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Formerly Utilized Sites Remedial Action Program (FUSRAP)
Contract No. DE-AC05-81OR20722

RADIOLOGICAL CHARACTERIZATION REPORT FOR THE COMMERCIAL PROPERTY AT 72 SIDNEY STREET

Lodi, New Jersey

September 1989

Bechtel National, Inc.

0489-0520.12

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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

DOE				

DOE/OR/20722-245

RADIOLOGICAL CHARACTERIZATION REPORT FOR THE COMMERCIAL PROPERTY AT 72 SIDNEY STREET 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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Bechtel National, Inc.
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Bechtel Job No. 14501

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ABBREVIATIONS

cm	centimeter
cm^2	square centimeter
cpm	counts per minute
dpm	disintegrations per minute
ft	foot
h	hour
in.	inch
km^2	square kilometer
L	liter
L/min	liters per minute
m	meter
m^2	square meter
MeV	million electron volts
μR/h	microroentgens per hour
mi	mile
mi^2	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^3	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.

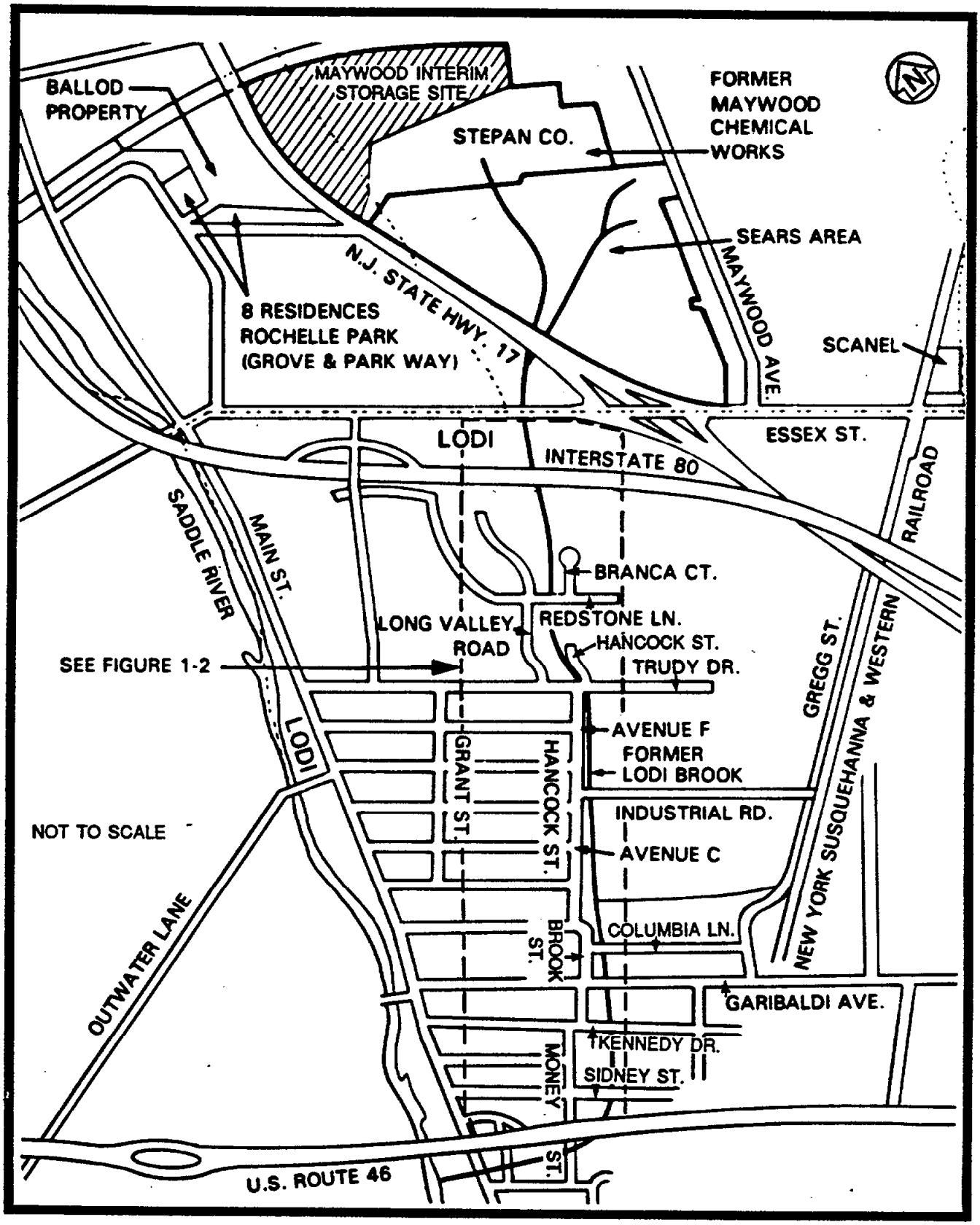

FIGURE 1-1 LOCATION OF LODI VICINITY PROPERTIES

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 72 Sidney Street (Figure 1-2) in Lodi, New Jersey, which was conducted in November and December 1987. Additional data were collected in September 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 at 72 Sidney Street is a vacant lot with a gravel surface and is used as an automobile parking area by a local automobile dealership. Access to the property was extremely limited because of the large number of automobiles parked there. For that reason, near-surface measurements, gamma exposure rate measurements, and a walkover survey could not be conducted.

This characterization confirmed that thorium-232 is the primary radioactive contaminant at this property. Results of surface soil samples for 72 Sidney Street showed maximum concentrations of thorium-232 and radium-226 to be less than 2.0 and less than 1.6 pCi/g, respectively. The maximum concentration of uranium-238 in surface soil samples was less than 7.9 pCi/g.

