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Formerly Utilized Sites Remedial  
Action Program (FUSRAP)

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**Maywood Chemical Company Superfund Site**

**ADMINISTRATIVE RECORD**

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**Document Number**

**MISS- 006.**

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**US Army Corps  
of Engineers®**

063982

# Bechtel National, Inc.

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Attention: Robert G. Atkin  
Technical Services Division

Subject: Bechtel Job No. 14501, FUSRAP Project  
DOE Contract No. DE-AC05-81OR20722  
Publication of Radiological Characterization Report  
for seventeen residential properties, four municipal  
properties, and seven commercial properties in  
Lodi and Maywood, New Jersey  
Code: 7315/WBS: 138

Dear Mr. Atkin:

Enclosed is one copy each of the 28 subject published reports for the properties listed in Attachment 1. These reports incorporate all comments received in this review cycle (CCNs 063165, 063327, 062285, and 061568) and are being published with approval of Steve Oldham, as reported in CCN 063868.

Also enclosed (as Attachment 2) is a proposed distribution list for these reports. Please send us any changes to the proposed distribution list at your earliest convenience so we may distribute the reports.

BNI would like to express our thanks to Mr. Oldham for his cooperation and efforts to review these drafts in an accelerated manner. His efforts have allowed us to publish these reports on schedule. If you have any questions about these documents, please call me at 576-4718.

Very truly yours,

R. C. Robertson  
Project Manager - FUSRAP

RCR:wfs:1756x  
Enclosure: As stated

cc: J. D. Berger, ORAU (w/e)  
N. J. Beskid, ANL (w/e)

CONCURRENCE

WFS	gll-			
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RADIOLOGICAL CHARACTERIZATION REPORT  
FOR THE COMMERCIAL PROPERTY AT  
80 INDUSTRIAL ROAD (FLINT INK CORPORATION)  
LODI, NEW JERSEY

SEPTEMBER 1989

Prepared for

UNITED STATES DEPARTMENT OF ENERGY  
OAK RIDGE OPERATIONS OFFICE  
Under Contract No. DE-AC05-81OR20722

By

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## ABBREVIATIONS

cm	centimeter
cm <sup>2</sup>	square centimeter
cpm	counts per minute
dpm	disintegrations per minute
ft	foot
h	hour
in.	inch
km <sup>2</sup>	square kilometer
L	liter
L/min	liters per minute
m	meter
m <sup>2</sup>	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
yd	yard
yd <sup>3</sup>	cubic yard

## 1.0 INTRODUCTION AND SUMMARY

This section provides a brief description of the history and background of the Maywood site and its vicinity properties. Data obtained from the radiological characterization of this vicinity property are also presented.

### 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 under the Formerly Utilized Sites Remedial Action Program (FUSRAP) under the direction of the DOE Division of Facility and Site Decommissioning Projects. Several residential, commercial, and municipal 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 U.S. 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 that DOE 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.

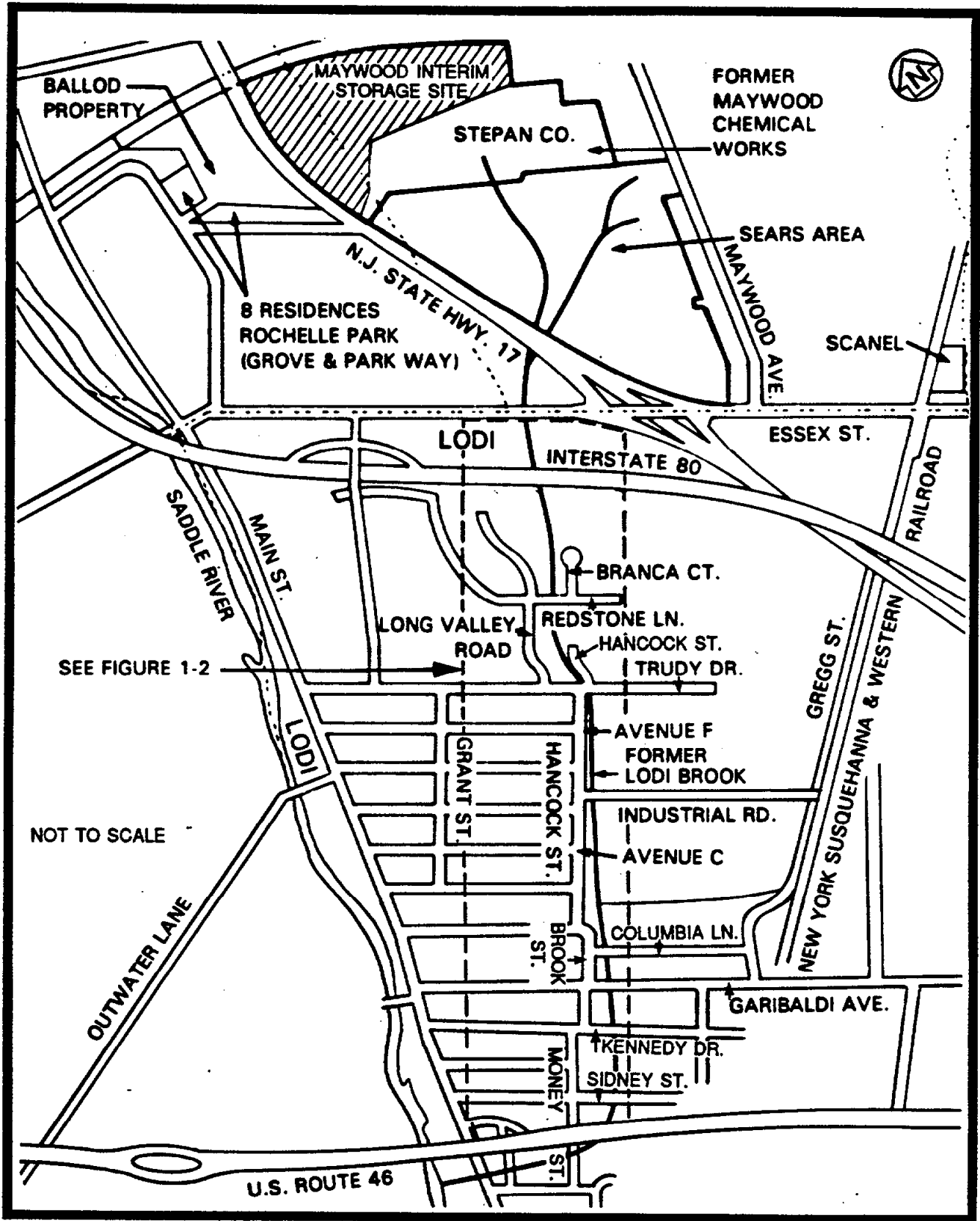


FIGURE 1-1 LOCATION OF LODI VICINITY PROPERTIES



## 1.2 PURPOSE

The purpose of the 1987 survey performed by BNI was to locate the horizontal and vertical boundaries of radionuclide concentrations exceeding remedial action guidelines.

## 1.3 SUMMARY

This report details the procedures and results of the radiological characterization of the property at 80 Industrial Road (Figure 1-2) in Lodi, New Jersey, which was conducted in November and December 1987. Additional data were obtained in November 1988.

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

The property located at 80 Industrial Road is a commercial property that consists of a concrete block building with a grassy area and an asphalt-paved parking lot along the western side and an asphalt-paved parking/loading area along the eastern side. The entrance or north side of the building is bordered by a grassy area, and the rear or south side of the building is bordered by a grassy area that adjoins a state-operated property. The property at 80 Industrial Road is occupied by the Flint Ink Company, which manufactures and distributes ink used in printing operations. The property is situated in a densely populated residential neighborhood; however, other commercial properties are located in close proximity or adjacent to this property.

This characterization confirmed that thorium-232 is the primary radioactive contaminant at this property. Results of

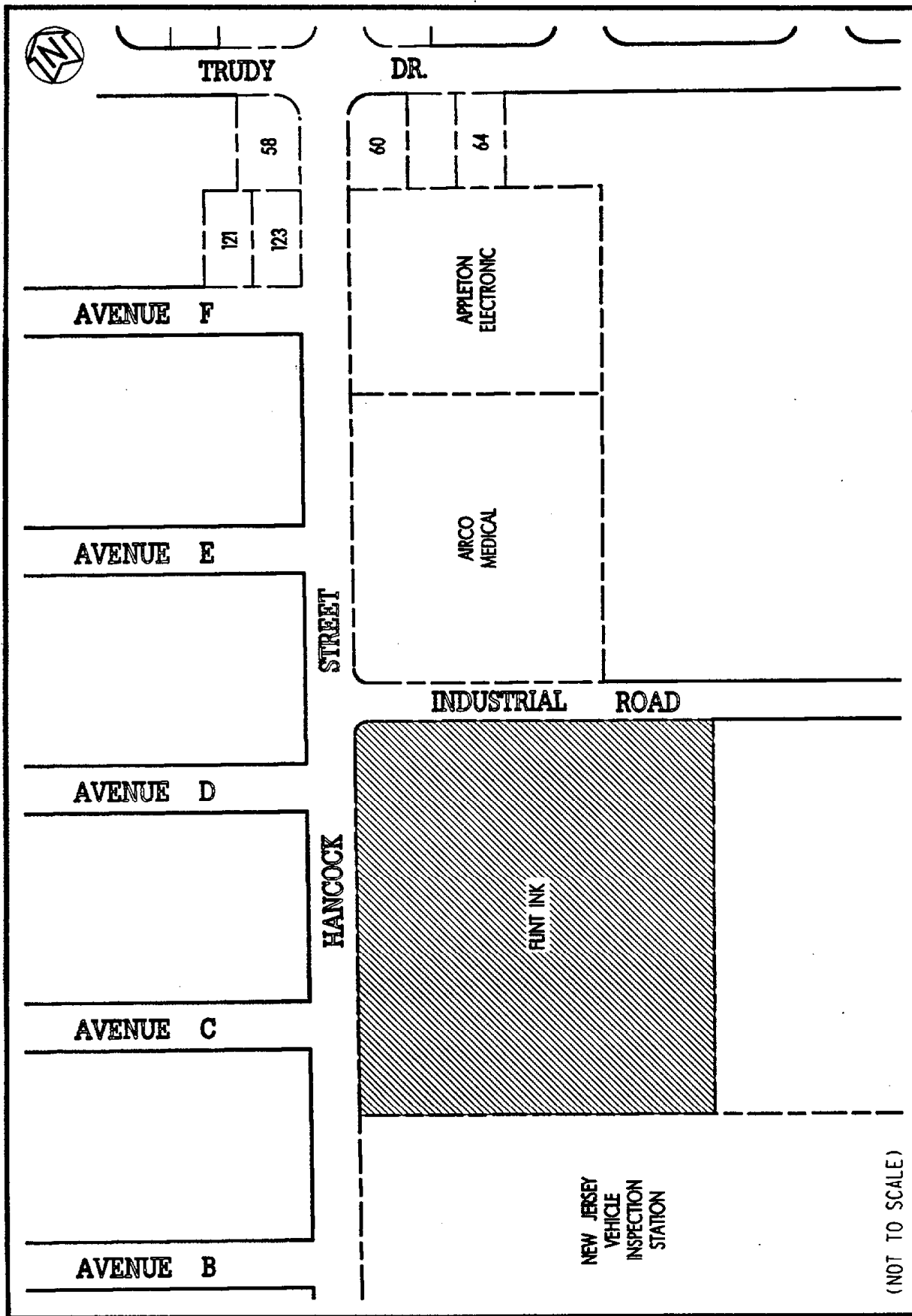


FIGURE 1-2 LOCATION OF 80 INDUSTRIAL ROAD

surface soil samples for 80 Industrial Road showed maximum concentrations of thorium-232 and radium-226 to be 15.0 and less than 1.7 pCi/g, respectively. The maximum concentration of uranium-238 in surface soil samples was less than 11.6 pCi/g.

Subsurface soil sample concentrations ranged from less than 0.5 to 28.8 pCi/g for thorium-232 and from 0.3 to 13.3 pCi/g for radium-226. The average background level in this area for both radium-226 and thorium-232 is 1.0 pCi/g. The concentrations of uranium-238 in subsurface soil samples ranged from less than 1.0 to 42.7 pCi/g. 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 conservative 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, the vicinity properties will be decontaminated in a manner so as to reduce future doses to levels that are as low as reasonably achievable (ALARA) (Ref. 2).

Soil analysis data for this property indicated surface contamination. Subsurface investigation by gamma logging indicated contamination to a depth of 1.83 m (6.0 ft).

Measurements for radon and its progeny (radon and thoron daughters) were not obtained for this property.

All data tables for this property appear at the end of this report.

#### 1.4 CONCLUSIONS

Evaluation of data collected, analyses performed, and historical documentation reviewed indicates the presence of radiological contamination on the property located at 80 Industrial Road. This contamination is both surface and subsurface contamination. The surface contamination is located along the rear (south side) of the building. The subsurface contamination ranges from a depth of 15.2 cm (6.0 in.) to 1.83 m (6.0 ft). In addition, the contamination appears to extend beneath the building, and there is a high probability that the contamination extends beneath the street (Industrial Road) in front of the building. The total affected area is estimated to be approximately 35 percent of the property. These conclusions are supported by documentation that establishes the presence of the former channel of Lodi Brook in this area. This channel is the suspected transport mechanism for the radiological contamination.

It has been determined, from review of aerial photographs of the area, that the former channel of Lodi Brook was realigned and buried in concrete conduit parallel to Hancock Street on this property. Prior to this realignment it is suspected that the former channel flowed across the property in a southwesterly direction in the area where the building now stands. Confirmation of this suspicion was obtained by drilling boreholes inside the building during characterization activities.

## 2.0 SITE HISTORY

The Maywood Chemical Works was founded in 1895. The company began processing thorium from monazite sand in 1916 (during World War I) for use in manufacturing gas mantles for various lighting devices. Process wastes from manufacturing operations were pumped to two areas surrounded by earthen dikes 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 coca leaves mixed with other material resulting from operations at the plant. Some fill material apparently contained thorium process wastes (Ref. 3).

Uncertainty exists as to 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. First, 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. Second, samples taken from Lodi properties indicate elevated concentrations of a series of elements known as rare earths. Rare earth elements are typically found in monazite sands, which also contain

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 on 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 recalled chemical odors in and around the brook in Lodi and steam rising off the water. These observations suggest that discharges of contaminants occurred 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

Numerous surveys of the Maywood site and its vicinity properties have been conducted. Among the past surveys, three that are pertinent to this vicinity property are detailed in this section.

January 1981--The Nuclear Regulatory Commission directed that a survey be conducted of the Stepan Company property and its vicinity properties in January 1981. Using the Stepan Company plant as the center, a 10.3-km<sup>2</sup> (4-mi<sup>2</sup>) aerial survey was conducted by the EG&G Energy Measurements Group, which identified anomalous concentrations of thorium-232 to the north and south of the Stepan Company property. The Lodi vicinity properties were included in this survey (Ref. 6).

June 1984--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).

September 1986--At the request of DOE, ORNL conducted radiological surveys of the vicinity properties in Lodi in September 1986 to determine which properties contained radioactive contamination in excess of DOE guidelines and would, therefore, 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 U.S. Environmental Protection Agency (EPA) for the Uranium Mill Tailings Remedial Action Program.

**TABLE 2-1  
SUMMARY OF RESIDUAL CONTAMINATION GUIDELINES**

**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 GUIDELINES**

<u>Radionuclide</u>	<u>Soil Concentration (pCi/g) Above Background<sup>a,b,c</sup></u>
Radium-226 Radium-228 Thorium-230 Thorium-232	5 pCi/g when averaged over the first 15 cm of soil below the surface; 15 pCi/g when averaged over any 15-cm-thick soil layer below the surface layer.
Other Radionuclides	Soil guidelines will be calculated on a site-specific basis using the DOE manual developed for this use.

**STRUCTURE GUIDELINES**

**Airborne Radon Decay Products**

Generic guidelines for concentrations of airborne radon decay products shall apply to existing occupied or habitable structures on private property that has no radiological restrictions on its use; 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 that has no radiological restrictions on its use shall not exceed the background level by more than 20 µR/h.

**Indoor/Outdoor Structure Surface Contamination,**

<u>Radionuclide<sup>f</sup></u>	<u>Allowable Surface Residual Contamination<sup>g</sup> (dpm/100 cm<sup>2</sup>)</u>		
	<u>Average<sup>g,h</sup></u>	<u>Maximum<sup>h,i</sup></u>	<u>Removable<sup>h,j</sup></u>
Transuranics, Ra-226, Ra-228, Th-230, Th-228 Pa-231, Ac-227, I-125, I-129	100	300	20
Th-Natural, Th-232, Sr-90, Ra-223, Ra-224 U-232, I-126, I-131, I-133	1,000	3,000	200
U-Natural, U-235, U-238, and associated decay products	5,000 α	15,000 α	1,000 α
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5,000 β - γ	15,000 β - γ	1,000 β - γ



## TABLE 2-1 (CONTINUED)

<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 1) the dose for the mixtures will not exceed the basic dose limit, or 2) the sum of ratios of the soil concentration of each radionuclide to the allowable limit for that radionuclide will not exceed 1 ("unity").

<sup>b</sup>These guidelines represent allowable 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<sup>2</sup> area does not exceed these limits. In addition, every reasonable effort shall be made to remove any source of radionuclide that exceeds 30 times the appropriate soil limit, regardless of the average concentration in the soil.

<sup>d</sup>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  $1.3 \times 10^5$  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>g</sup>Measurements of average contamination should not be averaged over more than 1 m<sup>2</sup>. 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>i</sup>The maximum contamination level applies to an area of not more than 100 cm<sup>2</sup>.

<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 were required to comply with the provisions of BNI health and safety requirements and as directed by the on-site BNI Health and Safety Officer.

#### 3.1 SUBCONTRACTOR TRAINING

Before the start of work, all subcontractor personnel attended an orientation session presented by the BNI Health and Safety Officer to explain the nature of the material to be encountered in the work and the personnel monitoring and safety measures that are required.

#### 3.2 SAFETY REQUIREMENTS

Subcontractor personnel complied with the following BNI requirements:

- o Bioassay--Subcontractor personnel submitted 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.
- o Protective Clothing/Equipment--Subcontractor personnel were required to wear the protective clothing/equipment specified in the subcontract or as directed by the BNI Health and Safety Officer.
- o Dosimetry--Subcontractor personnel were required to wear and return daily the dosimeters and monitors issued by BNI.
- o Controlled Area Access/Egress--Subcontractor personnel and equipment entering areas where access and egress were controlled for radiation and/or chemical safety purposes were surveyed by the BNI Health and Safety Officer (or personnel representing BNI) for contamination before leaving those areas.

- o Medical Surveillance--Upon written direction from BNI, subcontractor personnel who work in areas where hazardous chemicals might exist were 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 was under the direct supervision of personnel representing BNI.

Health and safety-related requirements for all activities involving exposure to radiation, radioactive material, chemicals, and/or chemically contaminated materials and other associated industrial safety hazards are generated in compliance with applicable regulatory requirements and industry-wide standards. Copies of these requirements are located at the BNI project office for use by project 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 was adjusted to characterize each property adequately. 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 with the east and north coordinates is shown on all figures included in Sections 4.0 and 5.0 of this report.

### 4.1 FIELD RADIOLOGICAL CHARACTERIZATION

This section provides a description of the instrumentation and methodologies used to obtain exterior surface and subsurface measurements during radiological characterization of this property.

#### 4.1.1 Measurements Taken and Methods Used

An initial walkover survey was performed using an unshielded gamma scintillation detector [5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide probe] to identify areas of elevated radionuclide activity. Near-surface gamma measurements taken using a cone-shielded gamma scintillation detector were also used to determine areas of surface contamination. 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 30.4 cm (12 in.) above the ground at the intersections of

3.0-m (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 (pCi/g). This calibration demonstrated that approximately 11,000 cpm corresponds to the DOE guideline of 5 pCi/g plus local average background of 1 pCi/g for thorium-232 in surface soils (Ref. 9).

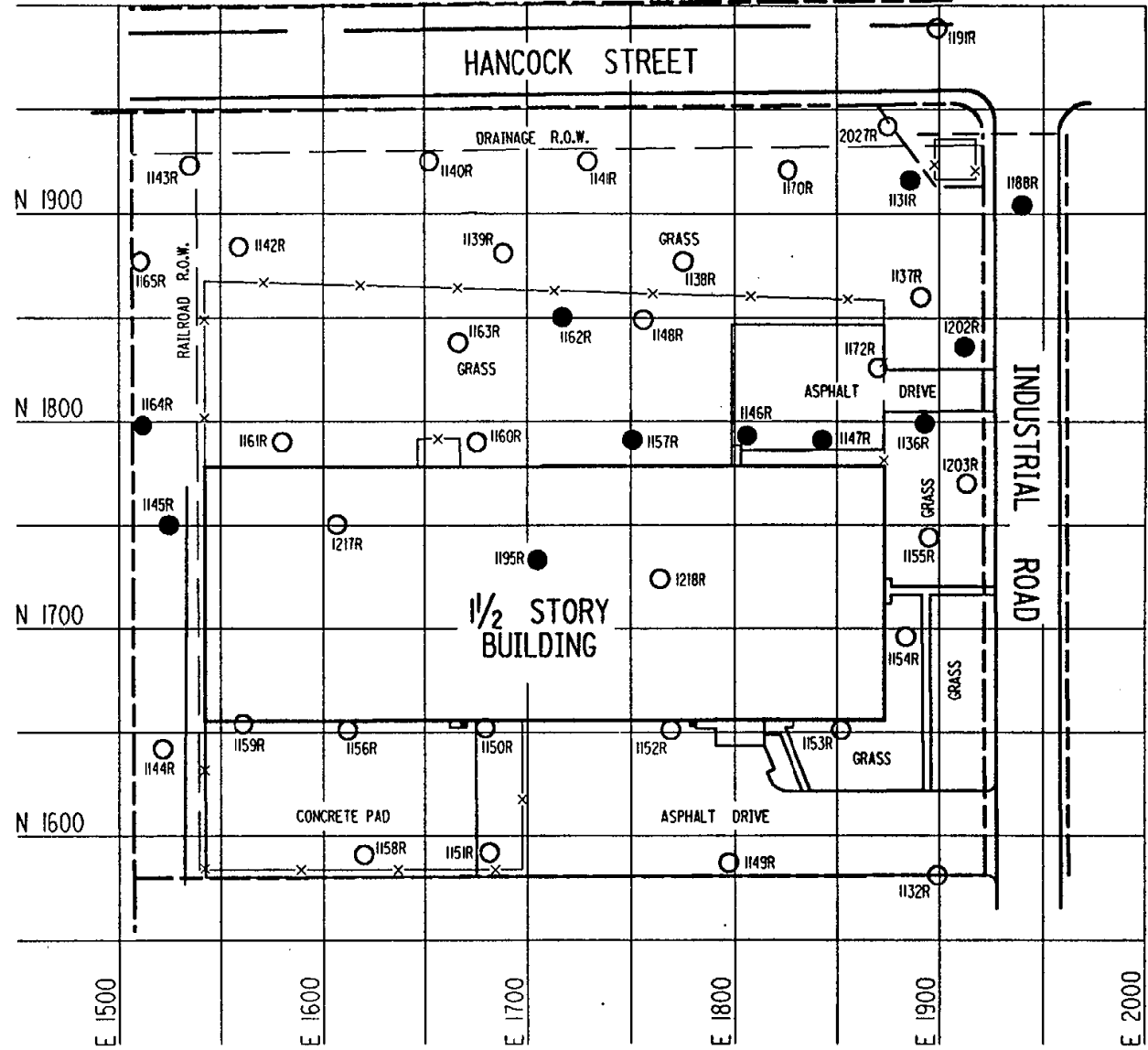
A subsurface investigation was conducted to determine the depth to which the previously identified surface contamination extended and to locate subsurface contamination where there was no surface manifestation. The subsurface characterization consisted of drilling 42 boreholes (Figure 4-1), using either a 7.6-cm- (3-in.-) or 15.2-cm- (6-in.-) diameter auger bit, and gamma logging them. The boreholes 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 accomplished in less time than collecting soil samples, and the need for analyzing these samples in a laboratory is eliminated. A 5.0- by 5.0-cm (2- 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. This relationship has also been corroborated by results from previous characterizations where thorium-232 was found (Ref. 9).

