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	Formerly Utilized Sites Remedial Action Program (FUSRAP)
	RADIOLOGICAL CHARACTERIZATION
	REPORT FOR THE RESIDENTIAL
	PROPERTY AT 18 LONG VALLEY ROAD
	Lodi, New Jersey
	·
	November 1988
	(Dente)
	BUILD
$\square$	Bechtel National, Inc.

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Attention: Peter J. Gross, Director Technical Services Division

- Subject: Bechtel Job No. 14501, FUSRAP Project DOE Contract No. DE-AC05-810R20722 Publication of the Radiological Characterization Reports for the Residential Properties at 7 Branca Court, 11 Branca Court, 16 Long Valley Road, 18 Long Valley Road, 20 Long Valley Road, 22 Long Valley Road, 26 Long Valley Road, 11 Redstone Lane, and the Lodi Municipal Park, in Lodi, New Jersey Code: 7310/WBS: 138
- Reference: Letter from S. K. Oldham (DOE), 88-669 dated October 19, 1988, to B. W. Clemens (BNI), "Final Comments on the Prepublication Draft of the Radiological Characterization Reports for the Residential Properties at 7 Branca Court, 11 Branca Court, 16 Long Valley Road, 18 Long Valley Road, 20 Long Valley Road, 22 Long Valley Road, 26 Long Valley Road, 11 Redstone Lane, and the Lodi Municipal Park, in Lodi, New Jersey," CCN 056527.

Dear Mr. Gross:

Enclosed are six copies each of the published version of the nine characterization reports listed above. Incorporated in these reports are comments based on the reference above and additional discussions between N. C. Ring and S. K. Oldham of your office and J. D. Berger of ORAU.



Peter J. Gross

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These publications also incorporate changes in wording regarding site release as requested by S. K. Oldham and A. Avel.

Please notify me should you require additional copies (6-1677).

Very truly yours, Dhenwood

SKI

B. W. Clemens for Project Manager - FUSRAP CONCURRENCE

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BWC/skl:1750x Enclosures: As stated

cc:

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#### DOE/OR/20722-170

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# RADIOLOGICAL CHARACTERIZATION REPORT FOR THE RESIDENTIAL PROPERTY AT 18 LONG VALLEY ROAD LODI, NEW JERSEY

NOVEMBER 1988

Prepared for

UNITED STATES DEPARTMENT OF ENERGY OAK RIDGE OPERATIONS OFFICE Under Contract No. DE-AC05-810R20722

By

N. C. Ring and S. K. Livesay Bechtel National, Inc. Oak Ridge, Tennessee Bechtel Job No. 14501

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### ABBREVIATIONS

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| cm              | centimeter                 |
|-----------------|----------------------------|
| cm <sup>2</sup> | square centimeter          |
| cpm             | counts per minute          |
| dpm             | disintegrations per minute |
| ft              | foot                       |
| h               | hour                       |
| in.             | inch                       |
| 1               | liter                      |
| l/min           | liters per minute          |
| m               | meter                      |
| 2<br>m          | square meter               |
| MeV             | million electron volts     |
| µR/h            | microroentgens per hour    |
| mi              | mile                       |
| mi <sup>2</sup> | square mile                |
| min             | minute                     |
| mrad/h          | millirad per hour          |
| mrem            | millirem                   |
| mrem/yr         | millirem per year          |
| pCi/g           | picocuries per gram        |
| pCi/l           | picocuries per liter       |
| WL              | working level              |
| Уd              | yard                       |
| yd <sup>3</sup> | cubic yards                |
|                 |                            |

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#### 1.0 INTRODUCTION AND SUMMARY

#### 1.1 INTRODUCTION

The 1984 Energy and Water Appropriations Act authorized the U.S. Department of Energy (DOE) to conduct a decontamination research and development project at four sites, including the site of the former Maywood Chemical Works (now owned by the Stepan Company) and its vicinity properties. The work is being administered by the Formerly Utilized Sites Remedial Action Program (FUSRAP), one of two remedial action programs under the direction of the DOE Division of Facility and Site Decommissioning Projects. The residential properties in Lodi, New Jersey, are included in FUSRAP as vicinity properties. Figure 1-1 shows the location of the Lodi vicinity properties in relation to the former Maywood Chemical Works.

The United States Government initiated FUSRAP in 1974 to identify, clean up, or otherwise control sites where low activity radioactive contamination (exceeding current guidelines) remains from the early years of the nation's atomic energy program or from commercial operations that resulted in conditions Congress has mandated DOE to remedy (Ref. 1).

FUSRAP is currently being managed by DOE Oak Ridge Operations. As the Project Management Contractor for FUSRAP, Bechtel National, Inc. (BNI) is responsible to DOE for planning, managing, and implementing FUSRAP.

#### 1.2 PURPOSE

The purpose of the 1986 survey performed by BNI was to locate the horizontal and vertical boundaries of radionuclide concentrations exceeding remedial action guidelines.



FIGURE 1-1 LOCATION OF LODI VICINITY PROPERTIES

#### 1.3 SUMMARY

This report summarizes the procedures and results of the radiological characterization of the property at 18 Long Valley Road (Figure 1-2) in Lodi, New Jersey, conducted from September through December 1986.

Ultimately, the data generated during the radiological characterization will be used to define the complete scope of remedial action necessary to release the site.

This characterization confirmed that thorium-232 is the primary radioactive contaminant at this property. Results of surface soil samples for 18 Long Valley Road showed maximum concentrations of thorium-232 and radium-226 to be 58.3 and less than 3.0 pCi/g, respectively. Subsurface soil sample concentrations ranged from 0.9 to 31.9 pCi/g for thorium-232 and from 0.5 to 2.8 pCi/g for radium-226. The average background level in this area for both radium-226 and thorium-232 is 1.0 pCi/g.

Historical information indicates that uranium is not a primary contaminant in this area; therefore, analysis for uranium was not considered critical for this characterization. The soil samples have been archived and, if necessary, can be analyzed for uranium at some future date. Because the major contaminants at the vicinity properties are thorium and radium, the decontamination guidelines provide the appropriate guidance for the cleanup activities. DOE believes that these guidelines are conservatively low for considering potential adverse health effects that might occur in the future from any residual contamination. The dose contributions from uranium and any other radionuclides not numerically specified in these guidelines are not expected to be significant following decontamination. In addition, because the vicinity properties will be decontaminated in a manner to reduce future doses to levels that are as low as reasonably achievable (ALARA), DOE will ensure that most of the radioactivity present at these vicinity properties will be removed during the cleanup (Ref. 2).



# FIGURE 1-2 LOCATION OF 18 LONG VALLEY ROAD

Soil analysis data for this property showed surface contamination. Subsurface investigation by gamma logging and soil analysis indicated contamination to a depth of 2.0 ft.

Exterior gamma radiation exposure measurements ranged from 7 to 12  $\mu$ R/h, including background, outside the residence. The measurement inside the residence was 5  $\mu$ R/h, including background.

The radon-222 measurements inside the residence indicated a concentration of 0.1 pCi/l, which is within the DOE guideline of 3.0 pCi/l.

Measurements for radon daughters ranged from 0.0007 to 0.002 WL, and measurements for thoron daughters ranged from 0.0001 to 0.0004 WL.

#### 2.0 SITE HISTORY

The Maywood Chemical Works was founded in 1895. During World War I (in 1916), the company began processing thorium from monazite sand for use in manufacturing gas mantles for various lighting devices. The company continued this work until 1956. Process wastes from manufacturing operations were pumped to two areas surrounded by earthen dikes (northern and southern diked areas) on property west of the plant. Subsequently, some of the contaminated wastes migrated onto adjacent and vicinity properties.

In 1928 and again between 1944 and 1946, some of the residues from the processing operations were moved from the company's property and used as mulch and fill in nearby low-lying areas. The fill material consisted of tea and cocoa leaves mixed with other material resulting from operations at the plant and apparently also contained thorium process wastes (Ref. 3).

It is not known for certain how the properties in Lodi were contaminated. According to an area resident, fill from an unknown source was brought to Lodi and spread over large portions of the previously low-lying and swampy area. For several reasons, however, a more plausible explanation is that the contamination migrated along a drainage ditch originating on the Maywood Chemical Works property. It can be seen from photographs and tax maps of the area that the course of a previously existing stream known as Lodi Brook, which originated at the former Maywood Chemical Works, generally coincides with the path of contamination in Lodi. The brook was subsequently replaced by a storm drain system as the area was developed. Secondly, samples taken from Lodi properties indicate elevated concentrations of a series of elements known as rare Rare earth elements are typically found in monazite sands, earths. which also include thorium. This type of sand was feedstock at the Maywood Chemical Works, and elevated levels are known to exist in the by-product of the extraction process. Third, the ratio of thorium to other radionuclides found in these Lodi properties is

comparable to the ratio found in contaminated material on other properties in Lodi (Ref. 4). And finally, long-time residents of Lodi recall chemical odors in and around the brook in Lodi and steam rising off the water. These observations suggest discharges of contaminants occurring upstream.

The Stepan Chemical Company (now called the Stepan Company) purchased Maywood Chemical Works in 1959. The Stepan Company itself has never been involved in the manufacture or processing of any radioactive materials (Ref. 5).

#### 2.1 PREVIOUS RADIOLOGICAL SURVEYS

<u>January 1981</u> - The Nuclear Regulatory Commission (NRC) directed that a survey of the Stepan Company property and its vicinity be conducted. Using the Stepan Company plant as the center, a 4-mi<sup>2</sup> aerial survey conducted by the EG&G Energy Measurements Group identified anomalous concentrations of thorium-232 to the north and south of the Stepan Company property. The Lodi residential properties were included in this survey (Ref. 6).

<u>June 1984</u> - In June 1984, Oak Ridge National Laboratory (ORNL) conducted a "drive by" survey of Lodi using its "scanning van." Although not comprehensive, the survey indicated areas requiring further investigation (Ref. 7).

<u>September 1986</u> - At the request of DOE, ORNL conducted radiological surveys of the vicinity properties in Lodi, New Jersey, for the purpose of determining which properties contained radioactive contamination in excess of guidelines and would require remedial action (Ref. 8).

#### 2.2 REMEDIAL ACTION GUIDELINES

Table 2-1 summarizes the DOE guidelines for residual contamination. The thorium-232 and radium-226 limits listed in Table 2-1 will be

used to determine the extent of remedial action required at the vicinity properties. DOE developed these guidelines to be consistent with the guidelines established by the Environmental Protection Agency (EPA) for the Uranium Mill Tailings Remedial Action Program.

#### TABLE 2-1

#### SUMMARY OF RESIDUAL CONTAMINATION GUIDELINES FOR THE LODI VICINITY PROPERTIES

#### Page 1 of 2

#### BASIC DOSE LIMITS

The basic limit for the annual radiation dose received by an individual member of the general public is 100 mrem/yr.

#### SOIL (LAND) GUIDELINES (MAXIMUM ALLOWABLE LIMITS)

#### Radionuclide

Soil Concentration (pCi/g) above background<sup>a,b,c</sup>

Radium-226 Radium-228 Thorium-230 Thorium-232 5 pCi/g, averaged over the first 15 cm of soil below the surface; 15 pCi/g when averaged over any 15-cmthick soil layer below the surface layer.

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#### STRUCTURE GUIDELINES (MAXIMUM ALLOWABLE LIMITS)

#### Airborne Radon Decay Products

Generic guidelines for concentrations of airborne radon decay products shall apply to existing occupied or habitable structures on private property; structures that will be demolished or buried are excluded. The applicable generic guideline (40 CFR 192) is: In any occupied or habitable building, the objective of remedial action shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL.<sup>d</sup> In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL. Remedial actions are not required in order to comply with this guideline when there is reasonable assurance that residual radioactive materials are not the cause.

#### External Gamma Radiation

The average level of gamma radiation inside a building or habitable structure on a site shall not exceed the background level by more than 20  $\mu$ R/h.

#### Indoor/Outdoor Structure Surface Contamination

|                                                                              | Allowable Residual Surface Co<br>(dpm/100 cm <sup>2</sup> ) |                    | Contamination <sup>e</sup>     |  |
|------------------------------------------------------------------------------|-------------------------------------------------------------|--------------------|--------------------------------|--|
| <u>Radionuclide</u> f                                                        | <u>Average</u> <sup>g,h</sup>                               | <u>Maximum</u> h,i | <u>Removable<sup>h,j</sup></u> |  |
| Transuranics, Ra-226, Ra-228, Th-230, Th-228<br>Pa-231, Ac-227, 1-125, 1-129 | 100                                                         | 300                | 20                             |  |
| Th-Natural, Th-232, Sr-90, Ra-223, Ra-224<br>U-232, 1-126, I-131, 1-133      | 1,000                                                       | 3,000              | 200                            |  |

| TAB | LE | 2- | 1 |
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|-----|----|----|---|

#### (continued)

#### Page 2 of 2

|                                                                                                 |                    |                    | Surface Contamination <sup>e</sup><br>00 cm <sup>2</sup> ) |  |
|-------------------------------------------------------------------------------------------------|--------------------|--------------------|------------------------------------------------------------|--|
| Radionuclide <sup>f</sup>                                                                       | <u>Average</u> g,h | <u>Maximum</u> h,i | <u>Removable</u> h,j                                       |  |
| U-Natural, U-235, U-238, and associated decay products                                          | 5,000 a            | 15,000 a           | 1,000 a                                                    |  |
| Beta-gamma emitters (radionuclides with decay<br>modes other than alpha emission or spontaneous |                    |                    |                                                            |  |
| fission) except Sr-90 and others noted above                                                    | 5,000 β-γ          | 15,000 B-Y         | 1,000 B-Y                                                  |  |

<sup>a</sup>These guidelines take into account ingrowth of radium-226 from thorium-230 and of radium-228 from thorium-232, and assume secular equilibrium. If either thorium-230 and radium-226 or thorium-232 and radium-228 are both present, not in secular equilibrium, the guidelines apply to the higher concentration. If other mixtures of radionuclides occur, the concentrations of individual radionuclides shall be reduced so that the dose for the mixtures will not exceed the basic dose limit.

<sup>b</sup>These guidelines represent residual concentrations above background averaged across any 15-cm-thick layer to any depth and over any contiguous 100-m<sup>2</sup> surface area.

<sup>C</sup>Localized concentrations in excess of these limits are allowable provided that the average concentration over a  $100-m^2$  area does not exceed these limits.

 $d_A$  working level (WL) is any combination of short-lived radon decay products in 1 liter of air that will result in the ultimate emission of 1.3 x 10<sup>5</sup> MeV of potential alpha energy.

<sup>e</sup>As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

<sup>f</sup>Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.

<sup>9</sup>Measurements of average contamination should not be averaged over more than  $1 \text{ m}^2$ . For objects of less surface area, the average shall be derived for each such object.

<sup>h</sup>The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm.

<sup>1</sup>The maximum contamination level applies to an area of not more than 100  $cm^2$ .

<sup>j</sup>The amount of removable radioactive material per 100 cm<sup>2</sup> of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm<sup>2</sup> is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. The numbers in this column are maximum amounts.

#### 3.0 HEALTH AND SAFETY PLAN

BNI is responsible for protecting the health of personnel assigned to work at the site. As such, all subcontractors and their personnel are required to comply with the provisions of the applicable project instructions cited in this section or as directed by the on-site BNI representative.

#### 3.1 SUBCONTRACTOR TRAINING

Before the start of work, all subcontractor personnel attend an orientation session presented by the BNI representative to explain the nature of the material to be encountered in the work and the required personnel monitoring and safety measures.

#### 3.2 <u>SAFETY REQUIREMENTS</u>

Subcontractor personnel must comply with the following BNI requirements.

