	MCX- 34	2 ± 1	? 11 ± 2	2.0 ± 0.4
25600	60100	0- 6	0	MCX-310	43 ± 2	7 ± 2	2.2 ± 0.2
25600	60100	6- 12	0	MCX-311	20 ± 1	8 ± 2	2.7 ± 0.3
25600	60100	12- 18	0	MCX-338	2 ± 1	9 ± 3	2.0 ± 0.5
25600	60200	0- 6	210	MCX- 73	160 ± 8	< 8 ± 0	1.9 ± 0.5
25569	59999	0- 6	0	MCX-308	308 ± 12	< 5 ± 0	? 0.9 ± 0.2
25569	59999	6- 12	0	MCX-309	223 ± 9	< 4 ± 0	? 1.3 ± 0.2
25561	59909	0- 6	0	MCX-305	324 ± 15	< 11 ± 0	? 1.3 ± 0.2
25561	59909	6- 12	0	MCX-306	408 ± 20	< 5 ± 0	? 1.1 ± 0.2
25561	59909	12- 18	0	MCX-307	238 ± 12	< 4 ± 0	? 1.6 ± 0.3
25546	59107	0- 6	275	MCX-759	4 ± 1	13 ± 2	? 1.5 ± 0.2
25546	59107	204-258	275	MCX-761	51 ± 2	? 6 ± 2	? 1.7 ± 0.2
25546	59107	258-264	275	MCX-762	44 ± 3	? 8 ± 3	2.1 ± 0.5
25546	59107	180-204	275	MCX-760	116 ± 5	24 ± 6	? 1.7 ± 0.2
25541	59802	0- 6	207	MBB-903	3 ± 1	11 ± 2	1.9 ± 0.2
25541	59802	0- 6	207	MCX- 35	10 ± 1	< 2 ± 0	2.1 ± 0.5
25521	59800	0- 6	0	MCX-301	185 ± 9	< 4 ± 0	? 1.7 ± 0.3
25521	59800	6- 12	0	MCX-302	1235 ± 51	< 15 ± 0	< 1.1 ± 0.0
25521	59800	12- 18	0	MCX-303	3098 ± 214	< 26 ± 0	< 1.7 ± 0.0
25511	59697	0- 6	0	MCX-273	491 ± 22	< 8 ± 0	< 0.4 ± 0.0

Table B-1 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
25511	59697	6- 12	0	MCX-274	2456 $\pm$ 107	< 17 $\pm$ 0	< 0.7 $\pm$ 0.0
25511	59697	12- 18	0	MCX-275	228 $\pm$ 10	< 6 $\pm$ 0	1.5 $\pm$ 0.5
25500	59000	0- 6	0	MCX-246	2 $\pm$ 1	16 $\pm$ 3	2.3 $\pm$ 0.5
25500	59000	6- 12	0	MCX-328	2 $\pm$ 1	8 $\pm$ 3	1.9 $\pm$ 0.4
25500	59000	12- 18	0	MCX-329	14 $\pm$ 1	< 3 $\pm$ 0	1.7 $\pm$ 0.4
25500	59200	0- 6	0	MCX-230	6 $\pm$ 2	14 $\pm$ 3	1.9 $\pm$ 0.4
25500	59400	0- 6	0	MCX-245	2 $\pm$ 1	12 $\pm$ 2	2.3 $\pm$ 0.2
25500	59400	0- 6	0	MBB-922	2 $\pm$ 1	? 10 $\pm$ 2	2.2 $\pm$ 0.5
25500	59800	0- 6	0	MCX-304	8 $\pm$ 1	8 $\pm$ 2	2.3 $\pm$ 0.2
25500	60000	0- 6	0	MCX-312	278 $\pm$ 12	< 7 $\pm$ 0	< 0.8 $\pm$ 0.0
25500	60000	6- 12	0	MCX-313	28 $\pm$ 1	? 6 $\pm$ 2	2.0 $\pm$ 0.2
25500	60000	12- 18	0	MCX-314	19 $\pm$ 1	9 $\pm$ 2	2.2 $\pm$ 0.2
25495	59901	0- 6	206	MCX- 23	51 $\pm$ 2	< 8 $\pm$ 0	1.9 $\pm$ 0.5
25495	59901	0- 6	206	MBB-902	52 $\pm$ 2	9 $\pm$ 2	1.9 $\pm$ 0.2
25490	59624	0- 6	0	MCX-267	315 $\pm$ 14	< 7 $\pm$ 0	< 0.4 $\pm$ 0.0
25490	59624	6- 12	0	MCX-268	509 $\pm$ 24	< 8 $\pm$ 0	< 0.4 $\pm$ 0.0
25490	59624	12- 18	0	MCX-269	1084 $\pm$ 53	< 11 $\pm$ 0	< 0.5 $\pm$ 0.0
25485	59600	0- 6	205	MCX- 49	543 $\pm$ 28	< 12 $\pm$ 0	1.5 $\pm$ 0.6
25457	59502	0- 6	0	MCX-270	603 $\pm$ 26	< 9 $\pm$ 0	< 0.4 $\pm$ 0.0
25457	59502	6- 12	0	MCX-271	576 $\pm$ 24	< 14 $\pm$ 0	? 0.5 $\pm$ 0.1
25457	59502	12- 18	0	MCX-272	14 $\pm$ 1	16 $\pm$ 4	1.6 $\pm$ 0.4
25457	59502	12- 18	0	MBB-923	14 $\pm$ 1	22 $\pm$ 4	2.5 $\pm$ 0.5
25455	59201	0- 6	203	MCX- 74	3 $\pm$ 1	? 12 $\pm$ 2	2.2 $\pm$ 0.5
25435	59400	0- 6	204	MCX- 75	467 $\pm$ 18	< 12 $\pm$ 0	1.2 $\pm$ 0.5
25413	58987	0- 6	201	MCX- 47	185 $\pm$ 11	< 9 $\pm$ 0	1.7 $\pm$ 0.5
25412	59299	0- 6	0	MCX-316	414 $\pm$ 16	< 13 $\pm$ 0	? 0.5 $\pm$ 0.1
25412	59299	6- 12	0	MCX-317	37 $\pm$ 1	10 $\pm$ 3	2.5 $\pm$ 0.3
25412	59299	12- 18	0	MCX-318	7 $\pm$ 1	8 $\pm$ 2	2.7 $\pm$ 0.3
25400	58800	0- 6	0	MCX-233	2 $\pm$ 1	10 $\pm$ 2	2.5 $\pm$ 0.3
25400	59100	0- 6	0	MCX-319	2 $\pm$ 1	12 $\pm$ 2	2.8 $\pm$ 0.3
25400	59100	6- 12	0	MCX-320	3 $\pm$ 1	12 $\pm$ 2	2.7 $\pm$ 0.3
25400	59100	12- 18	0	MCX-321	219 $\pm$ 15	< 4 $\pm$ 0	1.8 $\pm$ 0.3
25316	59066	0- 6	200	MCX- 48	11 $\pm$ 1	? 9 $\pm$ 2	2.2 $\pm$ 0.5
25200	58800	0- 6	0	MCX-232	2 $\pm$ 1	11 $\pm$ 2	2.5 $\pm$ 0.2
25200	58800	6- 12	0	MCX-322	4 $\pm$ 1	10 $\pm$ 2	2.4 $\pm$ 0.2
25200	58800	12- 18	0	MBB-927	6 $\pm$ 1	? 13 $\pm$ 3	2.4 $\pm$ 0.5
25200	58800	12- 18	0	MCX-323	7 $\pm$ 1	< 2 $\pm$ 0	1.2 $\pm$ 0.3
25200	59000	0- 6	0	MBB-921	2 $\pm$ 1	? 10 $\pm$ 2	1.9 $\pm$ 0.5
25200	59000	0- 6	0	MCX-231	2 $\pm$ 1	11 $\pm$ 2	2.4 $\pm$ 0.3
OLD ASSAY LAB		FLOOR	0	MCX-103	850 $\pm$ 35	< 15 $\pm$ 0	1.3 $\pm$ 0.7
(Room B)							

Table B-2

Gamma-Ray-Spectroscopy Data for Soil Samples from RFN

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
25600	46800	0- 6	0	MCX-332	3 ± 1	? 9 ± 2	? 1.5 ± 0.2
25600	46800	6- 12	0	MBB-929	? 1 ± 1	? 10 ± 2	1.8 ± 0.5
25600	46800	6- 12	0	MCX-333	1 ± 1	10 ± 2	1.7 ± 0.4
25600	47200	0- 6	0	MCX-440	12 ± 1	< 2 ± 0	1.6 ± 0.4
25600	47200	0- 6	0	MBB-936	12 ± 1	< 2 ± 0	1.5 ± 0.4
25600	47200	6- 12	0	MCX-441	16 ± 2	12 ± 3	1.6 ± 0.5
25600	47600	0- 6	0	MCX-501	21 ± 2	< 3 ± 0	1.4 ± 0.4
25600	47600	6- 12	0	MCX-502	14 ± 1	< 2 ± 0	1.7 ± 0.4
25600	48000	0- 6	0	MCX-503	13 ± 1	< 3 ± 0	1.4 ± 0.4
25600	48000	6- 12	0	MCX-504	3 ± 1	< 2 ± 0	1.8 ± 0.4
25600	48400	0- 6	0	MCX-505	28 ± 4	? 4 ± 1	? 1.7 ± 0.2
25600	48400	6- 12	0	MCX-506	5 ± 1	7 ± 3	1.7 ± 0.4
25600	48400	12- 18	0	MCX-507	2 ± 1	< 2 ± 0	1.8 ± 0.4
25600	48800	0- 6	0	MCX-509	80 ± 4	< 8 ± 0	2.0 ± 0.5
25600	48800	6- 12	0	MCX-510	25 ± 1	? 10 ± 2	2.1 ± 0.5
25600	48800	12- 18	0	MCX-511	15 ± 3	< 4 ± 0	1.7 ± 0.4
25600	49200	0- 6	0	MCX-512	35 ± 2	15 ± 3	2.2 ± 0.5
25600	49200	6- 12	0	MCX-513	3 ± 1	9 ± 1	2.5 ± 0.2
25600	49200	6- 12	0	MBB-943	3 ± 1	< 2 ± 0	1.6 ± 0.4
25600	49200	12- 18	0	MCX-514	3 ± 1	11 ± 2	2.9 ± 0.2
25599	46400	0- 6	0	MCX-331	5 ± 1	? 10 ± 2	1.9 ± 0.5
25599	46400	6- 12	0	MCX-429	3 ± 1	6 ± 2	1.9 ± 0.4
25599	46400	12- 18	0	MCX-430	2 ± 1	12 ± 3	1.8 ± 0.4
25595	46000	0- 6	0	MCX-438	8 ± 1	8 ± 3	1.8 ± 0.4
25595	46000	6- 12	0	MCX-439	3 ± 1	8 ± 2	2.2 ± 0.3
25588	45600	0- 6	0	MCX-437	2 ± 1	11 ± 2	1.8 ± 0.4
25553	48601	0- 6	166	MCX-925	62 ± 3	< 3 ± 0	2.3 ± 0.3
25503	48413	0- 6	160	MCX-919	86 ± 4	< 3 ± 0	2.0 ± 0.2
25500	48405	0- 6	131	MCX-867	73 ± 4	< 3 ± 0	1.7 ± 0.5
25499	48210	0- 6	161	MCX-920	230 ± 8	< 5 ± 0	? 1.6 ± 0.3
25497	48005	0- 6	162	MCX-921	151 ± 6	< 4 ± 0	? 1.6 ± 0.2
25493	46971	0- 6	165	MCX-924	114 ± 4	< 4 ± 0	? 1.7 ± 0.2
25490	47603	0- 6	163	MCX-922	52 ± 4	< 3 ± 0	1.8 ± 0.2
25489	47420	0- 6	164	MCX-923	228 ± 9	< 5 ± 0	? 1.9 ± 0.3
25469	49003	0- 6	0	MCX-718	499 ± 25	< 8 ± 0	< 0.4 ± 0.0
25469	49003	6- 12	0	MCX-719	29 ± 2	< 3 ± 0	1.7 ± 0.4
25458	47800	0- 6	0	MCX-740	74 ± 7	< 9 ± 0	1.5 ± 0.5
25448	48408	0- 6	0	MBB-958	72 ± 5	< 3 ± 0	1.7 ± 0.4
25448	48408	0- 6	0	MCX-741	70 ± 6	< 7 ± 0	1.9 ± 0.5
25448	48408	6- 12	0	MCX-742	12 ± 1	? 6 ± 2	1.7 ± 0.4
25447	47204	0- 6	0	MCX-795	36 ± 2	7 ± 2	2.5 ± 0.3
25447	47204	6- 12	0	MCX-796	64 ± 3	< 3 ± 0	2.1 ± 0.3
25447	47204	12- 18	0	MCX-797	101 ± 5	< 4 ± 0	1.5 ± 0.4
25441	48006	0- 6	0	MCX-798	140 ± 14	< 5 ± 0	< 0.6 ± 0.0
25441	48006	6- 12	0	MCX-799	497 ± 40	< 8 ± 0	< 0.7 ± 0.0

Table B-2 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
25441	48006	12- 18	0	MCX-800	41 ± 4	< 3 ± 0	1.2 ± 0.3
25402	48803	0- 18	133	MCX-733	6 ± 1	11 ± 2	1.8 ± 0.2
25402	48803	18- 36	133	MCX-734	2 ± 1	10 ± 2	2.0 ± 0.2
25402	48803	36- 54	133	MCX-735	3 ± 1	10 ± 2	1.9 ± 0.2
25402	48803	54- 72	133	MCX-736	2 ± 1	12 ± 2	2.1 ± 0.2
25401	46794	0- 6	123	MCX-426	23 ± 1	< 2 ± 0	1.4 ± 0.4
25401	46794	0- 24	123	MCX-355	7 ± 1	? 11 ± 2	1.9 ± 0.5
25401	46794	24- 48	123	MCX-356	9 ± 2	? 11 ± 2	? 1.9 ± 0.2
25401	46794	48- 66	123	MCX-357	2 ± 1	? 13 ± 3	2.5 ± 0.5
25401	47199	0- 6	125	MCX-362	73 ± 3	< 9 ± 0	2.3 ± 0.5
25400	45800	0- 6	0	MCX-418	15 ± 1	15 ± 4	1.8 ± 0.4
25400	45800	0- 6	0	MBB-934	14 ± 1	? 13 ± 3	2.5 ± 0.5
25400	46000	0- 6	0	MCX-567	5 ± 1	< 2 ± 0	1.5 ± 0.4
25400	46200	0- 6	0	MCX-335	9 ± 1	11 ± 3	2.0 ± 0.5
25400	46200	6- 12	0	MCX-551	2 ± 1	6 ± 2	1.2 ± 0.3
25400	46383	0- 6	0	MCX-698	103 ± 5	< 4 ± 0	1.8 ± 0.5
25400	46400	0- 6	0	MCX-334	8 ± 1	16 ± 3	2.6 ± 0.5
25400	46400	6- 12	0	MCX-552	6 ± 1	10 ± 3	1.6 ± 0.4
25400	46400	6- 12	0	MBB-946	6 ± 1	7 ± 3	1.8 ± 0.4
25400	46400	12- 18	0	MCX-431	3 ± 1	< 2 ± 0	1.3 ± 0.3
25400	46600	0- 6	0	MBB-928	? 1 ± 1	? 10 ± 2	2.2 ± 0.5
25400	46600	0- 6	0	MCX-330	1 ± 1	10 ± 2	1.9 ± 0.4
25400	47000	0- 6	124	MCX-621	34 ± 6	9 ± 4	2.0 ± 0.5
25400	47000	0- 24	124	MCX-358	? 1 ± 1	? 11 ± 2	2.3 ± 0.5
25400	47000	24- 48	124	MCX-359	2 ± 1	? 12 ± 2	2.4 ± 0.5
25400	47000	48- 66	124	MCX-360	? 1 ± 1	? 10 ± 2	2.4 ± 0.5
25400	47200	0- 6	0	MCX-620	44 ± 2	< 3 ± 0	1.7 ± 0.4
25400	47400	0- 6	126	MCX-619	39 ± 2	< 3 ± 0	1.8 ± 0.4
25400	47400	0- 24	126	MCX-365	5 ± 1	? 7 ± 2	2.0 ± 0.5
25400	47400	24- 48	126	MCX-366	5 ± 1	? 11 ± 3	2.0 ± 0.5
25400	47400	48- 66	126	MCX-367	3 ± 1	? 9 ± 2	? 1.4 ± 0.2
25400	47600	0- 6	127	MCX-618	4 ± 1	9 ± 2	1.8 ± 0.4
25400	48200	0- 6	0	MCX-827	161 ± 13	< 4 ± 0	1.8 ± 0.3
25400	48800	0- 6	0	MCX-452	31 ± 2	10 ± 2	2.2 ± 0.2
25400	48900	0- 6	0	MCX-682	303 ± 13	< 7 ± 0	< 0.8 ± 0.0
25400	48900	6- 12	0	MCX-683	349 ± 15	< 7 ± 0	? 1.6 ± 0.5
25400	48900	12- 18	0	MCX-684	333 ± 14	< 7 ± 0	2.0 ± 0.6
25400	49000	0- 6	134	MCX-453	12 ± 1	13 ± 2	2.3 ± 0.2
25399	47043	0- 6	0	MCX-737	58 ± 3	< 8 ± 0	2.4 ± 0.5
25399	47043	6- 12	0	MCX-738	117 ± 5	< 9 ± 0	1.8 ± 0.5
25399	47043	12- 18	0	MCX-739	125 ± 5	< 9 ± 0	2.2 ± 0.5
25396	48600	0- 6	132	MCX-451	46 ± 4	< 7 ± 0	1.7 ± 0.5
25396	48600	60- 78	132	MCX-540	2 ± 1	? 12 ± 3	1.8 ± 0.5
25396	48600	78- 96	132	MCX-541	? 1 ± 1	? 12 ± 3	2.2 ± 0.5
25395	46780	0- 6	0	MCX-689	65 ± 3	< 4 ± 0	1.6 ± 0.4
25395	46780	6- 12	0	MBB-955	2 ± 1	8 ± 3	1.8 ± 0.4
25395	46780	6- 12	0	MCX-690	2 ± 1	9 ± 2	1.4 ± 0.3

Table B-2 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
25395	46780	12- 18	0	MCX-691	1 ± 1	9 ± 2	1.7 ± 0.4
25394	48696	0- 6	0	MCX-685	216 ± 17	< 5 ± 0	< 0.6 ± 0.0
25394	48696	6- 12	0	MCX-687	500 ± 37	< 8 ± 0	< 0.7 ± 0.0
25394	48696	12- 18	0	MCX-688	479 ± 38	< 9 ± 0	< 0.8 ± 0.0
25393	48358	0- 6	131	MBB-964	2 ± 1	10 ± 2	1.7 ± 0.4
25393	48358	0- 6	131	MCX-828	2 ± 1	10 ± 2	2.5 ± 0.3
25313	48600	0- 6	0	MCX-743	127 ± 12	24 ± 7	1.6 ± 0.5
25313	48600	6- 12	0	MCX-744	142 ± 12	< 8 ± 0	1.9 ± 0.5
25313	48600	12- 18	0	MCX-745	34 ± 4	< 3 ± 0	1.1 ± 0.3
25300	46900	0- 6	113	MCX-613	18 ± 1	8 ± 4	1.9 ± 0.5
25300	47100	0- 6	0	MCX-614	10 ± 1	11 ± 3	2.1 ± 0.5
25300	47500	0- 6	0	MCX-616	18 ± 1	< 3 ± 0	1.1 ± 0.3
25300	48700	0- 6	122	MCX-456	2 ± 1	10 ± 2	2.4 ± 0.2
25300	48700	60- 78	122	MCX-548	2 ± 1	12 ± 2	2.7 ± 0.3
25300	48700	78- 96	122	MCX-549	1 ± 1	12 ± 2	2.7 ± 0.3
25299	47114	0- 6	114	MCX-361	2 ± 1	? 11 ± 2	2.3 ± 0.5
25299	47114	0- 6	114	MBB-930	3 ± 1	? 9 ± 2	2.6 ± 0.5
25299	48100	0- 6	0	MCX-490	148 ± 8	< 5 ± 0	< 0.7 ± 0.0
25299	48100	0- 6	0	MBB-941	148 ± 8	< 5 ± 0	< 0.7 ± 0.0
25298	47300	0- 6	115	MBB-950	3 ± 1	< 2 ± 0	1.4 ± 0.3
25298	47300	0- 6	115	MCX-615	3 ± 1	9 ± 3	1.7 ± 0.4
25295	48302	0- 6	120	MCX-488	85 ± 8	19 ± 5	2.0 ± 0.5
25285	47700	0- 6	117	MCX-617	4 ± 1	< 1 ± 0	1.8 ± 0.4
25282	48503	0- 6	121	MCX-489	23 ± 2	< 3 ± 0	< 0.5 ± 0.0
25282	48503	60- 78	121	MBB-945	2 ± 1	< 2 ± 0	1.5 ± 0.4
25282	48503	60- 78	121	MCX-542	2 ± 1	? 10 ± 2	1.7 ± 0.4
25282	48503	78- 96	121	MCX-543	? 1 ± 1	? 13 ± 3	1.9 ± 0.5
25240	46779	0- 6	0	MCX-670	365 ± 16	< 8 ± 0	< 0.8 ± 0.0
25240	46779	6- 12	0	MCX-671	356 ± 15	< 8 ± 0	< 0.8 ± 0.0
25240	46779	12- 18	0	MCX-672	222 ± 10	< 6 ± 0	< 0.7 ± 0.0
25203	47396	0- 48	104	MCX-363	32 ± 2	? 13 ± 4	2.0 ± 0.5
25203	47396	0- 6	104	MCX-610	123 ± 6	41 ± 10	1.5 ± 0.5
25203	47396	48- 66	104	MCX-364	8 ± 1	? 7 ± 2	2.1 ± 0.5
25202	46796	0- 6	101	MCX-427	14 ± 1	10 ± 3	1.8 ± 0.4
25200	45549	0- 6	0	MCX-419	99 ± 5	< 4 ± 0	2.0 ± 0.5
25200	45600	0- 6	0	MCX-420	14 ± 1	10 ± 4	2.2 ± 0.5
25200	45600	6- 12	0	MCX-421	3 ± 1	10 ± 3	2.0 ± 0.5
25200	45600	12- 18	0	MCX-422	2 ± 1	16 ± 3	1.9 ± 0.4
25200	46000	0- 6	0	MCX-407	10 ± 1	12 ± 4	2.0 ± 0.5
25200	46600	0- 24	100	MCX-824	2 ± 1	< 2 ± 0	1.5 ± 0.4
25200	46600	0- 6	100	MCX-600	14 ± 1	? 12 ± 3	3.8 ± 0.5
25200	46600	24- 48	100	MCX-825	2 ± 1	4 ± 2	1.3 ± 0.3
25200	46600	48- 66	100	MCX-354	2 ± 1	? 11 ± 2	2.3 ± 0.5
25200	46739	0- 6	0	MBB-953	36 ± 2	< 3 ± 0	? 0.7 ± 0.2
25200	46739	0- 6	0	MCX-673	37 ± 2	< 3 ± 0	1.4 ± 0.4
25200	46739	6- 12	0	MCX-674	6 ± 1	< 2 ± 0	? 1.0 ± 0.3
25200	47600	0- 6	105	MCX-609	34 ± 2	< 3 ± 0	1.8 ± 0.4

Table B-2 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
North	East				Ra-226 (pCi/g)	Th-232 (ppm)	K-40 (%)
25200	48000	0- 6	107	MCX-624	3 ± 1	12 ± 3	2.1 ± 0.5
25200	48200	0- 6	108	MCX-623	352 ± 17	< 7 ± 0	< 0.8 ± 0.0
25200	48389	0- 6	0	MCX-622	276 ± 24	< 6 ± 0	< 0.7 ± 0.0
25200	48600	0- 6	110	MCX-457	35 ± 2	10 ± 2	? 1.5 ± 0.2
25200	48600	60- 78	110	MCX-546	3 ± 1	? 12 ± 3	2.2 ± 0.5
25200	48600	78- 96	110	MCX-547	2 ± 1	11 ± 2	2.6 ± 0.3
25200	48800	0- 6	111	MCX-455	6 ± 1	10 ± 2	2.6 ± 0.3
25200	48800	60- 78	111	MCX-550	2 ± 1	13 ± 2	3.4 ± 0.3
25200	48800	78- 90	111	MCX-732	2 ± 1	16 ± 2	2.6 ± 0.2
25200	48973	0- 6	0	MCX-720	124 ± 6	< 4 ± 0	1.4 ± 0.4
25200	48973	6- 12	0	MCX-721	50 ± 3	< 3 ± 0	2.2 ± 0.5
25200	48973	12- 18	0	MCX-722	6 ± 1	? 12 ± 3	2.4 ± 0.5
25200	49000	0- 6	112	MCX-454	64 ± 3	10 ± 3	2.3 ± 0.3
25200	49200	0- 6	0	MCX-515	3 ± 1	12 ± 2	2.3 ± 0.2
25200	49200	6- 12	0	MCX-516	4 ± 1	13 ± 2	2.3 ± 0.2
25199	46283	0- 6	0	MCX-695	55 ± 3	< 3 ± 0	2.2 ± 0.5
25199	46283	6- 12	0	MCX-696	5 ± 1	10 ± 3	2.0 ± 0.5
25199	46283	12- 18	0	MCX-697	3 ± 1	11 ± 3	2.1 ± 0.5
25199	47200	0- 6	103	MCX-611	62 ± 7	< 6 ± 0	1.7 ± 0.4
25197	47799	0- 6	106	MCX-832	28 ± 2	< 3 ± 0	1.7 ± 0.4
25196	48384	0- 6	109	MCX-826	69 ± 7	< 3 ± 0	1.7 ± 0.3
25185	46370	0- 6	0	MCX-568	15 ± 1	< 3 ± 0	1.5 ± 0.4
25185	46370	6- 12	0	MCX-569	4 ± 1	< 2 ± 0	1.7 ± 0.4
25185	46370	12- 18	0	MCX-570	3 ± 1	10 ± 2	1.5 ± 0.4
25103	47883	0- 6	95	MCX-829	98 ± 7	< 4 ± 0	? 1.7 ± 0.2
25103	48299	0- 6	97	MCX-487	66 ± 6	< 7 ± 0	1.0 ± 0.4
25101	47667	0- 6	94	MCX-608	204 ± 12	< 5 ± 0	< 0.7 ± 0.0
25100	47100	0- 6	91	MCX-606	103 ± 10	< 6 ± 0	1.4 ± 0.4
25100	47300	0- 6	92	MCX-607	65 ± 4	< 3 ± 0	? 1.2 ± 0.3
25100	48100	0- 6	96	MCX-486	211 ± 16	< 6 ± 0	< 0.7 ± 0.0
25100	48500	0- 6	98	MCX-458	73 ± 6	7 ± 2	2.1 ± 0.3
25100	48500	0- 6	98	MBB-938	71 ± 6	< 4 ± 0	? 1.1 ± 0.3
25100	48700	0- 6	99	MCX-459	15 ± 1	10 ± 2	2.0 ± 0.2
25100	48700	60- 78	99	MCX-544	3 ± 1	? 13 ± 3	2.4 ± 0.5
25100	48700	78- 96	99	MCX-545	2 ± 1	15 ± 3	2.8 ± 0.5
25095	46902	0- 6	90	MCX-605	43 ± 2	< 3 ± 0	1.9 ± 0.5
25010	46412	0- 6	77	MCX-773	6 ± 1	< 2 ± 0	1.6 ± 0.4
25010	46412	6- 24	77	MBB-959	100 ± 5	< 4 ± 0	1.5 ± 0.4
25010	46412	6- 24	77	MCX-774	103 ± 5	< 5 ± 0	< 0.7 ± 0.0
25010	46412	24- 42	77	MCX-775	52 ± 3	< 4 ± 0	2.0 ± 0.5
25010	46412	42- 60	77	MCX-746	10 ± 2	14 ± 3	2.2 ± 0.5
25003	48944	0- 6	0	MCX-723	75 ± 8	< 7 ± 0	0.9 ± 0.4
25003	48944	6- 12	0	MBB-957	174 ± 8	< 5 ± 0	1.7 ± 0.5
25003	48944	6- 12	0	MCX-724	183 ± 11	< 9 ± 0	2.0 ± 0.5
25003	48944	12- 18	0	MCX-725	138 ± 9	< 8 ± 0	1.5 ± 0.5
25001	48732	0- 6	0	MCX-726	129 ± 7	< 9 ± 0	1.6 ± 0.5
25001	48732	6- 12	0	MCX-727	4 ± 1	? 11 ± 2	2.3 ± 0.5

Table B-2 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
25001	48732	12- 18	0	MCX-728	2 ± 1	? 13 ± 3	2.0 ± 0.5
25000	45800	0- 6	0	MCX-417	44 ± 3	< 3 ± 0	1.9 ± 0.5
25000	46200	0- 6	0	MCX-336	2 ± 1	9 ± 3	1.6 ± 0.4
25000	46200	6- 12	0	MCX-337	4 ± 1	10 ± 3	2.0 ± 0.5
25000	46200	12- 18	0	MCX-432	10 ± 2	? 10 ± 2	? 1.7 ± 0.2
25000	46400	0- 6	0	MCX-601	8 ± 2	9 ± 3	1.3 ± 0.3
25000	46800	0- 6	0	MCX-428	3 ± 1	7 ± 2	? 1.0 ± 0.3
25000	47000	0- 6	79	MCX-500	21 ± 1	< 3 ± 0	1.5 ± 0.4
25000	47200	0- 6	80	MBB-942	13 ± 1	< 3 ± 0	1.2 ± 0.3
25000	47200	0- 6	80	MCX-499	14 ± 1	< 3 ± 0	? 1.2 ± 0.3
25000	47400	0- 6	81	MCX-498	425 ± 20	< 9 ± 0	< 0.9 ± 0.0
25000	47800	0- 6	83	MCX-496	32 ± 4	? 5 ± 2	? 1.4 ± 0.2
25000	48400	0- 6	86	MCX-466	21 ± 2	8 ± 2	2.0 ± 0.3
25000	48570	0- 6	0	MCX-461	60 ± 3	14 ± 4	? 2.0 ± 0.3
25000	48800	0- 6	88	MCX-462	61 ± 6	? 8 ± 3	? 1.6 ± 0.2
25000	49000	0- 6	89	MCX-460	98 ± 6	< 3 ± 0	1.8 ± 0.2
24997	46661	0- 6	139	MCX-747	27 ± 2	< 3 ± 0	1.5 ± 0.4
24997	46661	42- 66	139	MCX-748	6 ± 1	< 2 ± 0	2.0 ± 0.5
24996	46660	0- 6	0	MCX-692	119 ± 6	< 4 ± 0	1.2 ± 0.4
24996	46660	6- 12	0	MCX-693	442 ± 22	< 7 ± 0	< 0.4 ± 0.0
24996	46660	12- 18	0	MCX-694	361 ± 17	< 7 ± 0	< 0.4 ± 0.0
24996	47604	0- 6	82	MCX-497	288 ± 17	< 6 ± 0	< 0.7 ± 0.0
24988	46788	0- 6	78	MCX-820	2 ± 1	9 ± 2	1.8 ± 0.4
24988	46788	6- 24	78	MCX-821	6 ± 1	13 ± 3	1.9 ± 0.5
24988	46788	24- 48	78	MCX-822	11 ± 1	6 ± 2	? 1.0 ± 0.3
24988	46788	24- 48	78	MBB-963	12 ± 1	11 ± 4	2.1 ± 0.5
24988	46788	48- 66	78	MCX-823	2 ± 1	< 2 ± 0	1.5 ± 0.4
24953	45601	0- 6	0	MCX-444	55 ± 3	< 4 ± 0	2.1 ± 0.5
24944	48592	0- 6	87	MCX-374	150 ± 13	< 8 ± 0	1.6 ± 0.5
24919	48010	0- 6	84	MCX-831	16 ± 1	< 2 ± 0	1.9 ± 0.4
24905	48507	0- 6	75	MCX-375	43 ± 9	< 5 ± 0	0.2 ± 0.4
24901	48290	0- 6	74	MCX-539	21 ± 2	< 2 ± 0	1.9 ± 0.4
24900	48300	0- 6	0	MCX-479	7 ± 1	10 ± 2	? 0.9 ± 0.3
24900	48500	0- 6	0	MCX-485	45 ± 7	< 3 ± 0	< 0.4 ± 0.0
24900	48700	0- 6	76	MCX-484	55 ± 4	< 4 ± 0	? 0.8 ± 0.3
24899	47707	0- 6	71	MCX-495	108 ± 7	< 4 ± 0	? 0.9 ± 0.3
24898	45799	0- 6	0	MCX-443	69 ± 3	< 4 ± 0	1.7 ± 0.5
24888	47893	0- 6	72	MCX-830	132 ± 9	< 4 ± 0	? 1.5 ± 0.2
24880	47570	0- 6	64	MCX-633	36 ± 2	< 3 ± 0	1.9 ± 0.5
24808	48864	0- 6	0	MCX-729	109 ± 5	< 9 ± 0	2.2 ± 0.5
24808	48864	6- 12	0	MCX-730	32 ± 2	? 8 ± 3	2.3 ± 0.5
24808	48864	12- 18	0	MCX-731	4 ± 1	? 13 ± 3	2.7 ± 0.5
24802	46721	0- 6	0	MCX-792	285 ± 11	< 5 ± 0	? 0.7 ± 0.2
24802	46721	6- 12	0	MCX-793	468 ± 19	< 6 ± 0	? 1.0 ± 0.2
24802	46721	12- 18	0	MBB-961	145 ± 6	< 5 ± 0	1.4 ± 0.5
24802	46721	12- 18	0	MCX-794	145 ± 5	< 4 ± 0	2.7 ± 0.3
24800	45600	0- 6	0	MCX-561	9 ± 1	? 12 ± 3	2.8 ± 0.5

Table B-2 (continued)

Grid Coordinates		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
North	East				Ra-226 (pCi/g)	Th-232 (ppm)	K-40 (%)
24800	46000	0- 6	0	MCX-408	66 ± 4	< 4 ± 0	2.2 ± 0.5
24800	46000	6- 12	0	MCX-409	4 ± 1	11 ± 3	2.1 ± 0.5
24800	46400	0- 6	0	MCX-433	82 ± 4	< 4 ± 0	1.9 ± 0.5
24800	46800	0- 6	0	MCX-401	385 ± 17	< 7 ± 0	< 0.4 ± 0.0
24800	47800	0- 6	65	MCX-625	43 ± 3	< 3 ± 0	1.3 ± 0.3
24800	48180	0- 6	67	MCX-649	112 ± 9	< 6 ± 0	1.2 ± 0.3
24800	48200	0- 6	0	MCX-478	120 ± 8	< 5 ± 0	? 0.8 ± 0.3
24800	48400	0- 6	68	MCX-483	49 ± 5	< 7 ± 0	? 1.3 ± 0.2
24800	48600	0- 6	0	MCX-482	343 ± 21	< 7 ± 0	< 0.7 ± 0.0
24800	48800	0- 6	70	MCX-463	3 ± 1	13 ± 2	2.8 ± 0.3
24800	49000	0- 6	0	MCX-517	2 ± 1	8 ± 1	2.2 ± 0.2
24800	49000	6- 12	0	MCX-518	1 ± 1	7 ± 1	2.0 ± 0.2
24795	46732	0- 6	63	MCX-634	449 ± 20	< 8 ± 0	< 0.4 ± 0.0
24766	48709	0- 6	0	MCX-652	260 ± 14	< 7 ± 0	< 0.7 ± 0.0
24766	48709	0- 6	0	MBB-951	268 ± 16	< 6 ± 0	< 0.7 ± 0.0
24766	48709	6- 12	0	MCX-653	26 ± 2	10 ± 3	2.0 ± 0.5
24766	48709	12- 18	0	MCX-654	39 ± 2	< 3 ± 0	1.8 ± 0.4
24762	48600	0- 6	69	MCX-529	174 ± 8	< 4 ± 0	1.7 ± 0.2
24709	46006	0- 6	0	MCX-445	146 ± 7	< 5 ± 0	2.0 ± 0.5
24709	46006	6- 12	0	MCX-446	4 ± 1	9 ± 3	1.8 ± 0.4
24709	46006	6- 12	0	MBB-937	4 ± 1	< 2 ± 0	1.6 ± 0.4
24703	48264	0- 6	60	MCX-538	45 ± 3	< 3 ± 0	1.7 ± 0.4
24700	47900	0- 6	58	MCX-493	258 ± 22	< 9 ± 0	1.7 ± 0.6
24700	47900	0- 24	58	MCX-833	31 ± 3	< 3 ± 0	1.6 ± 0.4
24700	47900	24- 48	58	MCX-834	29 ± 2	< 2 ± 0	1.7 ± 0.4
24700	47900	48- 66	58	MCX-835 ?	5 ± 1	? 10 ± 3	? 1.5 ± 0.2
24700	48100	0- 6	59	MCX-491	26 ± 2	< 3 ± 0	1.5 ± 0.4
24700	48300	0- 6	0	MCX-480	48 ± 6	< 3 ± 0	1.2 ± 0.4
24700	48300	0- 6	0	MBB-940	64 ± 7	< 3 ± 0	1.8 ± 0.5
24700	48500	0- 6	61	MCX-465	171 ± 7	< 4 ± 0	2.2 ± 0.3
24700	48700	0- 6	62	MCX-464	13 ± 1	7 ± 2	2.9 ± 0.3
24700	48700	0- 24	62	MCX-371	3 ± 1	? 11 ± 2	2.4 ± 0.5
24700	48700	24- 66	62	MBB-932	6 ± 1	? 12 ± 2	1.9 ± 0.5
24700	48700	24- 66	62	MCX-372	7 ± 1	? 11 ± 3	2.3 ± 0.5
24700	49300	0- 6	0	MCX-686	32 ± 2	< 4 ± 0	? 1.4 ± 0.4
24685	46205	0- 6	0	MCX-447	481 ± 21	< 8 ± 0	1.8 ± 0.6
24603	48769	0- 24	57	MCX-368	37 ± 2	? 10 ± 3	2.3 ± 0.5
24603	48769	24- 48	57	MCX-369	14 ± 1	? 12 ± 3	2.5 ± 0.5
24603	48769	48- 66	57	MCX-370	3 ± 1	? 10 ± 2	2.5 ± 0.5
24600	45800	0- 6	0	MCX-416	6 ± 1	11 ± 3	2.2 ± 0.5
24600	46200	0- 6	0	MCX-553	1 ± 1	9 ± 2	2.0 ± 0.5
24600	46200	6- 12	0	MCX-554	3 ± 1	9 ± 3	1.7 ± 0.4
24600	46200	12- 18	0	MCX-555	3 ± 1	9 ± 3	2.0 ± 0.5
24600	46600	0- 6	51	MCX-599	338 ± 13	< 11 ± 0	0.7 ± 0.5
24600	46600	0- 24	51	MCX-749	69 ± 3	< 4 ± 0	1.6 ± 0.4
24600	46600	24- 42	51	MCX-750	43 ± 2	< 3 ± 0	1.6 ± 0.4
24600	46600	42- 60	51	MCX-812	13 ± 1	< 3 ± 0	1.9 ± 0.5

Table B-2 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
North	East				Ra-226 (pCi/g)	Th-232 (ppm)	K-40 (%)
24600	46684	0- 6	0	MCX-789	387 ± 14	< 6 ± 0	? 0.1 ± 0.1
24600	46684	6- 12	0	MCX-790	464 ± 17	< 7 ± 0	< 1.1 ± 0.0
24600	46684	12- 18	0	MCX-791	1198 ± 57	< 13 ± 0	< 1.1 ± 0.0
24600	46800	0- 6	0	MCX-402	220 ± 10	< 6 ± 0	< 0.3 ± 0.0
24600	47600	0- 6	46	MCX-632	298 ± 13	< 6 ± 0	< 0.4 ± 0.0
24600	48000	0- 6	0	MCX-492	69 ± 6	< 4 ± 0	< 0.6 ± 0.0
24600	48200	0- 6	0	MCX-481	73 ± 7	< 4 ± 0	1.3 ± 0.4
24600	48400	0- 6	55	MCX-577	56 ± 4	< 3 ± 0	1.6 ± 0.4
24600	48600	0- 4	56	MCX-576	232 ± 13	< 5 ± 0	1.5 ± 0.5
24598	47821	0- 6	52	MCX-494	9 ± 1	14 ± 3	2.2 ± 0.5
24595	48001	0- 6	53	MCX-537	163 ± 8	< 5 ± 0	1.4 ± 0.4
24593	48180	0- 6	54	MCX-650	142 ± 11	< 6 ± 0	? 1.3 ± 0.3
24501	48109	0- 6	47	MCX-477	9 ± 1	12 ± 3	1.9 ± 0.4
24500	46770	0- 6	0	MCX-635	275 ± 13	< 6 ± 0	< 0.3 ± 0.0
24500	48285	0- 6	0	MCX-528	56 ± 6	< 5 ± 0	1.9 ± 0.5
24500	48285	0- 6	48	MCX-646	54 ± 5	< 4 ± 0	1.5 ± 0.4
24500	48500	0- 6	49	MCX-578	30 ± 2	< 2 ± 0	2.2 ± 0.5
24500	48500	0- 6	49	MBB-948	32 ± 3	< 3 ± 0	2.3 ± 0.5
24500	48700	0- 6	50	MCX-579	8 ± 1	9 ± 3	2.0 ± 0.5
24491	46767	30- 66	45	MCX-813	7 ± 1	< 2 ± 0	? 0.7 ± 0.2
24448	47264	816-834	151	MCX-753	14 ± 1	8 ± 3	2.1 ± 0.5
24448	47264	834-840	151	MCX-754	16 ± 1	< 2 ± 0	1.7 ± 0.4
24448	47264	840-876	151	MCX-755	6 ± 1	9 ± 2	2.7 ± 0.3
24402	48231	0- 6	41	MCX-530	53 ± 4	8 ± 2	1.8 ± 0.2
24400	45600	0- 6	0	MCX-559	9 ± 1	? 11 ± 3	2.5 ± 0.5
24400	45600	6- 12	0	MCX-560	1 ± 1	11 ± 3	2.2 ± 0.5
24400	46000	0- 6	0	MCX-410	5 ± 1	10 ± 3	2.0 ± 0.5
24400	46400	0- 6	0	MCX-434	5 ± 1	11 ± 3	1.8 ± 0.4
24400	46400	6- 12	0	MCX-435	75 ± 3	< 4 ± 0	1.5 ± 0.4
24400	46400	12- 18	0	MBB-935	3 ± 1	< 2 ± 0	1.7 ± 0.4
24400	46400	12- 18	0	MCX-436	2 ± 1	9 ± 2	2.8 ± 0.3
24400	46800	0- 6	0	MCX-403	300 ± 14	< 6 ± 0	< 0.3 ± 0.0
24400	48015	0- 6	40	MCX-476	59 ± 6	< 3 ± 0	1.4 ± 0.4
24400	48200	0- 6	0	MCX-467	120 ± 6	< 4 ± 0	2.5 ± 0.3
24400	48400	0- 6	0	MCX-468	237 ± 11	< 4 ± 0	2.4 ± 0.3
24400	48600	0- 6	43	MBB-939	131 ± 8	< 5 ± 0	1.4 ± 0.4
24400	48600	0- 6	43	MCX-469	122 ± 6	< 4 ± 0	2.4 ± 0.3
24400	48800	0- 6	44	MCX-470	6 ± 1	9 ± 2	2.7 ± 0.3
24398	48874	0- 6	0	MCX-655	325 ± 14	< 8 ± 0	< 0.8 ± 0.0
24398	48874	6- 12	0	MCX-656	46 ± 5	< 4 ± 0	? 0.9 ± 0.3
24398	48874	12- 18	0	MCX-657	5 ± 1	8 ± 3	1.4 ± 0.4
24393	48405	0- 6	42	MCX-373	259 ± 14	< 10 ± 0	2.0 ± 0.6
24300	48100	0- 6	36	MCX-474	77 ± 4	< 4 ± 0	1.5 ± 0.4
24300	48300	0- 6	0	MCX-473	2 ± 1	8 ± 2	1.9 ± 0.4
24300	48500	0- 6	38	MCX-472	7 ± 1	< 2 ± 0	1.7 ± 0.4
24300	48700	0- 6	39	MCX-471	14 ± 1	10 ± 2	2.2 ± 0.3
24279	47741	0- 6	30	MCX-631	490 ± 23	< 8 ± 0	< 0.4 ± 0.0

Table B-2 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
24274	48309	0- 6	37	MBB-944	27 ± 1	8 ± 2	1.6 ± 0.2
24274	48309	0- 6	37	MCX-526	26 ± 1	< 3 ± 0	1.4 ± 0.4
24256	46600	0- 6	0	MCX-809	298 ± 11	< 11 ± 0	0.6 ± 0.5
24256	46600	6- 12	0	MBB-962	360 ± 17	< 8 ± 0	< 0.4 ± 0.0
24256	46600	6- 12	0	MCX-810	366 ± 18	< 13 ± 0	1.1 ± 0.6
24256	46600	12- 18	0	MCX-811	4 ± 1	? 10 ± 3	2.3 ± 0.5
24229	48199	0- 6	32	MCX-645	186 ± 11	< 7 ± 0	< 0.7 ± 0.0
24229	48200	0- 6	0	MCX-527	231 ± 13	< 6 ± 0	< 0.7 ± 0.0
24203	46444	0- 24	28	MCX-818	136 ± 6	< 5 ± 0	< 0.8 ± 0.0
24203	46444	24- 44	28	MCX-819	32 ± 4	7 ± 3	2.2 ± 0.5
24202	46768	0- 6	29	MCX-636	261 ± 9	< 4 ± 0	? 0.7 ± 0.1
24202	46768	42- 72	29	MCX-814	14 ± 1	< 3 ± 0	1.9 ± 0.5
24202	46768	72-102	29	MCX-815	7 ± 1	10 ± 3	1.6 ± 0.4
24200	46000	0- 6	0	MCX-651	17 ± 1	9 ± 4	1.8 ± 0.5
24200	46200	0- 6	0	MCX-556	2 ± 1	14 ± 3	1.9 ± 0.4
24200	46400	0- 6	0	MCX-602	25 ± 2	12 ± 4	1.9 ± 0.5
24200	46400	0- 6	0	MBB-949	25 ± 1	< 3 ± 0	1.5 ± 0.4
24200	46600	0- 6	0	MCX-571	275 ± 12	< 7 ± 0	< 0.8 ± 0.0
24200	46600	6- 12	0	MCX-572	11 ± 1	< 3 ± 0	1.8 ± 0.4
24200	46600	12- 18	0	MCX-573	3 ± 1	< 2 ± 0	1.8 ± 0.4
24200	46800	0- 6	0	MCX-404	225 ± 10	< 6 ± 0	< 0.3 ± 0.0
24200	48200	0- 6	0	MCX-583	36 ± 2	< 3 ± 0	1.9 ± 0.5
24200	48400	0- 6	33	MCX-582	24 ± 1	< 2 ± 0	1.9 ± 0.5
24200	48600	0- 6	34	MCX-581	13 ± 1	11 ± 3	2.2 ± 0.5
24200	48800	0- 6	0	MCX-580	28 ± 2	< 3 ± 0	2.0 ± 0.5
24162	46159	0- 6	0	MCX-442	11 ± 1	10 ± 4	2.2 ± 0.5
24161	48800	0- 6	35	MCX-531	28 ± 3	8 ± 2	1.8 ± 0.2
24160	47492	864-882	150	MCX-751	70 ± 4	< 4 ± 0	1.8 ± 0.5
24160	47492	882-900	150	MCX-752	2 ± 1	11 ± 2	2.6 ± 0.3
24158	47254	468-492	152	MCX-756	14 ± 1	< 2 ± 0	2.0 ± 0.5
24158	47254	492-521	152	MCX-757	9 ± 1	11 ± 2	2.6 ± 0.3
24147	46140	0- 6	0	MCX-448	33 ± 2	< 3 ± 0	1.6 ± 0.4
24100	42700	0- 4	0	MBB-956	1 ± 1	6 ± 2	1.2 ± 0.3
24046	46383	0- 6	0	MCX-807	343 ± 13	< 12 ± 0	0.5 ± 0.5
24046	46383	6- 12	0	MCX-808	7 ± 1	? 9 ± 3	2.0 ± 0.5
24036	48208	0- 6	24	MCX-642	351 ± 15	< 7 ± 0	< 0.8 ± 0.0
24002	48999	0- 6	137	MCX-519	9 ± 1	8 ± 1	2.5 ± 0.2
24000	46000	0- 6	0	MCX-411	2 ± 1	8 ± 2	2.3 ± 0.5
24000	46400	0- 6	0	MCX-574	236 ± 10	< 6 ± 0	< 0.8 ± 0.0
24000	46400	6- 12	0	MCX-575	4 ± 1	8 ± 3	1.7 ± 0.4
24000	46400	6- 12	0	MBB-947	5 ± 1	11 ± 3	1.6 ± 0.4
24000	46400	12- 18	0	MCX-647	14 ± 3	13 ± 3	1.9 ± 0.4
24000	46800	0- 6	0	MCX-405	302 ± 14	< 6 ± 0	< 0.3 ± 0.0
24000	48000	0- 6	23	MCX-591	8 ± 2	17 ± 3	2.1 ± 0.5
24000	48200	0- 6	0	MCX-584	284 ± 13	< 7 ± 0	< 0.4 ± 0.0
24000	48400	0- 6	25	MCX-475	103 ± 5	< 5 ± 0	1.6 ± 0.4
24000	48600	0- 6	26	MCX-585	164 ± 9	< 9 ± 0	? 2.0 ± 0.3

Table B-2 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
24000	48800	0- 6	27	MCX-586	7 ± 1	8 ± 3	1.6 ± 0.4
24000	49000	6- 12	0	MCX-520	5 ± 1	< 2 ± 0	1.6 ± 0.4
24000	49000	12- 18	0	MCX-521	4 ± 1	< 2 ± 0	1.8 ± 0.4
23998	48698	0- 6	0	MCX-658	97 ± 6	< 4 ± 0	1.4 ± 0.4
23998	48698	6- 12	0	MCX-659	78 ± 7	< 7 ± 0	1.4 ± 0.5
23998	48698	12- 18	0	MCX-660	95 ± 8	< 7 ± 0	1.6 ± 0.5
23998	48698	12- 18	0	MBB-952	86 ± 7	< 4 ± 0	< 0.6 ± 0.0
23959	47931	0- 6	22	MCX-630	105 ± 5	< 3 ± 0	? 0.8 ± 0.1
23900	46421	0- 6	0	MCX-805	136 ± 6	< 10 ± 0	1.9 ± 0.5
23900	46421	6- 12	0	MCX-806	3 ± 1	? 10 ± 3	2.9 ± 0.5
23899	46753	0- 6	21	MCX-637	233 ± 16	< 6 ± 0	< 0.7 ± 0.0
23838	47743	0- 6	14	MCX-629	434 ± 19	< 7 ± 0	< 0.4 ± 0.0
23810	48602	0- 6	0	MCX-661	140 ± 9	< 8 ± 0	1.9 ± 0.5
23810	48602	6- 12	0	MCX-662	21 ± 2	? 7 ± 2	1.9 ± 0.5
23801	46284	0- 6	12	MCX-536	4 ± 1	10 ± 3	1.7 ± 0.4
23800	46200	0- 6	0	MCX-557	2 ± 1	14 ± 3	2.0 ± 0.5
23800	46300	0- 6	0	MCX-603	625 ± 33	< 10 ± 0	< 0.5 ± 0.0
23800	46600	0- 6	0	MCX-598	9 ± 1	? 12 ± 3	2.6 ± 0.5
23800	46800	0- 6	0	MCX-406	444 ± 20	< 7 ± 0	< 0.4 ± 0.0
23800	47800	0- 6	15	MCX-592	698 ± 35	< 13 ± 0	1.0 ± 0.6
23800	47976	0- 6	16	MCX-644	158 ± 8	< 6 ± 0	1.8 ± 0.5
23800	48000	0- 6	0	MCX-593	4 ± 1	? 7 ± 2	1.4 ± 0.5
23800	48200	0- 6	0	MCX-590	27 ± 1	? 7 ± 3	2.0 ± 0.5
23800	48245	0- 6	17	MCX-643	4 ± 2	11 ± 2	1.9 ± 0.4
23800	48400	0- 6	18	MCX-589	39 ± 3	? 7 ± 3	2.0 ± 0.5
23800	48600	0- 6	19	MCX-588	37 ± 3	< 7 ± 0	2.6 ± 0.5
23800	48800	0- 6	20	MCX-587	2 ± 1	10 ± 2	1.9 ± 0.4
23794	45956	0- 6	0	MCX-450	44 ± 2	< 3 ± 0	1.8 ± 0.5
23794	45956	6- 12	0	MCX-700	44 ± 2	< 3 ± 0	1.7 ± 0.4
23794	45956	12- 18	0	MCX-675	29 ± 2	< 3 ± 0	1.7 ± 0.4
23753	46597	0- 6	13	MCX-648	1087 ± 53	< 12 ± 0	< 0.6 ± 0.0
23753	46597	24- 66	13	MCX-816	16 ± 1	< 3 ± 0	1.4 ± 0.4
23753	46597	66- 90	13	MCX-817	13 ± 1	< 2 ± 0	1.2 ± 0.3
23717	46000	0- 6	0	MCX-449	4 ± 1	9 ± 3	2.1 ± 0.5
23686	46202	0- 6	0	MCX-776	2 ± 1	16 ± 3	2.1 ± 0.5
23683	46915	612-642	153	MCX-758	9 ± 1	11 ± 2	2.7 ± 0.3
23627	46450	0- 6	0	MCX-787	1239 ± 80	< 14 ± 0	< 1.2 ± 0.0
23627	46450	6- 12	0	MCX-788	35 ± 2	< 4 ± 0	2.1 ± 0.5
23600	41900	0- 4	0	MCX-709	1 ± 1	? 4 ± 2	1.2 ± 0.3
23600	46000	0- 6	0	MCX-412	1 ± 1	9 ± 2	1.9 ± 0.4
23600	46765	0- 6	9	MCX-638	193 ± 15	< 5 ± 0	< 0.6 ± 0.0
23600	47700	0- 6	10	MCX-628	446 ± 20	< 7 ± 0	< 0.4 ± 0.0
23600	47800	0- 6	0	MCX-594	244 ± 22	< 9 ± 0	1.2 ± 0.5
23598	47800	0- 6	11	MCX-532	581 ± 14	< 6 ± 0	< 0.7 ± 0.0
23501	47874	0- 6	0	MCX-663	235 ± 24	< 15 ± 0	3.1 ± 0.8
23501	47874	6- 12	0	MCX-664	245 ± 28	< 16 ± 0	3.5 ± 0.9
23501	47874	12- 18	0	MCX-665	225 ± 24	< 15 ± 0	3.7 ± 0.9

Table B-2 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
23480	47776	0- 6	0	MCX-666	349 ± 45	< 18 ± 0	4.3 ± 1.1
23480	47776	6- 12	0	MCX-667	326 ± 42	< 18 ± 0	3.0 ± 0.9
23480	47776	12- 18	0	MCX-669	321 ± 42	< 11 ± 0	< 1.5 ± 0.0
23456	46609	0- 6	0	MCX-784	649 ± 34	< 10 ± 0	< 0.5 ± 0.0
23456	46609	6- 12	0	MCX-785	70 ± 4	< 4 ± 0	2.5 ± 0.6
23456	46609	12- 18	0	MCX-786	24 ± 1	< 3 ± 0	2.1 ± 0.5
23414	46660	0- 6	0	MCX-783	2 ± 1	10 ± 3	1.5 ± 0.4
23402	46284	0- 6	0	MCX-777	75 ± 4	< 4 ± 0	1.8 ± 0.5
23402	46284	6- 12	0	MCX-778	44 ± 2	< 3 ± 0	1.8 ± 0.5
23402	46284	12- 18	0	MCX-779	52 ± 3	< 4 ± 0	1.7 ± 0.4
23401	47201	0- 6	7	MCX-639	233 ± 13	< 6 ± 0	< 0.7 ± 0.0
23400	46200	0- 6	0	MCX-558	1 ± 1	14 ± 3	2.0 ± 0.5
23400	46400	0- 6	0	MCX-423	2 ± 1	11 ± 3	2.0 ± 0.5
23400	46400	6- 12	0	MCX-424	1 ± 1	12 ± 2	1.8 ± 0.4
23400	46400	12- 18	0	MCX-425	2 ± 1	12 ± 3	1.8 ± 0.4
23400	46600	0- 6	6	MCX-604	2 ± 1	11 ± 3	1.9 ± 0.4
23400	47400	0- 6	135	MCX-640	173 ± 11	< 5 ± 0	< 0.7 ± 0.0
23400	47600	0- 6	8	MCX-641	27 ± 2	< 3 ± 0	? 1.0 ± 0.3
23325	68000	0- 6	0	MCX-627	38 ± 3	< 3 ± 0	1.3 ± 0.4
23317	48103	0- 6	2	MCX-533	7 ± 1	9 ± 2	1.8 ± 0.2
23314	46813	0- 6	4	MCX-534	291 ± 15	< 6 ± 0	< 0.3 ± 0.0
23300	48100	0- 6	0	MCX-595	3 ± 1	? 11 ± 2	2.1 ± 0.5
23300	48400	0- 6	3	MCX-596	23 ± 2	? 9 ± 3	1.9 ± 0.5
23285	48000	0- 6	0	MCX-678	17 ± 1	29 ± 5	2.1 ± 0.5
23210	46509	0- 6	0	MCX-802	38 ± 2	? 9 ± 3	1.9 ± 0.5
23210	46509	6- 12	0	MCX-803	48 ± 3	< 8 ± 0	1.7 ± 0.5
23210	46509	12- 18	0	MCX-804	66 ± 4	< 8 ± 0	2.0 ± 0.5
23200	46000	0- 6	0	MCX-413	3 ± 1	7 ± 2	1.8 ± 0.4
23200	46000	6- 12	0	MCX-414	3 ± 1	? 13 ± 2	? 2.1 ± 0.3
23200	46800	0- 6	1	MCX-597	125 ± 6	< 9 ± 0	2.2 ± 0.5
23200	46900	0- 6	0	MCX-626	806 ± 56	< 12 ± 0	< 1.2 ± 0.0
23200	47000	0- 6	0	MCX-565	4 ± 1	? 10 ± 2	? 1.9 ± 0.2
23200	47000	6- 12	0	MCX-566	2 ± 1	15 ± 3	2.0 ± 0.5
23200	47400	0- 6	0	MCX-680	3 ± 1	8 ± 2	1.9 ± 0.4
23200	48400	6- 12	0	MCX-523	14 ± 1	< 2 ± 0	1.6 ± 0.4
23200	48400	12- 18	0	MCX-524	23 ± 2	10 ± 3	1.2 ± 0.3
23200	48401	0- 6	136	MCX-522	16 ± 1	? 4 ± 2	1.4 ± 0.4
23190	46910	0- 6	5	MCX-535	7 ± 1	12 ± 3	1.8 ± 0.4
23157	45999	0- 6	0	MCX-801	2 ± 1	< 2 ± 0	1.4 ± 0.4
23107	46397	0- 6	0	MCX-780	235 ± 17	< 8 ± 0	< 0.5 ± 0.0
23107	46397	0- 6	0	MBB-960	246 ± 17	< 8 ± 0	< 0.5 ± 0.0
23107	46397	6- 12	0	MCX-781	166 ± 10	< 7 ± 0	< 0.4 ± 0.0
23107	46397	12- 18	0	MCX-782	263 ± 18	< 8 ± 0	< 0.5 ± 0.0
23063	46000	0- 6	0	MCX-415	2 ± 1	9 ± 2	2.1 ± 0.5
23052	46400	0- 6	0	MCX-562	3 ± 1	12 ± 2	1.5 ± 0.4
23040	46800	0- 6	0	MCX-563	6 ± 1	14 ± 3	2.4 ± 0.5
23040	46800	6- 12	0	MCX-564	3 ± 1	? 10 ± 2	? 1.9 ± 0.2

Table B-2 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
23027	47200	0- 6	0	MCX-681	15 ± 1	13 ± 4	1.7 ± 0.4
23020	47400	0- 6	0	MCX-676	8 ± 1	10 ± 3	2.2 ± 0.5
23000	47600	0- 6	0	MCX-677	2 ± 1	9 ± 3	1.9 ± 0.4
23000	48200	0- 6	0	MCX-679	4 ± 1	13 ± 3	1.7 ± 0.5
23000	48200	0- 6	0	MBB-954	4 ± 1	13 ± 3	1.6 ± 0.4
23000	48600	0- 6	0	MCX-508	5 ± 1	12 ± 3	2.0 ± 0.5

Table B-3

Gamma-Ray-Spectroscopy Data for Soil Samples Collected Along Highway 6 and 24

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration		
Coordinates					Ra-226	Th-232	K-40
North	East				(pCi/g)	(ppm)	(%)
26756	63161	0- 6	0	MCX- 85	17 ± 1	8 ± 2	2.4 ± 0.2
26260	62260	0- 6	0	MCX-116	16 ± 1	< 2 ± 0	1.7 ± 0.4
26260	62260	6- 12	0	MCX-117	11 ± 1	< 2 ± 0	1.6 ± 0.4
26085	56075	0- 6	0	MCX- 88	8 ± 1	? 6 ± 2	1.9 ± 0.5
26085	56075	6- 12	0	MCX- 89	12 ± 1	? 8 ± 2	1.7 ± 0.4
26085	56173	0- 6	0	MCX- 99	3 ± 1	9 ± 2	1.6 ± 0.4
26040	61817	0- 6	0	MBB-909	15 ± 1	9 ± 2	1.7 ± 0.2
26040	61817	0- 6	0	MCX-113	14 ± 1	10 ± 3	1.8 ± 0.4
26040	61817	6- 12	0	MCX-114	10 ± 1	14 ± 3	1.8 ± 0.4
26040	61817	12- 18	0	MCX-115	6 ± 1	9 ± 3	2.0 ± 0.5
26027	55705	0- 6	0	MCX-109	24 ± 1	< 2 ± 0	1.8 ± 0.4
26027	55705	6- 12	0	MCX-110	16 ± 1	< 2 ± 0	1.5 ± 0.4
26027	55705	12- 18	0	MCX-111	14 ± 1	13 ± 3	1.7 ± 0.4
25900	55150	0- 6	0	MCX-104	22 ± 1	< 2 ± 0	1.9 ± 0.4
25900	55150	6- 12	0	MCX-105	25 ± 1	< 2 ± 0	2.1 ± 0.5
25900	55150	12- 18	0	MCX-106	5 ± 1	13 ± 3	1.8 ± 0.4
25708	58217	0- 6	0	MCX-112	10 ± 1	10 ± 3	1.4 ± 0.3
25734	54120	0- 6	0	MCX- 90	8 ± 1	7 ± 2	1.9 ± 0.4
25734	54120	0- 6	0	MBB-906	8 ± 1	11 ± 2	1.7 ± 0.2
25734	54120	6- 12	0	MBB-908	10 ± 1	10 ± 2	1.3 ± 0.2
25734	54120	6- 12	0	MCX-100	10 ± 1	8 ± 3	1.7 ± 0.4
25734	54120	12- 18	0	MCX-101	4 ± 1	8 ± 3	1.4 ± 0.3
25730	53620	0- 6	0	MCX- 91	11 ± 1	< 2 ± 0	1.5 ± 0.4
25730	53620	6- 12	0	MCX- 92	23 ± 1	< 2 ± 0	1.6 ± 0.4
25663	58534	0- 6	0	MCX- 86	22 ± 1	8 ± 2	2.2 ± 0.2
25663	58534	6- 12	0	MCX- 87	22 ± 1	10 ± 2	2.4 ± 0.2
25659	51024	0- 6	0	MCX-102	17 ± 1	< 2 ± 0	2.1 ± 0.5
25655	58552	0- 6	0	MCX- 96	1 ± 1	7 ± 2	2.1 ± 0.5
25655	58552	6- 12	0	MCX- 97	9 ± 1	9 ± 3	1.6 ± 0.4
25655	58552	12- 18	0	MCX- 98	15 ± 1	< 2 ± 0	1.6 ± 0.4
25691	50310	0- 6	0	MCX- 93	60 ± 3	< 3 ± 0	1.6 ± 0.4
25691	50310	6- 12	0	MCX- 94	28 ± 1	< 2 ± 0	1.8 ± 0.4
25691	50310	6- 12	0	MBB-907	28 ± 2	< 3 ± 0	1.8 ± 0.2
25691	50310	12- 18	0	MCX- 95	12 ± 1	11 ± 2	1.8 ± 0.4
25440	41040	0- 6	0	MCX-107	8 ± 1	10 ± 3	1.8 ± 0.4
25440	41040	6- 12	0	MCX-108	4 ± 1	9 ± 2	1.9 ± 0.4

Table B-4

Comparison of Radium Data for Duplicate
Soil Samples from RFO and RFN

Original		Duplicate	
Sample Number	Ra-226 (pCi/g)	Sample Number	Ra-226 (pCi/g)
MCX-020	2.9 ± 1.0	MBB-901	2.7 ± 1.0
MCX-023	51.1 ± 2.4	MBB-902	52.0 ± 2.2
MCX-035	10.0 ± 1.0	MBB-903	3.3 ± 1.0
MCX-059	8.2 ± 1.0	MBB-904	8.9 ± 1.0
MCX-080	8.3 ± 1.0	MBB-905	8.6 ± 1.0
MCX-090	7.5 ± 1.0	MBB-906	7.9 ± 1.0
MCX-094	27.8 ± 1.4	MBB-907	27.6 ± 1.8
MCX-100	10.1 ± 1.0	MBB-908	10.0 ± 1.0
MCX-113	13.7 ± 1.0	MBB-909	14.7 ± 1.0
MCX-118	7.3 ± 1.0	MBB-910	7.0 ± 1.0
MCX-133	36.7 ± 2.7	MBB-911	35.5 ± 2.7
MCX-151	1.2 ± 1.0	MBB-912	1.4 ± 1.0
MCX-159	1.2 ± 1.0	MBB-913	1.7 ± 1.0
MCX-167	1.0 ± 1.0	MBB-914	1.3 ± 1.0
MCX-169	2.9 ± 1.0	MBB-915	3.0 ± 1.0
MCX-179	59.7 ± 2.4	MBB-916	62.0 ± 2.5
MCX-190	62.8 ± 2.2	MBB-917	65.2 ± 2.5
MCX-201	4.5 ± 1.0	MBB-918	5.3 ± 1.0
MCX-212	594.7 ± 42.1	MBB-919	543.3 ± 29.6
MCX-469	121.9 ± 6.3	MBB-939	103.9 ± 8.0
MCX-480	56.1 ± 6.3	MBB-940	63.8 ± 6.7
MCX-490	148.2 ± 8.4	MBB-941	148.3 ± 8.4
MCX-499	14.2 ± 1.0	MBB-942	13.1 ± 1.0
MCX-513	3.4 ± 1.0	MBB-943	3.3 ± 1.0
MCX-526	25.9 ± 1.4	MBB-944	26.7 ± 1.2
MCX-542	2.2 ± 1.0	MBB-945	1.5 ± 1.0
MCX-552	6.0 ± 1.0	MBB-946	6.0 ± 1.0
MCX-575	4.3 ± 1.0	MBB-947	4.8 ± 1.0
MCX-578	30.1 ± 1.8	MBB-948	32.2 ± 2.5
MCX-602	25.0 ± 1.6	MBB-949	24.7 ± 1.4
MCX-615	2.9 ± 1.6	MBB-950	2.8 ± 1.0
MCX-652	259.8 ± 13.9	MBB-951	268.0 ± 15.5
MCX-660	94.7 ± 7.6	MBB-952	85.5 ± 7.4
MCX-673	36.6 ± 2.0	MBB-953	35.5 ± 1.8
MCX-679	3.7 ± 1.0	MBB-954	3.9 ± 1.0

Table B-4 (continued)

Original			Duplicate		
Sample Number	Ra-226 (pCi/g)		Sample Number	Ra-226 (pCi/g)	
MCX-223	563.1	± 43.3	MBB-920	481.3	± 40.8
MCX-231	2.1	± 1.0	MBB-921	2.1	± 1.0
MCX-245	1.8	± 1.0	MBB-922	1.9	± 1.0
MCX-272	14.1	± 1.0	MBB-923	14.1	± 1.0
MCX-276	354.6	± 18.0	MBB-924	350.2	± 16.5
MCX-287	7184.6	± 292.2	MBB-925	7017.8	± 254.2
MCX-299	22.2	± 1.0	MBB-926	21.7	± 1.2
MCX-323	6.7	± 1.0	MBB-927	6.4	± 1.0
MCX-330	1.1	± 1.0	MBB-928	1.2	± 1.0
MCX-333	1.2	± 1.0	MBB-929	1.3	± 1.0
MCX-361	2.3	± 1.0	MBB-930	2.6	± 1.0
MCX-376	2.9	± 1.0	MBB-931	2.4	± 1.0
MCX-372	6.9	± 1.0	MBB-932	6.1	± 1.0
MCX-388	18.3	± 1.2	MBB-933	15.8	± 1.0
MCX-418	14.6	± 1.0	MBB-934	13.8	± 1.0
MCX-436	2.3	± 1.0	MBB-935	2.6	± 1.0
MCX-440	12.1	± 1.0	MBB-936	12.0	± 1.0
MCX-446	4.0	± 1.0	MBB-937	4.4	± 1.0
MCX-458	73.1	± 5.5	MBB-938	70.9	± 5.5
MCX-690	2.3	± 1.0	MBB-955	2.2	± 1.0
MCX-708	.8	± 1.0	MBB-956	1.2	± 1.0
MCX-724	182.6	± 10.6	MBB-957	174.3	± 8.2
MCX-741	70.2	± 6.3	MBB-958	71.8	± 4.5
MCX-774	102.8	± 4.9	MBB-959	100.3	± 4.5
MCX-780	234.6	± 16.9	MBB-960	246.2	± 17.1
MCX-794	145.3	± 5.3	MBB-961	144.5	± 6.3
MCX-810	366.1	± 17.8	MBB-962	359.6	± 16.7
MCX-822	11.1	± 1.0	MBB-963	11.6	± 1.0
MCX-828	1.9	± 1.0	MBB-964	1.7	± 1.0
MCX-837	831.5	± 34.5	MBB-965	837.0	± 34.3
MCX-853	1.5	± 1.0	MBB-966	1.6	± 1.0
MCX-864	1.8	± 1.0	MBB-967	2.0	± 1.0
MCX-903	10.4	± 1.0	MBB-968	11.5	± 1.0
MCX-916	2.6	± 1.0	MBB-969	2.5	± 1.0

Table B-5

**Loss-on-Drying (LOD) and Disequilibrium Data for
Soil Samples from RFO and RFN**

Grid Coordinates		Depth (in.)	Borehole Number	Sample Number	LOD (percent)	Disequi- librium (percent)
North	East					
25700	60200	0-6	RFO-214	MCX-022	14.8	
26200	60300	0-6	RFO-248	MCX-032	8.28	
25711	60700	0-6	RFO-218	MCX-046	8.52	
25800	60200	0-6	RFO-220	MCX-056	15.49	
27000	59200	0-6	0	MCX-077	10.13	
26085	56075	0-6	0	MCX-088	12.04	
25900	55150	6-6	0	MCX-105	8.3	
26080	61880	12-18	0	MCX-115	7.03	
26600	60800	6-12	0	MCX-118	11.66	
26800	60600	0-6	0	MCX-120		39.0
26617	59630	6-6	0	MCX-127	9.88	
26074	61208	0-6	0	MCX-134	8.44	
27000	59600	6-12	0	MCX-138	7.15	
27000	59600	12-18	0	MCX-139		0.0
26200	61600	0-6	0	MCX-152		12.0
26000	76400	0-6	0	MCX-158	7.76	
35000	59950	0-6	0	MCX-160		0.0
26200	61200	12-18	0	MCX-173		16.0
25997	60975	0-6	0	MCX-174	4.11	
26400	60600	6-12	0	MCX-180		23.0
26400	60600	12-18	0	MCX-181	4.77	
26209	61383	0-6	0	MCX-195	5.19	
26209	61383	6-6	0	MCX-196		31.0
26000	60000	12-12	0	MCX-208		32.0
25796	60341	0-6	0	MCX-212	10.53	
25815	60351	12-12	0	MCX-217		34.0
26173	60063	0-6	0	MCX-221	2.25	
25983	60207	6-12	0	MCX-225		41.0
25500	59200	0-6	0	MCX-230		51.0
25600	59900	0-6	0	MCX-239	10.16	
25600	59100	0-6	0	MCX-244		36.0
26870	60450	0-6	0	MCX-260		32.0
27125	60325	0-6	0	MCX-264	13.89	
25490	59624	12-18	0	MCX-269	17.17	
25457	59502	6-12	0	MCX-271		37.0
25457	59502	12-18	0	MCX-272	11.9	
26017	60655	0-6	0	MCX-276	9.21	
25779	60803	6-6	0	MCX-284	14.21	
25779	60803	12-18	0	MCX-285		49.0
25830	61208	12-18	0	MCX-291	8.21	
26784	61400	12-18	0	MCX-298		33.0
25521	59800	0-6	0	MCX-301	16.43	
25561	59909	0-6	0	MCX-305		28.0
25500	60000	12-18	0	MCX-314	7.45	

Table B-5 (continued)

Grid Coordinates		Depth (in.)	Borehole Number	Sample Number	LOD (percent)	Disequi- librium (percent)
North	East					
25412	59299	0-6	0	MCX-316		38.0
25600	59100	12-18	0	MCX-327		15.0
25600	46800	0-6	0	MCX-332		24.0
25800	59200	6-12	0	MCX-351	8.68	
25401	46794	0-6	RFN-123	MCX-355	11.86	
25401	46794	24-48	RFN-123	MCX-356		44.5
25400	47400	0-6	RFN-126	MCX-365	11.5	
25400	47400	48-66	RFN-126	MCX-367		23.7
26600	61400	12-18	0	MCX-376	5.62	
26990	61390	0-6	0	MCX-377		31.0
27000	61000	6-12	0	MCX-383	10.08	
27300	60700	0-6	0	MCX-390		27.0
24800	46800	0-6	0	MCX-401	19.93	
24000	46800	0-6	0	MCX-405	16.46	
24800	46000	6-12	0	MCX-409	25.26	
23600	46000	0-6	0	MCX-412	7.27	
23200	46000	0-6	0	MCX-413		27.0
23200	46000	6-12	0	MCX-414		3.0
25599	46400	6-12	0	MCX-429		35.0
25000	46200	12-18	0	MCX-432		29.0
24709	46006	0-6	0	MCX-445	26.22	
25300	48700	0-6	RFN-122	MCX-456	16.23	
25000	48800	0-6	RFN-088	MCX-462		47.0
24400	48400	0-6	0	MCX-468	15.51	
24400	48800	0-6	RFN-044	MCX-470	19.52	
24800	48400	0-6	RFN-068	MCX-483		49.0
25103	48299	0-6	RFN-097	MCX-487	14.24	
24600	48000	0-6	0	MCX-492	8.33	
25000	47800	0-6	RFN-083	MCX-496		49.0
25000	47000	0-6	RFN-079	MCX-500	22.25	
25600	48400	0-6	0	MCX-505		48.0
25600	48800	6-12	0	MCX-510	17.02	
25600	48800	12-18	0	MCX-511		44.2
23200	48401	0-6	RFN-136	MCX-522	9.43	
24500	48285	0-6	0	MCX-528		40.5
24762	48600	0-6	RFN-069	MCX-529		40.9
24402	48231	0-6	RFN-041	MCX-530		28.3
24161	48800	0-6	RFN-035	MCX-531		38.9
23598	47800	0-6	RFN-011	MCX-532		33.4
23317	48103	0-6	RFN-002	MCX-533		47.5
24595	48001	0-6	RFN-053	MCX-537	10.18	
23040	46800	0-6	0	MCX-563	12.52	
23040	46800	6-6	0	MCX-564		16.0
23200	47000	0-6	0	MCX-565		39.0
23200	47000	6-12	0	MCX-566	16.35	
24200	46600	0-6	0	MCX-571	13.39	
24000	48800	0-6	RFN-027	MCX-586	8.32	