Gamma radiation measurements were taken at 15.2-cm (6-in.) vertical intervals to determine the depth and concentration



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- UNCONTAMINATED BOREHOLE
- CONTAMINATED BOREHOLE

FIGURE 4-1 BOREHOLE LOCATIONS AT 80 INDUSTRIAL ROAD

of the contamination. The gamma-logging data were reviewed to identify trends, whether or not 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, 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 36 locations (Figure 4-2) and analyzed for thorium-232, uranium-238, 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 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 42 locations (Figure 4-2) using a 7.6-cm (3.0-in.) outside diameter (O.D.) split-spoon sampler mounted to a tripod or attached to a truck-mounted auger stem. The subsurface soil samples were analyzed for radium-226, uranium-238, and thorium-232 in the same manner as the surface soil samples.

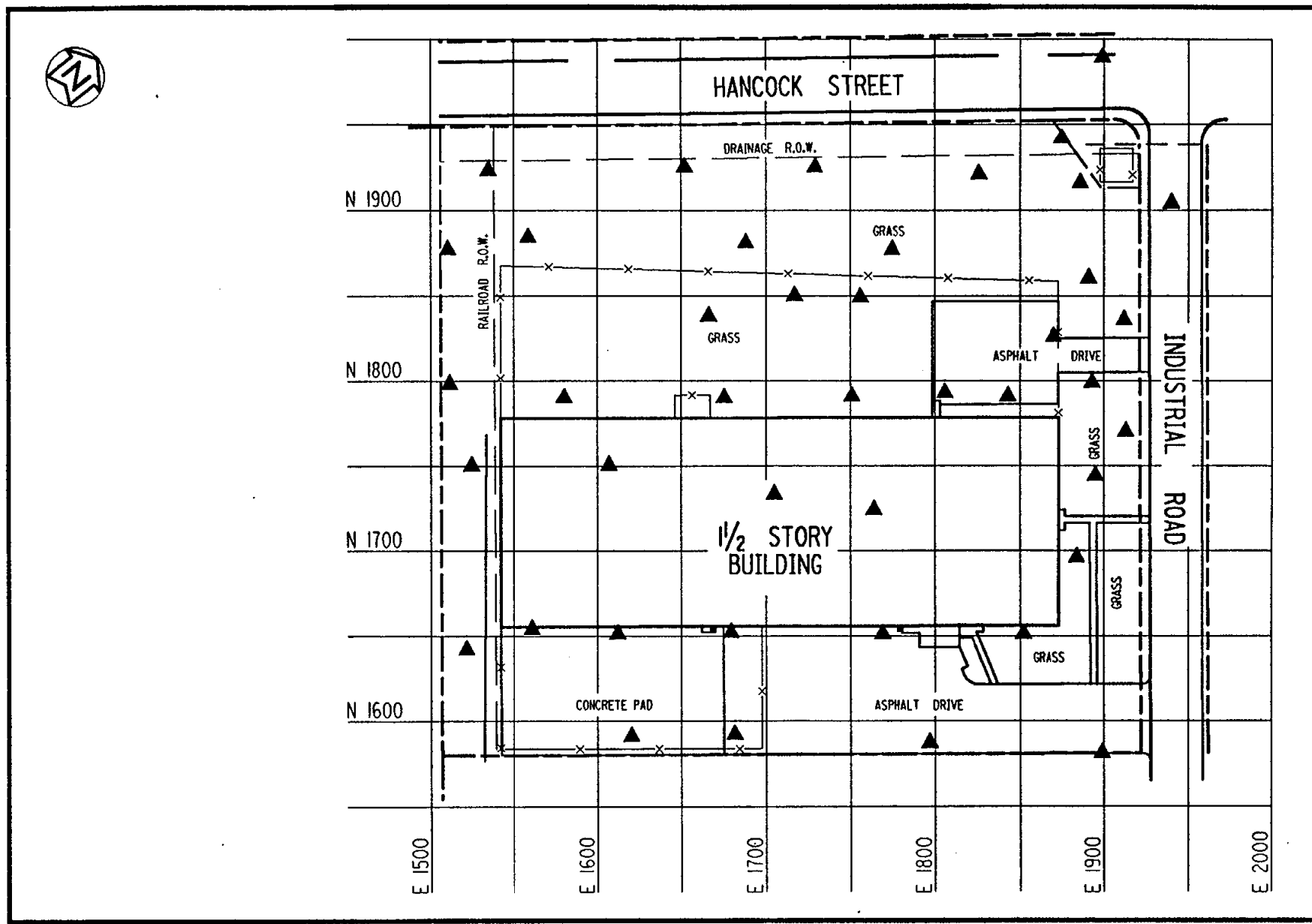


FIGURE 4-2 SURFACE AND SUBSURFACE SOIL SAMPLING LOCATIONS AT 80 INDUSTRIAL ROAD

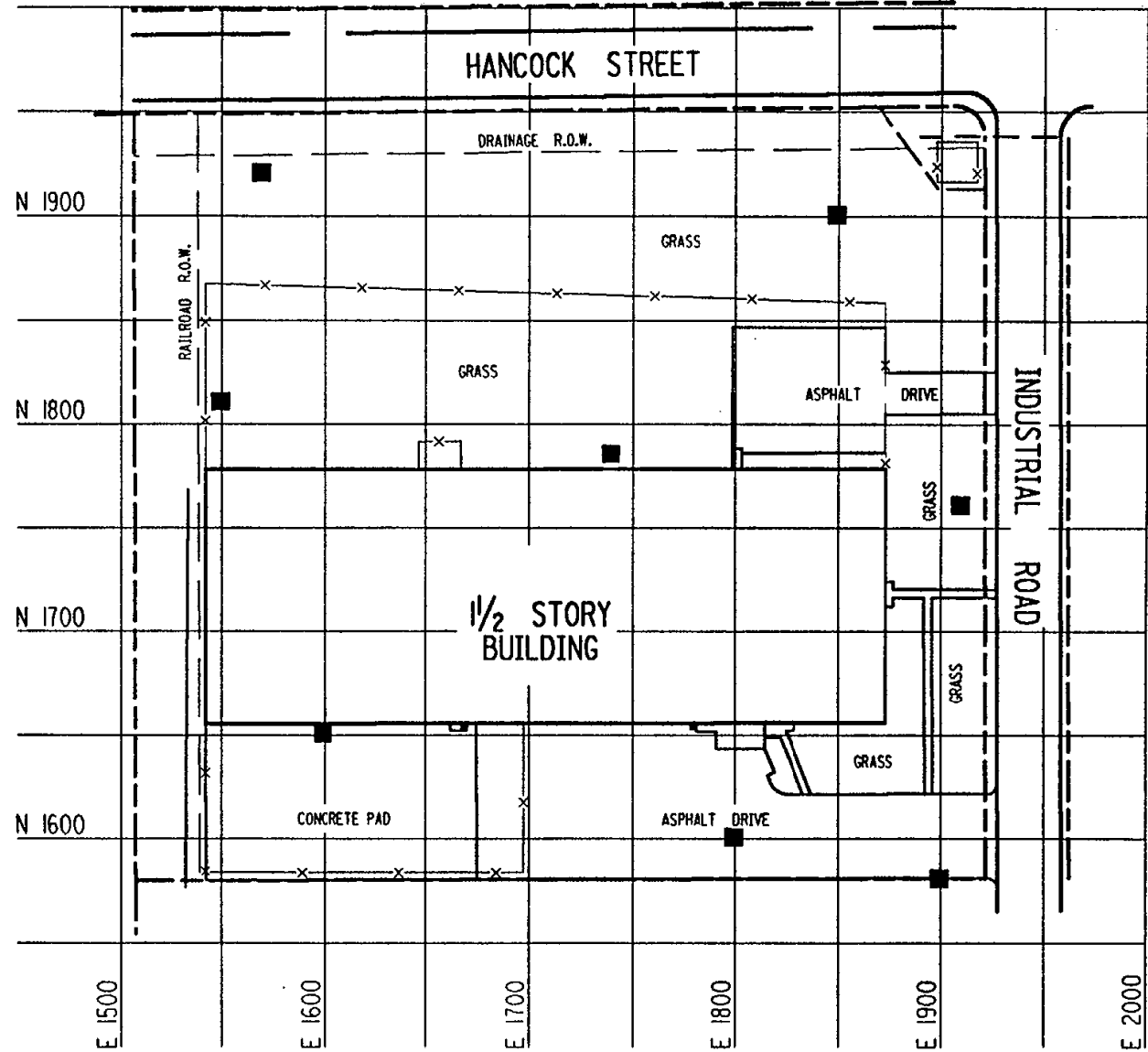


#### 4.2 BUILDING RADIOLOGICAL CHARACTERIZATION

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 building. Three boreholes were drilled inside the building to confirm the presence of contamination beneath the building. These boreholes were drilled, using either a 7.6-cm- (3-in.-) or 15.2-cm- (6-in.-) diameter auger bit, and gamma logged. The boreholes were drilled to depths determined in the field by the radiological and geological support representatives. In addition, soil samples were collected from each location.

Indoor measurements for radon and radon progeny were not obtained due to scheduling conflicts.

Exterior gamma exposure rate measurements were made at eight locations throughout the property grid system. To obtain these measurements, either a 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector designed to detect gamma radiation only or a pressurized ionization chamber (PIC) was used. Measurement locations are shown in 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 1 m (3 ft) above the ground. The locations were determined to be representative of the entire property.



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FIGURE 4-3 GAMMA EXPOSURE RATE MEASUREMENT LOCATIONS AT 80 INDUSTRIAL ROAD

## 5.0 CHARACTERIZATION RESULTS

Radiological characterization results are presented in this section. The data included represent exterior surface and subsurface radiation measurements and interior radiation measurements.

### 5.1 FIELD RADIOLOGICAL CHARACTERIZATION

Near-surface gamma radiation measurements on the property ranged from 6,000 cpm to approximately 22,000 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 and the basis for selecting the locations of soil samples. Areas of surface contamination are shown in Figure 5-1.

Surface soil samples [depths from 0.0 to 15.2 cm (6.0 in.)] were taken at 36 locations on the property (Figure 4-2). These samples were analyzed for thorium-232, uranium-238, and radium-226. The concentrations in these samples ranged from less than 2.6 to less than 11.6 pCi/g for uranium-238, from less than 0.6 to 15.0 pCi/g for thorium-232, and from less than 0.4 to less than 1.7 pCi/g for radium-226. Analytical results for surface soils are provided in Table 5-1; these data showed that concentrations of thorium-232 exceeded DOE guidelines (5 pCi/g plus background of 1 pCi/g for surface soils) with a maximum concentration of 15.0 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

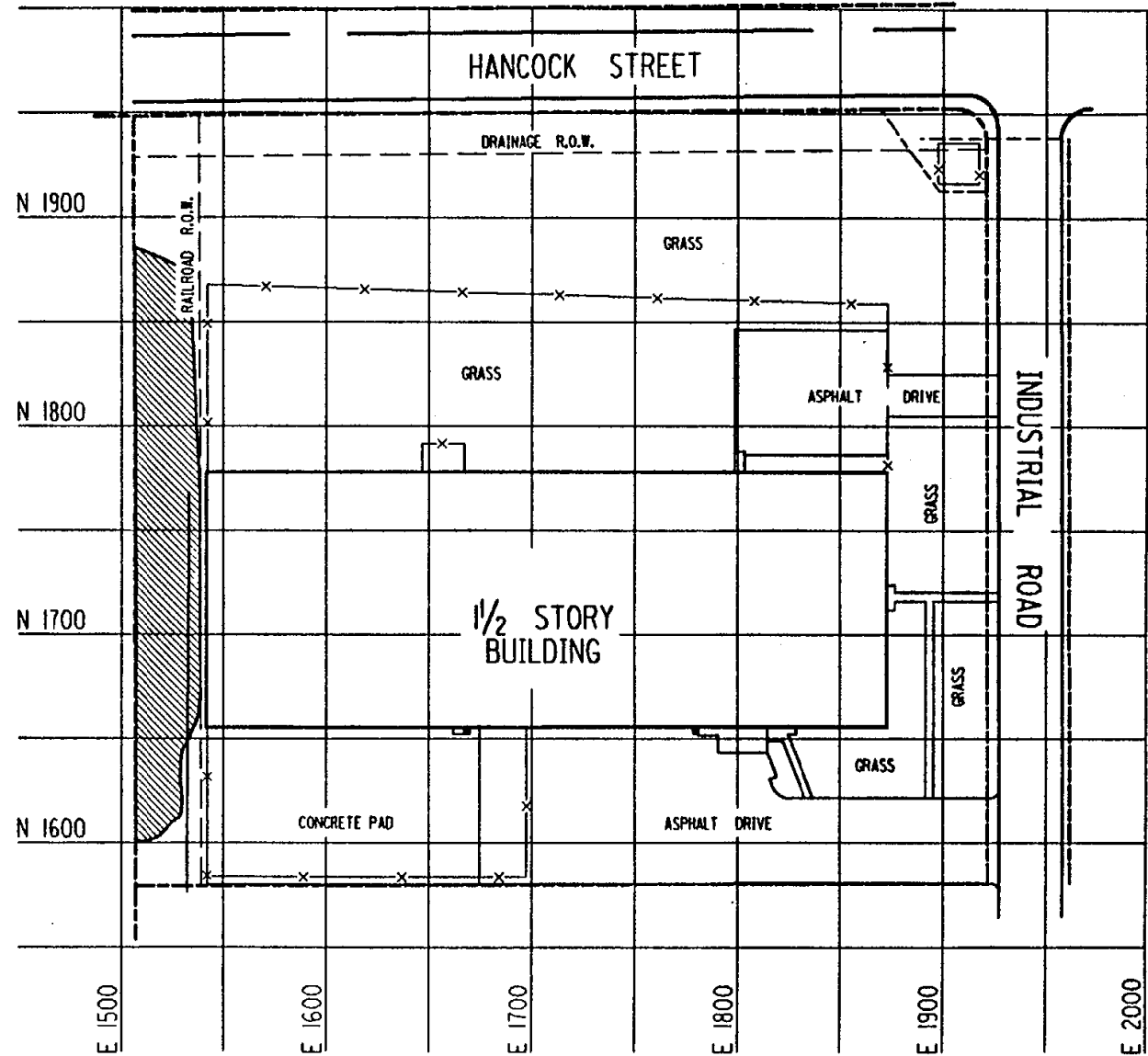


FIGURE 5-1 AREAS OF SURFACE CONTAMINATION AT 80 INDUSTRIAL ROAD

quantitative capacity of the instrument and technique used. The "less than" value 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 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.

Thorium-232, the primary contaminant at the site, is the radionuclide most likely to exceed a specific DOE guideline in soil. Parameters for soil sample analysis were selected to ensure that the thorium-232 would be detected and measured at concentrations well below the lower guideline value of 5 pCi/g in excess of background level. Radionuclides of the uranium series, specifically uranium-238 and radium-226, are also potential contaminants but at lower concentrations than thorium-232. Therefore, these radionuclides (considered secondary contaminants) would not be present in concentrations in excess of guidelines unless thorium-232 was also present in concentrations in excess of its guideline level. Parameters selected for the thorium-232 analyses also provide detection sensitivities for uranium-238 and radium-226 that demonstrate that concentrations of these radionuclides are below guidelines. However, because of the relatively low gamma photon abundance of uranium-238, many of the uranium-238 concentrations were below the detection sensitivity of the analytical procedure; these concentrations

are reported in the data tables as "less than" values. To obtain more sensitive readings for the uranium-238 radionuclide with these analytical methods, much longer instrument counting times would be required than were necessary for analysis of thorium-232, the primary contaminant.

Analytical results for subsurface soil samples are given in Table 5-1, and gamma logging data are given in Table 5-2. The results in Table 5-2 showed a range from 7,000 cpm to 114,000 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 uranium-238 concentrations ranging from less than 1.0 to 42.7 pCi/g, thorium-232 concentrations ranging from less than 0.5 to 28.8 pCi/g, and radium-226 concentrations ranging from 0.3 to 13.3 pCi/g.

On the basis of near-surface gamma radiation measurements, surface and subsurface soil sample analyses, and downhole gamma logging, contamination on this property is believed to consist primarily of subsurface contamination at depths ranging from 15.2 cm (6.0 in.) to 1.83 m (6.0 ft). The areas of subsurface contamination are shown in Figure 5-2. The subsurface contamination appears to extend beneath the building as well as into the street (Industrial Road) in front of the property.

It is apparent from review of historical documentation (e.g., aerial photographs of the area, interviews with local residents, and previous radiological surveys) that the subsurface contamination on this property lies along the former channel of Lodi Brook and its associated floodplain.



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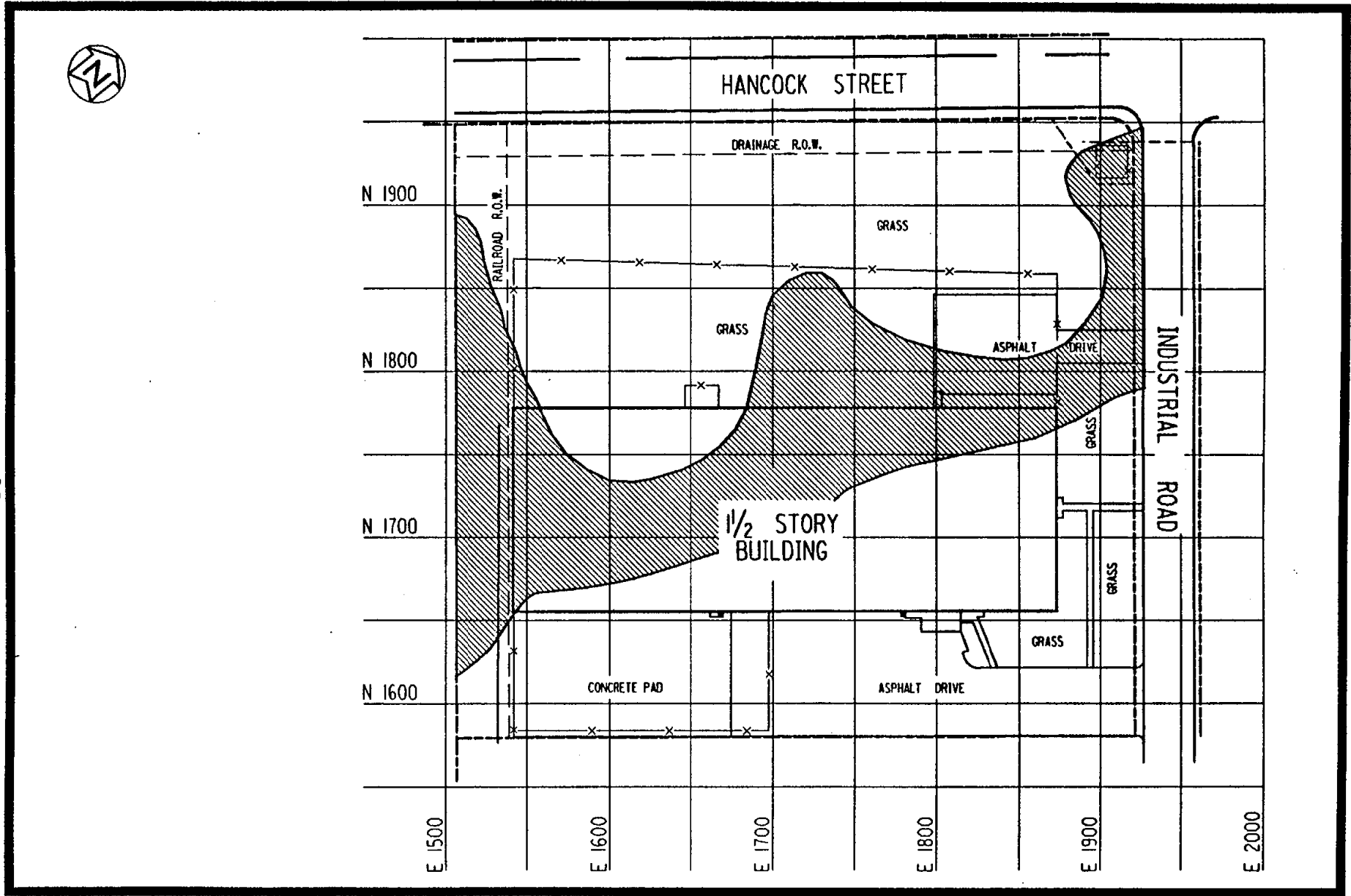


FIGURE 5-2 AREAS OF SUBSURFACE CONTAMINATION AT 80 INDUSTRIAL ROAD

The contamination on this property is similar to contamination found on commercial and municipal properties in close proximity to this property. It has been established that the Lodi Brook channel through these neighboring properties once occupied locations connecting to those where stream sediments were found at 80 Industrial Road. Thus, the elevated gamma readings shown on gamma logs from boreholes drilled on this property serve as further indication of the suspected mechanism of transport for radiological contamination (i.e., stream deposition from Lodi Brook).

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

Boreholes were drilled inside the building to better define the boundaries of subsurface contamination. Data from these boreholes confirmed the presence of contamination beneath the building.

Exterior gamma radiation exposure rate measurements ranged from 7 to 20  $\mu\text{R}/\text{h}$ , including background. These results can be found in Table 5-3. The average exterior rate for the property is 11  $\mu\text{R}/\text{h}$ . Assuming the indoor exposure rate is the same as the average exterior exposure rate, and that employees are present for 45 hours per week for 50 weeks per year (2,250 hours or 9 hours per day for 5 days per week), a yearly dose of 5 mrem above background (after subtracting average background of 9  $\mu\text{R}/\text{h}$ ; Ref. 12) could be expected.