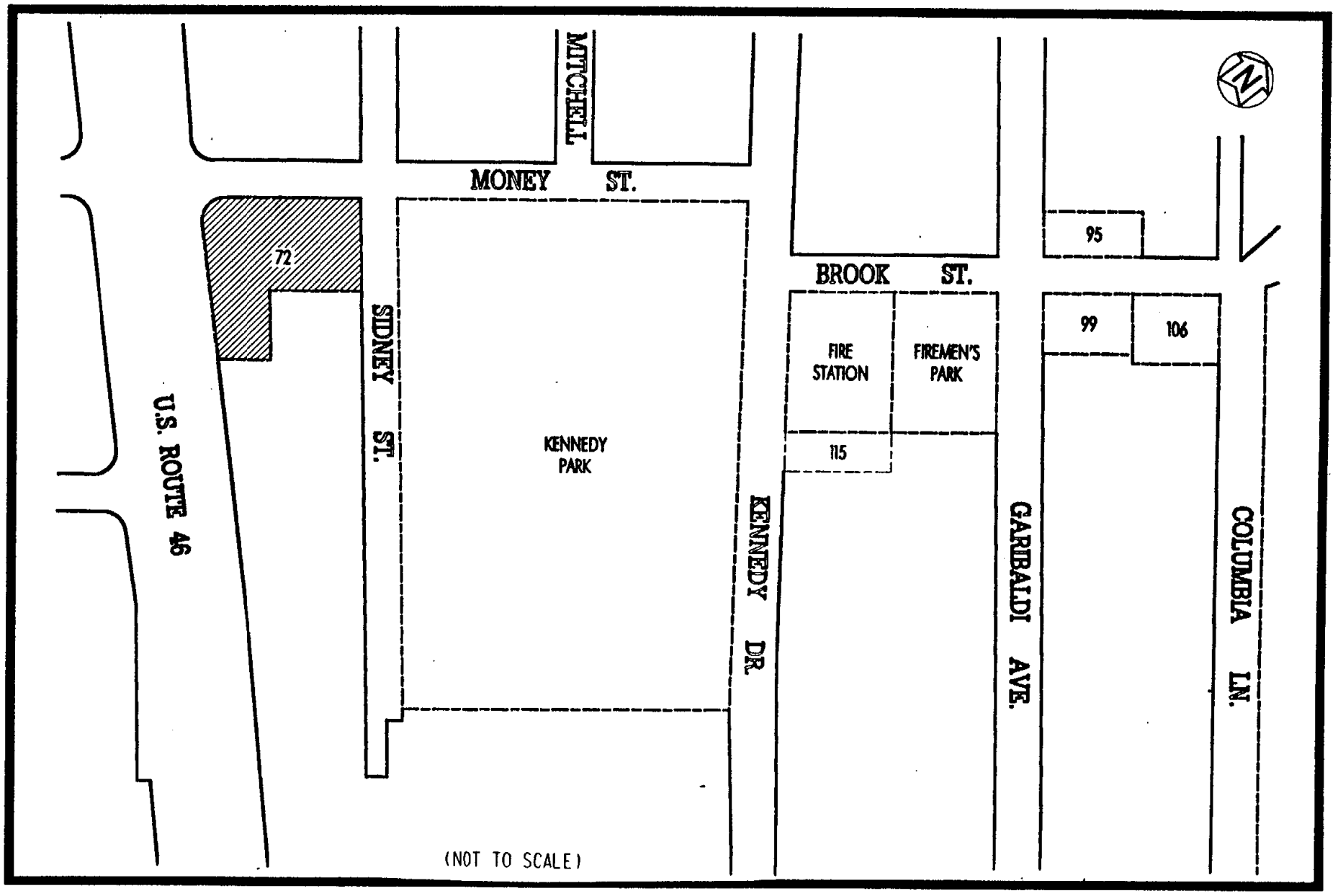

FIGURE 1-2 LOCATION OF 72 SIDNEY STREET

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Subsurface soil sample concentrations ranged from less than 0.5 to 6.2 pCi/g for thorium-232 and from less than 0.4 to less than 1.6 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 less than 7.4 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 did not indicate surface contamination. Subsurface investigation by gamma logging indicated marginal contamination at a depth of 0.76 m (2.5 ft) in one location on the 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 72 Sidney Street. This contamination is primarily an isolated area of marginal subsurface contamination at a depth

of 0.76 m (2.5 ft). The total affected area is estimated to be approximately less than 5 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 is known that the original channel of Lodi Brook has been realigned in this area. For that reason, it is suspected that contamination on this property may have been disturbed or displaced during realignment of the former stream channel. In support of this suspicion, boreholes were drilled in both streets immediately adjacent to this property (Money and Sidney Streets) to better define contamination boundaries. No evidence of subsurface contamination extending off this property was indicated.

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^2 (4-mi^2) 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

Radionuclide	Soil Concentration (pCi/g) Above Background[a,b,c]
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[d]. 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

Radionuclide[f]	Allowable Surface Residual Contamination[e] (dpm/100 cm²) Average[g,h]	Maximum[h,i]	Removable[h,i]
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)

[a]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").

[b]These guidelines represent allowable residual concentrations above background averaged across any 15-cm-thick layer to any depth and over any contiguous 100-m^2 surface area.

[c]Localized concentrations in excess of these limits are allowable, provided that the average concentration over a 100-m^2 area does not exceed these limits. 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.

[d]A working level (WL) is any combination of short-lived radon decay products in 1 liter of air that will result in the ultimate emission of 1.3 x 105 MeV of potential alpha energy.

[e]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.

[f]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.

[g]Measurements of average contamination should not be averaged over more than 1 m^2. For objects of less surface area, the average shall be derived for each such object.

[h]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.

[i]The maximum contamination level applies to an area of not more than 100 cm^2.

[j]The amount of removable radioactive material per 100 cm^2 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^2 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:

- 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.
- 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.
- Dosimetry--Subcontractor personnel were required to wear and return daily the dosimeters and monitors issued by BNI.
- 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.

- 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

A walkover survey was not performed on this property because of extremely limited access. The primary use of this commercial property is automobile parking for a local automobile dealership. Survey activities were, therefore, significantly limited as relocation of the automobiles was necessary prior to performing any work activities. The large number of automobiles parked on the property made it impossible to completely vacate the property at any time.

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 eight boreholes on the property and four boreholes in the streets adjacent to the property (Figure 4-1), using either a 7.0-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 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, using 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 four locations (Figure 4-2) and

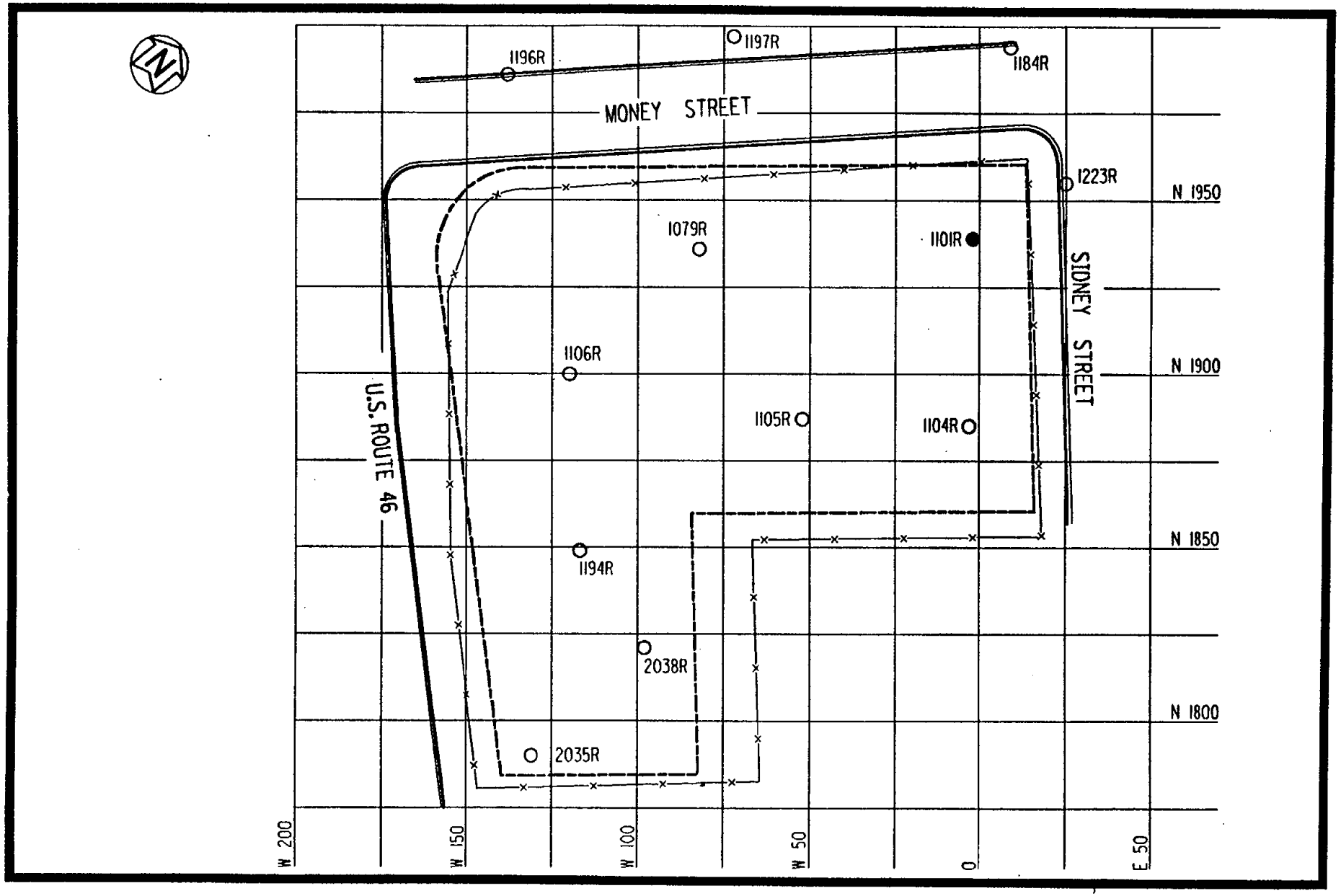

FIGURE 4-1 BOREHOLE LOCATIONS AT 72 SIDNEY STREET

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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 12 locations (Figure 4-2) using a 7.0-cm (3.0-in.) outside diameter (O.D.) split-spoon sampler mounted on 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.

4.2 BUILDING RADIOLOGICAL CHARACTERIZATION

No buildings are present on this property; therefore, this element of the characterization activities was not required.

Exterior gamma exposure rate measurements could not be obtained because of the extremely limited access and scheduling conflicts concerning the total removal of all the automobiles parked on the property.