- Bioassay Subcontractor personnel submit bioassay samples before or at the beginning of on-site activity, upon completion of the activity, and periodically during site activities as requested by BNI.
- Protective Clothing/Equipment Subcontractor personnel are required to wear the protective clothing/equipment specified in the subcontract or as directed by the BNI representative.
- o Dosimetry Subcontractor personnel are required to wear, and return daily, the dosimeters and monitors issued by BNI.
- Controlled Area Access/Egress Subcontractor personnel and equipment entering areas wherein access and egress are controlled for radiation and/or chemical safety purposes are surveyed by the BNI representative for contamination before leaving those areas.
- Medical Surveillance Upon written direction from BNI, subcontractor personnel who work in areas where hazardous chemicals might exist are given a baseline and periodic health assessment defined in BNI's Medical Surveillance Program.

Radiation and/or chemical safety surveillance of all activities related to the scope of work is under the direct supervision of personnel representing BNI.

The health physics requirements for all activities involving radiation or radioactive material are defined in Project Instruction No. 20.01, the Project Radiation Protection Manual and implementing procedures.

The industrial hygiene requirements for activities involving chemicals or chemically contaminated materials are defined in Project Instruction No. 26.00, the Environmental Hygiene Manual and implementing procedures.

Copies of these project instructions and manuals are located on-site for the use of subcontractor personnel.

#### 4.0 CHARACTERIZATION PROCEDURES

A master grid was established by the surveyor; BNI's radiological support subcontractor, Thermo Analytical/Eberline (TMA/E), established a grid on individual properties. The size of the grid blocks is adjusted to adequately characterize each property. The grid origin allows the grid to be reestablished during remedial action and is correlated with the New Jersey state grid system. All data correspond to coordinates on the characterization grid. The grid and its east and north coordinates are shown on all figures of the property (Sections 4 and 5).

#### 4.1 FIELD RADIOLOGICAL CHARACTERIZATION

#### 4.1.1 Measurements Taken and Methods Used

An initial walkover survey using unshielded gamma scintillation detectors (2-in. by 2-in. thallium-activated sodium iodide probe) to identify areas of elevated radionuclide activity was performed. Near-surface gamma measurements taken using a cone-shielded gamma scintillation detector were also used in determining areas of surface contamination. Using the shielded detector ensured that the majority of the radiation detected by the instrument originated from the ground directly beneath the unit. Shielding against lateral gamma flux, or shine, from nearby areas of contamination minimized potential sources of error in the measurements. The measurements were taken 12 in. above the ground at the intersections of 10-ft grid lines. The shielded detector was calibrated at the Technical Measurements Center (TMC) in Grand Junction, Colorado, to provide a correlation of counts per minute (cpm) to picocuries per gram This calibration demonstrated that 11,000 cpm corresponds (pCi/g). to the DOE guideline of 5 pCi/g plus local average background of 1 pCi/g for thorium-232 in surface soils (Ref. 9).

A subsurface investigation was conducted to determine the depth to which the previously identified surface contamination extends and to

locate subsurface contamination where there is no surface manifestation. The subsurface characterization consisted of drilling and gamma logging 12 boreholes (Figure 4-1) using either a 3-in.- or 6-in.-diameter auger bit; holes were drilled to depths determined in the field by the radiological and geological support representatives.

The downhole gamma logging technique was used because the procedure can be completed more quickly than collecting soil samples, and it eliminates the need for analyzing these samples in a laboratory. A 2-in. by 2-in. sodium iodide gamma scintillation detector was used to perform the downhole logging. The instrument was calibrated at TMC where it was determined that a count rate of approximately 40,000 cpm corresponds to the 15-pCi/g subsurface contamination guideline for thorium-232 in subsurface soils. This relationship has also been corroborated in results from previous characterizations where thorium-232 was found (Ref. 9).

Gamma radiation measurements were taken at 6-in. vertical intervals, and determined the depth and concentration of the contamination. The gamma logging data were reviewed to identify trends, regardless of whether concentrations exceeded the guidelines.

#### 4.1.2 Sample Collection and Analysis

To identify surface areas where the level of contamination exceeded the DOE guideline of 5 pCi/g for thorium-232 in surface soils, areas with measurements of more than 11,000 cpm were plotted. Using these data as well as data from previous surveys (Refs. 5, 6, 7, and 8), the locations of biased surface soil samples were selected to better define the limits of contamination. Surface soil samples were taken at 12 locations (Figure 4-2) and analyzed for thorium-232 and radium-226. Each sample was dried, pulverized, and counted for 10 min using an intrinsic germanium detector housed in a lead counting cave lined with cadmium and copper. The pulse height distribution was sorted using a computer-based, multichannel



## FIGURE 4-1 BOREHOLE LOCATIONS AT 18 LONG VALLEY ROAD

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FIGURE 4-2 SURFACE AND SUBSURFACE SOIL SAMPLING LOCATIONS AT 18 LONG VALLEY ROAD

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analyzer. Radionuclide concentrations were determined by comparing the gamma spectrum of each sample with the spectrum of a certified counting standard for the radionuclide of interest.

Subsurface soil samples were collected from 12 locations (Figure 4-2) using the side wall sampling method and were analyzed to compare laboratory soil sample results to downhole gamma radiation measurements. A cup or can attached to a steel pipe or wooden stake was inserted into the borehole and used to scrape samples off the side of the borehole at a specified depth. The subsurface soil samples were analyzed for radium-226 and thorium-232 in the same manner as the surface soil samples.

#### 4.2 BUILDING RADIOLOGICAL CHARACTERIZATION

After evaluating previous radiological survey data as well as data from this characterization, it was suspected that contamination might be present under the foundation of the residence. A radon measurement was obtained to verify the presence of contaminated material under the residence and to estimate potential occupational exposures during future remedial actions.

Indoor radon measurements were taken using the Tedlar bag technique. Using this method, radon measurements are obtained by pumping air into a Tedlar bag at a rate of approximately 2 1/min and transferring the air sample directly into a scintillation cell with an interior coating of zinc sulfide and an end window for viewing the scintillations. Analysis of the sample was simplified by allowing the radon decay products to build up over time. This method allows all the radon decay products to come into secular equilibrium with the radon. The scintillation cell was placed in contact with a photomultiplier tube, and the scintillations were counted using standard nuclear counting instrumentation.

Indoor air sample collection was also performed to determine working levels (WL) of radon and thoron daughters. Measurement of radon

daughters was done by collecting an air sample for exactly 5 min through a 0.45-micron membrane filter at a rate of 11 liters/min for a total sample volume of 55 1. Alpha particle activity on the filter paper was counted 40 to 90 min after sampling using an alpha scintillation detector coupled to a count-rate meter or a digital scaler. Measurements for thoron daughters were conducted using the same method as for radon daughters with the exception of the time between collection of the air sample and counting of the alpha particle activity. In the case of thoron daughters, the sample is allowed to age for at least 5 h after sampling before alpha activity is counted. This elapsed time allows radon daughters, which may be present with the thoron daughters, to decay sufficiently so as not to interfere in calculating the working levels for thoron daughters.

Exterior gamma exposure rate measurements were made at six locations throughout the property grid system and at one location inside the residence using either a 2-in. by 2-in. thallium-activated sodium iodide gamma scintillation detector used to detect gamma radiation only, or a pressurized ionization chamber (PIC) (Figure 4-3). The PIC instrument has a response to gamma radiation that is proportional to exposure in roentgens. A conversion factor for gamma scintillation to the PIC was established through a correlation of these two measurements at four locations in the vicinity of the property. The unshielded gamma scintillation detector readings were then used to estimate gamma exposure rates for each location. These measurements were taken 3 ft above the ground, and the locations were determined to be representative of the entire property. Interior measurements are generally obtained with the gamma scintillation instrument rather than the PIC because of its smaller size and the desire to minimize the technician's time inside the residence.



# FIGURE 4-3 EXPOSURE RATE MEASUREMENT LOCATIONS AT 18 LONG VALLEY ROAD

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#### 5.0 CHARACTERIZATION RESULTS

#### 5.1 FIELD RADIOLOGICAL CHARACTERIZATION

Near-surface gamma radiation measurements on the property ranged from 3,500 cpm to approximately 30,000 cpm. The average background level for this area is 5,000 cpm. A measurement of 11,000 cpm is approximately equal to the DOE guideline for thorium-232 of 5 pCi/g above background for surface soil contamination. Using this correlation, the near-surface gamma measurements were used to determine the extent of surface contamination as well as the basis for selecting the locations of soil samples.

Surface soil samples were taken from several locations on the property (Figure 4-2). These samples were analyzed for thorium-232 and radium-226. The concentrations in these samples ranged from 1.4 to 58.3 pCi/g for thorium-232 and from 0.9 pCi/g to less than 3.0 pCi/g for radium-226. Analysis results for surface soils (depths from 0.0 to 0.5 ft) are provided in Table 5-1. Results showed concentrations of thorium-232 in excess of DOE guidelines (5 pCi/g plus background of 1 pCi/g for surface soils) with a maximum concentration of 58.3 pCi/g. Use of the "less than" ( < ) notation in reporting results indicates that the radionuclide was not present in concentrations that are quantitative with the instruments and techniques used. The "less than" value represents the lower bound of the quantitative capacity of the instrument and technique used and is based on various factors, including the volume, size, and weight of the sample; the type of detector used; the counting time, and the background count rate. The actual concentration of the radionuclide is less than the value indicated. In addition, since radioactive decay is a random process, a correlation between the rate of disintegration and a given radionuclide concentration cannot be precisely established. For this reason, the exact concentration of the radionuclide cannot be determined. As such, each value that can be quantitatively determined has an associated uncertainty term  $(\pm)$ , which represents

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the amount by which the actual concentration can be expected to differ from the value given in the table. The uncertainty term has an associated confidence level of 95 percent.

Analysis results for subsurface soil samples given in Table 5-1 (depths from 0.5 to 1.0 ft) are consistent with the gamma logging data in Table 5-2. The results in Table 5-2 showed a range from 6,000 cpm to 91,000 cpm. A measurement of 40,000 cpm is approximately equal to the DOE guideline for subsurface contamination of 15 pCi/g. Analyses of subsurface soil samples indicated thorium-232 concentrations ranging from 0.9 to 31.9 pCi/g and radium-226 concentrations ranging from 0.5 to 2.8 pCi/g.

On the basis of near-surface gamma radiation measurements, surface and subsurface soil sample analysis, and downhole gamma logging, the contamination of this property is believed to consist primarily of surface contamination with an isolated area of subsurface contamination. The subsurface contamination is located in the backyard of the property near the southeastern corner to a depth of 2.0 ft. Areas of surface contamination are shown in Figure 5-1. The area of subsurface contamination is shown in Figure 5-2.

The vertical and horizontal limits of contamination as determined by this characterization effort are being evaluated to determine the volume of contaminated material that will require remedial action. To develop this estimate, BNI will consider the location of the contamination, construction techniques, and safety procedures.

#### 5.2 BUILDING RADIOLOGICAL CHARACTERIZATION

Results of two indoor radon measurements made with the Tedlar bag method indicated a concentration of 0.1 pCi/l. These measurements were substantially less than the applicable DOE guideline of 3.0 pCi/l (Ref. 10).

Results of measurements for radon daughters ranged from 0.0007 to 0.002 WL and were substantially less than the applicable generic



FIGURE 5-1 AREAS OF SURFACE CONTAMINATION AT 18 LONG VALLEY ROAD

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FIGURE 5-2 AREAS OF SUBSURFACE CONTAMINATION AT 18 LONG VALLEY ROAD

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guideline (40 CFR 192) (Ref. 10) of an annual average (or equivalent) radon decay product concentration not to exceed 0.02 WL.

Results of measurements for thoron daughters ranged from 0.0001 to 0.0004 WL. The generic guideline is more restrictive for radon-222 (radon) than for radon-220 (thoron) according to NCRP Report No. 50 (Ref. 11), which was used as the guideline for thoron daughter measurements.

Exterior gamma radiation exposure rate measurements ranged from 7  $\mu$ R/h to 12  $\mu$ R/h, including background. The indoor exposure rate measurement was 5  $\mu$ R/h, including background. None of the exterior measurements exceeds the DOE guideline of 100 mrem/yr for public exposure. This is based on the assumption of 16 hours occupancy per day for 365 days per year (5,840 hours) and subtracting average background of 9  $\mu$ R/h (Ref. 12). These results can be found in Table 5-3.

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SURFACE AND SUBSURFACE RADIONUCLIDE CONCENTRATIONS IN SOIL FOR 18 LONG VALLEY ROAD<sup>a</sup> .

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| Coord | linates | Depth     | Concent     | ration (pCi/g +/- 2 sign | ma)           |
|-------|---------|-----------|-------------|--------------------------|---------------|
| East  | North   | (ft)      | Uranium-238 | Radium-226               | Thorium-232   |
| 3510  | 2462    | 0.0 - 0.5 | '-b-        | 1.4 +/- 0.7              | 1.6 +/- 0.4   |
| 3510  | 2462    | 0.5 - 1.0 | -b-         | 1.1 +/- 0.6              | 2.1 +/- 0.6   |
| 3516  | 2242    | 0.0 - 0.5 | -b-         | 1.9 +/- 0.4              | 2.5 +/- 0.4   |
| 3516  | 2242    | 0.5 - 1.0 | -b-         | 2.3 +/- 0.7              | 1.5 +/- 0.6   |
| 3550  | 2451    | 0.0 - 0.5 | -b-         | < 1.1                    | 1.4 + / - 0.2 |
| 3550  | 2451    | 0.5 - 1.0 | -b-         | 0.5 +/- 0.3              | 1.2 +/- 0.2   |
| 3551  | 2407    | 0.0 - 0.5 | -b-         | < 1.3                    | 3.2 +/- 0.5   |
| 3551  | 2407    | 0.5 - 1.0 | -b-         | < 1.6                    | 1.9 +/- 0.4   |
| 3571  | 2433    | 0.0 - 0.5 | -b-         | 0.9 +/- 0.3              | 4.1 +/- 0.3   |
| 3571  | 2433    | 0.5 - 1.0 | -b-         | 1.0 +/- 0.4              | 1.9 +/- 0.7   |
| 3595  | 2380    | 0.0 - 0.5 | b           | 1.0 +/- 0.4              | 2.6 +/- 0.4   |
| 3595  | 2380    | 0.5 - 1.0 | -b-         | 2.8 +/- 0.6              | 1.1 +/- 0.8   |
| 3614  | 2335    | 0.0 - 0.5 | -b-         | 1.3 +/- 0.4              | 5.7 +/- 0.5   |
| 3614  | 2335    | 0.5 - 1.0 | -b-         | 2.7 +/- 0.8              | 8.8 +/- 1.1   |
| 3615  | 2390    | 0.0 - 0.5 | -b-         | 1.0 +/- 0.5              | 3.3 +/- 0.4   |
| 3615  | 2390    | 0.5 - 1.0 | -b-         | 1.0 +/- 0.6              | 0.9 +/- 0.6   |
| 3659  | 2330    | 0.0 - 0.5 | -b-         | 0.9 + / - 0.4            | 7.4 +/- 0.4   |
| 3659  | 2330    | 0.5 - 1.0 | - b-        | 0.9 +/- 0.4              | 1.1 +/- 0.7   |

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| TABLE 2-1 | • |
|-----------|---|
|-----------|---|

(continued)

| Coord | linates_ | natesDepthConcentration (pCi/g +/- 2 sigma) |             | ma)         |              |
|-------|----------|---------------------------------------------|-------------|-------------|--------------|
| East  | North    | (ft)                                        | Uranium-238 | Radium-226  | Thorium-232  |
| 3665  | 2291     | 0.0 - 0.5                                   | -b-         | 1.9 +/- 0.7 | 2.5 +/- 0.3  |
| 3665  | 2291     | 0.5 - 1.0                                   | -b-         | 2.4 +/- 0.6 | 2.6 +/- 0.6  |
| 3682  | 2272     | 0.0 - 0.5                                   | -b-         | < 3.0       | 58.3 +/- 1.3 |
| 3682  | 2272     | 0.5 - 1.0                                   | -b-         | 1.5 +/- 0.8 | 31.9 +/- 1.3 |
| 3688  | 2295     | 0.0 - 0.5                                   | -b-         | 1.0 +/- 0.3 | 34.0 +/- 0.7 |
| 3688  | 2295     | 0.5 - 1.0                                   | b           | 0.8 +/- 0.4 | 2.2 +/- 0.4  |

<sup>a</sup>Sampling locations are shown in Figure 4-2.