The DOE guideline is 100 mrem/yr above background. Based on the above information, the exposure rates and doses at this property are within DOE guidelines. Further, it should be emphasized that natural background exposure rates vary widely across the United States and are often significantly higher than average background for this area.

TABLE 5-1

## SURFACE AND SUBSURFACE RADIONUCLIDE CONCENTRATIONS IN SOIL

## FOR 80 INDUSTRIAL ROAD

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Coordinates <sup>a</sup>		Depth (ft)	Concentration (pCi/g $\pm$ 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
1501	1877	0.0 - 0.5	< 3.4	< 0.6	< 0.9
1501	1877	0.0 - 1.0	< 14.5	< 2.0	15.2 $\pm$ 1.3
1501	1877	3.0 - 4.0	< 6.0	< 1.1	< 1.5
1501	1877	7.0 - 8.0	< 5.3	< 1.0	< 1.2
1512	1798	0.0 - 0.5	< 6.1	< 0.8	6.5 $\pm$ 0.4
1512	1798	0.0 - 2.0	< 3.4	< 0.6	< 1.1
1512	1798	4.0 - 5.0	< 3.4	< 0.6	< 1.1
1512	1798	8.0 - 9.0	< 4.4	< 0.7	< 1.2
1512	1798	9.0 - 10.0	< 4.4	< 0.8	< 1.0
1522	1642	0.0 - 0.5	< 11.6	< 1.7	9.6 $\pm$ 0.6
1522	1642	0.0 - 2.0	< 5.7	< 0.7	7.8 $\pm$ 0.1
1522	1642	7.0 - 8.0	< 6.8	< 1.2	< 1.7
1522	1642	8.0 - 9.0	< 3.8	< 0.7	< 1.2
1522	1642	9.0 - 10.0	< 5.9	< 1.0	< 1.5
1522	1642	10.0 - 12.0	< 3.7	< 0.6	< 0.9
1522	1642	12.0 - 14.0	< 4.7	< 0.8	< 0.9
1522	1642	14.0 - 16.0	< 4.3	< 0.7	< 1.1
1525	1750	0.0 - 0.5	< 8.0	< 1.1	15.0 $\pm$ 0.7
1525	1750	0.0 - 2.0	< 8.2	< 0.9	< 2.5
1525	1750	4.0 - 6.0	< 2.7	< 0.4	< 0.6
1525	1750	6.0 - 7.0	< 3.0	< 0.6	< 0.7
1525	1750	7.0 - 8.0	< 5.3	< 0.9	< 1.1
1525	1750	8.0 - 9.0	< 3.6	< 0.7	< 1.2
1525	1750	9.0 - 10.0	< 5.2	< 0.9	< 1.4
1525	1750	10.0 - 11.0	< 1.6	< 0.4	< 0.6
1525	1750	11.0 - 12.0	< 1.8	< 0.5	< 0.6

TABLE 5-1  
(continued)

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Coordinates <sup>a</sup>		Depth (ft)	Concentration (pCi/g ± 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
1535	1923	0.0 - 0.5	< 4.5	< 0.9	< 1.3
1535	1923	0.0 - 2.0	< 2.8	< 0.4	< 1.0
1535	1923	6.0 - 7.0	< 1.9	< 0.5	< 0.6
1535	1923	9.0 - 10.0	< 3.4	< 0.9	< 1.3
1535	1923	10.0 - 12.0	< 3.0	< 0.6	< 0.9
1535	1923	12.0 - 13.0	< 3.8	< 1.0	< 1.5
1535	1923	13.0 - 14.0	< 3.4	< 0.7	< 0.9
1559	1923	0.0 - 0.5	< 3.4	< 0.9	< 1.1
1559	1923	0.0 - 2.0	< 4.0	< 1.1	< 1.9
1559	1923	5.0 - 6.0	< 4.3	< 1.0	< 1.6
1559	1923	8.0 - 9.0	< 5.1	< 1.3	< 6.9
1559	1923	9.0 - 10.0	< 5.3	< 1.1	< 1.7
1561	1654	0.0 - 0.5	< 5.1	< 0.8	< 1.3
1561	1654	0.0 - 2.0	< 5.0	< 0.6	5.5 ± 0.5
1561	1654	2.0 - 3.0	< 7.5	< 1.3	< 2.0
1561	1654	4.0 - 5.0	< 4.1	< 0.8	< 1.3
1561	1654	8.0 - 9.0	< 7.3	< 1.1	< 1.8
1561	1654	9.0 - 10.0	< 3.5	< 0.7	< 1.2
1580	1790	0.0 - 0.5	< 4.1	< 0.7	< 1.1
1580	1790	0.0 - 2.0	< 3.3	< 0.6	< 1.1
1580	1790	4.0 - 6.0	< 2.8	< 0.5	< 0.8
1580	1790	8.0 - 10.0	< 3.0	< 0.6	< 0.8
1607	1750	0.5 - 1.5	< 4.4	< 1.0	< 1.4
1607	1750	2.5 - 4.5	< 4.6	< 0.8	< 1.7
1607	1750	6.5 - 8.5	< 4.8	< 1.0	< 1.4

TABLE 5-1

(continued)

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Coordinates <sup>a</sup>		Depth (ft)	Concentration (pCi/g $\pm$ 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
1612	1651	0.0 - 0.5	< 3.4	< 0.6	< 1.1
1612	1651	0.0 - 2.0	< 3.3	< 0.5	< 0.9
1612	1651	3.0 - 4.0	< 3.6	< 0.6	< 1.0
1612	1651	6.0 - 7.0	< 3.4	< 0.6	< 1.0
1612	1651	7.0 - 8.0	< 3.0	< 0.7	< 1.1
1620	1591	0.0 - 0.5	< 3.6	< 0.6	< 1.1
1620	1591	0.0 - 1.0	< 5.5	< 1.1	< 1.6
1620	1591	3.4 - 4.0	< 6.3	< 0.9	< 1.9
1620	1591	7.0 - 8.0	< 3.4	< 0.6	< 1.2
1652	1925	0.0 - 0.5	< 3.6	< 0.9	< 1.3
1652	1925	0.0 - 2.0	< 3.4	< 0.7	< 1.0
1652	1925	5.0 - 6.0	< 4.3	< 1.4	< 1.7
1652	1925	8.0 - 9.0	< 1.8	1.3 $\pm$ 0.2	< 0.6
1652	1925	9.0 - 10.0	< 5.0	< 1.3	< 1.9
1666	1838	0.0 - 0.5	< 3.5	< 0.6	< 0.9
1666	1838	0.0 - 2.0	< 3.7	< 0.8	< 1.3
1666	1838	4.0 - 6.0	< 3.0	< 0.6	< 0.8
1666	1838	6.0 - 8.0	< 3.2	< 0.6	< 1.0
1666	1838	8.0 - 9.0	< 1.6	< 0.5	< 0.6
1666	1838	9.0 - 10.0	< 3.3	< 0.6	< 0.9
1675	1790	0.0 - 0.5	< 5.0	< 0.9	< 1.6
1675	1790	0.0 - 2.0	< 7.1	< 1.0	< 2.1
1675	1790	4.0 - 6.0	< 6.5	< 0.7	< 1.7
1675	1790	8.0 - 10.0	< 3.5	< 0.6	< 0.9
1675	1790	10.0 - 12.0	< 2.7	< 0.5	< 0.6

TABLE 5-1

(continued)

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Coordinates <sup>a</sup>		Depth (ft)	Concentration (pCi/g $\pm$ 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
1679	1652	0.0 - 0.5	< 5.8	< 0.7	< 1.4
1679	1652	0.0 - 2.0	< 3.8	< 0.6	< 0.8
1679	1652	4.0 - 5.0	< 6.4	< 1.0	< 1.7
1679	1652	7.0 - 8.0	< 6.9	< 0.8	< 1.7
1681	1952	0.0 - 0.5	< 8.3	< 1.5	< 2.5
1681	1952	0.0 - 1.0	< 6.6	< 1.0	< 1.4
1681	1952	4.0 - 6.0	< 4.8	< 0.8	< 1.0
1681	1952	7.0 - 8.0	< 5.7	< 0.9	< 1.3
1688	1881	0.0 - 0.5	< 3.7	< 0.8	< 1.4
1688	1881	0.0 - 2.0	< 3.1	< 0.6	< 0.9
1688	1881	6.0 - 7.0	< 4.6	< 0.9	< 1.3
1688	1881	8.0 - 9.0	< 4.3	< 1.2	< 1.6
1688	1881	9.0 - 10.0	< 3.3	< 0.7	< 1.0
1705	1733	0.5 - 2.0	< 4.3	< 0.9	< 1.5
1705	1733	6.0 - 8.0	< 11.5	5.0 $\pm$ 0.3	17.1 $\pm$ 0.6
1705	1733	8.0 - 9.0	< 5.6	< 1.1	< 1.7
1705	1733	9.0 - 10.0	< 6.9	< 1.8	< 2.3
1705	1733	10.0 - 12.0	< 2.6	< 0.4	< 0.9
1717	1850	0.0 - 0.5	< 4.7	< 0.8	4.9 $\pm$ 0.6
1717	1850	0.0 - 2.0	< 5.1	< 1.1	< 1.6
1717	1850	3.0 - 4.0	< 3.5	< 0.8	< 1.1
1717	1850	4.0 - 6.0	< 4.0	< 0.8	< 1.2
1717	1850	6.0 - 8.0	< 4.3	< 0.6	4.3 $\pm$ 0.4
1717	1850	8.0 - 9.0	< 10.2	< 1.2	23.6 $\pm$ 0.7
1717	1850	9.0 - 10.0	< 4.1	< 0.7	< 1.3
1717	1850	10.0 - 12.0	< 3.5	< 0.8	< 1.2

TABLE 5-1

(continued)

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Coordinates <sup>a</sup>		Depth (ft)	Concentration (pCi/g $\pm$ 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
1729	1925	0.0 - 0.5	< 4.4	< 1.2	< 1.6
1729	1925	0.0 - 2.0	< 5.6	< 1.0	< 1.7
1729	1925	4.0 - 5.0	< 4.2	< 1.0	< 1.6
1729	1925	8.0 - 10.0	< 3.1	< 0.9	< 1.3
1751	1791	0.0 - 0.5	< 4.8	< 0.8	< 1.4
1751	1791	0.0 - 2.0	< 2.6	< 0.7	3.7 $\pm$ 0.3
1751	1791	4.0 - 5.0	< 4.2	< 1.0	< 1.4
1751	1791	5.0 - 6.0	< 5.8	< 0.8	< 1.5
1751	1791	6.0 - 7.0	42.7 $\pm$ 6.4	< 1.6	28.8 $\pm$ 2.0
1751	1791	9.0 - 10.0	< 3.7	< 0.7	< 1.2
1756	1849	0.0 - 0.5	< 7.0	< 1.2	< 2.0
1756	1849	0.0 - 2.0	< 3.0	< 0.5	< 0.9
1756	1849	4.0 - 6.0	< 5.9	< 0.9	< 1.7
1756	1849	6.0 - 7.0	< 3.4	< 0.6	< 0.9
1756	1849	7.0 - 8.0	< 5.7	< 1.1	< 1.6
1764	1724	0.5 - 2.5	< 4.5	< 1.0	< 1.4
1764	1724	4.5 - 5.5	< 3.8	< 0.9	< 1.1
1764	1724	9.5 - 10.5	< 4.0	< 0.9	< 1.4
1769	1651	0.0 - 0.5	< 1.6	< 0.5	< 0.6
1769	1651	0.0 - 2.0	< 7.8	< 1.2	< 1.9
1769	1651	3.0 - 4.0	< 3.4	< 0.7	< 1.3
1769	1651	7.0 - 8.0	< 6.1	< 1.1	< 1.5

TABLE 5-1

(continued)

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Coordinates <sup>a</sup>		Depth (ft)	Concentration (pCi/g $\pm$ 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
1775	1877	0.0 - 0.5	< 3.6	< 0.7	< 1.1
1775	1877	0.0 - 2.0	< 3.5	< 0.7	< 1.1
1775	1877	4.0 - 6.0	< 3.1	< 0.7	< 1.1
1775	1877	9.0 - 10.0	< 3.9	< 0.7	< 1.1
1797	1587	0.0 - 0.5	< 6.1	< 0.7	< 1.3
1797	1587	0.0 - 2.0	< 5.6	< 1.0	< 1.6
1797	1587	4.0 - 6.0	< 5.5	< 0.9	< 1.3
1797	1587	6.0 - 8.0	< 4.8	< 0.7	< 1.2
1797	1587	8.0 - 9.0	< 6.0	< 1.1	< 1.5
1797	1587	9.0 - 10.0	< 6.6	< 0.9	< 1.4
1806	1793	0.0 - 0.5	< 2.6	< 0.4	< 0.7
1806	1793	0.0 - 2.0	< 1.7	< 0.5	< 0.7
1806	1793	4.0 - 6.0	< 5.6	< 0.7	< 1.2
1806	1793	6.0 - 8.0	< 3.9	< 0.7	< 1.1
1806	1793	8.0 - 10.0	< 2.8	< 0.4	< 0.7
1806	1793	10.0 - 12.0	< 4.8	< 0.8	< 1.3
1826	1921	0.0 - 0.5	< 6.1	< 0.8	4.1 $\pm$ 0.5
1826	1921	0.0 - 1.0	< 4.4	< 1.0	< 1.7
1826	1921	4.0 - 5.0	< 9.7	< 1.5	< 2.3
1826	1921	8.0 - 9.0	< 5.3	< 1.0	< 1.7
1826	1921	9.0 - 10.0	< 4.9	< 0.8	< 1.3

TABLE 5-1

(continued)

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Coordinates <sup>a</sup>		Depth (ft)	Concentration (pCi/g $\pm$ 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
1843	1791	0.0 - 0.5	< 5.0	< 0.6	< 1.5
1843	1791	0.0 - 2.0	< 9.4	< 1.5	< 2.6
1843	1791	4.0 - 6.0	< 3.7	< 0.7	< 1.1
1843	1791	6.0 - 8.0	< 8.4	< 1.2	5.1 $\pm$ 0.3
1843	1791	8.0 - 9.0	< 3.2	< 0.8	< 1.0
1843	1791	9.0 - 10.0	< 4.2	< 0.7	< 1.3
1852	1651	0.0 - 0.5	< 4.2	< 0.8	< 1.2
1852	1651	0.0 - 2.0	< 5.2	< 0.9	< 1.5
1852	1651	3.0 - 4.0	< 3.8	< 0.7	< 1.2
1852	1651	7.0 - 8.0	< 4.9	< 0.7	< 1.5
1870	1826	0.0 - 0.5	< 7.7	< 1.2	< 2.1
1870	1826	0.0 - 2.0	< 6.0	< 1.0	< 1.5
1870	1826	6.0 - 8.0	< 4.5	< 0.6	< 1.0
1870	1826	8.0 - 9.0	< 6.3	< 0.8	< 1.5
1870	1826	9.0 - 10.0	< 5.1	< 0.7	< 1.3
1875	1942	0.5 - 1.0	1.9 $\pm$ 1.0	0.6 $\pm$ 0.2	0.8 $\pm$ 0.3
1875	1942	1.0 - 1.5	< 2.0	0.6 $\pm$ 0.1	1.1 $\pm$ 0.5
1875	1942	2.0 - 2.5	< 2.0	0.7 $\pm$ 0.1	< 1.0
1875	1942	2.5 - 3.0	< 2.0	0.6 $\pm$ 0.1	0.9 $\pm$ 0.1
1875	1942	3.0 - 3.5	2.2 $\pm$ 1.3	0.7 $\pm$ 0.1	1.4 $\pm$ 0.1
1875	1942	3.5 - 4.0	< 1.0	0.5 $\pm$ 0.1	0.5 $\pm$ 0.2
1875	1942	4.0 - 4.5	1.3 $\pm$ 1.0	0.6 $\pm$ 0.1	0.9 $\pm$ 0.4
1875	1942	4.5 - 5.0	< 2.0	0.8 $\pm$ 0.5	1.4 $\pm$ 0.4



TABLE 5-1

(continued)

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Coordinates <sup>a</sup>		Depth (ft)	Concentration (pCi/g $\pm$ 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
1875	1942	5.0 - 5.5	< 2.0	0.6 $\pm$ 0.4	1.1 $\pm$ 0.1
1875	1942	5.5 - 6.0	< 2.0	< 1.0	< 1.0
1875	1942	6.0 - 6.5	< 1.0	0.5 $\pm$ 0.1	0.9 $\pm$ 0.1
1875	1942	6.5 - 7.0	< 2.0	0.3 $\pm$ 0.2	0.7 $\pm$ 0.5
1875	1942	7.0 - 7.5	< 2.0	0.8 $\pm$ 0.5	< 1.0
1875	1942	7.5 - 8.0	< 2.0	0.7 $\pm$ 0.1	1.1 $\pm$ 0.1
1875	1942	8.0 - 8.5	< 2.0	0.6 $\pm$ 0.1	1.1 $\pm$ 0.2
1875	1942	8.5 - 9.0	< 3.0	< 1.0	< 1.0
1875	1942	9.0 - 9.5	< 2.0	0.5 $\pm$ 0.2	0.9 $\pm$ 0.4
1875	1942	9.5 - 10.0	< 2.0	0.4 $\pm$ 0.2	< 1.0
1884	1696	0.0 - 0.5	< 3.8	< 0.7	< 1.0
1884	1696	0.0 - 2.0	< 3.4	< 0.6	< 1.1
1884	1696	4.0 - 5.0	< 3.7	< 0.8	< 1.1
1884	1696	6.0 - 8.0	< 3.4	< 0.7	< 1.1
1886	1916	0.0 - 0.5	< 3.5	< 0.7	< 1.0
1886	1916	0.0 - 1.0	< 5.4	< 1.1	6.6 $\pm$ 1.1
1886	1916	2.0 - 3.0	< 9.0	< 1.7	23.6 $\pm$ 2.1
1886	1916	6.0 - 7.0	< 1.4	< 0.4	< 0.5
1886	1916	7.0 - 8.0	< 8.8	< 1.3	16.9 $\pm$ 1.1
1886	1916	8.0 - 9.0	< 4.9	< 0.9	< 1.9
1886	1916	9.0 - 10.0	< 3.9	< 1.0	< 1.6
1886	1916	10.0 - 12.0	< 3.6	< 0.8	< 1.1
1886	1916	12.0 - 14.0	< 3.1	< 0.8	< 1.0
1886	1916	14.0 - 16.0	< 2.8	< 0.5	< 0.8
1886	1916	15.0 - 16.0	< 3.1	< 0.7	< 0.9

TABLE 5-1

(continued)

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Coordinates <sup>a</sup>		Depth (ft)	Concentration (pCi/g $\pm$ 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
1891	1860	0.0 - 0.5	< 3.8	< 0.9	< 1.5
1891	1860	0.0 - 2.0	< 5.1	< 0.9	< 1.4
1891	1860	6.0 - 8.0	< 3.8	< 1.0	< 1.3
1891	1860	8.0 - 9.0	< 4.4	< 0.8	< 1.2
1891	1860	9.0 - 10.0	< 3.9	< 1.1	< 1.6
1893	1799	0.0 - 0.5	< 3.3	< 0.9	< 1.8
1893	1799	0.0 - 1.0	< 4.6	< 0.8	< 1.3
1893	1799	5.0 - 6.0	< 2.9	< 0.8	< 1.3
1893	1799	9.0 - 10.0	< 3.9	< 0.9	< 1.3
1895	1744	0.0 - 0.5	< 3.6	< 0.8	< 1.3
1895	1744	0.0 - 2.0	< 5.8	< 1.0	< 1.5
1895	1744	4.0 - 6.0	< 3.7	< 0.6	< 1.0
1895	1744	9.0 - 10.0	< 5.1	< 0.9	< 1.1
1899	1581	0.0 - 0.5	< 3.4	< 0.7	< 1.0
1899	1581	0.0 - 2.0	< 3.3	< 0.6	< 0.8
1899	1581	5.0 - 6.0	< 3.5	< 0.6	< 1.0
1899	1581	8.0 - 10.0	< 4.5	< 0.8	< 1.4
1899	1581	10.0 - 11.0	< 2.4	< 0.5	< 0.7
1899	1581	11.0 - 12.0	< 4.5	< 0.6	< 0.9
1899	1581	12.0 - 14.0	< 2.5	< 0.6	< 0.7
1899	1989	0.0 - 0.5	< 3.5	< 0.7	< 1.0
1899	1989	0.5 - 2.0	< 3.1	< 0.7	< 1.0
1899	1989	3.0 - 4.0	< 3.9	< 0.8	< 1.1
1899	1989	8.0 - 10.0	< 1.4	< 0.3	< 0.5

TABLE 5-1

(continued)

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Coordinates <sup>a</sup>		Depth (ft)	Concentration (pCi/g $\pm$ 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
1912	1836	0.0 - 0.5	< 4.1	< 0.7	< 1.4
1912	1836	0.0 - 1.0	< 2.9	< 0.7	< 1.0
1912	1836	3.0 - 4.0	< 5.3	< 1.1	< 1.8
1912	1836	4.0 - 5.0	< 3.6	< 0.9	< 1.2
1912	1836	5.0 - 6.0	41.9 $\pm$ 6.9	13.3 $\pm$ 1.7	28.3 $\pm$ 1.5
1912	1836	6.0 - 7.0	< 3.1	< 0.7	< 1.1
1912	1836	7.0 - 8.5	< 3.6	< 0.8	< 1.1
1913	1770	0.0 - 1.0	< 3.1	< 0.7	< 1.1
1913	1770	1.0 - 2.0	< 4.8	< 1.1	< 1.6
1913	1770	6.0 - 7.0	< 4.3	< 0.9	< 1.2
1913	1770	8.0 - 9.0	< 3.6	< 0.9	< 1.2
1913	1770	9.0 - 10.0	< 2.3	< 0.4	< 0.7
1913	1770	10.0 - 11.0	< 3.6	< 0.8	< 1.1
1940	1904	0.0 - 0.5	< 4.1	< 1.0	< 1.9
1940	1904	0.5 - 2.0	< 3.8	< 0.7	< 1.6
1940	1904	2.0 - 4.0	< 3.8	< 0.8	< 1.4
1940	1904	4.0 - 6.0	< 4.4	< 0.9	< 1.6
1940	1904	8.0 - 10.0	< 2.8	< 0.6	< 1.0