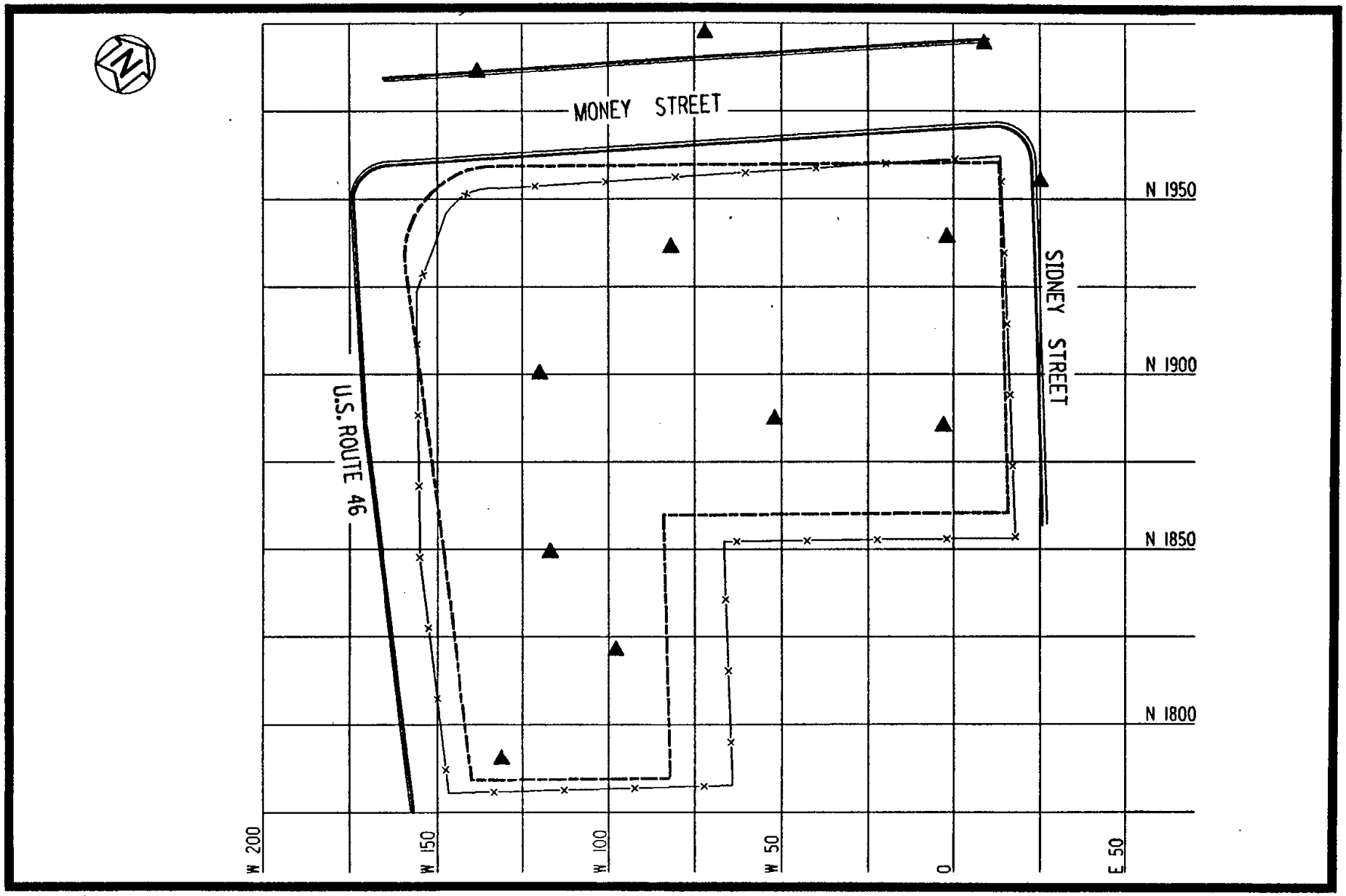

FIGURE 4-2 SURFACE AND SUBSURFACE SOIL SAMPLING LOCATIONS AT 72 SIDNEY STREET

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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 could not be obtained because of severely limited access to the property and scheduling conflicts concerning clearing of the property to allow sufficient surface area to be surveyed.

Surface soil samples [depths from 0.0 to 15.2 cm (6.0 in.)] were taken at one location on the property and three locations in the streets (Money Street and Sidney Street) immediately adjacent to 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 2.5 to less than 7.9 pCi/g for uranium-238, from less than 1.0 to less than 2.0 pCi/g for thorium-232, and from less than 0.5 to less than 1.6 pCi/g for radium-226. Analytical results for surface soils are provided in Table 5-1; these data showed that concentrations of thorium-232 do not exceed DOE guidelines (5 pCi/g plus background of 1 pCi/g for surface soils) with a maximum concentration of less than 2.0 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 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 (±), 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 5,000 cpm to 29,000 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 less than 7.4 pCi/g, thorium-232 concentrations ranging from less than 0.5 to 6.2 pCi/g, and radium-226 concentrations ranging from less than 0.4 to less than 1.6 pCi/g.

On the basis of surface and subsurface soil sample analyses and downhole gamma logging, contamination on this property is believed to consist primarily of an isolated area of marginal subsurface contamination at a depth of 0.76 m (2.5 ft). The area of subsurface contamination is shown in Figure 5-1. The subsurface contamination does not appear to extend off 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. The contamination on this property is similar to contamination found on a municipal property in close proximity to property. It has been established that the Lodi Brook channel through that property once occupied locations connecting to those where stream sediments were found at 72 Sidney Street. Thus, the elevated gamma readings shown on gamma logs from boreholes drilled on this property serve as