Table B-5 (continued)

Grid Coordinates		Depth (in.)	Borehole Number	Sample Number	LOD (percent)	Disequi- librium (percent)
North	East					
24000	48000	0-6	RFN-023	MCX-591		32.0
23800	47800	0-6	RFN-015	MCX-592	14.65	
23600	47800	0-6	0	MCX-594	7.48	
25200	46600	0-6	RFN-100	MCX-600	18.15	
25000	46400	0-6	0	MCX-601		0.2
25100	47100	0-6	RFN-091	MCX-606		13.6
25203	47396	0-6	RFN-104	MCX-610	28.64	
25199	47200	0-6	RFN-103	MCX-611		0.0
25300	46900	0-6	RFN-113	MCX-613	16.64	
25400	47200	0-6	0	MCX-620	17.95	
25400	47000	0-6	RFN-124	MCX-621		21.4
25200	48200	0-6	RFN-108	MCX-623	5.64	
25200	48000	0-6	RFN-107	MCX-624		55.0
23959	47931	0-6	RFN-022	MCX-630		33.3
24880	47570	0-6	RFN-064	MCX-633	15.54	
24202	46768	0-6	RFN-029	MCX-636		39.4
23400	47600	0-6	RFN-008	MCX-641	11.24	
24036	48208	0-6	RFN-024	MCX-642		42.8
23800	48245	0-6	RFN-017	MCX-643		34.3
23800	47976	0-6	RFN-016	MCX-644		29.3
24229	48199	0-6	RFN-032	MCX-645		52.3
24500	48285	0-6	RFN-048	MCX-646		33.2
24000	46400	12-18	0	MCX-647		27.0
24800	48180	0-6	RFN-067	MCX-649		59.8
24593	48180	0-6	RFN-054	MCX-650		57.7
24398	48874	0-6	0	MCX-655	21.45	
23998	48698	0-6	0	MCX-658	8.18	
25400	48900	12-18	0	MCX-684	13.11	
25395	46780	12-18	0	MCX-691	10.43	
25469	49003	6-12	0	MCX-719	14.63	
25001	48732	12-18	0	MCX-728	16.94	
25402	48803	0-6	RFN-133	MCX-733	18.02	
24600	46600	0-6	RFN-051	MCX-749	22.28	
24160	47492	882-900	RFN-150	MCX-752	17.54	
25614	59173	276-294	RFO-276	MCX-767	15.98	
23402	46284	0-6	0	MCX-777	26.01	
24600	46684	6-6	0	MCX-790	25.28	
23210	46509	0-6	0	MCX-802	14.98	
24491	46767	30-66	RFN-045	MCX-813	16.73	
25200	46600	0-6	RFN-100	MCX-824	12.66	

Table B-6

Concentrations of Th-230, Total Uranium, and Ra-226 in Soil Samples from RFO

Grid Coordinates		Depth (in.)	Bore- hole No.	Sample Number	Concentration (pCi/g)		
North	East				Th-230	U	Ra-226
26934	60439	0-6	259	MCX-44	7	11	9
26930	60271	0-6	261	MCX-43	211	662	32
26921	60286	0-6	257	MCX-42	43	117	44
26809	60288	0-6	260	MCX-41	15	5	19
26700	59500	0-6	255	MCX-36	112	67	2
26700	59500	60-84	255	MCX-859	1	2	124
26600	59600	0-6	252	MCX-70	129	127	143
26600	59600	60-84	252	MCX-860	2	2	2
26600	59800	0-6	253	MCX-71	51	32	50
26600	59800	60-84	253	MCX-861	3	2	3
26600	60000	0-6	254	MCX-37	95	20	2
26600	60000	60-84	254	MCX-862	4	2	28
26600	60300	0-6	256	MCX-38	4	1	3
26500	59500	0-6	250	MCX-39	15	7	2
26500	59500	60-84	250	MCX-864	2	2	14
26500	59700	0-6	251	MCX-40	207	104	4
26500	59700	60-84	251	MCX-863	6	4	125
26167	60361	0-6	249	MCX-865	60	31	64
26167	60361	60-84	249	MCX-866	5	4	5
26105	60398	60-63	242	MCX-857	21	19	21
26101	60301	60-84	241	MCX-855	9	6	13
26100	60100	0-6	0	MCX-65	5	2	5
26100	60200	0-6	240	MCX-66	189	184	188
26100	60200	180-189	240	MCX-856	2	2	2
26100	60500	60-84	243	MCX-853	1	2	2
26006	59423	0-6	238	MCX-76	153	33	29
26006	59423	294-306	238	MCX-836	19	7	172
26000	60200	0-24	233	MCX-837	473	114	86
26000	60200	24-48	233	MCX-838	168	64	266
26000	60200	48-66	233	MCX-839	48	14	832
26000	60600	0-24	236	MCX-843	353	204	58
26000	60600	24-48	236	MCX-844	92	50	22
26000	60600	48-66	236	MCX-845	35	22	152
26000	60800	60-84	237	MCX-852	5	7	6
25998	60298	0-24	234	MCX-840	179	127	209
25998	60298	24-48	234	MCX-841	76	43	85
25998	60298	66-90	234	MCX-842	46	67	48
25900	60700	60-84	231	MCX-846	7	7	7
25900	60900	60-84	232	MCX-851	3	3	3
25898	60141	0-6	226	MCX-57	5	5	5
25801	60789	60-84	224	MCX-849	14	12	32
25800	60600	60-84	223	MCX-847	5	8	4
25800	60800	0-6	0	MCX-52	134	107	193
25800	61000	0-6	225	MCX-51	306	241	268
25700	60100	0-6	213	MCX-24	385	164	5

Table B-6 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration (pCi/g)		
Coordinates					Th-230	U	Ra-226
North	East						
25675	50325	0-6	0	MCX-93	58	22	28
25675	50325	6-12	0	MCX-94	30	13	60
25675	50325	12-18	0	MCX-95	14	8	12
25614	59173	276-294	276	MCX-767	4	4	2
25600	59200	6-12	0	MCX-325	12	4	20
25600	60000	0-6	209	MCX-34	2	2	2
25546	59107	258-264	275	MCX-762	80	10	44
25521	59800	6-12	0	MCX-302	2596	100	1235
25500	60000	0-6	0	MCX-312	315	77	278
25495	59901	0-6	206	MCX-23	50	22	51
25485	59600	0-6	205	MCX-49	465	157	543
25455	59201	0-6	203	MCX-74	3	2	3
25435	59400	0-6	204	MCX-75	7	3	467
25413	58987	0-6	201	MCX-47	134	25	185
25316	59066	0-6	200	MCX-48	12	6	11

Table B-7

Concentrations of Th-230, Total Uranium, and Ra-226 in Soil Samples from RFN

Grid Coordinates		Depth (in.)	Bore- hole No.	Sample Number	Concentration (pCi/g)		
North	East				Th-230	U	Ra-226
25599	46400	0-6	0	MCX-331	9	7	5
25553	48601	0-6	166	MCX-925	112	54	62
25503	48413	0-6	160	MCX-919	212	124	86
25499	48210	0-6	161	MCX-920	576	311	230
25497	48005	0-6	162	MCX-921	449	231	151
25493	46971	0-6	165	MCX-924	841	87	114
25490	47603	0-6	163	MCX-922	245	27	52
25489	47420	0-6	164	MCX-923	1206	151	228
25401	46794	0-24	123	MCX-355	36	7	2
25401	46794	48-66	123	MCX-357	5	2	7
25401	47199	0-6	125	MCX-362	3698	281	73
25400	46400	0-6	0	MCX-334	26	7	8
25400	47000	0-24	124	MCX-358	3	1	1
25400	47000	24-48	124	MCX-359	2	1	1
25400	47000	48-66	124	MCX-360	1	1	2
25400	47400	0-24	126	MCX-365	25	5	5
25400	47400	24-48	126	MCX-366	36	6	5
25396	48600	60-78	132	MCX-540	6	1	1
25396	48600	78-96	132	MCX-541	3	1	2
25300	48700	60-78	122	MCX-548	2	1	2
25300	48700	78-96	122	MCX-549	2	1	1
25299	47114	0-6	114	MCX-361	69	15	2
25282	48503	60-78	121	MCX-542	2	2	1
25282	48503	78-96	121	MCX-543	1	1	2
25203	47396	0-48	104	MCX-363	293	37	8
25203	47396	48-66	104	MCX-364	62	9	32
25200	46600	0-24	100	MCX-824	3	1	2
25200	46600	24-48	100	MCX-825	4	17	2
25200	46600	48-66	100	MCX-354	4	2	2
25200	48600	60-78	110	MCX-546	5	3	3
25200	48600	78-96	110	MCX-547	2	1	2
25200	48800	60-78	111	MCX-550	3	1	2
25100	48700	60-78	99	MCX-544	4	2	2
25100	48700	78-96	99	MCX-545	3	1	3
25010	46412	0-6	77	MCX-773	16	4	6
25010	46412	6-24	77	MCX-774	345	16	103
25010	46412	24-42	77	MCX-775	137	6	52
24997	46661	0-6	139	MCX-747	36	4	27
24997	46661	42-66	139	MCX-748	7	2	6
24988	46788	0-6	78	MCX-820	7	1	2
24988	46788	6-24	78	MCX-821	10	2	6
24988	46788	24-48	78	MCX-822	22	2	2
24988	46788	48-66	78	MCX-823	4	1	11
24944	48592	0-6	87	MCX-374	728	107	150
24905	48507	0-6	75	MCX-375	191	70	43

Table B-7 (continued)

Grid		Depth (in.)	Bore- hole No.	Sample Number	Concentration (pCi/g)		
Coordinates					Th-230	U	Ra-226
North	East						
24800	47800	0-6	65	MCX-625	59	50	43
24700	47900	0-24	58	MCX-833	60	32	5
24700	47900	24-48	58	MCX-834	40	19	29
24700	47900	48-66	58	MCX-835	6	3	51
24700	48700	0-24	62	MCX-371	20	3	3
24700	48700	24-66	62	MCX-372	63	10	7
24603	48769	0-24	57	MCX-368	38	28	3
24603	48769	24-48	57	MCX-369	14	6	37
24603	48769	48-66	57	MCX-370	6	6	14
24600	46600	0-24	51	MCX-749	145	13	69
24600	46600	24-42	51	MCX-750	59	5	13
24600	46600	42-60	51	MCX-812	11	1	43
24491	46767	30-66	45	MCX-813	9	2	7
24448	47264	840-876	151	MCX-755	5	1	6
24393	48405	0-6	42	MCX-373	389	258	259
24203	46444	0-24	28	MCX-818	484	19	136
24202	46768	42-72	29	MCX-814	25	2	7
24202	46768	72-102	29	MCX-815	7	2	14
24160	47492	882-900	150	MCX-752	1	1	2
24158	47254	492-521	152	MCX-757	12	3	9
23753	46597	24-66	13	MCX-816	22	1	13
23753	46597	66-90	13	MCX-817	19	2	16
23683	46915	612-642	153	MCX-758	13	20	9
23200	46900	0-6	0	MCX-626	1883	54	806

Table B-8

Heavy-Metal Concentrations in Soil, Borehole, and Stream-Sediment Samples from RFO

Grid Coordinates	Depth (in.)	Sample Number (MCH-)	Concentration (ppm)											
			Cu	Pb	Zn	Ca	V	Cr	Mn	Fe	Hg	Sr	As	Mo
59500	60-84	859	16	47	53	<4	77	50	406	23800	<0.5	<2	7	4
59600	60-84	860	18	40	57	<4	82	50	428	24500	<0.5	<2	7	6
59700	60-84	863	18	41	62	<4	66	48	409	24300	<0.5	<2	5	4
60398	60-63	857	22	64	91	<4	367	70	323	29200	2	<2	10	6
60301	60-84	855	20	47	72	<4	130	46	447	21600	<0.5	6	8	4
60200	180-189	856	13	39	39	<4	81	22	450	18300	<0.5	<2	2	4
60500	60-84	853	15	38	59	<4	71	48	367	21400	<0.5	<2	5	4
59423	294-306	836	14	44	61	<4	120	40	391	20900	<0.5	<2	8	4
60200	24-48	838	19	73	164	<4	436	48	408	23400	<0.5	<2	26	6
60600	0-24	843	94	125	223	<4	1740	58	310	25600	<0.5	45	210	12
60800	60-84	852	17	40	76	<4	96	34	362	18300	<0.5	<2	5	6
60298	0-24	840	49	101	78	<4	864	36	300	16900	<0.5	32	86	8
60298	24-48	841	27	59	74	<4	405	48	372	20400	<0.5	17	34	6
60700	60-84	846	17	46	65	<4	145	42	350	21300	<0.5	<2	5	4
60900	60-84	851	19	39	86	<4	165	46	411	24700	<0.5	<2	4	4
60800	0-6	52	48	113	286	<4	1680	60	375	24800	<0.5	9	48	16
61000	0-6	51	128	405	674	<4	2070	44	222	26400	<0.5	90	74	14
60318	0-4	254	28	63	101	<4	1080	32	158	10400	<0.5	<2	45	4
59173	276-294	767	15	35	55	<4	76	44	337	25700	<0.5	<2	4	4
59200	6-12	325	18	30	65	<4	107	56	410	23600	<0.5	<2	7	4
60000	0-6	34	21	48	74	<4	79	54	688	25300	<0.5	<2	5	4
59107	258-264	762	14	47	75	<4	169	48	396	31500	<0.5	3	8	4
59800	6-12	302	54	551	103	<4	4990	150	95	19900	0.9	280	160	124
60000	0-6	312	322	1960	4860	<4	1050	36	3960	55300	<0.5	7	64	10
59901	0-6	23	454	2220	8510	<4	365	60	3170	89100	<0.5	4	52	24
59600	0-6	49	315	556	1950	9	1690	60	1580	23200	<0.5	12	88	8
59201	0-6	74	14	39	54	<4	72	48	531	22300	<0.5	<2	6	4
59400	0-6	75	16	40	62	<4	185	50	370	20700	<0.5	3	10	8
58987	0-6	47	18	56	90	<4	441	50	317	19400	<0.5	<2	32	6
59066	0-6	48	186	1050	2940	<4	294	50	3300	42800	<0.5	<2	21	6
OLD ASSAY LAB (Room B)	FLOOR	103	194	312	427	9	2570	160	600	45300	1.2	26	240	20

Table B-9

Heavy-Metal Concentrations in Soil, Borehole, and Stream-Sediment Samples from RFN

Grid Coordinates	Depth (ft.)	Sample Number (MCX-)	Concentration (ppm)											
			Cu	Pb	Zn	Cd	V	Cr	Mn	Fe	Hg	Sr	As	Mo
25399	0-6	331	17	155	121	<4	181	56	744	26900	<0.5	<2	6	2
25400	0-6	334	29	43	127	<4	404	56	421	25100	<0.5	<2	18	4
25396	60-78	540	18	39	64	<4	112	40	353	18100	<0.5	<2	6	6
25396	78-96	541	19	38	65	<4	83	44	321	19100	<0.5	<2	7	4
25300	60-78	548	22	106	84	<4	196	64	320	25300	<0.5	<2	7	4
25300	78-96	549	15	44	63	<4	100	70	352	23100	<0.5	<2	4	4
25182	60-78	542	19	37	64	<4	102	50	317	20100	<0.5	<2	8	6
25182	78-96	543	16	29	60	<4	84	48	324	18700	<0.5	<2	8	4
25200	78-96	547	23	45	88	<4	147	56	347	25000	<0.5	<2	8	4
25200	60-78	546	20	39	77	<4	460	68	350	22000	4	<2	7	4
25200	60-78	550	27	114	116	<4	500	100	396	32200	<0.5	<2	8	6
25176	0-4	702	22	40	89	<4	1050	44	320	23700	<0.5	<2	9	4
25100	60-78	544	25	40	114	<4	340	76	402	30600	<0.5	<2	9	6
25100	78-96	545	22	47	96	<4	175	54	446	28200	<0.5	<2	7	6
24850	0-4	704	20	32	80	<4	378	36	346	17800	<0.5	<2	18	6
24860	0-4	703	19	47	114	<4	474	100	470	24200	<0.5	<2	11	6
24800	0-6	625	54	68	227	<4	1450	36	496	20800	<0.5	6	27	62
24700	0-24	833	42	52	85	<4	826	46	364	19400	<0.5	3	28	24
24600	0-4	707	20	48	124	<4	145	30	334	18700	<0.5	<2	16	8
24448	840-876	755	16	43	56	<4	106	40	412	21100	<0.5	<2	6	4
24160	882-900	752	13	35	53	<4	64	50	320	21400	<0.5	<2	4	6
24158	492-521	757	14	44	52	<4	75	40	357	20700	<0.5	<2	6	4
24100	0-4	708	10	29	47	<4	55	20	480	15700	<0.5	<2	10	4
24100	0-4	710	16	70	124	<4	86	36	302	19800	<0.5	<2	6	4
23990	0-4	706	109	141	325	<4	1020	40	277	37300	<0.5	15	840	68
23950	0-4	705	8	13	36	<4	39	36	590	8900	<0.5	<2	4	14
23700	0-4	711	29	95	253	<4	167	32	611	21700	<0.5	<2	8	4
23683	612-642	758	54	67	124	<4	1550	40	295	28600	<2	34	130	72
23600	0-4	709	13	32	60	<4	65	40	264	19500	<0.5	<2	14	4
23400	0-4	715	22	68	153	<4	764	20	304	21200	<0.5	5	24	18
23365	0-4	716	202	142	802	7	3690	60	288	18800	<0.5	23	300	42
23250	0-4	717	39	106	800	12	842	50	2960	30200	<0.5	22	31	24
23220	0-4	712	29	89	808	18	612	42	990	24900	<0.5	18	18	42
23200	0-6	626	94	366	220	<4	12300	1200	1780	89900	<0.5	150	580	420
23020	0-4	714	421	225	1250	26	6690	44	971	29700	<0.5	110	560	172
23020	0-4	713	123	59	261	6	955	34	321	18600	<0.5	18	28	24

Appendix C

ANALYTICAL DATA FOR STREAM-SEDIMENT SAMPLES

Tables C-1 and C-2 present gamma-ray-spectroscopy analytical data for stream-sediment samples collected at RFO and RFN, respectively. The radium, thorium, and potassium values represent mass-normalized, dry-weight concentrations, assuming secular equilibrium between radium or thorium and its radioactive progeny. The analytical uncertainties are reported at the 2σ level. A less-than sign (<) indicates that the value is below the detection limit of the analytical system used. A question mark (?) indicates that the value is semiquantitative due to a low count rate.

Tables C-3 and C-4 present total uranium, thorium-230, and radium-226 concentrations for certain of the stream-sediment samples collected at RFO and RFN, respectively. (Data on heavy-metal concentrations in stream-sediment samples are included with the analogous data for soil samples; see Appendix B, Tables B-8 and B-9.)

Table C-1

Gamma-Ray-Spectroscopy Data for Stream-Sediment Samples from RFO

Grid		Depth (in.)	Sample Number	Concentration		
Coordinates North East				Ra-226 (pCi/g)	Th-232 (ppm)	K-40 (%)
27160	60570	0-4	MCX-263	16 ± 1	< 3 ± 0	1.5 ± 0.4
27125	60325	0-4	MCX-264	19 ± 1	< 3 ± 0	2.3 ± 0.6
26970	60400	0-6	MCX-262	4 ± 1	17 ± 4	1.6 ± 0.4
26870	60450	0-4	MCX-260	5 ± 1	? 11 ± 2	? 1.9 ± 0.3
26825	60000	0-4	MCX-265	4 ± 1	10 ± 3	2.0 ± 0.5
26820	60305	0-6	MCX-261	6 ± 1	6 ± 3	? 1.2 ± 0.3
26790	59790	0-4	MCX-266	3 ± 1	< 2 ± 0	1.4 ± 0.4
26615	61650	0-4	MCX-259	3 ± 1	< 2 ± 0	1.2 ± 0.3
26300	60800	0-3	MCX-257	3 ± 1	15 ± 3	? 1.1 ± 0.3
26250	60460	0-4	MCX-256	12 ± 1	< 3 ± 0	1.7 ± 0.4
26033	60390	0-4	MCX-251	234 ± 13	< 6 ± 0	< 0.7 ± 0.0
25900	60340	0-4	MCX-252	20 ± 1	< 3 ± 0	? 1.2 ± 0.3
25785	60338	0-4	MCX-253	191 ± 10	< 6 ± 0	< 0.7 ± 0.0
25680	58620	0-3	MCX-258	7 ± 1	11 ± 3	? 0.9 ± 0.2
25660	60318	0-4	MCX-254	228 ± 11	< 4 ± 0	? 0.7 ± 0.1
25580	60310	0-2	MCX-255	247 ± 16	< 6 ± 0	< 0.7 ± 0.0

Table C-2

Gamma-Ray-Spectroscopy Data for Stream-Sediment Samples from RFN

Grid		Depth (in.)	Sample Number	Concentration		
Coordinates				Ra-226	Th-232	K-40
North	East			(pCi/g)	(ppm)	(%)
25700	46800	0-4	MCX-701	1 ± 1	7 ± 2	1.2 ± 0.3
25170	46815	0-4	MCX-702	2 ± 1	11 ± 3	1.6 ± 0.4
24880	46225	0-4	MCX-704	6 ± 1	< 2 ± 0	1.5 ± 0.4
24860	46700	0-4	MCX-703	18 ± 1	< 3 ± 0	? 1.1 ± 0.3
24600	45000	0-4	MCX-707	2 ± 1	< 2 ± 0	1.8 ± 0.4
24100	42700	0-4	MCX-708	1 ± 1	< 2 ± 0	? 0.6 ± 0.2
24100	43100	0-4	MCX-710	1 ± 1	9 ± 2	? 1.1 ± 0.3
23990	46300	0-4	MCX-706	22 ± 2	< 4 ± 0	< 0.8 ± 0.0
23950	46180	0-4	MCX-705	? 1 ± 1	5 ± 2	< 0.6 ± 0.0
23700	44300	0-4	MCX-711	4 ± 1	< 3 ± 0	? 1.4 ± 0.4
23600	41900	0-4	MCX-709	1 ± 1	? 4 ± 2	1.2 ± 0.3
23400	47550	0-4	MCX-715	18 ± 1	< 2 ± 0	1.9 ± 0.5
23365	48100	0-4	MCX-716	149 ± 7	< 5 ± 0	1.3 ± 0.4
23250	48600	0-4	MCX-717	16 ± 1	15 ± 5	2.1 ± 0.5
23220	48380	0-4	MCX-712	7 ± 1	< 3 ± 0	? 1.4 ± 0.4
23020	47600	0-4	MCX-713	3 ± 1	< 2 ± 0	1.3 ± 0.3
23020	47380	0-4	MCX-714	28 ± 2	< 3 ± 0	1.6 ± 0.4

Table C-3

Concentrations of Th-230, Total Uranium, and Ra-226
in Stream-Sediment Samples from RFO

Grid		Depth (in.)	Sample Number	Concentration (pCi/g)		
Coordinates				Th-230	U	Ra-226
North	East					
25660	60318	0-4	MCX-254	228	57	228

Table C-4

Concentrations of Th-230, Total Uranium, and Ra-226
in Stream-Sediment Samples from RFN

Grid		Depth (in.)	Sample Number	Concentration (pCi/g)		
Coordinates				Th-230	U	Ra-226
North	East					
25170	46815	0-4	MCX-702	6	3	2
24880	46225	0-4	MCX-704	14	3	6
24860	46700	0-4	MCX-703	23	6	18
24600	45000	0-4	MCX-707	4	2	2
24100	42700	0-4	MCX-708	1	2	1
24100	43100	0-4	MCX-710	2	2	1
23990	46300	0-4	MCX-706	53	64	22
23950	46180	0-4	MCX-705	1	2	1
23700	44300	0-4	MCX-711	9	5	4
23600	41900	0-4	MCX-709	2	2	1
23400	47550	0-4	MCX-715	47	4	18
23365	48100	0-4	MCX-716	365	97	149
23250	48600	0-4	MCX-717	30	5	16
23220	48380	0-4	MCX-712	10	5	7
23020	47380	0-4	MCX-714	167	104	28
23020	47600	0-4	MCX-713	7	4	3

Appendix D

DELTA-GAMMA RADIUM MEASUREMENT DATA

Tables D-1, D-2, and D-3 present results of in-situ delta-gamma radium measurements made at RFO, RFN, and at hot spots along Highway 6 and 24, respectively. The radium values represent mass-normalized, dry-weight concentrations, assuming secular equilibrium in the uranium decay chain. The uncertainties are reported at the 2σ level, and reflect counting statistics only. A less-than sign (<) indicates the value is below the detection limit of the delta-gamma system used.

The radium data in all three tables have been corrected for area-average concentrations of Th-232 and K-40, as determined from analysis of soil samples from both sites (see Sections 3.3.3 and 4.2). Corrections have also been applied to account for average soil-moisture content and radium/radon disequilibrium, as described in Section 3.3.3; the values of F'_m and F'_e used to correct the data from the highway measurements are the same as those applied to the RFO data (see Section 4.2).

Table D-1

In-Situ Delta-Gamma Radium Measurement Results for RFO

<u>Coordinates</u>		<u>Depth</u> (in.)	<u>Ra-226</u> (pCi/g)		<u>Coordinates</u>		<u>Depth</u> (in.)	<u>Ra-226</u> (pCi/g)	
<u>North</u>	<u>East</u>				<u>North</u>	<u>East</u>			
27370	61400	12	5.5 ±	3.0	27000	61200	6	4.8 ±	1.6
27300	60300	12	4.2 ±	2.8	27000	61200	12	5.6 ±	1.7
27300	60700	12	3.8 ±	2.2	27000	61400	6	4.9 ±	1.7
27250	61315	10	2.8 ±	2.7	27000	61400	12	4.6 ±	1.7
27200	61400	0	10.8 ±	2.9	27000	61400	18	2.3 ±	1.8
27200	61400	6	4.0 ±	2.2	26800	59400	0	11.7 ±	1.6
27200	61400	12	4.5 ±	2.4	26800	59400	6	3.5 ±	1.7
27000	59200	0	2.7 ±	1.3	26800	59400	12	4.2 ±	1.7
27000	59200	6	3.4 ±	1.4	26800	59400	18	6.1 ±	1.7
27000	59200	12	5.0 ±	1.6	26800	59800	0	6.0 ±	1.5
27000	59200	18	4.9 ±	1.6	26800	59800	6	2.1 ±	1.5
27000	59600	0	2.8 ±	1.3	26800	60200	0	3.8 ±	1.4
27000	59600	6	4.1 ±	1.4	26800	60200	6	3.2 ±	1.2
27000	59600	12	4.2 ±	1.5	26800	60200	12	1.5 ±	1.5
27000	59600	18	3.6 ±	1.6	26800	60600	0	9.8 ±	1.7
27000	60000	0	2.1 ±	1.5	26800	60600	6	7.3 ±	1.8
27000	60000	6	3.9 ±	1.4	26800	60600	12	5.0 ±	1.9
27000	60000	12	2.2 ±	1.5	26800	60600	18	5.5 ±	1.8
27000	60400	0	8.2 ±	1.7	26784	61400	0	11.3 ±	2.0
27000	60400	6	4.2 ±	1.6	26784	61400	6	5.1 ±	1.8
27000	60400	12	3.5 ±	1.6	26784	61400	12	6.6 ±	1.8
27000	60400	18	4.4 ±	1.6	26784	61400	18	4.4 ±	1.8
27000	61000	6	5.3 ±	1.7	26617	59630	0	1343.9 ±	17.5
27000	61200	0	5.6 ±	1.5	26617	59630	0	1992.5 ±	18.1

Table D-1 (continued)

Coordinates		Depth (in.)	Ra-226 (pCi/g)		Coordinates		Depth (in.)	Ra-226 (pCi/g)	
North	East				North	East			
26617	59630	6	110.4 ±	16.0	26400	60800	18	5.3 ±	2.2
26617	59630	12	27.8 ±	10.9	26400	61000	0	27.5 ±	2.3
26617	59630	18	8.0 ±	10.1	26400	61000	6	5.9 ±	2.1
26600	59250	0	4.0 ±	1.3	26400	61000	12	5.0 ±	1.9
26600	59250	6	2.5 ±	1.3	26400	61000	18	6.8 ±	1.9
26600	59600	0	97.3 ±	3.7	26400	61400	0	20.2 ±	2.4
26600	59600	6	12.3 ±	3.3	26400	61400	6	4.1 ±	2.1
26600	59600	12	0.0 ±	2.4	26400	61400	12	4.4 ±	1.9
26600	60000	0	21.6 ±	2.3	26400	61400	18	1.1 ±	1.3
26600	60000	6	5.0 ±	2.3	26225	61350	0	57.9 ±	3.6
26600	60400	0	8.8 ±	1.8	26225	61350	6	7.3 ±	2.8
26600	60400	6	3.2 ±	1.6	26225	61350	12	5.5 ±	2.3
26600	60400	12	2.8 ±	1.7	26225	61350	18	3.3 ±	2.1
26600	60400	18	4.3 ±	1.7	26209	61383	0	45.3 ±	3.2
26600	60800	0	10.8 ±	1.4	26209	61383	6	5.9 ±	2.4
26600	60800	6	11.4 ±	1.9	26209	61383	12	5.0 ±	1.9
26600	60800	12	11.1 ±	2.0	26209	61383	18	5.5 ±	2.1
26600	60800	18	12.3 ±	2.2	26200	60800	6	1.0 ±	0.0
26600	61200	0	2.3 ±	1.2	26200	61200	0	4.3 ±	1.3
26600	61400	0	16.8 ±	2.1	26200	61200	6	3.1 ±	1.5
26600	61400	6	7.4 ±	2.0	26200	61200	12	3.8 ±	1.6
26600	61400	12	5.3 ±	1.9	26200	61200	18	5.7 ±	1.6
26600	61400	18	3.7 ±	1.9	26200	61600	0	4.0 ±	1.3
26600	61600	0	3.0 ±	1.4	26200	61600	6	4.4 ±	1.4
26600	61600	6	3.4 ±	1.4	26200	61600	12	4.5 ±	1.5
26600	61600	12	2.4 ±	1.5	26200	61600	18	4.3 ±	1.6
26445	59577	0	297.9 ±	8.1	26189	61020	0	93.8 ±	4.1
26445	59577	6	197.4 ±	9.2	26189	61020	6	59.0 ±	4.7
26445	59577	12	192.6 ±	9.4	26189	61020	12	8.2 ±	3.4
26445	59577	18	258.3 ±	9.8	26189	61020	18	6.7 ±	2.8
26440	60675	0	68.9 ±	3.7	26173	60063	0	950.6 ±	9.2
26440	60675	6	9.1 ±	3.7	26173	60063	6	942.0 ±	14.0
26440	60675	12	7.2 ±	3.0	26173	60063	12	173.1 ±	12.3
26440	60675	18	6.3 ±	2.2	26173	60063	18	89.4 ±	10.7
26421	60207	0	1953.9 ±	14.4	26074	61208	0	50.6 ±	3.5
26421	60207	6	167.7 ±	7.9	26074	61208	6	6.2 ±	3.3
26400	59400	0	6.2 ±	1.5	26074	61208	12	3.2 ±	2.4
26400	59400	6	5.2 ±	1.6	26017	60655	0	408.2 ±	8.0
26400	59400	12	3.3 ±	1.6	26017	60655	6	378.3 ±	9.8
26400	59400	18	4.8 ±	1.6	26017	60655	12	349.9 ±	10.3
26400	60200	0	4.5 ±	1.8	26017	60655	18	113.1 ±	7.7
26400	60200	6	2.1 ±	1.6	26000	59060	6	3.6 ±	2.5
26400	60600	6	7.7 ±	2.3	26000	59060	12	2.9 ±	2.5
26400	60600	12	5.6 ±	2.3	26000	60000	6	249.7 ±	5.1
26400	60600	18	4.9 ±	2.1	26000	60000	12	727.5 ±	8.2
26400	60800	0	40.2 ±	3.1	26000	60000	18	802.3 ±	11.0
26400	60800	6	9.2 ±	2.9	26000	60901	0	13.1 ±	2.0
26400	60800	12	5.0 ±	2.6	26000	60901	6	7.8 ±	1.9

Table D-1 (continued)

Coordinates		Depth (in.)	Ra-226 (pCi/g)		Coordinates		Depth (in.)	Ra-226 (pCi/g)	
North	East				North	East			
26000	60901	12	9.4 ±	1.9	25793	61011	0	8752.4 ±	29.5
26000	60901	18	14.8 ±	2.0	25786	60825	0	789.5 ±	8.7
26000	61000	0	82.4 ±	3.4	25786	60825	6	1229.5 ±	15.1
26000	61400	0	2.7 ±	1.1	25786	60825	10	141.1 ±	14.1
26000	61400	6	4.5 ±	1.4	25780	60805	0	1455.8 ±	10.9
26000	61400	12	3.5 ±	1.6	25780	60805	6	2142.3 ±	15.5
26000	61400	18	4.8 ±	1.7	25780	60805	12	1770.4 ±	18.6
26000	61800	0	1.2 ±	1.3	25779	60803	0	963.4 ±	10.8
25999	60577	0	389.9 ±	6.7	25779	60803	6	1461.8 ±	12.1
25999	60577	6	363.0 ±	6.7	25779	60803	12	928.6 ±	16.8
25999	60577	12	36.1 ±	7.9	25779	60803	15	239.8 ±	16.3
25999	60577	18	8.0 ±	5.6	25777	60436	0	293.7 ±	4.7
25983	60207	0	2794.3 ±	18.0	25777	60436	6	958.5 ±	10.2
25983	60207	6	1348.6 ±	25.0	25777	60436	12	899.3 ±	15.3
25983	60207	12	169.8 ±	17.3	25777	60436	18	163.4 ±	11.6
25983	60207	18	77.0 ±	12.5	25700	59000	0	2.1 ±	1.3
25914	60271	0	717.6 ±	8.5	25700	59000	6	1.3 ±	1.9
25914	60271	6	374.4 ±	11.8	25700	59100	6	7.8 ±	2.8
25914	60271	12	285.8 ±	11.0	25700	59100	12	6.4 ±	2.6
25914	60271	18	153.8 ±	9.3	25700	59100	18	12.1 ±	3.5
25830	61208	0	200.9 ±	4.4	25700	60000	0	216.6 ±	5.0
25830	61208	6	173.9 ±	6.4	25700	60000	6	441.5 ±	7.5
25830	61208	12	97.8 ±	5.1	25692	50411	0	34.6 ±	2.5
25830	61208	18	26.6 ±	5.6	25692	50411	6	13.4 ±	2.8
25815	60351	0	608.5 ±	6.9	25692	50411	12	5.8 ±	2.5
25815	60351	6	266.1 ±	9.0	25692	50411	18	5.4 ±	2.2
25815	60351	12	127.5 ±	8.0	25600	58000	6	0.2 ±	1.2
25815	60351	18	82.9 ±	8.4	25600	58800	6	1.0 ±	1.7
25814	61093	0	2886.6 ±	16.2	25600	59000	6	2.7 ±	2.1
25814	61093	6	225.5 ±	11.6	25600	59100	0	14.8 ±	2.2
25814	61093	12	295.0 ±	10.1	25600	59100	6	30.9 ±	2.9
25814	61093	18	67.9 ±	8.1	25600	59100	12	7.0 ±	2.8
25800	59100	6	0.8 ±	1.9	25600	59100	18	3.2 ±	1.9
25800	59200	6	3.7 ±	4.4	25600	59200	0	155.5 ±	3.8
25800	59200	12	12.8 ±	3.9	25600	59200	6	565.4 ±	6.9
25800	59200	18	13.4 ±	4.0	25600	59200	12	1131.4 ±	11.0
25800	60000	0	127.3 ±	4.1	25600	59900	0	22.8 ±	2.1
25800	60000	6	406.3 ±	5.4	25600	59900	6	65.0 ±	2.8
25800	60000	12	530.1 ±	8.4	25600	60100	0	43.5 ±	2.6
25800	60000	18	423.3 ±	10.8	25600	60100	6	18.3 ±	2.7
25796	60341	0	484.9 ±	7.9	25600	60100	12	6.2 ±	2.9
25796	60341	6	437.5 ±	8.7	25600	60100	18	3.8 ±	2.0
25796	60341	12	256.9 ±	8.8	25569	59999	0	296.7 ±	6.6
25796	60341	18	150.1 ±	7.7	25569	59999	6	125.8 ±	6.0
25796	60724	0	877.2 ±	9.3	25569	59999	12	1.0 ±	5.2
25796	60724	6	2468.9 ±	16.7	25561	59909	0	495.6 ±	7.8
25796	60724	12	419.0 ±	15.4	25561	59909	6	437.0 ±	11.9
25796	60724	13	161.3 ±	15.0	25561	59909	12	222.5 ±	11.6

Table D-1 (continued)

Coordinates		Depth (in.)	Ra-226 (pCi/g)		Coordinates		Depth (in.)	Ra-226 (pCi/g)	
North	East				North	East			
25561	59909	18	172.0 ±	10.1	25490	59624	0	597.7 ±	8.5
25521	59800	0	800.7 ±	9.2	25490	59624	6	1295.6 ±	13.0
25521	59800	6	1696.6 ±	15.8	25490	59624	12	2805.8 ±	18.6
25521	59800	12	1407.3 ±	21.7	25457	59502	0	373.8 ±	7.5
25521	59800	18	253.9 ±	19.4	25457	59502	6	376.7 ±	9.7
25511	59697	0	602.2 ±	8.1	25457	59502	12	30.1 ±	6.8
25511	59697	6	1485.2 ±	13.7	25457	59502	18	21.0 ±	6.0
25511	59697	12	225.4 ±	16.2	25412	59299	0	277.6 ±	7.3
25511	59697	18	106.6 ±	13.2	25412	59299	6	50.0 ±	7.4
25500	59000	0	5.5 ±	1.8	25412	59299	12	14.0 ±	4.7
25500	59000	6	9.6 ±	1.8	25412	59299	18	30.5 ±	3.8
25500	59000	12	22.9 ±	2.2	25400	58800	0	0.6 ±	1.4
25500	59000	18	11.0 ±	2.6	25400	58800	6	2.7 ±	1.3
25500	59200	0	76.0 ±	3.2	25400	59100	0	22.6 ±	2.0
25500	59200	6	245.7 ±	5.1	25400	59100	6	126.0 ±	3.5
25500	59400	0	20.1 ±	2.1	25400	59100	12	161.8 ±	5.8
25500	59400	6	38.5 ±	2.4	25400	59100	18	102.9 ±	5.1
25500	59800	0	5.8 ±	1.6	25200	58800	0	4.7 ±	1.3
25500	59800	6	1.0 ±	0.0	25200	58800	6	6.7 ±	1.6
25500	60000	0	166.1 ±	5.2	25200	58800	12	7.4 ±	2.0
25500	60000	6	31.5 ±	5.4	25200	58800	18	6.2 ±	1.9
25500	60000	12	15.4 ±	4.4	25200	59000	0	3.8 ±	1.3
25500	60000	18	5.0 ±	2.6	25200	59000	6	2.4 ±	1.3

Table D-2

In-Situ Delta-Gamma Radium Measurement Results for RFN

Coordinates		Depth	Ra-226		Coordinates		Depth	Ra-226	
North	East	(in.)	(pCi/g)		North	East	(in.)	(pCi/g)	
25600	46000	6	4.6 ±	2.0	25399	47043	18	17.1 ±	2.8
25600	46000	12	4.3 ±	1.9	25394	48696	6	326.4 ±	14.8
25600	46800	0	3.3 ±	1.8	25394	48696	12	303.8 ±	15.4
25600	46800	6	4.3 ±	1.4	25394	48696	18	47.6 ±	12.5
25600	46800	12	2.7 ±	1.8	25313	48600	6	194.2 ±	4.1
25600	47200	6	13.9 ±	2.4	25313	48600	12	20.3 ±	2.5
25600	47200	12	4.5 ±	2.4	25313	48600	18	15.5 ±	2.1
25600	47600	6	11.5 ±	2.8	25240	46779	6	263.5 ±	8.9
25600	47600	12	3.3 ±	2.0	25240	46779	12	158.3 ±	9.2
25600	48000	6	4.7 ±	2.1	25240	46779	18	29.6 ±	7.6
25600	48000	12	2.5 ±	1.6	25200	45549	6	2.6 ±	2.1
25600	48400	6	5.7 ±	2.2	25200	45600	6	4.5 ±	1.8
25600	48400	12	5.8 ±	2.1	25200	45600	12	4.5 ±	2.0
25600	48400	18	2.1 ±	1.6	25200	45600	18	2.8 ±	2.0
25600	48800	6	13.7 ±	3.7	25200	46000	6	0.6 ±	1.5
25600	48800	12	9.7 ±	2.8	25200	46739	6	9.0 ±	2.6
25600	48800	18	4.1 ±	2.4	25200	46739	12	3.8 ±	2.3
25600	49200	6	4.5 ±	2.2	25200	48973	6	40.4 ±	4.7
25600	49200	12	4.4 ±	2.3	25200	48973	12	11.0 ±	3.9
25600	49200	18	4.5 ±	2.1	25200	48973	18	7.9 ±	2.6
25599	46400	0	6.2 ±	1.9	25200	49200	6	8.1 ±	1.7
25599	46400	6	5.0 ±	1.7	25200	49200	12	3.8 ±	1.9
25599	46400	12	6.5 ±	1.8	25199	46283	6	8.1 ±	2.2
25599	46400	18	6.0 ±	1.8	25199	46283	12	6.2 ±	2.2
25588	45600	6	2.8 ±	1.5	25199	46283	18	5.3 ±	2.0
25469	49003	6	25.9 ±	6.5	25185	46370	6	7.6 ±	2.2
25448	48408	6	7.2 ±	1.5	25185	46370	12	6.0 ±	2.2
25448	48408	12	3.7 ±	1.6	25185	46370	18	4.0 ±	2.1
25447	47204	6	97.1 ±	4.5	25003	48944	6	370.2 ±	7.1
25447	47204	12	120.1 ±	4.6	25003	48944	12	209.1 ±	6.7
25447	47204	18	121.0 ±	5.9	25003	48944	18	76.1 ±	8.4
25441	47802	6	52.2 ±	2.7	25001	48732	6	3.8 ±	3.2
25441	48006	6	493.2 ±	7.1	25001	48732	12	7.2 ±	2.1
25441	48006	12	121.8 ±	8.5	25001	48732	18	4.1 ±	2.1
25441	48006	18	70.0 ±	8.1	25000	45800	6	16.1 ±	2.7
25400	45800	6	3.1 ±	1.6	25000	46200	6	7.6 ±	1.8
25400	46000	6	3.1 ±	1.8	25000	46200	12	14.6 ±	2.2
25400	46200	6	3.7 ±	1.9	25000	46200	18	12.2 ±	2.4
25400	46200	12	2.7 ±	1.9	24953	45601	6	28.0 ±	2.5
25400	46383	6	6.0 ±	2.9	24898	45799	0	44.4 ±	2.9
25400	46400	6	7.8 ±	2.0	24808	48864	6	37.4 ±	5.0
25400	46400	12	7.0 ±	1.9	24808	48864	12	8.5 ±	3.2
25400	46400	18	4.0 ±	1.9	24808	48864	18	< 1.0 ±	0.0
25400	46600	0	3.3 ±	1.5	24802	46721	6	442.1 ±	8.5
25399	47043	6	126.0 ±	2.8	24802	46721	12	179.3 ±	10.8
25399	47043	12	103.0 ±	3.3	24802	46721	18	57.8 ±	7.3

Table D-2 (continued)

Coordinates		Depth (in.)	Ra-226 (pCi/g)		Coordinates		Depth (in.)	Ra-226 (pCi/g)	
North	East				North	East			
24800	46000	6	6.6 ±	2.7	23900	46421	6	6.7 ±	1.5
24800	46000	12	5.2 ±	2.3	23900	46421	12	4.1 ±	1.5
24800	49000	6	4.4 ±	1.6	23810	48602	6	9.5 ±	2.9
24800	49000	12	10.7 ±	1.8	23810	48602	12	5.7 ±	2.9
24766	48709	6	67.9 ±	5.1	23800	46200	6	2.9 ±	2.3
24766	48709	12	30.4 ±	5.0	23794	45956	6	32.6 ±	1.6
24766	48709	18	9.7 ±	3.9	23794	45956	12	21.5 ±	1.9
24700	46100	6	6.4 ±	3.2	23794	45956	18	11.9 ±	1.7
24700	46100	12	4.0 ±	2.1	23717	46000	6	5.0 ±	0.9
24700	49300	6	6.8 ±	2.6	23686	46202	6	1.7 ±	1.3
24685	46205	6	60.6 ±	6.4	23627	46450	6	81.7 ±	9.2
24600	45800	6	2.5 ±	1.8	23627	46450	12	51.7 ±	9.8
24600	46200	6	6.4 ±	2.5	23600	46000	6	2.4 ±	1.6
24600	46200	12	6.6 ±	2.8	23501	47874	6	160.4 ±	6.3
24600	46200	18	7.2 ±	2.9	23501	47874	12	158.0 ±	7.0
24600	46684	6	642.7 ±	10.8	23501	47874	18	173.2 ±	7.4
24600	46684	12	696.2 ±	10.9	23480	47776	6	210.1 ±	7.5
24600	46684	18	72.8 ±	12.3	23480	47776	12	183.2 ±	8.0
24400	45600	6	4.0 ±	2.5	23480	47776	18	184.2 ±	8.1
24400	45600	12	2.2 ±	2.5	23456	46609	6	48.7 ±	8.5
24400	46000	6	3.1 ±	1.5	23456	46609	12	27.4 ±	7.4
24400	46400	6	11.7 ±	3.7	23456	46609	18	10.0 ±	4.4
24400	46400	12	5.5 ±	2.5	23414	46660	6	3.9 ±	2.1
24400	46400	18	2.2 ±	1.7	23402	46284	6	72.3 ±	3.8
24398	48874	6	70.1 ±	6.8	23402	46284	12	86.7 ±	4.4
24398	48874	12	15.1 ±	4.3	23402	46284	18	114.8 ±	4.9
24398	48874	18	8.8 ±	3.2	23400	46200	6	2.6 ±	2.2
24256	46600	6	186.6 ±	4.8	23400	46400	6	4.1 ±	1.4
24256	46600	12	20.6 ±	3.0	23400	46400	12	5.5 ±	1.8
24256	46600	18	17.1 ±	3.1	23400	46400	18	4.1 ±	1.5
24200	46200	6	3.3 ±	2.4	23285	48000	6	3.4 ±	1.5
24200	46600	6	21.4 ±	5.9	23210	46509	6	44.4 ±	1.8
24200	46600	12	6.9 ±	3.8	23210	46509	12	64.8 ±	2.1
24200	46600	18	9.9 ±	3.8	23210	46509	18	68.9 ±	2.7
24162	46159	0	14.8 ±	1.4	23200	46000	6	3.9 ±	1.4
24147	46140	0	48.0 ±	2.1	23200	46000	12	1.1 ±	1.5
24046	46383	6	41.5 ±	3.7	23200	47000	6	4.2 ±	1.8
24046	46383	12	17.2 ±	2.7	23200	47000	12	3.4 ±	1.5
24000	46000	6	2.9 ±	1.3	23200	47400	6	3.8 ±	1.9
24000	46400	6	21.9 ±	5.5	23200	48400	6	15.5 ±	2.2
24000	46400	12	10.3 ±	4.3	23200	48400	12	25.0 ±	2.5
24000	46400	18	2.5 ±	2.8	23200	48400	18	23.7 ±	2.7
24000	49000	6	9.0 ±	1.9	23157	45999	6	2.2 ±	0.9
24000	49000	12	7.7 ±	1.9	23107	46397	6	86.0 ±	3.3
24000	49000	18	14.1 ±	2.2	23107	46397	12	107.3 ±	5.1
23998	48698	6	92.2 ±	4.6	23107	46397	18	32.9 ±	5.0
23998	48698	12	81.6 ±	5.1	23065	46000	6	2.4 ±	1.6
23998	48698	18	26.3 ±	4.9	23057	46400	6	2.1 ±	1.6

Table D-2 (continued)

<u>Coordinates</u>		Depth (in.)	Ra-226		<u>Coordinates</u>		Depth (in.)	Ra-226	
North	East		(pCi/g)		North	East		(pCi/g)	
23040	46800	6	5.1	± 1.8	23000	47600	6	2.1	± 1.7
23040	46800	12	3.2	± 1.5	23000	48200	6	2.8	± 1.7
23027	47200	6	2.7	± 1.7	23000	48600	6	3.6	± 1.7
23020	47400	6	3.7	± 1.8					

Table D-3

In-Situ Delta-Gamma Radium Measurement Results for Highway 6 and 24

Coordinates		Depth (in.)	Ra-226 (pCi/g)		Coordinates		Depth (in.)	Ra-226 (pCi/g)	
North	East				North	East			
26756	63131	0	9.6 ±	1.7	25730	53620	6	30.6 ±	2.6
26756	63131	6	1.0 ±	1.5	25730	53620	12	2.9 ±	2.0
26260	62260	0	14.4 ±	1.7	25691	50310	0	34.6 ±	2.5
26260	62260	6	6.3 ±	2.0	25691	50310	6	13.4 ±	2.8
26260	62260	12	1.1 ±	1.7	25691	50310	12	5.8 ±	2.5
26085	56075	0	11.2 ±	1.6	25691	50310	18	5.4 ±	2.2
26085	56075	6	16.3 ±	1.7	25708	58217	0	10.0 ±	1.6
26085	56075	12	2.3 ±	1.7	25708	58217	6	2.2 ±	1.2
26085	56173	0	5.3 ±	1.2	25669	58778	0	2.4 ±	1.3
26085	56173	6	1.0 ±	1.1	25659	51024	0	13.6 ±	1.9
26040	61817	0	8.1 ±	1.2	25659	51024	6	2.6 ±	1.7
26040	61817	6	7.4 ±	1.7	25655	58552	0	4.6 ±	1.4
26040	61817	12	3.8 ±	1.8	25655	58552	6	12.2 ±	1.4
26040	61817	18	2.6 ±	1.4	25655	58552	12	10.6 ±	1.7
26027	55705	0	17.8 ±	1.8	25655	58552	18	1.4 ±	1.7
26027	55705	6	12.7 ±	2.2	25663	58534	0	22.6 ±	2.0
26027	55705	12	8.3 ±	2.2	25663	58534	6	14.3 ±	2.3
26027	55705	18	3.6 ±	2.0	25663	58534	12	2.0 ±	1.6
25900	55150	0	17.5 ±	1.5	25621	58728	0	1.2 ±	1.0
25900	55150	6	16.6 ±	1.8	25585	41439	0	6.4 ±	1.5
25900	55150	12	3.1 ±	1.7	25582	41240	0	2.6 ±	1.3
25900	55150	18	2.3 ±	1.7	25580	41040	0	1.8 ±	1.3
25734	54120	0	6.5 ±	1.5	25542	41240	0	1.6 ±	1.3
25734	54120	6	4.3 ±	1.6	25540	41040	0	7.5 ±	1.4
25734	54120	12	2.6 ±	1.7	25540	41040	0	4.5 ±	1.4
25734	54120	18	2.4 ±	1.7	25540	41040	6	3.8 ±	1.6
25730	53620	0	20.7 ±	1.9	25540	41040	12	2.2 ±	1.6

Appendix E

EXPOSURE-RATE SURVEY DATA

Table E-1 presents the results of exposure-rate measurements made at both RFO and RFN using the Reuter-Stokes RSS-111 pressurized ionization chamber (PIC) and the Eberline PRM-7 $\mu\text{R/h}$ meters. A linear-regression analysis of these data was performed to determine calibration coefficients which were subsequently used to correct the exposure-rate data obtained using the PRM-7 meters. These corrected exposure rates, from surface and waist-level measurements, are presented in Tables E-2 and E-3 for RFO and RFN, respectively. Table E-4 presents exposure-rate data from the scan of both sides of Highway 6 and 24. The data obtained from scanning the roadbeds along the DRGW/RR tracks are included in Table E-2 for those areas adjacent to RFO and in Table E-3 for those areas adjacent to RFN.

Table E-1

Cross-Correlation Data for the PIC and the PRM-7 $\mu\text{R/h}$ Meters

Coordinates		Exposure Rate ($\mu\text{R/h}$)		
North	East	PIC (C-3240)	PRM-7 (C-8838)	PRM-7 (C-8837)
25661	47829	18.9	38	39
25651	47030	20.5	45	44
25623	44634	15.9	22	21
25592	42038	16.1	23	23
25582	41040	16.4	23	21
26500	59500	29.4	70	70
26600	59600	166.5	360	340
26500	59700	135.5	280	275
26460	59800	49.6	115	110
26700	59500	65.1	150	140
26600	59600	163.7	320	310
26610	59620	286.7	550	600
26616	59629	508.8	1000	1050
23100	57100	13.9	16	16
26000	76400	15.3	20	19
15400	34700	15.3	19	20
35000	59950	14.8	18	18
20200	52900	15.0	18	19
24400	46700	319.9	810	800
23400	46700	77.1	200	210
25200	47600	111.5	300	305
24500	46770	329.4	850	800
24000	46200	22.8	55	55
24400	45600	20.6	32	35
25400	48600	74.3	120	140

Table E-1 (continued)

Coordinates		Exposure Rate (μ R/h)		
North	East	PIC (C-3240)	PRM-7 (C-8838)	PRM-7 (C-8837)
25185	46400	19.1	39	41
25200	46600	33.7	80	85
25200	46800	35.2	95	100
WAREHOUSE (RFN)		27.5	65	70
OFFICE/SHOPS (RFN)		17.1	22	25
CHANGE HOUSE (RFN)		21.2	34	36

Table E-2

Exposure-Rate Measurement Results for RFO

<u>Coordinates</u>		<u>Exposure Rate (μR/h)</u>		<u>Coordinates</u>		<u>Exposure Rate (μR/h)</u>	
<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>	<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>
27820	61280		12	27000	60400	21	22
27680	61140		11	27000	60600	23	21
27540	61000		16	27000	60601	21	20
27430	59650		12	27000	60800	19	18
27420	59660		11	27000	60800	17	17
27400	60860		17	27000	60900	15	15
27300	59800	12	12	27000	61000	17	16
27300	59900	16	16	27000	61100	15	15
27300	60000	16	16	27000	61200	15	15
27300	60100	17	17	27000	61300	17	17
27300	60200	20	19	27000	61315	24	20
27300	60300	21	19	27000	61330	17	17
27300	60400	16	17	27000	61400	23	21
27300	60500	16	16	27000	61400	21	19
27300	60600	15	16	26980	60410		22
27300	60700	16	16	26910	59970		19
27300	60800	14	15	26820	60280	20	20
27300	60900	14	14	26815	59600	21	19
27300	61000	15	14	26800	59200	21	22
27300	61100	15	14	26800	59200	21	22
27300	61200	14	13	26800	59400	22	21
27300	61300	20	19	26800	59400	22	21
27300	61400	19	18	26800	59600	19	20
27260	60720		22	26800	59800	21	22
27240	59760		14	26800	59800	19	21
27200	59800	15	15	26800	60000	21	22
27200	61400	21	22	26800	60000	20	21
27120	60580		28	26800	60200	21	20
27100	59800	18	18	26800	60200	18	17
27080	59890		17	26800	60400	34	32
27000	59200	13	12	26800	60400	23	24
27000	59200	20	19	26800	60600	25	24
27000	59400	16	14	26800	60600	22	21
27000	59400	16	16	26800	60800	21	21
27000	59600	14	14	26800	60800	21	20
27000	59600	17	15	26800	61400	29	26
27000	59800	15	15	26800	61400	29	26
27000	59800	18	13	26756	63161		17
27000	59800	16	16	26730	60070		15
27000	60000	18	17	26650	60800	22	22
27000	60000	18	17	26620	60800	26	26
27000	60200	23	21	26600	59200	16	16
27000	60200	23	21	26600	59250	18	20
27000	60200	23	23	26600	59400	27	27
27000	60400	21	22	26600	59400	31	31

Table E-2 (continued)

<u>Coordinates</u>		<u>Exposure Rate (μR/h)</u>		<u>Coordinates</u>		<u>Exposure Rate (μR/h)</u>	
<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>	<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>
26600	59600	121	152	26400	60800	61	51
26600	59600	162	152	26400	61000	34	32
26600	59800	89	70	26400	61000	41	37
26600	59800	46	36	26400	61030		21
26600	59816	353	101	26400	61200	16	17
26600	60000	44	46	26400	61200	15	16
26600	60000	24	23	26400	61400	41	44
26600	60060	20	20	26400	61400	39	41
26600	60200		17	26400	61600	17	16
26600	60200	20	20	26400	61600	16	16
26600	60200	17	17	26380	61000	34	37
26600	60200	18	17	26375	60800	26	24
26600	60300	17	17	26355	61005	38	36
26600	60400	29	29	26350	59400	33	31
26600	60400	22	21	26350	61000	23	22
26600	60600	32	32	26340	60800	19	20
26600	60600	25	20	26320	61000	19	22
26600	60800	24	26	26300	60920		18
26600	60800	23	23	26224	61340	74	51
26600	61000	17	18	26220	61340	54	51
26600	61000	17	16	26220	61380	61	41
26600	61200	18	17	26200	60000	112	134
26600	61200	17	17	26200	60000	124	162
26600	61400	32	29	26200	60000	118	147
26600	61400	32	34	26200	60100	101	114
26600	61400	37	32	26200	60100	107	129
26600	61600	17	17	26200	60200	197	152
26600	61600	18	18	26200	60200	192	152
26570	59800	454	202	26200	60200	192	152
26525	59806	404	177	26200	60200	185	152
26500	59600	454	253	26200	60400	41	46
26500	60000	46	51	26200	60600	23	23
26500	61000	15	16	26200	60600	22	29
26500	61200	15	16	26200	60800	19	23
26480	60800	39	32	26200	60800	17	18
26460	59800	26	31	26200	60800	17	18
26435	60700	56	51	26200	61000	68	51
26425	61000	19	20	26200	61000	68	49
26420	59605	51	61	26200	61200	19	18
26416	60220	1251	435	26200	61200	18	18
26400	29400	24	21	26200	61400	70	53
26400	60200	17	18	26200	61400	75	56
26400	60200	29	39	26200	61600	16	16
26400	60400	24	24	26200	61600	16	16
26400	60400	23	22	26200	61800	15	13
26400	60600	75	46	26200	61800	12	13
26400	60600	38	31	26190	60400	46	46
26400	60800	61	49	26190	60400		41

Table E-2 (continued)

<u>Coordinates</u>		<u>Exposure Rate (μR/h)</u>		<u>Coordinates</u>		<u>Exposure Rate (μR/h)</u>	
North	East	Surface	Waist Level	North	East	Surface	Waist Level
26190	61025	59	46	26000	61585	13	13
26175	61000	22	25	26000	61600	15	16
26170	60060	857	605	26000	61800	17	17
26170	61400	41	32	26000	61800	16	17
26150	60150	908	605	25996	60625	303	172
26100	60000	240	230	25995	61509		14
26100	60000	248	233	25995	61893	13	14
26100	60100	122	142	25985	61893	16	17
26100	60100	107	127	25982	60122	2521	681
26100	60200	162	134	25982	60208	2521	1059
26100	60200	180	147	25970	61800	13	13
26100	61000	41	37	25960	61800	21	19
26093	62265		17	25945	61707	18	18
26085	56075		21	25940	61400	22	22
26085	56173		17	25935	61707	24	21
26083	62265	13	15	25930	61200	56	41
26080	60800	22	22	25921	61614	16	16
26069	62172	17	16	25915	60260	656	353
26059	62172	17	14	25911	61614	29	22
26055	61200	70	56	25910	60810	132	107
26044	62079	31	18	25900	55150		26
26034	62079	23	17	25900	60000	278	278
26033	60400	605	303	25900	60000	253	253
26030	61200	32	32	25900	60100	172	162
26027	55705		17	25900	60100	162	132
26020	61800	32	22	25900	60200	54	61
26019	61986	21	16	25900	60200	54	64
26015	60650	467	182	25900	60400	605	303
26009	61986	27	19	25900	60403	1714	404
26000	59200	46	36	25896	61521	18	18
26000	60000	112	129	25886	61521	32	32
26000	60100	91	127	25877	61355	51	31
26000	60200	1210	555	25875	60196	61	61
26000	60400	64	64	25871	61428	21	22
26000	60400	56	51	25861	61428	41	32
26000	60600	91	81	25858	61377	38	31
26000	60600	104	91	25848	61377	80	41
26000	60800	37	46	25847	61335	28	31
26000	60800	36	50	25841	61332	46	51
26000	60800	33	41	25837	61335	89	51
26000	60975		24	25830	61210	171	94
26000	60975	28	28	25822	61242	41	46
26000	60975	31	31	25821	60350	530	278
26000	61200	19	20	25812	61205	96	81
26000	61200	16	17	25812	61242	70	46
26000	61400	17	17	25802	61100	2521	505
26000	61400	21	22	25800	59100	26	28
26000	61400	17	19	25800	59100		32

Table E-2 (continued)

Coordinates		Exposure Rate ($\mu\text{R/h}$)		Coordinates		Exposure Rate ($\mu\text{R/h}$)	
North	East	Surface	Waist Level	North	East	Surface	Waist Level
25800	59200	86	76	25717	59217	2521	1235
25800	59200	99	91	25714	60779	109	99
25800	60000	192	182	25707	60746	233	147
25800	60000	212	162	25700	59000		27
25800	60100	54	56	25700	59000	25	25
25800	60100	46	49	25700	59000	22	23
25800	60200	49	51	25700	59000	25	25
25800	60200	46	51	25700	59100	41	51
25800	60300	86	91	25700	59200	182	177
25800	60400	61	66	25700	59200	192	172
25800	60400	51	36	25700	60000	195	162
25800	60400	51	38	25700	60000	217	167
25800	60600	40	41	25700	60100	51	56
25800	60600	38	41	25700	60100	49	61
25800	60600	38	41	25700	60200	54	61
25800	60800	132	127	25700	60200	61	56
25800	60800	132	112	25700	60400	41	41
25800	60800	132	112	25700	60600	40	38
25800	61000	192	132	25695	60685	152	132
25800	61000	190	132	25685	60685	41	89
25800	61125	290	190	25680	60580	303	157
25800	61200	26	33	25675	58552		31
25800	61200	162	127	25673	60544	605	278
25800	61200	51	46	25669	58778		13
25800	61400	12	17	25668	60580	70	51
25800	61600	15	14	25660	59080	404	170
25797	61149	91	81	25659	51024		22
25795	60345	505	353	25655	58552		21
25795	60700	555	172	25650	60490	86	81
25790	61015	2521	505	25640	60490	89	51
25787	61149	89	51	25630	60392	107	91
25785	60830	555	278	25620	60392	61	61
25780	59220		162	25617	41629		16
25780	60820	1009	467	25612	60314	404	253
25775	60435	172	132	25608	60294	81	101
25775	60800	807	353	25600	58800	13	14
25773	61056	152	122	25600	58800	16	16
25770	61600	41	27	25600	58800	16	16
25763	61056	176	99	25600	58800	16	15
25760	60960	117	96	25600	58800		16
25758	60894	243	170	25600	59000	26	26
25754	60989	291	157	25600	59000	26	26
25750	60960	195	128	25600	59000	64	71
25735	60865	152	107	25600	59000	24	28
25727	60812	303	137	25600	59000		28
25725	59150	958	391	25600	59100	202	187
25725	60865	291	157	25600	59100	61	71
25724	60779	217	132	25600	59200	187	182

Table E-2 (continued)

<u>Coordinates</u>		<u>Exposure Rate ($\mu\text{R/h}$)</u>		<u>Coordinates</u>		<u>Exposure Rate ($\mu\text{R/h}$)</u>	
<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>	<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>
25600	59200	187	182	25500	59400	51	56
25600	59300	215	202	25500	59400	59	96
25600	59300	202	202	25500	59500	61	66
25600	59400	303	278	25500	59500	56	61
25600	59400	303	303	25500	59600	56	71
25600	59500	404	353	25500	59600	61	81
25600	59500	328	353	25500	59700	129	142
25600	59600	555	505	25500	59800	66	66
25600	59600	555	505	25500	59800	51	61
25600	59700	91	112	25500	59800	41	59
25600	59700	86	101	25500	60000	41	61
25600	59800	76	76	25500	60000	41	61
25600	59800	81	94	25487	59623	505	391
25600	59900	61	64	25480	59700	66	76
25600	59900	61	66	25480	59800	51	51
25600	60000	51	61	25476	59700	122	84
25600	60000	44	56	25466	59700	46	56
25600	60000	41	51	25464	59654	127	122
25600	60100	69	71	25460	59000	819	483
25600	60100	56	66	25452	59600	46	66
25600	60100	61	74	25450	59200	71	66
25600	60200	192	132	25450	59500	454	353
25600	60200	200	122	25450	59600	76	101
25587	60306	166	118	25442	59600	39	41
25585	60196	84	61	25430	59400	278	192
25579	59000	31	36	25430	59500	101	107
25575	60000	303	222	25428	59500	56	71
25570	59910	454	303	25420	59000	579	339
25565	60098	51	51	25418	59500	32	41
25555	60098	51	61	25415	59300	505	303
25550	59500	656	505	25409	59400	56	66
25550	60100	56	66	25400	58800	17	17
25540	60000	54	56	25400	58800	15	15
25535	59971	51	56	25400	58800	14	13
25525	59971	61	70	25400	59000	79	81
25524	59900	56	51	25400	59000	51	75
25520	59800	605	454	25400	59100	36	31
25520	59900	56	61	25400	59100	33	36
25514	59900	89	65	25400	59200	36	46
25512	59700	404	303	25400	59200	31	41
25500	59000	41	41	25400	59300	66	81
25500	59000	33	41	25400	59300	56	76
25500	59100	76	91	25400	59400	26	36
25500	59100	86	86	25399	59400	32	41
25500	59200	86	81	25390	59300	36	56
25500	59300	91	96	25386	58900	15	17
25500	59300	86	86	25380	58800	17	16
25500	59300	104	109	25380	59200	31	36

Table E-2 (continued)

<u>Coordinates</u>		<u>Exposure Rate (μR/h)</u>		<u>Coordinates</u>		<u>Exposure Rate (μR/h)</u>	
<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>	<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>
25380	59300	27	37	25364	59100	32	29
25376	58900	20	20	25200	58800	14	14
25376	59000	27	29	25200	58800	16	16
25374	59000	26	26	25200	59000	13	14
25374	59100	26	26	25200	59000	16	16
25370	59200	41	37	25200	59070	15	15

Table E-3

Exposure-Rate Measurement Results for RFN

<u>Coordinates</u>		<u>Exposure Rate (μR/h)</u>		<u>Coordinates</u>		<u>Exposure Rate (μR/h)</u>	
<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>	<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>
25600	45600	13	15	25537	48200	34	34
25600	46000	18	17	25537	48300	39	34
25600	46600	19	19	25536	48100	34	34
25600	46600	20	23	25535	48000	34	34
25600	46800	21	21	25534	47800	25	34
25600	46800	20	21	25534	47900	27	30
25600	46800	20	21	25533	47600	34	36
25600	46800	19	18	25533	47700	25	34
25600	47000	24	24	25532	47500	25	32
25600	47000	25	27	25531	47400	57	48
25600	47200	30	30	25530	47300	39	30
25600	47200	25	27	25529	47100	57	34
25600	47400	27	34	25529	47200	36	34
25600	47400	30	30	25528	47000	30	30
25600	47600	32	32	25527	46800	25	25
25600	47600	38	30	25527	46900	30	30
25600	47800	34	31	25527	48900	30	38
25600	47800	36	30	25526	46700	21	25
25600	48000	30	30	25526	48800	34	38
25600	48000	32	32	25525	46600	18	21
25600	48200	32	30	25525	48600	64	47
25600	48200	34	30	25525	48700	38	43
25600	48400	30	30	25524	46400	25	22
25600	48400	27	34	25524	46500	21	22
25600	48600	30	34	25524	48500	34	34
25600	48600	34	30	25523	46300	25	21
25600	48800	75	70	25522	46100	23	20
25600	49000	57	57	25522	46200	21	19
25600	49200	52	48	25522	48200	38	38
25599	46400	18	18	25522	48300	38	38
25599	46400	20	19	25521	46000	17	19
25598	45800	17	17	25521	48100	30	45
25597	46200	17	17	25520	45900	19	18
25597	46200	16	16	25520	48000	36	38
25595	46000	16	17	25519	45700	16	16
25592	45800	16	16	25519	45800	18	18
25588	45600	18	15	25519	47800	30	30
25575	47000	27	30	25518	45500	16	16
25570	46600	21	23	25518	45600	16	15
25552	48600	57	48	25518	46300	30	21
25542	48900	39	41	25518	46700	38	34
25542	49000	30	34	25518	47603	56	38
25541	48800	30	36	25518	47700	38	34
25540	48700	34	43	25517	46100	24	21
25539	48500	43	36	25517	46200	27	21
25538	48400	57	39	25517	46700	21	21

Table E-3 (continued)

Coordinates		Exposure Rate ($\mu\text{R/h}$)		Coordinates		Exposure Rate ($\mu\text{R/h}$)	
North	East	Surface	Waist Level	North	East	Surface	Waist Level
25517	47500	34	30	25400	45600	19	18
25516	46000	17	19	25400	45800	20	20
25516	47400	73	47	25400	45800	20	15
25515	45900	15	20	25400	46000	23	21
25515	47300	38	38	25400	46000	22	20
25514	45700	16	19	25400	46135	25	25
25514	47100	47	47	25400	46155	45	34
25514	47200	51	51	25400	46200	25	27
25514	48800	17	17	25400	46200	25	25
25513	45600	17	16	25400	46330	30	27
25513	46970	169	82	25400	46380	93	57
25513	47000	91	56	25400	46400	32	30
25512	45500	14	16	25400	46400	30	30
25512	46800	25	30	25400	46560	32	30
25512	46900	30	30	25400	46600	22	21
25509	46400	30	25	25400	46600	25	25
25509	46500	34	30	25400	46650	30	26
25503	48413	43	34	25400	46770	41	39
25500	46800	24	24	25400	46800	45	39
25500	47400	47	47	25400	46800	47	47
25500	47400	47	47	25400	46800	47	47
25500	47600	64	38	25400	47000	36	36
25500	47600	34	34	25400	47000	32	38
25500	47800	41	41	25400	47040	108	108
25500	47800	38	38	25400	47200	108	82
25500	48000	56	60	25400	47200	86	86
25500	48000	91	69	25400	47400	64	64
25500	48200	86	91	25400	47400	60	60
25500	48200	51	64	25400	47600	45	47
25500	48400	41	41	25400	47600	47	47
25500	48400	73	47	25400	47800	51	47
25500	49000	93	84	25400	48000	51	69
25499	48210	134	91	25400	48200	67	64
25497	48005	134	91	25400	48400	38	47
25489	47420	119	58	25400	48600		64
25480	49000	366	320	25400	48600		57
25475	47000	73	64	25400	48600	93	84
25475	47200	47	47	25400	48600	66	77
25475	47200	47	45	25400	48670	225	193
25460	47000	75	54	25400	48800	36	38
25460	47000	51	47	25400	48800	30	39
25450	47200	78	78	25400	48900	366	184
25450	47800	352	102	25400	49000	39	48
25450	48000	152	121	25400	49000	48	48
25450	48200	64	64	25400	49200	21	20
25450	48400	82	73	25395	46780	84	61
25400	45480	16	16	25300	48500	49	54
25400	45600	20	19	25300	48600	139	93

Table E-3 (continued)

Coordinates		Exposure Rate ($\mu\text{R/h}$)		Coordinates		Exposure Rate ($\mu\text{R/h}$)	
North	East	Surface	Waist Level	North	East	Surface	Waist Level
25300	48700	36	41	25000	46000	43	39
25240	46800	309	143	25000	46000	43	43
25200	45480	27	20	25000	46150	39	39
25200	45550	59	30	25000	46200	25	30
25200	45600	45	39	25000	46200	25	25
25200	45600	43	39	25000	46300	25	25
25200	45680	25	27	25000	46400	43	45
25200	45800	22	21	25000	46400	48	48
25200	45800	21	20	25000	46460	52	66
25200	46000	24	24	25000	46600	126	121
25200	46000	22	22	25000	46600	141	152
25200	46200	32	30	25000	46665	184	148
25200	46200	34	32	25000	46670	89	80
25200	46280	66	50	25000	46700	68	73
25200	46320	32	34	25000	46800	62	64
25200	46400	20	20	25000	46800	68	84
25200	46460	30	30	25000	48600	39	39
25200	46490	48	48	25000	48600	439	265
25200	46600		41	25000	48750	265	265
25200	46600	43	45	25000	48800	51	64
25200	46600		39	25000	48800	58	67
25200	46600	43	43	25000	48950	99	91
25200	46740	70	61	25000	49000	47	49
25200	46800		47	25000	49000	48	48
25200	46800	51	56	24950	45600	36	39
25200	46800	48	52	24900	45800	56	56
25200	46800		45	24900	49000	66	66
25200	47600		139	24800	45480	21	19
25200	47600		136	24800	45600	22	21
25200	48600	64	54	24800	45600	23	23
25200	48600	66	64	24800	45670	30	30
25200	48800	38	41	24800	45720	39	34
25200	48800	33	41	24800	45800	32	30
25200	48975	126	91	24800	45800	32	34
25200	49000	93	84	24800	45900	43	41
25200	49000	82	86	24800	46000	64	59
25200	49200	18	18	24800	46000	61	61
25200	49200	20	21	24800	46040	89	84
25200	49200	21	21	24800	46200	71	71
25195	46400	21	23	24800	46200	75	75
25185	46400		20	24800	46250	39	39
25185	46400		21	24800	46300	52	52
25050	48800	439	265	24800	46400	80	80
25000	45600	21	21	24800	46400	77	70
25000	45600	21	21	24800	46500	64	70
25000	45700	27	27	24800	46600	84	93
25000	45800	38	36	24800	46630	157	139
25000	45800	39	36	24800	46685	80	93

Table E-3 (continued)

<u>Coordinates</u>		<u>Exposure Rate ($\mu\text{R/h}$)</u>		<u>Coordinates</u>		<u>Exposure Rate ($\mu\text{R/h}$)</u>	
<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>	<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>
24800	46700	109	129	24600	46800	411	456
24800	46720	366	297	24600	48600	211	202
24800	46730	502	388	24600	48600	187	189
24800	46760	170	198	24600	48800	78	82
24800	46780	343	275	24600	48800	82	75
24800	46800	330	330	24600	48930	25	27
24800	46800	479	456	24600	48930	21	23
24800	48500	57	66	24519	47900	30	30
24800	48800	51	58	24500	46770		374
24800	48800	48	57	24500	46770		388
24800	48900	139	116	24490	48600	93	184
24800	49000	21	23	24448	47263	439	396
24800	49000	21	21	24400	45600		17
24800	49600	10	10	24400	45600	21	21
24800	49800	11	11	24400	45600	21	20
24800	49900	11	11	24400	45600		19
24800	50000	11	11	24400	45800	21	20
24800	50200	11	12	24400	45800	21	21
24800	50400	11	11	24400	46000	25	25
24800	50600	11	11	24400	46000	30	30
24800	50800	11	11	24400	46200	36	36
24800	51000	10	10	24400	46200	30	32
24800	51200	11	10	24400	46400	139	139
24800	51400	10	10	24400	46400	134	139
24764	48600	366	366	24400	46600	411	366
24764	48600	184	320	24400	46600	396	374
24740	46800	570	570	24400	46700		357
24700	46000	120	102	24400	46700	411	411
24700	46200	287	287	24400	46700		366
24640	48700	275	184	24400	46800	456	456
24600	45600	21	21	24400	46800	461	439
24600	45600	21	21	24400	48600	116	116
24600	45800	25	25	24400	48600	116	102
24600	45800	25	27	24400	48800	64	69
24600	46000	30	32	24400	48800	66	66
24600	46000	30	30	24400	48850	275	193
24600	46200	34	38	24400	48945	21	21
24600	46200	34	38	24240	46600	330	309
24600	46400	30	30	24200	46000	36	34
24600	46400	275	275	24200	46000	34	34
24600	46600	343	320	24200	46150	47	47
24600	46600	352	330	24200	46200	30	32
24600	46600	330	330	24200	46200	27	30
24600	46680	366	343	24200	46350	56	56
24600	46700	275	275	24200	46400	75	93
24600	46720	157	179	24200	46400	75	91
24600	46740	320	320	24200	46450	297	275
24600	46800	439	439	24200	46450	330	287