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

TABLE 5-2  
 DOWNHOLE GAMMA LOGGING RESULTS  
 FOR 80 INDUSTRIAL ROAD

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<u>Coordinates<sup>a</sup></u>		<u>Depth<sup>b</sup></u>	<u>Count Rate<sup>c</sup></u>
East	North	(ft)	(cpm)
<u>Borehole 1165R<sup>d</sup></u>			
1501	1877	0.5	8000
1501	1877	1.0	9000
1501	1877	1.5	9000
1501	1877	2.0	9000
1501	1877	2.5	10000
1501	1877	3.0	9000
1501	1877	3.5	8000
1501	1877	4.0	7000
1501	1877	4.5	6000
1501	1877	5.0	6000
1501	1877	5.5	6000
1501	1877	6.0	6000
<u>Borehole 1164R<sup>d</sup></u>			
1512	1798	0.5	38000
1512	1798	1.0	51000
1512	1798	1.5	47000
1512	1798	2.0	14000
1512	1798	2.5	10000
1512	1798	3.0	10000
1512	1798	3.5	8000
1512	1798	4.0	8000
1512	1798	4.5	8000
1512	1798	5.0	7000
1512	1798	5.5	7000
1512	1798	6.0	8000
1512	1798	6.5	7000
1512	1798	7.0	8000
1512	1798	7.5	8000
1512	1798	8.0	8000
1512	1798	8.5	8000
<u>Borehole 1144R<sup>d</sup></u>			
1522	1642	0.5	19000
1522	1642	1.0	13000
1522	1642	1.5	12000
1522	1642	2.0	11000
1522	1642	2.5	10000

TABLE 5-2

(continued)

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<u>Coordinates<sup>a</sup></u>		<u>Depth<sup>b</sup></u>	<u>Count Rate<sup>c</sup></u>
East	North	(ft)	(cpm)
<u>Borehole 1144R (continued)<sup>d</sup></u>			
1522	1642	3.0	10000
1522	1642	3.5	11000
1522	1642	4.0	13000
1522	1642	4.5	10000
1522	1642	5.0	8000
1522	1642	5.5	8000
1522	1642	6.0	9000
1522	1642	6.5	8000
1522	1642	7.0	9000
1522	1642	7.5	10000
1522	1642	8.0	11000
<u>Borehole 1145R<sup>d</sup></u>			
1525	1750	0.5	26000
1525	1750	1.0	51000
1525	1750	1.5	34000
1525	1750	2.0	16000
1525	1750	2.5	10000
1525	1750	3.0	8000
1525	1750	3.5	7000
1525	1750	4.0	8000
1525	1750	4.5	8000
1525	1750	5.0	8000
<u>Borehole 1143R<sup>d</sup></u>			
1535	1923	0.5	9000
1535	1923	1.0	8000
1535	1923	1.5	8000
1535	1923	2.0	10000
1535	1923	2.5	9000
1535	1923	3.0	8000
1535	1923	3.5	8000
1535	1923	4.0	9000
1535	1923	4.5	10000
1535	1923	5.0	10000
1535	1923	5.5	9000
1535	1923	6.0	9000
1535	1923	6.5	9000

TABLE 5-2  
(continued)

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<u>Coordinates<sup>a</sup></u>		<u>Depth<sup>b</sup></u>	<u>Count Rate<sup>c</sup></u>
East	North	(ft)	(cpm)
<u>Borehole 1143R (continued)<sup>d</sup></u>			
1535	1923	7.0	9000
1535	1923	7.5	10000
1535	1923	8.0	10000
1535	1923	8.5	9000
<u>Borehole 1142R<sup>d</sup></u>			
1559	1884	0.5	9000
1559	1884	1.0	9000
1559	1884	1.5	9000
1559	1884	2.0	9000
1559	1884	2.5	9000
1559	1884	3.0	9000
1559	1884	3.5	7000
1559	1884	4.0	7000
1559	1884	4.5	8000
1559	1884	5.0	7000
1559	1884	5.5	8000
1559	1884	6.0	9000
1559	1884	6.5	9000
1559	1884	7.0	10000
1559	1884	7.5	10000
1559	1884	8.0	10000
<u>Borehole 1159R<sup>d</sup></u>			
1561	1654	0.5	12000
1561	1654	1.0	18000
1561	1654	1.5	19000
1561	1654	2.0	26000
1561	1654	2.5	23000
1561	1654	3.0	11000
1561	1654	3.5	10000
1561	1654	4.0	9000
1561	1654	4.5	9000
1561	1654	5.0	9000
1561	1654	5.5	8000

TABLE 5-2

(continued)

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<u>Coordinates<sup>a</sup></u>		<u>Depth<sup>b</sup></u>	<u>Count Rate<sup>c</sup></u>
East	North	(ft)	(cpm)
<u>Borehole 1159R (continued)<sup>d</sup></u>			
1561	1654	6.0	12000
1561	1654	6.5	6000
1561	1654	7.0	6000
1561	1654	7.5	6000
1561	1654	8.0	5000
<u>Borehole 1161R<sup>d</sup></u>			
1580	1790	0.5	12000
1580	1790	1.0	13000
1580	1790	1.5	12000
1580	1790	2.0	12000
1580	1790	2.5	12000
1580	1790	3.0	12000
1580	1790	3.5	12000
1580	1790	4.0	8000
1580	1790	4.5	8000
1580	1790	5.0	7000
1580	1790	5.5	7000
1580	1790	6.0	8000
1580	1790	6.5	8000
1580	1790	7.0	8000
1580	1790	7.5	8000
1580	1790	8.0	8000
1580	1790	8.5	8000
<u>Borehole 1217R<sup>d</sup></u>			
1607	1750	0.5	12000
1607	1750	1.0	12000
1607	1750	1.5	14000
1607	1750	2.0	16000
1607	1750	2.5	12000
1607	1750	3.0	12000
1607	1750	3.5	12000
1607	1750	4.0	12000
1607	1750	4.5	12000

TABLE 5-2  
(continued)

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Coordinates <sup>a</sup>		Depth <sup>b</sup> (ft)	Count Rate <sup>c</sup> (cpm)
East	North		
<u>Borehole 1217R (continued)<sup>d</sup></u>			
1607	1750	5.0	12000
1607	1750	5.5	13000
1607	1750	6.0	13000
1607	1750	6.5	13000
1607	1750	7.0	13000
1607	1750	7.5	10000
1607	1750	8.0	9000
<u>Borehole 1156R<sup>d</sup></u>			
1612	1651	0.5	10000
1612	1651	1.0	11000
1612	1651	1.5	11000
1612	1651	2.0	12000
1612	1651	2.5	12000
1612	1651	3.0	13000
1612	1651	3.5	13000
1612	1651	4.0	13000
1612	1651	4.5	13000
1612	1651	5.0	14000
1612	1651	5.5	13000
1612	1651	6.0	13000
1612	1651	6.5	13000
<u>Borehole 1158R<sup>d</sup></u>			
1620	1591	0.5	10000
1620	1591	1.0	10000
1620	1591	1.5	10000
1620	1591	2.0	9000
1620	1591	2.5	9000
1620	1591	3.0	8000
1620	1591	3.5	8000
1620	1591	4.0	9000
1620	1591	4.5	9000
1620	1591	5.0	9000
1620	1591	5.5	9000
1620	1591	6.0	9000
1620	1591	6.5	10000
1620	1591	7.0	10000
1620	1591	7.5	10000



TABLE 5-2  
(continued)

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<u>Coordinates<sup>a</sup></u>		<u>Depth<sup>b</sup></u> (ft)	<u>Count Rate<sup>c</sup></u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole 1140R<sup>d</sup></u>			
1652	1925	0.5	14000
1652	1925	1.0	12000
1652	1925	1.5	11000
1652	1925	2.0	10000
1652	1925	2.5	10000
1652	1925	3.0	9000
1652	1925	3.5	9000
1652	1925	4.0	9000
1652	1925	4.5	9000
1652	1925	5.0	8000
1652	1925	5.5	8000
1652	1925	6.0	8000
1652	1925	6.5	8000
1652	1925	7.0	9000
1652	1925	7.5	10000
<u>Borehole 1163R<sup>d</sup></u>			
1666	1838	0.5	10000
1666	1838	1.0	10000
1666	1838	1.5	10000
1666	1838	2.0	10000
1666	1838	2.5	10000
1666	1838	3.0	10000
1666	1838	3.5	10000
1666	1838	4.0	11000
1666	1838	4.5	10000
1666	1838	5.0	9000
1666	1838	5.5	8000
1666	1838	6.0	8000
1666	1838	6.5	8000
1666	1838	7.0	8000
1666	1838	7.5	8000
1666	1838	8.0	8000
1666	1838	8.5	9000
1666	1838	9.0	9000

TABLE 5-2  
(continued)

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Coordinates <sup>a</sup>		Depth <sup>b</sup> (ft)	Count Rate <sup>c</sup> (cpm)
East	North		
<u>Borehole 1160R<sup>d</sup></u>			
1675	1790	0.5	13000
1675	1790	1.0	15000
1675	1790	1.5	19000
1675	1790	2.0	15000
1675	1790	2.5	12000
1675	1790	3.0	12000
1675	1790	3.5	11000
1675	1790	4.0	12000
1675	1790	4.5	11000
1675	1790	5.0	9000
1675	1790	5.5	9000
1675	1790	6.0	9000
1675	1790	6.5	9000
1675	1790	7.0	8000
1675	1790	7.5	8000
1675	1790	8.0	8000
1675	1790	8.5	7000
<u>Borehole 1150R<sup>d</sup></u>			
1679	1652	0.5	7000
1679	1652	1.0	9000
1679	1652	1.5	10000
1679	1652	2.0	12000
1679	1652	2.5	12000
1679	1652	3.0	12000
1679	1652	3.5	13000
1679	1652	4.0	13000
1679	1652	4.5	13000
1679	1652	5.0	13000
1679	1652	5.5	13000
1679	1652	6.0	13000
1679	1652	6.5	13000
1679	1652	7.0	12000

TABLE 5-2  
(continued)

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Coordinates <sup>a</sup>		Depth <sup>b</sup> (ft)	Count Rate <sup>c</sup> (cpm)
East	North		
<u>Borehole 1151R<sup>d</sup></u>			
1681	1952	0.5	9000
1681	1952	1.0	11000
1681	1952	1.5	12000
1681	1952	2.0	12000
1681	1952	2.5	12000
1681	1952	3.0	13000
1681	1952	3.5	12000
1681	1952	4.0	13000
1681	1952	4.5	13000
1681	1952	5.0	13000
1681	1952	5.5	13000
1681	1952	6.0	13000
1681	1952	6.5	13000
1681	1952	7.0	12000
<u>Borehole 1139R<sup>d</sup></u>			
1688	1881	0.5	12000
1688	1881	1.0	12000
1688	1881	1.5	13000
1688	1881	2.0	13000
1688	1881	2.5	11000
1688	1881	3.0	10000
1688	1881	3.5	9000
1688	1881	4.0	9000
1688	1881	4.5	9000
1688	1881	5.0	9000
1688	1881	5.5	9000
1688	1881	6.0	9000
1688	1881	6.5	10000
1688	1881	7.0	10000
1688	1881	7.5	10000
1688	1881	8.0	10000
<u>Borehole 1195R<sup>d</sup></u>			
1705	1733	0.5	9000
1705	1733	1.0	13000
1705	1733	1.5	17000

TABLE 5-2

(continued)

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Coordinates <sup>a</sup>		Depth <sup>b</sup> (ft)	Count Rate <sup>c</sup> (cpm)
East	North		
<u>Borehole 1195R (continued)<sup>d</sup></u>			
1705	1733	2.0	13000
1705	1733	2.5	12000
1705	1733	3.0	13000
1705	1733	3.5	12000
1705	1733	4.0	12000
1705	1733	4.5	12000
1705	1733	5.0	11000
1705	1733	5.5	12000
1705	1733	6.0	18000
1705	1733	6.5	46000
1705	1733	7.0	101000
1705	1733	7.5	114000
1705	1733	8.0	38000
<u>Borehole 1162R<sup>d</sup></u>			
1717	1850	0.5	11000
1717	1850	1.0	12000
1717	1850	1.5	12000
1717	1850	2.0	12000
1717	1850	2.5	13000
1717	1850	3.0	13000
1717	1850	3.5	15000
1717	1850	4.0	23000
1717	1850	4.5	30000
1717	1850	5.0	27000
1717	1850	5.5	32000
1717	1850	6.0	35000
1717	1850	6.5	43000
1717	1850	7.0	50000
1717	1850	7.5	65000
1717	1850	8.0	41000
<u>Borehole 1141R<sup>d</sup></u>			
1729	1925	0.5	14000
1729	1925	1.0	12000
1729	1925	1.5	14000
1729	1925	2.0	17000
1729	1925	2.5	13000
1729	1925	3.0	11000

TABLE 5-2  
(continued)

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Coordinates <sup>a</sup>		Depth <sup>b</sup>	Count Rate <sup>c</sup>
East	North	(ft)	(cpm)

Borehole 1141R (continued)<sup>d</sup>

1729	1925	3.5	9000
1729	1925	4.0	7000
1729	1925	4.5	8000
1729	1925	5.0	9000
1729	1925	5.5	9000
1729	1925	6.0	9000
1729	1925	6.5	9000
1729	1925	7.0	10000
1729	1925	7.5	10000
1729	1925	8.0	11000

Borehole 1157R<sup>d</sup>

1751	1791	0.5	10000
1751	1791	1.0	15000
1751	1791	1.5	13000
1751	1791	2.0	12000
1751	1791	2.5	11000
1751	1791	3.0	12000
1751	1791	3.5	13000
1751	1791	4.0	14000
1751	1791	4.5	15000
1751	1791	5.0	25000
1751	1791	5.5	64000
1751	1791	6.0	85000
1751	1791	6.5	34000
1751	1791	7.0	12000
1751	1791	7.5	12000
1751	1791	8.0	11000
1751	1791	8.5	11000
1751	1791	9.0	10000
1751	1791	9.5	9000

Borehole 1148R<sup>d</sup>

1756	1849	0.5	9000
1756	1849	1.0	12000
1756	1849	1.5	14000
1756	1849	2.0	15000
1756	1849	2.5	16000
1756	1849	3.0	16000

TABLE 5-2  
(continued)

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Coordinates <sup>a</sup>		Depth <sup>b</sup> (ft)	Count Rate <sup>c</sup> (cpm)
East	North		
<u>Borehole 1148R (continued)<sup>d</sup></u>			
1756	1849	3.5	15000
1756	1849	4.0	13000
1756	1849	4.5	12000
1756	1849	5.0	11000
1756	1849	5.5	11000
1756	1849	6.0	11000
<u>Borehole 1218R<sup>d</sup></u>			
1764	1724	0.5	13000
1764	1724	1.0	13000
1764	1724	1.5	12000
1764	1724	2.0	12000
1764	1724	2.5	11000
1764	1724	3.0	11000
1764	1724	3.5	12000
1764	1724	4.0	11000
1764	1724	4.5	11000
1764	1724	5.0	9000
1764	1724	5.5	9000
1764	1724	6.0	9000
1764	1724	6.5	9000
1764	1724	7.0	9000
1764	1724	7.5	9000
<u>Borehole 1152R<sup>d</sup></u>			
1769	1651	0.5	8000
1769	1651	1.0	8000
1769	1651	1.5	11000
1769	1651	2.0	10000
1769	1651	2.5	9000
1769	1651	3.0	9000
1769	1651	3.5	10000
1769	1651	4.0	11000
1769	1651	4.5	11000
1769	1651	5.0	12000
1769	1651	5.5	13000
1769	1651	6.0	13000

TABLE 5-2  
(continued)

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Coordinates <sup>a</sup>		Depth <sup>b</sup> (ft)	Count Rate <sup>c</sup> (cpm)
East	North		
<u>Borehole 1138R<sup>d</sup></u>			
1775	1877	0.5	12000
1775	1877	1.0	13000
1775	1877	1.5	19000
1775	1877	2.0	19000
1775	1877	2.5	12000
1775	1877	3.0	10000
1775	1877	3.5	10000
1775	1877	4.0	10000
1775	1877	4.5	9000
1775	1877	5.0	9000
1775	1877	5.5	9000
1775	1877	6.0	9000
1775	1877	6.5	9000
1775	1877	7.0	9000
1775	1877	7.5	10000
1775	1877	8.0	10000
<u>Borehole 1149R<sup>d</sup></u>			
1797	1587	0.5	8000
1797	1587	1.0	10000
1797	1587	1.5	12000
1797	1587	2.0	12000
1797	1587	2.5	13000
1797	1587	3.0	13000
1797	1587	3.5	13000
1797	1587	4.0	13000
1797	1587	4.5	13000
1797	1587	5.0	19000
<u>Borehole 1146R<sup>d</sup></u>			
1806	1793	0.5	13000
1806	1793	1.0	14000
1806	1793	1.5	14000
1806	1793	2.0	14000
1806	1793	2.5	15000
1806	1793	3.0	15000
1806	1793	3.5	15000

TABLE 5-2

(continued)

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Coordinates <sup>a</sup>		Depth <sup>b</sup> (ft)	Count Rate <sup>c</sup> (cpm)
East	North		

Borehole 1146R (continued)<sup>d</sup>

1806	1793	4.0	15000
1806	1793	4.5	20000
1806	1793	5.0	43000
1806	1793	5.5	92000
1806	1793	6.0	49000
1806	1793	6.5	29000
1806	1793	7.0	18000
1806	1793	7.5	14000
1806	1793	8.0	12000

Borehole 1170R<sup>d</sup>

1826	1921	0.5	10000
1826	1921	1.0	11000
1826	1921	1.5	11000
1826	1921	2.0	12000
1826	1921	2.5	14000
1826	1921	3.0	14000
1826	1921	3.5	17000
1826	1921	4.0	20000
1826	1921	4.5	20000
1826	1921	5.0	18000
1826	1921	5.5	15000
1826	1921	6.0	14000
1826	1921	6.5	11000
1826	1921	7.0	10000
1826	1921	7.5	9000
1826	1921	8.0	9000

Borehole 1147R<sup>d</sup>

1843	1791	0.5	9000
1843	1791	1.0	11000
1843	1791	1.5	15000
1843	1791	2.0	17000



TABLE 5-2

(continued)

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<u>Coordinates<sup>a</sup></u>		<u>Depth<sup>b</sup></u> (ft)	<u>Count Rate<sup>c</sup></u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole 1147R (continued)<sup>d</sup></u>			
1843	1791	2.5	16000
1843	1791	3.0	16000
1843	1791	3.5	15000
1843	1791	4.0	14000
1843	1791	4.5	15000
1843	1791	5.0	18000
1843	1791	5.5	26000
1843	1791	6.0	40000
1843	1791	6.5	51000
1843	1791	7.0	27000
1843	1791	7.5	16000
1843	1791	8.0	14000
<u>Borehole 1153R<sup>d</sup></u>			
1852	1651	0.5	9000
1852	1651	1.0	12000
1852	1651	1.5	14000
1852	1651	2.0	15000
1852	1651	2.5	13000
1852	1651	3.0	11000
1852	1651	3.5	12000
1852	1651	4.0	13000
1852	1651	4.5	13000
1852	1651	5.0	13000
1852	1651	5.5	14000
1852	1651	6.0	14000
1852	1651	6.5	13000
<u>Borehole 1172R<sup>d</sup></u>			
1870	1826	0.5	11000
1870	1826	1.0	12000
1870	1826	1.5	12000
1870	1826	2.0	12000
1870	1826	2.5	11000
1870	1826	3.0	12000

TABLE 5-2  
(continued)

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Coordinates <sup>a</sup>		Depth <sup>b</sup> (ft)	Count Rate <sup>c</sup> (cpm)
East	North		
<u>Borehole 1172R (continued)<sup>d</sup></u>			
1870	1826	3.5	11000
1870	1826	4.0	10000
1870	1826	4.5	9000
1870	1826	5.0	9000
1870	1826	5.5	9000
1870	1826	6.0	9000
1870	1826	6.5	9000
1870	1826	7.0	9000
1870	1826	7.5	10000
1870	1826	8.0	10000
1870	1826	8.5	10000
<u>Borehole 2027R<sup>d</sup></u>			
1875	1942	0.5	6000
1875	1942	1.0	6000
1875	1942	1.5	7000
1875	1942	2.0	9000
1875	1942	2.5	7000
1875	1942	3.0	5000
1875	1942	3.5	5000
1875	1942	4.0	5000
1875	1942	4.5	5000
1875	1942	5.0	6000
1875	1942	5.5	6000
1875	1942	6.0	6000
1875	1942	6.5	6000
1875	1942	7.0	5000
<u>Borehole 1154R<sup>d</sup></u>			
1884	1696	0.5	11000
1884	1696	1.0	14000
1884	1696	1.5	15000
1884	1696	2.0	14000

TABLE 5-2  
(continued)

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Coordinates <sup>a</sup>		Depth <sup>b</sup> (ft)	Count Rate <sup>c</sup> (cpm)
East	North		
<u>Borehole 1154R (continued)<sup>d</sup></u>			
1884	1696	2.5	12000
1884	1696	3.0	12000
1884	1696	3.5	12000
1884	1696	4.0	13000
1884	1696	4.5	13000
1884	1696	5.0	12000
<u>Borehole 1131R<sup>d</sup></u>			
1886	1916	0.5	15000
1886	1916	1.0	21000
1886	1916	1.5	38000
1886	1916	2.0	35000
1886	1916	2.5	17000
1886	1916	3.0	12000
1886	1916	3.5	11000
1886	1916	4.0	12000
1886	1916	4.5	12000
1886	1916	5.0	11000
1886	1916	5.5	13000
1886	1916	6.0	18000
1886	1916	6.5	28000
1886	1916	7.0	51000
1886	1916	7.5	43000
1886	1916	8.0	18000
1886	1916	8.5	12000
1886	1916	9.0	10000
<u>Borehole 1137R<sup>d</sup></u>			
1891	1860	0.5	11000
1891	1860	1.0	13000
1891	1860	1.5	13000
1891	1860	2.0	13000
1891	1860	2.5	12000
1891	1860	3.0	12000
1891	1860	3.5	12000
1891	1860	4.0	11000
1891	1860	4.5	10000
1891	1860	5.0	10000
1891	1860	5.5	9000

TABLE 5-2  
(continued)

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Coordinates <sup>a</sup>		Depth <sup>b</sup> (ft)	Count Rate <sup>c</sup> (cpm)
East	North		
<u>Borehole 1137R<sup>d</sup></u>			
1891	1860	6.0	9000
1891	1860	6.5	9000
1891	1860	7.0	9000
<u>Borehole 1136R<sup>d</sup></u>			
1893	1799	0.5	11000
1893	1799	1.0	12000
1893	1799	1.5	13000
1893	1799	2.0	12000
1893	1799	2.5	12000
1893	1799	3.0	12000
1893	1799	3.5	12000
1893	1799	4.0	12000
1893	1799	4.5	12000
1893	1799	5.0	18000
1893	1799	5.5	51000
1893	1799	6.0	36000
1893	1799	6.5	17000
1893	1799	7.0	12000
1893	1799	7.5	11000
1893	1799	8.0	10000
1893	1799	8.5	10000
<u>Borehole 1155R<sup>d</sup></u>			
1895	1744	0.5	10000
1895	1744	1.0	12000
1895	1744	1.5	14000
1895	1744	2.0	14000
1895	1744	2.5	14000
1895	1744	3.0	14000
1895	1744	3.5	14000
1895	1744	4.0	14000
1895	1744	4.5	12000
1895	1744	5.0	10000
1895	1744	5.5	10000

TABLE 5-2  
(continued)