<sup>b</sup>Analysis not requested.

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# DOWNHOLE GAMMA LOGGING RESULTS

FOR 18 LONG VALLEY ROAD<sup>a</sup>

| Page 1 of 4     |               |                    |                         |  |  |
|-----------------|---------------|--------------------|-------------------------|--|--|
| Coordi          | nates         | Depth <sup>b</sup> | Count Rate <sup>C</sup> |  |  |
| East            | North         | (Īt)               | (cpm)                   |  |  |
|                 |               |                    | ·····                   |  |  |
| Borehole        | A 27Dd        |                    |                         |  |  |
| BOLEHOIE        | 4271          |                    |                         |  |  |
| 3551            | 2407          | 0.5                | 12000                   |  |  |
| 3551            | 2407          | 1.0                | 12000                   |  |  |
| 3551            | 2407          | 1.5                | 12000                   |  |  |
| 3551            | 2407          | 2.0                | 12000                   |  |  |
| 3551            | 2407          | 2.5                | 12000                   |  |  |
| 3551            | 2407          | 3.0                | 12000                   |  |  |
| <u>Borehole</u> | <u>428R</u> d |                    |                         |  |  |
| 3516            | 2442          | 0.5                | 11000                   |  |  |
| 3516            | 2442          | 1.0                | 12000                   |  |  |
| 3516            | 2442          | 1.5                | 12000                   |  |  |
| 3516            | 2442          | 2.0                | 13000                   |  |  |
| 3516            | 2442          | 2.5                | 12000                   |  |  |
| 3516            | 2442          | 3.0                | 13000                   |  |  |
| 3516            | 2442          | 3.5                | 12000                   |  |  |
| 3516            | 2442          | 4.0                | 12000                   |  |  |
| 3516            | 2442          | 4.5                | 12000                   |  |  |
| 3516            | 2442          | 5.0                | 12000                   |  |  |
| 3516            | 2442          | 5.5                | 12000                   |  |  |
| 3516            | 2442          | 6.0                | 12000                   |  |  |
| 3516            | 2442          | 6.5                | 12000                   |  |  |
| <u>Borehole</u> | <u>429R</u> d |                    |                         |  |  |
|                 |               |                    |                         |  |  |
| 3550            | 2451          | 0.5                | 10000                   |  |  |
| 3550            | 2451          | 1.0                | 11000                   |  |  |
| 3550            | 2451          | 1.5                | 12000                   |  |  |
| <u>Borehole</u> | <u>430R</u> d |                    |                         |  |  |
| 3510            | 2462          | 0.5                | 8000                    |  |  |
| 3510            | 2462          | 1.0                | 10000                   |  |  |
| 3510            | 2462          | 1.5                | · 11000                 |  |  |
| 3510            | 2462          | 2.0                | 11000                   |  |  |
| Borehole        | <u>612R</u> d |                    |                         |  |  |
| 3688            | 2295          | 0.5                | 12000                   |  |  |
| 3688            | 2295          | 1.0                | 12000                   |  |  |
| 3688            | 2295          | 1.5                | 13000                   |  |  |
|                 |               |                    |                         |  |  |

## (continued)

| East         North         (ft)         (cpm)           Borehole 612R (continued) <sup>d</sup> 3688         2295         2.0         13000           3688         2295         2.5         12000           3688         2295         3.0         11000           Borehole 613R <sup>d</sup> 3682         2272         0.5         75000           3682         2272         1.5         69000         3682         2272         32000           3682         2272         2.0         32000         3682         2272         32000           3682         2272         3.0         13000         3600         3682         2272         4.0         13000           3682         2272         4.0         13000         3600         3659         2330         1.5         12000           3659         2330         0.5         13000         3600         3659         2330         1.0         13000           3659         2330         0.5         11000         3659         2330         3.5         9000           3659         2330         3.5         9000         3659         2330         4.0         8000           B | Coordinates     |               | Depth <sup>b</sup>  | Count Rate <sup>C</sup> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------|---------------------|-------------------------|
| 3688       2295       2.0       13000         3688       2295       3.0       11000         Borehole 613R <sup>d</sup> 3682       2272       0.5       75000         3682       2272       1.0       91000         3682       2272       1.5       69000         3682       2272       1.5       69000         3682       2272       2.0       32000         3682       2272       3.0       13000         3682       2272       3.0       13000         3682       2272       3.5       12000         3682       2272       3.5       12000         3682       2272       3.5       12000         3682       2272       4.0       13000         3682       2272       4.0       13000         3659       2330       1.5       11000         3659       2330       2.5       11000         3659       2330       3.5       9000         3659       2330       3.5       9000         3659       2330       3.5       10000         3665       2291       1.0       11000         3665<                                                                                                                                                | East            | North         |                     | (cpm)                   |
| 3688       2295       2.0       13000         3688       2295       3.0       11000         Borehole 613R <sup>d</sup> 3682       2272       0.5       75000         3682       2272       1.0       91000         3682       2272       1.5       69000         3682       2272       1.5       69000         3682       2272       2.0       32000         3682       2272       3.0       13000         3682       2272       3.0       13000         3682       2272       3.5       12000         3682       2272       3.5       12000         3682       2272       3.5       12000         3682       2272       3.5       12000         3682       2272       4.0       13000         3652       2272       4.0       13000         3659       2330       1.5       11000         3659       2330       2.5       11000         3659       2330       3.5       9000         3659       2330       3.5       9000         3659       2330       3.5       10000         3665<                                                                                                                                                | Borehole        | 612R (cont    | inued) <sup>d</sup> |                         |
| 3688       2295       2.5       12000         3688       2295       3.0       11000         Borehole 613R <sup>d</sup> 3682       2272       0.5       75000         3682       2272       1.0       91000       3682       2272       1.0         3682       2272       1.5       69000       3682       2272       2.5       15000         3682       2272       2.5       15000       3682       2272       3.0       13000         3682       2272       3.5       12000       3682       2272       4.0       13000         3682       2272       3.5       12000       3682       2272       4.0       13000         3682       2272       3.5       12000       3682       2272       4.0       13000         3659       2330       1.5       11000       3659       2330       2.5       10000         3659       2330       3.5       9000       3659       2330       3.5       9000         3659       2330       3.5       9000       3655       2291       1.0       11000         3665       2291       1.0       12000       3665 <td< td=""><td></td><td></td><td></td><td>12000</td></td<>                           |                 |               |                     | 12000                   |
| 3688       2295       3.0       11000         Borehole 613R <sup>d</sup> 3682       2272       0.5       75000         3682       2272       1.0       91000         3682       2272       1.5       69000         3682       2272       2.0       32000         3682       2272       2.5       15000         3682       2272       3.0       13000         3682       2272       3.5       12000         3682       2272       3.5       12000         3682       2272       4.0       13000         3659       2330       0.5       13000         3659       2330       1.5       11000         3659       2330       1.5       11000         3659       2330       2.5       10000         3659       2330       3.5       9000         3659       2330       3.5       9000         3659       2330       4.0       8000         Borehole 615R <sup>d</sup> 10000       3665       2291         3665       2291       1.5       10000         3665       2291       3.0       10000                                                                                                                                              |                 |               |                     |                         |
| 3682       2272       0.5       75000         3682       2272       1.0       91000         3682       2272       1.5       69000         3682       2272       2.0       32000         3682       2272       2.5       15000         3682       2272       3.0       13000         3682       2272       3.5       12000         3682       2272       4.0       13000         3682       2272       4.0       13000         3682       2272       4.0       13000         3682       2272       4.0       13000         3659       2330       0.5       13000         3659       2330       1.5       11000         3659       2330       2.5       11000         3659       2330       3.5       9000         3659       2330       3.5       9000         3659       2330       4.0       8000         Borehole 615R <sup>d</sup> 10000       3665       2291         3665       2291       1.0       10000         3665       2291       2.5       10000         3665       2291<                                                                                                                                                |                 |               |                     |                         |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <u>Borehole</u> | <u>613R</u> d |                     |                         |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3682            | 2272          | 0.5                 | 75000                   |
| 3682       2272       2.0       32000         3682       2272       2.5       15000         3682       2272       3.0       13000         3682       2272       3.5       12000         3682       2272       3.5       12000         3682       2272       4.0       13000         Borehole 614R <sup>d</sup> .0       13000         3659       2330       0.5       13000         3659       2330       1.0       13000         3659       2330       1.5       11000         3659       2330       2.0       12000         3659       2330       2.5       11000         3659       2330       3.0       10000         3659       2330       3.5       9000         3659       2330       3.5       9000         3659       2330       4.0       8000         Borehole 615R <sup>d</sup> .0       11000         3665       2291       1.5       12000         3665       2291       2.5       10000         3665       2291       2.5       10000         3665       2291       3.5       <                                                                                                                                        | 3682            | 2272          | 1.0                 | 91000                   |
| 3682       2272       2.5       15000         3682       2272       3.0       13000         3682       2272       3.5       12000         3682       2272       4.0       13000         Borehole 614R <sup>d</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 3682            | 2272          | 1.5                 | 69000                   |
| 3682       2272       3.0       13000         3682       2272       3.5       12000         3682       2272       4.0       13000         Borehole 614R <sup>d</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3682            | 2272          | 2.0                 | 32000                   |
| 3682       2272       3.5       12000         3682       2272       4.0       13000         Borehole 614R <sup>d</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3682            | 2272          | 2.5                 | 15000                   |
| 3682       2272       4.0       13000         Borehole 614R <sup>d</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3682            | 2272          |                     | 13000                   |
| Borehole 614R <sup>d</sup> 3659       2330       0.5       13000         3659       2330       1.0       13000         3659       2330       1.5       11000         3659       2330       2.0       12000         3659       2330       2.5       11000         3659       2330       3.0       10000         3659       2330       3.5       9000         3659       2330       3.5       9000         3659       2330       4.0       8000         Borehole 615R <sup>d</sup> 3665       2291       1.0         3665       2291       0.5       13000         3665       2291       1.0       11000         3665       2291       2.0       12000         3665       2291       2.0       12000         3665       2291       2.5       10000         3665       2291       3.0       10000         3665       2291       3.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000     <                                                                                                                                          | 3682            | 2272          | 3.5                 | 12000                   |
| 3659       2330       0.5       13000         3659       2330       1.0       13000         3659       2330       1.5       11000         3659       2330       2.0       12000         3659       2330       2.5       11000         3659       2330       3.0       10000         3659       2330       3.5       9000         3659       2330       4.0       8000         Borehole 615R <sup>d</sup> 3665       2291       0.5         3665       2291       0.5       13000         3665       2291       1.0       11000         3665       2291       1.0       12000         3665       2291       2.0       12000         3665       2291       2.5       10000         3665       2291       3.0       10000         3665       2291       3.5       10000         3665       2291       3.5       10000         3665       2291       4.0       11000         3665       2291       4.5       10000         3665       2291       4.5       10000         3665       2291 </td <td>3682</td> <td>2272</td> <td>4.0</td> <td>13000</td>                                                                                     | 3682            | 2272          | 4.0                 | 13000                   |
| 3659       2330       1.0       13000         3659       2330       1.5       11000         3659       2330       2.0       12000         3659       2330       2.5       11000         3659       2330       3.0       10000         3659       2330       3.5       9000         3659       2330       3.5       9000         3659       2330       4.0       8000         Borehole 615R <sup>d</sup> 3665       2291       0.5       13000         3665       2291       1.0       11000       3665         3665       2291       1.0       12000       3665         3665       2291       2.0       12000       3665       2291       3.0       10000         3665       2291       2.5       10000       3665       2291       3.5       10000         3665       2291       3.5       10000       3665       2291       4.5       10000         3665       2291       4.5       10000       3665       2291       4.5       10000         3665       2291       4.5       10000       3665       2291       4.5       10                                                                                                        | Borehole        | <u>614R</u> d |                     |                         |
| 3659       2330       1.5       11000         3659       2330       2.0       12000         3659       2330       2.5       11000         3659       2330       3.0       10000         3659       2330       3.5       9000         3659       2330       3.5       9000         3659       2330       4.0       8000         Borehole 615R <sup>d</sup> 3665       2291       0.5       13000         3665       2291       1.0       11000         3665       2291       1.5       12000         3665       2291       2.0       12000         3665       2291       2.5       10000         3665       2291       3.5       10000         3665       2291       3.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000                                                                                                                                                                                                             | 3659            | 2330          | 0.5                 | 13000                   |
| 3659       2330       2.0       12000         3659       2330       2.5       11000         3659       2330       3.0       10000         3659       2330       3.5       9000         3659       2330       3.5       9000         3659       2330       4.0       8000         Borehole 615R <sup>d</sup> 3665       2291       0.5       13000         3665       2291       1.0       11000         3665       2291       1.5       12000         3665       2291       2.0       12000         3665       2291       2.0       12000         3665       2291       3.0       10000         3665       2291       3.5       10000         3665       2291       3.5       10000         3665       2291       4.0       11000         3665       2291       4.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000                                                                                                                                                                                                             | 3659            | 2330          | 1.0                 | 13000                   |
| 3659       2330       2.5       11000         3659       2330       3.0       10000         3659       2330       3.5       9000         3659       2330       4.0       8000         Borehole 615R <sup>d</sup> 3665       2291       0.5       13000         3665       2291       1.0       11000         3665       2291       1.5       12000         3665       2291       2.5       10000         3665       2291       2.5       10000         3665       2291       2.5       10000         3665       2291       3.0       10000         3665       2291       3.5       10000         3665       2291       3.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000         3614       2335       0.5       42000                                                                                                                                                                                                                                                          | 3659            | 2330          | 1.5                 | 11000                   |
| 3659       2330       3.0       10000         3659       2330       3.5       9000         3659       2330       4.0       8000         Borehole 615R <sup>d</sup> 3665       2291       0.5       13000         3665       2291       1.0       11000         3665       2291       1.5       12000         3665       2291       2.5       10000         3665       2291       3.0       10000         3665       2291       3.5       10000         3665       2291       3.5       10000         3665       2291       3.5       10000         3665       2291       3.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000         3614       2335       0.5       42000                                                                                                                                                                                                                                                                                                        | 3659            | 2330          | 2.0                 | 12000                   |
| 3659       2330       3.5       9000         3659       2330       4.0       8000         Borehole 615R <sup>d</sup> 3665       2291       0.5       13000         3665       2291       1.0       11000       3665       2291       1.0         3665       2291       1.5       12000       3665       2291       2.0       12000         3665       2291       2.5       10000       3665       2291       3.0       10000         3665       2291       3.5       10000       3665       2291       3.5       10000         3665       2291       4.5       10000       3665       2291       4.5       30000         3665       2291       4.5       10000       3665       2291       4.5       30000         3665       2291       4.5       10000       3665       2291       4.5       30000         Borehole 616R <sup>d</sup> 3614       2335       0.5       42000       3614       3000                                                                                                                                                                                                                                   | 3659            | 2330          |                     | 11000                   |
| 3659       2330       4.0       8000         Borehole 615R <sup>d</sup> 3665       2291       0.5       13000         3665       2291       1.0       11000         3665       2291       1.5       12000         3665       2291       2.0       12000         3665       2291       2.5       10000         3665       2291       3.0       10000         3665       2291       3.5       10000         3665       2291       4.0       11000         3665       2291       4.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 | 2330          |                     | 10000                   |
| Borehole 615R <sup>d</sup> 3665       2291       0.5       13000         3665       2291       1.0       11000         3665       2291       1.5       12000         3665       2291       2.0       12000         3665       2291       2.5       10000         3665       2291       3.0       10000         3665       2291       3.5       10000         3665       2291       4.0       11000         3665       2291       4.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000         3665       2291       4.5       10000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 3659            | 2330          | 3.5                 | 9000                    |
| 3665       2291       0.5       13000         3665       2291       1.0       11000         3665       2291       1.5       12000         3665       2291       2.0       12000         3665       2291       2.5       10000         3665       2291       3.0       10000         3665       2291       3.5       10000         3665       2291       3.5       10000         3665       2291       4.0       11000         3665       2291       4.5       10000         3665       2291       4.5       10000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3659            | 2330          | 4.0                 | 8000                    |
| 3665       2291       1.0       11000         3665       2291       1.5       12000         3665       2291       2.0       12000         3665       2291       2.5       10000         3665       2291       3.0       10000         3665       2291       3.5       10000         3665       2291       3.5       10000         3665       2291       4.0       11000         3665       2291       4.5       10000         Borehole 616R <sup>d</sup> 2335       0.5       42000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <u>Borehole</u> | <u>615R</u> d |                     |                         |
| 3665       2291       1.5       12000         3665       2291       2.0       12000         3665       2291       2.5       10000         3665       2291       3.0       10000         3665       2291       3.5       10000         3665       2291       3.5       10000         3665       2291       4.0       11000         3665       2291       4.5       10000         Borehole 616R <sup>d</sup> 2335       0.5       42000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |               |                     |                         |
| 3665       2291       2.0       12000         3665       2291       2.5       10000         3665       2291       3.0       10000         3665       2291       3.5       10000         3665       2291       3.5       10000         3665       2291       4.0       11000         3665       2291       4.5       10000         Borehole 616R <sup>d</sup> 3614       2335       0.5       42000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |               |                     |                         |
| 3665       2291       2.5       10000         3665       2291       3.0       10000         3665       2291       3.5       10000         3665       2291       3.5       10000         3665       2291       4.0       11000         3665       2291       4.5       10000         Borehole 616R <sup>d</sup> 3614       2335       0.5       42000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |               |                     |                         |
| 3665       2291       3.0       10000         3665       2291       3.5       10000         3665       2291       4.0       11000         3665       2291       4.5       10000         Borehole 616R <sup>d</sup> 2335       0.5       42000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 |               |                     |                         |
| 3665       2291       3.5       10000         3665       2291       4.0       11000         3665       2291       4.5       10000         Borehole 616R <sup>d</sup> 3614       2335       0.5       42000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |               |                     |                         |
| 3665       2291       4.0       11000         3665       2291       4.5       10000         Borehole 616R <sup>d</sup> 3614       2335       0.5       42000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |               |                     |                         |
| 3665     2291     4.5     10000       Borehole 616R <sup>d</sup> 42000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 |               |                     |                         |
| <u>Borehole 616R<sup>d</sup></u><br>3614 2335 0.5 42000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |               |                     |                         |
| 3614 2335 0.5 42000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3665            | 2291          | 4.5                 | 10000                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <u>Borehole</u> | <u>616R</u> d |                     |                         |
| <b>3614 2335 1.0 26000</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |               |                     | 42000                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3614            | 2335          | 1.0                 | 26000                   |