Table E-3 (continued)

<u>Coordinates</u>		<u>Exposure Rate ($\mu\text{R/h}$)</u>		<u>Coordinates</u>		<u>Exposure Rate ($\mu\text{R/h}$)</u>	
<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>	<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>
24200	46600	189	200	23800	46600	64	69
24200	46600	178	191	23800	46700	352	352
24200	46700	352	352	23800	46800	439	374
24200	46800	352	374	23800	46800	439	418
24200	46800	352	352	23800	48600	47	51
24200	48600	60	69	23800	48600	52	57
24200	48600	61	70	23800	48800	21	23
24200	49000	20	18	23800	48800	19	17
24200	49000	18	21	23750	46600	570	439
24180	46140	70	68	23700	46000	25	25
24180	46140	69	67	23700	46200	30	25
24160	47492	352	396	23683	46915	527	527
24160	48800	47	51	23650	46450	547	388
24160	48800	47	51	23620	48600	21	21
24158	47254	527	418	23620	48600	18	18
24050	48600	275	275	23600	46000	39	39
24030	46380	275	275	23600	46000	18	20
24000	46000	23	23	23600	46200	22	23
24000	46000	21	21	23600	46200	48	48
24000	46200	30	30	23600	46400	48	57
24000	46200		27	23600	46400	48	48
24000	46200	30	30	23600	46600	110	104
24000	46200		27	23600	46600	93	93
24000	46400	202	193	23600	46700	184	184
24000	46400	229	229	23600	46760	275	275
24000	46600	93	93	23600	46800	411	388
24000	46600	82	80	23600	46800	374	374
24000	46700	547	547	23600	48800	18	17
24000	46800	456	456	23600	48800	17	17
24000	46800	418	396	23600	49400	11	11
24000	48600	157	175	23600	49600	18	14
24000	48600	152	157	23600	49800	12	13
24000	48700	93	61	23600	50000	10	11
24000	48800	36	34	23600	50200	11	11
24000	48800	25	30	23600	50400	12	12
24000	49000	18	19	23600	50600	11	11
24000	49000	21	21	23500	47750	221	187
23900	46400	120	111	23500	47800	56	56
23900	48600	84	102	23500	47900	169	152
23800	45965	56	56	23450	46600	352	309
23800	46000	25	30	23450	47800	56	56
23800	46000	25	25	23450	48000	47	47
23800	46200	27	30	23410	48800	14	14
23800	46200	30	30	23400	46000	17	17
23800	46300	265	265	23400	46000	15	16
23800	46400	70	66	23400	46200	19	19
23800	46400	73	71	23400	46200	20	20
23800	46600	60	67	23400	46290	60	38

Table E-3 (continued)

<u>Coordinates</u>		<u>Exposure Rate ($\mu\text{R/h}$)</u>		<u>Coordinates</u>		<u>Exposure Rate ($\mu\text{R/h}$)</u>	
<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>	<u>North</u>	<u>East</u>	<u>Surface</u>	<u>Waist Level</u>
23400	46400	32	30	23200	47200	34	39
23400	46400	30	30	23200	47200	39	39
23400	46600	47	51	23200	47400	48	48
23400	46600	47	51	23200	47400	47	47
23400	46650	156	156	23200	47600	30	30
23400	46700		95	23200	47600	38	38
23400	46700		93	23200	47600	39	39
23400	46700	91	99	23200	47760	30	30
23400	46800	374	352	23200	48000	30	24
23400	46800	352	352	23200	48000	30	30
23400	46800	374	352	23200	48200	23	22
23400	47000	48	48	23200	48200	23	21
23400	47000	320	320	23200	48400	22	21
23400	47000	352	330	23200	48400	20	21
23400	47200	287	265	23200	48600	14	13
23400	47200	297	229	23200	48600	14	14
23400	47400	147	152	23140	46000	16	15
23400	47400	150	152	23102	46400	68	39
23400	47600	91	91	23065	46000	12	11
23400	47600	73	91	23060	46200	14	13
23400	47800	56	56	23052	46400	17	18
23400	47800	34	39	23052	46400	18	18
23400	48000	39	48	23045	46600	84	84
23400	48000	52	52	23045	46600	27	30
23400	48000	43	43	23042	46700	27	30
23400	48000	45	41	23042	46700	93	93
23325	46800	265	243	23040	46800	343	366
23300	46800	287	287	23040	46800	25	27
23300	47000	166	184	23040	46800	25	24
23300	47200	48	57	23034	47000	30	30
23300	47400	99	91	23034	47000	23	23
23300	47600	60	60	23027	47200	25	25
23300	48400	39	48	23027	47200	30	27
23285	48000	34	39	23020	47400	30	30
23200	46000	43	43	23020	47400	27	30
23200	46000	14	14	23007	47800	25	25
23200	46200	21	16	23001	48000	21	23
23200	46200	39	39	23001	48000	21	23
23200	46400	30	34	23000	47600	23	21
23200	46400	25	25	23000	47600	17	20
23200	46550	57	52	23000	47800	21	21
23200	46600	32	32	23000	48200	17	17
23200	46600	39	39	23000	48200	17	18
23200	46700	57	61	23000	48400	19	19
23200	46800	207	139	23000	48400	19	18
23200	46800	180	143	23000	48600	17	18
23200	46800	729	683	23000	48600	17	17
23200	46900	479	366	22527	49000	30	38
23200	47000	48	70				

Table E-4

Exposure-Rate Data from the Scan of Highway 6 and 24

South Side of Highway			North Side of Highway		
Coordinates		Waist-Level Reading ($\mu\text{R/h}$)	Coordinates		Waist-Level Reading ($\mu\text{R/h}$)
North	East		North	East	
27160	64040	13	27200	64040	13
27069	63860	12	27109	63860	13
26978	63679	13	27018	63679	13
26886	63499	13	26926	63499	13
26795	63318	13	26835	63318	13
			26756	63161	17
26704	63138	13	26744	63138	13
26613	62957	13	26653	62957	12
26521	62777	13	26561	62777	12
26430	62597	12	26470	62597	11
26339	62416	14	26379	62416	12
26260	62260	25			
26252	62231	18	26292	62231	12
26135	62010	14	26175	62010	12
26043	61830	18	26085	61830	12
25980	61650	21	26020	61650	13
			25995	61509	14
25945	61455	25	25985	61455	16
25943	61255	21	25983	61255	17
25987	61060	25	26027	61060	19
26000	60975	23			
26040	60870	30	26080	60870	21
26110	60690	43	26150	60690	24
26173	60493	56	26213	60493	27
26190	60400	39			
26225	60290	47	26265	60290	32
26260	60100	61	26300	60100	41
26275	59900	65	26315	59900	52
26235	59705	56	26275	59705	52
26145	59525	52	26185	59525	47
26025	59370	52	26065	59370	43
25900	59215	47	25940	59215	38
25800	59100	30			
25755	59055	43	25795	59055	25
25700	59000	25			
25647	58885	30	25687	58885	20
25600	58800	15			
			25669	58778	14
25615	58690	17	25655	58690	14
			25655	58552	20
			25675	58552	29
25625	58495	14	25665	58495	29
25693	58295	17	25733	58295	15
25730	58100	17	25770	58100	13
25770	57905	14	25810	57905	13

Table E-4 (continued)

South Side of Highway			North Side of Highway		
Coordinates		Waist-Level	Coordinates		Waist-Level
North	East	Reading ($\mu\text{R/h}$)	North	East	Reading ($\mu\text{R/h}$)
25795	57705	14	25835	57705	13
25795	57505	12	25835	57505	12
25765	57305	11	25805	57305	12
25765	57107	11	25805	57107	11
25795	56910	13	25835	56910	11
25870	56730	13	25910	56730	11
25965	56550	12	26005	56550	10
26030	56355	12	26070	56355	10
26045	56175	12	26085	56175	16
			26085	56173	17
			26085	56075	20
			26085	55975	20
			26075	55775	16
26045	55975	12			
26035	55775	13			
26027	55705	17			
26007	55575	17	26047	55575	11
25965	55385	14	26005	55385	12
25910	55190	14	25950	55190	12
25900	55150	25			
			25909	55056	13
25850	55000	25	25890	55000	16
25800	54810	17	25840	54810	16
25747	54620	17	25787	54620	18
25705	54420	19	25745	54420	17
25695	54220	18	25735	54220	15
			25734	54120	19
25693	54020	19	25733	54020	19
25691	53820	19	25731	53820	14
25690	53620	17	25730	53620	21
25688	53420	14	25728	53420	19
25685	53221	13	25725	53221	15
25683	53021	14	25723	53021	12
25680	52821	13	25720	52821	11
25678	52622	14	25718	52622	12
25676	52422	14	25716	52422	12
25673	52222	14	25713	52222	13
25671	52023	14	25711	52023	13
25669	51823	17	25709	51823	15
25666	51623	18	25706	51623	15
25664	51423	15	25704	51423	17
25661	51224	14	25701	51224	16
25659	51024	21			
25657	50824	23	25697	50824	19
25654	50625	20	25694	50625	22
25652	50425	18	25692	50425	19
25650	50225	18	25690	50225	19
25647	50026	19	25687	50026	19
25645	49826	23	25685	49826	21

Table E-4 (continued)

South Side of Highway			North Side of Highway		
Coordinates		Waist-Level	Coordinates		Waist-Level
North	East	Reading ($\mu\text{R/h}$)	North	East	Reading ($\mu\text{R/h}$)
25642	49626	21	25682	49626	20
25640	49427	22	25680	49427	23
25638	49227	30	25678	49227	24
25635	49027	30	25675	49027	29
25633	48828	39	25673	48828	25
25630	48628	39	25670	48628	29
25628	48428	34	25668	48428	23
25626	48229	39	25666	48229	34
25623	48029	30	25663	48029	29
25621	47829	30	25661	47829	20
25619	47630	30	25659	47630	21
25616	47430	30	25656	47430	21
25614	47230	30	25654	47230	23
25611	47030	30	25651	47030	29
25609	46831	28	25649	46831	22
25607	46631	25	25647	46631	21
25604	46431	23	25644	46431	21
25602	46232	25	25642	46232	19
25600	46032	20	25640	46032	17
25597	45832	22	25637	45832	17
25595	45633	19	25635	45633	16
25592	45433	18	25632	45433	14
25590	45233	18	25630	45233	16
25588	45034	18	25628	45034	16
25585	44834	16	25625	44834	15
25583	44634	16	25623	44634	15
25580	44435	15	25620	44435	14
25578	44235	16	25618	44235	15
25576	44035	14	25616	44035	14
25573	43836	14	25613	43836	14
25571	43636	14	25611	43636	13
25569	43436	14	25609	43436	13
25566	43237	16	25606	43237	14
25564	43037	14	25604	43037	14
25561	42837	14	25601	42837	13
25559	42637	15	25599	42637	15
25557	42438	16	25597	42438	15
25554	42238	17	25594	42238	15
25552	42038	15	25592	42038	13
25550	41839	14	25590	41839	13
25547	41639	14	25587	41639	14
			25617	41629	16
25545	41439	14	25585	41439	14
25542	41240	14	25582	41240	13
25540	41040	14	25580	41040	13

Appendix F

RESULTS OF GAMMA-RAY SPECTROMETER MEASUREMENTS

Tables F-1 and F-2 present results of in-situ spectral-gamma measurements made at RFO and RFN, respectively, using an uncollimated geoMetrics GR-410 portable gamma-ray spectrometer. The radium and thorium values represent mass-normalized, dry-weight concentrations, assuming secular equilibrium between radium or thorium and its radioactive progeny. The uncertainties are reported at the 2 σ level, and reflect counting statistics only.

Table F-1

Results of Gamma-Ray Spectrometer Measurements at RFO

Grid Coordinates		Concentration		
		Ra-226	Th-232	K-40
North	East	(pCi/g)	(ppm)	(%)
27330	68830	4.1 $\pm$ 0.6	8.5 $\pm$ 1.3	1.3 $\pm$ 0.2
27000	59600	2.1 $\pm$ 0.6	14.3 $\pm$ 1.7	2.0 $\pm$ 0.2
27000	59800	2.7 $\pm$ 0.7	17.0 $\pm$ 1.9	2.1 $\pm$ 0.2
27000	60000	5.8 $\pm$ 0.9	13.2 $\pm$ 1.8	2.4 $\pm$ 0.3
26600	59600	138.1 $\pm$ 11.5	7.7 $\pm$ 10.0	0.4 $\pm$ 2.8
26600	59800	76.8 $\pm$ 6.5	10.6 $\pm$ 5.9	1.1 $\pm$ 1.6
26570	59400	10.3 $\pm$ 1.4	15.7 $\pm$ 2.7	2.0 $\pm$ 0.4
26470	59400	5.9 $\pm$ 0.8	6.2 $\pm$ 1.3	0.9 $\pm$ 0.2
26450	61350	14.2 $\pm$ 1.6	14.9 $\pm$ 2.2	2.3 $\pm$ 0.4
26394	62260	11.0 $\pm$ 1.2	9.9 $\pm$ 1.8	1.4 $\pm$ 0.3
26190	61035	39.6 $\pm$ 3.8	13.2 $\pm$ 3.6	1.6 $\pm$ 0.9
26175	61270	57.3 $\pm$ 5.0	16.2 $\pm$ 4.8	1.1 $\pm$ 1.2
26050	61410	2.9 $\pm$ 0.7	15.4 $\pm$ 1.8	2.1 $\pm$ 0.2
25905	61360	12.3 $\pm$ 1.3	9.7 $\pm$ 1.8	1.8 $\pm$ 0.4
25400	58800	4.4 $\pm$ 0.7	12.0 $\pm$ 1.7	2.0 $\pm$ 0.2
25325	58390	6.6 $\pm$ 0.9	11.1 $\pm$ 1.7	1.9 $\pm$ 0.3
25320	58735	4.6 $\pm$ 0.8	11.7 $\pm$ 1.6	2.0 $\pm$ 0.2

Table F-2

Results of Gamma-Ray Spectrometer Measurements at RFN

Grid Coordinates		Concentration		
		Ra-226 (pCi/g)	Th-232 (ppm)	K-40 (%)
North	East			
25400	46200	16.4 ± 1.8	12.5 ± 2.2	1.8 ± 0.4
25400	47400	46.8 ± 4.2	11.0 ± 3.7	1.8 ± 0.9
25395	48600	21.7 ± 2.2	11.1 ± 2.4	1.9 ± 0.5
25200	46600	18.6 ± 2.1	8.8 ± 2.5	1.8 ± 0.5
25200	49000	91.6 ± 7.8	7.9 ± 6.4	1.0 ± 1.7
25100	48100	222.6 ± 18.4	6.9 ± 14.7	0.7 ± 4.1
24800	48180	70.8 ± 6.1	7.8 ± 5.1	1.4 ± 1.4
24760	48700	228.6 ± 19.1	8.1 ± 15.2	0.5 ± 4.2
24600	45800	9.6 ± 1.2	9.7 ± 1.7	1.8 ± 0.3
24500	48700	23.9 ± 2.4	14.0 ± 2.8	1.9 ± 0.6
24400	46600	366.7 ± 30.4	8.9 ± 24.2	0.9 ± 6.8
24229	48200	149.4 ± 12.6	5.3 ± 10.2	1.0 ± 2.8
24200	48400	27.2 ± 2.7	11.1 ± 2.8	2.0 ± 0.6
24100	44544	8.2 ± 1.1	11.3 ± 1.8	1.9 ± 0.3
24000	46200	5.9 ± 0.9	14.5 ± 1.9	2.0 ± 0.3
24000	48600	220.7 ± 18.4	7.9 ± 14.8	1.9 ± 4.1
24000	49000	8.4 ± 1.1	11.1 ± 1.8	2.0 ± 0.3
23800	46000	7.8 ± 1.1	10.9 ± 1.8	2.2 ± 0.3
23400	46400	3.9 ± 0.8	12.7 ± 1.7	2.1 ± 0.2
23200	46000	3.0 ± 0.7	9.7 ± 1.5	2.3 ± 0.2
23200	47000	10.5 ± 1.4	12.2 ± 2.1	2.3 ± 0.3
23200	48000	7.6 ± 1.0	11.2 ± 1.8	2.0 ± 0.3
23040	46800	8.1 ± 1.1	12.4 ± 1.8	2.0 ± 0.3

Appendix G

BUILDING SURVEY DATA

Results of the building surveys at both sites are presented in Tables G-1 through G-6. In each table, exposure rates and alpha activities are listed by location numbers, which are keyed to the accompanying building sketches (Figures G-1 through G-6). Building locations at RFO and RFN are shown on Plates 1 and 2, respectively.

Exposure rates were measured at the surface and at waist level where possible, using Eberline PRM-7 $\mu\text{R/h}$ meters. The surface alpha data were obtained using an Eberline PAC-6 air-proportional alpha counter, except in the redcake and main office/shop buildings at RFN where a Ludlum Model 12/43-5 alpha counter was used. Direct measurements were made with the detector (wand) held approximately 1/4 in. above the surface being surveyed. At certain points where the alpha activity exceeded approximately 100 to 150 dpm/100 cm², wipe samples (smears) were collected. The smears were counted, using the alpha detector, approximately 4 hours after collection, and again approximately 40 hours after collection.

Table G-7 presents results of alpha measurements made on various items contained in the trash dump (26950N, 60350E) at RFO. A brief description of each surveyed item is provided.

Table G-1

Building Survey Data for the Assay Laboratory at RFO

Location Number	Alpha Activity (dpm/100 cm ²)			Exposure Rate (μR/h)	
	Direct Scan	Wipe (4 hr)	Wipe (40 hr)	Surface	Waist Level
1	377	340	460		36
1	290	180	180		
1	276	400	520		
2				45	46
3					89
4				51	49
5	435	100	140	14	14
6				22	16
7				21	26
8					23
9				14	17
10					41
11				44	61
12				41	44
13					28
14	2900			54	41
15				23	26
16				23	19
17				24	28
18				41	
19				20	26
20				13	20
21				20	24
22				19	18
23					36
24					13
25				18	18
26				13	14
27				13	15
28				13	16
29				14	15
30				13	13
31				16	15
32				18	20
33					54
34					51
35				17	19
36				28	56
37				28	31
38				36	54
39				38	46
40				36	44
41				36	38
42				36	33
43				36	49

Table G-1 (continued)

Location Number	Alpha Activity (dpm/100 cm ²)			Exposure Rate (μR/h)	
	Direct Scan	Wipe (4 hr)	Wipe (40 hr)	Surface	Waist Level
44				36	51
45				33	44
46				33	44
47				49	61
48				41	41
49				23	33
50				31	38
51				23	33
52				20	23
53				19	23
54				38	51
55				33	44
56				21	26
57				28	31
58				17	23
59				31	66
60				33	79
61				18	26
62				23	28
63				20	26
64				19	21
65				16	21
66				36	44
67				33	49
68	435	220	180	22	28
69				17	21
70				23	28
71				36	54
72				33	44
73				26	33
74				18	28
75				18	26
76	8700	2000	1700		
77	14500	3200	3400		
78	870	140	180		
79	435	100	140		
80	870	340	400		
81	1450	120	80

Figure G-1(a). Locations of Survey Measurements in the Assay Laboratory at RFO: First Floor

Table G-2

Building Survey Data for the Warehouse at RFN

Location Number ^a	Alpha Activity (dpm/100 cm ²)			Exposure Rate (uR/h)	
	Direct Scan	Wipe (4 hr)	Wipe (40 hr)	Surface	Waist Level
1	261	120	120		43
2					38
3					38
4					36
5					22
6					45
7					41
8					41
9					21
10					32
11					36
12					36
13					34
14	522	190	180		30
15					30
16					38
17					18
18					36
19				165	134
21					46

^aLocation number 20 was inaccessible, so no measurements were made.

Figure G-2. Locations of Survey Measurements in the Warehouse at RPN

Table G-3

Building Survey Data for the Garage/Change House at RFN

Location Number	Alpha Activity (dpm/100 cm ²)			Exposure Rate (μR/h)	
	Direct Scan	Wipe (4 hr)	Wipe (40 hr)	Surface	Waist Level
1				18	23
2	1392	160	160	18	18
3				33	33
4				17	22
5				17	20
6				17	20
7				17	18
8				22	19
9				15	18
10				17	22
11				16	18
12				22	20
13				21	20
14	116			23	18
15				15	19
16				16	17
17				24	17
18				19	19
19				21	16
20				15	17
21				15	17
22				21	16
23	609	80	100	20	18
24				14	16
25	1160	80	80	17	16
26				21	16
27				22	19
28				18	18
29	5800	800	800	16	16
30				15	15
31	696	180	180	16	15
32	145	40	40	17	16
33	812	170	160	17	17
34				17	20
35	406	90	80	17	20
36				17	20
37				18	17
38	261	100	100	18	20
38	725	160	150		
39	174	120	110	16	18
40				17	17
41				17	17
42	290	120	120	17	19
43				13	12
44				15	18

Table G-3 (continued)

Location Number	Alpha Activity (dpm/100 cm ²)			Exposure Rate (μR/h)	
	Direct Scan	Wipe (4 hr)	Wipe (40 hr)	Surface	Waist Level
45				14	13
46				17	18
47	116	80	80	16	16
48	290	80	90	16	17
48	812	120	120		
49	928	110	100	14	16
50	290	40	40	12	12
51	870	60	60	18	21
52				17	18
53	348	80	70	16	17
54				14	15
55				15	17
56				18	23

T-10

Figure G-3. Locations of Survey Measurements in the Garage/Change House at RPN

Table G-4

Building Survey Data for the Main Office/Shop Building at RFN

Location Number	Alpha Activity (dpm/100 cm ²)			Exposure Rate (uR/h)	
	Direct Scan	Wipe (4 hr)	Wipe (40 hr)	Surface	Waist Level
1	250			12	13
2				13	14
3				12	13
4				13	12
5				13	13
6	125			13	13
7	125			13	14
8	125			12	12
9				13	13
10	250			12	12
11	250			12	11
12				12	12
13				12	12
14	371			10	10
15	250			10	10
16				13	13
17				13	13
18	620			13	13
19				13	13
20	991	219	138	13	12
21				12	12
22				13	12
23	125			12	12
24				13	12
25				12	11
26				12	12
27				12	11
28				12	12
29				11	11
30				11	12
31				12	12
32	250			12	12
33	495			11	11
34	620			11	12
35				12	12
36	866			12	12
37	495			13	13
38	371			13	12
39				12	12
40	250			12	11
41				12	11
42	495			12	11
43				12	13
44	250			12	12
45	125			11	12

Table G-4 (continued)

Location Number	Alpha Activity (dpm/100 cm ²)			Exposure Rate (uR/h)	
	Direct Scan	Wipe (4 hr)	Wipe (40 hr)	Surface	Waist Level
46	745			13	13
47	768			14	14
48				16	17
49				16	16
50	1338	366	230	14	19
51				13	14
52	866			16	14
53				14	14
54	1160	400	320	12	11
55	1044	60	100	12	14
56	464			12	13
56	3717	511	506		
57	667			11	12
58	495			14	15
59				14	15
60	522			13	11
61	725			12	13
62	870			23	24
63				11	11
64				12	12
65				12	12
66				12	12
67	638			15	16
68	87			11	11
69	522			13	12
70	290			12	12
71	319			11	12
72				12	12
73	232			12	13
74	116			13	13
75	319			13	13
76	218			12	11
77	290			11	12
78				12	12
79	203			11	12
80				13	14
81	232			12	12
82	232			13	13
83	348			14	14
84	290			13	13
85	290			12	13
86	232			13	13
87				13	15
88	290			13	13
89	406			13	14
90				12	13
91	145			13	13

Table G-4 (continued)

Location Number	Alpha Activity (dpm/100 cm ²)			Exposure Rate (μR/h)	
	Direct Scan	Wipe (4 hr)	Wipe (40 hr)	Surface	Waist Level
92	247			13	12
93				12	13
94	290			13	13
95	145			13	13
96	580			13	13
97	754	80	100	16	14
98	522			17	16
99				16	16
100				15	15
101				13	13
102	638	160	240	16	14
103	174			15	16
104	348			15	15
105	290			16	15
106	725	60	80	14	15
107	638			14	14
108				15	16
109				17	17
110				16	16
111	406	120	60	15	15
112				16	18
113	464			14	14
114				13	12
115	290			13	13
116				13	13
117				13	13
118	435			13	13
119	464			13	13
120				12	12
121	116			13	12
122	290			15	14
123	638			14	14
124	986	200	140	16	15
125				15	16
126				17	16
127	812			17	16
128	348			15	15
129	290			15	16
130	986	160	140	21	30
131				14	17
132				14	15
133	1102	80	60	14	13
134				15	14
135				14	13
136	125			13	13
137	371			13	13
138	745				

Table G-4 (continued)

Location Number	Alpha Activity (dpm/100 cm ²)			Exposure Rate (μR/h)	
	Direct Scan	Wipe (4 hr)	Wipe (40 hr)	Surface	Waist Level
139	745				
140	620				
141	495				
142	371				
143	1240	366	184		
144	174				
145	464				
146	116				
147	116				
148	435				
149	377				
150	232				
151	1044	120	120		
152	464				
153	1044				
154	522				
155	638				
156	232				
157	725				
158	754				
159	2610	200	160		
160	1334	400	400		
161	812				
162	1276	460	400		
163	638

Figure G-4. Locations of Survey Measurements in the Main Office/Shop Building at RFN

Table G-5

Building Survey Data for the Redcake Building at RFN

Location Number ^a	Alpha Activity (dpm/100 cm ²)			Exposure Rate (μR/h)	
	Direct Scan	Wipe (4 hr)	Wipe (40 hr)	Surface	Waist Level
1					15
2	290				
3	348	60	40		
4	290	40	60		
5	638				30
6	580	20	20		
7	1044	80	60		
8	232	60	60		14
9	58	20	20		
10	522	20	20		57
11	232	60	40		
12	348	80	60		
13	3190	100	80		20
14	232	80	40		
15	406	80	20		10
16		60	20		
17	290	20	10		11
18	348	40	40		
19					12
20	371				18
21					27
22	371				
23	250				
24	620				
25	1611	292	219		
26	1486				
27	125				
28	125				
29	125				
30	250				
31	250				
32	125				
33	371				18
34	495				
35	1115	74	74		
36					16
39	250				
40	495				
41	2477	74	74		
42	125				
43	125				
44					10
45	250				
46	991	147	74		10

^aNo measurements were made at location numbers 37, 52, and 62.

Table G-5 (continued)

Location Number	Alpha Activity (dpm/100 cm ²)			Exposure Rate (μR/h)	
	Direct Scan	Wipe (4 hr)	Wipe (40 hr)	Surface	Waist Level
47	1240	74	74		
48	991	74	74		
49	371				
50	1240	110	74		
51					14
53	371				14
54	125				16
55	371				
56					12
57					19
58	125			118	
59	2972	110	74		30
60					39
61	495	110	74	89	
63	125				
64	250				18
65	4707	219	219		12
66	125				16
67	125				
68					21
69					27
70					15
71					12
72	145	40	40		11
73	1015	80	60		
73	250				
74	1044	20	40		
75	58	60	60		
76	522	60	40		
77	406	60	60		
78	232	40	20		
79	145	80	40		
80	1044	40	40		
81	174	60	40		
82	754	40	40		
83	406	60	60		
84	464	60	60		
85	116	20	40		
86	638	80	60		
87	290	40	20		
88	522	60	40		
88	371				
89	290	60	20		
90	1102	80	40		
91	435	60	20		
92	371				
93	1611	74	147

Figure G-5(a). Locations of Survey Measurements in the Redcake Building at RFN: Above Elevation of 5326 Ft

Figure G-5(b). Locations of Survey Measurements in the Redcake Building at RFN: Between Elevations of 5317 and 5326 Ft

Figure G-5(c). Locations of Survey Measurements in the Redcake Building at RFN: Between Elevations of 5298 and 5317 Ft

Figure G-5(d). Locations of Survey Measurements in the Redcake Building at RFN: Below Elevation of 5298 Ft

Table G-6

Building Survey Data for the Solvent Extraction Building at RFN

Location Number	Alpha Activity (dpm/100 cm ²)			Exposure Rate (uR/h)	
	Direct Scan	Wipe (4 hr)	Wipe (40 hr)	Surface	Waist Level
1	1305			36	
2	290			25	
3	957			20	
4	696			15	
5	4640	400	380	13	
6	348			18	
7	1015			13	
8	8990	640	680	14	
9	1160			14	
10	2030			19	
11	12180	500	460	22	
12	1740			16	
13	290			17	
14	261			16	
15	1450			12	
16	928			10	
17	174			14	
18	23200	280	240	38	
19	870			17	
20	1044			17	
21	870			17	
22	2610	120	120	14	
23	957			20	
24	1334			22	
25	2610	120	140	17	
26	2610	240	240	45	
27	3480	440	400	62	
28	7830	300	280	30	
29	2610	640	540	32	
30	6960	120	120	38	
31	1450			27	
32	3480	1320	1200	30	
33	14210	280	280	54	
34	6960	1800	1600	41	
35	2610	300	300	69	
36	8120	1640	1600	38	
37	2320			49	
38	2610			21	
39	1392			43	
40	4350	400	340	32	
41	4930	280	280	91	
42	2320			64	
43	5800	1600	1600	38	
44	5220	2000	2200	58

Figure G-6(a). Locations of Survey Measurements in the Solvent Extraction Building at RFN: Above Elevation of 5330 Ft

Figure G-6(b). Locations of Survey Measurements in the Solvent Extraction Building at RFN: At Elevation of 5320 Ft

Figure G-6(c). Locations of Survey Measurements in the Solvent Extraction Building at RFN: At Elevation of 5310 Ft

Figure G-6(d). Locations of Survey Measurements in the Solvent Extraction Building at RFN: At Elevation of 5305 Ft

Figure G-6(e). Locations of Survey Measurements in the Solvent Extraction Building at RFN: Basement

Table G-7

Survey Data for the Trash Dump at RFO

Item Surveyed	Alpha Activity (dpm/100 cm ²)		
	Direct Scan	Wipe (4 hr)	Wipe (40 hr)
Wood Building Frame	116	0	0
Wood Building Frame	58	0	0
Mattress	0	0	0
Yellow-Cake Barrel	2175	40	60
Piece of Metal	2610	50	40
Master Switch Box	1450	50	50
Metal Switch Box	2900	0	20
Barrel	29	0	0
Metal Tubing	9860	40	40
Small Metal Barrel	667	40	40

Appendix H

BOREHOLE LITHOLOGIC LOGS (on microfiche in pocket)

Borehole lithologic logs were recorded for those areas in which split-barrel sampling was conducted, using the U.S. Department of Interior Unified Soil Classification System (U.S. Department of Interior, 1963). The alpha-scan data listed in the Comments section on certain logs indicate the alpha contamination detected on the split-barrel sampler prior to its decontamination.

Microfiche are located in the Project Document Control Center, Albuquerque, New Mexico, location number 6.20.6.4.

Appendix I

BOREHOLE RADIOMETRIC LOGGING DATA

Radiometric logs for the boreholes at RFO and RFN are provided on microfiche (see pocket below). The procedures used for drilling and logging are described in Sections 3.5.2 and 3.5.3. The radium values cited on the logs represent mass-normalized, dry-weight concentrations, assuming secular equilibrium between radium and its radioactive progeny. Uncertainties are reported at the 2σ level, and include uncertainties associated with counting statistics, calibration, and correction factors. The fluid level in the hole is given in ft; for dry holes, the fluid level is reported as 99.0 ft, the computer-program default value. The auger height is measured from the top of the auger to ground surface.

Summaries of the characteristics and calibration parameters for the Compu-logger and RASCAL logging systems used at the two Rifle sites are provided at the top of the next page. Tables I-1 and I-2 summarize borehole data for RFO and RFN, respectively. For purposes of comparing logging-system performance, borehole RFN-140 was logged both open hole and through the auger stem, using the two systems, Compulogger and RASCAL.

Microfiche are located in the Project Document Control Center, Albuquerque, New Mexico, location number 6.20.6.4.

COMPULOGGER SYSTEM EQUIPMENT DATA

INSTRUMENT	Compullogger	CASING THICKNESS	0.1875 in.
GJO NUMBER	C-1912S	CASING FACTOR	1.254 ± 0.007
SERIAL NUMBER	230-01	FLUID FACTOR	1.108 ± 0.100
DETECTOR	NaI(Tl)	MOISTURE FACTOR	1.108 ± 0.041
DETECTOR SIZE	2 in. x 6 in.	K FACTOR	$7.31 \pm 0.14 \text{ g x}$
PROBE DIAMETER	2.7 in.		cps/pCi(Ra226)
HOLE DIAMETER	4.5 in.	ALPHA FACTOR	$3.20 \pm 0.32 \text{ inverse ft}$
		CALIBRATION DATE	10 October 1984

RASCAL SYSTEM EQUIPMENT DATA

INSTRUMENT	PRS-1 RASCAL	CASING THICKNESS	0.1875 in.
GJO NUMBER	C-3572S	CASING FACTOR	1.635 ± 0.119
SERIAL NUMBER	753	FLUID FACTOR	1.051 ± 0.036
DETECTOR	NaI(Tl)	MOISTURE FACTOR	1.108 ± 0.041
DETECTOR SIZE	2 in. x 2 in.	K FACTOR	$76.77 \pm 1.98 \text{ g x}$
PROBE DIAMETER	2.5 in.		cps/pCi(Ra226)
HOLE DIAMETER	4.5 in.	ALPHA FACTOR	$3.20 \pm 0.32 \text{ inverse ft}$
		CALIBRATION DATE	28 September 1984

Table I-1

Borehole Data for RFO

Hole Number	Grid Coordinates		Elevation (ft)	Log Depth (ft)	Fluid Level (ft)
	North	East			
RFO-200	25315.5	59066.0	5306.0	2.2	99.0
RFO-201	25413.0	58987.0	5306.7	1.3	99.0
RFO-203	25455.0	59201.0	5310.7	15.5	11.6
RFO-204	25435.0	59400.0	5304.1	5.0	99.0
RFO-205	25485.0	59600.0	5303.7	5.5	99.0
RFO-206	25495.0	59900.5	5309.1	1.5	99.0
RFO-207	25540.5	59801.5	5305.3	4.2	99.0
RFO-208	25587.0	60306.0	5310.9	2.0	99.0
RFO-209	25600.0	60000.0	5306.0	4.0	99.0
RFO-210	25600.0	60200.0	5308.6	5.0	99.0
RFO-211	25629.0	60307.5	5309.5	6.0	99.0
RFO-212	25677.0	60689.0	5312.5	5.0	99.0
RFO-213	25700.0	60100.0	5306.0	4.4	99.0
RFO-214	25700.0	60200.0	5306.8	5.5	99.0
RFO-215	25700.0	60300.0	5308.2	5.2	99.0
RFO-218	25711.0	60699.5	5313.1	1.3	99.0
RFO-219	25769.5	61095.5	5314.4	2.4	99.0
RFO-220	25800.0	60200.0	5305.9	4.5	3.5
RFO-221	25800.0	60300.0	5309.3	3.6	3.5
RFO-222	25800.0	60400.0	5311.7	5.5	99.0
RFO-223	25800.0	60600.0	5311.8	6.0	99.0

Table I-1 (continued)

Hole Number	Grid Coordinates		Elevation (ft)	Log Depth (ft)	Fluid Level (ft)
	North	East			
RFO-224	25801.0	60789.0	5312.0	12.0	7.3
RFO-225	25800.0	61000.0	5312.2	1.9	99.0
RFO-226	25898.0	60140.5	5306.9	3.8	3.7
RFO-227	25900.0	60200.0	5307.4	3.0	99.0
RFO-228	25900.0	60300.0	5310.5	5.7	99.0
RFO-229	25897.0	60405.0	5312.5	4.6	4.5
RFO-230	25900.0	60500.0	5312.6	1.0	99.0
RFO-231	25900.0	60700.0	5312.2	6.0	99.0
RFO-232	25900.0	60900.0	5311.5	6.0	99.0
RFO-233	26000.0	60200.0	5308.2	4.5	4.4
RFO-234	25997.5	60297.5	5313.1	9.0	99.0
RFO-235	26000.0	60400.0	5315.0	5.5	99.0
RFO-236	26000.0	60600.0	5311.0	4.0	99.0
RFO-237	26000.0	60800.0	5312.8	6.0	99.0
RFO-238	26006.0	59422.5	5328.0	24.5	99.0
RFO-240	26100.0	60199.5	5317.6	14.0	99.0
RFO-241	26101.0	60301.0	5314.2	5.5	99.0
RFO-242	26105.0	60398.0	5321.7	4.5	99.0
RFO-243	26100.0	60500.0	5314.6	6.0	99.0
RFO-244	26189.0	59720.5	5322.6	18.0	99.0
RFO-245	26200.0	60032.5	5337.3	5.7	99.0
RFO-246	26200.0	60100.0	5334.3	37.5	29.5
RFO-247	26200.0	60200.0	5326.8	15.5	99.0
RFO-248	26200.0	60300.0	5337.5	4.8	99.0
RFO-249	26167.0	60360.5	5326.0	6.0	99.0
RFO-250	26500.0	59500.0	5441.4	6.0	99.0
RFO-251	26500.0	59700.0	5437.0	5.0	99.0
RFO-252	26600.0	59600.0	5436.1	6.0	99.0
RFO-253	26600.0	59800.0	5430.7	6.0	99.0
RFO-254	26600.0	60000.0	5424.8	6.0	99.0
RFO-255	26700.0	59500.0	5437.1	6.0	99.0
RFO-256	26600.0	60300.0	5370.1	4.5	99.0
RFO-257	26921.0	60286.0	5397.6	4.7	99.0
RFO-258	26927.0	60382.5	5398.6	3.9	99.0
RFO-259	26933.5	60439.0	5408.8	5.1	99.0
RFO-260	26809.0	60287.5	5385.5	4.9	99.0
RFO-261	26929.5	60271.0	5401.8	5.0	99.0
RFO-262	25793.5	61010.0	5314.3	2.5	99.0
RFO-280	25673.0	60544.0	5311.6	6.1	99.0
RFO-281	25679.5	60580.0	5311.8	7.3	99.0
RFO-282	25572.0	60243.0	5310.2	1.7	99.0
RFO-283	25614.0	60421.5	5310.8	5.0	99.0
RFO-284	25634.5	60506.5	5311.3	5.0	99.0
RFO-285	25700.0	60795.0	5312.9	2.2	99.0
RFO-286	25723.5	60779.0	5313.4	5.0	99.0
RFO-287	25758.0	60893.5	5314.5	1.5	99.0
RFO-288	25813.0	61327.0	5315.2	1.5	99.0
RFO-290	25797.5	60840.0	5311.6	4.0	99.0

Table I-2

Borehole Data for RFN

Hole Number	Grid Coordinates		Elevation (ft)	Log Depth (ft)	Fluid Level (ft)
	North	East			
RFN-001	23200.0	46800.0	5262.5	3.5	99.0
RFN-002	23317.0	48103.0	5270.2	5.5	99.0
RFN-003	23300.0	48400.0	5263.3	4.1	3.2
RFN-004	23314.0	46813.0	5264.1	8.3	7.2
RFN-005	23190.0	46909.5	5264.3	6.0	99.0
RFN-006	23400.0	46600.0	5262.4	4.0	99.0
RFN-007	23400.5	47200.5	5268.3	3.5	99.0
RFN-008	23400.0	47600.0	5263.4	7.5	1.7
RFN-009	23599.5	46765.0	5268.2	7.0	99.0
RFN-010	23600.0	47700.0	5267.7	3.5	99.0
RFN-011	23597.5	47796.0	5264.5	6.0	1.8
RFN-012	23801.0	46284.0	5261.1	3.5	99.0
RFN-013	23752.5	46596.5	5261.9	6.0	3.7
RFN-014	23837.5	47743.0	5269.9	7.3	99.0
RFN-015	23800.0	47800.0	5264.7	2.6	99.0
RFN-016	23800.0	47976.0	5265.5	5.5	3.7
RFN-017	23800.0	48245.0	5264.4	4.2	4.0
RFN-018	23800.0	48400.0	5265.0	3.5	3.3
RFN-019	23800.0	48600.0	5266.0	7.0	5.5
RFN-020	23800.0	48800.0	5266.8	4.0	99.0
RFN-021	23899.0	46753.0	5266.7	5.5	99.0
RFN-022	23958.5	47930.5	5269.2	8.5	6.5
RFN-023	24000.0	48000.0	5266.3	2.0	99.0
RFN-024	24036.0	48208.0	5264.6	2.0	1.9
RFN-025	24000.0	48400.0	5264.5	5.5	2.8
RFN-026	24000.0	48600.0	5265.0	7.0	3.0
RFN-027	24000.0	48800.0	5266.4	4.0	3.6
RFN-028	24202.5	46444.0	5261.0	3.0	0.4
RFN-029	24201.5	46768.0	5268.0	6.5	99.0
RFN-029	24201.5	46768.0	5268.0	7.4	7.2
RFN-030	24279.0	47740.5	5272.2	2.0	2.0
RFN-031	24200.0	48015.0	5272.5	8.0	99.0
RFN-032	24229.0	48198.5	5268.6	7.0	4.0
RFN-033	24200.0	48400.0	5267.2	4.6	99.0
RFN-034	24200.0	48600.0	5265.6	3.0	4.8
RFN-035	24161.0	48800.0	5266.6	3.5	3.9
RFN-036	24300.0	48100.0	5267.2	7.0	2.9
RFN-037	24273.5	48309.0	5267.9	3.5	99.0
RFN-038	24300.0	48500.0	5267.5	3.0	99.0
RFN-039	24300.0	48700.0	5269.1	3.5	99.0
RFN-040	24400.0	48015.0	5271.9	7.2	99.0
RFN-041	24401.5	48231.0	5269.7	3.5	99.0
RFN-042	24393.0	48405.0	5268.6	3.5	99.0
RFN-043	24400.0	48600.0	5269.2	3.5	99.0
RFN-044	24400.0	48800.0	5269.8	3.5	99.0
RFN-045	24491.0	46767.0	5267.9	4.0	99.0

Table I-2 (continued)

Hole Number	Grid Coordinates		Elevation (ft)	Log Depth (ft)	Fluid Level (ft)
	North	East			
RFN-046	24556.5	47554.5	5274.6	5.5	99.0
RFN-047	24500.5	48108.5	5269.2	4.2	4.0
RFN-048	24500.0	48300.0	5269.9	3.5	99.0
RFN-049	24500.0	48500.0	5269.6	4.0	99.0
RFN-050	24500.0	48700.0	5269.6	3.5	99.0
RFN-051	24600.0	46600.0	5263.1	3.5	4.7
RFN-052	24600.0	47820.0	5275.9	4.5	99.0
RFN-053	24594.5	48001.0	5270.0	4.0	99.0
RFN-054	24593.0	48180.0	5270.4	4.0	99.0
RFN-055	24600.0	48400.0	5270.9	4.0	99.0
RFN-056	24600.0	48600.0	5270.8	3.5	99.0
RFN-057	24602.5	48769.0	5269.2	4.0	99.0
RFN-058	24700.0	47900.0	5271.2	4.5	99.0
RFN-059	24700.0	48100.0	5272.6	9.0	9.0
RFN-060	24703.0	48264.5	5271.9	4.0	99.0
RFN-061	24700.0	48500.0	5271.8	3.5	99.0
RFN-062	24700.0	48700.0	5270.0	4.0	99.0
RFN-063	24795.0	46732.0	5267.8	7.1	7.0
RFN-064	24880.0	47570.0	5275.6	7.2	99.0
RFN-065	24800.0	47800.0	5274.3	4.0	99.0
RFN-066	24802.0	48005.0	5275.6	6.3	99.0
RFN-067	24800.0	48180.0	5274.7	4.0	99.0
RFN-068	24800.0	48400.0	5273.8	3.5	99.0
RFN-069	24761.5	48599.5	5271.5	4.0	99.0
RFN-070	24800.0	48800.0	5270.0	4.0	99.0
RFN-071	24898.5	47706.5	5277.1	3.5	99.0
RFN-072	24888.0	47893.0	5276.1	4.0	99.0
RFN-073	24949.5	48111.0	5279.5	4.0	99.0
RFN-074	24900.5	48290.0	5278.2	4.0	99.0
RFN-075	24904.5	48506.5	5276.4	3.5	99.0
RFN-076	24900.0	48700.0	5271.7	3.5	99.0
RFN-077	25009.5	46412.0	5264.9	3.5	99.0
RFN-078	24987.5	46787.5	5272.5	4.7	99.0
RFN-079	25000.0	47000.0	5274.3	7.5	99.0
RFN-080	25000.0	47200.0	5276.9	6.5	99.0
RFN-081	25000.0	47400.0	5278.0	7.5	99.0
RFN-082	24996.0	47604.0	5278.1	7.6	99.0
RFN-083	25000.0	47800.0	5278.9	3.5	99.0
RFN-084	24918.5	48010.0	5279.0	3.5	99.0
RFN-086	25000.0	48400.0	5279.8	3.5	99.0
RFN-087	24943.5	48592.0	5275.6	13.5	10.6
RFN-088	25000.0	48800.0	5271.4	4.5	99.0
RFN-089	25000.0	49000.0	5271.6	4.0	99.0
RFN-090	25095.0	46901.5	5277.6	6.0	99.0
RFN-091	25100.0	47100.0	5275.0	7.5	99.0
RFN-092	25100.0	47300.0	5276.3	8.5	99.0
RFN-094	25101.0	47667.0	5281.1	4.0	99.0
RFN-095	25103.0	47883.0	5282.5	4.0	99.0

Table I-2 (continued)

Hole Number	Grid Coordinates		Elevation (ft)	Log Depth (ft)	Fluid Level (ft)
	North	East			
RFN-096	25100.0	48100.0	5283.7	7.8	99.0
RFN-097	25102.5	48299.0	5282.1	3.5	99.0
RFN-098	25100.0	48500.0	5279.5	3.5	99.0
RFN-099	25100.0	48700.0	5274.6	5.5	99.0
RFN-100	25200.0	46600.0	5274.5	4.0	99.0
RFN-101	25201.5	46795.5	5277.6	4.5	99.0
RFN-102	25203.0	47020.0	5275.5	7.0	99.0
RFN-102	25203.0	47020.0	5275.5	7.9	99.0
RFN-103	25199.0	47200.0	5276.1	4.0	99.0
RFN-104	25203.0	47395.5	5278.6	4.5	99.0
RFN-105	25200.0	47600.0	5281.0	3.5	99.0
RFN-106	25196.5	47798.5	5285.1	4.0	99.0
RFN-107	25200.0	48000.0	5286.2	3.5	99.0
RFN-108	25200.0	48200.0	5285.0	4.0	99.0
RFN-109	25196.0	48383.5	5282.7	4.0	99.0
RFN-110	25200.0	48600.0	5278.4	8.0	99.0
RFN-111	25200.0	48800.0	5274.4	5.5	99.0
RFN-112	25200.0	49000.0	5272.2	4.6	99.0
RFN-113	25300.0	46900.0	5276.2	6.0	99.0
RFN-114	25299.0	47114.0	5275.8	3.5	99.0
RFN-115	25298.0	47299.5	5278.3	3.5	99.0
RFN-116	25275.5	47501.0	5281.1	3.5	99.0
RFN-117	25285.0	47700.0	5285.6	4.0	99.0
RFN-119	25281.0	48130.0	5287.7	4.0	99.0
RFN-120	25295.0	48301.5	5289.9	4.0	99.0
RFN-121	25281.5	48502.5	5283.8	8.0	99.0
RFN-122	25300.0	48700.0	5277.5	7.5	99.0
RFN-123	25401.0	46793.5	5279.1	4.0	99.0
RFN-124	25400.0	47000.0	5278.2	4.0	99.0
RFN-125	25400.5	47199.0	5279.8	4.0	99.0
RFN-126	25400.0	47400.0	5283.3	4.0	99.0
RFN-127	25400.0	47600.0	5286.9	4.0	99.0
RFN-130	25387.0	48185.0	5290.4	4.0	99.0
RFN-131	25393.0	48358.0	5289.7	4.0	99.0
RFN-132	25395.5	48599.5	5287.6	7.5	99.0
RFN-133	25402.0	48802.5	5278.0	6.0	99.0
RFN-134	25400.0	49000.0	5275.9	4.5	99.0
RFN-135	23399.5	47400.0	5262.9	3.5	3.5
RFN-136	23203.0	48400.5	5263.6	4.7	3.8
RFN-137	24002.0	48999.0	5268.7	3.8	99.0
RFN-138	23500.0	47874.0	5263.8	3.0	2.3
RFN-139	24996.5	46660.5	5269.6	3.5	99.0
RFN-140	24400.5	46699.5	5265.7	4.9	4.5
RFN-140	24400.5	46699.5	5265.7	4.5	4.5
RFN-160	25502.5	48412.5	5288.0	5.0	99.0
RFN-161	25499.0	48209.5	5287.9	5.0	99.0
RFN-162	25496.5	48004.5	5287.9	4.0	99.0
RFN-163	25490.0	47602.5	5287.1	4.0	99.0

Table I-2 (continued)

Hole Number	Grid Coordinates		Elevation (ft)	Log Depth (ft)	Fluid Level (ft)
	North	East			
RFN-164	25488.5	47419.5	5286.7	4.0	99.0
RFN-165	25492.5	46970.5	5281.2	4.0	99.0
RFN-166	25552.5	48601.0	5287.0	4.0	99.0
RFN-167	23590.0	47800.0	5264.5	5.5	4.3

Appendix J

ANALYTICAL DATA AND RADIOMETRIC MEASUREMENT RESULTS FOR BACKGROUND SITES

Table J-1 presents gamma-ray-spectroscopy analytical results for surface (0 to 6 in.) soil samples collected at the four background sites (see Figure 1 for locations). Results of the in-situ delta-gamma radium measurements made on the surface at the soil-sampling locations are presented in Table J-2. Table J-3 lists spectral-gamma data from the four sites, obtained using a geoMetrics GR-410 portable gamma-ray spectrometer. Exposure rates were measured using a Reuter-Stokes RSS-111 PIC and two Eberline PRM-7 $\mu\text{R/h}$ meters; results are presented in Table J-4.

The radium, thorium, and potassium values represent mass-normalized, dry-weight concentrations, assuming secular equilibrium between radium or thorium and its radioactive progeny. Uncertainties are reported at the 2σ level.

Table J-1

Gamma-Ray-Spectroscopy Data for Soil Samples Collected at the Background Sites

Site	Grid		Depth (in.)	Sample Number	Concentration		
	Coordinates				Ra-226	Th-232	K-40
	North	East			(pCi/g)	(ppm)	(%)
BG-3	35000	59950	0-6	MCX-160	1 ± 1	11 ± 2	1.8 ± 0.4
BG-1	26000	76400	0-6	MCX-158	1 ± 1	11 ± 3	1.8 ± 0.4
BG-4	20200	52900	0-6	MCX-161	1 ± 1	11 ± 3	1.6 ± 0.4
BG-2	15400	34700	0-6	MBB-913	2 ± 1	10 ± 2	1.9 ± 0.2
BG-2	15400	34700	0-6	MCX-159	1 ± 1	10 ± 3	2.1 ± 0.5

Table J-2

In-Situ Delta-Gamma Radium Data for the Background Sites

Site	Grid Coordinates		Ra-226 Concentration (pCi/g)	
	North	East	Instr. C-1130S	Instr. C-1114S
BG-3	35000	59950	1.9 ± 1.1	2.6 ± 0.9
BG-1	26000	76400	2.7 ± 1.1	2.2 ± 1.2
BG-4	20200	52900	2.0 ± 1.1	3.1 ± 1.1
BG-2	15400	34700	3.0 ± 1.2	2.3 ± 0.9

Table J-3

Gamma-Ray Spectrometer Data for the Background Sites

Site	Grid Coordinates		Concentration		
	North	East	Ra-226 (pCi/g)	Th-232 (ppm)	K-40 (%)
BG-3	35000	59950	1.65 ± 0.45	12.29 ± 1.21	1.91 ± 0.15
BG-1	26000	76400	2.60 ± 0.53	12.56 ± 1.26	2.06 ± 0.17
BG-4	20200	52900	2.09 ± 0.50	13.63 ± 1.28	1.91 ± 0.16
BG-2	15400	34700	2.84 ± 0.51	10.01 ± 1.14	1.93 ± 0.16

Table J-4

Exposure-Rate Data for the Background Sites

Site	Grid Coordinates		Exposure Rate (μ R/h)		
	North	East	PRM-7 (C-8838)	PRM-7 (C-8837)	PIC
BG-3	35000	59950	11	12	14.8
BG-1	26000	76400	12	12	15.3
BG-4	20200	52900	11	12	15.0
BG-2	15400	34700	12	13	15.3

ADDENDUM D2
BOREHOLE INFORMATION

Table D2.1 Old Rifle borehole information

Hole number	Total hole depth (ft)	Physical depth (ft)	Sample description	Interval depth	BFEC activity (pCi/g)	SNL activity (pCi/g)	pCi/g interface (ft)
A-11	24.5	23	2	2.5-5	655		MSG
			6	12.5-15	718		
A-13	29.2	25	S-1	22.5-25	456	73.8	
			3	5-7.5	642		MSG
			S-1	25-27.5		15.7	
A-15	27	23	S-2	27.5-30	459		
			1	0-2.5	559		MSG
			8	17.5-20	680		
			S-1	22.5-25	26		
A-41	25.4	21.5	S-2	25-27.5	43	22.5	
			7	15-17.5	849		MSG
			S-1	20-22.5	14	35.3	
A-42	27.4	20	S-2	22.5-25	105		
			5	10-12.5	604		MSG
			8	17.5-20	647		
			S-1	20-22.5	1915	292.8	
			S-2	22.5-25	53	22.6	
			S-3	25-27.5	8	78.6	
A-43	27.5	19.5	3	5-7.5	812		MSG
			S-1	20-22.5	335	45.6	
			S-2	22.5-25	10	18.1	
			S-3	25-27.5	812		
A-44	27.5	19.7	6	12.5-15	752		22.5
			8	17.5-20	646		
			S-1	20-22.5	14	35.3	
			S-3	25-27.5	12	35.9	
A-45	22.5	16	4	7.5-10	846		MSG
			S-1	15-17.5	832	595.3	
			S-2	17.5-20	444	15.7	
			S-3	20-22.5	532		
A-47	21.7	14	3	5-7.5	1055		MSG
			5	10-12.5	1511		
			S-1	12.5-15	517		
			S-2	15-17.5	402	177.1	
			S-3	17.5-20	94	96.3	
			S-4	20-22.5	226		
A-49	27.5	22.5	3	5-7.5	731		MSG
			S-1	22.5-25	435		
			S-2	25-27.5		49.9	
A-50	26.1	21.5	2	2.5-5	587		MSG
			7	15-17.5	704		
			S-1	22.5-25	196	29.1	
			S-2	25-27.5	317		
A-51	26.4	22	8	17.5-20	1920		MSG
A-64	22.2	22.2	1	0-2.5	106		MSG
			4	7.5-10	588		
			S-1	22.5-25	5359	286	
A-65	19.2	14.5	2	2.5-5	756		20
			S-1	15-17.5	3226		
			S-2	17.5-20	30	14.3	
A-66	17.5	17.5	2	2.5-5	2191		MSG
			4	7.5-10	1514		
			5	10-12.5		676.7	
			S-1	12.5-15	790	208.3	
			S-2	15-17.5	329	16.4	

Table D2.1 Old Rifle borehole information (Continued)

Hole number	Total hole depth (ft)	Physical depth (ft)	Sample description	Interval depth	BFEC activity (pCi/g)	SWL activity (pCi/g)	pCi/g interface (ft)
A-67	17.8	9.5	3	5-7.5		4119.3	17.5
			4	7.5-10	1156	916.1	
			S-1	10-12.5	301	72	
			S-2	12.5-15	30		
			S-3	15-17.5	22	11	
B-9	24	24	S-4	17.5-20	12		MSG
			2	2.5-5	589		
B-10	24	21	7	15-17.5	753		MSG
			1	0-2.5	455		
			S-1	20-22.5	231		
B-16	18.3	18.3	S-2	22.5-25	969	74.2	MSG
			4	7.5-10	579		
B-17	23.1	22	6	12.5-15	522		25
			3	5-7.5	548		
B-18	29	26	S-1	22.5-25	20	19	30
			2	2.5-5	970		
			5	10-12.5	957		
B-19	23.7	20	S-1	25-27.5	29	7.8	MSG
			S-2	27.5-30	45	28.8	
			3	5-7.5	645		
B-37	25.7	19.5	S-1	20-22.5	31		MSG
			1	0-2.5	481		
			4	7.5-10	593		
			8	17.5-20		1841.2	
			S-1	20-22.5	60	14.8	
B-38	26	22	S-2	22.5-25	40		MSG
			S-3	25-27.5		38	
			4	7.5-10	611		
			S-1	20-22.5	219	17.3	
			S-2	22.5-25	16	14.7	
B-39	27.5	21	S-3	25-27.5	49	41	27.5
			1	0-2.5	477		
			8	17.5-20	670		
B-40	28	27	S-1	22.5-25	15	32.5	30
			S-2	25-27.5	20		
			6	12.5-15	545		
			9	20-22.5	1127		
B-46	23.5	19	S-1	25-27.5	45	27.8	MSG
			S-2	27.5-30	40	16.8	
			4	7.5-10	554		
			7	15-17.5	647		
B-48	26	23.5	S-1	20-22.5	589	36.3	MSG
			S-2	22.5-25	41	25.1	
			3	5-7.5	701		
B-62	27	21	S-1	22.5-25	52	25.2	27.5
			S-2	25-27.5	1226		
			2	2.5-5	649		
			6	12.5-15	690		
			S-1	20-22.5	347		
B-63	22	20.5	S-2	22.5-25	11	52.1	MSG
			S-3	25-27.5	6	22.7	
			5	12.5-15	642		
			S-1	22.5-25	80	26.7	
C-6	18.5	17	1	0-2.5	611		MSG
			4	7.5-10	548		
C-8	27	19	S-1	17.5-20	84	1357.5	27.5
			2	2.5-5	633		
			S-2	22.5-25	387	25.4	
			S-3	25-27.5	23	13.1	
C-12	21	16	4	7.5-10	589		

Table D2.1 Old Rifle borehole information (Continued)

Hole number	Total hole depth (ft)	Physical depth (ft)	Sample description	Interval depth	BFEC activity (pCi/g)	SNL activity (pCi/g)	pCi/g interface (ft)
C-14	20	16	6	12.5-15	3594		MSG
			S-1	15-17.5	87		
			S-2	17.5-20	458	87.8	
			S-3	20-22.5	52	26.8	
			5	10-12.5	620		MSG
C-21	25.3	22	S-1	17.5-20	1873		
			3	5-7.5	556		25
			8	17.5-20	734		
C-23	21.2	15	S-1	22.5-25	37	1.8	
			1	0-2.5	492		MSG
			S-1	15-17.5	7800		
			S-2	17.5-20	37	19	
C-30	23.3	21	S-3	20-22.5	1848	56.5	
			2	2.5-5	536		MSG
			6	12.5-15	1355		
			S-1	20-22.5	47	18.2	
			S-2	22.5-25	40	20.7	
C-32	18.7	17	6	12.5-15	463		MSG
			S-1	17.5-20	24	28.7	
			3	5-7.5	504		MSG
C-35	20.7	17	5	10-12.5	716		
			S-1	17.5-20	50		
			S-2	20-22.5	60		
C-36	25	17.5	1	0-2.5	383		25
			S-1	17.5-20	52	153.6	
			S-2	20-22.5	87		
			S-3	22.5-25	19	19.1	
			3	5-7.5	499		22.5
C-52	22.3	17	4	7.5-10	493		
			S-1	15-17.5	553		
			S-2	17.5-20	82	16	
			S-3	20-22.5	13	11.4	
			7	15-17.5	704		MSG
C-53	23.3	20	S-1	22.5-25	115	167.1	
			1	0-2.5	9		MSG
			5	10-12.5	688		
C-61	22.5	15	7	15-17.5		90.6	
			8	17.5-20		25.7	
			1	0-2.5		131.6	22.5
			2	2.5-5		623.6	
			3	5-7.5		293.4	
			4	7.5-10	591	710.3	
			5	10-12.5		624.2	
			6	12.5-15		1590.6	
			S-1	15-17.5	24	23.2	
			S-2	17.5-20	21	27.6	
D-2	20	14	S-3	20-22.5	9	8.8	
			4	7.5-10	242		17.5
			5	10-12.5	149		
			S-1	12.5-15	53	8	
			S-2	15-17.5	9	7.3	
D-4	21	16	S-3	17.5-20	8	7.9	
			5	10-12.5	644		MSG
			6	12.5-15		2239.5	
			S-1	15-17.5		17	
			S-2	17.5-20	512	112.7	
D-7	18.5	12.5	S-3	20-22.5	205	32.9	
			2	2.5-5	540		MSG
			6	12.5-15	1304		
			S-1	15-17.5	28	36.2	

Table D2.1 Old Rifle borehole information (Concluded)

Hole number	Total hole depth (ft)	Physical depth (ft)	Sample description	Interval depth	BFEC activity (pCi/g)	SNL activity (pCi/g)	pCi/g interface (ft)
D-20	18.2	14	S-2	17.5-20	129	166.5	MSG
			1	0-2.5	412		
			S-1	15-17.5	16	9.6	
D-22	17.7	17	S-2	17.5-20	83	13.3	MSG
			5	10-12.5	884		
			S-1	15-17.5	76	59.2	
D-24	5.3	3.5	S-2	17.5-20	1058		MSG
			2	2.5-5		38	
			S-1	2.5-5	482		
D-25	19.5	15	S-2	5-7.5	1473		MSG
			3	5-7.5	465		
			4	12.5-15	1542		
D-26	17.5	17.5	S-1	15-17.5	4125	110.7	MSG
			S-2	17.5-20	486		
			1	0-2.5	506		
D-27	19	19	5	10-12.5		567.4	20
			4	12.5-15		16.9	
			S-1	15-17.5	140		
D-28	19.7	15	3	5-7.5	1315		MSG
			S-1	17.5-20	23	8.5	
			5	10-12.5	1677		
D-31	7	3	S-1	15-17.5	1797	68.2	MSG
			S-2	17.5-20	291	709.7	
			1	0-2.5	131		
D-33	19	15.5	S-1	5-7.5	67	44.6	MSG
			1	0-2.5	334		
			S-1	17.5-20	189	32.7	
D-34	23	16	5	10-12.5	412		22.5
			S-1	15-17.5	631	180.4	
			S-2	17.5-20	210		
D-54	18	16	S-3	20-22.5	22		MSG
			3	5-7.5	756		
			5	10-12.5	597		
D-55	18.8	15	S-1	15-17.5	281		20
			S-2	17.5-20	74	8.4	
			1	0-2.5	116		
D-56	13.8	11	S-1	15-17.5	86		15
			S-2	17.5-20	21	38.6	
			1	0-2.5	289		
D-57	15	8	4	7.5-10	328		MSG
			S-1	10-12.5	34		
			S-2	12.5-15	7	5.8	
D-58	13.9	12	3	5-7.5	368		15
			S-1	7.5-10	40		
			S-2	10-12.5	4	5.9	
D-59	17.4	14	S-3	12.5-15	58	11.2	17.5
			2	2.5-5	383		
			4	7.5-10	469		
			S-1	12.5-15	14		
			3	5-7.5	641		
			S-1	15-17.5	34	9.5	

Table D2.2 New Rifle borehole information

Hole number	Total hole depth (ft)	Physical depth (ft)	Sample description	Interval depth	BFEC activity (pCi/g)	SNL activity (pCi/g)	pCi/g interface (ft)
A-62	76.9	71.5	13	30-32.5	1434		77.5
			23	55-57.5	3247		
			25	60-62.5	2998		
			27	65-67.5	2047		
			29	70-72.5	1732	596	
			30	72.5-75		11.9	
			31	75-77.5		23.2	
A-63	74.9	71	1	0-2.5	318		75
			2	2.5-5	343		
			4	7.5-10	290		
			29	70-72.5	259.8	25	
			30	72.5-75	15.2	20	
A-65	72	68	1	0-2.5	457		MSG
			28	67.5-70	218.9	52.7	
			29	70-72.5	355.2	18.4	
A-67	67	65	1	0-2.5	436		MSG
			2	2.5-5	453		
			3	5-7.5	814		
			27	65-67.5	430.9	19	
A-69	77.4	71	1	0-2.5	278		77.5
			4	7.5-10	322		
			10	22.5-25	1049		
			15	35-37.5	808		
			20	47.5-50	757		
			25	60-62.5	2795		
			29	70-72.5	999.4	50.7	
			30	72.5-75	30.5	23.2	
			31	75-77.5	20.4	22.6	
			32	77.5-80		19.1	
A-71	78.4	72	1	0-2.5	408		80
			2	2.5-5	399		
			3	5-7.5	316		
			29	70-72.5	1504	117	
			30	72.5-75	21.7	22.5	
			31	75-77.5	21.8	51.5	
			32	77.5-80		19.1	
			1	0-2.5	318		
			2	2.5-5	329		
			3	5-7.5	487		
			9	20-22.5	578		
			14	32.5-35	1079		
A-75	77.4	69.8	19	45-47.5	666		77.5
			24	57.5-60	1794		
			28	67.5-70	1984.9	2085	
			29	70-72.5	487.3	32.6	
			30	72.5-75	29.7	15.4	
			31	75-77.5	35.6	23.2	
			29	70-72.5	2141.6	1248	
			30	72.5-75	35.6	28.2	
			31	75-77.5	22.7	77.5	
			32	77.5-80	40.4	60.8	
A-77	74.5	68	27	65-67.5	1485.1		MSG
			28	67.5-70	504.6		
			29	70-72.5	464.7		
A-81	72.5	69	30	72.5-75	31.3		
			1	0-2.5	395		

Table D2.2 New Rifle borehole information (Continued)

Hole number	Total hole depth (ft)	Physical depth (ft)	Sample description	Interval depth	BFEC activity (pCi/g)	SNL activity (pCi/g)	pCi/g interface (ft)
A-83	69	67	2	2.5-5	216		MSG
			28	67.5-70	1111.4	163.8	
			29	70-72.5	37.4	109.5	
			1	0-2.5	360		MSG
			6	12.5-15	795		
			11	25-27.5	1050		
			16	37.5-40	1133		
			21	50-52.5	2491		
A-84	73.6	69.3	27	65-67.5	618.4	218.4	
			28	67.5-70	39.8	33.6	
			1	0-2.5	384		MSG
			7	15-17.5	1016		
			12	27.5-30	857		
			17	40-42.5	543		
			22	52.5-55	3556		
			29	70-72.5	147.7	147.7	
A-85	74	67.6	1	0-2.5	375		MSG
			28	67.5-70		47.3	
			29	70-72.5	691.4	60.8	
			30	72.5-75	91.7		
A-86	72.1	69	1	0-2.5	464		MSG
			2	2.5-5	464		
			3	5-7.5	456		
			28	67.5-70	924.8	1687.5	
			29	70-72.5	81.8	347.2	
A-87	70	69	1	0-2.5	262		MSG
A-88	69.2	67.6	28	67.5-70	796.5	85	
			1	0-2.5	349		MSG
A-89	70.8	69.2	28	67.5-70	1994.6	2209.9	
			1	0-2.5	296		MSG
			28	67.5-70		66.9	
A-90	70.2	69	29	70-72.5	579.9		
			28	67.5-70	929	784.7	MSG
			29	70-72.5		110.3	
A-91	70.9	70.7	1	0-2.5	472		MSG
			2	2.5-5	468		
			3	5-7.5	326		
			29	70-72.5	467.3	312	
A-92	71.9	68	1	0-2.5	331		MSG
			2	2.5-5	367		
			4	7.5-10	343		
			8	17.5-20	409		
			13	30-32.5	1591		
			18	42.5-45	2382		
			23	55-57.5	1700		
			28	67.5-70	679.3	79.5	
			29	70-72.5	234.4		
			1	0-2.5	338		MSG
A-93	70.9	68	2	2.5-5	329		
			28	67.5-70	28.4	19.5	
			29	70-72.5	115.5	46.2	
			28	67.5-70		99.7	MSG
A-94	74.5	68	29	70-72.5	533	112.3	
			1	0-2.5	378		MSG
			2	2.5-5	400		
A-95	75	70.8	29	70-72.5	60.3	89.6	
			30	72.5-75	30.5	65.2	
			27	65-67.5		857	
			29	70-72.5		93.1	
B-44	MSG	MSG	30	72.5-75		51.7	

Table D2.2 New Rifle borehole information (Continued)

Hole number	Total hole depth (ft)	Physical depth (ft)	Sample description	Interval depth	BFEC activity (pCi/g)	SNL activity (pCi/g)	pCi/g interface (ft)
B-52	78.8	72	1	0-2.5	558		77.5
			2	2.5-5	327		
			3	5-7.5	377		
			29	70-72.5	1422.3	1374.1	
			30	72.5-75	46.4	15.8	
			31	75-77.5	48.3	20.1	
B-53	75	72.4	27	65-67.5		857	MSG
B-54	76.9	72.2	30	72.5-75	48.6		MSG
			1	0-2.5	387	231.1	
			2	2.5-5	442	387.2	
			3	5-7.5	501	492.5	
			4	7.5-10		343.6	
			5	10-12.5		332.4	
			6	12.5-15	386	613.2	
			7	15-17.5		550.8	
			8	17.5-20		669.4	
			9	20-22.5		542.4	
			10	22.5-25		1196.6	
			11	25-27.5	1126	1630.8	
			12	27.5-30		533.1	
			13	30-32.5		445.5	
			14	32.5-35		560.3	
			15	37-37.5		425.7	
			16	37.5-40	469	610.1	
			17	40-42.5		1053.1	
			18	42.5-45		967.2	
			19	45-47.5		1907.4	
			20	47.5-50		843.2	
			21	50-52.5	933	959.5	
			22	52.5-55		1389.9	
			23	55-57.5		2166.8	
			24	57.5-60		1016.3	
			25	60-62.5		1802.4	
			26	62.5-65	2507	1479.2	
			27	65-67.5		2726.9	
			28	67.5-70		1689.3	
			29	70-72.5	1506.5	1959.3	
			30	72.5-75	87.1	70.3	
			31	75-77.5	40.6	53.5	
B-55	75.7	72	1	0-2.5	533		77.5
			29	70-72.5		56.5	
			30	72.5-75	38.6	13	
			31	75-77.5	16.8	30.7	
B-56	76.1	70	1	0-2.5	270		MSG
			29	70-72.5	511.2	68.2	
			30	72.5-75	45.4	64.9	
B-57	75	70	1	0-2.5	495		75
			2	2.5-5	679		
			9	20-22.5	1259		
			14	32.5-35	428		
			19	45-47.5	2077		
			24	57.5-60	1134		
			28	67.5-70	764.4	1260.5	
			29	70-72.5	52.1	45.3	
B-58	74.2	71.5	30	72.5-75	26.7	23.2	75
			1	0-2.5	301		
			2	2.5-5	494		
			6	12.5-15	350		
			11	25-27.5	566		
			16	37.5-40	585		

Table D2.2 New Rifle borehole information (Continued)

Hole number	Total hole depth (ft)	Physical depth (ft)	Sample description	Interval depth	BFEC activity (pCi/g)	SNL activity (pCi/g)	pCi/g interface (ft)
B-59	75.6	71	21	50-52.5	1129		
			24	62.5-65	1655		
			30	72.5-75	25.1		
			1	0-2.5	361		MSG
			29	70-72.5		30.1	
B-60	76	72	30	72.5-75	214.3	22.7	
			31	75-77.5	46.6		
			1	0-2.5	322		MSG
			2	2.5-5	346		
			4	7.5-10	355		
B-61	77.4	72	10	22.5-25	598		
			15	35-37.5	1327		
			20	47.5-50	1852		
			25	60-62.5	939		
			29	70-72.5	906.3	511.1	
B-64	77.4	72	30	72.5-75	53.5	76.9	
			1	0-2.5	487		77.5
			2	2.5-5	713		
			3	5-7.5	808		
			29	70-72.5	1263.5	240.7	
B-66	72.8	70	30	72.5-75	13.1	40.4	
			31	75-77.5	18.4	33.2	
							MSG
			1	0-2.5	381		MSG
			29	70-72.5	559.5	178.7	
B-68	72.8	69	30	72.5-75	76.8	155.9	
			1	0-2.5	361		MSG
			2	2.5-5	395		
			3	5-7.5	451		
			29	70-72.5		199.3	
B-70	73.3	71.5	1	0-2.5	394		MSG
			29	70-72.5	1163.7	177.2	
			30	72.5-75	50.9	40.4	
			1	0-2.5	258		MSG
			2	2.5-5	407		
B-72	73	70	4	7.5-10	331		
			8	17.5-20	1490		
			13	30-32.5	2907		
			18	42.5-45	808		
			23	55-57.5	1961		
B-74	75.7	71.3	29	70-72.5	883.7	951.6	
			1	0-2.5	403		MSG
			29	70-72.5		100.1	
			30	72.5-75	1221	39.2	
			31	75-77.5	35	437.7	
B-76	73.9	70.5	1	0-2.5	386		MSG
			2	2.5-5	363		
			3	5-7.5	396		
			10	22.5-25	1052		
			15	35-37.5	637		
B-78	74.4	70.5	20	47.5-50	2465		
			25	60-62.5	2678		
			29	70-72.5	591.3	69.2	
			30	72.5-75	38.6	77.7	
			1	0-2.5	363		MSG
B-80	75	75	29	70-72.5	819.1	34.9	
			30	72.5-75	39.7	49.4	
			24	57.5-60	868.5		MSG

Table D2.2 New Rifle borehole information (Continued)

Hole number	Total hole depth (ft)	Physical depth (ft)	Sample description	Interval depth	BFEC activity (pCi/g)	SNL activity (pCi/g)	pCi/g interface (ft)
C-1	49.5	46.5	1	0-2.5	89		MSG
			2	2.5-5	137		
			3	5-7.5	191		
			19	45-47.5	453.6	34.7	
			20	47.5-50	9.2	64.1	
C-2	51.1	44.3	1	0-2.5	478		52.5
			2	2.5-5	553		
			4	7.5-10	518		
			18	42.5-45		771	
			19	45-47.5	959.2	28.8	
			20	47.5-50	19	21.1	
			21	50-52.5	9.3	29.2	
C-3	54	46.5	1	0-2.5	89		52.5
			7	15-17.5	305		
			13	30-32.5	703		
			17	40-42.5	1244		
			20	47.5-50	57	17.3	
			21	50-52.5	15.9	25	
			22	52.5-55	8.7		
C-4	48.8	45.5	1	0-2.5	99		52.5
			20	47.5-50		17.3	
			21	50-52.5		25	
C-5	49.4	48	20	47.5-50	267.2	64.5	MSG
C-6	45	43	2	2.5-5	431		MSG
C-7	48.5	48.5	16	37.5-40	464.4		MSG
			1	0-2.5	473		
			2	2.5-5	590		
			3	5-7.5	531		
			8	17.5-20	1491		
			13	30-32.5	1809		
			18	42.5-45	2079	839.3	
C-8	48	48	19	45-47.5		23.7	MSG
			20	47.5-50	49.2		
			1	0-2.5	109		
			19	45-47.5		30.8	
			20	47.5-50	124.9		
			21	50-52.5	53.8		
			21	50-52.5			
C-9	47.8	46	1	0-2.5	94		MSG
			19	45-47.5	643.2		
			20	47.5-50	102.4		
C-10	47.3	45	1	0-2.5	181		45
			2	2.5-5	198		
			4	7.5-10	318		
			10	22.5-25	396		
			14	32.5-35	882		
			18	42.5-45	513		
			19	45-47.5	4.4	10.6	
C-11	49	49	1	0-2.5	98		MSG
			2	2.5-5	74		
			3	5-7.5	121		
			19	45-47.5	547.2	638.7	
C-13	49.8	47	20	47.5-50	52.7	22.8	50
			21	50-52.5	401.8		
			1	0-2.5	99		
			20	47.5-50	19.7	17.9	

Table D2.2 New Rifle borehole information (Continued)

Hole number	Total hole depth (ft)	Physical depth (ft)	Sample description	Interval depth	BFEC activity (pCi/g)	SNL activity (pCi/g)	pCi/g interface (ft)
C-14	43.8	42	1	0-2.5	379		MSG
			2	2.5-5	437		
			4	7.5-10	847		
			8	17.5-20	392		
			11	25-27.5	496		
			16	37.5-40	552		
			18	42.5-45	335	38.1	
C-15	47.3	46	19	45-47.5	309.1	108.4	MSG
C-16	46.2	43.3	1	0-2.5	307		MSG
			18	42.5-45	192.8	73.4	
			19	45-47.5	438.8	131.3	
C-17	44.2	44.2	1	0-2.5	577		MSG
			17	40-42.5	1026.6	335.1	
			18	42.5-45		274.7	
C-18	45.2	43	1	0-2.5	507		45.2
			18	42.5-45		13.8	
			19	45-47.5	18.9		
C-19	45.2	42	1	0-2.5	443		MSG
			2	2.5-5	502		
			17	40-42.5		1801.7	
			18	42.5-45	1285.4		
C-21	47	42	19	45-47.5	782.9		
			1	0-2.5	403		47.5
			2	2.5-5	476		
			3	5-7.5	544		
			17	40-42.5	622.8	708.2	
			18	42.5-45	388	32.9	
C-27	45.2	41.5	19	45-47.5	32.9		
			1	0-2.5	670		MSG
			3	5-7.5	424		
			18	42.5-45	206		
C-43	46.7	41.5	1	0-2.5	576		MSG
			6	12.5-15	1144		
			11	25-27.5	1075		
			16	37.5-40	2039		
			17	40-42.5	779.6	156.4	
			18	42.5-45	11.1	23.8	
			19	45-47.5	303.1	106.8	
D-12	47.7	45.2	1	0-2.5	190		48
			19	45-47.5		12.8	
			20	47.5-50	19.3		
D-20	46.2	43	1	0-2.5	243		MSG
			2	2.5-5	286		
			18	42.5-45	15.5	94.2	
			19	45-47.5	26.3	37.7	
D-22	45.2	45.2	1	0-2.5	252		MSG
			3	5-7.5	479		
			7	15-17.5	400		
			12	27.5-30	421		
			17	40-42.5	771		
			18	42.5-45	409		
D-23	47	44.6	1	0-2.5	159		47.5
			2	2.5-5	145		
			3	5-7.5	321		
			18	42.5-45	620.6	161.7	
D-24	53.2	49.3	19	45-47.5	8.5	17.5	
			1	0-2.5	134		55
			2	2.5-5	123		
			4	7.5-10	291		
			21	50-52.5	294.1	253.8	

Table D2.2 New Rifle borehole information (Continued)

Hole number	Total hole depth (ft)	Physical depth (ft)	Sample description	Interval depth	Bf/c activity (pCi/g)	SNL activity (pCi/g)	pCi/g interface (ft)
D-25	47.3	44.5	22	52.5-55	20.3	16.7	MSG
			1	0-2.5	278		
			17	40-42.5	331	207	
			18	42.5-45		39	
			19	45-47.5	108.1		
D-26	49.6	48	1	0-2.5	134		MSG
D-28	51.2	51.2	20	47.5-50	151.9	40.9	MSG
			1	0-2.5	125		
			2	2.5-5	122		
			3	5-7.5	64		
			4	7.5-10	202		
D-29	42.5	42.5	10	22.5-25	314		MSG
			15	35-37.5	527		
			19	45-47.5	381		
			21	50-52.5	472.1	287.9	
			1	0-2.5	119		
D-30	52	52	2	2.5-5	117		MSG
			3	5-7.5	287		
			17	40-42.5	511		
			1	0-2.5	137		
			21	50-52.5	1024.2	962.8	
D-31	52	47	1	0-2.5	124		MSG
			19	45-47.5	500.2	524.7	
			20	47.5-50	27.9	4.4	
			21	50-52.5	75.5		
			2	2.5-5	130		
D-32	52	52	3	5-7.5	178		MSG
			21	50-52.5	144.6	43.7	
			1	0-2.5	258		
			2	2.5-5	157		
			19	45-47.5	15.7	11.3	
D-33	46.8	45	1	0-2.5	85		MSG
			7	15-17.5	282		
			12	27.5-30	583		
			17	40-42.5	239		
			19	45-47.5	431		
D-34	53.8	49.5	20	47.5-50		644.9	MSG
			21	50-52.5	40.9	95.5	
			22	52.5-55	41.5	91.6	
			2	2.5-5	115		
			3	5-7.5	151		
D-36	50.7	48	20	47.5-50	177.7	43.6	52.5
			21	50-52.5	31.7		
			1	0-2.5	119		
			19	45-47.5	302.4	101.1	
			20	47.5-50	605.1		
D-37	47.2	45.5	22	52.5-55	160		MSG
			23	55-57.5	38.2		
			1	0-2.5	130		
			2	2.5-5	65		
			20	47.5-50	588.4	31.4	
D-38	55.5	52	21	50-52.5	12.6	4.3	MSG
			1	0-2.5			
			2	2.5-5			
			3	5-7.5			
			4	7.5-10			
D-39	51.4	49	5	10-12.5		456.4	MSG
			6	12.5-15		291.9	
			7	15-17.5		427.4	
			1	0-2.5	142	84.7	
			2	2.5-5		146.1	
D-40	55.4	53	3	5-7.5		515.1	MSG
			4	7.5-10		526.9	
			5	10-12.5		456.4	
			6	12.5-15		291.9	
			7	15-17.5		427.4	
D-44	46.3	42.5	1	0-2.5	142	84.7	MSG
			2	2.5-5		146.1	
			3	5-7.5		515.1	
			4	7.5-10		526.9	
			5	10-12.5		456.4	

Table D2.2 New Rifle borehole information (Concluded)

Hole number	Total hole depth (ft)	Physical depth (ft)	Sample description	Interval depth	BFEC activity (pCi/g)	SNL activity (pCi/g)	pCi/g interface (ft)
			8	17.5-20		458.6	
			9	20-22.5		329.2	
			10	22.5-25		389.5	
			11	25-27.5		524.5	
			12	27.5-30		462.4	
			13	30-32.5		320.7	
			14	32.5-35		313.1	
			15	35-37.5		237.7	
			16	37.5-40		287.3	
			17	40-42.5	817.9	1150	
			18	42.5-45	7.9	36.1	
			19	45-47.5	28.7	130.6	
D-45	43.3	41.5	1	0-2.5	104		MSG
			5	10-12.5	329		
			9	20-22.5	823		
			13	30-32.5	701		
			16	37.5-40	1492		
			18	42.5-45	700.1	1814	
			19	45-47.5		161.7	
D-46	43.8	41	1	0-2.5	293		MSG
			2	2.5-5	197		
			3	5-7.5	438		
			4	7.5-10	773		
			17	40-42.5	59	77.3	
			18	42.5-45	75.1	41.2	
D-47	45.9	42	1	0-2.5	124		MSG
			2	2.5-5	377		
			18	42.5-45	18.9	347.5	
			19	45-47.5	179.5	11.2	
			20	47.5-50		311.3	
D-49	45.7	43.5	1	0-2.5	288		MSG
			18	42.5-45		27.8	
			19	45-47.5	420.7		
D-51	52.4	49	1	0-2.5	295		52.4
			5	10-12.5	151		
			10	22.5-25	389		
			15	35-37.5	342		
			20	47.5-50	121.8	610.4	
			21	50-52.5	9.4	7.3	
			22	52.5-55		6.6	
S30	MSG	20					MSG
S31	MSG	10					MSG
S32	MSG	30					MSG
S33	MSG	20					MSG
S34	MSG	40					MSG
S35	MSG	10					MSG
S36	MSG	10					MSG
S37	MSG	20					MSG
S38	MSG	20					MSG
S39	MSG	25					MSG
S40	MSG	20					MSG
S41	MSG	50					MSG
S42	MSG	40					MSG
S43	MSG	40					MSG
S44	MSG	25					MSG
S45	MSG	20					MSG
S46	MSG	45					MSG

ADDENDUM D3
TAILINGS PILE ACTIVITY ANALYSIS

As part of the study to investigate the economic viability of reprocessing the Rifle tailings piles for uranium, vanadium, and molybdenum (MSRD, 1982a,b), 67 holes were drilled across the Old Rifle pile and 96 holes were drilled across the New Rifle pile using geometric grid systems for hole locations. Split barrel samples were collected in 2.5-foot increments down to the physical interface between tailings and sub-base material. Samples were also collected in each hole several feet beyond the physical interface. Sampling in some holes did not reach planned depths due to refusal, most likely due to river cobble. These samples were archived and recently analyzed for radium content (BFEC, 1985). The analyses results allow an estimate of the distribution of Ra-226 within the pile. They also allow an estimate of the depth below the physical interface at which the EPA standard of 15 pCi/g Ra-226 in soil is met. These provide the volume of material which would have to be excavated when the piles are stabilized, as well as the radon source term used for cover design.