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Coordinates <sup>a</sup>		Depth <sup>b</sup> (ft)	Count Rate <sup>c</sup> (cpm)
East	North		
<u>Borehole 1155R (continued)<sup>d</sup></u>			
1895	1744	6.0	10000
1895	1744	6.5	11000
1895	1744	7.0	11000
1895	1744	7.5	10000
1895	1744	8.0	9000
<u>Borehole 1132R<sup>d</sup></u>			
1899	1581	0.5	10000
1899	1581	1.0	10000
1899	1581	1.5	10000
1899	1581	2.0	10000
1899	1581	2.5	10000
1899	1581	3.0	10000
1899	1581	3.5	9000
1899	1581	4.0	8000
1899	1581	4.5	9000
1899	1581	5.0	10000
1899	1581	5.5	9000
1899	1581	6.0	9000
1899	1581	6.5	9000
1899	1581	7.0	9000
1899	1581	7.5	9000
1899	1581	8.0	9000
1899	1581	8.5	9000
<u>Borehole 1191R<sup>d</sup></u>			
1899	1989	0.5	7000
1899	1989	1.0	9000
1899	1989	1.5	9000
1899	1989	2.0	10000
1899	1989	2.5	9000
1899	1989	3.0	8000
1899	1989	3.5	6000
1899	1989	4.0	5000
1899	1989	4.5	5000
1899	1989	5.0	5000
1899	1989	5.5	6000

TABLE 5-2  
(continued)

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Coordinates <sup>a</sup>		Depth <sup>b</sup>	Count Rate <sup>c</sup>
East	North	(ft)	(cpm)
<u>Borehole 1191R (continued)<sup>d</sup></u>			
1899	1989	6.0	5000
1899	1989	6.5	5000
1899	1989	7.0	5000
1899	1989	7.5	5000
1899	1989	8.0	5000
<u>Borehole 1202R<sup>d</sup></u>			
1912	1836	0.5	13000
1912	1836	1.0	17000
1912	1836	1.5	16000
1912	1836	2.0	15000
1912	1836	2.5	15000
1912	1836	3.0	17000
1912	1836	3.5	31000
1912	1836	4.0	62000
1912	1836	4.5	97000
1912	1836	5.0	51000
1912	1836	5.5	18000
1912	1836	6.0	15000
1912	1836	6.5	13000
1912	1836	7.0	12000
<u>Borehole 1203R<sup>d</sup></u>			
1913	1770	0.5	10000
1913	1770	1.0	12000
1913	1770	1.5	12000
1913	1770	2.0	12000
1913	1770	2.5	12000
1913	1770	3.0	12000
1913	1770	3.5	13000
1913	1770	4.0	13000
1913	1770	4.5	12000
1913	1770	5.0	13000
1913	1770	5.5	13000
1913	1770	6.0	13000
1913	1770	6.5	12000
1913	1770	7.0	10000
1913	1770	7.5	8000
1913	1770	8.0	9000

TABLE 5-2  
(continued)

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Coordinates <sup>a</sup>		Depth <sup>b</sup> (ft)	Count Rate <sup>c</sup> (cpm)
East	North		
<u>Borehole 1188R<sup>d</sup></u>			
1940	1904	0.5	16000
1940	1904	1.0	26000
1940	1904	1.5	34000
1940	1904	2.0	37000
1940	1904	2.5	35000
1940	1904	3.0	35000
1940	1904	3.5	36000
1940	1904	4.0	29000
1940	1904	4.5	19000
1940	1904	5.0	18000
1940	1904	5.5	19000
1940	1904	6.0	20000
1940	1904	6.5	20000
1940	1904	7.0	20000
1940	1904	7.5	19000
1940	1904	8.0	20000
1940	1904	8.5	21000

<sup>a</sup>Borehole locations are shown in Figure 4-1.

<sup>b</sup>The variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

<sup>c</sup>Instrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

<sup>d</sup>Bottom of borehole collapsed.

TABLE 5-3  
 GAMMA RADIATION EXPOSURE RATES  
 FOR 80 INDUSTRIAL ROAD

Coordinates <sup>a</sup>		Rate <sup>b</sup> ( $\mu$ R/h)
East	North	
1550	1810	20
1570	1920	14
1600	1650	8
1900	1580	9
1740	1785	12
1800	1600	7
1850	1900	7
1910	1760	10

<sup>a</sup>Measurement locations are shown in Figure 4-3.

<sup>b</sup>Measurements include background.

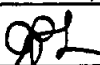


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APPENDIX A  
GEOLOGIC DRILL LOGS FOR 80 INDUSTRIAL ROAD

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.						
80 Industrial Rd. (LODI)				FUSRAP		14501-138	1 OF 1	1165R						
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING						
11-23-87			N 1,877 E 1,511			Vertical		-----						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH						
11-23-87	11-23-87	E.D.I.	Mobile B-57		6.5"	8.0		8.0						
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK						
4.5/56			4											
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:									
140 lbs./ 30 in.		NONE			D. Harnish 									
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.		
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.								
SS	2.0	1.3	2-2-3-6								0.0 - 3.8 Ft. <u>Silty SAND (FILL?)</u> (SM). 0.0-0.7 Ft. Dark brown (10YR3/3) topsoil.	Borehole advanced 0-8 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.  Hole caved in to 6.0 Ft.		
SS	2.0	1.7	4-8-10 11								0.7-3.8 Ft. Brown (10YR3/3) with iron-oxide mottling which increases downward to a pervasive stain, very fine-grained.			
SS	2.0	1.5	5-10-9 12								3.8 - 4.4 Ft. <u>Silty SAND (FILL?)</u> (SM). Black, thin beds with black silt, reworked fill?			
SS	2.0		7-16 19-25								4.4 - 6.3 Ft. <u>Silty SAND</u> (SM). Brown (10YR4/3), fine-grained, subangular grains, saturated.			
											6.3 - 8.0 Ft. <u>SAND and SILT</u> (SP, ML). Dark reddish brown (2.5YR3/4) becoming weak red (2.5YR4/2) downward, very fine-grained sand, some clay toward top, beds 2-10 mm. thick.			
											Bottom of borehole at 8.0 Ft. Borehole backfilled with spoils, 11/23/87.			
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER											SITE	80 Industrial Rd. (LODI)	HOLE NO.	1165R

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
80 Industrial Rd. (LODI)				FUSRAP		14501-138	1 OF 1	1164R			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
80 Industrial Rd. (LODI)			N 1,798 E 1,512			Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-23-87	11-23-87	E.D.I.	Mobile B-57		6.5"	10.0		10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
5.7/57			5								
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs./ 30 in.		NONE			D. Harnish <i>JDH</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	1.9	4-4-6-6						0.0 - 4.0 Ft. <b>SILT FILL (ML)</b> . Dark brown mixed with other silts.	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc. 4-6 Ft. Sample is saturated.  Hole caved in to 9.0 Ft.  Description and classification of soils by visual examination.	
SS	2.0	0.7	5-5-5-5						0.0-0.9 Ft. Mixed with light brownish gray (10YR6/2) silt.		
SS	2.0	1.5	2-2-7-6						1.8-2.0 Ft. Mixed with yellowish brown silt.		
SS	2.0	1.6	4-6-8 12						4.0 - 4.3 Ft. <b>SAND (FILL?) (SM)</b> . Brown (10YR4/3), silty, wet.		
SS	2.0		9-14 15-13						4.3 - 4.7 Ft. <b>SILT (FILL?) (OL)</b> . Very dark brown to black, organic.		
SS	2.0								4.7 - 8.0 Ft. <b>Silty SAND (SM)</b> . Brown, fine-grained, massive.		
									6.8-7.5 Ft. Faint bedding defined by variations in silt fraction.		
									7.9-8.0 Ft. Silt, brown (10YR4/3), laminated.		
									8.0 - 10.0 Ft. <b>SAND (SM)</b> . Dark brown (7.5YR4/2), very fine-grained, wet.		
Bottom of borehole at 10.0 Ft. Borehole backfilled with spoils, 11/23/87.											

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE  
D = DENNISON; P = PITCHER; O = OTHER

80 Industrial Rd. (LODI)

HOLE NO. 1164R

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501-138	1 OF 1	1144R				
80 Industrial Rd. (LODI)				N 1,642 E 1,522		ANGLE FROM HORIZ		BEARING				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-17-87	11-17-87	E.D.I.	MOBILE B-57		6.5"	18.5	1.5	20.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
11.4/71			8					18.5/				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs./ 30 in.		NONE			D. Harnish <i>[Signature]</i>							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.4	1-1-9-9								0.0 - 5.0 Ft. Gravelly SILT, GRAVEL, and SILT (ML-GM, GP, OL).	Borehole advanced 0-20 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc. 4-6 Ft. Grab-sampled from auger flight.
SS	2.0	1.7	9-8-8 14							0.0-1.0 Ft. Silt, dark brown (10YR3/3), humus topsoil.		
SS	2.0	0.2	11-10-3 2							1.0-2.7 Ft. Gravelly silt, dark reddish brown (2.5YR2.5/4), pieces of wood, Brunswick sandstone.		
SS	2.0	1.7	2-4-1-1							2.7-3.9 Ft. Silt, black, damp, homogeneous, organic.		
SS	2.0	1.8	5-12 15-27							3.9-4.1 Ft. Gray, fine-grained loose sand.		
SS	2.0	1.7	7-24 27-42							4.1-5.0 Ft. Gravel, broken pieces of Brunswick sandstone.		
SS	2.0	1.5	8-21 24-18							5.0 - 7.8 Ft. Silty SAND (SM). Black to dark gray and gray, fine-grained, saturated.		
SS	2.0	1.4	4-12 15-15							6.7-7.8 Ft. Finely interbedded.		
										7.8 - 8.9 Ft. SAND. Greenish gray (5Y5/1), fine-grained, saturated.		
										8.9 - 14.5 Ft. SILT and CLAY (ML-CL). Weak red (2.5YR4/2), laminated with 3-5 mm layers.		
										14.5 - 18.0 Ft. SAND and SILT (SP, ML). Dark yellowish brown (10YR4/4), fine- to medium-grained, some coarse-grained sand, thin interbeds of sand of silt.		
										18.0 - 20.0 Ft. WEATHERED BEDROCK.	18.0 Ft. Top of weathered bedrock.	
										Bottom of borehole at 20.0 ft. Borehole backfilled with spoils, 11/17/87.	Liquified sands cause rotary bit to get stuck. Water coming out of hole. Pulled bit out and augered to 20.0 Ft.	
											Description and classification of soils by visual examination.	
SS = SPLIT SPOON; ST = SHELBY TUBE; SITE											HOLE NO.	
O = DENNISON; P = PITCHER; O = OTHER											80 Industrial Rd. (LODI)	
											1144R	

GEOLOGIC DRILL LOG				PROJECT			JOB NO.		SHEET NO.		HOLE NO.		
SITE				COORDINATES				14501-138		1 OF 1		1145R	
80 Industrial Rd. (LODI)				N 1,750 E 1,520				Vertical		-----			
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE		OVERBURDEN		ROCK (FT.)	TOTAL DEPTH
11-17-87		11-17-87		E.D.I.		MOBILE B-57		6.5"		12.0			12.0
CORE RECOVERY (FT./%)		CORE BOXES		SAMPLES		EL. TOP CASING		GROUND EL.		DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK	
9.8/82				6									
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH				LOGGED BY:						
140 lbs./ 30 in.			NONE				D. Harnish						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.							
SS	2.0	1.3	1-1-4-8								0.0 - 2.4 Ft. <u>Gravelly SILT FILL</u> (ML-GM). Dark brown (10YR3/3) to black, organic with plant fragments, Brunswick sandstone gravel.	Borehole advanced 0-12 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.  Hole caved in to 3.0 Ft. deep. Cleaned out twice to 6.0 Ft. but hole would not remain open.	
SS	2.0	1.8	8-7-15 20							2.4 - 4.0 Ft. <u>SAND (FILL?)</u> (SP). Brown (10YR4/3), fine-grained, subangular grains, damp.			
SS	2.0	1.4	10-11 12-8				5			4.0 - 9.0 Ft. <u>SAND</u> (SM). Dark grayish brown (10YR4/2), silty.			
SS	2.0	2.0	9-12 10-15										
SS	2.0	2.0	4-7-15 18										
SS	2.0	1.3	3-6-7 12				10			9.0 - 12.0 Ft. <u>SAND and SILT</u> (SP, ML). Brown (10YR4/3), very fine-grained, interbedded with 5-10 mm layers, saturated.			
										Bottom of borehole at 12.0 ft. Borehole backfilled with spoils, 11/17/87.			
												Description and classification of soils by visual examination.	

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE

80 Industrial Rd. (LODI)

HOLE NO.

1145R

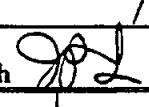
GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
80 Industrial Rd. (LODI)				N 1,923 E 1,535		14501-138	1 OF 1	1143R			
SITE		COORDINATES			ANGLE FROM HORIZ		BEARING				
BEGUN		COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)			
11-17-87		11-17-87	E.D.I.	MOBILE B-57		6.5"	12.2	1.8			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
11.0/79		7						12.2/			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs./ 30 in.		NONE			D. Harnish <i>[Signature]</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "IN" X CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.H.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	1.3	1-4-4-4						0.0 - 4.8 Ft. SAND and SILT FILL (SP, ML).	Borehole advanced 0-14 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.  13.0 Ft. Top of weathered bedrock.	
SS	2.0	2.0	2-2-4-12						0.0-0.7 Ft. Silt, dark brown, some dusky red Brunswick gravel.		
SS	2.0	1.5	6-15 10-13						0.7-4.8 Ft. Sand, yellowish brown (10YR5/6) with minor darker iron-oxide stain, fine-grained, loose.		
SS	2.0	1.5	7-20-20 20						4.8 - 9.7 Ft. SAND and SILT (SP, ML). Finely interbedded with 1-3 cm layers, some clay toward top.		
SS	2.0	1.9	12-13 17-20						4.8-6.7 Ft. Strong brown (7.5YR4/6).		
SS	2.0	1.2	2-2-7-9						6.7-8.0 Ft. Silt, reddish gray (5YR5/2).		
SS	2.0	1.6	10-31 24-34						8.0-9.7 Ft. Brown (10YR4/3) silt, sand is weak red (7.5R5/2).		
									9.7 - 12.2 Ft. SAND (SM). Brown (10YR4/3), some gravel, silty, wet.		
									9.7-10.6 Ft. Medium- to coarse-grained, round grains, some subrounded gravel.		
									10.6-12.2 Ft. Very fine-grained.		
									12.2 - 14.0 Ft. WEATHERED BEDROCK. Dusky red, silty gravel, Brunswick formation, gets harder downward.		
Bottom of borehole at 14.0 ft. Borehole backfilled with spoils, 11/17/87.											
Description and classification of soils by visual examination.											

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE  
D = DENNISON; P = PITCHER; O = OTHER

80 Industrial Rd. (LODI)

HOLE NO. 1143R



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
				FUSRAP		14501-138	1 OF 1	1142R			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
80 Industrial Rd. (LODI)			N 1,884 E 1,559			Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-17-87	11-17-87	E.D.I.	MOBILE B-57		6.5"	10.0		10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
7.9/79			5								
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs./ 30 in.			NONE			D. Harnish 					
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	0.9	1-3-3-4								Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.  8.0 Ft. Sample is saturated.  Description and classification of soils by visual examination.
SS	2.0	1.9	3-2-3-11						0.0 - 5.0 Ft. SILT and SAND FILL (ML, SP).  0.0-3.3 Ft. Silt, mixed reddish brown, dark grayish brown and yellowish brown, some charcoal pieces.  3.3-3.5 Ft. Silt, yellowish brown.		
SS	2.0	1.8	15-10 14-16					5	3.5-5.0 Ft. Sand, strong brown (7.5YR4/6), fine-grained, loose, slightly damp, wet at base.		
SS	2.0	2.0	14-14 24-24						5.0 - 5.7 Ft. SAND (SP). Grayish brown (10YR5/2) with minor iron-oxide stain, fine-grained, finely bedded.		
SS	2.0	1.3	12-21 20-20					10	5.7 - 7.0 Ft. SAND (SP). Brown (7.5YR4/2), fine- to medium-grained, some silt, subangular grains, no bedding features, saturated.		
									7.0 - 10.0 Ft. SILT and SAND (ML, SP). Brown (7.5YR5/2), very fine-grained, interbedded with 1 cm layers, wet.  8.0-10.0 Ft. Silt is weak red (7.5R4/2).		
Bottom of borehole at 10.0 Ft. Borehole backfilled with spoils, 11/17/87.											
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER									SITE	80 Industrial Rd. (LODI)	HOLE NO. 1142R

GEOLOGIC DRILL LOG				PROJECT		JOB NO.		SHEET NO.		HOLE NO.		
80 Industrial Rd. (LODI)				FUSRAP		14501-138		1 OF 1		1159R		
SITE				COORDINATES				ANGLE FROM HORIZ		BEARING		
80 Industrial Rd. (LODI)				N 1,654 E 1,561				Vertical		-----		
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE		OVERBURDEN		
11-20-87		11-20-87		E.D.I.		MOBILE B-57		6.5"		12.0		
CORE RECOVERY (FT./%)		CORE BOXES		SAMPLES		EL. TOP CASING		GROUND EL.		DEPTH/EL. GROUND WATER		
8.6/72		6										
SAMPLE HAMMER WEIGHT/FALL				CASING LEFT IN HOLE: DIA./LENGTH				LOGGED BY:				
140 lbs./ 30 in.				NONE				D. Harnish <i>DH</i>				
SAMP. TYPE AND DIAM.	SAMP. ADU. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.7	3-6-6-4								0.0 - 1.3 Ft. <u>Sandy SILT (FILL?) (SM-ML)</u> . Dark grayish brown on top to dark gray (10YR5/1), soft.	Borehole advanced 0-12 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc. 1.3-2.4 Ft. Strong diesel odor to silt. ENMET reads 300+ ppm.
SS	2.0	1.8	3-6-6-7							1.3 - 2.4 Ft. <u>SILT (FILL?) (OL)</u> . Black.		
SS	2.0	1.8	3-4-5 12							2.4 - 4.3 Ft. <u>SILT (ML)</u> . Grayish green, minor iron-oxide mottling.		
SS	2.0	1.3	17-15 24-24							4.3 - 12.0 Ft. <u>SAND and SILT (SP, ML)</u> . Gray and grayish brown, fine- to very fine-grained, interbedded.		
SS	2.0	1.8	6-6-7-8							4.3-4.7 Ft. Sand, very dark gray, some silt, wet.		
SS	2.0	0.2	11-16 23-28							4.7-6.2 Ft. Sand and silt, gray.		
										6.2-6.7 Ft. Sand, grayish brown (2.5Y5/2), subangular grains.		
										6.7-8.0 Ft. Silty sand, dark grayish brown (2.5Y4/2), saturated.		
										8.0-8.7 Ft. Silt, light grayish green.		
										8.7-12.0 Ft. Sand, dark brown (10YR4/3), some silt, saturated, liquefied.		
Bottom of borehole at 12.0 Ft. Borehole backfilled with spoils, 11/20/87.												
Description and classification of soils by visual examination.												

SS = SPLIT SPOON; ST = SHELBY TUBE;  
D = DENNISON; P = PITCHER; O = OTHER

SITE

80 Industrial Rd. (LODI)

HOLE NO.

1159R

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
80 Industrial Rd. (LODI)				FUSRAP		14501-138	1 OF 1	1161R				
SITE			COORDINATES			ANGLE FROM HORIZ BEARING						
80 Industrial Rd. (LODI)			N 1,790 E 1,580			Vertical -----						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
11-23-87	11-23-87	E.D.I.	MOBILE B-57	6.5"	10.0		10.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK					
4.5/45			5									
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs./ 30 in.		NONE			D. Harnish <i>DH</i>							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.4	1-3-9-9								0.0 - 4.2 Ft. Gravelly SILT and SILT FILL (GM-ML, OL).	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc. 2-4 Ft. Grab sample from auger flight.  8-10 Ft. Sample had little water.  10.0 Ft. ENMET reads 80 ppm, 70% LEL 6" into open hole.
SS	2.0	0.6	10-18 14-7								0.0-3.5 Ft. Gravelly silt, dark brown, reddish brown, light grayish brown, broken pieces of cement, Brunswick sandstone, charcoal.	
SS	2.0	1.2	1-3-6 11								3.5-4.0 Ft. SILT, black, soft. 4.0-4.2 Ft. SILT, grayish red.	
SS	2.0	1.3	4-8-13 13								4.2 - 10.0 Ft. Silty SAND and SILT (SM, ML). Dark grayish brown becoming brown downward, fine- to very fine-grained.	
SS	2.0		6-12 12-16								4.2-7.3 Ft. Silty sand, massive, unconsolidated. 7.3-7.5 Ft. Silt, dark grayish brown (2.5Y4/2). 7.5-10.0 Ft. Sand, brown (7.5YR4/2), few 5-10 mm silt interbeds.	
Bottom of borehole at 10.0 Ft. Borehole backfilled with spoils, 11/23/87.											Description and classification of soils by visual examination.	

SS = SPLIT SPOON; ST = SHELBY TUBE;  
D = DENNISON; P = PITCHER; O = OTHER

SITE

80 Industrial Rd. (LODI)

HOLE NO.