## (continued)

| Page 3 of            | Page 3 of 4            |                            |                                  |  |  |  |
|----------------------|------------------------|----------------------------|----------------------------------|--|--|--|
| <u>Coord</u><br>East | <u>inates</u><br>North | Depth <sup>b</sup><br>(ft) | Count Rate <sup>C</sup><br>(cpm) |  |  |  |
| Borehole             | 616R (cont             | inued) <sup>d</sup>        |                                  |  |  |  |
| 3614                 | 2335                   | 1.5                        | 22000                            |  |  |  |
| 3614                 | 2335                   | 2.0                        | 14000                            |  |  |  |
| 3614                 | 2335                   | 2.5                        | 11000                            |  |  |  |
| 3614                 | 2335                   | 3.0                        | 10000                            |  |  |  |
| 3614                 | 2335                   | 3.5                        | 11000                            |  |  |  |
| 3614                 | 2335                   | 4.0                        | 10000                            |  |  |  |
| 3614                 | 2335                   | 4.5                        | 8000                             |  |  |  |
| Borehole             | <u>617R</u> d          |                            |                                  |  |  |  |
| 3595                 | 2380                   | 0.5                        | 13000                            |  |  |  |
| 3595                 | 2380                   | 1.0                        | 17000                            |  |  |  |
| 3595                 | 2380                   | 1.5                        | 17000                            |  |  |  |
| 3595                 | 2380                   | 2.0                        | 14000                            |  |  |  |
| 3595                 | 2380                   | 2.5                        | 11000                            |  |  |  |
| 3595                 | 2380                   | 3.0                        | 10000                            |  |  |  |
| 3595                 | 2380                   | 3.5                        | 9000                             |  |  |  |
| 3595                 | 2380                   | 4.0                        | 6000                             |  |  |  |
| <u>Borehole</u>      | <u>618R</u> d          |                            |                                  |  |  |  |
| 3615                 | 2390                   | 0.5                        | 12000                            |  |  |  |
| 3615                 | 2390                   | 1.0                        | 11000                            |  |  |  |
| 3615                 | 2390                   | 1.5                        | 10000                            |  |  |  |
| 3615                 | 2390                   | 2.0                        | 9000                             |  |  |  |
| 3615                 | 2390                   | 2.5                        | <b>90</b> 00                     |  |  |  |
| 3615                 | 2390                   | 3.0                        | 7000                             |  |  |  |
| 3615                 | 2390                   | 3.5                        | 6000                             |  |  |  |
| 3615                 | 2390                   | 4.0                        | 8000                             |  |  |  |
| <u>Borehole</u>      | <u>619R</u> đ          |                            | <u>.</u>                         |  |  |  |
| 3571                 | 2433                   | 0.5                        | 13000                            |  |  |  |
| 3571                 | 2433                   | 1.0                        | 13000                            |  |  |  |
| 3571                 | 2433                   | 1.5                        | 12000                            |  |  |  |
| 3571                 | 2433                   | 2.0                        | 12000                            |  |  |  |
| 3571                 | 2433                   | 2.5                        | 12000                            |  |  |  |
| 3571                 | 2433                   | 3.0                        | 11000                            |  |  |  |
| 3571                 | 2433                   | 3.5                        | 11000                            |  |  |  |
| 3571                 | 2433                   | 4.0                        | 10000                            |  |  |  |
| 3571                 | 2433                   | 4.5                        | 10000                            |  |  |  |
| 3571                 | 2433                   | 5.0                        | 8000                             |  |  |  |
# TABLE 5-2

# (continued)

| Page 4 c                      | <u>f 4</u>                                                            |                                          |                         |
|-------------------------------|-----------------------------------------------------------------------|------------------------------------------|-------------------------|
| <u>    Coord</u>              | inates                                                                | Depth <sup>b</sup>                       | Count Rate <sup>C</sup> |
| East                          | North                                                                 | (ft)                                     | (cpm)                   |
| Borehole                      | 619R (cont                                                            | inued)d                                  |                         |
| 3571                          | 2433                                                                  | 5.5                                      | 8000                    |
| 3571                          | 2433                                                                  | 6.0                                      | 9000                    |
| and cor<br>table a<br>penetra | iations in<br>responding<br>re based on<br>ting the co<br>eaching ref | results giv<br>the boreho<br>ntamination | ven in this<br>bles     |
| thalliu<br>scintil            | ent used wa<br>m-activated<br>lation dete                             | sodium iod                               | 2-in.<br>lide gamma     |
| d<br>Bottom                   | of borehole                                                           | collapsed.                               |                         |

## TABLE 5-3 GAMMA RADIATION EXPOSURE RATES FOR 18 LONG VALLEY ROAD

| Coord    | inates       |      |
|----------|--------------|------|
| East     | North        | µR/h |
|          |              |      |
| 3505     | 2455         | 7    |
| 3525     | 2430         | 8    |
| 3540     | 2455         | 8    |
| 3560     | 2415         | 9    |
| 3650     | 2315         | 11   |
| 3675     | 2285         | 12   |
| INTERIOR | OF RESIDENCE | 5    |

Measurements include background.

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### APPENDIX A

### GEOLOGIC DRILL LOGS FOR 18 LONG VALLEY ROAD

LODI, NEW JERSEY

| <b>—</b> |          |            |                     |                    |         |               |            | PROJE  | СТ       |                                                                                                                                                                                                                                 |                                                | JOB NO.                                           | SHE              | ET NO.                                                                                                                 | HOLE NO.                                        |
|----------|----------|------------|---------------------|--------------------|---------|---------------|------------|--------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
|          |          | EC         | )LO(                | GIC                | DRI     | LL LC         |            |        |          | FUSRAP                                                                                                                                                                                                                          |                                                | 1                                                 | -138 1           |                                                                                                                        | 427R                                            |
| SITE     |          | Long       | v Vall              | ev R               | d. (LC  | ) <b>D</b> I) | COORDIN    | ATES   |          | N 2407; E 3551                                                                                                                                                                                                                  |                                                |                                                   | ANGLE FR<br>Vert | OM HORIZ                                                                                                               | BEARING                                         |
| BEGL     | ÎN .     | C          | MPLET               | DDR                | ILLER   |               |            |        |          | . MAKE AND MODEL                                                                                                                                                                                                                |                                                | OVERBURDEN                                        |                  | (FT.)                                                                                                                  | TOTAL DEPTH                                     |
|          |          |            | 0-7-                |                    |         |               | ENCH       | XP CAS | B&       | S Little Beaver                                                                                                                                                                                                                 | 4"<br>EL. GROUN                                | 6.0                                               | DEPTH            | /EL. TOP                                                                                                               | OF ROCK                                         |
|          |          | _/         |                     |                    |         |               |            |        |          | 44.8                                                                                                                                                                                                                            |                                                |                                                   |                  | /                                                                                                                      |                                                 |
|          |          |            | r weig<br>N/A       |                    | L C     | ASING LE      | FT IN HONO |        | A./LI    | ENGTH LOGGED BY:                                                                                                                                                                                                                |                                                | D. McGF                                           | ANE              |                                                                                                                        |                                                 |
| Ш.       | <b>.</b> |            |                     | 2                  | WATI    | ER<br>URE     |            |        | ø        |                                                                                                                                                                                                                                 | <u> </u>                                       |                                                   |                  |                                                                                                                        | <u> </u>                                        |
| SAMP DIA | SAMP. AD | SAMPLE REC | BLOUS "N"<br>* CORE | LOSS<br>LOSS<br>TN | TES     |               | ELEV.      | DEPTH  | GRAPHICS | U<br>DESCRIPTION                                                                                                                                                                                                                |                                                |                                                   |                  | WATER<br>CHARAC                                                                                                        | ON:<br>LEVELS,<br>RETURN,<br>TER OF<br>NG, ETC. |
|          |          |            |                     |                    |         |               | 38.8       | 5      |          | 0.0-6.0 ft. SILTY S<br>stratified; fine-t<br>poorly consolida<br>0.0-0.5 ft. mod<br>numerous grass<br>0.5-3.0 ft. dark<br>(10YR6/6).<br>3.0-6.0 ft. dark<br>mottled modera<br>Bottom of borehole<br>were immediatel<br>10-7-86. | roots and<br>vellowish<br>reddish<br>te brown. | wn (5YR3/4<br>organics.<br>n orange<br>brown (10Y | );<br>R6/6),     | Borehole<br>0.0-6.0 f<br>solid-ste<br>Site chear<br>contamin<br>hole gan<br>by Eber<br>Corpora<br>No groun<br>observed | on and<br>on and<br>by visual                   |
| SS =     | SDI      | 17 65      | 004 - 5             | T = C              | HELBY 1 |               | ITE        |        |          |                                                                                                                                                                                                                                 |                                                |                                                   |                  | HOLE NO.                                                                                                               |                                                 |
|          |          |            |                     |                    | R; 0 =  |               |            | 18     |          | ong Valley Rd                                                                                                                                                                                                                   | l. <b>(LO</b>                                  | DI)                                               | ٨                |                                                                                                                        | 27R                                             |