A uniform geometric grid (with irregular boundaries to fit the general shape of the piles) was constructed for each Rifle pile. Each grid block is represented by a borehole except for grid blocks on the toe of the pile where no holes were drilled. Because the split barrel samples were taken in 2.5-foot increments, each block is also divided into layers 2.5 feet thick. The following tables present radium profiles based on analyses of the borehole data. Note that for this analysis, the New Rifle pile was divided into upper and lower sections.

Table D3.1 Old Rifle pile

TAILINGS PILE DATA GENERATION UTILITY

- BY ROGER A. NELSON

IRREGULAR BOUNDARY MODIFICATION PROGRAM EXECUTION - Mon Oct 27 1986 3:00:10 01.34.02

RFOF1/BAS

FILE DATA FROM (7 by 11) GRID - GRID SPACING : (94.81 by 94.9 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
0.0 - 2.5					0	0	0	0	0	0	
2.5 - 5.0					970	0	0	0	0	0	
5.0 - 7.5					0	0	0	0	0	0	
7.5 - 10.0					0	579	0	589	0	242	
10.0 - 12.5					957	0	620	0	644	149	
12.5 - 15.0					0	522	0	3594	2243	53	
15.0 - 17.5					0	0	0	87	0	9	
17.5 - 20.0					0	0	1873	458	512		
20.0 - 22.5					0	0	0	52	205		
22.5 - 25.0					0	0	0	0	0		
25.0 - 27.5					29	0	0	0	0		
27.5 - 30.0					45	0	0	0	0		
30.0 - 32.5											
32.5 - 35.0											

Table D3.1 Old Rifle pile

PAGE NO. 2

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
0.0 - 2.5				0	455	0	0	611	0	0	412
2.5 - 5.0				655	0	589	633	0	540	0	0
5.0 - 7.5				0	0	0	0	0	0	0	0
7.5 - 10.0				0	0	0	0	548	0	0	0
10.0 - 12.5				0	0	0	0	0	0	884	0
12.5 - 15.0				718	0	0	0	0	1304	0	0
15.0 - 17.5				0	0	753	0	0	28	76	16
17.5 - 20.0				0	0	0	0	84	129	1058	83
20.0 - 22.5				0	231	0	0	0	0	0	0
22.5 - 25.0				456	969	0	387	0	0	0	0
25.0 - 27.5				0	0	0	23	0	0	0	0
27.5 - 30.0				0	0	0		0	0	0	0
30.0 - 32.5											
32.5 - 35.0											

Table D3.1 Old Rifle pile

PAGE NO. 3

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
0.0 - 2.5	0		559	0	0	0	0	492	0	0	0
2.5 - 5.0	0		0	0	0	0	0	0	0	0	0
5.0 - 7.5		642	0	548	645	556	0	465	1315	465	
7.5 - 10.0		0	0	0	0	0	0	0	0	0	
10.0 - 12.5		0	0	0	0	0	0	0	0	0	
12.5 - 15.0		0	0	0	0	0	0	1542	0	1542	
15.0 - 17.5		0	0	0	0	0	7800	4125	0	4125	
17.5 - 20.0		0	680	0	0	734	37	486	23	486	
20.0 - 22.5		0	0	0	31	0	1846	0		0	
22.5 - 25.0		0	26	20	0	37	0	0		0	
25.0 - 27.5		0	43		0		0	0		0	
27.5 - 30.0		459	0		0		0	0		0	
30.0 - 32.5											
32.5 - 35.0											

Table D3.1 Old Rifle pile

PAGE NO. 4

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
0.0 - 2.5		0	0	0	0	0	0	0	506	0	
2.5 - 5.0		0	0	0	0	0	536	0	0	482	
5.0 - 7.5		0	0	0	0	0	0	0	0	1473	
7.5 - 10.0		0	0	0	611	0	0	0	0	0	
10.0 - 12.5		0	604	0	0	0	0	1677	567	0	
12.5 - 15.0		752	0	545	0	463	1355	0	0	0	
15.0 - 17.5		0	0	0	0	0	0	1797	140	0	
17.5 - 20.0		646	647	0	0	24	0	291	0	0	
20.0 - 22.5		14	1915	1127	219	0	47	0	0	0	
22.5 - 25.0			53	0	16	0	40	0	0	0	
25.0 - 27.5			8	45	49	0	0	0	0	0	
27.5 - 30.0			0	40	0	0	0	0	0	0	
30.0 - 32.5											
32.5 - 35.0											

Table D3.1 Old Rifle pile

PAGE NO. 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
0.0 - 2.5	0	0	0	477	481	383	0	0	0	334	131
2.5 - 5.0	0	0	0	0	0	0	0	0	0	0	0
5.0 - 7.5	0	812	0	0	0	0	504	0	0	0	67
7.5 - 10.0	846	0	0	0	593	0	0	0	0	0	0
10.0 - 12.5	0	0	0	0	0	0	716	412	0	0	0
12.5 - 15.0	0	0	0	0	0	0	0	0	0	0	0
15.0 - 17.5	832	0	849	0	0	0	0	0	0	0	0
17.5 - 20.0	444	0	0	670	1841	52	50	631	189	0	0
20.0 - 22.5	532	335	14	0	60	87	62	210	0	0	0
22.5 - 25.0	0	10	105	15	40	19	0	0	0	0	0
25.0 - 27.5	0	812	0	20	38	0	0	0	0	0	0
27.5 - 30.0	0	0	0	0	0	0	0	0	0	0	0
30.0 - 32.5											
32.5 - 35.0											

Table D3.1 Old Rifle pile

PAGE NO. 6

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
0.0 - 2.5	0	0	0	0	0	0	0	0	0	116	289
2.5 - 5.0	0	0	0	587	0	0	0	0	0	0	0
5.0 - 7.5	1055	731	0	0	701	0	0	499	756	0	0
7.5 - 10.0	0	0	0	0	0	554	0	493	0	0	328
10.0 - 12.5	1511	0	0	0	0	0	0	0	597	0	34
12.5 - 15.0	517	0	0	0	0	0	0	0	0	0	7
15.0 - 17.5	402	0	0	704	0	647	704	553	281	86	
17.5 - 20.0	94	0	1920	0	0	0	0	82	74	21	
20.0 - 22.5	226	0	0	0	0	589	0	13	0		
22.5 - 25.0	0	435	0	196	52	41	115		0		
25.0 - 27.5	0	50	0	317	1226	0	0		0		
27.5 - 30.0	0	0	0	0	0	0	0		0		
30.0 - 32.5											
32.5 - 35.0											

Table D3.1 Old Rifle pile

PAGE NO. 7

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
0.0 - 2.5	0	0	0	106	0	0	132	9	0	0	0
2.5 - 5.0	0	2191	756	0	0	649	624	0	0	383	0
5.0 - 7.5	4119	0	0	0	0	0	293	0	641	0	368
7.5 - 10.0	1156	1514	0	588	0	0	591	0	0	469	40
10.0 - 12.5	301	677	0	0	642	0	624	688	0	0	4
12.5 - 15.0	30	790	0	0	0	690	1591	0	0	14	58
15.0 - 17.5	22	329	3226	0	0	0	24	91	34		0
17.5 - 20.0		0	30	0	0	0	21	26			0
20.0 - 22.5		0		0	0	347	9	0			0
22.5 - 25.0		0		5359	80	11		0			0
25.0 - 27.5		0		0	0	6		0			0
27.5 - 30.0		0		0	0			0			0
30.0 - 32.5											
32.5 - 35.0											

Table D3.1 Old Rifle pile

PAGE NO. 8

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
I = 1				30.0	-1.0	-1.0	-1.0	-1.0	-1.0	17.5	
I = 2			-1.0	-1.0	-1.0	27.5	-1.0	-1.0	-1.0	-1.0	
I = 3		-1.0	-1.0	25.0	-1.0	25.0	-1.0	-1.0	20.0	-1.0	
I = 4		22.5	-1.0	30.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
I = 5	-1.0	-1.0	-1.0	27.5	-1.0	25.0	-1.0	22.5	-1.0	-1.0	
I = 6	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	22.5	-1.0	20.0	15.0
I = 7	17.5	-1.0	20.0	-1.0	-1.0	27.5	22.5	-1.0	17.5	15.0	-1.0

Table D3.1 Old Rifle pile

PAGE NO. 9

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
I = 1					26.0	18.3	16.0	16.0	16.0	14.0	
I = 2				23.0	21.0	24.0	19.0	17.0	12.5	17.0	14.0
I = 3			25.0	23.0	22.0	20.0	22.0	15.0	15.0	19.0	15.0
I = 4			19.7	20.0	27.0	22.0	17.0	21.0	15.0	17.5	3.5
I = 5		16.0	19.5	21.5	21.0	19.5	17.5	17.0	16.0	15.5	3.0
I = 6	14.0	22.5	22.0	21.5	23.5	19.0	20.0	17.0	16.0	15.0	11.0
I = 7	9.5	17.5	14.5	22.2	20.5	21.0	15.0	16.0	14.0	12.0	8.0

Table D3.2 New Rifle lower pile

TAILINGS PILE DATA GENERATION UTILITY

- BY ROGER A. NELSON

IRREGULAR BOUNDARY MODIFICATION

PROGRAM EXECUTION - Mon01:27:986302:00 00.19.19

RFNLF2/DAT. NEW RIFLE LOWER PILE.

DATA ENTERED BY STEVE GREEN ON 3/7/85

FILE DATA FROM (9 by 12) GRID - GRID SPACING : (122.37 by 101.23 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										0	0	
2.5 - 5.0										0	0	
5.0 - 7.5										0	0	
7.5 - 10.0										0	0	
10.0 - 12.5										0	0	
12.5 - 15.0										0	0	
15.0 - 17.5										0	0	
17.5 - 20.0										0	0	
20.0 - 22.5										0	0	
22.5 - 25.0										0	0	
25.0 - 27.5										0	0	
27.5 - 30.0										0	0	
30.0 - 32.5										0	0	
32.5 - 35.0										0	0	
35.0 - 37.5										0	0	
37.5 - 40.0										0	0	
40.0 - 42.5										0	0	
42.5 - 45.0										0	0	
45.0 - 47.5										0	0	
47.5 - 50.0										0	0	
50.0 - 52.5										0	0	
52.5 - 55.0										0	0	
55.0 - 57.5										0	0	
57.5 - 60.0										0	0	
60.0 - 62.5										0	0	
62.5 - 65.0										0	0	

Table D3.2 New Rifle lower pile

PAGE NO. 2

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								104	124	288		0
2.5 - 5.0								0	377			0
5.0 - 7.5								0	0	0		0
7.5 - 10.0								0	0	0		0
10.0 - 12.5								329	0	0		0
12.5 - 15.0								0	0	0		0
15.0 - 17.5								0	0	0		0
17.5 - 20.0								0	0	0		0
20.0 - 22.5								823	0	0		0
22.5 - 25.0								0	0	0		0
25.0 - 27.5								0	0	0		0
27.5 - 30.0								0	0	0		0
30.0 - 32.5								701	0	0		0
32.5 - 35.0								0	0	0		0
35.0 - 37.5								0	0	0		0
37.5 - 40.0								1492	0	0		0
40.0 - 42.5								0	0	0		0
42.5 - 45.0								700	19	28		0
45.0 - 47.5								162	180	0		0
47.5 - 50.0								0	311	0		0
50.0 - 52.5								0	0	0		0
52.5 - 55.0								0	0	0		0
55.0 - 57.5								0	0	0		0
57.5 - 60.0								0	0	0		0
60.0 - 62.5								0	0	0		0
62.5 - 65.0												

Table D3.2 New Rifle lower pile

PAGE NO. 3

DATA FOR ROW : 3	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12
DEPTH												
0.0 - 2.5					670	576	293	142	119	295		
2.5 - 5.0					0	0	197	146	117	0		
5.0 - 7.5					424	0	438	515	287	0		
7.5 - 10.0					0	0	773	527	0	0		
10.0 - 12.5					0	0	0	456	0	151		
12.5 - 15.0					0	1144	0	292	0	0		
15.0 - 17.5					0	0	0	427	0	0		
17.5 - 20.0					0	0	0	459	0	0		
20.0 - 22.5					0	0	0	329	0	0		
22.5 - 25.0					0	0	0	390	0	389		
25.0 - 27.5					0	1075	0	525	0	0		
27.5 - 30.0					0	0	0	462	0	0		
30.0 - 32.5					0	0	0	321	0	0		
32.5 - 35.0					0	0	0	313	0	0		
35.0 - 37.5					0	0	0	236	0	342		
37.5 - 40.0					0	2039	0	287	0	0		
40.0 - 42.5					0	780	59	818	511	0		
42.5 - 45.0					206	11	75	8	0	0		
45.0 - 47.5					0	303	0	29	0	0		
47.5 - 50.0					0	0	0	0	0	122		
50.0 - 52.5					0	0	0	0	0	9		
52.5 - 55.0					0	0	0	0	0	0		
55.0 - 57.5					0	0	0	0	0	0		
57.5 - 60.0					0	0	0	0	0	0		
60.0 - 62.5					0	0	0	0	0	0		
62.5 - 65.0												

Table D3.2 New Rifle lower pile

PAGE NO. 4

DATA FOR ROW : 4	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12
DEPTH												
0.0 - 2.5	443	577	403	276	159	119	130					
2.5 - 5.0	502	0	476	0	145	0	65					
5.0 - 7.5	0	0	544	0	321	0	0					
7.5 - 10.0	0	0	0	0	0	0	0					
10.0 - 12.5	0	0	0	0	0	0	0					
12.5 - 15.0	0	0	0	0	0	0	0					
15.0 - 17.5	0	0	0	0	0	0	0					
17.5 - 20.0	0	0	0	0	0	0	0					
20.0 - 22.5	0	0	0	0	0	0	0					
22.5 - 25.0	0	0	0	0	0	0	0					
25.0 - 27.5	0	0	0	0	0	0	0					
27.5 - 30.0	0	0	0	0	0	0	0					
30.0 - 32.5	0	0	0	0	0	0	0					
32.5 - 35.0	0	0	0	0	0	0	0					
35.0 - 37.5	0	0	0	0	0	0	0					
37.5 - 40.0	1802	1027	623	331	0	0	0					
40.0 - 42.5	1285	275	388	39	621	0	0					
42.5 - 45.0	783	0	33	0	9	302	0					
45.0 - 47.5	0	0	0	0	0	605	588					
47.5 - 50.0	0	0	0	0	0	0	13					
50.0 - 52.5	0	0	0	0	0	0	165					
52.5 - 55.0	0	0	0	0	0	0	38					
55.0 - 57.5	0	0	0	0	0	0	0					
57.5 - 60.0	0	0	0	0	0	0	0					
60.0 - 62.5												
62.5 - 65.0												

Table D3.2 New Rifle lower pile

PAGE NO. 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				473	307	379	507	243	252	134	134	
2.5 - 5.0				590	0	437	0	286	0	123	0	
5.0 - 7.5				531	0	0	0	0	479	0	0	
7.5 - 10.0				0	0	847	0	0	0	291	0	
10.0 - 12.5				0	0	0	0	0	0	0	0	
12.5 - 15.0				0	0	0	0	0	0	0	0	
15.0 - 17.5				0	0	0	0	0	400	0	0	
17.5 - 20.0				1491	0	392	0	0	0	0	0	
20.0 - 22.5				0	0	0	0	0	0	0	0	
22.5 - 25.0				0	0	0	0	0	0	0	0	
25.0 - 27.5				0	0	496	0	0	0	0	0	
27.5 - 30.0				0	0	0	0	0	421	0	0	
30.0 - 32.5				1809	0	0	0	0	0	0	0	
32.5 - 35.0				0	0	0	0	0	0	0	0	
35.0 - 37.5				0	0	0	0	0	0	0	0	
37.5 - 40.0				0	0	552	0	0	0	0	0	
40.0 - 42.5				0	0	0	0	0	771	0	0	
42.5 - 45.0				2079	193	335	14	16	409	0	0	
45.0 - 47.5				24	439	309	0	26	0	0	0	
47.5 - 50.0				49	0	0		0	0	0	152	
50.0 - 52.5				0	0	0		0	0	254	0	
52.5 - 55.0				0	0	0		0	0	20	0	
55.0 - 57.5				0	0	0		0	0		0	
57.5 - 60.0				0	0	0		0	0		0	
60.0 - 62.5				0	0	0		0	0		0	
62.5 - 65.0												

Table D3.2 New Rifle lower pile

PAGE NO. 6

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		478		99	0	109	181	190	258	124	125	
2.5 - 5.0		553	0	0	431	0	198	0	157	0	122	
5.0 - 7.5		0	0	0	0	0	0	0	0	0	64	
7.5 - 10.0		518	0	0	0	0	318	0	0	0	202	
10.0 - 12.5		0	0	0	0	0	0	0	0	0	0	
12.5 - 15.0		0	0	0	0	0	0	0	0	0	0	
15.0 - 17.5		0	0	0	0	0	0	0	0	0	0	
17.5 - 20.0		0	0	0	0	0	0	0	0	0	0	
20.0 - 22.5		0	0	0	0	0	396	0	0	0	314	
22.5 - 25.0		0	0	0	0	0	0	0	0	0	0	
25.0 - 27.5		0	0	0	0	0	0	0	0	0	0	
27.5 - 30.0		0	0	0	0	0	0	0	0	0	0	
30.0 - 32.5		0	0	0	0	0	882	0	0	0	0	
32.5 - 35.0		0	0	0	0	0	0	0	0	0	527	
35.0 - 37.5		0	0	0	0	0	0	0	0	0	0	
37.5 - 40.0		0	0	0	464	0	0	0	0	0	0	
40.0 - 42.5		0	0	0	0	0	0	0	0	0	0	
42.5 - 45.0		771	0	0	0	0	513	0	0	0	0	
45.0 - 47.5		959	0	0	0	31	0	13	16	500	381	
47.5 - 50.0		19	17	0	0	125	0	0	0	28	0	
50.0 - 52.5		9	25	0	0	54	0	0	0	0	472	
52.5 - 55.0				0	0	0	0	0	0	0	0	
55.0 - 57.5				0	0	0	0	0	0	0	0	
57.5 - 60.0				0	0	0	0	0	0	0	0	
60.0 - 62.5				0	0	0	0	0	0	0	0	
62.5 - 65.0												

Table D3.2 New Rifle lower pile

PAGE NO. 7

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	0	89	89	94	98	99	0	85	0	137		
2.5 - 5.0	0	0	137	0	74	0	115	0	133	0		
5.0 - 7.5	0	0	191	0	121	0	151	0	178	0		
7.5 - 10.0	0	0	0	0	0	0	0	0	0	0		
10.0 - 12.5	0	0	0	0	0	0	0	0	0	0		
12.5 - 15.0	0	0	0	0	0	0	0	0	0	0		
15.0 - 17.5	0	305	0	0	0	0	0	0	282	0		
17.5 - 20.0	0	0	0	0	0	0	0	0	0	0		
20.0 - 22.5	0	0	0	0	0	0	0	0	0	0		
22.5 - 25.0	0	0	0	0	0	0	0	0	0	0		
25.0 - 27.5	0	0	0	0	0	0	0	0	0	0		
27.5 - 30.0	0	0	0	0	0	0	0	0	583	0		
30.0 - 32.5	0	703	0	0	0	0	0	0	0	0		
32.5 - 35.0	0	0	0	0	0	0	0	0	0	0		
35.0 - 37.5	0	0	0	0	0	0	0	0	0	0		
37.5 - 40.0	0	0	0	0	0	0	0	0	0	0		
40.0 - 42.5	0	1244	0	0	0	0	0	0	239	0		
42.5 - 45.0	0	0	0	0	0	0	0	0	0	0		
45.0 - 47.5	0	0	454	643	547	0	0	0	431	0		
47.5 - 50.0	0	57	9	102	53	20	177	645	0	0		
50.0 - 52.5	0	16	0	0	0	0	32	41	145	1024		
52.5 - 55.0	0	0	0	0	0	0	0	42	0	0		
55.0 - 57.5	0	0	0	0	0	0	0	0	0	0		
57.5 - 60.0	0	0	0	0	0	0	0	0	0	0		
60.0 - 62.5	0	0	0	0	0	0	0	0	0	0		
62.5 - 65.0	0	0	0	0	0	0	0	0	0	0		

Table D3.2 New Rifle lower pile

PAGE NO. 8

DATA FOR ROW : e	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12
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	0	0	0	0	0	0	0	0	0	0	0	0
2.5 - 5.0	0	0	0	0	0	0	0	0	0	0	0	0
5.0 - 7.5	0	0	0	0	0	0	0	0	0	0	0	0
7.5 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0
10.0 - 12.5	0	0	0	0	0	0	0	0	0	0	0	0
12.5 - 15.0	0	0	0	0	0	0	0	0	0	0	0	0
15.0 - 17.5	0	0	0	0	0	0	0	0	0	0	0	0
17.5 - 20.0	0	0	0	0	0	0	0	0	0	0	0	0
20.0 - 22.5	0	0	0	0	0	0	0	0	0	0	0	0
22.5 - 25.0	0	0	0	0	0	0	0	0	0	0	0	0
25.0 - 27.5	0	0	0	0	0	0	0	0	0	0	0	0
27.5 - 30.0	0	0	0	0	0	0	0	0	0	0	0	0
30.0 - 32.5	0	0	0	0	0	0	0	0	0	0	0	0
32.5 - 35.0	0	0	0	0	0	0	0	0	0	0	0	0
35.0 - 37.5	0	0	0	0	0	0	0	0	0	0	0	0
37.5 - 40.0	0	0	0	0	0	0	0	0	0	0	0	0
40.0 - 42.5	0	0	0	0	0	0	0	0	0	0	0	0
42.5 - 45.0	0	0	0	0	0	0	0	0	0	0	0	0
45.0 - 47.5	0	0	0	0	0	359	0	0	0	0	0	0
47.5 - 50.0	0	0	0	267	0	0	0	605	0	0	0	0
50.0 - 52.5	0	0	0	0	0	0	0	0	0	0	0	0
52.5 - 55.0	0	0	0	0	0	0	0	160	0	0	0	0
55.0 - 57.5	0	0	0	0	0	0	0	38	0	0	0	0
57.5 - 60.0	0	0	0	0	0	0	0	0	0	0	0	0
60.0 - 62.5	0	0	0	0	0	0	0	0	0	0	0	0
62.5 - 65.0	0	0	0	0	0	0	0	0	0	0	0	0

Table D3.2 New Rifle lower pile

PAGE NO. 9

DATA FOR ROW: 9

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	0	0	0	0	0	0	0	0	0	0	0	0
2.5 - 5.0	0	0	0	0	0	0	0	0	0	0	0	0
5.0 - 7.5	0	0	0	0	0	0	0	0	0	0	0	0
7.5 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0
10.0 - 12.5	0	0	0	0	0	0	0	0	0	0	0	0
12.5 - 15.0	0	0	0	0	0	0	0	0	0	0	0	0
15.0 - 17.5	0	0	0	0	0	0	0	0	0	0	0	0
17.5 - 20.0	0	0	0	0	0	0	0	0	0	0	0	0
20.0 - 22.5	0	0	0	0	0	0	0	0	0	0	0	0
22.5 - 25.0	0	0	0	0	0	0	0	0	0	0	0	0
25.0 - 27.5	0	0	0	0	0	0	0	0	0	0	0	0
27.5 - 30.0	0	0	0	0	0	0	0	0	0	0	0	0
30.0 - 32.5	0	0	0	0	0	0	0	0	0	0	0	0
32.5 - 35.0	0	0	0	0	0	0	0	0	0	0	0	0
35.0 - 37.5	0	0	0	0	0	0	0	0	0	0	0	0
37.5 - 40.0	0	0	0	0	0	0	0	0	0	0	0	0
40.0 - 42.5	0	0	0	0	0	0	0	0	0	0	0	0
42.5 - 45.0	0	0	0	0	0	0	0	0	0	0	0	0
45.0 - 47.5	0	0	0	0	0	0	0	0	0	0	0	0
47.5 - 50.0	0	0	0	0	0	0	0	0	0	0	0	0
50.0 - 52.5	0	0	0	0	0	0	0	0	0	0	0	0
52.5 - 55.0	0	0	0	0	0	0	0	0	0	0	0	0
55.0 - 57.5	0	0	0	0	0	0	0	0	0	0	0	0
57.5 - 60.0	0	0	0	0	0	0	0	0	0	0	0	0
60.0 - 62.5	0	0	0	0	0	0	0	0	0	0	0	0
62.5 - 65.0	0	0	0	0	0	0	0	0	0	0	0	0

Table D3.2 New Rifle lower pile

PAGE NO. 10

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										-1.0	-1.0	
I = 2							-1.0	-1.0	-1.0	-1.0		
I = 3					-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	52.4	
I = 4				-1.0	-1.0	47.5	-1.0	47.5	-1.0	51.4		
I = 5			-1.0	-1.0	-1.0	45.5	-1.0	-1.0	55.0	-1.0		
I = 6		52.5	52.5	-1.0	-1.0	45.0	48.0	47.5	-1.0	-1.0		
I = 7		-1.0	52.5	-1.0	-1.0	-1.0	50.0	52.5	-1.0	-1.0	-1.0	
I = 8	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
I = 9						-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	

Table D3.2 New Rifle lower pile

PAGE NO. 1:

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	10.0	
I = 2							41.5	42.0	43.5	30.0		
I = 3					41.5	41.5	41.0	42.5	42.5	49.0		
I = 4				42.0	44.2	42.0	44.5	44.6	45.5	49.0		
I = 5			48.5	43.3	42.0	43.0	43.0	45.2	49.3	48.0		
I = 6		44.3	45.5	43.0	48.0	45.0	45.2	45.0	47.0	51.2		
I = 7		45.0	46.5	46.5	46.0	49.0	47.0	48.0	49.5	52.0	52.0	
I = 8	20.0	25.0	40.0	48.0	40.0	46.0	50.0	52.0	50.0	50.0	40.0	20.0
I = 9							20.0	25.0	20.0	20.0	10.0	10.0

Table D3.3 New Rifle upper pile

TAILINGS PILE DATA GENERATION UTILITY

- BY ROGER A. NELSON

IRREGULAR BOUNDARY MODIFICATION PROGRAM EXECUTION - MonOct271986300100 01.26.44

RENUF2/DAT. NEW RIFLE UPPER PILE.

DATA ENTERED BY STEVE GREEN ON 3/7/85.

FILE DATA FROM (7 by 14) GRID - GRID SPACING : (98.94 by 94.18 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	J = 13	J = 14
0.0 - 2.5				0										
2.5 - 5.0				0										
5.0 - 7.5				0										
7.5 - 10.0				0										
10.0 - 12.5				0										
12.5 - 15.0				0										
15.0 - 17.5				0										
17.5 - 20.0				0										
20.0 - 22.5				0										
22.5 - 25.0				0										
25.0 - 27.5				0										
27.5 - 30.0				0										
30.0 - 32.5				0										
32.5 - 35.0				0										
35.0 - 37.5				0										
37.5 - 40.0				0										
40.0 - 42.5				0										
42.5 - 45.0				0										
45.0 - 47.5				0										
47.5 - 50.0				0										
50.0 - 52.5				0										
52.5 - 55.0				0										
55.0 - 57.5				0										
57.5 - 60.0				0										
60.0 - 62.5				0										
62.5 - 65.0				0										
65.0 - 67.5				0										
67.5 - 70.0				0										
70.0 - 72.5				0										
72.5 - 75.0				0										
75.0 - 77.5				0										
77.5 - 80.0				0										
80.0 - 82.5				0										
82.5 - 85.0				0										
85.0 - 87.5				0										

Table D3.3 New Rifle upper pile

PAGE NO. 2

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	J = 13	J = 14
0.0 - 2.5	0		0		0		0							
2.5 - 5.0	0		0		0		0							
5.0 - 7.5	0		0		0		0							
7.5 - 10.0	0		0		0		0							
10.0 - 12.5	0		0		0		0							
12.5 - 15.0	0		0		0		0							
15.0 - 17.5	0		0		0		0							
17.5 - 20.0	0		0		0		0							
20.0 - 22.5	0		0		0		0							
22.5 - 25.0	0		0		0		0							
25.0 - 27.5	0		0		0		0							
27.5 - 30.0	0		0		0		0							
30.0 - 32.5	0		0		0		0							
32.5 - 35.0	0		0		0		0							
35.0 - 37.5	0		0		0		0							
37.5 - 40.0	0		0		0		0							
40.0 - 42.5	0		0		0		0							
42.5 - 45.0	0		0		0		0							
45.0 - 47.5	0		0		0		0							
47.5 - 50.0	0		0		0		0							
50.0 - 52.5	0		0		0		0							
52.5 - 55.0	0		0		0		0							
55.0 - 57.5	0		0		0		0							
57.5 - 60.0	0		0		0		0							
60.0 - 62.5	0		0		0		0							
62.5 - 65.0	0		0		0		0							
65.0 - 67.5	0		0		0		0							
67.5 - 70.0	0		100		0		0							
70.0 - 72.5	0		533		0		0							
72.5 - 75.0	0		0		0		0							
75.0 - 77.5	0		0		0		0							
77.5 - 80.0	0		0		0		0							
80.0 - 82.5	0		0		0		0							
82.5 - 85.0	0		0		0		0							
85.0 - 87.5	0		0		0		0							

Table D3.3 New Rifle upper pile

DATA FOR ROW : 3	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12	J = 13	J = 14
DEPTH														
0.0 - 2.5	0	0	296	331	0	0	0							
2.5 - 5.0	0	0	0	367	0	0	0	0						
5.0 - 7.5	0	0	0	0	0	0	0	0						
7.5 - 10.0	0	0	0	343	0	0	0	0						
10.0 - 12.5	0	0	0	0	0	0	0	0						
12.5 - 15.0	0	0	0	0	0	0	0	0						
15.0 - 17.5	0	0	0	0	0	0	0	0						
17.5 - 20.0	0	0	0	0	409	0	0	0						
20.0 - 22.5	0	0	0	0	0	0	0	0						
22.5 - 25.0	0	0	0	0	0	0	0	0						
25.0 - 27.5	0	0	0	0	0	0	0	0						
27.5 - 30.0	0	0	0	0	0	0	0	0						
30.0 - 32.5	0	0	0	0	1591	0	0	0						
32.5 - 35.0	0	0	0	0	0	0	0	0						
35.0 - 37.5	0	0	0	0	0	0	0	0						
37.5 - 40.0	0	0	0	0	0	0	0	0						
40.0 - 42.5	0	0	0	0	0	0	0	0						
42.5 - 45.0	0	0	0	0	2382	0	0	0						
45.0 - 47.5	0	0	0	0	0	0	0	0						
47.5 - 50.0	0	0	0	0	0	0	0	0						
50.0 - 52.5	0	0	0	0	0	0	0	0						
52.5 - 55.0	0	0	0	0	0	0	0	0						
55.0 - 57.5	0	0	0	0	1700	0	0	0						
57.5 - 60.0	0	0	0	0	0	0	0	0						
60.0 - 62.5	0	0	0	0	0	0	0	0						
62.5 - 65.0	0	0	0	0	0	0	0	0						
65.0 - 67.5	0	0	0	0	0	0	0	0						
67.5 - 70.0	0	0	0	67	679	929	0	0						
70.0 - 72.5	0	0	0	580	234	110	0	0						
72.5 - 75.0	0	0	0	0	0	0	0	0						
75.0 - 77.5	0	0	0	0	0	0	0	0						
77.5 - 80.0	0	0	0	0	0	0	0	0						
80.0 - 82.5	0	0	0	0	0	0	0	0						
82.5 - 85.0	0	0	0	0	0	0	0	0						
85.0 - 87.5	0	0	0	0	0	0	0	0						

Table D3.3 New Rifle upper pile

PAGE NO. 4

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	J = 13	J = 14
0.0 - 2.5	0	0	262	472	349	464	0	0	0	0	0	0	0	0
2.5 - 5.0	0	0	0	468	0	464	0	0	0	0	0	0	0	0
5.0 - 7.5	0	0	0	326	0	456	0	0	0	0	0	0	0	0
7.5 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.0 - 12.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.5 - 15.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15.0 - 17.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17.5 - 20.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20.0 - 22.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22.5 - 25.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25.0 - 27.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27.5 - 30.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30.0 - 32.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32.5 - 35.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35.0 - 37.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37.5 - 40.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40.0 - 42.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42.5 - 45.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45.0 - 47.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47.5 - 50.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50.0 - 52.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52.5 - 55.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55.0 - 57.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57.5 - 60.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60.0 - 62.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62.5 - 65.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65.0 - 67.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
67.5 - 70.0	0	0	797	0	1995	925	0	0	0	0	0	0	0	0
70.0 - 72.5	0	0	0	467	0	82	54	0	0	0	0	0	0	0
72.5 - 75.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75.0 - 77.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
77.5 - 80.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80.0 - 82.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
82.5 - 85.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85.0 - 87.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table D3.3 New Rifle upper pile

PAGE NO. 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	J = 13	J = 14
0.0 - 2.5	0	0	395	360	436	384	258	394	361	381	321	0	0	0
2.5 - 5.0	0	0	216	0	453	0	407	0	395	0	494	0	0	0
5.0 - 7.5	0	0	0	0	814	0	0	0	451	0	0	0	0	0
7.5 - 10.0	0	0	0	0	0	0	331	0	0	0	0	0	0	0
10.0 - 12.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.5 - 15.0	0	0	0	795	0	0	0	0	0	0	352	0	0	0
15.0 - 17.5	0	0	0	0	0	1016	0	0	0	0	0	0	0	0
17.5 - 20.0	0	0	0	0	0	0	1490	0	0	0	0	0	0	0
20.0 - 22.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22.5 - 25.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25.0 - 27.5	0	0	0	1050	0	0	0	0	0	0	566	0	0	0
27.5 - 30.0	0	0	0	0	0	857	0	0	0	0	0	0	0	0
30.0 - 32.5	0	0	0	0	0	0	2927	0	0	0	0	0	0	0
32.5 - 35.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35.0 - 37.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37.5 - 40.0	0	0	0	1133	0	0	0	0	0	0	585	0	0	0
40.0 - 42.5	0	0	0	0	0	543	0	0	0	0	0	0	0	0
42.5 - 45.0	0	0	0	0	0	0	808	0	0	0	0	0	0	0
45.0 - 47.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47.5 - 50.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50.0 - 52.5	0	0	0	2491	0	0	0	0	0	0	1129	0	0	0
52.5 - 55.0	0	0	0	0	0	3556	0	0	0	0	0	0	0	0
55.0 - 57.5	0	0	0	0	0	0	1961	0	0	0	0	0	0	0
57.5 - 60.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60.0 - 62.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62.5 - 65.0	0	0	0	0	0	0	0	0	0	0	1655	0	0	0
65.0 - 67.5	0	1485	0	618	431	0	0	0	0	0	0	0	0	0
67.5 - 70.0	0	525	1111	40	0	0	0	0	0	0	0	0	0	0
70.0 - 72.5	0	465	37	0	0	148	884	1164	199	560	25	0	0	0
72.5 - 75.0	0	31	0	0	0	0	0	40	0	77	0	0	0	0
75.0 - 77.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
77.5 - 80.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80.0 - 82.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
82.5 - 85.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85.0 - 87.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table D3.3 New Rifle upper pile

PAGE NO. 6

DATA FOR ROW : 6	J = 1	J = 2	J = 3	J = 4	J = 5	J = 6	J = 7	J = 8	J = 9	J = 10	J = 11	J = 12	J = 13	J = 14
DEPTH														
0.0 - 2.5	0	318	375	339	457	378	403	386	363	322	270	367	0	0
2.5 - 5.0	0	329	0	329	0	400	0	363	0	346	0	442	0	0
5.0 - 7.5	0	487	0	0	0	0	0	396	0	0	0	501	0	0
7.5 - 10.0	0	0	0	0	0	0	0	0	0	355	0	344	0	0
10.0 - 12.5	0	0	0	0	0	0	0	0	0	0	0	322	0	0
12.5 - 15.0	0	0	0	0	0	0	0	0	0	0	0	386	0	0
15.0 - 17.5	0	0	0	0	0	0	0	0	0	0	0	551	0	0
17.5 - 20.0	0	0	0	0	0	0	0	0	0	0	0	669	0	0
20.0 - 22.5	0	578	0	0	0	0	0	0	0	0	0	542	0	0
22.5 - 25.0	0	0	0	0	0	0	0	1052	0	598	0	1197	0	0
25.0 - 27.5	0	0	0	0	0	0	0	0	0	0	0	1126	0	0
27.5 - 30.0	0	0	0	0	0	0	0	0	0	0	0	533	0	0
30.0 - 32.5	0	0	0	0	0	0	0	0	0	0	0	446	0	0
32.5 - 35.0	0	1079	0	0	0	0	0	0	0	0	0	560	0	0
35.0 - 37.5	0	0	0	0	0	0	0	637	0	1327	0	426	0	0
37.5 - 40.0	0	0	0	0	0	0	0	0	0	0	0	469	0	0
40.0 - 42.5	0	0	0	0	0	0	0	0	0	0	0	1053	0	0
42.5 - 45.0	0	0	0	0	0	0	0	0	0	0	0	967	0	0
45.0 - 47.5	0	666	0	0	0	0	0	0	0	0	0	1907	0	0
47.5 - 50.0	0	0	0	0	0	0	0	2465	0	1852	0	843	0	0
50.0 - 52.5	0	0	0	0	0	0	0	0	0	0	0	933	0	0
52.5 - 55.0	0	0	0	0	0	0	0	0	0	0	0	1389	0	0
55.0 - 57.5	0	0	0	0	0	0	0	0	0	0	0	2167	0	0
57.5 - 60.0	0	1794	0	0	0	0	0	0	0	0	0	1016	0	0
60.0 - 62.5	0	0	0	0	0	0	0	2687	0	939	0	1802	0	0
62.5 - 65.0	0	0	0	0	0	0	0	0	0	0	0	2507	0	0
65.0 - 67.5	0	0	0	0	0	0	0	0	0	0	0	2727	0	0
67.5 - 70.0	0	1985	47	28	219	0	0	0	0	0	0	1689	0	0
70.0 - 72.5	0	487	691	116	355	60	100	591	819	906	511	1507	0	0
72.5 - 75.0	0	30	0	0	0	31	1221	39	40	54	45	87	0	0
75.0 - 77.5	0	36	0	0	0	0	35	0	0	0	0	41	0	0
77.5 - 80.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80.0 - 82.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
82.5 - 85.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85.0 - 87.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table D3.3 New Rifle upper pile

PAGE NO. 7

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	J = 13	J = 14
0.0 - 2.5	0	0	408	276	316	0	487	361	495	533	0	558	0	0
2.5 - 5.0	0	0	399	0	343	0	713	0	679	0	0	327	0	0
5.0 - 7.5	0	0	316	0	0	0	808	0	0	0	0	377	0	0
7.5 - 10.0	0	0	0	322	290	0	0	0	0	0	0	0	0	0
10.0 - 12.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.5 - 15.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15.0 - 17.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17.5 - 20.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20.0 - 22.5	0	0	0	0	0	0	0	0	1259	0	0	0	0	0
22.5 - 25.0	0	0	0	1049	0	0	0	0	0	0	0	0	0	0
25.0 - 27.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27.5 - 30.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30.0 - 32.5	0	0	0	0	0	1434	0	0	0	0	0	0	0	0
32.5 - 35.0	0	0	0	0	0	0	0	0	428	0	0	0	0	0
35.0 - 37.5	0	0	0	808	0	0	0	0	0	0	0	0	0	0
37.5 - 40.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40.0 - 42.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42.5 - 45.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45.0 - 47.5	0	0	0	0	0	0	0	0	2077	0	0	0	0	0
47.5 - 50.0	0	0	0	757	0	0	0	0	0	0	0	0	0	0
50.0 - 52.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52.5 - 55.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55.0 - 57.5	0	0	0	0	0	3247	0	0	0	0	0	0	0	0
57.5 - 60.0	0	0	0	0	0	0	0	0	1134	0	0	0	0	0
60.0 - 62.5	0	0	0	2795	0	2996	0	0	0	0	0	0	0	0
62.5 - 65.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65.0 - 67.5	0	0	0	0	0	2047	0	0	0	0	857	0	0	0
67.5 - 70.0	0	0	0	0	0	0	0	0	764	0	0	0	0	0
70.0 - 72.5	0	2142	1504	999	260	1732	1264	214	52	57	0	1422	0	0
72.5 - 75.0	0	36	22	31	15	12	13	47	27	39	49	46	0	0
75.0 - 77.5	0	23	22	20		23	18			17	0	46	0	0
77.5 - 80.0	0	40	19				0				0	0	0	0
80.0 - 82.5	0	0					0				0	0	0	0
82.5 - 85.0	0	0					0				0	0	0	0
85.0 - 87.5														

Table D3.3 New Rifle upper pile

PAGE NO. 8

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	J = 13	J = 14
I = 1				-1.0										
I = 2			-1.0	-1.0	-1.0	-1.0								
I = 3		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0						
I = 4	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
I = 5	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	75.0	-1.0	-1.0	-1.0
I = 6	-1.0	77.5	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
I = 7	-1.0	-1.0	80.0	77.5	75.0	77.5	-1.0	75.0	75.0	77.5	-1.0	77.5	-1.0	-1.0

Table D3.3 New Rifle upper pile

PAGE NO. 9

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	J = 13	J = 14
I = 1				10.0										
I = 2			20.0	68.0	50.0	25.0								
I = 3		30.0	45.0	69.2	68.0	69.0	30.0	15.0						
I = 4	15.0	40.0	69.0	70.7	67.6	69.0	70.3	45.0	35.0	69.0	35.0	30.0	25.0	15.0
I = 5	25.0	68.0	69.0	67.0	65.0	69.3	70.0	71.5	69.0	70.0	71.5	60.0	75.0	20.0
I = 6	25.0	69.8	67.6	68.0	68.0	70.8	71.3	70.5	70.5	72.0	70.0	72.2	40.0	15.0
I = 7	25.0	72.0	72.0	71.0	71.0	71.5	72.0	71.0	70.0	72.0	72.4	72.0	35.0	15.0

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- MSRD (Mountain States Research and Development), 1982a. Economic Evaluation of Inactive Uranium Mill Tailings, Old Rifle Site, Rifle, Colorado, UMTRA-DOE/ALO-175, prepared by MSRD, Tucson, Arizona, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- MSRD (Mountain States Research and Development), 1982b. Economic Evaluation of Inactive Uranium Mill Tailings, New Rifle Site, Rifle, Colorado, UMTRA-DOE/ALO-176, prepared by MSRD, Tucson, Arizona, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

ADDENDUM D4
NOAA DATA FILE

FIGURE D 4.1
SEISMICITY MAP

SOURCE		DATE		TIME			LOCATION		DEPTH	MAGNITUDES			INT	F-E		CE	Q/N	DISTANCE
YR	MO	DA	HR	MM	SEC	LAT	LONG	KM	MB	MS	OTHER	MAX	DTSVNO				KM	
STO	1906	12	21	16	10	G 39.6	N 107.6	W				III		479		G*	17	
1***USN	1906	12	21	16	10	39.6	N 107.6	W				III		479		G	17	
2***USN	1969	09	10	21	00	00.1	39.4	N 107.9	W	5.3		VI		479		A	17	
PDE	1969	09	10	21	00	00.1A	39.406N	107.948W	0	5.3			E	479		106	19	
1***STO	1969	09	10	21	00	00.1G	39.41	N 107.95	W	0	5.3			479		AX	19	
1***USN	1920	12	29	02	50	39.5	N 107.5	W				V		479		G	24	
STO	1920	12	29	02	50	G 39.5	N 107.5	W				V		479		G	24	
1***USN	1920	12	30	09	50	39.5	N 107.5	W				V		479		G	24	
STO	1920	12	30	09	50	G 39.5	N 107.5	W				V		479		G	24	
STO	1920	12	30	17	50	G 39.5	N 107.5	W				V		479		G	24	
1***USN	1920	12	30	17	50	39.5	N 107.5	W	SG					479	F	7	29	
PDE	1982	11	22	10	09	01.4*	39.739N	107.581W	33	3.8				479		C	40	
1***STO	1968	06	23	20	16	13.	G 39.31	N 107.41	W	33N	3.8			479		H	41	
PDE	1968	06	23	20	16	13.	* 39.314N	107.409W	33N	3.8				479		A	41	
STO	1889	01	15			G 39.5	N 107.3	W	33	3.8				479		B	41	
2***USN	1968	06	23	20	16	13.	39.3	N 107.4	W	33	4.3			479		G*	42	
PDE	1971	01	07	20	39	52.1	39.486N	107.307W	33N	4.3				479		G	42	
1***STO	1971	01	07	20	39	52.1G	39.49	N 107.31	W	33	4.3			479			43	
STO	1946	01	31	22	45	G 39.6	N 107.3	W				IV		479			45	
1***USN	1946	01	31	22	45	39.6	N 107.3	W				IV		479			45	
PDE	1984	05	10	01	53	51.8?	39.36	N 107.303W	SG					479		6	47	
PDE	1977	09	24	11	16	48.4	39.309N	107.311W	SG	4.				479		23	47	
1***STO	1977	09	24	11	16	48.4G	39.31	N 107.31	W	5	4.			479		B	47	
PDE	1978	05	29	16	45	18.	39.275N	107.322W	SG					479		17	48	
1***STO	1978	05	29	16	45	18.	G 39.28	N 107.32	W	5				479		B	48	
PDE	1984	05	04	01	17	10.4?	39.334N	107.274W	SG					479	F	6	49	
PDE	1984	05	06	02	13	34.4?	39.349N	107.262W	SG					479		6	49	
PDE	1984	05	06	04	17	35.5?	39.354N	107.258W	SG					479		6	50	
PDE	1984	05	03	19	18	23.	? 39.331N	107.253W	SG					479	F	6	50	
PDE	1984	05	06	02	12	49.7?	39.339N	107.248W	SG					479		6	50	
PDE	1984	05	10	01	20	14.9?	39.346N	107.249W	SG					479		7	50	
PDE	1984	05	11	03	34	57.9?	39.336N	107.259W	SG					479	F	6	51	
PDE	1984	05	04	02	13	33.1?	39.34	N 107.245W	SG					479	F	6	51	
PDE	1984	05	06	02	00	56.6?	39.335N	107.249W	SG					479	F	7	51	
PDE	1984	05	17	09	11	20.2*	39.337N	107.245W	SG					479	F	7	52	
PDE	1984	05	03	18	28	54.1?	39.304N	107.253W	SG					479	F	6	52	
PDE	1984	05	06	02	51	36.9?	39.331N	107.232W	SG					479	F	6	52	
PDE	1984	05	06	04	21	37.7?	39.329N	107.239W	SG					479	F	6	53	
PDE	1984	05	14	10	14	17.2*	39.322N	107.228W	SG				IV	479	F	9	53	
PDE	1984	04	12	20	16	57.8*	39.298N	107.232W	SG					479	F	9	54	
PDE	1984	05	03	18	25	35.4?	39.291N	107.229W	SG					479		6	54	
PDE	1984	06	12	04	48	54.1*	39.143N	107.394W	1G					479		11	54	
PDE	1984	05	04	18	44	37.4?	39.283N	107.203W	SG					479		5	57	
STO	1973	05	17	16		G 39.79	N 106.37	W	0	5.4	4.1	5.7	BRK			AX	58	
2***PDE	1973	05	17	16	00	00.0A	39.793N	108.366W	0	5.4				479		123	58	
PDE	1984	04	22	17	30	56.7*	39.281N	107.19	W	SG				479	F	10	58	
1***USN	1973	05	17	16		39.8	N 108.4	W		5.4				479		A	61	
PDE	1944	09	09	04	12	18.	39.	N 107.5						479	F		64	

SOURCE	DATE		TIME			LOCATION		DEPTH KM	MAGNITUDES			INT MAX	DTSVNO	F-E CE	Q/N	DISTANCE KM
	YR	MO	DA	HR	MIN	SEC	LAT		LONG	Mb	Ms					
1***STO	1944	09	09	04	12	20.	G 39.	N 107.5				VI	479	G	64	
1***USN	1946	04	03	02	05		39.	N 107.5				V	479	I	64	
2***USN	1967	01	12	03	52	06.2	39.	N 107.5	4.4				479	A	64	
PDE	1967	01	12	03	52	06.2	38.979N	107.506W	4.4				479	11	65	
1***STO	1967	01	12	03	52	06.2G	38.98	N 107.51	4.4				479	B	65	
STO	1946	04	03	02	05	G	39.8	N 107.1				IV	479	G*	66	
1***USN	1915	02	28	07	51		39.2	N 108.6				II	479	G	79	
PDE	1975	01	30	14	48	40.3	39.27	N 108.646W	4.4			V	479	F 11	79	
1***STO	1975	01	30	14	48	40.3G	39.27	N 108.65	4.4			V	479	B	80	
STO	1960	10	17	16		G	39.2	N 106.9				III	479	F	84	
STO	1915	02	28	07	51	G	39.1	N 108.6					479	G *	85	
1***STO	1967	01	18	06	12	00.6G	40.05	N 107.05	3.8				479	C	85	
PDE	1967	01	18	06	12	00.6*	40.054N	107.049W	3.8				479	5	86	
STO	1940	04	08	17		G	39.3	N 106.8				III	479	G**	88	
1***STO	1941	02	13	11	32	30.	G 39.3	N 106.8				IV	479	G *	88	
STO	1941	02	21	21	22	G	39.3	N 106.8				IV	479	G *	88	
STO	1941	02	28	06	19	G	39.3	N 106.8				III	479	G *	88	
USN	1915	03	01	07	51		39.1	N 108.7				II	479	G	92	
1***USN	1940	04	08	17			39.2	N 106.8					479	G	92	
USN	1941	02	13	10	30		39.2	N 106.8				IV	479	G	92	
1***USN	1941	02	21	21	22		39.2	N 106.8				IV	479	G	92	
USN	1941	02	27			X	39.2	N 106.8					479	G	92	
1***USN	1944	10	05	14	05		39.2	N 106.8				IV	479	G*	92	
STO	1944	10	05	14	05	G	39.2	N 106.8				IV	479	G	92	
1***USN	1960	10	17	16			39.2	N 106.8				V	479	C	92	
STO	1962	03	05	04	23	06.7G	39.2	N 106.8	25				479	A	92	
2***USN	1967	01	18	06	12	00.6	40.1	N 107.	3.8			IV	479	G	92	
STO	1880	09	17	07		G	39.3	N 106.7				VI	479	G	96	
1***STO	1954	02	21	20	20	51.	G 40.	N 108.75				IV	479	D	98	
2***USE	1954	02	21	20	20	51.	40.	N 108.75				IV	479	F	98	
2***USN	1966	11	01	07	40	28.1	40.1	N 106.9	3.9			IV	479	C	99	
3***USN	1954	02	21	20	20	51.	40.	N 108.8				IV	479	C	101	
1***STG	1971	11	12	09	30	44.6G	38.91N	108.68W				III	479	B *	103	
FDE	1966	11	01	07	40	28.	40.2	N 106.9	5				479	F 12	103	
PDE	1966	11	01	07	40	28.	G 40.2	N 106.9	33				479	9	106	
1***STO	1966	11	01	07	40	28.	G 40.2	N 106.9	33				479	D	106	
1***STO	1978	11	30	18	50	15.8G	40.47	N 107.61	5				479	C	106	
PDE	1978	11	30	18	50	15.8*	40.471N	107.607W	5G				479	6	106	
STO	1891	12				G	40.5	N 108.				VI	479	H	110	
PDE	1941	02	13	11	32	30.	38.9	N 106.8					479	G	110	
USN	1944	09	09	04	30		38.5	N 107.8				VI	479	G	114	
1***STG	1970	04	21	15	05	47.5G	40.09	N 108.9	4			IV	479	B *	114	
PDE	1970	04	21	15	05	47.5	40.09	N 108.898W	4.6			IV	479	F 10	114	
USN	1962	01	13	14			38.5	N 107.9					479	G	115	
1***STO	1966	04	03	16	21	34.	G 39.36	N 106.46	0				479	AX	115	
2***PDE	1966	04	03	16	21	34.0E	39.363N	106.462W	0				479	16	115	
PDE	1966	07	06	05	47	08.2	40.1	N 108.9	5				479	10	115	
1***USE	1970	04	21	08	53	52.4G	40.1	N 108.9	4			V	479	F 016	115	
STO	1970	04	21	08	53	52.4G	40.1	N 108.9	4			V	479	B	115	
2***USN	1970	04	21	08	53	52.4	40.1	N 108.9	4			V	479	A	115	
2***USN	1970	04	21	15	05	47.5	40.1	N 108.9	4			V	479	A	115	

NGDC EARTHQUAKE DATA FILE

SOURCE	DATE	TIME	LOCATION	DEPTH	MB	Ms	OTHER	LOCAL	INT	DTSVNO	F-E	CE	Q/N	DISTANCE
YR	MO	DA	HR	MIN	SEC	LAT	LONG	KM						KM
PDE	1954	02	21	20	20	46.	N 109.							116
1***USN	1963	08	01	05	00	17.3	39.3 N 109.1	33	3.7				C	116
PDE	1963	08	01	05	00	17.3	39.3 N 109.1	33	3.7				5	116
2***STO	1966	07	06	05	47	08.46	40.09 N 108.95	7	4.1				A	118
PDE	1979	03	19	14	59	29.7	40.177N 108.895	2G					F	119
1***STO	1966	07	05	20	02	41.76	40.06 N 109.	7	3.5				A	120
1***STO	1979	03	19	14	59	29.76	40.18 N 108.9	2					B	120
PDE	1979	03	29	22	07	13.3*	40.266N 108.813	2G					F	120
1***STO	1979	03	29	22	07	13.36	40.27 N 108.81	2					C	120
USN	1966	04	03	16	21	33.5	39.3 N 106.4	7	4.6				C	121
2***STO	1966	07	05	18	26	13.36	40.09 N 109.	7	3.7				A	121
1***USN	1966	07	06	05	47	08.3	40.2 N 108.9	5	4.5				C	121
STO	1882	11	10				107.						H	123
STO	1895	03	22				107.1						G	123
STO	1955	02	10	17	30		106.9						G	123
STO	1942	08					108.5						G*	124
STO	1962	01	13	13	33		107.8						F	125
PDE	1966	12	19	20	52	33.3	39.	5	4.6				5	125
1***STO	1966	12	19	20	52	33.36	39.	5	4.6				C	125
PDE	1967	02	15	03	28	03.6	40.1 N 109.072	5G					F	127
STO	1967	02	15	04	33	22.36	40.22 N 108.97	7	4.5				A	127
2***USN	1965	05	30	17	31	04.1	39.4 N 106.3	33	4.3				C	128
PDE	1965	05	30	17	31	04.1	39.4 N 106.3	33	4.3				8	128
1***STO	1965	05	30	17	31	04.16	39.4 N 106.3	33	4.3				C	128
PDE	1966	07	05	18	26	13.	40.2 N 109.	5	3.7				C	128
1***USN	1966	07	05	18	26	13.	40.2 N 109.	5	3.7				C	128
PDE	1966	07	05	20	02	41.3	40.2 N 109.	8	3.5				A	129
1***USN	1967	02	15	03	28	03.6	40.1 N 109.1	5	4.5				D	130
STO	1962	06	23	17	11	04.	38.5 N 108.5	33					B	134
1***STO	1967	04	04	22	53	39.56	38.32 N 107.75	33	4.5				C	135
2***USN	1966	07	05	20	02	43.1	40.2 N 109.1	5	3.5				C	135
PDE	1967	04	04	22	53	39.5	38.318N 107.754	33N	4.5				C	136
STO	1968	01	18	21	16	38.26	40.44 N 108.84	7					H	137
1***USN	1955	02	10	17	30		106.8						D	137
PDE	1960	10	11	08	05	30.5	38.3 N 107.6						C	137
1***STO	1960	10	11	08	05	30.56	38.3 N 107.6	49					C	137
2***USN	1960	10	11	08	05	30.5	38.3 N 107.6						C	137
STO	1960	10	12	00	30		38.3 N 107.6						F**	137
PDE	1964	05	23	21	44	59.1E	39.4 N 106.2	0					C	137
1***STO	1966	09	04	09	52	34.56	38.3 N 107.6	33	4.2				C	137
PDE	1966	09	04	09	52	34.5	38.3 N 107.6	33	4.2				5	137
2***USN	1967	04	04	22	53	39.6	38.3 N 107.7	33	4.5				A	137
PDE	1962	03	17	09	14	04.4	38.3 N 108.1	33					5	139
2***USN	1962	03	17	09	14	04.46	38.3 N 108.1	33					C	139
1***STO	1962	03	17	09	14	04.46	38.3 N 108.1	33					C	139
PDE	1964	05	26	00	25	40.6	39.5 N 109.4	33					5	139
1***USN	1964	05	26	00	25	40.6	39.5 N 109.4	33					C	139
1***STO	1964	05	23	21	44	59.16	39.37 N 106.17	0					AX	140
2***USN	1974	03	31	11	58	47.1	40.7 N 107.1	5					A	143
1***STO	1974	03	31	11	58	47.16	40.7 N 107.05	5					8	144
PDE	1979	01	20	06	59	08.4*	40.818N 107.861	5G					11	144

SOURCE	DATE		TIME			LOCATION		DEPTH KM	-----MAGNITUDES-----			INT MAX	F-E CE	Q/N	DISTANCE KM
	YR	MO	DA	HR	MIN	SEC	LAT		Mb	Ms	OTHER				
1***STO	1979	01	20	06	59	08.4G	40.82 N	5			3.3 ML GS		479	a	144
2***USN	1964	05	23	21	44	59.1	39.4 N						479	C	145
PDE	1974	03	31	11	58	47.1	40.703N	5G				II	479	F 10	145
1***STO	1971	03	18	09	08	59.9G	40.7 N	10	4.4			V	479	B	147
EQM	1913	11	11	21	55		38.2 N					V	479	F	143
1***STO	1913	11	11	21	55	G	38.2 N					V	479	G	148
2***USN	1913	11	11	21	55		38.2 N					V	479	G	148
STO	1913	11	11	22	18	G	38.2 N						479	F G	148
STO	1913	11	11	23	45	G	38.2 N						479	F G	148
1***STO	1962	02	05	14	45	51.1G	38.2 N	25				V	479	F C	148
PDE	1962	02	05	14	45	51.1	38.2 N	25				V	479	F 6	148
2***USN	1962	02	05	14	45	51.1	38.2 N					V	479	F C	148
PDE	1971	03	18	09	08	59.9	40.705N	10G	4.4				479	F 14	148
STO	1886	07				G	38.2 N						479	F H	153
2***USN	1964	08	04	11	13	25.2	39.7 N	33				IV	479	C	154
1***STO	1964	08	04	11	13	25.2G	39.7 N	33	4.				479	C	154
PDE	1964	08	04	11	13	25.2	39.7 N	33	4.				479	C 8	154
USN	1956	02	12	03	03		40.3 N					IV	478	G	155
USN	1956	02	12	04	15		40.3 N					IV	478	G	155
PDE	1961	11	27	00	55	45.7	39. N	33N				IV	479	F	156
1***STO	1961	11	27	00	55	45.7G	39. N	33				IV	479	C	156
STO	1961	11	27	01	05	G	39. N					III	479	F *	156
1***USN	1921	02	06	06	15		38.7 N						479	G	158
1***USN	1921	02	06	06	25		38.7 N						479	G	158
1***USN	1921	02	06	06	30		38.7 N						479	G	158
EQM	1901	11	15			X	38.8 N					VII	479	D	159
1***USN	1901	11	15			X	38.8 N					VI	479	G	159
STO	1901	11	15	10		G	38.8 N					VI	479	G	159
2***USN	1961	11	27	00	55	45.7	38.9 N					IV	479	C	161
STO	1921	02	06	06	15	G	38.6 N					IV	479	G *	164
STO	1921	02	06	06	25	G	38.6 N					IV	479	G *	164
STO	1921	02	06	06	30	G	38.6 N					IV	479	G *	164
STO	1921	02	17	01	45	G	38.6 N					III	479	G	164
1***USN	1921	02	17	01	45		38.6 N					III	479	G	164
STO	1921	02	17	13	05	G	38.6 N					III	479	G	164
STO	1921	02	26	15	55	G	38.6 N					III	479	G	164
1***USN	1921	02	26	15	55		38.6 N					III	479	G	164
STO	1921	02	27	17		G	38.6 N					III	479	G	164
STO	1921	02	27	17		G	38.6 N					III	479	G	164
STO	1921	03	04	06		G	38.6 N					II	479	G	164
STO	1921	03	08	19	15	G	38.6 N					IV	479	G	164
STO	1921	03	09	01	25	G	38.6 N					III	479	G	164
STO	1921	03	12	07		G	38.6 N					III	479	G	164
STO	1921	03	22	21	45	G	38.6 N					III	479	G	164
STO	1921	07	27	21	30	G	38.6 N					III	479	G *	164
STO	1921	07	29	02	55	G	38.6 N					III	479	G	164
STO	1921	07	29	02	55	G	38.6 N					III	479	G *	164
PDE	1983	09	24	16	57	45.7	40.783N	5G			4.1 ML GS	III	479	F 19	166
1***USN	1960	10	12	00	30		38. N						479	G	170
1***USN	1955	08	03	06	39	42.	38. N						479	G	175
STO	1955	08	03	06	39	42.	G 38. N					VI	479	F	175

NGDC EARTHQUAKE DATA FILE

SOURCE	YR	MO	DA	TIME HR MN SEC	LAT	LONG	DEPTH KM	Mb	Ms	OTHER	LOCAL	INT MAX	DTSVNO	F-E	CE	Q/N	DISTANCE KM
STO	1871	11	09	17 15	G 39.7	N 105.7	W					IV		479		G	179
STO	1894	08	05	12	G 39.7	N 105.7	W					V		479		G	179
PDE	1967	02	13	19 21 33.9	40.378N	109.569W	33N							478		8	179
PDE	1971	07	10	17 22 37.2*	40.403N	109.566W	8	3.8				IV		478		7	180
STO	1894	01	01	10	G 37.9	N 107.8	W							479		H	181
USN	1948	10	03	04 30	40.7	N 106.3	W							479		H	181
PDE	1965	07	18	03 55 51.4	39.5	N 109.9	W	3.1				III		478		6	182
1***USN	1965	07	18	03 55 51.4	39.5	N 109.9	W	3.1						478		C	182
1***USN	1967	02	18	19 21 33.9	40.4	N 109.6	W	3.1				IV		478		A	183
1***USN	1971	07	10	17 22 37.2	40.4	N 109.6	W	3.8						478		A	183
PDE	1970	02	03	05 59 35.6*	37.918N	108.311W	8	4.						479		5	185
1***STO	1970	02	03	05 59 35.6G	37.92	N 108.31	W	4.				IV		479		C	185
STO	1955	08	03	06 35	G 37.9	N 107.3	W							479		F**	186
STO	1955	08	03	06 37	G 37.9	N 107.3	W							479		F*	186
2***USN	1970	02	03	05 59 35.6	37.9	N 108.3	W	4.				V		479		A	186
1***USN	1963	05	06	05 09 00.1	39.6	N 110.	W							478		C	190
PDE	1963	05	06	05 09 00.1	39.6	N 110.	W							478		6	190
1***USN	1965	05	29	12 03 29.2	39.5	N 110.	W	3.2				III		478		C	190
PDE	1965	05	29	12 03 29.2	39.5	N 110.	W	3.2						478		7	190
USN	1945	04	29	17 08	37.8	N 107.7	W					IV		479		G	192
USN	1945	04	29	17 32	37.8	N 107.7	W							479		G	192
USN	1916	10	12	05 40 40.	40.3	N 105.7	W					IV		479		G	197
1***STO	1916	10	12	05 41	G 40.1	N 105.6	W					IV		479		G*	197
STO	1966	01	23	04	G 37.9	N 106.9	W					III		479		G*	197
1***USN	1966	01	23	04	37.9	N 106.9	W					III		479		G	197
PDE	1967	02	05	10 07 16.6*	39.549N	110.097W	33N	3.						478		5	198
PDE	1977	03	03	17 50 28.	41.242N	107.147W	5G	4.2						460		16	198
1***USN	1963	09	02	17 40 15.4	39.6	N 110.1	W							478		C	199
PDE	1963	09	02	17 40 15.4	39.6	N 110.1	W							478		10	199
PDE	1963	12	26	14 40 06.2	39.6	N 110.1	W	4.1						478		6	199
1***USN	1963	12	26	14 40 06.2	39.6	N 110.1	W	3.7						478		C	199
USN	1964	06	06	12 46 59.9	39.4	N 110.1	W							478		C	199
USN	1965	01	14	12 30 11.1	39.5	N 110.1	W	4.5				V		478		C	199
1***USN	1967	02	05	10 07 16.6	39.5	N 110.1	W	3.				III		478		A	199

3.5 ML GS

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

TOTAL NUMBER OF EVENTS RETRIEVED IS 235
TOTAL NUMBER OF SUSPECTED DUPLICATES IS 99

ADDENDUM D5
BOREHOLES AND TEST PITS SUMMARIES

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D5.6	MSRD Boring Logs, Old Rifle
D5.7	MSRD Boring Logs, New Rifle

ADDENDUM D5.1

ESTES GULCH BOREHOLE AND TEST PIT SUMMARIES

BOREHOLE AND TEST PIT SUMMARY

BITE ID: RFL-08
LOCATION ID: 925
LOCATION COORDINATES:
N 57,053.167
E 52,307.604
GROUND ELEVATION (FT. MSL): 6033.55

BH-BOREHOLE/TP-TEST PIT: TP
DRILLER/EXCAVATOR: _____
COMPLETION DATE: _____
BOREHOLE DIAMETER (IN): _____
TOTAL DEPTH (FT.): 10

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
 INSTALLER: _____ FORMATION OF COMPLETION: _____
 INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
 CASING ELEV. (FT. MSL): _____ OPEN/SCREEN DEPTH (FT.): _____
 CASING LENGTH (FT.): _____ OPEN/SCREEN LENGTH (FT.): _____
 CASING DIA. (IN.): _____ OPEN/SCREEN AREA (IN²/FT.): _____
 SEAL END) DEPTH (FT.): _____ * FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

[illegible]

DW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08 BH-BOREHOLE/TP-TEST PIT: TP
LOCATION ID: 926 DRILLER/EXCAVATOR: _____
LOCATION COORDINATES: COMPLETION DATE: _____
N 56,817.053 BOREHOLE DIAMETER (IN): _____
E 53,384.786 TOTAL DEPTH (FT.): _____
GROUND ELEVATION (FT. MSL): 6025.52

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
INSTALLER: _____ FORMATION OF COMPLETION: _____
INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
CASING ELEV. (FT. MSL): _____ OPEN/SCREEN DEPTH (FT.): _____
CASING LENGTH (FT.): _____ OPEN/SCREEN LENGTH (FT.): _____
CASING DIA. (IN): _____ OPEN/SCREEN AREA (IN²/FT.): _____
SEAL (END) DEPTH (FT.): _____ *FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0 - 10	CL	1	Clay, silty, some fine sand	01	0 - 1	D	
			low to medium plasticity,	02	4 - 5	D	
			dark brown, moist, stiff	03	9 - 10	D	
			grades reddish brown dry,				
			blocky, sandy, calcareous and				
			with occasional gravel sized				
			sandstone fragments below 3'				
			grades to light olive green				
			below 9', no groundwater				

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08
LOCATION ID: 928
LOCATION COORDINATES:
N 57,112.756
E 52,731.651
GROUND ELEVATION (FT. MSL): 6028.25

BH-BOREHOLE/TP-TEST PIT: TP
DRILLER/EXCAVATOR: _____
COMPLETION DATE: _____
BOREHOLE DIAMETER (IN): _____
TOTAL DEPTH (FT.): 11

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
INSTALLER: _____ FORMATION OF COMPLETION: _____
INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
CASING ELEV. (FT. MSL): _____ OPEN/SCREEN DEPTH (FT.): _____
CASING LENGTH (FT.): _____ OPEN/SCREEN LENGTH (FT.): _____
CASING DIA. (IN): _____ OPEN/SCREEN AREA (IN²/FT.): _____
SEAL (END) DEPTH (FT.): _____ *FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0 - 1	CL	1	Clay, silty, low plasticity	01	0 - 1	D	
			sandy, moist, light brown,	02	1.5 - 3	D	
			minor rootlets	03	9.5 - 10	D	
1 - 6	SC	2	SAND, clayey, fine to coarse,				
			some gravel, angular, low				
			plasticity, light brown, dry,				
			dense				
6 - 11	CL	1	CLAY, silty, low plasticity,				
			calcareous, blocky, light				
			brown, dry, hard no ground-				
			water.				