1161R

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.						
80 Industrial Rd. (LODI)				FUSRAP		14501-138	1 OF 1	1217R						
SITE		COORDINATES			ANGLE FROM HORIZ		BEARING							
12-10-87		12-11-87		E.D.I.		LPL BEAVER		6.5"						
4.8/48		4				10.6		10.6						
140 lbs./ 30 in.		NONE		D. Harnish <i>DH</i>										
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.		
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.								
SS	2.0	1.7	6-6-16 20								0.0 - 0.6 Ft. <b>CEMENT</b> . Concrete foundation of Flint Ink.	Borehole advanced 0-10.6 Ft. using 3 in. o.d. split-spoons and		
SS	2.0	0.8	11-21 23-22								0.6 - 9.0 Ft. <b>Gravelly SILT FILL</b> (GM-ML). Dark grayish brown with reddish brown and grayish green silt mixed in; gravel is Brunswick sandstone, some angular pieces of basalt and metamorphic rock, few wood pieces; top 0.4 ft. is dusky red Brunswick sandstone gravel.	6.5 in. o.d. solid-stem augers. Cored through 6 in. concrete floor. All depths from top of floor. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.		
SS	2.0	1.2	9-13 10-6											
SS	2.0	1.1	5-7-14 16											
SS	2.0		ND								contact is approximate	Augered and gamma-logged to 8.0 Ft.		
											9.0 - 10.6 Ft. <b>Silty SAND (SM)</b> . Gray (5Y5/1), fine-grained, damp.	10.6 Ft. ENMET reads >300 ppm, >20% LEL, at mouth of open hole.		
Bottom of borehole at 10.6 Ft. Borehole backfilled with spoils, 12/10/87.												Description and classification of soils by visual examination.		
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER											SITE		HOLE NO.	
80 Industrial Rd. (LODI)											1217R			

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.						
80 Industrial Rd. (LODI)				N 1,651 E 1,612		14501-138	1 OF 1	1156R						
BEGUN		COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
11-20-87		11-20-87	E.D.I.	MOBILE B-57		6.5"	8.0		8.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK						
5.2/87			3											
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs./ 30 in.			NONE			D. Harnish <i>992</i>								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.		
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.								
											0.0 - 2.2 Ft. <u>Silty SAND (FILL?) (SM)</u> . Olive gray (5Y4/2) with some black silt, mushy, wet.	Borehole advanced 0-8 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.		
SS	2.0	1.8	4-12-15 18								2.2 - 3.0 Ft. <u>SILT and SAND (ML, SP)</u> . Fine- to very fine-grained, 3-5 mm beds interlayered.			
SS	2.0	1.6	10-13 14-15								2.2-2.9 Ft. Olive (5Y5/4).	0-2 Ft. Grab sample from auger flights. 0-0.5 Ft. is loading dock cement slab.		
SS	2.0	1.8	10-15 12-20								2.9-4.0 ft. Brown (7.5YR4/2) with some olive layers.			
											4.0-6.0 Ft. Silt, brown.			
											6.0-.08 Ft. Silt, dark reddish gray (5YR4/2), faintly laminated.	Olive color at 2.2-2.9 Ft. may be petroleum-related.		
Bottom of borehole at 8.0 Ft. Borehole backfilled with spoils, 11/20/87.														
											Description and classification of soils by visual examination.			
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER									SITE		80 Industrial Rd. (LODI)		HOLE NO. 1156R	

GEOLOGIC DRILL LOG				PROJECT		JOB NO.		SHEET NO.		HOLE NO.				
80 Industrial Rd. (LODI)				FUSRAP		14501-138		1 OF 1		1158R				
SITE				COORDINATES				ANGLE FROM HORIZ		BEARING				
11-20-87				E.D.I.		MOBILE B-57		6.5"		8.0				
BEGUN				COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE				
11-20-87				11-20-87		E.D.I.		MOBILE B-57		6.5"				
CORE RECOVERY (FT./%)				CORE BOXES		SAMPLES		EL. TOP CASING		GROUND EL.				
3.0/38						4								
SAMPLE HAMMER WEIGHT/FALL				CASING LEFT IN HOLE: DIA./LENGTH				LOGGED BY:						
140 lbs./ 30 in.				NONE				D. Harnish <i>DH</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.		
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.								
SS	2.0	1.5	2-5-8 13								0.0 - 2.6 Ft. SILT and Sandy SILT FILL (GM-ML, SM-ML).	Borehole advanced 0-8 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.		
SS	2.0	1.5	5-13 17-14							0.0-0.2 Ft. Silt, yellowish brown (10YR4/6), dusky red gravelly silt on top.				
SS	2.0		10-15 21-20							0.2-2.6 Ft. Sandy silt, reddish brown (5YR5/3) mixed with yellowish brown sand, light greenish gray silt, abundant iron-oxide mottling.				
SS	2.0		19-16 19-18							2.6 - 8.0 Ft. SAND and SILT (SM, SP, ML). Interbedded, sand is dark brown, silt is reddish brown to reddish gray.				
											2.6-3.1 Ft. Silt, reddish brown (5YR5/4).			
											3.1-4.2 Ft. Sand, dark brown (10YR3/3), fine-grained.			
											4.2-6.0 Ft. Silt, reddish gray (5YR5/2), beds 3-10 mm thick.			
											6.0-7.4 Ft. Sand, dark brown (10YR4/3), some silt, subangular, damp.			
											7.4-8.0 Ft. Silt.			
											Bottom of borehole at 8.0 Ft. Borehole backfilled with spoils, 11/20/87.			
											Description and classification of soils by visual examination.			
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER											SITE	80 Industrial Rd. (LODI)	HOLE NO.	1158R

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.						
80 Industrial Rd. (LODI)				COORDINATES		14501-138	1 OF 1	1140R						
N 1,925 E 1,652				ANGLE FROM HORIZ		Vertical		-----						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH							
11-17-87	11-17-87	E.D.I.	MOBILE B-57	6.5"	10.0		10.0							
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK						
5.8/58			5											
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:									
140 lbs./ 30 in.			NONE		D. Harnish <i>gjh</i>									
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.		
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.								
SS	2.0	0.3	2-4-4-3								0.0 - 2.0 Ft. <u>Gravelly SILT FILL</u> (ML-GM). Dark brown (7.5YR4/4), organic. Gravel is broken Brunswick sandstone.	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.		
SS	2.0	1.4	1-1-2-5							2.0 - 5.0 ft. <u>Silty SAND and SILT (FILL?)</u> (SM, ML). Light brownish gray (10YR6/2) with increasing iron-oxide mottling downward.				
SS	2.0	1.4	5-19 19-19							4.7-5.0 Ft. Pinkish gray mottling.				
SS	2.0	1.4	25-20 20-23							5.0 - 10.0 Ft. <u>SAND and SILT</u> (SM, ML). Dark brown (10YR4/3), sand is fine- and very fine-grained, finely interbedded.				
SS	2.0	1.3	7-10 12-8							5.0-6.0 Ft. Sand.				
										8.0-8.7 Ft. Dark reddish gray (5YR4/2).				
										8.7-10.0 Ft. Dark brown (10YR4/3).				
Bottom of borehole at 10.0 ft. Borehole backfilled with spoils, 11/17/87.														
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER											SITE	80 Industrial Rd. (LODI)	HOLE NO.	1140R

GEOLOGIC DRILL LOG				PROJECT <b>FUSRAP</b>		JOB NO. 14501-138	SHEET NO. 1 OF 1	HOLE NO. 1163R			
SITE <b>80 Industrial Rd. (LODI)</b>			COORDINATES <b>N 1,838 E 1,666</b>			ANGLE FROM HORIZ <b>Vertical</b>		BEARING -----			
BEGUN <b>11-23-87</b>	COMPLETED <b>11-23-87</b>	DRILLER <b>E.D.I.</b>	DRILL MAKE AND MODEL <b>Mobile B-57</b>		SIZE <b>6.5"</b>	OVERBURDEN <b>10.0</b>	ROCK (FT.)	TOTAL DEPTH <b>10.0</b>			
CORE RECOVERY (FT./%) <b>5.9/59</b>		CORE BOXES <b>5</b>	SAMPLES/EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
SAMPLE HAMMER WEIGHT/FALL <b>140 lbs./ 30 in.</b>		CASING LEFT IN HOLE: DIA./LENGTH <b>NONE</b>			LOGGED BY: <b>D. Harnish</b>						
SAMP. TYPE AND DIAM.	SAMP. ADU. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN IN G.P.M	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	1.3	1-3-7 10						0.0 - 4.7 Ft. <b>Gravelly SILT and SAND FILL (GM-ML, SP).</b>	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.	
SS	2.0	0.6	5-9-3-2					0.0-4.0 Ft. Gravelly silt, mixed dark brown and yellowish brown, some gray silty sand, gravel is cement and Brunswick sandstone.			
SS	2.0	1.1	7-2-7 10				5	4.0-4.7 Ft. Sand, dark yellowish brown, fine-grained, some medium-grained, uniformly graded.			
SS	2.0	1.2	3-8-14 11					4.7 - 6.4 Ft. <b>SILT (FILL?) (ML).</b> Reddish gray (5YR5/2) with some iron-oxide stain; disturbed?			
SS	2.0	1.7	11-14 16-19				10	6.4 - 10.0 Ft. <b>SAND (SP).</b> Brown (10YR4/3), very fine-grained, uniform, wet. 8.1 Ft. Thin silt bed. 9.6 Ft. Thin silt bed.			
Bottom of borehole at 10.0 Ft. Borehole backfilled with spoils, 11/23/87.											

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE  
**80 Industrial Rd. (LODI)**

HOLE NO.  
**1163R**



GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.				
80 Industrial Rd. (LODI)				N 1,790 E 1,675	14501-138	1 OF 1	1160R				
SITE		COORDINATES			ANGLE FROM HORIZ		BEARING				
80 Industrial Rd. (LODI)		N 1,790 E 1,675			Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-23-87	11-23-87	E.D.I.	MOBILE B-57	6.5"	12.0		12.0				
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK					
8.2/68		6									
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:							
140 lbs./ 30 in.		NONE		D. Harnish <i>902</i>							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" X CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	1.6	2-2-6 14							0.0 - 6.4 Ft. Gravelly SILT and SILT FILL (GM-ML, ML-OL).	Borehole advanced 0-12 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.
SS	2.0	1.7	16-15 11-8						0.0-6.0 Ft. Gravelly silt, mixed reddish brown, dark brown, light gray; pieces of wood, hard gray slag, and dusky red Brunswick sandstone gravel.		
SS	2.0	0.4	5-4-2-6				5		6.0-6.4 Ft. Silt, black, very soft, semi-liquid.		
SS	2.0	1.7	3-12 14-22						6.4 - 8.0 Ft. SILT (ML). Grayish green becoming dark grayish brown (10YR4/2) toward base, some iron-oxide mottling, interbedded.		
SS	2.0	1.1	4-15 20-24				10		6.4-6.8 Ft. Laminated with 5-10 mm layers. 6.8-8.0 Ft. Some interbeds of fine-grained sand.		
SS	2.0	1.8	8-7-14 15						8.0 - 12.0 Ft. SAND and SILT (SM, ML). Grayish brown (10YR4/2), 30% silt beds 2-30 mm in thickness. 10.0-12.0 Ft. Brown (7.5YR4/2), some 2-7 mm silt interbeds, saturated.		
Bottom of borehole at 12.0 Ft. Borehole backfilled with spoils, 11/23/87.											
										Description and classification of soils by visual examination.	
SS = SPLIT SPOON; ST = SHELBY TUBE; O = DENNISON; P = PITCHER; O = OTHER								SITE		HOLE NO.	
80 Industrial Rd. (LODI)								80 Industrial Rd. (LODI)		1160R	

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
80 Industrial Rd. (LODI)				COORDINATES		FUSRAP	4501-138 1 OF 1	1150R				
SITE		COORDINATES				ANGLE FROM HORIZ		BEARING				
80 Industrial Rd. (LODI)		N 1,652 E 1,679				Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-18-87	11-18-87	E.D.I.		MOBILE B-57		6.5"	8.0		8.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
4.3/54			4									
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs./ 30 in.			NONE			D. Harnish						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	0.3	11-5-4 11								0.0 - 1.8 Ft. <u>Gravelly SILT FILL</u> (ML-GM). Black silt, dark gray sandy silt.	Borehole advanced 0-8 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.
SS	2.0	1.0	2-8-13 12							1.8 - 2.8 Ft. <u>SILT (FILL?) (ML)</u> . Reddish gray (5YR5/2) mottled with iron-oxide stain, some fine-grained sand.		
SS	2.0	1.8	12-12 14-11							2.8 - 8.0 Ft. <u>SILT (ML)</u> . Brown (7.5YR5/2) with some iron-oxide stain, uniform.		
SS	2.0	1.2	7-13 12-14									
Bottom of borehole at 8.0 Ft. Borehole backfilled with spoils, 11/18/87.											Borehole caved in to 7.0 Ft.	
											Description and classification of soils by visual examination.	

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE  
D = DENNISON; P = PITCHER; O = OTHER

80 Industrial Rd. (LODI)

HOLE NO.  
1150R

GEOLOGIC DRILL LOG				PROJECT <b>FUSRAP</b>		JOB NO. 14501-138	SHEET NO. 1 OF 1	HOLE NO. 1151R			
SITE <b>80 Industrial Rd. (LODI)</b>			COORDINATES <b>N 1,952 E 1,681</b>			ANGLE FROM HORIZ BEARING <b>Vertical</b>					
BEGUN <b>11-19-87</b>	COMPLETED <b>11-19-87</b>	DRILLER <b>E.D.I.</b>	DRILL MAKE AND MODEL <b>Mobile B-57</b>	SIZE <b>6.5"</b>	OVERBURDEN <b>8.0</b>	ROCK (FT.)	TOTAL DEPTH <b>8.0</b>				
CORE RECOVERY (FT./%) <b>5.5/69</b>		CORE BOXES <b>4</b>	SAMPLES EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
SAMPLE HAMMER WEIGHT/FALL <b>140 lbs./ 30 in.</b>		CASING LEFT IN HOLE: DIA./LENGTH <b>NONE</b>			LOGGED BY: <b>D. Harnish</b> <i>DH</i>						
SAMP. TYPE AND DIAM.	SAMP. ADU. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	1.4	14-8 10-14							0.0 - 4.3 Ft. <b>SILT and SAND FILL</b> (ML, SP).	Borehole advanced 0-8 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.  Borehole caved in to 5.0 Ft.  8.0 Ft. ENMET reads 60 ppm 6" into open hole.
SS	2.0	1.5	6-7-21 21						0.0-0.8 Ft. Silt, light gray (2.5Y7/2) mottled with yellowish brown (10YR5/8).		
SS	2.0	1.3	11-13 12-14						0.8-2.4 Ft. Sand, yellowish brown (10YR5/6), fine-grained with minor gravel of dusky red Brunswick sandstone. Gray silt at base (0.1 Ft.)		
SS	2.0	1.3	13-14 19-17						2.4-4.3 Ft. Sand (FILL?), brown (10YR5/3) fine- and very fine-grained, uniformly graded.		
									4.3 - 8.0 Ft. <b>SILT</b> (ML). Reddish brown (5YR4/3), finely bedded with 1-5 mm thin beds.		
Bottom of borehole at 8.0 Ft. Borehole backfilled with spoils, 11/19/87.											
										Description and classification of soils by visual examination.	

SS = SPLIT SPOON; ST = SHELBY TUBE;  
D = DENNISON; P = PITCHER; O = OTHER

SITE  
**80 Industrial Rd. (LODI)**

HOLE NO.  
**1151R**

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
80 Industrial Rd. (LODI)				FUSRAP		14501-138	1 OF 1	1139R			
SITE			COORDINATES			ANGLE FROM HORIZBEARING					
80 Industrial Rd. (LODI)			N 1,881 E 1,688			Vertical					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-16-87	11-16-87	E.D.I.	MOBILE B-57		6.5"	10.0		10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
8.7/87			5								
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs./ 30 in.		NONE			D. Harnish <i>[Signature]</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "IN" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	1.7	1-4-4-8						0.0 - 3.8 Ft. Gravelly SILT and SILT FILL (ML-GM, ML).	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.	
SS	2.0	1.8	3-3-2-3					0.0-2.7 Ft. Gravelly silt, very dusky red (7.5R2.5/2), coarse-grained gravel of Brunswick sandstone, soft, damp.			
SS	2.0	1.1	3-9-17 20				5	2.7-3.4 Ft. Silt, mixed grayish brown (10YR5/2) and weak red, root pieces.			
SS	2.0	1.4	11-18 21-20					3.4-3.8 Ft. Silt, black, organic. Fill?			
SS	2.0	1.7	9-12 10-13				10	3.8 - 4.7 Ft. Silty SAND (SM). Gray (10YR5/1) mottled with grayish brown and greenish gray, fine-grained.			
								4.7 - 8.0 Ft. SAND (SP). Brown (10YR5/3), very fine-grained, few thin interbeds of reddish brown silt toward base.			
								8.0 - 10.0 Ft. SILT and CLAY (ML-CL). Reddish gray (5YR5/2) becoming brown (7.5YR 5/4 downward, finely interbedded.			
Bottom of borehole at 10.0 ft. Borehole backfilled with spoils, 11/16/87.											
Description and classification of soils by visual examination.											
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER								SITE		HOLE NO.	
80 Industrial Rd. (LODI)										1139R	

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		14501-138	1 OF 1	1195R			
80 Industrial Rd. (LODI)				N 1,733 E 1,705		ANGLE FROM HORIZ		BEARING			
BEGUN				DRILLER		OVERBURDEN		TOTAL DEPTH			
12-4-87				E.D.I.		12.0		12.0			
COMPLETED				DRILL MAKE AND MODEL		ROCK (FT.)					
12-4-87				MINUTEMAN		Vertical		-----			
CORE RECOVERY (FT./%)				SAMPLES		DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
2.9/25				3				/			
SAMPLE HAMMER WEIGHT/FALL				CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:					
140 lbs./ 30 in.				NONE		D. Harnish					
SAMP. TYPE AND DIAM.	SAMP. ADU. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	1.5	1.1	8-13-26							0.0 - 0.5 Ft. <b>CONCRETE FOUNDATION.</b>	Borehole advanced 0-12 Ft. using 3 in. o.d. split-spoons and 6.5 in. o.d. solid-stem augers. Cored through 6 in. concrete floor. All depths from top of floor.  Radiologically sampled and gamma-logged by TMA-Eberline, Inc.
SS	2.0	1.8	10-17 18-19							0.5 - 4.0 Ft. <b>Gravelly SILT and SILT FILL (GM-ML, ML, OL).</b>	
SS	2.0	0.0	15-14 9-9							0.5-1.3 Ft. Gravelly silt, dark reddish brown (5YR3/2), round cobbles.	
SS	2.0		ND							1.3-2.0 Ft. Silt, gray mixed with very dark gray (7.5YR3/0) and dark reddish brown.	
SS	2.0		16-ND							2.0-4.0 Ft. Gravelly silt, dusky red (2.5YR3/2), gravel is Brunswick sandstone and shale, silt is soft.	
SS	2.0		7-15 15-7							2.5-2.7 Ft. Minor black and very dark gray (7.5YR3/0) silt mixed in.	
										3.1-3.3 Ft. Light olive gray silt (5Y6/2) mixed in.	
										4.0 - 6.0 Ft. <b>Silty SAND (FILL?) (SM).</b> Brown, some round gravel.	
										6.0 - 8.1 Ft. <b>SILT (FILL?) (OL).</b> Very dark gray (7.5YR3/0), organic with pieces of wood, soft.	
										8.1 - 8.9 Ft. <b>SILT and Silty SAND (ML, SM).</b> Grayish green becoming brown downward, sand is fine-grained, sand and silt are interbedded.	
										8.9 - 12.0 Ft. <b>Silty SAND (SM).</b> Weak red (5YR5/3) with yellowish brown iron-oxide stain near base, fine-grained, damp.	
										11.1-12.0 Ft. Brown (10YR4/3), medium-grained with some gravel, saturated.	
										Bottom of borehole at 12.0 Ft. Borehole backfilled with spoils, 12/4/87.	
Description and classification of soils by visual examination.											
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER									SITE		HOLE NO.
80 Industrial Rd. (LODI)									1195R		

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
80 Industrial Rd. (LODI)				COORDINATES		14501-138	1 OF 1	1162R				
N 1,850 E 1,717				ANGLE FROM HORIZ		Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
11-23-87	11-23-87	E.D.I.	Mobile B-57	6.5"	12.0		12.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK					
7.5/63			6									
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:								
140 lbs./ 30 in.		NONE		D. Harnish <i>JD</i>								
SAMP. TYPE AND DIAM.	SAMP. ADU. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE "IN" BLOWS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURNS, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	0.8	1-2-26 26								0.0 - 8.0 Ft. Gravelly SILT and SILT FILL (GM-ML, ML).	Borehole advanced 0-12 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.
SS	2.0	1.8	13-15 8-13							0.0-6.2 Ft. Gravelly silt, dusky red (5R3/2), gravel is broken Brunswick sandstone, granite. Silt is decomposed Brunswick formation.		
SS	2.0	0.9	7-12-8 3							4.0-6.2 Ft. Brown silt mixed in.		
SS	2.0	1.4	1-2-3-4							5.0-6.0 Ft. Gravel.		
SS	2.0	1.7	3-8-14 14							6.2-8.0 Ft. Silt, mixed greenish gray, dark gray, and brown with wood at the bottom.		
SS	2.0	0.9	4-12 19-20							8.0 - 9.8 Ft. SILT (OL). Grayish brown (10YR5/2), organic, faint laminations, medium stiff.		
										8.0-8.3 Ft. Wet and soft.	Hole caved in to 10.0 Ft.	
										9.8 - 12.0 Ft. SILT (ML-OL). Dark brown (10YR4/2), vague laminations 5-10 mm thick defined by reddish brown hue.	12.0 Ft. ENMET reads 100 ppm, 50% LEL 6" into open hole.	
Bottom of borehole at 12.0 Ft. Borehole backfilled with spoils, 11/23/87.												
Description and classification of soils by visual examination.												
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER								SITE		HOLE NO.		
80 Industrial Rd. (LODI)										1162R		

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
80 Industrial Rd. (LODI)				N 1,925 E 1,729		14501-138	1 OF 1	1141R			
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE			
11-17-87		11-17-87		E.D.I.		MOBILE B-57		6.5"			
OVERBURDEN		ROCK (FT.)		TOTAL DEPTH							
10.0		10.0		10.0							
CORE RECOVERY (FT./%)			CORE BOXES		SAMPLES		EL. TOP CASING				
7.4/74					5						
GROUND EL.			DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK						
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs./ 30 in.			NONE			D. Harnish					
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOWS "IN" X CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	1.0	1-15-2 6						0.0 - 3.3 Ft. Gravelly SILT and SILT FILL (GM-ML, ML).	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.	
SS	2.0	1.8	4-2-4-8					0.0-2.0 Ft. Gravelly silt, dark brown (10YR3/3) topsoil mixed with yellowish brown silty sand, gravel is dusky red Brunswick shale.			
SS	2.0	1.9	3-15 30-25				5	2.0-2.4 Ft. Gravelly silt, very dusky red (7.5R2.5/2) decomposed Brunswick shale and sandstone with angular sandstone and shale gravel.			
SS	2.0	1.3	13-24 25-24					2.4-2.6 Ft. Silt, yellowish brown silt with 0.1 Ft. thick layer of yellowish white silt.			
SS	2.0	1.4	11-10 11-16				10	2.6-3.3 Ft. Silt, mixed very dark brown and grayish brown, root cast, iron-oxide stained, disturbed material.			
								3.3 - 4.9 Ft. SILT (ML). Light gray (10YR7/2), abundant small root holes and finely disseminated iron-oxide stain.	10.0 Ft. ENMET reads 100 ppm, 2 bars LEL, 6" down open hole.		
								4.0-4.9 Ft. Light brownish gray (10YR6/2), some thin beds of gray clay.			
								4.9 - 6.9 Ft. SAND (SP). Yellowish brown (10YR5/4) becoming brown (7.5YR5/4) downward, fine- to very fine-grained.			
								6.9 - 10.0 Ft. SAND and SILT (SP, ML). Fine-grained, finely interbedded, wet.			
								6.9-8.0 Ft. Brown (7.5YR5/4).			
								8.0-10.0 Ft. Dark reddish gray (5YR4/2).			
Bottom of borehole at 10.0 Ft. Borehole backfilled with spoils, 11/17/87.											
Description and classification of soils by visual examination.											
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER								SITE		HOLE NO.	
80 Industrial Rd. (LODI)								1141R			