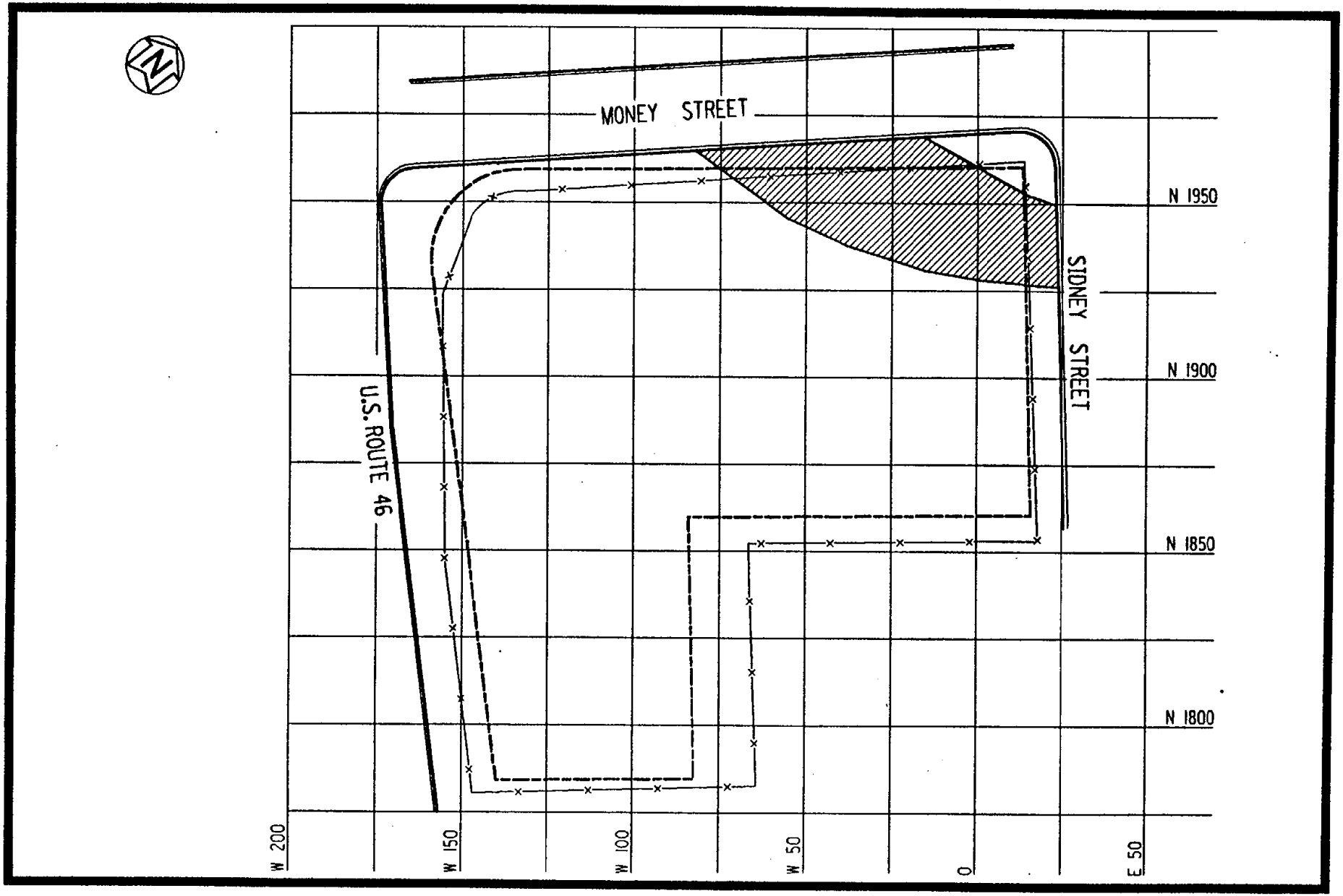

FIGURE 5-1 AREAS OF SUBSURFACE CONTAMINATION AT 72 SIDNEY STREET

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further indication of the suspected mechanism of transport for radiological contamination (i.e., stream deposition from Lodi Brook). Furthermore, it is believed that the contamination on this property is marginal and isolated because of prior construction activities to realign the former channel of Lodi Brook. It is suspected that any contamination that may have been present at that time was disturbed or displaced.

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

No buildings are present on this property; therefore, building characterization activities were not necessary.

Exterior gamma radiation exposure rate measurements could not be obtained because of scheduling conflicts and extremely limited access to the property.

TABLE 5-1

SURFACE AND SUBSURFACE RADIONUCLIDE CONCENTRATIONS IN SOIL

FOR 72 SIDNEY STREET

Page 1 of 4

Coordinates[a]			Depth (ft)	Concentration (pCi/g ± 2 sigma) Uranium-238	Radium-226	Thorium-232
W	2	N 1939	0.0 - 2.0	< 3.4	< 0.9	< 1.3
W	2	N 1939	2.0 - 3.0	< 4.0	< 1.1	< 1.8
W	2	N 1939	3.0 - 4.0	< 6.6	< 1.6	6.2 ± 1.6
W	2	N 1939	4.0 - 5.0	< 3.7	< 0.9	< 1.2
W	2	N 1939	8.0 - 10.0	< 3.8	< 0.9	< 1.2
W	3	N 1886	0.0 - 1.0	< 2.7	< 0.7	< 1.1
W	3	N 1886	2.0 - 3.0	< 6.4	< 1.3	< 2.6
W	3	N 1886	4.0 - 5.0	< 3.9	< 0.6	< 1.3
W	3	N 1886	9.0 - 10.0	< 4.6	< 1.0	< 1.5
W	9	N 1994	0.0 - 0.5	< 7.9	< 1.6	< 2.0
W	9	N 1994	0.0 - 2.0	< 4.0	< 0.8	< 1.5
W	9	N 1994	5.0 - 6.0	< 3.9	< 0.8	< 1.1
W	9	N 1994	8.0 - 9.0	< 7.4	< 1.1	< 2.0
W	9	N 1994	9.0 - 10.0	< 1.8	< 0.5	< 0.7
W	52	N 1887	0.0 - 1.0	< 4.2	< 1.1	< 1.5
W	52	N 1887	5.0 - 6.0	< 4.8	< 1.3	< 1.8
W	52	N 1887	10.0 - 11.0	< 2.8	< 0.6	< 0.9
W	52	N 1887	11.0 - 12.0	< 3.1	< 0.6	< 0.9
W	72	N 1997	0.5 - 2.0	< 4.2	< 0.9	< 1.4
W	72	N 1997	2.0 - 3.0	< 4.2	< 0.9	< 1.4
W	72	N 1997	4.0 - 6.0	< 4.7	< 1.0	< 1.6
W	72	N 1997	7.0 - 8.0	< 3.2	< 0.6	< 1.0

TABLE 5-1

(continued)

Page 2 of 4

Coordinates[a]		Depth (ft)	Concentration (pCi/g ± 2 sigma)		
			Uranium-238	Radium-226	Thorium-232
W 82	N 1936	0.0 - 2.0	< 2.7	< 0.7	< 0.9
W 82	N 1936	6.0 - 8.0	< 2.8	< 0.8	< 1.1
W 82	N 1936	14.0 - 16.0	< 2.0	< 0.5	< 0.8
W 98	N 1821	0.0 - 0.5	< 3.0	< 1.0	< 1.0
W 98	N 1821	2.0 - 2.5	2.4 ± 0.5	0.8 ± 0.2	1.0 ± 0.1
W 98	N 1821	2.5 - 3.0	1.5 ± 1.4	< 1.0	0.8 ± 0.6
W 98	N 1821	3.0 - 3.5	< 2.0	0.5 ± 0.1	0.8 ± 0.3
W 98	N 1821	3.5 - 4.0	< 2.0	< 1.0	< 1.0
W 98	N 1821	4.0 - 4.5	< 2.0	0.5 ± 0.1	0.7 ± 0.6
W 98	N 1821	4.5 - 5.0	1.4 ± 0.6	0.9 ± 0.1	1.1 ± 0.2
W 98	N 1821	5.0 - 5.5	< 2.0	< 1.0	< 1.0
W 98	N 1821	5.5 - 6.0	< 2.0	0.3 ± 0.1	< 1.0
W 98	N 1821	6.0 - 6.5	< 2.0	0.4 ± 0.1	0.6 ± 0.3
W 98	N 1821	6.5 - 7.0	< 1.0	0.4 ± 0.1	< 1.0
W 98	N 1821	7.0 - 7.5	< 2.0	< 1.0	0.8 ± 0.4
W 98	N 1821	7.5 - 8.0	< 1.0	0.5 ± 0.1	< 1.0
W 98	N 1821	8.0 - 8.5	< 2.0	< 1.0	< 1.0
W 98	N 1821	8.5 - 9.0	< 2.0	0.6 ± 0.3	1.0 ± 0.2
W 98	N 1821	9.0 - 9.5	< 1.0	< 1.0	< 1.0
W 98	N 1821	9.5 - 10.0	< 2.0	< 1.0	< 1.0
W 117	N 1849	0.0 - 0.5	< 4.2	< 0.7	< 1.1
W 117	N 1849	0.0 - 2.0	< 3.6	< 0.7	< 1.1
W 117	N 1849	5.0 - 6.0	< 4.2	< 0.7	< 1.3
W 117	N 1849	9.0 - 10.0	< 3.2	< 0.7	< 1.0

TABLE 5-1

(continued)

Page 3 of 4

Coordinates[a]		Depth (ft)	Concentration (pCi/g ± 2 sigma)		
			Uranium-238	Radium-226	Thorium-232
W 120	N 1900	0.0 - 1.0	< 2.2	< 0.5	< 0.8
W 120	N 1900	4.0 - 6.0	< 3.1	< 0.8	< 1.0
W 120	N 1900	8.0 - 10.0	< 1.5	< 0.4	< 0.5
W 120	N 1900	10.0 - 12.0	< 3.9	< 1.1	< 1.4
W 131	N 1790	3.0 - 3.5	< 2.0	0.5 ± 0.1	1.1 ± 0.7
W 131	N 1790	3.5 - 4.0	2.7 ± 1.9	0.8 ± 0.2	1.1 ± 0.3
W 131	N 1790	5.0 - 5.5	< 2.0	0.9 ± 0.2	1.4 ± 0.1
W 131	N 1790	5.5 - 6.0	< 2.0	< 1.0	< 1.0
W 131	N 1790	6.0 - 6.5	< 2.0	< 1.0	0.8 ± 0.4
W 131	N 1790	6.5 - 7.0	1.6 ± 1.5	0.6 ± 0.1	< 1.0
W 131	N 1790	7.0 - 7.5	< 2.0	0.6 ± 0.2	0.7 ± 0.1
W 131	N 1790	7.5 - 8.0	2.7 ± 1.1	0.8 ± 0.1	1.1 ± 0.4
W 131	N 1790	8.0 - 8.5	< 2.0	0.4 ± 0.1	< 1.0
W 131	N 1790	8.5 - 9.0	< 2.0	0.4 ± 0.1	< 1.0
W 131	N 1790	9.0 - 9.5	< 2.0	< 1.0	0.6 ± 0.5
W 131	N 1790	9.5 - 10.0	< 1.0	0.2 ± 0.2	< 1.0
W 131	N 1790	10.0 - 10.5	< 2.0	0.5 ± 0.2	< 1.0
W 131	N 1790	10.5 - 11.0	< 2.0	0.5 ± 0.1	< 1.0
W 131	N 1790	11.0 - 11.5	< 2.0	0.5 ± 0.2	0.8 ± 0.4