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08 BH-BOREHOLE/TP-TEST PIT: TP
LOCATION ID: 930 DRILLER/EXCAVATOR: _____
LOCATION COORDINATES: COMPLETION DATE: _____
N 57,365.993 BOREHOLE DIAMETER (IN): _____
E 52,959.602 TOTAL DEPTH (FT.): 11.5
GROUND ELEVATION (FT. MSL): 6040.3

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
INSTALLER: _____ FORMATION OF COMPLETION: _____
INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
CASING ELEV. (FT. MSL): _____ OPENS/SCREEN DEPTH (FT.): _____
CASING LENGTH (FT.): _____ OPENS/SCREEN LENGTH (FT.): _____
CASING DIA. (IN): _____ OPENS/SCREEN AREA (IN²/FT.): _____
SEAL (END) DEPTH (FT.): _____ *FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0 - 11.5	CL	1	Clay, silty, low to medium	01	0 - 1	D	
			plasticity, trace sand to	02	1 - 3	D	
			sandy, some fine to coarse	03	8 - 10	D	
			gravel, occasional cobbles to				
			6" blocky, calcareous, pin				
			sized holes, brown, dry, hard				
			cobbles grade out below 8'				
			No groundwater				

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08
LOCATION ID: 931
LOCATION COORDINATES:
N 57,366.970
E 52,750.026
GROUND ELEVATION (FT. MSL): 6038.38

BH-BOREHOLE/TP-TEST PIT: TP
DRILLER/EXCAVATOR: _____
COMPLETION DATE: _____
BOREHOLE DIAMETER (IN): _____
TOTAL DEPTH (FT.): 10.5

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
 INSTALLER: _____ FORMATION OF COMPLETION: _____
 INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
 CASING ELEV. (FT. MSL): _____ OPEN/SCREEN DEPTH (FT.): _____
 CASING LENGTH (FT.): _____ OPEN/SCREEN LENGTH (FT.): _____
 CASING DIA. (IN.): _____ OPEN/SCREEN AREA (IN²/FT.): _____
 SEAL (END) DEPTH (FT.): _____ * FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

[illegible]

OW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08
LOCATION ID: 933
LOCATION COORDINATES:
N 57,664.786
E 52,552.959
GROUND ELEVATION (FT. MSL): 6057.22

BH-BOREHOLE/TP-TEST PIT: _____ TP
 DRILLER/EXCAVATOR: _____
 COMPLETION DATE: _____
 BOREHOLE DIAMETER (IN): _____
 TOTAL DEPTH (FT.): _____

WELL SUMMARY

WELL OWNER: _____
 INSTALLER: _____
 INSTALLATION DATE: _____
 CASING ELEV. (FT. MSL): _____
 CASING LENGTH (FT.): _____
 CASING DIA. (IN.): _____
 SEAL (END) DEPTH (FT.): _____

FILTER PACK LENGTH (FT.): _____
FORMATION OF: COMPLETION: _____
STRATIGRAPHIC ORDER: _____
OPENS/SCREEN DEPTH (FT.): _____
OPENS/SCREEN LENGTH (FT.): _____
OPENS/SCREEN AREA (IN.²/FT.): _____
***FLOW RELATIONSHIP:** _____

LITHOLOGICAL SUMMARY

[illegible]

FLOW RELATIONSHIP: U-Upgrade D-Downgrade C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08 BH-BOREHOLE/TP-TEST PIT: TP
LOCATION ID: 935 DRILLER/EXCAVATOR: _____
LOCATION COORDINATES: COMPLETION DATE: _____
N 57,973.756 BOREHOLE DIAMETER (IN): _____
E 52,972.092 TOTAL DEPTH (FT.): 11
GROUND ELEVATION (FT. MSL): 6075.05

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
INSTALLER: _____ FORMATION OF COMPLETION: _____
INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
CASING ELEV. (FT. MSL): _____ OPEN/SCREEN DEPTH (FT.): _____
CASING LENGTH (FT.): _____ OPEN/SCREEN LENGTH (FT.): _____
CASING DIA. (IN.): _____ OPEN/SCREEN AREA (IN.²/FT.): _____
SEAL (END) DEPTH (FT.): _____ *FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0 - 1	CL	01	Clay, silty, medium plasti-	01	0 - 1.3	D	
			city dark brown, moist,	02	3.5 - 4	D	
			rootlets				
1 - 11	SC	02	Sand, clayey, some silt some	03	9 - 10	D	
			gravel and cobbles, non-				
			plastic, dry light brown,				
			hard, no groundwater				

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08
LOCATION ID: 936
LOCATION COORDINATES:
N 57,952.732
E 52,811.081
GROUND ELEVATION (FT. MSL): 6070.95
BH-BOREHOLE/TP-TEST PIT: TP
DRILLER/EXCAVATOR:
COMPLETION DATE:
BOREHOLE DIAMETER (IN):
TOTAL DEPTH (FT.):

WELL SUMMARY

WELL OWNER:
INSTALLER:
INSTALLATION DATE:
CASING ELEV. (FT. MSL):
CASING LENGTH (FT.):
CASING DIA. (IN):
SEAL (END) DEPTH (FT.):
FILTER PACK LENGTH (FT.):
FORMATION OF COMPLETION:
STRATIGRAPHIC ORDER:
OPENS/SCREEN DEPTH (FT.):
OPENS/SCREEN LENGTH (FT.):
OPENS/SCREEN AREA (IN²/FT.):
* FLOW RELATIONSHIP:

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0 - 11.5	CL	1	Clay, silty, trace sand to	01	0 - 0.5	D	
			sandy, low plasticity, dry	02	4 - 5	D	
			below 1', brown, occasional				
			cobble, calcareous, hard no				
			groundwater				

LOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08
LOCATION ID: 937
LOCATION COORDINATES:
N 57,940.851
E 52,478.878
GROUND ELEVATION (FT. MSL): 6074.35

BH-BOREHOLE/TP-TEST PIT: TP
DRILLER/EXCAVATOR: _____
COMPLETION DATE: _____
BOREHOLE DIAMETER (IN): _____
TOTAL DEPTH (FT.): 11

WELL SUMMARY

WELL OWNER: _____
INSTALLER: _____
INSTALLATION DATE: _____
CASING ELEV. (FT. MSL): _____
CASING LENGTH (FT.): _____
CASING DIA. (IN): _____
SEAL (END) DEPTH (FT.): _____

FILTER PACK LENGTH (FT.): _____
FORMATION OF COMPLETION: _____
STRATIGRAPHIC ORDER: _____
OPENS/SCREEN DEPTH (FT.): _____
OPENS/SCREEN LENGTH (FT.): _____
OPENS/SCREEN AREA (IN²/FT.): _____
*FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0-11	CL	1	CLAY, silty, trace to	01	0-1	D	
			some sand, light brown	02	5-6	D	
			slightly cemented,				
			dry, hard.				
			No ground water.				

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08
LOCATION ID: 939
LOCATION COORDINATES:
N 58,321.993
E 52,698.454
GROUND ELEVATION (FT. MSL): 6092.74
BH-BOREHOLE/TP-TEST PIT: TP
DRILLER/EXCAVATOR:
COMPLETION DATE:
BOREHOLE DIAMETER (IN):
TOTAL DEPTH (FT.): 8

WELL SUMMARY

WELL OWNER:
INSTALLER:
INSTALLATION DATE:
CASING ELEV. (FT. MSL):
CASING LENGTH (FT.):
CASING DIA. (IN):
SEAL (END) DEPTH (FT.):
FILTER PACK LENGTH (FT.):
FORMATION OF COMPLETION:
STRATIGRAPHIC ORDER:
OPEN/SCREEN DEPTH (FT.):
OPEN/SCREEN LENGTH (FT.):
OPEN/SCREEN AREA (IN²/FT.):
*FLOW RELATIONSHIP:

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0-8	CL	1	CLAY, silty, trace	01	0.5-1	D	
			sand to sandy, low	02	3-4	D	
			to medium plasticity,	03	6-8	D	
			dry below 1', light brown,				
			hard.				
			Grades calcareous with some				
			weathered sandstone cobbles				
			below 1'.				
			No ground water.				

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08
LOCATION ID: 940
LOCATION COORDINATES:
N 58,535.772
E 52,985.767
GROUND ELEVATION (FT. MSL): 6119.75
BH-BOREHOLE/TP-TEST PIT: TP
DRILLER/EXCAVATOR:
COMPLETION DATE:
BOREHOLE DIAMETER (IN):
TOTAL DEPTH (FT.): 11

WELL SUMMARY

WELL OWNER:
INSTALLER:
INSTALLATION DATE:
CASING ELEV. (FT. MSL):
CASING LENGTH (FT.):
CASING DIA. (IN.):
SEAL (END) DEPTH (FT.):
FILTER PACK LENGTH (FT.):
FORMATION OF COMPLETION:
STRATIGRAPHIC ORDER:
OPENS/SCREEN DEPTH (FT.):
OPENS/SCREEN LENGTH (FT.):
OPENS/SCREEN AREA (IN²/FT.):
*FLOW RELATIONSHIP:

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0-2	CL	1	CLAY, silty, low plasticity	01	0-1	D	
			moist, brown, rootlets, soft	02	2-4	D	
2-11	SC-GC	2	Sand and gravel, some				
			cobbles to 8", clayey.				
			Gravel is in the form of				
			sandstone fragments				
			non plastic, dry, light				
			brown, dense.				
			No ground water.				

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL 08
LOCATION ID: 900
LOCATION COORDINATES:
N 59,891.544
E 52,684.487
GROUND ELEVATION (FT. MSL): 6017.86

BH-BOREHOLE/TP-TEST PIT: BH
DRILLER/EXCAVATOR: _____
COMPLETION DATE: _____
BOREHOLE DIAMETER (IN): 6.5
TOTAL DEPTH (FT.): 30'

WELL SUMMARY

WELL OWNER: _____
INSTALLER: _____
INSTALLATION DATE: _____
CASING ELEV. (FT. MSL): _____
CASING LENGTH (FT.): _____
CASING DIA. (IN): _____
SEAL END DEPTH (FT.): _____

FILTER PACK LENGTH (FT.): _____
FORMATION OF COMPLETION: _____
STRATIGRAPHIC ORDER: _____
OPENS/SCREEN DEPTH (FT.): _____
OPENS/SCREEN LENGTH (FT.): _____
OPENS/SCREEN AREA (IN²/FT.): _____
*FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0-26	CL	1	CLAY, silty, trace sand, low	01	0-2	U	28
			to medium plasticity, slight	02	2-4	U	29
			to moderate calcareous, con-	03	4-6	U	26
			tains pin sized holes, light	04	11-13	U	50/5.5"
			brown, dry, hard calcium	05	16-18	U	57/3"
			grades out and in below 5'	06	28-29	U	50/4"
			Grades hard and with				
			zones of sandy clay below 15'				

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL 08 BH-BOREHOLE/TP-TEST PIT: BH
LOCATION ID: 917 DRILLER/EXCAVATOR: _____
LOCATION COORDINATES: _____ COMPLETION DATE: _____
N 56,572.657 BOREHOLE DIAMETER (IN): 6.5
E 52,750.005 TOTAL DEPTH (FT.): 30
GROUND ELEVATION (FT. MSL): 6004.69

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
INSTALLER: _____ FORMATION OF COMPLETION: _____
INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
CASING ELEV. (FT. MSL): _____ OPENS/SCREEN DEPTH (FT.): _____
CASING LENGTH (FT.): _____ OPENS/SCREEN LENGTH (FT.): _____
CASING DIA. (IN): _____ OPENS/SCREEN AREA (IN²/FT.): _____
SEAL (END) DEPTH (FT.): _____ *FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0-16	CL	1	CLAY, sandy, silty, low	01	0-2	U	51
			to medium plasticity,	02	2-4	U	53
			calcareous,	03	4-6	U	50/5"
			contains pinsized holes,	04	6-8	U	61
			gray-brown to brown	05	8-10	U	50/4.5"
			dry, hard	06	10-12	U	95/11"
16-22	SC	4	SAND, fine, clayey,	07	12-14	U	50/5"
			low plasticity, contains	08	14-16	U	50/5"
			lenses of	09	16-18	U	94
			sandy clay, calcareous,	10	18-20	U	82
			some fine gravel, tan, dry, hard	11	20-22	U	50/4"

OW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL 08
LOCATION ID: 918
LOCATION COORDINATES:
N 57,238.052
E 52,554.755
GROUND ELEVATION (FT. MSL): 6035.14
BH-BOREHOLE/TP-TEST PIT: BH
DRILLER/EXCAVATOR:
COMPLETION DATE:
BOREHOLE DIAMETER (IN): 6.5
TOTAL DEPTH (FT.): 20.3

WELL SUMMARY

WELL OWNER:
INSTALLER:
INSTALLATION DATE:
CASING ELEV. (FT. MSL):
CASING LENGTH (FT.):
CASING DIA. (IN):
SEAL (END) DEPTH (FT.):
FILTER PACK LENGTH (FT.):
FORMATION OF COMPLETION:
STRATIGRAPHIC ORDER:
OPEN/SCREEN DEPTH (FT.):
OPEN/SCREEN LENGTH (FT.):
OPEN/SCREEN AREA (IN²/FT.):
*FLOW RELATIONSHIP:

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
-20.3	CL	1	CLAY, sandy, silty, low to	1	0-2	U	17
			medium plasticity, contains	2	2-4	U	33
			pin sized holes, light brown	3	4-6	U	31
			to gray-brown to orange-brown,	4	6-8	U	26
			dry, ranging from very stiff	5	8-10	U	26
			to hard with depth.	6	10-12	U	39
				7	12-14	U	88/11"
				8	14-16	U	50/4"
				9	16-18	U	50/5.5"
				10	18-20	U	50/4"
				11	20-20.3	U	50/4"

FW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL 08
LOCATION ID: 919
LOCATION COORDINATES:
N 57,961.736
E 52,438.706
GROUND ELEVATION (FT. MSL): 6079.91

BH-BOREHOLE/TP-TEST PIT: BH
DRILLER/EXCAVATOR:
COMPLETION DATE:
BOREHOLE DIAMETER (IN): 6.5
TOTAL DEPTH (FT.): 18

WELL SUMMARY

WELL OWNER:
INSTALLER:
INSTALLATION DATE:
CASING ELEV. (FT. MSL):
CASING LENGTH (FT.):
CASING DIA. (IN.):
SEAL END DEPTH (FT.):

FILTER PACK LENGTH (FT.):
FORMATION OF COMPLETION:
STRATIGRAPHIC ORDER:
OPENSOURCE DEPTH (FT.):
OPENSOURCE LENGTH (FT.):
OPENSOURCE AREA (IN²/FT.):
*FLOW RELATIONSHIP:

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0-13	CL	1	CLAY, sandy, silty, low to medium plasticity, calcareous, contains pinsized holes, contains lenses of clayey sand with gravel, brown, dry, hard.	01	0-2	U	9
				02	2-4	U	20
				03	4-6	U	24
				04	6-8	U	31
				05	8-10	U	34
				06	10-12	U	52
				07	12-14	U	85/9"
				08	14-16	U	50/4"
				09	16-18	U	50/1"
				10	18-20	U	50/1"
13-18	SS	3	SANDSTONE, fine grained, (See Page 2)				

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL 08 BH-BOREHOLE/TP-TEST PIT: BH
LOCATION ID: 920 DRILLER/EXCAVATOR: _____
LOCATION COORDINATES: _____ COMPLETION DATE: _____
N 58,479.980 BOREHOLE DIAMETER (IN): 6.5
E 52,744.655 TOTAL DEPTH (FT.): 20
GROUND ELEVATION (FT. MSL): 6106.30

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
INSTALLER: _____ FORMATION OF COMPLETION: _____
INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
CASING ELEV. (FT. MSL): _____ OPENSREEN DEPTH (FT.): _____
CASING LENGTH (FT.): _____ OPENSREEN LENGTH (FT.): _____
CASING DIA. (IN): _____ OPENSREEN AREA (IN²/FT.): _____
SEAL (END) DEPTH (FT.): _____ * FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE

PENETRATION TEST

DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0-11	CL	1	CLAY, silty, some fine	01	0-2	U	53
			sand, no to low cementation,	02	2-4	U	85/5"
			medium plasticity, some	03	4-6	U	50/3"
			gravel sized rock frag-	04	6-8	U	50/3"
			ments, trace rootlets,	05	8-10	U	100
			calcareous, brown, dry, hard.	06	10-12	U	46
11-18	CL	2	CLAY, silty, trace fine sand,	07	12-14	U	45
			(weathered claystone).	08	14-16	U	92
18-20	CT	3	CLAYSTONE, fine sandy,	09	16-18	U	79/11"
			variegated gray and purple,	10	18-20	U	50/3"
			highly weathered, soft -				
			WASATCH FORMATION.				

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08 **BH-BOREHOLE/TP-TEST PIT:** BH
LOCATION ID: 921 **DRILLER/EXCAVATOR:** _____
LOCATION COORDINATES: **COMPLETION DATE:** _____
N 58,375.093 **BOREHOLE DIAMETER (IN):** 6.5
E 52,951.179 **TOTAL DEPTH (FT.):** 17
GROUND ELEVATION (FT. MSL): 6103.95

WELL SUMMARY

WELL OWNER: _____ **FILTER PACK LENGTH (FT.):** _____
INSTALLER: _____ **FORMATION OF COMPLETION:** _____
INSTALLATION DATE: _____ **STRATIGRAPHIC ORDER:** _____
 casing ELEV. (FT. MSL): _____ **OPENSOURCE DEPTH (FT.):** _____
 casing LENGTH (FT.): _____ **OPENSOURCE LENGTH (FT.):** _____
 casing DIA. (IN): _____ **OPENSOURCE AREA (IN²/FT.):** _____
 casing END DEPTH (FT.): _____ ***FLOW RELATIONSHIP:** _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0-13	CL	1	CLAY, silty, trace fine	01	0-2	U	10
			sand, medium plasticity,	02	2-4	U	27
			some rootlets, brown,	03	4-6	U	27
			moist, medium stiff.	04	6-9	T	--
			Grades calcareous, dry,	05	9-11	U	50/5"
			hard and with more	06	11-13	U	50/5"
			sand at 2'.	07	13-15	U	50/5"
			Grades with zones of clayey	08	15-17	U	50/5"
			sand at 11'.				
3-17	CL	2	CLAY, silty, dry, very hard				
			(weathered claystone).				

W RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

BITE ID: RFL-08 **BH-BOREHOLE/TP-TEST PIT:** BH
LOCATION ID: 922 **DRILLER/EXCAVATOR:** _____
LOCATION COORDINATES: _____ **COMPLETION DATE:** _____
N 57,597.068 **BOREHOLE DIAMETER (IN):** 6.5
E 53,052.666 **TOTAL DEPTH (FT.):** 30
GROUND ELEVATION (FT. MSL): 6057.16

WELL SUMMARY

WELL OWNER: _____ **FILTER PACK LENGTH (FT.):** _____
INSTALLER: _____ **FORMATION OF COMPLETION:** _____
INSTALLATION DATE: _____ **STRATIGRAPHIC ORDER:** _____
CASING ELEV. (FT. MSL): _____ **OPEN/SCREEN DEPTH (FT.):** _____
CASING LENGTH (FT.): _____ **OPEN/SCREEN LENGTH (FT.):** _____
CASING DIA. (IN): _____ **OPEN/SCREEN AREA (IN²/FT.):** _____
SEAL (END) DEPTH (FT.): _____ ***FLOW RELATIONSHIP:** _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0-30	CL	1	CLAY, silty, sandy, low to	01	0-2	U	17
			medium plasticity, brown,	02	2-5	T	--
			dry, very stiff. Grades with	03	5-7	U	25
			trace fine gravel and	04	7-9	U	15
			calcareous at 2'.	05	9-12	T	--
			Grades very hard at 12'	06	12-14	U	54
			Grades with zones of clayey	07	14-16	U	47
			sand at 28'.	08	16-18	U	60
				09	18-20	U	94/11"
				10	20-22	U	69
				11	22-24	U	50/5"

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL 08 BH-BOREHOLE/TP-TEST PIT: BH
LOCATION ID: 923 DRILLER/EXCAVATOR: _____
LOCATION COORDINATES: _____ COMPLETION DATE: _____
N 58,080.810 BOREHOLE DIAMETER (IN): 6.5
E 52,945.588 TOTAL DEPTH (FT.): 25.5
GROUND ELEVATION (FT. MSL): 6081.44

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
INSTALLER: _____ FORMATION OF COMPLETION: _____
INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
CASING ELEV. (FT. MSL): _____ OPENS/SCREEN DEPTH (FT.): _____
CASING LENGTH (FT.): _____ OPENS/SCREEN LENGTH (FT.): _____
CASING DIA. (IN): _____ OPENS/SCREEN AREA (IN²/FT.): _____
SEAL (END) DEPTH (FT.): _____ *FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0-19	CL	1	CLAY, silty, some fine to	01	0-2	U	36
			medium sand, calcareous, low	02	2-4	U	43
			to medium plasticity, light	03	4-6	U	20
			gray to tan, dry, hard.	04	6-8	T	--
			Grades with weathered	05	9-12	T	--
			sandstone fragments at 3'	06	12-14	U	44
			Grades calcareous with	07	14-16	U	108
			depth from 12'	08	17-19	U	94
				09	19-21	U	50/4.5"
19-22	SM	4	SAND, silty, fine to medium,	10	21-23	U	50/6"
			non plastic, contains sand-	11	23-25	U	50/4"

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL 08 BH-BOREHOLE/TP-TEST PIT: BH
LOCATION ID: 924 DRILLER/EXCAVATOR: _____
LOCATION COORDINATES: COMPLETION DATE: _____
N 56,919.693 BOREHOLE DIAMETER (IN): 6.5
E 53,078.338 TOTAL DEPTH (FT.): 32
GROUND ELEVATION (FT. MSL): 6017.87

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
INSTALLER: _____ FORMATION OF COMPLETION: _____
INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
CASING ELEV. (FT. MSL): _____ OPEN/SCREEN DEPTH (FT.): _____
CASING LENGTH (FT.): _____ OPEN/SCREEN LENGTH (FT.): _____
CASING DIA. (IN): _____ OPEN/SCREEN AREA (IN²/FT.): _____
SEAL END DEPTH (FT.): _____ *FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0-28	CL	1	CLAY, silty, some fine to medium sand, low to medium plasticity, calcareous, pin-sized holes, brown to gray, dry medium stiff to top foot grading to hard.	01	0-2	U	11
				02	2-4	T	--
				03	4-6	U	41
				04	6-8	U	49
				05	8-10	U	94/9"
				06	10-12	U	50/5"
				07	12-14	U	50/5"
				08	14-16	U	88/11.5"
				09	16-18	U	50/4.5"
28-32	SS	3	SANDSTONE, weathered, fine to medium grained	10	18-20	U	50/4.5"
				11	20-22	U	96/11"

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08 BH-BOREHOLE/TP-TEST PIT: BH
LOCATION ID: 932 DRILLER/EXCAVATOR: _____
LOCATION COORDINATES: _____ COMPLETION DATE: _____
N 57,727.954 BOREHOLE DIAMETER (IN): _____
E 52,796.650 TOTAL DEPTH (FT.): 12
GROUND ELEVATION (FT. MSL): 6058.52

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
INSTALLER: _____ FORMATION OF COMPLETION: _____
INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
CASING ELEV. (FT. MSL): _____ OPENS/SCREEN DEPTH (FT.): _____
CASING LENGTH (FT.): _____ OPENS/SCREEN LENGTH (FT.): _____
CASING DIA. (IN): _____ OPENS/SCREEN AREA (IN²/FT.): _____
SEAL (END) DEPTH (FT.): _____ *FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0 - 12	CL	1	Clay, sandy, low plasticity	01	0 - 1	D	
			calcareous some sandstone	02	4.5-5.5	D	
			gravel and cobbles, occasional	03	7.5-8	D	
			boulders to 12", dry, light				
			brown to brown, hard at 1'				
			No groundwater				

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BH-BOREHOLE/TP-TEST PIT: _____ BH
DRILLER/EXCAVATOR: _____
COMPLETION DATE: _____
BOREHOLE DIAMETER (IN): _____ 3
TOTAL DEPTH (FT.): _____ 253.5

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
 INSTALLER: _____ FORMATION OF COMPLETION: _____
 INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
 CASING ELEV. (FT. MSL): _____ OPEN/SCREEN DEPTH (FT.): _____
 CASING LENGTH (FT.): _____ OPEN/SCREEN LENGTH (FT.): _____
 CASING DIA. (IN.): _____ OPEN/SCREEN AREA (IN²/FT.): _____
 SEAL (END) DEPTH (FT.): _____ *FLOW RELATIONSHIP: _____

BOREHOLE AND TEST PIT SUMMARY

BITE ID: RFL-08
LOCATION ID: 954
LOCATION COORDINATES:
N 58,571.424
E 52,804.594
GROUND ELEVATION (FT. MSL): 6115.62

BH-BOREHOLE/TP-TEST PIT: BH
DRILLER/EXCAVATOR: _____
COMPLETION DATE: _____
BOREHOLE DIAMETER (IN): 3
TOTAL DEPTH (FT.): 260'

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
INSTALLER: _____ FORMATION OF COMPLETION: _____
INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
CASING ELEV. (FT. MSL): _____ OPENS/SCREEN DEPTH (FT.): _____
CASING LENGTH (FT.): _____ OPENS/SCREEN LENGTH (FT.): _____
CASING DIA. (IN): _____ OPENS/SCREEN AREA (IN²/FT.): _____
SEAL (END) DEPTH (FT.): _____ *FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	%Reg/ NRQD VALUE
0-17	CL	1	CLAY, sandy	1	24-33	NQ	100/95
17-225	ST	3	SILTSTONE, very fine	2	33-43	NQ	100/95
			sandy, slightly weathered,	3	43-54	NQ	100/85
			variegated purple and	4	54-64	NQ	100/100
			gray, hard - WASATCH	5	64-73	NQ	100/100
			FORMATION	6	73-83	NQ	100/100
			Dark gray oxidation	7	83-93	NQ	100/100
			along natural fractures	8	93-103	NQ	100/90
			10" bands of light gray	9	103-113	NQ	100/95
			sandy claystone and	10	113-123	NQ	100/100
			clayey sandstone from 30'	11	123-133	NQ	100/100

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

LITHOLOGICAL SUMMARY

PAGE 2 OF 3

RFL-08,954

SOIL/ROCK PROFILE				STD. PENETRATION TEST			
DEPTH (FT)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
			Grades massive from	12	133-143	NQ	100/100
			58'	13	143-153	NQ	100/100
			Grades to blue gray in	14	153-163	NQ	100/95
			color from 78	15	163-173	NQ	100/90
			Grades reddish brown	16	173-183	NQ	100/100
			from 110	17	183-193	NQ	100/100
			Grades to variegated	18	193-203	NQ	100/100
			purple and gray claystone	19	203-213	NQ	100/75
			with varying amounts	20	213-220	NQ	90/45
			of fine sand from 135	21	220-230	NQ	90/75
			Grades with more	22	230-240	NQ	100/95
			slickensides and some	23	240-250	NQ	100/85
			healed fractures from	24	250-260	NQ	100/90
			146'				
			Grades with fewer slicken-				
			sides from 161'				
			Slickensides grade out below				
			175'				
			Grades to bluish gray, very				
			fine grained sandstone

LITHOLOGICAL SUMMARY

PAGE 3 OF 3

RFL-08,954

SOIL/ROCK PROFILE				STD. PENETRATION TEST			
DEPTH (FT)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
			by 205'				
			Sandstone grades out at				
			210'				
			Contains slickensides				
			and zones of major				
			fractures from 211.3 to				
			222.7'				
225-254	ST	3	SILTSTONE, very fine grained,				
			blue gray to gray, to brown,				
			slightly weathered, hard -				
			WASATCH FORMATION				
			Grades with slickensides				
			from 240'				
			Contains crumbled zones				
			from 241' to 253'				
254-260	SS	3	SANDSTONE, silty, fine				
			grained, slightly weathered,				
			hard, gray -				
			WASATCH FORMATION

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08 BH-BOREHOLE/TP-TEST PIT: BH
LOCATION ID: 956 DRILLER/EXCAVATOR: _____
LOCATION COORDINATES: COMPLETION DATE: _____
N 56,194.320 BOREHOLE DIAMETER (IN): 6.5
E 53,393.024 TOTAL DEPTH (FT.): 75'
GROUND ELEVATION (FT. MSL): 5995.19

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
INSTALLER: _____ FORMATION OF COMPLETION: _____
INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
CASING ELEV. (FT. MSL): _____ OPENS/SCREEN DEPTH (FT.): _____
CASING LENGTH (FT.): _____ OPENS/SCREEN LENGTH (FT.): _____
CASING DIA. (IN): _____ OPENS/SCREEN AREA (IN²/FT.): _____
SEAL (END) DEPTH (FT.): _____ *FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0-24	CL	1	CLAY, silty, trace to	01	0-2	U	36
			some fine sand, low to	02	2-4	U	27
			medium plasticity, trace	03	4-6	U	60
			Rootlets, moist, stiff,	04	6-8	U	69
			light brown	05	8-10	U	46
2	*GD		Grades sandy, with	06	10-12	U	54
			medium sand, dry calcareous	07	12-14	U	76
			with shale and sandstone	08	14-16	U	97
			gravel sized fragments below	09	16-18	U	68
			2'	10	18-20	U	89
6	*GD		Grades with lenses of	11	20-22	U	50/5"

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

LITHOLOGICAL SUMMARY

PAGE 2 OF 3

RFL-08,956

SOIL/ROCK PROFILE				STD. PENETRATION TEST			
DEPTH (FT)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
			clayey sand below 6'	12	22-24	U	50/6"
15	*GD		grades to track to some	13	24-26	U	82
			sand below 15'	14	26-28	U	97/9"
16	*GD		Grades reddish brown	15	26.8-33.5	NQ	20/0
			below 16'	16	33.5-38.5	NQ	REG ROD 20/0
21	*GD		Grades with more sand	17	38.5-40.5	NQ	100/0
			below 21'	18	40.5-47.0	NQ	100/80
24-36	SS	3	SANDSTONE, silty, fine	19	47.0-49.0	NQ	100/90
			grained, calcareous, ^{fractured} highly/	20	49.0-53.5	NQ	100/25
			weathered, gray, very soft -	21	53.5-61.0	NQ	100/55
			WASATCH FORMATION	22	61-71	NQ	100/70
				23	71-75	NQ	100/100
36-75	CT	3	CLAYSTONE, very fine sandy				
			some vertical fracturing and				
			slickensides, gray, moderately				
			to highly weathered, soft -				
			WASATCH FORMATION				
42.5	*GD		24" SANDSTONE layer at 42.5'				
48	*GD		4' thick silty sandstone layer				
			at 48'				
52	*GD		Grades with less sand and				
			less weathered at 52'

PAGE 3 **OF** 3

[illegible]

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08 BH-BOREHOLE/TP-TEST PIT: BH
LOCATION ID: 958 DRILLER/EXCAVATOR: _____
LOCATION COORDINATES: _____ COMPLETION DATE: _____
N 56,985.603 BOREHOLE DIAMETER (IN): 6.5
E 53,124.522 TOTAL DEPTH (FT.): 117
GROUND ELEVATION (FT. MSL): 6024.66

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
INSTALLER: _____ FORMATION OF COMPLETION: _____
INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
CASING ELEV. (FT. MSL): _____ OPENS/SCREEN DEPTH (FT.): _____
CASING LENGTH (FT.): _____ OPENS/SCREEN LENGTH (FT.): _____
CASING DIA. (IN): _____ OPENS/SCREEN AREA (IN²/FT.): _____
SEAL (END) DEPTH (FT.): _____ *FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0-12	CL	1	CLAY, silty, trace to	01	0-2	U	59
			some fine sand, low to	02	2-4	U	95
			medium plasticity,	03	4-6	U	45
			calcareous, brown, dry	04	6-8	U	37
			hard.	06	8-10	U	38
			Grades with pinsized	07	10-12	U	37
			holes at 3'.	08	12-14	U	51
			Grades with more	09	14-16	U	109
			sand and gravel	10	16-18	U	50/4.5"
			sized sandstone	11	24-33.5	NQ	60/60
			fragments at 6'.	12	33.5-43.5	NQ	90/80

OW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

LITHOLOGICAL SUMMARY

PAGE 2 OF 4

SOIL/ROCK PROFILE				STD. PENETRATION TEST			
DEPTH (FT)	UNIFIED SOIL/ ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
			Grades more calcareous	13	43.5-52	NQ	60/20
			at 10'.	14	52-62	NQ	100/100
12-20	ST	3	SILTSTONE, some fine	15	62-65.5	NQ	50/50
			sand, highly weathered,	16	65.5-73	NQ	55/50
			reddish brown, soft -	17	73-83	NQ	100/100
			WASATCH FORMATION.	18	83-87.3	NQ	100/100
20-35	SS	3	SANDSTONE, silty, fine	19	87.3-97.5	NQ	100/100
			to medium grained, weakly	20	97.5-107.5	NQ	100/100
			cemented, soft, highly	21	107.5-117	NQ	100/95
			weathered, light gray -				
			WASATCH FORMATION.				
35-69	CT	3	CLAYSTONE, trace fine				
			sand, highly weathered,				
			occasional calcium carbonate,				
			some oxidation, some slicken-				
			sides, hard, moderately				
			weathered, light gray -				
			WASATCH FORMATION.				
			Slickensides at 42'

LITHOLOGICAL SUMMARY

PAGE 3 OF 4

RFL 08, 958

SOIL/ROCK PROFILE				STD. PENETRATION TEST			
DEPTH (FT)	UNIFIED SOIL/ ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
			slickensides at 45'				
			grades with major sandstone				
			inclusions from 52'.				
			18" sandstone bed at				
			60'.				
69-90	SS	3	SANDSTONE, fine grained,				
			some silt, weakly cemented,				
			moderately weathered, hard,				
			light gray -				
			WASATCH FORMATION				
			Grades with sandy siltstone,				
			purplish brown,				
			highly gradational between				
			siltstone and sandstone				
			from 71'				
110.5	SS		SANDSTONE, silty, very				
			fine grained, moderately				
			cemented, moderately

BOREHOLE AND TEST PIT SUMMARY

SITE ID: REF-08
LOCATION ID: 961
LOCATION COORDINATES:
N 58,035.658
E 52,823.929
GROUND ELEVATION (FT. MSL): 6076.27

BH-BOREHOLE/TP-TEST PIT: BH
DRILLER/EXCAVATOR:
COMPLETION DATE:
BOREHOLE DIAMETER (IN): 3
TOTAL DEPTH (FT.): 302

WELL SUMMARY

WELL OWNER: _____
 INSTALLER: _____
 INSTALLATION DATE: _____
 CASING ELEV. (FT. MSL): _____
 CASING LENGTH (FT.): _____
 CASING DIA. (IN.): _____
 SEAL END DEPTH (FT.): _____

FILTER PACK LENGTH (FT.): _____
FORMATION OF COMPLETION: _____
STRATIGRAPHIC ORDER: _____
OPEN/SCREEN DEPTH (FT.): _____
OPEN/SCREEN LENGTH (FT.): _____
OPEN/SCREEN AREA (IN²/FT.): _____
*** FLOW RELATIONSHIP:** _____

LITHOLOGICAL SUMMARY

[illegible]

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

BITE ID: RFL-08
LOCATION ID: 962
LOCATION COORDINATES:
N 57,492.628
E 51,979.989
GROUND ELEVATION (FT. MSL): 6061.06

WELL SUMMARY

WELL OWNER: _____

INSTALLER: _____

INSTALLATION DATE: _____

CASING ELEV. (FT. MSL): _____

CASING LENGTH (FT.): _____

CASING DIA. (IN.): _____

SEAL END DEPTH (FT.): _____

FILTER PACK LENGTH (FT.): _____

FORMATION OF COMPLETION: _____

STRATIGRAPHIC ORDER: _____

OPEN/SCREEN DEPTH (FT.): _____

OPEN/SCREEN LENGTH (FT.): _____

OPEN/SCREEN AREA (IN²/FT.): _____

* FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

[illegible]

DW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08 BH-BOREHOLE/TP-TEST PIT: BH
LOCATION ID: 963 DRILLER/EXCAVATOR: _____
LOCATION COORDINATES: _____ COMPLETION DATE: _____
N 57,469.430 BOREHOLE DIAMETER (IN): 6.5
E 52,779.524 TOTAL DEPTH (FT.): 302
GROUND ELEVATION (FT. MSL): 6043.75

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
INSTALLER: _____ FORMATION OF COMPLETION: _____
INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
CASING ELEV. (FT. MSL): _____ OPEN/SCREEN DEPTH (FT.): _____
CASING LENGTH (FT.): _____ OPEN/SCREEN LENGTH (FT.): _____
CASING DIA. (IN): _____ OPEN/SCREEN AREA (IN²/FT.): _____
SEAL (END) DEPTH (FT.): _____ *FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0 - 37	CL	1	Clay, silty, sandy, low to	01	0-2	U	30
			medium plasticity, calcareous,	02	2-4	U	19
			contains pin sized holes,	03	4-6	U	15
			light brown, dry, stiff grades	04	6-9	T	--
			with occasional gravel from	05	9-11	U	21
			10' grades hard from 13'	06	11-13	U	17
			grades with lenses of sand	07	13-15	U	32
			with trace clay to sandy clay	08	15-17	U	35/11"
			from 25'	09	17-19	U	36/11"
				10	19-21	U	50/6"
				11	21-23	U	50/5"
37 - 40	SS	3	SANDSTONE, fine grained,	12	23-25	U	50/5½"
			highly weathered, calcareous	13	25-27	U	93

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08
LOCATION ID: 964
LOCATION COORDINATES:
N 57.512.033
E 52.812.143
GROUND ELEVATION (FT. MSL): 6046.35

BH-BOREHOLE/TP-TEST PIT: BH
DRILLER/EXCAVATOR: _____
COMPLETION DATE: _____
BOREHOLE DIAMETER (IN): 3
TOTAL DEPTH (FT.): 220

WELL SUMMARY

WELL OWNER: _____

INSTALLER: _____

INSTALLATION DATE: _____

CASING ELEV. (FT. MSL): _____

CASING LENGTH (FT.): _____

CASING DIA. (IN.): _____

SEAL (END) DEPTH (FT.): _____

FILTER PACK LENGTH (FT.): _____

FORMATION OF COMPLETION: _____

STRATIGRAPHIC ORDER: _____

OPEN/SCREEN DEPTH (FT.): _____

OPEN/SCREEN LENGTH (FT.): _____

OPEN/SCREEN AREA (IN.²/FT.): _____

* FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

[illegible]

FLOW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

BOREHOLE AND TEST PIT SUMMARY

SITE ID: RFL-08 BH-BOREHOLE/TP-TEST PIT: BH
 LOCATION ID: 965 DRILLER/EXCAVATOR: _____
 LOCATION COORDINATES: COMPLETION DATE: _____
 N 56,132.157 BOREHOLE DIAMETER (IN): 6.5
 E 52,867.452 TOTAL DEPTH (FT.): _____
 GROUND ELEVATION (FT. MSL): _____

WELL SUMMARY

WELL OWNER: _____ FILTER PACK LENGTH (FT.): _____
 INSTALLER: _____ FORMATION OF COMPLETION: _____
 INSTALLATION DATE: _____ STRATIGRAPHIC ORDER: _____
 CASING ELEV. (FT. MSL): _____ OPENS/SCREEN DEPTH (FT.): _____
 CASING LENGTH (FT.): _____ OPENS/SCREEN LENGTH (FT.): _____
 CASING DIA. (IN): _____ OPENS/SCREEN AREA (IN²/FT.): _____
 SEAL (END) DEPTH (FT.): _____ *FLOW RELATIONSHIP: _____

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT)	SAMPLE METHOD	N VALUE
0-28	CL	1	CLAY, silty, trace sand, low	01	0 - 2	U	20
			to medium plasticity,	02	2 - 4	U	89
			slightly calcareous, contains	03	4 - 6	U	53
			pinsized holes, moist, light	04	6 - 8	U	82
			brown, hard, grades dry and	05	8 - 10	U	50/5½"
			with more sand from 1.0'	06	10- 12	U	94/10"
			grades very calcareous from	07	12- 14	U	52
			6', grades with lenses of sand	08	14- 16	U	69
			trace sand to sandy with	09	16- 18	U	90/11½"
			trace gravel from 10'	10	18- 20	U	50/6"
				11	20- 22	U	97/11"
				12	22- 24	U	86/11"

OW RELATIONSHIP: U-Upgradient D-Downgradient C-Cross Gradient O-On Site N-Not Known B-Background

ADDENDUM D5.2

NUS BOREHOLE LOGS, OLD RIFLE

Old Mine Site GOR-1

Elevation: 5312.1 ft.

SUBSURFACE PROFILE		DEPTH SCALE	SAMPLES						DENSITY (pcf)	MOISTURE CONTENT (%)	ATTENUEING LIMITS (%)	CIRCULATION (%)	PERMEABILITY (cm/sec)
DESCRIPTION	GRAPHIC LOG		LOCATION	NUMBER	TYPE	BLOW / FT	RECOVERY						
Moderate brown sandy SILT; FILL (ML)		5	1	SS	7	10 10							
GRAVEL (GR)													
Firm moderate brown, sandy SILT (ML)		10	2	SS	20 25	810							
Very dense sandy GRAVEL (GR)													
Borehole completed on October 18, 1962 at a depth of 10 ft. Groundwater not encountered during drilling.													

Figure C-6. Geotechnical borehole logs (continued).

Old Rifle Site GOR-2

Elevation: 5312.1 ft.

SUBSURFACE PROFILE		SAMPLES				DENSITY (pcf)	MOISTURE CONTENT (%)	ATTENBERG LIMITS (%)	COMPLIATION (%)	PERMEABILITY (cm/sec)
DESCRIPTION	GRAPHIC LOG	LOCATION	NUMBER	TYPE	BLOW / FT.	RECOVERY				
Moderate yellow brown, sandy SILT to silty SAND (ML-SH)		1	1	ST						
		2	2	ST						
		3	3	SS	50 6	12 12				
GRAVEL (GH)										
Borehole completed on October 18, 1982 at a depth of 10 ft. Groundwater not encountered during drilling.										

Old Rifle Site GOR-3

Elevation: 5320.0 ft.

SUBSURFACE PROFILE		SAMPLES				DENSITY (pcf)	MOISTURE CONTENT (%)	ATTENBERG LIMITS (%)	COMPLIATION (%)	PERMEABILITY (cm/sec)
DESCRIPTION	GRAPHIC LOG	LOCATION	NUMBER	TYPE	BLOW / FT.	RECOVERY				
Loose mixed grass-mature silt; FILL		1	1	ST						
Loose to firm medium light gray silty SAND; TAILINGS (SP-SH)		2	2	ST						
Becoming medium light gray tan and reddish brown		3	3	SS	11 18	18 18				
Dark brown SILT, sandy (ML)		4	4	SS	59	12 12				
Very dense GRAVEL (GH)										
Borehole completed on October 18, 1982 at a depth of 21 ft. Groundwater not encountered at 19.7 ft.										

Figure C-6. Geotechnical borehole logs (continued).

Old Rifle Site GOR-4

Elevation: 5323.0 ft.

Old Rifle Site GOR-5

Elevation: 5219.4 3 ft.

SUBSURFACE PROFILE		SAMPLES					DEPTH SCALE	GRAPHIC LOG	DESCRIPTION	DENSITY (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	CIRCULATION (%)	PERMEABILITY (cm/sec)
LOCATION	NUMBER	TYPE	BLOW / FT.	RECOVERY										
	1	ST			5			Loose mixed grass-manure sandy silt; fill Firm medium light gray silty sand; TAILINGS (SP-SH)						
	2	SS	22	18 18	10			Becoming loose to very loose with depth. Extremely wet.						
	3	SS	4.5	18 18	15									
	4	SS	3	18 18	20			Firm medium dark brown sandy silt (ML) Very dense sandy GRAVEL (GM)						
	5	SS	13	18 18	25									
	6	SS	88	18 18				Borehole completed on October 19, 1982 at a depth of 25.5 ft. Groundwater encountered at 23ft. during drilling.						

SUBSURFACE PROFILE		DEPTH SCALE	LOCATION	NUMBER	TYPE	BLOW / FT.	RECOVERY	DENSITY (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	CIRCULATION (%)	PERMEABILITY (cm/sec)
DESCRIPTION	GRAPHIC LOG											
Loose mixed grass-manure, sandy SILT; FILL Loose to firm, medium light gray silty SAND; TAILINGS (SP-SH)		5	1	ST				95.6	3.3			
		10	2	SS	10	18 18		94.0	5.1			
			15	4	ST	21	18 18					
Very stiff medium brown sandy SILT (ML)		20	5	ST	50 2"	2 2"						
Very dense sandy GRAVEL (GM)												
Borehole completed on October 19, 1982 at 18.7 ft. Ground- water not encountered during drilling.												

Figure C-6. Geotechnical borehole logs (continued).

Elevation: Not Surveyed

Loy Borrow Pit LP-1

Elevation: 5322.4 ft.

Old Rifle Site GOR-6

SUBSURFACE PROFILE		SAMPLES					DEPT SCALE	LOG	GRAPHIC	PERMEABILITY (cm/sec)	CIRCULATION (%)	ATTEBERG LIMITS (%)	MOISTURE CONTENT (%)	DENSITY (pcf)
DESCRIPTION		NUMBER	TYPE	BLOW / FT	RECOVERY	LOCATION								
Very stiff, pale yellow brown sandy SILT (HL)		1	ST											
		2	SS	24	18/18		5						3.3	
Softer at 7 feet		3	SS	18	18/18		10						3.9	
Hard clayey fragments 13'-14 ft		4	SS	47	18/18		15						3.7	
Gravel (15-17 ft)														
Becoming hard greyish orange to pale yellowish brown sandy CLAY; some SILT (CL)		5	ST				20					LL=24 PL=13 PI=11	5.3	89
Cemented sandstone lense (21-22 ft)		6	SS	59	18/18		25							
Becoming very hard light tan sandy SILT with trace gravel and claystone flakes														
Sandy GRAVEL, some sandstone		7	SS	76	18/18		30							
Hard to very hard greyish orange sandy SILT; trace fine gravel (HL)		8	SS	47	18/18		35							

SUBSURFACE PROFILE		SAMPLES					DEPT SCALE	LOG	GRAPHIC	PERMEABILITY (cm/sec)	CIRCULATION (%)	ATTEBERG LIMITS (%)	MOISTURE CONTENT (%)	DENSITY (pcf)
DESCRIPTION		NUMBER	TYPE	BLOW / FT	RECOVERY	LOCATION								
Loose mixed grass-manure sandy SILT; FILL (HL)		1	ST											
Firm medium light gray silty SAND; TAILINGS (SP-SM)		2	SS	16	18/18		5							
		3	SS	10	18/18		10							
		4	ST				15						91.3	6.3
Becoming moist		5	SS	7	18/18		20							
Very stiff medium brown sandy SILT (HL)		6	SS	81	18/18		25							
Very dense GRAVEL (GM)														
Borehole completed on October 19, 1982 at 25.5 ft. Groundwater encountered at 21.5 ft. during drilling.														

Figure C-6. Geotechnical borehole logs (continued).

ADDENDUM D5.3

NUS BOREHOLE LOGS, NEW RIFLE

New Rifle Site GNR-1

Elevation: 5336.7 ft.

New Rifle Site GNR-1 (con't)

Figure C-6. Geotechnical borehole logs.

New Rifle Site GNR-1 (con't)

SUBSURFACE PROFILE		SAMPLES					DEPTH SCALE	LOG GRAPHIC	DESCRIPTION	DENSITY (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	CIRCULATION (%)	PERMEABILITY (cm/sec)
LOCATION	NUMBER	TYPE	BLOW / FT.	RECOVERY										
	15	SS	10	18 18		75		Loose medium light gray silty SAND; TAILINGS (SM)
							Firm medium dark brown to gray sandy SILT (ML)
							Silty fine GRAVEL, some sand (CN)						
Borehole completed on October 14, 1982 at a depth of 78 ft. Groundwater not encountered during drilling.														

New Rifle Site GNR-2

Elevation: 5332.7 ft.

SUBSURFACE PROFILE		SAMPLES					DENSITY (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	CIRCULATION (%)	PERMEABILITY (cm/sec)	
DESCRIPTION	GRAPHIC LOG	DEPTH SCALE	LOCATION	NUMBER	TYPE	BLOW / FT.						RECOVERY
Loose mixed manure, grass; FILL Very loose medium light gray silty SAND; TAILINGS (SH) Alternating thin (1") bands of moist materials; slimes Between 23.3' and 24.3' a green-gray layer of silty SAND Becoming firmer		5	1	ST								
		10	2	SS	4	18 18		10.7				
		15	3	ST								
		20	4	SS	3.5	18 18		49.0				
		25	5	SS	9	18 18		50.2				
		30	6	SS	9	18 18		35.7				
		35	7	SS	12	18 18		25.9				

Figure C-6. Geotechnical borehole logs (continued).

New Rifle Site GNR-2 (con't)

SUBSURFACE PROFILE		SAMPLES				DENSITY (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	CIRCULATION (%)	PERMEABILITY (cm/sec)
DESCRIPTION	GRAPHIC LOG	LOCATION	NUMBER	TYPE	BLOW / FT.	RECOVERY				
Loose to firm medium light gray silty SAND; TAILINGS (SH)		40	8	SS	10	18 / 18	34.8			
		45	9	SS	17	18 / 18	22.2			
Thin (<1/4 to 1/2") bands of silty to clayey material; slimes		60	10	SS	12	18 / 18	44.4			
		65	11	SS	14	18 / 18	34.9			
Firm medium dark brown sandy SILT; some roots (ML)		70	12	SS	18	18 / 18	25.6			
		70	13	SS	18	18 / 18	31.7			

New Rifle Site GNR-2 (con't)

SUBSURFACE PROFILE		SAMPLES				DENSITY (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	CIRCULATION (%)	PERMEABILITY (cm/sec)
DESCRIPTION	GRAPHIC LOG	LOCATION	NUMBER	TYPE	BLOW / FT.	RECOVERY				
Firm medium dark brown sandy SILT (ML)		75	14		54	9 / 9				
Very dense silty fine GRAVEL some sand (CH)		80								
Borehole completed on October 14, 1982 at a depth of 73.8 ft. Groundwater not encountered during drilling.										

Figure C-6. Geotechnical borehole logs (continued).

New Rifle Site GNR-3

Elevation: 5331.6 ft.

New Rifle Site GNR-3 (con't)

SUBSURFACE PROFILE		SAMPLES				DEPTH SCALE LOG	GRAPHIC LOG
DESCRIPTION		LOCATION NUMBER	TYPE	BLOW / FT.	RECOVERY		
0-2 ft. loose manure cover.		1	ST			5	
Loose medium gray silty fine SAND; TAILINGS (SH-ML)		2	SS	2	15 18	10	
Very loose sandy SILT; SLIMES 7 to 7.4 ft. (HL)		3	SS	6	18 18	15	
Loose medium light gray silty SAND; TAILINGS (SH-ML)		4	SS	8	15 18	20	
Variable moisture with depth		5				25	
		6	SS	11	15 18	30	
Harder, drier material		7	ST			35	
		8	SS	12	12 18		
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SUBSURFACE PROFILE		SAMPLES				DEPTH SCALE LOG	GRAPHIC LOG
DESCRIPTION		LOCATION NUMBER	TYPE	BLOW / FT.	RECOVERY		
Firm medium light gray silty SAND; TAILINGS (SH)		9	SS	21	12 18	40	
2-4 inch thick seam light green silty sand at 39 ft.		10	SS	18	12 18	45	
Stiff to very stiff brown gray clayey SILT; SLIMES (ML)		11	SS	16	12 18	50	
Firm medium light gray silty SAND; TAILINGS (SH)		12	SS	16	18 18	55	
Moist and becoming clayey with depth		13	SS	11	18 18	60	
		14	SS	13	18 18	65	
		15	SS	13	18 18	70	
		16	SS	13	18 18	75	
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		89					
		90					
		91					
		92					
		93					
		94					
		95					
		96					
		97					
		98					
		99					
		100					

Figure C-6. Geotechnical borehole logs (continued).

New Rifle Site GNR-3 (con't)

New Rifle Site GNR-4

Elevation: 5316.0 ft.

SUBSURFACE PROFILE		SAMPLES					DEPTH SCALE	GRAPHIC LOG	DESCRIPTION	DENSITY (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	CIRCULATION (%)	PERMEABILITY (cm/sec)
NUMBER	TYPE	BLOW / FT.	RECOVERY	LOCATION										
						71		Firm to stiff dark brown sandy silt. Some roots (all). Very dense silty fine GRAVEL, some sand (CH)						
						75		Borehole completed on October 13, 1982 at a depth of 72.5 ft. Groundwater not encountered during drilling.						

SUBSURFACE PROFILE		SAMPLES					DEPTH SCALE	GRAPHIC LOG	DESCRIPTION	DENSITY (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	CIRCULATION (%)	PERMEABILITY (cm/sec)
NUMBER	TYPE	BLOW / FT.	RECOVERY	LOCATION										
1	ST					5		Loose mixed manure, grass, sandy SILT; FILL.			8.7			
2	SS	10	18 18					Loose medium dark gray silty SAND; TAILINGS (SM)						
3	SS	8	18 18			10				92.5	7.4			
4	ST					15					7.6			
5	SS	38	18 18			20		Hard clayey SILT; silts (ML)			28.8 7.6			
6	SS	19	18 18			25					12.5			
7	SS	17	18 18			30		Becoming firm			8.1			

Figure C-6. Geotechnical borehole logs (continued).

New Rifle Site GNR-4 (con't)

New Rifle Site GNR-5

Elevation: 5305.6 ft.

SUBSURFACE PROFILE		DEPTH SCALE	SAMPLES					DENSITY (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	CIRCULATION (%)	PERMEABILITY (cm/sec)
DESCRIPTION	GRAPHIC LOG		LOCATION	NUMBER	TYPE	BLOW / FT.	RECOVERY					
Firm to dense medium light gray silty SAND; TAILINGS (SM)----		35	9	SS	21	$\frac{18}{18}$	$\frac{18}{18}$	10.3				
		40	10	SS	38	$\frac{18}{18}$	$\frac{18}{18}$	10.4				
		45	11	SS	21	$\frac{18}{18}$	$\frac{18}{18}$	10.2				
		50	12	SS	17	$\frac{18}{18}$	$\frac{18}{18}$	13.2				
		55	13	SS	50	$\frac{2}{2}$	$\frac{2}{2}$					
Very dense GRAVEL (GM)												
Borehole completed on October 15, 1982 at a depth of 53 ft. Groundwater not encountered during drilling.												

SUBSURFACE PROFILE		SAMPLES					DEPTH SCALE	GRAPHIC LOG	DESCRIPTION	DENSITY (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	CIRCULATION (%)	PERMEABILITY (cm/sec)
LOCATION	NUMBER	TYPE	BLOW / FT.	RECOVERY										
	1	ST				5		Loose manure, sandy SILT; FILL Dark gray, sandy SILT; SLIMES (ML)	90.6	40.1				
	2	ST				10								
	3	SS	10	18 18		15				41.3				
	4	SS	10	18 18		20				43.8				
	5	SS	11	18 18		25				20.4				
	6	SS	8	18 18		30				18.5				
	7	SS	20	18 18		35		Firm dark yellow orange silty SAND; TAILINGS (SM)		12.7				

Figure C-6. Geotechnical borehole logs (continued).

New Rifle Site GNR-6 (con't)

SUBSURFACE PROFILE		SAMPLES						DENSITY (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	COMPLICATION (%)	PERMEABILITY (cm/sec)
DESCRIPTION	GRAPHIC LOG	DEPTH SCALE	LOCATION	NUMBER	TYPE	BLOW / FT.	RECOVERY					
Firm medium light gray silty SAND; TAILINGS (SN)		40	X	8	SS	14	18 / 18					
		45	X	9	SS	21	18 / 18					
		50	X	10	SS	78	18 / 18					
Medium to dark brown sandy SILT (HG-SH) Very dense sandy GRAVEL with gypsum crystals
Borehole completed on October 15, 1982 at a depth of 49.5 ft. Groundwater not encountered during drilling.												

Figure C-6. Geotechnical borehole logs (continued).

ADDENDUM D5.4

CSU BORING LOGS, OLD RIFLE

OLD RIFLE

BOREHOLE 200

CAL = California Tube

SS = Split Spoon

ST = Shelby Tube

OLD RIFLE

BOREHOLE 201

CAL = California T
SS = Split Spoon
ST = Shelby Tube

OLD RIFLE

BOREHOLE 202

OLD RIFLE

BOREHOLE 203

OLD RIFLE

BOREHOLE 204

OLD RIFLE

BOREHOLE 205

OLD RIFLE

BOREHOLE 206

OLD RIFLE

BOREHOLE 207

CAL = California T

SS = Split Spoon

ST = Shelby Tube

OLD RIFLE

BOREHOLE 208

OLD RIFLE

BOREHOLE 209

OLD RIFLE

BOREHOLE 210

ADDENDUM D5.5

CSU BORING LOGS, NEW RIFLE

NEW RIFLE BOREHOLE 200

CAL=California Tube
SS =Split Spoon
ST =Shelby Tube

NEW RIFLE BOREHOLE 201

SS @ 0'
SS @ 5'
SS @ 10'
SS @ 15'
ST @ 20'
SS @ 25'
CA @ 30'
CA @ 35'
SIT @ 40'
SS @ 45'
SS @ 50'
SS @ 55'
SS @ 60'
SS @ 65'
SS @ 70'

DEPTH (FT)

gray moist silty fine Sand
with occasional slime lenses

green "

fine Sand, saturated

sub base- brown clayey sandy gravel
Auger Refusal @ 70'

CAL=California Tub
SS =Split Spoon
ST =Shelby Tube

NEW RIFLE BOREHOLE 202

CAL=California Tube
SS =Split Spoon
ST =Shelby Tube

NEW RIFLE BOREHOLE 203

CAL=California Tub
SS =Split Spoon
ST =Shelby Tube

NEW RIFLE BOREHOLE 204

NEW RIFLE BOREHOLE 205

CAL=California Tub
SS =Split Spoon
ST =Shelby Tube

NEW RIFLE BOREHOLE 206

CAL=California Tube
SS =Split Spoon
ST =Shelby Tube

NEW RIFLE BOREHOLE 207

CAL=California Tube
SS =Split Spoon
ST =Shelby Tube

NEW RIFLE BOREHOLE 208

CAL=California Tube
SS =Split Spoon
ST =Shelby Tube

NEW RIFLE BOREHOLE 209

SS @ 0'

SS @ 5'

brown medium Sand

Refusal @ 7.5'

CAL=California Tube
SS =Split Spoon
ST =Shelby Tube

NEW RIFLE BOREHOLE 210

CAL=California Tube
SS =Split Spoon
ST =Shelby Tube

NEW RIFLE BOREHOLE 211

SS @ 0'
SS @ 5'
SS @ 10'
SS @ 15'
SS @ 20'
ST @ 25'
CAL @ 30'
SS @ 35'
SS @ 40'
SS @ 45'
SS @ 50'
SS @ 55'
SS @ 60'
SS @ 65'
SS @ 70'
SS @ 73'

grey silty Sand, slightly moist

Slime lens @ 41'

grey Clay, moist, high P.I.

sub base brown sandy Clay, moist, 1
P.I.
Refusal @ 74.5'

CAL=California Tub
SS =Split Spoon
ST =Shelby Tube

NEW RIFLE BOREHOLE 212

CAL=California Tube
SS =Split Spoon
ST =Shelby Tube

NEW RIFLE BOREHOLE 213

CAL=California Tub
SS =Split Spoon
ST =Shelby Tube

NEW RIFLE BOREHOLE 214

CAL=California Tube
SS =Split Spoon
ST =Shelby Tube

NEW RIFLE BOREHOLE 215

ST @ 0'

SS @ 5'

moist grey medium Sand with occasional debris

sub base: silty Sand with non plastic fines

Gravel and Cobbles

Auger Refusal @ 11.3'

CAL=California Tube
SS =Split Spoon
ST =Shelby Tube

NEW RIFLE BOREHOLE 216

CAL = Caliche
SS = Silty Sand
ST = Silty Clay

NEW RIFLE BOREHOLE 217

SS @ 0'

SS @ 5'

SS @ 10'

SS @ 15'

ST @ 20'

SS @ 25'

SS @ 30'

SS @ 35'

SS @ 40'

SS @ 45'

DEPTH (FT)

grey silty Sand, slightly moist

Sampler and Auger Refusal @ 45'

CAL=California Tut
SS =Split Spoon
ST =Shelby Tube

ADDENDUM D5.6

MSRD BORING LOGS, OLD RIFLE

PROJECT OLD RIFLE
JOB NO. EBI-63E DATE 7/29/81

LOG OF TEST BORING NO. D-1

JOB NO. EBI-63E DATE 7/29/81

RIG TYPE CME-55 (203)

BORING TYPE G-2 HSA

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.

SERGEANT, HAUSKINS & BECKWITH

PROJECT Old Kit
JOB NO. F21-65E DATE 7/19/81

LOG OF TEST BORING NO. 1

RIG TYPE CHIE 75 (206)
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
0								
5								
10								
15								
20								
25								
30								
35								
40								
45								
50								
55								
60								
65								
70								
75								
80								
85								
90								
95								
100								

RIG TYPE S.H.E. 15 (206)

BORING TYPE 6" dia. HSA

SURFACE ELEV. _____

DATUM _____

REMARKS	VISUAL CLASSIFICATION
Dry / V moist G 12'-17'	S.H. Sand fine y graded auger at 10' submerged NP grey "stake some work" simulated ...
Saturated	Clayey Sand hi PY brown Note: 1/2 acc @ 20' Subbase
	Stopped Auger @ 15' Stopped sampler @ 20'
	hole caved to 10'

GROUND WATER
SAMPLE TYPE

GROUND WATER

SAMPLE TYPE

DEPTH	HOUR	DATE
17'	9.30A	7/29/8

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT OLD RIFLE
JOB NO. EBI-63E DATE 7/29/81

LOG OF TEST BORING NO. D-3

JOB NO. E81-63E DATE 7/29/81

RIG TYPE CME-55 (203)

BORING TYPE 6 1/2 HSA

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.

SERGEANT, HAUSKINS & BECKWITH

PROJECT Old Rte To ...
 JOB NO. EB1-63E DATE 7/29/81

LOG OF TEST BORING NO. 1

RIG TYPE CME 75 (206)
 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		20"	X	U	6-9-12-23	32				Silty Sand
5		21"	X	U	16-20-16-5-17	SM				poorly graded angular
		19"	X	U	2-2-2-2-2					very loose
10		20"	X	U	2-3-4-3-3					
		20"	X	U	5-5-6-7-6					
15		21"	X	U	4-3-4-7-					Clay
		19"	X	U	4-5-7-5-4					trace sand med. li. PE brown
20		20"	X	U	5-10-10-10-10	CH				
		1	X	U	15-50 1/4"	SP-SC				Sand
25										some clay trace silt poorly graded 10 PE brown
										Stopped Auger @ 20'
										Stopped sample @

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT OLD PIFLE

JOB NO. E8H63E DATE 7/29/81

LOG OF TEST BORING NO. D-5

[illegible]

GROUND WATER

SAMPLE TYPE

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

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT OLD RIFLEJOB NO. EB163E DATE 7/29/81LOG OF TEST BORING NO. D-7

JOB NO. _____ DATE _____									RIG TYPE <u>CME 55</u> (203)	
									BORING TYPE <u>6 1/2 HSA</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		18"	X	U	4-5-12-17-27			CL	DRY	SANDY CLAY
		20"	X	U	31-28-31-30-24				DRY TO S. MOIST	LO PI LIGHT BROWN (COVER MATERIAL)
5		15"	X	U	4-5-9-6-6					SAND
		24"	X	U	2-5-7-7-5				NOTE: Trace clay pinkish	PRD FINE NP GREY
10		12"	X	U	6-5-4-3-2			CL	V. MOIST	NOTE: lens clay
		8"	X	U	2-2-2-2-3			SP		
15		19"	X	U	4-14-22-50/5"			CL	MOIST TO SATURATED	CLAY MED PI GREY/BROWN
		8"	X	U	4-17-50/5"			SP	MOIST	LENS OF Sand (3") TAILINGS
20									P.LUG	SAND W/ SOME CLAY NP - LO PI PRD FINE BROWNISH
										SANDY CLAY w/ organics LO PI DARK BROWN
										SAND w/ SOME CLAY PRD FINE NP Reddish Brown
										NOTE: Rounded Gravel
										STOPPED AUGER @ 17 1/2' REFUSED SAMPLER 18'5"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Old Rifle
 JOB NO. EBH-63E DATE 8/15/81

LOG OF TEST BORING NO. 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	RIG TYPE <u>CME-55 (203)</u> BORING TYPE <u>6 1/2 HSA</u> SURFACE ELEV. _____ DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
0										
		20"	X	U	5-7-13-17-26			SP	DRY TO S. MOIST	SAND W/TRACE CLAY/SP
		21"	X	U	20-35-33-17-32					PREDFINE
5		14"	X	U	6-9-12-13-13					LIGHT GREY, BROWN-TA
		17"	X	U	8-7-9-5-4					
10		15"	X	U	3-2-2-3-4					
		19"	X	U	2-1-1-1-1					
15		0"	X	U	1-1-1-1-1			N.R.		
		21"	X	U	1-2-2-12-14				plug	
20		0"	X	U	5-6-4-5-7					TAILING SUBBASE
		22"	X	U	1-2-3-5-6				V. MOIST TO SATURATED	CLAY MED-HI PI
25		20"	X	U	8-2-25-21-3				Saturated	GREY W/SOME YELLOW
										Sand trace clay NP brown-grey
										Auger refusal @ 24' 6"
										Sampler refusal @ 26' 6"

GROUND WATER

DEPTH	HOUR	DATE
19'	15:00	8/15/81

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Old Rte 116 Tollway
 JOB NO. EP-100 DATE 8/15/91

LOG OF TEST BORING NO. B-6

RIG TYPE 200 FT (203)
 BORING TYPE 1.5" ID
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
5		28"	X	T				SP	DRY TO S. MOIST	SAND W/ TRACE CLAY / SILT PREL FINE NP LIGHT-GREY, TAN, BROWN (PRIMARILY GREY) NOTE: 4" SANDY CLAY COVER MATERIAL LIGHT BROWN
		28"	X	T						
		29"	X	T						
10		27"	X	T						
		28"	X	T						
		29"	X	T					MOIST	
15		25"	X	T						
		12"	X	T						
20		22"	X	U	26 44 46 47					SATURATED (Subbase) Sand & Gravel rounded NP brown-grey
		NR	X	U	50/51/2"					
25								GP	6PT	Auger refused @ 24 1/2 Sampler refused @ 22
30										

GROUND WATER

DEPTH	HOUR	DATE
5'	12:00	8/15/91

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT Old Mill Tail
 JOB NO. FRL-632 DATE 7/5/81

LOG OF TEST BORING NO. 6

RIG TYPE Cole ST (203)
 BORING TYPE 6' 3" - 5' 1"
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		20"	X	u	7-13-25-17-20			SP	DRY TO S. MOIST	SAND W/ TRACE CLAY / SILT MED FINE NP LIGHT GREY - BROWN
		26"	X	u	12-12-12-13-17					
5		5"	X	u	40-41-18-16-16			SC	DRY	NOTE: 1" SPANNY CLAY COL
		4"	X	u	50/5 1/2"			SP		CLAYEY SAND MED FINE LO PI LIGHT BROWN
10		20"	X	u	4-4-5-6-10				DRY TO S. MOIST	
		24"	X	u	9-9-10-10-15					
15		20"	X	u	8-10-10-12-20				MOIST TO V. MOIST	SAND W/ TRACE CLAY / SILT MED FINE NP LIGHT GREY
		19"	X	u	11-11-10-11-13					
20		21"	X	u	6-7-7-9-14			SP	MOIST TO V. MOIST	TAILW SAND W/ SOME CLAY ^{SC} MED FINE NP lenses of grey clay Black & BROWN
		14"	X	u	11-12-50/5 1/2"					
25										
30										

Auger refused @ 24'
 Sampler refusal @ 21'

GROUND WATER

DEPTH	HOUR	DATE
<u>None</u>		

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 Old RifleJOB NO. EB-635 DATE 8/5/81LOG OF TEST BORING NO. A-1

RIG TYPE <u>CME-55</u> (203)										
BORING TYPE <u>L₂ HSA</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		24"	X	u	7-12	25-18-25		CL	DRY	SANDY CLAY
5		9"	X	u	22-19-18-17-11			SP	DRY TO S. MOIST	LO PI LITE BROWN (COVER MATERIAL)
		NR	X	u	13-12-11-12-13					SAND w/ TRACE CLAY/FIL.
10		NR	X	u	26-20-19-17-20					FINE
		17"	X	u	34-36-13-12-12					NP LITE GREY
15		29"	X	u	8-9-11-14-18					
		19"	X	u	3-8-9-10-12					
20		23"	X	u	8-10-11-13-17					
		23"	X	u	6-8-8-8-11					
25		20"	X	u	7-6-17-[50/5 ^{1/2}]			GP	MOIST SATURATED	SAND, CLAY & GRAVEL MIX ROUNDED FINE NP BROWN & BLACK
30										Auger Refused 24' 9" SAMPLE REFUSED @ 24' 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.

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT C.D. RIFLEJOB NO. EBFG3E DATE 9/5/81LOG OF TEST BORING NO. A-1RIG TYPE CMF-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			16"	X	10-15-11-13-18			CL	DRY	SANDY CLAY
			20"	X	13-13-13-11-13			SP	DRY	LO PI
5			16"	X	12-6-7-7-9				TO S. MOIST	LITE BROWN (COVER MATERIAL)
			26"	X	7-8-10-10-11				Note: LITE GREY	SAND W/ TRACE CLAY/SILT (RED FINE NP)
10			23"	X	4-4-5-7-10					LITE GREY & LITE PINK (DROPPED ON GROUND)
			26"	X	9-7-8-11-13					
15			19"	X	8-8-9-10-13					
			26"	X	10-12-12-17-20					
20			22"	X	10-9-7-8-11					
			10"	X	7-5-5-6-8				MOIST	TAILING-
25			30"	X	4-6-6-8-27			SC	MOIST TO	CLAYEY SAND SUBBASE
			5"	X	50/5"			GP	V. MOIST TO SATURATED	RED FINE NP BROWN SOME BLACK W/ ORGANICS
30									Plug	SAND GRAVELY CLAY MIX. Reddish FINE NP BROWN
										REFUSED SAMPLER @ 27 " Auger @ 29'3"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

CONSULTING PROFESSIONAL ENGINEERS

DATE 8/5/91

LOG OF TEST BORING NO. 4

QmE 75 (206)

Gold's Inc

SURFACE ELEV.

DATUM

JOB NO. _____									RIG TYPE	CME 75 (206)		
									BORING TYPE	6 1/2 1-5 4		
									SURFACE ELEV.			
									DATUM			
Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION		
0			X	U	6-7-11-15-28			SP	Dry	Sand trace silt pred. fine sand NP grey		
		24"	X	U	39-32-29-35-58							
		20"	X	U	13-26-25-35-28							
5		20"	X	U	15-13-12-12-9							
		8"	X	U	5-6-5-4-5							
		12"	X	U	6-7-7-14-11							
		13"	X	U	5-5-1-2-6			SP				
10			X	NR	15-16-14-22-33				tailings substrate saturated	Sand trace clay trace gravel poor NP / Silted brown		
15			X									
20										Auger stopped @ 20 Sampler stopped @ 20		
					</							

GROUND WATER

SAMPLE TYPE

DEPTH	HOUR	DATE
17'	6:50 P	4/5/51

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 Old RifleJOB NO. EB163E DATE 8/16/81LOG OF TEST BORING NO. A-1

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-SS (203)</u>	
									BORING TYPE <u>6 1/2 HSA</u>	
									SURFACE ELEV. _____	
									DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
21"			X	u	14-18	13-12-13		SP	DRY TO S. moist	SAND w/TRACE CLAY/SILT FINE NP LITE GREY Note: 12" sandy clay core made like brown
20"			X	u	?					
18"			X	u	45-19	32-17-18				
22"			X	u	36-15	16-12-14				
21"			X	u	6-15	10-10-11				
18"			X	u	2-10	12-11-15				
24"			X	u	12-13	14-13-16			MOIST	
22"			X	u	10-12	13-15-24				
22"			X	u	8-13	14-11-13				
24"			X	u	5-7	7-12-15		SC	MOIST TO V. MOIST	TAILINGS SUBBASE
16"			X	u	10-11	50/5"			PLUG	CLAYEY SAND FINE NP to 10 PI BROWN 3" len of sand w/TRACE
									REFUSED SAMPLER @ 26'	
									" Auger @ 27'	

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Old 2nd E. T. 2003
 JOB NO. EE-63E DATE 8/6/81

LOG OF TEST BORING NO.

RIG TYPE CME 75 (206)
 BORING TYPE G-12
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
		24"	X		19-19-25-30-35			ML	Dry	Silt
			X					SP		some clay
		16"	X		25-25-40-55-29				Dry	Lo FI
5			X							
		19"	X		6-8-10-10-13-13					Sand
			X							trace silt
		20"	X		7-7-6-5-7					pred. fine grained
10			X							NP
		7"	X		6-10-8-13-12				Note: moist below 12'	grey
			X		9-9-9-10-14					
15			X							
		7"	X		1-1-1-4-4					
		18"	X		24-50/4 1/2'					
20										
25										Auger refused @ 11'
										Sampler refused @

GROUND WATER

DEPTH	HOUR	DATE
17'	1:00 P	8/6/81

SAMPLE TYPE

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

SERGENT & SONS

CONSULTING GEOTECHNICAL ENGINEERS

LOG OF TEST BORING NO. B-1

BORING TYPE 6 1/2 HSD

DATUM.