• •

| SITE |              |           | <u>_</u>                      | •      |             |                    | L LO         | COORDIN   | ATES   |          | FUSRAP 145                                                                                                                                 | 501-138 1<br>ANGLE FR | OF 1                  | 428<br>BEARING |
|------|--------------|-----------|-------------------------------|--------|-------------|--------------------|--------------|-----------|--------|----------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|----------------|
|      |              |           | Vall                          |        |             |                    | DI)          |           |        |          | N 2442; E 3516                                                                                                                             | Vert                  |                       |                |
| BEGU |              |           | MPLETE                        |        | DRILL       |                    |              |           |        |          | MAKE AND MODEL SIZE OVERBUR                                                                                                                |                       | ( (FT.)               | TOTAL C        |
|      |              |           | 0-7-8                         |        | CODE        |                    |              | ENCH      |        | _        |                                                                                                                                            | .0                    | (5) 700               | 9.             |
| LOKC | REU          | UVER<br>/ | ( <b>r</b> i.,                | / ~ )  | LUKE        | BUXE               | SSAMPL       | ESIEL. IU | P LAS  | ING I    | ROUND EL. DEPTH/EL. GROUND WATER<br>46.2 ¥ /                                                                                               |                       | /EL. TOP              | OF ROCK        |
| SAMP | LE H         | AMME      | R WEIG                        | HT/F   | ALL         | CAS                | ING LE       | FT IN HO  | LE: DI | A./LI    |                                                                                                                                            | l                     | /                     |                |
|      |              | ]         | N/A                           |        |             |                    |              | NO        | NE     |          | 1 I I I I I I I I I I I I I I I I I I I                                                                                                    | GRANE                 |                       |                |
| μ.   | <u>ال</u>    | ιj.       | Ξ.                            | J      | W           | ATER               | 2            |           |        | 6        |                                                                                                                                            |                       | 1                     |                |
| 囹    | CORE         |           | SAMPLE<br>BLOWS "N"<br>× CORE | Ľ.     |             | ESTS               |              | ELEV.     | E      | GRAPHICS |                                                                                                                                            |                       | NOTES                 |                |
| 0    |              |           | 14 S O                        | Ö ű    | 2_ <b>F</b> | ю́н.               | ₩            | ELEV.     | DEPTH  | H        | DESCRIPTION AND CLASSIF                                                                                                                    | TCHITON               | WATER                 |                |
| 影    | SAMP.<br>LEN | ΞB        | w<br>J×                       | ы<br>Ш | R.P.S       | PRESS.<br>P. S. I. | TIME<br>MIN. |           |        | Ř        |                                                                                                                                            |                       | CHARAC                | TER O          |
| Q.T  | ŵ!           | 80        | <u>w</u>                      |        | - 0         | <u>ā</u> c         |              | 46.2      |        |          |                                                                                                                                            |                       | DRILLI                | ING, E         |
|      |              |           |                               |        | [           |                    |              |           | .      |          | 0.0-6.0 ft. <u>SILTY SAND</u> (SM). Colo<br>stratified; fine-to medium-graine                                                              | d; soft;              | B                     |                |
|      |              |           |                               |        |             |                    |              |           | .      |          | poorly consolidated (loose); moist<br>difficult to distinguish between fi                                                                  | il and                | Borehole<br>0.0-9.0 1 | t. using       |
|      |              |           |                               |        |             |                    |              |           | .      |          | f natural material                                                                                                                         |                       | solid-ste             | -              |
| 1    |              |           |                               |        |             |                    |              |           |        |          | 0.0-0.5 ft. moderate brown (5YF<br>numerous grass roots and organic<br>0.5-2.5 ft. dark reddish brown (<br>numerous rounded pebbles of var | .s.<br>10R3/4):       | Site che<br>radioact  |                |
|      |              |           |                               |        |             |                    |              |           | δ_     | ]        |                                                                                                                                            |                       | contami<br>hole gan   | nation a       |
|      |              |           |                               |        |             |                    |              |           | "-     | ]        | 2.5-90.0 ft. dark reddish brown, r<br>with a few dark yellowish orange<br>zones. 5.0 ft. piece of glass (fill).                            | nottled               | by Eber<br>Corpora    | line-TM        |
|      |              |           |                               |        | 1           |                    |              |           | '      |          | zones. 5.0 ft. piece of glass (fill).                                                                                                      | (10110/0)             | Corpora               | •1011.         |
|      |              |           | i                             |        |             |                    |              |           | •      | 1        |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           | •      | 1        |                                                                                                                                            |                       | No grou               | nd wate        |
|      |              |           |                               |        |             |                    |              | 37.2_     | •      |          |                                                                                                                                            |                       | observed              | 1.             |
|      |              |           |                               |        |             |                    |              |           |        |          | Bottom of borehole at 9.0 ft. Auger a<br>were immediately replaced in the                                                                  | spoils<br>hole,       |                       |                |
|      |              |           |                               |        |             |                    |              |           |        |          | 10-7-86.                                                                                                                                   | •                     |                       |                |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       |                       |                |
| ·    |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       |                       |                |
| ŀ    |              |           |                               |        |             |                    |              |           | .      |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    | -            |           |        |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           | l      |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       | 1                     |                |
|      |              |           |                               |        |             |                    |              |           | l      |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       | 1                     |                |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           | l      |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               | 1      |             |                    |              |           |        |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       | Descript              | ion and        |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       | classifica<br>samples | by visua       |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       | examina               | 10 <b>N</b> .  |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       |                       |                |
|      |              |           |                               |        |             |                    |              |           |        |          |                                                                                                                                            |                       |                       |                |
|      | ¢DI 1        | L         | 004-                          |        | CHE1        |                    | PE. S        | ITE       | L      |          | I                                                                                                                                          |                       | HOLE NO               |                |
|      |              |           | 200N; \$<br>: P = F           |        |             |                    |              |           | 10     |          | ong Valley Rd. (LODI)                                                                                                                      | ١.                    |                       | 28R            |

| Г     |         |       |      |                               |             |         |                                                                                                  |              |          | PROJE | ст         |          |                    |                                       |                     |                  | JOB NO                  | . s           | SHEET N  | 0.                        | HOLE NO.                           |
|-------|---------|-------|------|-------------------------------|-------------|---------|--------------------------------------------------------------------------------------------------|--------------|----------|-------|------------|----------|--------------------|---------------------------------------|---------------------|------------------|-------------------------|---------------|----------|---------------------------|------------------------------------|
|       | TE      | G     | EC   | DLOC                          | JIC         | DR      |                                                                                                  | - 10         | COORDIN  | ATEC  |            |          | FUS                | RAP                                   |                     |                  |                         |               | 1 OF     |                           | 429R<br>BEARING                    |
| 3     |         | 8 L   | ong  | Valle                         | ey R        | d. (I   | LOI                                                                                              | )I)          | COOKDIN  | AIES  |            | N        | 2451: )            | E 3550                                |                     |                  |                         |               | ertical  |                           |                                    |
|       | GUI     | Î     | CC   | MPLETE                        | D DR        | ILLER   | 2                                                                                                |              |          |       |            | L MAK    | E AND M            | ODEL                                  | SIZE                | OVE              |                         |               | OCK (F   |                           | TOTAL DEPT                         |
|       |         |       |      | 0-7-8                         |             |         |                                                                                                  |              | ENCH     | PCAS  |            |          | ittle B            |                                       | 4"<br>/EL. GR       | OUND             | 2.5                     | DEP           | TH/EL.   | TOP                       | 2.5<br>OF ROCK                     |
|       |         |       | 1    |                               |             |         |                                                                                                  |              |          |       |            |          |                    | I¥ /                                  |                     |                  |                         |               |          | /                         |                                    |
| s/    | MPI     | .E H/ |      | r weigi<br>N/A                | IT/FA       | LL      | CAS                                                                                              | ING LE       | FT IN HO |       | IA./L      | .ENGTI   | LOGGE              | D BY:                                 |                     | n                | . McG                   | DANE          | 2        |                           |                                    |
| ų     |         |       | ان   |                               | J           | WA      | TER                                                                                              | 2            |          |       | T_         | Π        |                    |                                       |                     |                  | MCO                     | NANE          | <u> </u> |                           |                                    |
| TYE   | DIAM    | CORE  |      | PLE<br>NN<br>NN<br>NN<br>NN   |             | 1       | STS                                                                                              | ;<br>        | ELEV.    | DEPTH | GRAPHICS   | SANELE   | DESCR              | IPTION                                | 1 AND               | CLAS             | SIFIC                   | ATION         |          | TES<br>TER                | ON:<br>LEVELS,                     |
| SAMP. | AND     | LEN.  | CORE | SAMPLE<br>BLOWS "N"<br>X CORE | LOSS        | 0. P. M | ы<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | TIME<br>MIN. |          | DE    | GRAF       | SAI      |                    |                                       |                     |                  |                         |               | CH       | ARAC                      | RETURN,<br>TER OF<br>NG, ETC       |
| Ē     |         |       | 11   |                               |             |         |                                                                                                  |              |          |       |            | <b>o</b> | stratif            | . <u>SILTY</u><br>ied; fine-          | -to medi            | ium-e            | rained: w               | vith          |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       | -          |          | few pie<br>litholo | eces of g<br>gies; soft<br>1.2 ft. mo | ravel an<br>; uncon | d cobi<br>solida | bles of vi<br>ted; moi: | arious<br>st. | 0.0      | -2.5 f                    | t. using 4"<br>m augers.           |
|       |         |       |      |                               |             |         |                                                                                                  |              | -        |       |            | ΪŢ       | numer              | ous root                              | s and or            | ganica           | l.                      |               | Sit      | e chec                    | ked for                            |
|       |         | '     |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    | of boreho                             |                     |                  | <u> </u>                |               | cor      |                           | nation and                         |
|       |         |       |      |                               | -           |         |                                                                                                  |              |          | -     |            |          | were in<br>10-7-1  | mmediat                               | ely repla           | aced in          | n the hol               | e,            | by       | Eberl<br>rpora            | ima-logged<br>ine-TMA,<br>tion.    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               | (co      | bble).                    | iger refusal                       |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               | No       | groui                     | nd water                           |
|       |         |       |      |                               |             |         |                                                                                                  | :            |          |       |            |          |                    |                                       |                     |                  |                         |               | ļ        |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          | }     |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       | 1          |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       | •    |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           | ion and                            |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               | sar      | ssifica<br>nples<br>unina | tion of soil<br>by visual<br>tion. |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       |                     |                  |                         |               |          |                           |                                    |
|       |         |       |      |                               |             |         |                                                                                                  |              |          |       |            |          |                    |                                       | •                   |                  |                         |               |          |                           |                                    |
| ss    | <br>; = | SPL   | TS   | POON; S                       | )<br>ST = 1 | SHELBY  | Y TU                                                                                             | BE; S        | ITE      |       |            | Щ        |                    |                                       |                     | <b></b>          |                         |               | HOL      | E NO.                     |                                    |
|       |         |       |      | ; P = P                       |             |         |                                                                                                  |              |          | 1     | <u>8 L</u> | ong      | g Val              | ley R                                 | d. (L               | <u>.0D</u>       | <u> )</u>               | ،<br>ــــــــ |          | 4                         | 29R                                |

|   |             |             |                  |                                                                                             |      |                     |                  |              |           | PROJE | CT       |              | JOB NO. SHEE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | T NO. HOLE NO.                                        |
|---|-------------|-------------|------------------|---------------------------------------------------------------------------------------------|------|---------------------|------------------|--------------|-----------|-------|----------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
|   |             |             | E                |                                                                                             | G    | CD                  | RILI             |              |           |       |          |              | FUSRAP 14501-138 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                       |
|   | SITE        |             | ~~               | V.                                                                                          | Har  | Rd.                 | /I ^             | יזר          | COORD IN/ | ATES  |          |              | N 2462; E 3510 ANGLE FRC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | M HORIZBEARING                                        |
| , | BEGL        | _           |                  |                                                                                             |      | DRILL               |                  | <u></u>      |           |       | DRIL     | _            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | (FT.) TOTAL DEPTH                                     |
| ~ |             |             |                  | 0-7-                                                                                        |      | ;                   | MO               |              | RENCH     |       | B        | &            | S Little Beaver 4" 2.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.5                                                   |
|   | CORE        | REC         | OVER             | Y ĈFT                                                                                       | ./%  | CORE                | BOXE             | SAMPL        | ESEL. TO  | P CAS | ING      | G            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | EL. TOP OF ROCK                                       |
|   |             |             |                  |                                                                                             | CHT  | /FALL               | Inas             |              | ET IN HO  | E+ D1 | A /      |              | 45.9 7 / International Action of the second | /                                                     |
|   | ərun        |             |                  | N/A                                                                                         | GAT  |                     |                  |              | · NOI     |       |          | le 6a 1      | D. McGRANE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |
|   | ш.          | -1          | loi .            |                                                                                             | J    | L<br>L              | JATER            | 2            |           |       | 6        | T            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                       |
|   | DIAM.       | <b>O</b> RO | E E              | SAMPLE<br>BLOWS "N"                                                                         | БЩ   | 1                   | ESSU             | RE<br>3      | ELEV.     | E     | GRAPHICS | Ш            | DESCRIPTION AND CLASSIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | NOTES ON:                                             |
|   | Ö           | n Z         |                  | E S S                                                                                       | SS   | ω<br>Σ              | SE.              | 뿌ァᅷ          | ELEV.     | DEPTH | Ę        | SAMPLE       | DESCRIPTION AND CLASSIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | WATER LEVELS,<br>WATER RETURN,                        |
|   | SAMP        | <u>Ĕ</u>    | H H H            | S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S | ×Ũ   | LOSS<br>IN<br>G.P.M | PRESS.<br>P.S.I. | HINE<br>MIN. |           |       | Ē        | Ŋ            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CHARACTER OF<br>Drilling, Etc.                        |
|   | <u>0</u> ,- | (1)         | <u> <u> </u></u> | +                                                                                           | -+   |                     |                  |              | 45.9      |       |          | $\mathbf{T}$ | 0.0-3.5 ft. <u>SILTY SAND</u> (SM). Color<br>stratified; fine-to medium-grained; with                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                       |
|   |             |             |                  |                                                                                             |      |                     |                  |              |           |       | [        |              | few pieces of gravel and cobbles of various                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Borehole drilled                                      |
|   |             |             |                  |                                                                                             | ·    |                     |                  |              |           | -     | 1        |              | lithologies; soft; unconsolidated; moist.<br>0.0-0.5 ft. moderate brown (5YR3/4);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.0-3.5 ft. using 4"<br>solid-stem augers.            |
|   |             |             |                  |                                                                                             |      |                     |                  |              | 42.4_     | -     | L        |              | numerous roots and organics.<br>0.5-3.5 ft. dark reddish brown (10R3/4).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Site checked for radioactive                          |
|   |             | i           |                  |                                                                                             |      |                     |                  |              |           |       |          |              | Bottom of borehole at 3.5 ft. Auger spoils<br>were immediately replaced in the hole,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | contamination and                                     |
|   |             |             |                  |                                                                                             |      |                     |                  |              |           |       | 1        |              | 10-7-86.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | hole gamma-logged<br>by Eberline-TMA,<br>Corporation. |
|   |             |             |                  |                                                                                             |      |                     |                  |              | 1         |       |          |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Corporation.                                          |
|   |             |             |                  |                                                                                             |      |                     |                  |              |           |       |          |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3.5 ft. auger refusal<br>(cobble).                    |
|   |             |             |                  |                                                                                             |      |                     |                  |              |           |       |          |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | No ground water<br>observed.                          |
|   |             |             |                  |                                                                                             |      | 1                   |                  |              |           |       |          |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | obberveu.                                             |
|   |             |             |                  |                                                                                             |      |                     |                  |              |           |       |          |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                       |
|   |             |             |                  |                                                                                             |      |                     |                  |              |           |       |          |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                       |
|   |             |             |                  |                                                                                             |      |                     |                  |              |           |       |          |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                       |
|   |             |             |                  |                                                                                             |      |                     |                  |              |           |       |          |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                       |
|   |             |             | ·                |                                                                                             |      |                     |                  |              |           |       |          |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                       |
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|   |             |             |                  | ł                                                                                           |      |                     |                  |              |           |       |          |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                       |
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|   |             |             |                  |                                                                                             |      |                     |                  |              |           |       |          |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | classification of soil<br>samples by visual           |
|   |             |             |                  | 1                                                                                           |      |                     |                  |              | 1         |       | l        |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | examination.                                          |
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|   | p =         | DENN        | I SON            | ; P =                                                                                       | : PI | TCHER;              | 0 = 0            | THER         |           | 10    | o l      |              | ng Valley Rd. (LODI)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 430R                                                  |