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
80 Industrial Rd. (LODI)				FUSRAP		14501-138	1 OF 1	1157R			
SITE			COORDINATES			ANGLE FROM HORIZ BEARING					
80 Industrial Rd. (LODI)			N 1,791 E 1,751			Vertical -----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-20-87	11-20-87	E.D.I.	MOBILE B-57		6.5"	12.0		12.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
7.4/62			6								
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs./ 30 in.		NONE			D. Harnish <i>JDH</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	0.7	3-6-6-8							0.0 - 7.5 Ft. <u>Silty GRAVEL SILT. Gravelly SILT FILL</u> (GM, ML, ML-GM).	Borehole advanced 0-12 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.  0-2 Ft. Grab sample from auger flights.  6.3-7.0 Ft. HP-260 gives elevated reading for sample.  5.0 Ft. Groundwater observed.
SS	2.0	1.1	4-5-20 16						0.0-2.8 Ft. Silt, mixed dusky red, grayish brown, minor black. 2.8-4.0 Ft. Silty gravel, cement, Brunswick sandstone, black rock. 3.0 Ft. Some white powder.		
SS	2.0	1.5	8-9-7-8				5		4.0-6.3 Ft. Gravelly silt, mixed very dusky red (5R2.5/2), gray, black; gravel is Brunswick sandstone, granite, schist.		
SS	2.0	1.6	4-3-5 11						6.3-7.3 Ft. Black silt, with gray sand 6.4-6.5 Ft.		
SS	2.0	1.2	11-14 14-12						7.3-7.5 Ft. Sand, dark greenish gray, fine-grained.		
SS	2.0	1.3	9-14 15-22				10		7.5 - 12.0 Ft. <u>SILT and Silty SAND</u> (ML, SM). Weak red (5R5/3), more gray toward top, some brown silt beds, thinly interbedded with sand present as 0.1-0.2 Ft. thick beds.		
Bottom of borehole at 12.0 Ft. Borehole backfilled with spoils, 11/20/87.											
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER											
SITE								HOLE NO.			
80 Industrial Rd. (LODI)								1157R			



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.		
80 Industrial Rd. (LODI)				COORDINATES			14501-138	1 OF 1	1148R		
SITE				N 1,849 E 1,756			ANGLE FROM HORIZ		BEARING		
BEGUN		COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-18-87		11-18-87	E.D.I.	MOBILE B-57		6.5"	8.0		8.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
2.4/30			4								
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs./ 30 in.			NONE			D. Harnish					
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	0.2	1-3-8 24						0.0 - 5.8 Ft. <b>Gravelly SILT and SILT FILL</b> (GW, ML).	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc. 0-2 Ft. Grab-sampled from auger flight.	
SS	2.0	1.1	8-10 15-10						0.0-4.0 Ft. Gravelly silt, dusky red (2.5YR3/2), some sand, broken gravel of Brunswick sandstone.		
SS	2.0	1.1	5-3-2-4					5	4.0-5.8 Ft. Silt, grayish brown (10YR5/2), disturbed.		
SS	2.0	0.0	9-28 30-27						5.8 - 8.0 Ft. <b>Silty SAND (SM)</b> . Greenish gray and dark olive gray (5Y3/2), fine-grained.		
									7.1-8.0 Ft. Grayish brown (10YR5/2) becoming yellowish brown downward.		
Bottom of borehole at 8.0 ft. Borehole backfilled with spoils, 11/18/87.											
Description and classification of soils by visual examination.											
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER									SITE	HOLE NO.	
80 Industrial Rd. (LODI)										1148R	

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
80 Industrial Rd. (LODI)				N 1,724 E 1,764		14501-138	1 OF 1	1218R				
BEGUN		COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-10-87		12-10-87	E.D.I.	LPL BEAVER		6.5"	10.6		10.6			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
7.5/75			5									
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs./ 30 in.			NONE			D. Harnish <i>[Signature]</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.3	11-29 24-21								0.0 - 0.6 Ft. <b>CEMENT</b> . Concrete foundation of Flint Ink.	Borehole advanced 0-10.6 Ft. using 3 in. o.d. split-spoons and 6.5 in. o.d. solid-stem augers. Cored through 6 in. concrete floor. All depths from top of floor. Radiologically sampled and gamma-logged by TMA-Eberline, Inc. 4-6 Ft. OVA reads 1000 ppm toxics at mouth of open hole. Augered and gamma-logged to 8.0 Ft.
SS	2.0	1.5	12-18 15-6							0.6 - 5.3 Ft. <b>Silty GRAVEL and SILT FILL</b> (GM, ML).		
SS	2.0	1.5	5-5-3 13				5			0.6-2.4 Ft. Silty gravel, dusky red on top and dark reddish brown below, broken Brunswick sandstone gravel, some silt and sand, bits of glass at 1.8 Ft.		
SS	2.0	1.4	13-25 23-19							2.4-3.2 Ft. Silt, brownish gray, dry.		
SS	2.0	1.8	8-14 11-11							3.2-5.3 Ft. Gravel, dusky red, broken Brunswick sandstone.		
SS	2.0	1.8	8-14 11-11							5.3 - 5.8 Ft. <b>SILT</b> (OL). Very dark gray to black becoming dark gray downward, organic, abundant plant material.		
											5.8 - 9.4 Ft. <b>Silty SAND</b> (SM). Dark gray (5Y4/1), fine-grained, some sandy silt, gradational contact with unit above.	
											9.4 - 10.6 Ft. <b>Silty SAND</b> (SM). Brown (10YR4/3), fine-grained.	
											10.2-10.3 Ft. Silt, reddish brown (5YR5/3).	
Bottom of borehole at 10.0 Ft. Borehole backfilled with spoils, 12/10/87.												
Description and classification of soils by visual examination.												
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER										SITE		HOLE NO.
80 Industrial Rd. (LODI)										1218R		

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
80 Industrial Rd. (LODI)				FUSRAP		14501-138	1 OF 1	1152R				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
80 Industrial Rd. (LODI)			N 1,651 E 1,769			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-19-87	11-19-87	E.D.I.		Mobile B-57		6.5"	8.0		8.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
4.4/55			4									
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs./ 30 in.			NONE			D. Harnish						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	0.2	27-11 7-4								0.0 - 4.0 Ft. Silty GRAVEL and Silty SAND FILL (GM, SM, SP).	Borehole advanced 0-8 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc. 2" of asphalt at surface.
SS	2.0	1.2	2-1-1 11								0.0-0.5 Ft. Silty gravel, black and dusky red silt, broken basalt gravel.	
SS	2.0	1.3	8-11 10-9								0.5-2.3 Ft. Silty gravel, very dusky red, weathered and broken pieces of Brunswick formation.	
SS	2.0	1.7	5-11 18-19								2.3-4.0 Ft. Silty sand, brown (10YR5/3) with iron-oxide mottling, fine-grained, clean sand at base.	
											4.0 - 8.0 Ft. SAND and SILT (SM, SP, ML). Yellowish brown (10YR5/6) and brown on top, dark brown below 5.1 Ft., interbedded.	
											4.0-5.1 Ft. Sand and silt, fine-grained, interbedded with 3-10 mm layers.	Bottom of borehole at 8.0 Ft. Borehole backfilled with spoils, 11/19/87.
											5.1-6.7 Ft. Sand, very fine- to medium-grained, subangular grains.	
											6.0-7.2 Ft. Silt and sand, very fine-grained.	
											7.2-8.0 Ft. Sand, fine-grained.	
Description and classification of soils by visual examination.												

SS = SPLIT SPOON; ST = SHELBY TUBE;  
D = DENNISON; P = PITCHER; O = OTHER

SITE  
**80 Industrial Rd. (LODI)**

HOLE NO.  
**1152R**

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
80 Industrial Rd. (LODI)				COORDINATES		4501-138	1 OF 1	1203R			
BEGUN				DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ANGLE FROM HORIZ			
12-2-87				G. Engel; BNI.		4"	11.0	Bearing			
COMPLETED				DRILLER		ROCK (FT.)	TOTAL DEPTH				
12-2-87				G. Engel; BNI.			11.0	Vertical			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
8.5/77			11								
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs./ 18 in.			NONE			R. Miguez <i>RM</i>					
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "IN" X CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	1.0	0.7							0.0 - 1.4 Ft. <b>Silty sandy CLAY (CL-ML)</b> . Dusky yellowish brown (10YR2/2). Fine- to medium-grained.	Borehole advanced 0-11 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.  Augered to 8.5 Ft. Gamma-logged to 8.0 Ft.	
SS	1.0	0.6						1.4 - 5.0 Ft. <b>Clayey silty SAND (SC-SM)</b> . Moderate reddish brown (10R4/6). Fine- to very coarse-grained with angular fragments of brunswick and carbonaceous material, or paint or ink residues.			
SS	1.0	0.9						5.0 - 5.4 Ft. <b>SAND (SW)</b> . Pale yellowish brown (10YR6/2). Fine- to medium-grained.			
SS	2.0	0.4						5.4 - 5.9 Ft. <b>Sandy CLAY (CL-SC)</b> . Light brown (5YR5/6) mottled with pale brown (5YR5/2) and moderate reddish brown (10R4/6).			
SS	1.0	1.0						5.9 - 6.4 Ft. <b>CLAY (CL)</b> . Dusky yellowish brown (10YR2/2) mottled with dark reddish brown (10R3/4).			
SS	1.0	1.0						6.4 - 7.0 Ft. <b>Silty SAND (SM)</b> . Brownish gray (5YR4/1) mottled with moderate reddish brown (10R4/6). Fine- to medium-grained.			
SS	1.0	1.0						7.0 - 7.7 Ft. <b>SAND (SP)</b> . Medium light gray (N6). Fine- to coarse-grained.			
SS	1.0	0.9						7.7 - 8.1 Ft. <b>CLAY (CL)</b> . Medium gray (N5).			
SS	1.0	1.0						8.1 - 9.5 Ft. <b>SAND (SW)</b> . Light brownish gray (5YR6/1). Fine- to medium-grained layered with grayish orange (10YR7/4) and light brown (5YR5/6).  9.0-9.5 Ft. Light olive gray (5Y6/1), and increasingly coarse-grained.			
SS	1.0	1.0						9.5 - 10.9 Ft. <b>CLAY (CL)</b> . Light olive gray (5Y6/1) layered with moderate reddish brown (10R4/6) and dark yellowish orange (10R6/6).			
								10.9 - 11.0 Ft. <b>SAND (SP)</b> . Pale reddish brown (10R5/4). Fine- to coarse-grained.			
Bottom of borehole at 11.0 Ft. Borehole backfilled with spoils, 12/2/87.											
Description and classification of soils by visual examination.											
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER								SITE		HOLE NO.	
80 Industrial Rd. (LODI)								1203R			

GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.		
80 Industrial Rd. (LODI)				COORDINATES			14501-138	1 OF 1	1138R		
N 1,877 E 1,775				ANGLE FROM HORIZ			Vertical		BEARING		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-16-87	11-16-87	E.D.I.	MOBILE B-57	6.5"	10.0		10.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK				
6.8/68			5								
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs./ 30 in.		NONE			D. Harnish <i>JDH</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" X CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.					
SS	2.0	1.6	1-3-11 20							0.0 - 3.5 Ft. Gravelly SILT and SILT FILL (ML-GM, OL).	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.
SS	2.0	1.8	6-6-6-3						0.0 - 2.8 Ft. Gravelly silt, dusky red (5R5/3), minor fine-grained sand and black silt interbeds; gravel is Brunswick sandstone.		
SS	2.0	1.3	1-3-11 13						2.8-3.3 Ft. Silt matrix is brown (10YR4/3).		
SS	2.0	0.8	13-12 10-9						3.3-3.5 Ft. Silt, black, soft.		
SS	2.0	1.4	5-6-10 12						3.5 - 5.0 Ft. SILT (ML). Olive gray (5Y5/2) to gray (5Y5/1), black plant fragments and minor iron-oxide mottling.		
SS	2.0	1.4	5-6-10 12						5.0 - 8.0 Ft. SAND (SP). Dark grayish brown (2.5Y4/2), very fine-grained, saturated.		
									8.0 - 10.0 Ft. CLAY and SILT (CL-ML). Weak red (5R5/3), and reddish gray (10R5/1), interbedded as 1 cm layers.		
Bottom of borehole at 10.0 Ft. Borehole backfilled with spoils, 11/16/87.											
Description and classification of soils by visual examination.											
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER									SITE	HOLE NO.	
80 Industrial Rd. (LODI)										1138R	

GEOLOGIC DRILL LOG				PROJECT		JOB NO.		SHEET NO.		HOLE NO.		
80 Industrial Rd. (LODI)				N 1,587 E 1,797		14501-138		1 OF 1		1149R		
SITE		COORDINATES				ANGLE FROM HORIZ		BEARING				
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE		OVERBURDEN		
11-18-87		11-18-87		E.D.I.		MOBILE B-57		6.5"		10.0		
CORE RECOVERY (FT./%)		CORE BOXES		SAMPLES		EL. TOP CASING		GROUND EL.		DEPTH/EL. TOP OF ROCK		
5.6/56				5								
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs./ 30 in.			NONE			D. Harnish						
SAMP. TYPE AND DIAM.	SAMP. ADU. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "IN" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.3	23-13 23-17							0.0 - 4.0 Ft. SAND and SILT FILL (SP, ML).	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.  10 Ft. ENMET reads 150 ppm 6" into open hole.	
SS	2.0	1.6	11-5 12-8							0.0-2.8 Ft. Sand, grayish brown (2.5Y5/2) and yellowish brown (10YR5/8), fine-grained.		
SS	2.0	1.4	7-9-9-8							2.8-4.0 Ft. Silt, mixed grayish brown and yellowish brown, disturbed.		
SS	2.0	1.4	7-10-10 9							4.0 - 8.2 Ft. SAND and SILT (SP, ML). Grayish brown (10YR5/2), sand is very fine-grained, some is fine-grained and iron-oxide stained; all beds are 5-10 mm thick.		
SS	2.0		5-12 13-13							7.8-8.2 Ft. Strong brown (7.5YR5/6).		
										8.2 - 10.0 Ft. SILT (ML). Dark grayish brown (10YR4/2). wet.		
Bottom of borehole at 10.0 ft. Borehole backfilled with spoils, 11/18/87.												
Description and classification of soils by visual examination.												

SS = SPLIT SPOON; ST = SHELBY TUBE;  
D = DENNISON; P = PITCHER; O = OTHER

SITE

80 Industrial Rd. (LODI)

HOLE NO.

1149R

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
80 Industrial Rd. (LODI)				N 1,793 E 1,806		14501-138	1 OF 1	1146R			
BEGUN		COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-18-87		11-18-87	E.D.I.	MOBILE B-57		6.5"	12.0		12.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
4.8/40			6								
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs./ 30 in.		NONE			D. Harnish						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	0.3	3-13 13-13						0.0 - 7.5 Ft. Silty GRAVEL (GW).	Borehole advanced 0-12 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc. 0-2 Ft. Grab sample from auger flights.  6-8 Ft. Grab sample from auger flights.  8-10 Ft. Sample has chemical odor; green tint.  12.0 Ft. ENMET reads 200 ppm at 6" in open hole. 10-12 Ft. Sample is saturated.	
SS	2.0	0.6	3-13 13-10						0.0-2.0 Ft. Very dusky red Brunswick sandstone gravel with some black coal ash (?).  2.0-6.0 Ft. Brunswick sandstone gravel with mixed silts: very dusky red, dark gray, dusky red.		
SS	2.0	1.3	7-6-10 12					5	6.0-7.5 Ft. Basalt gravel.		
SS	2.0	0.1	4-4-4 11						7.5 - 10.0 Ft. SAND (SP). Greenish gray, very fine- and medium-grained interbedded.		
SS	2.0	1.2	13-14-3 8					10	10.0 - 12.0 Ft. SILT and SAND (ML, SP). Silt is gray and dark olive gray (5Y3/2); sand is light greenish gray, fine- and medium-grained. Bottom is silt, brown.		
SS	2.0	1.3	5-2-3 14						Bottom of borehole at 12.0 Ft. Borehole backfilled with spoils, 11/18/87.		
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER											
SITE								80 Industrial Rd. (LODI)		HOLE NO. 1146R	

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
80 Industrial Rd. (LODI)				FUSRAP		14501-138	1 OF 1	1170R				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
80 Industrial Rd. (LODI)			N 1,921 E 1,826			Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-24-87	11-24-87	E.D.I.	Mobile B-57		6.5"	10.0		10.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
7.4/74			5									
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs./ 30 in.		NONE			D. Harnish <i>[Signature]</i>							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.5	1-1-2-1								0.0 - 6.7 Ft. <u>Gravelly SILT, Silty SAND and SILT FILL</u> (GM-ML, SM, ML-OL).	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.
SS	2.0	1.8	15-14 15-10							0.0-1.4 Ft. Gravelly silt, dark reddish brown (2.5YR3/4), some Brunswick sandstone gravel; base is dusky red with abundant gravel.		
SS	2.0	1.3	10-6-4 6				5			1.4-3.0 Ft. Silty sand, yellowish brown becoming light yellowish brown (2.5Y6/4) at base, very fine-grained, slightly stiff.		
SS	2.0	1.4	4-4-11 15							3.0-4.0 Ft. Silt, mixed reddish brown, black, yellowish brown, and brown, horizontally interlayered.		
SS	2.0	1.4	7-14 14-17				10			4.0-6.7 Ft. Silt, mixed dark gray, gray, with pieces of grayish green and black silt, minor yellowish brown sand, and wood. 6.0 Ft. Wood with tarry black coating. 6.3-6.7 Ft. Wood in black silt.		
											6.7 - 10.0 Ft. <u>SILT (ML)</u> . Laminated, becoming more distinct downward. 6.7-8.4 Ft. Weak red (5R5/3) and gray. 8.4-10.0 Ft. Reddish brown (5YR5/3) and yellowish brown (5YR5/3) interlayered, less yellowish brown downward.	
											Bottom of borehole at 10.0 Ft. Borehole backfilled with spoils, 11/24/87.	
												Description and classification of soils by visual examination.

SS = SPLIT SPOON; ST = SHELBY TUBE;  
D = DENNISON; P = PITCHER; O = OTHER

SITE  
**80 Industrial Rd. (LODI)**

HOLE NO.  
**1170R**



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
80 Industrial Rd. (LODI)				FUSRAP		14501-138	1 OF 1	1147R			
SITE			COORDINATES			ANGLE FROM HORIZ BEARING					
80 Industrial Rd. (LODI)			N 1,791 E 1,843			Vertical -----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-18-87	11-18-87	E.D.I.	MOBILE B-57		6.5"	10.0		10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
6.4/64			5								
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs./ 30 in.		NONE			D. Harnish <i>JPH</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	0.7	7-18 16-18						0.0 - 6.0 Ft. Gravelly SILT and Silty GRAVEL FILL (GW-ML, GW).	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.  8-10 Ft. Sample has chemical odor. 10.0 Ft. ENMET reads 200 ppm at 6" in open hole.  No groundwater observed.	
SS	2.0	1.8	8-12 8-11						0.0-4.0 Ft. Silty gravel, dusky red Brunswick sandstone, broken angular pieces, some basalt gravel, pieces of glass; silt is grayish brown.		
SS	2.0	1.0	9-9-8 10				5		4.0-6.0 Ft. Gravelly silt, grayish brown (10YR5/2), pieces of Brunswick sandstone.		
SS	2.0	1.1	2-1-1-2						6.0 - 6.4 Ft. SAND (SP). Olive gray (5Y6/2), fine-grained.		
SS	2.0	1.8	10-14 8-5				10		6.4 - 7.8 Ft. SILT. Black, organic with some plant material.  7.8 - 10.0 Ft. Silty SAND (SM). Light greenish gray (5Y7/2), fine- and medium-grained, minor clay and silt interbedded, wet.		
Bottom of borehole at 10.0 Ft. Borehole backfilled with spoils, 11/18/87.										Description and classification of soils by visual examination.	

SS = SPLIT SPOON; ST = SHELBY TUBE;  
D = DENNISON; P = PITCHER; O = OTHER

SITE

80 Industrial Rd. (LODI)

HOLE NO.

1147R

GEOLOGIC DRILL LOG										PROJECT		JOB NO.		SHEET NO.		HOLE NO.	
80 Industrial Rd. (LODI)										N 1,651 E 1,852				Vertical		-----	
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE		OVERBURDEN		ROCK (FT.)		TOTAL DEPTH			
11-19-87		11-19-87		E.D.I.		MOBILE B-57		6.5"		8.0				8.0			
CORE RECOVERY (FT./%)			CORE BOXES		SAMPLES		EL. TOP CASING		GROUND EL.		DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
3.2/40					4												
SAMPLE HAMMER WEIGHT/FALL				CASING LEFT IN HOLE: DIA./LENGTH				LOGGED BY:									
140 lbs./ 30 in.				NONE				D. Harnish <i>DH</i>									
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.					
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.											
SS	2.0	1.4	1-3-7-6								0.0 - 2.7 Ft. Gravelly SILT and SILT FILL (GM, OL).	Borehole advanced 0-8 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.					
SS	2.0	1.8	4-1-2-4							0.0-2.5 Ft. Gravelly silt, dusky red (5YR3/2), gravel is broken angular pieces of Brunswick sandstone, broken glass; silt is soft with some fine-grained sand.							
SS	2.0		10-15 14-14							2.5 - 2.7 Ft. Silt, black, organic.							
SS	2.0		13-17 16-17							2.7 - 4.1 Ft. Sandy SILT (FILL?) (ML). Dark grayish brown (2.5Y4/2), very fine-grained, damp.							
										3.5-4.1 Ft. Sand, olive brown (2.5Y4/4).							
										4.1 - 6.5 Ft. Sandy CLAY (CL-SC). Light gray (2.5Y7/2) with iron-oxide mottling, sand is very fine-grained.	8.0 Ft. ENMET reads 300 ppm 6" into open hole.						
										6.5 - 8.0 Ft. SILT and SAND (ML, SP). Dark yellowish brown (10YR4/4), fine-grained, interbedded with 3-10 mm thick beds.							
Bottom of borehole at 8.0 Ft. Borehole backfilled with spoils, 11/19/87.																	
												Description and classification of soils by visual examination.					