GROUND WATER		
DEPTH	HOUR	DATE
NONE		

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

SERGEANT. HAUSKINS & BECKWITH

PROJECT Old R. & L. Tailings
 JOB NO. ES-1-63E DATE 8/6/51

LOG OF TEST BORING NO. 1

RIG TYPE CME 75 (206)
 BORING TYPE 6 1/2" H.S.H.
 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	V	8-3-3-5-4			ML	Dry	Silt trace clay
		18"	X	V	4-4-9-10-14			SP		Lo PE brown
5		22"	X	V	17-10-19-7-7					Sand trace silt
		19"	X	V	6-5-4-5-5				moist	pred. fine gr. med NP grey
10		19"	X	V	11-8-12-13-19					
		21"	X	V	10-9-8-8-5					
15		19"	X	V	6-4-6-6-4					
20		20"	X	V	5-7-7-6-4					
		25"	X	V	6-6-6-4-4					
		9"	X	V	4-50/4"					
25		19"	X	V	5-6-5-5-7			CH	Saturated	Clay some sand
			X	V	39-44-50/5"			SP		HI PE brown
30										Sand some clay pred. fine grained NP brown
										Auger refused @ 28' 1/2"
										Sampler refused @ 28' 1/2"

GROUND WATER

DEPTH	HOUR	DATE
18'	7:00 P	8/6/51

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT Old RifleJOB NO. EBH3-E DATE 8-6-81LOG OF TEST BORING NO. B-1RIG TYPE CME-55 (203)BORING TYPE L¹/₂ NSA

SURFACE ELEV. _____

DATUM _____

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
		19"	X	u	6-12-9-9-11			CL	DRY	SANDY CLAY
		17"	X	u	9-11-12-10-12			SP	DRY TO S. MOIST	LO PI LITE BROWN (COVER MATERIAL)
5		15"	X	u	19-8-6-6-7					SAND W/TRACE CLAY/SILT
		25"	X	u	6-7-4-5-7					NP
10		23"	X	u	3-4-7-7-12					PRE FINE LITE GREY
		24"	X	u	9-12-3-15-16					
15		23"	X	u	8-12-13-13-16					
		17"	X	u	13-10-12-11-12					
20		27"	X	u	4-6-7-26-50/5 1/4			SP	MOIST MOIST TO V. MOIST	TAILINGS SUBBASE
		NR.	X	u	50/5 1/2					SAND W/SOME CLAY
25									Pling	PRE FINE NP SOME ROUNDED GRAVEL BOTTOM 2" BROWN
										REFUSED SAMPLER @ 22' 11" " Auger @ 23' 9"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

LOG OF TEST BORING NO. 1

BORING TYPE 6 1/2" WSN

SURFACE ELEV.

DATUM

Arge stopped @ 15
Samples collected @

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.

SERGEANT, HAUSKINS & BECKWITH

PROJECT

JOB NO.

Old Rifle Trail
 21-032 DATE 8/10/81 10/17/81

LOG OF TEST BORING NO.

RIG TYPE

BORING TYPE

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			4"	T				ML	Dry	Silt trace sand
5			6"	T				SP	Sl. moist	Lo PI brown
			6"	T						Sand trace silt
10			6"	T						pred. fine grained
			20"		U 6-5-7-9-8					NP gray
			N/R		U 6-2-2-12-10					
15			20"		U 8-7-7-10-18				fine	clay
17 1/2			20"		U 50/3				saturated	clay trace sand trace silt H. PI brown-gray
20										
25										
30										

GROUND WATER

DEPTH	HOUR	DATE
17 1/2'	8:00 A	8/17/81

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT OLIO RIFLEJOB NO. E81-63E DATE 8/16/81LOG OF TEST BORING NO. C-2

JOB NO. _____ DATE _____										RIG TYPE <u>CME-SS</u> (203)	
										BORING TYPE <u>6 1/2 HSA</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		24"	X	u	5-7-13-20-34			CL	DRY	SANDY CLAY	
			X	u	25-27-19-18-20			SP	DRY TO S. MOIST	LO PI LITE BROWN	
5		NR	X	u	16-8-10-8-8					SAND W/TRACE CLAY/SIL FINE NO	
		?	X	u	5-4-5-4-6					LITE GREY	
		26"	X	u	3-3-4-5-3						
10		24"	X	u	2-2-2-3-4				MOIST		
		17"	X	u	6-3-4-4-3			CL/CH	V. MOIST	CLAY MED/III PI GREY LEAKS OF SAND	
15		20"	X	u	?			SP	MOIST TO V. MOIST		
20			X	u	12-22-50/1 1/2'					SAND W/ SOME CLAY FINE NO BROWN NOTE: GRAVEL IN NOSE OF SAMPLER	
										REFUSED SAMPLE @ 21 1/2'	
									</		

GROUND WATER

DEPTH	HOUR	DATE
20.1'	2:30	8/16/81

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

Moved to be
 deeping into water.

PROJECT Old 256 - 1000
 JOB NO. E01-63E DATE 8/7/91

LOG OF TEST BORING NO. 206

RIG TYPE CR-25
 BORING TYPE 1000
 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	Dr 1	
		22"	X	U	1-2-1-5-11			SP		
		18"	X	U	20-15-20-50/34			CL	moist	fine sand to silty
5		14"	X	U	20-14			CL	moist	fine sand to silty
10										clay / some sand to silty brown
15										
20										
25										
										Auger stopped @ Sample cut @ 5'4"

GROUND WATER

DEPTH	HOUR	DATE
None		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWIT

PROJECT OLD RAILJOB NO. EBI-63E DATE 9/6/81LOG OF TEST BORING NO. D-2

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" NSA</u>	
									SURFACE ELEV. _____	
									DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
0		15"	X	u	6-9-15-17-23			CL	DRY	SANDY CLAY
		26"	X	u	30-29-37-42-32			SP	DRY TO S MOIST	LO PE LITE BROWN (COVER MATERIAL)
5		12"	X	u	10-12-13-11-13				NOTE: PINKISH	
		22"	X	u	9-9-11-13-9					SANDY/TRACE CLAY/SILT PREO FINE NP
10		17"	X	u	6-5-4-6-5				MOIST	LITE GREY
		22"	X	u	7-5-4-5-5					
15		28"	X	u	4-4-10-25-39			CL CM	MOIST TO V. MOIST	CLAY MED-HI PE GREY
		4"	X	u	13-33-45-50-4"			GP	Plug	TAILINGS SLEW CASE
20										SAND & GRAVEL MIX Rounded FINE NP BROWN
										REFUSED SAMPLE @ 19' " Auger @ 19'6"

GROUND WATER

DEPTH	HOUR	DATE
<u>NONE</u>		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT OL Rite T-1000
 JOB NO. EBI-63E DATE FEB 11

LOG OF TEST BORING NO. 2

RIG TYPE CHIEF TS (206)
 BORING TYPE 6" 2" 45"
 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
0			NR		4-8-10-7-6			ML
22"					10-6-7-8-9			
5			19"		12-4-5-8-10			
			18"		6-5-4-8-8			
10			19"		6-8-8-10-9			
			18"		6-5-1-12-16			PI
15			20"		6-9-20-40-50/5			PI

REMARKS	VISUAL CLASSIFICATION
Dry	S. 1/4 trace sand 10 PI brown
S. moist	Sand trace silt med. fine grained
PI 8 moist	CLAYEY sand med. fine grained 10 PI brown
	Auger stopped @ 15' Sampler used @ 17'5"

GROUND WATER

DEPTH	HOUR	DATE
DATA		

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.

PROJECT Old Rifle

JOB NO. E81-63E DATE 5-6-71

LOG OF TEST BORING NO. D-2

RIG TYPE CME-55 (203)

BORING TYPE 6 1/2 HSA

SURFACE ELEV.

DATUM.

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			X	u	6-6-4-8-8			CL	DRY	SANDY CLAY
			X	u	11-12-11-10-6			SP	Note: Pinkish then greenish	LO MZ LIGHT BROWN (cover material)
5			X	u	10-9-9-7-8					
			X	u	7-6-7-9-10					SAND w/ TRACE CLAY / SP
10			X	u	4-5-7-6-5					PRED FINE NP
			X	u	7-6-5-4-3					Lite grey & yellowish
15			X	u	3-5-6-7-10				MOIST	TAILINGS SUBBASE
			X	u	9-30-50/5"				V. MOIST Plug	SAND w/ some clay & Trace Round Gravel in bottom inch. Pred Fine NP Brown
20										SAMPLER REFUSED @ 18' Auger Refused @ 19'

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

Figure 1 shows a Western blot analysis of p38 phosphorylation. The blot displays protein bands for p38 in two groups: control (lanes 1-3) and treatment (lanes 4-6). Molecular weight markers are indicated on the left at 36, 34, 32, 30, 28, 26, 24, 22, 20, 18, 16, 14, 12, 10, 8, 6, and 4 kDa. The bands represent different phosphorylation states of p38.

PROJECT Old Rifle Tailings
 JOB NO. E81-G3E DATE 8/7/81

LOG OF TEST BORING NO. 203

RIG TYPE CUTS
 BORING TYPE 6" - 5"
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
		24"	X	U	9-12-18-17-12			ML SP	Dry	Silt + trace sand Lo PE brown
		21"	X	U	11-12-10-8-10				Dry	
5		20"	X	U	10-6-5-5-5					Sand trace silt pred. fine grained NP grey
		21"	X	U	4-5-4-6-8					
10		20"	X	U	7-4-4-6-5				plug	Sandy Clay Lo PE brown
		19"	X	U	2-3-4-5-7				moist	
15		18"	X	U	4-6-13-28-36			CL GP	moist	Sandy gravel some silt rounded NP brown
		4"	X	U	27-26-20-25-30/3"					
20										
25										Auger stopped @ 15' Sampler refused @ 1'

GROUND WATER

DEPTH	HOUR	DATE
N/A		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT Old R. & L. Tailings
 JOB NO. EB1-G3E DATE 8/7/81

LOG OF TEST BORING NO. (206)

RIG TYPE CME 75
 BORING TYPE GEOPHON
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								ML	Dry	Silt
		8"	X	T				SP		trace sand
		21"	X	T					Dry to sl. moist	Lo PE
5		8"	X	T						Sand
		20"	X	T						trace silt
10		12"	X	T					moist	pred. fine gravel
		22"	X	T						med. grey
15		5"	X	T						Notes: lenses of red tailings @ 6'
		13"	X	T						
20			X	T	U R-21-17-12-11				plug	
			X	T	U 4-4-4-5-6			CL	moist	Sandy Clay, silty
			X	T	U 32-50/4 1/2			CH		trace silt / med. PE brown
25										Auger stepped @ samples refused 23' 4 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.

SERGENT, HAUSKINS & BECKWITH

PROJECT Old Rifle Tailings
 JOB NO. EB1-GZE DATE 8/7/81

LOG OF TEST BORING NO. (206)

RIG TYPE CME 75
 BORING TYPE 6" 1/2" 45.2
 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		8"	X	U	2-2-5-6-9			ML	Dry	Silt
		20"	X	U	12-7-7-5-4			SP	Dry	trace sand
5		22"	X	U	9-3-2-7-8					loose
		21"	X	U	9-12-16-25-28					brown
10		NR	X	U	25-19-15-20-17					Sand
		21"	X	U	20-7-5-7-13					trace silt
15		20"	X	U	9-12-13-20-30					pred fine gravel
			X	U	5-6-50-13"				moist	NP
									plug	slly
20									moist	clay
										some sand
										hi PL
										brown
										Auger stop @
										Sample 10' @
										18' 9"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT Old RifleLOG OF TEST BORING NO. D3JOB NO. FB-63E DATE 8/7/81RIG 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			16"	X	45-8-8-11			CL	DRY	SANDY CLAY
			16"	X	5-4-8-10-12			SP	DRY TO S. M. 1/2"	LO PZ LITE BROWN (LOWER MATERIAL)
5			30"	X	45-40-37-40-41					SAND & TRACE CLAY / S. M. 1/2"
			15"	X	44-27-17-30-36					PRD FINE M.P. LITE GREY
10			18"	X	5-8-11-11-17					NOTE: SOME YELLOW TAILINGS SUBGRADE
			18"	X	13-15-12-12-16 (MOST DROPPED ON GROUND)					CLAY W/ SOME SAND
15			19"	X	12-16-8-13-38			CL	MOIST	LO PZ BROWN
			HR.		50 5/8"				MOIST N.R. - cobbles plug	
20										REFUSED SAMPLE @ 17' 1/2" " Auger @ 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.

SERGENT, HAUSKINS & BECKWITH

PROJECT CLO RIFLEJOB NO. EB-63E DATE 8/7/81LOG OF TEST BORING NO 2RIG 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			21"	X	46-77-8-10			CL	DRY	SANDY CLAY LO PI
			25"	X	46-73-12-14-17				DRY TO S. MOIST	LITE BROWN (COVER MATERIAL)
5			0"	X	420-18-18-15-14			N.R.		SAND W/ TRACE CLAY / S
			0"	X	428-26-25-21-23			N.R.		PREL FINE NP
10			10"	X	433-27-14-16-19					LITE GREY (Golden)
			28"	X	431-32-25-22-28					
15			22"	X	417-14-13-18-34			SP	MOIST TO V. MOIST TO SATURATED	SAND W/ SOME CLAY S. PREL FINE NP
			18"	X	412-18-20-13-15					yellowish brown r; Note: more clay lo pi Brown
20			NR.	X	410-2-5-27-50/5 1/2"					
			5"	X	450/5"					
25										Refused Sampler @ 2 Stopped Auger @ 20

GROUND WATER

DEPTH	HOUR	DATE
20.2'	11:00	8/7/81

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Old RifleJOB NO. EB-63E DATE 8/7/81LOG OF TEST BORING NO. C-3

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"	X	u	7-10-9-9-19			CL
		22"	X	u	?			
5		19"	X	u	45-12-9-8-10			SP
		24"	X	u	8-9-10-11-14			
10		17"	X	u	12-17-22-21-24			
		18"	X	u	19-22-21-23-21			
15		24"	X	u	8-11-14-21-20			
		20"	X	u	10-12-13-14-39			SC
20		2"	X	u	39-50 1/2"			Plug
25								

RIG TYPE CME-55 (203)BORING TYPE 6 1/2 HSA

SURFACE ELEV. _____

DATUM _____

REMARKS

VISUAL CLASSIFICATION

DRY

DRY
TO
S MOISTSANDY CLAY
LOPE
LITE BROWN
(COVER MATERIAL)SAND W/ TRACE CLT / SILT
FRED FINE
NP
LITE GREY

MOIST

V. MOIST

TAILOR

SUBSEA

CLAYEY SAND
FRED FINE
NP
BROWNNote: SANDY GRAVEL
in nose of last
SamplerREFUSED Auger @ 20'
" Sampler @ 20'8"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Old RifleJOB NO. EBH-63E DATE 8/7/81LOG OF TEST BORING NO. B-2

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		19"	X	A ?				CL
		22"	X	A ?				SP
5		14"	X	A ?				
		23"	X	A 10-9-9-11-14				
10		23"	X	A 16-8-10-12-13				
		22"	X	A 11-12-15-14-20				
15		20"	X	A 3-7-9-7-15				
		22"	X	A 14-14-13-14-15				
20			X	A 10-5-5-5-8				SC
		12"	X	A 11-13-12-19-35				
25		4"	X	A 25-50/25"				

RIG TYPE CME-55 (203)BORING TYPE 6" DIA

SURFACE ELEV. _____

DATUM _____

REMARKS

VISUAL CLASSIFICATION

DRY

SANDY CLAY

LO P

LITE BROWN

(COVER MATERIAL)

DRY
TO
S. MOIST

SAND W/ TRACE CLAY FINE

RED FINE

NP

LITE GREY

TAILINGS

SUBBASE

MOIST

CLAYEY SAND

RED FINE

NP

Plus

V. MOIST

BROWN & GREY

SOME ORGANICS

SANDY GRAVEL

ROUNDED

FINE

NP

BROWN

STOPPED AUGER @ 25'

REFUSED SAMPLE @ 25'

GROUND WATER

DEPTH	HOUR	DATE
PICKLE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT OLD Rifle Tailings
 JOB NO. ER-63E DATE 8/7/81

LOG OF TEST BORING NO. 1

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

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		18"	X	U	4-7-4-8-10			ML SP	Dry	S. & trace sand Lo PS known
		26"	X	U	12-7-9-12-13				Dry	
5		17"	X	U	26-13-10-13-14				sl. moist	Sand trace s. & k pred. fine gravel
		30"	X	U	26-23-18-20-23					
10		23	X		12-16-15-21-25					
		21	X	U	8-10-15-19-14					
15		22"	X	U	10-14-12-13-21					
		17'	X	U	22-24-21-25-23					
20		19	X	U	8-9-8-11-20				plug	tailings subbase
		17"	X	U	17-11-9-11-41			CH	Moist	Clay + trace sand Hi PL known
25			X	U	36-5/5 1/2"					
30										Auger stopped @ 25 Sampler refused @ 25

GROUND WATER

DEPTH	HOUR	DATE
2	6:00 P	8/7/81

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT OLD RIFLEJOB NO. EB-63E DATE 8/7/81LOG OF TEST BORING NO. B-3

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</u> (203)	
									BORING TYPE <u>6 1/2 HSA</u>	
									SURFACE ELEV. _____	
									DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
0		20"	X	u	4-7-8-7-8			CL	DRY	SANDY CLAY
		26"	X	u	9-11-13-15-16			SP	DRY TO S. MOIST	LD PI LITE BROWN (COVER MATERIAL)
5		14"	X	u	42-40-13-5-13					
		17"	X	u	9-10-10-10-12					SAND w/TRACE CLAY/SILT PRED FINE NP
10		24"	X	u	12-11-8-8-11					LITE GREY, GREEN
		18"	X	u	9-10-11-10-13				MOIST	
15		18"	X	u	7-8-7-10-13					
		22"	X	u	9-10-11-13-16					
20		18"	X	u	10-9-8-7-6					TAILINGS
		?	X	u	4-7-9-8-9			SC	MOIST TO V. MOIST	CLAYEY SAND SUBS. AS PRED FINE NP BROWN
25		?	X	u	7-10-12-15-40				Plug	
30										Note: Some Round Gravel in case.
										STOPPED AUGER @ 25' " Sample @ 27'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Old 2 1/2 T. 1 - 5
 JOB NO. FE-63E DATE 7-1-81-818181

LOG OF TEST BORING NO. 1

RIG TYPE CMS 75 (206)
 BORING TYPE 6" dia
 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	4-3-2-4-2			SP		
		21"	X	U	6-4-8-11-3					
5		17"	X	U	40-14-12-11-17					
		19"	X	U	15-16-15-27-24					
10		18"	X	U	9-14-4-14-19					
		21"	X	U	13-16-16-21-26					
15		22"	X	U	9-11-12-19-22					
		23"	X	U	17-17-16-23-27					
20		24"	X	U	11-7-9-9-10					
		20"	X	U	5-9-11-10-12					
25		19"	X	U	4-16-37-3-50 15 1/4					

REMARKS: 20'
moist
saturated

VISUAL CLASSIFICATION: S -
fine sand
Lo to
medium
Sand
fine
NP
gray

Clay
 some sand
 hard S. 10
 NP
 brown

Sand & pebbles
 rounded
 NP
 brown

Auger stopped @ 25
 Sampler refused @
 27' 11 3/4"

GROUND WATER

DEPTH	HOUR	DATE
26'	9:00A	7/8/81

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWILL

PROJECT Old RifleJOB NO. E81-63E DATE 8/8/81LOG OF TEST BORING NO. A4RIG 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										
		21"	X	u	3-3-4-5-8			CL	DRY	SANDY CLAY
			X					SP		LO PI
		24"	X	u	11-10-8-8-11				DRY TO	LIGHT BROWN
5		0"	X	u	58-19-14-18-22			N.R.	S: MOIST	(LOWER MATERIAL)
		24"	X	u	16-19-16-14-17					SAND W/ TRACE CLAY / SILT
10		19"	X	u	4-6-7-7-11				NOTE: Greenish	PRED FINE
		17"	X	u	10-12-13-13-14					NP
15		26"	X	u	12-10-9-8-13					LIGHT GREY
		16"	X	u	9-17-15-8-16					
20		23"	X	u	11-10-7-7-9					
		20"	X	u	4-7-10-11-33			SC	MOIST TO	CLAYEY SAND W/ TRACE
25		4"	X	u	50/42"				SATURATED	PRED FINE
										NP
										BROWN
										REFUSED AUGER'S
										SAMPLER @ 25' 4 1/2"

GROUND WATER

DEPTH	HOUR	DATE
2.8	9:15	8/8/81

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Old Rte To Line
 JOB NO. 625 DATE 8/8/81

LOG OF TEST BORING NO.

RIG TYPE CME 75 (206)
 BORING TYPE 6" WSP
 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								ME		
		20"	X	T				SP	Dry	Silt trace sand weakly cemented
5		17"	X	T					sl. moist	10 PT brown
		21"	X	T						Sand trace silt med fine grained
10		25"	X	T						NP grey
		15"	X	T						
		24"	X	T						
5		19"	X	T						
		21"	X	U	14-5-18-11-19					CLAY
20		20"	X	U	5-10-14-17-11			OH	plug moist	some sand Hi PT brown
		19"	X	U	5-6-9-3-2					
25			X	U	42-32-41-24-50/5"			SP	Saturated	Sand some clay comp. med fine grained brown
										Auger stopped @ 27'5"
										Sampler refused @ 27'5"

GROUND WATER

DEPTH	HOUR	DATE
15'	11:40 A	8/8/81

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT Old RifleJOB NO. EB163E DATE 8/8/81LOG OF TEST BORING NO A-4RIG 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		20"	X	U	4-4-4-7-6			CL SP	DRY	SANDY CLAY
		17"	X	U	5-4-3-9-8				DRY TO S. MOIST	LD PI LIGHT BROWN (COVER MATERIAL)
5		7"	X	U	8-6-7-8-9					
		18"	X	U	?					SAND W/TRACE CLAY/SCL
10		16"	X	U	4-4-9-9-8-13					NP PREO FINE LIGHT GREY & BROWN
		23"	X	U	8-10-12-14-18					NOTE: GREY
15		24"	X	U	10-7-8-8-9				MOIST	NOTE: Golden brown
		22"	X	U	4-3-3-2-6					TAILINGS
20		15"	X	U	2-2-3-5-6			SC	MOIST TO V. MOIST TO SATURATED	SUBBASE CLAYEY SAND W/SOME PREO FINE ORGANIC NP BLACK
		20"	X	U	4-4-4-4-13					
25		20"	X	U	6-8-4-9-25					
30										NOTE: COBBLES
										STEPPED AUGER @ 25' " SAMPLED @ 27'6"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

JOB NO.

3/21

LOG OF TEST BORING NO. 2

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
0								
5								
10								
15								
20								
25								
30								

RIG TYPE CAL-75
 BORING TYPE 6 1/2" A.P.C.
 SURFACE ELEV. _____
 DATUM _____

REMARKS	VISUAL CLASSIFICATION
Drill	Silt trace gravel Lo PI brown
Sl. moist	
	Sand trace silt fine grained NP gray Note: yellow lamination
plug	
saturated	clay trace sand trace gravel Hi PI brown-gray tailie subsa
saturated	Sand, gravel & cobb NP brown
	Auger stopped @ Sampler stopped @ 27 1/2'

GROUND WATER

DEPTH	HOUR	DATE
260'	12:30P	8-8-71

SAMPLE TYPE

11 - 2" 0 0 2 42" 1 0 tube female

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT OLD RIFLEJOB NO. FB163E DATE 8-8-81LOG OF TEST BORING NO. A-4

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		44-5-6-17-13			CL
			X					SP
5		6"	X		43-15-16-10-14			CL
		18"	X		47-6-7-7-11			SP
10		17"	X		419-11-10-5-8			
		16"	X		411-15-28-13-13			
15		0"	X		49-11-7-5-4			NR.
		12"	X		410-7-9-7-40			
20		24"	X		433-12-8-7-8			
		12"	X		48-4-5-6-7			
25								

RIG TYPE CME-55

(203)

BORING TYPE 6 1/2 HSA

SURFACE ELEV. _____

DATUM _____

REMARKS

VISUAL CLASSIFICATION

DRY

SANDY CLAY

LO PI

LIGHT BROWN

(COVER MATERIAL)

DRY

DRY

SAND W/TRACE CLAY

NP

PREO FINE

LIGHT BROWN

SANDIST

NOTE:

TRACE GRAVEL

NOTE:

BROWNISH

SANDY CLAY

LO-ME PI

LIGHT BROWN

V. MOIST

TO

SATURATED

SAND W/TRACE CLAY/SIL

NP

FINE

GREY TO GREENISH

TAILIN
SUBSEAS

CLAYEY SAND

PREO FINE

NP TO LOW PI

BROWN

STOPPED AUGER @ 20

" Sampler @ 22 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.

SERGENT, HAUSKINS & BECKWITH

PROJECT OR Rifle
 JOB NO. ED-62E DATE 9/10/81

LOG OF TEST BORING NO. 1

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

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								CL	DRY TO S. MOIST	SANDY CLAY LO PI LIGHT BROWN (LOWER MATERIAL)
5		26"	X	T						
		22"	X	T						
10		20"	X	T (22")						SAND W/TRACE CLAY / S PREDFINE NP LIGHT GRAY
		25"	X	T						
		24"	X	T						
15		26"	X	T						
		23"	X	T						
20		27"	X	T				CH SL	moist moist	tailings subbase Clay hard sand hi PI brown
		12"	X	T (12")						
25										CLAYEY SAND FINE NP to 10 PI. BROWN & BLACK
										REFUSED SAMPLER @

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 H - 3" O.D. 2.38" I.D. tube sample.

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOLOGICAL ENGINEERS

PROJECT Old RifleJOB NO. EB1-63E DATE 8-8-81LOG OF TEST BORING NO A-4RIG 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		20"	X	u	7-20-19-23-24			CL	DRY	SANDY CLAY LO PI LIGHT BROWN (LOWER MATERIAL)
5		3"	X	u	19-18-15-13-19					
		20"	X	u	12-9-10-10-12					
10		17"	X	u	7-5-5-11-6			SP	DRY TO S. MOIST	SAND WITH TRACE CLAY / SH PREP FINE NP LIGHT GREY
		19"	X	u	7-9-8-12-13					
15		17"	X	u	6-7-11-10-10			SG		TYPICAL SWEET
		8"	X	u	7-8-9-8-8				MOIST TO V. MOIST	CLAYEY SAND PREP FINE LO PI BROWN
			X	u	5-9-5-8-10					
20		15"	X	u	2-3-10-50/3"					NOTE: SOME BLACK & GRAY EFFECTS
25										STOPPED Auger @ 20' Refused Sample @ 21'9"

GROUND WATER

DEPTH	HOUR	DATE
20.5'	2:15	8/8/81

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Old Rifle
 JOB NO. E81-63E DATE 8/19/81

LOG OF TEST BORING NO. 203

RIG TYPE CME-55
 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								CL	DRY	SANDY CLAY
		20"	X	U	3-6-7-10-11					LO PI
		22"	X	U	10-12-25-24-26				DRY TO	LITE BROWN
5		18"	X	U	20-15-10-11-12				S. MOIST	(COVER MATERIAL)
		22"	X	U	8-12-11-11-10					SAND W/ TRACE CLAY, 1/3
10		21"	X	U	17-12-9-17-21					PRED FINE
		24"	X	U	12-13-17-17-20					ALL
15		23"	X	U	12-10-11-12-19					LIGHT GREY
		24"	X	U	12-11-13-12-14					
20		16"	X	U	17-9-4-5-5					
		30"	X	U	6-10-7-6-37				Note: Yellow Silts	
25		11"	X	U	38-5/5			SL	MOIST TO V. MOIST	CLAYEY SAND
										FINE (medium)
										NP
										BROWN
										Note: Gravel in no of sample
										Rounded
										Stopped Auger @ 25'
										Refused Sample @ 25'

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 OLD RIFLEJOB NO. E8463E DATE 8/5/51LOG OF TEST BORING NO. A4RIG TYPE CME-55 (203)BORING TYPE 6" HSA

SURFACE ELEV. _____

DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		26"	X	T				CL	DRY	SANDY CLAY
		27"	X	T				SP		LO PE
5		27"	X	T						LITE BROWN
		29"	X	T						(COVER MATERIAL)
10		26"	X	T						SAND W/ TRACE CLAY / SILT
		27"	X	T						NP
15		0"	X	T	N.R.					FINE
		14"	X	U	4-2-2-2-3				V. MOIST (SOME SLIMES)	GALEY
		?	X	U	5-5-6-4-3					
		15"	X	U	3-2-2-6-5			CL	moist to	TAILINGS
25		26"	X	U	19-23-27-25-26			GP	V. moist -	SUBBASE
									SATURATED	Clay
30										Some sand
										NP - 1/2 PE
										black
										Not plant material present
										SANDY GRAVEL
										ROUNDED
										NP
										BROWN
										STOPPED SAMPLER @ 27 1/2

GROUND WATER

DEPTH	HOUR	DATE
10.0	5:32	8/1/51

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Old RifleLOG OF TEST BORING NO. AJOB NO. EBI-63E DATE 8/9/81RIG TYPE CME-55 (203)
BORING TYPE 4 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		19"	X	u	6-7-7-12-17			CL SP	DRY	SANDY CLAY LO PI LIGHT BROWN (LOWER MATERIAL)
5		23"	X	u	8-11-15-16-18				Note: Pinkish Dry to S. moist	
		18"	X	u	17-13-11-9-14					SAND w/TRACE CLAY/silt PREP FINE NP LIGHT GREY, BROWN
10		20"	X	u	8-16-32-26-19					
		16"	X	u	13-15-10-11-12					
15		22"	X	u	10-11-17-17-15					
		20"	X	u	7-8-9-10-17					
20		21"	X	u	6-8-12-9-11				NOTE: SOME V. MOIST	
		16"	X	u	9-6-8-6-4					TAILING SUBBAS
25		12"	X	u	6-7-8-8-10			SC	MOIST	CLAYEY SAND PREP FINE NP to low PI BROWN
		2"	X	u	4-29-50/2"					
30										SAMPLER REFUSED @ 21

GROUND WATER

DEPTH	HOUR	DATE
23.9	10:45	8/9/81

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT 012 R.F.CJOB NO. 581-635 DATE 8/9/81LOG OF TEST BORING NO. A-E

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	8-8-10-10-10			CL	DRY	SANDY CLAY
			15"	X	22-17-16-14-12			SP	DRY TO S. MOIST	LOW PI LIGHT BROWN (COVER MATERIAL)
5			0"	X	NR					
			0"	X	20-16-16-13-15			NR		SAND W/ TRACE CLAY / SILT PREO FINE NP LIGHT GREY & BROWN
10			19"	X	3-5-6-8-11					
			24"	X	7-10-14-16-17					
15			24"	X	10-7-7-8-10				MOIST	
			8"	X	8-7-7-6-9					
20			15"	X	7-8-5-5-5					
			?	X	4-10-6-9-11			SP	V. MOIST	TAILING SAND W/ SOME CLAY SUBS. UP TO LO PI BROWN
25			NR.	X	2-22-50/5					
30										Refused Auger & Sampler @ 26'5"

GROUND WATER

DEPTH	HOUR	DATE
21.0'		8/9/81

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Old RifleLOG OF TEST BORING NO. 6JOB NO. EBH-63E DATE 8/10/81RIG TYPE CME-SS (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										
		24"	X	U	12-10-10-9-13			SP	DRY TO S. MOIST	SANDY CLAY
		19"	X	U	5-8-7-4-5				S. MOIST	LQ PI
5		21"	X	U	?					LIGHT BROWN (LOOER MATERIAL)
		16"	X	U	20-20-20-17-18					SAND W/TRACE CLAY / SA
10		19"	X	U	10-8-7-8-12					FINE FINE
		20"	X	U	8-9-13-16-17					NP
15		21"	X	U	7-8-9-11-16					LIGHT GREY
		?	X	U	8-11-12-13-14			SL	MOIST	CLAYE. SAND
20		12"	X	U	4-6-31-45-50/4			GP	V. MOIST TO SATURATED	trace silt FINE BROWN
25										SANDY GRAVEL
										Round
										NP
										BROWN
										REFUSED AUGER @ 22

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

REGISTERED PROFESSIONAL ENGINEERS

PROJECT Old RifleJOB NO. E8163E DATE 8/9/81LOG OF TEST BORING NO. C-5RIG TYPE CME-55 (203)BORING TYPE 6 1/2" TSA

SURFACE ELEV. _____

DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		20"	X	U	3-2-6-5-2			CL	DRY	SANDY CLAY
		24"	X	U	7-4-7-10-14			SP	DRY TO S. MOIST	LO PI LITE BROWN (COVER INTER. HILL)
5		23"	X	U	19-10-9-15-19					SAND W/TRACE CLAY/SIL
		10"	X	U	9-10-14-14-13					RED FINE NP
10		0"	X	U	10-17-27-32-24			NR.		LIGHT GRAY
		18"	X	U	26-23-25-25-24					
15		12"	X	U	17-12-15-13-16					
		27"	X	U	10-11-13-13-21					
20		0"	X	U	16-13-8-9-14			NR.	MOIST TO V. MOIST	CLAYEY SAND
			X	U	36-50/4"			SL		NP FINE BROWN
25										STOPPED AUGER @ 20' REFUSED SAMPLE @ 23'4"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

LOG OF TEST BORING NO. 4

REMARKS

VISUAL CLASSIFICATION

REMARKS	VISUAL CLASSIFICATION
DRY TO MOIST S.M. 159	SANDY CLAY LOW PI LIGHT BROWN
	SANDY / TAPEL CLAY / FRED FINE NP LIGHT GREY
MOIST	TAILING SUBGRADE CLAYEY SAND FINE NP BROWN
	REFUSED SAMPLER @ 1. (Kept going to 19', w Sample for R+D.)

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

JOB NO. E8463E DATE 7/18/81

LOG OF TEST BORING NO. D-5

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							CL	DRY	SANDY CLAY
5		23"	T				SP	S. MOIST	LOW FT LIGHT BROWN (COVER MATERIAL)
		28"	T				?		
		22"	T				SP	S. MOIST	SAND w/ FINE CLAY / SHT FINE
10		7"	X	21-22-23-29-37				Note: BROWNSH TO GREYISH	NP LIGHT GREY w/SOME WHITE
		14"	X	19-21-20-24-27					NOTE: White Chalky material
15		26"	X	18-21-28-30-23					2
		24"	X	55-77-8			CH	MOIST	
		5"	X	47-2 50 5 1/2			SC		SAND w/TRACE CLAY / SHT FINE NP GREENISH BROWN
20								MOIST	CLAY MED TO HI PE BLACK & BROWN CLAYEY SAND FINE NP BROWN
									REFUSED ALLOW @ SAMPLER @ 18' 9 1/2"

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

LOG OF TEST BORING NO. 2

RIG TYPE CME-55 (203)
BORING TYPE 6 1/2 175A
SURFACE ELEV. _____
DATUM _____

Anger Refusal @ 15'
Scamper " @ 13'1."

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWIT

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT OLD RIFLEJOB NO. EB-63E DATE 8/18/81LOG OF TEST BORING NO. D-3

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	u	8-12-17-14-6			GL
		4"	X	u	50/5"			SP
5								
		24"	X	u	4-7-16-13-17			
		20"	X	u	12-7-7-8-11			CL
10								SC
		16"	X	u	6-6-9-10-11			
		14"	X	u	6-6-11-50/2"			
15								
20								

RIG TYPE CME-55 (203)BORING TYPE S 1/2 HSA

SURFACE ELEV. _____

DATUM _____

REMARKS

VISUAL CLASSIFICATION

DRY

SANDY CLAY W/TRACE ORG. LO PI.

LIGHT BROWN
(LOWER MATERIAL)

S. MOIST

SAND W/TRACE CLAY/SILT
FINENP
LIGHT GREYMOIST
TO
V. MOISTCLAY W/ SOME SAND
LO-MED PI
BROWNTAIL
SubbCLAYEY SAND
FINE
NP to lo PI
BROWN

AUGER REFUSED @ 15'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT 210 Rifle
 JOB NO. EBH63E DATE 8/18/81

LOG OF TEST BORING NO. 2

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

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			23"	X	37-32-5			CL	DRY	SANDY CLAY
			26"	X	5-5-6-7-9			SP		LOW PI
5			14"	X	32-9-8-11-16				DRY TO 5% MOIST	LIGHT BROWN (COVER MATERIAL)
			22"	X	13-15-18-20-23					SAND W/ TRACE CLAY / SIL FINE
10			NR	X	45-50/4 1/2" N.R.					UP
			16"	X	3-11-50/4 1/2"			CH	MOIST	LIGHT GRAY & BROWN
15										TAILED
										SUB
20										CLAY W/ TRACE SAND & HIDE
										BLACK & BROWN
										Auger Refused @ 14
										Sampler ' @ 13'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT Old RifleJOB NO. ED-163E DATE 8/18/81LOG OF TEST BORING NO. D-1RIG TYPE CME-55 (203)BORING TYPE 6 1/2" MSA

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	u	4-4-8-12-4			CL	DRY	SANDY CLAY
		18"	X	u	4-10-8-11-13			SP	DRY TO	LOW PL
5		20"	X	u	5-5-5-4-6				S. MOIST	LIGHT BROWN (COVER HINDERING)
		18"	X	u	5-6-8-15-16					SAND w/ TRACE CLAY SILT
10		0"	X	u	16-17-21-22-42			NR		NP
		27"	X	u	9-13-17-19-20					LIGHT GREY
15		23"	X	u	4-5-6-13-50/5"			SP	MOIST	TAILINGS SURFACE
										SAND w/ SOME CLAY
										FINE
										NP
										BROWN
										Note: Gravel & cobbles in nose
										REFUSED SAMPLER @ 17'

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. 2.44" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

PROJECT Old Rifle
 JOB NO. EB-63E DATE 8-18-81

LOG OF TEST BORING NO. 1

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

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		26"	X	U	5-15-9-8-7			CL	DRY	SANDY CLAY
		2"	X	U	3-4-7-7-9			SP	DRY	LOW PI
5		20"	X	U	7-5-6-6-8				TO S. MOIST	LIGHT BROWN (COVER MATERIAL)
		15"	X	U	?					SAND W/ TRACE CLAY / SP
10		17"	X	U	8-5-6-7-11					FINE NP
		24"	X	U	8-7-8-12-10					LIGHT GREY & BROWN
15		20"	X	U	5-5-7-11-13			SP	moist	SAND W/ SOME CLAY (TAIL)
		20"	X	U	7-7-7-9-11					FINE SUBC
20		4"	X	U	5-5-7-9-11					NP REDDISH BROWN
										Note: SOME COBBLES IN 1' OF SAMPLER
25										REFUSED SAMPLER @ 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

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT 01Q Rifle

JOB NO. BB-63E DATE 8-18-81

LOG OF TEST BORING NO. C-6

RIG TYPE CME-55 (203)

BORING TYPE 6 1/2 HSA

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.

11. 2" 0 0 2 42" 1 0 4.42 complete

SERGEANT, HAUSKINS & BECKWITH

PROJECT Old Rifle
 JOB NO. EB-63E DATE 8/18/81

LOG OF TEST BORING NO. 1

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

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			X		4 6-5-4-6-6			CL	dry	SANDY, clay Low P.F. Lt brn.
5			X		4 5-5-6-10-13				S. moist	
			X		4 22-9-9-11-13			SP	(greenish)	clayey, silty, sand fine NP Lt grey
10			X		4 9-11-11-13-14					
			X		4 3-8-11-12-14					
			X		4 10-10-11-13-15					
15			X		4 2-1-3-4-9					TAILING SUBSTR
			X		4 2-3-2-3-3					SAND w/clay NP fine brown
20			X		4 3-6-6-5-8				moist	
			X		4 7-8-9-10-13			SP		
25			X		4 16-22-35-50/5"				SATURATED	(Note: gravel & cobbles last 6')
30										sampler refusal @ 26' 11"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger cuttings. B - Block sample

S. ☒

SERGEANT, HAUSKINS & B

JOB NO. E81-63E DATE 8/18/81

LOG OF TEST BORING NO. B-6

BORING TYPE 6'2 HSA

SURFACE ELEV.

DATUM.

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT Old R-10 Tail Pond
 JOB NO. EP-032 DATE May 81

LOG OF TEST BORING NO.

RIG TYPE CME 75 (206)
 BORING TYPE 6" - 20"
 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		28'	X	U6-7-6-7-11				SP	dry	Silt
5		20"	X	U10-11-12-13-14					sl. moist	trace clay / trace sand
		7"	X	U13-14-21-23-25						Lo. FZ
10		18"	X	U12-13-12-14-15						Sand
		20"	X	U19-21-17-16-19						trace silt / fine to med. sand
15		21"	X	U13-18-20-16-19						NP
		8"	X	U5-4-5-5-4						medium
20		6"	X	U1-1-1-1-1					dry	
		20"	X	U3-2-3-18-50/ft					v. moist	Clay
25										some gravel / some sand
										H. FT / pipe
										* Auger stopped @ 15'
										Sampler refused @ 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.

SERGEANT, HAUSKINS & BECKWIT

LOG OF TEST BORING NO. AG

BORING TYPE 502-5A

SURFACE ELEV.

DATUM.

GROUND WATER		
DEPTH	HOUR	DATE
N/A		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT

JOB NO.

DATE

LOG OF TEST BORING NO. 2

RIG TYPE

BORING TYPE

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification
0								
		30"	X	U	7-11-9-10-17			ML SP
		18"	X	U	10-8-10-10-10			
5		22'	X	U	7-7-8-7-8			
		22"	X	U	9-8-5-4-4			
10		19"	X	U	3-3-2-4-5			
			X	U	10-5-7-6-9			SC
15			X	U	10-8-8-10-25			SP
20								
25								

REMARKS

VISUAL CLASSIFICATION

V. 1

mud

f-8

mud

V mud

S -
fine clay,
LO PT
brownSand
fine &
well sorted
NP
grayClay, sand
NP
brownSand
fine clay,
fine gravel
NP
brownAuger stopped @ 15'
Sampler stopped @ 1'TAI.
SUB

GROUND WATER

DEPTH	HOOR	DATE
W0A'E		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT

LOG OF TEST BORING NO.

RIG TYPE

BORING TYPE

SURFACE ELEV.

DATUM.

Depth in Feet

**Continuous
Penetration
Resistance**

Graphical Log

Sample

Sample Type

**Blows per foot
140 lb. 30" free-
fall drop hammer**

Dry Density
Lbs. per cu. ft.

Moisture Content
Per Cent of Dry Wt.

Unified Soil Classification

REMARKS

VISUAL CLASSIFICATION

Dry

S. 12
Trace sand
to PI
beginning

U.S. DEPT. OF AGRICULTURE

Clay
trace silt
H. H.
purple

100

37

1010; c-Δ

Sand
trace silt
fine grained
nit

Serial	Particulars	Debit	Credit	Balance
1	By Balance b/d			
2	To Balance b/d			
3	By Balance b/d			
4	To Balance b/d			
5	By Balance b/d			
6	To Balance b/d			
7	By Balance b/d			
8	To Balance b/d			
9	By Balance b/d			
10	To Balance b/d			
11	By Balance b/d			
12	To Balance b/d			
13	By Balance b/d			
14	To Balance b/d			
15	By Balance b/d			
16	To Balance b/d			
17	By Balance b/d			
18	To Balance b/d			
19	By Balance b/d			
20	To Balance b/d			
21	By Balance b/d			
22	To Balance b/d			
23	By Balance b/d			
24	To Balance b/d			
25	By Balance b/d			
26	To Balance b/d			
27	By Balance b/d			
28	To Balance b/d			
29	By Balance b/d			
30	To Balance b/d			
31	By Balance b/d			
32	To Balance b/d			
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87	By Balance b/d			
88	To Balance b/d			
89	By Balance b/d			
90	To Balance b/d			
91	By Balance b/d			
92	To Balance b/d			
93	By Balance b/d			
94	To Balance b/d			
95	By Balance b/d			
96	To Balance b/d			
97	By Balance b/d			
98	To Balance b/d			
99	By Balance b/d			
100	To Balance b/d			

Sancti
pau
NP

12.4.2027

Angel stopped @ 15'
Samples refuse @
17'10"

GROUND WATER

DEPTH
119'

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH
CONSULTING GEOTECHNICAL ENGINEERS

PROJECT Old Rifle
 JOB NO. EB163E DATE 8/11/81

LOG OF TEST BORING NO. 2

RIG TYPE CME-55 (203)
 BORING TYPE 6'2 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		19"	X	S	2-3-3			CL	S. moist	SANDY CLAY LOW PI LIGHT BROWN (COVER MATERIAL)
5		0"	X	T	N.R.			SP	Note: lens of light grey sand	
		12"	X	C	6-5-4					SAND w/ TRACE CLAY, FINE N.P. LIGHT GREY
10		16"	X	C	3-5-8					
15		18"	X	S	1-1-1			SP	MOIST TO V. MOIST	SILTY SAND (SUMES) LO-MAL PI FINE GREY
20			X	C	1-2-2				MOIST	TAIL SUBBASE
25										
30										REFUSED AUGER 2'

GROUND WATER

DEPTH	HOUR	DATE
21' 0"	2:00	8/11/81

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT Old RifleJOB NO. BLG3E DATE 8/11/81LOG OF TEST BORING NO. 20

C59

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		14"	X	C 3-5-B				CL-SP	S. MOIST S. MOIST	SANDY CLAY Lo PI LIGHT BROWN (COVER MATERIAL)
5		16"	X	C 9-5-4						SAND W/TRACE CLAY/SILT FINE NP LIGHT GREY
10		27"	X	T						
15		16"	X	C 5-4-6						
20		27"	X	T				SE	Plug moist	CLAYEY SAND FINE NP BROWN
25										Refused Auger @ 22'9"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT 010 P.F.I.EJOB NO. BRIDGE DATE 5/11/81LOG OF TEST BORING NO. 20RIG TYPE CME-55 (203)BORING TYPE 6" HSA

SURFACE ELEV. _____

DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		19"	☒	S	2-3-5			CL SP	DRY TO S. MUDY	SANDY CLAY LOW PL LIGHT BROWN (COARSE GRAINED)
5		19"	☒	S	4-7-9					SAND W/ TRACED CLAY/SILT FINE NP LIGHT GREY
10		18"	☒	S	4-5-6					
15		8"	☒	C	7-3-5					TAILING SUBBASE
		0"	☒	T	N.R.					
		8"	☒	T	(12")					
20										
25										AUGER REFUSE @ 19'9"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT Old Rifle
 JOB NO. BF-638 DATE 8/11/81

LOG OF TEST BORING NO. 2

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

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		6"	X	C 3-4-8				CL SP	S. moist	SANDY CLAY LOW PI LIGHT BROWN (COVER MATERIAL)
5		12"	X	C 4-8-8						SAND W/TRACE CLAY / SCL FINE NP LIGHT GREY
10		27"	X	T					moist	
15		0"	X	C 7-2-2						
20									plug	
25										Auger Refused @ 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.

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT CIA RIFLEJOB NO. E81-63E DATE 8/11/81LOG OF TEST BORING NO. C56
201

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>E - HSP</u>	SURFACE ELEV. _____
									DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
0		19"	X	S4-5-6				CL SP	DRY TO MOIST	SANDY CLAY LOW PI LIGHT BROWN (COVER MATERIAL)
5		14"	X	S4-4-7					S. MOIST	
10		4"	X	C14-9-6					MOIST	SAND WITH CLAY / SILT
15		10"	X	C7-2-3				SC	MOIST TO V. MOIST	TAILINGS SUBBASE CLAYEY SAND FINE NP BROWN
20										PIPER REFUSE @ 18'

GROUND WATER

DEPTH	HOUR	DATE
<u>NONE</u>		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Old Rifle
 JOB NO. EB163E DATE 8/10/81

LOG OF TEST BORING NO. 2

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

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		16"	X	S 2-4-5				CL SP	DRY TO S. MOIST	SANDY CLAY
5		16"	X	S 6-7-8					S. MOIST	LO PI LIGHT BROWN (COVER MATERIAL)
10	8/10	0"	X	C 9-9-7						SAND w/ TRACE CLAY / SI
	8/11	12"	X	C 12-12-13						PREP FINE NP LIGHT GREY
15		22"	X	T					MOIST	
20		16"	X	C 9-3-6					plug	TAILING SUBBAS.
										Auger Refused @ 23'

GROUND WATER

DEPTH	HOUR	DATE
None		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH, INC.

PROJECT Old Rifle
 JOB NO. EBH3E DATE 8/10/81

LOG OF TEST BORING NO. 201

CS9

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		16"	X	S	2-8-10			CL SP	DRY TO S. MOIST	SANDY CLAY
5		26"	X	T					S. MOIST	LO-PI LIGHT BROWN (COVER MATERIAL)
10		15"	X	C	11-12-17					SAND WITH FINE PIE & FINE RP LIGHT GREY
15		17"	X	S	6-6-11			SC	MOIST TO V. MOIST	CLAYEY SAND SUBGAS FINE LO PI BROWN
20										Auger Refused @ 18'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT OLD KEEF
 JOB NO. EBK63E DATE 5/1/77

LOG OF TEST BORING NO. 2

RIG TYPE CME-55 (203)
 BORING TYPE 3" DIA
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			☒ S	1-3-10				CL	S MIST TO 10' 10" 10' 10"	SANDY CLAY LOW TO LIGHT BROWN
5			☒ S	2-4-8					10' 10" TO 10' 10"	
10										SANDY TO CLAY FINE LIGHT BROWN
										CLAY W/ TRACE SAND MED FINE CHALKY CLAY 10' 10" CLAY & SAND (4") (SATURATED)
										Range between @ 7 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.

SERGEANT, HAUSKINS & BECKWITH

PROJECT Old Rifle
 JOB NO. EB/63E DATE 7/11/81

LOG OF TEST BORING NO. 203

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		19"	☒ S	3-4-6				CL	Pay to S. moist	SANDY CLAY WITH TRACE OF LOW PI LIGHT BROWN (COVER HATER...)
5		9"	☒ T						S. moist	SAND W/TRACE CLAY / SIL FINE NP LIGHT GREY
10		18"	☒ C	8-4-5						
15		18"	☒ S	6-9-12				SP	MOIST	TAILINGS SUGAR
20		0"	☒ S	2-1-1				N.R.	Note: more clay dark brown (from cuttings)	SAND W/TRACE CLAY FINE (coarser than test) NP Rusty Brown
										Auger Refusal @ 22'0"

GROUND WATER

DEPTH	HOUR	DATE
20.5'	4:00	7/11/81

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

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT Old Rifle
 JOB NO. EBH63E DATE 8/11/81

LOG OF TEST BORING NO. 2

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

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		18"	X	S	4-2-2			CL	S. moist	SANDY CLAY LOW PI LIGHT BROWN (COVER MATERIAL)
5		28"	X	T						
10		17"	X	S	3-2-2					SAND w/TRACE CLAY / PRE FINE NP LIGHT GREY
15		0"	X	T	NO RECOVERY				note: slight purple tint	
20										Auger Refused @ 20'
25										

GROUND WATER

DEPTH	HOUR	DATE
13.0'	17:35	8/11/81

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT W. C. RICE JR. / 1981
 JOB NO. EPI-03E DATE 8/11/81

LOG OF TEST BORING NO. 210 ^{CSC}

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		17"	☒	S	3-4-7			CL SP
5			☒	S	5-4-6			
10		26"	☒	T				
15			☒	C				
20			☒	C				
25								
30								

RIG TYPE CHIEF 55 (203)
 BORING TYPE 1.5" I.D.
 SURFACE ELEV. _____
 DATUM _____

REMARKS	VISUAL CLASSIFICATION
S. MOIST S. MOIST	SANDY CLAY LOW P LIGHT BROWN (COULD BE MOISTURE)
MOIST	SAND WITH CLAY / SILT FINE NP LIGHT GREY
	AUGER REFUSED @ 24'

GROUND WATER

DEPTH	HOUR	DATE
<u>NONE</u>		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

ADDENDUM D5.7

MSRD BORING LOGS, NEW RIFLE

PROJECT NIEN RIFLELOG OF TEST BORING NO. CJOB NO. EBI-63F DATE 8/19/81RIG 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								SP	S. MOIST	SAND w/ TRACE SILT
		24"	X		u 12-5-7-8					FINE
		19"	X		u 7-12-14-14-14					NP
5										PURPLE
		20"	X		u 8-10-10-11-15				NOTE:	
		21"	X		u 9-9-11-15-19				LIGHT GREY & BROWN & PURPLE	
10		24"	X		u 10-8-10-12-17					
		20"	X		u 9-10-11-14-17					
15		21"	X		u 7-5-7-10-12					X
		24"	X		u 9-8-11-24-26					Auger Refusal @
20		19"	X		u 18-20-20-23-23					Sampler refusal @ 48'6"
		19"	X		u 12-16-22-22-23					
25		0"	X		u 15-18-22-2-20			N.R.		
		17"	X		u 17-29-33-26-28					
30		18"	X		u 14-17-20-19-20					
		18"	X		u 10-10-11-15-19					
35		23"	X		u 7-3-10-11-13				NOTE: Lenses of clayey Purple S.	
		19"	X		u 9-8-9-15-25			CLAY	moist	CLAY & SANDY CLAY (S.
40		24"	X		u 16-18-20-25-27			SP	S. MOIST	LO - 14% PI
		22"	X		u 14-13-17-18-19					Purple & brownish
45		24"	X		u 10-10-19-16-19					SAND w/ TRACE SILT
			X		u 10-35-[50%]			SP		FINE
50										NP
										DRY

GROUND WATER

DEPTH	OUR	DATE
NONE		

SAMPLE TYPE

A - Auger cuttings. B - Block sample
S - 2" O.D. 1.38" I.D. tube sample. - SEE A P. 22
SERGENT, HAUSKINS & BECKWITH

PROJECT New Rife Tailings
 JOB NO. ERI-03F DATE 8/19/81

LOG OF TEST BORING NO. CZ

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		29"	X	U 1-1-2-3-2				SP
5		22"	X	U 3-5-5-10-12				
		25"	X	U 7-6-9-15-9				
		23"	X	U 9-7-6-11-15				
10		21"	X	U 7-8-9-14-14				
		24"	X	U 8-10-10-13-14				
15		22"	X	U 10-9-12-18-16				
		21"	X	U 11-11-18-13-16				
20		24"	X	U 7-8-11-15-17				
		16"	X	U 15-13-10-12-8				
25		25"	X	U 4-2-4-8-15				
		22"	X	U 10-10-11-13-16				
30		6"	X	U 11-10-4-14-14				
		20"	X	U 14-18-19-18-18				
35			X	U 4-7-12-10-10				
			X	U 15-14-14-10-16				CH
40			X	U 8-16-12-11-11				
			X	U 9-13-13-9-29				
45			X	U 14-15-16-17-17				SP-SM
			X	U 10-13-13-17-20				

RIG TYPE CME 75 (206)
 BORING TYPE 6 1/2" - SA
 SURFACE ELEV. _____
 DATUM _____

REMARKS	VISUAL CLASSIFICATION
sl. moist	Sand trace silt pud. fine grain NP grey [Note: purple below 5'] [Note: sandy clay lenses @ 18'] [Note: very moist below 34']
	Clay H.P.F. grey-purple
	Silty clay med. PE black-purple tailings subbase
	Silty Sand pud. fine grain

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 1/4" O.D. 2 1/4" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

JOB NO. FEI-62E DATE 9/19/81

LOG OF TEST BORING NO. 4

BORING TYPE 6": 5

SURFACE ELEV. _____

DATUM _____

[illegible]

REMARKS

VISUAL CLASSIFICATION

Very moist

$$Ni^{2+}$$

Huger stopped @ 50'
Sample returned @ 51'

GROUND WATER

SAMPLE TYPE

DEPTH	HOUR	DATE
NONE		

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT NEW RIFLE
 JOB NO. EB1-63F DATE 8/19/81

LOG OF TEST BORING NO. C-3

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

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		22	X	u	7			SP	DRY TO S. MOIST	SAND w/TRACE SILT FINE NP PURPLE
5		20	X	u	4-4-4-5-7					
		24	X	u	6-3-5-7-4				Note: LAVENDER	
10		21	X	u	6-7-7-8-12					
		22	X	u	10-12-13-14-14				Note: GREY	
		26	X	u	8-8-11-11-15					
15		24	X	u	8-10-13-16-16					
		21	X	u	9-7-8-10-11					
20			X	u	7-6-6-8-1					
		27	X	u	4-4-6-8-5					
25		24	X	u	5-5-5-7-9					
		26	X	u	6-5-6-10-11				Note: BROWNISH	
30		27	X	u	7-9-12-11-12					
		24	X	u	6-6-7-8-11					
35		22	X	u	7-8-7-9-11				MOIST	CLAY HI PI OCCASIONAL LENSES OF SAND GREYISH
		24	X	u	6-5-6-7-9				MOIST TO V. MOIST	TAILINGS SUBBASE SANDY CLAY LO-MED PI BROWN
40		25	X	u	5-7-9-9-10					
		30	X	u	7-8-12-12-18			CH		
45		30	X	u	11-13-15-19-31				MOIST	CLAYEY SAND FINE NP BROWN
		16	X	u	21-25-24-24-27			CL SC	V. MOIST	
50										

GROUND WATER		
DEPTH	HOUR	DATE

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.

5 ft Auger 4 1/2 ft Sand
 SERGENT, HAUSKINS & BECKWITH

PROJECT New Rock Tailings
 JOB NO. ESP/CEE DATE 8/1/91

LOG OF TEST BORING NO. C-4

RIG TYPE CME 75 (206)
 BORING TYPE 6' 2" SCA
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
5			22"	X	2-3-4-5-9			SP	sil. mc	Sand
			21"	X	8-9-10-6-12					trace -
			20"	X	4-7-12-12-14					fine brown sil
				X	7-7-8-10-12					NP
10			21"	X						{Note: changes to sil.
			23"	X	7-7-12-13					@ 7-8'}
15			21"	X	12-11-14-17-11					
			22"	X	10-8-7-11-11					
20			23"	X	6-9-10-13-13					
			22"	X	13-14-15-20-18					
25			22"	X	13-15-13-12-15					
			21"	X	12-15-20-15-16					
30			20"	X	33-13-10-15-14					
			21"	X	14-11-11-15-14					
35			22"	X	8-11-9-13-10					{Note: saturated lenses
			20"	X	6-8-10-12-16					@ 30'}
40				X	10-10-12-14-13			CH	v. moist	Clay
			7"	X	10-8-23-50/3 1/2"				plug	hi PE
45			22"	X	12-10-1-15-30			CH	v. moist	purple
				X	8-10-50/4"					tailings
										subbase
										Clay
										fine sand
										hi PE
										brown

LOG OF TEST BORING NO. 4

[illegible]

VISUAL CLASSIFICATION

Auger stopped @ 45'
Sample is from
@ 48' 10"

SERGEANT, HAUSKINS & BECKWITH

PROJECT NEW RIFLEJOB NO. EB163F DATE 8/20/81LOG OF TEST BORING NO. C-1RIG 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									S. MOIST	SAND W/ TRALE SILT
		23"	X	u	1-9-14-19-20					FINE
		14"	X	u	14-14-11-13-17					NP
5										PURPLE
		20"	X	u	4-5-5-6-6					
		20"	X	u	5-6-11-15-16"					
10									Note: GREY	
		22"	X	u	8-9-7-13-18					
		22"	X	u	11-10-14-21-21					
15										
		23"	X	u	10-12-14-18-18					
		24"	X	u	10-10-13-23-31					
20										
		22"	X	u	16-14-13-17-25					
		23"	X	u	15-12-13-21-31					
25										
		21"	X	u	18-16-18-19-22					
		21"	X	u	15-17-20-20-21					
30										
		23"	X	u	11-8-9-12-16					
		22"	X	u	11-10-11-12-16					
35										
		21"	X	u	9-10-12-11-16					
		22"	X	u	13-11-15-11-17					
40										
		22"	X	u	15-11-13-32-36					
		25"	X	u	20-27-30-35-35					
45										
		24"	X	u	14-19-23-29-23					
			X	u	7-15-22- [50/41.2]					
50										

MOIST

MOIST

TAKINGS

CLAYEY SAND SUBBASE
FINE
NP to 10 PI
BROWNREFUSED SAMPLE @ 44'
" Auger @ 49'

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.

SERGENT, HAUSKINS & BECKWITH

PROJECT NEW R.C. TO PACE
 JOB NO. 91-03-F DATE 5-20-61

LOG OF TEST BORING NO. 206

RIG TYPE CME 75
 BORING TYPE 3" - 10' - 10'
 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										

DEPTH	HOUR	DATE
100		

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.

SERGEANT, HAUSKINS & BECKWIT

sl. moist

Sand
 Some s. &
 fine
 NP
 sh.

(Note: clay lenses
 @ 24')

moist

moist

Clayey Sand
 trace s. &
 to PE

Auger stopped @ 45'
 Sample refused @ 45'

PROJECT New Rifle
 JOB NO. E81-63F DATE 8/20/81

LOG OF TEST BORING NO. C'

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		21	X	4	1-2-3-3-5			SP	dry to s. moist	sand w/ trace of silt
		22	X	4	3-5-7-7-9					fine NP grey
5		22	X	4	5-4-4-5-7					
		24	X	4	4-4-5-6-10					
10		22	X	4	6-10-14-22-22					
		22	X	4	?					
15		27	X	4	6-8-10-10-14					Note: Lenses of clay @ 18
		24	X	4	8-8-7-6-14					
20		26	X	4	11-13-15-16-17					
		22	X	4	7-8-10-11-12					Note: lens of coarse granular
25		26	X	4	6-9-13-18-21					
		22	X	4	10-11-12-14-15					Note: 12" lense of purple HZ clay
30		25	X	4	7-7-7-13-16				Note: brown	HZ PI clay (sandy clay)
		11	X	4	8-7-6-6-10				Note: 3" lense of	
35		29	X	4	8-9-11-13-15					
		22	X	4	6-8-11-12-15					Clay med pt. to high brown to purple
40		20	X	4				CL-CH		TAILING SUBSTR
		26	X	4	10-15-18-20-17					Clayey SAND fine Low to med pt. brown
45		24	X	4	5-6-10-13-17			SC		
		0	X	4	5-9 50/1"					sampler refusal @ 48' 7"

GROUND WATER

DEPTH	HOUR	DATE
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SAMPLE TYPE

A - Auger cuttings. B - Block sample

SERGEANT, HAUSKINS & BECK

PROJECT New Rte To Bridge
 JOB NO. EP1-125 DATE 8/20/91

LOG OF TEST BORING NO.

RIG TYPE CME 75 (206)
 BORING TYPE 6" x 42" SSB
 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								A	sl. moist	Sand
5		30"	X	T						some s -
		25"	X	T						and fine grain sand
		26"	X	T						Slightly shaded red
		25"	X	T						NP
10		18"	X	T						grey - purple
		25"	X	T						[Note: saturated clay lenses @ 19']
15		24"	X	T						
		23"	X	T						
20		24"	X	T						
		26"	X	T						
25		27"	X	T					moist	
		28"	X	T						
30		15"	X	T						[Note: saturated clay lenses @ 25'-30']
		23"	X	T						
35		22"	X	T						
		24"	X	T						
40		14"	X	T						
		20"	X	T	U 15-16-14-11				plug	tail
45		22"	X	T	U 10-16-16-18-16			SC	moist	Chacey sand subbr
		5"	X	T	SSU 50/50					some silt
										NP
50										Auger stopped @ 45'
										Sample removed @ 45'

GROUND WATER		
DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample. ☒ S

SERGEANT, HAUSKINS & BECKWITH

PROJECT New Rifle
 JOB NO. EB1-63F DATE 8/20/81

LOG OF TEST BORING NO. C-

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 1/2" HSA</u> SURFACE ELEV. _____ DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
0								SP	dry to s. moist	silty, SAND fine NP purple to gray
		22	X	4	1-3-6-7-9					
		24	X	4	10-10-11-12-14					
5		22	X	4	7-7-12-14-20					
		17	X	4	10-12-14-14-16					
10		19	X	4	12-14-17-18-19					
		20	X	4	10-11-14-13-14					
15		19	X	4	12-6-10-14-16					
		24	X	4	10-9-13-17-19					
20		22	X	4	10-9-10-14-17					
		27	X	4	10-10-12-14-17				Note: tense of silt slimes	
25		24	X	4	9-9-11-15-21					
		24	X	4	12-11-12-13-16					
30		22	X	4	15-11-12-16-16					
		19	X	4	9-9-11-14-16					
35		21	X	4	8-8-9-12-12					
		20	X	4	7-11-15-16-16					
40		21	X	4	12-13-17-18-22					
		22	X	4	13-12-19-23-25					
45		20	X	4	11-11-9-15-14					
		NR	X	4	50/3"					
50										

Note: tense of silt slimes

TAILING
SUBBAS

clayey, SAND
some organics
fine
Low p.I.
Brown

Note: gravel & cobbles

moist

sampler refused @ 47' 9"
auger refused @ 49' 0"

GROUND WATER

DEPTH	HOUR	DATE
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SAMPLE TYPE

A - Auger cuttings. B - Block sample

SERGENT, HAUSKINS & BECK

LOG OF TEST BORING NO. C-11

RIG TYPE CME-55 (203)
BORING TYPE 62 552
SURFACE ELEV. _____
DATUM _____

RIG TYPE CME-SS (203)								
BORING TYPE G-1 WSP								
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
0		22"	X	G-1-47-7-9				SP
		19"	X	G-1-?				
5		20"	X	G-1-7-10-13-16-21				
		16"	X	G-1-13-13-16-19-20				
10		19"	X	G-1-14-16-21-21-19				
		20"	X	G-1-13-11-13-13-13				
15		18"	X	G-1-8-10-11-19-22				
		20"	X	G-1-11-11-13-14-17				
20		21"	X	G-1-150				
		17"	X	G-1-100				
25		22"	X	G-1-147				
		22"	X	G-1-129				
30		20"	X	G-1-113				
		22"	X	G-1-99				
35		27"	X	G-1-72				
		18"	X	G-1-71				
40		24"	X	G-1-99				
		25"	X	G-1-98				
45			X	G-1-112				
			X	G-1-50/18"				

RIG TYPE CME-SS (203)

BORING TYPE G-1 WSP

SURFACE ELEV.

DATUM

REMARKS

DRY TO S. MOIST

Note: Grey

Note: Down Hole Hammer Used

Note: V. moist & 6" lens of silty Sand

Clayey Sand / Subbase

Sample at 45'

Sample at 49'

VISUAL CLASSIFICATION

SAND w/ TRACE SILT FINE WP PURPLE

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 New R. 1/2 Ta. 1-23
 JOB NO. ER1-123F DATE 8/21/81

LOG OF TEST BORING NO. 1

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

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		20"	X	U	3-4-4-5-8			SP	sl. moist	Sand some silt
		21"	X	U	6-5-5-10-8					Fine fine grains (NP)
5		22"	X	U	4-4-5-7-10					grey - purple
		19"	X	U	4-6-4-6-8					
10		23"	X	U	7-4-3-7-5					
		21"	X	U	8-8-8-10-12					
15		21"	X	U	28-12-9-13-15				moist	
		22"	X	U	18-22-16-14-21					
20		20"	X	U	8-7-45/18"					
		17"	X	U	9-12-5-2-1					
25		19"	X	U	9-7-7-8-9				moist	Note: saturated clay lenses @ 3
		21"	X	U	9-7-29-30-10					
30		21"	X	U	10-23-17-25-9					
		20"	X	U	79					
35		20"	X	U	86					Note: cobbles @ 47"
		20"	X	U	89					
40		19"	X	U	69					tailings subsoil
		21"	X	U	107				plug	Clayey sand trace silt med FL burning
45		20"	X	U	100/28"				moist	
		21"	X	U	21"					Auger stopped @ 45'
50										Sampler refused @ 47'

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. 2.12" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH, INC.

PROJECT NEW RIFLEJOB NO. EB-63F DATE 8/21/57LOG OF TEST BORING NO. C-1RIG TYPE CME-55

(203)

BORING TYPE 2" 152

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	1-3-5-5-7			SP	10' TO 15' DEEP	SAND W/ TRACED CLAY
		23"	X	u	7-7-7-7-9					10' FINE
5		23"	X	u	5-5-6-8-10					10' FINE
		22"	X	u	9-10-10-9-12					10' FINE
10		20"	X	u	7-8-9-10-12					10' FINE
		22"	X	u	6-8-7-10-10					10' FINE
15		25"	X	u	6-7-8-12-18					10' FINE
		24"	X	u	11-12-14-15-17					10' FINE
20		23"	X	u	12-13-17-21-21					10' FINE
		20"	X	u	11-12-14-19					10' FINE
25	8/21	21"	X	u	6-9-10-13-15					10' FINE
	8/22	24"	X	u	12-10-10-12-17					10' FINE
30		18"	X	u	12-12-14-14-20					10' FINE
		19"	X	u	11-12-13-16-19					10' FINE
35		26"	X	u	11-11-11-15-14					10' FINE
		24"	X	u	9-11-11-12-18					10' FINE
40		21"	X	u	11-12-14-24-24					10' FINE
		24"	X	u	20-18-23-27-24					10' FINE
45		26"	X	u	17-15-16-15-21					10' FINE
			X	u	11-13-13-17-17			SP		10' FINE

Note:

MOIST TO 15' DEEP

Lenses

6" lens of 1" - 2" 152

TAKEN

SUBB.

SAND W/ SOME CLAY

FINE

NO

10' OF 1" - 2" 152

FOLLOW.

REFUSED SAMPLE @ 49' 9"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT New Rte 19.1
 JOB NO. 81-63E DATE 8/21/71

LOG OF TEST BORING NO.

RIG TYPE CME 75 (206)
 BORING TYPE 6" ID
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		26"	X	U	2-3-4-5-10			ML	Dry sl. moist	Silt fine gr. Some gravel to 1"
		21"	X	U	10-7-10-9-9			SP		between cover
5		20"	X	U	4-6-7-13-10					Sand Some silt pred. fine grained slightly sandier NP
		22"	X	U	7-8-9-20-6					gr. - fine
10		20"	X	U	10-10-5-10-13				moist to very moist	[Note: natural sand and sandy cl. below 2']
		19"	X	U	11-12-8-9-12					
15		NR	X	U	8-10-13-14-10					
		19"	X	U	10-10-9-8-7					
20		19"	X	U	7-11-11-16-26				plug. very moist	
		20"	X	U	11-17-15-27-19					
25		22"	X	U	10-14-15-14-13					
		21"	X	U	12-11-2-13-10					tailin Clayey Sand Subbase
30		20"	X	U	14-12-10-11-12					Some silt NP brown {Note: cobbles @ 43 1/2'
		21"	X	U	14-12-15-11-10					
35		22"	X	U	20-19-20-23-18					
		20"	X	U	24-19-20-23-24					
40		21"	X	U	16-15-1-23-12					
		15"	X	U	10-15-50/3"					
45										Auger stopped @ 35' Sampler refused @ 43'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 H - 2" O.D. 2.43" I.D. tube sample.

SERGEANT, HAUSKINS & BECKWITH

PROJECT NEW KARE
 JOB NO. E01-63F DATE 5/10/70

LOG OF TEST BORING NO. C-1

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		24"	X	A	11-7-2-4			SP
		21"	X	A	4-4-4-8-10			
5		21"	X	A	24-8-10-14-18			
		21"	X	A	13-14-15-16-19			
10		21"	X	A	12-13-14-18-12			
		19"	X	A	9-10-11-11-13			
15		21"	X	A	8-7-11-17-19			
		19"	X	A	13-11-19-26-24			
20		21"	X	A	17-15-18-19-21			
		20"	X	A	14-11-16-19-21			
25		21"	X	A	34-22-18-19-11			
		28"	X	A	7-10-13-12-16			
30		25"	X	A	9-16-20-21-28			
		21"	X	A	16-17-19-18-19			
35		22"	X	A	12-12-16-12-14			
		23"	X	A	10-9-11-13-14			
40		26"	X	A	11-11-12-14-19			
		22"	X	A	12-13-22-24-30			
45			X	A	20-20-24-19-30			
50		0"	X	A	[50/4] N.R.			SC

RIG TYPE 200 (203)
 BORING TYPE 200
 SURFACE ELEV.
 DATUM

REMARKS	VISUAL CLASSIFICATION
DRY TO S. MOIST	SAND WITH FINE SILT FINE NP PURPLE & GREY
Note: occasional moist - U. moist CLAY LENSES	TAILINGS Subbase CLAYEY SAND FINE NP to 10' P. BROWN
	Refused at 49' 10" Sample @ 47' 10"

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 Uranium Tailings (Area 2 & 3)
 JOB NO. E81-63F DATE 9/22/77

LOG OF TEST BORING NO. (206)

RIG TYPE CME 75
 BORING TYPE FE - E81
 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	U	1-3-5-6-8			SP		
		18"	X	U	6-6-6-8-9				moist	Sand some silt med. fine grained NP gray - purple
5		19"	X	U	12-14-12-16-12					
		21"	X	U	12-14-14-12-12					Note: intermittent clay sandy clay lenses to 4'
10		20"	X	U	6-8-10-18-21					
		21"	X	U	20-12-12-15-15					Note: changes color to yellow @ 23 1/2'
15		21"	X	U	6-22-27-25-26					
		20"	X	U	9-9-16-15-13					
20		22"	X	U	20-21-13-25-18					Note: changes color to gray @ 29'
		23"	X	U	15-13-10-18-18					
25		22"	X	U	15-18-19-20-15					
		21"	X	U	10-10-10-14-15					
30		22"	X	U	22-26-25-20-18					Clay hi FE brown
		21"	X	U	15-11-5-10-9					
35		20"	X	U	9-10-7-12-9				moist to v. moist	
		22"	X	U	14-11-14-18-13					
40		21"	X	U	14-15-13-20-13			CH	v. moist	Clayey Sand trace silt trace gravel NP brown
		23"	X	U	37-23-17-20-24			SC		Note: cobbles @ 46'
45		" 14"	X		14-8-20/2"					Auger stopped @ 20' Sampler refused @ 46' 2"
50										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 H - 3" O.D. 2.43" I.D. tube sample.

SERGEANT, HAUSKINS & BECKWITH

PROJECT NEW RIFLEJOB NO. EB163F DATE 9/22/81LOG OF TEST BORING NO. C17

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		25"	X	u	2-6-6-8-7			SP
		23"	X	u	7-8-9-10-11			
5		24"	X	u	22-6-6-6-8			
		0"	X	u	5-11-11-10-7			NR
10		29"	X	u	3-6-10-15-16			
		24"	X	u	11-10-9-7-9			
15		24"	X	u	3-6-10-10-15			
		21"	X	u	11-11-11-14-17			
20		20"	X	u	10-10-12-14-17			
		19"	X	u	7-12-16-20-50 1/2			
25		21"	X	u	6-9-10-11-15			
		20"	X	u	7-8-9-12-14			
30		21"	X	u	9-10-11-14-19			
		19"	X	u	8-10-11-11-15			
35		20"	X	u	8-12-15-16-17			
		3"	X	u	7-9-12-14-15			
40			X	u	7-6-14-22-24			CH
			X	u	15-10-18-50 1/2			SC
45								
50								
55								
58								

RIG TYPE CME-55 (203)BORING TYPE 6. 203

SURFACE ELEV. _____

DATUM _____

REMARKS

VISUAL CLASSIFICATION

Dry to
S. moistSAND WITH TRACE SILT
FINE
NP
Purple & grey
Note: lenses of siltNote: more
6" lens of slimesNote:
more slimes

Note: Greenish

CLAY
Hi Pi
PinkishTAILIN
SubbotCLAYEY SAND
FINE
NP
BROWN

REFUSED SAMPLE @ 44'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT San Juan Talinas (Plan 8-11)
 JOB NO. 1-03F DATE 2/23/51

LOG OF TEST BORING NO. (206)

RIG TYPE 202-5
 BORING TYPE 6 1/2" - 54"
 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									sl. moist	Sand some silt - med. fine grain (NP exp. - 100 C
10										
15									moist	(Note: saturated. (cl lenses lenses < 15'
20										
25										
30										
35									plug	Clayey Sand sub trace gravel NP brown
40									moist	(Note: cobbles @ 45'
45										
50										Auger stopped @ 20' Sample recovered @ 45'

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.