TABLE 5-1

(continued)

Coordinates[a]		Depth (ft)	Concentration (pCi/g ± 2 sigma)		
			Uranium-238	Radium-226	Thorium-232
W 138	N 1986	0.0 - 2.0	< 2.3	< 0.5	< 0.8
W 138	N 1986	2.0 - 3.0	< 3.0	< 0.8	< 1.1
W 138	N 1986	6.0 - 7.0	< 3.7	< 0.8	< 1.3
W 138	N 1986	8.0 - 9.0	< 2.9	< 0.6	< 1.0
E 906	N 1955	0.0 - 0.5	< 2.5	< 0.5	< 1.0
E 906	N 1955	4.0 - 6.0	< 2.8	< 0.6	< 0.9
E 906	N 1955	6.0 - 8.0	< 1.9	< 0.5	< 0.7
E 906	N 1955	8.0 - 10.0	< 3.0	< 0.7	< 0.7

[a]Sampling locations are shown in Figure 4-2.

TABLE 5-2

DOWNHOLE GAMMA LOGGING RESULTS

FOR 72 SIDNEY STREET

Coordinates[a] West	Coordinates[a] North	Depth[b] (ft)	Count Rate[c] (cpm)
Borehole 1101R[d]			
2	1939	0.5	9000
2	1939	1.0	11000
2	1939	1.5	12000
2	1939	2.0	16000
2	1939	2.5	29000
2	1939	3.0	24000
2	1939	3.5	13000
2	1939	4.0	11000
2	1939	4.5	9000
2	1939	5.0	8000
2	1939	5.5	8000
2	1939	6.0	10000
2	1939	6.5	11000
2	1939	7.0	11000
2	1939	7.5	11000
2	1939	8.0	10000
2	1939	8.5	9000
Borehole 1104R[d]			
3	1886	0.5	9000
3	1886	1.0	12000
3	1886	1.5	12000
3	1886	2.0	18000
3	1886	2.5	25000
3	1886	3.0	20000
3	1886	3.5	19000
3	1886	4.0	16000
3	1886	4.5	10000
3	1886	5.0	8000
3	1886	5.5	8000
3	1886	6.0	9000
3	1886	6.5	9000
3	1886	7.0	9000
3	1886	7.5	9000
3	1886	8.0	9000
3	1886	8.5	9000
3	1886	9.0	9000
3	1886	9.5	10000

TABLE 5-2

(continued)

Coordinates[a] West	Coordinates[a] North	Depth[b] (ft)	Count Rate[c] (cpm)
Borehole 1105R[d]			
52	1887	0.5	12000
52	1887	1.0	13000
52	1887	1.5	13000
52	1887	2.0	13000
52	1887	2.5	15000
52	1887	3.0	18000
52	1887	3.5	17000
52	1887	4.0	16000
52	1887	4.5	11000
52	1887	5.0	11000
52	1887	5.5	9000
52	1887	6.0	8000
52	1887	6.5	8000
52	1887	7.0	8000
52	1887	7.5	7000
52	1887	8.0	8000
52	1887	8.5	8000
52	1887	9.0	8000
Borehole 1197R[d]			
72	1997	0.5	11000
72	1997	1.0	12000
72	1997	1.5	10000
72	1997	2.0	8000
72	1997	2.5	8000
72	1997	3.0	8000
72	1997	3.5	9000
72	1997	4.0	8000
72	1997	4.5	8000
72	1997	5.0	8000
72	1997	5.5	8000
72	1997	6.0	9000
72	1997	6.5	8000
72	1997	7.0	9000

TABLE 5-2

(continued)

Coordinates[a] West	Coordinates[a] North	Depth[b] (ft)	Count Rate[c] (cpm)
Borehole 1079R[d]			
82	1936	0.5	10000
82	1936	1.0	11000
82	1936	1.5	10000
82	1936	2.0	9000
82	1936	2.5	7000
82	1936	3.0	7000
82	1936	3.5	7000
82	1936	4.0	7000
82	1936	4.5	8000
82	1936	5.0	7000
82	1936	5.5	8000
82	1936	6.0	9000
82	1936	6.5	8000
82	1936	7.0	8000
82	1936	7.5	8000
82	1936	8.0	8000
82	1936	8.5	8000
82	1936	9.0	8000
82	1936	9.5	8000
82	1936	10.0	9000
82	1936	10.5	8000
82	1936	11.0	8000
82	1936	11.5	8000
82	1936	12.0	8000
82	1936	12.5	7000
82	1936	13.0	7000
82	1936	13.5	7000
82	1936	14.0	7000
Borehole 2038R[d]			
98	1821	0.5	12000
98	1821	1.0	14000
98	1821	1.5	14000
98	1821	2.0	14000
98	1821	2.5	13000

TABLE 5-2

(continued)

Coordinates[a] West	Coordinates[a] North	Depth[b] (ft)	Count Rate[c] (cpm)
Borehole 2038R (continued)[d]			
98	1821	3.0	11000
98	1821	3.5	10000
98	1821	4.0	10000
98	1821	4.5	10000
98	1821	5.0	10000
98	1821	5.5	9000
98	1821	6.0	10000
98	1821	6.5	10000
98	1821	7.0	10000
98	1821	7.5	10000
98	1821	8.0	9000
98	1821	8.5	9000
98	1821	9.0	10000
Borehole 1194R[d]			
117	1849	0.5	8000
117	1849	1.0	11000
117	1849	1.5	14000
117	1849	2.0	16000
117	1849	2.5	12000
117	1849	3.0	10000
117	1849	3.5	9000
117	1849	4.0	11000
117	1849	4.5	9000
117	1849	5.0	8000
117	1849	5.5	9000
117	1849	6.0	8000
117	1849	6.5	6000
117	1849	7.0	6000
117	1849	7.5	8000
117	1849	8.0	7000
117	1849	8.5	6000
117	1849	9.0	6000
117	1849	9.5	6000

TABLE 5-2

(continued)

Coordinates[a] West	Coordinates[a] North	Depth[b] (ft)	Count Rate[c] (cpm)
Borehole 1106R[d]			
120	1900	0.5	10000
120	1900	1.0	12000
120	1900	1.5	12000
120	1900	2.0	12000
120	1900	2.5	11000
120	1900	3.0	8000
120	1900	3.5	7000
120	1900	4.0	7000
120	1900	4.5	7000
120	1900	5.0	6000
120	1900	5.5	7000
120	1900	6.0	8000
120	1900	6.5	8000
120	1900	7.0	8000
120	1900	7.5	8000
120	1900	8.0	8000
120	1900	8.5	7000
Borehole 2035R[d]			
131	1790	0.5	11000
131	1790	1.0	15000
131	1790	1.5	18000
131	1790	2.0	16000
131	1790	2.5	13000
131	1790	3.0	12000
131	1790	3.5	13000
131	1790	4.0	14000
131	1790	4.5	13000
131	1790	5.0	10000
131	1790	5.5	10000
131	1790	6.0	10000
131	1790	6.5	10000
131	1790	7.0	10000
131	1790	7.5	10000
131	1790	8.0	9000
131	1790	8.5	9000

TABLE 5-2

(continued)