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| SITE DORVALEY Road (LODI) N 2295; E 3688 Vertical BEGUIT COMPLETED POILL AND AD MOREL POILL AND AD MORE POIL AND AD MO                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                       |             | PROJECT                                                                  |                                                                                                                                                                  | JOB NO. SHE                                                                               | ET NO. HOLE NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| 18 Long Valley Road (LODI)       N 2295; E 3688       Vertical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                       |             |                                                                          | RAP                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| EEUU     COMPLETED PAILLER     PAILLENCE AD MOREL     DIZE     DORGRUNDEL     DOCERDANCEL     12     12     2.8     5.       COMPLETED DATE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                       | 1           |                                                                          | F 3699                                                                                                                                                           | [                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 10.7-7.86     Moretrench     BAS Little Beaver     41     3.2     2.8     6       Code RECORE (F1.7A)     DORE BOXESIMPLESIL. TO PARCE     GRUND UNTER     DEFINICI. TO PARCE     GRUND UNTER     DEFINICI. TO PARCE       Sample Rumer MEIGHT/FALL     ENSING LEFT IN NOCE     DIA./LENGTH     DAME Came     D.McGranc       MA     Nonc     D.McGranc     D.McGranc     NOTES ON:<br>MATER LEVER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                       |             |                                                                          |                                                                                                                                                                  |                                                                                           | and the second se |
| CORE RECOVERY (F1.72) DORE BORES/BLAUDELEFL. TOP ASING BEAUND EL. DEPTINEL. GROUD WATER DEPTINEL. TOP OF ACCOUNT OF THE CONTROL OF THE CONTRO                                                                                                                                                                                                                                                                                                                                                                         | 10-7-86 10-7-86                                                                                       | Moretrench  | B&S Little 1                                                             | 1 1                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| SAULE BUNKER HEIGHT/ALL CASING LEFT IN HOLE DIA/LENGTH LOCED FY:<br>NA None D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McGrane<br>D.McCrane<br>D.McGrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.McCrane<br>D.M |                                                                                                       |             | P CASING GROUND EL.                                                      |                                                                                                                                                                  |                                                                                           | I/EL. TOP OF ROCK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| N/A     None     D.McGrame       Her state     Pressure     Pressure     Pressure       Go all a subject of the state state     Pressure     ELEV.     ELEV.     ELEV.       Go all a subject of the state     Pressure     ELEV.     ELEV.     ELEV.       Go all a subject of the state     Pressure     ELEV.     ELEV.     ELEV.       Go all a subject of the state     Pressure     Pressure     Pressure       Go all a subject of the state     Pressure     Pressure     Pressure       Go all a subject of the state     Pressure     Pressure     Pressure       Go all a subject of the state     Pressure     Pressure     Pressure       Go all a subject of the state     Pressure     Pressure     Pressure       Go all a subject of the state     Pressure     Pressure     Pressure       Go all a subject of the state     Pressure     Pressure     Pressure       Go all a subject of the state     Pressure     Pressure     Pressure       State     Pressure     Pressure     Pressure     Pressure       Battern of the state     Pressure     Pressure     Pressure     Pressure       Battern of the state     Pressure     Pressure     Pressure     Pressure       Battern of the state     Pressure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                       |             |                                                                          | ¥ /                                                                                                                                                              |                                                                                           | 3.8/37.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| We shall be used in the second standard                                                                                                                                                                                                                                                                                                                                                                                           | •                                                                                                     | 3           |                                                                          |                                                                                                                                                                  | D.McGrane                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 37.9     37.9     5.1     Solution of the second                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                       | WATER       |                                                                          |                                                                                                                                                                  |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 37.9     37.9     5.1     Solution of the second                                                                                                                                                                                                                                                                                                                                                                                                                      | NDP. TAP.<br>MP. OIAM.<br>MPLE REC.<br>ORE REC.<br>SAMPLE REC.<br>CORE REC.<br>CORE REC.<br>CORE REC. | TESTS ELEV. | SOUTH DESCR                                                              | IPTION AND CLA                                                                                                                                                   | SSIFICATION                                                                               | WATER LEVEL<br>WATER RETUR<br>CHARACTER O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 37.9. 37.9. 37.9. 37.9. 37.9. 5. 35.2. 5. 5. 35.2. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                       |             |                                                                          | SH TY SAND (SM-                                                                                                                                                  | SC) Color                                                                                 | DRILLING, E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| S - SPLIT SPOOR: ST = SHELPT TURE:  SITE   S                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                       | 37.9_       | stratii<br>poorly<br>moist.<br>0.0-3<br>(10YF<br>3.0-<br>yellow<br>(5G7/ | ied; fine-to medium-g<br>consolidated (loose);<br>.0 ft., dark yellowish l<br>.4/2).<br>3.2 ft., clayey (SC); m<br>ish brown (10YR4/2);<br>2) and dark yellowish | rained; soft;<br>dry-slightly<br>brown<br>ottled dark<br>; pale green                     | contamination an                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| S = SPLIT SPOOR: ST = SHELPT UNE:       SITE       Dark redding brown (1083/4); fine-grained (2083/4); fine-grained (2003/4); fine-gra                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                       | 35.2_       | 3.2-6.0 ft                                                               | DECOMPOSED SA                                                                                                                                                    | NDSTONE.                                                                                  | Corporation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| S = SPLIT SPON: S1 = SHELBY TUBE: [SITE HOLE NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |             | Bottom c                                                                 | eddish brown (10R3)-<br>aceous); soft-to mode:<br>-well cemented; totall<br>posed-highly weather<br>i of silty sand (SM) ar<br>of sandstone gravel.<br>          | 4); fine-grained<br>rately hard;<br>y<br>ed; drill spoils<br>nd occasional<br>uger spoils | No ground water<br>observed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| S = SPLIT SPOON: ST = SHELBY TUBE: SITE HOLE NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |             |                                                                          |                                                                                                                                                                  | n the hole,                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| S = SPLIT SPOON: ST = SHELBY TUBE: SITE HOLE NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |             |                                                                          |                                                                                                                                                                  |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| S = SPLIT SPOON: ST = SHELBY TUBE: SITE HOLE NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |             |                                                                          |                                                                                                                                                                  |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| S = SPLIT SPOON: ST = SHELBY TUBE: SITE HOLE NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |             |                                                                          |                                                                                                                                                                  |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| S = SPLIT SPOON: ST = SHELBY TUBE: SITE HOLE NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |             |                                                                          |                                                                                                                                                                  |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| S = SPLIT SPOON: ST = SHELBY TUBE: SITE HOLE NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |             |                                                                          |                                                                                                                                                                  |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| S = SPLIT SPOON: ST = SHELBY TUBE: SITE HOLE NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |             |                                                                          |                                                                                                                                                                  |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| S = SPLIT SPOON: ST = SHELBY TUBE: SITE HOLE NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |             |                                                                          | •                                                                                                                                                                |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| S = SPLIT SPOON: ST = SHELBY TUBE: SITE HOLE NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |             |                                                                          |                                                                                                                                                                  |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| S = SPLIT SPOON: ST = SHELBY TUBE: SITE HOLE NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |             |                                                                          |                                                                                                                                                                  |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| S = SPLIT SPOON: ST = SHELBY TUBE: SITE HOLE NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |             |                                                                          |                                                                                                                                                                  |                                                                                           | classification of so                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                       |             |                                                                          |                                                                                                                                                                  |                                                                                           | examination.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                       |             |                                                                          |                                                                                                                                                                  |                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                       |             | 18 Long Valle                                                            | w Road (1 Or                                                                                                                                                     | (וכ                                                                                       | HOLE NO.<br>612R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| 4      |                         |            |                     |                   |                   |                                    | DII           |                      |          | PROJE | СТ       |          |                                                                                                                                                                                                                                                                   |                                                                                                            | JOB NO                                                                                                                   | ). SH                                  | EET NO.                                           | HOLE NO.                                                        |
|--------|-------------------------|------------|---------------------|-------------------|-------------------|------------------------------------|---------------|----------------------|----------|-------|----------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|-----------------------------------------------------------------|
|        | SITE                    |            |                     |                   |                   |                                    | KIL           | LLO                  | COORDIN  | ATES  | •        | <u> </u> | FUSRAP                                                                                                                                                                                                                                                            | , . <u>.</u>                                                                                               |                                                                                                                          |                                        |                                                   | 613R                                                            |
|        |                         | 18 I       |                     |                   |                   | Rd.                                |               | DI)                  |          |       |          |          | N 2272; E 3682                                                                                                                                                                                                                                                    |                                                                                                            |                                                                                                                          |                                        | ROM HORIZ                                         |                                                                 |
| $\sim$ | BEGL                    | in<br>-7-8 |                     |                   |                   | DRILL                              |               | DETR                 | ENCH     | I     |          | ĹΙ       | MAKE AND MODEL                                                                                                                                                                                                                                                    | SIZE                                                                                                       | OVERBURDEN                                                                                                               |                                        | K (FT.)                                           | TOTAL DEPTH                                                     |
|        |                         |            |                     |                   |                   |                                    |               |                      | ENCH     |       | ING      | GI       | S little beaver<br>ROUND EL. DEPTH,                                                                                                                                                                                                                               | 4"<br>/EL. GROL                                                                                            | 3.5                                                                                                                      | DEPT                                   | 1.5<br>H/EL. TOP                                  | 5.0<br>OF ROCK                                                  |
|        | SAMD                    |            | /                   | PUE               | ICHT              | /FALL                              | icac          |                      | ET TN 40 |       |          |          | IGTH LOGGED BY:                                                                                                                                                                                                                                                   |                                                                                                            |                                                                                                                          |                                        | 3.5/3                                             |                                                                 |
|        |                         |            |                     | N/A               |                   | / "                                |               |                      | NO       |       | .A./L    | .E.H     | LOGGED BT:                                                                                                                                                                                                                                                        |                                                                                                            | D. MCG                                                                                                                   | RANE                                   |                                                   |                                                                 |
|        | Π.<br>Π                 | <u>у</u> ш |                     |                   | ı≿                | l<br>PR                            | JATEF<br>ESSU | RE                   |          |       | ι<br>Ω   | Π        |                                                                                                                                                                                                                                                                   |                                                                                                            |                                                                                                                          |                                        | 1                                                 |                                                                 |
|        | SAMP. TYPE<br>AND DIAM. | SAMP. AC   | SAMPLE R<br>CORE RE | SAMPLE<br>BLOWS " | X CORE<br>RECOVER | R<br>NI<br>B.P.A<br>B.P.A<br>C.P.A | EST:<br>SSUA  | TIME<br>TINE<br>MIN. | ELEV.    | DEPTH | GRAPHICS | SAMPLE   | DESCRIPTION                                                                                                                                                                                                                                                       | I AND C                                                                                                    | LASSIFIC                                                                                                                 | ATION                                  | WATER                                             | ON:<br>LEVELS,<br>RETURN,<br>TER OF<br>NG, ETC.                 |
|        |                         |            |                     |                   |                   |                                    |               |                      | -        | - 5_  |          |          | 0.0 - 3.5 FT. SIL<br>Color stratified<br>soft; poorly co<br>moist.<br>0.0-0.5 ft., dar<br>3/4); numerou<br>0.5-3.0 ft., dar<br>3.0-3.5 ft., dar<br>yellowish brow<br>dark yellowish<br>3.5 - 5.0 FT. DEC                                                          | ; fine to r<br>nsolidated<br>k reddish<br>s roots ar<br>k yellow k<br>'ey (SC);<br>n, pale gr<br>orange (1 | nedium-grai<br>d (loose); dr<br>brown (10 Y<br>nd organics.<br>brown (10 YI<br>mottled, da<br>een (5 G 7/2<br>0 YR 6/6). | y to<br>'R<br>R 4/2).<br>rk<br>!), and | Borehole<br>5.0 ft. ut                            | drilled 0 -<br>sing 4"<br>m augers.<br>ked for                  |
|        |                         |            |                     |                   |                   |                                    |               |                      |          |       |          |          | 3.5 - 5.0 FT. DEC         SANDSTONE         3/4); fine grain         to moderately         to moderately         cemented; tota         weathered; moderately         silty sand (SM)         sandstone grav         Bottom of boring         Borehole backfille. | ned (argil<br>nard; poo<br>ally decon<br>ist. Drill<br>and occa<br>el.                                     | laceous); so<br>orly to well<br>posed to hig<br>spoils consis<br>isional pieces                                          | 10 R<br>ft<br>shly<br>st of<br>s of    | contamin<br>hole gan<br>by Eberl<br>Corp.         | nation and<br>oma-logged<br>ine-TMA,<br>fusal at 5.0<br>ndwater |
|        |                         |            |                     |                   |                   |                                    |               |                      |          |       |          |          | 10-7-86.                                                                                                                                                                                                                                                          |                                                                                                            | Ber Pholip                                                                                                               |                                        |                                                   |                                                                 |
|        |                         |            |                     |                   |                   |                                    |               |                      |          |       |          |          |                                                                                                                                                                                                                                                                   |                                                                                                            |                                                                                                                          |                                        |                                                   |                                                                 |
|        |                         |            |                     |                   | •                 |                                    |               |                      |          |       |          |          |                                                                                                                                                                                                                                                                   |                                                                                                            |                                                                                                                          |                                        |                                                   |                                                                 |
|        |                         |            |                     |                   |                   |                                    |               |                      |          |       |          |          |                                                                                                                                                                                                                                                                   |                                                                                                            |                                                                                                                          |                                        | Descripti<br>classifical<br>samples b<br>examinat | tion of soil<br>by visual                                       |
|        |                         |            |                     |                   |                   | = SHEL<br>CHER;                    |               |                      | TE       | 18    |          |          | ng Valley Ro                                                                                                                                                                                                                                                      | J. (LC                                                                                                     | DI)                                                                                                                      | ١.                                     | HOLE NO.                                          | 13R                                                             |

|                          | _                      |            |                               |                         |           |         | ~        | PROJE             | СТ       |                                                                                                                                                                                                                                                                                                                                                                                                           | JOB NO. SH                                                                                                            | EET NO.                                                                                                                                    | HOLE NO.                                                                                    |
|--------------------------|------------------------|------------|-------------------------------|-------------------------|-----------|---------|----------|-------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|                          |                        | jE(        | DLOC                          |                         | RIL       |         |          |                   |          | FUSRAP                                                                                                                                                                                                                                                                                                                                                                                                    | 14501-138                                                                                                             |                                                                                                                                            | 614R                                                                                        |
| SITI                     |                        |            | W-H-                          | . Deer                  |           | TT)     | COORDIN  | ATES              |          | N 9999. E 9661                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                       | ROM HORIZE                                                                                                                                 | BEARING                                                                                     |
| BEG                      |                        |            | Valle<br>OMPLETE              |                         |           | ועי     |          |                   |          | N 2332; E 3661<br>MAKE AND MODEL SIZE                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                       | tical X (FT.)                                                                                                                              | TOTAL DEPT                                                                                  |
|                          |                        |            | 10-7-8                        |                         |           | loretr  | ench     |                   |          | S Little Beaver 4"                                                                                                                                                                                                                                                                                                                                                                                        | 8.5                                                                                                                   |                                                                                                                                            | 8.5                                                                                         |
|                          |                        |            |                               |                         | E BOXE    | SAMPL   | ESEL. TO | OP CAS            | ING      | GROUND EL. DEPTH/EL. GRO                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                       | H/EL. TOP                                                                                                                                  | OF ROCK                                                                                     |
|                          |                        | /          |                               |                         |           |         |          |                   |          | 41.7                                                                                                                                                                                                                                                                                                                                                                                                      | 10-1-00                                                                                                               | /                                                                                                                                          |                                                                                             |
| SAN                      | PLE                    |            | R WEIGH<br>N/A                | T/FALL                  | CAS       | SING LE | FI IN BO |                   | A./L     | ENGTH LOGGED BY:                                                                                                                                                                                                                                                                                                                                                                                          | D.McGrane                                                                                                             |                                                                                                                                            |                                                                                             |
| <u>ш</u>                 | •1                     |            |                               |                         | WATER     | 2       |          |                   |          |                                                                                                                                                                                                                                                                                                                                                                                                           | D.MCGrane                                                                                                             | 1                                                                                                                                          | <del> <u>.</u></del> 3                                                                      |
| SAMP . TYPE<br>AND DIAM. | SAMP. ADU.<br>LEN CORE | SAMPLE REC | SAMPLE<br>SAMPLE<br>BLOWS "N" | LOSS<br>LOSS<br>A.P.M.J | TESSU     | RE      | ELEV.    | DEPTH             | GRAPHICS | DESCRIPTION AND                                                                                                                                                                                                                                                                                                                                                                                           | CLASSIFICATION                                                                                                        | WATER<br>CHARAC                                                                                                                            | LEVELS,<br>RETURN,                                                                          |
| <u>97</u>                | <u></u>                |            |                               |                         | <u></u> . |         | 41.9     | -<br>-<br>5_<br>- |          | 0.0-8.5 ft. SILTY SAND (<br>stratified; fine-to media<br>poorly consolidated (loc<br>moist-saturated at 6.5 i<br>0.0-2.0 ft. dark yellow<br>(10YR4/2); numerous g<br>organics.<br>2.0-3.0 ft. dark yellow<br>(10YR6/6).<br>3.0-3.5 ft., clayey (SC)<br>yellowish brown; pale g<br>dark yellowish orange.<br>3.5-8.5 ft., dark yellow<br>roots.<br>Bottom of borehole at 8.5 i<br>were immediately replace | see);<br>ft.<br>ish brown<br>grass roots and<br>ish orange<br>); mottled dark<br>reen (5G7/2), and<br>vish brown; few | Borehole<br>0.0-8.5 fi<br>solid-ster<br>Site chec<br>radioacti<br>contamir<br>hole gam<br>by Eberli<br>Corporat<br>6.5 ft., gr<br>observed | drilled<br>t. using 4"<br>m augers.<br>ked for<br>ve<br>nation and<br>ma-logged<br>ine-TMA. |
|                          |                        |            |                               |                         |           |         |          |                   |          | 10-7-86.                                                                                                                                                                                                                                                                                                                                                                                                  | ,<br>,                                                                                                                |                                                                                                                                            |                                                                                             |
|                          |                        |            |                               |                         |           |         | •        |                   |          |                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                       | Descriptio<br>classificat<br>samples b<br>examinat                                                                                         | ion of soil<br>y visual                                                                     |
|                          |                        |            | POON; ST<br>; P = P1          |                         |           |         | TE       | 18                | Loi      | ng Valley Road (L                                                                                                                                                                                                                                                                                                                                                                                         | .ODI)                                                                                                                 | HOLE NO.                                                                                                                                   | I4R                                                                                         |