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT Uranium Tailings (near R. He)
 JOB NO. FEI-103E DATE 9/22/81

LOG OF TEST BORING NO. 21

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

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			X	S	1-3-4			SM	sl most	Silty sand pred. fine gravel NP guy
5			X	S	3-3-3					Note color change to white @ 5'-8"
10			X	S	3-4-5					
15			X	S	5-5-6					
20			X	T						
25			X	S	4-6-5					
30			X	S	5-6-12					Note: ripples @ 44 1/2'
35			X	S	7-7-11					
40			X	S	8-6-7				plug	
45				S	50/0"					Auger stopped @ 45' Sampler retracted @ 45'
50										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT NEW RIFLE
JOB NO. EB-63F DATE 8/23/81

LOG OF TEST BORING NO. C1

RIG TYPE CME-55 (203)

BORING TYPE 6 1/2 HSA

SURFACE ELEV.

DATUM.

50

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

JOB NO.

UNCLASSIFIED
81-63F DATE 8/22/81

LOG OF TEST BORING NO. 1

RIG TYPE

CME 75

(206)

BORING TYPE

6 1/2" - 541

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
0								SP
2					2-6-7-10-11			
4					10-5-5-6-8			
6					10-11-9-9-9			
8					13-12-11-11-12			
10					13-12-16-12-12			
12					11-14-12-13-15			
14					11-8-11-15-15			
16					13-11-13-15-17			
18					12-11-11-16-16			
20					13-14-14-16-21			
22					10-19-17-19-12			
24					14-15-14-17-17			
26					16-17-17-16-16			
28					23-18-16-14-15			
30					16-19-11-14-14			
32					15-16-11-13-16			
34					15-13-14-13-13			
36					13-10-10-14-14			CL
38					9-17-50/5"			

REMARKS

VISUAL CLASSIFICATION

moist

Sand
trace silt
well fine grainedNote: Unified to soil
city laws taken totail
subb.Sandy Cla.
trace silt
Lo PE
brown

moist

fig

Auger stopped @ 40'
Sampler refused @ 46'

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT NEW RIFLE
 JOB NO. E81-63F DATE 8/23/81

LOG OF TEST BORING NO G21

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			24"	X	u 1-3-6-6-7			SP	DRY TO S. MOIST	SAND W/ TRACE SILT FINE NP
5			20"	X	u 3-4-5-6-7				Note: lenses of slimes	PURPLE
			19"	X	u 16-6-8-9-9					
10			22"	X	u 4-5-8-11-12				Layers change from clay slimes to sands continuously	
			20"	X	u 5-8-8-9-10					
			21"	X	u 6-9-9-10-13					
15			18"	X	u 8-10-12-13-14					
20			21"	X	u 7-10-9-10-17					
			22"	X	u 11-12-13-16-17					
			23"	X	u 11-11-12-18-20					
25			23"	X	u 10-10-13-10-13				Note: All slimes	
			27"	X	u 7-11-12-12-16				LAYERED SLIMES AGAIN	
30			22"	X	u 7-8-10-12-16					TAILING SANDY CLAY Subba
			21"	X	u 9-10-10-12-18					LO PI BROWN
35			21"	X	u 9-9-12-12-16					
40			20"	X	u 11-11-12-17-21				MOIST	CLAYEY SAND & SANDY CL FINE NP - med pi BROWN
			21"	X	u 7-8-10-10-14					
45			23"	X	u 10-14-18-16-17				CLAYEY MOIST	
			8"	X	u 13-[50/3 1/2]					REFUSED Auger @ 47'

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

LOG OF TEST BORING NO. 1

JOB NO. 391-62F DATE 8/23/51

BORING TYPE 6' 2" HCA

SURFACE ELEV.

DATUM.

REMARKS	VISUAL CLASSIFICATION
Dr /	Sand some silt incl. fine gravel NP 3x1
plug	[Note: u. moist to sat clay lenses @ 44']
	Aug. stopped @ 20' Sampler raised @ 4'

[Note: u. moist to sat
clay lenses @ 44']

पुनः

Boat stopped @ 20'
Sampling resumed @ 45'

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.

SERGEANT, HAUSKINS & BECKWIT

REGISTERED PROFESSIONAL ENGINEER

PROJECT NEW RIFLEJOB NO. E81-63F DATE 5/27/81LOG OF TEST BORING NO D-2RIG 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		21	X	u	1-3-4-17			SP	DRY TO S. MOIST	SAND W/ TRACE SILT
			X	u	2-3-5-6-6					NO FINE
5		20	X	u	23-10-9-10-11					PURPLE & GREY
		19	X	u	6-8-10-6-8					
10		20	X	u	9-8-8-15-14					
		21	X	u	6-8-9-6-11					
15		18	X	u	7-9-10-9-10					
		20	X	u	9-10-9-12-13					
20		20	X	u	11-9-11-12-15					
		19	X	u	10-11-10-15-18					
25		20	X	u	11-12-13-15-18					
		21	X	u	8-9-10-13-16					TAILINGS SUBBASE
30		20	X	u	12-11-13-15-12					CLAYEY SAND W/ SOME CO. FINE
		21	X	u	11-11-15-18-20					NO FINE
35		20	X	u	12-14-14-16-22					BROWN
		24	X	u	12-13-12-15-21					
40	8/23	20	X	u	20-18-16-19-23					
	8/24	21	X	u	13-14-17-17-15					
45		22	X	u	17 [50/2 1/2]			SC	MOIST	Auger Refusal @ 47'
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Grand Tower (New 200)
 JOB NO. SP-100 DATE 8-20-75

LOG OF TEST BORING NO. 1

RIG TYPE CMS-75 (206)
 BORING TYPE U-2
 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			8"	X	U 4-4-5-9-2			SP	sl. moist to moist	Sand
5			11"	X	U 11-12-14-15-12					fine sand
			20"	X	U 8-7-7-7-10					pred. fine grained
			21"	X	U 9-5-12-12-12					NP
10			21"	X	U 10-12-11-12-15					grey
			21"	X	U 15-12-13-15-12					[Note: color change to light @ 6']
15			22"	X	U 12-10-11-13-17					[Note: color change to grey @ 13']
			21"	X	U 18-17-16-16-15					[Note: embedded at lens @ 16']
20			22"	X	U 16-17-17-18-8					
			23"	X	U 16-12-14-14-15					
25			22"	X	U 10-17-13-17-20					
			22"	X	U 18-15-20-27-23					
30			23"	X	U 15-13-15-18-15					
			22"	X	U 16-17-14-16-20					
35			23"	X	U 15-16-17-25-15					
			21"	X	U 20-21-21-21-27					
40			22"	X	U 22-21-18-35-23					hardening
			10"	X	U 15-15-17-21-21					subbase
45			20"	X	U 19-21-18-18-18					Sandy clay
			20"	X	U 15-11-12-14-10					hard - 15
50										medium

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

LOG OF TEST BORING NO. D2

RIG TYPE 5018 75 (206)
BORING TYPE 6 2
SURFACE ELEV. _____
DATUM _____

Aug 1 stopped @ 20'
Samples refrozen
@ 53'3"

SERGEANT, HAUSKINS & BECKWITH

PROJECT FIELD RIFLE
 JOB NO. EBK63F DATE 8/24/81

LOG OF TEST BORING NO. 1

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		24"	X	T				SP
		28"	X	T				
5		25"	X	T				
		30"	X	T				
10		26"	X	T				
		20"	X	T				
15		29"	X	T				
		28"	X	T				
20		29"	X	T				
		28"	X	T				
25		27"	X	T				
		21"	X	T				
30		28"	X	T				
		28"	X	T				
35		27"	X	T				
		26"	X	T				
40		0"	X	T	NR			
		30"	X	S	10-8-6-7-17			
45			X	S	18-37-45-45			
50								

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

REMARKS	VISUAL CLASSIFICATION
DOWN TO 5' MOIST	SAND WITH TRACE SILT FINE NP PURPLE & GREY Note: some lenses of silt &/or clay (moist)
Note: 12" lens of med PI clay	CLAYEY SAND WITH FINE clay lenses FINE NP BROWN Note: SAND & GRAVEL
	REFUSED SAMPLES @ 47' 4"

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 Uman Ta 1195
 JOB NO. 57-005 DATE 8/20/81

LOG OF TEST BORING NO. DZ

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 75 (206)</u>	
									BORING TYPE <u>CME 75</u>	SURFACE ELEV. <u>5.4</u>
									REMARKS	VISUAL CLASSIFICATION
0								SP		Sand
5										
10										
15										
20										
25										
30										
35										
40										
45										
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

1 S
 SERGENT, HAUSKINS & BECKWITH

TAILINGS

Sandy clay
 trace silt
 H. PI
 brown

moist to
 v. moist

Auger stopped @ 5'
 Sampler cut @ 49'

LOG OF TEST BORING NO. 1

RIG TYPE CME-55 (203)

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM.

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 Uranium Tailings (New River)
 JOB NO. EB-63F DATE 8/25/81

LOG OF TEST BORING NO. DZ

RIG TYPE CME 75 (206)
 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		19"	X	U	6-5-12-13-14			SP	sl. moist	Sand some s. fl
5		20"	X	U	14-12-18-25-17					np grey
		22"	X	U	7-9-28-10-9					
10		23"	X	U	9-10-15-15-15				moist	
		22"	X	U	12-11-11-13-14					
		23"	X	U	13-15-13-15-13					
15		22"	X	U	10-12-15-16-12					
		21"	X	U	14-15-16-25-23					
20		23"	X	U	25-20-26-27-22					
		23"	X	U	18-18-15-16-14					
25		22"	X	U	16-16-15-15-19					
		22"	X	U	19-14-13-17-21					
30		22"	X	U	23-19-16-18-17					
		23"	X	U	14-20-25-35-23					
35		23"	X	U	19-18-16-20-16					
		22"	X	U	15-19-19-25-22					
40		22"	X	U	25-22-21-25-29					
		22"	X	U	23-23-23-23-26					
45		22"	X	U	18-15-22-30-37				plug	
			X	U	98-31-31-37-43					
50										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT Urban Tallas
 JOB NO. ED-605 DATE 8/25/81

LOG OF TEST BORING NO. 1

RIG TYPE CME 75 206
 BORING TYPE 1 1/2" IDA
 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
50			X	U	30-40	50/3		CH
51								
52								
53								
54								
55								
56								
57								
58								
59								
60								
61								
62								
63								
64								
65								
66								
67								
68								
69								
70								
71								
72								
73								
74								
75								
76								
77								
78								
79								
80								
81								
82								
83								
84								
85								
86								
87								
88								
89								
90								
91								
92								
93								
94								
95								
96								
97								
98								
99								
100								

REMARKS	VISUAL CLASSIFICATION
moist	Sandy clay / trace silt / Hi PI Loam Note: cobbles @ 51' Auger stopped @ 5' Sampler retrieved @ 51'3"

GROUND WATER		
DEPTH	HOUR	DATE
NONE		

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

SERGEANT, HAUSKINS & BECKWITH
 CONSULTING GEOTECHNICAL ENGINEERS

PROJECT NEW RIFLELOG OF TEST BORING NO. D-2JOB NO. EB-63F DATE 8/25/81RIG 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		29"	X	T				SP	DRY TO S. MOIST	SAND W/ TRACE SILT FINE NP PURPLE & GREY
5		30"	X	T						
		28"	X	T						
10		30"	X	T						
		29"	X	T						
		29"	X	T						
15		30"	X	T						
		25"	X	T						
20		28"	X	T						
		28"	X	T						
25		29"	X	T						
		?	X	T						
30		25"	X	T						
		28"	X	T						
35		29"	X	T						TAILINGS
		30"	X	T						WOOD (railroad pile?)
40		25"	X	T						
45		0"		S (SD/1) NR.						REFUSED SAMPLER @ 42 1/2'
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Hampton Twp. (New York)
 JOB NO. ES-1-6-1 DATE 9/25/41 - 12/26/41

LOG OF TEST BORING NO. 1

RIG TYPE CME 75 (206)
 BORING TYPE G.C. - 201
 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								SP		
		18"	X	U	10-7-7-14-16					
		22"	X	U	11-11-10-13-12					
5		22"	X	U	16-17-18-26-20					
		21"	X	U	17-14-15-19-15					
10		22"	X	U	17-18-24-19-17					
		23"	X	U	12-21-19-18-17					
15		20"	X	U	13-12-13-16-19					
		23"	X	U	18-18-18-26-30					
20		20"	X	U	24-22-26-36-30					
		21"	X	U	25-24-20-16-20					
25		20"	X	U	21-18-19-25-20					
		22"	X	U	33-22-21-22-20					
30		21"	X	U	21-13-17-18-15					
		22"	X	U	16-17-16-18-25					
35		22"	X	U	32-26-29-25-17					
		12"	X	U	14-24-[50/5 1/2]					
40		20"	X	U	17-25-32-48-50					
		20"	X	U	50-48-43-[50/5 1/2]					
45		20"	X	U	16-17-22-24-15					
		21"	X	U	15-32-27-27-32					
50										

Sand
 partly graded
 med. fine grained
 N.P.
 20%
 [Note: color change to
 washed @ 6'-316']
 [Note: saturated clay
 lenses @ 24']

plug

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 GEOLOGICAL ENGINEERS

LOG OF TEST BORING NO. D3

RIG TYPE CN 75 (206)

BORING TYPE تعميق

SURFACE ELEV.

DATUM.

Auger refused @ 53'
Sample refused @ 51' 11 1/2"

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

PROJECT NEW RIFLELOG OF TEST BORING NO. 1JOB NO. EBH63F DATE 8/25/81RIG 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								SP	DRY TO S MOIST	SAND W/ TRACE SILT
		20"	X	T						
		27"	X	T						
5			X	T					Note: SOME moist lenses	FINE PURPLE & GRAY
		30"	X	T						
		30"	X	T						
10		30"	X	T						
		28"	X	T						
15	<u>8/25</u>		X	T						
	<u>8/26</u>	24"	X	T						
		?	X	T						
20		25"	X	T						TAILIN SUBBAS
		?	X	T						
25		26"	X	T						CLAYEY SAND
		28"	X	T						FINE
30		30"	X	T						NP to 10 pZ
		29"	X	T						BROWN
35		28"	X	T						
		30"	X	T						
40		30"	X	T						
		29"	X	T						
45		?	X	T						
		?	X	T						
50			X	T				SC		

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWIT

JOB NO. E81-63F DATE 8-26-81

LOG OF TEST BORING NO. D3

RIG TYPE CNE-55 (203)

BORING TYPE 1-1-1

SURFACE ELEV.

DATUM.

[illegible]

REFUSED ALICE @ 52
" Sample @ 52'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT New K&L
 JOB NO. Uranium 15 DATE 8/28/81 - 8/31/81

LOG OF TEST BORING NO. 1

RIG TYPE CME 75
 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
5		5"	X	U	4-6-5-4-6			SP
		7"	X	U	8-7-7-6-7			
10		20"	X	U	12-19-14-13-15			
		20"	X	U	18-17-12-17-19			
15		21"	X	U	20-13-17-15-20			
		21"	X	U	12-13-17-18-18			
20		22"	X	U	19-15-16-18-15			
		22"	X	U	12-17-17-16-17			
25		21"	X	U	15-15-10-15-15			
		22"	X	U	14-16-14-18-15			
30		22"	X	U	14-13-18-23-17			
		21"	X	U	17-17-15-20-22			
35		19"	X	U	23-22-20-23-24			
		22"	X	U	21-23-27-29-27			
40		27"	X	U	20-20-21-20-25			
		23"	X	U	17-23-35-41-36			
45		23"	X	U	26-17-21-14-22			
		24"	X	U	30-21-23-35-33			
50		24"	X	U	23-21-21-22-20			
			X	U	23-23-25-24-21			

REMARKS

VISUAL CLASSIFICATION

Dry

Sand
 some silt
 med. fine sand
 NP
 grey

moist

[Note color change to
 yellow @ 9']

[Note color change to
 grey @ 18']

NOTE: 6" SATURATED LE
 @ 42'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

LOG OF TEST BORING NO. D3:

RIG TYPE CME-75 (206)

BORING TYPE 6 1/2" HSA

SURFACE ELEV.

DATUM.

REFUSED SAMPLER 5

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT New R¹/₂ Tailings
 JOB NO. 21-63F DATE 8/31/81 - 9/1/81

LOG OF TEST BORING NO. 1

RIG TYPE CNC SS (203)
 BORING TYPE 6" L" 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							SP		
		25"	X	U 1-3-4-5					
		22"	X	U 3-5-4-4-6					
5		22"	X	U 3-5-4-6-8				moist	Sand fine silt pred. fine grained NP w/
		21"	X	U 6-8-7-8-13					
10		23"	X	U 5-7-8-8-10					
		22"	X	U 7-7-8-10-13					
15		21"	X	U 6-7-9-11-13					
		22"	X	U 7-10-9-10-13					
20		NR	X	U 8-10-11-14-14					
		21"	X	U 9-10-11-14-14					
25		22"	X	U 8-8-8-11-15					
		21"	X	U 9-10-11-15-14					
30		22"	X	U 9-10-12-15-18					[Note: saturated clay @ 44']
8/31		21"	X	U 13-11-13-15-21					
9/1		22"	X	U 11-12-14-17-24					
		22"	X	U 14-18-23-25-27					
40		21"	X	U 16-17-20-20-22				plug	[Note: cobbles @ 46 1/2'] Clayey Sand NP brown
		21"	X	U 18-23-23-22-16					
45			X	U 7-9-11-13-12			SC		finger stopped @ 5' Samples refused @ 46'
50									

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.

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT New Rifle
 JOB NO. 5-1-81 DATE 9-1-81

LOG OF TEST BORING NO. D-1

RIG TYPE CME 75 (206)
 BORING TYPE 6 1/2" H.S.I.
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		20'	X	U	2-4-9-7-9			SP-5M	MOIST	SANDY SILT FI NO GRAY
5		8"	X	U	7-8-8-10-9					
		20"	X	U	6-8-6-7-7					
10		21"	X	U	14-12-14-16-13					
		20"	X	U	12-12-12-12-15					
15		20"	X	U	17-12-11-13-16					NOTE: PURPLE 20-25'
		21"	X	U	8-14-13-17-16					
20		20"	X	U	16-14-15-20-22					
		21"	X	U	20-19-19-21-21					NOTE: 3" LENS OF SAT. SILT @ 24 1/2'
25		20"	X	U	20-20-16-17-18					
		20"	X	U	19-25-28-23-21					
30		20"	X	U	23-16-16-18-19					
		20"	X	U	15-14-17-16-15					
35		20"	X	U	19-22-21-21-23					
		22"	X	U	20-21-23-22-24					
40		20"	X	U	28-31-44-(50) 5 1/2"					
		20"	X	U	27-24-25-35-30					NOTE: SAT. FROM 47 to 4
45		21"	X	U	28-23-20-21-21					TAILINGS SUBBASE
		21"	X	U	24-18-23-41-(50) 5"					SANDY CLAY MEB TO LO. PI BRN
50			X	U	28-23-17-20-27					

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.

SERGEANT, HAUSKINS & BECKWITH

PROJECT New Rifle
JOB NO. 121638 DATE 9-1-51

New Rifle

JOB NO.

281.638

DATE.

9.1-51

RIG TYPE.

CME 7E (206)

BORING TYPE

512" USA

SURFACE ELEV.

DATUM

[illegible]

GROUND WATER

SAMPLE TYPE

DEPTH	HOUR	DATE
NONE		

A - Auger cuttings. B - Block sample

S = 2" O.D. 1.38" I.D. tube sample.

11 2" D D 2 42" L D tube complete

SERGEANT, HAUSKINS & BECKWITH

PROJECT NEW R.I. TA 1-PS
 JOB NO. 1-63F DATE 9/1/81

LOG OF TEST BORING NO. D3

RIG TYPE CME 55 (203)
 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								SP		
		25"	X	✓	1-1-6-5-6					
		22"	X	✓	8-10-12-14-13					
5		21"	X	✓	18-9-10-9-11					
		21"	X	✓	5-6-8-11-1					
10		21"	X	✓	8-9-13-16					
		18"	X	✓	12-11-12-13-15					
15		21"	X	✓	10-13-14-1-24					
		19"	X	✓	16-13-15-17-26					
20		16"	X	✓	16-17-20-16-17					
		22"	X	✓	12-13-17-17-18					
25		19"	X	✓	11-13-11-11-13					
		21"	X	✓	11-12-16-16-19					
30		19"	X	✓	13-12-17-23-26					
		18"	X	✓	14-24-27-23-26					
35		20"	X	✓	15-20-22-19-21					
		21"	X	✓	11-12-16-19-21					
40		20"	X	✓	15-15-16-18-26					
		21"	X	✓	18-18-24-23-30					
45		14"	X	✓	19-18-22-25-28					
		10"	X	✓	19-21-27-21-26					
50										

Sand
 trace silt
 med. fine grained
 1.1%
 spec.

S' moved to
 next

[Note: saturated clay lens
 @ 44']

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 - 2" O.D. 2.42" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOLOGICAL ENGINEERS

PROJECT New Rifle
 JOB NO. ER-637 DATE 9-1-91

LOG OF TEST BORING NO. D

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		4"	X	U	4-4-4-5-8			ML
		15"	X	U	2-2-3-4-7			
5		12"	X	U	11-11-12-14-21			
		20"	X	U	17-17-18-16-21			
10		18"	X	U	14-11-11-14-11			
		18"	X	U	14-12-10-12-12			
15		20"	X	U	11-11-11-15-18			
		21"	X	U	19-14-14-18-17			
20		21"	X	U	15-19-20-25-23			
		21"	X	U	27-20-22-21-24			
25		19"	X	U	19-20-20-25-22			
		19"	X	U	19-19-15-19-18			
30		20"	X	U	18-19-30-38-49			
		20"	X	U	14-20-22-22			
35		20"	X	U	23-21-22-25-26			
		21"	X	U	31-28-28-27-32			
40		21"	X	U	23-25-23-31-26			
		22"	X	U	24-17-22-26-19			
45		20"	X	U	24-26-24-29-28			
			X	U	8-17-12-20-24			

RIG TYPE CME 75 (206)
 BORING TYPE 6 1/2" H&A
 SURFACE ELEV. -
 DATUM -

REMARKS	VISUAL CLASSIFICATION
MOIST	SANDY SILT FIN. PR. N.P. PURPLE
	NOTE: GRAY FROM 18
	NOTE: PURPLE FROM 38'
	OCC. SAT. SLIME LENS FROM 39'
	TAILINGS
MOIST	SUB BASE

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.

SERGEANT, HAUSKINS & BECKWITH

PROJECT _____
JOB NO. E31-63F DATE 9-1-81

LOG OF TEST BORING NO. 1

RIG TYPE CME75 (206)
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			X4	32-(50)74				SM	MOIST	SILTY SAND FN. NP BRN.
55										SAMPLER REFUSED @ 50'-8"

GROUND WATER

DEPTH	HOUR	DATE
	1145	

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWIT

PROJECT New R.C. Tailings
 JOB NO. E81-03F DATE 2/11/91

LOG OF TEST BORING NO. D3

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								SP
		22"	X	U	4-4-6-9-10			
		19"	X	U	7-9-5-8-8			
5		18"	X	U	2-3-4-5-9			
		17"	X	U	5-6-7-7-11			
10		17"	X	U	6-7-14-14-14			
		15"	X	U	7-8-10-11-14			
15		19"	X	U	10-11-11-11-12			
		17"	X	U	8-9-10-11-13			
20		20"	X	U	6-6-7-13-17			
		20"	X	U	8-8-10-12-14			
25		21"	X	U	10-9-10-11-11			
		20"	X	U	6-9-12-14-16			
30		21"	X	U	9-13-13-15-18			
		21"	X	U	9-10-12-12-16			
35		21"	X	U	10-13-19-21-21			
		22"	X	U	10-12-16-20-23			
40		21"	X	U	10-14-22-23-21			
		21"	X	U	20-18-22-21-21			
45			X	U	12-24-22-20 [50/50]			SP
50								
55								
60								

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

REMARKS

VISUAL CLASSIFICATION

moist

Sand
 trace silt
 med. fine grained
 NP
 grey

tailings
 subbase

Clayey Sand
 NP
 brown
 [Note: cobbles @ 47']

moist

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT

New Riffe

LOG OF TEST BORING NO. 1

JOB NO. FR-63EDATE 9-1-81RIG TYPE LINE 75 (206)BORING TYPE 6 1/2" HSA

SURFACE ELEV. _____

DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									MOIST	SANDY SILT
		10"	X	4	6-11-11-4-4			ML		FN.
		4"	X	4	2-2-2-4-8					N.O.
5			X							GRAY
		21"	X	4	33-24-15-25-27					
		21"	X	4	13-26-22-22-20					
10			X							
		20"	X	4	13-20-14-20-15					
		20"	X	4	13-12-10-13-16					
15			X							
		20"	X	4	11-11-11-11-12					
		21"	X	4	11-10-11-12-12					
20			X							
		21"	X	4	11-12-18-30-40					
		20"	X	4	34-27-29-43-36					
25			X							
		20"	X	4	21-33-30-27-26-26					
		21"	X	4	18-15-17-17-23					
30			X							
		18"	X	4	21-33-35-26-31					
		21"	X	4	27-32-26-29-30					
35			X							
		20"	X	4	28-23-38-49-40					
		21"	X	4	28-20-28-31-35					
40			X							
		19"	X	4	29-31-32-34-33					
		20"	X	4	21-20-18-23-27					
45			X							
		18"	X	4	27-30-22-35-37					
		22"	X	4	24-15-21-40-34					
50			X							

NOTE 3" LENS OF SAT.
SLIME @ 27 1/2'
AND 30'

GROUND WATER

DEPTH	HOOR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT New Rifle
JOB NO. EBI-63F DATE 9-1-81

LOG OF TEST BORING NO. D-3

RIG TYPE CME-75 # 206
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
50			X		4 26-11-11-11-15					
			X		4 13-13-13-23-33					
55			X		50/5 1/2"					
60										sampler refusal @ 55' 5 1/2"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger cuttings. B - Block sample
C - 2" O.D. x 20" L.D. tube sample

SERGENT, HAUSKINS & BECK

PROJECT New R/W Tailings
 JOB NO. 81-63F DATE 9/14/81 - 9/2/81

LOG OF TEST BORING NO. 1

RIG TYPE CME 55 (203)
 BORING TYPE 6 1/2" dia
 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								SP	Dr 1	Sand
		22'	X	U	1-2-3-6-11					have silt
		22'	X	U	10-11-9-11-12					pred. fine grained
5									sl. moist in most	NP
		22"	X	U	10-6-7-10-11					gr 1
		21"	X	U	6-8-9-12-5					
10										
		22"	X	U	9-10-11-12-15					
		22"	X	U	8-7-11-10-12					
15										
		21"	X	U	6-8-7-8-11					
		21"	X	U	9-10-11-16-18					
20										
		22"	X	U	4-6-7-9-19					
		21"	X	U	12-10-12-13-15					
25										
		22"	X	U	11-11-13-13-14					
		21"	X	U	8-10-12-19-25					
30										
		21"	X	U	11-10-11-13-18					
		22"	X	U	10-11-12-15-17					
35										
		22"	X	U	10-9-12-13-16					
		21"	X	U	11-11-11-14-17					
40										
		21"	X	U	11-10-12-13-18					
		22"	X	U	16-19-30-30-30					
45										
		21"	X	U	19-8-20-25-24					
		22"	X	U	16-14-15-17-16					
50								CH	plug moist	clay light brown

tailing
subbase

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT New file - a lines
JOB NO. 521-535 DATE 2-6-71

LOG OF TEST BORING NO. D3^c

RIG TYPE CME 55 (203)

BORING TYPE 2" - 3/4"

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			17"	XU	17	50	5"		pin	Note corner @ 5' = 1'
55										Age. station @ 30'
										sample returned @ 51's

Age: 30' @ 30'
 Age: 51' @ 51's

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT

JOB NO. F81-13EDATE 9-2-81LOG OF TEST BORING NO. 1New RifleRIG TYPE CME 75 (206)
BORING TYPE 6 1/2" HSA
SURFACE ELEV. _____
DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			18"	X	46-10-20-10-5				MOIST	
5			18"	X	48-6-6-12-15					
			19"	X	413-9-8-12-14					
10			20"	X	416-16-17-17-15					
			19"	X	417-16-15-13-14					
			20"	X	415-13-15-13-14					
15			20"	X	413-11-12-20-15					
			20"	X	416-14-13-16-16					
20			24"	X	417-17-26-39-42					
				X	421-20-24-30-31					
25			22"	X	422-30-25-23-21					
			21"	X	425-27-40-43-37					
30			20"	X	413-16-17-17-13					
			21"	X	415-18-19-18-19					
35			20"	X	421-23-19-25-22					
			20"	X	416-20-24-33-32					
40			20"	X	424-29-35-40-46					
			20"	X	432-33-31-32-39					
45				X	432-31-32-32-31					
				X	425-26-26-25-22					
50				X						

NOTE: 2' LENS OF SLIME FROM 20' & 22'

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. 2.125" I.D. tube sample.

SERGENT, HAUSKINS & BECKWILL

LOG OF TEST BORING NO. D4

JOB NO. E81-63 F DATE 9-2-81

RIG TYPE CME 75 (206)
BORING TYPE G.E. 145A
SURFACE ELEV. _____
DATUM _____

REFUSED SAMPLE
@ 54'-5"

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.

SERGEANT, HAUSKINS & BECKWITH

PROJECT Alameda
 JOB NO. E9 63 F DATE 9-12-78

LOG OF TEST BORING NO. 1

RIG TYPE CME 55 (203)
 BORING TYPE 6-2-54
 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								SP		
5			25"	X	U 4-3-9-11-9				silty	Sand trace in
			22"	X	U 6-6-6-11-14					and fine grained
			22"	X	U 4-9-7-11-12					NP
10			22"	X	U 6-5-6-11-14					gray
			22"	X	U 9-10-1-13-21					
15			22"	X	U 6-5-19-21-27					
			18"	X	U 6-5-16-16-18					
20			22"	X	U 12-18-19-24-25					
			22"	X	U 4-7-7-8-10					
25			23"	X	U 8-8-9-15-13					
			22"	X	U 7-9-13-14-18					
30			22"	X	U 10-10-13-16-22					
			22"	X	U 6-7-9-12-14					
35			21"	X	U 7-9-12-12-16					
			21"	X	U 12-13-16-16-18					
40			22"	X	U 9-13-16-19-2					
			21"	X	U 15-17-18-33-46					
45			20"	X	U 25-32-38-50/5 1/2"					
			18"	X	S 16-20-19-20-19				plug	tailings subbase
50			18"	X	S 12-14-14-16-18				moist	Sandy clay H.P.E. brown

GROUND WATER

DEPTH	HOUR	DATE
None		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

LOG OF TEST BORING NO. D4

RIG TYPE CMS 55 (203)

BORING TYPE 5'-2"-5d

SURFACE ELEV.

DATUM

GROUND WATER		
DEPTH	HOUR	DATE
NONE		

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT

New Rifle

LOG OF TEST BORING NO. 1

JOB NO. 81-105 E DATE 1-2-31

RIG TYPE CME 75 (206)

BORING TYPE 6 1/2" H.S.

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		20"	X	U	10-13-20-13-17				MOIST TO V-MOIST	SANDY SILT
		20"	X	U	10-10-14-14-13					FIN
5		21"	X	U	8-8-8-11-15					CLAY
		20"	X	U	12-17-16-18-18					GRAY
10		20"	X	U	15-13-11-17-18					
		20"	X	U	18-17-13-15-17					
15		20"	X	U	14-12-11-11-10					
		20"	X	U	10-11-12-15-21					
20		20"	X	U	26-15-19-15-15					
		20"	X	U	15-14-12-19-20					
25		20"	X	U	18-15-14-17-19					
		20"	X	U	25-24-19-18-20					
30		20"	X	U	17-23-20-24-22					
		20"	X	U	20-19-21-22-23					
35		21"	X	U	23-28-34-31-34					
		20"	X	U	20-21-20-20-20					
40		20"	X	U	22-20-19-20-23					
		21"	X	U	16-17-14-18-23					
45		22"	X	U	19-21-22-31-33					
			X	U	23-26-22-27-29					
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 - 2" O.D. 2.47" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT New Rifle
 JOB NO. ERI-63F DATE 9-3-81

LOG OF TEST BORING NO. D4

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			22"	X	420-10-14-21-15					
55				X	419-30-150-4"			CC	V-MOIST	TAILINGS SUBSTR CLAY, SAND & GRAVEL. SOME CARBS. RND. LO. FI. BRN.
60										REFUSED SAMPLE @ 54'

GROUND WATER

DEPTH	HOUR	DATE
	00.00	

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT New R. Mc Tailings
 JOB NO. EP-875 DATE 7-12-67

LOG OF TEST BORING NO. (203)

RIG TYPE CIVIS
 BORING TYPE G-2
 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								SP		
		24"	X	U	2-5-6-5-10				moist to v. moist	Sand some s. 14 pred. fine sand
5		20"	X	U	3-6-9-5-7					[Note: saturated clay la from 2']
		21"	X	U	7-6-7-6-10					
10		20"	X	U	4-4-7-7-9					Note: saturated clay and sandy clay lens from 2' to 10'
		22"	X	U	7-4-8-6-9					
15		20"	X	U	7-7-9-12-16					
		21"	X	U	17-13-16-19-19					
20		22"	X	U	16-19-20-17-17					
		20"	X	U	8-8-8-9-11					
25		22"	X	U	7-8-9-10-12					
		21"	X	U	8-8-9-8-13					
30		21"	X	U	11-10-11-13-12					
		22"	X	U	11-10-11-11-15					
35		22"	X	U	11-11-12-12-12					
		22"	X	U	8-7-9-10-12					tailings subbase
40		21"	X	U	11-12-12-13-15				plug v moist	Sandy clay Hi PE brown
		22"	X	U	12-15-21-21-27					
45		20"	X	U	16-16-14-17-18					
		15"	X	U	11-13-17-5-50/2"					
50										Auger stopped @ 20' Sampler missed @ 46'

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 & BECKWIT

PROJECT New RifleJOB NO. E8163F DATE 9-3-81LOG OF TEST BORING NO. D4

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			19'	X	4	6-5-6-7-7		
5			21"	X	4	7-5-5-6-8		ML
			18"	X	4	5-7-6-12-14		
			21"	X	4	4-11-4-9-12		
10			21"	X	4	10-11-12-12-14		
			20"	X	4	13-12-10-14-15		
15			22"	X	4	15-14-11-16-15		
			21"	X	4	12-12-10-12-12		
20			20"	X	4	14-16-17-21-10		
			23"	X	4	19-12-15-15-19		
25			19'	X	4	17-17-13-18-15		
			22"	X	4	14-14-14-13-15		
30			21"	X	4	11-14-16-13-16		
			21"	X	4	18-19-18-24-28		
35			22"	X	4	19-18-18-21-25		
			20"	X	4	22-23-20-26-30		
40			23'	X	4	19-16-14-13-14		
				X	4	11-11-12-13-16		CL
45				X	4	17-26-(50)3'		

RIG TYPE CME 75 (206)¹⁴
BORING TYPE 6 1/2" HSA
SURFACE ELEV. _____
DATUM _____

REMARKS

VISUAL CLASSIFICATION

SANDY SILT
FN.
N.P.
GRAI/NOTE: OCC. LENS OF
SAT. SLIME FROM
20'TAILINGS
SUB. BASE
MOISTNOTE: 4" LENS OF PUR
SLIME @ 42'
(SATURATED TAILIN
SUBBASESANDY CLAY
SOME SILT
MED. PL.
BRN

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger cuttings. B - Block sample
S - 2" O.D. 1.38" I.D. tube sample.SAMPLER REF. 04761
SERGENT, HAUSKINS & BECKWITH

PROJECT New Rile Tailings
 JOB NO. ES1-63E DATE 9/2/81

LOG OF TEST BORING NO. 1

RIG TYPE CMS 55 (203)
 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		25"	X	U 1-2-3-4-5				SP	sl. moist	Sand trace silt pred. fine grained
5		22"	X	U 1-4-4-5-6						NP gray
		20"	X	U 16-14-2-11-12						
		21"	X	U 5-5-4-4-6						
10		21"	X	U 3-3-4-4-6						
		22"	X	U 3-3-4-4-6						
15		21"	X	U 4-3-5-7-2						
		22"	X	U 6-7-7-7-11						
20		21"	X	U 8-8-10-11-15						
		20"	X	U 9-9-9-11-13						
25		21"	X	U 8-9-11-11-14						[Note: yellowish color @ 32']
		22"	X	U 9-7-10-10-14						
30		21"	X	U 3-10-10-17-18						
		21"	X	U 12-11-8-11-15						
35		20"	X	U 8-8-8-13-13						tailings subbase
		21"	X	U 6-8-11-14-13						Sandy clay 10 PI brown
40				U 10-12-14-19-19					moist	[Note: cobbles @ 43']
45										Auger stopped @ 35' Sampler retrieved @ 43'

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT New Rifle
 JOB NO. E31-63F DATE 9-3-81

LOG OF TEST BORING NO. C-4

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			10" X		48	12.9	11-12	ML
5			17" X		41	14-14	12-10-11	
			19" X		48	8-9	11-12-10	
10			18" X		46	6-6	9.5-10	
			20" X		49	7-9	9-11	
			21" X		410	9-8	10-17	
15			20" X		412	14-14	15-21	
			21" X		419	15-14	15-17	
20			21" X		415	15-15	15-18-20	
			20" X		413	13-13	12-13-18	
25			20" X		416	16-16	13-11-15	
			20" X		412	9-10	13-15	
30			20" X		415	14-15	17-18	
			20" X		415	14-12	10-14	
35			20" X		419	18-17	14-21	
			20" X		415	13-13	17-26	
40			15" X		419	12-13	14-15	SW
			16" X		416	19	(50) 31	V-MOIST
45								
50								

RIG TYPE CME 75 (206)
 BORING TYPE 6" HSA
 SURFACE ELEV. _____
 DATUM _____

REMARKS	VISUAL CLASSIFICATION
V-MOIST	SANDY SILT OCC. SAT. SLIME LENS SP. NP GRA
SW V-MOIST	CLAYEY SAND & GRAVEL SOME COBBS. FRO MED LO. P. BRZ
	SAMPLER RET @ 43' 9"

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 New R. to 1100'
 JOB NO. EP-1-25 DATE 9/12/51

LOG OF TEST BORING NO. 1

RIG TYPE Cole 55 (203)
 BORING TYPE S - 2"
 SURFACE ELEV. 100.00
 DATUM 100.00

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
		26"	X	U	1-3-6-11-20			-M	cl. med	S. L. sand
		21"	X	U	20-19-14-10-50					med. ...
5		21"	X	U	10-9-11-13-15					11P
		21"	X	U	13-11-11-11-14					11"
10		21"	X	U	9-8-10-11-12					
		22"	X	U	10-10-13-19-25					
15		22"	X	U	8-21-21-21-20					
		22"	X	U	12-14-17-17-17					
20		22"	X	U	4-7-8-9-11					
		22"	X	U	8-10-10-10-9					
25		21"	X	U	8-7-9-11-14					
		22"	X	U	10-7-10-12-17					
30		23"	X	U	7-9-10-11-18					
		21"	X	U	12-12-16-15-18					
35		21"	X	U	10-11-12-16-17					
		21"	X	U	10-12-13-15-14					
40		21"	X	U	4-7-8-10-13				moist	Sandy clay
		22"	X	U	8-12-17-20-18			CL		to fine subsoil
45		10"	X	U	17-50/5"					Auger stopped @ 50'
										Sample refused
50										

GROUND WATER

DEPTH	HOUR	DATE
100'		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT

JOB NO. C-1-1235

DATE

9-4-81

New Rifle

LOG OF TEST BORING NO. D-4

RIG TYPE

CME-75 (206)

BORING TYPE

6 1/2" H-C

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									MOIST TO V-MOIST	SANDY SILT
5			10"	X	4	10-12-7-11				FA, N.P. GRAY
			20"	X	4	7-10-13-14-10		ML		
10			15"	X	4	8-9-9-10-12				
			20"	X	4	9-11-11-12-13				
15			20"	X	4	9-9-12-15-9				
			14 1/2"	X	4	9-11-12-12-12				
20			25"	X	4	10-12-14-12-11				NOTE: OCC. LENS OF SAND, SLIME 12-20, 17'
			20"	X	4	10-12-16-18-21				
25			19 1/2"	X	4	11-13-14-18-20				
			19"	X	4	11-13-14-18-20				
30			20"	X	4	15-15-14-14-17				
			18"	X	4	13-14-12-16-18				
35			18"	X	4	18-16-16-22-22				
			19"	X	4	17-16-16-20-19				
40			20"	X	4	10-14-15-15-19-19				
			20"	X	4	16-17-13-18-22				
45			22"	X	4	8-9-9-11-14		CL		TAILINGS SUB BASE
				X	4	10-11-24-26 (50) 3"		CL		SANDY CLAY LO TO MED P.I. BAN.
50									SAMPLER REF. @ 44' 3"	CLAYEY SAND GRAVEL & CO PREO. MED. SAND. LO. PI TO N.P. BRN.

GROUND WATER

DEPTH	HOUR	DATE
	11:00	

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT New R. 1/2 to 1 mi
 JOB NO. E71-62 DATE 9/2/81

LOG OF TEST BORING NO. 1

RIG TYPE CME 55 (203)
 BORING TYPE 6 1/2" - 5 1/2"
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM	sl moist	S. Hy Sand pred. fine silica sand NIP gray
5										
10										
15										
20										
25										
30										
35										
40										
45								CL		
50										

GROUND WATER		
DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.

SERGEANT, HAUSKINS & BECKWITH

PROJECT

New Rifle

LOG OF TEST BORING NO. D5

JOB NO. E1-63 F

DATE 7-4-81

RIG TYPE CME75 (206)

BORING TYPE 6" DIA. HSA

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		18"	X	U	9-10-13-12-14			SP	MOIST T	SILTY SAND.
		20"	X	U	10-10-10-11-9				V-MOIST	FN.
5		19"	X	U	9-8-5-6-9					N.P.
		18"	X	U	10-12-10-15-14					GRAY
10		10"	X	U	10-9-8-7-7					
		20"	X	U	5-5-4-7-11					
15		21"	X	U	14-14-12-10-12					
		26"	X	U	18-13-10-10-12					
20		20"	X	U	17-12-13-15-13					
		21"	X	U	12-11-13-15-17					
25		20"	X	U	17-18-20-22-16					
		22"	X	U	17-14-19-20-24					NOTE: YELLOWISH TAN FROM 27'
30		20'	X	U	24-21-16-17-14				V-MOIST	CLAYEY SAND
		21"	X	U	14-14-13-13-14					PRED. MED.
35		20"	X	U	10-13-10-12-11					P.G.
		20"	X	U	10-15-14-10-11					LO. P.I. TO N.P.
40		20"	X	U	13-17-14-19-15				V-MOIST	BROWNISH YELLOW
		20"	X	U	116-(50) 4"					SILTY SAND
45										PRED. FN.
										N.P.
										PURPLE H GRAY TAIL
										SANDY CLAY
										LO TO MED. P.I.
										BRA.
50										SAMPLER REFUSED @ 43' 8"

GROUND WATER

DEPTH	HOUR	DATE
	NOV	

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT New R² to 1 line
 JOB NO. 81-62E DATE 9/13/81 - 9/14/81

LOG OF TEST BORING NO. 1

RIG TYPE CME 55 (203)
 BORING TYPE 6 1/2" - 10"
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		26"	X	U	1-2-3-4-6			Sk1	sl moist	Silt, Sand pred. fine grain NP gray
5		21"	X	U	7-8-9-14-17					
		21"	X	U	8-7-9-14-14					
10		21"	X	U	9-9-9-8-11					
		18"	X	U	1-7-8-14-18					
15		22"	X	U	13-17-21-17-20					
		21"	X	U	11-12-16-19-25					
20		21"	X	U	16-19-20-22-31					
		21"	X	U	7-9-10-12-13					
25		22"	X	U	11-12-11-12-14					
		21"	X	U	10-9-13-16-17					
30		20"	X	U	10-12-13-15-16					
		21"	X	U	11-12-16-19-22					
35		21"	X	U	12-12-15-15-19					
		21"	X	U	12-12-23-31-35					
40		22"	X	U	21-22-29-30-30					
		18"	X	U	18-20-24-28-28					
45		10"	X	U	22-[50/51-2]					
		NR	X	S	21-22-31-36-30					
			X	S	12-13-14-16-23					
50			X	CL						

1/3
1/4

plug
moist to moist

tailings
subbase
Sandy Clay
10 PI
brown

GROUND WATER

DEPTH	HOUR	DATE
49'	9:00A	9/14/81

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKW

LOG OF TEST BORING NO. D5

JOB NO. EX-62E DATE 9/4/81

RIG TYPE CME 55 (203)

BORING TYPE G 12 - SA

SURFACE ELEV.

DATUM.

GROUND WATER		
DEPTH	HOUR	DATE
49'	2:00 P	9/2/91

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT

New Riche

LOG OF TEST BORING NO. E

JOB NO.

DATE

2-5-91

RIG TYPE

CME 75 206

BORING TYPE

6" 1/2" N.S.R.

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"	X	U	3-7-4-5-3					SANDY SILT
		20"	X	U	7-4-6-7-11			ML		FN. NP. GRAY TO PURPLE
5		20"	X	U	10-11-9-13-11					
		20"	X	U	7-6-6-9-8					
10		20"	X	U	7-8-6-9-8					
		20"	X	U	4-4-5-10-11-12					NOTE: 7' LEAS of S SLIME @ 16'
15		20"	X	U	10-10-9-13-12					
		20"	X	U	17-10-12-13-15					
20		20"	X	U	17-11-11-14-16					
		22"	X	U	12-11-12-16-22					NOTE: CONS. SLIME FROM 25' (SATURATED)
25		20"	X	U						
		18"	X	U						
30		26"	X	U	10-14-12-14-16-24				moist	SILTY SAND
		20"	X	U	10-15-14-20-16-18			SP		FN. NP. LITE GRAY
35		24"	X	U	17-21-25-23-17					
		20"	X	U	24-24-21-22-34					
40		24"	X	U	24-29-21-26-30					
		24"	X	U	1416					
45		24"	X	U	?					
		24"	X	U	24-30-21-47-44					
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger cuttings. B - Black sample
S - 2" O.D. 1.38" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

PROJECT

JOB NO.

New Riche

DATE

9-3-51

LOG OF TEST BORING NO. B-1

RIG TYPE

CME 75 (206)

BORING TYPE

6" 5" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
50			24	u	229					
55			23	u	9-					
			22	u	117					
60			24	u	22-30-41-55-50					
			24	u	30-32-21-33-20					
65			22	u	17-19-17					
			21	u	20-24-20-30-21					
70			24	u	9-8-17-18-39					
			22	u	17-19-20-24-29					
75			23	u	12-22-14-19-32			CL	V-MOIST.	SANDY CLAY. MED. PL. BRN.
			10	u	6-77-18-23-60					
80										SAMPLE REFUSED @ 77'-9"

GROUND WATER

DEPTH	HOUR	DATE
77'	10:00	7-10

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT New Rifle Range
 JOB NO. E81-63F DATE 9/5/81

LOG OF TEST BORING NO. E

RIG TYPE CME 55 (203)
 BORING TYPE 6" JSP
 SURFACE ELEV. _____
 DATUM _____

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			26"	U	1-1-5-5-8			SM	sl. moist	Silty sand prod. fine grained NP grey
5			22"	U	2-3-5-6-6					
			21"	U	2-3-4-5-6					
10			22"	U	3-4-7-7-9					
			21"	U	5-5-5-7-9					
			22"	U	5-7-7-8-9					
15			22"	U	6-7-8-8-11					
			21"	U	7-8-9-11-14					
20			22"	U	8-10-12-14-19					
			21"	U	12-12-13-11-17			ML	moist to saturated	Silt some clay 10 PI grey
25			20"	U	1-9-12-12-15			SM	moist	
			22"	U	9-9-12-13-14					
30			21"	U	1-8-11-12-16					Silty sand prod. fine grained NP grey
			22"	U	9-11-10-14-13					
35			22"	U	9-10-11-11-15					
			23"	U	10-10-10-12-16					
40			22"	U	10-11-11-17-17					
			22"	U	10-16-15-17-22					
45			22"	U	11-13-16-15-20					
			21"	U	11-12-14-14-22					
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT New Rifle Tailings
JOB NO. EG-1-23 DATE 9/5/81

LOG OF TEST BORING NO. B5

[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.

SERGEANT, HAUSKINS & BECKWITH

PROJECT

JOB NO.

New Rifle

DATE

LOG OF TEST BORING NO. I

RIG TYPE

BORING TYPE

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification
0								
		21'	X	U	4-5-8-10-12			ML
		22'	X	U	8-2-9-9-12			
5			X	U	8-6-11-15-12			
		22	X	U	5-9-4-10-14			
10			X	U	12-12-2-21-13			
		22	X	U	16-12-11-13-14			
15			X	U	11-12-10-11-17			
		24	X	U	12-8-8-18-23			
20			X	U	20-38-21-13-19			
		24	X	U	12-13-17-18-26			
25			X	U	15-21-14-18-24			
		23	X	U	20-13-14-9-24			
30			X	U	24-24-20-19-26			
		22	X		15-15-15-19-26			
35			X	U	25-29-27-28-32			
		23	X	U	23-15-20-16-28			
40			X	U	18-22-19-30-38			
		24	X	U	23-20-16-21-28			
45			X	U	17-27-31-37-50			
		23	X	U	49-35-20-33-41			
50								

VFM DIST

VISUAL CLASSIFICATION

SHARP CUT
OCC. CLAY - 1/2" DIA. S
M
FRESHEN GRAY

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOLOGICAL ENGINEERS

PROJECT

JOB NO. E81-63F DATE 9-7-81LOG OF TEST BORING NO. BERIG TYPE CME -75 (206)
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
50		24"	X	4	41-25-20-28:5					
		23"	X	4	11-20-17-20-24					
55		24"	X	4	12-20-15-20-21					
		25"	X	4	23-23-22-21-50:5					
60		25"	X	4	25-40-25-20-44					
		25"	X		30-32-22-23-46					
65		24"	X	4	22-23-19-21-24					
		25"	X	4	20-10-15-20-50:6"					
70		27"	X	4	10-11-23-11-25					TAILINGS
		20"	X	4	22-24-19-18-20				N-MOIST	SUB. BASE
75			X	4	22-26-22-50:44					
80										Sample Refused @ 76'10"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT New Rille Tailings
 JOB NO. E21-63F DATE 9/5/81 - 11:00

LOG OF TEST BORING NO. E

RIG TYPE CME SS (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								SP		
		25"	X	U	14-5-7-7				cl. mat	cl. mat
		21"	X	U	4-5-4-5-6					red fine sand
5		21"	X	U	12-8-8-7-7					NP
		21"	X	U	4-5-4-5-7					80%
10		19"	X	U	5-4-3-6-8					
		19"	X	U	4-5-6-5-8					
15		20"	X	U	7-7-8-9-11					
		22"	X	U	7-8-8-8-12					
20		22"	X	U	9-8-9-11-14					
		21"	X	U	7-9-12-11-14					
25		21"	X	U	8-9-10-11-12					
		22"	X	U	9-11-14-13-16					
30		21"	X	U	9-11-12-10-15					
		22"	X	U	9-10-12-12-17					
35		22"	X	U	11-11-14-16-21					
		21"	X	U	13-11-13-17-18					
40		22"	X	U	8-9-11-10-14					
		22"	X	U	10-11-14-13-21					
45		22"	X	U	9-12-13-15-18					
		21"	X	U	12-16-20-20-22					
50										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT New Rile Tailings
 JOB NO. E81-62 DATE 9/5/81

LOG OF TEST BORING NO. B5

RIG TYPE CME 55 (203)
 BORING TYPE 10" 2" - TA
 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			X	U	18-20-23-27-31					
			X	U	21-23-21-23-30					
55			X	U	10-12-14-16-18					
			X	U	14-16-15-18-25					
60			X	U	12-11-12-15-18					
			X	U	12-14-16-17-25					
65			X	U	16-15-15-14-22					
			X	U	17-20-19-21-31					
70			X	U	8-10-23-23-27				plug	
			X	U	12-18-22-25-30			CH	U. moist to saturated	Sandy clay, trace silt, 11. PE brown
75			X	U	21-50/2					
80										Auger stopped @ 65' Sample ref. @ 75'

GROUND WATER		
DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.

SERGEANT, HAUSKINS & BECKWITH

PROJECT New Rifle
 JOB NO. EB1-63P DATE 9-7-51

LOG OF TEST BORING NO. E

RIG TYPE CME 75 (203)
 BORING TYPE 2 1/2" A.S.
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		26	X	T						
		8"	X	T						
5		12"	X	T						
		20"	X	T						
10		27"	X	T						
		26"	X	T						
15		24"	X	T						
		24"	X	T						
20		25"	X	T						
		12"	X	T						
25		23"	X	T						
		27"	X	T						
30		24"	X	T						
		12"	X	T						
35		0"	X	4						
40		23"	X	u	17-19-15-18-24					
		22"	X	u	14-17-21-17-28					
45		21"	X	u	14-23-20-26-46					
		18"	X	u	25-20-24-23-42					
50										

NOTE: CEAS SAT SC.
 @ 25-27 1/2'

GROUND WATER			SAMPLE TYPE	
DEPTH	HOUR	DATE	A - Auger cuttings.	B - Block sample
			S - 2" O.D. 1.38" I.D. tube sample.	

1
 SERGENT, HAUSKINS & BECKWITH

PROJECT

JOB NO. 01-63F DATE 7-1-57LOG OF TEST BORING NO. B5RIG TYPE CME 75 (206)

BORING TYPE

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
55			23'	X	4 23-17-25-31-33					
			24'	X	4 24-25-16-26-37					
			23'	X	4 26-41-21-10-39					
60			18"	X	4 36-44-34-34-26					
			24'	X	4 33-32-22-21-10					
65			20"	X	20-24-28-32-34					
			19"	X	4 22-24-19-13-27					
70			20"	X	4 12-12-14-18-32					TAILINGS
				X	4 23-21-19-23-40				V-MOIST	SUB. BASE
				X	11-13-12-19-31				SP	CLAYEY SAND
75			0'	X	9-22-(50) 1"					MEETS LO. P.I. BRN.
80										SAMPLED REFUSED @ 76' 1"

GROUND WATER

DEPTH	HOUR	DATE
1.0	1.0	1.0

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT W. 1/2 Sec. 36, T. 12 N., R. 10 E., S. 1
 JOB NO. E81-G3F DATE 4/16/12

LOG OF TEST BORING NO. 1

RIG TYPE 342 SS (203)
 BORING TYPE 6 3/4" - 30"
 SURFACE ELEV.
 DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0					4-4-4-7			SM		
		21"	X		5-5-5-2-3					
5		21"	X		3-3-4-5-7					
		23"	X		4-5-5-4-6					
10		21"	X		4-5-5-8-11					
		18"	X		6-6-8-9-11					
15		20"	X		6-6-8-10-15					
		19"	X		7-8-12-13-16					
20		20"	X		10-12-18-12-15					
		21"	X		12-14-16-15-17					
25		21"	X		10-9-11-15-17					
		21"	X		12-12-14-18-23					
30		21"	X		14-13-14-17-23					
		17"	X		12-18-21-23-32					
35		20"	X		16-16-20-20-23					
		21"	X		15-17-20-21-22					
40		21"	X		9-11-10-10-9					
		21"	X		10-10-14-16-21					
45			X		8-10-10-16-21					
			X		12-14-16-17-19					
50										

S. 1/4 sand
 fine-grained
 1/8"
 3/16"
 [Note: color change
 to white and grey
 @ 25'-30']

[Note: silty clay lens.
 @ 46']

GROUND WATER

DEPTH	HOUR	DATE
73'	2:00	4/16/12

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT WATER TOWER
 JOB NO. 18-62E DATE 7-1-51

LOG OF TEST BORING NO. B5'

RIG TYPE ME-1 (203)
 BORING TYPE TEST
 SURFACE ELEV. 75.00
 DATUM 75.00

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
19"			X	U	15-18-21-28		50/5 1/2			
20"			X	U	10-15-21-19-20			CH		
22"			X	U	12-12-16-18-26				Di. g. moist	
21"			X	U	12-13-13-15-22					Sandy Clay Hi Ft. Brown
21"			X	U	16-16-18-19-18					La / nas subbase
21"			X	U	11-11-15-21-22					
21"			X	U	13-16-16-16-21					
22"			X	U	14-14-18-18-8					
21"			X	U	19-19-17-22-28					

GROUND WATER

DEPTH	HOUR	DATE
75	2:00	7-1-51

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

Auger stopped @ 55'
 Sampler refused @ 74'11"

PROJECT

JOB NO. E81-63 F DATE 9-7-51New RyleLOG OF TEST BORING NO. ERIG TYPE: CME 75 (206)
BORING TYPE: Co's 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	u	3-5-6-6			SP	MOIST	Silty Sand
5		18"	X	u	5-5-5-9-12					FL. OCC. LENS OF SL
		20"	X	u	8-7-9-8-10					N.P.
10		24"	X	u	9-12-14-16-25					N.P.
		20"	X	u	11-10-9-13-14					GRAY TO PURPLE
15		8"	X	u	10-9-11-14-9					
		23"	X	u	10-10-9-15-19					
20		24"	X	u	8-9-27-23-13					
		24"	X	u	19-14-13-18-19					
25		23"	X	u	26-22-20-17-12					
		22"	X	u	20-27-19-26-22					
30		23"	X	u	21-18-23-27-28					
		27"	X	u	22-28-18-20-30					
35		24"	X	u	25-20-14-30-34					
		26"	X	u	35-26-33-48-(56)6"					
40		24"	X	u	30-31-37-27-48					
		27"	X	u	23-27-21-28-24					
45		24"	X	u	23-26-13-21-31					
		25"	X	u	27-20-20-28-25					
50		26"	X	u	21-17-13-17-31					

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITZ

PROJECT New Rifle
 JOB NO. 57-637 DATE

LOG OF TEST BORING NO. BE

RIG TYPE CME 75 (206)
 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
50		25'	X	4	27	21	32	36	44	
		26'	X	4	32	29	28	21	37	
55		26"	X	4	32	29	32	30	32	
		20'	X		25	30	26	29	36	
60		30'	X	4	20	15	14	20	32	
		21'	X	4	24	17	16	26	30	
65		26'	X	4	6	4	13	16	20	
		24"	X	4	19	21	18	17	46	
70		22'	X	4	6	9	11	28	32	
			X	4	40	31	46	(56)	22	V. MOIST
75										TAILINGS SUB. BASE CLAYEY SAND FN. MED. PI BRN
80										SAMPLER REFUSED @ 74'-2 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.

SERGEANT, HAUSKINS & BECKWITH

PROJECT 102
JOB NO. 102

DATE 1-15-54

LOG OF TEST BORING NO. E

(203)

RIG TYPE

BORING TYPE

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification
0								
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
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28								
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30								
31								
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33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								

REMARKS

VISUAL CLASSIFICATION

Handwritten notes in Visual Classification column:
 1-10' Sand
 10-15' Sand
 15-20' Sand
 20-25' Sand
 25-30' Sand
 30-35' Sand
 35-40' Sand
 40-45' Sand
 45-50' Sand

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT New Rte. Viaduct Tailings
 JOB NO. EB1-63F DATE 9/8/81

LOG OF TEST BORING NO. B5

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
50		24"	X	U	9-12-13-15-25					
55		22"	X	U	9-20-26-30-27					Notes: sand in clay, and sand in clay lenses @ 60'
		21"	X	U	6-4-13-13-15					
60		25"	X	U	14-16-23-21-37					Clayey, lo. mod. brown
		23"	X	U	8-9-18-9-19				moist	
		22"	X	U	12-24-19-17-62			ML		
65		10"	X	U	6-22-12-8-14			SP	U. moist	
		22"	X	U	9-10-13-16-28				clay	Sand some silt poorly graded NP gray
70		22"	X	U	5-20-16-22-30			CH	U moist	tailings subbase
		22"	X	U	4-36-20-34-35					Silt, Clay Hi PI brown
75		2"	X	U	7-50-1"					(Note: lenses of sand @ 72')
80										Auger stopped @ 75" Sampler refused @ 75"7"

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT New Rifle
 JOB NO. 53-272 DATE 1-2-54

LOG OF TEST BORING NO. I

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 75- (206)</u>	
									BORING TYPE	SURFACE ELEV.
									DATUM	
									REMARKS	VISUAL CLASSIFICATION
0		22"	X					SP	MOIST	VERY SAND
5		22"	X		4 9-3-11-12-13					FM.
		17"	X		4 2-1-15-16-17					NA
10		20"	X		4 13-1-15-16-17					GRAY TO BROWNISH
		20"	X		4 7-9-2-12-3					GRAY
15		22"	X		4 13-1-12-13-14					
		22"	X		4 11-16-11-16-11					
20		20"	X		4 11-17-10-9-10					
		28"	X		4 37-22-20-21-16					
25		24"	X		4 36-20-21-21-20					
		18"	X		4 20-16-13-13-16					
30		23"	X		4 25-20-20-16-29					
		23"	X		4 8-12-9-15-19					
35		23"	X		4 28-17-23-23-27					
		20"	X		4 11-18-9-12-17					NOTE: 8" LENS OF SAT. SLIME @ 36"
40		23"	X		4 24-24-22-29-20					
		28"	X		4 16-14-13-24-30					
45		22"	X		4 34-19-19-18-29					
		20"	X		4 22-22-19-18-29					NOTE: SLIMES FROM 48' (SAT.)
50		29"	X		18-22-21-39-44					

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 & BECKWIT

PROJECT

JOB NO.

DATE

LOG OF TEST BORING NO. B6

RIG TYPE

BORING TYPE

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
50		22"	X	U	15-16-17-18-19-20					
55		24"	X	U	18-21-14-19-23					
		23"	X	U	16-17-23-24-46					
60		20"	X	U	30-39-20-28-40					
		22"	X	U	37-27-32-31-50					
65		6"	X	U	12-14-16-14-10					
70		20"	X	U	7-10-10-40-39				V-MOIST	SAND FRED. MED. ANG. M.P.
		0"	X	U	6-7-20-13-10					
		19"	X	U	17-22-18-18-29					TAILINGS SUB. BASE
75		20"	X	U	11-23-16-21-35				V-MOIST	SANDY CLAY
		0"	X	U	10-12-50-0"					MED. P.I. DARK BROWN
80										Sampler refused @ 7

GROUND WATER

DEPTH	HOUR	DATE
	NONE	

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Drummond Springs Water
 JOB NO. FR-63F DATE 9-9-51

LOG OF TEST BORING NO. 203

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>CR-3</u> (203)	
									BORING TYPE	SURFACE ELEV.
									DATUM	
									REMARKS	VISUAL CLASSIFICATION
0		25'	X	U 2-3-4-4-5				SM	SI mostly in water	S.H., Sand fine, fine grained ND 9" /
		22'	X	U 4-3-4-5-5						
5		22"	X	U 4-5-6-6-5						
		21"	X	U 3-5-6-6-6						[Note: saturated clay lenses @ 2'-10']
10		21"	X	U 4-6-7-7-9						
		22"	X	U 4-6-7-8-7						
15		21"	X	U 5-6-10-7-10						
		22"	X	U 6-8-9-9-11						
20		21"	X	U 6-8-10-14-12						
		21"	X	U 12-9-13-13-15						
25		22"	X	U 9-15-20-21-22						
		22"	X	U 12-13-15-29-24						
30		21"	X	U 6-17-20-13-18						
		22"	X	U 11-10-15-14-16						
35		22	X	U 8-15-16-19-20						
		22"	X	U 9-19-15-14-19						
40		22"	X	U 9-19-18-20-30						
		22"	X	U 15-20-21-25-33						
45		22"	X	U 11-15-19-18-18						
50		23'	X	U 11-16-20-21-20						

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT Uranium Tailings (1000 F. 2'2)
 JOB NO. 81-63F DATE 4/7/91

LOG OF TEST BORING NO. B6

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 (263)</u> BORING TYPE <u>SA - CA</u> SURFACE ELEV. _____ DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
50		22'	X	U	14-15-16-17-18					
		20"	X	U	15-17-22-18-37					
55		23"	X	U	7-13-15-20-18					
		22"	X	U	12-14-16-30-26					
60		22"	X	U	9-13-20-22-25			CH	moist to v. moist	Clay inack 5" Hi Fe grey
		22"	X	U	11-11-15-20-31					
65		22"	X	U	9-14-21-32-18					[Note saturated at sand, clay lenses @ 62'-70' tailings
		20"	X	U	12-14-22-28-40					
70		22"	X	U	7-12-16-22-26			SC	v moist to saturated	Clayey sand NP brown [Note: cobbles @ 77 1/2']
		21"	X	U	19-25-33-25-26					
75		21"	X	U	25-27-25-20 For 5"					
80										Auger stopped @ 75' Sampler refused @ 77.5'

GROUND WATER

DEPTH	HOUR	DATE
None		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT _____
 JOB NO. _____ DATE _____

LOG OF TEST BORING NO. A

RIG TYPE _____
 BORING TYPE _____
 SURFACE ELEV. _____
 DATUM _____

(203)

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										
18										
19										
20										
21										
22										
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25										
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27										
28										
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30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										

Notes: 1. 24" 21"
 2. 24" 21"
 3. 24" 21"
 4. 24" 21"
 5. 24" 21"
 6. 24" 21"
 7. 24" 21"
 8. 24" 21"
 9. 24" 21"
 10. 24" 21"
 11. 24" 21"
 12. 24" 21"
 13. 24" 21"
 14. 24" 21"
 15. 24" 21"
 16. 24" 21"
 17. 24" 21"
 18. 24" 21"
 19. 24" 21"
 20. 24" 21"
 21. 24" 21"
 22. 24" 21"
 23. 24" 21"
 24. 24" 21"
 25. 24" 21"
 26. 24" 21"
 27. 24" 21"
 28. 24" 21"
 29. 24" 21"
 30. 24" 21"
 31. 24" 21"
 32. 24" 21"
 33. 24" 21"
 34. 24" 21"
 35. 24" 21"
 36. 24" 21"
 37. 24" 21"
 38. 24" 21"
 39. 24" 21"
 40. 24" 21"
 41. 24" 21"
 42. 24" 21"
 43. 24" 21"
 44. 24" 21"
 45. 24" 21"
 46. 24" 21"
 47. 24" 21"
 48. 24" 21"
 49. 24" 21"
 50. 24" 21"

GROUND WATER		
DEPTH	HOUR	DATE
23'	2:00 P	11/19/81

SAMPLE TYPE	
A - Auger cuttings.	B - Block sample
S - 2" O.D. 1.38" I.D. tube sample.	

SERGEANT, HAUSKINS & BECKWIT

JOB NO.

DATE

LOG OF TEST BORING NO. AL

RIG TYPE.

BORING TYPE

SURFACE ELEV.

DATUM.

[illegible]

GROUND WATER

DEPTH	HOUR	DATE
73'	12:00 P	01/9/91

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT Urban Sanitation
JOB NO. 12345 DATE 10/10/2021

LOG OF TEST BORING NO. 1

RIG TYPE CORE (203)
BORING TYPE 6
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	RIG TYPE (205)	
									BORING TYPE	SURFACE ELEV.
									DATUM	
									REMARKS	VISUAL CLASSIFICATION
27"			X	U	1-2-4-5-6					
22"			X	U	4-4-7-8-8					
21"			X	U	11-6-8-7-11					
18"			X		6-7-10-10-11					
21"			X	U	6-7-8-8-10					
22"			X	U	7-7-10-9-12					
20"			X	U	6-8-8-10-12					
21"			X	U	8-12-14-14-16					
21"			X	U	9-9-6-8-13					
21"			X	U	9-9-12-10-15					
21"			X	U	11-14-8-21-31					
21"			X	U	15-14-20-16-29					
21"			X	U	5-10-11-8-12					
22"			X	U	9-10-14-20-26					
22"			X	U	14-10-24-23-30					
22"			X	U	15-24-39-32-31					
21"			X	U	11-16-19-17-21					
21"			X	U	7-15-25-14-29					
21"			X	U	15-20-20-22-36					
			X	U	17-20-29-28-33					

Sample taken
and analyzed
8/4/

Note: color change to
olive green @ 22'
27']

GROUND WATER

SAMPLE TYPE

DEPTH	HOUR	DATE
1000		

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

SERGEANT, HAUSKINS & BECKWIT:

DATE 2/8/21

LOG OF TEST BORING NO. A6

RIG TYPE CNG-55 (203)
BORING TYPE C-2-SH
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.

SERGEANT HAUSKINS & BECKWITH

JOB NO. E81-63F DATE 9-5-81

LOG OF TEST BORING NO. B

RIG TYPE COLE 75 (206)
BORING TYPE 6 1/2" 1-5 in D
SURFACE ELEV. _____
DATUM _____

RIG NO. _____										RIG TYPE <u>CONE 75 (206)</u>	
										BORING TYPE <u>6 1/2" 1.5 in</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			20'	X	U 1-3-7-10-5				MOIST TO V-MOIST	Silty SAND FN N.P. GRAY	
5			20'	X	U 7-8-7-11-10			SP			
			18"	X	U 5-22-20-14-12						
10			26"	X	U 12-14-15-14-12						
			20"	X	U 7-7-5-6-9						
15			21"	X	U 8-12-11-10-9						
			22"	X	U 13-10-14-26-12						
20			0"	X	U 30-48-14-17-17						
			6"	X	U 9-15-19-17-16						
25			22"	X	U 20-37-23-18-37						
			22"	X	U 10-9-14-16-32						
30			20"	X	U 17-17-19-20-21						
			20"	X	U 23-11-20-23-37						
35			28"	X	U 24-21-20-18-34						
			23"	X	U 15-18-16-29-31						
40			21"	X	U 18-21-15-20-17						
			25"	X	U 20-19-22-24-30						
45			24"	X	U 15-30-21-18-23-						
			24"	X	U 16-25-18-29-27						
50			23"	X	U 16-28-30-26-16						

GROUND WATER

SAMPLE TYPE

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 _____
JOB NO. E81-63F DATE 9-8-81

LOG OF TEST BORING NO. B6

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

TAILINGS
SUB BASE
SANDY CLAY/
MED TO CO P.
BRN.

Sampler Refused
@ 73'

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 Uranium Tailings (New Rifle)
 JOB NO. 591-63F DATE 9/9/81 - 9/5/81

LOG OF TEST BORING NO. 1

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

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
5										
10										
15										
20										
25										
30										
35										
40										
45										
7/9										
7/15										
50										

[Note: color change to olive green @ 4'-8"]

[Note: color change to olive green @ 27']

Silty clay,
 10 FT
 gray

moist

GROUND WATER		
DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.

SERGEANT, HAUSKINS & BECKWITH

PROJECT Drummond Tailings
 JOB NO. 59-3-5 DATE 11-16-57

LOG OF TEST BORING NO. AL6

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										
								SM		Silty Sand
		21"			26-48-47-48-49					some clay
55										
		21"			11-16-18-30-37					pred. fine grained
		21"			15-16-18-27-31					NP
60										gray
		22"			16-18-18-26-38					
		22"			12-15-11-9-9					[Note: U. moist to submer. below 63']
65										
		21"			13-16-18-20-22					
					5-15-29-40-50/5 1/2"			CH	U. moist	fairly fine subbase
70					13-28-29-43-50/6"					Clay some silt
										hi PE [Note: coll. @ 72']
										brown
75										Auger stopped @ 70'
										Sampler refused @ 72'
										hole not plugged
										caved to 65'

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT

JOB NO. 581-635

DATE

New Rifle9-9-51LOG OF TEST BORING NO. 1RIG TYPE CME 75206BORING TYPE C 5" I.D.

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			9'	X	4	22-3-2-2			moist to	Silty Sand
5			21"	X	4	5-4-3-7		SM	V-MOIST	FN.
			20'	X	4	18-15-9-12-10				NP
10			23"	X	4	4-6-8-12-11				Gray w/occ. Purple
			20'	X	4	5-4-6-11-10				
15			21"	X	4	6-8-8-9-13				
			21"	X	4	11-11-12-16-16				
20			22"	X	4	10-9-10-17-16				
			22"	X	4	16-14-19-16-19				
25			23"	X	4	11-16-17-14-20				
			21"	X	4	16-16-14-24-20				
30			23"	X	4	16-16-14-21-29				
			24"	X	4	21-19-16-30-29				
35			23"	X	4	26-21-18-20-21				
			23"	X	4	19-14-25-29-19				
40			22"	X	4	20-23-24-28-34				
			20"	X	4	27-23-22-24-41				
45			22"	X	4	34-23-24-30-46				
			22"	X	4	27-30-22-34-35				
50			23"	X	4	36-30-24-25-34				

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

NOTE: 6" LENS O.
SAT SLIME
@ 33'

PROJECT New Rifle
 JOB NO. 851-638 DATE 9-7-

LOG OF TEST BORING NO. B60

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 75 (206)</u>	
									BORING TYPE <u>CME 75</u>	SURFACE ELEV. <u>62.5</u>
									DATUM	
									REMARKS	VISUAL CLASSIFICATION
50		23"	X	U	30-27-27-28-45					
55		23"	X	U	30-42-30-34-42					
60		22"	X	U	20-30-20-34-50					
60		22"	X	U	14-11-15-28-35					
65		20"	X	U	15-21-20-21-27					
65		20"	X	U	16-20-21-21-30					
65	9-14-21	18"	X	U	31-29-20-40-41					
70		23"	X	U	38-34-30-39-41					
70			X	U	31-26-27-20				V-MOIST	
75			X	U	(50) 3"				SM	

NOTE: SAT. FROM 67'
 ALSO MED GRD.

TAILINGS
 SUB BASE
 SILTY SAND
 SOME GRV.
 NP.
 BRN.

STOPPED AUG. @ 70'
 SAMPLER REFUSEL @ 72

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 Uranium Tailings (New R. 16)
 JOB NO. EB-63F DATE 9/15/81

LOG OF TEST BORING NO. 1

RIG TYPE WIS 55 (200)
 BORING TYPE (12" - 2")
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			22	U	1-3-4-7-7			SM	moist	Silly Sand
			20	U	7-7-6-6-5					prod. fine grains
5			21	U	5-13-10-10-9					NP
			21	U	4-5-6-4-5					gray
10			21"	U	4-7-1-7-7					[Note: saturated clay to below 5']
			22'	U	5-5-8-9-11					
15			21	U	6-7-7-9-11					
			21"	U	5-8-12-12-18					[Note: color change to gray @ 21']
20			22"	U	14-13-19-22-33					
			22"	U	19-17-28-27-37					
25			21"	U	13-13-14-19-22					
			21"	U	12-14-19-25-32					
30			21"	U	16-33-45-41-42					
			21"	U	19-17-30-32-26					
35			21"	U	20-18-20-24-28					
			21"	U	14-17-25-29-35					
40			20"		18-31-49-50 (4 1/2")					
			22"		16-18-22-24-36					
45			21"		10-18-33-35-31					
			24"		7-10-18-20-31					
50										

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 & BECKWII

PROJECT New Rifle Tailings
 JOB NO. E81-63F DATE 7/11/78

LOG OF TEST BORING NO. A6

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
50		21	X	U	7-10-15-15-37							
55		21"	X	U	8-13-17-22-48							
		22"	X	U	12-13-24-32-34							
60		21"	X	U	19-20-31-43-22							
		21"	X	U	15-20-14-21-25							
65		NR	X	U	13-18-16-23-15							
		21"	X	U	20-24-27-25-50/51							
70												
75												

RIG TYPE CME SS (203)
 BORING TYPE 6" SPT
 SURFACE ELEV. _____
 DATUM _____

REMARKS VISUAL CLASSIFICATION

plug
 Clayey Sand
 pred. fine gravel
 NP
 brown
 (Note: rather
 @ 67' 7")
 to 1/2" substrate

Auger refused @ 67' 1/2"
 Sampler refused @ 67' 5/8"

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

New Rifle

LOG OF TEST BORING NO. 8

JOB NO.