Coordinates[a] West	Coordinates[a] North	Depth[b] (ft)	Count Rate[c] (cpm)
Borehole 1196R[d]			
138	1986	0.5	8000
138	1986	1.0	9000
138	1986	1.5	9000
138	1986	2.0	8000
138	1986	2.5	8000
138	1986	3.0	7000
138	1986	3.5	7000
138	1986	4.0	8000
138	1986	4.5	10000
138	1986	5.0	11000
138	1986	5.5	10000
138	1986	6.0	10000
138	1986	6.5	10000
138	1986	7.0	10000
138	1986	7.5	9000
138	1986	8.0	9000
Borehole 1184R[d]			
9	1994	0.5	13000
9	1994	1.0	11000
9	1994	1.5	8000
9	1994	2.0	7000
9	1994	2.5	7000
9	1994	3.0	7000
9	1994	3.5	9000
9	1994	4.0	10000
9	1994	4.5	10000
9	1994	5.0	10000
9	1994	5.5	10000

TABLE 5-2

(continued)

Coordinates[a] East	Coordinates[a] North	Depth[b] (ft)	Count Rate[c] (cpm)
Borehole 1184R (continued)[d]			
9	1994	6.0	11000
9	1994	6.5	10000
9	1994	7.0	11000
9	1994	7.5	10000
9	1994	8.0	11000
9	1994	8.5	11000
Borehole 1223R[d]			
25	1955	0.5	8000
25	1955	1.0	9000
25	1955	1.5	8000
25	1955	2.0	8000
25	1955	2.5	8000
25	1955	3.0	7000
25	1955	3.5	7000
25	1955	4.0	8000
25	1955	4.5	8000
25	1955	5.0	9000
25	1955	5.5	10000
25	1955	6.0	9000
25	1955	6.5	7000
25	1955	7.0	6000
25	1955	7.5	5000
25	1955	8.0	5000
25	1955	8.5	5000

[a]Borehole locations are shown in Figure 4-1.

[b]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.

[c]Instrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

[d]Bottom of borehole collapsed.

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APPENDIX A

GEOLOGIC DRILL LOGS FOR 72 SIDNEY STREET

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
FUSRAP	14501-138	1 OF 1	1101R

SITE	COORDINATES	ANGLE FROM HORIZ	BEARING
72 Sidney St. (LODI)	N 1,939 W 2	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
10-30-87	10-30-87	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
8.5/85		5			▽ /	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs/30 in	NONE	David Harnish

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	WATER PRESSURE TESTS: PRESS. P.S.I.	WATER PRESSURE TESTS: TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE
SS	2.0	1.4	7-14-9-9							
SS	2.0	1.5	5-4-3-2							
SS	2.0	2.0	3-4-6-6					5		
SS	2.0	1.3	9-9-9-9							
SS	2.0	1.3	1-2-5-15					10		

DESCRIPTION AND CLASSIFICATION

0.0 - 4.4 ft. **SILT and SAND FILL** (ML, SP).

0.0-0.5 ft. Gravelly SILT. Gray (5YR5/1), coal pieces at base.

0.5-1.8 ft. SILT. Reddish brown (2.5YR4/4), mixed with SAND, brown, medium-grained.

1.8-4.2 ft. SILT. Dark grayish brown (10YR4/2), minor gravel, yellowish brown sand, coal, coal ash, plant fragments.

4.2-4.4 ft. Coal ash, black (2.5YR2.5/0) low density, loose.

4.4 - 5.1 ft. **CLAY** (CL). Gray (7.5YR5/0) with organic stains.

5.1 - 6.4 ft. **Silty SAND** (SM). Light gray (2.5Y7/2), fine-grained, some iron-oxide nodules and plant pieces.

6.4 - 8.7 ft. **SILT** (ML). Laminated.

6.4-7.4 ft. Yellowish brown (10YR5/6).

7.4-8.7 ft. Reddish gray (5R5/1) with gray CLAY interbeds.

8.7 - 10.0 ft. **SAND** (SW). Yellowish brown (10YR5/4), fine-grained, variable bedding.

8.7-8.8 ft. Medium-grained, with minor gravel.

Bottom of borehole at 10.0 ft.
Borehole backfilled with spoils, 10/30/87.

NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.

Boring advanced 0-10 Ft. with 6.5" o.d. hollow stem auger.

Boring radiologically sampled and gamma-logged by TMA-Eberline, Corp.

Identification and classification of soil samples by visual examination.

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

SITE: 72 Sidney St. (LODI)

HOLE NO.: 1101R

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
FUSRAP	14501-138	1 OF 1	1104R

SITE	COORDINATES	ANGLE FROM HORIZ	BEARING
72 Sidney St. (LODI)	N 1,886 W 3	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
11-2-87	11-2-87	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	David Harnish

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE "N" BLOWS % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	WATER PRESSURE TESTS: PRESS. P.S.I.	WATER PRESSURE TESTS: TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE
SS	2.0	1.5	10-17 18-17							
SS	2.0	1.9	10-4-10 7							
SS	2.0	2.0	2-3-5-5					5		
SS	2.0	1.3	15-15 12-14							
SS	2.0	2.0	4-8-11 14					10		

DESCRIPTION AND CLASSIFICATION

0.0 - 4.0 ft. **Gravelly SILT and SAND FILL** (GM-ML, SP, SM).

0.0-1.3 ft. Gravelly SILT; black (10YR2/1), some fine-grained sand and broken glass.

1.3-2.3 ft. SAND; pale brown (10YR6/3), fine-grained, loose.

2.3-3.2 ft. Silty SAND; dark brown (10YR4/3), fine-grained, some rounded gravel, bits of coal.

3.2-4.0 ft. SILT; black (10YR2/1), pieces of glass.

4.0 - 5.5 ft. **SAND** (SP). Black and dark grayish brown (10YR4/2), with pieces of wood and some small round gravel; damp.

5.5 - 9.0 ft. **SAND and CLAYEY SAND** (SP, SC). Gray (5Y5/1) and greenish gray, medium-grained. Clayey sand is fine-grained. Interbedded thicknesses of 1-3 cm.

5.8-6.5 ft. SAND is dusky brown (7.5YR5/6), SILT is yellowish brown (10YR5/6).

7.8-7.9 ft. Gravelly.

9.0 - 10.0 ft. **SILT** (ML). Yellowish red (5YR4/6).

Bottom of borehole at 10.0 Ft.
Borehole backfilled with spoils, 11/2/87.

NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.

Boring advanced 0-10 Ft. with 6.5" o.d. hollow stem auger.

Boring radiologically sampled and gamma-logged by TMA-Eberline, Corp.

Identification and classification of soil samples by visual examination.

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

SITE: 72 Sidney St. (LODI)

HOLE NO. 1104R

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
FUSRAP	14501-138	1 OF 1	1105R

SITE	COORDINATES	ANGLE FROM HORIZ	BEARING
72 Sidney St. (LODI)	N 1,887 W 52	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
11-2-87	11-2-87	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
9.2/77		6			▽ /	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs/30 in	NONE	David Harnish

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	WATER PRESSURE TESTS: PRESS. P.S.I.	WATER PRESSURE TESTS: TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.5	5-14-12 14								0.0 - 4.7 ft. **SILT and SAND FILL** (ML, GM, SP, SM).	Boring advanced 0-10 Ft. with 6.5" o.d. hollow stem auger.
SS	2.0	2.0	5-7-7-7								0.0-0.6 ft. Gravelly SILT, black.	
SS	2.0	2.0	3-1-1-4								0.6-2.3 ft. SILT, dark gray and dark brown, some gravel.	Boring radiologically sampled and gamma-logged by TMA-Eberline, Corp.
SS	2.0	1.8	9-15 13-15					5			2.3 - 3.2 ft. SILTY SAND, mixed yellowish brown (10YR 5/6) and gray (10YR 5/1), fine grained. 3.2-3.5 ft. SILT, reddish brown (5YR4/3).	
SS	2.0	0.1	19-17 13-9								3.5-4.5 ft. COAL ASH, black (7.5YR2/0) with white sinter. 4.5-4.7 ft. SAND (SP), dark yellowish brown (10YR4/6) fine-grained.	6.5-8.0 Ft. Distinct fuel smell.
SS	2.0	1.8	3-2-2-3					10			4.7 - 6.0 ft. **SILT** (ML-OL). Very dark gray (7.5YR3/0), with some iron-oxide mottling; small root holes.	
											6.0 - 6.8 ft. **CLAY** (CL). Light gray (7.5YR7/0), iron stained at top, some sand.	
											6.8 - 12.0 ft. **Silty SAND** (SM). Brown (10YR5/3), medium-grained, some gravel, saturated.	
											6.5-8.0 ft. Greenish tint.	
											8.0-8.1 ft. Gravelly.	
											Bottom of borehole at 12.0 ft. Borehole backfilled with spoils, 11/2/87.	Identification and classification of soil samples by visual examination.