|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  | PROJEC | ст                                    |        |                    |                        |                           | JOB N                                        | D.  SH                 | EET NO.              | HOLE NO.                              |
|-----------------|-------|-----------------------|-------------|--------------------------------------------------------------------|-----------------------|----------|----------------------------------------------------------------------|------------------|--------|---------------------------------------|--------|--------------------|------------------------|---------------------------|----------------------------------------------|------------------------|----------------------|---------------------------------------|
|                 | L_    |                       | EC          | log                                                                | IC D                  | KIL      |                                                                      |                  |        |                                       |        | FUS                | SRAP                   | <u> </u>                  | 14501                                        |                        | 1 OF 1               | 615R                                  |
|                 | SITE  |                       |             |                                                                    |                       | /1 01    | <b>\T</b> \                                                          | COORDINA         | TES    |                                       |        | 0001               | <b>D A</b> //          |                           |                                              |                        | FROM HORIZ           | BEARING                               |
|                 | BEGL  |                       |             | Valle:                                                             |                       |          | Л)                                                                   |                  |        | NPT1                                  |        | 2291;<br>KE AND    | E 3665                 | SIZE                      | OVERBURDE                                    |                        | rtical  <br>CK (FT.) | TOTAL DEPTH                           |
| <sup>ر</sup> مر |       |                       |             | 0-7-80                                                             |                       |          | RETR                                                                 | ENCH             | ſ      |                                       |        |                    | beaver                 | 4"                        | 2.5                                          |                        | 3.5                  | 6.0                                   |
|                 |       |                       |             |                                                                    |                       |          |                                                                      | ESEL. TO         | P CASI |                                       |        | IND EL.            | DEPTH                  | /EL GRO                   | JND WATER                                    |                        | H/EL. TOP            |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        | 41.0               | ¥_/                    | 5/35.5 1                  |                                              |                        | 2.5/3                | 38.5                                  |
|                 | SAMP  | 1.2 11                |             | R WEIGHT<br>N/A                                                    | /FALL                 | CAS      | ING LE                                                               | FT IN HOL<br>NOI |        | A./L                                  | ENG.   | M LOG              | ED BI:                 |                           | D. MCG                                       |                        |                      |                                       |
|                 | ш.    | •                     |             |                                                                    |                       | <u> </u> | 2                                                                    |                  |        | <del> </del>                          | Π      | 1                  |                        | -                         | D. MCC                                       | RANE                   |                      | <u></u>                               |
|                 | DIAM. | D<br>D<br>E<br>E<br>E |             | SAMPLE<br>BLOUS "N"<br>X CORE<br>RECOVERY                          | PR                    | ESSU     | RE                                                                   |                  | т      | GRAPHICS                              | щ      |                    |                        |                           |                                              |                        | NOTES                | ON:                                   |
|                 | .5    | .0                    | ЩС          | Ē<br>Ω<br>Ω<br>Ω<br>Ω<br>Ω<br>Ω<br>Ω<br>Ω<br>Ω<br>Ω<br>Ω<br>Ω<br>Ω | mΣ                    | юн       |                                                                      | ELEV.            | DEPTH  | E                                     | SAMPLE | DESC               | RIPTION                | N AND C                   | LASSIFI                                      | CATION                 | WATER                | LEVELS,                               |
|                 | SAMP  | ΣU                    | <u>T</u> RO | Ϋ́ςς<br>Ϋ́ςς<br>Ϋ́ςς                                               | LOSS<br>IN<br>G. P. M | PRES.    | AINE<br>Suna<br>Suna<br>Suna<br>Suna<br>Suna<br>Suna<br>Suna<br>Suna |                  | ŏ      | Å.                                    | 29     |                    |                        |                           |                                              |                        |                      | RETURN,<br>CTER OF                    |
|                 | ğ₫.   | 21                    | ∦<br>Ω      | 80° L                                                              | 0 -                   | ă.       | ΕΣ                                                                   | 41.0             |        |                                       |        |                    |                        |                           |                                              |                        |                      | ING, ETC.                             |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  | -      |                                       |        | 0.0 - 2.1<br>yello | wish brow              | $\frac{114}{n}$ (10 YR    | (SM). Da<br>4/2); fine                       | rk<br>O                | 6.0 ft. u            |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  | _      | $\left[ \left[ \cdot \right] \right]$ |        | (loos              | um-grain<br>e); few ro | ed; soit; ;<br>ots and or | poorly conse<br>ganics; moi                  | st.                    | solid-st             | em augers.                            |
|                 |       |                       |             |                                                                    |                       |          |                                                                      | 38.5_            | -      | li - I                                |        | 2.5 - 6.6          | FT. DE                 | COMPOS                    | ED                                           | (10 D                  | -                    |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  | -      |                                       |        | 3/4):              | fine grai              | ined (argil               | ldish brown<br>llaceous); so                 | oft                    |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  | _ δ_   |                                       |        | ceme               | nted; tot              | ally decor                | orly to well<br>nposed to hi<br>urated at 5. | ighly                  | 0.4.1                |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      | 35.0             | -      |                                       | Щ.     | Drill              | spoils cor             | isist of sil              | ty sand (SM<br>lstone grave                  | $\hat{\mathbf{a}}$ and | Site che<br>radioact | ive                                   |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       | \      | occa               | sional piec            | ces of sand               | istone grave                                 |                        | hole gar             | nation and<br>nma-logged<br>line-TMA, |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        | Bottom             | of boring              | at 6.0 ft.                | iger spoils,                                 |                        | Corp.                | nne-1MA,                              |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        | 10-7               | -86.                   |                           | iger spons,                                  |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        | Ground               |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        | observed             | d, 10-7-86.                           |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       | -           |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          | :                                                                    |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        | -                         |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        | 1                                     |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        | 1                                     |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      | ation of soil                         |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        | samples<br>examina   | by visual<br>tion.                    |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        |                                       |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             |                                                                    |                       |          |                                                                      |                  |        | <u> </u>                              |        |                    |                        |                           |                                              |                        |                      |                                       |
|                 |       |                       |             | POON; ST<br>; P = PI                                               |                       |          |                                                                      | ITE              | 15     | R T                                   | որ     | σVa                | lley R                 | a (1)                     | וחכ                                          | ١                      | HOLE NO              | 15R                                   |
|                 | Γ_    |                       |             | , . <del>-</del> <b>F</b> I                                        | . VILL                | 5-0      |                                                                      |                  | 11     | -                                     | A-     |                    | ncy n                  |                           |                                              |                        |                      |                                       |

|           |             | iEC           | )LOG                       | iic I        | DRIL             | L LC         |          | PROJE  |                     | FUSRAP                                                                                                                                       |                                        | 138 1                     |                          | HOLE NO<br>616  |
|-----------|-------------|---------------|----------------------------|--------------|------------------|--------------|----------|--------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------|--------------------------|-----------------|
| SITE      |             |               |                            |              |                  |              | COORDIN  | ATES   |                     |                                                                                                                                              |                                        | NGLE FR                   | OM HORIZI                | BEARING         |
| 1<br>BEGL |             |               | Valley<br>MPLETER          |              |                  | (וענ         | ,I       |        | harri               | N 2335; E 3610<br>MAKE AND MODEL SIZE                                                                                                        |                                        | Vert                      |                          |                 |
|           |             |               | 0-7-8                      |              |                  | Aoretr       | ench     |        |                     |                                                                                                                                              | E OVERBURDEN                           | KULK                      | (FT.)                    | TOTAL DI<br>9.0 |
|           |             |               |                            |              |                  |              |          | OP CAS | ING                 |                                                                                                                                              | GROUND WATER                           | DEPTH,                    | /EL. TOP                 |                 |
|           |             | _/            |                            |              |                  |              |          |        |                     | 40.7                                                                                                                                         | .2 10-7-86                             |                           | /                        |                 |
| SAMP      | LE H        |               | R WEIGH                    | T/FALL       | CA               | SING LE      | FT IN HO |        | IA./LE              | NGTH LOGGED BY:                                                                                                                              |                                        |                           |                          |                 |
| 1.1       |             |               | <u>N/A</u>                 | 1            | WATE             |              | No       | ne     | <u> </u>            |                                                                                                                                              | D.McGr                                 | ane                       | <u> </u>                 |                 |
| 뜻         | SAMP. ADU.  | ត្តី ចំ       | SAMPLE<br>% CORE<br>% CORE | P            | RESSU            | IRE          | l        | -      | 8                   |                                                                                                                                              |                                        |                           | NOTES                    | <b>0</b> 111    |
| DIAM      | <b>€</b>  0 | ШŘ            |                            |              |                  | T            | ELEV.    | DEPTH  | GRAPHICS<br>SAMDI E | DESCRIPTION AN                                                                                                                               | D CLASSIFICA                           | TION                      | WATER                    | LEVELS          |
|           | Ê Z         | <u>t</u><br>L |                            | LOSS<br>LOSS | PRESS<br>P. S. I | HINE<br>MIN. |          | l 🛛    | LA LA               |                                                                                                                                              |                                        |                           | WATER<br>CHARAC          |                 |
| ₫<br>ď    | SA          | ξ<br>S<br>S   | _ <b>6</b> ' °             |              | <u>R</u>         | FΣ           | 40.7     |        | Ø                   |                                                                                                                                              |                                        |                           | DRILLI                   |                 |
|           |             |               |                            |              |                  |              |          |        |                     | 0.0-8.0 ft. SILTY SAN<br>stratified; fine-to m                                                                                               | D (SM-SC). Color<br>edium-grauned: so  | ft:                       |                          | <u>.</u>        |
|           | 1           |               |                            | 1            |                  |              |          |        |                     | poorly consolidated                                                                                                                          | (ioose);                               |                           | Borehole<br>0.0-9.0 f    | drilled         |
|           |             |               |                            |              |                  |              |          | '      |                     | 0.0-1.0 ft. grayish I grass roots and orga                                                                                                   | black(N2); numero<br>nics; clayev (SC) | <b>115</b>                | solid-ste                | m augers        |
|           |             |               |                            |              |                  |              |          |        |                     | moist-saturated at l<br>0.0-1.0 ft. gravish i<br>grass roots and orga<br>1.0-9.0 ft. dark yell<br>(10YR4/2); mottled<br>(δYR3/4) (7.0-9.0 ft | lowish brown<br>moderate brown         |                           | Site chec<br>radioacti   |                 |
|           |             |               |                            |              |                  |              |          | 5      | ]                   | (5YR3/4) (7.0-9.0 f                                                                                                                          | t.).                                   |                           | contamir<br>hole gam     | ation an        |
|           |             |               |                            |              |                  |              |          | ¥ँ     |                     |                                                                                                                                              |                                        |                           | by Eberl<br>Corporat     | ine-TMA         |
|           |             |               |                            |              |                  |              |          | 1 .    |                     |                                                                                                                                              |                                        |                           | 5.5 it., gi<br>observed  | round wa        |
| 1         |             |               |                            |              | 1                |              |          |        |                     |                                                                                                                                              |                                        |                           | observed                 | •               |
|           |             |               |                            |              |                  |              | \$1.7_   | } .    |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             |               |                            |              | 1                |              | Q1.7_    | 1 .    |                     | Bottom of borehole at C                                                                                                                      | 0 th Auger spoils                      | · · · · · · · · · · · · · |                          |                 |
|           |             |               |                            |              |                  |              |          |        |                     | Bottom of borehole at 9<br>were immediately rej<br>10-7-86.                                                                                  | placed in the hole,                    |                           |                          |                 |
|           |             |               |                            |              |                  |              |          |        |                     | 10-7-60.                                                                                                                                     |                                        |                           |                          |                 |
|           |             |               |                            | ł            | l                |              |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        | -                         | -                        |                 |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             |               |                            |              | .                |              |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           | ļ           |               |                            |              |                  |              |          |        |                     | •                                                                                                                                            |                                        |                           | :                        |                 |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           | Í           | ł             |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             |               |                            |              |                  | 1            |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             |               |                            |              |                  | 1            |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             | ·             |                            |              |                  | 1            |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           | Descriptio               | has de          |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           | classificat<br>samples b | ion of soi      |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           | examinati                |                 |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        | · -                       |                          |                 |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             |               |                            |              |                  |              |          |        |                     |                                                                                                                                              |                                        |                           |                          |                 |
|           |             | T CD/         | DON; ST                    |              | EQV TH           | BE: SI       | 1 E      |        |                     |                                                                                                                                              |                                        |                           | HOLE NO.                 |                 |