E9-63F

DATE

9-15-81

RIG TYPE

CME 25 (206)

BORING TYPE

CME 157 D.H.

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		19'	X	U	7-6	9	14	14	MOIST	SILTY SAND
5		22"	X	U	17-8	8	10	13		FN.
		19 1/2	X	U	4-3	7	7	9		NP
		21'	X	U	3-3	8	10	15		GRAY
10		20'	X	U	7-10	11	10	20		
		22"	X	U	10-12	10	13	18		
15		21'	X	U	9-10	13	17	17		
		21'	X	U	12-13	19	44	40		
20		21'	X	U	38-25	22	15	19		
		21'	X	U	27-28	29	23			
25		20'	X	U	24-27	25	30	30		
		21'	X	U	22-20	11	10	20		
30		22'	X	U	16-14	17	29	29		
		22'	X	U	24-11	12	18	25		
35		23'	X	U	21-20	18	30	31		
		22'	X	U	20-14	31	42	49		
40		24'	X	U	26-20	30	45	45		
		24'	X	U	30-31	29	76	30		
45		25'	X	U	33-30	22	34	44		
			X	U	27-32	28	35	28		
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

NOTE: COUS. LENSES -
 SATURATED SCI.
 FROM 40'

PROJECT _____
JOB NO. 21-634 DATE 9-15-91

LOG OF TEST BORING NO. B6

RIG TYPE CME 7.5 (200)
BORING TYPE 6 1/2" AIR DR.
SURFACE ELEV. _____
DATUM _____

SAMPLER REFUSED @ 72'

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT New R/R Tailing
 JOB NO. EB1-G3F DATE 7/15/87

LOG OF TEST BORING NO. 1

RIG TYPE CME 55 (203)
 BORING TYPE 6" - 7"
 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		
		22"	X	U	1-3-5-5				sl. wet	Silty Sand fine grained NP gray
		22"	X	U	4-6-4-6-6					
5		19"	X	U	3-5-6-9-8					
		19"	X	U	4-4-6-7-9					
10		20"	X	U	4-4-6-9-9					
		23"	X	U	5-7-7-8-9					
15		22"	X	U	6-8-8-9-10					
		22"	X	U	6-7-7-9-12					
20		21"	X	U	9-9-8-10-13					
		21"	X	U	5-8-9-11-14					
25		21"	X	U	10-10-11-14-20					
		21"	X	U	12-16-15-16-17					
30		21"	X	U	11-14-12-10-14					
		21"	X	U	12-18-24-28-32					
35		22"	X	U	12-18-20-16-25					
		21"	X	U	25-33-15-13-16					
40		22"	X	U	24-14-19-24-32					
		21"	X	U	20-17-21-18-30					
45		22"	X	U	10-14-20-21-20					
			X	U	18-17-11-18-19					
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT New R. Lk. Tailrace
 JOB NO. EP-105 DATE 7-1-81

LOG OF TEST BORING NO. A6

RIG TYPE CW18 ST (20?)

BORING TYPE 6" - 15A

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										
		22'	X	U	30-18-20-24-24					
55		21"	X	U	17-17-15-22-20					
		22"	X	U	10-15-13-14-19					
60		21'	X	U	9-11-20-29-23					
		20"	X	U	9-10-16-14-14					
		21"	X	U	7-14-21-28-38					
65		21"	X	U	5-11-18-24-30					
		21"	X	U	12-15-18-25-25					
70		21"	X	U	10-16-30-46-[50/5"]				U. moist	Sandy, Clay 12. PE brown
			X		15-12-19-22-26			CH		
75			X	U	12-14-16-40-[50/5"]					[Note: collar @ 77']
80										Auger stopped @ 75' Sampler retrieved @ 77.5'
										hole not plugged - caved to 70'

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

JOB NO. E81-63F DATE 9-15-81

New Rifle

LOG OF TEST BORING NO. ERIG TYPE CME 75 (206)BORING TYPE 6" HSA

SURFACE ELEV. _____

DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0									MOIST TO	SILTY SAND
			7	X	4	1-3-6-6-9			V-MOIST	FN
			12"	X	4	4-5-5-7-6		SM		OCC. LENS OF SLIME
5						6-6-7-10-10				NP
			18	X	4					GRAY
			19	X	4	8-12-10-11-13				
10			20	X	4	11-11-10-13-11				
			20	X	4	7-7-8-14-13				
15			20	X	4	9-10-12-13-15				
			20	X	4	11-9-13-14-9				
20			23	X	4	17-21-15-21-10				
				X	4	DRILLED FAST (ERROR)				
25			20	X	4	33-10-17-17-7				
			20	X	4	21-20-17-14-21				
30			22"	X	4	36-16-16-16-25				
			22"	X	4	21-10-15-16-30				
35			23"	X	4	10-16-14-14-25				
			26"	X	4	20-17-26-28-41				
40			23	X	4	29-18-17-23-30				
			24	X	4	16-15-17-21-26				
45			24	X	4	15-15-22-20-23				
			20	X	4	14-15-15-21-23				
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

NOTE: GREENISH FROM 30'

PROJECT

JOB NO. E81-63F DATE 9-15-31

New Rifle

LOG OF TEST BORING NO. B-7RIG TYPE CME 75 (206)BORING TYPE 6 1/2" HSA D.H.H.

SURFACE ELEV. _____

DATUM _____

RIG TYPE <u>CME 75 (206)</u>								BORING TYPE <u>6 1/2" 1450 D.H.H.</u>	
SURFACE ELEV. _____								DATUM _____	
REMARKS								VISUAL CLASSIFICATION	
50									
		22	X	4	22	23	23	21	23
		23	X	4	22	21	20	33	37
55									
		23	X	4	9	19	15	16	14
		9	X	4	43	50	3		
60									
		22	X	4	11	9	20	10	25
		20	X	4	23	22	25	46	
65									
		22	X	4	15	15	12	20	30
		20	X	4	27	15	16	20	30
70									
			X	4	15	15	30	25	37
			X	4	32	50	4		
75									
						</			

NOTE: SATURATED FROM 60'

MOIST

TAILINGS
SUB. BASE
SILTY SAND
SOME CLAY
NO
BRN.STOPPED AUGER 70'
SAMPLER REFUSED @
73' - 4"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT New Kille Tailings
 JOB NO. 81-635 DATE 5/1/61

LOG OF TEST BORING NO. 1

RIG TYPE CORE SS (20?)
 BORING TYPE 6 3/4" SS
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
		2	X	U	1-2-3-5-7					
		21"	X	U	5-5-6-7-9					
5		25"	X	U	7-6-6-6-7					
		22"	X	U	4-4-5-7-9					
10		23"	X	U	7-6-7-8-9					
		22"	X	U	4-4-7-7-10					
15		20"	X	U	5-8-9-9-10					
		23"	X	U	5-6-7-9-13					
20		20"	X	U	8-8-9-10-10					
		20"	X	U	7-8-9-12-14					
25		20"	X	U	9-10-12-12-15					
		21"	X	U	9-9-14-13-14					
30		23"	X	U	12-13-16-18-19					
		21"	X	U	14-12-13-20-18					
35		23"	X	U	15-21-23-13-18					
		23"	X	U	17-13-17-17-18					
40		21"	X	U	22-20-17-16-15					
		23"	X	U	14-20-20-14-10					
45		23"	X	U	16-17-25-22-22					
		20"	X	U	20-24-24-34-35					
50										

*S. 1/2 Sand
 pebbly fine grained
 NP
 SWY*
*[Notes: saturated to 4
 and clay lenses
 @ 20' on 17]*
*[Notes: color change
 to olive during ...]*

GROUND WATER

DEPTH	HOUR	DATE
11.55	11.55	5/1/61

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT

JOB NO.

DATE

LOG OF TEST BORING NO. A7

RIG TYPE

BORING TYPE

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
55		23"		✓	22-26	25-40	35			
		23"		✓	18-22	21-39	18			
		20"		✓	13-10	20-20	28			
60		21"		✓	15-1	20-36	45			
		21"		✓	12-14	16-23	24	CH	moist	Clay H. FI gray
65		21"		✓	12-9	25-48	50			
		21"		✓	14-19	22-30	32			
70		21"		✓	22-30	20-50	5 1/2"			tailings subbase
		21"		✓	15-34	42-49	50	CL-	moist	Sandy Clay Lo PI brown
		21"		✓	15-20	30-20	37	CH		[Note: coarse sand & cobbles @ 77']
75		21"		✓	8-14	40-47	39			
		10"		✓	31-50	5"				
80										Auger stopped @ 77 1/2' Sampler refused @ 78'5' hole not plugged due to saturated clays in auger

GROUND WATER

DEPTH	HOUR	DATE
77'	11:04	2/16/51

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT

JOB NO. ES-63F DATE 9-15-31

New Rifle

LOG OF TEST BORING NO. 1RIG TYPE CME75 (206)
BORING TYPE 2 1/2" I.D.
SURFACE ELEV. _____
DATUM _____

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
		20"	X	4	1-3-3-8-10					Silty Sand
		20"	X	4	14-9-7-11-8			SM		FN.
5		20"	X	4	12-7-7-10-11					NP.
		21"	X	4	8-9-10-11-12					GRAY
10		21"	X	4	6-8-8-8-5-12					
		22"	X	4	7-8-7-12-13					
15		22"	X	4	12-11-14-14-18					
		20"	X	4	10-12-16-10-12					
20		20"	X	4	10-15-25-25					
		20"	X	4	18-19-29-24-20			NON		
25		22"	X	4	13-14-15-10-22					NOTE: 8' LENS OF GR
		23"	X	4	32-15-18-15-30					SAT. SLIME @
30		20"	X	4	11-11-20-28-25					25'
		20"	X	4	15-15-15-34-27					
35		23"	X	4	24-16-17-31-24					NOTE: CONS. AMT OF
		21"	X	4	22-24-14-34-38					SLIMES FROM
40		19	X	4	18-16-23-21-21					35'
		26"	X	4	10-14-16-19-21					
45		20"	X	4	17-15-22-23-41					
		20"	X	4	26-21-26-28-28					
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 - 2" O.D. 2.00" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

PROJECT New Rifle
 JOB NO. ER-63F DATE 9-16-81

LOG OF TEST BORING NO. B-7

RIG TYPE CME 75 (206)
 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
50		19"	X	U	24-15-18-20-38					
55		24"	X	U	14-35-34-49-50 1/2					
		20"	X	U	17-14-42-45-50 1/2					
60		12"	X	U	27-30-19-26-20					
		20"	X	U	16-20-30-19-22					
65		0"	X	U	13-30-41-50 1/2 NR					
		20"	X	U	10-10-18-40-30					
70		20"	X	U	20-29-20-22-28					
		20"	X	U	9-7-16-8-23-17				N-MOIST	TAILINGS
75			X	U	(50) 5				SC	SUB BASE
										CLAYEY SAND
										SOME COBBES
										BLON P.I.
										BRN.
										STOPPED AUG. @ 70
										SAMPLER REFUSED @ 72'
										4' OF PLUG.

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 New R.I.C. To Lines
 JOB NO. EF-635 DATE 2/16/71

LOG OF TEST BORING NO. 102

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	U 1-1-3-4			SM
5			21"	X	U 4-4-5-5-7			
			21"	X	U 5-5-6-6-6			
			21"	X	U 3-4-6-5-7			
10			21"	X	U 4-4-5-6-6			
			20"	X	U 3-4-7-7-10			
15			21"	X	U 6-5-8-7-10			
			12"	X	U 6-6-9-10-11			
20			21"	X	U 8-7-9-9-13			
			21"	X	U 7-7-7-8-13			
25			21"	X	U 8-9-10-12-15			
				X	U 10-9-11-14-15			
30				X	U 6-10-12-14-16			
				X	U 8-12-14-12-20			
35			21"	X	U 10-12-14-20-28			
			22"	X	U 14-20-20-19-25			
40			23"	X	U 12-14-18-20-32			
			22"	X	U 15-16-24-26-30			
45			23"	X	U 18-22-20-22-26			
			23"	X	U 16-19-21-21-29			
50								

RIG TYPE CME ST 1203
 BORING TYPE 6" 1/2" HSD
 SURFACE ELEV. _____
 DATUM _____

REMARKS	VISUAL CLASSIFICATION
sl. west	S. 1/2, sand and fine gravel NP SM [Note saturated clay lenses @ 26']

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, INC.

PROJECT New Rifle Tailings
 JOB NO. EPI-G2F DATE 4/16/81

LOG OF TEST BORING NO. A7

JOB NO. _____ DATE _____										RIG TYPE <u>CME SS (203)</u>	
										BORING TYPE <u>6" - 54</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	
50			23"	X	U 15-26-25-21-29						
			23"	X	U 24-29-20-23-34						
55			22"	X	U 14-24-25-27-33						
			21"	X	U 13-18-21-23-32			CH	micist	Clay in FE 644	
60			22"	X	U 11-29-20-27-42						
			21"	X	U 16-13-18-14-24						
65			21"	X	U 10-15-18-20-29						
			24"	X	U 16-22-22-17-47				plug	tailings Sandy Clay Subbase	
70			21"	X	U 12-18-26-32-50/3"			CL	U. micist	Lo PE brown	
			22"	X	U 12-18-40-46-32						
75				X	U 18-20-17-20-21						
				X	U 12-42-50/1"						
80										Auger stopped @ 77 1/2" Sampler retracted @ 78' 7"	

GROUND WATER		
DEPTH	HOUR	DATE
75'	3:00 P	4/16/81

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.

SERGEANT, HAUSKINS & BECKWITH

PROJECT

New Rifle

LOG OF TEST BORING NO. E

JOB NO. E91-63F

DATE 9-16-51

RIG TYPE

CME 75 (206)

BORING TYPE

6" F.P. D.H.

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 TO V-MOIST	SILTY SAND
5										FN.
										N.P.
										GRAY.
10										
15										
20										
25										
30										
35										
40										
45										
50										

NOTE: CONS. LENSE
OF SLIMES
FROM 25'

NOTE: GREENISH FROM
37'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT

JOB NO. EBI-63F DATE 9-16-91New RifleLOG OF TEST BORING NO. B7RIG TYPE CME 75BORING TYPE (200)

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			23"	X	4	8-11-11-10-24				
			18"	X	4	13-31-(50)3"				
55			20"	X	4	11-11-9-17-18				
			0"	X	4	14-15-21-21-31	MR			
60			20"	X	4	12-16-12-17-29				
			20"	X	4	22-24-20-24-35				
65			23"	X	4	14-16-18-15-20				
			23"	X	4	17-20-21-22-24				
70			24"	X	4	10-20-18-24-30	SC			
			20"	X	4	31-32-26-34	(50)5"			
75			4"	X						
						4 17-(50)2"				
80										

NOTE: SATURATED FROM 57'

NOTE SOME CLAYEY SLIME FROM 60

TAILINGS
Sub BaseCLAYEY SAND
FW. TO MED.

NEW, P.I.

BRN

NOTE: COBBLES @ 75' 1/2'

Stopped Aug. @ 75'
Sampler Refused @ 75'-8"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Union Pacific (New E-22)
 JOB NO. EP-635 DATE 11/18/81 9/17/81

LOG OF TEST BORING NO. 1

RIG TYPE CME-8/2031
 BORING TYPE 6" S.D.
 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		
		23"	X	U 11-3-4-7					sl. moist	S/Ly Sand pred. fine grained rip gr. 1
		22"	X	U 5-5-6-8-8						
5		21"	X	U 9-14-15-12-16						
		21"	X	U 5-5-8-8-9						
10		21"	X	U 5-5-7-7-9						
		2	X	U 5-5-9-9-10						
15		21"	X	U 7-7-8-8-9						
		22"	X	U 5-6-7-6-7						
20		21"	X	U 6-6-9-10-8						
		21"	X	U 6-6-8-10-11						
25		21"	X	U 7-7-8-9-10						
		21"	X	U 7-8-13-13-15						
30		25"	X	U 10-15-13-17-14						
		24"	X	U 13-15-13-15-15						
35		24"	X	U 15-15-17-18-22						
		23"	X	U 16-12-18-20-18						
40		23"	X	U 12-18-17-20-29						
			X	U 20-17-17-17-16						
45			X	U 16-26-10-12-22						
			X	U 16-32-20-33-27						
50										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Uranium Tailings Heap (S2)
 JOB NO. E2153F DATE 9-16-91 - 9/17/91

LOG OF TEST BORING NO. A7

RIG TYPE CME 55 (203)
 BORING TYPE RTS
 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		23"	X	U	14-19-28-49-49					
		22"	X	U	15-36-29-25-38					
55		21"	X	U	15-11-24-23-30					
		21"	X	U	15-11-17-20-12					
60		22"	X	U	9-14-12-23-33			CL-CH	moist & saturated	Clay loam
		21"	X	U	12-13-29-30-43					[Note: occasional sand lenses below 60']
65		21"	X	U	13-16-16-25-28					TAILINGS
		22"	X	U	17-20-20-31-48					SUBBASE
70		21"	X	U	23-35-30-49-50 1/2"			CH	moist	Clay hi PE
		22"	X	U	20-22-20-12-40					green - brown
75		22"	X	U	11 20-25-25-50 1/2"					
80										Auger stopped @ 75' Sampler refused @ 77' 5"
										Note not plugged - cased to 65'

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT

New Rifle

LOG OF TEST BORING NO. B

JOB NO.

DATE

RIG TYPE

CME 75 206

BORING TYPE

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification		
0			22'	X	4	2.3	5.4	4		
5			23'	X	4	21	15	15	17	SM
			23'	X	4	6	7	7	16	18
10			24'	X	4	10	9	9	8	12
			24'	X	4	6	10	7	9	15
15			23'	X	4	6	3	4	12	16
			22'	X	4	9	7	6	11	6
20			22'	X	4	8	7	10	15	20
			22'	X	4	34	24	20	19	20
25			21'	X	4	17	18	17	19	20
			21'	X	4	9	10	14	16	14
30			24'	X	4	20	19	19	16	19
			22'	X	4	29	24	21	31	21
35			23'	X	4	18	25	15	13	17
			22'	X	4	27	19	18	18	26
40			22'	X	4	15	20	15	14	16
			22'	X	4	20	16	15	10	29
45			23'	X	4	17	19	19	17	25
			24'	X	4	15	15	15	21	30
50			26'	X	4	15	15	20	23	35
GROUND WATER										

REMARKS

VISUAL CLASSIFICATION

1770135 40

V. MOIST

SILTY SAND

FN.

OCC. LENS. OF SILT

N.P.

GRAY

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT New Rifle
 JOB NO. 291-23 DATE 9-16-51

LOG OF TEST BORING NO. B-7

RIG TYPE CMF 75 (206)
 BORING TYPE 65-100
 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		20"	X	4	18-22-20-17-15					
53		22"	X	4	22-25-20-27-37					
		20"	X	4	21-15-15-24-16					
60		22"	X	4	22-17-17-15-19 12-14-17-18-24					
		20"	X	4	12-14-17-18-14					
65		20"	X	4	19-17-17-20-22					
		20"	X	4	8-11-16-17-16					
70		0"	X	4	20-20-15-17-14 NR					
		20"	X	4	3-3-6-7-19				V-MOIST	TAILINGS SUBBASE CLAYE/ SAND FM SOME GRV. + COBBLES LOW. P.I. BRN
75			X	4	20-35(50)5" SC					Stopped Aug. @ 70 Sampler Refused @ 73'-11"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger cuttings. B - Blow
 S - 2" O.D. 1.38" I.D. tube sam
 H - 2" O.D. 2.00" I.D. tube sam

SERGENT, HAUSKINS & BECKWITH

PROJECT NEW HALLS
JOB NO. SP-102 DATE 2/17/81

LOG OF TEST BORING NO. 1

RIG TYPE CORE 35 12071
BORING TYPE 2 2 5
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	RIG TYPE <u>CR-8 25 12071</u>	
									BORING TYPE <u>2 2 1/2</u>	SURFACE ELEV. _____
									DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
0			22"	X	1-1-2-2-12			SM		
5			21"	X	9-8-8-7-8					
			21"	X	5-5-5-6-8					
			21"	X	4-3-5-6-6					
10			21"	X	3-4-5-6-6					
			21"	X	5-7-4-7-9					
15			21"	X	2-3-5-7-7					
			21"	X	5-5-5-8-9					
20			21"	X	6-6-10-10-11					
			21"	X	9-8-9-10-10					
25			21"	X	8-8-10-10-12					
			21"	X	9-9-12-12-14					
30			21"	X	9-14-12-14-20					
			22"	X	17-11-14-16-23					
35			21"	X	9-13-14-11-31					
			21"	X	17-12-15-25-38					
40			21"	X	14-13-17-24-46					
			21"	X	18-16-20-22-38					
45			21"	X	17-18-20-24-17					
				X	16-14-25-20-25					
50										

GROUND WATER

SAMPLE TYPE

GROUND WATER

SAMPLE TYPE

DEPTH	HOUR	DATE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT New R. 1/2 T. 1/2
 JOB NO. 521-G3E DATE 01/17/81

LOG OF TEST BORING NO. A7

RIG TYPE CME 5 (200)
 BORING TYPE 2" - 1/2"
 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		22"	X	u	16-24-24-28-28					
		23"	X	u	16-18-20-20-20					
55		23"	X	u	6-12-18-24-24					
		24"	X	u	10-10-20-30-30					
60		22"	X	u	8-15-23-25-30			CH		clay H: PE gray
		22"	X	u	7-14-21-28-30					
65		21"	X	u	14-31-21-31-31					
		21"	X	u	20-29-48-48-50			CH	in. moist	tailings Sandy clay subbase H: PE brown
70		21"	X	u	8-8-8-6-10					
			X	u	13-10-13-(54/5 1/2")					
75										Auger stopped @ 72 1/2' Sampler closed @ 74' 5 1/2"
80										hole caved - not plugged

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT New Rifle
 JOB NO. 90-2 DATE 1-17-5

LOG OF TEST BORING NO. E

RIG TYPE 011-75 (206)
 BORING TYPE 1.5" 1.5" 1.5"
 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		12"	X	T						Silty Sand F.N. OCC. SLIMES N.A. GRAY
5		13"	X	T				SM		
10		16"	X	T						
15		12"	X	T						
20		9"	X	T						
25		8"	X	T						
30		12"	X	T						
35		20"	X	T						
40		8"	X	T						
45		12"	X	T						
50		20'	X	u	19-18-15-14-18					
			X	u	17-20-14-20-18					
		22'	X	u	10-10-11-15-18					
		21"	X	u	18-14-15-27-23					
		22'	X	u	20-11-15-11-11					
		21'	X	u	22-27-11-16-15					
		23'	X	u	16-15-25-26-25					
		24'	X	u	20-15-14-10-18					
		23'	X	u	18-10-14-20-20					
			X	u	18-14-16-22-17					

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 & BECKWI

PROJECT

JOB NO.

New Rifle

DATE

9-17-54

LOG OF TEST BORING NO. B-7

RIG TYPE

CMT 75 (206)

BORING TYPE

SURFACE ELEV.

DATUM

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
50			20'	X	4 10-14-15-20-23					
			20'	X	4 21-23-18-23-15					
55			20'	X	4 17-16-16-29-31					
			20"	X	4 17-20-18-23-19					
60			21"	X	4 10-14-16-23-41					
			21"	X	4 20-20-18-20-18					
65			23"	X	4 17-16-14-23-02					
			9'	X	4 23-18-21-39-24					
70			20'	X	4 9-9-15-22-17				V-MOIST	TAILINGS SUB BASE
			17'	X	4 36-19-47-50-5 SC					CLAYEY SAND SM. AMT. OF GRV. SOME COBBS. LO. PL. TO N.P. BRN.
75										
80										

NOTE: SNT. FROM
67'

TAILINGS

SUB BASE

CLAYEY SAND

SM. AMT. OF GRV.

SOME COBBS.

LO. PL. TO N.P.

BRN.

STOPPED AUG. @ 71

SAMPLER REFUSED @ 7

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Washburn Tailings (New 1-16)
 JOB NO. ERI-63F DATE 9/17/81

LOG OF TEST BORING NO. 1

RIG TYPE CNC 55 (203)
 BORING TYPE G 12 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 c. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification
0			22"	u	1-2-5	5-9		SM
5			22"	u	0-8-9-8-9			
			23"	u	8-5-5-6-7			
10			22"	u	3-4-4-4-6			
			23"	u	4-4-4-6-5			
15			23"	u	7-5-6-6-8			
20			22"	u	5-4-5-4-7			
			22"	u	4-6-6-8-9			
25			21"	u	3-5-6-5-8			
			22"	u	8-8-9-12-14			
30			22"	u	7-7-9-10-14			
			21"	u	6-5-10-12-15			
35			21"	u	13-12-14-13-8			
			21"	u	12-11-9-9-15			
40			21"	u	13-13-15-14-19			
			20"	u	13-9-30-15-17			
45			21"	u	25-25-30-26-30			
			24"	u	17-19-16-15-40			
			21"	u	15-20-18-31-33			
50			21"	u	20-20-17-15-20			

REMARKS

VISUAL CLASSIFICATION

sl moist

S. H. Sand
 and fine s.s. and
 NP
 grey

Note estimated clay
 lenses 15'-23'

Note color change to
 olive green @ 20'-21'

GROUND WATER

DEPTH	HOOR	DATE
NON Z		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

LOG OF TEST BORING NO. A7

RIG TYPE ONE 55 (203)

BORING TYPE 6" NCH

SURFACE ELEV.

DATUM.

DEPTH	HOUR	DATE
100' E		

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT New Rifle
 JOB NO. FR-63F DATE 9-17-81

LOG OF TEST BORING NO. 1

RIG TYPE CME 75 (206)
 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									MOIST	SLTY SAND
									70 V. MOIST	FN.
										N.P.
5										GRAY TO PURPLISH
10										
15										
20										
25										
30										
35										
40										
45										
50										

NOTE: SAT. LENSE
 OF SLIMES
 FROM 27 1/2'
 "DRAGON SNOT"

NOTE: V-DENSE
 @ 40'

GROUND-WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

LOG OF TEST BORING NO. BE

JOB NO. E81-637 DATE 9-17-81

RIG TYPE CME 75 (206)
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
50			23'	X	4	31-23-14-21-32				
55			23'	X	4	23-21-26-30-41				
60			24'	X	4	15-15-14-28-47				
				X	4	25-35-30-60-3				
65										
70										
75										
80										

RIG TYPE CML 1.5 (200)
 BORING TYPE 6 1/2 HSA-
 SURFACE ELEV. _____
 DATUM _____

3:30 pm HAMMER
 CABLE BROKE

 NOTE: Had to drill
 without samp.
 to plug. AUG

AUG REFUSED @ 7'

GROUND WATER _____ SAMPLE TYPE _____

3:30 pm HAMMER
CABLE BROKE

NOTE: Had to drill
without samp!
75 PLUG. AUG

AUG REFUSED @ 75

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 Wright to Lake (New R. Rd)
 JOB NO. 81-635 DATE 9/18/81

LOG OF TEST BORING NO. 1.72

RIG TYPE CMS 55 (203)
 BORING TYPE 6" S.W.
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
			X	U	1-2-3-5-6			SM		
			X	U	3-4-4-4-6					
5			X	NR	4-5-6-6-6-7					
			X	U	6-7-7-6-7					
10			X	U	5-4-7-7-7					
			X	U	4-4-7-7-10					
15			X	U	6-6-6-7-10					
			X	U	6-5-8-9-11					
20			X	U	8-7-7-9-13					
			X	U	9-8-12-15-15					
25			X	U	10-10-11-12-14					
			X	U	9-9-12-16-19					
30			X	U	11-12-12-10-10					
			X	U	5-9-14-21-30					
35			X	U	12-13-14-14-48					
			X	U	12-20-25-10-[50/2"]					
40			X	U	15-23-25-26-[50/3"]					
			X	U	7-11-20-35-44					
45			X	U	16-25-30-35-45					
			X	U	10-15-15-18-38					
50										

GROUND WATER

DEPTH	HOUR	DATE
72'	2:00 P	9/1

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT Village Tailings (New Rock)
 JOB NO. F91-63F DATE 2/18/81

LOG OF TEST BORING NO. 42

RIG TYPE CME 55 (203)
 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
50										
		23"	X	u	8-15-20-25-30					
		23"	X	u	13-18-19-24-36					
55		23"	X	u	11-17-23-30-30			CH		Clay w/ PE
		21"	X	u	9-12-20-27-25					gray
60		21"	X	u	9-10-16-21-27					Sand some clay
		16"	X	u	14-9-10-12-16					Feet. fine grained NP
65		21"	X	u	9-9-22-32-76			SP	v. moist	brown
		21"	X	u	12-12-29-47-[50/3"]			CL	moist	(tailings) Sandy clay (subbase Lo PE
70		21"	X	u	11-20-15-20-36					brown Enlarge collar 72 1/2"
75										Auger refused @ 72'1". Sampler stopped @ 72'
80										

GROUND WATER

DEPTH	HOUR	DATE
72'	3:00 P	2/18/81

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT NEW RIFLELOG OF TEST BORING NO. AJOB NO. F81-63F DATE 9-18-81RIG TYPE CME 25 (206)
BORING TYPE 6 1/2" HSA D.H.
SURFACE ELEV. _____
DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
		20'	X	U	4-4-7-8-9			SM	MOIST TO V-MOIST	SILTY SAND
		21'	X	U	10-7-10-10-10					FN. OCC. LENS.
5		2"	X	U	11-12-12-9-13					SLIME S.
		20'	X	U	8-7-6-7-9					N.P.
10		21'	X	U	5-5-7-12-14					GRAEY
		20'	X	U	7-6-6-8-12					
15		21'	X	U	8-10-10-16-10					
		23'	X	U	12-10-10-14-15					
20		21'	X	U	14-16-24-28-34					
		20'	X	U	26-16-13-16-18					
25		23'	X	U	10-20-20-19-20					
		19'	X	U	13-11-13-18-32-31					
30		20'	X	U	12-19-18-33-28					
		20'	X	U	22-24-20-21-24					
35		20'	X	U	10-16-11-14-21					
		21'	X	U	19-21-21-24-34					
40		20'	X	U	8-17-16-22-20					
		20'	X	U	18-23-21-22-34					
45		20'	X	U	7-13-24-26-31					
		20'	X	U	18-25-18-24-29					
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWIT

PROJECT NEW RIFLEJOB NO. E21-63E DATE 9-18-51LOG OF TEST BORING NO. A-5RIG TYPE CME-75 (206)BORING TYPE 6 1/2 H.S.A.

SURFACE ELEV. _____

DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
50			20'	X	4 14-18-15-20-31					
			20'	X	4 17-20-23-20-17					
55			20'	X	4 14-16-20-21-20					
			0"	X	4 12-17-14-19-30 NR					NOTE: SATURATED FROM 57 1/2'
60			22'	X	4 15-11-16-23-22					NOTE: 6" LENS OF SANDY CLAY @ 60-60 1/2'
			20"	X	4 19-19-20-18-20					
65			20'	X	4 10-11-19-21-37 SP				SATURATED	SAND
			28"	X	4 15-17-20-19-18					FN.
70			0"	X	4 17-16-10-16-16 CE				V-MOIST	P.G.
			0"	X	4 (50) 3" NR					NP.
										BRN. (TAILINGS) (SUB BASE)
										SANDY CLAY
										SM. AMT. OF GRV.
										COBBS
										LOW R.
										BRN.
										STOPPED Aug @ 76'
										SAMPLER REFUSED @ 72'-9"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Uranium - a. l. c. (N. 10. E. 2. S.)
 JOB NO. ERT-65 DATE 7/18/81 - 9/19/81

LOG OF TEST BORING NO. 1

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 ST (203)</u>	BORING TYPE <u>CME - 2H</u>	SURFACE ELEV. _____	DATUM _____	REMARKS	VISUAL CLASSIFICATION
0								SM					moist	S 12, Sand
		24"	X	U	1-1-3-5-7									part. fine gravel
		21"	X	U	4-6-6-6-7									ND
5														gray
		21"	X	U	9-6-4-7-7									[note scattered cl.,
		21"	X	U	4-5-7-7-5									lenses of S' - 2"]
10														
		21"	X	U	3-4-5-5-5									
		21"	X	U	6-9-9-7-8									[note color change to
15														olive green @ 25' - 3
		21"	X	U	4-6-7-9-10									
		22"	X	U	6-6-8-9-10									
20														
		21"	X	U	4-6-10-13-12									
		21"	X	U	7-10-12-13-15									
25														
		21"	X	U	9-9-10-12-17									
		22"	X	U	12-10-12-9-7									
30														
		22"	X	U	11-9-14-25-34									
		21"	X	U	11-11-18-21-32									
35														
		21"	X	U	12-15-23-28-43									
		21"	X	U	13-22-22-31-[50/3"]									
40														
		21"	X	U	15-24-15-20-46									
		21"	X	U	30-28-30-38-42									
45														
		21"	X	U	11-16-28-30-35									
		22"	X	U	30-26-24-24-23									
50														

GROUND WATER		
DEPTH	HOUR	DATE
None		

SAMPLE TYPE	
A - Auger cuttings.	B - Block sample
S - 2" O.D. 1.38" I.D. tube sample.	

1
 SERGENT, HAUSKINS & BECKWITH

PROJECT Uranium Tailings (New York)
 JOB NO. E91-GZE DATE 9/18/81

LOG OF TEST BORING NO. AT

RIG TYPE CME 55 (C-3)
 BORING TYPE 6" ID - 2" DIA
 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			22"	U	10-12	17-22	42			
			21"	U	9-9	10-20	30			
55			21"	U	10-12	13-20	19			
			21"	U	12-10	30-37	36			
60			20"	U	6-5	20-22	25			
65			21"	U	14-14	14-17	43			
				U	8-12	16-23	21			
				U	16-16	50/5"		CL	moist.	(tailings) (subgrade) Sandy Clay, Lo PT brown
70										
75										
80										
85										
90										
95										
100										
105										
110										
115										
120										
125										
130										
135										
140										
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940										
945										
950										
955										
960										
965										
970										
975										
980										
985										
990										
995										
1000										

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

Auger stopped @ 67 1/2
 Sampler refused @
 68' 11"
 hole caved to 65' -
 not plugged

PROJECT NEW RIFLELOG OF TEST BORING NO. AJOB NO. EBI-63F DATE 9-18-81RIG TYPE CME 75 (206)
BORING TYPE 6 1/2" HSA D.
SURFACE ELEV. _____
DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0										
		20"	X	U	8-8-8-8-8			SM		Silty Sand
5		20"	X	U	11-10-18-19-10					FF.
		20"	X	U	7-7-12-12-13					N.P.
10		20"	X	U	7-7-9-12-12					GRAY
		21"	X	U	4-7-9-14-11					
15		22"	X	U	10-6-10-14-16					
		23"	X	U	6-7-8-13-10					
20		20"	X	U	10-15-17-20-12					
		22"	X	U	16-16-15-25-27					
25		20"	X	U	24-16-11-14-11					
		21"	X	U	10-13-11-10-15					
30		21"	X	U	12-13-15-15-19					
		22"	X	U	13-14-14-20-23					
35		21"	X	U	19-17-13-17-18					
		22"	X	U	11-17-22-23-23					
40		19"	X	U	21-21-19-25-22					
		18"	X	U	5-6-14-26-27					
45		17"	X	U	29-18-18-23-24					
		18"	X	U	16-12-15-21-25					
50		18"	X	U	12-22-23-17-18					

NOTE: SLIMES FROM
12'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT NEW RIFLE
 JOB NO. E81-63F DATE 9-18-81

LOG OF TEST BORING NO. 19

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 75 (206)</u> BORING TYPE <u>6 1/2" HSA DH.H</u> SURFACE ELEV. _____ DATUM _____		
									REMARKS	VISUAL CLASSIFICATION	
50			0"	X	4	20	20	20	36	40 NR	
55			19"	X	4	20	18	20	20	21	
			19"	X	4	11	12	16	14	20	
60			17"	X	4	23	26	23	31	32	SATURATED TO V. MOIST
			19"	X	4	10	10	14	11	20	
65			18"	X	4	18	23	15	23	20	
			0"	X	4	1	3	4	7	10 NR	
70			20"	X	4	8	6	16	32	24	(TAILINGS) (SUBBASE)
			6"	X	4	20	FOR 30"	SC			CLAY & SAND
75			0"	X	4	25	45	(60)	1"	NR	SOME ROOTS @ INTERFACE LO. P. TO NP BRN.
											STOPPED AUG @ 70' SAMPLER REFUSED @ 73'

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 Urban Sanitation (Hanksville)
 JOB NO. SP-6-75 DATE 3/19/81

LOG OF TEST BORING NO. 1

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	1-2-3-4					
		21"	X	U	4-5-6-7-8					
5		22"	X	U	9-5-4-4-8					
		21"	X	U	4-4-5-5-4					
10		24"	X	U	2-2-5-6-8					
		24"	X	U	6-7-8-8-10					
15		21"	X	U	7-6-6-8-11					
		21"	X	U	8-6-9-11-10					
20		24"	X	U	4-7-7-8-11					
		21"	X	U	8-8-10-11-14					
25		20"	X	U	9-10-11-12-15					
		21"	X	U	11-12-12-14-16					
30		21"	X	U	6-12-14-20-19					
		21"	X	U	5-10-17-21-26					
35		22"	X	U	11-28-23-28-28					
		21"	X	U	8-29-38-[50/5"]					
40		21"	X	U	17-17-21-25-50					
		21"	X	U	18-15-21-35-48					
45		21"	X	U	12-17-19-23-36					
			X	U	14-16-13-27-39					
50										

RIG TYPE CME 55 (203)
 BORING TYPE 6" NCA
 SURFACE ELEV. _____
 DATUM _____

Silly Sand
 Red fine grain
 NP
 grey

GROUND WATER

DEPTH	HOUR	DATE
NONZ		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT Water in the ...
 JOB NO. EP-025 DATE May 21

LOG OF TEST BORING NO. A7
 2 of 2

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>CHS-1000</u> BORING TYPE <u>GS-100</u> SURFACE ELEV. _____ DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
33		20"	X	U	10-20-41-[50/5 1/2"]					
35		21"	X	U	14-23-22-38-41					
37		21"	X	U	15-23-23-26-28			CH	U moist to saturated	Clay white gr. l
40		21"	X	U	12-13-17-20-31					
42		21"	X	U	14-15-16-20-20					
44		21"	X	U	8-12-20-23-19					
46		NR	X	U	10-12-22-19-19					
48		19"	X	U	16-29-[50/5"]			CL	U. moist	(TAILINGS) Sandy Clay (Subbase, Lo PE brown
50		18"	X	U	20-26-19-[50/5 1/2"]					
75									Auger stopped @ 70' Sampler refused @ 71' 11 1/2"	
									hole caved - not plugged	

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

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOLOGICAL ENGINEERS

PROJECT

JOB NO. E81-63E

DATE

New Riche9-18-81LOG OF TEST BORING NO. 1RIG TYPE CME 75 (206)
BORING TYPE 68" HSA D
SURFACE ELEV. _____
DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" 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	4 33-4-5-8				MOIST	SILTY SAND
			20"	X	4 9-14-14-22-14				TO V-MOIST	FN.
5			20"	X	4 5-5-6-8-10			SM		Occ. lens of SLIM
			20"	X	4 7-6-8-8-10					HP
10			20"	X	4 7-8-13-10-10					GREY
			21"	X	4 18-10-13-7-15					
15			23"	X	4 10-10-14-15-17					
			20"	X	4 15-18-10-12-15					
20			9"	X	4 15-15-17-17-18					
			21"	X	4 22-22-20-19-32					
25			19"	X	4 24-28-32-35-36					
30			20"	X	4 17-15-24-31-40					
			20"	X	4 25-24-29-31-36					
35			20"	X	4 17-17-12-22-23					
40			18"	X	4 27-22-26-44-50-51					
			19"	X	4 20-17-15-23-21					
45			19"	X	4 20-22-25-40-36					
			19"	X	4 13-23-18-17-20					
50			16"	X	15-27-31-30-34					

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

LOG OF TEST BORING NO. A-E

RIG TYPE CME 75 (206)
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
50			20"	X	4	10-13-13-15-29				
			22"	X	4	18-24-25-40-47				
55			16"	X	4	12-17-16-21-26				
			13"	X	4	27-17-28-37-39				
60			20"	X	4	13-15-18-9-22				
			16"	X	4	27-18-25-23-30			V-MOIST TO SATURATE	NOTE: SATURATED FROM 66'
65			16"	X	4	16-15-17-22-23				SAND.
			20"	X	4	20-23-29-39-46				PRED. FN.
70			16"	X	4	6-25-50-1'		SL	V-MOIST	NP
										LITE BRN. TAILINGS SUB BASE
75										CLAYEY SAND
										FN.
										SOME COBBS.
										LO P.I.
										BRN
										STOPPED AUG. @ 76'
										SAMPLER REFUSED @ 71'-1"

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 New Rifle Tailings
 JOB NO. E91-63F DATE 9/19/81

LOG OF TEST BORING NO. 1

RIG TYPE CME 55 (700)
 BORING TYPE PC - 20
 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		
			21'	U	2-2-4-7-9					
			22'	U						
5			21"	U	2-2-3-23					
			20"	U	5-5-5-5-10					
10			22"	U	4-5-6-6-6					
			21'	U	5-6-7-7-9					
15			22"	U	5-4-4-4-4					
			23"	U	5-4-4-3-3					
20			21"	U	5-6-8-10-8					
			22"	U	7-10-12-14-14					
25			22"	U	10-8-9-12-15					
				U	11-11-10-10-12					
30				U	10-14-16-16-20					
				U	15-20-20-15-20					
35				U	8-13-20-18-23					
				U	12-27-35 (50-5")					
40				U	15-20-21-37 (50-5")					
45										
50										

S. 14, Sand
 med. fine grained
 NT
 GMP

No samples take 42'
 65' due to necessity of
 augering to 65' - no
 down-the-hole hammer

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

LOG OF TEST BORING NO. AE

RIG TYPE CAT 55 (203)
BORING TYPE 6" 1/2" DIA
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 - 2" O.D. 2.42" I.D. tube sample.

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT New Rifle
 JOB NO. EBI-63F DATE 9/19/81

LOG OF TEST BORING NO. 1

RIG TYPE CME-75 (206)
 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								SP		SAND
			20	X	4 3-5-6-11-10					Fine
			20	X	4 3-10-16-17-15					NP
5			24	X	4 21-10-11-12-13					grey
			21	X	4 7-9-6-5-16					Note: continuous slims
10			21	X	4 5-5-4-10-11					from 10' (purple)
			23	X	4 11-8-10-10-14					
15			20	X	4 9-9-8-10-11					
			22	X	4 5-7-10-10-10					
20			25	X	4 6-20-17-10-10					
			20	X	4 15-10-15-15-16					
25			28	X	4 12-13-16-15-15					
			20	X	4 9-20-12-16-10					
30			22	X	4 7-10-13-15-20					
			24	X	4 17-11-19-21-27					
35			20	X	4 12-14-14-23-17					
			21	X	4 28-38-28-50/4					
40			20	X	4 14-19-17-16-30					
			21	X	4 17-31-20-18-20					
45			20	X	4 24-16-12-11-16					
			26	X	4 23-16-20-19-21					
50										

GROUND WATER

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

SAMPLE TYPE

A - Auger cuttings. B - Block sample

SERGEANT, HAUSKINS & B

PROJECT New Rifle
JOB NO. P31-235 DATE 9-19-81

LOG OF TEST BORING NO. 48

RIG TYPE CME 75 (206)
BORING TYPE 1 1/2" PISA
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										
			20'	X	18-20-18-40-30-					
			28'	X	27-22-18-27-17					
55			19'	X	16-20-19-18-20					
			20"	X	32-18-17-17-24					
60			21"	X	16-15-14-17-20					
			18'	X	21-19-18-20-26					
65			8"	X	14-14-15-17-20			SP	SATURATED	SAND FN. NP LITE BRN.
			24	X	28-29-3'				V-MU 5T	TAILINGS SUB. BASE
70										CLAYEY SAND SOME ROBBES. NP TO LO. P.I. BRN.
										STOPPED AUG @ 65' SAMPLER REFUSED @ 69'-3"

GROUND WATER		
DEPTH	HOUR	DATE

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

SERGEANT, HAUSKINS & BECKWITH
CONSULTING GEOTECHNICAL ENGINEERS

PROJECT New Rifle Training
 JOB NO. 81-63F DATE 01/19/81 - 9/20/81

LOG OF TEST BORING NO. 1

RIG TYPE CMS 55 (200)
 BORING TYPE 1 1/2" - 5" W
 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		
		22"	X	u	1-2-4-4-7					
		21"	X	u	4-5-7-9-4					
5		8"	X	u	10-10-7-5-6					
		21"	X	u	7-8-10-10-10					
10		23"	X	u	6-6-5-8-9					
		22'	X	u	6-7-7-6-10					
15		21"	X	u	7-7-5-3-7					
		22"	X	u	7-9-9-9-8					
20		22"	X	u	6-10-13-12-12					
		18'	X	u	14-14-12-14-18					
25		22"	X	u	7-6-9-12-9					
		22"	X	u	6-7-19-13-16					
30		22"	X	u	3-10-11-13-15					
		22"	X	u	10-15-18-19-35					
35		21"	X	u	12-18-11-16-39					
		22"	X	u	19-23-20-25 (50 ft 5)					
40		4"	X	u	14-11-12-14-30					
		21"	X	u	6-13-17-22-30					
45		21"	X	u	6-8-15-12-21					
		22"	X	u	19-18-20-26-47					
50										

9/19
9/20

GROUND WATER

DEPTH	HOUR	DATE
1' 01/12		

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

LOG OF TEST BORING NO. AE

JOB NO. 581-63F DATE 4/11/61 2:30 PM

BORING TYPE LC 1/2 LSA

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

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT New RifleJOB NO. 51-631 DATE 9-14-91LOG OF TEST BORING NO. 1RIG TYPE CME 75 (206)
BORING TYPE 6" 2" 1"
SURFACE ELEV. _____
DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			17"	X	2-4-2-4-4				MOIST TO	SAND
				X					V. MOIST	FN OCC SLIMES
5			18"	X	6-6-7-6-10			SP		NP
				X						GREY
			19"	X	22-10-9-9-8					
10			20"	X	8-6-10-9-12					
			20"	X	5-4-4-7-10					
15			19"	X	4-5-8-15-15					
			21"	X	7-8-7-12-12					
20			20"	X	15-10-12-14-11					
			20"	X	15-11-14-10-15					
25			20"	X	7-16-14-18-19					
			20"	X	12-17-19-10-12					
30			20"	X	27-14-15-32-14					
			19"	X	10-9-12-20-16					
35			21"	X	24-25-23-26-24					
			20"	X	20-20-15-17-19					
40			21"	X	11-25-26-20-20					
			19"	X	12-14-16-20-23					
45			20"	X	23-17-24-17-24					
			21"	X	21-15-19-20-20					
50			20"	X	18-18-20-29-29					

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

REGISTERED PROFESSIONAL ENGINEERS

PROJECT New Rifle
 JOB NO. E-9-23 DATE 9-19-21

LOG OF TEST BORING NO. A9

RIG TYPE CME 75-206
 BORING TYPE C'S 1.5'
 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										
			19"	X	4	20-21-23-30-40				
			20"	X	4	13-14-17-25-19				
55			20"	X	4	19-22-23-25-21				
			20"	X	4	25-23-32-30-20				
60			20"	X	4	15-11-12-13-20			SATURATED	SAND MED. FR. N.P. LITE BRN.
			16"	X	4	20-18-25-26-24				
65			26"	X	4	9-10-8-9-10				
				X	4	18-22-20-30-50				TAILINGS SUB BASE SILTY SAND SOME CORDS N.D. BRN.
70				X	4	50 1/2"			SM-N-MOIST	
75										STOPPED AUG @ 70' SAMPLER REFUSE! @ 70'-1 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.
 H - 3" O.D. 2.42" I.D. tube sample.

SERGEANT, HAUSKINS & BECKWITH

REGISTERED PROFESSIONAL ENGINEERS

PROJECT San Juan To Lake (Pine Fl.)
 JOB NO. E 71-635 DATE 9/20/81

LOG OF TEST BORING NO. 1

RIG TYPE CRS 55 (202)
 BORING TYPE S 1-75
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
5		2'	X	T				SM	sl. wet	S 1/2 Sand
7		10"	X	T					[Note: no sample taken 7'-10'- disturbed remove sampler]	put 1/2 in plastic
10		10'	X	T						sl. wet
13		13"	X	U	12-14-9-9-10					[Note: estimated clay on silt lenses below 3']
16		21"	X	U	8-7-5-7-9					
20		20"	X	U	52-34-22-20-12					
22		20"	X	U	10-8-10-23-34					
25		21'	X	U	26-19-19-19-21					
27		21"	X	U	14-15-18-16-20					
30		22"	X	U	12-14-19-20-25					
33		21"	X	U	11-14-15-19-15					
35		20"	X	U	8-8-17-25-25					
38		22"	X	U	10-18-18-27-30					
40		22"	X	U	15-19-19-25-30					
43		20"	X	U	12-14-18-30-49					
45		20"	X	U	8-12-16-30-32					
48		20"	X	U	8-10-16-27-30					
50		20"	X	U	10-12-18-28-24					

GROUND WATER

DEPTH	HOUR	DATE
70'	200P	9/20/81

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWIT

PROJECT Union - 1-93
 JOB NO. 1008E DATE 1/20/81

LOG OF TEST BORING NO. A

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>CASE 5-170"</u>	
									BORING TYPE <u>1-1/2" DIA</u>	
									SURFACE ELEV. _____	
									DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
55		21"	X	u	5-10-16-20-27					
		21"	X	u	10-8-15-19-20					
		21"	X	u	7-9-10-11-15					
60		21"	X	u	9-10-12-20-37					
		22"	X	u	8-8-10-10-16					
65		21"	X	u	7-9-18-28-30					
		21"	X	u	7-12-18-25-29					
		21"	X	u	7-4-16-50/5"					
70		10"	X	u	14-50/5"			GP	saturated	Sandy cobbles some gravel some clay ND brown
75										Auger stopped @ 70' Sample recovered @ 70" 11"

GROUND WATER

DEPTH	HOUR	DATE
70'	2:00 P	1/20/81

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT

New Rifle

LOG OF TEST BORING NO. 1

JOB NO. E-31-63

DATE 9-19-81

RIG TYPE

CME 75 (206)

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			19'	X	4	2.6	5.7	7	V-MOIST	SILTY SAND
5			19'	X	4	4.4	3.4	6		FN.
			19'	X	4	9.8	7.5	7		N.P
			8'	X	4	7.6	7.7	11		GRREY
10			6"	X	4	12.1	12.13	12		
			19"	X	4	17.11	11.13	15		
15			0"	X	4	15.15	14.17	16	1/R	
			8'	X	4	17.19	20.20	19		
20			19"	X	4	17.14	20.17	10		NOTE: SLIMES FROM 2
			26"	X	4	14.22	10.12	23		NOTE: COLOR CHANG TO GREEN FROM 20'
25			20"	X	4	19.20	18.21	21		
			22"	X	4	21.20	15.14	18		
30			20"	X	4	9.20	15.16	20		
			20"	X	4	20.20	17.21	20		
35			20"	X	4	10.15	15.17	18		
			20"	X	4	20.35	20.44	27		
40			20"	X	4	3.5	7.11	22		
			21"	X	4	20.17	13.23	22		
45			20"	X	4	17.14	13.12	24		
			20"	X	4	18.17	14.20	23		
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 - 2" O.D. 2.42" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

JOB NO. E81-63F DATE 9-20-51

CMT 25 (206)

BORING TYPE

SURFACE ELEV.

DATUM.

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT New R.I. Tunnel
 JOB NO. EP-103 DATE 9/20/81 - 9/21/81

LOG OF TEST BORING NO. 172

RIG TYPE Cole SS (702)
 BORING TYPE 6 1/2" - A
 SURFACE ELEV. _____
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0								SM		
		21"	X	T					SI mixed	silty, sand and fine gravel
5		22"	X	T						rip
		8"	X	T						gray
10		23"	X	T						
		22"	X	T						
15		22"	X	T						
		22"	X	T						
20		11"	X	T						
		25"	X	T						
25		18"	X	T						
7.0		21"	X	T						
9/21		21"	X	T						
30		21"	X	T						
		22"	X	T						
35		20"	X	T						
		10'	X	T						
40		21"	X	U	5-18-12-27-40					
		21"	X	U	19-20-24-50/5 1/2					
45		21"	X	U	18-19-57-47					
		21"	X	U	45-35-19-25-44					
50										

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 - 2" O.D. 2.00" I.D. tube sample.

SERGENT, HAUSKINS & BECKWIT

PROJECT

JOB NO.

DATE

LOG OF TEST BORING NO.

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
55		2"	X	U	20-18-38-46-44			
		2"	X	U	11-15-22-22-29			
		2"	X	U	8-9-9-17-21			
60		22"	X	U	10-14-22-32-51			
		21"	X	U	5-10-14-16-28			
		22"	X	U	7-9-20-20-30			
65		21"	X	U	6-7-10-14-22			
		25"	X	U	11-12-18-46-47			CL
70		10"	X	U	10-[50/5"]			

RIG TYPE

BORING TYPE

SURFACE ELEV.

DATUM

REMARKS

VISUAL CLASSIFICATION

moist

(tailings)
(subbase)Sandy clay
Lo FE
brown

[Note: cobbles @ 71']

Auger stopped @ 70'
Sampler refused @
70' 11"hole not plugged -
could to 65'

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT NEW RIFLEJOB NO. ES-03F DATE 9-20-91LOG OF TEST BORING NO ARIG TYPE CME 75 (206)
BORING TYPE CR 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									V-MOIST	SILTY SAND
										FN.
5										N.P.
										GRAY
10										
15										NOTE: CONS. SLIME
										FROM 15'
										PURPLE
20										
25										NOTE: GREEN @ 2'
30										
35										
40										
45										
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 - 2" O.D. 2.42" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

PROJECT NEW RIFLE
JOB NO. 67-03 DATE 7-20-51

LOG OF TEST BORING NO. A9.

BORING TYPE 6 1/2 HSA

SURFACE ELEV.

DATUM.

GROUND WATER		
DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT New Rifle
 JOB NO. E81-63F DATE 9-21-81

LOG OF TEST BORING NO. 1

RIG TYPE CME-75 (206)
 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			7"	T				SP		Silty SAND
			7"	T						CONG. SLIMES
5			12"	T						N.P.
			5"	T						GREY TO PURPLE
10			12"	T						
			12"	T						
15			12"	T						
			9"	T						
20			12"	T	14-20-21-22-23					NOTE: GREEN FRO
			20"	T	15-14-17-14-14					22 1/2' - 30'
25			20"	T	15-17-20-15-14					
			19"	T	21-20-20-17-15					
30			20"	T	30-22-19-15-27					NOTE: V-LITTLE SL
			19"	T	22-19-15-14-30					FROM 32'
35			21"	T	19-19-26-23-31					
			20"	T	44-25-42-(50)3"					
40			21"	T	37-26-26-24-23					
			18"	T	33-17-18-38-31					
45			19"	T	18-13-11-14-20					
			19"	T	18-19-21-22-20					
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

JOB NO. E81-63F DATE 9-21-81

LOG OF TEST BORING NO. A-5

RIG TYPE CME 75 (206)
BORING TYPE 6'2" 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
50			16"	X	4 27-18-13-18-20					
			0"	X	4 7-8-9-9-5					
55			8"	X	4 10-8-7-12-14					
			28"	X	4 15-21-29-40-49					
60			17"	X	4 7-11-13-15-21					
			6"	X	4 21-19-18-17-15					
65			0"	X	4 5-4-3-4-15				SATURATED	SAND FINE N.P. LITE BRN. (TAILINGS)
			28"	X	4 5-6-22-16-13					
70			12"	X	4 4-2-8-10-10			SC	V-MOIST	(SUB. BASE) CLAYEY SAND FN. LD. P! BRN.
				X	4 20-14-21-22-22					
75				X	4 (50) 0"					
										STOPPED AUG @ 75' SAMP. REF @ 75'

GROUND WATER		
DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT NEW R.F. TAILINGS
 JOB NO. EBI-63F DATE 7/29/91

LOG OF TEST BORING NO. 2

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

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			X	S	1-3-4(1)			SP	dry	SAND
									moist	silty cemented
5			X	S	2-3-4(5)					Low P.I.
										frag
10			X	S	1-1-2(5)			CH	Soft	(TAILIN) silty, clay (SUBB)
										silty cemented
15			X	S	1-2-3(5)				V. moist	med to h. silty
								GP		lt. brown to pink
										SANDY, gravel, some cobble
20										auger stopped @ 19.0'
										piezometer set to 17.0'
										NO H ₂ O

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT NEW RIFLEJOB NO. ES-63F DATE 9-22-8LOG OF TEST BORING NO. 20

CSU

RIG TYPE CME 75 (206)BORING TYPE 6 1/2" HCA

SURFACE ELEV. _____

DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			X		2-4-4				MOIST TO V-MOIST	SILTY SAND FN OCC LENS OF CLIMES N.P. GRAY
5			X		2-4-8					
10			X		5-4-3					
15			X		9-1-1					
20			X	T						NOTE: CONS CLIMES FROM 17'
25			X	S	9-6-10					
30			X	C	10-4 N/R					
35			X	e	5-7					NOTE: GREEN FROM 35'
40			X	T						
45			X	S	2-6-7					
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

CS

PROJECT New Rifle

LOG OF TEST BORING NO. 1

JOB NO. 81-634 DATE 9-22-51

RIG TYPE CMF-75 (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
50			X	S	3-4-5					
55			X	S	1-2-3					
60			X	S	1-2-4					
65			X	S	4-4-2					
70					4-(S) 1 1/2"			GC	N-MOIST	SAND FIN. NR WHITE GRN (TAILINGS) (SUB. BASE) CLAYEY SANDS GR. FOUR CORNERS RND LO. P. TO HP REEL
75										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger cuttings. B - Block sample
S - 2" O.D. 1.38" I.D. tube sample.
H - 2" O.D. 2.43" I.D. 1/2 lb. sample

SERGENT, HAUSKINS & BECKWITH, INC.

PROJECT NEW RIFLELOG OF TEST BORING NO. 202JOB NO. 9-1-67 DATE 9-22-67RIG TYPE CME 75 (206)
BORING TYPE CME 75
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			XS					SP		
5			XS		4-11					GREY.
10			XC		6-9					NOTE: SLIMES FROM 10' PURPLE
15			XS		17-9					NOTE: GREEN FROM 25' 1/2'
20			XC		13-13					
25		30	XS		7-6-7					
30			XS		4-35					
35			XS		4-4-6					
40			XS		5-7-5					
45			XS		8-7					
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT

New Rifle

LOG OF TEST BORING NO. 1

JOB NO. F-430

DATE

9-22-81

RIG TYPE CME 75 (206)

BORING TYPE 6 1/2 H.S.A.

SURFACE ELEV. 1

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			X	C	3-7					
55			X	S	3-4-6					
60			X	S	6-10-5					
65			X	S	4-6-5			SP	SATURATED	SAND FN. N.P. LITE BRN TO TAN (TAILINGS) (SUB. CASE)
70			X	S	(50) 2'			GP		SILTY SAND & CL. = PRES. FN. RND. N.P. BRN
										AUG. REFUSED @ 70' SAMPLER REFUSED @ 69'-8"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger cuttings. B - Block sample

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

H - 2" O.D. 2.125" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

PROJECT New Rifle
JOB NO. FB-63F DATE 9-29-81

LOG OF TEST BORING NO.

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
0			X	C	2-2			SP	MOIST TO V-MOIST	SAND	FR. TO P.G.	
5			X	C	6-3						N.P.	
10			X	C	7-3						GREY	
15			X	T							CONS.	
20			X	C	2-3						NOTE: SAT. SLIME FROM 14'	
25			X	C	3-3						PURPLISH GRAY	
30			X	C	3-4						NOTE: GREEN FROM 20 1/2' TO 30'	
35			X	T								
40			X	C	3-4							
45			X	C	3-5							

GROUND WATER		
DEPTH	HOUR	DATE

SAMPLE TYPE
A - Auger cuttings. B - Block sample
S - 2" O.D. 1.38" I.D. tube sample.
H - 3" O.D. 2.44" I.D. tube sample.

SERGEANT, HAUSKINS & BECKWITH
CONSULTING GEOLOGICAL ENGINEERS

PROJECT

JOB NO.

New Rifle

DATE

9-29-81

LOG OF TEST BORING NO. 20

CS

RIG TYPE

CME 75 (206)

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
50			X	C	4-6			N/R		
55			X	C	1-2					
60			X	C	3-3					
65			X	C	2-3					
70			X	C	2-3					
75				S	(SU) 5"				SM 4-MOIST	(TAILINGS) (SUB BASE) SILTY SAND SM AMT OF CLAY ND TO LO. PI. BRN. NOTE: COBBS PRG

AUG REF @ 74 1/2'
SAMP REF @ 74'-11"

GROUND WATER

DEPTH	HOUR	DATE
	N/A	

SAMPLE TYPE

A - Auger cuttings. B - Block sample
S - 2" O.D. 1.38" I.D. tube sample.
H - 3" O.D. 2.43" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

PROJECT

N. R. Fle

LOG OF TEST BORING NO. 2

JOB NO.

EEI-63F

DATE

9-22-81

RIG TYPE

CME 75 (206)

BORING TYPE

6" 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
0			X	S	3-3-7			SM
5			X	S	4-2-4			
10			X	S	6-3-4			
15			X	S	3-2-2			
20			X	T				
25			X	S	5-12-9			
30			X	C	5-6			
35			X	S	5-6-5			
40			X	T				
45			X	S	4-4-7			

REMARKS

VISUAL CLASSIFICATION

DILTY SAND
FN.
NP.
GRAY

OCC
NOTE: SAT. SLIME
FROM 18'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger cuttings - Block sample

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

H - 3" O.D. 2.43" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

PROJECT

New Rifle

JOB NO.

ERI-63E DATE 9-22-81

LOG OF TEST BORING NO. 20

RIG TYPE

CME 75 (206)

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
50			X	S	7-6-8					
55			X	S	9-5-7					
60			X	S	7-4-4					
65			X	T						
70			X	S	5-6-11					
75			X	C	7-6					
								SP	SATURATED	SAND FIN. NP. LITE BRN. TO TAN.
								SC	W-MOIST	SP (TAILINGS) (SUB BASE) CLAYEY SAND & GRAVEL SOME COBBS. RND. N.P. TO LO. P.I. BRN.
								GP.		SAND GRAVEL & COBB. RED CRS. RND. NP. BRN.
										AUG REF. @ 79' STOPPED SAMP. @ 75'

GROUND WATER

DEPTH	HOUR	DATE
	10:00	9/22/81

SAMPLE TYPE

A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.44" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

PROJECT New Rille TAILINGS
 JOB NO. EBT-1.3F DATE 9/29/81

LOG OF TEST BORING NO. 204

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

									RIG TYPE <u>CME-55 (C-5)</u>		
									BORING TYPE <u>6 1/2" HSH</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			X	S	1-4-4 (10)			SM	dry	soft	silty, sand
5			X	U	7-3-5 (8)				moist		None to wkly cemented finegrained, poorly graded dk to dk gray
10			X	S	1-3-14 (17)				wet		[Note: slimes found @ 11.0']
15			X	U	7-5-10 (15)					firm	
20			X	T	6"-push				v. moist		[Note: med cementation] slime lenses unaccounted interm. Hardly
25			X	U	8-6-14 (22)						[TAILINGS]
30			X	U	5-8-9 (15)						SANDY, gravel (SUBBASE, poorly graded no-cementation bwn to blk.
35			X	U	10-9-12 (21)						
40			X	U	7-5-8 (13)					v. firm	
45			X	U	7-22-28 (47)				moist		
								GP			Piez. set @ 47.5" ABS 4" pipe
50											Auger stopped @ 47.5" sample @ 46.0

GROUND WATER		
DEPTH	HOUR	DATE

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 2" O.D. 2.42" I.D. tube sample.

SERGEANT, HAUSKINS & BECKWITH

PROJECT Granular Tailings (New File)
 JOB NO. EP1-63F DATE 9/22/71

LOG OF TEST BORING NO. C

RIG TYPE CME 55 (203)
 BORING TYPE 6 1/2" PSH
 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
0			X	S 1-2-3				Sm
5			X	S 2-2-3				
10			X	T				
15			X	S 5-5-6				
20			X	S 6-5-9				
25			X	S 5-5-8				
30			X	S 10-8-15				
35			X	S 5-5-8				
40			X	S 6-8-11				
45			X	S 10-12-12				CL plug
50								

REMARKS

VISUAL CLASSIFICATION

S.H. Sand
 part. fine grained
 NP
 grey

Note: slime lens @

Note: cobbles @ 47'
 Note: some clay @ 45'

(tailings)
 (sub base)
 Sandy clay
 Lo PL
 brown

Auger refused @ 47 1/2'
 Sampler stopped @ 45'

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT Premium Paintings
JOB NO. E81-63F DATE 9/22/81

LOG OF TEST BORING NO. 1

RIG TYPE CME-55 (203)

BORING TYPE 6 1/2 H.S.A.

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.

SERGENT, HAUSKINS & BECKWITH

C.51

PROJECT New Rifle TAILINGSLOG OF TEST BORING NO. 202JOB NO. EB1-63F DATE 9/29/81RIG 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 dry	silty sand
10									moist	dk grey to gray silty to silty sand fine gradation
20										(TAILINGS)
30										(NATIVE MATERIALS)
40										
50										
60									60	Auger stopped @ 51 1/2'
70										piezometer set to
80										a depth of 51 1/2' with
90										4" ABS.

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

LOG OF TEST BORING NO. 2

REMARKS

VISUAL CLASSIFICATION

REMARKS	VISUAL CLASSIFICATION
dry	SANDY, silt organics present no cementation Low F-I brn to dk brn Cobbles + gravels = sparse intermixed.
moist	(TA) SANDY, gravelly, cobbles river run (sub) rainbow colors No plasticity
	Auger refusal @ 4.0'

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

PROJECT New Rifle TAILINGS
 JOB NO. EOI-63F DATE 9/29/41

LOG OF TEST BORING NO. 209

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 1/2 H.S.A.</u>		
									SURFACE ELEV. _____		
									DATUM _____		
									REMARKS	VISUAL CLASSIFICATION	
0			X	S	3-2-4 (1)			SP	dry	V firm	SAND fine grained NO P.I. 11 ft. (TAILINGS)
5			X	S	15-22-7 (2)			GP			SANDY, gravel, some cobbles (subbase)
											Auger refused at 9.0' piezometer set to 9.0' ABS pipe

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 H - 2" O.D. 2.40" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

LOG OF TEST BORING NO. ^{C54}211

PROJECT _____
JOB NO. E81-63F DATE 6/12/81

RIG TYPE CMC 55 (203)

BORING TYPE 10 1/2" LPA

SURFACE ELEV.

DATUM.

OB NO. _____ DATE _____									RIG TYPE _____			BORING TYPE _____			SURFACE ELEV. _____			DATUM _____		
Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION										
0			X	S 1-1-3				SM	Sl. moist	Silty Sand Fined fine grained NP SNY										
1			X	S 3-2-3																
2			X	S 2-2-3																
3			X	S 3-3-4																
4			X	S 4-5-8																
5			X	T																
6			X	CN 11 9-15																
7			X	S 9-9-14																
8			X	S 10-15-18																
9			X	S 5-5-9																
10									[Note: silty loess @ 41']											
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				
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48																				
49																				
50																				

GROUND WATER

SAMPLE TYPE

DEPTH	HOUR	DATE
NONE		

A - Auger cuttings. B - Block sample

S = 2" O.D. 1.38" I.D. tube sample.

[illegible]

SERGEANT, HAUSKINS & BECKWITH

PROJECT Urban Taings (N. R. 12.5)
 JOB NO. 291-62F DATE 11/2/71

LOG OF TEST BORING NO. 291-62F

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
50			X	S	5-5-15			
55			X	S	15-9-9			
60			X	S	5-4-4			
65			X	S	1-32-36			CL
70			X	S	5-4-4			CL
75			X	G	10-24-32			

RIG TYPE CUT OFF (200)
 BORING TYPE 1/2" 5A
 SURFACE ELEV. _____
 DATUM _____

REMARKS	VISUAL CLASSIFICATION
	[Note: saturated sand and clay lenses @ 60]
moist to u moist	Clay h.P.I. grey
moist	tailings subbase Sandy clay 10 P.I. brown
	Auger stopped @ 73' Sampler stopped @ 7.
	hole covered to 70'. not plugged

GROUND WATER

DEPTH	HOUR	DATE
NONE		

SAMPLE TYPE

A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 H - 3" O.D. 2.44" I.D. tube sample.

SERGENT, HAUSKINS & BECKWITH

PROJECT NEW RIFLE

JOB NO. E91.63F DATE 9-25-51

LOG OF TEST BORING NO. 211

RIG TYPE CME 75
BORING TYPE 6'12" HSP
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. -
H - 2" O.D. 2.42" I.D. tube sample.

SERGEANT, HAUSKINS & BECKWITH

PROJECT Urban To Lines (New P.C.)
 JOB NO. EX-1000 DATE 7/23/21

CS
LOG OF TEST BORING NO. 2

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
0			X	S	1-1-2							
5			X	S	3-3-4							
10			X	S	3-3-2							
15			X	S	3-3-6							
20			X	S	3-3-5							
25			X	S	4-13-12							
30			X	S	5-4-3							
35			X	S	5-7-9							
40			X	S	5-12-12							
45			X	S	11-24-11							
50			X									

RIG TYPE CME SS (203)
 BORING TYPE SEA
 SURFACE ELEV. _____
 DATUM _____

sl. sand
fine sand
IP
very

(Note - grain size of sand)
0.075"

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

PROJECT Urban in Tallies
JOB NO. ETI-035 DATE 3/22/81

LOG OF TEST BORING NO. ^{CSU}212

JOB NO. _____

DATE

5127181

RIG TYPE CRIG 55 (702)

BORING TYPE 64-15A

SURFACE ELEV.

DATUM.

[illegible]

Auger raised @ 74' 1/2'
Sampler stopped @
71'

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.

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PROJECT Vramun Tailings (Plan E 66)
 JOB NO. E81-63F DATE 9/22/81

LOG OF TEST BORING NO. C

RIG TYPE CME 55 (203)
 BORING TYPE 6" SH
 SURFACE ELEV. _____
 DATUM _____

Depth In Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			X	S	1-1-4			SM	sl moist	S.L. sand med. fine grained NIP grey
5			X	S	3-4-5					
10			X	S	2-3-5					
15			X	S	2-4-4					
20			X	S	5-5-5					
25			X	S	5-5-6					[Note: green sand lens @ 25']
30			X	G	1-14-14					[Note: silty lens @ 35']
35			X	S	7-5-10					
40			X	S	5-8-1					
45			X	G	6-12-11					
50										

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

CS

PROJECT New Rifle
JOB NO. ES1-63E DATE 9-22-81

LOG OF TEST BORING NO. 2

RIG TYPE CME 751
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			X	S	2-2-5			SM	MOIST LOOSE	SILTY SAND FN. NP. GRAY
					7					
5			X	S	2-4-5					
					9					
10			X	S	2-3-5					
					8					
15			X	S	3-3-3					
					6					
20			X	S	4-4-5					
					7					
25			X	T						
30			X	S	6-6-6					
					12					
35			X	S	6-8-12					
					20					
40			X	S	4-4-6					
					9					
45			X	S	3-4-7					
					11					

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

JOB NO. ES-63E DATE 9-22-81

LOG OF TEST BORING NO. 244

RIG TYPE CME 75 (206)
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	RIG TYPE CME 75 (WSS)	
									BORING TYPE 6" HSA	SURFACE ELEV. _____ DATUM _____
									REMARKS	VISUAL CLASSIFICATION
50			X	C 1-2	N/A					
55			X	C 9-13						
60			X	C 8-10-11	21					
65			X	T						
70			X	S 2-2-3	5			SP	SATURATED LOOSE	SAND GCC. & THIN LENS OF CLAY FN. N.P.
75			X	S 4-6-7				SM	N-MOIST	LITE BRN. TO TAN (FAIRLY) (SUB BASE) SILTY SAND FN. N.P. BRN.
									AUG. REF. @ 77' STOPPED SAMP @ 76'	

NOTE: SLIMES @
50'-60'

SATURATED
LOOSE

SAND
Occ. a thin LENS OF
CLAY
FN.
N.P.
LITE BRN. TO TAN
~~(FAIRLY)~~
(SUB BASE)
SILTY SAND
FN.
N.P.
BRN.

AUG. REF. @ 77'
STOPPED SAMP @ 76'

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 - 2" O.D. 2.42" I.D. tube sample.

SERGEANT. HAUSKINS & BECKWITH

COMPUTING GEOTECHNICAL ENGINEERS

PROJECT New Rifle
JOB NO. 591-632 DATE 7-20-61

RIG TYPE CME 75 (206)
BORING TYPE 6" HSA
SURFACE ELEV. _____
DATUM _____

[illegible]

HOLE DRILLED
TO 78' FOR
PIEZ. INST.

GROUND WATER

DEPTH	HOUR	DATE
741	6:50	9-26-81

SAMPLE TYPE

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

SERGEANT, HAUSKINS & BECKWITH

PROJECT New Rifle
 JOB NO. ES-65 DATE 9-24-81

LOG OF TEST BORING NO. CS 21

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			X	IT				SP	MOIST	SAND
5			X	S 2-5-4				SM	V-MOIST	FIN. - FC. RUP GRNY NOTE: SOME DEBRIS FROM 2' is wood chips
10								GL		(TAILINGS) (SUB BASE)
15										SILTY SAND SOME ORGANICS @ INTER NP BRN
										GRAVELY COBES. RND. CRS. NP BRN
										AUG. REF. @ 11'-4"

GROUND WATER		
DEPTH	HOUR	DATE

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

SERGENT, HAUSKINS & BECKWITH
 CONSULTING GEOLOGICAL ENGINEERS

PROJECT

New Rifle

JOB NO.

E01-63E

DATE

9-22-81

LOG OF TEST BORING NO. 3

CE

RIG TYPE

CME 75 (206)

BORING TYPE

6 3/4" HSA

SURFACE ELEV.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			X	S	1-3-4			SM	MOIST	SILTY SAND
					-7					FN.
5			X	S	2-3-3					N.P.
					6					DARK GRAY
10			X	S	4-4-8					
					12					
15			X	S	6-6-8					
					14					
20			X	T						
25			X	S	3-6-10					
					16					
30			X	S	3-3-5					
					8					
35			X	S	2-4-8					
					12					
40			X	S	3-3-2					
					5					
45			X	C	6-7			SM / GM	MOIST	(TAILINGS)
					N/R					(SUB BASE)
										SILTY SAND & GRV.
										SOME COBBES.
										RND. BRN
										N.P. BRN
										AUG. REFUSED @ 46

GROUND WATER

DEPTH	HOOR	DATE
	0700	9/22/81

SAMPLE TYPE

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

SERGENT, HAUSKINS & BECKWITH

END

**DATE
FILMED**

8/27/93