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

SITE: 72 Sidney St. (LODI)

HOLE NO.: 1105R

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
FUSRAP	14501-138	1 OF 1	1197R

SITE	COORDINATES	ANGLE FROM HORIZ	BEARING
Money St. (LODI)	N 1,997 W 72	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
12-5-87	12-5-87	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	David Harnish

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	WATER PRESSURE TESTS: PRESS. P.S.I.	WATER PRESSURE TESTS: TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	1.5	0.0	12-32-45								0.0 - 3.0 ft. Silty GRAVEL, SILT, and SAND FILL (GM, ML, SP).	Boring advanced 0-10 Ft. with 6.5" o.d. hollow stem auger.
SS	2.0	1.9	14-21 23-28								0.0-0.5 ft. Silty GRAVEL, broken basalt gravel, dark gray silt.	Boring radiologically sampled and gamma-logged by TMA-Eberline, Corp.
SS	2.0	0.8	14-15 21-19					5			0.5-2.6 ft. Silt, mixed black and dark reddish brown, some gravel.	
SS	2.0	1.6	8-12-12 16								2.0-2.6 ft. Gravelly.	
											2.6-3.0 ft. SAND, strong brown (7.5YR4/6) fine-grained.	
											3.0 - 4.0 ft. Silty SAND (SM, FILL?). Dark grayish brown and very dark grayish brown, fine-grained.	
											3.7-4.0 ft. Strong brown (7.5YR4/6), loose, some small gravel.	0-0.5 Ft. Road base gravel; not sampled.
											4.0 - 6.0 ft. Sandy GRAVEL (GW). Gravel is New Brunswick sandstone, subangular to angular, sand is fine- to medium-grained. Brook channel.	
											6.0 - 8.0 ft. Silty SAND (SM). Dark yellowish brown (10YR4/4).	
											7.5-7.7 ft. SILT, laminated.	
											Bottom of borehole at 8.0 ft. Borehole backfilled with spoils, 12/5/87.	Identification and classification of soil samples by visual examination.

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

SITE: Money St. (LODI)

HOLE NO.: 1197R

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
FUSRAP	14501-138	1 OF 1	1079R

SITE	COORDINATES	ANGLE FROM HORIZ	BEARING
72 Sidney St. (LODI)	N 1,936 W 82	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
10-30-87	10-30-87	E.D.I.	MOBILE B-57	6.5"	15.7	7.3	23.0

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
13.4/84		8			▽ 6.0/ 10/30/87 /	15.7/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs/30 in		David Harnish

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	WATER PRESSURE TESTS: PRESS. P.S.I.	WATER PRESSURE TESTS: TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.4	15-12-12 6								0 - 4.8 ft. SAND and Gravelly SILT FILL (SP, GC-ML).	Boring advanced 0-23 Ft. with 6.5" o.d. hollow stem auger.
SS	2.0	1.6	5-5-6-7								0-2.3 ft. Gravelly SILT; dark grayish brown (10YR4/2), with bits of coal.	Boring radiologically sampled and gamma-logged by TMA-Eberline, Corp.
SS	2.0	1.3	6-10-17 17								2.3-4.8 ft. SAND; yellowish brown (10YR5/6), fine- to medium-grained; broken New Brunswick shale gravel toward base.	
SS	2.0	1.8	13-13 12-12					5			4.8 - 6.3 ft. Gravelly SAND (SW). Dark grayish brown (10YR4/2), medium- to coarse-grained, subrounded gravel and sand.	6 ft. Groundwater observed.
SS	2.0	1.9	4-11-11 12								6.3 - 8.0 ft. Silty SAND (SM). Dark grayish brown (10YR4/2), medium-grained.	
SS	2.0	2.0	7-9-12 15					10			7.2-7.4 ft. Silt.	
SS	2.0	1.8	9-11 12-27								8.0 - 15.7 ft. Silty SAND and SAND (SM, SP). Grayish brown (10YR4/2), with some subrounded gravel.	
SS	2.0	1.6	13-17 17-19								8.0-9.0 ft. Fine-grained.	
											9.0-14.0 ft. Medium-grained, some coarse-grained sand and gravel.	
								15			12.0-13.7 ft. Iron-oxide stained.	
											14.0-15.7 ft. Coarse-grained sand, rounded, with minor silt.	16-23 ft. augered through weathered rock, intermittently fast and slow as differently weathered horizons penetrated.
											15.7 - 23.0 ft. WEATHERED BEDROCK. New Brunswick sandstone.	
								20				
											Bottom of boring at 23.0 Ft Borehole backfilled with spoils, 10/30/87.	Identification and classification of soil samples by visual examination.

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

SITE: 72 Sidney St. (LODI)

HOLE NO.: 1079R

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
FUSRAP	14501-138	1 OF 1	2038R

SITE	COORDINATES	ANGLE FROM HORIZ	BEARING
72 Sidney St. (LODI)	N 1,821 W 98	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
9-21-88	9-21-88	EMPIRE SOILS	CME 45B	12"	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			▽ 7.5/ 9/21/88	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
300 lbs. / 24 in.	NONE	J. LORD

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	WATER PRESSURE TESTS: PRESS. P.S.I.	WATER PRESSURE TESTS: TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	0.5	16-12 13-9								0.0 - 3.5 Ft. Silty Sandy GRAVEL. (FILL) Dark gray (N3-N2) loose, crumbly, angular fill. Slightly moist, and increasing moisture with depth.	0-10 ft. advanced using 6 1/4 in. i.d. hollow stem augers. Borehole radiologically sampled and gamma-scanned by TMA-Eberline, Inc.
SS	2.0	2.0	4-3-3-2								3.0-3.5 Ft. Black gravelly sand. Soft, moist.	
SS	2.0	1.4	5-4-7-10					5			3.5 - 7.8 Ft. Silty SAND (SM). Medium to light gray (N6). Stiff, dry to slightly moist, slightly adhesive. Crumbles easily.	Groundwater detected in hole, 7.5 Ft.
SS	2.0	2.0	4-7-16 18								7.0 Ft. Increasing moisture content.	
SS	2.0	2.0	6-10-7-6					10			7.8 - 8.2 Ft. Sandy GRAVEL (GS). Grayish green (10G4/2) and Moderate reddish brown (10R4/6) grains and gravel to 0.5 inches. Stiff, saturated, crumbles easily.	
											8.2 - 10.0 Ft. Silty, Sandy GRAVEL (GP). Dark gray (N3). Large chunks, angular; looks like riprap. Saturated in a liquid with strong fuel oil odor. Irridescent.	Top of undisturbed soil undetected.
											Bottom of borehole at 10.0 Ft. Borehole backfilled with spoils, 9/21/88.	Stopped at 10 Ft. to avoid penetration into product-saturated soil.
												Description and classification of soils by visual examination of samples.