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE  
D = DENNISON; P = PITCHER; O = OTHER

80 Industrial Rd. (LODI)

HOLE NO.  
1153R

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
80 Industrial Rd. (LODI)				COORDINATES		14501-138	1 OF 1	1172R					
N 1,826 E 1,870				ANGLE FROM HORIZ		Vertical		-----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
11-25-87	11-25-87	E.D.I.	Mobile B-57		6.5"	10.0		10.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
6.1/61			5					/					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs./ 30 in.		NONE			D. Harnish								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "IN" X CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAIDLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.							
SS	2.0	1.2	1-4-9 88								0.0 - 6.8 Ft. Gravelly SAND, Sandy SILT and SAND FILL (SW, ML, SP).	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.	
SS	2.0	1.7	10-22 9-9								0.0-2.7 Ft. Gravelly sand, dark reddish brown (5YR3.3), fine-grained with crushed Brunswick sandstone and basalt gravel, silty.		
SS	2.0	0.2	1-5-17 22					5			2.7-4.2 Ft. Sandy silt, yellowish brown, gray silt and Brunswick sandstone gravel mixed in.	4-6 Ft. Grab sample from auger flights.	
SS	2.0	1.4	17-20 19-17								3.5 Ft. Rock.		
SS	2.0	1.6	9-13 18-20								4.2-4.4 Ft. Black silt and yellowish brown silty sand.		
								10			5.0-6.8 Ft. Sand, yellowish brown (10YR5/4), very fine-grained, clean.		
											6.8 - 10.0 Ft. SAND (SM-SP). Brown (7.5YR4/2), very fine-grained, thin bedding defined by silty beds.	No free water in hole.	
Bottom of borehole at 10.0 Ft. Borehole backfilled with spoils, 11/25/87.													
Description and classification of soils by visual examination.													
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER										SITE		HOLE NO.	
80 Industrial Rd. (LODI)										1172R			

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
80 Industrial Rd. (LODI)				FUSRAP		14501-138	1 OF 1	2027R				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
80 Industrial Rd. (LODI)			N 1,942 E 1,875			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-8-88	11-22-88	EMPIRE SOILS		TRIPOD	4"	8.0		8.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
7.6/95			4			5.0/ 11\22\88		/				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lb. / 12 in.		NONE			J. Lord							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	2.0	7-15-45 40								0.0 - 1.0 Ft. <b>TOPSOIL</b> . Moderate brown (5YR5/4) silty sand topsoil. Loose, dry, some roots, worms, grass.	Borehole advanced 0-8 ft. using 3 in. i.d. split-spoon samplers inside 4 in. o.d. steel drive pipe. Radiologically sampled and gamma-logged by TMA-Eberline, Inc. 5.0 Ft. Groundwater observed.  Boring originally driven to 6', 10/8/88. Extended to 8', 11/22/88.  5.3 Ft. Top of undisturbed soil.
SS	2.0	2.0	23-30 31-37							1.0 - 2.8 Ft. <b>Silty clayey LOAM (FILL)</b> . Dusky brown (5YR2/2) matrix with mixed colors and organic flecks. Compressed, cohesive, dry. Crumbles easily. No thread. Some gravel and cobble pieces.		
SS	2.0	2.0	55-67 60-89							2.8 - 5.3 Ft. <b>Silty SAND (SM)</b> . Greenish gray (5G6/1). Moist, loose, adhesive, slightly stiff. Slight fines component, poorly sorted overall. No thread.		
SS	2.0	1.6	12-19 22-19							5.0 Ft. <b>Water</b> .		
											5.3 - 8.0 Ft. <b>Sandy SILT (ML)</b> . Light brown (5YR5/6). Moist. Stiff, well sorted, slightly cohesive, but crumbles easily. Dense. Probably undisturbed. 6.0 Ft. <b>Saturated</b> .	
Bottom of borehole at 8.0 Ft. Borehole backfilled with well gravel and spoils, 11/22/88.												
Description and classification of soils by visual examination.												
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER								SITE		HOLE NO.		
80 Industrial Rd. (LODI)										2027R		

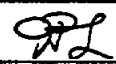
GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
80 Industrial Rd. (LODI)				COORDINATES		14501-138	1 OF 1	1154R				
N 1,696 E 1,884				ANGLE FROM HORIZ		Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-19-87	11-19-87	E.D.I.	MOBILE B-57		6.5"	8.0		8.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK					
5.8/73			4									
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs./ 30 in.		NONE			D. Harnish <i>[Signature]</i>							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.3	1-6-6-4								0.0 - 4.6 Ft. Gravelly SILT and Silty SAND FILL (GM-ML, SM).	Borehole advanced 0-8 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.
SS	2.0	1.2	2-3-2-3							0.0-2.5 Ft. Gravelly silt, dusky red (5R3/3) decomposed Brunswick shale with gravel of broken Brunswick sandstone. Top 0.3 ft of brown topsoil.		
SS	2.0	1.8	1-6-17 17							2.5-3.0 Ft. Gravelly silt, dark brown and dusky red, gravel of brick, glass and Brunswick sandstone. Black silt, soft and damp, at base.		
SS	2.0	1.5	11-13 11-13							3.0-4.6 Ft. Silty sand, dark yellowish brown (10YR4/4), fine-grained, damp.		
										4.6 - 6.0 Ft. SILT (ML). Light gray (10YR7/1) with some iron-oxide mottling, clayey in spots.		
										6.0 - 8.0 Ft. SAND and SILT (SP, SM). Brown (7.5YR5/2), very fine- and fine-grained.		
Bottom of borehole at 8.0 ft. Borehole backfilled with spoils, 11/19/87.												

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE  
D = DENNISON; P = PITCHER; O = OTHER

80 Industrial Rd. (LODI)

HOLE NO. 1154R

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		14501-138	1 OF 1	1131R			
80 Industrial Rd. (LODI)				N 1,916 E 1,886		ANGLE FROM HORIZ		BEARING			
BEGUN		COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-10-87		11-10-87	E.D.I.	MOBILE B-57	6.5"	23.0		23.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK				
12.4/78			8								
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs./ 30 in.		NONE			D. Harnish <i>JPH</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" X CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	1.3	1-20-15 10							0.0 - 3.8 Ft. <b>SILT and Gravelly SILT FILL (ML, GM-ML)</b> .	Borehole advanced 0-23 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Int.  8.0 Ft. Black sludge coming up outside the augers.  14-16 ft. Groundwater observed.  16.0 Ft. 5 Ft. of sand-surge in augers; no more samples. Augered 16-23 ft., describing cuttings. 18 Ft. Some gravel.  Sand 18-23 ft.  23 ft. Auger refusal.  Description and classification of soils by visual examination.
SS	2.0	1.9	5-8-7 10						0.0-0.5 Ft. Topsoil, dark brown (10YR3/3), organic.		
SS	2.0	1.2	5-8-8-8						0.5-1.1 Ft. Gravel, dusky red, broken Brunswick sandstone.		
SS	2.0	2.0	7-4-4-3						1.1-2.6 Ft. Gravelly silt, dark brown (10YR4/3), soft reddish brown silt pebbles, dusky red Brunswick sandstone gravel toward base.		
SS	2.0	1.8	4-12 10-7						2.6-2.9 Ft. Silt, black.		
SS	2.0	1.0	3-14 11-12						2.9-3.1 Ft. Silt, black interlayered with dark brown silt.		
SS	2.0	1.2	3-4-7-7						3.1-3.8 Ft. Gravelly silt, grayish brown with soft yellowish brown, green and reddish brown silt pebbles.		
SS	2.0	2.0	6-7-18 20						3.8 - 4.7 Ft. <b>CLAY (CL)</b> . Reddish brown (5YR5/3), base has plant fragments and small silt pieces.		
									4.7 - 7.1 Ft. <b>SAND (SP)</b> . Dark gray (10YR4/1), fine-grained, minor small round gravel.		
									7.1 - 8.4 Ft. <b>ORGANIC SILT (OL)</b> . Black, soft, organic.		
									7.5-7.8 Ft. Silty sand, weak red, medium-grained, wet.		
									7.8-8.4 Ft. Sludge, black, organic.		
									8.4 - 10.7 Ft. <b>CLAY (CL)</b> . Reddish brown (2.5YR4/4) and grayish brown (10YR5/2) finely interbedded; yellowish brown clay interbedded toward base.		
									10.7 - 23.0 Ft. <b>SAND (SP)</b> . Reddish brown (5YR4/3), fine- to coarse-grained, some round gravel, wet.		
									10.7-12.5 Ft. Fine-grained.		
									12.5-12.8 Ft. Medium-grained.		
									12.8-13.0 Ft. Coarse-grained, some round gravel.		
									13.0-13.2 Ft. Brownish yellow with low density plant material mixed in.		
									14.0-15.5 Ft. Reddish brown, medium-grained.		
									15.5-16.0 Ft. Coarse-grained, gravelly, channel sand.		
									18.0 Ft. Gravelly.		
Bottom of borehole at 23.0 ft. Borehole backfilled with spoils, 11/10/87.											
SS = SPLIT SPOON; ST = SHELBY TUBE; SITE										HOLE NO.	
D = DENNISON; P = PITCHER; O = OTHER										1131R	
80 Industrial Rd. (LODI)											

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
				FUSRAP		14501-138	1 OF 1	1137R			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
80 Industrial Rd. (LODI)			N 1,860 E 1,891			Vertical		-----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)			
11-16-87	11-16-87	E.D.I.		MOBILE B-57		6.5"	10.0	TOTAL DEPTH			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
5.8/58			5								
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs./ 30 in.		NONE			D. Harnish 						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" X CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	1.0	1-5-17-6							0.0 - 4.7 Ft. <b>Gravelly SAND and SAND FILL (SW-SF)</b> .	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc. 2-4 Ft. Grab-sampled from auger flight.
SS	2.0	0.2	4-4-7-13						0.0-4.3 Ft. Gravelly sand, dark reddish brown (2.5YR2.5/4), fine-grained, abundant broken pieces of hard Brunswick sandstone.		
SS	2.0	1.8	8-2-2-6				5		4.3-4.6 Ft. Sand, yellowish brown (10YR5/6), medium- to fine-grained, loose.		
SS	2.0	1.3	7-18 19-13						4.6-4.7 Ft. Silt, black, laminated, soft.		
SS	2.0	1.5	4-15 12-17				10		4.7 - 6.4 Ft. <b>SILT (OL)</b> . Grayish brown (10YR5/2), soft, damp, plant fragments with iron-oxide reaction halos around them.		
									6.4 - 10.0 Ft. <b>SILT (ML)</b> . Dark reddish gray (5YR4/2), some thin sand interbeds, very fine-grained, yellowish brown.		
									8.0-10.0 Ft. Dark brown (7.5YR4/2) with slight reddish tint.		
Bottom of borehole at 10.0 ft. Borehole backfilled with spoils, 11/16/87.											
										Description and classification of soils by visual examination.	
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER								SITE		HOLE NO.	
80 Industrial Rd. (LODI)										1137R	

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
80 Industrial Rd. (LODI)				COORDINATES		14501-138	1 OF 1	1136R			
N 1,799 E 1,893				ANGLE FROM HORIZ		Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-16-87	11-16-87	E.D.I.	MOBILE B-57	6.5"	10.0		10.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK				
5.9/66			5								
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs./ 30 in.			NONE			D. Harnish <i>[Signature]</i>					
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	1.8	1-14 17-9							0.0 - 6.8 Ft. Gravelly SILT and SILT FILL (GM-ML, OL).	Drilled with hollow stem auger, 3.5" ID/6.5" OD.
SS	1.0	1.0	8-35 50/0"							0.0-6.0 Ft. Gravelly silt, very dusky red (2.5YR2.5/2), some very fine- and coarse-grained sand, Brunswick sandstone and basalt gravel.	Boring geophysically logged by Eberline Analytical.
SS	2.0	0.3	4-6-3-3							3.0-3.5 Ft. Rock; glacial erratic?	Drilled through rock 3-4 ft.
SS	2.0	1.3	7-11 17-18							6.0-6.8 Ft. Silt, black, soft, bluish gray clay mixed in at base.	Water rose to 6.0 ft. in 20 min. after hole completed.
SS	2.0	1.5	14-25 25-25							6.8 - 10.0 Ft. Silty CLAY (CL-ML). Weak red (2.5YR5/2) varying to dusky red in places, minor finely interbedded very fine-grained sand, beds 1 cm thick.	ENMET alarm >300 ppm, 5 bars LEL, 6 in. down 10 ft. hole.
										8.5-8.9 Ft. Sand, dark reddish gray (5YR4/2), very fine-grained.	
										8.9-10.0 Ft. Dark reddish gray (5YR4/2).	
										9.5 Ft. Thin bed of medium-grained sand.	
										Bottom of borehole at 10.0 Ft. Borehole backfilled with spoils, 11/16/87.	
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER								SITE		80 Industrial Rd. (LODI)	
								HOLE NO.		1136R	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
80 Industrial Rd. (LODI)				FUSRAP		14501-138	1 OF 1	1155R			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
80 Industrial Rd. (LODI)			N 1,744 E 1,895			Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-19-87	11-19-87	E.D.I.	MOBILE B-57		6.5"	10.0		10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
5.0/50			5								
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs./ 30 in.		NONE			D. Harnish <i>JD</i>						
SAMP. TYPE AND DIAM.	SAMP. ADU. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	1.2	1-4-8-8						0.0 - 4.9 Ft. <u>Silty GRAVEL and SILT</u> (GM, ML).	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.  4-6 Ft. Grab sample from auger flights.	
SS	2.0	1.3	8-8-7 13						0.0-1.6 Ft. Silty gravel, very dusky red (SR 2.5/2), broken Brunswick sandstone, dusky red and dark brown silt of decomposed Brunswick sandstone and shale, some sand.		
SS	2.0	0.0	5-3-1-5						1.6 - 4.9 Ft. Silt, mixed dusky red, dark grayish brown and light brownish gray, disturbed natural material.		
SS	2.0	1.2	19-30 33-54						4.9 - 6.0 Ft. <u>Silty SAND (SM)</u> . Light brownish gray (2.5Y6/2), fine-grained, damp, thin bed of black silt at top.		
SS	2.0	1.3	10-14 18-21						6.0 - 10.0 Ft. <u>SAND and SILT (SM, SP, ML)</u> . Dark grayish brown (2.5Y4/2), fine-grained.		
									6.0-8.7 Ft. Interbedded with 3-5 mm layers.		
									8.7-10.0 Ft. Silty sand, fine- to medium-grained, subround grains, wet.		
Bottom of borehole at 10.0 Ft. Borehole backfilled with spoils, 11/19/87.											
Description and classification of soils by visual examination.											
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER								SITE		80 Industrial Rd. (LODI)	
								HOLE NO.		1155R	

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501-138	1 OF 1	1132R				
80 Industrial Rd. (LODI)				N 1,581 E 1,899		ANGLE FROM HORIZ		BEARING				
BEGUN		COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-13-87		11-13-87	E.D.I.	MOBILE B-57	6.5"	12.9	1.1	14.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
8.8/63			7			V /		12.9/				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs./ 30 in.		NONE			D. Harnish <i>gpl</i>							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" X CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.I.	TIME IN MIN.						
SS	2.0	1.2	7-11-18 7								0.0 - 5.8 Ft. SAND and SILT, and Sandy GRAVEL FILL (SM, SP, ML, GW).	Borehole advanced 0-14 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.
SS	2.0		7-9 9-13							0.0-0.8 Ft. Sandy GRAVEL, dusky red Brunswick sandstone, broken and angular, mixed with brownish yellow sand, fine-grained.		
SS	2.0	1.4	8-10 13-13					5		0.8-5.8 Ft. SAND, light gray (10YR6/1) and yellowish brown (10YR5/6), very fine-grained, uniformly graded.		
SS	2.0	2.0	11-13 13-14							4.0-5.8 Ft. Fine-grained.		
SS	2.0	1.3	8-13 10-8							5.8 - 9.1 Ft. SILT (ML). Brown (10YR4/3), some 2-3 cm interbeds of fine-grained sand.		
SS	2.0	2.0	3-5 7-18					10		9.1 - 12.6 Ft. SAND (SP). Reddish brown (5YR4/3), medium-grained, some gravel.		
SS	2.0	0.9	18-22 17-19							11.5-11.7 Ft. Some gravel, round. 12.6 - 12.9 Ft. CLAY (CL). Light brownish gray (2.5YR6/2).		
										12.9 - 14 Ft. WEATHERED BEDROCK. Dusky red (7.5R3/2), Brunswick sandstone.	14 Ft. ENMET reads 300 ppm 2" into open hole.	
Bottom of borehole at 14.0 ft. Borehole backfilled with spoils, 11/13/87.												
Description and classification of soils by visual examination.												

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE  
D = DENNISON; P = PITCHER; O = OTHER

80 Industrial Rd. (LODI)

HOLE NO.  
1132R

GEOLOGIC DRILL LOG										PROJECT		JOB NO.		SHEET NO.		HOLE NO.	
SITE <b>Hancock St. (LODI)</b>										COORDINATES <b>N 1,989 E 1,899</b>				ANGLE FROM HORIZ <b>Vertical</b>		BEARING <b>-----</b>	
BEGUN <b>12-3-87</b>		COMPLETED <b>12-3-87</b>		DRILLER <b>E.D.I.</b>		DRILL MAKE AND MODEL <b>MOBILE B-57</b>		SIZE <b>6.5"</b>	OVERBURDEN <b>10.0</b>	ROCK (FT.)		TOTAL DEPTH <b>10.0</b>					
CORE RECOVERY (FT./%) <b>5.1/54</b>			CORE BOXES	SAMPLES <b>5</b>	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK								
SAMPLE HAMMER WEIGHT/FALL <b>140 lbs./ 30 in.</b>			CASING LEFT IN HOLE: DIA./LENGTH <b>NONE</b>			LOGGED BY: <b>D. Harnish</b> <i>DL</i>											
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.						
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.											
SS	1.5	1.0	8-10-17						0.0 - 2.6 Ft. <b>GRAVEL and SILT FILL (GP, ML).</b>	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.  0-0.5 Ft. No sample; roadbed.  8-10 Ft. Rotary bit jams inside augers due to saturated sand.							
SS	2.0	1.3	10-10 12-24					0.0-0.5 Ft. Gravel, broken 1-3 in. pieces, basalt.									
SS	2.0	1.2	15-16 15-17					0.5-0.8 Ft. Silt, black with minor yellow and reddish brown silt mixed in, some small gravel.									
SS	2.0	1.3	16-18 15-16					0.8-2.6 Ft. Silty sand, light brownish gray (2.5Y6/2), very fine-grained.									
SS	2.0	0.3	10-10 11-11					2.6 - 4.0 Ft. <b>SILT and SAND (FILL?) (ML, SP).</b>									
									2.6-3.1 Ft. Silt, light gray (5Y7/1) with green mottling, minor iron-oxide stain.								
									3.1-4.0 Ft. Sand, dark grayish brown (2.5Y4/1), very fine-grained.								
									4.0 - 5.2 Ft. <b>Silty SAND (SM).</b> Brown (10YR4/3) with yellowish brown iron-oxide stain, fine- to medium-grained.								
									4.9 Ft. Top of wet sand.								
									5.2 - 10 Ft. <b>SAND (SP).</b> Dark yellowish brown (10YR4/4), some silt and gravel.								
									6.3 Ft. Some gravel.								
									6.9-7.3 Ft. Some coarse-grained sand.								
									8.0-10.0 Ft. Reddish brown (5YR4/3), saturated, liquefied.								
Bottom of borehole at 10.0 Ft. Borehole backfilled with spoils, 12/3/87.																	
										Description and classification of soils by visual examination.							

SS = SPLIT SPOON; ST = SHELBY TUBE;  
D = DENNISON; P = PITCHER; O = OTHER

SITE

**Hancock St. (LODI)**

HOLE NO.

**1191R**

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
80 Industrial Rd. (LODI)				FUSRAP		14501-138	1 OF 1	1202R				
SITE		COORDINATES				ANGLE FROM HORIZ		BEARING				
80 Industrial Rd. (LODI)		N 1,836 E 1,912				Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)				
12-2-87	12-2-87	G. Engel; BNI.		MINUTEMAN AUGER		4"	8.5	8.5				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
7.5/88			8									
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs./ 18 in.		NONE			R. Miguez <i>RM</i>							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS "N" X CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
SS	1.0	1.1										Borehole advanced 0-8.5 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.
SS	1.0	1.0								0.0 - 0.5 Ft. <b>Sandy silty CLAY (CL-ML)</b> . Dusky yellowish brown (10YR2/2). Fine- to medium-grained.		
SS	1.0	1.0								0.5 - 4.0 Ft. <b>Pebbly clayey silty SAND (SC-SG)</b> . Moderate reddish brown (10R4/6). Fine- to coarse-grained with subangular pebbles to 1.0 in.; Brunswick Fm. and other lithologies.		
SS	1.0	1.0								4.0 - 5.0 Ft. <b>SAND (SW)</b> . Pale olive (10Y6/2) finely layered with lesser portions of moderate reddish brown (10R4/6) and brownish gray (5YR4/1) layers. Fine- to medium-grained.		
SS	1.0	0.6								5.0 - 6.0 Ft. <b>Sandy CLAY (CL-SC)</b> . Brownish gray (5Y4/1).		
SS	1.0	1.0								6.0 - 7.0 Ft. <b>SAND (SP)</b> . Light olive gray (5Y6/1) mottled with greenish gray (5GY8/1) and dusky yellowish green (5GY5/2).		
SS	1.5	1.2								7.0 - 8.5 Ft. <b>SILT (ML)</b> . Pale red (5R6/2) mottled with light brownish gray (5YR6/1).		
											Bottom of borehole at 8.5 Ft. Borehole backfilled with spoils, 12/2/87.	
											Description and classification of soils by visual examination.	
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER											SITE	HOLE NO.
80 Industrial Rd. (LODI)											1202R	

GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
Industrial Rd. (LODI)				COORDINATES		14501-138	1 OF 1	1188R			
FUSRAP				N 1,904 E 1,940		Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-2-87	12-2-87	E.D.I.	MOBILE B-57		6.5"	10.0		10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
5.4/68			5					/			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs./ 30 in.		NONE			D. Harnish						
SAMP. TYPE AND DIAM.	SAMP. ADU. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS IN" % CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M	PRESS. P.S.I.						
SS	1.5	1.0	14-15-14							0.0 - 5.5 Ft. Gravelly SILT, SILT, and GRAVEL FILL (GM-ML, ML, GP).	Borehole advanced 0-10 Ft. using 6.5 in. o.d. hollow-stem auger. Radiologically sampled and gamma-logged by TMA-Eberline, Inc.  4.5-5.5 Ft. Possible glacial erratic.  8.0 Ft. ENMET reads >300 ppm 6" into open hole.  No free water in hole.
SS	2.0	1.2	7-13 11-22						0.0-0.5 Ft. Gravel, broken basalt.		
SS	0.5	0.5	8						0.5-1.0 Ft. Gravel, dusky red Brunswick sandstone.		
SS	2.0	1.4	10-19 25-25						1.0-4.5 Ft. Silt, grayish brown (10YR5/2), small pieces of reddish brown and black mixed in at top, black, olive green and green mixed in through the rest.		
SS	2.0	1.3	9-10 9-10						4.5-5.5 Ft. Rock, metamorphic rock cobble.		
									5.5 - 10.0 Ft. SILT (ML). Grayish brown (10YR5/2) becoming brown (7.5YR4/2) downward with minor iron-oxide stain, faint bedding.		
									6.0-10.0 Ft. Wet.		
									8.0-10.0 Ft. Faint laminae.		
Bottom of borehole at 10.0 Ft. Borehole backfilled with spoils, 12/2/87.											
Description and classification of soils by visual examination.											
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER								SITE		HOLE NO.	
Industrial Rd. (LODI)										1188R	