| GEOLOGIC DRILL LOG     PUSRAP     14507-135     107     107       ITE     JACL FLOR NOL (LOD)     N 3237: E 3557     Vertical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1        |         |          |         |                             |                | <u> </u> | DII  |          |          | PROJE    | СТ          | JOB NO. SHEET NO. HOLE NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------|----------|---------|-----------------------------|----------------|----------|------|----------|----------|----------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PICON CONFERENCE PALLER<br>PIO-7-86 Moretreech<br>DI-7-86 SID 7-786 Moretreech<br>DI-7-86 SID 7-786 SID 7-786<br>SID 7-786 SID 7-786 SID 7-786 SID 7-786<br>SID 7-786 SID 7 |          | SITE    |          | 321     | JLU                         | GIC            | . 0      |      |          |          | ATES     |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 10-7-86     Moretreech     B&S Liftle Beaver     4     5.0     1.0     6.0       000000000000000000000000000000000000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | f        |         |          |         |                             |                |          |      | DI)      |          |          | · · · · · · |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| CORE RECOVERY (17.72) ECCE BOSSISAULES[L. TOP CASHE GROUD EL. DEPARTL, BOUND LATER DEPARTL. TOP OF ROLL 5.0/46.9<br>SOURCE NAMER VETONT/ALL CASHO LEFT IN HOLE DIA./LENGTH LOGGED BT:<br>NOR NOR D.MCGrane D.MCGRA                                     | ~ /      |         |          |         |                             |                | DRILL    |      | loretr   | ench     |          | 1           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| SARDLE RANGER VEIGHT/TALL CASING LEFT IN HOLE: DIA./LENTH LOGGED BT:<br>N/A None D.McGrane<br>Provide and the second s                                     |          |         |          |         |                             |                | CORE     |      |          |          | OP CAS   |             | GROUND EL. DEPTH/EL. GROUND WATER DEPTH/EL. TOP OF ROCK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| N/A     None     D.McGrane       Example of the second state of the s                                                                                                  |          | CANT    |          | /       |                             | HT /E          |          | ICAS |          | ET IN NO |          | 1A /1       | 41.9 2 / 5.0/40.9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <ul> <li>Statistic di ficto di la di la di chi di chi</li></ul>                                   | ľ        |         |          |         | N/A                         | -              |          |      |          |          |          | IX./ L      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <ul> <li>Statistic di ficto di la di la di chi di chi</li></ul>                                   |          | ۳.      | <b>1</b> |         | ; <del></del> .             | <u>&gt;</u>    | PR       | ATER | ?<br>RE  |          |          | n           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <ul> <li>Statistic di ficto di la di la di chi di chi</li></ul>                                   |          | ND or A | MP. AD   | MPLE RI | SAMPLE<br>SAMPLE<br>LOUS "I | RECOVER<br>053 | - 1      |      |          | ELEV.    | DEPTH    | RAPHIC      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       36.9 ±     5       37.9 ±     5       36.0 ±     5       37.9 ±     5       36.0 ±     5       37.9 ±     5       37.9 ±     5       37.9 ±     5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          | ¶⊈<br>B | 8-18     |         | 5 6                         |                | Ċ        | ã.   | ы н<br>н | 41.9     | <b> </b> |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| classification of soil<br>samples by visual<br>examination.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |         |          |         |                             |                |          |      |          | -        | Ŧ        |             | poorly consolidated (loose);<br>moist-saturated to 5.0 ft.Borehole drilled<br>0.0-5.0 ft. using 4<br>solid-stem augers0.0-1.0 ft., dark reddish brown (10R3/4);<br>numerous roots and organics.<br>1.0-1.5 ft., clayey (SC); mottled dark<br>yellowish brown (10YR4/2); pale green<br>(5G7/2) and dark yellowish orange<br>(10YR6/6).Borehole drilled<br>0.0-5.0 ft. using 4<br>solid-stem augers1.5-5.0 ft., dark yellowish orange.<br>(10YR6/6).Site checked for<br>radioactive<br>contamination an<br>hole gamma-logg<br>by Eberline-TMA<br>Corporation.5.0-6.0 ft. DECOMPOSED SANDSTONE.<br>Dark reddish brown (10R3/4); fine-grained<br>(argillaceous); soft; poorly consolidated;<br>poorly cemented; totally decomposed;<br>moist-saturated at 5.0 ft. Drill spoils<br>consist of silty sand (SM) and occasional<br>pieces of sandstone gravel.5.0 ft., ground wa<br>observed.Bottom of borehole at 6.0 ft. Auger spoils<br>were immediately replaced in the hole,Steelester<br>radioactive<br>contamination an<br>hole gamma-logg. |
| ss = split spoon; st = shelby tube; SITE<br>b = dennison; p = pitcher; o = other 18 Long Valley Road (LODI) 617R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <u>v</u> |         |          |         |                             |                |          |      |          | ΤΕ       | 18       |             | classification of so<br>samples by visual<br>examination.<br>HOLE NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

|            |                             | <br>- 1 /        |                                         |              |                |              | <u> </u>              | PROJE  | CT       |                                                                                                                                                                            | SHEET NO.              | HOLE NO.              |  |
|------------|-----------------------------|------------------|-----------------------------------------|--------------|----------------|--------------|-----------------------|--------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------|--|
| SIT        | GEOLOGIC DRILL LOG          |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            | 4501-138 1 OF 1 618    |                       |  |
|            |                             | .0110            | Valley                                  | Road         |                | DI)          | COORDIN               | AIES   |          |                                                                                                                                                                            | ertical                |                       |  |
| AEG        | _                           |                  | ONPLETED                                |              |                | <u></u>      | _1                    |        | DRILL    |                                                                                                                                                                            | OCK (FT.)              | TOTAL DE              |  |
| 10         | -7-                         | 86 ] :           | 10-7-8                                  | 6            |                | loretr       |                       |        |          | S Little Beaver 4" 5.0                                                                                                                                                     | 0.5                    | 5.5                   |  |
| CORI       | E RE                        | COVER            | (FT./                                   | X) CORI      | E BOXE         | SISANPL      | ESEL. TO              | IP CAS | ING      | ROUND EL. DEPTH/EL. GROUND WATER DE<br>43.0 2 5.0/38.0 10-7-86                                                                                                             | TH/EL. TOP             |                       |  |
| SAM        | / 43.0 \$ 2.0/38.0 5.0/38.0 |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
| L          | N/A None D.McGrane          |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
| ¥.         | ا د                         |                  | SAMPLE<br>SAMPLE<br>BLOWS "N"<br>X CORE | PR           | WATER          | RE           |                       |        | 0        |                                                                                                                                                                            |                        |                       |  |
| SAUP - IAH |                             |                  |                                         | ļ            | TESTS          | 5            | ELEV.                 | ₽      | GRAPHICS | DESCRIPTION AND CLASSIFICATIO                                                                                                                                              | NOTES<br>WATER         |                       |  |
|            |                             |                  |                                         | m Σ<br>mZn   | 1 m H 1        | TIME<br>MIN. |                       | DEPTH  | ЧЧ.      |                                                                                                                                                                            | WATER                  | RETURN                |  |
| 톬          | NAS -                       |                  |                                         | LOSS<br>LOSS | 10.00<br>10.00 | 5uz          | 43.0                  |        | 6        |                                                                                                                                                                            | DRILLI                 |                       |  |
| <u> </u>   |                             | - <u> </u> 00    | 1                                       | <u> </u>     |                |              | 40.0                  |        | TØ       | 0.0-5.0 ft. SILTY SAND (SM). Fine-to<br>medium-grained; soft; poorly consolidated                                                                                          |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       | -      |          | (loose); moist-saturated at 5.0 It.                                                                                                                                        | Borehole               | drilled               |  |
|            |                             |                  |                                         | ľ            |                |              |                       | •      |          | 0.0-3.0 ft., dark reddish brown<br>(10R3/4);numerous organics(0.0-0.3 ft.).<br>3.0-5.0 ft., mottled dark reddish brown<br>(10R3/4) and dark yellowish orange<br>(10YR6/6). |                        | m augers              |  |
|            |                             |                  | l                                       |              |                |              |                       | -      |          | (10R3/4) and dark yellowish orange<br>(10R8/6)                                                                                                                             | Site check             |                       |  |
|            |                             |                  |                                         |              |                |              | <b>3</b> 8.1 <u>3</u> | -      |          |                                                                                                                                                                            | contamin<br>hole gan   | nation an<br>una-logg |  |
|            |                             |                  |                                         |              |                |              | 37.5                  | F •-   |          | 5.0-5.5 ft. <u>DECOMPOSED SANDSTONE</u><br>Dark reddish brown (10R3/4); fine-grained                                                                                       | by Eberl               | ine-TMA               |  |
|            | 1                           | {                |                                         |              |                |              |                       |        |          | (argilaceous); soft-moderately hard;                                                                                                                                       | 5.0 ft., g<br>observed | round wa              |  |
| ļ          |                             |                  | 1                                       |              |                |              |                       |        |          | decomposed-highly weathered. Drill spoils<br>consist of silty sand (SM) and occasional                                                                                     | 5.5 ft., a<br>refusal. | uger                  |  |
|            |                             |                  |                                         |              |                |              |                       |        |          | pieces of sandstone gravél.                                                                                                                                                |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          | Bottom of borehole at 5.5 ft. Auger spoils                                                                                                                                 |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          | were immediately replaced in the hole, 10-7-86.                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  | ]                                       |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             | ļ                |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          | -                                                                                                                                                                          |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              | {              |              |                       |        |          | •                                                                                                                                                                          |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            | Descripti              | ion and               |  |
|            |                             | i                |                                         |              |                |              |                       |        |          |                                                                                                                                                                            | classifica<br>samples  |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            | examinat               | tion.                 |  |
|            |                             |                  |                                         |              |                |              |                       |        |          |                                                                                                                                                                            |                        |                       |  |
|            |                             |                  |                                         |              |                |              |                       |        |          | •                                                                                                                                                                          |                        |                       |  |
| <br>SS =   | SDI                         | <u> </u><br> T © | POON; ST                                | # SHEI       | BY TH          | RF. SI       | ITE                   |        | LL       |                                                                                                                                                                            | HOLE NO.               |                       |  |
|            |                             |                  | wwn, wt                                 | - enci       |                | THER         |                       | 10     | 1        | g Valley Road (LODI)                                                                                                                                                       |                        | 18R                   |  |

|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           | PROJECT                                    |                                          |                                                | JOB NO. SHEET NO. HOLE NO.          |                           |                       |  |
|----|------------------------------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------|-------------------------------|----------------------|----------------|-------------------|--------------------------------------|---------------------------|--------------------------------------------|------------------------------------------|------------------------------------------------|-------------------------------------|---------------------------|-----------------------|--|
|    | GEOLOGIC DRILL LOG                                                           |                        |                                                                                             |                               |                      |                |                   |                                      | FUSRAP                    |                                            |                                          |                                                | 14501-138 1 OF 1 61                 |                           |                       |  |
|    | SITE COC<br>18 Long Valley Road (LODI)                                       |                        |                                                                                             |                               |                      |                |                   |                                      | OORDINATES N 2433; E 3571 |                                            |                                          |                                                | ANGLE FROM HORIZBEARING<br>Vertical |                           |                       |  |
|    | BEGUN COMPLETED DRILLER                                                      |                        |                                                                                             |                               |                      |                |                   |                                      | DRILL MAKE AND HO         |                                            |                                          | SIZE OVERBURDEN RO                             |                                     | CK (FT.) TOTAL DE         |                       |  |
|    |                                                                              |                        |                                                                                             | 10-7-8<br>X (FT./             |                      |                | Ioretr<br>Sisampl |                                      | OP CAS                    |                                            | S Little Beaver                          | 4" 8.0                                         | DEPTH                               | EL. TOP                   | 8.0                   |  |
|    |                                                                              |                        | _/                                                                                          |                               |                      |                |                   |                                      |                           |                                            | 44.7 12/                                 | L. GROUND WATER<br>39.9 10-7-86                |                                     | /                         |                       |  |
|    | SAM                                                                          | PLE I                  |                                                                                             | R WEIGH<br>N/A                | I/FALL               | CAS            | SING LE           |                                      | ole: Di<br>Dne            | IA./L                                      | ENGTH LOGGED BY:                         | D.McG                                          | rane                                |                           |                       |  |
| 1  | ш.<br>Ш.                                                                     | تا ت                   | U.                                                                                          | ÷. >                          | - pr                 | WATER          | 2<br>2<br>8<br>2  |                                      | T                         | 6                                          |                                          |                                                |                                     |                           |                       |  |
|    | SAMP . TYPE<br>AND DIAN.                                                     | SAMP. ADU.<br>LEN CORE |                                                                                             | SAMPLE<br>BLOUS "N"<br>X CORE |                      | TEST           | \$                | ELEV.                                | DEPTH                     | GRAPHICS                                   | U<br>DESCRIPTION<br>D                    | AND CLASSIFIC                                  |                                     | NOTES<br>WATER            | ON:<br>LEVELS,        |  |
|    | 毁                                                                            | Ξ.<br>Π                | L<br>L<br>L<br>L<br>L<br>L<br>L<br>L<br>L<br>L<br>L<br>L<br>L<br>L<br>L<br>L<br>L<br>L<br>L |                               | LOSS<br>P. H<br>M. H | PRESS<br>P.S.I | TIME<br>MIN.      |                                      | 0E                        | RAF                                        |                                          |                                                |                                     | WATER<br>CHARAC           | RETURN,<br>TER OF     |  |
|    | <u>β</u> α                                                                   | 21-                    | C C                                                                                         |                               | 0                    | Ed             | Σ -               | 44.9                                 | <u> </u>                  | । ज                                        | 0.0-8.0 ft. SILTY S                      | AND (SM). Color                                |                                     | DRILLI                    | NG, ETC.              |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      | ·                         |                                            | stratified; fine-to<br>poorly consolidat | ) medium-grained; so<br>ied (loose):           | · ·                                 | Borehole                  | drilled               |  |
|    |                                                                              |                        |                                                                                             |                               |                      | · ·            |                   | moist-saturated<br>0.0-0.2 ft., mode | 4.                        | 0.0-8.0 ft. using 4"<br>solid-stem augers. |                                          |                                                |                                     |                           |                       |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           | ]                                          | 0.2-6.0 ft., dark<br>mottled moderate    | nd organics.<br>reddish brown (10R<br>e brown. | 3/4);                               | Site chec<br>radioacti    | ve                    |  |
|    |                                                                              |                        |                                                                                             | i                             |                      |                |                   |                                      | ¥ ₅_                      |                                            |                                          |                                                |                                     | hole gam                  | ma-logged             |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      | -                         |                                            | 6.0-8.0 ft., dark                        | reddish brown (10R:<br>stone?                  |                                     | Corporat                  | ion.<br>ound water    |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   | 36.9                                 | -                         |                                            | decomposed sand                          | stone?                                         |                                     | observed.                 |                       |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      | ] -                       |                                            | Bottom of borehole                       | at 8.0 ft. Auger spoil                         |                                     | 8.0 ft., au<br>refusal.   | lger                  |  |
|    |                                                                              |                        |                                                                                             | i                             |                      |                |                   |                                      |                           |                                            | were immediately 10-7-86.                | replaced in the hole                           | •                                   |                           |                       |  |
| 1  |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                |                                     |                           |                       |  |
| ~  |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                |                                     |                           |                       |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                |                                     |                           |                       |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                |                                     |                           |                       |  |
|    |                                                                              |                        | į                                                                                           |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                | 1                                   |                           |                       |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                |                                     |                           |                       |  |
|    |                                                                              |                        |                                                                                             |                               |                      | •              |                   |                                      |                           |                                            |                                          |                                                |                                     |                           |                       |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                |                                     |                           |                       |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                |                                     |                           |                       |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                |                                     |                           |                       |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                |                                     |                           |                       |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                |                                     |                           |                       |  |
|    |                                                                              |                        |                                                                                             |                               |                      | 1              |                   |                                      |                           |                                            |                                          |                                                |                                     |                           |                       |  |
|    |                                                                              |                        |                                                                                             | ·                             |                      | Ì              |                   |                                      |                           |                                            |                                          |                                                |                                     |                           |                       |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                |                                     |                           |                       |  |
|    | l                                                                            |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            | :                                        |                                                |                                     |                           |                       |  |
| •  |                                                                              |                        |                                                                                             |                               |                      | ľ              |                   |                                      |                           |                                            |                                          |                                                |                                     | Descriptic<br>lassificati | on and<br>ion of soil |  |
| ~1 |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                |                                     | amples b<br>xaminati      | y visual              |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                | ļ                                   |                           |                       |  |
|    |                                                                              |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                |                                     |                           | r<br>r                |  |
| S  | S =                                                                          | SPLI                   | T SP                                                                                        | DON; ST                       | = SHEL               | BY TUB         | E; SII            | IE                                   | 12                        | 1.0-                                       | a Valley Pear                            |                                                | <u>,</u> н                          | OLE NO.                   | 0P                    |  |
| Ľ  | D = DENNISON; P = PITCHER; D = OTHER 18 Long Valley Road (LODI) 619R<br>A-12 |                        |                                                                                             |                               |                      |                |                   |                                      |                           |                                            |                                          |                                                |                                     |                           |                       |  |