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

SITE: 72 Sidney St. (LODI)

HOLE NO. 2038R

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
FUSRAP	14501-138	1 OF 1	1194R

SITE	COORDINATES	ANGLE FROM HORIZ	BEARING
72 Sidney St. (LODI)	N 1,849 W 117	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
12-3-87	12-3-87	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
5.5/55		5			▽ /	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs./ 30 in.	NONE	David Harnish

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	WATER PRESSURE TESTS: PRESS. P.S.I.	WATER PRESSURE TESTS: TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.3	6-27 14-7								0.0 - 5.9 ft. Silty GRAVEL, Sandy SILT, and SILT FILL (GM, ML, OL).	Boring advanced 0-10 Ft. with 6.5" o.d. hollow stem auger.
SS	2.0	0.0	8-6-5-4								0.0-0.9 ft. Silty GRAVEL, black silt, broken basalt gravel.	
SS	2.0	1.8	1-1-2-3								0.9-2.0 ft. Silty GRAVEL, dusky red, New Brunswick sandstone.	Boring radiologically sampled and gamma-logged by TMA-Eberline, Corp.
SS	2.0	0.7	1-3-12 21					5			2.0-4.0 ft. Silty GRAVEL, black silt, broken basalt.	
SS	2.0	1.7	21-15 7-9								4.0-4.9 ft. Sandy SILT, dark yellowish brown (10YR4/4) mixed with black organic silt.	
											4.9-5.9 ft. SILT, black, organic, abundant roots, minor gravel.	
								10			5.9 - 8.7 ft. Gravelly SAND (SG). Light greenish gray (5Y7/1), fine-grained with round to subangular gravel of basalt and New Brunswick sandstone, gravel is subangular at the base.	ENMET alarm >300 ppm toxic 6 in. down 10 Ft. open hole.
											8.3-8.7 ft. Saturated with very dark gray to black water.	
											8.7 - 10.0 ft. SAND (SP). Very dark gray (7.5YR3/3), very fine-grained, saturated.	
											Bottom of borehole at 10.0 ft. Borehole backfilled with spoils, 12/3/87.	
												Identification and classification of soil samples by visual examination.

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

SITE: 72 Sidney St. (LODI)

HOLE NO.: 1194R

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
FUSRAP	14501-138	1 OF 1	1106R

SITE	COORDINATES	ANGLE FROM HORIZ	BEARING
72 Sidney St. (LODI)	N 1,900 W 120	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
11-2-87	11-2-87	E.D.I.	MOBILE B-57	6.5"	26.0	1.0	27.0

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
/		6			▼ /	26.0/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs/30 in	NONE	David Harnish

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	WATER PRESSURE TESTS: PRESS. P.S.I.	WATER PRESSURE TESTS: TIME IN MIN.	ELEV.
SS	2.0	1.2	15-11 11-13				
SS	2.0	0.3	5-4-3-2				
SS	2.0	1.0	7-7-8 13				
SS	2.0	2.0	16-18 16-22				
SS	2.0	0.8	12-12-9 9				
SS	2.0	0.8	10-15-20 50/5"				

DEPTH: 5, 10, 15, 20, 25

GRAPHICS / SAMPLE

DESCRIPTION AND CLASSIFICATION

0.0 - 7.4 ft. **Gravelly SILT and SAND FILL** (GM, SP).

0.0-4.0 ft. Gravelly SILT, dark brown (7.5YR3/2) and dusky red (2.5YR3/2); gravel is brick, New Brunswick sandstone, and asphalt.

4.0-7.4 ft. SAND, yellowish brown (10YR5/4), fine-grained.

7.4 - 8.0 ft. **SAND (FILL?)** (SW). Fine- to medium-grained, some gravel, angular, New Brunswick sandstone.

8.0 - 26.0 ft. **SAND** (SP). Brown (10YR4/3), fine- to coarse-grained, some round gravel, saturated.

23.0-24.0 ft. Sandy GRAVEL.

24.0-26.0 ft. SAND.

26.0 - 27.0 ft. **WEATHERED BEDROCK**, New Brunswick sandstone formation.

Bottom of borehole at 27.0 ft.
Borehole backfilled with spoils, 11/2/87.

NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.

Boring advanced 0-27 ft. with 6.5" o.d. hollow stem auger.

Boring radiologically sampled and gamma-logged by TMA-Eberline, Corp.

2 ft. of sand entered into augers after 10-12 ft. sample.

Augered, only, 12-27 ft.; logged cuttings.

15-20 ft., liquefied sand cuttings.

Identification and classification of soil samples by visual examination.

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

SITE: 72 Sidney St. (LODI)

HOLE NO.: 1106R

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
FUSRAP	14501-138	1 OF 1	2035R

SITE	COORDINATES	ANGLE FROM HORIZ	BEARING
72 Sidney St. (LODI)	N 1,790 W 131	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
9-21-88	9-21-88	EMPIRE SOILS	CME 45B	12"	12.0		12.0

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
/		6			▽ 8.0/ 9/21/88 /	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
300 lbs. / 24 in.	NONE	J. LORD

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE "N" BLOWS / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	WATER PRESSURE TESTS: PRESS. P.S.I.	WATER PRESSURE TESTS: TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	1.5	0.0	7-12-6								0.0 - 5.2 Ft. Silty Sandy GRAVEL (FILL) Dark gray (N3-N2) loose, crumbly, angular fill. Slightly moist, and increasing moisture with depth. No samples recovered down to 4.0 Ft. Description from cuttings. Auger pulled after reaching 4.0 Ft. and the flights were sampled at 4.0-3.5, & 3.5-3.0.	0-12 ft. advanced using 6 1/4 in. i.d. hollow stem augers. Borehole radiologically sampled and gamma-scanned by TMA-Eberline, Inc.
SS	2.0	0.0	4-2-2-2									
SS	2.0	1.2	1-1-1-6					5			4.5-5.2 Ft. Saturated	
SS	2.0	2.0	7-10-10 17								5.2 - 7.6 Ft. Silty SAND (SM). Medium to light gray (N6). Stiff, dry to slightly moist, slightly adhesive. Crumbles easily.	Groundwater detected in hole, 8.0 Ft.
SS	2.0	2.0	10-8-8 11								7.6 - 9.3 Ft. Sandy GRAVEL (GS). Grayish green (10G4/2) and Moderate reddish brown (10R4/6) granules and gravel to 0.5 inches. Stiff, compacted, very moist, crumbles easily. Moderately sorted, subangular to spherical.	
SS	2.0	1.5	7-4-5-6					10			9.0 Ft. Saturated	Top of undisturbed soil 11.0 Ft.
											9.3 - 11.0 Ft. Silty, Sandy GRAVEL (GP). Dark gray (N3). Large chunks, angular; appears like riprap. Saturated in a liquid with strong fuel oil odor. Irridescent.	
											11.0 - 12.0 Ft. Clayey SILT (M-C). Pale yellowish brown (10YR6/2) silt. Saturated, runny to slightly stiff, no thread.	
											Bottom of borehole at 12.0 Ft. Borehole backfilled with spoils, 9/21/88.	

Description and classification of soils by visual examination of samples.

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

SITE: 72 Sidney St. (LODI)

HOLE NO. 2035R

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
FUSRAP	14501-138	1 OF 1	1196R

SITE	COORDINATES	ANGLE FROM HORIZ	BEARING
Money St. (LODI)	N 1,986 W 138	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
12-5-87	12-5-87	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
6.3/63		5			▽ /	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs./ 30 in.	NONE	David Harnish

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	WATER PRESSURE TESTS: PRESS. P.S.I.	WATER PRESSURE TESTS: TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	0.1	22-17 12-7								0.0 - 5.1 ft. Silty GRAVEL, Sandy SILT and Silty SAND FILL (GM, ML, SM).	Boring advanced 0-10 Ft. with 6.5" o.d. hollow stem auger.
SS	2.0	1.8	5-7-6-5								0.0-0.6 ft. Silty GRAVEL, broken basalt gravel, dark gray silt.	Boring radiologically sampled and gamma-logged by TMA-Eberline, Corp.
SS	2.0	1.6	6-9-6-5								0.6-2.0 ft. Sandy SILT, very dark grayish brown (10YR3/2).	
SS	2.0	1.7	2-2-1-2					5			2.0-2.7 ft. Silty GRAVEL, broken basalt gravel.	0-2.0 Ft. Took supplemental grab samples from auger flights.
SS	2.0	1.1	2-5-5-8								2.7-5.1 ft. Silty SAND, dark yellowish brown (10YR4/4), fine-grained, uniformly graded.	
											4.8-5.0 ft. Gravelly, wet.	
								10			5.1 - 8.7 ft. SILT (ML). Dark gray (10YR4/1) with yellowish brown iron-oxide stain on top.	6.0-8.0 Ft. sample is wet.
											6.0-8.7 ft. Dark gray (5YR4/1).	
											8.7 - 10.0 ft. Silty SAND (SM). Dark gray (5YR4/1), fine-grained, wet.	
											Bottom of borehole at 10.0 ft. Borehole backfilled with spoils, 12/5/87.	Identification and classification of soil samples by visual examination.

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

SITE: Money St. (LODI)

HOLE NO.: 1196R